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**BASELINE VEGETATION INVENTORY
BLACK BUTTE PROJECT
MEAGHER COUNTY, MONTANA**

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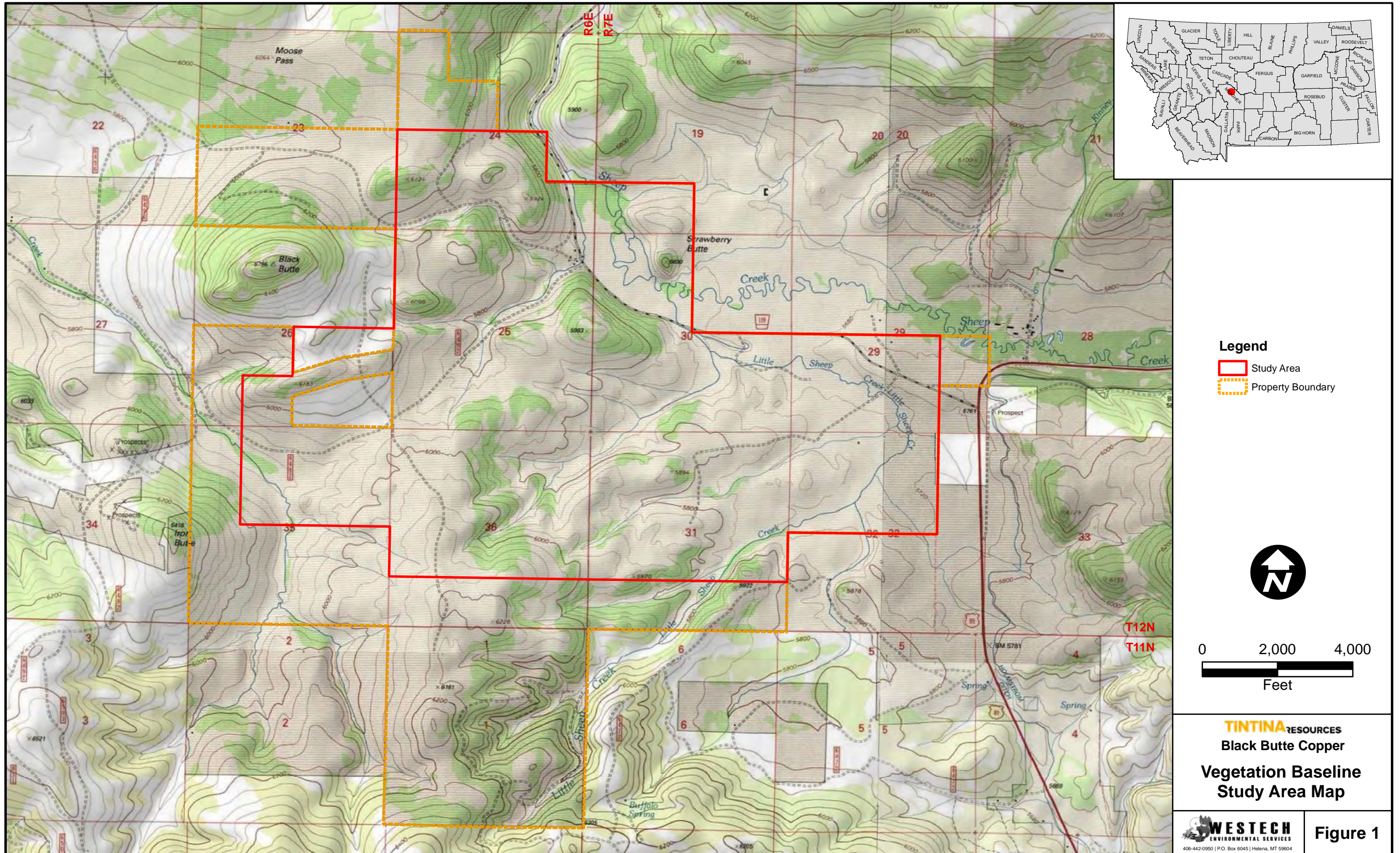
1.0 INTRODUCTION

Tintina Resources contracted WESTECH Environmental Services, Inc. (WESTECH) to conduct a baseline vegetation inventory of their Black Butte Copper Project area approximately 16 miles north of White Sulphur Springs, Montana in north-central Meagher County (Figure 1). The vegetation baseline was also designed to provide portions of a land use analysis of the study area, in particular to assess vegetation components of hay cropland and grazing lands. The study area (Figure 1) is located in all or portions of Sections 24-26, 35 and 36 in T12N, R6E and Sections 19 and 29-32 in T12N, R7E, comprising pertinent portions of Tintina's current surface and mineral leases. The vegetation baseline study area comprised 3367 acres (5.3 square miles). The vegetation baseline was designed to address current and potential environmental concerns related to vegetation resources of the project area. This inventory will be used to assist mine permitting and reclamation planning in accordance with the laws and regulations administered by MDEQ's Hard Rock Section.

The study area climate is continental, having cold winters and warm summers with a growing season extending from Mid-May to late-September in most years.

In 2015, quantitative sampling was conducted in or near areas potentially affected by proposed mining operations (Figure 1 and Plate 1). The 2015 field inventory was conducted May 27 and June 12 (spring flora), and July 13-20 (quantitative vegetation inventory). Vegetation data obtained during the 2014 baseline wetlands inventory were also selectively incorporated into this vegetation baseline report.

Field investigators for the baseline vegetation inventory were Ken Scow, Drake Barton, Steve Cooper, Ed Darfler and Joe Elliott. Field work for the baseline wetlands/waters of the U.S. inventory was led by John Beaver, with the hydrophytic vegetation data also collected by Ken Scow, Drake Barton, Steve Cooper, Lisa Larsen, Ed Darfler and Dean Culwell, and GPS data recorded by John Beaver, Dan Culwell and Dave Hagen. Vegetation data analysis and report preparation were conducted by Ken Scow and Nancy Horn, with computer graphics by Dan Culwell.



2.0 METHODS

2.1 MAPPING/VEGETATION TYPE DELINEATION

Vegetation resources of the intensive study area were preliminarily office-mapped to the level of vegetation physiognomic type by interpretation of color ortho-photos (1 inch = 500 feet scale). Vegetation type designations were based on a combination of dominant plant species, topoedaphic features and disturbance/management history. The preliminary mapping was checked in the field by pedestrian and vehicular surveys, later verified by analysis of quantitative data, and modified as necessary. Derivation of the vegetation classification for the study area is explained in Section 3.1 of this report.

2.2 SAMPLE LOCATION AND SAMPLE SIZE

The preliminary vegetation map indicated the general delineation and distribution of physiognomic types and subtypes in the study area. A 100-foot grid was overlaid on the study area map to select sample sites using a stratified random procedure based on projected sample size for each physiognomic type and subtype. To ensure an even (yet stratified random) distribution of sample plots throughout narrow portions of Drainage Bottom mapping units, plot sites were sometimes selected where grid lines intersect drainage bottoms because grid points often do not fall within these narrow units. Sample sites were located in the field using the aerial photo-map and a hand-held GPS unit. Sample sites are shown on Plate 1.

Sample size varied by physiognomic type according to the variability and relative areal extent of each type, with more extensive types receiving proportionately more plots. In addition, certain vegetation types received preferential sampling, particularly wetland and riparian types. Sample size and distribution were based on professional judgment, with the intent of the baseline study to quantitatively characterize vegetation ecology within the study area and show variability within the availability of sample sites.

Sampling intensity among vegetation types was adjusted following pedestrian surveys and mapping refinements to allow a more confident prediction of satisfactory sample sizes and plot distribution.

2.3 QUANTITATIVE INVENTORY

Sampling of vegetation physiognomic types was conducted as described below for each component. Quantitative data were collected for the vegetation baseline inventory during the 2015 growing season on July 13-20.

Plot dimensions at each sample site are listed below for each principal sample parameter:

- 1) estimation of canopy cover was made on a 0.01-acre circular plot centered on each randomly selected point;
- 2) shrub density was determined by recording all live individuals by species and health class in a 2 x 20-meter belt transect centered on each point;

- 3) tree density was estimated by recording all live individuals by species and diameter at breast height (dbh) class in a 0.1-acre circular plot centered on each point.

A color photograph (oblique) was taken at each sample site.

2.3.1 Canopy Cover

On each sample field form, location was recorded along with date, personnel, percent slope, aspect, topography and slope configuration. Each non-forested upland plot was also identified as to its occurrence in either a grassland (less than approximately 10 to 15 percent shrub cover) or shrub/grassland stand. The 10 to 15 percent shrub cover threshold was determined for the overall mapping unit in which the cover plot was located and did not necessarily reflect the shrub cover value estimated for the plot itself. The reason for this distinction in the field is that, for example, a grassland site may contain widely scattered shrubs or small clumps of shrubs, and a randomly located sample plot may happen to fall in such a site; although substantial shrub cover may be recorded for the plot, it should be shown to occur in a grassland mapping unit, and the data should be tabulated accordingly. Conversely, a random plot may fall in a relatively small opening with sparse shrub density in a stand otherwise clearly dominated by shrubs; although the plot may show scant shrub cover, it should be mapped in a shrub/grassland mapping unit and the data treated accordingly. With sufficient sample size, the natural range in variation of canopy cover can be properly recorded and compared between the two physiognomic types. Similarly, each drainage bottom plot was identified as to its occurrence in a specific physiognomic type/subtype determined by the overall map unit setting in which it was located.

In each 0.01-acre cover plot (11.8-foot radius), an ocular estimate was made of percent cover for ground cover classes, including bare ground, rock, litter, lichens, moss and basal vegetation to total 100 percent. Nonstratified canopy cover was estimated to the nearest percent in each plot for total live vascular plant cover, for each morphological (or functional) class category (tree, shrub, perennial graminoid, annual graminoid, perennial forb and annual/biennial forb), and for each vascular plant species. Ocular estimates of tree cover were made by walking around the plot and estimating the extent of tree canopy extending within a vertical projection of the plot perimeter.

Cover data are tabulated in the report by plot (Appendix B), and summarized by both community type and physiognomic type (Section 5.0). Using these data, stratified cover values and relative cover values were generated in the office to evaluate composition and diversity.

2.3.2 Productivity

Predicted average yield data for grazing lands and croplands in the study area were obtained from the *Meagher County Soil Survey* (USDA Natural Resources Conservation Service (NRCS) website), and other NRCS and USFS publications. Yield data were directly correlated with ecological site and soils information derived from these sources and the Black Butte baseline soils inventory.

2.3.3 Shrub Density

Densities were determined for each shrub species by counting the number of live individuals rooted within a 2 x 20-meter belt transect centered on each sample point. Individuals were recorded as healthy (immature to mature) or decadent. Belt transects were aligned along the contour on slopes; on drainage bottoms, belt transects were aligned with the general direction of the drainage.

2.3.4 Tree Density

Tree density was recorded in a 0.1-acre circular plot (37.2-foot radius) centered on each sample point. Live trees greater than 6 inches tall were counted in each plot by species for the following diameter-at-breast-height (dbh) classes: less than 1-inch dbh, 1 to 4-inch dbh, 4 to 8-inch dbh, 8 to 12-inch dbh, 12 to 16-inch dbh, *etc.* For trees forking less than 4.5 feet above the base (ground level), the dbh of each stem was measured at 3.5 feet above the first indication of the fork (Avery 1967). The 0.1-acre plot and belt transect perimeters were measured with a fiberglass tape and marked with pin-flags prior to inventory.

2.3.5 Species Composition and Diversity

Species composition, origin, utility, seasonality and diversity parameters are inherently determined for each vegetation type using cover data. Species diversity was evaluated by determining the average number of vascular plant species per 0.01-acre plot in each community and physiognomic type. Species nomenclature and functional groups follow the recently published *Manual of Montana Vascular Plants* (Lesica 2012).

2.3.6 Species List/Sensitive Plants/Noxious Weeds

All vascular plant species encountered in the study area were recorded and a comprehensive list was compiled. This involved seasonal investigations between August 14 and September 4, 2014 (wetlands field inventories), and between May 27 and July 20, 2015 (vegetation baseline field inventories), including quantitative sampling, and qualitative and mapping surveys. Particular attention was given to the search for sensitive plant species, including taxa currently listed as rare, threatened or endangered by the Montana Natural Heritage Program (MTNHP), new Montana records, and taxa which may represent significant extensions of distribution records.

Taxa not readily identified in the field were collected and identified in the laboratory using a stereozoom binocular scope and taxonomic references including (but not limited to) Lesica (2012), Flora of North America Editorial Committee (1993+), Hitchcock *et al.* (1955-1969), Hitchcock and Cronquist (1973), Dorn (1984), Great Plains Flora Association (1986), Cronquist *et al.* (1972-2012), Gleason and Cronquist (1991) and Holmgren (1998). Nomenclature of vascular plant species in this report follows Lesica (2012).

Noxious weeds listed by the Montana County Weed Control Act were qualitatively assessed for distribution and abundance, as well as quantitatively sampled on cover estimation plots.

2.3.7 Productivity and Utility Evaluation

Ecological sites were identified and mapped (Plate 2) using baseline soils inventory data along with any available Natural Resource Conservation Service soil survey information for Meagher County. Predicted potential productivity and carrying capacity of grazing land were then determined using NRCS technical guides, based on computer-generated study area acreages.

2.3.8 Delineation of Hydrophytic Vegetation

Sites within the study area supporting hydrophytic vegetation were sampled during the wetlands baseline inventory, and were subsequently delineated on the baseline vegetation map with minor modifications. These data were used to assist in completing (in conjunction with assessments of hydric soils and wetland hydrology) the baseline wetlands inventory and delineation for the study area, a more detailed examination and sub-meter (GPS) delineation of wetland vegetation community types. Wetlands mapping is presented in a separate baseline wetlands report for the Black Butte inventory area.

3.0 RESULTS

3.1 VEGETATION CLASSIFICATION

The Black Butte vegetation classification was based on published classifications of vegetation types that have been developed statewide for Montana, with modifications to reflect community types induced by sustained livestock grazing. Grassland and Shrubland habitat types were identified following Mueggler and Stewart (1980), Forest habitat types follow Pfister *et al.* (1977), and Wetland/ Riparian types follow Hansen *et al.* (1995), with minor modifications based on comparisons with various western Montana and regional baseline inventories conducted during the past 40+ years in the region. Many of the studies reviewed to develop the Black Butte classification were summarized and synthesized in Culwell *et al.* (1987); these and more recent studies pertinent to the Black Butte region are listed in Appendix G.

Table 1 (Section 5.0) lists habitat types and community types for each physiognomic type sampled in the Black Butte baseline study area in 2014-2015. Vegetation types were mapped (Plate 1) by physiognomic type or series according to dominant species identified in the dichotomous classifications listed above.

Habitat types and vegetation community types are normally named for dominant, codominant and occasionally subdominant plant species, the two classification systems distinguished by recognition of species perceived to be the ecologically successional climax for a site (habitat types), or the species currently dominating a site (community types). These species, the most conspicuous in the Black Butte study area, are discussed in the following narrative by scientific name (binomial) and are listed below with common names. A complete list of all vascular plant species recorded in the Black Butte baseline study area is given in Appendix A.

There were four native Grassland habitat types identified in two series including the *Festuca idahoensis* (Idaho fescue) and *Festuca campestris* (rough fescue) series (Table 1). An Upland Altered Grassland community type was also identified, dominated by non-native perennial grasses *Poa pratensis* (Kentucky bluegrass) and *Phleum pratense* (common timothy).

Six Upland Shrubland types were sampled, dominated by *Artemisia tridentata* (big sagebrush) or *Dasiphora fruticosa* (shrubby cinquefoil). Understories were dominated or distinguished variously by *Festuca idahoensis*, *Festuca campestris*, and *Poa pratensis*.

Of seven Conifer Forest and Woodland habitat types identified, six were in the *Pseudotsuga menziesii* (Douglas-fir) series, and one in the *Picea engelmannii* (Engelmann spruce) series. Understories were distinguished by *Festuca idahoensis*, *Festuca campestris*, *Juniperus communis* (common juniper), *Calamagrostis rubescens* (pinegrass), *Symphoricarpos albus* (common snowberry), and *Linnaea borealis* (twinflower).

A Lowland Altered Grassland or Hay Meadow type was sampled at 16 sites, primarily on the Sheep Creek floodplain.

Dominant Plant Species in the Black Butte Baseline Study Area

BINOMIAL	COMMON NAME
GRASSES and SEDGES	
<i>Agropyron spicatum</i>	Bluebunch wheatgrass
<i>Agropyron trachycaulum</i>	Slender wheatgrass
<i>Agrostis stolonifera</i>	Redtop
<i>Alopecurus arundinaceus</i>	Creeping meadow foxtail
<i>Bromus carinatus</i>	Mountain brome
<i>Bromus inermis</i>	Smooth brome
<i>Calamagrostis canadensis</i>	Bluejoint reedgrass
<i>Calamagrostis rubescens</i>	Pinegrass
<i>Calamagrostis stricta</i>	Northern reedgrass
<i>Carex aquatilis</i>	Water sedge
<i>Carex filifolia</i>	Threadleaf sedge
<i>Carex geyeri</i>	Elk sedge
<i>Carex nebrascensis</i>	Nebraska sedge
<i>Carex pellita</i>	Woolly sedge
<i>Carex praegracilis</i>	Clustered field sedge
<i>Carex rossii</i>	Ross sedge
<i>Carex simulata</i>	Short-beaked sedge
<i>Carex utriculata</i>	Southern beaked sedge
<i>Danthonia intermedia</i>	Timber oatgrass
<i>Danthonia unispicata</i>	One-spike oatgrass
<i>Deschampsia cespitosa</i>	Tufted hairgrass
<i>Festuca campestris</i>	Rough fescue
<i>Festuca idahoensis</i>	Idaho fescue
<i>Festuca rubra</i>	Red fescue
<i>Glyceria striata</i>	Fowl mannagrass
<i>Juncus balticus</i>	Baltic rush
<i>Koeleria macrantha</i>	Prairie junegrass
<i>Phleum pratense</i>	Common timothy
<i>Poa palustris</i>	Fowl bluegrass
<i>Poa pratensis</i>	Kentucky bluegrass
<i>Schedonorus pratensis</i>	Meadow fescue
<i>Stipa nelsonii</i>	Columbia needlegrass
<i>Stipa richardsonii</i>	Richardson's needlegrass
FORBS AND SUBSHRUBS	
<i>Achillea millefolium</i>	Common yarrow
<i>Anemone multifida</i>	Ball anemone
<i>Antennaria parvifolia</i>	Small-leaf pussytoes
<i>Antennaria rosea</i>	Rosy pussytoes
<i>Arenaria congesta</i>	Ballhead sandwort
<i>Arnica cordifolia</i>	Heartleaf arnica
<i>Artemisia ludoviciana</i>	Cudweed sagewort
<i>Astragalus miser</i>	Weedy milkvetch
<i>Berberis repens</i>	Creeping Oregon-grape
<i>Campanula rotundifolia</i>	Roundleaf harebell
<i>Canadanthus modestus</i>	Few-flowered aster
<i>Carduus nutans</i>	Musk thistle
<i>Carum carvi</i>	Caraway
<i>Cerastium arvense</i>	Field chickweed
<i>Cirsium arvense</i>	Canada thistle
<i>Clematis hirsutissima</i>	Vaseflower clematis
<i>Cynoglossum officinale</i>	Common hound's-tongue

BINOMIAL	COMMON NAME
FORBS AND SUBSHRUBS (cont.)	
<i>Erigeron subtrinervis</i>	Three nerve fleabane
<i>Eriogonum umbellatum</i>	Sulfur buckwheat
<i>Eurybia conspicua</i>	Western showy aster
<i>Fragaria vesca</i>	Woods strawberry
<i>Fragaria virginiana</i>	Virginia strawberry
<i>Galium boreale</i>	Northern bedstraw
<i>Gentianella amarella</i>	Northern gentian
<i>Geranium richardsonii</i>	White geranium
<i>Geranium viscosissimum</i>	Sticky geranium
<i>Geum macrophyllum</i>	Large leaf avens
<i>Geum rivale</i>	Water avens
<i>Geum triflorum</i>	Prairiesmoke
<i>Linnaea borealis</i>	Western twinflower
<i>Lupinus leucophyllus</i>	Velvet lupine
<i>Lupinus sericeus</i>	Silky lupine
<i>Mentha arvensis</i>	Field mint
<i>Pedicularis groenlandica</i>	Elephanthead
<i>Perideridia montana</i>	Gairdner's yampa
<i>Petasites frigidus</i>	Arrowleaf coltsfoot
<i>Phlox hoodii</i>	Hood's phlox
<i>Potentilla gracilis</i>	Slender cinquefoil
<i>Rhinanthus crista-galli</i>	Yellow rattle
<i>Selaginella densa</i>	Compact clubmoss
<i>Senecio sphaerocephalus</i>	Mountain-marsh butterweed
<i>Solidago canadensis</i>	Canada goldenrod
<i>Solidago missouriensis</i>	Missouri goldenrod
<i>Stachys palustris</i>	Swamp hedge-nettle
<i>Symphotrichum campestre</i>	Meadow aster
<i>Symphotrichum subspicatum</i>	Douglas' aster
<i>Taraxacum officinale</i>	Common dandelion
<i>Thalictrum venulosum</i>	Veiny meadowrue
<i>Trifolium hybridum</i>	Alsike clover
<i>Trifolium pratense</i>	Red clover
<i>Trifolium repens</i>	White Dutch clover
<i>Valeriana dioica</i>	Northern valerian
<i>Viola nephrophylla</i>	Northern bog violet
SHRUBS and TREES	
<i>Arctostaphylos uva-ursi</i>	Kinnikinnick
<i>Artemisia tridentata</i>	Big sagebrush
<i>Betula glandulosa</i>	Bog birch
<i>Dasiphora fruticosa</i>	Shrubby cinquefoil
<i>Juniperus communis</i>	Common juniper
<i>Juniperus scopulorum</i>	Rocky Mountain juniper
<i>Picea engelmannii</i>	Engelmann spruce
<i>Pinus contorta</i>	Lodgepole pine
<i>Populus tremuloides</i>	Quaking aspen
<i>Pseudotsuga menziesii</i>	Douglas-fir
<i>Ribes inerme</i>	Whitestem gooseberry
<i>Ribes setosum</i>	Bristly gooseberry
<i>Rosa woodsii</i>	Wood's rose
<i>Salix bebbiana</i>	Bebb willow

BINOMIAL	COMMON NAME
SHRUBS and TREES (cont.)	
<i>Salix boothii</i>	Booth willow
<i>Salix geyeriana</i>	Geyer willow
<i>Salix planifolia</i>	Planeleaf willow

BINOMIAL	COMMON NAME
SHRUBS and TREES (cont.)	
<i>Salix pseudomonticola</i>	Mountain willow
<i>Spiraea betulifolia</i>	White spirea
<i>Symphoricarpos albus</i>	Common snowberry

Scientific nomenclature follows Lesica (2012).

Three primary Riparian-Wetland (RW) types were classified according to physiognomic type, including Herbaceous, Shrub and Deciduous Tree. The Herbaceous RW type was sampled in three mesophytic/hydrophytic habitat types or community types dominated by various associations of *Juncus balticus* (Baltic rush), *Carex nebrascensis* (Nebraska sedge), and *Carex utriculata* (southern beaked sedge). The Shrub RW type includes three mesophytic or hydrophytic low shrub community types in the *Dasiphora fruticosa* series, and two hydrophytic tall shrub series dominated by *Salix bebbiana* (Bebb willow) or *Salix geyeriana* (Geyer willow). The Deciduous Tree Riparian type was comprised of one community type and one habitat type in the *Populus tremuloides* (quaking aspen) series.

The diversity of community types in the inventory area is largely representative of other, lower to middle elevation study areas in central Montana, as listed in the literature review table in Appendix G. All vegetation types identified in this study have been documented in previous studies in the region under the same or similar type names, as reviewed and summarized from published literature and unpublished technical reports.

3.2 COMMUNITY TYPE DESCRIPTIONS

Following is a narrative description of habitat and community types identified for the Black Butte baseline study area. All summary tables are presented in Section 5.0 (see index page 5-i). Table 1 identifies plot numbers and sample size by vegetation type (see Plate 1 for plot locations). Summary data are presented for cover/constancy in Tables 2 through 7, shrub density (Tables 8 through 13), tree density (Tables 14 through 19), ecological site/soils correlations (Table 20), vegetation/soils correlations (Table 21), and vegetation/ecological site correlations (Table 22). Summaries of rangeland productivity and grazing capacity are given in Table 23, hay cropland productivity and yield (Table 24), plant species of concern (Table 25), species diversity (Table 26), noxious weeds (Table 27), and acreage of vegetation types (Table 28).

The summary tables listed above are derived from the 2015 quantitative data presented by sample site in the Appendix Section 6.0, including cover/constancy (Appendix B), shrub density (Appendix C), tree density (Appendix D), and ecological site/soils correlations (Appendix E). Appendix F presents a summary of site parameters by vegetation type, and Appendix G summarizes a review of current literature concerning regional plant communities, providing context for the Black Butte vegetation type classification. Representative photographs are presented for each vegetation type in Appendix H.

For most data parameters, a weighted mean is given for all habitat types and communities composited within each physiognomic type. The physiognomic type means are not meant to be viewed as an ecological presentation, but can be used to facilitate practical comparisons with any future revegetation efforts on-site (*i.e.*, reclamation planning and evaluation of reclamation success).

The following habitat and community type descriptions are arranged for each physiognomic type to generally follow a gradient of site parameters, particularly soil texture (apparent water-holding capacity), topographic position and aspect (slope exposure). Departures from this arrangement are intended to account for species dominance and considerations of relative susceptibility to various disturbances, particularly grazing history, logging history and agricultural practices.

3.2.1 Upland Grassland

Upland herbaceous communities or “grasslands” were identified according to two principal categories:

- Upland Native Grassland (607 acres, or 18 percent of the study area) that is dominated by native grass (and forb) species, with adventitious occurrences of introduced (exotic) species and relatively minor amounts of woody plants.
- Upland Altered Grassland (172 acres, or 5 percent of the study area) is land that has been invaded by or interseeded with introduced (exotic) species, primarily *Poa pratensis* and *Phleum pratense* in the study area.

There were four Upland Native Grassland habitat types in two series and one Upland Altered Grassland community type identified during the 2015 inventory, comprising 779 acres or 23 percent of total study area acreage. The two Native Grassland series were dominated or distinguished by *Festuca idahoensis*, or *Festuca campestris*.

Upland Grassland cover and constancy data are presented by sample site (plot) in Appendix Tables B1 through B3, and summarized by habitat and community type in Table 2. Shrub density data are given by plot in Appendix Tables C1 through C3, and summarized for Upland Grassland types in Table 8. Tree density data are presented by plot in Appendix Table D1, and summarized by Upland Grassland type in Table 14.

A correlation of soils mapping units, ecological sites and community types is listed by plot in Appendix E, and summarized by parameter in Tables 20 through 22. Rangeland productivity values and projected grazing capacity are shown in Table 23.

Plant species of concern listed by MTNHP (2015) for Meagher County are summarized in Table 25. A simple comparison of relative diversity among physiognomic types is presented in Table 26. The abundance of noxious weeds sampled in Upland Grassland types is given in Table 27. Appendix F provides a synopsis of important site parameters (topographical position, slope gradient and aspect) recorded for Black Butte Upland Grassland communities. A list of selected ecological literature pertinent to the Black Butte study area is synthesized in Appendix G. Acreage of vegetation physiognomic types is given in Table 28. All vegetation sample site locations are shown on the vegetation type map (Plate 1). Representative photographs are included in Appendix H.

In the following text, the Native Upland Grassland types are arranged approximately in order of xeric to mesic moisture regime, and lower to higher topographical position.

Upland Altered Grassland community type

The Upland Altered Grassland community type is very common in the Black Butte baseline study area. A total of nine plots were sampled, primarily on toeslope to middle slope positions of gentle to moderate (1-10 percent) slope gradient. Aspect was variable, commonly easterly or westerly. The predominant ecological sites were loamy and loamy droughty, associated with the Houlihan sandy loams, Wineglass channery clay loams and Libeg clay loams soils. Plant species dominance is shown below, based on mean percent canopy cover rounded to the nearest percent.

Upland Altered Grassland c.t. n=9					
GRAMINOIDS		FORBS		WOODY PLANTS	
<u>Class/Species</u>	<u>Percent Cover</u>	<u>Class/Species</u>	<u>Percent Cover</u>	<u>Class/Species</u>	<u>Percent Cover</u>
Perennial	83	Perennial	50	Shrub	3
Annual	-	Annual/Biennial	<1	Tree	-
<i>Poa pratensis</i>	37	<i>Geranium viscosissimum</i>	11	<i>Artemisia tridentata</i>	1
<i>Phleum pratense</i>	29	<i>Potentilla gracilis</i>	7	<i>Rosa woodsii</i>	<1
<i>Bromus inermis</i>	4	<i>Knautia arvensis</i>	5		
<i>Festuca idahoensis</i>	3	<i>Taraxacum officinale</i>	4		
<i>Stipa nelsonii</i>	2	<i>Artemisia ludoviciana</i>	3		
<i>Danthonia intermedia</i>	2	<i>Erigeron subtrinervis</i>	2		
<i>Carex petasata</i>	1	<i>Antennaria rosea</i>	2		
<i>Danthonia californica</i>	1	<i>Lupinus leucophyllus</i>	2		
<i>Bromus carinatus</i>	1	<i>Geum triflorum</i>	2		
<i>Festuca campestris</i>	<1	<i>Solidago missouriensis</i>	2		
		<i>Galium boreale</i>	2		
		<i>Cerastium arvense</i>	2		
		<i>Achillea millefolium</i>	1		
		<i>Symphyotrichum campestre</i>	1		
		<i>Lupinus sericeus</i>	<1		

Shrub density averaged 596 live stems per acre, of which 49 percent was *Artemisia tridentata*, 45 percent was *Rosa woodsii* and 6 percent was *Dasiphora fruticosa*. No trees were recorded in the Upland Altered Grassland community type.

***Festuca idahoensis/Agropyron spicatum* habitat type**

The *Festuca idahoensis/Agropyron spicatum* habitat type is relatively uncommon in the Black Butte baseline study area. Three plots were sampled on ridge and lower slope positions of moderate (6-11 percent) slope gradient. Aspect was commonly southerly and southeasterly. The *Festuca idahoensis/Agropyron spicatum* habitat type was sampled on the shallow droughty and loamy droughty ecological sites associated with three upland soils mapping units, including the Cheadle channery loams and Libeg clay loams soils. Plant species dominance is shown below, based on mean percent canopy cover rounded to the nearest percent.

***Festuca idahoensis/Agropyron spicatum* h.t.
n=3**

GRAMINOIDS		FORBS		WOODY PLANTS	
<u>Class/Species</u>	<u>Percent Cover</u>	<u>Class/Species</u>	<u>Percent Cover</u>	<u>Class/Species</u>	<u>Percent Cover</u>
Perennial	64	Perennial	42	Shrub	-
Annual	-	Annual/Biennial	2	Tree	-
<i>Festuca idahoensis</i>	26	<i>Antennaria rosea</i>	10		
<i>Danthonia unispicata</i>	22	<i>Phlox hoodii</i>	4		
<i>Agropyron spicatum</i>	6	<i>Selaginella densa</i>	3		
<i>Koeleria macrantha</i>	3	<i>Eriogonum umbellatum</i>	3		
<i>Danthonia intermedia</i>	3	<i>Achillea millefolium</i>	2		
<i>Carex filifolia</i>	1	<i>Lupinus sericeus</i>	2		
		<i>Artemisia ludoviciana</i>	2		
		<i>Erigeron caespitosus</i>	2		
		<i>Geum triflorum</i>	2		
		<i>Cerastium arvense</i>	1		
		<i>Alyssum alyssoides</i>	1		
		<i>Arenaria congesta</i>	1		
		<i>Solidago missouriensis</i>	1		
		<i>Zigadenus venenosus</i>	1		
		<i>Galium boreale</i>	1		

Shrub density averaged only 34 live stems per acre, entirely *Artemisia tridentata*. No trees were recorded in the *Festuca idahoensis/Agropyron spicatum* habitat type.

***Festuca idahoensis/Stipa richardsonii* habitat type**

The *Festuca idahoensis/Stipa richardsonii* habitat type is infrequent in the Black Butte baseline study area. Two plots were sampled on a bench and middle slope position of gentle (2-6 percent) slope gradient and northerly aspect. The ecological sites were droughty and shallow droughty, associated with the Farlin clay loams and Cheadle channery loams soils. Plant species dominance is shown below, based on mean percent canopy cover rounded to the nearest percent.

***Festuca idahoensis/Stipa richardsonii* h.t.**
n=2

GRAMINOIDS		FORBS		WOODY PLANTS	
<u>Class/Species</u>	<u>Percent Cover</u>	<u>Class/Species</u>	<u>Percent Cover</u>	<u>Class/Species</u>	<u>Percent Cover</u>
Perennial	73	Perennial	53	Shrub	6
Annual	-	Annual/Biennial	2	Tree	-
<i>Poa pratensis</i>	17	<i>Antennaria rosea</i>	13	<i>Rosa woodsii</i>	3
<i>Stipa richardsonii</i>	13	<i>Geum triflorum</i>	9	<i>Artemisia tridentata</i>	3
<i>Festuca idahoensis</i>	13	<i>Geranium viscosissimum</i>	5		
<i>Danthonia unispicata</i>	12	<i>Solidago missouriensis</i>	5		
<i>Danthonia intermedia</i>	6	<i>Lupinus sericeus</i>	5		
<i>Stipa nelsonii</i>	3	<i>Eriogonum umbellatum</i>	3		
<i>Carex filifolia</i>	3	<i>Potentilla gracilis</i>	3		
<i>Agropyron trachycaulum</i>	2	<i>Clematis hirsutissima</i>	3		
<i>Agropyron smithii</i>	2	<i>Achillea millefolium</i>	2		
<i>Carex eleocharis</i>	1	<i>Artemisia ludoviciana</i>	2		
<i>Koeleria macrantha</i>	1	<i>Anemone multifida</i>	2		
		<i>Orthocarpus luteus</i>	2		
		<i>Pyrrocoma integrifolia</i>	1		

Shrub density averaged 2934 live stems per acre, of which 64 percent was *Rosa woodsii* and 36 percent was *Artemisia tridentata*. No trees were recorded in the *Festuca idahoensis/Stipa richardsonii* habitat type.

***Festuca campestris/Agropyron spicatum* habitat type**

The *Festuca campestris/Agropyron spicatum* habitat type is uncommon in the Black Butte baseline study area. One plot was sampled on a middle slope position of moderate (20 percent) slope gradient and southerly aspect. The ecological site was loamy droughty, associated with the Libeg clay loams soils. Plant species dominance is shown below, based on percent canopy cover rounded to the nearest percent.

***Festuca campestris /Agropyron spicatum* h.t.**
n=1

GRAMINOIDS		FORBS		WOODY PLANTS	
<u>Class/Species</u>	<u>Percent Cover</u>	<u>Class/Species</u>	<u>Percent Cover</u>	<u>Class/Species</u>	<u>Percent Cover</u>
Perennial	56	Perennial	47	Shrub	4
Annual	-	Annual/Biennial	<1	Tree	-
<i>Danthonia unispicata</i>	22	<i>Artemisia ludoviciana</i>	10	<i>Juniperus communis</i>	4
<i>Festuca idahoensis</i>	12	<i>Erigeron caespitosus</i>	5		
<i>Festuca campestris</i>	8	<i>Solidago missouriensis</i>	5		
<i>Agropyron spicatum</i>	5	<i>Antennaria rosea</i>	3		
<i>Koeleria macrantha</i>	4	<i>Astragalus tenellus</i>	3		
<i>Carex filifolia</i>	3	<i>Heterotheca villosa</i>	3		
<i>Agropyron smithii</i>	2	<i>Lupinus sericeus</i>	3		
		<i>Phlox hoodii</i>	3		
		<i>Symphotrichum falcatum</i>	3		
		<i>Antennaria parvifolia</i>	2		
		<i>Cerastium arvense</i>	2		
		<i>Astragalus drummondii</i>	1		
		<i>Eriogonum umbellatum</i>	1		
		<i>Lithospermum ruderales</i>	1		

Shrub density averaged about 100 live stems per acre, comprised entirely of *Juniperus communis*. No trees were recorded in the *Festuca campestris/Agropyron spicatum* habitat type.

***Festuca campestris/Festuca idahoensis* habitat type**

The *Festuca campestris/Festuca idahoensis* habitat type is the most common Upland Grassland type in the Black Butte baseline study area. A total of thirteen plots were sampled, primarily on middle and upper slope positions of mostly moderate (6-15 percent) slope gradient. Aspects were primarily northwesterly through northeasterly. The predominant ecological sites were, in order, droughty, shallow droughty and loamy droughty, associated primarily with the Woodhall skeletal loams, Cheadle channery loams and Libeg clay loams soils. Plant species dominance is shown below, based on mean percent canopy cover rounded to the nearest percent.

***Festuca campestris/Festuca idahoensis* h.t.
n=13**

GRAMINOIDS		FORBS		WOODY PLANTS	
<u>Class/Species</u>	<u>Percent Cover</u>	<u>Class/Species</u>	<u>Percent Cover</u>	<u>Class/Species</u>	<u>Percent Cover</u>
Perennial	80	Perennial	47	Shrub	2
Annual	-	Annual/Biennial	<1	Tree	-
<i>Festuca campestris</i>	28	<i>Geum triflorum</i>	14	<i>Artemisia tridentata</i>	1
<i>Stipa richardsonii</i>	20	<i>Geranium viscosissimum</i>	5		
<i>Festuca idahoensis</i>	10	<i>Solidago missouriensis</i>	5		
<i>Danthonia intermedia</i>	7	<i>Antennaria rosea</i>	3		
<i>Poa pratensis</i>	7	<i>Selaginella densa</i>	2		
<i>Carex rossii</i>	2	<i>Potentilla gracilis</i>	2		
<i>Agropyron trachycaulum</i>	1	<i>Cerastium arvense</i>	2		
<i>Carex filifolia</i>	1	<i>Sedum lanceolatum</i>	2		
<i>Koeleria macrantha</i>	1	<i>Phlox hoodii</i>	1		
<i>Agropyron spicatum</i>	1	<i>Eriogonum umbellatum</i>	1		
<i>Stipa nelsonii</i>	<1	<i>Lupinus sericeus</i>	1		
		<i>Artemisia ludoviciana</i>	1		
		<i>Clematis hirsutissima</i>	<1		

Shrub density averaged about 553 live stems per acre, of which 63 percent was *Artemisia tridentata* and 37 percent was *Dasiphora fruticosa*. Tree density was negligible in the *Festuca campestris/Festuca idahoensis* habitat type (Table 14), averaging about 1 *Pseudotsuga menziesii* per acre.

3.2.2 Upland Shrubland

There were six Upland Shrubland habitat types and communities identified in three series during the 2015 inventory, comprising 1,372 acres or 41 percent of total study area acreage. The three types in the *Artemisia tridentata* series were dominated or distinguished in the understory by *Poa pratensis*, *Festuca idahoensis*, or *Festuca campestris*. A second series was codominated by *Artemisia tridentata* and *Dasiphora fruticosa*, with the more-altered sites (historical grazing) dominated in the understory by *Poa pratensis*, and the less-altered sites by *Festuca campestris*. A third “series” was identified according to topo-edaphic features, the mixed shrub-shale outcrop community type, a vegetation type of limited occurrence in the study area.

Upland Shrubland cover and constancy data are presented by sample site (plot) in Appendix Tables B4 through B7, and summarized by habitat and community type in Table 3. Shrub density data are given by plot in Appendix Tables C4 through C7, and summarized for Upland Shrubland types in Table 9. Tree density data are presented by plot in Appendix Tables D2 through D5, and summarized by Upland Shrubland type in Table 15.

A correlation of soils mapping units, ecological sites and community types is listed by plot in Appendix E, and summarized by parameter in Tables 20 through 22. Rangeland productivity values and projected grazing capacity are shown in Table 23.

Plant species of concern listed by MTNHP (2015) for Meagher County are summarized in Table 25. A simple comparison of relative diversity among physiognomic types is presented in Table 26. The abundance of noxious weeds sampled in Upland Shrubland types is given in Table 27. Appendix F provides a synopsis of important site parameters (topographical position, slope gradient and aspect) recorded for Black Butte Upland Shrubland communities. A list of selected ecological literature pertinent to the Black Butte study area is synthesized in Appendix G. Acreage of vegetation physiognomic types is given in Table 28. All vegetation sample site locations are shown on the vegetation type map (Plate 1). Representative photographs are included in Appendix H.

In the following text, Upland Shrubland series are arranged approximately in order of lower to higher topographical positions.

Artemisia tridentata/Poa pratensis community type

The *Artemisia tridentata/Poa pratensis* community type is very common in the Black Butte baseline study area. Thirteen plots were sampled on swales and middle to upper slope positions of gentle to moderate (1-14 percent) slope gradient. Aspects were primarily northerly through easterly to southeasterly. The ecological sites were shallow droughty, droughty, and loamy, associated with the Cheadle channery loams, Redchief silty loams and Wineglass channery clay loams soils. Plant species dominance is shown below, based on mean percent canopy cover rounded to the nearest percent.

**Artemisia tridentata/Poa pratensis c.t.
n=13**

GRAMINOIDS		FORBS		WOODY PLANTS	
<u>Class/Species</u>	<u>Percent Cover</u>	<u>Class/Species</u>	<u>Percent Cover</u>	<u>Class/Species</u>	<u>Percent Cover</u>
Perennial	82	Perennial	27	Shrub	40
Annual	<1	Annual/Biennial	<1	Tree	<1
<i>Poa pratensis</i>	64	<i>Cerastium arvense</i>	6	<i>Artemisia tridentata</i>	39
<i>Phleum pratense</i>	5	<i>Geum triflorum</i>	3		
<i>Festuca idahoensis</i>	3	<i>Solidago missouriensis</i>	2		
<i>Danthonia intermedia</i>	3	<i>Artemisia ludoviciana</i>	2		
<i>Festuca campestris</i>	2	<i>Erigeron subtrinervis</i>	1		
<i>Stipa richardsonii</i>	2	<i>Potentilla gracilis</i>	1		
<i>Agropyron trachycaulum</i>	<1	<i>Geranium viscosissimum</i>	1		
<i>Stipa nelsonii</i>	<1	<i>Lupinus leucophyllus</i>	1		
		<i>Lupinus sericeus</i>	1		
		<i>Antennaria parvifolia</i>	1		
		<i>Lithospermum ruderae</i>	<1		

Shrub density averaged 5985 live stems per acre, of which 98 percent was *Artemisia tridentata* and 2 percent was *Dasiphora fruticosa*. Density of trees less than four inches dbh averaged 14 *Pseudotsuga menziesii* and 2 *Juniperus scopulorum* per acre in the *Artemisia tridentata/Poa pratensis* community type.

***Artemisia tridentata/Festuca idahoensis* habitat type**

The *Artemisia tridentata/Festuca idahoensis* habitat type is infrequent in the Black Butte baseline study area. Three plots were sampled on lower slopes and a bench of gentle (2-5 percent) slope gradient. Aspect was northeasterly to southeasterly. The ecological site was shallow droughty, associated with the Cheadle channery loams soils. Plant species dominance is shown below, based on mean percent canopy cover rounded to the nearest percent.

***Artemisia tridentata/Festuca idahoensis* h.t.**

n=3

GRAMINOIDS		FORBS		WOODY PLANTS	
<u>Class/Species</u>	<u>Percent Cover</u>	<u>Class/Species</u>	<u>Percent Cover</u>	<u>Class/Species</u>	<u>Percent Cover</u>
Perennial	34	Perennial	26	Shrub	27
Annual	-	Annual/Biennial	<1	Tree	-
<i>Festuca idahoensis</i>	12	<i>Antennaria rosea</i>	8	<i>Artemisia tridentata</i>	26
<i>Danthonia unispicata</i>	9	<i>Phlox hoodii</i>	4		
<i>Poa pratensis</i>	4	<i>Cerastium arvense</i>	4		
<i>Agropyron spicatum</i>	3	<i>Selaginella densa</i>	2		
<i>Danthonia intermedia</i>	3	<i>Lupinus sericeus</i>	2		
<i>Koeleria macrantha</i>	1	<i>Galium boreale</i>	1		
<i>Agropyron trachycaulum</i>	<1	<i>Paronychia sessiliflora</i>	1		
<i>Poa secunda</i>	<1	<i>Arenaria congesta</i>	1		

Shrub density averaged 5362 live stems per acre, comprised of 99 percent *Artemisia tridentata* and 1 percent *Juniperus communis*. No trees were recorded in the *Artemisia tridentata/Festuca idahoensis* habitat type.

Artemisia tridentata/Festuca campestris habitat type

The *Artemisia tridentata/Festuca campestris* habitat type is the most common Upland Shrubland type in the Black Butte baseline study area. A total of seventeen plots were sampled on mostly middle and upper slope positions and benches of primarily gentle to moderate (2-17 percent) slope gradient and essentially all aspects. The predominant ecological site (16 of 17 samples) was shallow droughty, associated with the Cheadle channery loams and Poin skeletal sandy loams soils. Plant species dominance is shown below, based on mean percent canopy cover rounded to the nearest percent.

Artemisia tridentata/Festuca campestris h.t.
n=17

GRAMINOIDS		FORBS		WOODY PLANTS	
<u>Class/Species</u>	<u>Percent Cover</u>	<u>Class/Species</u>	<u>Percent Cover</u>	<u>Class/Species</u>	<u>Percent Cover</u>
Perennial	63	Perennial	34	Shrub	41
Annual	-	Annual/Biennial	<1	Tree	<1
<i>Festuca campestris</i>	20	<i>Cerastium arvense</i>	4	<i>Artemisia tridentata</i>	40
<i>Festuca idahoensis</i>	14	<i>Geum triflorum</i>	4	<i>Juniperus communis</i>	<1
<i>Danthonia intermedia</i>	9	<i>Selaginella densa</i>	4		
<i>Poa pratensis</i>	8	<i>Antennaria parvifolia</i>	3		
<i>Stipa richardsonii</i>	4	<i>Lupinus sericeus</i>	3		
<i>Carex filifolia</i>	3	<i>Antennaria rosea</i>	2		
<i>Danthonia unispicata</i>	2	<i>Phlox hoodii</i>	1		
<i>Carex eleocharis</i>	1	<i>Potentilla gracilis</i>	1		
		<i>Solidago missouriensis</i>	1		
		<i>Eriogonum umbellatum</i>	1		
		<i>Arenaria congesta</i>	<1		
		<i>Artemisia ludoviciana</i>	<1		

Shrub density averaged 5452 live stems per acre, of which 98 percent was *Artemisia tridentata* and 2 percent *Rosa woodsii*. Density of trees less than four inches dbh (diameter at breast height) averaged 11 *Pseudotsuga menziesii* per acre and 2 *Juniperus scopulorum* per acre.

***Artemisia tridentata*-*Dasiphora fruticosa*/*Poa pratensis* community type**

The *Artemisia tridentata*-*Dasiphora fruticosa*/*Poa pratensis* community type is relatively common in the Black Butte baseline study area, mostly occupying transitional areas between drainage bottom types and upland types. Six plots were sampled on swales, toeslopes and other low topographical positions of gentle (0-9 percent) slope gradient and mostly westerly aspect. The primary ecological sites were loamy and loamy argillic, associated with five soils including the Duckcreek clay loams soil. Plant species dominance is shown below, based on mean percent canopy cover rounded to the nearest percent.

***Artemisia tridentata*-*Dasiphora fruticosa*/*Poa pratensis* c.t.**

n=6

GRAMINOIDS		FORBS		WOODY PLANTS	
<u>Class/Species</u>	<u>Percent Cover</u>	<u>Class/Species</u>	<u>Percent Cover</u>	<u>Class/Species</u>	<u>Percent Cover</u>
Perennial	75	Perennial	45	Shrub	43
Annual	-	Annual/Biennial	1	Tree	-
<i>Poa pratensis</i>	49	<i>Taraxacum officinale</i>	4	<i>Artemisia tridentata</i>	23
<i>Danthonia intermedia</i>	7	<i>Potentilla gracilis</i>	4	<i>Dasiphora fruticosa</i>	19
<i>Festuca campestris</i>	3	<i>Cerastium arvense</i>	4	<i>Rosa woodsii</i>	<1
<i>Agropyron smithii</i>	2	<i>Artemisia ludoviciana</i>	3		
<i>Festuca idahoensis</i>	2	<i>Antennaria rosea</i>	3		
<i>Stipa richardsonii</i>	2	<i>Solidago missouriensis</i>	3		
<i>Agropyron trachycaulum</i>	2	<i>Geum triflorum</i>	2		
<i>Stipa nelsonii</i>	2	<i>Lupinus sericeus</i>	2		
<i>Carex petasata</i>	1	<i>Lupinus leucophyllus</i>	2		
<i>Muhlenbergia richardsonis</i>	1	<i>Galium boreale</i>	2		
<i>Phleum pratense</i>	1	<i>Antennaria parvifolia</i>	2		
<i>Juncus confusus</i>	<1	<i>Phlox hoodii</i>	1		
		<i>Fragaria virginiana</i>	1		
		<i>Campanula rotundifolia</i>	1		
		<i>Penstemon procerus</i>	<1		
		<i>Fragaria vesca</i>	<1		

Shrub density averaged about 5400 live stems per acre, of which 74 percent was *Artemisia tridentata*, 25 percent *Dasiphora fruticosa* and 1 percent was *Rosa woodsii*. No trees were recorded in the *Artemisia tridentata*-*Dasiphora fruticosa*/*Poa pratensis* community type.

***Dasiphora fruticosa-Artemisia tridentata/Festuca campestris* community type**

The *Dasiphora fruticosa-Artemisia tridentata/Festuca campestris* community type is relatively uncommon in the Black Butte baseline study area. Three plots were sampled on terrace to middle slope positions of gentle to moderate (1-20 percent) slope gradient. Aspect was northwesterly and northerly. The ecological sites were loamy argillic and shallow droughty, associated with the Duckcreek clay loams and Cheadle channery loams soils. Plant species dominance is shown below, based on mean percent canopy cover rounded to the nearest percent.

***Dasiphora fruticosa-Artemisia tridentata/Festuca campestris* c.t.
n=3**

GRAMINOIDS		FORBS		WOODY PLANTS	
<u>Class/Species</u>	<u>Percent Cover</u>	<u>Class/Species</u>	<u>Percent Cover</u>	<u>Class/Species</u>	<u>Percent Cover</u>
Perennial	79	Perennial	37	Shrub	33
Annual	-	Annual/Biennial	<1	Tree	-
<i>Danthonia intermedia</i>	25	<i>Geum triflorum</i>	12	<i>Dasiphora fruticosa</i>	20
<i>Festuca campestris</i>	22	<i>Lupinus sericeus</i>	6	<i>Artemisia tridentata</i>	13
<i>Poa pratensis</i>	12	<i>Antennaria parvifolia</i>	2		
<i>Festuca idahoensis</i>	7	<i>Astragalus adsurgens</i>	2		
<i>Stipa richardsonii</i>	3	<i>Clematis hirsutissima</i>	2		
<i>Carex filifolia</i>	2	<i>Cerastium arvense</i>	2		
<i>Agropyron trachycaulum</i>	1	<i>Pyrrocoma integrifolia</i>	2		
<i>Carex eleocharis</i>	1	<i>Solidago missouriensis</i>	2		
<i>Carex obtusata</i>	1	<i>Symphyotrichum campestre</i>	1		
<i>Juncus balticus</i>	1	<i>Campanula rotundifolia</i>	1		
		<i>Galium boreale</i>	1		
		<i>Anemone multifida</i>	<1		

Shrub density averaged 2833 live stems per acre, of which 79 percent was *Dasiphora fruticosa* and 21 percent was *Artemisia tridentata*. No trees were recorded in the *Dasiphora fruticosa-Artemisia tridentata/Festuca campestris* community type.

Mixed Shrub-Shale Outcrop community type

The Mixed Shrub-Shale Outcrop community type is infrequent in the Black Butte baseline study area. Two plots were sampled on middle slope and ridge positions of moderately steep (17-30 percent) slope gradient and southerly to westerly aspect. The ecological site was shallow droughty, associated with the Cheadle channery loams soil. Plant species dominance is shown below, based on percent canopy cover rounded to the nearest percent.

Mixed Shrub-Shale Outcrop c.t.					
n=2					
GRAMINOIDS		FORBS		WOODY PLANTS	
<u>Class/Species</u>	<u>Percent Cover</u>	<u>Class/Species</u>	<u>Percent Cover</u>	<u>Class/Species</u>	<u>Percent Cover</u>
Perennial	9	Perennial	20	Shrub	9
Annual	-	Annual/Biennial	4	Tree	2
<i>Agropyron spicatum</i>	3	<i>Phlox hoodii</i>	4	<i>Juniperus horizontalis</i>	4
<i>Festuca idahoensis</i>	2	<i>Stenotus acaulis</i>	4	<i>Dasiphora fruticosa</i>	3
<i>Koeleria macrantha</i>	1	<i>Medicago lupulina</i>	2	<i>Pseudotsuga menziesii</i>	2
<i>Agropyron dasystachyum</i>	1	<i>Comandra umbellata</i>	2	<i>Artemisia tridentata</i>	2
<i>Agropyron trachycaulum</i>	1	<i>Alyssum alyssoides</i>	2		
<i>Oryzopsis hymenoides</i>	1	<i>Erigeron caespitosum</i>	2		
		<i>Cerastium arvense</i>	1		
		<i>Eriogonum ovalifolium</i>	1		

Shrub density averaged 1518 live stems per acre, of which 40 percent was *Artemisia tridentata*, 40 percent was *Rosa woodsii*, 17 percent was *Dasiphora fruticosa* and 3 percent was *Juniperus horizontalis*. Density of trees less than four inches dbh (diameter at breast height) averaged 25 *Pseudotsuga menziesii* per acre and 5 *Pinus ponderosa* per acre.

3.2.3 Conifer Forest And Woodland

Seven Conifer Forest and Woodland habitat types were identified in two series during the 2015 inventory, comprising 737 acres or 22 percent of total study area acreage. The two Conifer series were dominated or distinguished by *Pseudotsuga menziesii* or *Picea engelmannii*. Each habitat type was named for the characteristic understory union, *i.e.*, *Festuca idahoensis*, *Festuca campestris*, *Juniperus communis*, *Calamagrostis rubescens*, *Symphoricarpos albus*, or *Linnaea borealis* (two series). Mature conifer stands totaled 502 acres or 15 percent of study area acreage, while immature stands totaled 235 acres (7 percent). Immature stands were comprised of seedling, sapling, and/or pole-sized trees reflecting two different ecologies:

1. Logged areas undergoing conifer recruitment (regeneration)
2. Areas where conifers are encroaching into upland grassland or shrubland, generally adjoining the downhill perimeter of mature conifer stands.

Conifer cover and constancy data are presented by sample site (plot) in Appendix Tables B8 through B11, and summarized by habitat type in Table 4. Shrub density data are given by plot in Appendix Tables C8 through C11, and summarized for Conifer types in Table 10. Tree density data are presented by plot in Appendix Tables D6 through D9, and summarized by Conifer type in Table 16.

A correlation of soils mapping units, ecological sites and community types is listed by plot in Appendix E, and summarized by parameter in Tables 20 through 22. Grazeable understory productivity values and projected grazing capacity are shown in Table 23.

Plant species of concern listed by MTNHP (2015) for Meagher County are summarized in Table 25. A simple comparison of relative diversity among physiognomic types is presented in Table 26. The abundance of noxious weeds sampled in Conifer types is given in Table 27. Appendix F provides a synopsis of important site parameters (topographical position, slope gradient and aspect) recorded for Black Butte Conifer habitat types. A list of selected ecological literature pertinent to the Black Butte study area is synthesized in Appendix G. Acreage of vegetation physiognomic types is given in Table 28. All vegetation sample site locations are shown on the vegetation type map (Plate 1). Representative photographs are included in Appendix H.

In the following text, Conifer Forest and Woodland habitat types are arranged roughly in order of postulated successional status (using Pfister *et al.* 1977) as well as moisture regime (xeric to mesic). Site parameters and understory species composition were also taken into account.

***Pseudotsuga menziesii/Festuca idahoensis* habitat type**

The *Pseudotsuga menziesii/Festuca idahoensis* habitat type is very infrequent in the Black Butte baseline study area. One plot was sampled on an upper slope position of moderate (12 percent) slope gradient and southeasterly aspect. The ecological site was Douglas-fir/rough fescue, associated with the Casepeak skeletal loams soil. Plant species dominance is shown below, based on percent canopy cover rounded to the nearest percent.

***Pseudotsuga menziesii/Festuca idahoensis* h.t.
n=1**

GRAMINOIDS		FORBS		WOODY PLANTS	
<u>Class/Species</u>	<u>Percent Cover</u>	<u>Class/Species</u>	<u>Percent Cover</u>	<u>Class/Species</u>	<u>Percent Cover</u>
Perennial	32	Perennial	43	Shrub	25
Annual	-	Annual/Biennial	<1	Tree	40
<i>Stipa nelsonii</i>	12	<i>Artemisia ludoviciana</i>	20	<i>Pseudotsuga menziesii</i>	40
<i>Poa pratensis</i>	6	<i>Antennaria parvifolia</i>	5	<i>Artemisia tridentata</i>	25
<i>Danthonia intermedia</i>	4	<i>Cerastium arvense</i>	5		
<i>Stipa richardsonii</i>	4	<i>Arenaria congesta</i>	1		
<i>Carex petasata</i>	3	<i>Arnica sororia</i>	1		
<i>Festuca idahoensis</i>	2	<i>Eriogonum umbellatum</i>	1		
<i>Agropyron trachycaulum</i>	1	<i>Gaillardia aristata</i>	1		
		<i>Geum triflorum</i>	1		
		<i>Helianthella uniflora</i>	1		
		<i>Solidago missouriensis</i>	1		
		<i>Symphotrichum falcatum</i>	1		

Shrub density averaged 2226 live stems per acre, comprised entirely of *Artemisia tridentata*.

Density of trees greater than four inches dbh (diameter at breast height) was 110 *Pseudotsuga menziesii* per acre; density of trees less than four inches dbh was 590 *Pseudotsuga menziesii* per acre.

***Pseudotsuga menziesii/Festuca campestris* habitat type**

The *Pseudotsuga menziesii/Festuca campestris* habitat type is one of the two most common Conifer types in the Black Butte baseline study area. Twelve plots were sampled on middle and upper slope positions and ridges of gentle to steep (4-45 percent) slope gradient. Aspect was variable, commonly southerly, but also northwesterly and northeasterly. The ecological site was Douglas-fir/rough fescue, associated with the Caseypeak skeletal loams, Kimpton skeletal loams, Poin skeletal sandy loams and Woodhall skeletal loams soils. Plant species dominance is shown below, based on mean percent canopy cover rounded to the nearest percent.

***Pseudotsuga menziesii/Festuca campestris* h.t.**
n=12

GRAMINOIDS		FORBS		WOODY PLANTS	
<u>Class/Species</u>	Percent <u>Cover</u>	<u>Class/Species</u>	Percent <u>Cover</u>	<u>Class/Species</u>	Percent <u>Cover</u>
Perennial	33	Perennial	24	Shrub	8
Annual	-	Annual/Biennial	<1	Tree	45
<i>Festuca idahoensis</i>	12	<i>Antennaria parvifolia</i>	2	<i>Pseudotsuga menziesii</i>	39
<i>Agropyron spicatum</i>	5	<i>Cerastium arvense</i>	2	<i>Juniperus scopulorum</i>	5
<i>Festuca campestris</i>	4	<i>Antennaria rosea</i>	2	<i>Artemisia tridentata</i>	3
<i>Poa pratensis</i>	2	<i>Balsamorhiza sagittata</i>	1	<i>Juniperus communis</i>	2
<i>Stipa nelsonii</i>	2	<i>Solidago missouriensis</i>	1	<i>Pinus contorta</i>	<1
<i>Danthonia intermedia</i>	1	<i>Fragaria virginiana</i>	1		
<i>Danthonia unispicata</i>	1	<i>Phlox hoodii</i>	1		
<i>Phleum pratense</i>	1	<i>Potentilla gracilis</i>	1		
<i>Stipa richardsonii</i>	<1	<i>Astragalus adsurgens</i>	<1		
<i>Poa interior</i>	<1	<i>Astragalus miser</i>	<1		
		<i>Selaginella densa</i>	<1		

Shrub density averaged 5422 live stems per acre, of which 25 percent was *Spiraea betulifolia*, 23 percent *Symphoricarpos albus*, 19 percent *Arctostaphylos uva-ursi*, 18 percent *Rosa woodsii*, and 11 percent *Artemisia tridentata*.

Density of trees greater than four inches dbh (diameter at breast height) averaged 173 *Pseudotsuga menziesii*, 3 *Pinus ponderosa* and 2 *Pinus contorta* per acre; trees less than four inches dbh averaged 275 *Pseudotsuga menziesii* per acre, and 74 *Juniperus scopulorum* per acre.

***Pseudotsuga menziesii/Juniperus communis* habitat type**

The *Pseudotsuga menziesii/Juniperus communis* habitat type is common in the Black Butte baseline study area. Eight plots were sampled on lower to upper slope positions of moderate to very steep (10-60 percent) slope gradient. Aspect was commonly northerly, occasionally southerly. The ecological site was Douglas-fir/common juniper, associated most often with the Kimpton skeletal loams and Poin skeletal sandy loams soils. Plant species dominance is shown below, based on mean percent canopy cover rounded to the nearest percent.

***Pseudotsuga menziesii/Juniperus communis* h.t.**
n=8

GRAMINOIDS		FORBS		WOODY PLANTS	
<u>Class/Species</u>	<u>Percent Cover</u>	<u>Class/Species</u>	<u>Percent Cover</u>	<u>Class/Species</u>	<u>Percent Cover</u>
Perennial	12	Perennial	16	Shrub	40
Annual	-	Annual/Biennial	<1	Tree	48
<i>Poa pratensis</i>	4	<i>Antennaria parvifolia</i>	2	<i>Pseudotsuga menziesii</i>	38
<i>Agropyron spicatum</i>	1	<i>Antennaria neglecta</i>	2	<i>Juniperus communis</i>	25
<i>Festuca idahoensis</i>	1	<i>Arnica cordifolia</i>	1	<i>Pinus contorta</i>	9
<i>Calamagrostis rubescens</i>	1	<i>Valeriana dioica</i>	1	<i>Arctostaphylos uva-ursi</i>	7
<i>Danthonia intermedia</i>	1	<i>Fragaria virginiana</i>	1	<i>Spiraea betulifolia</i>	2
<i>Festuca campestris</i>	<1	<i>Astragalus miser</i>	1	<i>Symphoricarpos albus</i>	1
		<i>Fragaria vesca</i>	1	<i>Rosa woodsii</i>	<1
		<i>Antennaria rosea</i>	<1		

Shrub density averaged about 15,300 live stems per acre, of which 43 percent was *Spiraea betulifolia*, 22 percent *Arctostaphylos uva-ursi*, 14 percent *Symphoricarpos albus*, 13 percent *Rosa woodsii*, and 6 percent *Juniperus communis*.

Density of trees greater than four inches dbh (diameter at breast height) averaged 163 *Pseudotsuga menziesii* per acre and 48 *Pinus contorta* per acre; trees less than four inches dbh averaged 758 *Pseudotsuga menziesii* per acre, 227 *Pinus contorta* per acre, 15 *Pinus flexilis* per acre, and 13 *Juniperus scopulorum* per acre.

***Pseudotsuga menziesii/Calamagrostis rubescens* habitat type**

The *Pseudotsuga menziesii/Calamagrostis rubescens* habitat type is infrequent in the Black Butte baseline study area. Two plots were sampled on a toeslope and a middle slope position of generally steep (40-50 percent) slope gradient. Aspects of the sample sites were northerly and northwesterly. The ecological site assigned was Douglas-fir/snowberry, associated with the Kimpton skeletal loams soil. Plant species dominance is shown below, based on mean percent canopy cover rounded to the nearest percent.

***Pseudotsuga menziesii/Calamagrostis rubescens* h.t.**
n=2

GRAMINOIDS		FORBS		WOODY PLANTS	
<u>Class/Species</u>	<u>Percent Cover</u>	<u>Class/Species</u>	<u>Percent Cover</u>	<u>Class/Species</u>	<u>Percent Cover</u>
Perennial	3	Perennial	5	Shrub	-
Annual	-	Annual/Biennial	2	Tree	55
<i>Poa pratensis</i>	2	<i>Heuchera parvifolia</i>	2	<i>Pseudotsuga menziesii</i>	55
		<i>Antennaria parvifolia</i>	<1		
		<i>Galium boreale</i>	<1		

No shrubs were recorded in the two belt transects sampled in the *Pseudotsuga menziesii/Calamagrostis rubescens* habitat type.

Density of trees greater than four inches dbh (diameter at breast height) averaged 330 *Pseudotsuga menziesii* per acre; density of trees less than four inches dbh averaged 75 *Pseudotsuga menziesii* per acre.

***Pseudotsuga menziesii/Symphoricarpos albus* habitat type**

The *Pseudotsuga menziesii/Symphoricarpos albus* habitat type is very common in the Black Butte baseline study area. Eleven plots were sampled, primarily on toeslope to upper slope positions of variable (5-55 percent) slope gradient. Aspects of the sample sites were northerly and easterly. The ecological site was Douglas-fir/snowberry, associated with the Kimpton skeletal loams and Woodhall skeletal loams, among other soils. Plant species dominance is shown below, based on mean percent canopy cover rounded to the nearest percent.

***Pseudotsuga menziesii/Symphoricarpos albus* h.t.
n=11**

GRAMINOIDS		FORBS		WOODY PLANTS	
<u>Class/Species</u>	<u>Percent Cover</u>	<u>Class/Species</u>	<u>Percent Cover</u>	<u>Class/Species</u>	<u>Percent Cover</u>
Perennial	30	Perennial	23	Shrub	31
Annual	<1	Annual/Biennial	1	Tree	35
<i>Poa pratensis</i>	12	<i>Fragaria virginiana</i>	2	<i>Pseudotsuga menziesii</i>	35
<i>Calamagrostis rubescens</i>	4	<i>Fragaria vesca</i>	2	<i>Arctostaphylos uva-ursi</i>	11
<i>Phleum pratense</i>	3	<i>Arnica cordifolia</i>	2	<i>Symphoricarpos albus</i>	10
<i>Carex geyeri</i>	3	<i>Valeriana dioica</i>	2	<i>Spiraea betulifolia</i>	5
<i>Carex rossii</i>	2	<i>Potentilla gracilis</i>	1	<i>Juniperus communis</i>	2
<i>Stipa nelsonii</i>	1	<i>Antennaria parvifolia</i>	1	<i>Rosa woodsii</i>	1
<i>Festuca campestris</i>	1	<i>Eurybia conspicua</i>	1	<i>Ribes setosum</i>	1
<i>Festuca idahoensis</i>	<1	<i>Astragalus miser</i>	1		
		<i>Galium boreale</i>	1		
		<i>Berberis repens</i>	<1		

Shrub density averaged about 24,800 live stems per acre, of which 51 percent was *Symphoricarpos albus*, 27 percent *Spiraea betulifolia*, 14 percent *Arctostaphylos uva-ursi*, 4 percent *Rosa woodsii*, and 1 percent *Rubus idaeus*.

Density of trees greater than four inches dbh (diameter at breast height) averaged 162 *Pseudotsuga menziesii* per acre; trees less than four inches dbh averaged 420 *Pseudotsuga menziesii* per acre, 8 *Pinus contorta* per acre, and about 4 *Juniperus scopulorum* per acre.

***Pseudotsuga menziesii/Linnaea borealis* habitat type**

The *Pseudotsuga menziesii/Linnaea borealis* habitat type is not particularly common in the Black Butte baseline study area. Four plots were sampled, primarily on middle slopes, also on a lower slope position; slope gradients were moderately steep to very steep (30-80 percent) on northerly aspects. The ecological site was Douglas-fir/twinflower, associated with the Kimpton skeletal loams soil. Plant species dominance is shown below, based on mean percent canopy cover rounded to the nearest percent.

***Pseudotsuga menziesii/Linnaea borealis* h.t.**

n=4

GRAMINOIDS		FORBS		WOODY PLANTS	
<u>Class/Species</u>	Percent <u>Cover</u>	<u>Class/Species</u>	Percent <u>Cover</u>	<u>Class/Species</u>	Percent <u>Cover</u>
Perennial	15	Perennial	32	Shrub	55
Annual	-	Annual/Biennial	<1	Tree	28
<i>Calamagrostis rubescens</i>	7	<i>Linnaea borealis</i>	11	<i>Juniperus communis</i>	34
<i>Carex geyeri</i>	3	<i>Eurybia conspicua</i>	5	<i>Pseudotsuga menziesii</i>	27
<i>Poa pratensis</i>	2	<i>Arnica cordifolia</i>	2	<i>Arctostaphylos uva-ursi</i>	10
<i>Phleum pratense</i>	1	<i>Berberis repens</i>	2	<i>Symphoricarpos albus</i>	5
		<i>Antennaria racemosa</i>	2	<i>Spiraea betulifolia</i>	2
		<i>Fragaria vesca</i>	2	<i>Rosa woodsii</i>	1
		<i>Fragaria virginiana</i>	1	<i>Pinus contorta</i>	1
		<i>Thalictrum venulosum</i>	1	<i>Shepherdia canadensis</i>	1
		<i>Astragalus miser</i>	<1		

Shrub density averaged about 21,700 live stems per acre, of which 36 percent was *Symphoricarpos albus*, 18 percent *Rubus idaeus*, 17 percent *Arctostaphylos uva-ursi*, 11 percent *Rosa woodsii*, 8 percent *Juniperus communis*, and 8 percent *Spiraea betulifolia*.

Density of trees greater than four inches dbh (diameter at breast height) averaged 185 *Pseudotsuga menziesii* per acre, and 28 *Pinus contorta* per acre; trees less than four inches dbh averaged 400 *Pseudotsuga menziesii* per acre, 15 *Pinus contorta* per acre, and 8 *Juniperus scopulorum* per acre.

***Picea engelmannii/Linnaea borealis* habitat type**

The *Picea engelmannii/Linnaea borealis* habitat type is an infrequent Conifer Forest-Woodland type in the Black Butte baseline study area. Two plots were sampled on a middle slope position of steep (38 percent) slope gradient, and on an upland drainage bottom of gentle (5-8 percent) slope gradient. Aspect was northerly for both sample sites. The ecological site was spruce/twinflower, associated with the Kimpton skeletal loams soil. Plant species dominance is shown below, based on mean percent canopy cover rounded to the nearest percent.

***Picea engelmannii/Linnaea borealis* h.t.**
n=2

GRAMINOIDS		FORBS		WOODY PLANTS	
<u>Class/Species</u>	<u>Percent Cover</u>	<u>Class/Species</u>	<u>Percent Cover</u>	<u>Class/Species</u>	<u>Percent Cover</u>
Perennial	58	Perennial	47	Shrub	18
Annual	-	Annual/Biennial	<1	Tree	49
<i>Carex disperma</i>	27	<i>Eurybia conspicua</i>	20	<i>Picea engelmannii</i>	40
<i>Calamagrostis rubescens</i>	9	<i>Linnaea borealis</i>	4	<i>Pseudotsuga menziesii</i>	8
<i>Carex geyeri</i>	6	<i>Geranium richardsonii</i>	3	<i>Symphoricarpos albus</i>	5
<i>Phleum pratense</i>	6	<i>Stellaria crispa</i>	3	<i>Ribes setosum</i>	4
<i>Poa pratensis</i>	5	<i>Fragaria virginiana</i>	2	<i>Rubus idaeus</i>	2
<i>Glyceria striata</i>	2	<i>Actaea rubra</i>	2	<i>Spiraea betulifolia</i>	2
<i>Agrostis exarata</i>	1	<i>Thalictrum venulosum</i>	2	<i>Clematis occidentalis</i>	2
<i>Bromus carinatus</i>	1	<i>Galium boreale</i>	2	<i>Rosa woodsii</i>	2
		<i>Chamerion angustifolium</i>	1	<i>Salix bebbiana</i>	2
		<i>Smilacina racemosa</i>	1	<i>Juniperus communis</i>	1
		<i>Geum macrophyllum</i>	1	<i>Pinus contorta</i>	1
		<i>Osmorhiza occidentalis</i>	1		

Shrub density averaged about 11,600 live stems per acre, of which 46 percent was *Symphoricarpos albus*, 15 percent *Spiraea betulifolia*, 9 percent *Rosa acicularis*, 9 percent *Ribes setosum*, 7 percent *Rosa woodsii*, and 6 percent *Rubus idaeus*.

Density of trees greater than four inches dbh (diameter at breast height) averaged 105 *Picea engelmannii* per acre, and 100 *Pseudotsuga menziesii* per acre; trees less than four inches dbh averaged 205 *Picea engelmannii* per acre, 190 *Pseudotsuga menziesii* per acre, and 70 *Pinus contorta* per acre.

3.2.4 Lowland Altered Grassland

The Lowland Altered Grassland physiognomic type consists of two herbaceous communities occurring in low-lying, open areas. The first is of limited extent on lower Little Sheep Creek, dominated by musk thistle and Kentucky bluegrass; it is associated with an area of gravel-cobble tailings in a disturbed setting, and is discussed as the Noxious Weed Tailings community type. The second type, Lowland Altered Grassland, includes Hay Meadow, and is based on considerations of land use (management-related activities), referring to land that has been seeded, interseeded or invaded by introduced forage species of relatively limited diversity that provides special or seasonal use for livestock, often on a more intensively managed basis than that which would occur if the land were native grazing land.

In the Black Butte study area, Hay Meadow areas on the Sheep Creek floodplain are regularly mowed and baled for hay production for livestock feed. These lowland meadows are predominantly various mixtures of introduced species, particularly *Phleum pratense*, *Poa pratensis* and clovers, with lesser amounts of native sedges, grasses and forbs. Upland Grassland in the study area currently dominated by introduced grasses is discussed earlier in Section 3.2.1 as the Upland Altered Grassland community type. In the Black Butte study area, Noxious Weed Tailings occurred on 7 acres (0.2 percent of the study area), while Lowland Altered Grassland occupied 118 acres or 4 percent of the study area, including the Hay Meadow community type at 69 acres (2 percent).

Lowland Altered Grassland cover and constancy data are presented by sample site in Appendix Tables B12 and B13, and summarized in Table 5. Shrub density data are given by plot in Appendix Table C12, and summarized for Hay Meadow in Table 11.

A correlation of soils mapping units, ecological sites and community types is listed by plot in Appendix E, and summarized by parameter in Tables 20 through 22. Predicted cropland yields (NRCS 2015) are given in Table 24.

Hay Meadow species diversity is given by functional class, and compared with relative diversity among physiognomic types in Table 26. The abundance of noxious weeds sampled in the Hay Meadow type is presented in Table 27. Appendix F provides a synopsis of important site parameters (topographical position, slope gradient and aspect) recorded for the Hay Meadow type in the study area. Acreage of vegetation types is given in Table 28. All vegetation sample site locations are shown on the vegetation type map (Plate 1). Representative photographs are included in Appendix H.

Noxious Weed Tailings community type

The Noxious Weed Tailings community type occupies only 7 acres (0.2 percent) of the Black Butte Baseline study area. One dense population of *Carduus nutans* (musk thistle) was sampled during the 2014 baseline wetlands inventory (plot 162, Plate 1). The site was treated with herbicide (very effectively) in the interim, prior to the 2015 baseline vegetation inventory, when it was again sampled. A comparison of the two years of vegetation cover data is presented below.

Noxious Weed Tailings c.t. (2014/2015)
n=1

GRAMINOIDS			FORBS			WOODY PLANTS		
<u>Class/Species</u>	<u>Percent Cover</u>		<u>Class/Species</u>	<u>Percent Cover</u>		<u>Class/Species</u>	<u>Percent Cover</u>	
	<u>2014</u>	<u>2015</u>		<u>2014</u>	<u>2015</u>		<u>2014</u>	<u>2015</u>
Perennial	86	95	Perennial	9	-	Shrub	4	-
Annual	-	-	Annual/Biennial	85	-	Tree	-	-
<i>Poa pratensis</i>	86	95	<i>Carduus nutans</i>	84	0	<i>Artemisia tridentata</i>	4	0
			<i>Cirsium arvense</i>	8	0			
			<i>Cynoglossum officinale</i>	1	0			
			<i>Silene latifolia</i>	1	0			

Lowland Altered Grassland (Hay Meadow) community type

The Lowland Altered Grassland (Hay Meadow) community type occurs on floodplains and terraces, in the study area primarily those associated with Sheep Creek, however a few sites sampled along Little Sheep Creek and Black Butte Creek floodplains showed similar plant composition and are included here. A total of 16 plots were sampled, all on low terraces of very gentle (0-3 percent) slope gradient. Aspect was not relevant. The primary ecological sites were subirrigated and wet meadow, associated mostly with the Redfish-occasionally flooded and Medicinelodge-frequently flooded soils. Plant species dominance is shown below, based on mean percent canopy cover rounded to the nearest percent.

Lowland Altered Grassland (Hay Meadow) c.t.
n=16

GRAMINOIDS		FORBS		WOODY PLANTS	
<u>Class/Species</u>	<u>Percent Cover</u>	<u>Class/Species</u>	<u>Percent Cover</u>	<u>Class/Species</u>	<u>Percent Cover</u>
Perennial	112	Perennial	55	Shrub	-
Annual	-	Annual/Biennial	13	Tree	-
<i>Phleum pratense</i>	37	<i>Trifolium pratense</i>	19		
<i>Poa pratensis</i>	28	<i>Taraxacum officinale</i>	14		
<i>Alopecurus arundinaceus</i>	11	<i>Trifolium hybridum</i>	7		
<i>Carex praeegracilis</i>	9	<i>Carum carvi</i>	7		
<i>Juncus balticus</i>	8	<i>Rhinanthus crista-galli</i>	6		
<i>Bromus inermis</i>	7	<i>Potentilla gracilis</i>	3		
<i>Poa palustris</i>	4	<i>Trifolium repens</i>	2		
<i>Schedonorus pratensis</i>	4	<i>Geum rivale</i>	1		
<i>Deschampsia cespitosa</i>	2	<i>Potentilla anserina</i>	1		
<i>Agrostis stolonifera</i>	2				

No shrubs were encountered in the 16 belt transects sampled in the Hay Meadow community type. No trees were recorded in the 16 0.1-acre tree density plots sampled in this type.

3.2.5 Riparian and Wetland (RW) Vegetation Types

Three primary Riparian and Wetland (RW) vegetation types were identified in the Black Butte baseline study area, and classified according to physiognomic type, including Herbaceous RW, Shrub RW, and Deciduous Forest RW. Riparian and Wetland types collectively comprised 303 acres (9 percent) of the study area. These communities are restricted to major drainage floodplains (Sheep Creek, Little Sheep Creek and Black Butte Creek), tributary drainage bottoms and adjacent toeslopes, sidehill springs and seeps, *i.e.*, sites which receive supplemental water from perennial streams, overflow, subirrigation or springs-seepage. The following type descriptions are arranged with regard to the stratification of plant physiognomy.

The Herbaceous RW type was comprised of three hydrophytic habitat types and community types dominated by various associations of *Juncus balticus*, *Carex nebrascensis*, and *Carex utriculata*. Due to the mosaic distribution of these often small-scale communities, they are mapped according to physiognomic type. Herbaceous RW types totaled 75 acres, or 25 percent of total Riparian and Wetland vegetation type acreage, and 2 percent of the baseline study area.

Shrub-dominated RW types totaled 216 acres, or 71 percent of total Riparian and Wetland vegetation type acreage, and 6 percent of the baseline study area. The Shrub RW type included three mesophytic/hydrophytic low shrub community types in the *Dasiphora fruticosa* series (120 acres), and two hydrophytic tall shrub willow series dominated by *Salix bebbiana* or *Salix geyeriana* (96 acres). The Deciduous Forest RW type was comprised of the mesophytic *Populus tremuloides* series, including the *Populus tremuloides/Osmorhiza occidentalis* habitat type and *Populus tremuloides/Poa pratensis* community type. *Populus tremuloides* stands comprised approximately 13 acres, or 4 percent of total Riparian and Wetland vegetation type acreage, and 0.4 percent of the baseline study area.

Riparian and Wetland cover and constancy data are presented by sample site (plot) in Appendix Tables B14 and B15 (Herbaceous RW types), Appendix Tables B16 through B18 (Shrub RW types), and Appendix Table B19 (Deciduous Forest RW types), summarized by habitat and community type in Tables 5 through 7, respectively. Shrub density data are given by plot in Appendix Tables C13 through C18, and summarized for Riparian and Wetland types in Tables 11 through 13. Tree density data are presented by plot in Appendix Tables D10 through D13, and summarized by Riparian and Wetland type in Tables 17 through 19.

A correlation of soils mapping units, ecological sites and community types is listed by plot in Appendix E, and summarized by parameter in Tables 20 through 22. Rangeland productivity values and projected grazing capacity are shown in Table 23.

Plant species of concern listed by MTNHP (2015) for Meagher County are summarized in Table 25. A simple comparison of relative diversity among physiognomic types is presented in Table 26. The abundance of noxious weeds sampled in Riparian and Wetland types is given in Table 27. Appendix F provides a synopsis of important site parameters (topographical position, slope gradient and aspect) recorded for Black Butte Riparian and Wetland communities. A list of selected ecological literature

pertinent to the Black Butte study area is synthesized in Appendix G. Acreage of vegetation physiognomic types is given in Table 28. All vegetation sample site locations are shown on the vegetation type map (Plate 1). Representative photographs are included in Appendix H.

In the following text, Riparian and Wetland vegetation types are arranged first by physiognomic subtype (lower to taller vegetation stratum) and secondly, within the herbaceous and shrub subtypes, a moisture gradient from mesophytic to clearly hydrophytic.

3.2.5.1 Herbaceous Riparian And Wetland Types

Juncus balticus community type

The *Juncus balticus* community type is a common Riparian/Wetland type in the Black Butte baseline study area. Five plots were sampled on drainage bottoms and terraces of gentle (0-6 percent) slope gradient. Aspect was generally not relevant. The ecological sites were wet meadow and subirrigated, chiefly associated with the Medicinelodge-occasionally flooded soil. Plant species dominance is shown below, based on mean percent canopy cover rounded to the nearest percent.

<i>Juncus balticus</i> c.t. n=5					
GRAMINOIDS		FORBS		WOODY PLANTS	
<u>Class/Species</u>	<u>Percent Cover</u>	<u>Class/Species</u>	<u>Percent Cover</u>	<u>Class/Species</u>	<u>Percent Cover</u>
Perennial	105	Perennial	42	Shrub	2
Annual	-	Annual/Biennial	<1	Tree	-
<i>Juncus balticus</i>	38	<i>Cirsium arvense</i>	13	<i>Salix brachycarpa</i>	1
<i>Carex praegracilis</i>	16	<i>Symphyotrichum subspicatum</i>	7		
<i>Phleum pratense</i>	10	<i>Potentilla gracilis</i>	4		
<i>Poa pratensis</i>	9	<i>Senecio sphaerocephalus</i>	3		
<i>Festuca rubra</i>	6	<i>Geum rivale</i>	3		
<i>Poa palustris</i>	5	<i>Viola nephrophylla</i>	2		
<i>Deschampsia cespitosa</i>	4	<i>Polygonum amphibium</i>	2		
<i>Calamagrostis stricta</i>	4	<i>Geum aleppicum</i>	1		
<i>Carex pellita</i>	3	<i>Pedicularis groenlandica</i>	1		
<i>Hordeum jubatum</i>	3	<i>Taraxacum officinale</i>	1		
<i>Carex aquatilis</i>	2	<i>Sonchus arvensis</i>	1		
<i>Alopecurus arundinaceus</i>	1	<i>Mentha arvensis</i>	1		
<i>Anthoxanthum hirtum</i>	1				
<i>Carex nebrascensis</i>	1				

Shrub density averaged 911 live stems per acre, of which 73 percent was *Dasiphora fruticosa*, 11 percent *Salix planifolia*, 9 percent *Salix brachycarpa*, 4 percent *Salix bebbiana*, and 2 percent *Salix boothii*.

No trees were recorded in the five 0.1-acre density plots sampled in the *Juncus balticus* community type.

Carex nebrascensis community type

The *Carex nebrascensis* community type is a rather uncommon wetland type in the Black Butte baseline study area. Two plots were sampled on mucky drainage bottoms of gentle (0-3 percent) slope gradient. Aspect was westerly. The ecological site was wet meadow, associated with the MedicineLodge-frequently flooded soil. Plant species dominance is shown below, based on mean percent canopy cover rounded to the nearest percent.

Carex nebrascensis c.t.
n=2

GRAMINOIDS		FORBS		WOODY PLANTS	
<u>Class/Species</u>	<u>Percent Cover</u>	<u>Class/Species</u>	<u>Percent Cover</u>	<u>Class/Species</u>	<u>Percent Cover</u>
Perennial	101	Perennial	40	Shrub	5
Annual	-	Annual/Biennial	<1	Tree	-
<i>Carex nebrascensis</i>	41	<i>Stachys palustris</i>	19	<i>Salix geyeriana</i>	2
<i>Juncus balticus</i>	15	<i>Mentha arvensis</i>	14	<i>Dasiphora fruticosa</i>	1
<i>Carex praegracilis</i>	11	<i>Viola nephrophylla</i>	2	<i>Salix boothii</i>	1
<i>Calamagrostis stricta</i>	8	<i>Potentilla anserina</i>	2	<i>Salix planifolia</i>	1
<i>Deschampsia cespitosa</i>	6	<i>Potentilla gracilis</i>	2		
<i>Carex aquatilis</i>	4	<i>Polygonum amphibium</i>	1		
<i>Poa palustris</i>	4				
<i>Poa pratensis</i>	4				
<i>Eleocharis palustris</i>	3				
<i>Festuca rubra</i>	2				
<i>Glyceria striata</i>	1				
<i>Hordeum brachyantherum</i>	1				
<i>Muhlenbergia richardsonis</i>	1				

Shrub density averaged 2428 live stems per acre, of which 63 percent was *Salix bebbiana* (stunted), 33 percent *Dasiphora fruticosa*, and 4 percent *Salix boothii*.

No trees were recorded in the two 0.1-acre density plots sampled in the *Carex nebrascensis* community type.

Carex utriculata habitat type

The *Carex utriculata habitat* type is the most abundant Herbaceous Wetland type in the Black Butte baseline study area. Eight plots were sampled on mucky drainage bottoms and terraces of gentle (0-5 percent) slope gradient. Aspect was northerly and westerly. The sole ecological site was wet meadow, associated with the Medicinelodge-frequently flooded soil. Plant species dominance is shown below, based on mean percent canopy cover rounded to the nearest percent.

Carex utriculata h.t.
n=8

GRAMINOIDS		FORBS		WOODY PLANTS	
<u>Class/Species</u>	<u>Percent Cover</u>	<u>Class/Species</u>	<u>Percent Cover</u>	<u>Class/Species</u>	<u>Percent Cover</u>
Perennial	116	Perennial	12	Shrub	3
Annual	-	Annual/Biennial	<1	Tree	-
<i>Carex utriculata</i>	69	<i>Potentilla anserina</i>	2	<i>Dasiphora fruticosa</i>	3
<i>Carex nebrascensis</i>	10	<i>Mentha arvensis</i>	2		
<i>Alopecurus arundinaceus</i>	9	<i>Senecio sphaerocephalus</i>	2		
<i>Carex aquatilis</i>	8	<i>Stachys palustris</i>	2		
<i>Juncus balticus</i>	4	<i>Rumex occidentalis</i>	1		
<i>Carex simulata</i>	4	<i>Symphotrichum lanceolatum</i>	1		
<i>Carex praegracilis</i>	3				
<i>Alopecurus pratensis</i>	2				
<i>Poa pratensis</i>	2				
<i>Festuca rubra</i>	1				
<i>Deschampsia cespitosa</i>	1				
<i>Phleum pratense</i>	1				

Shrub density averaged 1100 live stems per acre, of which 91 percent was *Dasiphora fruticosa*, 6 percent *Salix bebbiana*, and 3 percent *Salix planifolia*.

No trees were recorded in the eight 0.1-acre density plots sampled in the *Carex utriculata* habitat type.

3.2.5.2 Shrub Riparian And Wetland Types

Dasiphora fruticosa/Poa pratensis community type

The *Dasiphora fruticosa/Poa pratensis* community type is relatively common on mesic, transitional sites between xeric communities upslope and hydrophytic communities on bottoms downslope. It appears to represent a grazing-induced phase of the less altered *Dasiphora fruticosa/Deschampsia cespitosa* community type. Six plots were sampled on bottoms and terraces of gentle (0-4 percent) slope gradient, and northerly or westerly aspects. The primary ecological site was subirrigated, associated with the Medicinelandge-occasionally flooded soil. Plant species dominance is shown below, based on percent canopy cover rounded to the nearest percent.

Dasiphora fruticosa/Poa pratensis c.t.
n=6

GRAMINOIDS		FORBS		WOODY PLANTS	
<u>Class/Species</u>	<u>Percent Cover</u>	<u>Class/Species</u>	<u>Percent Cover</u>	<u>Class/Species</u>	<u>Percent Cover</u>
Perennial	95	Perennial	64	Shrub	44
Annual	-	Annual/Biennial	<1	Tree	-
<i>Poa pratensis</i>	37	<i>Potentilla gracilis</i>	10	<i>Dasiphora fruticosa</i>	43
<i>Phleum pratense</i>	30	<i>Taraxacum officinale</i>	7	<i>Salix bebbiana</i>	1
<i>Juncus balticus</i>	7	<i>Symphotrichum subspicatum</i>	7		
<i>Carex praegracilis</i>	6	<i>Fragaria virginiana</i>	6		
<i>Agrostis stolonifera</i>	5	<i>Cirsium arvense</i>	3		
<i>Festuca rubra</i>	3	<i>Trifolium pratense</i>	3		
<i>Danthonia californica</i>	2	<i>Antennaria rosea</i>	3		
<i>Carex praticola</i>	1	<i>Viola nephrophylla</i>	3		
<i>Danthonia intermedia</i>	1	<i>Galium boreale</i>	2		
<i>Deschampsia cespitosa</i>	1	<i>Solidago canadensis</i>	2		
		<i>Antennaria microphylla</i>	2		
		<i>Geum rivale</i>	2		
		<i>Achillea millefolium</i>	1		
		<i>Iris missouriensis</i>	1		
		<i>Symphotrichum ascendens</i>	1		
		<i>Astragalus agrestis</i>	1		
		<i>Trifolium hybridum</i>	1		
		<i>Geum macrophyllum</i>	1		

Shrub density averaged 3980 live stems per acre, of which 90 percent was *Dasiphora fruticosa*, 6 percent *Salix bebbiana*, 2 percent *Salix planifolia*, 1 percent *Salix pseudomonticola*, and 1 percent *Rosa woodsii*.

No trees were recorded in the six 0.1-acre density plots sampled in the *Dasiphora fruticosa/Poa pratensis* community type.

***Dasiphora fruticosa/Deschampsia cespitosa* community type**

The *Dasiphora fruticosa/Deschampsia cespitosa* community type is a relatively common shrub riparian type in the Black Butte baseline study area. Four plots were sampled on bottoms, terraces, and a lower slope position of gentle (1-4 percent) slope gradient and northerly aspect. The ecological site was subirrigated, associated with the Medicin lodge-occasionally flooded soil. Plant species dominance is shown below, based on mean percent canopy cover rounded to the nearest percent.

***Dasiphora fruticosa/Deschampsia cespitosa* c.t.**
n=4

GRAMINOIDS		FORBS		WOODY PLANTS	
<u>Class/Species</u>	<u>Percent Cover</u>	<u>Class/Species</u>	<u>Percent Cover</u>	<u>Class/Species</u>	<u>Percent Cover</u>
Perennial	88	Perennial	48	Shrub	63
Annual	-	Annual/Biennial	<1	Tree	-
<i>Poa pratensis</i>	23	<i>Symphyotrichum subspicatum</i>	13	<i>Dasiphora fruticosa</i>	63
<i>Festuca rubra</i>	14	<i>Potentilla gracilis</i>	6		
<i>Deschampsia cespitosa</i>	13	<i>Taraxacum officinale</i>	5		
<i>Juncus balticus</i>	12	<i>Viola nephrophylla</i>	4		
<i>Carex praegracilis</i>	10	<i>Trifolium repens</i>	4		
<i>Carex pellita</i>	5	<i>Fragaria virginiana</i>	3		
<i>Agrostis stolonifera</i>	4	<i>Valeriana edulis</i>	2		
<i>Agropyron trachycaulum</i>	2	<i>Geum rivale</i>	2		
<i>Phleum pratense</i>	2	<i>Achillea millefolium</i>	1		
<i>Calamagrostis stricta</i>	1	<i>Galium boreale</i>	1		
<i>Muhlenbergia richardsonis</i>	1	<i>Allium schoenoprasum</i>	1		
		<i>Trifolium longipes</i>	1		

Shrub density averaged 5110 live stems per acre, of which 95 percent was *Dasiphora fruticosa*, 2 percent *Ribes setosum*, 1 percent *Salix geyeriana*, and 1 percent *Salix bebbiana*.

No trees were recorded in the four 0.1-acre density plots sampled in the *Dasiphora fruticosa/Deschampsia cespitosa* community type.

***Dasiphora fruticosa/Carex utriculata* community type**

The *Dasiphora fruticosa/Carex utriculata* community type is an uncommon shrub RW type in the Black Butte baseline study area. Two plots were sampled on bottoms of gentle (3-5 percent) slope gradient and northerly aspect. The ecological site was wet meadow, associated with the MedicineLodge-frequently flooded soil. Plant species dominance is shown below, based on mean percent canopy cover rounded to the nearest percent.

***Dasiphora fruticosa/Carex utriculata* c.t.**

n=2

GRAMINOIDS		FORBS		WOODY PLANTS	
<u>Class/Species</u>	<u>Percent Cover</u>	<u>Class/Species</u>	<u>Percent Cover</u>	<u>Class/Species</u>	<u>Percent Cover</u>
Perennial	120	Perennial	11	Shrub	21
Annual	-	Annual/Biennial	-	Tree	-
<i>Carex utriculata</i>	50	<i>Symphyotrichum subspicatum</i>	5	<i>Dasiphora fruticosa</i>	21
<i>Carex nebrascensis</i>	19	<i>Viola nephrophylla</i>	2		
<i>Deschampsia cespitosa</i>	16	<i>Geum macrophyllum</i>	1		
<i>Agrostis stolonifera</i>	9	<i>Taraxacum officinale</i>	1		
<i>Carex praegracilis</i>	6				
<i>Poa pratensis</i>	6				
<i>Juncus balticus</i>	6				
<i>Festuca rubra</i>	2				
<i>Calamagrostis stricta</i>	2				
<i>Carex pellita</i>	2				
<i>Phleum pratense</i>	2				

Shrub density averaged 3642 live stems per acre, comprised entirely of *Dasiphora fruticosa*.

No trees were recorded in the two 0.1-acre density plots sampled in the *Dasiphora fruticosa/Carex utriculata* community type.

Salix bebbiana series

The *Salix bebbiana* series is a common tall shrub RW type in the Black Butte baseline study area. Thirteen plots were sampled on the primary floodplain terraces as well as tributary upland drainages. Slope gradients were mostly gentle (1-8 percent) and aspects northerly and easterly depending on the direction of drainage. The sole ecological site was wet meadow, associated with the Medicinelodge-frequently flooded and Medicinelodge-occasionally flooded soils. Plant species dominance is shown below, based on mean percent canopy cover rounded to the nearest percent.

**Salix bebbiana series
n=13**

GRAMINOIDS		FORBS		WOODY PLANTS	
<u>Class/Species</u>	<u>Percent Cover</u>	<u>Class/Species</u>	<u>Percent Cover</u>	<u>Class/Species</u>	<u>Percent Cover</u>
Perennial	110	Perennial	35	Shrub	61
Annual	-	Annual/Biennial	<1	Tree	<1
<i>Carex utriculata</i>	38	<i>Geum rivale</i>	7	<i>Salix bebbiana</i>	27
<i>Juncus balticus</i>	14	<i>Symphytotrichum subspicatum</i>	6	<i>Dasiphora fruticosa</i>	16
<i>Poa pratensis</i>	12	<i>Viola nephrophylla</i>	3	<i>Salix planifolia</i>	7
<i>Carex nebrascensis</i>	9	<i>Fragaria virginiana</i>	2	<i>Salix pseudomonticola</i>	4
<i>Carex pellita</i>	8	<i>Solidago canadensis</i>	2	<i>Betula glandulosa</i>	2
<i>Phleum pratense</i>	5	<i>Taraxacum officinale</i>	1	<i>Juniperus communis</i>	1
<i>Agrostis stolonifera</i>	3	<i>Trifolium hybridum</i>	1	<i>Salix brachycarpa</i>	1
<i>Festuca rubra</i>	3	<i>Mentha arvensis</i>	1		
<i>Deschampsia cespitosa</i>	3	<i>Heracleum lanatum</i>	1		
<i>Carex aquatilis</i>	2				
<i>Carex simulata</i>	2				
<i>Carex praegracilis</i>	2				
<i>Poa palustris</i>	2				
<i>Bromus inermis</i>	2				
<i>Glyceria striata</i>	1				
<i>Juncus longistylis</i>	1				

Shrub density averaged 9157 live stems per acre, of which 33 percent was *Salix bebbiana*, 31 percent *Dasiphora fruticosa*, 13 percent was *Salix planifolia*, 6 percent *Salix pseudomonticola*, 4 percent *Salix brachycarpa*, and 2 percent each for *Betula glandulosa*, *Rosa woodsii*, *Rosa acicularis*, *Ribes setosum* and *Salix geyeriana*.

Tree density was negligible in the *Salix bebbiana* series at 13 *Juniperus scopulorum* per acre, and *Picea engelmannii*, *Pinus flexilis* and *Populus tremuloides* each averaging about 1 tree per acre, all four species in the 1 to 4-inch dbh class.

Salix geyeriana series

The *Salix geyeriana* series is a common tall shrub RW type in the Black Butte baseline study area. Twelve plots were sampled, particularly on the Sheep Creek floodplain terrace where it is the dominant willow series in that portion of the study area. It was occasionally sampled on tributary upland drainages. It occurs on very gentle (0-4 percent) slope gradients; aspects were variable and not relevant. The ecological sites were wet meadow (9 samples) and subirrigated (3 samples), associated with the Medicinelodge-frequently flooded and Medicinelodge-occasionally flooded soils. Plant species dominance is shown below, based on mean percent canopy cover rounded to the nearest percent.

<i>Salix geyeriana</i> series n=12					
GRAMINOIDS		FORBS		WOODY PLANTS	
<u>Class/Species</u>	<u>Percent Cover</u>	<u>Class/Species</u>	<u>Percent Cover</u>	<u>Class/Species</u>	<u>Percent Cover</u>
Perennial	67	Perennial	37	Shrub	100
Annual	-	Annual/Biennial	1	Tree	-
<i>Carex utriculata</i>	27	<i>Petasites frigidus</i>	7	<i>Salix boothii</i>	34
<i>Juncus balticus</i>	7	<i>Geum rivale</i>	6	<i>Salix geyeriana</i>	29
<i>Poa palustris</i>	6	<i>Symphyotrichum subspicatum</i>	4	<i>Salix bebbiana</i>	11
<i>Phleum pratense</i>	5	<i>Canadanthus modestus</i>	3	<i>Salix planifolia</i>	10
<i>Poa pratensis</i>	4	<i>Geum macrophyllum</i>	3	<i>Dasiphora fruticosa</i>	7
<i>Carex pellita</i>	3	<i>Viola nephrophylla</i>	2	<i>Ribes inerme</i>	2
<i>Carex nebrascensis</i>	3	<i>Mentha arvensis</i>	2	<i>Salix drummondiana</i>	2
<i>Calamagrostis canadensis</i>	2	<i>Taraxacum officinale</i>	1	<i>Betula glandulosa</i>	2
<i>Carex praegracilis</i>	2	<i>Cirsium arvense</i>	<1	<i>Salix melanopsis</i>	1
<i>Festuca rubra</i>	2				
<i>Agrostis stolonifera</i>	1				
<i>Bromus inermis</i>	1				
<i>Scirpus microcarpus</i>	1				

Shrub density averaged 4309 live stems per acre, of which 20 percent was *Salix boothii*, 20 percent *Dasiphora fruticosa*, 18 percent was *Ribes inerme*, 13 percent *Salix geyeriana*, 11 percent *Salix bebbiana*, 8 percent *Salix planifolia*, 4 percent was *Salix drummondiana*, 2 percent *Betula glandulosa*, and 1 percent each for *Salix melanopsis*, *Rosa woodsii* and *Ribes setosum*.

No trees were recorded in the twelve 0.1-acre density plots sampled in the *Salix geyeriana* series.

3.2.5.3 Deciduous Forest Riparian And Wetland Types

Populus tremuloides/Osmorhiza occidentalis habitat type

The *Populus tremuloides/Osmorhiza occidentalis* habitat type is infrequent in the Black Butte baseline study area. One plot was sampled on a midslope position of moderate (18 percent) slope gradient and northerly aspect. The ecological site was aspen/Kentucky bluegrass, associated with the Redchief silty loams soil. Plant species dominance is shown below, based on percent canopy cover rounded to the nearest percent.

Populus tremuloides/Osmorhiza occidentalis h.t.
n=1

GRAMINOIDS		FORBS		WOODY PLANTS	
<u>Class/Species</u>	<u>Percent Cover</u>	<u>Class/Species</u>	<u>Percent Cover</u>	<u>Class/Species</u>	<u>Percent Cover</u>
Perennial	85	Perennial	56	Shrub	6
Annual	-	Annual/Biennial	2	Tree	52
<i>Phleum pratense</i>	32	<i>Geranium richardsonii</i>	25	<i>Populus tremuloides</i>	52
<i>Calamagrostis rubescens</i>	30	<i>Osmorhiza occidentalis</i>	13	<i>Rosa woodsii</i>	3
<i>Poa pratensis</i>	18	<i>Actaea rubra</i>	7	<i>Symphoricarpos albus</i>	3
<i>Agropyron trachycaulum</i>	3	<i>Fragaria virginiana</i>	3		
<i>Bromus carinatus</i>	2	<i>Geum macrophyllum</i>	2		
		<i>Cynoglossum officinale</i>	2		
		<i>Achillea millefolium</i>	1		
		<i>Galium boreale</i>	1		
		<i>Ranunculus uncinatus</i>	1		
		<i>Thalictrum venulosum</i>	1		
		<i>Taraxacum officinale</i>	1		

Shrub density averaged 8400 live stems per acre, of which 63 percent was *Symphoricarpos albus*, and 37 percent was *Rosa woodsii*.

Density of trees greater than four inches dbh (diameter at breast height) averaged 290 *Populus tremuloides* per acre; trees less than four inches dbh averaged 830 *Populus tremuloides* per acre, 10 *Picea engelmannii* per acre, and 10 *Pinus flexilis* per acre.

Populus tremuloides/Poa pratensis community type

The *Populus tremuloides/Poa pratensis* community type is relatively uncommon in the Black Butte baseline study area. Three plots were sampled on variable terrain including a bottom, midslope and ridge saddle. The sites were on gentle (3-8 percent) slope gradients of easterly aspect. The ecological sites were loamy droughty and aspen/bluegrass, associated with the Libeg clay loams, Medicinelodge-occasionally flooded and Redchief silty loams soils. Plant species dominance is shown below, based on mean percent canopy cover rounded to the nearest percent.

Populus tremuloides/Poa pratensis c.t.
n=3

GRAMINOIDS		FORBS		WOODY PLANTS	
<u>Class/Species</u>	<u>Percent Cover</u>	<u>Class/Species</u>	<u>Percent Cover</u>	<u>Class/Species</u>	<u>Percent Cover</u>
Perennial	81	Perennial	61	Shrub	25
Annual	-	Annual/Biennial	2	Tree	53
<i>Poa pratensis</i>	54	<i>Taraxacum officinale</i>	21	<i>Populus tremuloides</i>	52
<i>Phleum pratense</i>	22	<i>Geranium viscosissimum</i>	10	<i>Rosa woodsii</i>	23
<i>Calamagrostis rubescens</i>	1	<i>Eurybia integrifolia</i>	7	<i>Symphoricarpos albus</i>	1
<i>Bromus carinatus</i>	<1	<i>Potentilla gracilis</i>	4		
		<i>Fragaria virginiana</i>	4		
		<i>Achillea millefolium</i>	3		
		<i>Galium boreale</i>	2		
		<i>Symphyotrichum subspicatum</i>	2		
		<i>Arnica cordifolia</i>	1		
		<i>Perideridia montana</i>	1		
		<i>Cynoglossum officinale</i>	1		
		<i>Lupinus leucophyllus</i>	1		

Shrub density averaged 11,400 live stems per acre, of which 92 percent was *Rosa woodsii*, 3 percent *Symphoricarpos albus*, 2 percent *Dasiphora fruticosa*, 1 percent *Ribes setosum*, and 1 percent *Symphoricarpos occidentalis*.

Density of trees greater than four inches dbh (diameter at breast height) averaged 87 *Populus tremuloides* per acre; trees less than four inches dbh averaged 836 *Populus tremuloides* per acre.

3.3 PRODUCTIVITY AND UTILITY

The primary land uses in the Black Butte study area are livestock grazing (rangeland) and hay production (lowland altered grassland or hay meadow). The Natural Resources Conservation Service (2015) presents long-term productivity data for some of the applicable soils and ecological sites in Meagher County, relative to good-excellent condition in the perceived “Historic Climax Plant Community” (HCPC). Additionally, NRCS (2015) gives long-term irrigated and nonirrigated hay yields by soils mapping unit that can be expected under a high level of management. Information pertinent to the Black Butte study area is summarized below.

3.3.1 Rangeland

Appendix E identifies the soil mapping unit and ecological site for each vegetation plot sampled in the study area in 2015. Soil types are correlated with ecological sites in Table 20. Vegetation habitat types and community types are correlated with soil types in Table 21, and with ecological sites in Table 22.

The NRCS uses long-term data to predict productivity for each “Historic Climax Plant Community (HCPC)” to represent range in excellent condition, and indicates productivity for years of normal precipitation and temperature patterns. Annual production was determined for each soil mapping unit in the inventory area using the long-term data (NRCS 2015) (when available) developed for ecological sites in Major Land Resource Area 43B (MLRA 43B-Central Rocky Mountains) in the 15 to 19-inch and 20+-inch mean annual precipitation zones. Production data derived from NRCS (2015) are presented in Tables 20 and 23.

Productivity varies considerably among vegetation types in the study area, depending on current condition and the ecological sites involved. Potential rangeland productivity listed in Table 23 is projected for estimated grazing capacity in the baseline study area. Hypothetical grazing capacity calculated for HCPC (not current condition) rangeland was estimated at 4350 animal unit months (annually) for the baseline study area as a whole.

3.3.2 Cropland

Hay is the only crop grown in the study area. In the Black Butte baseline study area, hay meadow areas on the Sheep Creek floodplain are regularly mowed and baled for hay production for livestock feed. These lowland pastures are dominated by various mixtures of *Phleum pratense*, *Poa pratensis*, *Alopecurus arundinaceus*, *Bromus inermis*, *Poa palustris* and *Schedonorus pratensis*, in combination with lesser composition of the native species *Carex praegracilis*, *Juncus balticus* and *Deschampsia cespitosa*. In the Black Butte baseline study area, the Hay Meadow type occurred on 69 acres (2 percent of the study area).

Based on compilation of long-term annual production data, the NRCS (2015) has determined representative values for non-irrigated and irrigated hay production for pertinent soils in the Black Butte baseline study area (Table 24). Hay cropland in the study area can be expected to produce approximately 3 to 5 AUM’s per acre, depending on the soil. The predicted yield of grass hay in the study area is expected

to average 1.5 to 2.0 tons per acre in non-irrigated pastures (Table 24). Grass-legume hay in the study area can be expected to yield 1.8 to 2.3 non-irrigated tons per acre, and 3.0 to 4.0 irrigated tons per acre based on NRCS (2015) productivity guidelines. In recent practice, grass hay and grass-legume hay on the Sheep Creek floodplain is harvested once a year within the study area, producing approximately 3 tons per acre annually on average (ranch manager, personal communication, 2015).

3.4 SPECIES LIST/MTNHP-LISTED SPECIES

Appendix A is a list of vascular plant taxa identified during the 2014-2015 quantitative and mapping inventory of the Black Butte vegetation (and wetland) baseline study area. A total of 398 vascular plant taxa were identified, with forbs (278 species) comprising the majority (70 percent). Forbs included 235 perennial taxa (213 native, 16 introduced and 6 fern allies), and 43 annual/biennial taxa (31 native and 12 introduced). Of 82 grasses and grass-like plants identified (21 percent of the total), there were 78 perennial taxa (66 native and 12 introduced), and 4 annual taxa (2 native and 2 introduced). The 38 woody plant taxa (9 percent of the total) recorded in the study area included 31 shrubs and vines, and 7 tree species, all native. Species numbers are listed by class below.

CLASS	NUMBER OF SPECIES	
	Black Butte Study Area (2014-2015) 5.3 square miles	Percent
Native Perennial Graminoid	66	16.6
Introduced Perennial Grass	12	3.0
Native Annual Graminoid	2	0.5
Introduced Annual Grass	2	0.5
Native Perennial Forb and Subshrub	213	53.5
Introduced Perennial Forb	16	4.0
Ferns and Allies	6	1.5
Native Annual/Biennial Forb	31	7.8
Introduced Annual/Biennial Forb	12	3.0
Native Shrub and Vine	31	7.8
Native Tree	7	1.8
TOTAL	398	100

No federally listed or proposed endangered or threatened plant species are known to occur in the vicinity of the Black Butte study area, and none were recorded during the 2014-2015 baseline vegetation inventory. A search of the Montana Natural Heritage Program (2015) website for “plant species of concern or SOC” in Meagher County (Table 25) found one plant species of concern that was identified in the study area, *Cirsium longistylum* (long-styled thistle).

Cirsium longistylum, endemic to central Montana, is a short-lived perennial (biennial?) species inhabiting montane to subalpine meadows. It is listed as G2G3 (global rank) and S2S3 (state rank). These rankings indicate a range of uncertainty whether the species is at risk (S2) or potentially at risk (S3) in the state (and globally). MTNHP (2015) gives the state rank reason as: “population estimates of approximately

30,000 plants, including seven high quality populations over four mountain ranges... in generally high quality habitat with few if any problem weeds... and (for the largest populations) promising habitat protection on both public and private lands”.

In the Black Butte baseline study area, *Cirsium longistylum* was noted qualitatively by pedestrian survey, and recorded quantitatively during the vegetation inventory using the randomly located sample sites. It was usually associated with the vegetation types most altered by historical grazing, including Upland Altered Grassland (plot #67), *Festuca campestris*/*Festuca idahoensis* (plot #108), *Artemisia tridentata*/*Poa pratensis* (plots #51 and 97), *Artemisia tridentata*-*Dasiphora fruticosa*/*Poa pratensis* (plots #110 and 116), and *Dasiphora fruticosa*/*Poa pratensis* (plot #82). Plot locations are shown on the vegetation type map (Plate 1).

Many *Cirsium longistylum* specimens in the Black Butte study area indicated hybridization with other native thistle species, apparently *Cirsium scariosum* and/or *Cirsium hookerianum*.

3.5 PLANT SPECIES DIVERSITY

The diversity of vascular plant species was evaluated by determining the average number of species per plot in each general vegetation physiognomic type (Table 26). These data are summarized from the cover data presented by community type in Appendix B. Although these tallies are dependent on sample size, Table 26 provides a generalized assessment of the relative diversity of species by functional class among physiognomic types, particularly for those with similar sample sizes.

3.6 WEEDS

State-listed noxious weeds are given on the “Montana Noxious Weed List, Effective July, 2015” (Montana Code Annotated 2015). Four state-listed weed species (all Priority 2B), and one Priority 3 regulated plant species were encountered on the study area during the 2014/2015 Black Butte baseline vegetation and wetland inventories. In addition to the state list, Meagher County (Ohlson 2016) has listed an additional thirteen noxious weed species, of which five were identified during the 2014/2015 baseline vegetation and wetland inventories. Noxious weeds are also addressed for the Lewis and Clark National Forest (USDA Forest Service 1994).

Priority 2B noxious weeds are abundant in Montana and widespread in many counties of the state. Management criteria will require eradication or containment where less abundant. Management shall be prioritized by local weed districts. These weeds are capable of rapid spread and render land unfit or greatly limit beneficial uses. The five species recorded in the study area included:

- Canada thistle (*Cirsium arvense*)
- Spotted knapweed (*Centaurea maculosa*)
- Oxeye daisy (*Leucanthemum vulgare*)
- Houndstongue (*Cynoglossum officinale*)

One additional “2B” species, leafy spurge (*Euphorbia esula*), was identified and mapped (Figure 2) during an earlier (2011-2012) reconnaissance inventory of the Project area (Tintina 2013).

Priority 3 species are “regulated plants” (not Montana-listed noxious weeds). These regulated plants have the potential to have significant negative impacts. The plant may not be intentionally spread or sold other than as a contaminant in agricultural products. One Priority 3 species was recorded on the Black Butte study area:

- Cheatgrass brome (*Bromus tectorum*)

The distribution and relative abundance of noxious weeds are discussed by vegetation community type in the following sections.

3.6.1 Baseline Vegetation Inventory

The distribution of 185 sample plots throughout vegetation communities in the study area provides a fair assessment of the relative abundance of vascular plant species among community types, including state- and county-listed noxious weed species. Vascular plant canopy cover and constancy data are summarized in Tables 2 through 7, and an excerpt of noxious weed data is presented by species and vegetation type in Table 27.

Presently, 33 Priority 1 and 2 species are listed for Montana statewide. Of the five state-listed noxious weed species reported for the study area, three of them were recorded during the quantitative inventory of randomly distributed cover plots including Canada thistle (*Cirsium arvense*), houndstongue (*Cynoglossum officinale*) and spotted knapweed (*Centaurea maculosa*). The remaining species, oxeye daisy (*Leucanthemum vulgare*), was recorded during qualitative surveys of the study area, and leafy spurge (*Euphorbia esula*) was identified during an earlier survey. In addition to noxious weeds listed for Montana state-wide, many counties have independently listed various other troublesome weed species targeted for control. Of 56 Montana counties, most have designated such additional target weed species, including Meagher County (Ohlson 2016) which has listed thirteen additional weed species. Of these, five were identified in the Black Butte study area including common wormwood (*Artemisia absinthium*), musk thistle (*Carduus nutans*), bull thistle (*Cirsium vulgare*), field scabious (*Knautia arvensis*) and field sow-thistle (*Sonchus arvensis*). Two other potentially problematic weed species in the Black Butte study area were also analyzed, caraway (*Carum carvi*) and yellow rattle (*Rhinanthus crista-galli*), as they can often proliferate in high-mesic meadows; in the Black Butte baseline study area, they had relatively high canopy cover values (about 6 percent each) in the Lowland Altered Grassland (Hay Meadow) community type. A dense population of field scabious was recorded in a lower tributary just north of Little Sheep Creek in the vicinity of the county road. Many Montana counties have listed musk thistle as a problematic weed. The

**Noxious Weed Abundance and Distribution (Percent Cover/Constancy) by Physiognomic Type,
Black Butte Baseline Vegetation Study Area, 2015.**

	Upland Grassland n=28	Upland Shrubland n=44	Conifer Forest and Woodland n=40	Hay Meadow and Roadsides n=16	Riparian and Wetland (RW)		
					Herbaceous RW n=15	Shrub RW n=37	Deciduous Tree RW n=4
STATE-LISTED NOXIOUS WEEDS							
<i>Centaurea maculosa</i>		0.2/2					
<i>Cirsium arvense</i>			<0.1/5	0.3/19	4.3/20	1.0/30	0.1/25
<i>Cynoglossum officinale</i>		0.1/5	0.2/15			0.2/14	1.3/75
<i>Euphorbia esula</i> *	X						
<i>Leucanthemum vulgare</i>				X			
MEAGHER COUNTY-LISTED WEEDS							
<i>Artemisia absinthium</i>				X			
<i>Carduus nutans</i>	<0.1/4	<0.1/2	0.1/5	<0.1/6		<0.1/3	
<i>Cirsium vulgare</i>						<0.1/3	0.3/25
<i>Knautia arvensis</i>	1.5/4					<0.1/5	
<i>Sonchus arvensis</i>					0.4/7		
PROBLEMATIC WEEDS							
<i>Carum carvi</i>				6.6/63			
<i>Rhinanthus crista-galli</i>				6.3/50	0.3/13		

n = number of quantitative sample sites X = present in the type, not recorded at a sample site

**Euphorbia esula* was identified during an earlier (2011-2012) reconnaissance survey.

twelve species recorded in the Black Butte study area are shown above in a list of weed abundance and distribution summarized from Table 27.

The two most common noxious weeds in the Black Butte study area, particularly in lowlands, were Canada thistle and common houndstongue. Spotted knapweed was recorded with minor cover values at limited sites in upland shrubland community types. Oxeye daisy was noted only as scattered plants in hay meadow and disturbed roadside locations. Leafy spurge was mapped during an earlier (2011-2012) survey in upland grassland-shrubland (Tintina 2013).

Of the seven additional problematic weed species recorded, musk thistle was by far the most common. In fact, musk thistle was generally more conspicuous than the listed noxious weed species, occurring in almost every vegetation physiognomic type present in the study area, occasionally in dense patches. One dense population was sampled during the 2014 baseline wetlands inventory (plot 162, Plate 1). The site was treated with herbicide (very effectively) in the interim, prior to the 2015 baseline vegetation inventory, when it was again sampled. A comparison of the two years of vegetation cover data is

presented in section 3.2.4 as the “noxious weed tailings” community type, and is shown in comparative photographs in Appendix H.

3.6.2 Baseline Wetlands Inventory

The baseline wetland and waterbody survey (WESTECH 2015) was reviewed to further document noxious weed occurrence in the Project area. Quantitative and qualitative vegetation data were recorded at 45 wetland and 51 adjacent upland sample sites during the 2014 wetland survey, documenting six weed species of concern as summarized below.

The noxious weed species most commonly recorded at wetland/waterbody sites in the Project area was Canada thistle, occurring at 13 percent of wetland sites and 22 percent of the adjacent upland sites sampled. Where it occurred, canopy cover values ranged from 0.5 to 14 percent (averaging about 6 percent) on wetland sites, and 1 to 22 percent (averaging 10 percent) on upland sites.

Houndstongue did not occur on any of the 45 wetland sites sampled, however was recorded on 8 percent of the 51 adjacent upland sites where cover values ranged from 1 to 3 percent.

Musk thistle occurred on only two (4 percent) of the upland sample sites, at 3 to 84 percent cover. Field sow-thistle was recorded on one (2 percent) of the 45 wetland sites sampled, at 0.5 percent (trace) cover.

Two other potentially problematic weed species occurred on the Sheep Creek floodplain in and adjacent to the Hay Meadow vegetation type. Caraway was found at 4 percent of 45 wetland sites and 8 percent of 51 adjacent upland sites, ranging from 2 to 26 percent (average 7 percent) cover where it occurred. Yellow rattle was recorded at 4 percent of wetland sites and 4 percent of the upland sites, ranging from 2 to 36 percent (average 19 percent) canopy cover.

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**5.0
SUMMARY TABLES
BLACK BUTTE VEGETATION BASELINE**

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Shrub Riparian and Wetland	6	5-24
Deciduous Forest Riparian and Wetland	7	5-31
SHRUB DENSITY		
Upland Grassland	8	5-33
Upland Shrubland	9	5-34
Conifer Forest and Woodland	10	5-35
Lowland Altered Grassland and Herbaceous Riparian and Wetland	11	5-38
Shrub Riparian and Wetland	12	5-39
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Table 1
Vegetation Types Identified in the Black Butte Baseline Study Area, Meagher County, Montana, 2015.

VEGETATION TYPE ¹	PLOT NUMBERS ²	n
UPLAND GRASSLAND		28
Upland Altered Grassland c.t.	44, 45, 46, 47, 50, 52, 67, 78, 85	9
<i>Festuca idahoensis</i> / <i>Agropyron spicatum</i> h.t.	63, 68, 69	3
<i>Festuca idahoensis</i> / <i>Stipa richardsonii</i> h.t.	61, 107	2
<i>Festuca campestris</i> / <i>Agropyron spicatum</i> h.t.	48	1
<i>Festuca campestris</i> / <i>Festuca idahoensis</i> h.t.	56, 62, 64, 65, 66, 70, 71, 72, 73, 74, 75, 93, 108	13
UPLAND SHRUBLAND		44
<i>Artemisia tridentata</i> / <i>Poa pratensis</i> c.t.	51, 53, 54, 57, 77, 83, 84, 88, 92, 95, 97, 100, 101	13
<i>Artemisia tridentata</i> / <i>Festuca idahoensis</i> h.t.	99, 105, 111	3
<i>Artemisia tridentata</i> / <i>Festuca campestris</i> h.t.	49, 55, 58, 59, 60, 76, 79, 81, 90, 91, 94, 98, 102, 103, 104, 114, 115	17
<i>Artemisia tridentata</i> - <i>Dasiphora fruticosa</i> / <i>Poa pratensis</i> c.t.	89, 96, 109, 110, 112, 116	6
<i>Dasiphora fruticosa</i> - <i>Artemisia tridentata</i> / <i>Festuca campestris</i> c.t.	80, 106, 113	3
Mixed Shrub-Shale Outcrop c.t.	86, 87	2
CONIFER FOREST AND WOODLAND		40
<i>Pseudotsuga menziesii</i> / <i>Festuca idahoensis</i> h.t.	13	1
<i>Pseudotsuga menziesii</i> / <i>Festuca campestris</i> h.t.	11, 12, 15, 17, 19, 20, 23, 28, 34, 38, 42, 43	12
<i>Pseudotsuga menziesii</i> / <i>Juniperus communis</i> h.t.	14, 24, 25, 26, 29, 32, 33, 40	8
<i>Pseudotsuga menziesii</i> / <i>Calamagrostis rubescens</i> h.t.	31, 35	2
<i>Pseudotsuga menziesii</i> / <i>Symphoricarpos albus</i> h.t.	1, 4, 5, 7, 16, 18, 27, 30, 36, 37, 39	11
<i>Pseudotsuga menziesii</i> / <i>Linnaea borealis</i> h.t.	10, 21, 22, 41	4
<i>Picea engelmannii</i> / <i>Linnaea borealis</i> h.t.	6, 9	2
LOWLAND ALTERED GRASSLAND		17
Noxious Weed Tailings c.t. (2014/2015)	162	1
Lowland Altered Grassland (Hay Meadow) c.t.	117, 133, 134, 135, 138, 139, 140, 141, 143, 144, 145, 148, 151, 152, 153, 165	16
RIPARIAN AND WETLAND (RW)³		56
Herbaceous RW types		(15)
<i>Juncus balticus</i> c.t.	129, 149, 163, 164, 176	5
<i>Carex nebrascensis</i> c.t.	127, 166	2
<i>Carex utriculata</i> h.t.	126, 146, 167, 168, 172, 174, 178, 179	8
Shrub RW types		(37)
<i>Dasiphora fruticosa</i> / <i>Poa pratensis</i> c.t.	82, 118, 160, 169, 170, 177	6
<i>Dasiphora fruticosa</i> / <i>Deschampsia cespitosa</i> c.t.	175, 180, 182, 185	4
<i>Dasiphora fruticosa</i> / <i>Carex utriculata</i> c.t.	155, 173	2
<i>Salix bebbiana</i> series	120, 122, 123, 125, 156, 157, 158, 159, 161, 171, 181, 183, 184	13
<i>Salix geyeriana</i> series	119, 121, 128, 130, 131, 132, 136, 137, 142, 147, 150, 154	12
Deciduous Forest RW types		(4)
<i>Populus tremuloides</i> / <i>Osmorhiza occidentalis</i> h.t.	8	1
<i>Populus tremuloides</i> / <i>Poa pratensis</i> c.t.	2, 3, 124	3
TOTAL SAMPLE SITES		185

¹Grassland and shrubland habitat types were identified following Mueggler and Stewart (1980); Forest habitat types follow Pfister *et al.* (1977), and Wetland/Riparian types follow Hansen *et al.* (1995), with minor modifications. In these classifications, vegetation types are named according to the following convention:

A slash (/) indicates a separation of species dominating one or more strata, namely the herbaceous, shrub and/or tree layers; c.t. = community type, h.t. = habitat type.

²All plot locations are shown on the vegetation type map (Plate 1).

³Wetlands in the study area are often associated with relatively narrow streamside fringes. Such sites are generally missed by the stratified random procedure used to select vegetation sample sites, whereas these sites are specifically targeted for identification and delineation during the baseline wetland inventory. Accordingly, selected riparian and wetland cover/composition data were drawn from the wetland inventory to supplement the vegetation baseline database.

Table 2
 Summary of Mean Percent Canopy Cover and Constancy by Class and Species for Five
 UPLAND GRASSLAND Vegetation Types, Black Butte Baseline Study Area, 2015.

	UPLAND ALTERED GRASSLAND		FES IDA/AGR SPI		FES IDA/STI RIC		FES CAM/AGR SPI		FES CAM/FES IDA		UPLAND GRASSLAND COMPOSITE	
	Mean Cover	Con- stancy	Mean Cover	Con- stancy	Mean Cover	Con- stancy	Mean Cover	Con- stancy	Mean Cover	Con- stancy	Mean Cover	Con- stancy
	n=9		n=3		n=2		n=1		n=13		n=28	
GROUND COVER												
Bare Ground	8.11	100	12.67	100	5.50	100	28	100	5.18	77	7.76	89
Rock	0.81	33	12.00	100			12	100	1.82	38	2.82	43
Litter	82.67	100	68.33	100	71.50	100	55	100	78.00	100	77.18	100
Lichens	0.51	44	0.77	100	3.00	100			1.43	77	1.13	68
Moss	1.37	44	1.00	100	14.00	100			6.69	92	4.65	75
Basal Vegetation	6.67	100	5.33	100	6.00	100	5	100	6.92	100	6.54	100
VEGETATION STRUCTURE (nonstratified cover)												
Total Vegetation	92.00	100	78.67	100	91.50	100	76	100	90.38	100	89.21	100
Perennial Graminoids	73.89	100	59.33	100	65.00	100	51	100	70.69	100	69.39	100
Annual Graminoids												
Perennial Forbs and Subshrubs	43.44	100	35.67	100	48.50	100	44	100	41.46	100	42.07	100
Annual/Biennial Forbs	0.47	67	1.77	100	2.00	100	0.3	100	0.75	85	0.84	82
Shrubs	2.67	56			5.50	100	4	100	1.74	69	2.20	61
Trees (0.01-acre)												
Trees (0.1-acre)									0.02	8	0.01	4
CLASS\SPECIES												
NATIVE PERENNIAL GRAMINOIDS												
Agropyron smithii					1.50	50	2	100			0.18	7
Agropyron spicatum			6.00	100			5	100	1.08	8	1.32	18
Agropyron trachycaulum	0.62	78	0.10	33	2.00	100			1.02	85	0.83	75
Agrostis scabra	0.22	22			0.15	50			0.15	31	0.15	25
Bromus carinatus	1.22	56							0.38	8	0.57	21
Carex eleocharis	0.14	22			1.00	50			0.60	69	0.40	43
Carex filifolia	0.33	11	1.00	33	2.50	100	3	100	1.02	62	0.97	46
Carex microptera	0.03	11									0.01	4
Carex petasata	1.48	67			0.15	50			0.33	31	0.64	39
Carex praticola	0.11	11									0.04	4
Carex rossii									1.58	31	0.74	14
Danthonia californica	1.44	56									0.46	18
Danthonia intermedia	1.56	67	3.00	67	6.00	50			7.15	100	4.57	79
Danthonia unispicata	0.22	11	22.33	100	12.00	50	22	100	0.25	38	4.22	39
Festuca campestris	0.89	22	0.67	33	0.50	50	8	100	27.92	100	13.64	64
Festuca idahoensis	2.67	67	26.33	100	12.50	100	12	100	10.38	92	9.82	86
Juncus balticus	0.22	11			0.15	50					0.08	7
Juncus confusus	0.22	11							0.02	8	0.08	7
Koeleria macrantha			3.33	100	1.00	50	4	100	1.07	62	1.07	46
Poa secunda					0.50	50			0.02	8	0.05	7

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 Summary of Mean Percent Canopy Cover and Constancy by Class and Species for Five
 UPLAND GRASSLAND Vegetation Types, Black Butte Baseline Study Area, 2015.

	UPLAND ALTERED GRASSLAND		FES IDA/AGR SPI		FES IDA/STI RIC		FES CAM/AGR SPI		FES CAM/FES IDA		UPLAND GRASSLAND COMPOSITE	
	Mean Cover	Con- stancy	Mean Cover	Con- stancy	Mean Cover	Con- stancy	Mean Cover	Con- stancy	Mean Cover	Con- stancy	Mean Cover	Con- stancy
	n=9		n=3		n=2		n=1		n=13		n=28	
Stipa nelsonii	2.22	44	0.33	33	3.00	100			0.74	46	1.31	46
Stipa richardsonii			0.67	33	13.00	100			19.77	92	10.18	54
TOTAL NPG	13.61	100	63.77	100	55.95	100	56.0	100	73.48	100	51.32	100
INTRODUCED PERENNIAL GRAMINOIDS												
Bromus inermis	3.56	11									1.14	4
Phleum pratense	28.89	100							0.02	8	9.30	36
Poa compressa	0.33	11									0.11	4
Poa pratensis	36.67	100	0.67	33	17.00	100			6.64	54	16.15	68
TOTAL IPG	69.44	100	0.67	33	17.00	100			6.66	54	26.70	68
NATIVE PERENNIAL FORBS AND SUBSHRUBS												
Achillea millefolium	1.10	100	2.33	100	2.00	50	0.3	100	0.44	92	0.96	93
Agoseris glauca	0.43	44							0.25	46	0.25	36
Allium cernuum									0.05	15	0.02	7
Allium textile			0.30	100			0.3	100	0.10	15	0.09	21
Anemone multifida	0.07	22			1.50	50			0.16	54	0.20	36
Anemone patens	0.03	11	0.10	33					0.02	8	0.03	11
Antennaria anaphaloides	0.07	22							0.15	31	0.09	21
Antennaria microphylla	0.03	11									0.01	4
Antennaria parvifolia							2	100	0.58	31	0.34	18
Antennaria rosea	2.00	33	10.00	100	12.50	100	3	100	2.84	77	4.03	68
Arabis nuttallii			0.10	33					0.05	15	0.03	11
Arenaria congesta			1.10	100	0.50	50	0.3	100	0.44	92	0.37	61
Arnica fulgens					0.15	50			0.02	8	0.02	7
Arnica sororia	0.14	22	0.43	67					0.12	38	0.15	32
Artemisia frigida			0.10	33							0.01	4
Artemisia ludoviciana	3.00	44	2.00	100	1.50	100	10	100	1.15	23	2.18	46
Astragalus adsurgens			0.43	67			0.3	100	0.12	23	0.11	21
Astragalus drummondii							1	100			0.04	4
Astragalus purshii			0.43	67			0.3	100	0.02	8	0.07	14
Astragalus tenellus							3	100			0.11	4
Campanula rotundifolia	0.36	56	0.10	33	0.15	50			0.38	92	0.31	68
Cerastium arvense	1.56	56	1.33	67	0.50	50	2	100	1.72	77	1.55	68
Cirsium longistylum	0.03	11							0.02	8	0.02	7
Clematis hirsutissima	0.54	67			2.50	100			0.84	77	0.74	64
Crepis atriobarba			0.10	33							0.01	4
Crepis occidentalis							0.3	100			0.01	4
Delphinium bicolor	0.03	11	0.10	33							0.02	7
Drymocallis arguta	0.11	11							0.10	15	0.08	11
Erigeron caespitosus			1.77	100			5	100	0.08	8	0.40	18

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 Summary of Mean Percent Canopy Cover and Constancy by Class and Species for Five
 UPLAND GRASSLAND Vegetation Types, Black Butte Baseline Study Area, 2015.

	UPLAND ALTERED GRASSLAND		FES IDA/AGR SPI		FES IDA/STI RIC		FES CAM/AGR SPI		FES CAM/FES IDA		UPLAND GRASSLAND COMPOSITE	
	Mean Cover	Con- stancy	Mean Cover	Con- stancy	Mean Cover	Con- stancy	Mean Cover	Con- stancy	Mean Cover	Con- stancy	Mean Cover	Con- stancy
	n=9		n=3		n=2		n=1		n=13		n=28	
Erigeron compositus			0.33	33							0.04	4
Erigeron ochroleucus									0.02	8	0.01	4
Erigeron subtrinervis	2.11	33							0.28	38	0.81	29
Eriogonum umbellatum			2.67	67	3.00	100	1	100	1.20	77	1.09	54
Erysimum inconspicuum									0.02	8	0.01	4
Fragaria vesca									0.08	8	0.04	4
Fragaria virginiana	0.81	22									0.26	7
Fritillaria pudica			0.10	33					0.05	15	0.03	11
Gaillardia aristata	0.11	11	0.43	67	0.15	50			0.32	54	0.24	39
Galium boreale	1.51	78	1.00	33					0.35	54	0.75	54
Gentiana affinis	0.03	11									0.01	4
Geranium viscosissimum	10.56	78			5.00	100			5.38	62	6.25	61
Geum triflorum	1.78	56	1.67	67	9.00	100			13.92	100	7.86	79
Heterotheca villosa			0.20	67			3	100	0.25	15	0.25	18
Heuchera parvifolia									0.15	31	0.07	14
Linum lewisii							0.3	100	0.05	15	0.03	11
Lithospermum ruderale	0.22	22	0.43	67	0.50	50	1	100	0.68	54	0.51	46
Lomatium macrocarpum			0.20	67			0.3	100			0.03	11
Lomatium triternatum									0.07	23	0.03	11
Lupinus argenteus									0.02	8	0.01	4
Lupinus leucophyllus	1.89	44									0.61	14
Lupinus sericeus	0.89	22	2.33	100	4.50	100	3	100	1.22	77	1.53	64
Musineon divaricatum									0.02	8	0.01	4
Noccaea fendleri									0.07	23	0.03	11
Orobanche fasciculata			0.10	33							0.01	4
Oxytropis besseyi			0.10	33							0.01	4
Oxytropis sericea			0.10	33					0.05	15	0.03	11
Oxytropis splendens	0.03	11							0.02	8	0.02	7
Paronychia sessiliflora			0.33	33					0.05	15	0.06	11
Pedicularis parryi									0.02	8	0.01	4
Penstemon procerus	0.07	22									0.02	7
Perideridia montana	0.77	67							0.02	8	0.26	25
Phlox hoodii			4.33	100			3	100	1.48	38	1.26	32
Potentilla anserina									0.23	8	0.11	4
Potentilla gracilis	6.89	100	0.43	67	3.00	100			1.65	100	3.24	93
Potentilla hippiana									0.07	23	0.03	11
Potentilla pensylvanica					0.15	50			0.12	38	0.06	21
Pyrrocoma integrifolia					1.00	50					0.07	4
Sedum lanceolatum									1.56	15	0.73	7
Senecio canus			0.33	33					0.10	15	0.08	11
Senecio streptanthifolius					0.15	50			0.15	31	0.08	18

Table 2
 Summary of Mean Percent Canopy Cover and Constancy by Class and Species for Five
 UPLAND GRASSLAND Vegetation Types, Black Butte Baseline Study Area, 2015.

	UPLAND ALTERED GRASSLAND		FES IDA/AGR SPI		FES IDA/STI RIC		FES CAM/AGR SPI		FES CAM/FES IDA		UPLAND GRASSLAND COMPOSITE	
	Mean Cover	Con- stancy	Mean Cover	Con- stancy	Mean Cover	Con- stancy	Mean Cover	Con- stancy	Mean Cover	Con- stancy	Mean Cover	Con- stancy
	n=9		n=3		n=2		n=1		n=13		n=28	
Silene drummondii	0.03	11	0.10	33					0.09	31	0.06	21
Sisyrinchium idahoense									0.05	15	0.02	7
Solidago canadensis (S. lepida)	0.59	22									0.19	7
Solidago missouriensis	1.78	56	1.10	100	5.00	100	5	100	4.76	92	3.44	82
Symphyotrichum ascendens			0.10	33	0.15	50			0.08	8	0.06	11
Symphyotrichum campestre	1.26	56			0.15	50			0.15	31	0.48	36
Symphyotrichum falcatum							3	100	0.23	8	0.21	7
Symphyotrichum subspicatum	0.48	22									0.15	7
Thalictrum venulosum	0.03	11									0.01	4
Trifolium longipes	0.07	22									0.02	7
Vicia americana									0.02	8	0.01	4
Viola adunca	0.03	11									0.01	4
Zigadenus venenosus			1.00	67					0.09	31	0.15	21
TOTAL NPF	41.44	100	38.13	100	53.05	100	47.4	100	44.80	100	43.69	100
INTRODUCED PERENNIAL FORBS												
Knaulia arvensis	4.78	11									1.54	4
Taraxacum officinale	3.70	78	0.20	67					0.02	8	1.22	36
TOTAL IPF	8.48	78	0.20	67					0.02	8	2.76	36
FERNS AND ALLIES												
Selaginella densa			3.33	33	0.15	50			2.23	31	1.40	21
TOTAL FA			3.33	33	0.15	50			2.23	31	1.40	21
NATIVE ANNUAL/BIENNIAL FORBS												
Androsace occidentalis			0.10	33					0.05	15	0.03	11
Androsace septentrionalis			0.10	33					0.09	31	0.05	18
Barbarea orthoceras	0.03	11									0.01	4
Boechera divaricarpa									0.02	8	0.01	4
Collomia linearis	0.03	11	0.10	33					0.02	8	0.03	11
Gentianella amarella			0.33	33	0.50	50			0.45	69	0.28	39
Microsteris gracilis	0.03	11									0.01	4
Orthocarpus luteus	0.07	22			1.50	50			0.08	8	0.16	14
Orthocarpus tenuifolius					0.15	50					0.01	4
Polygonum douglasii	0.07	22									0.02	7
Turritis glabra	0.07	22									0.02	7
TOTAL NA/BF	0.30	56	0.63	100	2.15	100			0.71	85	0.65	75

Table 2
 Summary of Mean Percent Canopy Cover and Constancy by Class and Species for Five
 UPLAND GRASSLAND Vegetation Types, Black Butte Baseline Study Area, 2015.

	UPLAND ALTERED GRASSLAND		FES IDA/AGR SPI		FES IDA/STI RIC		FES CAM/AGR SPI		FES CAM/FES IDA		UPLAND GRASSLAND COMPOSITE	
	Mean Cover	Con- stancy	Mean Cover	Con- stancy	Mean Cover	Con- stancy	Mean Cover	Con- stancy	Mean Cover	Con- stancy	Mean Cover	Con- stancy
	n=9		n=3		n=2		n=1		n=13		n=28	
INTRODUCED ANNUAL/BIENNIAL FORBS												
Alyssum alyssoides			1.33	33			0.3	100	0.08	8	0.19	11
Carduus nutans	0.03	11									0.01	4
Thlaspi arvense	0.22	11							0.02	8	0.08	7
Tragopogon dubius							0.3	100			0.01	4
TOTAL IA/BF	0.26	22	1.33	33			0.6	100	0.10	15	0.29	21
SHRUBS												
Artemisia tridentata	1.22	33			2.50	100			1.25	54	1.15	43
Clematis occidentalis									0.02	8	0.01	4
Dasiphora fruticosa	0.67	22							0.43	23	0.41	18
Juniperus communis							4	100			0.14	4
Rosa woodsii	0.89	22			3.00	50			0.05	15	0.52	18
TOTAL SHRUBS	2.78	56			5.50	100	4.0	100	1.75	69	2.24	61
TREES (0.1-acre)												
Pseudotsuga menziesii									0.02	8	0.01	4
TOTAL TREES (0.1-acre)									0.02	8	0.01	4
TOTAL VEGETATION (Stratified)	136.31	100	108.07	100	133.80	100	108.0	100	129.76	100	129.05	100

Nomenclature follows Lesica (2012).

Table 3
Summary of Mean Percent Canopy Cover and Constancy by Class and Species for Six UPLAND SHRUBLAND
Vegetation Types, Black Butte Baseline Study Area, 2015.

	ART TRI/POA PRA		ART TRI/FES IDA		ART TRI/FES CAM		ART TRI-DAS FRU/ POA PRA		DAS FRU-ART TRI/ FES CAM		MIXED SHRUB- SHALE OUTCROP		UPLAND SHRUBLAND COMPOSITE	
	Mean Cover	Con- stancy	Mean Cover	Con- stancy	Mean Cover	Con- stancy	Mean Cover	Con- stancy	Mean Cover	Con- stancy	Mean Cover	Con- stancy	Mean Cover	Con- stancy
	n=13		n=3		n=17		n=6		n=3		n=2		n=44	
GROUND COVER														
Bare Ground	0.97	38	27.00	100	6.54	100	3.72	83	0.77	67	30.00	100	6.58	77
Rock	0.02	8	16.00	67	1.49	41	0.83	33			52.00	100	4.15	32
Litter	85.38	100	50.33	100	80.76	100	83.33	100	86.00	100	15.50	100	77.80	100
Lichens	0.67	92	1.87	100	1.53	100	1.60	100	0.87	100	0.50	50	1.22	95
Moss	7.71	100	2.00	67	4.62	100	4.88	100	6.43	100	0.15	50	5.31	95
Basal Vegetation	5.38	100	3.00	100	5.06	100	5.67	100	6.00	100	2.00	100	5.02	100
VEGETATION STRUCTURE (nonstratified cover)														
Total Vegetation	95.69	100	59.33	100	89.12	100	93.17	100	93.33	100	38.50	100	87.57	100
Perennial Graminoids	75.54	100	31.00	100	56.12	100	66.33	100	70.67	100	9.00	100	60.39	100
Annual Graminoids	0.02	8											0.01	2
Perennial Forbs and Subshrubs	24.54	100	23.00	100	30.00	100	39.17	100	33.00	100	18.00	100	28.82	100
Annual/Biennial Forbs	0.44	85	0.20	67	0.47	76	0.93	67	0.10	33	3.50	100	0.62	75
Shrubs	39.62	100	26.67	100	41.06	100	40.67	100	31.67	100	8.00	100	37.45	100
Trees (0.01-acre)	0.54	15			0.37	18					2.00	50	0.39	14
Trees (0.1-acre)	0.25	38			0.32	41					1.00	50	0.24	30
CLASS\SPECIES														
NATIVE PERENNIAL GRAMINOIDS														
Agropyron dasystachyum											1.00	50	0.05	2
Agropyron smithii			0.10	33			2.33	50					0.33	9
Agropyron spicatum	0.02	8	2.77	100	0.72	41					3.00	50	0.61	27
Agropyron trachycaulum	0.83	85	0.77	67	0.68	65	1.72	100	1.10	100	1.00	50	0.91	77
Agrostis scabra	0.09	31			0.06	6	0.27	50	0.67	33			0.13	20
Bromus carinatus	0.38	8			0.41	6	0.05	17					0.28	7
Bromus porteri	0.02	8											0.01	2
Carex eleocharis	0.35	31	0.10	33	1.01	82	0.22	33	1.33	33			0.62	50
Carex filifolia	0.25	15			2.70	53	0.17	17	2.33	67	0.15	50	1.31	34
Carex microptera							0.17	17					0.02	2
Carex obtusata							0.05	17	1.00	33			0.08	5
Carex petasata	0.22	54			0.42	41	1.27	67					0.40	41
Carex rossii	0.18	23	0.10	33	0.34	47	0.10	33			0.50	50	0.23	34
Danthonia californica	0.08	8					0.33	17					0.07	5
Danthonia intermedia	2.71	100	2.67	33	8.71	88	7.00	100	24.67	100			6.98	86
Danthonia unispicata	0.05	15	9.00	100	1.78	47	0.72	33	0.33	33	0.15	50	1.44	39
Elymus glaucus	0.02	8											0.01	2
Festuca campestris	2.07	77	0.10	33	19.71	100	2.55	100	22.33	100			10.10	84
Festuca idahoensis	3.32	92	11.67	100	14.18	100	2.10	83	7.33	100	1.50	50	8.11	93
Festuca rubra									0.10	33			0.01	2

Table 3
 Summary of Mean Percent Canopy Cover and Constancy by Class and Species for Six UPLAND SHRUBLAND
 Vegetation Types, Black Butte Baseline Study Area, 2015.

	ART TRI/POA PRA		ART TRI/FES IDA		ART TRI/FES CAM		ART TRI-DAS FRU/ POA PRA		DAS FRU-ART TRI/ FES CAM		MIXED SHRUB- SHALE OUTCROP		UPLAND SHRUBLAND COMPOSITE	
	Mean Cover	Con- stancy	Mean Cover	Con- stancy	Mean Cover	Con- stancy	Mean Cover	Con- stancy	Mean Cover	Con- stancy	Mean Cover	Con- stancy	Mean Cover	Con- stancy
	n=13		n=3		n=17		n=6		n=3		n=2		n=44	
Juncus balticus							0.67	17	1.00	33			0.16	5
Juncus confusus							0.83	17					0.11	2
Koeleria macrantha	0.22	38	1.10	100	0.69	65	0.17	17	0.33	33	1.00	100	0.50	52
Muhlenbergia richardsonis	0.02	8					1.17	17					0.17	5
Oryzopsis hymenoides											1.00	50	0.05	2
Poa secunda	0.10	15	0.77	67	0.29	29					0.15	50	0.20	23
Stipa nelsonii	0.81	77	0.43	67	0.23	35	1.72	83	0.20	67			0.60	57
Stipa richardsonii	1.89	85	0.33	33	3.56	71	2.05	50	3.00	67			2.44	66
TOTAL NPG	13.65	100	29.90	100	55.49	100	25.63	100	65.73	100	9.45	100	35.92	100
INTRODUCED PERENNIAL GRAMINOIDS														
Bromus inermis	0.62	8											0.18	2
Phleum pratense	4.53	46	0.33	33			0.88	50	0.43	67			1.51	27
Poa pratensis	63.69	100	4.10	67	7.82	82	48.83	100	12.33	100			29.62	86
TOTAL IPG	68.84	100	4.43	67	7.82	82	49.72	100	12.77	100			31.31	86
INTRODUCED ANNUAL GRAMINOIDS														
Bromus japonicus	0.02	8											0.01	2
TOTAL IAG	0.02	8											0.01	2
NATIVE PERENNIAL FORBS AND SUBSHRUBS														
Achillea millefolium	0.55	77	0.30	100	0.47	88	0.58	100	0.10	33	0.65	100	0.48	84
Agoseris glauca	0.09	31			0.05	18	0.10	33	0.67	33	0.50	50	0.13	25
Allium cernuum	0.02	8	0.20	67	0.02	6					0.15	50	0.03	11
Allium textile	0.02	8	0.20	67							0.15	50	0.03	9
Anemone multifida	0.28	31			0.22	47	0.43	67	0.77	100	0.30	100	0.29	48
Anemone patens					0.04	12			0.10	33			0.02	7
Antennaria anaphaloides	0.19	46			0.13	29	0.20	67	0.10	33			0.14	36
Antennaria microphylla	0.08	8			0.06	6							0.05	5
Antennaria parvifolia	0.99	54	0.77	67	3.49	82	1.50	33	2.00	67			2.03	61
Antennaria rosea	0.43	31	7.77	100	2.08	53	2.83	67	0.10	33	0.15	50	1.86	50
Arabis nuttallii	0.02	8											0.01	2
Arenaria congesta	0.35	62	0.87	100	0.72	100	0.15	50	0.20	67			0.48	75
Arnica fulgens	0.19	46	0.10	33	0.11	24			0.10	33			0.11	27
Arnica sororia	0.05	15			0.07	24	0.05	17					0.05	16
Artemisia dracunculul	0.08	8											0.02	2
Artemisia frigida											0.15	50	0.01	2
Artemisia ludoviciana	1.56	38			0.86	35	3.22	67					1.23	34
Astragalus adsurgens	0.05	15			0.44	47	0.33	17	2.00	33			0.37	27
Astragalus agrestis	0.02	8			0.08	12	0.10	33					0.05	11
Astragalus crassicaulus											0.15	50	0.01	2

Table 3
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 Vegetation Types, Black Butte Baseline Study Area, 2015.

	ART TRI/POA PRA		ART TRI/FES IDA		ART TRI/FES CAM		ART TRI-DAS FRU/ POA PRA		DAS FRU-ART TRI/ FES CAM		MIXED SHRUB- SHALE OUTCROP		UPLAND SHRUBLAND COMPOSITE	
	Mean Cover	Con- stancy	Mean Cover	Con- stancy	Mean Cover	Con- stancy	Mean Cover	Con- stancy	Mean Cover	Con- stancy	Mean Cover	Con- stancy	Mean Cover	Con- stancy
	n=13		n=3		n=17		n=6		n=3		n=2		n=44	
Astragalus miser	0.02	8			0.05	18							0.03	9
Astragalus purshii					0.05	18							0.02	7
Astragalus vexilliflexus											0.15	50	0.01	2
Balsamorhiza sagittata					0.24	6							0.09	2
Besseyia wyomingensis					0.02	6							0.01	2
Boechera pendulocarpa					0.02	6							0.01	2
Boechera stricta					0.02	6							0.01	2
Campanula rotundifolia	0.49	92	0.20	67	0.35	71	1.05	50	0.87	100	0.30	100	0.51	77
Castilleja flava					0.04	12			0.10	33			0.02	7
Castilleja pallescens					0.02	6							0.01	2
Cerastium arvense	6.15	100	3.67	100	4.24	100	3.50	100	1.67	67	1.00	100	4.34	98
Cirsium hookerianum									0.33	33			0.02	2
Cirsium longistylum	0.05	15					0.38	33					0.07	9
Cirsium undulatum	0.08	8									0.15	50	0.03	5
Clematis hirsutissima	0.39	77			0.36	53	0.33	17	1.77	67			0.42	50
Comandra umbellata							0.05	17			1.50	100	0.08	7
Crepis acuminata					0.02	6							0.01	2
Crepis occidentalis											0.15	50	0.01	2
Delphinium bicolor	0.02	8											0.01	2
Dodecatheon conjugens	0.02	8			0.02	6							0.01	5
Dodecatheon pulchellum	0.02	8					0.10	33					0.02	7
Drymocallis arguta	0.02	8					0.05	17					0.01	5
Erigeron caespitosus	0.02	8			0.04	12					1.50	50	0.09	9
Erigeron compositus											0.30	100	0.01	5
Erigeron subtrinervis	1.33	69			0.13	29	0.50	17	0.10	33			0.52	36
Eriogonum ovalifolium											1.00	50	0.05	2
Eriogonum umbellatum	0.35	46	0.77	100	1.13	82	0.38	33	0.10	33			0.65	59
Erysimum inconspicuum	0.02	8									0.15	50	0.01	5
Fragaria vesca	0.15	31					0.83	17					0.16	11
Fragaria virginiana	0.15	15					1.22	33					0.21	9
Frasera speciosa	0.02	8					0.17	17					0.03	5
Fritillaria pudica	0.02	8											0.01	2
Gaillardia aristata	0.17	38	0.10	33	0.30	59					0.15	50	0.18	39
Galium boreale	0.14	46	1.33	33	0.48	65	1.72	83	0.87	100	0.65	100	0.64	64
Gaura coccinea											0.15	50	0.01	2
Gentiana affinis	0.02	8			0.02	6							0.01	5
Geranium viscosissimum	1.20	85			0.27	24	0.72	33	0.67	33			0.60	41
Geum macrophyllum							0.67	17					0.09	2
Geum triflorum	2.69	54			3.88	76	2.38	100	11.67	100			3.42	66
Heuchera parvifolia	0.15	31			0.04	12	0.05	17					0.06	16
Linum lewisii					0.04	12	0.05	17			0.65	100	0.05	11

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 Vegetation Types, Black Butte Baseline Study Area, 2015.

	ART TRI/POA PRA		ART TRI/FES IDA		ART TRI/FES CAM		ART TRI-DAS FRU/ POA PRA		DAS FRU-ART TRI/ FES CAM		MIXED SHRUB- SHALE OUTCROP		UPLAND SHRUBLAND COMPOSITE	
	Mean Cover	Con- stancy	Mean Cover	Con- stancy	Mean Cover	Con- stancy	Mean Cover	Con- stancy	Mean Cover	Con- stancy	Mean Cover	Con- stancy	Mean Cover	Con- stancy
	n=13		n=3		n=17		n=6		n=3		n=2		n=44	
Lithophragma parviflorum							0.05	17					0.01	2
Lithospermum ruderales	0.84	62			0.23	35	0.67	33	0.10	33			0.43	39
Lomatium macrocarpum					0.13	29							0.05	11
Lupinus leucophyllus	1.20	77			0.02	6	1.83	83					0.61	36
Lupinus sericeus	0.97	77	1.53	100	2.61	100	2.17	50	5.67	100			2.08	82
Mertensia viridis							0.67	17					0.09	2
Musineon divaricatum											0.15	50	0.01	2
Noccaea fendleri	0.02	8											0.01	2
Orobanche fasciculata					0.02	6							0.01	2
Oxytropis sericea					0.02	6					0.15	50	0.01	5
Oxytropis splendens									0.33	33			0.02	2
Paronychia sessiliflora			1.10	67	0.04	12							0.09	9
Penstemon eriantherus											0.15	50	0.01	2
Penstemon nitidus											0.30	100	0.01	5
Penstemon procerus	0.41	23			0.06	6	0.77	67	0.20	67			0.26	23
Perideridia montana	0.12	38			0.06	6	0.10	33	0.10	33			0.08	20
Phacelia hastata											0.15	50	0.01	2
Phlox hoodii	0.15	15	4.00	100	1.36	65	1.33	17			3.50	100	1.19	43
Physaria didymocarpa											0.50	50	0.02	2
Potentilla gracilis	1.22	92	0.33	33	1.29	82	3.67	83	0.43	67			1.41	77
Potentilla hippiana			0.10	33	0.04	12							0.02	7
Potentilla pensylvanica	0.08	8	0.20	67	0.13	29	0.17	17			0.15	50	0.12	23
Pyrrocoma integrifolia					0.02	6	0.50	33	1.67	67			0.19	11
Sedum lanceolatum			0.20	67	0.05	18							0.03	11
Senecio canus			0.10	33	0.04	12					0.65	100	0.05	11
Senecio streptanthifolius	0.02	8			0.04	12	0.17	17	0.43	67			0.07	14
Silene drummondii					0.02	6							0.01	2
Sisyrinchium idahoense					0.02	6							0.01	2
Solidago missouriensis	1.53	77			1.22	82	2.50	67	1.67	67	0.15	50	1.39	70
Stenotus acaulis											3.50	50	0.16	2
Symphyotrichum ascendens	0.25	38	0.10	33	0.05	18	0.60	50			0.15	50	0.19	30
Symphyotrichum campestre	0.25	15			0.09	29	0.50	50	1.00	67			0.25	27
Symphyotrichum falcatum	0.46	8			0.18	6							0.20	5
Thalictrum venulosum	0.02	8											0.01	2
Trifolium longipes	0.28	77			0.17	24	0.05	17	0.10	33			0.16	36
Valeriana dioica							0.05	17					0.01	2
Vicia americana							0.17	17					0.02	2
Viola adunca	0.02	8			0.12	6	0.60	50	0.33	33			0.16	14
Viola nuttallii	0.07	23			0.02	6	0.05	17	0.33	33	0.15	50	0.06	16
Zigadenus venenosus	0.02	8			0.12	41			0.10	33			0.06	20
TOTAL NPF	26.64	100	23.93	100	28.72	100	40.25	100	36.73	100	19.65	100	29.48	100

Table 3
 Summary of Mean Percent Canopy Cover and Constancy by Class and Species for Six UPLAND SHRUBLAND
 Vegetation Types, Black Butte Baseline Study Area, 2015.

	ART TRI/POA PRA		ART TRI/FES IDA		ART TRI/FES CAM		ART TRI-DAS FRU/ POA PRA		DAS FRU-ART TRI/ FES CAM		MIXED SHRUB- SHALE OUTCROP		UPLAND SHRUBLAND COMPOSITE	
	Mean Cover	Con- stancy	Mean Cover	Con- stancy	Mean Cover	Con- stancy	Mean Cover	Con- stancy	Mean Cover	Con- stancy	Mean Cover	Con- stancy	Mean Cover	Con- stancy
	n=13		n=3		n=17		n=6		n=3		n=2		n=44	
INTRODUCED PERENNIAL FORBS														
Centaurea maculosa					0.41	6							0.16	2
Taraxacum officinale	0.45	77	0.43	67	0.15	35	4.22	83	0.33	33			0.82	55
TOTAL IPF	0.45	77	0.43	67	0.56	41	4.22	83	0.33	33			0.98	57
FERNS AND ALLIES														
Equisetum laevigatum							0.17	17					0.02	2
Selaginella densa	0.08	8	2.00	33	4.25	47	0.17	17					1.83	25
TOTAL FA	0.08	8	2.00	33	4.25	47	0.33	33					1.85	27
NATIVE ANNUAL/BIENNIAL FORBS														
Androsace occidentalis					0.02	6							0.01	2
Androsace septentrionalis	0.14	46	0.20	67	0.22	59	0.10	33					0.15	45
Collinsia parviflora					0.04	12							0.01	5
Gentianella amarella	0.02	8			0.15	24							0.07	11
Lappula squarrosa											0.15	50	0.01	2
Orthocarpus luteus	0.07	23			0.02	6	0.38	33	0.10	33			0.09	16
Orthocarpus tenuifolius					0.02	6							0.01	2
Turritis glabra	0.02	8											0.01	2
TOTAL NA/BF	0.25	69	0.20	67	0.46	76	0.48	50	0.10	33	0.15	50	0.35	66
INTRODUCED ANNUAL/BIENNIAL FORBS														
Alyssum alyssoides											1.50	100	0.07	5
Carduus nutans	0.02	8											0.01	2
Cynoglossum officinale	0.15	8					0.17	17					0.07	5
Medicago lupulina			0.10	33			0.33	17			2.00	50	0.14	7
Thlaspi arvense	0.02	8											0.01	2
Tragopogon dubius	0.05	15									0.15	50	0.02	7
TOTAL IA/BF	0.25	31	0.10	33			0.50	17			3.65	100	0.31	18
SHRUBS														
Artemisia tridentata	38.92	100	26.33	100	40.24	100	22.67	100	13.00	100	1.50	50	32.89	98
Clematis occidentalis	0.22	31			0.05	18	0.05	17					0.09	18
Dasiphora fruticosa	0.53	31	0.33	33	0.08	12	18.50	100	19.67	100	3.00	100	4.21	41
Juniperus communis	0.51	23			0.88	18	0.67	17			0.15	50	0.59	18
Juniperus horizontalis							0.50	17			4.00	100	0.25	7
Rosa woodsii					0.08	12	0.83	17			0.30	100	0.16	11
TOTAL SHRUBS	40.18	100	26.67	100	41.32	100	43.22	100	32.67	100	8.95	100	38.18	100

Table 3
Summary of Mean Percent Canopy Cover and Constancy by Class and Species for Six UPLAND SHRUBLAND
Vegetation Types, Black Butte Baseline Study Area, 2015.

	ART TRI/POA PRA		ART TRI/FES IDA		ART TRI/FES CAM		ART TRI-DAS FRU/ POA PRA		DAS FRU-ART TRI/ FES CAM		MIXED SHRUB- SHALE OUTCROP		UPLAND SHRUBLAND COMPOSITE	
	Mean Cover	Con- stancy	Mean Cover	Con- stancy	Mean Cover	Con- stancy	Mean Cover	Con- stancy	Mean Cover	Con- stancy	Mean Cover	Con- stancy	Mean Cover	Con- stancy
	n=13		n=3		n=17		n=6		n=3		n=2		n=44	
TREES (0.01-acre)														
Juniperus scopulorum	0.15	8			0.12	6							0.09	5
Pseudotsuga menziesii	0.38	8			0.25	12					2.00	50	0.30	9
TOTAL TREES (0.01-acre)	0.54	15			0.37	18					2.00	50	0.39	14
TREES (0.1-acre)														
Juniperus scopulorum	0.05	15			0.05	18							0.03	11
Pseudotsuga menziesii	0.20	23			0.31	35					1.00	50	0.22	23
TOTAL TREES (0.1-acre)	0.25	38			0.36	41					1.00	50	0.26	30
TOTAL VEGETATION (Stratified)	150.89	100	87.67	100	138.99	100	164.35	100	148.33	100	43.85	100	138.78	100

Nomenclature follows Lesica (2012).

Table 4
 Summary of Mean Percent Canopy Cover and Constancy by Class and Species for Seven
 CONIFER FOREST AND WOODLAND Habitat Types, Black Butte Baseline Study Area, 2015.

	PSE MEN/FES IDA		PSE MEN/FES CAM		PSE MEN/JUN COM		PSE MEN/CAL RUB		PSE MEN/SYM ALB		PSE MEN/LIN BOR		PIC ENG/LIN BOR		CONIFER FOREST AND WOODLAND COMPOSITE	
	Mean Cover	Con- stancy	Mean Cover	Con- stancy	Mean Cover	Con- stancy	Mean Cover	Con- stancy	Mean Cover	Con- stancy	Mean Cover	Con- stancy	Mean Cover	Con- stancy	Mean Cover	Con- stancy
	n=1		n=12		n=8		n=2		n=11		n=4		n=2		n=40	
GROUND COVER																
Bare Ground	12	100	7.66	92	4.91	75	2.00	50	5.64	82	3.33	75	2.00	100	5.66	83
Rock	6	100	7.08	67	1.79	38	0.50	50	3.66	45	1.25	25	4.00	50	3.99	50
Litter	65	100	66.67	100	70.00	100	83.50	100	63.18	100	49.50	100	68.50	100	65.55	100
Lichens	4	100	1.68	92	3.33	100	0.30	100	2.26	100	1.83	100	3.00	100	2.24	98
Moss	8	100	13.61	92	17.29	100	11.15	100	21.75	100	41.25	100	15.00	100	19.16	98
Water													1.50	50	0.08	3
Basal Vegetation	5	100	3.33	100	2.75	100	2.50	100	3.64	100	3.00	100	6.00	100	3.40	100
VEGETATION STRUCTURE (nonstratified cover)																
Total Vegetation	90	100	72.83	100	79.38	100	59.50	100	78.73	100	79.75	100	96.00	100	77.38	100
Perennial Graminoids	29	100	29.92	100	11.25	100	2.50	100	27.64	100	13.75	100	52.50	100	23.68	100
Annual Graminoids									0.09	9					0.03	3
Perennial Forbs and Subshrubs	37	100	21.08	100	14.88	100	4.50	100	21.82	100	28.50	100	41.50	100	21.38	100
Annual/Biennial Forbs	0.3	100	0.23	58	0.58	38	1.15	100	1.17	73	0.15	50	0.65	100	0.62	63
Shrubs	25	100	7.86	100	36.75	100			28.45	100	47.50	100	16.50	100	23.73	95
Trees (0.01-acre)	40	100	42.25	100	47.13	100	55.00	100	34.91	100	27.25	100	48.00	100	40.58	100
Trees (0.1-acre)	45	100	41.00	100	50.63	100	74.00	100	44.82	100	42.75	100	40.00	100	45.85	100
CLASS\SPECIES																
NATIVE PERENNIAL GRAMINOIDS																
Agropyron spicatum			4.53	67	1.41	38									1.64	28
Agropyron trachycaulum	1	100	0.24	42	0.04	13			0.33	36	0.25	25	0.50	50	0.25	33
Agrostis exarata													1.00	50	0.05	3
Agrostis scabra			0.61	25	0.28	63	0.65	100	0.45	45	0.40	75	0.15	50	0.44	48
Bromus carinatus			0.25	8	0.13	13			0.55	27			1.00	50	0.30	15
Calamagrostis rubescens			0.11	17	0.95	50	0.30	100	4.30	73	6.75	100	9.00	50	2.55	53
Carex disperma													27.00	50	1.35	3
Carex eleocharis			0.13	25											0.04	8
Carex geyeri									2.55	18	2.50	25	6.00	50	1.25	10
Carex hoodii									0.03	9					0.01	3
Carex microptera													0.15	50	0.01	3
Carex obtusata			0.03	8											0.01	3
Carex petasata	3	100	0.05	17					0.14	45					0.13	20
Carex rossii			0.69	50	0.69	100	0.15	50	1.66	64	0.40	75			0.85	63
Danthonia intermedia	4	100	1.30	50	0.95	50			0.20	45	0.08	25			0.74	43
Danthonia unispicata			1.05	42											0.32	13
Deschampsia cespitosa													0.15	50	0.01	3
Elymus glaucus											0.08	25			0.01	3

Table 4
 Summary of Mean Percent Canopy Cover and Constancy by Class and Species for Seven
 CONIFER FOREST AND WOODLAND Habitat Types, Black Butte Baseline Study Area, 2015.

	PSE MEN/FES IDA		PSE MEN/FES CAM		PSE MEN/JUN COM		PSE MEN/CAL RUB		PSE MEN/SYM ALB		PSE MEN/LIN BOR		PIC ENG/LIN BOR		CONIFER FOREST AND WOODLAND COMPOSITE	
	Mean Cover	Con- stancy	Mean Cover	Con- stancy	Mean Cover	Con- stancy	Mean Cover	Con- stancy	Mean Cover	Con- stancy	Mean Cover	Con- stancy	Mean Cover	Con- stancy	Mean Cover	Con- stancy
	n=1		n=12		n=8		n=2		n=11		n=4		n=2		n=40	
<i>Festuca campestris</i>			4.25	100	0.79	63			1.03	64	0.50	50			1.77	65
<i>Festuca idahoensis</i>	2	100	11.67	100	1.11	88			0.85	55	0.58	50			4.06	70
<i>Glyceria striata</i>													2.00	50	0.10	3
<i>Juncus balticus</i>													0.15	50	0.01	3
<i>Koeleria macrantha</i>	0.3		0.48	58	0.04	13			0.05	18					0.18	25
<i>Luzula campestris</i>									0.09	9					0.03	3
<i>Poa interior</i>			0.86	25	0.75	13									0.41	10
<i>Poa secunda</i>			0.44	25	0.04	13			0.55	18					0.29	15
<i>Stipa nelsonii</i>	12	100	1.97	67	0.41	25			1.08	82	0.25	25			1.30	53
<i>Stipa richardsonii</i>	4	100	0.86	33	0.20	38			0.15	27	0.25	25			0.46	30
<i>Trisetum spicatum</i>			0.11	17	0.16	25			0.21	27	0.50	25			0.17	20
TOTAL NPG	26.3	100	29.62	100	7.94	100	1.10	100	14.19	100	12.53	100	47.10	100	18.70	100
INTRODUCED PERENNIAL GRAMINOIDS																
<i>Phleum pratense</i>			1.17	8					2.82	36	1.00	25	6.00	50	1.53	18
<i>Poa palustris</i>									0.05	18					0.02	5
<i>Poa pratensis</i>	6	100	2.17	58	4.16	63	1.65	100	12.48	91	1.75	25	5.00	50	5.57	68
TOTAL IPG	6.0	100	3.33	58	4.16	63	1.65	100	15.35	100	2.75	25	11.00	50	7.11	70
INTRODUCED ANNUAL GRAMINOIDS																
<i>Bromus tectorum</i>									0.09	9					0.03	3
TOTAL IAG									0.09	9					0.03	3
NATIVE PERENNIAL FORBS AND SUBSHRUBS																
<i>Achillea millefolium</i>	0.3	100	0.27	50					0.16	55	0.15	50	0.15	50	0.16	40
<i>Actaea rubra</i>													1.65	100	0.08	5
<i>Agoseris glauca</i>	0.3	100	0.03	8					0.03	9	0.08	25			0.03	10
<i>Allium brevistylum</i>									0.03	9			0.15	50	0.02	5
<i>Allium cernuum</i>	0.3	100	0.25	83	0.11	38	0.15	50	0.16	55	0.08	25			0.17	55
<i>Anemone multifida</i>	0.3	100	0.43	58	0.29	38			0.20	45					0.25	40
<i>Anemone patens</i>									0.03	9					0.01	3
<i>Antennaria anaphaloides</i>			0.05	17	0.04	13			0.20	45	0.08	25			0.09	23
<i>Antennaria corymbosa</i>													0.15	50	0.01	3
<i>Antennaria neglecta</i>					1.88	13			0.09	9					0.40	5
<i>Antennaria parvifolia</i>	5	100	2.22	67	2.11	63	0.65	100	1.27	18	0.33	50			1.63	50
<i>Antennaria racemosa</i>			0.11	17	0.50	38			0.21	18	1.65	75	0.15	50	0.36	28
<i>Antennaria rosea</i>			1.91	83	0.79	50					0.25	25			0.76	38
<i>Antennaria umbrinella</i>									0.18	9					0.05	3
<i>Arabis nuttallii</i>			0.08	25											0.02	8
<i>Arenaria congesta</i>	1	100	0.29	50	0.04	13			0.05	18					0.14	25

Table 4
 Summary of Mean Percent Canopy Cover and Constancy by Class and Species for Seven
 CONIFER FOREST AND WOODLAND Habitat Types, Black Butte Baseline Study Area, 2015.

	PSE MEN/FES IDA		PSE MEN/FES CAM		PSE MEN/JUN COM		PSE MEN/CAL RUB		PSE MEN/SYM ALB		PSE MEN/LIN BOR		PIC ENG/LIN BOR		CONIFER FOREST AND WOODLAND COMPOSITE	
	Mean Cover	Con- stancy	Mean Cover	Con- stancy	Mean Cover	Con- stancy	Mean Cover	Con- stancy	Mean Cover	Con- stancy	Mean Cover	Con- stancy	Mean Cover	Con- stancy	Mean Cover	Con- stancy
	n=1		n=12		n=8		n=2		n=11		n=4		n=2		n=40	
Arnica cordifolia			0.08	8	1.33	63	0.15	50	1.75	36	2.08	100	0.50	50	1.01	40
Arnica fulgens			0.03	8											0.01	3
Arnica sororia	1	100	0.16	33							0.08	25			0.08	15
Artemisia dracunculus			0.17	8											0.05	3
Artemisia frigida			0.11	17											0.03	5
Artemisia ludoviciana	20	100	0.58	17											0.68	8
Astragalus adsurgens			0.78	42	0.25	13			0.27	18					0.36	20
Astragalus miser			0.80	33	1.00	25			1.03	45	0.83	75			0.81	35
Astragalus purshii			0.05	17											0.02	5
Balsamorhiza sagittata	0.3	100	1.19	33					0.03	9					0.37	15
Berberis repens			0.08	8	0.49	63			0.78	36	2.00	100			0.54	35
Besseyia wyomingensis			0.03	8					0.03	9					0.02	5
Boechera pendulocarpa			0.03	8											0.01	3
Boechera stricta			0.05	17											0.02	5
Campanula rotundifolia	0.3	100	0.15	50	0.08	25			0.16	55	0.23	75	0.15	50	0.14	48
Cardamine breweri													0.15	50	0.01	3
Castilleja miniata													0.15	50	0.01	3
Cerastium arvense	5	100	1.99	83	0.13	13	0.15	50	0.33	45					0.85	45
Chamerion angustifolium			0.03	8					0.03	9	0.08	25	1.00	50	0.07	10
Cirsium undulatum			0.03	8											0.01	3
Clematis hirsutissima			0.13	25											0.04	8
Comandra umbellata			0.03	8											0.01	3
Conimitella williamsii					0.04	13									0.01	3
Corallorhiza wisteriana											0.08	25			0.01	3
Crepis acuminata			0.13	25	0.04	13			0.03	9					0.06	13
Crepis atribarba	0.3	100							0.03	9					0.02	5
Dodecatheon conjugens			0.05	17					0.03	9					0.02	8
Draba oligosperma			0.03	8											0.01	3
Drymocallis arguta									0.12	18					0.03	5
Epilobium ciliatum													0.15	50	0.01	3
Erigeron caespitosus			0.53	25											0.16	8
Erigeron speciosus									0.18	9					0.05	3
Erigeron subtrineris			0.69	42	0.41	25			0.48	18	0.15	50			0.44	28
Eriogonum umbellatum	1	100	0.25	25					0.03	9					0.11	13
Eurybia conspicua					0.41	50			1.18	36	4.50	100	20.00	50	1.86	33
Fragaria vesca			0.38	42	0.91	50	0.15	50	1.85	36	1.50	75			0.96	43
Fragaria virginiana			1.00	33	1.08	63			2.48	55	1.33	75	2.00	100	1.43	50
Frasera speciosa			0.03	8	0.13	13			0.03	9	0.15	50			0.06	13
Fritillaria atropurpurea					0.04	13									0.01	3
Gaillardia aristata	1	100	0.05	17					0.03	9					0.05	10

Table 4
 Summary of Mean Percent Canopy Cover and Constancy by Class and Species for Seven
 CONIFER FOREST AND WOODLAND Habitat Types, Black Butte Baseline Study Area, 2015.

	PSE MEN/FES IDA		PSE MEN/FES CAM		PSE MEN/JUN COM		PSE MEN/CAL RUB		PSE MEN/SYM ALB		PSE MEN/LIN BOR		PIC ENG/LIN BOR		CONIFER FOREST AND WOODLAND COMPOSITE	
	Mean Cover	Constancy	Mean Cover	Constancy	Mean Cover	Constancy	Mean Cover	Constancy	Mean Cover	Constancy	Mean Cover	Constancy	Mean Cover	Constancy	Mean Cover	Constancy
	n=1		n=12		n=8		n=2		n=11		n=4		n=2		n=40	
Galium boreale			0.34	67	0.11	38	0.65	100	0.93	82	0.30	100	1.50	50	0.52	68
Galium trifidum												0.15	50	0.01	3	
Geranium richardsonii												3.00	100	0.15	5	
Geranium viscosissimum			0.17	8					0.05	18				0.07	8	
Geum macrophyllum												1.00	50	0.05	3	
Geum rivale												0.50	50	0.03	3	
Geum triflorum	1	100	0.50	25	0.25	13			0.45	55	0.33	50			0.38	33
Helianthella uniflora	1	100													0.03	3
Heuchera cylindrica			0.08	8	0.38	25			0.38	55	0.65	100	0.50	50	0.30	35
Heuchera parvifolia			0.10	33	0.20	38	1.50	100	0.03	9					0.15	25
Hieracium albiflorum					0.13	13									0.03	3
Hieracium scouleri									0.03	9					0.01	3
Linnaea borealis					0.08	25					10.75	100	3.50	100	1.27	20
Linum lewisii					0.04	13									0.01	3
Lithophragma parviflorum			0.03	8			0.30	100	0.03	9					0.03	10
Lithospermum ruderale	0.3	100	0.58	50	0.15	50			0.54	64	0.15	50			0.37	50
Lomatium dissectum	0.3	100													0.01	3
Lomatium macrocarpum			0.05	17											0.02	5
Lupinus argenteus			0.03	8											0.01	3
Lupinus leucophyllus									0.18	9	0.25	25			0.08	5
Lupinus sericeus	0.3	100	0.44	25	0.04	13			0.60	45					0.31	25
Mentha arvensis												0.50	50	0.03	3	
Mertensia viridis			0.33	17	0.04	13			0.26	36					0.18	18
Micranthes odontoloma												0.50	50	0.03	3	
Moehringia lateriflora									0.03	9					0.01	3
Moneses uniflora												0.15	50	0.01	3	
Noccaea fendleri			0.03	8											0.01	3
Orthilia secunda					0.04	13					0.15	50	0.15	50	0.03	10
Osmorhiza chilensis					0.04	13			0.03	9			0.50	50	0.04	8
Osmorhiza occidentalis									0.03	9	0.08	25	1.00	50	0.07	8
Oxytropis sericea	0.3	100													0.01	3
Pedicularis groenlandica												0.15	50	0.01	3	
Penstemon procerus			0.28	17											0.08	5
Perideridia montana									0.09	9					0.03	3
Phlox hoodii			1.00	33	0.25	13									0.35	13
Platanthera obtusata												0.15	50	0.01	3	
Potentilla anserina			0.58	8											0.18	3
Potentilla gracilis			0.91	58	0.49	75	0.15	50	1.42	73	0.33	50	0.15	50	0.81	63
Potentilla hippiana			0.03	8					0.03	9					0.02	5
Potentilla pensylvanica			0.30	33	0.04	13									0.10	13

Table 4
 Summary of Mean Percent Canopy Cover and Constancy by Class and Species for Seven
 CONIFER FOREST AND WOODLAND Habitat Types, Black Butte Baseline Study Area, 2015.

	PSE MEN/FES IDA		PSE MEN/FES CAM		PSE MEN/JUN COM		PSE MEN/CAL RUB		PSE MEN/SYM ALB		PSE MEN/LIN BOR		PIC ENG/LIN BOR		CONIFER FOREST AND WOODLAND COMPOSITE	
	Mean Cover	Constancy	Mean Cover	Constancy	Mean Cover	Constancy	Mean Cover	Constancy	Mean Cover	Constancy	Mean Cover	Constancy	Mean Cover	Constancy	Mean Cover	Constancy
	n=1		n=12		n=8		n=2		n=11		n=4		n=2		n=40	
Prosartes trachycarpa									0.03	9	0.15	50			0.02	8
Prunella vulgaris													0.15	50	0.01	3
Pyrola asarifolia													0.15	50	0.01	3
Pyrola chlorantha					0.11	38							0.15	50	0.03	10
Pyrola minor													0.15	50	0.01	3
Ranunculus uncinatus													0.15	50	0.01	3
Sedum lanceolatum			0.10	33	0.11	38	0.30	100	0.05	18	0.15	50			0.10	33
Senecio canus			0.03	8											0.01	3
Senecio integerrimus	0.3	100													0.01	3
Senecio pseud aureus													0.15	50	0.01	3
Senecio streptanthifolius			0.11	17	0.04	13			0.05	18					0.06	13
Silene drummondii			0.10	33					0.08	27	0.08	25			0.06	20
Smilacina racemosa					0.04	13			0.57	27			1.00	50	0.22	13
Smilacina stellata					0.04	13			0.08	27	0.15	50	0.15	50	0.05	18
Solidago missouriensis	1	100	1.04	83	0.15	50			0.09	9	0.25	25			0.42	43
Stellaria crispa													2.50	50	0.13	3
Stellaria longifolia													0.15	50	0.01	3
Symphotrichum ascendens									0.03	9	0.25	25			0.03	5
Symphotrichum campestre											0.08	25			0.01	3
Symphotrichum falcatum	1	100													0.03	3
Symphotrichum subspicatum													0.15	50	0.01	3
Thalictrum venulosum			0.03	8					0.51	55	1.00	25	1.50	50	0.32	23
Trifolium longipes			0.03	8					0.26	36	0.08	25	0.15	50	0.10	18
Valeriana dioica			0.05	17	1.11	75	0.15	50	1.66	64	0.65	75			0.77	48
Veronica americana													0.15	50	0.01	3
Viola adunca	0.3	100			0.04	13	0.50	50	0.30	18					0.12	13
Viola nuttallii			0.03	8	0.04	13									0.02	5
Zigadenus elegans									0.27	9	0.25	25	0.15	50	0.11	8
Zigadenus venenosus	0.3	100	0.03	8											0.02	5
TOTAL NPF	42.2	100	22.52	100	15.99	100	4.80	100	22.57	100	31.70	100	46.55	100	22.95	100
INTRODUCED PERENNIAL FORBS																
Cirsium arvense											0.25	25	0.15	50	0.03	5
Silene latifolia									0.18	9					0.05	3
Taraxacum officinale	0.3	100	0.21	50	0.28	63	0.15	50	0.54	45	0.15	50	0.50	50	0.32	53
TOTAL IPF	0.3	100	0.21	50	0.28	63	0.15	50	0.72	45	0.40	50	0.65	100	0.40	55

Table 4
 Summary of Mean Percent Canopy Cover and Constancy by Class and Species for Seven
 CONIFER FOREST AND WOODLAND Habitat Types, Black Butte Baseline Study Area, 2015.

	PSE MEN/FES IDA		PSE MEN/FES CAM		PSE MEN/JUN COM		PSE MEN/CAL RUB		PSE MEN/SYM ALB		PSE MEN/LIN BOR		PIC ENG/LIN BOR		CONIFER FOREST AND WOODLAND COMPOSITE	
	Mean Cover	Constancy	Mean Cover	Constancy	Mean Cover	Constancy	Mean Cover	Constancy	Mean Cover	Constancy	Mean Cover	Constancy	Mean Cover	Constancy	Mean Cover	Constancy
	n=1		n=12		n=8		n=2		n=11		n=4		n=2		n=40	
FERNS AND ALLIES																
Cystopteris fragilis													0.15	50	0.01	3
Selaginella densa			0.83	8											0.25	3
Woodsia oregana			0.03	8											0.01	3
TOTAL FA			0.86	17									0.15	50	0.27	8
NATIVE ANNUAL/BIENNIAL FORBS																
Androsace filiformis													0.15	50	0.01	3
Androsace occidentalis							0.15	50							0.01	3
Androsace septentrionalis			0.03	8			0.15	50	0.08	27					0.04	13
Boechera divaricarpa			0.03	8					0.03	9					0.02	5
Chenopodium fremontii							0.50	50							0.03	3
Collinsia parviflora			0.08	25			0.30	100	0.03	9					0.05	15
Collomia linearis	0.3	100	0.05	17			0.15	50	0.03	9					0.04	13
Descurainia incana					0.04	13									0.01	3
Epilobium brachycarpum			0.03	8					0.03	9					0.02	5
Gentianella amarella					0.04	13			0.09	9	0.15	50			0.05	10
Lappula squarrosa			0.03	8			0.15	50							0.02	5
Microsteris gracilis									0.03	9					0.01	3
Phacelia linearis			0.03	8											0.01	3
Polygonum douglasii							0.15	50	0.03	9					0.02	5
Turritis glabra									0.05	18					0.02	5
TOTAL NA/BF	0.3	100	0.25	42	0.08	25	1.55	100	0.39	55	0.15	50	0.15	50	0.31	48
INTRODUCED ANNUAL/BIENNIAL FORBS																
Alyssum alyssoides			0.11	17											0.03	5
Carduus nutans					0.13	13			0.27	9					0.10	5
Cynoglossum officinale					0.38	13			0.45	36			0.50	50	0.23	15
Descurainia sophia							0.15	50	0.09	9					0.03	5
Thlaspi arvense			0.03	8					0.03	9					0.02	5
Tragopogon dubius									0.05	18					0.02	5
TOTAL IA/BF			0.13	25	0.50	13	0.15	50	0.90	55			0.50	50	0.42	30
SHRUBS																
Amelanchier alnifolia			0.03	8							0.25	25			0.03	5
Arctostaphylos uva-ursi			0.67	25	7.38	75			10.64	64	10.00	100			5.60	50
Artemisia tridentata	25	100	3.03	33	0.16	25			0.12	18					1.60	23
Clematis occidentalis					0.75	25			0.75	18	0.08	25	1.50	50	0.44	15
Dasiphora fruticosa			0.03	8	0.63	13			0.05	18					0.15	10
Juniperus communis			2.11	67	25.25	100			1.73	27	34.00	100	1.15	100	9.62	63

Table 4
 Summary of Mean Percent Canopy Cover and Constancy by Class and Species for Seven
 CONIFER FOREST AND WOODLAND Habitat Types, Black Butte Baseline Study Area, 2015.

	PSE MEN/FES IDA		PSE MEN/FES CAM		PSE MEN/JUN COM		PSE MEN/CAL RUB		PSE MEN/SYM ALB		PSE MEN/LIN BOR		PIC ENG/LIN BOR		CONIFER FOREST AND WOODLAND COMPOSITE	
	Mean Cover	Con- stancy	Mean Cover	Con- stancy	Mean Cover	Con- stancy	Mean Cover	Con- stancy	Mean Cover	Con- stancy	Mean Cover	Con- stancy	Mean Cover	Con- stancy	Mean Cover	Con- stancy
	n=1		n=12		n=8		n=2		n=11		n=4		n=2		n=40	
Juniperus horizontalis			0.33	8							0.25	25			0.10	3
Lonicera utahensis											0.25	25			0.03	3
Prunus virginiana									0.09	9	0.50	25			0.08	5
Ribes cereum			0.03	8	0.04	13									0.02	5
Ribes inerme			0.17	8					0.09	9					0.08	5
Ribes setosum			0.11	17	0.63	25			1.18	36	0.50	25	3.50	100	0.71	28
Rosa acicularis													0.50	50	0.03	3
Rosa woodsii			0.49	50	0.79	50			1.33	82	1.25	75	1.50	50	0.87	58
Rubus idaeus					0.38	13			0.36	18	0.08	25	2.00	50	0.28	13
Salix bebbiana													1.50	50	0.08	3
Shepherdia canadensis					0.38	25			0.27	18	1.08	75	0.15	50	0.27	20
Spiraea betulifolia			0.50	25	2.45	75			5.03	55	2.33	100	2.00	50	2.36	50
Symphoricarpos albus			0.69	42	1.13	38			9.82	100	4.75	100	4.50	50	3.83	60
Vaccinium scoparium					0.04	13									0.01	3
TOTAL SHRUBS	25.0	100	8.17	100	39.98	100			31.46	100	55.05	100	18.30	100	26.14	95
TREES (0.01-acre)																
Juniperus scopulorum			5.36	50	0.25	13			0.27	9	0.08	25			1.74	23
Picea engelmannii													40.00	100	2.00	5
Pinus contorta			0.83	8	9.00	25			0.09	9	1.25	25	1.00	50	2.25	15
Pinus flexilis					0.25	13									0.05	3
Pinus ponderosa			0.03	8											0.01	3
Pseudotsuga menziesii	40	100	38.67	100	38.00	100	55.00	100	34.82	100	26.75	100	7.65	100	35.58	100
TOTAL TREES (0.01-acre)	40.0	100	44.88	100	47.50	100	55.00	100	35.18	100	28.08	100	48.65	100	41.63	100
TREES (0.1-acre)																
Juniperus scopulorum			1.83	67	0.16	25			0.12	18	0.08	25			0.62	33
Picea engelmannii													31.50	100	1.58	5
Pinus contorta			0.50	17	8.83	63			0.09	9	4.08	50	1.50	50	2.42	28
Pinus flexilis					0.16	25							0.15	50	0.04	8
Pinus ponderosa			0.44	25											0.13	8
Populus tremuloides											0.08	25	0.15	50	0.02	5
Pseudotsuga menziesii	45	100	39.75	100	41.88	100	74.00	100	44.82	100	39.75	100	8.00	100	41.83	100
TOTAL TREES (0.1-acre)	45.0	100	42.52	100	51.03	100	74.00	100	45.03	100	43.98	100	41.30	100	46.63	100
TOTAL VEGETATION (Stratified)	140.1	100	109.97	100	116.41	100	64.40	100	120.86	100	130.65	100	173.05	100	117.95	100

Nomenclature follows Lesica (2012).

Table 5
 Summary of Mean Percent Canopy Cover and Constancy by Class and Species for
 the LOWLAND ALTERED GRASSLAND and Three HERBACEOUS RIPARIAN AND
 WETLAND Community Types, Black Butte Baseline Study Area, 2015.

	LOWLAND ALTERED GRASSLAND (HAY MEADOW)		JUN BAL		CAR NEB		CAR UTR		HERBACEOUS RIPARIAN AND WETLAND COMPOSITE	
	Mean Cover	Con- stancy	Mean Cover	Con- stancy	Mean Cover	Con- stancy	Mean Cover	Con- stancy	Mean Cover	Con- stancy
	n=16		n=5		n=2		n=8		n=15	
GROUND COVER										
Bare Ground	0.18	25			0.15	50	1.04	25	0.57	20
Rock	0.04	13								
Litter	85.75	100	81.80	100	57.00	100	49.75	100	61.40	100
Lichens										
Moss	7.22	75	11.20	40	16.65	100	14.16	88	13.51	73
Water			0.60	20	18.00	50	26.63	88	16.80	60
Basal Vegetation	6.88	100	6.40	100	8.00	100	8.50	100	7.73	100
VEGETATION STRUCTURE (nonstratified cover)										
Total Vegetation	92.56	100	88.00	100	91.00	100	91.75	100	90.40	100
Perennial Graminoids	83.25	100	80.00	100	82.00	100	89.13	100	85.13	100
Annual Graminoids										
Perennial Forbs and Subshrubs	46.06	100	37.40	100	34.50	100	10.25	88	22.53	93
Annual/Biennial Forbs	12.24	81	0.66	40	0.50	50	0.25	13	0.42	27
Shrubs			2.20	60	4.50	50	2.91	50	2.89	53
Trees (0.01-acre)										
Trees (0.1-acre)										
CLASS\SPECIES										
NATIVE PERENNIAL GRAMINOIDS										
Agropyron trachycaulum	0.06	6								
Anthoxanthum hirtum			1.06	40	0.50	50	0.04	13	0.44	27
Bromus pumpellianus			0.06	20					0.02	7
Calamagrostis stricta			3.66	40	8.00	50	0.75	25	2.69	33
Carex aquatilis			1.60	40	4.00	50	8.00	38	5.33	40
Carex atherodes	0.02	6								
Carex microptera			0.46	40					0.15	13
Carex nebrascensis	0.52	13	1.00	40	41.00	100	10.13	75	11.20	67
Carex pellita	0.25	6	3.40	40					1.13	13
Carex praegracilis	8.56	44	16.20	100	11.00	100	3.00	25	8.47	60
Carex praticola			0.20	20					0.07	7
Carex simulata							4.00	38	2.13	20
Carex utriculata	0.13	6			0.15	50	69.00	100	36.82	60
Deschampsia cespitosa	2.00	25	4.20	80	6.00	100	1.00	50	2.73	67
Eleocharis palustris					3.00	50	0.63	25	0.73	20
Festuca rubra	0.19	6	6.20	80	1.50	50	1.29	25	2.95	47
Glyceria striata					1.00	50	0.13	13	0.20	13

Table 5
 Summary of Mean Percent Canopy Cover and Constancy by Class and Species for
 the LOWLAND ALTERED GRASSLAND and Three HERBACEOUS RIPARIAN AND
 WETLAND Community Types, Black Butte Baseline Study Area, 2015.

	LOWLAND ALTERED GRASSLAND (HAY MEADOW)		JUN BAL		CAR NEB		CAR UTR		HERBACEOUS RIPARIAN AND WETLAND COMPOSITE	
	Mean Cover	Con- stancy	Mean Cover	Con- stancy	Mean Cover	Con- stancy	Mean Cover	Con- stancy	Mean Cover	Con- stancy
	n=16		n=5		n=2		n=8		n=15	
Hordeum brachyantherum	0.02	6	0.20	20	1.00	50			0.20	13
Hordeum jubatum			2.80	20					0.93	7
Juncus balticus	7.50	56	37.60	100	15.00	50	4.13	38	16.73	60
Juncus longistylis	0.04	13								
Muhlenbergia richardsonis	0.06	6			1.00	50			0.13	7
TOTAL NPG	19.34	63	78.64	100	93.15	100	102.08	100	93.07	100
INTRODUCED PERENNIAL GRAMINOIDS										
Agropyron repens	0.25	13								
Agrostis stolonifera	1.58	50								
Alopecurus arundinaceus	11.14	56	1.20	20			8.75	13	5.07	13
Alopecurus pratensis							2.00	13	1.07	7
Bromus inermis	7.13	38								
Dactylis glomerata	0.02	6								
Phleum pratense	37.25	88	10.00	80			1.13	13	3.93	33
Poa compressa										
Poa palustris	4.13	19	5.46	80	4.00	50	0.75	25	2.75	47
Poa pratensis	27.50	94	9.40	80	3.50	50	1.50	13	4.40	40
Schedonorus arundinaceus	0.31	13								
Schedonorus pratensis	3.63	38								
TOTAL IPG	92.93	100	26.06	100	7.50	50	14.13	38	17.22	60
NATIVE PERENNIAL FORBS AND SUBSHRUBS										
Achillea millefolium	0.58	38	0.06	20					0.02	7
Agoseris glauca			0.06	20					0.02	7
Allium geveryi	0.04	13								
Allium schoenoprasum	0.44	6	0.60	20					0.20	7
Anemone multifida	0.02	6								
Antennaria microphylla	0.02	6								
Arnica chamissonis	0.23	19								
Artemisia ludoviciana	0.02	6								
Campanula rotundifolia	0.02	6								
Cerastium arvense	0.13	6								
Cicuta maculata							0.13	13	0.07	7
Crepis runcinata	0.04	13								
Dodecatheon pulchellum	0.44	19	0.46	40					0.15	13
Epilobium ciliatum							0.04	13	0.02	7
Epilobium palustre			0.06	20			0.24	50	0.15	33
Erigeron lonchophyllus	0.02	6								

Table 5
 Summary of Mean Percent Canopy Cover and Constancy by Class and Species for
 the LOWLAND ALTERED GRASSLAND and Three HERBACEOUS RIPARIAN AND
 WETLAND Community Types, Black Butte Baseline Study Area, 2015.

	LOWLAND ALTERED GRASSLAND (HAY MEADOW)		JUN BAL		CAR NEB		CAR UTR		HERBACEOUS RIPARIAN AND WETLAND COMPOSITE	
	Mean Cover	Con- stancy	Mean Cover	Con- stancy	Mean Cover	Con- stancy	Mean Cover	Con- stancy	Mean Cover	Con- stancy
	n=16		n=5		n=2		n=8		n=15	
Fragaria virginiana	0.08	13	0.06	20					0.02	7
Galium boreale	0.16	25	0.06	20					0.02	7
Galium trifidum					0.15	50	0.11	38	0.08	27
Geum aleppicum			1.20	40					0.40	13
Geum macrophyllum							0.13	13	0.07	7
Geum rivale	1.25	13	2.92	60	0.15	50			0.99	27
Lupinus leucophyllus	0.50	6								
Mentha arvensis	0.06	6	1.00	20	14.00	50	1.75	50	3.13	40
Oxytropis splendens	0.38	6								
Pedicularis groenlandica			1.20	40					0.40	13
Polygonum amphibium	0.13	6	1.60	20	1.00	50	0.04	13	0.69	20
Potamogeton filiformis							0.13	13	0.07	7
Potentilla anserina	0.91	19			2.00	50	2.25	13	1.47	13
Potentilla gracilis	3.27	88	3.86	100	1.50	50	0.38	13	1.69	47
Pyrrocoma integrifolia	0.13	6								
Ranunculus acrifolius	0.33	19								
Ranunculus macounii							0.25	13	0.13	7
Rumex occidentalis							1.04	50	0.55	27
Senecio sphaerocephalus	0.46	19	3.20	20			1.50	13	1.87	13
Sisyrinchium idahoense	0.02	6								
Solidago canadensis (S. lepida)	0.04	13	0.06	20					0.02	7
Stachys palustris			0.60	20	19.00	50	1.50	13	3.53	20
Stellaria longifolia			0.06	20			0.25	13	0.15	13
Stellaria longipes			0.06	20					0.02	7
Symphotrichum boreale							0.04	13	0.02	7
Symphotrichum lanceolatum var. hesperium							1.13	13	0.60	7
Symphotrichum subspicatum	0.66	69	7.06	100	0.50	50			2.42	40
Thalictrum venulosum	0.02	6								
Trifolium longipes	0.19	13	0.60	40					0.20	13
Viola nephrophylla	0.02	6	1.60	40	2.15	100	0.66	63	1.17	60
Zizia aptera			0.06	20					0.02	7
TOTAL NPF	10.56	94	26.44	100	40.45	100	11.54	88	20.36	93
INTRODUCED PERENNIAL FORBS										
Cerastium fontanum	0.77	13								
Cirsium arvense	0.25	19	12.80	40			0.13	13	4.33	20
Medicago sativa	0.19	6								
Sonchus arvensis			1.20	20					0.40	7
Taraxacum officinale	14.44	94	1.12	80			0.04	13	0.39	33

Table 5
 Summary of Mean Percent Canopy Cover and Constancy by Class and Species for
 the LOWLAND ALTERED GRASSLAND and Three HERBACEOUS RIPARIAN AND
 WETLAND Community Types, Black Butte Baseline Study Area, 2015.

	LOWLAND ALTERED GRASSLAND (HAY MEADOW)		JUN BAL		CAR NEB		CAR UTR		HERBACEOUS RIPARIAN AND WETLAND COMPOSITE	
	Mean Cover	Con- stancy	Mean Cover	Con- stancy	Mean Cover	Con- stancy	Mean Cover	Con- stancy	Mean Cover	Con- stancy
	n=16		n=5		n=2		n=8		n=15	
Trifolium hybridum	7.10	75	0.40	20			0.25	13	0.27	13
Trifolium pratense	18.94	75								
Trifolium repens	2.31	50	0.06	20					0.02	7
TOTAL IPF	43.99	100	15.58	80			0.41	25	5.41	40
FERNS AND ALLIES										
Equisetum arvense	0.63	6								
Equisetum laevigatum	0.14	31	0.12	40					0.04	13
TOTAL FA	0.76	38	0.12	40					0.04	13
NATIVE ANNUAL/BIENNIAL FORBS										
Cardamine pensylvanica					0.50	50			0.07	7
Rhinanthus crista-galli	6.25	50	0.60	20			0.25	13	0.33	13
TOTAL NA/BF	6.25	50	0.60	20	0.50	50	0.25	13	0.40	20
INTRODUCED ANNUAL/BIENNIAL FORBS										
Carduus nutans	0.02	6								
Carum carvi	6.56	63								
Medicago lupulina	0.02	6								
Thlaspi arvense	0.04	13	0.06	20					0.02	7
TOTAL IA/BF	6.63	69	0.06	20					0.02	7
SHRUBS										
Dasiphora fruticosa			0.60	20	1.00	50	2.63	38	1.73	33
Salix bebbiana			0.20	20			0.16	25	0.15	20
Salix boothii			0.20	20	1.00	50			0.20	13
Salix brachycarpa			1.00	20					0.33	7
Salix geyeriana					1.50	50			0.20	7
Salix planifolia			0.20	20	1.00	50	0.13	13	0.27	20
TOTAL SHRUBS			2.20	60	4.50	50	2.91	50	2.89	53
TOTAL VEGETATION (Stratified)	180.48	100	149.70	100	146.10	100	131.31	100	139.41	100

Nomenclature follows Lesica (2012).

Table 6
 Summary of Mean Percent Canopy Cover and Constancy by Class and Species for 12 Sample Sites
 in Three DASIPHORA FRUTICOSA RIPARIAN AND WETLAND Community Types and 25 Sites in Two
 SALIX RW Series, Black Butte Baseline Study Area, 2015.

	DAS FRU/POA PRA		DAS FRU/DES CES		DAS FRU/CAR UTR		SAL BEB		SAL GEY		SHRUB RIPARIAN AND WETLAND COMPOSITE	
	Mean Cover	Con- stancy	Mean Cover	Con- stancy	Mean Cover	Con- stancy	Mean Cover	Con- stancy	Mean Cover	Con- stancy	Mean Cover	Con- stancy
	n=6		n=4		n=2		n=13		n=12		n=37	
GROUND COVER												
Bare Ground	1.67	50			1.00	50	0.35	62	0.92	25	0.74	41
Rock							1.18	15	0.08	8	0.44	8
Litter	90.67	100	86.50	100	76.00	100	68.85	100	74.67	100	76.57	100
Lichens							0.02	8			0.01	3
Moss	0.88	67	7.00	100	9.50	100	17.41	100	15.00	92	12.39	92
Water					4.50	100	4.15	62	1.42	42	2.16	41
Basal Vegetation	6.83	100	6.50	100	9.00	100	8.15	100	7.92	100	7.73	100
VEGETATION STRUCTURE (nonstratified cover)												
Total Vegetation	93.83	100	95.25	100	97.00	100	94.54	100	98.00	100	95.76	100
Perennial Graminoids	73.00	100	70.00	100	91.50	100	82.85	100	56.00	100	71.62	100
Perennial Forbs and Subshrubs	52.17	100	40.25	100	11.00	100	31.00	100	33.33	100	35.11	100
Annual/Biennial Forbs	0.77	50	0.08	25			0.30	38	1.46	58	0.71	43
Shrubs	43.50	100	62.50	100	21.00	100	53.77	100	78.50	100	59.30	100
Trees (0.01-acre)							0.38	31			0.13	11
Trees (0.1-acre)							0.27	46			0.09	16
CLASS\SPECIES												
NATIVE PERENNIAL GRAMINOIDS												
Agropyron trachycaulum	0.05	17	2.25	100			0.10	15	0.58	8	0.48	22
Agrostis scabra	0.17	17	0.25	25							0.05	5
Anthoxanthum hirtum									0.33	8	0.11	3
Bromus carinatus	0.17	17									0.03	3
Bromus ciliatus							0.08	8			0.03	3
Bromus pumpellianus							0.10	15	0.17	17	0.09	11
Calamagrostis canadensis							0.08	8	2.33	50	0.78	19
Calamagrostis stricta			1.25	50	2.00	50	0.46	31	0.25	17	0.49	24
Carex aquatilis							2.38	23			0.84	8
Carex athrostachya	0.05	17									0.01	3
Carex aurea							0.07	23	0.03	8	0.03	11
Carex interior							0.69	23	0.03	8	0.25	11
Carex microptera	0.17	17	0.50	25	0.50	50	0.15	15			0.16	14
Carex multicosata	0.17	17									0.03	3
Carex nebrascensis	0.17	17	0.50	25	19.00	100	9.08	54	2.83	33	5.22	41

Table 6
 Summary of Mean Percent Canopy Cover and Constancy by Class and Species for 12 Sample Sites in Three DASIPHORA FRUTICOSA RIPARIAN AND WETLAND Community Types and 25 Sites in Two SALIX RW Series, Black Butte Baseline Study Area, 2015.

	DAS FRU/POA PRA		DAS FRU/DES CES		DAS FRU/CAR UTR		SAL BEB		SAL GEY		SHRUB RIPARIAN AND WETLAND COMPOSITE	
	Mean Cover	Con- stancy	Mean Cover	Con- stancy	Mean Cover	Con- stancy	Mean Cover	Con- stancy	Mean Cover	Con- stancy	Mean Cover	Con- stancy
	n=6		n=4		n=2		n=13		n=12		n=37	
Carex pachystachya	0.33	17					0.23	8			0.14	5
Carex pellita			4.50	50	2.00	50	7.69	23	2.92	25	4.24	24
Carex praegracilis	5.50	67	9.75	75	6.00	50	2.00	31	1.86	33	3.58	43
Carex praticola	1.33	33									0.22	5
Carex simulata							2.31	8			0.81	3
Carex utriculata	0.33	17			50.00	100	38.38	92	26.92	83	24.97	68
Danthonia californica	1.67	17	0.08	25							0.28	5
Danthonia intermedia	1.33	17	0.25	25							0.24	5
Deschampsia cespitosa	1.17	50	13.00	100	15.50	100	2.69	46	0.75	25	3.62	49
Festuca rubra	2.88	83	13.50	100	2.00	100	2.79	62	1.78	42	3.59	65
Glyceria grandis									0.08	8	0.03	3
Glyceria striata							1.33	46	0.44	25	0.61	24
Juncus balticus	6.67	50	12.25	100	5.50	100	14.31	85	6.58	58	9.86	73
Juncus longistylis							1.12	23			0.39	8
Juncus nodosus									0.03	8	0.01	3
Muhlenbergia richardsonis	0.33	17	1.00	25	0.15	50	0.05	15			0.19	14
Phalaris arundinacea									0.50	8	0.16	3
Scirpus microcarpus									1.00	17	0.32	5
Stipa richardsonii	0.17	17									0.03	3
TOTAL NPG	22.65	100	59.08	100	102.65	100	86.10	100	49.40	100	61.88	100
INTRODUCED PERENNIAL GRAMINOIDS												
Agrostis stolonifera	5.33	33	4.00	25	9.00	50	3.23	38	1.25	25	3.32	32
Alopecurus arundinaceus							0.23	8			0.08	3
Alopecurus pratensis					0.50	50	0.02	8	0.17	8	0.09	8
Bromus inermis	0.05	17					1.69	8	1.11	17	0.96	11
Phleum pratense	30.17	100	2.00	50	1.50	50	4.77	31	4.58	25	8.35	43
Poa palustris			0.08	25			1.54	54	6.42	83	2.63	49
Poa pratensis	37.00	100	23.00	100	6.00	50	12.31	62	4.11	75	14.47	76
Schedonorus pratensis							0.02	8			0.01	3
TOTAL IPG	72.55	100	29.08	100	17.00	50	23.82	69	17.63	92	29.91	84
NATIVE PERENNIAL FORBS AND SUBSHRUBS												
Achillea millefolium	1.38	83	1.33	100	0.50	50	0.17	38	0.11	17	0.49	46
Agoseris glauca	0.27	50					0.02	8			0.05	11
Allium geberi	0.05	17	0.08	25							0.02	5
Allium schoenoprasum	0.17	17	1.08	75							0.14	11

Table 6
 Summary of Mean Percent Canopy Cover and Constancy by Class and Species for 12 Sample Sites in Three DASIPHORA FRUTICOSA RIPARIAN AND WETLAND Community Types and 25 Sites in Two SALIX RW Series, Black Butte Baseline Study Area, 2015.

	DAS FRU/POA PRA		DAS FRU/DES CES		DAS FRU/CAR UTR		SAL BEB		SAL GEY		SHRUB RIPARIAN AND WETLAND COMPOSITE	
	Mean Cover	Con- stancy	Mean Cover	Con- stancy	Mean Cover	Con- stancy	Mean Cover	Con- stancy	Mean Cover	Con- stancy	Mean Cover	Con- stancy
	n=6		n=4		n=2		n=13		n=12		n=37	
Anemone multifida	0.05	17									0.01	3
Antennaria microphylla	1.83	50	0.08	25							0.31	11
Antennaria neglecta							0.05	15			0.02	5
Antennaria rosea	3.00	17	0.58	50							0.55	8
Arabis nuttallii	0.05	17									0.01	3
Arnica chamissonis									0.19	17	0.06	5
Arnica fulgens	0.05	17									0.01	3
Astragalus agrestis	1.17	17									0.19	3
Astragalus alpinus							0.08	8			0.03	3
Campanula rotundifolia	0.05	17									0.01	3
Canadanthus modestus									3.08	50	1.00	16
Cardamine breweri					0.15	50					0.01	3
Castilleja miniata							0.05	15	0.08	8	0.04	8
Cerastium arvense	0.83	33									0.14	5
Cicuta maculata									0.03	8	0.01	3
Cirsium hookerianum					0.15	50					0.01	3
Cirsium longistylum	0.05	17									0.01	3
Cirsium scariosum	0.05	17	0.08	25							0.02	5
Claytonia rosea	0.05	17	0.08	25							0.02	5
Crepis atriobarba	0.05	17									0.01	3
Crepis runcinata	0.10	33	0.08	25			0.07	23			0.05	16
Dodecatheon pulchellum	0.33	17	0.50	25			0.02	8			0.12	8
Epilobium ciliatum					0.50	50	0.32	46	0.63	42	0.35	32
Epilobium palustre					0.15	50	0.07	23			0.03	11
Erigeron lonchophyllus	0.05	17	0.08	25			0.02	8			0.02	8
Erigeron subtrinervis	0.05	17									0.01	3
Fragaria virginiana	6.00	100	2.50	75			2.31	62	0.69	25	2.28	54
Galium boreale	2.17	83	1.23	100			0.48	31	0.63	42	0.86	49
Galium trifidum							0.09	31	0.08	25	0.06	19
Gentiana affinis			0.08	25			0.05	15			0.02	8
Geranium richardsonii							0.31	8			0.11	3
Geranium viscosissimum	0.05	17					0.38	15			0.14	8
Geum aleppicum	0.17	17					0.23	8	0.19	17	0.17	11
Geum macrophyllum	1.00	17			1.00	50	0.62	23	2.58	58	1.27	32
Geum rivale	1.83	33	2.25	50	0.15	50	6.77	62	6.08	50	4.90	51
Heracleum lanatum							1.08	8			0.38	3
Iris missouriensis	1.33	17	0.08	25							0.22	5

Table 6
 Summary of Mean Percent Canopy Cover and Constancy by Class and Species for 12 Sample Sites in Three DASIPHORA FRUTICOSA RIPARIAN AND WETLAND Community Types and 25 Sites in Two SALIX RW Series, Black Butte Baseline Study Area, 2015.

	DAS FRU/POA PRA		DAS FRU/DES CES		DAS FRU/CAR UTR		SAL BEB		SAL GEY		SHRUB RIPARIAN AND WETLAND COMPOSITE	
	Mean Cover	Con- stancy	Mean Cover	Con- stancy	Mean Cover	Con- stancy	Mean Cover	Con- stancy	Mean Cover	Con- stancy	Mean Cover	Con- stancy
	n=6		n=4		n=2		n=13		n=12		n=37	
Lupinus leucophyllus	0.05	17					0.69	8			0.01	3
Lysimachia ciliata											0.24	3
Mentha arvensis							1.25	31	1.53	58	0.94	30
Mimulus guttatus					0.15	50	0.08	8			0.04	5
Moehringia lateriflora							0.05	15	0.03	8	0.02	8
Oxytropis deflexa	0.50	17									0.08	3
Parnassia palustris					0.15	50	0.35	31	0.03	8	0.14	16
Paronychia sessiliflora											0.00	0
Pedicularis groenlandica							0.15	8			0.05	3
Perideridia montana	0.17	17									0.03	3
Petasites frigidus							0.31	8	6.50	25	2.22	11
Platanthera hyperborea							0.07	23	0.05	17	0.04	14
Polygonum amphibium									0.08	8	0.03	3
Potentilla anserina	0.17	17							0.43	42	0.17	16
Potentilla gracilis	9.67	100	6.00	100	0.30	100	0.33	31	0.13	25	2.39	51
Prunella vulgaris	0.50	17					0.25	15	0.05	17	0.19	14
Pyrola asarifolia							0.35	46	0.03	8	0.13	19
Pyrocoma integrifolia	0.22	33									0.04	5
Ranunculus macounii			0.08	25			0.12	23	0.03	8	0.06	14
Ranunculus uncinatus			0.50	25							0.05	3
Rumex occidentalis					0.15	50	0.38	31	0.53	25	0.31	22
Rumex salicifolius							0.02	8			0.01	3
Scutellaria galericulata									0.13	25	0.04	8
Senecio pauperculus							0.08	8	0.03	8	0.04	5
Senecio pseudoureus									0.61	33	0.20	11
Senecio sphaerocephalus							0.18	15	0.69	17	0.29	11
Sisyrinchium idahoense			0.08	25							0.01	3
Smilacina stellata	0.15	50	0.23	75			0.07	23	0.16	33	0.12	35
Solidago canadensis (S. lepida)	2.00	67	0.50	25			1.61	54	0.50	25	1.11	41
Sparganium angustifolium									0.03	8	0.01	3
Spiranthes romanzoffiana							0.07	23			0.02	8
Stachys palustris			0.08	25			0.05	15	0.19	17	0.09	14
Stellaria longifolia							0.22	31	0.38	67	0.20	32
Stellaria longipes							0.05	15			0.02	5
Symphyotrichum ascendens	1.33	17					0.62	8			0.43	5
Symphyotrichum boreale									0.17	8	0.05	3
Symphyotrichum campestre	0.33	17									0.05	3
Symphyotrichum foliaceum	0.83	17					0.69	8			0.38	5
Symphyotrichum subspicatum	6.50	50	13.25	100	5.15	100	5.95	85	4.28	92	6.24	84

Table 6
 Summary of Mean Percent Canopy Cover and Constancy by Class and Species for 12 Sample Sites in Three DASIPHORA FRUTICOSA RIPARIAN AND WETLAND Community Types and 25 Sites in Two SALIX RW Series, Black Butte Baseline Study Area, 2015.

	DAS FRU/POA PRA		DAS FRU/DES CES		DAS FRU/CAR UTR		SAL BEB		SAL GEY		SHRUB RIPARIAN AND WETLAND COMPOSITE	
	Mean Cover	Con- stancy	Mean Cover	Con- stancy	Mean Cover	Con- stancy	Mean Cover	Con- stancy	Mean Cover	Con- stancy	Mean Cover	Con- stancy
	n=6		n=4		n=2		n=13		n=12		n=37	
Thalictrum venulosum	0.17	17	0.25	25			0.02	8	0.36	17	0.18	14
Trifolium longipes	0.05	17	0.90	75			0.02	8	0.33	8	0.22	16
Valeriana dioica			0.08	25			0.07	23	0.03	8	0.04	14
Valeriana edulis	0.67	17	2.33	75							0.36	11
Veronica americana					0.15	50	0.10	15	0.24	33	0.12	19
Viola adunca	0.43	50	0.08	25			0.02	8	0.05	17	0.10	19
Viola canadensis							0.02	8	0.28	25	0.10	11
Viola nephrophylla	2.50	17	3.83	75	1.50	50	3.33	85	1.58	67	2.58	65
Zigadenus elegans			0.33	50							0.04	5
Zizia aptera	0.50	33	0.25	25			0.05	15			0.12	14
TOTAL NPF	48.92	100	38.78	100	10.15	100	30.81	100	33.80	100	34.46	100
INTRODUCED PERENNIAL FORBS												
Cerastium fontanum			0.08	25			0.07	23	0.03	8	0.04	14
Cirsium arvense	3.22	50					0.54	23	0.75	42	0.95	30
Knautia arvensis	0.05	17							0.03	8	0.02	5
Plantago major					0.15	50	0.05	15	0.08	25	0.05	16
Taraxacum officinale	7.00	100	5.15	100	1.00	50	1.45	54	1.38	50	2.71	65
Trifolium hybridum	1.00	33					1.41	15	0.44	25	0.80	19
Trifolium pratense	3.00	50									0.49	8
Trifolium repens	0.50	17	4.00	25							0.51	5
TOTAL IPF	14.77	100	9.23	100	1.15	50	3.52	62	2.70	58	5.56	70
FERNS AND ALLIES												
Botrychium minganense							0.02	8			0.01	3
Equisetum arvense	0.05	17					0.30	31	0.72	33	0.35	24
Equisetum laevigatum	0.05	17	0.15	50			0.12	38	0.03	8	0.07	24
TOTAL FA	0.10	33	0.15	50			0.44	62	0.74	42	0.43	46
NATIVE ANNUAL/BIENNIAL FORBS												
Androsace septentrionalis							0.02	8			0.01	3
Arabis hirsuta									0.03	8	0.01	3
Artemisia biennis									0.03	8	0.01	3
Cardamine pensylvanica							0.02	8	0.22	25	0.08	11
Erysimum cheiranthoides									0.17	8	0.05	3
Orthocarpus luteus	0.05	17									0.01	3
Rorippa palustris									0.36	17	0.12	5
Turritis glabra							0.02	8			0.01	3
TOTAL NA/BF	0.05	17					0.07	23	0.79	50	0.29	27

Table 6
 Summary of Mean Percent Canopy Cover and Constancy by Class and Species for 12 Sample Sites
 in Three DASIPHORA FRUTICOSA RIPARIAN AND WETLAND Community Types and 25 Sites in Two
 SALIX RW Series, Black Butte Baseline Study Area, 2015.

	DAS FRU/POA PRA		DAS FRU/DES CES		DAS FRU/CAR UTR		SAL BEB		SAL GEY		SHRUB RIPARIAN AND WETLAND COMPOSITE	
	Mean Cover	Con- stancy	Mean Cover	Con- stancy	Mean Cover	Con- stancy	Mean Cover	Con- stancy	Mean Cover	Con- stancy	Mean Cover	Con- stancy
	n=6		n=4		n=2		n=13		n=12		n=37	
INTRODUCED ANNUAL/BIENNIAL FORBS												
Carduus nutans	0.17	17									0.03	3
Cirsium vulgare									0.03	8	0.01	3
Cynoglossum officinale	0.05	17	0.08	25			0.23	15	0.25	8	0.18	14
Galeopsis tetrahit									0.33	8	0.11	3
Medicago lupulina	0.50	17					0.02	8			0.09	5
Thlaspi arvense									0.03	8	0.01	3
TOTAL IA/BF	0.72	33	0.08	25			0.25	23	0.63	17	0.42	22
SHRUBS												
Arctostaphylos uva-ursi							0.54	15			0.19	5
Betula glandulosa							1.77	15	1.67	17	1.16	11
Dasiphora fruticosa	42.67	100	62.50	100	21.00	100	16.08	92	6.92	75	22.70	89
Juniperus communis							1.20	54			0.42	19
Juniperus horizontalis			0.25	25							0.03	3
Ribes inerme							0.08	8	2.33	83	0.78	30
Ribes setosum			0.08	25			0.22	38	0.69	17	0.31	22
Rosa acicularis							0.15	8			0.05	3
Rosa woodsii	0.17	17					0.43	38	0.13	42	0.22	30
Salix bebbiana	1.00	17	0.25	25			26.77	92	11.00	58	13.16	57
Salix boothii							0.23	15	34.00	83	11.11	32
Salix brachycarpa							1.15	15	0.08	8	0.43	8
Salix drummondiana									2.33	17	0.76	5
Salix geyeriana							0.62	23	29.08	83	9.65	35
Salix melanopsis							0.08	8	1.00	8	0.35	5
Salix planifolia							6.92	54	9.83	58	5.62	38
Salix pseudomonticola							4.23	69	0.50	17	1.65	30
Shepherdia canadensis							0.08	8			0.03	3
TOTAL SHRUBS	43.83	100	63.08	100	21.00	100	60.55	100	99.56	100	68.62	100
TREES (0.01-acre)												
Juniperus scopulorum							0.35	23			0.12	8
Pinus flexilis							0.02	8			0.01	3
TOTAL TREES (0.01-acre)							0.38	31			0.13	11

Table 6
 Summary of Mean Percent Canopy Cover and Constancy by Class and Species for 12 Sample Sites in Three DASIPHORA FRUTICOSA RIPARIAN AND WETLAND Community Types and 25 Sites in Two SALIX RW Series, Black Butte Baseline Study Area, 2015.

	DAS FRU/POA PRA		DAS FRU/DES CES		DAS FRU/CAR UTR		SAL BEB		SAL GEY		SHRUB RIPARIAN AND WETLAND COMPOSITE	
	Mean Cover	Con- stancy	Mean Cover	Con- stancy	Mean Cover	Con- stancy	Mean Cover	Con- stancy	Mean Cover	Con- stancy	Mean Cover	Con- stancy
	n=6		n=4		n=2		n=13		n=12		n=37	
TREES (0.1-acre)												
Juniperus scopulorum							0.22	31			0.08	11
Picea engelmannii							0.02	8			0.01	3
Pinus flexilis							0.02	8			0.01	3
Populus tremuloides							0.02	8			0.01	3
TOTAL TREES (0.1-acre)							0.29	46			0.10	16
TOTAL VEGETATION (Stratified)	203.58	100	199.45	100	151.95	100	205.92	100	205.26	100	201.71	100

Nomenclature follows Lesica (2012).

Table 7
 Summary of Mean Percent Canopy Cover and Constancy by Class
 and Species for Four Sample Sites in Two DECIDUOUS FOREST
 RIPARIAN AND WETLAND Vegetation Types, Black Butte Baseline
 Study Area, 2015.

	POP TRE/ OSM OCC		POP TRE/ POA PRA		DECIDUOUS FOREST RIPARIAN AND WETLAND COMPOSITE	
	Mean Cover	Con- stancy	Mean Cover	Con- stancy	Mean Cover	Con- stancy
	n=1		n=3		n=4	
GROUND COVER						
Bare Ground	7.00	100	5.00	67	5.50	75
Rock						
Litter	86.00	100	84.33	100	84.75	100
Lichens			1.00	67	0.75	50
Moss			2.43	100	1.83	75
Water						
Basal Vegetation	7.00	100	7.33	100	7.25	100
VEGETATION STRUCTURE (nonstratified cover)						
Total Vegetation	95.00	100	95.00	100	95.00	100
Perennial Graminoids	74.00	100	73.00	100	73.25	100
Annual Graminoids						
Perennial Forbs and Subshrubs	48.00	100	51.00	100	50.25	100
Annual/Biennial Forbs	2.00	100	1.53	100	1.65	100
Shrubs	5.00	100	24.67	100	19.75	100
Trees (0.01-acre)	52.00	100	52.33	100	52.25	100
Trees (0.1-acre)	52.00	100	51.33	100	51.50	100
CLASS\SPECIES						
NATIVE PERENNIAL GRAMINOIDS						
Agropyron trachycaulum	3.00	100	0.67	33	1.25	50
Agrostis scabra			0.33	33	0.25	25
Bromus carinatus	2.00	100	0.77	67	1.08	75
Calamagrostis rubescens	30.00	100	1.33	33	8.50	50
Carex petasata			0.33	33	0.25	25
Danthonia intermedia			0.33	33	0.25	25
Festuca campestris			0.33	33	0.25	25
Festuca idahoensis			0.33	33	0.25	25
TOTAL NPG	35.00	100	4.43	100	12.08	100
INTRODUCED PERENNIAL GRAMINOIDS						
Bromus inermis			0.67	33	0.50	25
Phleum pratense	32.00	100	22.33	100	24.75	100
Poa pratensis	18.00	100	54.00	100	45.00	100
TOTAL IPG	50.00	100	77.00	100	70.25	100
NATIVE PERENNIAL FORBS AND SUBSHRUBS						
Achillea millefolium	1.00	100	3.33	100	2.75	100
Actaea rubra	7.00	100			1.75	25
Allium brevistylum	0.30	100	0.10	33	0.15	50
Allium cernuum			0.10	33	0.08	25
Allium geveryi			0.10	33	0.08	25
Antennaria anaphaloides			0.10	33	0.08	25
Arnica cordifolia			1.33	33	1.00	25
Arnica fulgens			0.10	33	0.08	25
Campanula rotundifolia			0.30	100	0.23	75
Castilleja miniata	0.30	100	0.10	33	0.15	50
Cerastium arvense			0.33	33	0.25	25
Epilobium ciliatum			0.10	33	0.08	25
Eurybia integrifolia			6.67	33	5.00	25
Fragaria virginiana	3.00	100	3.67	67	3.50	75
Galium boreale	1.00	100	2.33	100	2.00	100
Geranium richardsonii	25.00	100			6.25	25
Geranium viscosissimum			10.00	100	7.50	75
Geum aleppicum			0.33	33	0.25	25

Table 7
 Summary of Mean Percent Canopy Cover and Constancy by Class
 and Species for Four Sample Sites in Two DECIDUOUS FOREST
 RIPARIAN AND WETLAND Vegetation Types, Black Butte Baseline
 Study Area, 2015.

	POP TRE/ OSM OCC		POP TRE/ POA PRA		DECIDUOUS FOREST RIPARIAN AND WETLAND COMPOSITE	
	Mean Cover	Con- stancy	Mean Cover	Con- stancy	Mean Cover	Con- stancy
	n=1		n=3		n=4	
Geum macrophyllum	2.00	100	0.67	33	1.00	50
Geum triflorum			0.33	33	0.25	25
Heracleum lanatum			0.33	33	0.25	25
Ligusticum filicinum			0.33	33	0.25	25
Lupinus leucophyllus			1.00	33	0.75	25
Osmorhiza occidentalis	13.00	100			3.25	25
Perideridia montana	0.30	100	1.00	100	0.83	100
Potentilla gracilis			3.67	100	2.75	75
Ranunculus uncinatus	1.00	100			0.25	25
Smilacina racemosa	0.30	100			0.08	25
Solidago canadensis (S. lepida)			0.10	33	0.08	25
Symphytotrichum subspicatum			2.00	33	1.50	25
Thalictrum venulosum	1.00	100	0.67	33	0.75	50
Zigadenus elegans			0.10	33	0.08	25
TOTAL NPF	55.20	100	39.20	100	43.20	100
INTRODUCED PERENNIAL FORBS						
Cirsium arvense			0.10	33	0.08	25
Taraxacum officinale	1.00	100	21.33	100	16.25	100
TOTAL IPF	1.00	100	21.43	100	16.33	100
NATIVE ANNUAL/BIENNIAL FORBS						
Collomia linearis			0.20	67	0.15	50
TOTAL NA/BF			0.20	67	0.15	50
INTRODUCED ANNUAL/BIENNIAL FORBS						
Cirsium vulgare			0.33	33	0.25	25
Cynoglossum officinale	2.00	100	1.10	67	1.33	75
TOTAL IA/BF	2.00	100	1.43	67	1.58	75
SHRUBS						
Dasiphora fruticosa			0.33	33	0.25	25
Ribes inerme			0.10	33	0.08	25
Ribes setosum			0.33	33	0.25	25
Rosa woodsii	3.00	100	23.00	100	18.00	100
Symphoricarpos albus	3.00	100	1.33	33	1.75	50
Symphoricarpos occidentalis			0.10	33	0.08	25
TOTAL SHRUBS	6.00	100	25.20	100	20.40	100
TREES (0.01-acre)						
Picea engelmannii			0.33	33	0.25	25
Populus tremuloides	52.00	100	52.33	100	52.25	100
TOTAL TREES (0.01-acre)	52.00	100	52.67	100	52.50	100
TREES (0.1-acre)						
Picea engelmannii	1.00	100	0.10	33	0.33	50
Pinus flexilis	0.30	100			0.08	25
Populus tremuloides	52.00	100	50.67	100	51.00	100
Pseudotsuga menziesii			1.00	33	0.75	25
TOTAL TREES (0.1-acre)	53.30	100	51.77	100	52.15	100
TOTAL VEGETATION (Stratified)	201.20	100	221.57	100	216.48	100

Nomenclature follows Lesica (2012).

Table 8
 Summary of Shrub Density (Plants Per Acre) by Species for Five
 UPLAND GRASSLAND Vegetation Types, Black Butte Baseline Study Area,
 2015.

	UPLAND ALTERED GRASSLAND	FES IDA/ AGR SPI	FES IDA/ STI RIC	FES CAM/ AGR SPI	FES CAM/ FES IDA	UPLAND GRASSLAND COMPOSITE
SHRUB SPECIES/AGE CLASS	n=9	n=3	n=2	n=1	n=13	n=28
Artemisia tridentata						
immature/mature	292.3	33.7	1062.4		350.2	336.1
decadent						
Total live	292.3	33.7	1062.4		350.2	336.1
Dasiphora fruticosa						
immature/mature	33.7				202.4	104.8
decadent						
Total live	33.7				202.4	104.8
Juniperus communis						
immature/mature				101.2		3.6
decadent						
Total live				101.2		3.6
Rosa woodsii						
immature/mature	269.8		1871.8			220.4
decadent						
Total live	269.8		1871.8			220.4
TOTAL SHRUBS						
IMMATURE/MATURE	595.8	33.7	2934.2	101.2	552.6	664.9
DECADENT						
TOTAL LIVE	595.8	33.7	2934.2	101.2	552.6	664.9

Table 9
Summary of Shrub Density (Plants Per Acre) by Species for Six UPLAND SHRUBLAND
Vegetation Types, Black Butte Baseline Study Area, 2015.

SHRUB SPECIES/AGE CLASS	ART TRI/ POA PRA n=13	ART TRI/ FES IDA n=3	ART TRI/ FES CAM n=17	ART TRI- DAS FRU/ POA PRA n=6	DAS FRU- ART TRI/ FES CAM n=3	MIXED SHRUB- SHALE OUTCROP n=2	UPLAND SHRUBLAND COMPOSITE n=44
Artemisia tridentata							
immature/mature	5417.0	4924.1	4969.7	3642.5	573.4	607.1	4419.7
decadent	474.8	404.7	363.1	354.1	33.7		358.7
Total live	5891.8	5328.8	5332.8	3996.6	607.1	607.1	4778.5
Dasiphora fruticosa							
immature/mature	93.4			1332.2	2226.0	253.0	372.5
decadent							
Total live	93.4			1332.2	2226.0	253.0	372.5
Juniperus communis							
immature/mature		33.7	11.9				6.9
decadent							
Total live		33.7	11.9				6.9
Juniperus horizontalis							
immature/mature						50.6	2.3
decadent							
Total live						50.6	2.3
Rosa woodsii							
immature/mature			107.1	67.5		607.1	78.2
decadent							
Total live			107.1	67.5		607.1	78.2
TOTAL SHRUBS							
IMMATURE/MATURE	5510.4	4957.8	5088.8	5042.1	2799.3	1517.7	4879.6
DECADENT	474.8	404.7	363.1	354.1	33.7		358.7
TOTAL LIVE	5985.2	5362.5	5451.8	5396.3	2833.0	1517.7	5238.4

Table 10
Summary of Shrub Density (Plants Per Acre) by Species for Seven CONIFER FOREST AND
WOODLAND Habitat Types, Black Butte Baseline Study Area, 2015.

SHRUB SPECIES/AGE CLASS	PSE MEN/ FES IDA n=1	PSE MEN/ FES CAM n=12	PSE MEN/ JUN COM n=8	PSE MEN/ CAL RUB n=2	PSE MEN/ SYM ALB n=11	PSE MEN/ LIN BOR n=4	PIC ENG/ LIN BOR n=2	CONIFER FOREST AND WOODLAND COMPOSITE n=40
Arctostaphylos uva-ursi								
immature/mature		1045.5	3427.5		3440.1	3642.5		2309.4
decadent								
Total live		1045.5	3427.5		3440.1	3642.5		2309.4
Artemisia tridentata								
immature/mature	1214	404.7	12.6		27.6			161.9
decadent	1012	202.4						86.0
Total live	2226	607.1	12.6		27.6			247.9
Clematis occidentalis								
immature/mature					110.4		404.7	50.6
decadent								
Total live					110.4		404.7	50.6
Dasiphora fruticosa								
immature/mature			126.5		27.6	50.6		37.9
decadent								
Total live			126.5		27.6	50.6		37.9
Juniperus communis								
immature/mature		67.5	872.7		46.0	1795.9	101.2	392.1
decadent								
Total live		67.5	872.7		46.0	1795.9	101.2	392.1
Juniperus horizontalis								
immature/mature		33.7						10.1
decadent								
Total live		33.7						10.1

Table 10
Summary of Shrub Density (Plants Per Acre) by Species for Seven CONIFER FOREST AND
WOODLAND Habitat Types, Black Butte Baseline Study Area, 2015.

SHRUB SPECIES/AGE CLASS	PSE MEN/ FES IDA n=1	PSE MEN/ FES CAM n=12	PSE MEN/ JUN COM n=8	PSE MEN/ CAL RUB n=2	PSE MEN/ SYM ALB n=11	PSE MEN/ LIN BOR n=4	PIC ENG/ LIN BOR n=2	CONIFER FOREST AND WOODLAND COMPOSITE n=40
Lonicera utahensis								
immature/mature						25.3		2.5
decadent								
Total live						25.3		2.5
Ribes cereum								
immature/mature					27.6			7.6
decadent								
Total live					27.6			7.6
Ribes inerme								
immature/mature		16.9						5.1
decadent								
Total live		16.9						5.1
Ribes setosum								
immature/mature		16.9	50.6		174.8	126.5	1011.8	126.5
decadent								
Total live		16.9	50.6		174.8	126.5	1011.8	126.5
Rosa acicularis								
immature/mature							1062.4	53.1
decadent								
Total live							1062.4	53.1
Rosa woodsii								
immature/mature		994.9	1973.0		1085.4	2453.6	809.4	1277.4
decadent								
Total live		994.9	1973.0		1085.4	2453.6	809.4	1277.4

Table 10
 Summary of Shrub Density (Plants Per Acre) by Species for Seven CONIFER FOREST AND
 WOODLAND Habitat Types, Black Butte Baseline Study Area, 2015.

	PSE MEN/ FES IDA	PSE MEN/ FES CAM	PSE MEN/ JUN COM	PSE MEN/ CAL RUB	PSE MEN/ SYM ALB	PSE MEN/ LIN BOR	PIC ENG/ LIN BOR	CONIFER FOREST AND WOODLAND COMPOSITE
SHRUB SPECIES/AGE CLASS	n=1	n=12	n=8	n=2	n=11	n=4	n=2	n=40
Rubus idaeus								
immature/mature			25.3		358.7	3946.0	708.3	533.7
decadent								
Total live			25.3		358.7	3946.0	708.3	533.7
Salix bebbiana								
immature/mature							303.5	15.2
decadent								
Total live							303.5	15.2
Shepherdia canadensis								
immature/mature		42.2	88.5		110.4	101.2	50.6	73.4
decadent								
Total live		42.2	88.5		110.4	101.2	50.6	73.4
Spiraea betulifolia								
immature/mature		1340.6	6627.3		6751.5	1644.2	1770.7	3837.3
decadent								
Total live		1340.6	6627.3		6751.5	1644.2	1770.7	3837.3
Symphoricarpos albus								
immature/mature		1256.3	2099.5		12619.9	7892.0	5362.5	5324.6
decadent								
Total live		1256.3	2099.5		12619.9	7892.0	5362.5	5324.6
TOTAL SHRUBS								
IMMATURE/MATURE	1214	5219.2	15303.5	0.0	24779.9	21677.8	11585.1	14218.3
DECADENT	1012	202.4						86.0
TOTAL LIVE	2226	5421.6	15303.5	0.0	24779.9	21677.8	11585.1	14304.3

Table 11
 Summary of Shrub Density (Plants Per Acre) by Species for the
 LOWLAND ALTERED GRASSLAND and Three HERBACEOUS
 RIPARIAN AND WETLAND Community Types, Black Butte
 Baseline Study Area, 2015.

	LOWLAND ALTERED GRASSLAND (HAY MEADOW)	<i>JUN BAL</i>	<i>CAR NEB</i>	<i>CAR UTR</i>	HERBACEOUS RIPARIAN AND WETLAND COMPOSITE
SHRUB SPECIES/AGE CLASS	n=16	n=5	n=2	n=8	n=15
Dasiphora fruticosa					
immature/mature		667.8	809.4	948.6	836.4
decadent				50.6	27.0
Total live		667.8	809.4	999.2	863.4
Salix bebbiana					
immature/mature		40.5	1517.7	63.2	249.6
decadent					
Total live		40.5	1517.7	63.2	249.6
Salix boothii					
immature/mature		20.2	101.2		20.2
decadent					
Total live		20.2	101.2		20.2
Salix brachycarpa					
immature/mature		80.9			27.0
decadent					
Total live		80.9			27.0
Salix planifolia					
immature/mature		101.2		37.9	54.0
decadent					
Total live		101.2		37.9	54.0
TOTAL SHRUBS					
IMMATURE/MATURE	0.0	910.6	2428.3	1049.7	1187.2
DECADENT				50.6	27.0
TOTAL LIVE	0.0	910.6	2428.3	1100.3	1214.2

Table 12
 Summary of Shrub Density (Plants Per Acre) by Species for Three *Dasiphora fruticosa* RIPARIAN AND WETLAND Community Types and Two *Salix* RW Series, Black Butte Baseline Study Area, 2015.

SHRUB SPECIES/AGE CLASS	DAS FRU/ POA PRA n=6	DAS FRU/ DES CES n=4	DAS FRU/ CAR UTR n=2	SAL BEB n=12	SAL GEY n=12	SHRUB RIPARIAN AND WETLAND COMPOSITE n=36
Arctostaphylos uva-ursi						
immature/mature				50.6		16.9
decadent						
Total live				50.6		16.9
Betula glandulosa						
immature/mature				185.5	75.9	87.1
decadent					8.4	2.8
Total live				185.5	84.3	89.9
Dasiphora fruticosa						
immature/mature	3524.4	4502.5	3490.7	2875.2	860.0	2526.7
decadent	67.5	354.1	151.8	8.4	8.4	64.6
Total live	3591.9	4856.6	3642.5	2883.6	868.5	2591.3
Juniperus communis						
immature/mature				59.0		19.7
decadent						
Total live				59.0		19.7
Juniperus horizontalis						
immature/mature		25.3				2.8
decadent						
Total live		25.3				2.8
Ribes inerme						
immature/mature				33.7	792.6	275.4
decadent						
Total live				33.7	792.6	275.4
Ribes setosum						
immature/mature		101.2		160.2	42.2	78.7
decadent						
Total live		101.2		160.2	42.2	78.7
Rosa acicularis						
immature/mature				168.6		56.2
decadent						
Total live				168.6		56.2
Rosa woodsii						
immature/mature	50.6			202.4	50.6	92.7
decadent						
Total live	50.6			202.4	50.6	92.7

Table 12
 Summary of Shrub Density (Plants Per Acre) by Species for Three *Dasiphora fruticosa* RIPARIAN AND WETLAND Community Types and Two *Salix* RW Series, Black Butte Baseline Study Area, 2015.

SHRUB SPECIES/AGE CLASS	DAS FRU/ POA PRA n=6	DAS FRU/ DES CES n=4	DAS FRU/ CAR UTR n=2	SAL BEB n=12	SAL GEY n=12	SHRUB RIPARIAN AND WETLAND COMPOSITE n=36
Salix bebbiana						
immature/mature	219.2	50.6		2951.1	472.2	1183.2
decadent				109.6	8.4	39.3
Total live	219.2	50.6		3060.7	480.6	1222.6
Salix boothii						
immature/mature				8.4	843.2	283.9
decadent						
Total live				8.4	843.2	283.9
Salix brachycarpa						
immature/mature				345.7	16.9	120.9
decadent						
Total live				345.7	16.9	120.9
Salix drummondiana						
immature/mature					151.8	50.6
decadent						
Total live					151.8	50.6
Salix geyeriana						
immature/mature		75.9		177.1	548.1	250.1
decadent					8.4	2.8
Total live		75.9		177.1	556.5	253.0
Salix melanopsis						
immature/mature				25.3	59.0	28.1
decadent						
Total live				25.3	59.0	28.1
Salix planifolia						
immature/mature	67.5			1205.7	337.3	525.6
decadent					8.4	2.8
Total live	67.5			1205.7	345.7	528.4
Salix pseudomonticola						
immature/mature	50.6			581.8	16.9	208.0
decadent						
Total live	50.6			581.8	16.9	208.0
Shepherdia canadensis						
immature/mature				8.4		2.8
decadent						
Total live				8.4		2.8

Table 12
 Summary of Shrub Density (Plants Per Acre) by Species for Three *Dasiphora fruticosa* RIPARIAN AND WETLAND Community Types and Two *Salix* RW Series, Black Butte Baseline Study Area, 2015.

SHRUB SPECIES/AGE CLASS	DAS FRU/ POA PRA n=6	DAS FRU/ DES CES n=4	DAS FRU/ CAR UTR n=2	SAL BEB n=12	SAL GEY n=12	SHRUB RIPARIAN AND WETLAND COMPOSITE n=36
TOTAL SHRUBS						
IMMATURE/MATURE	3912.3	4755.5	3490.7	9038.7	4266.4	5809.4
DECADENT	67.5	354.1	151.8	118.0	42.2	112.4
TOTAL LIVE	3979.7	5109.6	3642.5	9156.8	4308.6	5921.8

Table 13
 Summary of Shrub Density (Plants Per Acre)
 by Species for Four Sample Sites in Two
 DECIDUOUS FOREST RIPARIAN AND
 WETLAND Vegetation Types, Black Butte
 Baseline Study Area, 2015.

SHRUB SPECIES/AGE CLASS	POP TRE/ OSM OCC n=1	POP TRE/ POA PRA n=3	DECIDUOUS FOREST RIPARIAN AND WETLAND COMPOSITE n=4
Dasiphora fruticosa			
immature/mature		269.8	202.4
decadent			
Total live		269.8	202.4
Ribes inerme			
immature/mature		33.7	25.3
decadent			
Total live		33.7	25.3
Ribes setosum			
immature/mature		168.6	126.5
decadent			
Total live		168.6	126.5
Rosa woodsii			
immature/mature	3137	10489.0	8650.9
decadent			
Total live	3137	10489.0	8650.9
Symphoricarpos albus			
immature/mature	5261	303.5	1543.0
decadent			
Total live	5261	303.5	1543.0
Symphoricarpos occidentalis			
immature/mature		134.9	101.2
decadent			
Total live		134.9	101.2
TOTAL SHRUBS			
IMMATURE/MATURE	8398	11399.6	10649.2
DECADENT			
TOTAL LIVE	8398	11399.6	10649.2

Table 14
 Summary of Tree Density (Trees Per Acre) by Species for Five UPLAND
 GRASSLAND Vegetation Types, Black Butte Baseline Study Area, 2015.

	UPLAND ALTERED GRASSLAND	FES IDA/ AGR SPI	FES IDA/ STI RIC	FES CAM/ AGR SPI	FES CAM/ FES IDA	UPLAND GRASSLAND COMPOSITE
TREE SPECIES						
DBH CLASS - LIVE TREES	n=9	n=3	n=2	n=1	n=13	n=28
Pseudotsuga menziesii						
<1"					0.77	0.36
1-4"						
4-8"						
8-12"						
12-16"						
16-20"						
TOTAL LIVE TREES					0.77	0.36
TOTAL TREE SPECIES - LIVE						
<1"					0.77	0.36
1-4"						
4-8"						
8-12"						
12-16"						
16-20"						
*TOTAL LIVE TREES	0.0	0.0	0.0	0.0	0.77	0.36

Table 15
 Summary of Tree Density (Trees Per Acre) by Species for Six UPLAND SHRUBLAND
 Vegetation Types, Black Butte Baseline Study Area, 2015.

	ART TRI/ POA PRA	ART TRI/ FES IDA	ART TRI/ FES CAM	ART TRI- DAS FRU/ POA PRA	DAS FRU- ART TRI/ FES CAM	MIXED SHRUB- SHALE OUTCROP	UPLAND SHRUBLAND COMPOSITE
TREE SPECIES							
DBH CLASS - LIVE TREES	n=13	n=3	n=17	n=6	n=3	n=2	n=44
Juniperus scopulorum							
<1"	2.3		2.4				1.59
1-4"							
4-8"							
8-12"							
12-16"							
16-20"							
TOTAL LIVE TREES	2.3		2.4				1.59
Pinus ponderosa							
<1"						5.0	0.23
1-4"							
4-8"							
8-12"							
12-16"							
16-20"							
TOTAL LIVE TREES						5.0	0.23
Pseudotsuga menziesii							
<1"	6.2		8.8			25.0	6.36
1-4"	7.7		1.8				2.95
4-8"							
8-12"							
12-16"							
16-20"							
TOTAL LIVE TREES	13.8		10.6			25.0	9.32
TOTAL TREE SPECIES - LIVE							
<1"	8.5		11.2			30.0	8.18
1-4"	7.7		1.8				2.95
4-8"							
8-12"							
12-16"							
16-20"							
TOTAL LIVE TREES	16.2	0.0	12.9	0.0	0.0	30.0	11.14

Table 16
 Summary of Tree Density (Trees Per Acre) by Species for Seven CONIFER FOREST AND
 WOODLAND Habitat Types, Black Butte Baseline Study Area, 2015.

	PSE MEN/ FES IDA	PSE MEN/ FES CAM	PSE MEN/ JUN COM	PSE MEN/ CAL RUB	PSE MEN/ SYM ALB	PSE MEN/ LIN BOR	PIC ENG/ LIN BOR	CONIFER FOREST AND WOODLAND COMPOSITE
TREE SPECIES								
DBH CLASS - LIVE TREES	n=1	n=12	n=8	n=2	n=11	n=4	n=2	n=40
Juniperus scopulorum								
<1"		65.8	11.3		3.6	7.5		23.75
1-4"		8.3	1.3					2.75
4-8"		0.8						0.25
8-12"								
12-16"								
16-20"								
20-24"								
24-28"								
28-32"								
TOTAL LIVE TREES		75.0	12.5		3.6	7.5		26.75
Picea engelmannii								
<1"							130.0	6.50
1-4"							75.0	3.75
4-8"							55.0	2.75
8-12"							45.0	2.25
12-16"							5.0	0.25
16-20"								
20-24"								
24-28"								
28-32"								
TOTAL LIVE TREES							310.0	15.50
Pinus contorta								
<1"			28.8		4.5	12.5	45.0	10.50
1-4"			197.5		2.7	2.5	25.0	41.75
4-8"		1.7	46.3		1.8	15.0		11.75
8-12"			2.5			12.5		1.75
12-16"								
16-20"								
20-24"								
24-28"								
28-32"								
TOTAL LIVE TREES		1.7	275.0		9.1	42.5	70.0	65.75

Table 16
 Summary of Tree Density (Trees Per Acre) by Species for Seven CONIFER FOREST AND
 WOODLAND Habitat Types, Black Butte Baseline Study Area, 2015.

	PSE MEN/ FES IDA	PSE MEN/ FES CAM	PSE MEN/ JUN COM	PSE MEN/ CAL RUB	PSE MEN/ SYM ALB	PSE MEN/ LIN BOR	PIC ENG/ LIN BOR	CONIFER FOREST AND WOODLAND COMPOSITE
TREE SPECIES								
DBH CLASS - LIVE TREES	n=1	n=12	n=8	n=2	n=11	n=4	n=2	n=40
Pinus flexilis								
<1"			12.5		0.9		5.0	3.00
1-4"			2.5					0.50
4-8"								
8-12"								
12-16"								
16-20"								
20-24"								
24-28"								
28-32"								
TOTAL LIVE TREES			15.0		0.9		5.0	3.50
Pinus ponderosa								
<1"		2.5						0.75
1-4"			1.3					0.25
4-8"			1.3					0.25
8-12"		1.7						0.50
12-16"								
16-20"		0.8						0.25
20-24"								
24-28"								
28-32"								
TOTAL LIVE TREES		5.0	2.5					2.00
Populus tremuloides								
<1"						2.5	5.0	0.50
1-4"								
4-8"								
8-12"								
12-16"								
16-20"								
20-24"								
24-28"								
28-32"								
TOTAL LIVE TREES						2.5	5.0	0.50

Table 16
Summary of Tree Density (Trees Per Acre) by Species for Seven CONIFER FOREST AND WOODLAND Habitat Types, Black Butte Baseline Study Area, 2015.

	PSE MEN/ FES IDA	PSE MEN/ FES CAM	PSE MEN/ JUN COM	PSE MEN/ CAL RUB	PSE MEN/ SYM ALB	PSE MEN/ LIN BOR	PIC ENG/ LIN BOR	CONIFER FOREST AND WOODLAND COMPOSITE
TREE SPECIES								
DBH CLASS - LIVE TREES	n=1	n=12	n=8	n=2	n=11	n=4	n=2	n=40
Pseudotsuga menziesii								
<1"	170.0	178.3	647.5	50.0	402.7	342.5	175.0	343.50
1-4"	420.0	96.7	110.0	25.0	17.3	57.5	15.0	74.00
4-8"	100.0	80.0	87.5	130.0	38.2	77.5	75.0	72.50
8-12"	10.0	45.0	52.5	160.0	69.1	75.0	25.0	60.00
12-16"		30.8	17.5	30.0	46.4	25.0		29.50
16-20"		10.0	3.8	10.0	7.3	5.0		6.75
20-24"		5.0	1.3			2.5		2.00
24-28"		0.8	1.3		0.9			0.75
28-32"		1.7						0.50
TOTAL LIVE TREES	700.0	448.3	921.3	405.0	581.8	585.0	290.0	589.50
TOTAL TREE SPECIES - LIVE								
<1"	170.0	246.7	700.0	50.0	411.8	365.0	360.0	388.50
1-4"	420.0	105.0	312.5	25.0	20.0	60.0	115.0	123.00
4-8"	100.0	82.5	135.0	130.0	40.0	92.5	130.0	87.50
8-12"	10.0	46.7	55.0	160.0	69.1	87.5	70.0	64.50
12-16"		30.8	17.5	30.0	46.4	25.0	5.0	29.75
16-20"		10.8	3.8	10.0	7.3	5.0		7.00
20-24"		5.0	1.3			2.5		2.00
24-28"		0.8	1.3		0.9			0.75
28-32"		1.7						0.50
TOTAL LIVE TREES	700.0	530.0	1226.3	405.0	595.5	637.5	680.0	703.50

Table 17
 Summary of Tree Density (Trees Per Acre) by Species for the LOWLAND
 ALTERED GRASSLAND (HAY MEADOW) and Three HERBACEOUS RIPARIAN AND
 WETLAND Community Types, Black Butte Baseline Study Area, 2015.

	LOWLAND ALTERED GRASSLAND (HAY MEADOW)	<i>JUNCUS BALTICUS</i>	<i>CAREX NEBRASCENSIS</i>	<i>CAREX UTRICULATA</i>	HERBACEOUS RIPARIAN AND WETLAND COMPOSITE
TREE SPECIES					
DBH CLASS - LIVE TREES	n=16	n=5	n=2	n=8	n=15
TOTAL TREE SPECIES - LIVE					
<1"					
1-4"					
4-8"					
8-12"					
12-16"					
16-20"					
20-24"					
24-28"					
TOTAL LIVE TREES	0.0	0.0	0.0	0.0	0.00

Table 18
 Summary of Tree Density (Trees Per Acre) by Species for Three
Dasiphora fruticosa RIPARIAN AND WETLAND Community Types and
 Two *Salix* RW Series, Black Butte Baseline Study Area, 2015.

	DAS FRU/ POA PRA	DAS FRU/ DES CES	DAS FRU/ CAR UTR	SAL BEB	SAL GEY	SHRUB RIPARIAN AND WETLAND COJMPPOSITE
TREE SPECIES						
DBH CLASS - LIVE TREES	n=6	n=4	n=2	n=12	n=12	n=36
Juniperus scopulorum						
<1"				13.3		4.44
1-4"						
4-8"						
8-12"						
TOTAL LIVE TREES				13.3		4.44
Picea engelmannii						
<1"				0.8		0.28
1-4"						
4-8"						
8-12"						
TOTAL LIVE TREES				0.8		0.28
Pinus flexilis						
<1"				0.8		0.28
1-4"						
4-8"						
8-12"						
TOTAL LIVE TREES				0.8		0.28
Populus tremuloides						
<1"				0.8		0.28
1-4"						
4-8"						
8-12"						
TOTAL LIVE TREES				0.8		0.28
TOTAL TREE SPECIES - LIVE						
<1"				15.8		5.28
1-4"						
4-8"						
8-12"						
*TOTAL LIVE TREES	0.0	0.0	0.0	15.8	0.0	5.28

Table 19
 Summary of Tree Density (Trees Per Acre) by Species for Two
 DECIDUOUS FOREST RIPARIAN AND WETLAND Vegetation Types,
 Black Butte Baseline Study Area, 2015.

	POP TRE/ OSM OCC	POP TRE/ POA PRA	DECIDUOUS FOREST RIPARIAN AND WETLAND COMPOSITE
TREE SPECIES			
DBH CLASS - LIVE TREES	n=1	n=3	n=4
Picea engelmannii			
<1"		3.3	2.50
1-4"	10.0		2.50
4-8"			
8-12"			
12-16"			
16-20"			
TOTAL LIVE TREES	10.0	3.3	5.00
Pinus flexilis			
<1"	10.0		2.50
1-4"			
4-8"			
8-12"			
12-16"			
16-20"			
TOTAL LIVE TREES	10.0		2.50
Populus tremuloides			
<1"	400.0	316.7	337.50
1-4"	430.0	520.0	497.50
4-8"	10.0	36.7	30.00
8-12"	280.0	30.0	92.50
12-16"		20.0	15.00
16-20"			
TOTAL LIVE TREES	1120.0	923.3	972.50
Pseudotsuga menziesii			
<1"			
1-4"			
4-8"			
8-12"			
12-16"			
16-20"		3.3	2.50
TOTAL LIVE TREES		3.3	2.50

Table 19
 Summary of Tree Density (Trees Per Acre) by Species for Two
 DECIDUOUS FOREST RIPARIAN AND WETLAND Vegetation Types,
 Black Butte Baseline Study Area, 2015.

	POP TRE/ OSM OCC	POP TRE/ POA PRA	DECIDUOUS FOREST RIPARIAN AND WETLAND COMPOSITE
TREE SPECIES			
DBH CLASS - LIVE TREES	n=1	n=3	n=4
TOTAL TREE SPECIES - LIVE			
<1"	410.0	320.0	342.50
1-4"	440.0	520.0	500.00
4-8"	10.0	36.7	30.00
8-12"	280.0	30.0	92.50
12-16"		20.0	15.00
16-20"		3.3	2.50
TOTAL LIVE TREES	1140.0	930.0	982.50

Table 20
Correlation of Soils Mapping Units with Ecological Sites, Black Butte Baseline Study Area, Meagher County, Montana, 2015.

SOIL MAPPING UNIT ¹		ECOLOGICAL SITE ² (15-19" and 20+" ppz)	TOTAL ANNUAL PRODUCTION (dry pounds/acre) ³		
Symbol	Name		Favorable	Normal	Unfavorable
Ad-b	Adel loams, 5-15%	Overflow	3000	2400	1800
Ch-b	Cheadle, channery loams, 5-15%	Shallow Droughty	1800	1100	700
Cl-a	Clunton, clay loams - frequently flooded, 0-5%	Wet Meadow	4500	4000	3500
Cp-c	Caseypeak, skeletal loams, 15-40%	Douglas-fir/rough fescue	600	400	200
Cp-d	Caseypeak, skeletal loams – steep, 40-70%	Douglas-fir/rough fescue	600	400	200
Dc-a	Duckcreek, clay loams, 0-5%	Loamy Argillic	2500	1800	1100
Fa-b	Farlin, clay loams, 0-5%	Droughty	2200	1500	900
HI-b	Houlihan, sandy loams, 5-15%	Loamy	2800	2100	1400
Kp-c	Kimpton, skeletal loams, 15-40%	Douglas-fir/snowberry, Douglas-fir/twinflower, Douglas-fir/common juniper	300	200	100
Kp-d	Kimpton, skeletal loams – steep, 40-70%	Douglas-fir/snowberry, Douglas-fir/twinflower, Douglas-fir/common juniper	300	200	100
Lb-b	Libeg, clay loams, 5-15%	Loamy Droughty	2500	1800	1100
MI-a	Medicinelodge - frequently flooded, 0-5%	Wet Meadow, Subirrigated	4500, 3500	4000, 3000	3500, 2500
MI-b	Medicinelodge - occasionally flooded, 5-15%	Subirrigated, Quaking aspen/Kentucky bluegrass	3000	2500	2000
Pn-b	Poin, skeletal sandy loams, 5-15%	Shallow Droughty, Douglas-fir/rough fescue, Douglas-fir/common juniper	1800, 600, 300	1100, 400, 200	700, 200, 100
Rc-b	Redchief, silty loams, 5-15%	Droughty, Quaking aspen/Kentucky bluegrass	2200, 3000	1500, 2500	900, 2000
Rf-a	Redfish, occasionally flooded, 0-5%	Wet Meadow, Subirrigated	4500, 3500	4000, 3000	3500, 2500
Ry-b	Raynesford, silty clay loams, 5-15%	Loamy	2800	2100	1400
Se-b	Sebud, gravelly loams, 5-15%	Subirrigated	3000	2500	2000
Wa-b	Woodhall, skeletal loams, 5-15%	Droughty, Douglas-fir/rough fescue, Douglas-fir/snowberry	2200, 600, 300	1500, 400, 200	900, 200, 100
Wg-b	Wineglass, channery clay loams, 5-15%	Loamy	2800	2100	1400
Wu-b	Woodhurst, skeletal loams, 5-15%	Droughty	2200	1500	900
DL	Disturbed Land, varies	NA	-	-	-
RO	Rock Outcrop, 30-90%	NA	-	-	-

¹Soils mapping units are identified, classified and delineated in the Black Butte baseline soils report and map (Baker 2015).

²Soils mapping units were correlated with ecological sites using the online Meagher County Soil Survey (NRCS 2015), and, as necessary, on-site vegetation composition data. All ecological sites are in MLRA 43B, Central Rocky Mountains; ecological sites are primarily in the 20+-inch precipitation zone ("ppz"), occasionally the 15 to 19-inch ppz.

³"Normal" annual production refers to a year of about average precipitation and temperature patterns.

Table 21

Correlation of Vegetation Types with Soil Mapping Units, Black Butte Baseline Study Area, Meagher County, Montana, 2015.

VEGETATION TYPE	n	Number of Vegetation Sample Plots by Soil Mapping Unit												
		Ad	Ch	Cl	Cp	Dc	Fa	HI	Kp	Lb	MI	Pn	Rc	Rf
UPLAND GRASSLAND	28													
Upland Altered Grassland c.t.	9							2		3	1		1	
<i>Festuca idahoensis</i> / <i>Agropyron spicatum</i> h.t.	3		1		1					1				
<i>Festuca idahoensis</i> / <i>Stipa richardsonii</i> h.t.	2		1					1						
<i>Festuca campestris</i> / <i>Agropyron spicatum</i> h.t.	1									1				
<i>Festuca campestris</i> / <i>Festuca idahoensis</i> h.t.	13		4					1		2				
UPLAND SHRUBLAND	44													
<i>Artemisia tridentata</i> / <i>Poa pratensis</i> c.t.	13		5								1		2	
<i>Artemisia tridentata</i> / <i>Festuca idahoensis</i> h.t.	3		3											
<i>Artemisia tridentata</i> / <i>Festuca campestris</i> h.t.	17		12		1			1	1			2		
<i>Artemisia tridentata</i> - <i>Dasiphora fruticosa</i> / <i>Poa pratensis</i> c.t.	6		1				2	1			1			
<i>Dasiphora fruticosa</i> - <i>Artemisia tridentata</i> / <i>Festuca campestris</i> c.t.	3		1				2							
Mixed Shrub-Shale Outcrop c.t.	2		2											
CONIFER FOREST AND WOODLAND	40													
<i>Pseudotsuga menziesii</i> / <i>Festuca idahoensis</i> h.t.	1				1									
<i>Pseudotsuga menziesii</i> / <i>Festuca campestris</i> h.t.	12				6				2			2		
<i>Pseudotsuga menziesii</i> / <i>Juniperus communis</i> h.t.	8				1				4			2		
<i>Pseudotsuga menziesii</i> / <i>Calamagrostis rubescens</i> h.t.	2								2					
<i>Pseudotsuga menziesii</i> / <i>Symphoricarpos albus</i> h.t.	11				1				6			1	1	
<i>Pseudotsuga menziesii</i> / <i>Linnaea borealis</i> h.t.	4								4					
<i>Picea engelmannii</i> / <i>Linnaea borealis</i> h.t.	2								2					
LOWLAND ALTERED GRASSLAND	17													
Noxious Weed Tailings c.t. (2014/2015)	1										1			
Lowland Altered Grassland (Hay Meadow) c.t.	16	1		1			1				5			8
RIPARIAN AND WETLAND (RW)	56													
Herbaceous RW types	(15)													
<i>Juncus balticus</i> c.t.	5										4			
<i>Carex nebrascensis</i> c.t.	2										2			
<i>Carex utriculata</i> h.t.	8										8			

Table 21

Correlation of Vegetation Types with Soil Mapping Units, Black Butte Baseline Study Area, Meagher County, Montana, 2015.

VEGETATION TYPE	n	Number of Vegetation Sample Plots by Soil Mapping Unit												
		Ad	Ch	Cl	Cp	Dc	Fa	HI	Kp	Lb	MI	Pn	Rc	Rf
Shrub RW types	(37)													
<i>Dasiphora fruticosa</i> / <i>Poa pratensis</i> c.t.	6			1		1					4			
<i>Dasiphora fruticosa</i> / <i>Deschampsia cespitosa</i> c.t.	4										4			
<i>Dasiphora fruticosa</i> / <i>Carex utriculata</i> c.t.	2										2			
<i>Salix bebbiana</i> series	13										13			
<i>Salix geyeriana</i> series	12			1							11			
Deciduous Forest RW types	(4)													
<i>Populus tremuloides</i> / <i>Osmorhiza occidentalis</i> h.t.	1												1	
<i>Populus tremuloides</i> / <i>Poa pratensis</i> c.t.	3									1	1		1	
TOTAL PLOTS	185	1	30	3	11	6	2	4	21	8	58	7	6	8

Map
Symbol¹ Soil Mapping Unit¹

- Ad-b Adel loams, 5-15%
- Ch-b Cheadle, channery loams, 5-15%
- Cl-a Clunton, clay loams - frequently flooded, 0-5%
- Cp-c Caseypeak, skeletal loams, 15-40%
- Cp-d Caseypeak, skeletal loams – steep, 40-70%
- Dc-a Duckcreek, clay loams, 0-5%
- Fa-b Farlin, clay loams, 0-5%
- HI-b Houlihan, sandy loams, 5-15%
- Kp-c Kimpton, skeletal loams, 15-40%
- Kp-d Kimpton, skeletal loams – steep, 40-70%
- Lb-b Libeg, clay loams, 5-15%
- MI-a Medicinelodge - frequently flooded, 0-5%
- MI-b Medicinelodge - occasionally flooded, 5-15%
- Pn-b Poin, skeletal sandy loams, 5-15%
- Rc-b Redchief, silty loams, 5-15%
- Rf-a Redfish, occasionally flooded, 0-5%
- Ry-b Raynesford, silty clay loams, 5-15%
- Se-b Sebud, gravelly loams, 5-15%
- Wa-b Woodhall, skeletal loams, 5-15%
- Wg-b Wineglass, channery clay loams, 5-15%
- Wu-b Woodhurst, skeletal loams, 5-15%
- RO Rock Outcrop, 30-90%

¹Soils mapping units are identified, classified and delineated in the baseline soils report and map (Baker 2015).

n=number of sample sites

Table 21
 Correlation of Vegetation Types with Soil Mapping Units, Black Butte Baseline Study Area, Meagher County, Montana, 2015.

VEGETATION TYPE	n	Number of Vegetation Sample Plots by Soil Mapping Unit					
		RO	Ry	Se	Wa	Wg	Wu
UPLAND GRASSLAND	28						
Upland Altered Grassland c.t.	9					2	
<i>Festuca idahoensis</i> / <i>Agropyron spicatum</i> h.t.	3						
<i>Festuca idahoensis</i> / <i>Stipa richardsonii</i> h.t.	2						
<i>Festuca campestris</i> / <i>Agropyron spicatum</i> h.t.	1						
<i>Festuca campestris</i> / <i>Festuca idahoensis</i> h.t.	13				5	1	
UPLAND SHRUBLAND	44						
<i>Artemisia tridentata</i> / <i>Poa pratensis</i> c.t.	13				1	3	1
<i>Artemisia tridentata</i> / <i>Festuca idahoensis</i> h.t.	3						
<i>Artemisia tridentata</i> / <i>Festuca campestris</i> h.t.	17						
<i>Artemisia tridentata</i> - <i>Dasiphora fruticosa</i> / <i>Poa pratensis</i> c.t.	6		1				
<i>Dasiphora fruticosa</i> - <i>Artemisia tridentata</i> / <i>Festuca campestris</i> c.t.	3						
Mixed Shrub-Shale Outcrop c.t.	2						
CONIFER FOREST AND WOODLAND	40						
<i>Pseudotsuga menziesii</i> / <i>Festuca idahoensis</i> h.t.	1						
<i>Pseudotsuga menziesii</i> / <i>Festuca campestris</i> h.t.	12				2		
<i>Pseudotsuga menziesii</i> / <i>Juniperus communis</i> h.t.	8				1		
<i>Pseudotsuga menziesii</i> / <i>Calamagrostis rubescens</i> h.t.	2						
<i>Pseudotsuga menziesii</i> / <i>Symphoricarpos albus</i> h.t.	11				2		
<i>Pseudotsuga menziesii</i> / <i>Linnaea borealis</i> h.t.	4						
<i>Picea engelmannii</i> / <i>Linnaea borealis</i> h.t.	2						
LOWLAND ALTERED GRASSLAND	17						
Noxious Weed Tailings c.t. (2014/2015)	1						
Lowland Altered Grassland (Hay Meadow) c.t.	16						
RIPARIAN AND WETLAND (RW)	56						
Herbaceous RW types	(15)						
<i>Juncus balticus</i> c.t.	5			1			
<i>Carex nebrascensis</i> c.t.	2						
<i>Carex utriculata</i> h.t.	8						

Table 21
 Correlation of Vegetation Types with Soil Mapping Units, Black Butte Baseline Study Area, Meagher County, Montana, 2015.

VEGETATION TYPE	n	Number of Vegetation Sample Plots by Soil Mapping Unit					
		RO	Ry	Se	Wa	Wg	Wu
Shrub RW types	(37)						
<i>Dasiphora fruticosa</i> / <i>Poa pratensis</i> c.t.	6						
<i>Dasiphora fruticosa</i> / <i>Deschampsia cespitosa</i> c.t.	4						
<i>Dasiphora fruticosa</i> / <i>Carex utriculata</i> c.t.	2						
<i>Salix bebbiana</i> series	13						
<i>Salix geyeriana</i> series	12						
Deciduous Forest RW types	(4)						
<i>Populus tremuloides</i> / <i>Osmorhiza occidentalis</i> h.t.	1						
<i>Populus tremuloides</i> / <i>Poa pratensis</i> c.t.	3						
TOTAL PLOTS	185	0	1	1	11	6	1

Map Symbol ¹	Soil Mapping Unit ¹
Ad-b	Adel loams, 5-15%
Ch-b	Cheadle, channery loams, 5-15%
Cl-a	Clunton, clay loams - frequently flooded, 0-5%
Cp-c	Caseypeak, skeletal loams, 15-40%
Cp-d	Caseypeak, skeletal loams – steep, 40-70%
Dc-a	Duckcreek, clay loams, 0-5%
Fa-b	Farlin, clay loams, 0-5%
Hl-b	Houlihan, sandy loams, 5-15%
Kp-c	Kimpton, skeletal loams, 15-40%
Kp-d	Kimpton, skeletal loams – steep, 40-70%
Lb-b	Libeg, clay loams, 5-15%
Ml-a	Medicinelodge - frequently flooded, 0-5%
Ml-b	Medicinelodge - occasionally flooded, 5-15%
Pn-b	Poin, skeletal sandy loams, 5-15%
Rc-b	Redchief, silty loams, 5-15%
Rf-a	Redfish, occasionally flooded, 0-5%
Ry-b	Raynesford, silty clay loams, 5-15%
Se-b	Sebud, gravelly loams, 5-15%
Wa-b	Woodhall, skeletal loams, 5-15%
Wg-b	Wineglass, channery clay loams, 5-15%
Wu-b	Woodhurst, skeletal loams, 5-15%
RO	Rock Outcrop, 30-90%

¹Soils mapping units are identified, classified and delineated in the baseline soils report and map (Baker 2015).
 n=number of sample sites

Table 22
Correlation of Vegetation Types with Ecological Sites, Black Butte Baseline Study Area, Meagher County, Montana, 2015.

VEGETATION TYPE	n	Number of Vegetation Sample Plots by Ecological Site ¹ (15-19" and 20+" ppz)												
		Dr	Lo	LoA	LoDr	SwDr	D-fir/ r. fescue	D-fir/ c. juniper	D-fir/ snowberry	D-fir/ twinflower	Q. aspen/ K. bluegrass	Ov	Sb	WM
UPLAND GRASSLAND	28													
Upland Altered Grassland c.t.	9	1	4		3								1	
<i>Festuca idahoensis</i> / <i>Agropyron spicatum</i> h.t.	3				1	2								
<i>Festuca idahoensis</i> / <i>Stipa richardsonii</i> h.t.	2	1				1								
<i>Festuca campestris</i> / <i>Agropyron spicatum</i> h.t.	1				1									
<i>Festuca campestris</i> / <i>Festuca idahoensis</i> h.t.	13	6	1		2	4								
UPLAND SHRUBLAND	44													
<i>Artemisia tridentata</i> / <i>Poa pratensis</i> c.t.	13	4	3			5							1	
<i>Artemisia tridentata</i> / <i>Festuca idahoensis</i> h.t.	3					3								
<i>Artemisia tridentata</i> / <i>Festuca campestris</i> h.t.	17		1			16								
<i>Artemisia tridentata</i> - <i>Dasiphora fruticosa</i> / <i>Poa pratensis</i> c.t.	6		2	2		1							1	
<i>Dasiphora fruticosa</i> - <i>Artemisia tridentata</i> / <i>Festuca campestris</i> c.t.	3			2		1								
Mixed Shrub-Shale Outcrop c.t.	2					2								
CONIFER FOREST AND WOODLAND	40													
<i>Pseudotsuga menziesii</i> / <i>Festuca idahoensis</i> h.t.	1						1							
<i>Pseudotsuga menziesii</i> / <i>Festuca campestris</i> h.t.	12						12							
<i>Pseudotsuga menziesii</i> / <i>Juniperus communis</i> h.t.	8							8						
<i>Pseudotsuga menziesii</i> / <i>Calamagrostis rubescens</i> h.t.	2								2					
<i>Pseudotsuga menziesii</i> / <i>Symphoricarpos albus</i> h.t.	11								11					
<i>Pseudotsuga menziesii</i> / <i>Linnaea borealis</i> h.t.	4									4				
<i>Picea engelmannii</i> / <i>Linnaea borealis</i> h.t.	2									2				
LOWLAND ALTERED GRASSLAND	17													
Noxious Weed Tailings c.t. (2014/2015)	1												1	
Lowland Altered Grassland (Hay Meadow) c.t.	16											1	8	7
RIPARIAN AND WETLAND (RW)	56													
Herbaceous RW types	(15)													
<i>Juncus balticus</i> c.t.	5												2	3
<i>Carex nebrascensis</i> c.t.	2													2
<i>Carex utriculata</i> h.t.	8													8

Table 22
Correlation of Vegetation Types with Ecological Sites, Black Butte Baseline Study Area, Meagher County, Montana, 2015.

VEGETATION TYPE	n	Number of Vegetation Sample Plots by Ecological Site ¹ (15-19" and 20+" ppz)												
		Dr	Lo	LoA	LoDr	SwDr	D-fir/ r. fescue	D-fir/ c. juniper	D-fir/ snowberry	D-fir/ twinflower	Q. aspen/ K. bluegrass	Ov	Sb	WM
Shrub RW types	(37)													
<i>Dasiphora fruticosa</i> / <i>Poa pratensis</i> c.t.	6			1									4	1
<i>Dasiphora fruticosa</i> / <i>Deschampsia cespitosa</i> c.t.	4												4	
<i>Dasiphora fruticosa</i> / <i>Carex utriculata</i> c.t.	2													2
<i>Salix bebbiana</i> series	13													13
<i>Salix geyeriana</i> series	12												3	9
Deciduous Forest RW types	(4)													
<i>Populus tremuloides</i> / <i>Osmorhiza occidentalis</i> h.t.	1										1			
<i>Populus tremuloides</i> / <i>Poa pratensis</i> c.t.	3				2						1			
TOTAL PLOTS	185	12	11	5	9	35	13	8	13	6	2	1	25	45

¹Ecological sites were determined using descriptions in the Meagher County Soil Survey (USDA Natural Resources Conservation Service 2003, 2015):

Map Symbol	Ecological Site (15-19" and 20+" ppz)
Dr	Droughty
Lo	Loamy
LoA	Loamy Argillic
LoDr	Loamy Droughty
SwDr	Shallow Droughty
D-fir/r. fescue	Douglas-fir/rough fescue
D-fir/c. juniper	Douglas-fir/common juniper
D-fir/snowberry	Douglas-fir/common snowberry
D-fir/twinflower	Douglas-fir/twinflower
Q. aspen/K. bluegrass	Quaking aspen/Kentucky bluegrass
Ov	Overflow
Sb	Subirrigated
WM	Wet Meadow

Table 23
 Potential Rangeland Productivity and Estimated Grazing Capacity of the Black Butte Baseline Study Area,
 Meagher County, Montana, 2015.

Soil ¹ Symbol	Productivity ² (dry pounds/acre)	Acreage by Soil ¹	Total Annual Production ² (dry pounds)	Estimated Available Forage (Percent) ²	Estimated Grazing Capacity (AUM) ³
Ad-b	2400	26.9	64,542	85	69.4
Ch-b	1100	798.5	878,313	78	867.2
Cl-a	4000	26.5	105,992	80	107.3
Cp-c	400	220.3	88,130	70	78.1
Cp-d	400	79.3	31,712	70	28.1
Dc-a	1800	138.0	248,338	80	251.5
Fa-b	1500	46.5	69,779	78	68.9
HI-b	2100	55.6	116,786	77	113.8
Kp-c	200	329.7	65,946	50	41.7
Kp-d	200	127.7	25,530	50	16.2
Lb-b	1800	197.8	355,985	80	360.5
MI-a	3700	256.4	948,599	80	960.6
MI-b	2500	71.7	179,300	70	158.9
Pn-b	500	200.8	100,392	65	82.6
Rc-b	1800	86.5	155,669	70	137.9
Rf-a	3400	31.5	107,194	80	108.6
Ry-b	2100	67.5	141,795	77	138.2
Se-b	2500	35.7	89,269	80	90.4
Wa-b	1000	297.8	297,797	65	245.0
Wg-b	2100	166.4	349,457	77	340.6
Wu-b	1500	58.2	87,282	78	86.2
DL	NA	36.9	-	NA	-
RO	NA	11.3	-	NA	-
TOTALS		3367.5	4,507,805		4351.7

¹Soil symbols and mapping are taken from Baker (2015). Soil names are given for each mapping unit symbol in Table 20.

²Following NRCS (2003), total annual production is the amount of vegetation that can be expected to grow annually on well-managed range that is supporting the historic climax plant community (HCPC). As most of the study area does not support the HCPC, due to historical grazing, annual production and therefore grazing capacity can be expected to be considerably less than the figures taken from NRCS (2003).

Productivity figures are for years of "normal" precipitation and temperature regime (see Table 20). Figures for soils with multiple ecological sites are weighted means derived from Appendix E.

³AUM calculations are based on 790 pounds forage per animal unit month (AUM) for a 1,000 pound cow with calf up to 4 months age. No adjustments have been made for site grazability factors, such as steep slopes, site inaccessibility, distance to water, or land use alterations such as irrigation, etc.

Table 24
Predicted Average Yields of Principal Crops, Black Butte Baseline Study Area, 2015.

Soil Name (Baker 2015)	Land Capability ¹		Hay Meadow Acreage by Soil		Hay Meadow Expected Yield ²				
					Grass Hay (Tons per Acre)		Grass - Legume Hay (Tons per Acre)		Pasture (AUM per Acre)
	Non-Irrigated	Irrigated	Non-Irrigated	Irrigated	Non-Irrigated	Irrigated	Non-Irrigated	Irrigated	
Clunton-frequently flooded	5w	5w	9.20		2.0		2.3	4.0	5.1
Duckcreek	6e	6e	2.40		1.5		1.8	3.0	3.0
Medicinelodge-frequently flooded	6w	6w		30.73	2.0		2.3	4.0	5.1
Redfish-occasionally flooded	6w	6w		26.72	2.0		2.3	4.0	5.1
TOTAL			11.60	57.45					

¹Land capability classification (NRCS 2012) shows, in a general way, the suitability of soils for most kinds of field crops. Soils are generally grouped at three levels - capability class, subclass, and unit.

Capability classes, the broadest groups, are designated by the numbers 1 through 8, indicating progressively greater limitations and narrower choices for practical use. If properly managed, soils in classes 1, 2, 3 and 4 are suitable for the mechanized production of commonly grown field crops and for pasture.

Capability subclasses indicate the dominant limitations in the class by adding a letter, e, w, s, or c, to the class numeral. The letter e shows that the main hazard is the risk of erosion; w shows that water in or on the soil interferes with plant growth; s shows that the soil is limited mainly because it is shallow, droughty, or stony; and c shows that the chief limitation is climate that is very cold or very dry.

²Source: Meagher County Soil Survey (NRCS 2015), where "absence of a yield figure indicates that the soil is not suitable for the crop or the crop is not generally grown on the soil". Yields are those that can be expected under a high level of non-irrigated and irrigated management.

Table 25
Montana Natural Heritage Program Records¹ of Plant Species of Concern,
Meagher County, Montana, 2015.

Plant Species	Global Rank	State Rank	USFWS	USFS	BLM	Habitat
<i>Adoxa moschatellina</i> Musk-root	G5	S3		Sensitive		Rock/Talus
<i>Cirsium longistylum</i> Long-styled thistle	G2G3	S2S3				Meadows (Montane-subalpine)
<i>Downingia laeta</i> Great Basin downingia	G5	S2S3				Wetland/Riparian (Shallow water ponds, lakes)
<i>Eleocharis rostellata</i> Beaked spikerush	G5	S3		Sensitive		Wetlands (Alkaline)
<i>Goodyera repens</i> Northern rattlesnake-plantain	G5	S3		Sensitive		Mesic Forest
<i>Phlox kelseyi</i> var. <i>missoulensis</i> Missoula phlox	G3	S3		Sensitive		Slopes/ridges (open, foothills to subalpine)
<i>Physaria klausii</i> Divide bladderpod	G3	S3				Slopes (Open, Montane/subalpine)
<i>Salix serissima</i> Autumn willow	G4	S3				Wetland/Riparian

¹Explanation of ranking categories follows the MTNHP website at: <http://fieldguide.mt.gov/statusCodes.aspx>

SPECIES STATUS CODES: Definitions for species conservation status ranks, categories and other codes designated by MTNHP, Federal and State Agencies:

Species of Concern: Species of Concern are native taxa that are at-risk due to declining population trends, threats to their habitats, restricted distribution, and/or other factors. Designation as a Montana Species of Concern or Potential Species of Concern is based on the Montana Status Rank, and is not a statutory or regulatory classification. Montana employs a standardized ranking system to denote **global** (range-wide) and **state** status (NatureServe 2006). Species are assigned numeric ranks ranging from 1 (highest risk, greatest concern) to 5 (demonstrably secure), reflecting the relative degree of risk to the species' viability, based upon available information.

Rank	Definition
G1 S1	At high risk because of extremely limited and/or rapidly declining population numbers, range and/or habitat, making it highly vulnerable to global extinction or extirpation in the state.
G2 S2	At risk because of very limited and/or potentially declining population numbers, range and/or habitat, making it vulnerable to global extinction or extirpation in the state.
G3 S3	Potentially at risk because of limited and/or declining numbers, range and/or habitat, even though it may be abundant in some areas.
G4 S4	Apparently secure, though it may be quite rare in parts of its range, and/or suspected to be declining.
G5 S5	Common, widespread, and abundant (although it may be rare in parts of its range). Not vulnerable in most of its range.
GH SH	Historical, known only from records usually 40 or more years old; may be rediscovered.
T#	Rank of a subspecies or variety. Appended to the global rank of the full species, e.g. G4T3

U.S. Fish and Wildlife Service (Endangered Species Act): Status of a taxon under the federal Endangered Species Act of 1973 (16 U.S.C.A. § 1531-1543 (Supp. 1996))

Designation Descriptions

LT	Listed threatened: Any species likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range (16 U.S.C. 1532(20)).
C	Candidate: Those taxa for which sufficient information on biological status and threats exists to propose to list them as threatened or endangered. We encourage their consideration in environmental planning and partnerships; however, none of the substantive or procedural provisions of the Act apply to candidate species.

Table 25
Montana Natural Heritage Program Records¹ of Plant Species of Concern,
Meagher County, Montana, 2015.

Bureau of Land Management: BLM Sensitive Species are defined by the BLM 6840 Manual as those that normally occur on Bureau administered lands for which BLM has the capability to significantly affect the conservation status of the species through management. The sensitive species designation, for species other than federally listed, proposed, or candidate species, may include such native species as those that could become endangered in or extirpated from a state, are under status review by FWS, or are undergoing significant current or predicted downward trends in habitat capability, etc.

Designation Descriptions

Sensitive	Denotes species listed as sensitive on BLM lands
Special Status	Denotes species that are listed as Endangered or Threatened under the Endangered Species Act

U.S. Forest Service: U.S. Forest Service Manual (2670.22) defines Sensitive Species on Forest Service lands as those for which population viability is a concern as evidenced by a significant downward trend in population or a significant downward trend in habitat capacity.

Designation Descriptions

Endangered	Listed as Endangered (LE) under the U.S. Endangered Species Act.
Threatened	Listed as Threatened (LT) under the U.S. Endangered Species Act.
Sensitive	Listed as a Sensitive Species by USFS Northern Region (R1).

Table 26
Average Number of Vascular Plant Species per Plot for Seven Physiognomic Types,
Black Butte Baseline Study Area, Meagher County, Montana, 2015.

AVERAGE NUMBER OF SPECIES PER PLOT¹							
CLASS	UPLAND GRASSLAND n=28	UPLAND SHRUBLAND n=44	CONIFER FOREST AND WOODLAND n=40	LOWLAND ALTERED GRASSLAND n=16	HERBACEOUS RIPARIAN AND WETLAND n=15	SHRUB RIPARIAN AND WETLAND n=37	DECIDUOUS FOREST RIPARIAN AND WETLAND n=4
NATIVE PERENNIAL GRAMINOIDS	7.5	8.3	6.4	1.9	5.8	5.9	3.0
INTRODUCED PERENNIAL GRAMINOIDS	1.1	1.2	0.9	4.1	1.4	2.2	2.3
NATIVE ANNUAL GRAMINOIDS	-	-	-	-	-	-	-
INTRODUCED ANNUAL GRAMINOIDS	-	<0.1	<0.1	-	-	-	-
NATIVE PERENNIAL FORBS AND SUBSHRUBS	18.1	19.1	16.8	4.8	5.3	12.0	13.3
INTRODUCED PERENNIAL FORBS	0.4	0.6	0.6	3.3	0.8	1.6	1.3
FERNS AND ALLIES	0.2	0.3	0.1	0.4	0.1	0.5	-
NATIVE ANNUAL/BIENNIAL FORBS	1.2	0.9	0.9	0.5	0.2	0.3	0.5
INTRODUCED ANNUAL/BIENNIAL FORBS	0.3	0.3	0.4	0.9	0.1	0.3	1.0
SHRUBS	0.9	1.9	4.2	-	1.0	4.2	2.5
TREES	-	0.1	1.5	-	-	0.1	1.3
TOTAL	29.7	32.7	31.8	15.9	14.7	27.2	25.0

¹n = number of 0.01-acre plots (11.8 feet radius) sampled in each physiognomic type.

Table 27
 Noxious Weed Abundance and Distribution by Vegetation Type, Black Butte Baseline Study Area,
 Meagher County, Montana, 2015.

VEGETATION TYPE	n	Percent Cover/Constancy by Species Potentially Problematic Weeds (not listed)			
		<i>Carduus nutans</i>	<i>Carum carvi</i>	<i>Knautia arvensis</i>	<i>Rhinanthus crista-galli</i>
UPLAND GRASSLAND	28	0.01/4		1.54/4	
Upland Altered Grassland c.t.	9	0.03/11		4.78/11	
<i>Festuca idahoensis</i> / <i>Agropyron spicatum</i> h.t.	3				
<i>Festuca idahoensis</i> / <i>Stipa richardsonii</i> h.t.	2				
<i>Festuca campestris</i> / <i>Agropyron spicatum</i> h.t.	1				
<i>Festuca campestris</i> / <i>Festuca idahoensis</i> h.t.	13				
UPLAND SHRUBLAND	44	0.01/2			
<i>Artemisia tridentata</i> / <i>Poa pratensis</i> c.t.	13	0.02/8			
<i>Artemisia tridentata</i> / <i>Festuca idahoensis</i> h.t.	3				
<i>Artemisia tridentata</i> / <i>Festuca campestris</i> h.t.	17				
<i>Artemisia tridentata</i> - <i>Dasiphora fruticosa</i> / <i>Poa pratensis</i> c.t.	6				
<i>Dasiphora fruticosa</i> - <i>Artemisia tridentata</i> / <i>Festuca campestris</i> c.t.	3				
Mixed Shrub-Shale Outcrop c.t.	2				
CONIFER FOREST AND WOODLAND	40	0.10/5			
<i>Pseudotsuga menziesii</i> / <i>Festuca idahoensis</i> h.t.	1				
<i>Pseudotsuga menziesii</i> / <i>Festuca campestris</i> h.t.	12				
<i>Pseudotsuga menziesii</i> / <i>Juniperus communis</i> h.t.	8	0.13/13			
<i>Pseudotsuga menziesii</i> / <i>Calamagrostis rubescens</i> h.t.	2				
<i>Pseudotsuga menziesii</i> / <i>Symphoricarpos albus</i> h.t.	11	0.27/9			
<i>Pseudotsuga menziesii</i> / <i>Linnaea borealis</i> h.t.	4				
<i>Picea engelmannii</i> / <i>Linnaea borealis</i> h.t.	2				
LOWLAND ALTERED GRASSLAND	17	NA	NA		NA
Noxious Weed Tailings c.t. (2014)	1	84.0/100			
Noxious Weed Tailings c.t. (2015) post-herbicide	1	0/0			
Lowland Altered Grassland (Hay Meadow) c.t.	16	0.02/6	6.56/63		6.25/50
RIPARIAN AND WETLAND (RW)	56				
Herbaceous RW types	(15)				0.33/13
<i>Juncus balticus</i> c.t.	5				0.60/20
<i>Carex nebrascensis</i> c.t.	2				
<i>Carex utriculata</i> h.t.	8				0.25/13
Shrub RW types	(37)	0.03/3		0.02/5	
<i>Dasiphora fruticosa</i> / <i>Poa pratensis</i> c.t.	6	0.17/17		0.05/17	
<i>Dasiphora fruticosa</i> / <i>Deschampsia cespitosa</i> c.t.	4				
<i>Dasiphora fruticosa</i> / <i>Carex utriculata</i> c.t.	2				
<i>Salix bebbiana</i> series	13				
<i>Salix geyeriana</i> series	12			0.03/8	
Deciduous Forest RW types	(4)				
<i>Populus tremuloides</i> / <i>Osmorhiza occidentalis</i> h.t.	1				
<i>Populus tremuloides</i> / <i>Poa pratensis</i> c.t.	3				
TOTAL PLOTS	185				

n = number of sample sites

X = species noted as sporadic, limited occurrence in the study area, and not recorded in the vegetation sample plots.

Table 27
 Noxious Weed Abundance and Distribution by Vegetation Type, Black Butte Baseline Study Area,
 Meagher County, Montana, 2015.

VEGETATION TYPE	n	Percent Cover/Constancy by Species			
		State-listed Noxious Weeds			
		<i>Centaurea maculosa</i>	<i>Cirsium arvense</i>	<i>Cynoglossum officinale</i>	<i>Leucanthemum vulgare</i>
UPLAND GRASSLAND	28				
Upland Altered Grassland c.t.	9				
<i>Festuca idahoensis</i> / <i>Agropyron spicatum</i> h.t.	3				
<i>Festuca idahoensis</i> / <i>Stipa richardsonii</i> h.t.	2				
<i>Festuca campestris</i> / <i>Agropyron spicatum</i> h.t.	1				
<i>Festuca campestris</i> / <i>Festuca idahoensis</i> h.t.	13				
UPLAND SHRUBLAND	44	0.16/2		0.07/5	
<i>Artemisia tridentata</i> / <i>Poa pratensis</i> c.t.	13			0.15/8	
<i>Artemisia tridentata</i> / <i>Festuca idahoensis</i> h.t.	3				
<i>Artemisia tridentata</i> / <i>Festuca campestris</i> h.t.	17	0.41/6			
<i>Artemisia tridentata</i> - <i>Dasiphora fruticosa</i> / <i>Poa pratensis</i> c.t.	6			0.17/17	
<i>Dasiphora fruticosa</i> - <i>Artemisia tridentata</i> / <i>Festuca campestris</i> c.t.	3				
Mixed Shrub-Shale Outcrop c.t.	2				
CONIFER FOREST AND WOODLAND	40		0.03/5	0.23/15	
<i>Pseudotsuga menziesii</i> / <i>Festuca idahoensis</i> h.t.	1				
<i>Pseudotsuga menziesii</i> / <i>Festuca campestris</i> h.t.	12				
<i>Pseudotsuga menziesii</i> / <i>Juniperus communis</i> h.t.	8			0.38/13	
<i>Pseudotsuga menziesii</i> / <i>Calamagrostis rubescens</i> h.t.	2				
<i>Pseudotsuga menziesii</i> / <i>Symphoricarpos albus</i> h.t.	11			0.45/36	
<i>Pseudotsuga menziesii</i> / <i>Linnaea borealis</i> h.t.	4		0.25/25		
<i>Picea engelmannii</i> / <i>Linnaea borealis</i> h.t.	2		0.15/50	0.50/50	
LOWLAND ALTERED GRASSLAND	17		NA		X
Noxious Weed Tailings c.t. (2014)	1		8.0/100	1.0/100	
Noxious Weed Tailings c.t. (2015) post-herbicide	1		0/0	0/0	
Lowland Altered Grassland (Hay Meadow) c.t.	16		0.25/19		X
RIPARIAN AND WETLAND (RW)	56				
Herbaceous RW types	(15)		4.33/20		
<i>Juncus balticus</i> c.t.	5		12.80/40		
<i>Carex nebrascensis</i> c.t.	2				
<i>Carex utriculata</i> h.t.	8		0.13/13		
Shrub RW types	(37)		0.95/30	0.18/14	
<i>Dasiphora fruticosa</i> / <i>Poa pratensis</i> c.t.	6		3.22/50	0.05/17	
<i>Dasiphora fruticosa</i> / <i>Deschampsia cespitosa</i> c.t.	4			0.08/25	
<i>Dasiphora fruticosa</i> / <i>Carex utriculata</i> c.t.	2				
<i>Salix bebbiana</i> series	13		0.54/23	0.23/15	
<i>Salix geyeriana</i> series	12		0.75/42	0.25/8	
Deciduous Forest RW types	(4)		0.08/25	1.33/75	
<i>Populus tremuloides</i> / <i>Osmorhiza occidentalis</i> h.t.	1			2.00/100	
<i>Populus tremuloides</i> / <i>Poa pratensis</i> c.t.	3		0.10/33	1.10/67	
TOTAL PLOTS	185				

n = number of sample sites

X = species noted as sporadic, limited occurrence in the study area, and not recorded in the vegetation sample plots.

Table 28
Vegetation Acreage of the Black Butte Baseline Study Area,
Meagher County, Montana, 2015 (see Plate 1)

MAP UNIT	VEGETATION TYPE	ACRES	PERCENT
UPLAND GRASSLAND		778.80	23.13
11	Upland Altered Grassland c.t.	172.00	5.11
12	Upland Native Grassland		18.02
	<i>Festuca idahoensis</i> / <i>Agropyron spicatum</i> h.t.	606.80	
	<i>Festuca idahoensis</i> / <i>Stipa richardsonii</i> h.t.		
	<i>Festuca campestris</i> / <i>Agropyron spicatum</i> h.t.		
<i>Festuca campestris</i> / <i>Festuca idahoensis</i> h.t.			
UPLAND SHRUBLAND		1372.14	40.75
21	<i>Artemisia tridentata</i> / <i>Poa pratensis</i> c.t.	1348.61	40.05
	<i>Artemisia tridentata</i> / <i>Festuca idahoensis</i> h.t.		
	<i>Artemisia tridentata</i> / <i>Festuca campestris</i> h.t.		
	<i>Artemisia tridentata</i> - <i>Dasiphora fruticosa</i> / <i>Poa pratensis</i> c.t.		
	<i>Dasiphora fruticosa</i> - <i>Artemisia tridentata</i> / <i>Festuca campestris</i> c.t.		
22	Mixed Shrub-Shale Outcrop c.t.	23.53	0.70
CONIFER FOREST AND WOODLAND (Mature)		502.12	14.91
CONIFER FOREST AND WOODLAND (Immature)		235.07	6.98
31 AND 31R ¹	<i>Pseudotsuga menziesii</i> / <i>Festuca idahoensis</i> h.t.	(31) 465.44 (31R) 228.65	13.82 6.79
	<i>Pseudotsuga menziesii</i> / <i>Festuca campestris</i> h.t.		
	<i>Pseudotsuga menziesii</i> / <i>Juniperus communis</i> h.t.		
	<i>Pseudotsuga menziesii</i> / <i>Calamagrostis rubescens</i> h.t.		
	<i>Pseudotsuga menziesii</i> / <i>Symphoricarpos albus</i> h.t.		
32 AND 32R ¹	<i>Pseudotsuga menziesii</i> / <i>Linnaea borealis</i> h.t.	(32) 36.68	1.09
	<i>Picea engelmannii</i> / <i>Linnaea borealis</i> h.t.	(32R) 6.42	0.19
LOWLAND ALTERED GRASSLAND		125.34	3.72
41	Noxious Weed Tailings c.t.	6.82	0.20
42	Lowland Altered Grassland c.t.	49.47	1.47
43	Hay Meadow	69.05	2.05
RIPARIAN AND WETLAND (RW)		303.32	9.00
51	Herbaceous RW types		75.01
	<i>Juncus balticus</i> c.t.	2.23	
	<i>Carex nebrascensis</i> c.t.		
	<i>Carex utriculata</i> h.t.		
52	Low Shrub (Cinquefoil) RW types		120.04
	<i>Dasiphora fruticosa</i> / <i>Poa pratensis</i> c.t.	3.56	
	<i>Dasiphora fruticosa</i> / <i>Deschampsia cespitosa</i> c.t.		
	<i>Dasiphora fruticosa</i> / <i>Carex utriculata</i> c.t.		
53	Tall Shrub (Willow) RW types		95.77
	<i>Salix bebbiana</i> series	2.84	
	<i>Salix geyeriana</i> series		
54	Deciduous Forest (Aspen) RW types		12.50
	<i>Populus tremuloides</i> / <i>Osmorhiza occidentalis</i> h.t.	0.37	
	<i>Populus tremuloides</i> / <i>Poa pratensis</i> c.t.		
MISCELLANEOUS			50.70
D	Disturbed	17.40	0.52
Rd	Road	28.72	0.85
W	Water	4.58	0.14
TOTAL		3367.49	100.00

¹R = immature stands of seedling, sapling, pole-sized trees in logged areas with conifer recruitment or where conifers are encroaching into grassland and shrubland areas.

6.0

APPENDICES

BLACK BUTTE VEGETATION BASELINE

(Data by Sample Site)

APPENDIX	SAMPLE PARAMETERS	PAGE
A	List of Vascular Plant Species	A-i
B	Canopy Cover and Constancy	B-i
C	Shrub Density	C-i
D	Tree Density	D-i
E	Vegetation Type/Ecological Site/Soils Correlation	E-i
F	Summary of Site Parameters by Community Type	F-i
G	Literature Review of Regional Plant Communities	G-i
H	Representative Photographs of Vegetation Sample Plots	H-i

APPENDIX A

List of Vascular Plant Species Identified in the Black Butte Baseline Study Area, Meagher County, Montana, 2015.

Appendix A
List of Vascular Plant Species Identified for the Black Butte Baseline Vegetation Inventory,
Meagher County, Montana, 2015.

Binomial	Code	Common Name
NATIVE PERENNIAL GRAMINOIDS		
Agropyron dasystachyum (Elymus lanceolatus*)	Agr das	Thickspike wheatgrass
Agropyron smithii (Elymus smithii, Pascopyrum smithii*)	Agr smi	Western wheatgrass
Agropyron spicatum (Elymus spicatus, Pseudoroegneria spicata)	Agr spi	Bluebunch wheatgrass
Agropyron trachycaulum (Agropyron caninum, Elymus trachycaulus*)	Agr tra	Slender wheatgrass
Agrostis exarata*	Agr exa	Spike bentgrass
Agrostis scabra*	Agr sca	Rough bentgrass
Anthoxanthum hirtum* (Hierochloa odorata)	Ant hir	Northern sweetgrass
Bromus carinatus (Bromus marginatus)	Bro car	Mountain brome
Bromus ciliatus*	Bro cil	Fringed brome
Bromus porteri (Bromus anomalus)	Bro por	Nodding brome
Bromus pumpellianus (Bromus inermis var. pumpellianus)	Bro pum	Pumpelly's brome
Calamagrostis canadensis*	Cal can	Bluejoint reedgrass
Calamagrostis rubescens	Cal rub	Pinegrass
Calamagrostis stricta* (Calamagrostis inexpansa, Calamagrostis neglecta)	Cal str	Northern reedgrass
Carex aquatilis*	Car aqu	Water sedge
Carex atherodes*	Car ath	Slough sedge
Carex athrostachya*	Car ato	Slender-beaked sedge
Carex aurea*	Car aur	Golden sedge
Carex disperma*	Car dis	Soft-leaved sedge
Carex eleocharis (Carex duriuscula, Carex stenophylla)	Car ele	Needleleaf sedge
Carex filifolia	Car fil	Threadleaf sedge
Carex geyeri	Car gey	Elk sedge
Carex hoodii*	Car hoo	Hood's sedge
Carex interior*	Car int	Inland sedge
Carex microptera*	Car mic	Small-winged sedge
Carex multicosata	Car mul	Manyrib sedge
Carex nebrascensis*	Car neb	Nebraska sedge
Carex obtusata	Car obt	Blunt sedge
Carex pachystachya*	Car pac	Chamisso sedge
Carex pellita* (Carex lanuginosa)	Car pel	Woolly sedge
Carex petasata*	Car pet	Liddon's sedge
Carex praegracilis*	Car pra	Clustered field sedge
Carex praticola*	Car prt	Meadow sedge
Carex rossii	Car roi	Ross sedge
Carex scirpoidea*	Car sci	Northern single-spike sedge
Carex simulata*	Car sim	Short-beaked sedge
Carex utriculata* (Carex rostrata)	Car utr	Southern beaked sedge
Catabrosa aquatica*	Cat aqu	Brookgrass
Danthonia californica*	Dan cal	California danthonia
Danthonia intermedia*	Dan int	Timber oatgrass
Danthonia unispicata	Dan uni	One-spike oatgrass
Deschampsia cespitosa (Deschampsia caespitosa*)	Des ces	Tufted hairgrass
Eleocharis palustris* (Eleocharis macrostachya, Eleocharis erythropoda)	Ele pal	Common spikesedge
Elymus glaucus*	Ely gla	Blue wildrye
Festuca campestris (Festuca scabrella, Festuca altaica*)	Fes cam	Rough fescue
Festuca idahoensis*	Fes ida	Idaho fescue
Festuca rubra*	Fes rub	Red fescue
Glyceria grandis*	Gly gra	American mannagrass
Glyceria striata*	Gly str	Fowl mannagrass
Hordeum brachyantherum* (Hordeum caespitosum)	Hor bra	Meadow barley
Hordeum jubatum*	Hor jub	Foxtail barley
Juncus balticus* (Juncus arcticus var. balticus)	Jun bal	Baltic rush
Juncus confusus*	Jun con	Colorado rush
Juncus longistylis*	Jun lon	Longstyle rush

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Binomial	Code	Common Name
Juncus nodosus*	Jun nod	Jointed rush
Koeleria macrantha (Koeleria cristata, Koeleria pyramidata)	Koe mac	Prairie junegrass
Luzula campestris (Luzula multiflora*)	Luz cam	Field woodrush
Muhlenbergia richardsonii*	Muh ric	Mat muhly
Oryzopsis hymenoides (Achnatherum hymenoides*)	Ory hym	Indian ricegrass
Phalaris arundinacea*	Pha aru	Reed canarygrass
Poa interior*	Poa int	Inland bluegrass
Poa secunda* (Poa canbyi, Poa gracillima, Poa juncifolia, Poa nevadensis, Poa sandbergii, Poa scabrella)	Poa sec	Sandberg's bluegrass
Scirpus microcarpus*	Sci mic	Panicled bulrush
Stipa nelsonii (Stipa columbiana, Achnatherum nelsonii*)	Sti nel	Columbia needlegrass
Stipa richardsonii (Achnatherum richardsonii*)	Sti ric	Richardson's needlegrass
Trisetum spicatum*	Tri spi	Spike trisetum
INTRODUCED PERENNIAL GRAMINOIDS		
Agropyron repens (Elymus repens*, Elytrigia repens)	Agr rep	Quackgrass
Agrostis stolonifera* (Agrostis alba)	Agr sto	Redtop
Alopecurus arundinaceus*	Alo aru	Creeping meadow foxtail
Alopecurus pratensis*	Alo pra	Tufted meadow foxtail
Bromus inermis*	Bro ine	Smooth brome
Dactylis glomerata*	Dac glo	Orchard-grass
Phleum pratense*	Phl pra	Common timothy
Poa compressa*	Poa com	Canada bluegrass
Poa palustris*	Poa pal	Fowl bluegrass
Poa pratensis*	Poa pra	Kentucky bluegrass
Schedonorus arundinaceus* (Festuca arundinacea)	Sch aru	Tall fescue
Schedonorus pratensis* (Festuca pratensis)	Sch pra	Meadow fescue
NATIVE ANNUAL GRAMINOIDS		
Beckmannia syzigachne*	Bec syz	American sloughgrass
Juncus bufonius*	Jun buf	Toad rush
INTRODUCED ANNUAL GRAMINOIDS		
Bromus japonicus (Bromus arvensis*)	Bro jap	Japanese brome
Bromus tectorum	Bro tec	Cheatgrass brome
NATIVE PERENNIAL FORBS AND SUBSHRUBS		
Achillea millefolium*	Ach mil	Common yarrow
Actaea rubra*	Act rub	Red baneberry
Agoseris glauca*	Ago gla	Prairie agoseris
Allium brevistylum	All bre	Short-style onion
Allium cernuum*	All cer	Nodding onion
Allium geberi*	All gey	Geyer's onion
Allium schoenoprasum*	All sch	Chives
Allium textile	All tex	Textile onion
Anemone multifida	Ane mul	Ball anemone
Anemone patens (Anemone nuttalliana)	Ane pat	Pasqueflower
Antennaria anaphaloides	Ant ana	Tall pussytoes
Antennaria corymbosa*	Ant cor	Flat-top pussytoes
Antennaria microphylla	Ant mic	Littleleaf pussytoes
Antennaria neglecta* (Antennaria howellii)	Ant neg	Field pussytoes
Antennaria parvifolia	Ant par	Small-leaf pussytoes
Antennaria racemosa	Ant rac	Raceme pussytoes
Antennaria rosea	Ant ros	Rosy pussytoes
Antennaria umbrinella*	Ant umb	Umber pussytoes
Arabis nuttallii	Ara nut	Nuttall's rockcress
Arenaria congesta (Eremogone congesta)	Are con	Ballhead sandwort
Arnica chamissonis*	Arn cha	Meadow arnica
Arnica cordifolia	Arn cor	Heartleaf arnica

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Binomial	Code	Common Name
<i>Arnica fulgens</i> *	Arn ful	Orange arnica
<i>Arnica sororia</i>	Arn sor	Twin arnica
<i>Artemisia dracunculoides</i>	Art dra	False-tarragon sagewort
<i>Artemisia frigida</i>	Art fri	Fringed sagewort
<i>Artemisia ludoviciana</i> *	Art lud	Cudweed sagewort
<i>Astragalus adsurgens</i> (<i>Astragalus striatus</i>)	Ast ads	Prairie milkvetch
<i>Astragalus agrestis</i> * (<i>Astragalus dasyglottis</i>)	Ast agr	Field milkvetch
<i>Astragalus alpinus</i> *	Ast alp	Alpine milkvetch
<i>Astragalus crassicus</i>	Ast cra	Groundplum milkvetch
<i>Astragalus drummondii</i>	Ast dru	Drummond's milkvetch
<i>Astragalus miser</i>	Ast mis	Weedy milkvetch
<i>Astragalus purshii</i>	Ast pur	Pursh's milkvetch
<i>Astragalus tenellus</i>	Ast ten	Loose flower milkvetch
<i>Astragalus vexilliflexus</i>	Ast vex	Bent-flowered milkvetch
<i>Balsamorhiza sagittata</i>	Bal sag	Arrowleaf balsamroot
<i>Berberis repens</i> (<i>Mahonia repens</i>)	Ber rep	Creeping Oregon-grape
<i>Besseyia wyomingensis</i>	Bes wyo	Wyoming kittentail
<i>Boechera pendulocarpa</i> (<i>Arabis holboellii</i> var. <i>pendulocarpa</i>)	Boe pen	Pendulous holboell's rockcress
<i>Boechera stricta</i> * (<i>Arabis drummondii</i>)	Boe str	Drummond's rockcress
<i>Campanula rotundifolia</i> *	Cam rot	Roundleaf harebell
<i>Canadanthus modestus</i> * (<i>Aster modestus</i>)	Can mod	Few-flowered aster
<i>Cardamine breweri</i> *	Car brw	Brewer's bittercress
<i>Castilleja flava</i> (<i>Castilleja rustica</i>)	Cas fla	Yellow paintbrush
<i>Castilleja miniata</i> *	Cas min	Scarlet paintbrush
<i>Castilleja pallescens</i>	Cas pal	Pale paintbrush
<i>Cerastium arvense</i> *	Cer arv	Field chickweed
<i>Chamerion angustifolium</i> (<i>Epilobium angustifolium</i> , <i>Chamaenerion angustifolium</i> *)	Cha ang	Fireweed
<i>Cicuta maculata</i> *	Cic mac	Spotted water-hemlock
<i>Cirsium hookerianum</i>	Cir hoo	White thistle
<i>Cirsium longistylum</i>	Cir lon	Long-styled thistle
<i>Cirsium scariosum</i> *	Cir sca	Elk thistle
<i>Cirsium undulatum</i> *	Cir und	Wavyleaf thistle
<i>Claytonia rosea</i> (<i>Claytonia lanceolata</i> var. <i>flava</i> , <i>Claytonia multiscapa</i> *)	Clay ros	Yellow springbeauty
<i>Clematis hirsutissima</i>	Cle hir	Vaseflower clematis
<i>Comandra umbellata</i> *	Com umb	Pale bastard toadflax
<i>Conimitella williamsii</i>	Con wil	Conimitella
<i>Corallorhiza wisteriana</i> *	Cor wis	Wister coral-root
<i>Crepis acuminata</i>	Cre acu	Tapertip hawksbeard
<i>Crepis atriobarba</i>	Cre atr	Slender hawksbeard
<i>Crepis occidentalis</i>	Cre occ	Western hawksbeard
<i>Crepis runcinata</i> *	Cre run	Meadow hawksbeard
<i>Delphinium bicolor</i>	Del bic	Low larkspur
<i>Dodecatheon conjugens</i> *	Dod con	Slimpod shooting star
<i>Dodecatheon pulchellum</i> *	Dod pul	Few-flowered shooting star
<i>Draba oligosperma</i>	Dra oli	Few-seeded draba
<i>Dryocallis arguta</i> * (<i>Potentilla arguta</i>)	Dry arg	Tall cinquefoil
<i>Epilobium ciliatum</i> * (<i>Epilobium glandulosum</i>)	Epi cil	Common willow-herb
<i>Epilobium palustre</i> *	Epi pal	Swamp willow-herb
<i>Erigeron caespitosus</i>	Eri cae	Tufted fleabane
<i>Erigeron compositus</i>	Eri com	Cutleaf daisy
<i>Erigeron lonchophyllus</i> *	Eri lon	Spearleaf fleabane
<i>Erigeron ochroleucus</i>	Eri och	Buff fleabane
<i>Erigeron speciosus</i>	Eri spe	Showy fleabane
<i>Erigeron subtrinervis</i>	Eri sub	Three nerve fleabane
<i>Eriogonum ovalifolium</i> *	Eri ova	Oval-leaved buckwheat
<i>Eriogonum umbellatum</i>	Eri umb	Sulfur buckwheat

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Binomial	Code	Common Name
<i>Erysimum inconspicuum</i>	Ery inc	Smallflowered rocket
<i>Eurybia conspicua</i> (<i>Aster conspicuus</i>)	Eur con	Western showy aster
<i>Eurybia integrifolia</i> (<i>Aster integrifolius</i>)	Eur int	Thickstem aster
<i>Fragaria vesca</i> *	Fra ves	Woods strawberry
<i>Fragaria virginiana</i> *	Fra vir	Virginia strawberry
<i>Frasera speciosa</i>	Fra spe	Giant frasera
<i>Fritillaria atropurpurea</i>	Fri atr	Checker lily
<i>Fritillaria pudica</i>	Fri pud	Yellow bell
<i>Gaillardia aristata</i>	Gai ari	Blanket-flower
<i>Galium boreale</i> *	Gal bor	Northern bedstraw
<i>Galium trifidum</i> *	Gal trf	Small bedstraw
<i>Gaura coccinea</i>	Gau coc	Scarlet gaura
<i>Gentiana affinis</i> *	Gen aff	Pleated gentian
<i>Geranium richardsonii</i> *	Ger ric	White geranium
<i>Geranium viscosissimum</i> *	Ger vis	Sticky geranium
<i>Geum aleppicum</i> *	Geu ale	Yellow avens
<i>Geum macrophyllum</i> *	Geu mac	Large leaf avens
<i>Geum rivale</i> *	Geu riv	Water avens
<i>Geum triflorum</i> *	Geu tri	Prairiesmoke
<i>Helianthella uniflora</i>	Hel uni	One flower helianthella
<i>Heracleum lanatum</i> (<i>Heracleum maximum</i> , <i>Heracleum sphondylium</i> *)	Her lan	Cow parsnip
<i>Heterotheca villosa</i> (<i>Chrysopsis villosa</i>)	Het vil	Hairy goldenaster
<i>Heuchera cylindrica</i>	Heu cyl	Roundleaf alumroot
<i>Heuchera parvifolia</i>	Heu par	Littleleaf alumroot
<i>Hieracium albiflorum</i>	Hie alb	White-flowered hawkweed
<i>Hieracium scouleri</i> (<i>Hieracium albertinum</i> , <i>Hieracium cynoglossoides</i>)	Hie sco	Woolly hawkweed
<i>Hippuris vulgaris</i> *	Hip vul	Common mare's tail
<i>Iris missouriensis</i> *	Iri mis	Rocky Mountain iris
<i>Ligusticum filicinum</i> (<i>Ligusticum tenuifolium</i> *)	Lig fil	Fernleaf licorice-root
<i>Linnaea borealis</i> *	Lin bor	Western twinflower
<i>Linum lewisii</i> (<i>Linum perenne</i>)	Lin lew	Blue flax
<i>Lithophragma parviflorum</i>	Lit par	Smallflower fringecup
<i>Lithospermum ruderale</i>	Lit rud	Western gromwell
<i>Lomatium dissectum</i>	Lom dis	Fern-leaved lomatium
<i>Lomatium macrocarpum</i>	Lom mac	Large-fruited lomatium
<i>Lomatium triternatum</i>	Lom tri	Nine-leaf lomatium
<i>Lupinus argenteus</i>	Lup arg	Silvery lupine
<i>Lupinus leucophyllus</i>	Lup leu	Velvet lupine
<i>Lupinus sericeus</i>	Lup ser	Silky lupine
<i>Lysimachia ciliata</i> *	Lys cil	Fringed loosestrife
<i>Mentha arvensis</i> *	Men arv	Field mint
<i>Mertensia viridis</i> *	Mer vir	Canescent bluebells
<i>Micranthes odontoloma</i> * (<i>Saxifraga arguta</i> , <i>Saxifraga odontoloma</i>)	Mic odo	Brook saxifrage
<i>Mimulus guttatus</i> *	Mim gut	Common monkey-flower
<i>Moehringia lateriflora</i> * (<i>Arenaria lateriflora</i>)	Moe lat	Bluntleaf sandwort
<i>Moneses uniflora</i> * (<i>Pyrola uniflora</i>)	Mon uni	Woodnymph
<i>Musineon divaricatum</i>	Mus div	Leafy musineon
<i>Noccaea fendleri</i> (<i>Thlaspi montanum</i>)	Noc fen	Alps pennycress
<i>Oenothera flava</i> *	Oen fla	Long-tubed evening-primrose
<i>Orobanche fasciculata</i>	Oro fas	Clustered broomrape
<i>Orthilia secunda</i> * (<i>Pyrola secunda</i>)	Ort sec	One-sided wintergreen
<i>Osmorhiza chilensis</i> (<i>Osmorhiza berteroi</i> *)	Osm chi	Mountain sweetroot
<i>Osmorhiza occidentalis</i>	Osm occ	Sweet anise
<i>Oxytropis besseyi</i>	Oxy bes	Bessey's locoweed
<i>Oxytropis deflexa</i> *	Oxy def	Pendent-pod locoweed
<i>Oxytropis sericea</i>	Oxy ser	Silky locoweed
<i>Oxytropis splendens</i> *	Oxy spl	Showy locoweed

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<i>Parnassia palustris</i> *	Par pal	Northern grass-of-parnassus
<i>Paronychia sessiliflora</i>	Par ses	Stemless whitlow-wort
<i>Pedicularis groenlandica</i> *	Ped gro	Elephanthead
<i>Pedicularis parryi</i> *	Ped par	Parry's lousewort
<i>Penstemon eriantherus</i>	Pen eri	Fuzzytongue penstemon
<i>Penstemon nitidus</i>	Pen nit	Waxleaf penstemon
<i>Penstemon procerus</i> *	Pen pro	Littleflower penstemon
<i>Perideridia montana</i> (<i>Perideridia gairdneri</i> *)	Per mon	Gairdner's yampa
<i>Petasites frigidus</i> * (<i>Petasites sagittatus</i>)	Pet fri	Arrowleaf coltsfoot
<i>Phacelia hastata</i>	Pha has	Silverleaf phacelia
<i>Phlox hoodii</i>	Phl hoo	Hood's phlox
<i>Physaria didymocarpa</i>	Phy did	Common twinpod
<i>Platanthera hyperborea</i> (<i>Habenaria hyperborea</i> , <i>Platanthera aquilonis</i> *)	Pla hyp	Northern green bog-orchid
<i>Platanthera obtusata</i> * (<i>Habenaria obtusata</i>)	Pla obt	Blunt-leaf rein-orchid
<i>Polemonium pulcherrimum</i>	Pol pul	Showy polemonium
<i>Polygonum amphibium</i> (<i>Polygonum coccineum</i> , <i>Persicaria amphibia</i> *)	Pol amp	Water ladysthumb
<i>Polygonum bistortoides</i> (<i>Bistorta bistortoides</i> *)	Pol bis	American bistort
<i>Potamogeton filiformis</i> (<i>Stuckenia filiformis</i> *)	Pot fil	Slenderleaf pondweed
<i>Potamogeton foliosus</i> *	Pot fol	Leafy pondweed
<i>Potentilla anserina</i> * (<i>Argentina anserina</i>)	Pot ans	Common silverweed
<i>Potentilla gracilis</i> *	Pot gra	Slender cinquefoil
<i>Potentilla hippiana</i>	Pot hip	Woolly cinquefoil
<i>Potentilla pensylvanica</i> *	Pot pen	Prairie cinquefoil
<i>Prosartes trachycarpa</i> * (<i>Disporum trachycarpum</i>)	Pro tra	Wartberry fairy-bell
<i>Prunella vulgaris</i> *	Pru vul	Self-heal
<i>Pyrola asarifolia</i> *	Pyr asa	Pink wintergreen
<i>Pyrola chlorantha</i> *	Pyr chl	Green-flowered wintergreen
<i>Pyrola minor</i> *	Pyr min	Snowline pyrola
<i>Pyrrocoma integrifolia</i> (<i>Haplopappus integrifolius</i>)	Pyr int	Entire-leaved goldenweed
<i>Ranunculus acriformis</i> *	Ran aci	Sharp buttercup
<i>Ranunculus aquatilis</i> * (<i>Ranunculus longirostris</i> , <i>Ranunculus subrigidus</i>)	Ran aqu	Hairleaf water buttercup
<i>Ranunculus inamoenus</i> *	Ran ina	Graceful buttercup
<i>Ranunculus macounii</i> *	Ran mac	Macoun's buttercup
<i>Ranunculus uncinatus</i> *	Ran uni	Little buttercup
<i>Rumex occidentalis</i> *	Rum occ	Western dock
<i>Rumex salicifolius</i> (<i>Rumex triangulivalvis</i> *, <i>Rumex utahensis</i>)	Rum sal	Willow dock
<i>Scutellaria galericulata</i> *	Scu gal	Marsh skullcap
<i>Sedum lanceolatum</i>	Sed lan	Lanceleaf stonecrop
<i>Senecio canus</i> (<i>Packera cana</i>)	Sen can	Woolly groundsel
<i>Senecio integerrimus</i> *	Sen int	Western groundsel
<i>Senecio pauperculus</i> (<i>Packera paupercula</i> *)	Sen pap	Balsam groundsel
<i>Senecio pseud aureus</i> (<i>Packera pseud aurea</i> *)	Sen pse	Golden groundsel
<i>Senecio sphaerocephalus</i> *	Sen sph	Mountain-marsh butterweed
<i>Senecio streptanthifolius</i> (<i>Packera streptanthifolia</i> *)	Sen str	Rocky Mountain butterweed
<i>Silene drummondii</i> (<i>Lychnis drummondii</i>)	Sil dru	Drummond campion
<i>Sisyrinchium idahoense</i> *	Sis ida	Idaho blue-eyed grass
<i>Smilacina racemosa</i> (<i>Maianthemum racemosum</i> *)	Smi rac	Feather solomon's seal
<i>Smilacina stellata</i> (<i>Maianthemum stellatum</i> *)	Smi ste	Starry false solomon's seal
<i>Solidago canadensis</i> (<i>Solidago lepida</i> *)	Sol canl	(Western) Canada goldenrod
<i>Solidago missouriensis</i>	Sol mis	Missouri goldenrod
<i>Sparganium angustifolium</i> * (<i>Sparganium emersum</i>)	Spa ang	Simplestem bur-reed
<i>Spiranthes romanzoffiana</i> *	Spi rom	Hooded ladies-tresses
<i>Stachys palustris</i> (<i>Stachys pilosa</i> *)	Sta pal	Swamp hedge-nettle
<i>Stellaria crispa</i> *	Ste cri	Crisped starwort
<i>Stellaria longifolia</i> *	Ste log	Longleaved starwort
<i>Stellaria longipes</i> *	Ste lon	Longstalk starwort

Appendix A
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Meagher County, Montana, 2015.

Binomial	Code	Common Name
<i>Stenotus acaulis</i> (<i>Haplopappus acaulis</i>)	Ste aca	Cushion goldenweed
<i>Symphyotrichum ascendens</i> * (<i>Aster chilensis</i>)	Sym asc	Long-leaved aster
<i>Symphyotrichum boreale</i> * (<i>Aster junciformis</i>)	Sym bor	Rush aster
<i>Symphyotrichum campestre</i> (<i>Aster campestris</i>)	Sym cam	Meadow aster
<i>Symphyotrichum falcatum</i> * (<i>Aster falcatus</i>)	Sym fal	Creeping white prairie aster
<i>Symphyotrichum foliaceum</i> * (<i>Aster foliaceus</i>)	Sym fol	Leafy aster
<i>Symphyotrichum lanceolatum</i> * var. <i>hesperium</i> (<i>Aster hesperius</i>)	Sym lanh	Lance-leaved aster
<i>Symphyotrichum subspicatum</i> * (<i>Aster subspicatus</i>)	Sym sub	Douglas' aster
<i>Thalictrum venulosum</i> *	Tha ven	Veiny meadowrue
<i>Townsendia parryi</i>	Tow par	Parry's townsendia
<i>Trifolium longipes</i> *	Tri lon	Long-stalked clover
<i>Valeriana dioica</i> *	Val dio	Northern valerian
<i>Valeriana edulis</i> *	Val edu	Edible valerian
<i>Veronica americana</i> *	Ver ame	American speedwell
<i>Vicia americana</i> *	Vic ame	American vetch
<i>Viola adunca</i> *	Vio adu	Early blue violet
<i>Viola canadensis</i> *	Vio can	Canada violet
<i>Viola nephrophylla</i> * (<i>Viola pratincola</i>)	Vio nep	Northern bog violet
<i>Viola nuttallii</i>	Vio nut	Yellow prairie violet
<i>Zigadenus elegans</i> (<i>Anticlea elegans</i> *)	Zig ele	Mountain death-camas
<i>Zigadenus venenosus</i> (<i>Toxicoscordion venenosum</i> *)	Zig ven	Meadow death-camas
<i>Zizia aptera</i> *	Ziz apt	Heart-leaved alexanders
INTRODUCED PERENNIAL FORBS		
<i>Artemisia absinthium</i>	Art abs	Common wormwood
<i>Centaurea maculosa</i> (<i>Centaurea stoebe</i>)	Cen mac	Spotted knapweed
<i>Cerastium fontanum</i> * (<i>Cerastium vulgatum</i>)	Cer fon	Common chickweed
<i>Cirsium arvense</i> *	Cir arv	Canada thistle
<i>Knautia arvensis</i>	Kna arv	Field scabious
<i>Leucanthemum vulgare</i> * (<i>Chrysanthemum leucanthemum</i>)	Leu vul	Oxeye daisy
<i>Lotus corniculatus</i> *	Lot cor	Birdsfoot trefoil
<i>Medicago sativa</i> *	Med sat	Alfalfa
<i>Plantago major</i> *	Pla maj	Common plantain
<i>Rumex crispus</i> *	Rum cri	Curl dock
<i>Silene latifolia</i> (<i>Lychnis alba</i>)	Sil lat	White campion
<i>Sonchus arvensis</i> * (<i>Sonchus uliginosus</i>)	Son arv	Field sow-thistle
<i>Taraxacum officinale</i> *	Tar off	Common dandelion
<i>Trifolium hybridum</i> *	Tri hyb	Alsike clover
<i>Trifolium pratense</i> *	Tri pra	Red clover
<i>Trifolium repens</i> *	Tri rep	White Dutch clover
FERNS AND ALLIES		
<i>Botrychium minganense</i>	Bot min	Mingan Island moonwort
<i>Cystopteris fragilis</i> *	Cys fra	Brittle bladder-fern
<i>Equisetum arvense</i> *	Equ arv	Common horsetail
<i>Equisetum laevigatum</i> *	Equ lae	Smooth horsetail
<i>Selaginella densa</i>	Sel den	Compact clubmoss
<i>Woodsia oregana</i>	Woo ore	Oregon woodsia
NATIVE ANNUAL/BIENNIAL FORBS		
<i>Androsace filiformis</i> *	And fil	Slender fairy-candelabra
<i>Androsace occidentalis</i> *	And occ	Western rockjasmine
<i>Androsace septentrionalis</i> *	And sep	Northern fairy-candelabra
<i>Arabis hirsuta</i> (<i>Arabis pycnocarpa</i> *)	Ara hir	Hairy rockcross
<i>Artemisia biennis</i> *	Art bie	Biennial wormwood
<i>Barbarea orthoceras</i> *	Bar ort	American wintercress
<i>Boechera divaricarpa</i> * (<i>Arabis divaricarpa</i> , <i>Arabis confinis</i>)	Boe div	Spreading-pod rockcross

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List of Vascular Plant Species Identified for the Black Butte Baseline Vegetation Inventory,
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Binomial	Code	Common Name
<i>Cardamine pensylvanica</i> *	Car pes	Pennsylvania bittercress
<i>Chenopodium fremontii</i> *	Che fre	Fremont's goosefoot
<i>Chenopodium glaucum</i> *	Che gla	Oak-leaved goosefoot
<i>Collinsia parviflora</i>	Col par	Blue-eyed Mary
<i>Collomia linearis</i> *	Col lin	Narrow-leaf collomia
<i>Corydalis aurea</i>	Cor aur	Golden corydalis
<i>Descurainia incana</i> * (<i>Descurainia richardsonii</i>)	Des inc	Richardson's tansymustard
<i>Epilobium brachycarpum</i> (<i>Epilobium paniculatum</i>)	Epi bra	Autumn willow-herb
<i>Erysimum cheiranthoides</i> *	Ery che	Treacle mustard
<i>Gentianella amarella</i> *	Gen ama	Northern gentian
<i>Lappula squarrosa</i> (<i>Lappula echinata</i>)	Lap squ	Bristly stickseed
<i>Madia glomerata</i> *	Mad glo	Cluster tarweed
<i>Microsteris gracilis</i> *	Mic gra	Pink microsteris
<i>Monolepis nuttalliana</i> *	Mon nut	Nuttall's poverty weed
<i>Orthocarpus luteus</i> *	Ort lut	Yellow owl clover
<i>Orthocarpus tenuifolius</i>	Ort ten	Thinleaf owl clover
<i>Phacelia linearis</i>	Pha lin	Threadleaf phacelia
<i>Plagiobothrys scouleri</i> (<i>Plagiobothrys hispidulus</i> *)	Pla sco	Scouler's popcorn-flower
<i>Polygonum achoreum</i> *	Pol ach	Doorweed
<i>Polygonum douglasii</i> *	Pol dou	Douglas knotweed
<i>Potentilla norvegica</i> *	Pot nor	Norwegian cinquefoil
<i>Rhinanthus crista-galli</i> (<i>Rhinanthus minor</i> *)	Rhi cri	Yellow rattle
<i>Rorippa palustris</i> * (<i>Rorippa islandica</i>)	Ror pal	Marsh yellowcress
<i>Turritis glabra</i> (<i>Arabis glabra</i>)	Tur gla	Tower mustard
INTRODUCED ANNUAL/BIENNIAL FORBS		
<i>Alyssum alyssoides</i>	Aly aly	Pale alyssum
<i>Capsella bursa-pastoris</i> *	Cap bur	Shepherd's purse
<i>Carduus nutans</i> *	Car nut	Musk thistle
<i>Carum carvi</i> *	Car car	Caraway
<i>Cirsium vulgare</i> *	Cir vul	Bull thistle
<i>Cynoglossum officinale</i> *	Cyn off	Common hound's-tongue
<i>Descurainia sophia</i>	Des sop	Flixweed tansymustard
<i>Galeopsis tetrahit</i> *	Gal tet	Common hemp nettle
<i>Medicago lupulina</i> *	Med lup	Black medick
<i>Polygonum aviculare</i> * (<i>Polygonum arenastrum</i>)	Pol avi	Prostrate knotweed
<i>Thlaspi arvense</i> *	Thl arv	Fanweed
<i>Tragopogon dubius</i>	Tra dub	Common salsify
NATIVE SHRUBS AND VINES		
<i>Amelanchier alnifolia</i> *	Ame aln	Western serviceberry
<i>Arctostaphylos uva-ursi</i> *	Arc uva	Kinnikinnick
<i>Artemisia tridentata</i>	Art tri	Big sagebrush
<i>Betula glandulosa</i> *	Bet gla	Bog birch
<i>Clematis occidentalis</i> (<i>Clematis columbiana</i> (Nutt.) T & G)	Cle occ	Western clematis
<i>Dasiphora fruticosa</i> * (<i>Potentilla fruticosa</i> , <i>Pentaphylloides floribunda</i>)	Das fru	Shrubby cinquefoil
<i>Juniperus communis</i> *	Jun com	Common juniper
<i>Juniperus horizontalis</i> *	Jun hor	Creeping juniper
<i>Lonicera utahensis</i> *	Lon uta	Utah honeysuckle
<i>Prunus virginiana</i> *	Pru vir	Common chokecherry
<i>Ribes cereum</i>	Rib cer	Wax currant
<i>Ribes inerme</i> *	Rib ine	Whitestem gooseberry
<i>Ribes setosum</i> (<i>Ribes oxyacanthoides</i> *)	Rib set	Bristly gooseberry
<i>Rosa acicularis</i> *	Ros aci	Prickly rose
<i>Rosa arkansana</i> *	Ros ark	Prairie rose
<i>Rosa woodsii</i> *	Ros woo	Wood's rose
<i>Rubus idaeus</i> *	Rub ida	Red raspberry

Appendix A
List of Vascular Plant Species Identified for the Black Butte Baseline Vegetation Inventory,
Meagher County, Montana, 2015.

Binomial	Code	Common Name
Salix bebbiana*	Sal beb	Bebb willow
Salix boothii* (Salix myrtilifolia)	Sal boo	Booth willow
Salix brachycarpa*	Sal bra	Short-fruited willow
Salix drummondiana*	Sal dru	Drummond willow
Salix eriocephala var. mackenzieana (Salix rigida var. mackenzieana, Salix prolixa*)	Sal erim	Mackenzie willow
Salix geieriana*	Sal gey	Geyer willow
Salix melanopsis* (Salix exigua ssp. melanopsis)	Sal mel	Dusky willow
Salix planifolia* (Salix phylicifolia)	Sal pla	Planeleaf willow
Salix pseudomonticola* (Salix monticola)	Sal pse	Mountain willow
Shepherdia canadensis*	She can	Canada buffaloberry
Spiraea betulifolia*	Spi bet	White spirea
Symphoricarpos albus*	Sym alb	Common snowberry
Symphoricarpos occidentalis*	Sym occ	Western snowberry
Vaccinium scoparium*	Vac sco	Grouse whortleberry
NATIVE TREES		
Juniperus scopulorum	Jun sco	Rocky Mountain juniper
Picea engelmannii*	Pic eng	Engelmann spruce
Pinus contorta*	Pin con	Lodgepole pine
Pinus flexilis	Pin fle	Limber pine
Pinus ponderosa*	Pin pon	Ponderosa pine
Populus tremuloides*	Pop tre	Quaking aspen
Pseudotsuga menziesii*	Pse men	Douglas-fir

Scientific nomenclature follows Lesica (2012). The more recent, most commonly used synonyms, partial synonyms/combinations, and misapplied names are given in parentheses. These, as well as common names, are taken from a variety of sources including:

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The National Wetland Plant List : 2014 Update of Wetland Ratings. Phytoneuron 2014-41: 1-42.
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*An asterisk indicates nomenclature appearing on the National Wetland Plant List (Lichvar 2012, updated 2014). Taxa with no asterisk do not appear on the NWPL, and are to be considered "Upland" species in the context of wetland inventories; additionally, the 2014 NWPL rates wetland plants at only the species level and does not distinguish among infraspecific taxa in assigning wetland ratings.

APPENDIX B
Percent Canopy Cover and Constancy by Plot for Vegetation Types Identified in the
Black Butte Baseline Study Area, Meagher County, Montana, 2015.

TABLE	VEGETATION TYPE ¹	PAGE
UPLAND GRASSLAND		
B1	Upland Altered Grassland c.t.	B-1
B2	<i>Festuca idahoensis</i> / <i>Agropyron spicatum</i> h.t.	B-5
	<i>Festuca idahoensis</i> / <i>Stipa richardsonii</i> h.t.	
	<i>Festuca campestris</i> / <i>Agropyron spicatum</i> h.t.	
B3	<i>Festuca campestris</i> / <i>Festuca idahoensis</i> h.t.	B-9
UPLAND SHRUBLAND		
B4	<i>Artemisia tridentata</i> / <i>Poa pratensis</i> c.t.	B-14
B5	<i>Artemisia tridentata</i> / <i>Festuca idahoensis</i> h.t.	B-19
B6	<i>Artemisia tridentata</i> / <i>Festuca campestris</i> h.t.	B-21
B7	<i>Artemisia tridentata</i> - <i>Dasiphora fruticosa</i> / <i>Poa pratensis</i> c.t.	B-26
	<i>Dasiphora fruticosa</i> - <i>Artemisia tridentata</i> / <i>Festuca campestris</i> c.t.	
	Mixed Shrub-Shale Outcrop c.t.	
CONIFER FOREST AND WOODLAND		
B8	<i>Pseudotsuga menziesii</i> / <i>Festuca idahoensis</i> h.t.	B-31
	<i>Pseudotsuga menziesii</i> / <i>Festuca campestris</i> h.t.	
B9	<i>Pseudotsuga menziesii</i> / <i>Juniperus communis</i> h.t.	B-37
	<i>Pseudotsuga menziesii</i> / <i>Calamagrostis rubescens</i> h.t.	
B10	<i>Pseudotsuga menziesii</i> / <i>Symphoricarpos albus</i> h.t.	B-42
B11	<i>Pseudotsuga menziesii</i> / <i>Linnaea borealis</i> h.t.	B-47
	<i>Picea engelmannii</i> / <i>Linnaea borealis</i> h.t.	
LOWLAND ALTERED GRASSLAND		
B12	Noxious Weed Tailings c.t. (2014/2015)	B-52
B13	Lowland Altered Grassland (Hay Meadow) c.t.	B-53
RIPARIAN AND WETLAND (RW)³		
Herbaceous RW types		
B14	<i>Juncus balticus</i> c.t.	B-57
	<i>Carex nebrascensis</i> c.t.	
B15	<i>Carex utriculata</i> h.t.	B-61
Shrub RW types		
B16	<i>Dasiphora fruticosa</i> / <i>Poa pratensis</i> c.t.	B-64
	<i>Dasiphora fruticosa</i> / <i>Deschampsia cespitosa</i> c.t.	
	<i>Dasiphora fruticosa</i> / <i>Carex utriculata</i> c.t.	
B17	<i>Salix bebbiana</i> series	B-69
B18	<i>Salix geyeriana</i> series	B-74
Deciduous Forest RW types		
B19	<i>Populus tremuloides</i> / <i>Osmorhiza occidentalis</i> h.t.	B-79
	<i>Populus tremuloides</i> / <i>Poa pratensis</i> c.t.	

¹Grassland and shrubland habitat types were identified following Mueggler and Stewart (1980); Forest habitat types follow Pfister *et al.* (1977), and Wetland/Riparian types follow Hansen *et al.* (1995), with minor modifications.

All plot locations are shown on the vegetation type map (Plate 1).

Wetlands in the study area are often associated with relatively narrow streamside fringes. Such sites are generally missed by the stratified random procedure used to select baseline vegetation sample sites, whereas these sites are specifically targeted for identification and delineation during the baseline wetland inventory. Accordingly, selected riparian and wetland cover/composition data were drawn from the wetland inventory to supplement the vegetation baseline database.

APPENDIX B
Percent Canopy Cover and Constancy by Plot for Vegetation Types Identified in the
Black Butte Baseline Study Area, Meagher County, Montana, 2015.

Footnotes for the tables in Appendix B:

Trace cover values were assigned 0.3 percent for each 0.01-acre canopy cover estimation plot.
Constancy values apply only to species recorded in the 0.01-acre plots.
Binomials follow Lesica (2012).

Site Parameters:

Topography codes:

Ben = Bench	Low, Lower = Lower slope	Swa = Swale
Bnk = Bank	Mid = Mid slope	Ter = Terrace
Bot = Bottom	Rid = Ridge	Toe = Toeslope
Flo = Floodplain	Sho = Shoulder	Upper = Upper slope

Configuration codes:

S = Straight	V = Concave
U = Undulating	X = Convex

Slope Aspect and Photo Azimuth: All compass readings are magnetic north, *i.e.*, the compass declination was set at zero.

Table B1
 Percent Canopy Cover by Class and Species for Nine Sample Sites in the UPLAND
 ALTERED GRASSLAND Vegetation Type, Black Butte Baseline Study Area, 2015.

UPLAND ALTERED GRASSLAND											
	PLOT NUMBER									Mean Cover	Con- stancy
	44	45	46	47	50	52	67	78	85		
n=9											
SITE PARAMETERS*											
Slope (percent)	2	8	8	9	10	12	5	3	4		
Aspect (degrees)	290	160	112	076	340	110	274	050	290		
Topography	Saddle	Low	Mid	Mid	Toe	Mid	Swale	Ter/Toe	Toe		
Configuration	Concave	Straight	Straight	Concave	Concave	Concave	Concave	Concave	Concave		
Photo # (Digital)	969-972	977-980	945-948	957-960	70-73	46-49	884-887	113-116	102-105		
Investigator	DB	DB	DB	DB	DB	DB	DB	JE/SC	DB		
Date	7/16/15	7/16/15	7/16/15	7/16/15	7/19/15	7/18/15	7/14/15	7/17/15	7/20/15		
GROUND COVER											
Bare Ground	6	15	10	4	20	7	3	5	3	8.11	100
Rock		2	5				0.3			0.81	33
Litter	86	77	77	88	67	80	89	90	90	82.67	100
Lichens			0.3		2	2		0.3		0.51	44
Moss			1		6	5		0.3		1.37	44
Basal Vegetation	8	6	7	8	5	6	8	5	7	6.67	100
VEGETATION STRUCTURE (nonstratified cover)											
Total Vegetation	93	87	91	94	88	90	97	94	94	92.00	100
Perennial Graminoids	80	70	68	78	48	74	85	90	72	73.89	100
Annual Graminoids											
Perennial Forbs and Subshrubs	40	44	55	38	60	41	45	14	54	43.44	100
Annual/Biennial Forbs		0.3	1	0.3	2		0.3		0.3	0.47	67
Shrubs			1	7	4			6	6	2.67	56
Trees (0.01-acre)											
Trees (0.1-acre)											

Table B1
 Percent Canopy Cover by Class and Species for Nine Sample Sites in the UPLAND
 ALTERED GRASSLAND Vegetation Type, Black Butte Baseline Study Area, 2015.

CLASS\SPECIES	UPLAND ALTERED GRASSLAND										
	PLOT NUMBER									Mean Cover	Con- stancy
	44	45	46	47	50	52	67	78	85		
											n=9
NATIVE PERENNIAL GRAMINOIDS											
Agropyron trachycaulum	1	1	1		1		0.3	0.3	1	0.62	78
Agrostis scabra	1				1					0.22	22
Bromus carinatus	1	1	5		2		2			1.22	56
Carex eleocharis						1		0.3		0.14	22
Carex filifolia						3				0.33	11
Carex microptera							0.3			0.03	11
Carex petasata	1	2	2	3			5	0.3		1.48	67
Carex praticola				1						0.11	11
Danthonia californica		3	3	3		3	1			1.44	56
Danthonia intermedia		2	3		2	2	4		1	1.56	67
Danthonia unispicata				2						0.22	11
Festuca campestris	3						5			0.89	22
Festuca idahoensis	2	4	2		6	8	2			2.67	67
Juncus balticus									2	0.22	11
Juncus confusus							2			0.22	11
Stipa nelsonii		6	6		3		5			2.22	44
TOTAL NPG	9.0	19.0	22.0	9.0	15.0	17.0	26.6	0.9	4.0	13.61	100
INTRODUCED PERENNIAL GRAMINOIDS											
Bromus inermis									32	3.56	11
Phleum pratense	38	34	18	55	26	39	22	22	6	28.89	100
Poa compressa							3			0.33	11
Poa pratensis	40	30	40	25	12	26	45	72	40	36.67	100
TOTAL IPG	78.0	64.0	58.0	80.0	38.0	65.0	70.0	94.0	78.0	69.44	100
NATIVE PERENNIAL FORBS AND SUBSHRUBS											
Achillea millefolium	1	3	1	0.3	2	0.3	1	1	0.3	1.10	100
Agoseris glauca			0.3		3	0.3			0.3	0.43	44
Anemone multifida						0.3			0.3	0.07	22
Anemone patens			0.3							0.03	11
Antennaria anaphaloides	0.3	0.3								0.07	22
Antennaria microphylla							0.3			0.03	11
Antennaria rosea					3	14			1	2.00	33
Arnica sororia		0.3	1							0.14	22
Artemisia ludoviciana		6	4				12	5		3.00	44
Campanula rotundifolia		0.3	2		0.3		0.3	0.3		0.36	56
Cerastium arvense		5	1		4			1	3	1.56	56
Cirsium longistylum							0.3			0.03	11
Clematis hirsutissima	0.3	2	1			1	0.3		0.3	0.54	67

Table B1
Percent Canopy Cover by Class and Species for Nine Sample Sites in the UPLAND
ALTERED GRASSLAND Vegetation Type, Black Butte Baseline Study Area, 2015.

	UPLAND ALTERED GRASSLAND										Mean Cover	Con- stancy
	PLOT NUMBER									n=9		
	44	45	46	47	50	52	67	78	85			
Delphinium bicolor			0.3								0.03	11
Drymocallis arguta		1									0.11	11
Erigeron subtrinervis		4	5		10						2.11	33
Fragaria virginiana					7			0.3			0.81	22
Gaillardia aristata			1								0.11	11
Galium boreale	3	2		0.3	1	0.3	6		1		1.51	78
Gentiana affinis						0.3					0.03	11
Geranium viscosissimum	20	12	23	20	2	9	9				10.56	78
Geum triflorum	4	2		2	3		5				1.78	56
Lithospermum ruderale		1			1						0.22	22
Lupinus leucophyllus	3				5		4		5		1.89	44
Lupinus sericeus		2	6								0.89	22
Oxytropis splendens									0.3		0.03	11
Penstemon procerus					0.3		0.3				0.07	22
Perideridia montana	1	0.3	3	0.3		0.3	2				0.77	67
Potentilla gracilis	8	6	8	14	9	3	8	4	2		6.89	100
Silene drummondii					0.3						0.03	11
Solidago canadensis (S. lepida)			0.3		5						0.59	22
Solidago missouriensis		1	5			6	1		3		1.78	56
Symphyotrichum campestre	5	3	1	0.3			2				1.26	56
Symphyotrichum subspicatum				0.3	4						0.48	22
Thalictrum venulosum					0.3						0.03	11
Trifolium longipes					0.3		0.3				0.07	22
Viola adunca								0.3			0.03	11
TOTAL NPF	45.6	51.2	63.2	37.5	60.5	46.8	44.8	6.9	16.5		41.44	100
INTRODUCED PERENNIAL FORBS												
Knautia arvensis									43		4.78	11
Taraxacum officinale	1			4	9	0.3	7	8	4		3.70	78
TOTAL IPF	1.0	0.0	0.0	4.0	9.0	0.3	7.0	8.0	47.0		8.48	78
NATIVE ANNUAL/BIENNIAL FORBS												
Barbarea orthoceras				0.3							0.03	11
Collomia linearis					0.3						0.03	11
Microsteris gracilis			0.3								0.03	11
Orthocarpus luteus			0.3				0.3				0.07	22
Polygonum douglasii		0.3			0.3						0.07	22
Turritis glabra			0.3	0.3							0.07	22
TOTAL NA/BF	0.0	0.3	0.9	0.6	0.6	0.0	0.3	0.0	0.0		0.30	56

Table B1
 Percent Canopy Cover by Class and Species for Nine Sample Sites in the UPLAND
 ALTERED GRASSLAND Vegetation Type, Black Butte Baseline Study Area, 2015.

	UPLAND ALTERED GRASSLAND											
	PLOT NUMBER									Mean Cover	Con- stancy	
	44	45	46	47	50	52	67	78	85			
											n=9	
INTRODUCED ANNUAL/BIENNIAL FORBS												
Carduus nutans									0.3	0.03	11	
Thlaspi arvense					2					0.22	11	
TOTAL IA/BF	0.0	0.0	0.0	0.0	2.0	0.0	0.0	0.0	0.3	0.26	22	
SHRUBS												
Artemisia tridentata					4			3	4	1.22	33	
Dasiphora fruticosa								3	3	0.67	22	
Rosa woodsii			1	7						0.89	22	
TOTAL SHRUBS	0.0	0.0	1.0	7.0	4.0	0.0	0.0	6.0	7.0	2.78	56	
TOTAL VEGETATION (Stratified)	133.6	134.5	145.1	138.1	129.1	129.1	148.7	115.8	152.8	136.31	100	

*Footnotes are given on cover page B-ii.
 Nomenclature follows Lesica (2012).

Table B2
 Percent Canopy Cover by Class and Species for Six Sample Sites in Three UPLAND
 GRASSLAND Habitat Types, Black Butte Baseline Study Area, 2015.

	<i>FESTUCA IDAHOENSIS/ AGROPYRON SPICATUM</i> HABITAT TYPE					<i>FESTUCA IDAHOENSIS/ STIPA RICHARDSONII</i> HABITAT TYPE				<i>FES CAM/ AGR SPI</i> HABITAT TYPE
	PLOT NUMBER			Mean	Con-	PLOT NUMBER		Mean	Con-	PLOT
	63	68	69	Cover	stancy	61	107	Cover	stancy	48
	n=3					n=2				
SITE PARAMETERS*										
Slope (percent)	11	6	10			6	2			20
Aspect (degrees)	150	178	184			348	018			165
Topography	Ridge	Lower	Knoll			Low-Mid	Bench			Mid
Configuration	Convex	Convex	Convex			Straight	Concave			Convex
Photo # (Digital)	888-891	880-883	871-874			331-334	941-944			993-996
Investigator	DB	DB	DB			ALL	DB			DB
Date	7/14/15	7/14/15	7/14/15			7/13/15	7/15/15			7/17/15
GROUND COVER										
Bare Ground	14	3	21	12.67	100	2	9	5.50	100	28
Rock	6	1	29	12.00	100					12
Litter	73	87	45	68.33	100	70	73	71.50	100	55
Lichens	1	1	0.3	0.77	100	2	4	3.00	100	
Moss	1	1	1	1.00	100	20	8	14.00	100	
Basal Vegetation	5	7	4	5.33	100	6	6	6.00	100	5
VEGETATION STRUCTURE (nonstratified cover)										
Total Vegetation	84	90	62	78.67	100	92	91	91.50	100	76
Perennial Graminoids	68	78	32	59.33	100	68	62	65.00	100	51
Annual Graminoids										
Perennial Forbs and Subshrubs	38	30	39	35.67	100	50	47	48.50	100	44
Annual/Biennial Forbs	0.3	1	4	1.77	100	1	3	2.00	100	0.3
Shrubs						4	7	5.50	100	4
Trees (0.01-acre)										
Trees (0.1-acre)										

Table B2
Percent Canopy Cover by Class and Species for Six Sample Sites in Three UPLAND
GRASSLAND Habitat Types, Black Butte Baseline Study Area, 2015.

CLASS\SPECIES	<i>FESTUCA IDAHOENSIS/ AGROPYRON SPICATUM</i> HABITAT TYPE					<i>FESTUCA IDAHOENSIS/ STIPA RICHARDSONII</i> HABITAT TYPE				<i>FES CAM/ AGR SPI</i> HABITAT TYPE
	PLOT NUMBER			Mean Cover	Con- stancy	PLOT NUMBER		Mean Cover	Con- stancy	PLOT
	63	68	69			61	107			
	n=3					n=2				
NATIVE PERENNIAL GRAMINOIDS										
Agropyron smithii						3	1.50	50		2
Agropyron spicatum	6	4	8	6.00	100					5
Agropyron trachycaulum	0.3			0.10	33	1	3	2.00	100	
Agrostis scabra						0.3		0.15	50	
Carex eleocharis						2		1.00	50	
Carex filifolia			3	1.00	33	2	3	2.50	100	3
Carex petasata						0.3		0.15	50	
Danthonia intermedia	5	4		3.00	67		12	6.00	50	
Danthonia unispicata	7	58	2	22.33	100	24		12.00	50	22
Festuca campestris	2			0.67	33	1		0.50	50	8
Festuca idahoensis	50	15	14	26.33	100	22	3	12.50	100	12
Juncus balticus						0.3		0.15	50	
Koeleria macrantha	2	3	5	3.33	100	2		1.00	50	4
Poa secunda						1		0.50	50	
Stipa nelsonii			1	0.33	33	1	5	3.00	100	
Stipa richardsonii	2			0.67	33	12	14	13.00	100	
TOTAL NPG	74.3	84.0	33.0	63.77	100	68.9	43.0	55.95	100	56.0
INTRODUCED PERENNIAL GRAMINOIDS										
Poa pratensis			2	0.67	33	6	28	17.00	100	
TOTAL IPG	0.0	0.0	2.0	0.67	33	6.0	28.0	17.00	100	0.0
NATIVE PERENNIAL FORBS AND SUBSHRUBS										
Achillea millefolium	1	1	5	2.33	100	4		2.00	50	0.3
Allium textile	0.3	0.3	0.3	0.30	100					0.3
Anemone multifida							3	1.50	50	
Anemone patens	0.3			0.10	33					
Antennaria parvifolia										2
Antennaria rosea	9	13	8	10.00	100	5	20	12.50	100	3
Arabis nuttallii	0.3			0.10	33					
Arenaria congesta	0.3	2	1	1.10	100	1		0.50	50	0.3
Arnica fulgens						0.3		0.15	50	
Arnica sororia		0.3	1	0.43	67					
Artemisia frigida	0.3			0.10	33					

Table B2
Percent Canopy Cover by Class and Species for Six Sample Sites in Three UPLAND
GRASSLAND Habitat Types, Black Butte Baseline Study Area, 2015.

	<i>FESTUCA IDAHOENSIS/ AGROPYRON SPICATUM</i> HABITAT TYPE					<i>FESTUCA IDAHOENSIS/ STIPA RICHARDSONII</i> HABITAT TYPE				<i>FES CAM/ AGR SPI</i> HABITAT TYPE
	PLOT NUMBER			Mean Cover	Con- stancy	PLOT NUMBER		Mean Cover	Con- stancy	PLOT
	63	68	69			61	107			
				n=3				n=2		
Artemisia ludoviciana	2	2	2	2.00	100	2	1	1.50	100	10
Astragalus adsurgens	1		0.3	0.43	67					0.3
Astragalus drummondii										1
Astragalus purshii		0.3	1	0.43	67					0.3
Astragalus tenellus										3
Campanula rotundifolia	0.3			0.10	33	0.3		0.15	50	
Cerastium arvense	3		1	1.33	67	1		0.50	50	2
Clematis hirsutissima						2	3	2.50	100	
Crepis atriobarba		0.3		0.10	33					
Crepis occidentalis										0.3
Delphinium bicolor			0.3	0.10	33					
Erigeron caespitosus	0.3	1	4	1.77	100					5
Erigeron compositus			1	0.33	33					
Eriogonum umbellatum		1	7	2.67	67	5	1	3.00	100	1
Fritillaria pudica			0.3	0.10	33					
Gaillardia aristata	1		0.3	0.43	67	0.3		0.15	50	
Galium boreale	3			1.00	33					
Geranium viscosissimum						5	5	5.00	100	
Geum triflorum	2	3		1.67	67	16	2	9.00	100	
Heterotheca villosa	0.3	0.3		0.20	67					3
Linum lewisii										0.3
Lithospermum ruderales	0.3		1	0.43	67		1	0.50	50	1
Lomatium macrocarpum		0.3	0.3	0.20	67					0.3
Lupinus sericeus	3	3	1	2.33	100	5	4	4.50	100	3
Orobanche fasciculata			0.3	0.10	33					
Oxytropis besseyi			0.3	0.10	33					
Oxytropis sericea	0.3			0.10	33					
Paronychia sessiliflora			1	0.33	33					
Phlox hoodii	2	4	7	4.33	100					3
Potentilla gracilis		1	0.3	0.43	67	3	3	3.00	100	
Potentilla pensylvanica						0.3		0.15	50	
Pyrrocoma integrifolia							2	1.00	50	
Senecio canus	1			0.33	33					
Senecio streptanthifolius						0.3		0.15	50	
Silene drummondii	0.3			0.10	33					
Solidago missouriensis	2	0.3	1	1.10	100	4	6	5.00	100	5

Table B2
Percent Canopy Cover by Class and Species for Six Sample Sites in Three UPLAND
GRASSLAND Habitat Types, Black Butte Baseline Study Area, 2015.

	FESTUCA IDAHOENSIS/ AGROPYRON SPICATUM HABITAT TYPE					FESTUCA IDAHOENSIS/ STIPA RICHARDSONII HABITAT TYPE				FES CAM/ AGR SPI HABITAT TYPE
	PLOT NUMBER			Mean Cover	Con- stancy	PLOT NUMBER		Mean Cover	Con- stancy	PLOT
	63	68	69			61	107			
			0.3	0.10	33	0.3		0.15	50	
Symphotrichum ascendens						0.3		0.15	50	
Symphotrichum campestre										
Symphotrichum falcatum										3
Zigadenus venenosus	1	2		1.00	67					
TOTAL NPF	34.3	35.1	45.0	38.13	100	55.1	51.0	53.05	100	47.4
INTRODUCED PERENNIAL FORBS										
Taraxacum officinale	0.3		0.3	0.20	67					
TOTAL IPF	0.3	0.0	0.3	0.20	67	0.0	0.0	0.0	0	0.0
FERNS AND ALLIES										
Selaginella densa	10			3.33	33	0.3		0.15	50	
TOTAL FA	10.0	0.0	0.0	3.33	33	0.3	0.0	0.15	50	0.0
NATIVE ANNUAL/BIENNIAL FORBS										
Androsace occidentalis	0.3			0.10	33					
Androsace septentrionalis			0.3	0.10	33					
Collomia linearis			0.3	0.10	33					
Gentianella amarella		1		0.33	33	1		0.50	50	
Orthocarpus luteus							3	1.50	50	
Orthocarpus tenuifolius						0.3		0.15	50	
TOTAL NA/BF	0.3	1.0	0.6	0.63	100	1.3	3.0	2.15	100	0.0
INTRODUCED ANNUAL/BIENNIAL FORBS										
Alyssum alyssoides			4	1.33	33					0.3
Tragopogon dubius										0.3
TOTAL IA/BF	0.0	0.0	4.0	1.33	33	0.0	0.0	0.0	0	0.6
NATIVE SHRUBS										
Artemisia tridentata						4	1	2.50	100	
Juniperus communis										4
Rosa woodsii							6	3.00	50	
TOTAL NATIVE SHRUBS	0.0	0.0	0.0	0.00	0	4.0	7.0	5.50	100	4.0
TOTAL VEGETATION (Stratified)	119.2	120.1	84.9	108.07	100	135.6	132.0	133.80	100	108.0

*Footnotes are given on cover page B-ii.
Nomenclature follows Lesica (2012).

Table B3
 Percent Canopy Cover by Class and Species for Thirteen Sample Sites in the *FESTUCA CAMPESTRIS*/
FESTUCA IDAHOENSIS Habitat Type, Black Butte Baseline Study Area, 2015.

<i>FESTUCA CAMPESTRIS</i> / <i>FESTUCA IDAHOENSIS</i> HABITAT TYPE															
	PLOT NUMBER													Mean Cover	Con- stancy
	56	62	64	65	66	70	71	72	73	74	75	93	108		
n=13															
SITE PARAMETERS*															
Slope (percent)	10	5	12	9	8	7	9	7	11	15	13	16	8		
Aspect (degrees)	064	330	140	184	294	350	010	350	360	310	025	340	020		
Topography	Mid	Mid	Mid	Lower	Low-Mid	Upper	Low-Mid	Mid	Upper	Upper	Mid	Upper-Mid	Bench		
Configuration	Concave	Convex	Straight	Concave	Straight	Convex	Convex	Und	Straight	Straight	Concave	Convex	Concave		
Photo # (Digital)	62-65	49-52	900-903	904-907	863-866	867-870	45-48	37-40	17-20	25-28	13-16	157-160	66-69		
Investigator	DB	JE/SC	DB	DB	DB	DB	JE/SC	JE/SC	JE/SC	JE/SC	JE/SC	JE/SC	DB		
Date	7/18/15	7/15/15	7/14/15	7/14/15	7/14/15	7/14/15	7/15/15	7/15/15	7/14/15	7/14/15	7/14/15	7/18/15	7/18/15		
GROUND COVER															
Bare Ground	7	0.3	18	15	2	15	1	1				2	6	5.18	77
Rock			7	4		12	0.3					0.3		1.82	38
Litter	68	93	68	72	80	48	89	79	90	82	88	70	87	78.00	100
Lichens	4	1	1	1	3	2		5		0.3	1	0.3		1.43	77
Moss	16	2	1	2	8	18	5	10	5	12	5	3		6.69	92
Basal Vegetation	5	4	5	6	7	5	5	5	5	6	6	24	7	6.92	100
VEGETATION STRUCTURE (nonstratified cover)															
Total Vegetation	88	84	84	89	98	72	95	93	96	94	97	92	93	90.38	100
Perennial Graminoids	62	60	66	74	85	42	75	67	90	82	85	58	73	70.69	100
Annual Graminoids															
Perennial Forbs and Subshrubs	46	39	41	40	31	50	57	48	16	29	32	58	52	41.46	100
Annual/Biennial Forbs	1	0.3		2	1	3	0.3	0.3	0.3	1	0.3	0.3		0.75	85
Shrubs	1	0.3		3			1		0.3	5	4	2	6	1.74	69
Trees (0.01-acre)															
Trees (0.1-acre)			0.3											0.02	8

Table B3
 Percent Canopy Cover by Class and Species for Thirteen Sample Sites in the *FESTUCA CAMPESTRIS*/
FESTUCA IDAHOENSIS Habitat Type, Black Butte Baseline Study Area, 2015.

<i>FESTUCA CAMPESTRIS</i> / <i>FESTUCA IDAHOENSIS</i> HABITAT TYPE																
CLASS\SPECIES	PLOT NUMBER													Mean Cover	Con- stancy	
	56	62	64	65	66	70	71	72	73	74	75	93	108			
n=13																
NATIVE PERENNIAL GRAMINOIDS																
Agropyron spicatum			14												1.08	8
Agropyron trachycaulum	3	0.3	1	1	2	2	1	0.3		0.3	0.3		2	1.02	85	
Agrostis scabra							0.3	0.3		0.3	1			0.15	31	
Bromus carinatus	5													0.38	8	
Carex eleocharis		2		0.3	0.3	1	0.3	0.3	3	0.3		0.3		0.60	69	
Carex filifolia	7	3	0.3	1	1			0.3	0.3	0.3				1.02	62	
Carex petasata	2						0.3				1	1		0.33	31	
Carex rossii		1					0.3	19	0.3					1.58	31	
Danthonia intermedia	14	8	9	16	4	8	10	12	1	4	1	3	3	7.15	100	
Danthonia unispicata			2					0.3	0.3	0.3		0.3		0.25	38	
Festuca campestris	10	24	9	12	65	7	30	18	43	44	55	31	15	27.92	100	
Festuca idahoensis	18	3	30	24	1	18	2	2		1	2	28	6	10.38	92	
Juncus confusus											0.3			0.02	8	
Koeleria macrantha		2	3	4	1	3		0.3		0.3		0.3		1.07	62	
Poa secunda											0.3			0.02	8	
Stipa nelsonii		0.3	1	1			1			0.3			6	0.74	46	
Stipa richardsonii	10	27	6	6	18	8	29	20	52	35	35		11	19.77	92	
TOTAL NPG	69.0	70.6	75.3	65.3	92.3	47.0	74.2	72.8	99.9	87.1	95.9	62.9	43.0	73.48	100	
INTRODUCED PERENNIAL GRAMINOIDS																
Phleum pratense										0.3				0.02	8	
Poa pratensis				20	6		10	1		9	0.3		40	6.64	54	
TOTAL IPG	0.0	0.0	0.0	20.0	6.0	0.0	10.0	1.0	0.0	9.3	0.3	0.0	40.0	6.66	54	
NATIVE PERENNIAL FORBS AND SUBSHRUBS																
Achillea millefolium	0.3	0.3		0.3	0.3	1	1	0.3	0.3	0.3	0.3	1	0.3	0.44	92	
Agoseris glauca		1					0.3	0.3	0.3	0.3	1			0.25	46	
Allium cernuum							0.3	0.3						0.05	15	
Allium textile						1						0.3		0.10	15	
Anemone multifida		0.3			0.3		0.3	0.3		0.3		0.3	0.3	0.16	54	
Anemone patens											0.3			0.02	8	
Antennaria anaphaloides				0.3	0.3					0.3	1			0.15	31	
Antennaria parvifolia		0.3					1		0.3			6		0.58	31	
Antennaria rosea	7	1	10	4	5	5	0.3	0.3		0.3			4	2.84	77	
Arabis nuttallii					0.3	0.3								0.05	15	
Arenaria congesta	0.3	0.3	0.3	1	0.3	0.3	1	0.3	0.3	0.3	0.3	1		0.44	92	
Arnica fulgens		0.3												0.02	8	
Arnica sororia	0.3			0.3		0.3				0.3	0.3			0.12	38	
Artemisia ludoviciana				8			1						6	1.15	23	

Table B3
Percent Canopy Cover by Class and Species for Thirteen Sample Sites in the *FESTUCA CAMPESTRIS*/
FESTUCA IDAHOENSIS Habitat Type, Black Butte Baseline Study Area, 2015.

<i>FESTUCA CAMPESTRIS</i> / <i>FESTUCA IDAHOENSIS</i> HABITAT TYPE																
PLOT NUMBER													Mean Cover	Con- stancy		
56	62	64	65	66	70	71	72	73	74	75	93	108				
n=13																
Astragalus adsurgens					1		0.3					0.3		0.12	23	
Astragalus purshii			0.3											0.02	8	
Campanula rotundifolia	0.3	0.3	0.3	0.3	0.3	0.3	1	0.3	0.3	1	0.3	0.3		0.38	92	
Cerastium arvense	1	0.3	6	5		5	1	1		1	1	1		1.72	77	
Cirsium longistylum													0.3	0.02	8	
Clematis hirsutissima	2	1		1	1		0.3	0.3	0.3	1	1		3	0.84	77	
Dryocallis arguta			1				0.3							0.10	15	
Erigeron caespitosus						1								0.08	8	
Erigeron ochroleucus						0.3								0.02	8	
Erigeron subtrinervis				0.3			1	1		1	0.3			0.28	38	
Eriogonum umbellatum	2	2	1	1	1		0.3	0.3	1	5	2			1.20	77	
Erysimum inconspicuum					0.3									0.02	8	
Fragaria vesca							1							0.08	8	
Fritillaria pudica				0.3		0.3								0.05	15	
Gaillardia aristata	0.3		1	0.3	1	1		0.3				0.3		0.32	54	
Galium boreale	1	0.3				2	0.3	0.3	0.3			0.3		0.35	54	
Geranium viscosissimum	3			10		1	9	5		8	14		20	5.38	62	
Geum triflorum	22	30	13	2	12	4	27	24	5	7	10	22	3	13.92	100	
Heterotheca villosa	0.3		3											0.25	15	
Heuchera parvifolia						0.3				0.3	1	0.3		0.15	31	
Linum lewisii			0.3			0.3								0.05	15	
Lithospermum ruderale	1		1	1			0.3			0.3			0.3	5	0.68	54
Lomatium triternatum				0.3		0.3					0.3			0.07	23	
Lupinus argenteus									0.3					0.02	8	
Lupinus sericeus		2	2	1	1		0.3	1		1	0.3	0.3	7	1.22	77	
Musineon divaricatum			0.3											0.02	8	
Noccaea fendleri							0.3	0.3				0.3		0.07	23	
Oxytropis sericea								0.3				0.3		0.05	15	
Oxytropis splendens								0.3						0.02	8	
Paronychia sessiliflora		0.3										0.3		0.05	15	
Pedicularis parryi						0.3								0.02	8	
Perideridia montana	0.3													0.02	8	
Phlox hoodii		0.3	4	5		9						1		1.48	38	
Potentilla anserina													3	0.23	8	
Potentilla gracilis	4	0.3	2	0.3	2	0.3	1	1	0.3	3	2	0.3	5	1.65	100	
Potentilla hippiana				0.3			0.3	0.3						0.07	23	
Potentilla pensylvanica		0.3						0.3	0.3	0.3	0.3			0.12	38	
Sedum lanceolatum								0.3				20		1.56	15	
Senecio canus			1			0.3								0.10	15	
Senecio streptanthifolius		0.3						0.3	1				0.3	0.15	31	
Silene drummondii	0.3							0.3		0.3	0.3			0.09	31	

Table B3
Percent Canopy Cover by Class and Species for Thirteen Sample Sites in the *FESTUCA CAMPESTRIS*/
FESTUCA IDAHOENSIS Habitat Type, Black Butte Baseline Study Area, 2015.

<i>FESTUCA CAMPESTRIS</i> / <i>FESTUCA IDAHOENSIS</i> HABITAT TYPE															
	PLOT NUMBER												Mean Cover	Con- stancy	
	56	62	64	65	66	70	71	72	73	74	75	93			108
													n=13		
<i>Sisyrinchium idahoense</i>						0.3		0.3						0.05	15
<i>Solidago missouriensis</i>	2	1		2	9	7	16	14	7	0.3	0.3	0.3	3	4.76	92
<i>Symphotrichum ascendens</i>													1	0.08	8
<i>Symphotrichum campestre</i>	1			0.3	0.3			0.3						0.15	31
<i>Symphotrichum falcatum</i>	3													0.23	8
<i>Vicia americana</i>				0.3										0.02	8
<i>Zigadenus venenosus</i>	0.3			0.3		0.3						0.3		0.09	31
TOTAL NPF	51.7	41.9	46.5	44.9	34.4	42.2	64.9	53.3	17.3	31.3	36.3	56.5	61.2	44.80	100
INTRODUCED PERENNIAL FORBS															
<i>Taraxacum officinale</i>												0.3		0.02	8
TOTAL IPF	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.02	8
FERNS AND ALLIES															
<i>Selaginella densa</i>		3				15		1				10		2.23	31
TOTAL FA	0.0	3.0	0.0	0.0	0.0	15.0	0.0	1.0	0.0	0.0	0.0	10.0	0.0	2.23	31
NATIVE ANNUAL/BIENNIAL FORBS															
<i>Androsace occidentalis</i>		0.3					0.3							0.05	15
<i>Androsace septentrionalis</i>				0.3				0.3		0.3		0.3		0.09	31
<i>Boechera divaricarpa</i>										0.3				0.02	8
<i>Collomia linearis</i>										0.3				0.02	8
<i>Gentianella amarella</i>	1	0.3		0.3	1	2	0.3		0.3	0.3	0.3			0.45	69
<i>Orthocarpus luteus</i>				1										0.08	8
TOTAL NA/BF	1.0	0.6	0.0	1.6	1.0	2.0	0.6	0.3	0.3	1.2	0.3	0.3	0.0	0.71	85
INTRODUCED ANNUAL/BIENNIAL FORBS															
<i>Alyssum alyssoides</i>						1								0.08	8
<i>Thlaspi arvense</i>				0.3										0.02	8
TOTAL IA/BF	0.0	0.0	0.0	0.3	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.10	15
NATIVE SHRUBS															
<i>Artemisia tridentata</i>	1			3			0.3			5	4	2	1	1.25	54
<i>Clematis occidentalis</i>							0.3							0.02	8
<i>Dasiphora fruticosa</i>							0.3		0.3				5	0.43	23
<i>Rosa woodsii</i>		0.3					0.3							0.05	15
TOTAL NATIVE SHRUBS	1.0	0.3	0.0	3.0	0.0	0.0	1.2	0.0	0.3	5.0	4.0	2.0	6.0	1.75	69

Table B3
 Percent Canopy Cover by Class and Species for Thirteen Sample Sites in the *FESTUCA CAMPESTRIS*/
FESTUCA IDAHOENSIS Habitat Type, Black Butte Baseline Study Area, 2015.

<i>FESTUCA CAMPESTRIS</i> / <i>FESTUCA IDAHOENSIS</i> HABITAT TYPE															
PLOT NUMBER													Mean Cover	Con- stancy	
56	62	64	65	66	70	71	72	73	74	75	93	108			n=13
NATIVE TREES (0.1-acre)															
Pseudotsuga menziesii			0.3											0.02	8
TOTAL TREES (0.1-acre)	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.02	8
TOTAL VEGETATION (Stratified)															
	122.7	116.4	121.8	135.1	133.7	107.2	150.9	128.4	117.8	133.9	137.1	131.7	150.2	129.76	100

*Footnotes are given on cover page B-ii.
 Nomenclature follows Lesica (2012).

Table B4
 Percent Canopy Cover by Class and Species for Thirteen Sample Sites in the *ARTEMISIA TRIDENTATA/POA PRATENSIS*
 Community Type, Black Butte Baseline Study Area, 2015.

<i>ARTEMISIA TRIDENTATA/POA PRATENSIS</i> COMMUNITY TYPE															
	PLOT NUMBER													Mean Cover	Con- stancy
	51	53	54	57	77	83	84	88	92	95	97	100	101		
n=13															
SITE PARAMETERS*															
Slope (percent)	9	13	5	14	4	12	6	8	4	7	4	14	0		
Aspect (degrees)	164	154	072	335	045	020	080	080	085	045	140	005	none		
Topography	Saddle	Low-Mid	Swale	Upper	Toe	Low-Mid	Low-Mid	Low-Mid	Swale	Upper	Swale	Mid	Lower		
Configuration	Concave	Convex	Concave	Concave	Concave	Convex	Straight	Convex	Concave	Straight	Concave	Straight	Convex		
Photo # (Digital)	50-53	58-61	29-32	61-64	109-112	81-84	77-80	73-76	80-83	161-164	67-71	149-152	145-148		
Investigator	DB	DB	DB	JE/SC	JE/SC	JE/SC	JE/SC	JE/SC	JE/SC	JE/SC	JE/SC	JE/SC	JE/SC		
Date	7/18/15	7/18/15	7/17/15	7/15/15	7/17/15	7/16/15	7/16/15	7/16/15	7/18/15	7/18/15	7/19/15	7/18/15	7/18/15		
GROUND COVER															
Bare Ground	2	6	4							0.3		0.3		0.97	38
Rock		0.3												0.02	8
Litter	84	85	82	94	91	63	90	95	94	94	93	80	65	85.38	100
Lichens	3	1	2	0.3	0.3	0.3	0.3		0.3	0.3	0.3	0.3	0.3	0.67	92
Moss	4	1	6	0.3	4	32	5	0.3	0.3	0.3	2	15	30	7.71	100
Basal Vegetation	7	7	6	5	5	5	5	5	5	5	5	5	5	5.38	100
VEGETATION STRUCTURE (nonstratified cover)															
Total Vegetation	93	94	94	90	97	97	98	96	98	98	96	96	97	95.69	100
Perennial Graminoids	65	70	75	65	85	90	70	84	71	83	70	79	75	75.54	100
Annual Graminoids				0.3										0.02	8
Perennial Forbs and Subshrubs	41	31	23	29	18	15	23	26	18	15	19	37	24	24.54	100
Annual/Biennial Forbs	0.3	1	0.3		0.3	0.3		0.3	0.3	2	0.3	0.3	0.3	0.44	85
Shrubs	49	48	36	41	38	24	36	36	44	37	50	31	45	39.62	100
Trees (0.01-acre)		5					2							0.54	15
Trees (0.1-acre)	0.3	2		0.3			0.3						0.3	0.25	38

Table B4
 Percent Canopy Cover by Class and Species for Thirteen Sample Sites in the *ARTEMISIA TRIDENTATA/POA PRATENSIS*
 Community Type, Black Butte Baseline Study Area, 2015.

ARTEMISIA TRIDENTATA/POA PRATENSIS COMMUNITY TYPE															
CLASS\SPECIES	PLOT NUMBER												Mean Cover	Con- stancy	
	51	53	54	57	77	83	84	88	92	95	97	100			101
															n=13
NATIVE PERENNIAL GRAMINOIDS															
Agropyron spicatum												0.3		0.02	8
Agropyron trachycaulum	4	1		1	2	1	0.3		0.3	0.3	0.3	0.3	0.3	0.83	85
Agrostis scabra	0.3			0.3					0.3		0.3			0.09	31
Bromus carinatus	5													0.38	8
Bromus porteri				0.3										0.02	8
Carex eleocharis				3		0.3		1				0.3		0.35	31
Carex filifolia							3						0.3	0.25	15
Carex petasata		0.3		0.3	0.3				1	0.3	0.3		0.3	0.22	54
Carex rossii				0.3	1			1						0.18	23
Danthonia californica			1											0.08	8
Danthonia intermedia	6	1	4	0.3	0.3	4	3	10	0.3	0.3	2	1	3	2.71	100
Danthonia unispicata				0.3						0.3				0.05	15
Elymus glaucus				0.3										0.02	8
Festuca campestris				2	0.3	5	2	0.3	0.3	1	2	6	8	2.07	77
Festuca idahoensis	9	6	3	7	0.3		1	0.3	0.3	0.3	2	10	4	3.32	92
Koeleria macrantha				1			0.3				0.3	1	0.3	0.22	38
Muhlenbergia richardsonii				0.3										0.02	8
Poa secunda												0.3	1	0.10	15
Stipa nelsonii	2	3	2	0.3	0.3	1			0.3	0.3	0.3	1		0.81	77
Stipa richardsonii	5	2	3	1	0.3	1	3	6	0.3		1		2	1.89	85
TOTAL NPG	31.3	13.3	13.0	17.7	4.8	12.3	12.6	18.6	3.1	2.8	8.5	20.2	19.2	13.65	100
INTRODUCED PERENNIAL GRAMINOIDS															
Bromus inermis			8											0.62	8
Phleum pratense	15	18	25	0.3		0.3	0.3							4.53	46
Poa pratensis	30	50	40	52	84	82	61	78	70	82	66	70	63	63.69	100
TOTAL IPG	45.0	68.0	73.0	52.3	84.0	82.3	61.3	78.0	70.0	82.0	66.0	70.0	63.0	68.84	100
INTRODUCED ANNUAL GRAMINOIDS															
Bromus japonicus				0.3										0.02	8
TOTAL IAG	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.02	8
NATIVE PERENNIAL FORBS AND SUBSHRUBS															
Achillea millefolium	1	0.3	0.3	0.3	3			0.3	0.3	1	0.3	0.3		0.55	77
Agoseris glauca			0.3	0.3			0.3			0.3				0.09	31
Allium cernuum											0.3			0.02	8
Allium textile												0.3		0.02	8
Anemone multifida				0.3			1	0.3					2	0.28	31
Antennaria anaphaloides					0.3	0.3	0.3	0.3	0.3	1	0.3			0.19	46

Table B4
 Percent Canopy Cover by Class and Species for Thirteen Sample Sites in the *ARTEMISIA TRIDENTATA/POA PRATENSIS*
 Community Type, Black Butte Baseline Study Area, 2015.

ARTEMISIA TRIDENTATA/POA PRATENSIS COMMUNITY TYPE															
	PLOT NUMBER													Mean Cover	Con- stancy
	51	53	54	57	77	83	84	88	92	95	97	100	101		
	n=13														
Antennaria microphylla							1							0.08	8
Antennaria parvifolia				3		0.3			5	0.3	2	2	0.3	0.99	54
Antennaria rosea	4		1	0.3	0.3									0.43	31
Arabis nuttallii				0.3										0.02	8
Arenaria congesta		0.3		0.3		0.3	1	1	1			0.3	0.3	0.35	62
Arnica fulgens							0.3			0.3	0.3	1	0.3	0.19	46
Arnica sororia				0.3	0.3									0.05	15
Artemisia dracunculus			1											0.08	8
Artemisia ludoviciana		10	6		0.3		2			2				1.56	38
Astragalus adsurgens										0.3		0.3		0.05	15
Astragalus agrestis			0.3											0.02	8
Astragalus miser										0.3				0.02	8
Campanula rotundifolia	0.3	1	1	0.3	0.3	0.3	0.3	1	0.3		0.3	0.3	1	0.49	92
Cerastium arvense	4	4	3	2	4	8	15	12	3	2	2	16	5	6.15	100
Cirsium longistylum	0.3										0.3			0.05	15
Cirsium undulatum					1									0.08	8
Clematis hirsutissima	1		1	0.3		0.3	0.3	1	0.3		0.3	0.3	0.3	0.39	77
Delphinium bicolor					0.3									0.02	8
Dodecatheon conjugens												0.3		0.02	8
Dodecatheon pulchellum					0.3									0.02	8
Dryocallis arguta											0.3			0.02	8
Erigeron caespitosus				0.3										0.02	8
Erigeron subtrinervis	9	1		2		0.3		1		1	1	1	1	1.33	69
Eriogonum umbellatum				1		0.3			0.3		1	1	1	0.35	46
Erysimum inconspicuum										0.3				0.02	8
Fragaria vesca					0.3					0.3	1		0.3	0.15	31
Fragaria virginiana									1				1	0.15	15
Frasera speciosa				0.3										0.02	8
Fritillaria pudica											0.3			0.02	8
Gaillardia aristata	0.3			1			0.3					0.3	0.3	0.17	38
Galium boreale			0.3	0.3	0.3	0.3	0.3				0.3			0.14	46
Gentiana affinis	0.3													0.02	8
Geranium viscosissimum	5		2	2	1	1		1	0.3	0.3	1	1	1	1.20	85
Geum triflorum				4		1		5	2		4	12	7	2.69	54
Heuchera parvifolia				0.3				0.3		1	0.3			0.15	31
Lithospermum ruderales	3	4	1	0.3			0.3	1		0.3		1		0.84	62
Lupinus leucophyllus	4	1	1	1	5				1	0.3	1	0.3	1	1.20	77
Lupinus sericeus		2	3	0.3		1	1	1		0.3	1	1	2	0.97	77
Noccaea fendleri	0.3													0.02	8
Penstemon procerus	4			0.3							1			0.41	23
Perideridia montana	0.3			0.3		0.3					0.3		0.3	0.12	38

Table B4
Percent Canopy Cover by Class and Species for Thirteen Sample Sites in the *ARTEMISIA TRIDENTATA/POA PRATENSIS* Community Type, Black Butte Baseline Study Area, 2015.

ARTEMISIA TRIDENTATA/POA PRATENSIS COMMUNITY TYPE															
	PLOT NUMBER													Mean Cover	Con- stancy
	51	53	54	57	77	83	84	88	92	95	97	100	101		
	n=13														
Phlox hoodii							1					1		0.15	15
Potentilla gracilis	4		2	1	2	1	0.3	0.3	2	0.3	1	1	1	1.22	92
Potentilla pensylvanica												1		0.08	8
Senecio streptanthifolius												0.3		0.02	8
Solidago missouriensis	4	2		7		1		1	1	3	0.3	0.3	0.3	1.53	77
Symphytotrichum ascendens				2		0.3	0.3	0.3		0.3				0.25	38
Symphytotrichum campestre		3		0.3										0.25	15
Symphytotrichum falcatum		6												0.46	8
Thalictrum venulosum				0.3										0.02	8
Trifolium longipes	0.3	0.3	0.3		0.3	0.3		1	0.3	0.3	0.3		0.3	0.28	77
Viola adunca											0.3			0.02	8
Viola nuttallii					0.3	0.3		0.3						0.07	23
Zigadenus venenosus							0.3							0.02	8
TOTAL NPF	45.1	34.9	23.5	31.7	19.3	16.6	25.3	27.8	18.4	15.2	20.5	41.0	27.0	26.64	100
INTRODUCED PERENNIAL FORBS															
Taraxacum officinale	0.3		1	1	0.3	0.3			1	0.3	1	0.3	0.3	0.45	77
TOTAL IPF	0.3	0.0	1.0	1.0	0.3	0.3	0.0	0.0	1.0	0.3	1.0	0.3	0.3	0.45	77
FERNS AND ALLIES															
Selaginella densa												1		0.08	8
TOTAL FA	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.08	8
NATIVE ANNUAL/BIENNIAL FORBS															
Androsace septentrionalis						0.3		0.3	0.3		0.3	0.3	0.3	0.14	46
Gentianella amarella								0.3						0.02	8
Orthocarpus luteus	0.3	0.3	0.3											0.07	23
Turritis glabra											0.3			0.02	8
TOTAL NA/BF	0.3	0.3	0.3	0.0	0.0	0.3	0.0	0.6	0.3	0.0	0.6	0.3	0.3	0.25	69
INTRODUCED ANNUAL/BIENNIAL FORBS															
Carduus nutans										0.3				0.02	8
Cynoglossum officinale										2				0.15	8
Thlaspi arvense											0.3			0.02	8
Tragopogon dubius		0.3			0.3									0.05	15
TOTAL IA/BF	0.0	0.3	0.0	0.0	0.3	0.0	0.0	0.0	0.0	2.3	0.3	0.0	0.0	0.25	31

Table B4
 Percent Canopy Cover by Class and Species for Thirteen Sample Sites in the *ARTEMISIA TRIDENTATA/POA PRATENSIS*
 Community Type, Black Butte Baseline Study Area, 2015.

<i>ARTEMISIA TRIDENTATA/POA PRATENSIS</i> COMMUNITY TYPE															
	PLOT NUMBER													Mean Cover	Con- stancy
	51	53	54	57	77	83	84	88	92	95	97	100	101		
														n=13	
SHRUBS															
Artemisia tridentata	49	48	36	41	38	24	34	30	44	36	50	31	45	38.92	100
Clematis occidentalis							0.3			2	0.3	0.3		0.22	31
Dasiphora fruticosa				0.3				6			0.3		0.3	0.53	31
Juniperus communis			0.3				6					0.3		0.51	23
TOTAL SHRUBS	49.0	48.0	36.3	41.3	38.0	24.0	40.3	36.0	44.0	38.0	50.6	31.6	45.3	40.18	100
TREES (0.01-acre)															
Juniperus scopulorum							2							0.15	8
Pseudotsuga menziesii		5												0.38	8
TOTAL TREES (0.01-acre)	0.0	5.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.54	15
TREES (0.1-acre)															
Juniperus scopulorum							0.3						0.3	0.05	15
Pseudotsuga menziesii	0.3	2		0.3										0.20	23
TOTAL TREES (0.1-acre)	0.3	2.0	0.0	0.3	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.3	0.25	38
TOTAL VEGETATION (Stratified)	171.0	169.8	147.1	144.3	146.7	135.8	141.5	161.0	136.8	140.6	147.5	164.4	155.1	150.89	100

*Footnotes are given on cover page B-ii.
 Nomenclature follows Lesica (2012).

Table B5
 Percent Canopy Cover by Class and Species for
 Three Sample Sites in the *ARTEMISIA TRIDENTATA*/
FESTUCA IDAHOENSIS Habitat Type,
 Black Butte Baseline Study Area, 2015.

ARTEMISIA TRIDENTATA/FESTUCA IDAHOENSIS					
	PLOT NUMBER			Mean Cover	Con- stancy
	99	105	111		
n=3					
SITE PARAMETERS*					
Slope (percent)	2	5	3		
Aspect (degrees)	070	135	064		
Topography	Bench	Lower	Lower		
Configuration	Straight	Straight	Straight		
Photo # (Digital)	76-79	121-124	929-932		
Investigator	JE/SC	JE/SC	DB		
Date	7/18/15	7/17/15	7/15/15		
GROUND COVER					
Bare Ground	26	41	14	27.00	100
Rock		44	4	16.00	67
Litter	68	14	69	50.33	100
Lichens	0.3	0.3	5	1.87	100
Moss	3		3	2.00	67
Basal Vegetation	3	1	5	3.00	100
VEGETATION STRUCTURE (nonstratified cover)					
Total Vegetation	58	39	81	59.33	100
Perennial Graminoids	33	13	47	31.00	100
Annual Graminoids					
Perennial Forbs and Subshrubs	17	13	39	23.00	100
Annual/Biennial Forbs		0.3	0.3	0.20	67
Shrubs	18	17	45	26.67	100
Trees (0.01-acre)					
Trees (0.1-acre)					
CLASS\SPECIES					
NATIVE PERENNIAL GRAMINOIDS					
Agropyron smithii		0.3		0.10	33
Agropyron spicatum	0.3	6	2	2.77	100
Agropyron trachycaulum	0.3		2	0.77	67
Carex eleocharis			0.3	0.10	33
Carex rossii	0.3			0.10	33
Danthonia intermedia			8	2.67	33
Danthonia unispicata	10	1	16	9.00	100
Festuca campestris	0.3			0.10	33
Festuca idahoensis	22	4	9	11.67	100
Koeleria macrantha	0.3	2	1	1.10	100
Poa secunda	2	0.3		0.77	67
Stipa nelsonii	0.3		1	0.43	67
Stipa richardsonii			1	0.33	33
TOTAL NPG	35.8	13.6	40.3	29.90	100
INTRODUCED PERENNIAL GRAMINOIDS					
Phleum pratense			1	0.33	33
Poa pratensis		0.3	12	4.10	67
TOTAL IPG	0.0	0.3	13.0	4.43	67

Table B5
Percent Canopy Cover by Class and Species for
Three Sample Sites in the *ARTEMISIA TRIDENTATA*/
FESTUCA IDAHOENSIS Habitat Type,
Black Butte Baseline Study Area, 2015.

ARTEMISIA TRIDENTATA/FESTUCA IDAHOENSIS					
	PLOT NUMBER			Mean Cover	Con- stancy
	99	105	111		
n=3					
NATIVE PERENNIAL FORBS AND SUBSHRUBS					
Achillea millefolium	0.3	0.3	0.3	0.30	100
Allium cernuum	0.3	0.3		0.20	67
Allium textile		0.3	0.3	0.20	67
Antennaria parvifolia	0.3	2		0.77	67
Antennaria rosea	8	0.3	15	7.77	100
Arenaria congesta	2	0.3	0.3	0.87	100
Arnica fulgens	0.3			0.10	33
Campanula rotundifolia	0.3		0.3	0.20	67
Cerastium arvense	3	1	7	3.67	100
Eriogonum umbellatum	1	0.3	1	0.77	100
Gaillardia aristata		0.3		0.10	33
Galium boreale			4	1.33	33
Lupinus sericeus	0.3	0.3	4	1.53	100
Paronychia sessiliflora	0.3	3		1.10	67
Phlox hoodii	2	5	5	4.00	100
Potentilla gracilis	1			0.33	33
Potentilla hippiana		0.3		0.10	33
Potentilla pensylvanica		0.3	0.3	0.20	67
Sedum lanceolatum	0.3		0.3	0.20	67
Senecio canus		0.3		0.10	33
Symphyotrichum ascendens		0.3		0.10	33
TOTAL NPF	19.4	14.6	37.8	23.93	100
INTRODUCED PERENNIAL FORBS					
Taraxacum officinale	0.3		1	0.43	67
TOTAL IPF	0.3	0.0	1.0	0.43	67
FERNS AND ALLIES					
Selaginella densa			6	2.00	33
TOTAL FA	0.0	0.0	6.0	2.00	33
NATIVE ANNUAL/BIENNIAL FORBS					
Androsace septentrionalis		0.3	0.3	0.20	67
TOTAL NA/BF	0.0	0.3	0.3	0.20	67
INTRODUCED ANNUAL/BIENNIAL FORBS					
Medicago lupulina		0.3		0.10	33
TOTAL IA/BF	0.0	0.3	0.0	0.10	33
SHRUBS					
Artemisia tridentata	18	16	45	26.33	100
Dasiphora fruticosa		1		0.33	33
TOTAL SHRUBS	18.0	17.0	45.0	26.67	100
TOTAL VEGETATION (Stratified)	73.5	46.1	143.4	87.67	100

*Footnotes are given on cover page B-ii.
Nomenclature follows Lesica (2012).

Table B6
 Percent Canopy Cover by Class and Species for Seventeen Sample Sites in the *ARTEMISIA TRIDENTATA/FESTUCA CAMPESTRIS* Habitat Type,
 Black Butte Baseline Study Area, 2015.

<i>ARTEMISIA TRIDENTATA/FESTUCA CAMPESTRIS</i> HABITAT TYPE																			
	PLOT NUMBER																Mean Cover	Con- stancy	
	49	55	58	59	60	76	79	81	90	91	94	98	102	103	104	114			115
n=17																			
SITE PARAMETERS*																			
Slope (percent)	22	10	16	4	6	13	2	17	0	0-2	2	4	12	6	3-4	2	4		
Aspect (degrees)	160	130	180	094	168	310	170	134	none	none	020	045	120	020	050	360	284		
Topography	Low-Mid	Toe	Lower	Swale	Saddle	Up-Mid	Up-Mid	Shoulder	Bench	Bench	Rid-Ben	Low-Mid	Low-Mid	Mid	Mid	Bench	Shoulder		
Configuration	Convex	Straight	Concave	Concave	Concave	Concave	Convex	Convex	Straight	X (S)	S (X)	Straight	Straight	Concave	S (V)	Straight	Und		
Photo # (Digital)	21-24	25-28	859-862	855-858	851-854	172-175	105-108	912-915	129-132	84-87	165-168	72-75	125-128	141-144	137-140	104-107	933-936		
Investigator	DB	DB	DB	DB	DB	JE/SC	JE/SC	DB	JE/SC	JE/SC	JE/SC	JE/SC	JE/SC	JE/SC	JE/SC	SC	DB		
Date	7/17/15	7/17/15	7/13/15	7/13/15	7/13/15	7/18/15	7/17/15	7/15/15	7/17/15	7/18/15	7/18/15	7/18/15	7/17/15	7/17/15	7/17/15	7/20/15	7/15/15		
GROUND COVER																			
Bare Ground	21	7	18	10	1	6	0.3	8	9	4	0.3	0.3	1	0.3	1	3	21	6.54	100
Rock	9	2	6	1				5								0.3	2	1.49	41
Litter	55	71	64	71	72	88	92	71	87	90	91	94	94	94	91	79	69	80.76	100
Lichens	7	3	3	2	3	0.3	0.3	4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	1	1.53	100
Moss	3	12	4	10	18	1	2	7	0.3	0.3	3	0.3	0.3	0.3	3	12	2	4.62	100
Basal Vegetation	5	5	5	6	6	5	5	5	4	5	5	5	5	5	5	5	5	5.06	100
VEGETATION STRUCTURE (nonstratified cover)																			
Total Vegetation	88	91	87	90	94	88	88	88	83	84	95	90	96	92	90	85	86	89.12	100
Perennial Graminoids	61	64	45	64	59	60	45	68	31	43	78	58	64	70	58	38	48	56.12	100
Annual Graminoids																			
Perennial Forbs and Subshrubs	41	30	28	43	37	20	23	37	16	20	13	16	16	38	16	72	44	30.00	100
Annual/Biennial Forbs		2	1	0.3	2	0.3	0.3	0.3	0.3	0.3	0.3		0.3	0.3	0.3			0.47	76
Shrubs	47	53	52	31	44	34	48	16	51	53	48	36	49	16	41	33	46	41.06	100
Trees (0.01-acre)		0.3								4			2					0.37	18
Trees (0.1-acre)		0.3	0.3		0.3					0.3	2	2		0.3				0.32	41

Table B6
 Percent Canopy Cover by Class and Species for Seventeen Sample Sites in the *ARTEMISIA TRIDENTATA/FESTUCA CAMPESTRIS* Habitat Type,
 Black Butte Baseline Study Area, 2015.

ARTEMISIA TRIDENTATA/FESTUCA CAMPESTRIS HABITAT TYPE																			
CLASS\SPECIES	PLOT NUMBER																Mean Cover	Con- stancy	
	49	55	58	59	60	76	79	81	90	91	94	98	102	103	104	114			115
																		n=17	
NATIVE PERENNIAL GRAMINOIDS																			
Agropyron spicatum	3		2				0.3			0.3		0.3	0.3				6	0.72	41
Agropyron trachycaulum	1	1	0.3	2	2	1			0.3	0.3			0.3			0.3	3	0.68	65
Agrostis scabra				1														0.06	6
Bromus carinatus		7																0.41	6
Carex eleocharis			1	2	2	0.3		5	0.3	1	1	0.3	1	1	1	1	0.3	1.01	82
Carex filifolia		8		7	12	5		12				0.3	0.3	0.3	1			2.70	53
Carex petasata	0.3	2	2	2	0.3		0.3		0.3									0.42	41
Carex rossii						0.3	0.3	1		0.3		0.3	0.3		0.3	3		0.34	47
Danthonia intermedia		12	16	20	18	7		25	3	2	9	3	4	8	7	6	8	8.71	88
Danthonia unispicata	9		1				10	4	1	1					0.3		4	1.78	47
Festuca campestris	33	16	10	5	3	16	7	15	4	12	48	40	42	30	33	16	5	19.71	100
Festuca idahoensis	20	7	10	8	12	30	12	10	18	10	4	18	8	31	18	9	16	14.18	100
Koeleria macrantha			4	2		0.3	0.3	1	1	0.3		0.3	0.3			0.3	2	0.69	65
Poa secunda				1			3		0.3				0.3	0.3				0.29	29
Stipa nelsonii				1	1	0.3	0.3			0.3						1		0.23	35
Stipa richardsonii	2	13	4	4	11			2	2	0.3			18	3	1	0.3		3.56	71
TOTAL NPG	68.3	66.0	50.3	55.0	61.3	60.2	33.5	75.0	30.2	27.8	62.0	62.5	74.8	73.6	61.6	36.9	44.3	55.49	100
INTRODUCED PERENNIAL GRAMINOIDS																			
Poa pratensis		10		18	6	5	18		4	21	25	1	3	6	1	6	9	7.82	82
TOTAL IPG	0.0	10.0	0.0	18.0	6.0	5.0	18.0	0.0	4.0	21.0	25.0	1.0	3.0	6.0	1.0	6.0	9.0	7.82	82
NATIVE PERENNIAL FORBS AND SUBSHRUBS																			
Achillea millefolium		1	1	1	1	0.3	1	0.3	0.3		0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.47	88
Agoseris glauca						0.3						0.3	0.3					0.05	18
Allium cernuum	0.3																	0.02	6
Anemone multifida				1					0.3	0.3		0.3	0.3	0.3	1	0.3		0.22	47
Anemone patens			0.3							0.3								0.04	12
Antennaria anaphaloides		0.3		0.3						0.3			0.3		1			0.13	29
Antennaria microphylla												1						0.06	6
Antennaria parvifolia	3		2	5		1	0.3	1	3	9	1	2	1	1	2	28		3.49	82
Antennaria rosea	1	3	4	9	4			2	0.3							2	10	2.08	53
Arenaria congesta	0.3	0.3	2	0.3	1	1	3	0.3	0.3	1	0.3	0.3	0.3	0.3	1	0.3	0.3	0.72	100
Arnica fulgens						1				0.3		0.3				0.3		0.11	24
Arnica sororia	0.3			0.3				0.3	0.3									0.07	24
Artemisia ludoviciana	5	6		2	1					0.3			0.3					0.86	35
Astragalus adsurgens			2		0.3			2	0.3	0.3	0.3		0.3				2	0.44	47
Astragalus agrestis				1						0.3								0.08	12
Astragalus miser								0.3	0.3						0.3			0.05	18

Table B6
Percent Canopy Cover by Class and Species for Seventeen Sample Sites in the *ARTEMISIA TRIDENTATA/FESTUCA CAMPESTRIS* Habitat Type,
Black Butte Baseline Study Area, 2015.

ARTEMISIA TRIDENTATA/FESTUCA CAMPESTRIS HABITAT TYPE																			
	PLOT NUMBER																Mean Cover	Con- stancy	
	49	55	58	59	60	76	79	81	90	91	94	98	102	103	104	114			115
n=17																			
<i>Astragalus purshii</i>					0.3		0.3	0.3										0.05	18
<i>Balsamorhiza sagittata</i>	4																	0.24	6
<i>Besseyia wyomingensis</i>						0.3												0.02	6
<i>Boechea pendulocarpa</i>			0.3															0.02	6
<i>Boechea stricta</i>					0.3													0.02	6
<i>Campanula rotundifolia</i>	0.3	0.3	0.3	2	1	0.3			0.3		0.3	0.3	0.3	0.3	0.3			0.35	71
<i>Castilleja flava</i>			0.3					0.3										0.04	12
<i>Castilleja pallescens</i>										0.3								0.02	6
<i>Cerastium arvense</i>	6	6	5	5	3	3	16	2	2	1	2	1	1	10	4	1	4	4.24	100
<i>Clematis hirsutissima</i>		0.3	1	0.3	1	1		0.3			1		1		0.3			0.36	53
<i>Crepis acuminata</i>								0.3										0.02	6
<i>Dodecatheon conjugens</i>						0.3												0.02	6
<i>Erigeron caespitosus</i>								0.3									0.3	0.04	12
<i>Erigeron subtrinervis</i>				1	0.3				0.3	0.3			0.3					0.13	29
<i>Eriogonum umbellatum</i>	2	3	3	2	3	0.3		1	0.3	1		0.3	1	0.3	1		1	1.13	82
<i>Gaillardia aristata</i>	0.3	0.3	1		1				0.3		0.3	1	0.3	0.3	0.3			0.30	59
<i>Galium boreale</i>		1	1	3		0.3		0.3	0.3		0.3	0.3	0.3		0.3		1	0.48	65
<i>Gentiana affinis</i>						0.3												0.02	6
<i>Geranium viscosissimum</i>					1	0.3							3	0.3				0.27	24
<i>Geum triflorum</i>		2	3		5	5			4	1	6	4	2	25	2	2	5	3.88	76
<i>Heuchera parvifolia</i>						0.3				0.3								0.04	12
<i>Linum lewisii</i>									0.3								0.3	0.04	12
<i>Lithospermum ruderales</i>		1			1					1	0.3		0.3		0.3			0.23	35
<i>Lomatium macrocarpum</i>	0.3						0.3	1				0.3					0.3	0.13	29
<i>Lupinus leucophyllus</i>										0.3								0.02	6
<i>Lupinus sericeus</i>	3	5	2	5	8	2	1	5	1	1	0.3	1	1	2	1	2	4	2.61	100
<i>Orobanche fasciculata</i>																	0.3	0.02	6
<i>Oxytropis sericea</i>										0.3								0.02	6
<i>Paronychia sessiliflora</i>									0.3							0.3		0.04	12
<i>Penstemon procerus</i>				1														0.06	6
<i>Perideridia montana</i>														1				0.06	6
<i>Phlox hoodii</i>	3		1		3		0.3	2	2	0.3			0.3	0.3		5	6	1.36	65
<i>Potentilla gracilis</i>	4	3	1	2	2	2	0.3	3	0.3		1		1	1	1	0.3		1.29	82
<i>Potentilla hippiana</i>											0.3				0.3			0.04	12
<i>Potentilla pensylvanica</i>					0.3			1				0.3				0.3	0.3	0.13	29
<i>Pyrracoma integrifolia</i>								0.3										0.02	6
<i>Sedum lanceolatum</i>			0.3												0.3		0.3	0.05	18
<i>Senecio canus</i>			0.3										0.3					0.04	12
<i>Senecio streptanthifolius</i>							0.3	0.3										0.04	12
<i>Silene drummondii</i>							0.3											0.02	6
<i>Sisyrinchium idahoense</i>					0.3													0.02	6

Table B6
 Percent Canopy Cover by Class and Species for Seventeen Sample Sites in the *ARTEMISIA TRIDENTATA/FESTUCA CAMPESTRIS* Habitat Type,
 Black Butte Baseline Study Area, 2015.

<i>ARTEMISIA TRIDENTATA/FESTUCA CAMPESTRIS</i> HABITAT TYPE																				
	PLOT NUMBER																	Mean Cover	Con- stancy	
	49	55	58	59	60	76	79	81	90	91	94	98	102	103	104	114	115			
																			n=17	
<i>Solidago missouriensis</i>	3		2	7	2	1		1	0.3	0.3		0.3	0.3	0.3	1	0.3	2	1.22	82	
<i>Symphotrichum ascendens</i>						0.3					0.3			0.3				0.05	18	
<i>Symphotrichum campestre</i>		0.3			0.3					0.3		0.3	0.3					0.09	29	
<i>Symphotrichum falcatum</i>	3																	0.18	6	
<i>Trifolium longipes</i>									0.3			0.3			0.3		2	0.17	24	
<i>Viola adunca</i>				2														0.12	6	
<i>Viola nuttallii</i>						0.3												0.02	6	
<i>Zigadenus venenosus</i>							0.3	0.3	0.3			0.3		0.3	0.3		0.3	0.12	41	
TOTAL NPF	38.8	32.8	32.8	48.2	42.1	20.6	23.4	24.6	17.1	19.5	14.3	12.9	16.8	43.6	17.6	43.1	40.0	28.72	100	
INTRODUCED PERENNIAL FORBS																				
<i>Centaurea maculosa</i>	7																	0.41	6	
<i>Taraxacum officinale</i>				0.3	0.3			0.3	0.3	1			0.3					0.15	35	
TOTAL IPF	7.0	0.0	0.0	0.3	0.3	0.0	0.0	0.3	0.3	1.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.56	41	
FERNS AND ALLIES																				
<i>Selaginella densa</i>						2	2	17		1		5		0.3		36	9	4.25	47	
TOTAL FA	0.0	0.0	0.0	0.0	0.0	2.0	2.0	17.0	0.0	1.0	0.0	5.0	0.0	0.3	0.0	36.0	9.0	4.25	47	
NATIVE ANNUAL/BIENNIAL FORBS																				
<i>Androsace occidentalis</i>					0.3													0.02	6	
<i>Androsace septentrionalis</i>			1		0.3	0.3	0.3	0.3		0.3	0.3		0.3	0.3	0.3			0.22	59	
<i>Collinsia parviflora</i>										0.3				0.3				0.04	12	
<i>Gentianella amarella</i>		1	0.3	0.3	1													0.15	24	
<i>Orthocarpus luteus</i>		0.3																0.02	6	
<i>Orthocarpus tenuifolius</i>		0.3																0.02	6	
TOTAL NA/BF	0.0	1.6	1.3	0.3	1.6	0.3	0.3	0.3	0.3	0.3	0.3	0.0	0.3	0.6	0.3	0.0	0.0	0.46	76	
SHRUBS																				
<i>Artemisia tridentata</i>	41	53	52	31	44	34	48	15	51	48	48	36	48	16	40	33	46	40.24	100	
<i>Clematis occidentalis</i>										0.3			0.3		0.3			0.05	18	
<i>Dasiphora fruticosa</i>													0.3		1			0.08	12	
<i>Juniperus communis</i>	8									6			1					0.88	18	
<i>Rosa woodsii</i>							1	0.3										0.08	12	
TOTAL SHRUBS	49.0	53.0	52.0	31.0	44.0	34.0	48.0	16.0	51.3	54.3	48.0	36.0	49.6	16.0	41.3	33.0	46.0	41.32	100	
TREES (0.01-acre)																				
<i>Juniperus scopulorum</i>													2					0.12	6	
<i>Pseudotsuga menziesii</i>		0.3								4								0.25	12	
TOTAL TREES (0.01-acre)	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0	0.37	18	

Table B6
 Percent Canopy Cover by Class and Species for Seventeen Sample Sites in the *ARTEMISIA TRIDENTATA/FESTUCA CAMPESTRIS* Habitat Type,
 Black Butte Baseline Study Area, 2015.

<i>ARTEMISIA TRIDENTATA/FESTUCA CAMPESTRIS</i> HABITAT TYPE																			
PLOT NUMBER																	Mean Cover	Con- stancy	
49	55	58	59	60	76	79	81	90	91	94	98	102	103	104	114	115			n=17
TREES (0.1-acre)																			
Juniperus scopulorum			0.3		0.3							0.3						0.05	18
Pseudotsuga menziesii		0.3	0.3					0.3	2	2		0.3						0.31	35
TOTAL TREES (0.1-acre)	0.0	0.3	0.6	0.0	0.3	0.0	0.0	0.0	0.3	2.0	2.0	0.0	0.6	0.0	0.0	0.0	0.0	0.36	41
TOTAL VEGETATION (Stratified)																			
	163.1	163.7	136.4	152.8	155.3	122.1	125.2	133.2	103.2	128.9	149.6	117.4	146.8	140.1	121.8	155.0	148.3	138.99	100

*Footnotes are given on cover page B-ii.
 Nomenclature follows Lesica (2012).

Table B7
 Percent Canopy Cover by Class and Species for Eleven Sample Sites in Three UPLAND SHRUBLAND Community Types,
 Black Butte Baseline Study Area, 2015.

	ARTEMISIA TRIDENTATA-DASIPHORA FRUTICOSA/POA PRATENSIS COMMUNITY TYPE							DASIPHORA FRUTICOSA-ARTEMISIA TRIDENTATA/ FESTUCA CAMPESTRIS COMMUNITY TYPE					MIXED SHRUB-SHALE OUTCROP COMMUNITY TYPE				
	PLOT NUMBER						Mean Cover	Con- stancy	PLOT NUMBER			Mean Cover	Con- stancy	PLOT NUMBER		Mean Cover	Con- stancy
	89	96	109	110	112	116			80	106	113			86	87		
							n=6					n=3				n=2	
SITE PARAMETERS*																	
Slope (percent)	9	4	9	0-1	0	9			20	8	0-2			30	17		
Aspect (degrees)	320	054	216	none	none	290			310	355	320			260	190		
Topography	Swale	Swale	Low-Mid	Toe	Mid-Ben	Toe			Up-Mid	Lower	Terrace			Mid	Shoulder		
Configuration	Concave	Concave	Und	S (Und)	S (Und)	Concave			Convex	Convex	S (V)			Convex	Convex		
Photo # (Digital)	177-180	86-89	937-940	925-928	96-99	94-97			908-911	101-104	100-103			106-109	69-72		
Investigator	JE/SC	DB	DB	DB	SC	DB			DB	JE/SC	SC			DB	JE/SC		
Date	7/18/15	7/19/15	7/15/15	7/15/15	7/20/15	7/19/15			7/15/15	7/15/15	7/20/15			7/20/15	7/16/15		
GROUND COVER																	
Bare Ground		2	12	4	0.3	4	3.72	83	2		0.3	0.77	67	30	30	30.00	100
Rock			4	1			0.83	33						50	54	52.00	100
Litter	94	83	73	74	94	82	83.33	100	71	93	94	86.00	100	18	13	15.50	100
Lichens	0.3	3	1	2	0.3	3	1.60	100	2	0.3	0.3	0.87	100		1	0.50	50
Moss	1	5	5	13	0.3	5	4.88	100	18	0.3	1	6.43	100		0.3	0.15	50
Basal Vegetation	5	7	5	6	5	6	5.67	100	7	6	5	6.00	100	2	2	2.00	100
VEGETATION STRUCTURE (nonstratified cover)																	
Total Vegetation	98	94	89	91	93	94	93.17	100	94	96	90	93.33	100	33	44	38.50	100
Perennial Graminoids	77	70	52	64	66	69	66.33	100	72	77	63	70.67	100	5	13	9.00	100
Annual Graminoids																	
Perennial Forbs and Subshrubs	36	34	38	51	23	53	39.17	100	45	31	23	33.00	100	20	16	18.00	100
Annual/Biennial Forbs	0.3	3		2	0.3		0.93	67			0.3	0.10	33	1	6	3.50	100
Shrubs	50	36	48	23	52	35	40.67	100	31	24	40	31.67	100	9	7	8.00	100
Trees (0.01-acre)															4	2.00	50
Trees (0.1-acre)														2	1.00	50	

Table B7
 Percent Canopy Cover by Class and Species for Eleven Sample Sites in Three UPLAND SHRUBLAND Community Types,
 Black Butte Baseline Study Area, 2015.

CLASS\SPECIES	ARTEMISIA TRIDENTATA-DASIPHORA FRUTICOSA/POA PRATENSIS COMMUNITY TYPE								DASIPHORA FRUTICOSA-ARTEMISIA TRIDENTATA/ FESTUCA CAMPESTRIS COMMUNITY TYPE					MIXED SHRUB-SHALE OUTCROP COMMUNITY TYPE			
	PLOT NUMBER						Mean Cover	Con- stancy	PLOT NUMBER			Mean Cover	Con- stancy	PLOT NUMBER		Mean Cover	Con- stancy
	89	96	109	110	112	116			80	106	113			86	87		
	n=6								n=3					n=2			
NATIVE PERENNIAL GRAMINOIDS																	
Agropyron dasystachyum														2		1.00	50
Agropyron smithii			5	8	1		2.33	50									
Agropyron spicatum														6		3.00	50
Agropyron trachycaulum	0.3	2	3	2	1	2	1.72	100	1	0.3	2	1.10	100		2	1.00	50
Agrostis scabra	0.3	0.3				1	0.27	50	2			0.67	33				
Bromus carinatus			0.3				0.05	17									
Carex eleocharis	0.3			1			0.22	33	4			1.33	33				
Carex filifolia				1			0.17	17	6	1		2.33	67	0.3		0.15	50
Carex microptera		1					0.17	17									
Carex obtusata					0.3		0.05	17		3		1.00	33				
Carex petasata	0.3	4			0.3	3	1.27	67									
Carex rossii	0.3				0.3		0.10	33						1		0.50	50
Danthonia californica		2					0.33	17									
Danthonia intermedia	3	16	3	5	1	14	7.00	100	30	8	36	24.67	100				
Danthonia unispicata	0.3		4				0.72	33			1	0.33	33	0.3		0.15	50
Festuca campestris	4	0.3	1	2	6	2	2.55	100	12	51	4	22.33	100				
Festuca idahoensis	1	0.3	4		0.3	7	2.10	83	10	7	5	7.33	100	3		1.50	50
Festuca rubra										0.3		0.10	33				
Juncus balticus		4					0.67	17			3	1.00	33				
Juncus confusus		5					0.83	17									
Koeleria macrantha					1		0.17	17		1		0.33	33	1	1	1.00	100
Muhlenbergia richardsonis		7					1.17	17									
Oryzopsis hymenoides														2		1.00	50
Poa secunda														0.3		0.15	50
Stipa nelsonii	0.3	3		3	1	3	1.72	83		0.3	0.3	0.20	67				
Stipa richardsonii	0.3			4	8		2.05	50		2	7	3.00	67				
TOTAL NPG	10.4	44.9	20.3	26.0	20.2	32.0	25.63	100	65.0	73.9	58.3	65.73	100	5.0	13.9	9.45	100
INTRODUCED PERENNIAL GRAMINOIDS																	
Phleum pratense				3	0.3	2	0.88	50	1		0.3	0.43	67				
Poa pratensis	72	40	40	44	52	45	48.83	100	15	10	12	12.33	100				
TOTAL IPG	72.0	40.0	40.0	47.0	52.3	47.0	49.72	100	16.0	10.0	12.3	12.77	100	0.0	0.0	0.00	0
NATIVE PERENNIAL FORBS AND SUBSHRUBS																	
Achillea millefolium	0.3	2	0.3	0.3	0.3	0.3	0.58	100			0.3	0.10	33	0.3	1	0.65	100
Agoseris glauca	0.3	0.3					0.10	33	2			0.67	33		1	0.50	50
Allium cernuum															0.3	0.15	50
Allium textile														0.3		0.15	50
Anemone multifida	0.3		1	1	0.3		0.43	67	1	1	0.3	0.77	100	0.3	0.3	0.30	100

Table B7
 Percent Canopy Cover by Class and Species for Eleven Sample Sites in Three UPLAND SHRUBLAND Community Types,
 Black Butte Baseline Study Area, 2015.

	ARTEMISIA TRIDENTATA-DASIPHORA FRUTICOSA/POA PRATENSIS COMMUNITY TYPE								DASIPHORA FRUTICOSA-ARTEMISIA TRIDENTATA/ FESTUCA CAMPESTRIS COMMUNITY TYPE					MIXED SHRUB-SHALE OUTCROP COMMUNITY TYPE			
	PLOT NUMBER						Mean Cover	Con- stancy	PLOT NUMBER			Mean Cover	Con- stancy	PLOT NUMBER		Mean Cover	Con- stancy
	89	96	109	110	112	116			80	106	113			86	87		
							n=6					n=3				n=2	
Anemone patens								0.3			0.10	33					
Antennaria anaphaloides	0.3	0.3			0.3	0.3	0.20	67	0.3		0.10	33					
Antennaria parvifolia	6		3				1.50	33	1		2.00	67					
Antennaria rosea		8	3	4		2	2.83	67		0.3	0.10	33		0.3	0.15	50	
Arenaria congesta	0.3		0.3	0.3			0.15	50	0.3	0.3	0.20	67					
Arnica fulgens										0.3	0.10	33					
Arnica sororia						0.3	0.05	17									
Artemisia frigida														0.3	0.15	50	
Artemisia ludoviciana	0.3		2	15	2		3.22	67									
Astragalus adsurgens			2				0.33	17	6		2.00	33					
Astragalus agrestis		0.3	0.3				0.10	33									
Astragalus crassicaarpus														0.3	0.15	50	
Astragalus vexilliflexus														0.3	0.15	50	
Campanula rotundifolia	0.3	4				2	1.05	50	2	0.3	0.3	0.87	100	0.3	0.3	0.30	100
Castilleja flava									0.3			0.10	33				
Cerastium arvense	2	7	2	4	3	3	3.50	100	3	2	1	1.67	67	1	1	1.00	100
Cirsium hookerianum										1	0.33	33					
Cirsium longistylum				0.3		2	0.38	33									
Cirsium undulatum														0.3	0.15	50	
Clematis hirsutissima						2	0.33	17	5	0.3	1.77	67					
Comandra umbellata			0.3				0.05	17						2	1	1.50	100
Crepis occidentalis														0.3	0.15	50	
Dodecatheon pulchellum	0.3					0.3	0.10	33									
Drymocallis arguta				0.3			0.05	17									
Erigeron caespitosus														3	1.50	50	
Erigeron compositus														0.3	0.3	0.30	100
Erigeron subtrinervis						3	0.50	17		0.3	0.10	33					
Eriogonum ovalifolium														2	1.00	50	
Eriogonum umbellatum	0.3		2				0.38	33	0.3		0.10	33					
Erysimum inconspicuum														0.3	0.15	50	
Fragaria vesca	5						0.83	17									
Fragaria virginiana		0.3				7	1.22	33									
Frasera speciosa						1	0.17	17									
Gaillardia aristata														0.3	0.15	50	
Galium boreale	0.3		1	3	3	3	1.72	83	0.3	0.3	2	0.87	100	1	0.3	0.65	100
Gaura coccinea														0.3	0.15	50	
Geranium viscosissimum	0.3					4	0.72	33	2		0.67	33					
Geum macrophyllum						4	0.67	17									
Geum triflorum	3	0.3	4	2	1	4	2.38	100	20	13	2	11.67	100				
Heuchera parvifolia	0.3						0.05	17									
Linum lewisii			0.3				0.05	17						0.3	1	0.65	100

Table B7
 Percent Canopy Cover by Class and Species for Eleven Sample Sites in Three UPLAND SHRUBLAND Community Types,
 Black Butte Baseline Study Area, 2015.

	ARTEMISIA TRIDENTATA-DASIPHORA FRUTICOSA/POA PRATENSIS COMMUNITY TYPE								DASIPHORA FRUTICOSA-ARTEMISIA TRIDENTATA/ FESTUCA CAMPESTRIS COMMUNITY TYPE					MIXED SHRUB-SHALE OUTCROP COMMUNITY TYPE			
	PLOT NUMBER						Mean Cover	Con- stancy	PLOT NUMBER			Mean Cover	Con- stancy	PLOT NUMBER		Mean Cover	Con- stancy
	89	96	109	110	112	116			80	106	113			86	87		
						n=6					n=3				n=2		
Lithopragma parviflorum						0.3	0.05	17									
Lithospermum ruderale			1		3		0.67	33	0.3			0.10	33				
Lupinus leucophyllus	2	1		4	1	3	1.83	83									
Lupinus sericeus			4	7		2	2.17	50	7	8	2	5.67	100				
Mertensia viridis						4	0.67	17									
Musineon divaricatum														0.3		0.15	50
Oxytropis sericea														0.3		0.15	50
Oxytropis splendens										1		0.33	33				
Penstemon eriantherus														0.3		0.15	50
Penstemon nitidus														0.3	0.3	0.30	100
Penstemon procerus	0.3			2	0.3	2	0.77	67	0.3	0.3		0.20	67				
Perideridia montana	0.3	0.3					0.10	33		0.3		0.10	33				
Phacelia hastata														0.3		0.15	50
Phlox hoodii			8				1.33	17						3	4	3.50	100
Physaria didymocarpa														1		0.50	50
Potentilla gracilis		6	5	7	1	3	3.67	83	1	0.3		0.43	67				
Potentilla pensylvanica				1			0.17	17						0.3		0.15	50
Pyrrocoma integrifolia				2	1		0.50	33	2	3		1.67	67				
Senecio canus														1	0.3	0.65	100
Senecio streptanthifolius					1		0.17	17	0.3	1		0.43	67				
Solidago missouriensis	4			4	4	3	2.50	67	3	2		1.67	67		0.3	0.15	50
Stenotus acaulis														7		3.50	50
Symphyotrichum ascendens	0.3	3	0.3				0.60	50						0.3		0.15	50
Symphyotrichum campestre				1	1	1	0.50	50	1		2	1.00	67				
Trifolium longipes		0.3					0.05	17	0.3			0.10	33				
Valeriana dioica	0.3						0.05	17									
Vicia americana					1		0.17	17									
Viola adunca	0.3		3		0.3		0.60	50		1		0.33	33				
Viola nuttallii	0.3						0.05	17		1		0.33	33	0.3		0.15	50
Zigadenus venenosus										0.3		0.10	33				
TOTAL NPF	27.4	33.1	42.8	57.9	23.8	56.5	40.25	100	52.7	34.4	23.1	36.73	100	21.3	18.0	19.65	100
INTRODUCED PERENNIAL FORBS																	
Taraxacum officinale	15	4		1	0.3	5	4.22	83			1	0.33	33				
TOTAL IPF	15.0	4.0	0.0	1.0	0.3	5.0	4.22	83	0.0	0.0	1.0	0.33	33	0.0	0.0	0.00	0
FERNS AND ALLIES																	
Equisetum laevigatum		1					0.17	17									
Selaginella densa					1		0.17	17									
TOTAL FA	0.0	1.0	0.0	0.0	1.0	0.0	0.33	33	0.0	0.0	0.0	0.00	0	0.0	0.0	0.00	0

Table B7
 Percent Canopy Cover by Class and Species for Eleven Sample Sites in Three UPLAND SHRUBLAND Community Types,
 Black Butte Baseline Study Area, 2015.

	ARTEMISIA TRIDENTATA-DASIPHORA FRUTICOSA/POA PRATENSIS COMMUNITY TYPE								DASIPHORA FRUTICOSA-ARTEMISIA TRIDENTATA/ FESTUCA CAMPESTRIS COMMUNITY TYPE					MIXED SHRUB-SHALE OUTCROP COMMUNITY TYPE			
	PLOT NUMBER						Mean Cover	Con- stancy	PLOT NUMBER			Mean Cover	Con- stancy	PLOT NUMBER		Mean Cover	Con- stancy
	89	96	109	110	112	116			80	106	113			86	87		
	n=6						n=3					n=2					
NATIVE ANNUAL/BIENNIAL FORBS																	
Androsace septentrionalis	0.3				0.3		0.10	33									
Lappula squarrosa													0.3	0.15	50		
Orthocarpus luteus				2	0.3		0.38	33			0.3	0.10	33				
TOTAL NA/BF	0.3	0.0	0.0	2.0	0.6	0.0	0.48	50	0.0	0.0	0.3	0.10	33	0.0	0.3	0.15	50
INTRODUCED ANNUAL/BIENNIAL FORBS																	
Alyssum alyssoides														1	2	1.50	100
Cynoglossum officinale		1					0.17	17									
Medicago lupulina		2					0.33	17						4		2.00	50
Tragopogon dubius														0.3		0.15	50
TOTAL IA/BF	0.0	3.0	0.0	0.0	0.0	0.0	0.50	17	0.0	0.0	0.0	0.00	0	1.0	6.3	3.65	100
SHRUBS																	
Artemisia tridentata	24	16	35	15	29	17	22.67	100	8	13	18	13.00	100		3	1.50	50
Clematis occidentalis	0.3						0.05	17									
Dasiphora fruticosa	28	22	12	8	24	17	18.50	100	24	12	23	19.67	100	3	3	3.00	100
Juniperus communis						4	0.67	17						0.3		0.15	50
Juniperus horizontalis			3				0.50	17						7	1	4.00	100
Rosa woodsii			5				0.83	17						0.3	0.3	0.30	100
TOTAL SHRUBS	52.3	38.0	55.0	23.0	53.0	38.0	43.22	100	32.0	25.0	41.0	32.67	100	10.3	7.6	8.95	100
TREES (0.01-acre)																	
Pseudotsuga menziesii															4	2.00	50
TOTAL TREES (0.01-acre)	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0	0.0	0.0	0.0	0.0	0	0.0	4.0	2.00	50
TREES (0.1-acre)																	
Pseudotsuga menziesii															2	1.00	50
TOTAL TREES (0.1-acre)	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0	0.0	0.0	0.0	0.0	0	0.0	2.0	1.00	50
TOTAL VEGETATION (Stratified)	177.4	164.0	158.1	156.9	151.2	178.5	164.35	100	165.7	143.3	136.0	148.33	100	37.6	50.1	43.85	100

*Footnotes are given on cover page B-ii.
 Nomenclature follows Lesica (2012).

Table B8
Percent Canopy Cover by Class and Species for Thirteen Sample Sites in Two CONIFER FOREST AND WOODLAND Habitat Types,
Black Butte Baseline Study Area, 2015.

PSE MEN/ FES IDA	PSEUDOTSUGA MENZIESII/FESTUCA CAMPESTRIS HABITAT TYPE														Mean Cover	Con- stancy
	PLOT	PLOT NUMBER														
	13	11	12	15	17	19	20	23	28	34	38	42	43			
														n=12		
SITE PARAMETERS*																
Slope (percent)	12	18	18	44	4	16	17	9	7-12	10-14	31	45	35			
Aspect (degrees)	150	114	158	180	040	152	325	190	025	090	165	140	326			
Topography	Upper	Up-Mid	Upper	Upper	Saddle	Upper	Mid	Shoulder	Up-Sho	Shoulder	Mid	Upper	Upper			
Configuration	Straight	Convex	Straight	Convex	Convex	Convex	Und	S (X)	Und	Convex	Straight	Convex	Convex			
Photo # (Digital)	892-895	17-20	896-899	38-41	74-77	54-57	33-36	65-68	21-24	133-136	89-92	921-924	916-919			
Investigator	DB	DB	DB	DB	DB	DB	JE/SC	JE/SC	JE/SC	JE/SC	JE/SC	DB	DB			
Date	7/14/15	7/17/15	7/14/15	7/18/15	7/19/15	7/18/15	7/14/15	7/15/15	7/14/15	7/17/15	7/16/15	7/15/15	7/15/15			
GROUND COVER																
Bare Ground	12	10	20	20	14	18		0.3	0.3	0.3	1	3	5	7.66	92	
Rock	6	7	5	18		12	12				4	24	3	7.08	67	
Litter	65	79	67	43	66	60	27	76	91	82	93	66	50	66.67	100	
Lichens	4		1	2	3	2	1	0.3	0.3	0.3	0.3	2	8	1.68	92	
Moss	8		2	14	12	4	58	20	6	15	0.3	2	30	13.61	92	
Basal Vegetation	5	4	5	3	5	4	2	3	3	2	2	3	4	3.33	100	
VEGETATION STRUCTURE (nonstratified cover)																
Total Vegetation	90	79	89	71	87	88	62	74	72	46	48	70	88	72.83	100	
Perennial Graminoids	29	46	60	18	39	37	17	28	18	22	14	24	36	29.92	100	
Annual Graminoids																
Perennial Forbs and Subshrubs	37	31	40	17	47	24	12	12	20	15	15	2	18	21.08	100	
Annual/Biennial Forbs	0.3	0.3	1	0.3	0.3	0.3		0.3			0.3			0.23	58	
Shrubs	25	8	2	6	30	9	6	0.3	10	7	11	3	2	7.86	100	
Trees (0.01-acre)	40	35	24	62	18	65	45	68	34	14	20	55	67	42.25	100	
Trees (0.1-acre)	45	22	14	32	24	42	53	61	43	48	35	58	60	41.00	100	

Table B8
 Percent Canopy Cover by Class and Species for Thirteen Sample Sites in Two CONIFER FOREST AND WOODLAND Habitat Types,
 Black Butte Baseline Study Area, 2015.

PSE MEN/ FES IDA	PSEUDOTSUGA MENZIESII/FESTUCA CAMPESTRIS HABITAT TYPE													Mean Cover	Con- stancy
	PLOT	PLOT NUMBER													
	13	11	12	15	17	19	20	23	28	34	38	42	43	n=12	
CLASS\SPECIES															
NATIVE PERENNIAL GRAMINOIDS															
Agropyron spicatum		4	10	7		7		0.3			8	14	4	4.53	67
Agropyron trachycalum	1	1					0.3	0.3	0.3				1	0.24	42
Agrostis scabra							5		2	0.3				0.61	25
Bromus carinatus					3									0.25	8
Calamagrostis rubescens							0.3	1						0.11	17
Carex eleocharis			0.3		1			0.3						0.13	25
Carex obtusata										0.3				0.03	8
Carex petasata	3						0.3	0.3						0.05	17
Carex rossii				2		2	2		1	0.3	1			0.69	50
Danthonia intermedia	4		5		4		0.3	0.3	5	1				1.30	50
Danthonia unispicata		4	7			1				0.3	0.3			1.05	42
Festuca campestris		8	5	2	2	4	4	6	2	4	3	4	7	4.25	100
Festuca idahoensis	2	25	35	4	7	25	2	4	4	15	1	6	12	11.67	100
Koeleria macrantha	0.3		4				0.3	0.3		0.3	0.3	0.3	0.3	0.48	58
Poa interior				0.3								2	8	0.86	25
Poa secunda				2				0.3					3	0.44	25
Stipa nelsonii	12	2		2	2			15	0.3	0.3	1		1	1.97	67
Stipa richardsonii	4				5			1	4	0.3				0.86	33
Trisetum spicatum								0.3	1					0.11	17
TOTAL NPG	26.3	44.0	66.3	19.3	24.0	39.0	14.5	29.4	19.6	22.1	14.6	26.3	36.3	29.62	100
INTRODUCED PERENNIAL GRAMINOIDS															
Phleum pratense					14									1.17	8
Poa pratensis	6	6			7		3	3	1	2			4	2.17	58
TOTAL IPG	6.0	6.0	0.0	0.0	21.0	0.0	3.0	3.0	1.0	2.0	0.0	0.0	4.0	3.33	58
NATIVE PERENNIAL FORBS AND SUBSHRUBS															
Achillea millefolium	0.3	0.3	1		1	0.3			0.3		0.3			0.27	50
Agoseris glauca	0.3		0.3											0.03	8
Allium cernuum	0.3	0.3		0.3		0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.25	83
Anemone multifida	0.3	1		1	0.3			0.3	0.3	0.3	0.3		2	0.43	58
Antennaria anaphaloides							0.3		0.3					0.05	17
Antennaria parvifolia	5	4				3	0.3	6	0.3	9	3		1	2.22	67
Antennaria racemosa						1			0.3					0.11	17
Antennaria rosea		4	4	1	8	1	0.3		1		0.3	0.3	3	1.91	83
Arabis nuttallii			0.3				0.3	0.3						0.08	25
Arenaria congesta	1		2			0.3		0.3	0.3	0.3			0.3	0.29	50
Arnica cordifolia									1					0.08	8
Arnica fulgens		0.3												0.03	8

Table B8
Percent Canopy Cover by Class and Species for Thirteen Sample Sites in Two CONIFER FOREST AND WOODLAND Habitat Types,
Black Butte Baseline Study Area, 2015.

PSE MEN/ FES IDA	PSEUDOTSUGA MENZIESII/FESTUCA CAMPESTRIS HABITAT TYPE												Mean Cover	Con- stancy		
	PLOT	PLOT NUMBER														
	13	11	12	15	17	19	20	23	28	34	38	42	43	n=12		
Arnica sororia	1		1					0.3	0.3			0.3			0.16	33
Artemisia dracunculus						2									0.17	8
Artemisia frigida						0.3						1			0.11	17
Artemisia ludoviciana	20				1	6									0.58	17
Astragalus adsurgens		1	1		1	0.3							6		0.78	42
Astragalus miser							3	0.3	6	0.3					0.80	33
Astragalus purshii			0.3									0.3			0.05	17
Balsamorhiza sagittata	0.3	9	2	3								0.3			1.19	33
Berberis repens						1									0.08	8
Besseyia wyomingensis										0.3					0.03	8
Boechera pendulocarpa				0.3											0.03	8
Boechera stricta					0.3		0.3								0.05	17
Campanula rotundifolia	0.3	0.3			0.3		0.3	0.3			0.3		0.3		0.15	50
Cerastium arvense	5	1	12		5	1	0.3	0.3		1	2	0.3	1		1.99	83
Chamerion angustifolium									0.3						0.03	8
Cirsium undulatum			0.3												0.03	8
Clematis hirsutissima					0.3		0.3		1						0.13	25
Comandra umbellata						0.3									0.03	8
Crepis acuminata						0.3		0.3				1			0.13	25
Crepis atribarba	0.3															
Dodecatheon conjugens			0.3							0.3					0.05	17
Draba oligosperma				0.3											0.03	8
Erigeron caespitosus						4					2		0.3		0.53	25
Erigeron subtrinervis		1		2	4					0.3			1		0.69	42
Eriogonum umbellatum	1		1		1	1									0.25	25
Fragaria vesca							1	1	2	0.3	0.3				0.38	42
Fragaria virginiana		1		1	7				3						1.00	33
Frasera speciosa													0.3		0.03	8
Gaillardia aristata	1				0.3			0.3							0.05	17
Galium boreale		0.3		0.3	2	0.3	0.3	0.3	0.3		0.3				0.34	67
Geranium viscosissimum					2										0.17	8
Geum triflorum	1						2			1			3		0.50	25
Helianthella uniflora	1															
Heuchera cylindrica			1												0.08	8
Heuchera parvifolia							0.3		0.3	0.3			0.3		0.10	33
Lithophragma parviflorum							0.3								0.03	8
Lithospermum ruderale	0.3	4		1	0.3			1		0.3	0.3				0.58	50
Lomatium dissectum	0.3															
Lomatium macrocarpum		0.3				0.3									0.05	17
Lupinus argenteus								0.3							0.03	8
Lupinus sericeus	0.3		2		3				0.3						0.44	25

Table B8
Percent Canopy Cover by Class and Species for Thirteen Sample Sites in Two CONIFER FOREST AND WOODLAND Habitat Types,
Black Butte Baseline Study Area, 2015.

PSE MEN/ FES IDA	PSEUDOTSUGA MENZIESII/FESTUCA CAMPESTRIS HABITAT TYPE													Mean Cover	Con- stancy
	PLOT	PLOT NUMBER											n=12		
	13	11	12	15	17	19	20	23	28	34	38	42	43		
Mertensia viridis		3		1										0.33	17
Noccaea fendleri							0.3							0.03	8
Oxytropis sericea	0.3														
Penstemon procerus				3		0.3								0.28	17
Phlox hoodii		2	5			1						4		1.00	33
Potentilla anserina					7									0.58	8
Potentilla gracilis		1			4	0.3	2		3	0.3	0.3			0.91	58
Potentilla hippiana										0.3				0.03	8
Potentilla pensylvanica									0.3	2	0.3		1	0.30	33
Sedum lanceolatum						0.3	0.3		0.3				0.3	0.10	33
Senecio canus			0.3											0.03	8
Senecio integerrimus	0.3														
Senecio streptanthifolius					0.3		1							0.11	17
Silene drummondii			0.3					0.3	0.3		0.3			0.10	33
Solidago missouriensis	1	0.3	2	2	4	2	0.3	1		0.3	0.3	0.3		1.04	83
Symphotrichum falcatum	1														
Thalictrum venulosum							0.3							0.03	8
Trifolium longipes				0.3										0.03	8
Valeriana dioica							0.3		0.3					0.05	17
Viola adunca	0.3														
Viola nuttallii											0.3			0.03	8
Zigadenus venenosus	0.3		0.3											0.03	8
TOTAL NPF	42.2	34.1	35.1	17.5	52.4	26.6	14.1	12.9	21.5	16.9	16.8	2.2	20.1	22.52	100
INTRODUCED PERENNIAL FORBS															
Taraxacum officinale	0.3			0.3	1			0.3	0.3		0.3		0.3	0.21	50
TOTAL IPF	0.3	0.0	0.0	0.3	1.0	0.0	0.0	0.3	0.3	0.0	0.3	0.0	0.3	0.21	50
FERNS AND ALLIES															
Selaginella densa			10											0.83	8
Woodsia oregana				0.3										0.03	8
TOTAL FA	0.0	0.0	10.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.86	17

Table B8
Percent Canopy Cover by Class and Species for Thirteen Sample Sites in Two CONIFER FOREST AND WOODLAND Habitat Types,
Black Butte Baseline Study Area, 2015.

PSE MEN/ FES IDA	PSEUDOTSUGA MENZIESII/FESTUCA CAMPESTRIS HABITAT TYPE													Mean Cover	Con- stancy
	PLOT	PLOT NUMBER													
	13	11	12	15	17	19	20	23	28	34	38	42	43	n=12	
NATIVE ANNUAL/BIENNIAL FORBS															
Androsace septentrionalis											0.3			0.03	8
Boechera divaricarpa			0.3											0.03	8
Collinsia parviflora						0.3		0.3						0.08	25
Collomia linearis	0.3				0.3									0.05	17
Epilobium brachycarpum													0.3	0.03	8
Lappula squarrosa						0.3								0.03	8
Phacelia linearis				0.3										0.03	8
TOTAL NA/BF	0.3	0.0	0.0	0.6	0.3	0.6	0.0	0.3	0.0	0.0	1.2	0.0	0.0	0.25	42
INTRODUCED ANNUAL/BIENNIAL FORBS															
Alyssum alyssoides			1	0.3										0.11	17
Thlaspi arvense		0.3												0.03	8
TOTAL IA/BF	0.0	0.3	1.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.13	25
SHRUBS															
Amelanchier alnifolia											0.3			0.03	8
Arctostaphylos uva-ursi							3		3	2				0.67	25
Artemisia tridentata	25				28	6		0.3				2		3.03	33
Dasiphora fruticosa										0.3				0.03	8
Juniperus communis		6		2	2	2	0.3		3	1	9			2.11	67
Juniperus horizontalis											4			0.33	8
Ribes cereum							0.3							0.03	8
Ribes inerme												2		0.17	8
Ribes setosum			1			0.3								0.11	17
Rosa woodsii		2				0.3	1		2	0.3	0.3			0.49	50
Spiraea betulifolia			2			1			3					0.50	25
Symphoricarpos albus				3			2				0.3	1	2	0.69	42
TOTAL SHRUBS	25.0	8.0	2.0	6.0	30.0	9.6	6.6	0.3	11.0	7.6	11.9	3.0	2.0	8.17	100
TREES (0.01-acre)															
Juniperus scopulorum				40		1	0.3				5	10	8	5.36	50
Pinus contorta									10					0.83	8
Pinus ponderosa				0.3										0.03	8
Pseudotsuga menziesii	40	35	24	40	18	65	45	68	24	14	16	50	65	38.67	100
TOTAL TREES (0.01-acre)	40.0	35.0	24.0	80.3	18.0	66.0	45.3	68.0	34.0	14.0	21.0	60.0	73.0	44.88	100

Table B8
 Percent Canopy Cover by Class and Species for Thirteen Sample Sites in Two CONIFER FOREST AND WOODLAND Habitat Types,
 Black Butte Baseline Study Area, 2015.

PSE MEN/ FES IDA	PSEUDOTSUGA MENZIESII/FESTUCA CAMPESTRIS HABITAT TYPE														Mean Cover	Con- stancy
	PLOT	PLOT NUMBER											n=12			
	13	11	12	15	17	19	20	23	28	34	38	42	43			
TREES (0.1-acre)																
Juniperus scopulorum			0.3	15	0.3	2	0.3					1	1	2	1.83	67
Pinus contorta							3		3						0.50	17
Pinus ponderosa			0.3			2							3		0.44	25
Pseudotsuga menziesii	45	22	14	25	24	40	52	61	40	48	34	57	60	39.75	100	
TOTAL TREES (0.1-acre)	45.0	22.0	14.3	40.3	24.3	44.0	55.3	61.0	43.0	48.0	35.0	61.0	62.0	42.52	100	
TOTAL VEGETATION (Stratified)	140.1	127.4	138.4	124.6	146.7	141.8	83.5	114.2	87.4	62.6	65.8	91.5	135.7	109.97	100	

*Footnotes are given on cover page B-ii.
 Nomenclature follows Lesica (2012).

Table B9
 Percent Canopy Cover by Class and Species for Ten Sample Sites in Two CONIFER FOREST AND WOODLAND
 Habitat Types, Black Butte Baseline Study Area, 2015.

	PSEUDOTSUGA MENZIESII/JUNIPERUS COMMUNIS HABITAT TYPE									PSEUDOTSUGA MENZIESII/ CALAMAGROSTIS RUBESCENS HABITAT TYPE				
	PLOT NUMBER								Mean	Con-	PLOT NUMBER		Mean	Con-
	14	24	25	26	29	32	33	40	Cover	stancy	31	35	Cover	stancy
									n=8		n=2			
SITE PARAMETERS*														
Slope (percent)	20	8	19	11	25	23	60	33			48	39		
Aspect (degrees)	010	055	300	125	005	160	290	005			320	340		
Topography	Mid	Low-Mid	Lower	Mid	Mid-Up	Upper	Lower	Up-Mid			Toe	Mid		
Configuration	Convex	Straight	Convex	Convex	Straight	Straight	Convex	Und			Straight	Convex		
Photo # (Digital)	33-36	94-97	41-44	5-8	9-12	153-156	90-93	93-96			169-172	88-91		
Investigator	DB	JE/SC	JE/SC	JE/SC	JE/SC	JE/SC	DB	JE/SC			JE/SC	JE/SC		
Date	7/18/15	7/13/15	7/15/15	7/14/15	7/14/15	7/18/15	7/19/15	7/16/15			7/18/15	7/18/15		
GROUND COVER														
Bare Ground	3	1	10	6		0.3	19		4.91	75		4	2.00	50
Rock		7		0.3			7		1.79	38		1	0.50	50
Litter	59	80	61	91	58	72	57	82	70.00	100	95	72	83.50	100
Lichens	10	5	4	0.3	4	0.3	2	1	3.33	100	0.3	0.3	0.30	100
Moss	25	5	22	0.3	35	26	10	15	17.29	100	0.3	22	11.15	100
Basal Vegetation	3	2	3	2	3	2	5	2	2.75	100	4	1	2.50	100
VEGETATION STRUCTURE (nonstratified cover)														
Total Vegetation	80	90	62	72	85	88	84	74	79.38	100	70	49	59.50	100
Perennial Graminoids	10	11	5	6	2	18	31	7	11.25	100	2	3	2.50	100
Annual Graminoids														
Perennial Forbs and Subshrubs	11	5	16	9	14	32	24	8	14.88	100	4	5	4.50	100
Annual/Biennial Forbs	0.3					4	0.3		0.58	38	2	0.3	1.15	100
Shrubs	20	35	49	20	26	50	38	56	36.75	100				
Trees (0.01-acre)	55	70	14	55	75	40	42	26	47.13	100	65	45	55.00	100
Trees (0.1-acre)	57	66	37	60	76	27	40	42	50.63	100	75	73	74.00	100

Table B9
Percent Canopy Cover by Class and Species for Ten Sample Sites in Two CONIFER FOREST AND WOODLAND
Habitat Types, Black Butte Baseline Study Area, 2015.

CLASS\SPECIES	PSEUDOTSUGA MENZIESII/JUNIPERUS COMMUNIS HABITAT TYPE									PSEUDOTSUGA MENZIESII/ CALAMAGROSTIS RUBESCENS HABITAT TYPE					
	PLOT NUMBER								Mean Cover	Con- stancy	PLOT NUMBER		Mean Cover	Con- stancy	
	14	24	25	26	29	32	33	40			31	35			
										n=8		n=2			
NATIVE PERENNIAL GRAMINOIDS															
Agropyron spicatum				1		0.3	10		1.41	38					
Agropyron trachycaulum		0.3							0.04	13					
Agrostis scabra		0.3	0.3	0.3			1	0.3	0.28	63	1	0.3	0.65	100	
Bromus carinatus							1		0.13	13					
Calamagrostis rubescens		3	0.3		0.3			4	0.95	50	0.3	0.3	0.30	100	
Carex rossii	1	1	0.3	0.3	0.3	0.3	2	0.3	0.69	100	0.3		0.15	50	
Danthonia intermedia		5	0.3		0.3		2		0.95	50					
Festuca campestris		1	3	0.3			1	1	0.79	63					
Festuca idahoensis	1	0.3	1	3		0.3	3	0.3	1.11	88					
Koeleria macrantha							0.3		0.04	13					
Poa interior							6		0.75	13					
Poa secunda	0.3								0.04	13					
Stipa nelsonii				0.3			3		0.41	25					
Stipa richardsonii		0.3		0.3	1				0.20	38					
Trisetum spicatum				1				0.3	0.16	25					
TOTAL NPG	2.3	11.2	5.2	6.5	1.9	2.9	27.3	6.2	7.94	100	1.6	0.6	1.10	100	
INTRODUCED PERENNIAL GRAMINOIDS															
Poa pratensis	8		0.3				16	8	1	4.16	63	0.3	3	1.65	100
TOTAL IPG	8.0	0.0	0.3	0.0	0.0	16.0	8.0	1.0	4.16	63	0.3	3.0	1.65	100	
NATIVE PERENNIAL FORBS AND SUBSHRUBS															
Allium cernuum			0.3	0.3			0.3		0.11	38		0.3	0.15	50	
Anemone multifida			1	0.3			1		0.29	38					
Antennaria anaphaloides							0.3		0.04	13					
Antennaria neglecta						15			1.88	13					
Antennaria parvifolia		2	0.3	0.3		14		0.3	2.11	63	0.3	1	0.65	100	
Antennaria racemosa			1		2			1	0.50	38					
Antennaria rosea		1	0.3	2			3		0.79	50					
Arenaria congesta				0.3					0.04	13					
Arnica cordifolia	3	0.3	0.3		3			4	1.33	63		0.3	0.15	50	
Astragalus adsurgens							2		0.25	13					
Astragalus miser			5		3				1.00	25					
Berberis repens	2	0.3		1	0.3			0.3	0.49	63					
Campanula rotundifolia				0.3				0.3	0.08	25					
Cerastium arvense								1	0.13	13	0.3		0.15	50	
Conimitella williamsii								0.3	0.04	13					
Crepis acuminata				0.3					0.04	13					

Table B9
 Percent Canopy Cover by Class and Species for Ten Sample Sites in Two CONIFER FOREST AND WOODLAND
 Habitat Types, Black Butte Baseline Study Area, 2015.

	PSEUDOTSUGA MENZIESII/JUNIPERUS COMMUNIS HABITAT TYPE								PSEUDOTSUGA MENZIESII/ CALAMAGROSTIS RUBESCENS HABITAT TYPE					
	PLOT NUMBER								Mean Cover	Con- stancy	PLOT NUMBER		Mean Cover	Con- stancy
	14	24	25	26	29	32	33	40			31	35		
									n=8		n=2			
Erigeron subtrineris				0.3				3	0.41	25				
Eurybia conspicua	1	0.3	1		1				0.41	50				
Fragaria vesca			2	0.3	1	4			0.91	50	0.3		0.15	50
Fragaria virginiana	1	0.3	1	0.3				6	1.08	63				
Frasera speciosa								1	0.13	13				
Fritillaria atropurpurea				0.3					0.04	13				
Galium boreale			0.3	0.3	0.3				0.11	38	0.3	1	0.65	100
Geum triflorum								2	0.25	13				
Heuchera cylindrica	1							2	0.38	25				
Heuchera parvifolia				0.3	0.3			1	0.20	38	1	2	1.50	100
Hieracium albiflorum								1	0.13	13				
Linnaea borealis					0.3			0.3	0.08	25				
Linum lewisii								0.3	0.04	13				
Lithophragma parviflorum											0.3	0.3	0.30	100
Lithospermum ruderale			0.3	0.3	0.3	0.3			0.15	50				
Lupinus sericeus				0.3					0.04	13				
Mertensia viridis				0.3					0.04	13				
Orthilia secunda								0.3	0.04	13				
Osmorhiza chilensis					0.3				0.04	13				
Phlox hoodii								2	0.25	13				
Potentilla gracilis		0.3	1	0.3	1	0.3	1		0.49	75	0.3		0.15	50
Potentilla pensylvanica				0.3					0.04	13				
Pyrola chlorantha		0.3		0.3	0.3				0.11	38				
Sedum lanceolatum				0.3				0.3	0.3	38	0.3	0.3	0.30	100
Senecio streptanthifolius			0.3						0.04	13				
Smilacina racemosa								0.3	0.04	13				
Smilacina stellata								0.3	0.04	13				
Solidago missouriensis		0.3	0.3	0.3		0.3			0.15	50				
Valeriana dioica	3		3	0.3	2	0.3		0.3	1.11	75		0.3	0.15	50
Viola adunca						0.3			0.04	13	1		0.50	50
Viola nuttallii		0.3							0.04	13				
TOTAL NPF	11.0	5.4	17.4	9.3	15.1	34.5	25.8	9.4	15.99	100	4.1	5.5	4.80	100
INTRODUCED PERENNIAL FORBS														
Taraxacum officinale			0.3	0.3	0.3	0.3	1		0.28	63	0.3		0.15	50
TOTAL IPF	0.0	0.0	0.3	0.3	0.3	0.3	1.0	0.0	0.28	63	0.3	0.0	0.15	50

Table B9
 Percent Canopy Cover by Class and Species for Ten Sample Sites in Two CONIFER FOREST AND WOODLAND
 Habitat Types, Black Butte Baseline Study Area, 2015.

	PSEUDOTSUGA MENZIESII/JUNIPERUS COMMUNIS HABITAT TYPE										PSEUDOTSUGA MENZIESII/ CALAMAGROSTIS RUBESCENS HABITAT TYPE			
	PLOT NUMBER								Mean Cover	Con- stancy	PLOT NUMBER		Mean Cover	Con- stancy
	14	24	25	26	29	32	33	40			31	35		
									n=8		n=2			
NATIVE ANNUAL/BIENNIAL FORBS														
Androsace occidentalis												0.3	0.15	50
Androsace septentrionalis											0.3		0.15	50
Chenopodium fremontii											1		0.50	50
Collinsia parviflora											0.3	0.3	0.30	100
Collomia linearis											0.3		0.15	50
Descurainia incana	0.3								0.04	13				
Gentianella amarella							0.3		0.04	13				
Lappula squarrosa											0.3		0.15	50
Polygonum douglasii											0.3		0.15	50
TOTAL NA/BF	0.3	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.08	25	2.5	0.6	1.55	100
INTRODUCED ANNUAL/BIENNIAL FORBS														
Carduus nutans						1			0.13	13				
Cynoglossum officinale						3			0.38	13				
Descurainia sophia											0.3		0.15	50
TOTAL IA/BF	0.0	0.0	0.0	0.0	0.0	4.0	0.0	0.0	0.50	13	0.3	0.0	0.15	50
SHRUBS														
Arctostaphylos uva-ursi		6	13	6	4	8		22	7.38	75				
Artemisia tridentata		1				0.3			0.16	25				
Clematis occidentalis	5				1				0.75	25				
Dasiphora fruticosa							5		0.63	13				
Juniperus communis	6	22	36	16	16	42	28	36	25.25	100				
Ribes cereum				0.3					0.04	13				
Ribes setosum	3					2			0.63	25				
Rosa woodsii		1	0.3		2		3		0.79	50				
Rubus idaeus	3								0.38	13				
Shepherdia canadensis			1					2	0.38	25				
Spiraea betulifolia	4	8	0.3	0.3	5			2	2.45	75				
Symphoricarpos albus			1		2		6		1.13	38				
Vaccinium scoparium								0.3	0.04	13				
TOTAL SHRUBS	21.0	38.0	51.6	22.6	30.0	52.3	42.0	62.3	39.98	100	0.0	0.0	0.00	0
TREES (0.01-acre)														
Juniperus scopulorum	2								0.25	13				
Pinus contorta		68						4	9.00	25				
Pinus flexilis		2							0.25	13				
Pseudotsuga menziesii	55	1	14	55	75	40	42	22	38.00	100	65	45	55.00	100
TOTAL TREES (0.01-acre)	57.0	71.0	14.0	55.0	75.0	40.0	42.0	26.0	47.50	100	65.0	45.0	55.00	100

Table B9
 Percent Canopy Cover by Class and Species for Ten Sample Sites in Two CONIFER FOREST AND WOODLAND
 Habitat Types, Black Butte Baseline Study Area, 2015.

	PSEUDOTSUGA MENZIESII/JUNIPERUS COMMUNIS HABITAT TYPE									PSEUDOTSUGA MENZIESII/ CALAMAGROSTIS RUBESCENS HABITAT TYPE				
	PLOT NUMBER								Mean Cover	Con- stancy	PLOT NUMBER		Mean Cover	Con- stancy
	14	24	25	26	29	32	33	40			31	35		
									n=8				n=2	
TREES (0.1-acre)														
Juniperus scopulorum	0.3						1		0.16	25				
Pinus contorta	0.3	65	3		0.3			2	8.83	63				
Pinus flexilis		1			0.3				0.16	25				
Pseudotsuga menziesii	57	1	34	60	75	27	40	41	41.88	100	75	73	74.00	100
TOTAL TREES (0.1-acre)	57.6	67.0	37.0	60.0	75.6	27.0	41.0	43.0	51.03	100	75.0	73.0	74.00	100
TOTAL VEGETATION (Stratified)	99.6	125.6	88.8	93.7	122.3	150.0	146.4	104.9	116.41	100	74.1	54.7	64.40	100

*Footnotes are given on cover page B-ii.
 Nomenclature follows Lesica (2012).

Table B10
 Percent Canopy Cover by Class and Species for Eleven Sample Sites in the
PSEUDOTSUGA MENZIESII/*SYMPHORICARPOS ALBUS* Habitat Type,
 Black Butte Baseline Study Area, 2015.

<i>PSEUDOTSUGA MENZIESII</i> / <i>SYMPHORICARPOS ALBUS</i> HABITAT TYPE														
	PLOT NUMBER											Mean Cover	Con- stancy	
	1	4	5	7	16	18	27	30	36	37	39			
													n=11	
SITE PARAMETERS*														
Slope (percent)	7	5	54	39	18	26	30	52	9	28	15			
Aspect (degrees)	100	148	006	322	012	060	085	095	345	330	060			
Topography	Up/Sho	Up-Mid	Toe	Upper	Lower	Mid	Mid	Toe/Bot	Rid/Sho	Lower	Mid			
Configuration	Und	Straight	Convex	Convex	Concave	Convex	Concave	Concave	Straight	S (X)	Convex			
Photo # (Digital)	961-964	973-976	78-81	953-956	42-45	82-85	29-32	117-120	181-184	92-95	85-88			
Investigator	DB	DB	DB	DB	DB	DB	JE/SC	JE/SC	JE/SC	SC	JE/SC			
Date	7/16/15	7/16/15	7/19/15	7/16/15	7/18/15	7/19/15	7/14/15	7/17/15	7/18/15	7/18/15	7/16/15			
GROUND COVER														
Bare Ground	6	5	4	12	12	12	3	3	5			5.64	82	
Rock	15	16		6			0.3	3				3.66	45	
Litter	63	59	48	65	42	80	88	91	33	32	94	63.18	100	
Lichens	2	3	4	4	8	1	1	0.3	0.3	1	0.3	2.26	100	
Moss	8	12	40	8	35	3	5	0.3	60	65	3	21.75	100	
Basal Vegetation	6	5	4	5	3	4	3	3	2	2	3	3.64	100	
VEGETATION STRUCTURE (nonstratified cover)														
Total Vegetation	93	89	80	93	72	75	72	70	58	68	96	78.73	100	
Perennial Graminoids	49	61	8	38	6	14	13	12	18	10	75	27.64	100	
Annual Graminoids											1	0.09	9	
Perennial Forbs and Subshrubs	27	24	42	28	12	26	9	17	29	18	8	21.82	100	
Annual/Biennial Forbs	0.3	2		2			0.3	1	1	0.3	6	1.17	73	
Shrubs	66	46	33	50	2	54	16	24	2	17	3	28.45	100	
Trees (0.01-acre)	20	28	25	20	64	27	56	36	18	35	55	34.91	100	
Trees (0.1-acre)	24	27	48	30	60	20	62	32	65	55	70	44.82	100	

Table B10
Percent Canopy Cover by Class and Species for Eleven Sample Sites in the
PSEUDOTSUGA MENZIESII/*SYMPHORICARPOS ALBUS* Habitat Type,
Black Butte Baseline Study Area, 2015.

<i>PSEUDOTSUGA MENZIESII</i> / <i>SYMPHORICARPOS ALBUS</i> HABITAT TYPE													
CLASS\SPECIES	PLOT NUMBER											Mean Cover	Con- stancy
	1	4	5	7	16	18	27	30	36	37	39		
												n=11	
NATIVE PERENNIAL GRAMINOIDS													
<i>Agropyron trachycaulum</i>	2			1			0.3	0.3				0.33	36
<i>Agrostis scabra</i>				0.3				0.3	2	2	0.3	0.45	45
<i>Bromus carinatus</i>	2	1		3								0.55	27
<i>Calamagrostis rubescens</i>	8	20	2	10		2	2	3			0.3	4.30	73
<i>Carex geeyeri</i>	14	14										2.55	18
<i>Carex hoodii</i>		0.3										0.03	9
<i>Carex petasata</i>				0.3				0.3	0.3	0.3	0.3	0.14	45
<i>Carex rossii</i>	3	3			0.3	4	2	5		1		1.66	64
<i>Danthonia intermedia</i>				1		0.3	0.3	0.3	0.3			0.20	45
<i>Festuca campestris</i>	2			2		2	2	2	0.3	1		1.03	64
<i>Festuca idahoensis</i>	2			3		1	1	0.3		2		0.85	55
<i>Koeleria macrantha</i>									0.3	0.3		0.05	18
<i>Luzula campestris</i>		1										0.09	9
<i>Poa secunda</i>		3			3							0.55	18
<i>Stipa nelsonii</i>	3	1		2	1	3	1	0.3	0.3	0.3		1.08	82
<i>Stipa richardsonii</i>						1		0.3		0.3		0.15	27
<i>Trisetum spicatum</i>			1				1			0.3		0.21	27
TOTAL NPG	36.0	43.3	3.0	22.6	4.3	13.3	9.6	12.1	3.5	7.5	0.9	14.19	100
INTRODUCED PERENNIAL GRAMINOIDS													
<i>Phleum pratense</i>	10	12		8		1						2.82	36
<i>Poa palustris</i>				0.3		0.3						0.05	18
<i>Poa pratensis</i>	10	10	5	12	2		4	0.3	16	3	75	12.48	91
TOTAL IPG	20.0	22.0	5.0	20.3	2.0	1.3	4.0	0.3	16.0	3.0	75.0	15.35	100
INTRODUCED ANNUAL GRAMINOIDS													
<i>Bromus tectorum</i>											1	0.09	9
TOTAL IAG	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.09	9
NATIVE PERENNIAL FORBS AND SUBSHRUBS													
<i>Achillea millefolium</i>	0.3	0.3				0.3	0.3		0.3	0.3		0.16	55
<i>Agoseris glauca</i>							0.3					0.03	9
<i>Allium brevistylum</i>	0.3											0.03	9
<i>Allium cernuum</i>	0.3	0.3		0.3		0.3		0.3		0.3		0.16	55
<i>Anemone multifida</i>				0.3	0.3	0.3		1		0.3		0.20	45
<i>Anemone patens</i>								0.3				0.03	9
<i>Antennaria anaphaloides</i>	0.3			0.3			1	0.3		0.3		0.20	45
<i>Antennaria neglecta</i>		1										0.09	9

Table B10
Percent Canopy Cover by Class and Species for Eleven Sample Sites in the
PSEUDOTSUGA MENZIESII/*SYMPHORICARPOS ALBUS* Habitat Type,
Black Butte Baseline Study Area, 2015.

PSEUDOTSUGA MENZIESII/SYMPHORICARPOS ALBUS HABITAT TYPE													
	PLOT NUMBER										Mean Cover	Con- stancy	
	1	4	5	7	16	18	27	30	36	37			39
											n=11		
Antennaria parvifolia							2	12				1.27	18
Antennaria racemosa			2				0.3					0.21	18
Antennaria umbrinella	2											0.18	9
Arenaria congesta								0.3	0.3			0.05	18
Arnica cordifolia			12			6	1	0.3				1.75	36
Astragalus adsurgens			2			1						0.27	18
Astragalus miser		0.3		2				1	1	7		1.03	45
Balsamorhiza sagittata						0.3						0.03	9
Berberis repens						7	0.3	1			0.3	0.78	36
Besseyia wyomingensis										0.3		0.03	9
Campanula rotundifolia	0.3			0.3			0.3	0.3	0.3	0.3		0.16	55
Cerastium arvense		1		1			0.3	0.3	1			0.33	45
Chamerion angustifolium				0.3								0.03	9
Crepis acuminata							0.3					0.03	9
Crepis atribarba						0.3						0.03	9
Dodecatheon conjugens				0.3								0.03	9
Drymocallis arguta		0.3						1				0.12	18
Erigeron speciosus	2											0.18	9
Erigeron subtrinervis						5				0.3		0.48	18
Eriogonum umbellatum								0.3				0.03	9
Eurybia conspicua		3	5	3		2						1.18	36
Fragaria vesca					7		0.3		10	3		1.85	36
Fragaria virginiana	5	7	5	8		2	0.3					2.48	55
Frasera speciosa			0.3									0.03	9
Gaillardia aristata								0.3				0.03	9
Galium boreale	3	2	2	1	0.3	0.3	0.3			1	0.3	0.93	82
Geranium viscosissimum							0.3	0.3				0.05	18
Geum triflorum				2		0.3	0.3	0.3	1	1		0.45	55
Heuchera cylindrica	1	2	0.3	0.3						0.3	0.3	0.38	55
Heuchera parvifolia								0.3				0.03	9
Hieracium scouleri							0.3					0.03	9
Lithophragma parviflorum										0.3		0.03	9
Lithospermum ruderale		0.3		1		2	0.3	0.3	1	1		0.54	64
Lupinus leucophyllus	2											0.18	9
Lupinus sericeus	3	2					0.3	1		0.3		0.60	45
Mertensia viridis			2					0.3	0.3	0.3		0.26	36
Moehringia lateriflora		0.3										0.03	9
Osmorhiza chilensis							0.3					0.03	9
Osmorhiza occidentalis	0.3											0.03	9
Perideridia montana	1											0.09	9

Table B10
Percent Canopy Cover by Class and Species for Eleven Sample Sites in the
PSEUDOTSUGA MENZIESII/*SYMPHORICARPOS ALBUS* Habitat Type,
Black Butte Baseline Study Area, 2015.

<i>PSEUDOTSUGA MENZIESII</i> / <i>SYMPHORICARPOS ALBUS</i> HABITAT TYPE													
	PLOT NUMBER											Mean Cover	Con- stancy
	1	4	5	7	16	18	27	30	36	37	39		
	n=11												
Potentilla gracilis	6		1	1			1	5	0.3	1	0.3	1.42	73
Potentilla hippiana										0.3		0.03	9
Prosartes trachycarpa			0.3									0.03	9
Sedum lanceolatum				0.3						0.3		0.05	18
Senecio streptanthifolius				0.3						0.3		0.05	18
Silene drummondii				0.3		0.3		0.3				0.08	27
Smilacina racemosa		0.3	5			1						0.57	27
Smilacina stellata	0.3	0.3								0.3		0.08	27
Solidago missouriensis								1				0.09	9
Symphotrichum ascendens	0.3											0.03	9
Thalictrum venulosum	1	1	2	1	0.3		0.3					0.51	55
Trifolium longipes	0.3	2		0.3					0.3			0.26	36
Valeriana dioica			3	6	5		2	1		1	0.3	1.66	64
Viola adunca										0.3	3	0.30	18
Zigadenus elegans			3									0.27	9
TOTAL NPF	28.7	23.4	44.9	29.3	12.9	28.4	9.8	18.5	27.8	20.1	4.5	22.57	100
INTRODUCED PERENNIAL FORBS													
Silene latifolia											2	0.18	9
Taraxacum officinale		0.3					0.3		3	0.3	2	0.54	45
TOTAL IPF	0.0	0.3	0.0	0.0	0.0	0.0	0.3	0.0	3.0	0.3	4.0	0.72	45
NATIVE ANNUAL/BIENNIAL FORBS													
Androsace septentrionalis								0.3		0.3	0.3	0.08	27
Boechera divaricarpa				0.3								0.03	9
Collinsia parviflora								0.3				0.03	9
Collomia linearis								0.3				0.03	9
Epilobium brachycarpum		0.3										0.03	9
Gentianella amarella				1								0.09	9
Microsteris gracilis		0.3										0.03	9
Polygonum douglasii								0.3				0.03	9
Turritis glabra	0.3							0.3				0.05	18
TOTAL NA/BF	0.3	0.6	0.0	1.3	0.0	0.0	0.0	1.5	0.0	0.3	0.3	0.39	55

Table B10
 Percent Canopy Cover by Class and Species for Eleven Sample Sites in the
PSEUDOTSUGA MENZIESII/*SYMPHORICARPOS ALBUS* Habitat Type,
 Black Butte Baseline Study Area, 2015.

<i>PSEUDOTSUGA MENZIESII</i> / <i>SYMPHORICARPOS ALBUS</i> HABITAT TYPE													
	PLOT NUMBER											Mean Cover	Con- stancy
	1	4	5	7	16	18	27	30	36	37	39		
												n=11	
INTRODUCED ANNUAL/BIENNIAL FORBS													
Carduus nutans											3	0.27	9
Cynoglossum officinale		1		1					1		2	0.45	36
Descurainia sophia											1	0.09	9
Thlaspi arvense										0.3		0.03	9
Tragopogon dubius		0.3					0.3					0.05	18
TOTAL IA/BF	0.0	1.3	0.0	1.0	0.0	0.0	0.3	0.0	1.0	0.3	6.0	0.90	55
SHRUBS													
Arctostaphylos uva-ursi	17	7		35		35	1	18		4		10.64	64
Artemisia tridentata							1		0.3			0.12	18
Clematis occidentalis			8	0.3								0.75	18
Dasiphora fruticosa									0.3	0.3		0.05	18
Juniperus communis						8	3			8		1.73	27
Prunus virginiana			1									0.09	9
Ribes inerme				1								0.09	9
Ribes setosum	6	5		1	1							1.18	36
Rosa woodsii	1	2	2	4		2		2	0.3	1	0.3	1.33	82
Rubus idaeus		2									2	0.36	18
Shepherdia canadensis			1	2								0.27	18
Spiraea betulifolia	20	10	11			12	2			0.3		5.03	55
Symphoricarpos albus	30	20	14	14	1	14	5	3	2	4	1	9.82	100
TOTAL SHRUBS	74.0	46.0	36.0	58.3	2.0	63.0	17.0	26.0	2.9	17.6	3.3	31.46	100
TREES (0.01-acre)													
Juniperus scopulorum							3					0.27	9
Pinus contorta							1					0.09	9
Pseudotsuga menziesii	20	28	25	20	64	27	55	36	18	35	55	34.82	100
TOTAL TREES (0.01-acre)	20.0	28.0	25.0	20.0	64.0	27.0	59.0	36.0	18.0	35.0	55.0	35.18	100
TREES (0.1-acre)													
Juniperus scopulorum						0.3	1					0.12	18
Pinus contorta							1					0.09	9
Pseudotsuga menziesii	24	27	48	30	60	20	62	32	65	55	70	44.82	100
TOTAL TREES (0.1-acre)	24.0	27.0	48.0	30.0	60.0	20.3	64.0	32.0	65.0	55.0	70.0	45.03	100
TOTAL VEGETATION (Stratified)	179.0	164.9	113.9	152.8	85.2	133.0	100.0	94.4	72.2	84.1	150.0	120.86	100

*Footnotes are given on cover page B-ii.

Nomenclature follows Lesica (2012).

Table B11
 Percent Canopy Cover by Class and Species for Six Sample Sites in Two
 CONIFER FOREST AND WOODLAND Habitat Types,
 Black Butte Baseline Study Area, 2015.

	PSEUDOTSUGA MENZIESII/LINNAEA BOREALIS HABITAT TYPE						PICEA ENGELMANNII/LINNAEA BOREALIS HABITAT TYPE			
	PLOT NUMBER				Mean	Con-	PLOT NUMBER		Mean	Con-
	10	21	22	41	Cover	stancy	6	9	Cover	stancy
					n=4		n=2			
SITE PARAMETERS*										
Slope (percent)	30	32	47	78			5-8	38		
Aspect (degrees)	010	305	065	020			012	052		
Topography	Up-Mid	Low-Mid	Low-Mid	Toe-Low			Bot	Mid		
Configuration	S (Und)	Straight	Convex	Straight			Concave	S (Und)		
Photo # (Digital)	989-992	53-56	57-60	97-100			1916-1921	985-988		
Investigator	DB	JE/SC	JE/SC	JE/SC			KS/ED	DB		
Date	7/17/15	7/15/15	7/15/15	7/16/15			7/20/15	7/17/15		
GROUND COVER										
Bare Ground	12	1	0.3		3.33	75	2	2	2.00	100
Rock	5				1.25	25	8	8	4.00	50
Litter	68	42	61	27	49.50	100	66	71	68.50	100
Lichens	4	1	2	0.3	1.83	100	2	4	3.00	100
Moss	6	54	35	70	41.25	100	22	8	15.00	100
Water							3		1.50	50
Basal Vegetation	5	2	2	3	3.00	100	5	7	6.00	100
VEGETATION STRUCTURE (nonstratified cover)										
Total Vegetation	82	81	58	98	79.75	100	98	94	96.00	100
Perennial Graminoids	41	4	5	5	13.75	100	56	49	52.50	100
Annual Graminoids										
Perennial Forbs and Subshrubs	49	21	14	30	28.50	100	23	60	41.50	100
Annual/Biennial Forbs	0.3			0.3	0.15	50	0.3	1	0.65	100
Shrubs	21	65	16	88	47.50	100	6	27	16.50	100
Trees (0.01-acre)	15	28	36	30	27.25	100	72	24	48.00	100
Trees (0.1-acre)	14	50	65	42	42.75	100	59	21	40.00	100

Table B11
 Percent Canopy Cover by Class and Species for Six Sample Sites in Two
 CONIFER FOREST AND WOODLAND Habitat Types,
 Black Butte Baseline Study Area, 2015.

CLASS\SPECIES	PSEUDOTSUGA MENZIESII/LINNAEA BOREALIS HABITAT TYPE						PICEA ENGELMANNII/LINNAEA BOREALIS HABITAT TYPE			
	PLOT NUMBER				Mean Cover	Con- stancy	PLOT NUMBER		Mean Cover	Con- stancy
	10	21	22	41			6	9		
	n=4						n=2			
NATIVE PERENNIAL GRAMINOIDS										
Agropyron trachycaulum	1				0.25	25		1	0.50	50
Agrostis exarata							2		1.00	50
Agrostis scabra	1	0.3		0.3	0.40	75	0.3		0.15	50
Bromus carinatus							2		1.00	50
Calamagrostis rubescens	16	2	4	5	6.75	100		18	9.00	50
Carex disperma							54		27.00	50
Carex geyeri	10				2.50	25		12	6.00	50
Carex microptera							0.3		0.15	50
Carex rossii	1	0.3	0.3		0.40	75				
Danthonia intermedia		0.3			0.08	25				
Deschampsia cespitosa							0.3		0.15	50
Elymus glaucus			0.3		0.08	25				
Festuca campestris		1	1		0.50	50				
Festuca idahoensis	2	0.3			0.58	50				
Glyceria striata							4		2.00	50
Juncus balticus							0.3		0.15	50
Stipa nelsonii	1				0.25	25				
Stipa richardsonii	1				0.25	25				
Trisetum spicatum	2				0.50	25				
TOTAL NPG	35.0	4.2	5.6	5.3	12.53	100	61.2	33.0	47.10	100
INTRODUCED PERENNIAL GRAMINOIDS										
Phleum pratense	4				1.00	25		12	6.00	50
Poa pratensis	7				1.75	25		10	5.00	50
TOTAL IPG	11.0	0.0	0.0	0.0	2.75	25	0.0	22.0	11.00	50
NATIVE PERENNIAL FORBS AND SUBSHRUBS										
Achillea millefolium	0.3	0.3			0.15	50	0.3		0.15	50
Actaea rubra							0.3	3	1.65	100
Agoseris glauca		0.3			0.08	25				
Allium brevistylum							0.3		0.15	50
Allium cernuum		0.3			0.08	25				
Antennaria anaphaloides				0.3	0.08	25				
Antennaria corymbosa							0.3		0.15	50
Antennaria parvifolia		0.3	1		0.33	50				
Antennaria racemosa	6	0.3		0.3	1.65	75	0.3		0.15	50
Antennaria rosea	1				0.25	25				
Arnica cordifolia	2	2	0.3	4	2.08	100		1	0.50	50

Table B11
Percent Canopy Cover by Class and Species for Six Sample Sites in Two
CONIFER FOREST AND WOODLAND Habitat Types,
Black Butte Baseline Study Area, 2015.

	PSEUDOTSUGA MENZIESII/LINNAEA BOREALIS HABITAT TYPE						PICEA ENGELMANNII/LINNAEA BOREALIS HABITAT TYPE			
	PLOT NUMBER				Mean Cover	Con- stancy	PLOT NUMBER		Mean Cover	Con- stancy
	10	21	22	41			6	9		
					n=4				n=2	
Arnica sororia	0.3				0.08	25				
Astragalus miser	0.3	1		2	0.83	75				
Berberis repens	3	2	1	2	2.00	100				
Campanula rotundifolia	0.3	0.3	0.3		0.23	75		0.3	0.15	50
Cardamine breweri							0.3		0.15	50
Castilleja miniata								0.3	0.15	50
Chamerion angustifolium				0.3	0.08	25		2	1.00	50
Corallorhiza wisteriana	0.3				0.08	25				
Epilobium ciliatum							0.3		0.15	50
Erigeron subtrinervis	0.3	0.3			0.15	50				
Eurybia conspicua	12	2	1	3	4.50	100		40	20.00	50
Fragaria vesca		3	1	2	1.50	75				
Fragaria virginiana	3		0.3	2	1.33	75	1	3	2.00	100
Frasera speciosa		0.3		0.3	0.15	50				
Galium boreale	0.3	0.3	0.3	0.3	0.30	100		3	1.50	50
Galium trifidum							0.3		0.15	50
Geranium richardsonii							1	5	3.00	100
Geum macrophyllum							2		1.00	50
Geum rivale							1		0.50	50
Geum triflorum		0.3	1		0.33	50				
Heuchera cylindrica	1	0.3	0.3	1	0.65	100		1	0.50	50
Linnaea borealis	16	7	8	12	10.75	100	3	4	3.50	100
Lithospermum ruderale	0.3	0.3			0.15	50				
Lupinus leucophyllus	1				0.25	25				
Mentha arvensis							1		0.50	50
Micranthes odontoloma							1		0.50	50
Moneses uniflora							0.3		0.15	50
Orthilia secunda	0.3			0.3	0.15	50	0.3		0.15	50
Osmorhiza chilensis							1		0.50	50
Osmorhiza occidentalis	0.3				0.08	25		2	1.00	50
Pedicularis groenlandica							0.3		0.15	50
Platanthera obtusata							0.3		0.15	50
Potentilla gracilis	1	0.3			0.33	50	0.3		0.15	50
Prosartes trachycarpa		0.3		0.3	0.15	50				
Prunella vulgaris							0.3		0.15	50
Pyrola asarifolia								0.3	0.15	50
Pyrola chlorantha								0.3	0.15	50
Pyrola minor							0.3		0.15	50
Ranunculus uncinatus							0.3		0.15	50
Sedum lanceolatum		0.3		0.3	0.15	50				

Table B11
 Percent Canopy Cover by Class and Species for Six Sample Sites in Two
 CONIFER FOREST AND WOODLAND Habitat Types,
 Black Butte Baseline Study Area, 2015.

	PSEUDOTSUGA MENZIESII/LINNAEA BOREALIS HABITAT TYPE						PICEA ENGELMANNII/LINNAEA BOREALIS HABITAT TYPE			
	PLOT NUMBER				Mean Cover	Con- stancy	PLOT NUMBER		Mean Cover	Con- stancy
	10	21	22	41			6	9		
	n=4						n=2			
Senecio pseud aureus							0.3		0.15	50
Silene drummondii		0.3			0.08	25				
Smilacina racemosa	0.3							2	1.00	50
Smilacina stellata		0.3	0.3		0.15	50	0.3		0.15	50
Solidago missouriensis		1			0.25	25				
Stellaria crispa							5		2.50	50
Stellaria longifolia							0.3		0.15	50
Symphotrichum ascendens	1				0.25	25				
Symphotrichum campestre		0.3			0.08	25				
Symphotrichum subspicatum							0.3		0.15	50
Thalictrum venulosum	4				1.00	25		3	1.50	50
Trifolium longipes	0.3				0.08	25	0.3		0.15	50
Valeriana dioica		0.3	0.3	2	0.65	75				
Veronica americana							0.3		0.15	50
Zigadenus elegans				1	0.25	25	0.3		0.15	50
TOTAL NPF	54.6	23.7	15.1	33.4	31.70	100	22.9	70.2	46.55	100
INTRODUCED PERENNIAL FORBS										
Cirsium arvense	1				0.25	25		0.3	0.15	50
Taraxacum officinale	0.3			0.3	0.15	50	1		0.50	50
TOTAL IPF	1.3	0.0	0.0	0.3	0.40	50	1.0	0.3	0.65	100
FERNS AND ALLIES										
Cystopteris fragilis							0.3		0.15	50
TOTAL FA	0.0	0.0	0.0	0.0	0.0	0	0.3	0.0	0.15	50
NATIVE ANNUAL/BIENNIAL FORBS										
Androsace filiformis							0.3		0.15	50
Gentianella amarella	0.3			0.3	0.15	50				
TOTAL NA/BF	0.3	0.0	0.0	0.3	0.15	50	0.3	0.0	0.15	50
INTRODUCED ANNUAL/BIENNIAL FORBS										
Cynoglossum officinale								1	0.50	50
TOTAL IA/BF	0.0	0.0	0.0	0.0	0.0	0	0.0	1.0	0.50	50

Table B11
 Percent Canopy Cover by Class and Species for Six Sample Sites in Two
 CONIFER FOREST AND WOODLAND Habitat Types,
 Black Butte Baseline Study Area, 2015.

	PSEUDOTSUGA MENZIESII/LINNAEA BOREALIS HABITAT TYPE						PICEA ENGELMANNII/LINNAEA BOREALIS HABITAT TYPE			
	PLOT NUMBER				Mean Cover	Con- stancy	PLOT NUMBER		Mean Cover	Con- stancy
	10	21	22	41			6	9		
	n=4						n=2			
SHRUBS										
Amelanchier alnifolia			1		0.25	25				
Arctostaphylos uva-ursi	4	4	2	30	10.00	100				
Clematis occidentalis				0.3	0.08	25		3	1.50	50
Juniperus communis	5	60	3	68	34.00	100	0.3	2	1.15	100
Lonicera utahensis				1	0.25	25				
Prunus virginiana				2	0.50	25				
Ribes setosum	2				0.50	25	1	6	3.50	100
Rosa acicularis							1		0.50	50
Rosa woodsii		1	2	2	1.25	75		3	1.50	50
Rubus idaeus	0.3				0.08	25		4	2.00	50
Salix bebbiana							3		1.50	50
Shepherdia canadensis	1	0.3		3	1.08	75	0.3		0.15	50
Spiraea betulifolia	2	3	0.3	4	2.33	100		4	2.00	50
Symphoricarpos albus	9	1	8	1	4.75	100		9	4.50	50
TOTAL SHRUBS	23.3	69.3	16.3	111.3	55.05	100	5.6	31.0	18.30	100
TREES (0.01-acre)										
Juniperus scopulorum				0.3	0.08	25				
Picea engelmannii							72	8	40.00	100
Pinus contorta				5	1.25	25		2	1.00	50
Pseudotsuga menziesii	15	28	36	28	26.75	100	0.3	15	7.65	100
TOTAL TREES (0.01-acre)	15.0	28.0	36.0	33.3	28.08	100	72.3	25.0	48.65	100
TREES (0.1-acre)										
Juniperus scopulorum				0.3	0.08	25				
Picea engelmannii							58	5	31.50	100
Pinus contorta	0.3			16	4.08	50		3	1.50	50
Pinus flexilis							0.3		0.15	50
Populus tremuloides	0.3				0.08	25		0.3	0.15	50
Pseudotsuga menziesii	14	50	65	30	39.75	100	2	14	8.00	100
TOTAL TREES (0.1-acre)	14.6	50.0	65.0	46.3	43.98	100	60.3	22.3	41.30	100
TOTAL VEGETATION (Stratified)	140.5	125.2	73.0	183.9	130.65	100	163.6	182.5	173.05	100

*Footnotes are given on cover page B-ii.
 Nomenclature follows Lesica (2012).

Table B12
Percent Canopy Cover by Class and Species for One Sample Site in the NOXIOUS WEED TAILINGS Vegetation Type, Black Butte Baseline Study Area, 2014 and 2015.

	NOXIOUS WEED TAILINGS			
	PLOT	PLOT	Mean Cover	Con- stancy
	162 2014	162 2015		
SITE PARAMETERS*				
Slope (percent)	2-4	2-4		
Aspect (degrees)	000	000		
Topography	Ben	Ben		
Configuration	X (Und)	X (Und)		
Photo # (Digital)	1499-1502	1872-1875		
Investigator	KS/DB	KS/ED		
Date	9/3/14	7/18/15		
GROUND COVER				
Bare Ground		1	0.50	50
Rock	1	1	1.00	100
Litter	93	93	93.00	100
Lichens				
Moss				
Water				
Basal Vegetation	6	5	5.50	100
VEGETATION STRUCTURE (nonstratified cover)				
Total Vegetation	99	95	97.00	100
Perennial Graminoids	86	95	90.50	100
Annual Graminoids				
Perennial Forbs and Subshrubs	9		4.50	50
Annual/Biennial Forbs	84		42.00	50
Shrubs	4		2.00	50
Trees (0.01-acre)				
Trees (0.1-acre)				
CLASS\SPECIES				
NATIVE PERENNIAL GRAMINOIDS				
Agropyron smithii		0.3	0.15	50
TOTAL NPG	0.0	0.3	0.15	50
INTRODUCED PERENNIAL GRAMINOIDS				
Poa pratensis	86	95	90.50	100
TOTAL IPG	86.0	95.0	90.50	100
NATIVE PERENNIAL FORBS AND SUBSHRUBS				
Achillea millefolium	0.3		0.15	50
TOTAL NPF	0.3	0.0	0.15	50
INTRODUCED PERENNIAL FORBS				
Cirsium arvense	8		4.00	50
Silene latifolia	1		0.50	50
TOTAL IPF	9.0	0.0	4.50	50
INTRODUCED ANNUAL/BIENNIAL FORBS				
Carduus nutans	84		42.00	50
Cynoglossum officinale	1		0.50	50
TOTAL IA/BF	85.0	0.0	42.50	50
SHRUBS				
Artemisia tridentata	4		2.00	50
TOTAL SHRUBS	4.0	0.0	2.00	50
TOTAL VEGETATION (Stratified)	184.3	95.3	139.80	100

*Footnotes are given on cover page B-ii.
Nomenclature follows Lesica (2012).

Table B13
 Percent Canopy Cover by Class and Species for Sixteen Sample Sites in the LOWLAND ALTERED GRASSLAND (HAY MEADOW) Community Type,
 Black Butte Baseline Study Area, 2015.

LOWLAND ALTERED GRASSLAND (HAY MEADOW) COMMUNITY TYPE																		
PLOT NUMBER																Mean Cover	Con- stancy	
117	133	134	135	138	139	140	141	143	144	145	148	151	152	153	165			
																n=16		
SITE PARAMETERS*																		
Slope (percent)	0-1	0-1	0-2	0-1	0-1	0-1	4	0-1	0-1	0-1	0-1	0-1	0-1	1-2	1-3	0-1		
Aspect (degrees)	000	000	000	000	000	000	040	000	000	000	000	000	000	000	000	280		
Topography	Flo Ter	Flo Ter	Flo Ter	Flo Ter	Flo Ter	Flo Ter	Up Ter	Ter	Flo Ter	Flo Ter	Flo Ter	Ter	Flo Ter	Flo Ter	Ter	Ter		
Configuration	S (V)	S (Und)	S (Und)	S (V)	S (V)	S (V)	S (X)	V (S)	S (V)	S (V)	S	S	S (V)	S (V)	S	S		
Photo # (Digital)	1908-11	2315-18	2308-11	1776-79	1780-83	1716-19	1739-42	1743-46	1712-15	1708-11	1724-27	1731-34	1696-99	1692-95	1700-03	1804-07		
Investigator	KS/ED	KS/JB	KS/JB	KS/ED	KS/ED	KS/ED	KS/ED	KS/ED	KS/ED	KS/ED	KS/ED	KS/ED	KS/ED	KS/ED	KS/ED	KS		
Date	7/20/15	8/14/14	8/14/14	7/15/15	7/15/15	7/14/15	7/14/15	7/14/15	7/14/15	7/14/15	7/14/15	7/14/15	7/13/15	7/13/15	7/13/15	7/16/15		
GROUND COVER																		
Bare Ground					2			0.3		0.3					0.3		0.18	25
Rock					0.3										0.3		0.04	13
Litter	92	48	92	94	92	70	62	92	93	91	94	80	93	92	93	94	85.75	100
Lichens																		
Moss	0.3	44	0.3			21	30	2	0.3	0.3		14	1	2		0.3	7.22	75
Basal Vegetation	8	8	8	6	6	9	8	6	7	8	6	6	6	6	6	6	6.88	100
VEGETATION STRUCTURE (nonstratified cover)																		
Total Vegetation	96	98	97	98	88	99	96	84	95	98	88	82	94	86	92	90	92.56	100
Perennial Graminoids	93	90	88	84	74	91	94	82	80	74	68	78	86	84	88	78	83.25	100
Annual Graminoids																		
Perennial Forbs and Subshrubs	21	80	68	72	62	28	13	8	80	52	43	13	74	16	42	65	46.06	100
Annual/Biennial Forbs		1	36	11	0.3	43	2	2	13	72	14		0.3	1	0.3		12.24	81
Shrubs																		
Trees (0.01-acre)																		
Trees (0.1-acre)																		

Table B13
Percent Canopy Cover by Class and Species for Sixteen Sample Sites in the LOWLAND ALTERED GRASSLAND (HAY MEADOW) Community Type,
Black Butte Baseline Study Area, 2015.

LOWLAND ALTERED GRASSLAND (HAY MEADOW) COMMUNITY TYPE																		
CLASS\SPECIES	PLOT NUMBER																Mean Cover	Con- stancy
	117	133	134	135	138	139	140	141	143	144	145	148	151	152	153	165		
n=16																		
NATIVE PERENNIAL GRAMINOIDS																		
Agropyron trachycaulum	1																0.06	6
Carex atherodes		0.3															0.02	6
Carex nebrascensis		8				0.3											0.52	13
Carex pellita		4															0.25	6
Carex praegracilis	34	6				56		8		6		15		12			8.56	44
Carex utriculata							2										0.13	6
Deschampsia cespitosa	12	8				7		5									2.00	25
Festuca rubra	3																0.19	6
Hordeum brachyantherum												0.3					0.02	6
Juncus balticus	20	36				8		8	1	3		2		38		4	7.50	56
Juncus longistylis	0.3								0.3								0.04	13
Muhlenbergia richardsonis		1															0.06	6
TOTAL NPG	70.3	63.3	0.0	0.0	0.0	71.3	2.0	21.0	1.3	9.0	0.0	17.3	0.0	50.0	0.0	4.0	19.34	63
INTRODUCED PERENNIAL GRAMINOIDS																		
Agropyron repens												1	3				0.25	13
Agrostis stolonifera	15	2		2				1	3	1		0.3		1			1.58	50
Alopecurus arundinaceus			2	5	1	9	78	70				12		0.3	1		11.14	56
Bromus inermis					14				2	4	22		54		18		7.13	38
Dactylis glomerata									0.3								0.02	6
Phleum pratense	22	52	56	60	52	52		28	58	16	22	26	56	42	54		37.25	88
Poa palustris		6				6	54										4.13	19
Poa pratensis	18	4	34	48	32	3		4	58	1	44	54	42	4	60	34	27.50	94
Schedonorus arundinaceus						3			2								0.31	13
Schedonorus pratensis		8	18						2	14					4	12	3.63	38
TOTAL IPG	55.0	72.0	110.0	115.0	99.0	73.0	132.0	75.0	95.3	78.0	82.0	89.3	125.0	61.3	125.0	100.0	92.93	100
NATIVE PERENNIAL FORBS AND SUBSHRUBS																		
Achillea millefolium	2				0.3				1		1		2		3		0.58	38
Allium geyeri		0.3						0.3									0.04	13
Allium schoenoprasum													7				0.44	6
Anemone multifida														0.3			0.02	6
Antennaria microphylla								0.3									0.02	6
Arnica chamissonis		3		0.3		0.3											0.23	19
Artemisia ludoviciana														0.3			0.02	6
Campanula rotundifolia												0.3					0.02	6
Cerastium arvense												2					0.13	6
Crepis runcinata	0.3	0.3															0.04	13
Dodecatheon pulchellum		2						4	1								0.44	19

Table B13
 Percent Canopy Cover by Class and Species for Sixteen Sample Sites in the LOWLAND ALTERED GRASSLAND (HAY MEADOW) Community Type,
 Black Butte Baseline Study Area, 2015.

LOWLAND ALTERED GRASSLAND (HAY MEADOW) COMMUNITY TYPE																		
	PLOT NUMBER																Mean Cover	Con- stancy
	117	133	134	135	138	139	140	141	143	144	145	148	151	152	153	165		
																	n=16	
Erigeron lonchophyllus								0.3									0.02	6
Fragaria virginiana				1										0.3			0.08	13
Galium boreale									1				1	0.3	0.3		0.16	25
Geum rivale	4	16															1.25	13
Lupinus leucophyllus													8				0.50	6
Mentha arvensis	1																0.06	6
Oxytropis splendens													6				0.38	6
Polygonum amphibium	2																0.13	6
Potentilla anserina						0.3		0.3								14	0.91	19
Potentilla gracilis	8	6	8	2	3	0.3			3	1	2	4	2	3	2	8	3.27	88
Pyrrocoma integrifolia												2					0.13	6
Ranunculus acriformis		4	0.3	1													0.33	19
Senecio sphaerocephalus	2	5	0.3														0.46	19
Sisyrinchium idahoense		0.3															0.02	6
Solidago canadensis (S. lepida)									0.3						0.3		0.04	13
Symphotrichum subspicatum	1			0.3	0.3	1		1	0.3		0.3		0.3	3	1	2	0.66	69
Thalictrum venulosum													0.3				0.02	6
Trifolium longipes	1															2	0.19	13
Viola nephrophylla	0.3																0.02	6
TOTAL NPF	21.6	36.9	8.6	4.6	3.6	1.9	0.0	5.6	7.2	1.0	3.3	6.0	21.9	13.6	7.2	26.0	10.56	94
INTRODUCED PERENNIAL FORBS																		
Cerastium fontanum			12								0.3						0.77	13
Cirsium arvense					1								2		1		0.25	19
Medicago sativa															3		0.19	6
Taraxacum officinale	1	24	26	42	22	8	1		12	10	22	7	28	2	14	12	14.44	94
Trifolium hybridum		26	4	0.3	0.3	5	12	2		4	9		7		4	40	7.10	75
Trifolium pratense		4	28	28	40	10		1	74	42	15		42		18	1	18.94	75
Trifolium repens		3		14	7	7			1	2			2	1			2.31	50
TOTAL IPF	1.0	57.0	70.0	84.3	70.3	30.0	13.0	3.0	87.0	58.3	46.0	7.0	81.0	3.0	40.0	53.0	43.99	100
FERNS AND ALLIES																		
Equisetum arvense				10													0.63	6
Equisetum laevigatum		0.3	0.3		0.3				1	0.3							0.14	31
TOTAL FA	0.0	0.3	0.3	10.0	0.3	0.0	0.0	0.0	1.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.76	38
NATIVE ANNUAL/BIENNIAL FORBS																		
Rhinanthus crista-galli		1	36	1			40	2	2	7	11						6.25	50
TOTAL NA/BF	0.0	1.0	36.0	1.0	0.0	40.0	2.0	2.0	7.0	11.0	0.0	0.0	0.0	0.0	0.0	0.0	6.25	50

Table B13
 Percent Canopy Cover by Class and Species for Sixteen Sample Sites in the LOWLAND ALTERED GRASSLAND (HAY MEADOW) Community Type,
 Black Butte Baseline Study Area, 2015.

LOWLAND ALTERED GRASSLAND (HAY MEADOW) COMMUNITY TYPE																		
	PLOT NUMBER															Mean Cover	Con- stancy	
	117	133	134	135	138	139	140	141	143	144	145	148	151	152	153			165
																	n=16	
INTRODUCED ANNUAL/BIENNIAL FORBS																		
Carduus nutans													0.3				0.02	6
Carum carvi		0.3	4	10	0.3	5			6	64	14			1	0.3		6.56	63
Medicago lupulina															0.3		0.02	6
Thlaspi arvense											0.3		0.3				0.04	13
TOTAL IA/BF	0.0	0.3	4.0	10.0	0.3	5.0	0.0	0.0	6.0	64.0	14.3	0.0	0.6	1.0	0.6	0.0	6.63	69
TOTAL VEGETATION (Stratified)	147.9	230.8	228.9	224.9	173.5	221.2	149.0	106.6	204.8	221.6	145.6	119.6	228.5	128.9	172.8	183.0	180.48	100

*Footnotes are given on cover page B-ii.
 Nomenclature follows Lesica (2012).

Table B14
 Percent Canopy Cover by Class and Species for Seven Sample Sites in Two HERBACEOUS
 RIPARIAN AND WETLAND Community Types, Black Butte Baseline Study Area, 2015.

	JUNCUS BALTICUS COMMUNITY TYPE							CAREX NEBRASCENSIS COMMUNITY TYPE			
	PLOT NUMBER					Mean Cover	Con- stancy	PLOT NUMBER		Mean Cover	Con- stancy
	129	149	163	164	176			127	166		
	n=5							n=2			
SITE PARAMETERS*											
Slope (percent)	6	1-2	0-2	0-1	2-3			3	0-1		
Aspect (degrees)	182	000	000	000	336			270	280		
Topography	Toe	Ter	Ter	Bot	Bot			Bot	Bot		
Configuration	V	V (S)	V (S)	V	S (V)			V	V		
Photo # (Digital)	1764-67	1735-38	1808-11		1820-23			1756-59	1784-87		
Investigator	KS/ED	KS/ED	KS	KS	KS/ED			KS/ED	KS/ED		
Date	7/15/15	7/14/15	7/16/15	7/16/15	7/17/15			7/15/15	7/16/15		
GROUND COVER											
Bare Ground									0.3	0.15	50
Rock											
Litter	94	50	93	90	82	81.80	100	24	90	57.00	100
Lichens											
Moss		44			12	11.20	40	33	0.3	16.65	100
Water				3		0.60	20	36		18.00	50
Basal Vegetation	6	6	7	7	6	6.40	100	7	9	8.00	100
VEGETATION STRUCTURE (nonstratified cover)											
Total Vegetation	92	84	84	98	82	88.00	100	85	97	91.00	100
Perennial Graminoids	86	74	76	88	76	80.00	100	78	86	82.00	100
Annual Graminoids											
Perennial Forbs and Subshrubs	48	40	37	48	14	37.40	100	4	65	34.50	100
Annual/Biennial Forbs		3		0.3		0.66	40		1	0.50	50
Shrubs		6	2		3	2.20	60	9		4.50	50
Trees (0.01-acre)											
Trees (0.1-acre)											

Table B14
 Percent Canopy Cover by Class and Species for Seven Sample Sites in Two HERBACEOUS
 RIPARIAN AND WETLAND Community Types, Black Butte Baseline Study Area, 2015.

CLASS\SPECIES	JUNCUS BALTICUS COMMUNITY TYPE							CAREX NEBRASCENSIS COMMUNITY TYPE			
	PLOT NUMBER					Mean Cover	Con- stancy	PLOT NUMBER		Mean Cover	Con- stancy
	129	149	163	164	176			127	166		
						n=5				n=2	
NATIVE PERENNIAL GRAMINOIDS											
Anthoxanthum hirtum				5	0.3	1.06	40		1	0.50	50
Bromus pumpellianus					0.3	0.06	20				
Calamagrostis stricta				18	0.3	3.66	40		16	8.00	50
Carex aquatilis		6			2	1.60	40	8		4.00	50
Carex microptera	0.3		2			0.46	40				
Carex nebrascensis		4			1	1.00	40	62	20	41.00	100
Carex pellita			14	3		3.40	40				
Carex praegracilis	48	4	18	1	10	16.20	100	8	14	11.00	100
Carex praticola	1					0.20	20				
Carex utriculata									0.3	0.15	50
Deschampsia cespitosa		6	8	1	6	4.20	80	3	9	6.00	100
Eleocharis palustris								6		3.00	50
Festuca rubra	2	12	12		5	6.20	80		3	1.50	50
Glyceria striata									2	1.00	50
Hordeum brachyantherum				1		0.20	20		2	1.00	50
Hordeum jubatum				14		2.80	20				
Juncus balticus	24	46	36		62	37.60	100		30	15.00	50
Muhlenbergia richardsonis								2		1.00	50
TOTAL NPG	75.3	78.0	90.0	63.0	86.9	78.64	100	89.0	97.3	93.15	100
INTRODUCED PERENNIAL GRAMINOIDS											
Alopecurus arundinaceus		6				1.20	20				
Phleum pratense	24	2	8	16		10.00	80				
Poa palustris		0.3	10	16	1	5.46	80		8	4.00	50
Poa pratensis	16	1	4	26		9.40	80		7	3.50	50
TOTAL IPG	40.0	9.3	22.0	58.0	1.0	26.06	100	0.0	15.0	7.50	50
NATIVE PERENNIAL FORBS AND SUBSHRUBS											
Achillea millefolium	0.3					0.06	20				
Agoseris glauca	0.3					0.06	20				
Allium schoenoprasum		3				0.60	20				
Dodecatheon pulchellum		2			0.3	0.46	40				
Epilobium palustre					0.3	0.06	20				
Fragaria virginiana	0.3					0.06	20				
Galium boreale	0.3					0.06	20				
Galium trifidum									0.3	0.15	50
Geum aleppicum	5		1			1.20	40				
Geum rivale	0.3	14			0.3	2.92	60	0.3		0.15	50
Mentha arvensis				5		1.00	20		28	14.00	50

Table B14
 Percent Canopy Cover by Class and Species for Seven Sample Sites in Two HERBACEOUS
 RIPARIAN AND WETLAND Community Types, Black Butte Baseline Study Area, 2015.

	JUNCUS BALTICUS COMMUNITY TYPE							CAREX NEBRASCENSIS COMMUNITY TYPE			
	PLOT NUMBER					Mean Cover	Con- stancy	PLOT NUMBER		Mean Cover	Con- stancy
	129	149	163	164	176			127	166		
						n=5				n=2	
Pedicularis groenlandica		2			4	1.20	40				
Polygonum amphibium				8		1.60	20		2	1.00	50
Potentilla anserina									4	2.00	50
Potentilla gracilis	4	2	11	2	0.3	3.86	100		3	1.50	50
Senecio sphaerocephalus		16				3.20	20				
Solidago canadensis (S. lepida)	0.3					0.06	20				
Stachys palustris				3		0.60	20		38	19.00	50
Stellaria longifolia		0.3				0.06	20				
Stellaria longipes	0.3					0.06	20				
Symphyotrichum subspicatum	3	1	28	0.3	3	7.06	100		1	0.50	50
Trifolium longipes	1	2				0.60	40				
Viola nephrophylla		3			5	1.60	40	4	0.3	2.15	100
Zizia aptera					0.3	0.06	20				
TOTAL NPF	15.1	45.3	40.0	18.3	13.5	26.44	100	4.3	76.6	40.45	100
INTRODUCED PERENNIAL FORBS											
Cirsium arvense	36			28		12.80	40				
Sonchus arvensis				6		1.20	20				
Taraxacum officinale	4		0.3	1	0.3	1.12	80				
Trifolium hybridum				2		0.40	20				
Trifolium repens			0.3			0.06	20				
TOTAL IPF	40.0	0.0	0.6	37.0	0.3	15.58	80	0.0	0.0	0.00	0
FERNS AND ALLIES											
Equisetum laevigatum		0.3			0.3	0.12	40				
TOTAL FA	0.0	0.3	0.0	0.0	0.3	0.12	40	0.0	0.0	0.00	0
NATIVE ANNUAL/BIENNIAL FORBS											
Cardamine pensylvanica									1	0.50	50
Rhinanthus crista-galli		3				0.60	20				
TOTAL NA/BF	0.0	3.0	0.0	0.0	0.0	0.60	20	0.0	1.0	0.50	50
INTRODUCED ANNUAL/BIENNIAL FORBS											
Thlaspi arvense				0.3		0.06	20				
TOTAL IA/BF	0.0	0.0	0.0	0.3	0.0	0.06	20	0.0	0.0	0.00	0

Table B14
 Percent Canopy Cover by Class and Species for Seven Sample Sites in Two HERBACEOUS
 RIPARIAN AND WETLAND Community Types, Black Butte Baseline Study Area, 2015.

	JUNCUS BALTICUS COMMUNITY TYPE							CAREX NEBRASCENSIS COMMUNITY TYPE			
	PLOT NUMBER					Mean Cover	Con- stancy	PLOT NUMBER		Mean Cover	Con- stancy
	129	149	163	164	176			127	166		
						n=5				n=2	
SHRUBS											
Dasiphora fruticosa					3	0.60	20	2		1.00	50
Salix bebbiana			1			0.20	20				
Salix boothii			1			0.20	20	2		1.00	50
Salix brachycarpa		5				1.00	20				
Salix geyeriana								3		1.50	50
Salix planifolia		1				0.20	20	2		1.00	50
TOTAL SHRUBS	0.0	6.0	2.0	0.0	3.0	2.20	60	9.0	0.0	4.50	50
TOTAL VEGETATION (Stratified)	170.4	141.9	154.6	176.6	105.0	149.70	100	102.3	189.9	146.10	100

*Footnotes are given on cover page B-ii.
 Nomenclature follows Lesica (2012).

Table B15
Percent Canopy Cover by Class and Species for Eight Sample Sites in the
CAREX UTRICULATA Habitat Type, Black Butte Baseline Study Area, 2015.

CAREX UTRICULATA HABITAT TYPE										
	PLOT NUMBER								Mean Cover	Con- stancy
	126	146	167	168	172	174	178	179		
n=8										
SITE PARAMETERS*										
Slope (percent)	4-5	0-1	0-1	1-4	4-5	4	4	2-3		
Aspect (degrees)	269	000	280	280	040	004	030	006		
Topography	Bot	Flo Ter	Ter (bog)	Bot	Bot	Bot	Bot	Bot		
Configuration	V	S	S (V)	V	V (S)	S (V)	S (V)	S (V)		
Photo # (Digital)	1751-54	2329-32	1788-91	1792-95	1864-67	1816-19	1828-31	1836-39		
Investigator	KS/ED	KS/JB	KS/ED	KS/ED	KS/ED	KS/ED	KS/ED	KS/ED		
Date	7/15/15	8/14/14	7/16/15	7/16/15	7/18/15	7/17/15	7/17/15	7/17/15		
GROUND COVER										
Bare Ground	0.3			8					1.04	25
Rock										
Litter	55	32	55	68	48	80	15	45	49.75	100
Lichens										
Moss		60	35	0.3	5	10	2	1	14.16	88
Water	36		2	15	38	3	74	45	26.63	88
Basal Vegetation	9	8	8	9	9	7	9	9	8.50	100
VEGETATION STRUCTURE (nonstratified cover)										
Total Vegetation	96	95	90	90	88	84	94	97	91.75	100
Perennial Graminoids	94	94	90	80	84	80	94	97	89.13	100
Annual Graminoids										
Perennial Forbs and Subshrubs	22	4	2	48	1	1		4	10.25	88
Annual/Biennial Forbs		2							0.25	13
Shrubs			0.3		11	9		3	2.91	50
Trees (0.01-acre)										
Trees (0.1-acre)										

Table B15
Percent Canopy Cover by Class and Species for Eight Sample Sites in the
CAREX UTRICULATA Habitat Type, Black Butte Baseline Study Area, 2015.

CLASS\SPECIES	CAREX UTRICULATA HABITAT TYPE									
	PLOT NUMBER								Mean Cover	Con- stancy
	126	146	167	168	172	174	178	179		
									n=8	
NATIVE PERENNIAL GRAMINOIDS										
Anthoxanthum hirtum						0.3			0.04	13
Calamagrostis stricta				4		2			0.75	25
Carex aquatilis			32	16		16			8.00	38
Carex nebrascensis	12	18	10	2	36	3			10.13	75
Carex praegracilis		22			2				3.00	25
Carex simulata			24				2	6	4.00	38
Carex utriculata	84	58	56	42	58	64	94	96	69.00	100
Deschampsia cespitosa	1	1	1	5					1.00	50
Eleocharis palustris		4	1						0.63	25
Festuca rubra					0.3	10			1.29	25
Glyceria striata				1					0.13	13
Juncus balticus	10	7		16					4.13	38
TOTAL NPG	107.0	110.0	124.0	86.0	96.3	95.3	96.0	102.0	102.08	100
INTRODUCED PERENNIAL GRAMINOIDS										
Alopecurus arundinaceus		70							8.75	13
Alopecurus pratensis	16								2.00	13
Pheum pratense				9					1.13	13
Poa palustris		4		2					0.75	25
Poa pratensis				12					1.50	13
TOTAL IPG	16.0	74.0	0.0	23.0	0.0	0.0	0.0	0.0	14.13	38
NATIVE PERENNIAL FORBS AND SUBSHRUBS										
Cicuta maculata	1								0.13	13
Epilobium ciliatum				0.3					0.04	13
Epilobium palustre			0.3		1	0.3		0.3	0.24	50
Galium trifidum					0.3	0.3		0.3	0.11	38
Geum macrophyllum	1								0.13	13
Mentha arvensis	2	2		8				2	1.75	50
Polygonum amphibium		0.3							0.04	13
Potamogeton filiformis				1					0.13	13
Potentilla anserina				18					2.25	13
Potentilla gracilis				3					0.38	13
Ranunculus macounii				2					0.25	13
Rumex occidentalis	6	0.3		1				1	1.04	50
Senecio sphaerocephalus	12								1.50	13
Stachys palustris				12					1.50	13
Stellaria longifolia	2								0.25	13

Table B15
 Percent Canopy Cover by Class and Species for Eight Sample Sites in the
 CAREX UTRICULATA Habitat Type, Black Butte Baseline Study Area, 2015.

CAREX UTRICULATA HABITAT TYPE										
	PLOT NUMBER								Mean Cover	Con- stancy
	126	146	167	168	172	174	178	179		
									n=8	
Symphotrichum boreale		0.3							0.04	13
Symphotrichum lanceolatum var. hesperium				9					1.13	13
Viola nephrophylla			2	1	0.3	1		1	0.66	63
TOTAL NPF	24.0	2.9	2.3	55.3	1.6	1.6	0.0	4.6	11.54	88
INTRODUCED PERENNIAL FORBS										
Cirsium arvense				1					0.13	13
Taraxacum officinale				0.3					0.04	13
Trifolium hybridum		2							0.25	13
TOTAL IPF	0.0	2.0	0.0	1.3	0.0	0.0	0.0	0.0	0.41	25
NATIVE ANNUAL/BIENNIAL FORBS										
Rhinanthus crista-galli		2							0.25	13
TOTAL NA/BF	0.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.25	13
SHRUBS										
Dasiphora fruticosa					9	9		3	2.63	38
Salix bebbiana			0.3		1				0.16	25
Salix planifolia					1				0.13	13
TOTAL SHRUBS	0.0	0.0	0.3	0.0	11.0	9.0	0.0	3.0	2.91	50
TOTAL VEGETATION (Stratified)	147.0	190.9	126.6	165.6	108.9	105.9	96.0	109.6	131.31	100

*Footnotes are given on cover page B-ii.
 Nomenclature follows Lesica (2012).

Table B16

Percent Canopy Cover by Class and Species for Twelve Sample Sites in Three *DASIPHORA FRUTICOSA* RIPARIAN AND WETLAND Community Types, Black Butte Baseline Study Area, 2015.

	<i>DASIPHORA FRUTICOSA</i> /POA PRATENSIS COMMUNITY TYPE							<i>DASIPHORA FRUTICOSA</i> /DESCHAMPSIA CESPITOSA COMMUNITY TYPE						<i>DASIPHORA FRUTICOSA</i> /CAREX UTRICULATA COMMUNITY TYPE				
	PLOT NUMBER						Mean Cover	Con-stancy	PLOT NUMBER				Mean Cover	Con-stancy	PLOT NUMBER		Mean Cover	Con-stancy
	82	118	160	169	170	177			175	180	182	185			155	173		
							n=6						n=4					
SITE PARAMETERS*																		
Slope (percent)	2	2-3	4	2	0-1	3			4	2-3	1-2	2-3			3-4	4-5		
Aspect (degrees)	304	315	050	280	280	003			004	016	045	030			056	030		
Topography	Ter	Bot	Bot	Ter	Low Ter	Mid			Low	Ter	Ter	Bot			Bot	Bot		
Configuration	V	V (S)	V	S	S	S			S	S (V)	S (V)	S (V)			V	V (S)		
Photo # (Digital)	98-101	2334-37	1896-99	1796-99	1800-04	1824-27			1812-15	1832-35	1856-59	1844-47			1876-79	1860-63		
Investigator	DB	KS/JB	KS/ED	KS/ED	KS/ED	KS/ED			KS/ED	KS/ED	KS/ED	KS/ED			KS/ED	KS/ED		
Date	7/20/15	8/14/14	7/19/15	7/16/15	7/16/15	7/17/15			7/17/15	7/17/15	7/18/15	7/18/15			7/19/15	7/18/15		
GROUND COVER																		
Bare Ground	2		3	5			1.67	50							2		1.00	50
Rock																		
Litter	91	92	88	88	93	92	90.67	100	78	86	92	90	86.50	100	82	70	76.00	100
Lichens																		
Moss		0.3	2	1		2	0.88	67	16	8	1	3	7.00	100	3	16	9.50	100
Water															3	6	4.50	100
Basal Vegetation	7	8	7	6	7	6	6.83	100	6	6	7	7	6.50	100	10	8	9.00	100
VEGETATION STRUCTURE (nonstratified cover)																		
Total Vegetation	95	97	94	88	96	93	93.83	100	96	94	92	99	95.25	100	98	96	97.00	100
Perennial Graminoids	65	90	74	75	86	48	73.00	100	64	58	74	84	70.00	100	90	93	91.50	100
Annual Graminoids																		
Perennial Forbs and Subshrubs	45	78	56	54	42	38	52.17	100	54	28	19	60	40.25	100	17	5	11.00	100
Annual/Biennial Forbs	0.3	4		0.3			0.77	50				0.3	0.08	25				
Shrubs	51	27	58	13	40	72	43.50	100	56	78	68	48	62.50	100	16	26	21.00	100
Trees (0.01-acre)																		
Trees (0.1-acre)																		

Table B16

Percent Canopy Cover by Class and Species for Twelve Sample Sites in Three *DASIPHORA FRUTICOSA* RIPARIAN AND WETLAND Community Types, Black Butte Baseline Study Area, 2015.

CLASS\SPECIES	DASIPHORA FRUTICOSA/POA PRATENSIS COMMUNITY TYPE								DASIPHORA FRUTICOSA/DESCHAMPSIA CESPITOSA COMMUNITY TYPE						DASIPHORA FRUTICOSA/CAREX UTRICULATA COMMUNITY TYPE			
	PLOT NUMBER						Mean Cover	Con- stancy	PLOT NUMBER				Mean Cover	Con- stancy	PLOT NUMBER		Mean Cover	Con- stancy
	82	118	160	169	170	177			175	180	182	185			155	173		
	n=6						n=4						n=2					
NATIVE PERENNIAL GRAMINOIDS																		
Agropyron trachycaulum		0.3					0.05	17	3	2	2	2	2.25	100				
Agrostis scabra			1				0.17	17				1	0.25	25				
Bromus carinatus		1					0.17	17										
Calamagrostis stricta										4	1	1.25	50	4		2.00	50	
Carex athrostachya				0.3			0.05	17										
Carex microptera				1			0.17	17			2	0.50	25	1		0.50	50	
Carex multcostata		1					0.17	17										
Carex nebrascensis			1				0.17	17		2		0.50	25	10	28	19.00	100	
Carex pachystachya				2			0.33	17										
Carex pellita										2	16	4.50	50	4		2.00	50	
Carex praegracilis	3		3	26	1		5.50	67	7	28		4	9.75	75	12	6.00	50	
Carex praticola		2		6			1.33	33										
Carex utriculata			2				0.33	17						38	62	50.00	100	
Danthonia californica		10					1.67	17			0.3	0.08	25					
Danthonia intermedia				8			1.33	17			1	0.25	25					
Deschampsia cespitosa			2	2	3		1.17	50	20	8	16	8	13.00	100	28	3	15.50	100
Festuca rubra	1		7	1	0.3	8	2.88	83	28	6	18	2	13.50	100	2	2	2.00	100
Juncus balticus	12		10		18		6.67	50	4	5	22	18	12.25	100	3	8	5.50	100
Muhlenbergia richardsonii				2			0.33	17			4		1.00	25		0.3	0.15	50
Stipa richardsonii	1						0.17	17										
TOTAL NPG	17.0	14.3	25.0	10.0	57.6	12.0	22.65	100	62.0	51.0	84.0	39.3	59.08	100	86.0	119.3	102.65	100
INTRODUCED PERENNIAL GRAMINOIDS																		
Agrostis stolonifera		4	28				5.33	33				16	4.00	25	18		9.00	50
Alopecurus pratensis															1		0.50	50
Bromus inermis		0.3					0.05	17										
Phleum pratense	36	66	20	54	4	1	30.17	100	2			6	2.00	50	3		1.50	50
Poa palustris										0.3			0.08	25				
Poa pratensis	22	58	18	32	52	40	37.00	100	16	14	8	54	23.00	100	12		6.00	50
TOTAL IPG	58.0	128.3	66.0	86.0	56.0	41.0	72.55	100	18.0	14.3	8.0	76.0	29.08	100	34.0	0.0	17.00	50
NATIVE PERENNIAL FORBS AND SUBSHRUBS																		
Achillea millefolium	0.3	2	2		2	2	1.38	83	2	1	0.3	2	1.33	100	1		0.50	50
Agoseris glauca	0.3	1				0.3	0.27	50										
Allium geeyeri						0.3	0.05	17	0.3				0.08	25				
Allium schoenoprasum						1	0.17	17	2	0.3	2		1.08	75				
Anemone multifida		0.3					0.05	17										
Antennaria microphylla	2	1	8				1.83	50			0.3		0.08	25				
Antennaria rosea				18			3.00	17	0.3			2	0.58	50				

Table B16

Percent Canopy Cover by Class and Species for Twelve Sample Sites in Three *DASIPHORA FRUTICOSA* RIPARIAN AND WETLAND Community Types, Black Butte Baseline Study Area, 2015.

	<i>DASIPHORA FRUTICOSA/POA PRATENSIS</i> COMMUNITY TYPE							<i>DASIPHORA FRUTICOSA/DESCHAMPSIA CESPITOSA</i> COMMUNITY TYPE					<i>DASIPHORA FRUTICOSA/CAREX UTRICULATA</i> COMMUNITY TYPE					
	PLOT NUMBER						Mean Cover	Con- stancy	PLOT NUMBER				Mean Cover	Con- stancy	PLOT NUMBER		Mean Cover	Con- stancy
	82	118	160	169	170	177			175	180	182	185			155	173		
	n=6							n=4					n=2					
<i>Arabis nuttallii</i>	0.3						0.05	17										
<i>Arnica fulgens</i>		0.3					0.05	17										
<i>Astragalus agrestis</i>		7					1.17	17										
<i>Campanula rotundifolia</i>		0.3					0.05	17										
<i>Cardamine breweri</i>													0.3		0.15	50		
<i>Cerastium arvense</i>	2	3					0.83	33										
<i>Cirsium hookerianum</i>													0.3		0.15	50		
<i>Cirsium longistylum</i>	0.3						0.05	17										
<i>Cirsium scariosum</i>					0.3		0.05	17	0.3				0.08	25				
<i>Claytonia rosea</i>				0.3			0.05	17	0.3				0.08	25				
<i>Crepis atribarba</i>	0.3						0.05	17										
<i>Crepis runcinata</i>		0.3	0.3				0.10	33	0.3				0.08	25				
<i>Dodecatheon pulchellum</i>			2				0.33	17	2				0.50	25				
<i>Epilobium ciliatum</i>														1		0.50	50	
<i>Epilobium palustre</i>														0.3		0.15	50	
<i>Erigeron lonchophyllus</i>			0.3				0.05	17	0.3				0.08	25				
<i>Erigeron subtrinervis</i>		0.3					0.05	17										
<i>Fragaria virginiana</i>	3	8	3	12	6	4	6.00	100	4	2		4	2.50	75				
<i>Galium boreale</i>	4	3		2	2	2	2.17	83	4	0.3	0.3	0.3	1.23	100				
<i>Gentiana affinis</i>										0.3			0.08	25				
<i>Geranium viscosissimum</i>		0.3					0.05	17										
<i>Geum aleppicum</i>					1		0.17	17										
<i>Geum macrophyllum</i>	6						1.00	17						2		1.00	50	
<i>Geum rivale</i>			9			2	1.83	33			8	1	2.25	50		0.15	50	
<i>Iris missouriensis</i>		8					1.33	17	0.3				0.08	25				
<i>Lupinus leucophyllus</i>	0.3						0.05	17										
<i>Mimulus guttatus</i>														0.3		0.15	50	
<i>Oxytropis deflexa</i>		3					0.50	17										
<i>Parnassia palustris</i>															0.3		0.15	50
<i>Perideridia montana</i>		1					0.17	17										
<i>Potentilla anserina</i>					1		0.17	17										
<i>Potentilla gracilis</i>	4	10	2	16	18	8	9.67	100	3	5	2	14	6.00	100	0.3	0.3	0.30	100
<i>Prunella vulgaris</i>			3				0.50	17										
<i>Pyrrocoma integrifolia</i>				0.3	1		0.22	33										
<i>Ranunculus macounii</i>											0.3		0.08	25				
<i>Ranunculus uncinatus</i>												2	0.50	25				
<i>Rumex occidentalis</i>														0.3		0.15	50	
<i>Sisyrinchium idahoense</i>									0.3				0.08	25				
<i>Smilacina stellata</i>	0.3		0.3			0.3	0.15	50	0.3	0.3		0.3	0.23	75				
<i>Solidago canadensis (S. lepida)</i>	2		1		4	5	2.00	67		2			0.50	25				
<i>Stachys palustris</i>											0.3		0.08	25				

Table B16

Percent Canopy Cover by Class and Species for Twelve Sample Sites in Three *DASIPHORA FRUTICOSA* RIPARIAN AND WETLAND Community Types, Black Butte Baseline Study Area, 2015.

	DASIPHORA FRUTICOSA/POA PRATENSIS COMMUNITY TYPE								DASIPHORA FRUTICOSA/DESCHAMPSIA CESPITOSA COMMUNITY TYPE						DASIPHORA FRUTICOSA/CAREX UTRICULATA COMMUNITY TYPE			
	PLOT NUMBER						Mean Cover	Con-stancy	PLOT NUMBER				Mean Cover	Con-stancy	PLOT NUMBER		Mean Cover	Con-stancy
	82	118	160	169	170	177			175	180	182	185			155	173		
	n=6						n=4						n=2					
Symphotrichum ascendens				8			1.33	17										
Symphotrichum campestre					2		0.33	17										
Symphotrichum foliaceum		5					0.83	17										
Symphotrichum subspicatum			18		9	12	6.50	50	28	5	6	14	13.25	100	10	0.3	5.15	100
Thalictrum venulosum						1	0.17	17	1				0.25	25				
Trifolium longipes						0.3	0.05	17	3	0.3		0.3	0.90	75				
Valeriana dioica												0.3	0.08	25				
Valeriana edulis					4		0.67	17	8	1	0.3		2.33	75				
Veronica americana															0.3		0.15	50
Viola adunca			2	0.3		0.3	0.43	50	0.3				0.08	25				
Viola nephrophylla			15				2.50	17		14	1	0.3	3.83	75		3	1.50	50
Zigadenus elegans									1		0.3		0.33	50				
Zizia aptera				1	2		0.50	33	1				0.25	25				
TOTAL NPF	25.1	53.8	65.9	57.6	48.3	42.8	48.92	100	62.0	31.5	21.1	40.5	38.78	100	15.8	4.5	10.15	100
INTRODUCED PERENNIAL FORBS																		
Cerastium fontanum												0.3	0.08	25				
Cirsium arvense	15	4			0.3		3.22	50										
Knautia arvensis	0.3						0.05	17										
Plantago major															0.3		0.15	50
Taraxacum officinale	9	28	2	1	1	1	7.00	100	2	0.3	0.3	18	5.15	100	2		1.00	50
Trifolium hybridum		4		2			1.00	33										
Trifolium pratense	1	14		3			3.00	50										
Trifolium repens	3						0.50	17				16	4.00	25				
TOTAL IPF	28.3	50.0	2.0	6.0	1.3	1.0	14.77	100	2.0	0.3	0.3	34.3	9.23	100	2.3	0.0	1.15	50
FERNS AND ALLIES																		
Equisetum arvense			0.3				0.05	17										
Equisetum laevigatum		0.3					0.05	17	0.3		0.3		0.15	50				
TOTAL FA	0.0	0.3	0.3	0.0	0.0	0.0	0.10	33	0.3	0.0	0.3	0.0	0.15	50	0.0	0.0	0.00	0
NATIVE ANNUAL/BIENNIAL FORBS																		
Orthocarpus luteus				0.3			0.05	17										
TOTAL NA/BF	0.0	0.0	0.0	0.3	0.0	0.0	0.05	17	0.0	0.0	0.0	0.0	0.0	0	0.0	0.0	0.00	0

Table B16

Percent Canopy Cover by Class and Species for Twelve Sample Sites in Three *DASIPHORA FRUTICOSA* RIPARIAN AND WETLAND Community Types, Black Butte Baseline Study Area, 2015.

	<i>DASIPHORA FRUTICOSA/POA PRATENSIS</i> COMMUNITY TYPE								<i>DASIPHORA FRUTICOSA/DESCHAMPSIA CESPITOSA</i> COMMUNITY TYPE						<i>DASIPHORA FRUTICOSA/CAREX UTRICULATA</i> COMMUNITY TYPE					
	PLOT NUMBER						Mean Cover	Con- stancy	PLOT NUMBER				Mean Cover	Con- stancy	PLOT NUMBER		Mean Cover	Con- stancy		
	82	118	160	169	170	177			175	180	182	185			155	173				
							n=6						n=4						n=2	
INTRODUCED ANNUAL/BIENNIAL FORBS																				
Carduus nutans		1					0.17	17												
Cynoglossum officinale	0.3						0.05	17			0.3	0.08	25							
Medicago lupulina		3					0.50	17												
TOTAL IA/BF	0.3	4.0	0.0	0.0	0.0	0.0	0.72	33	0.0	0.0	0.0	0.3	0.08	25	0.0	0.0	0.00	0		
SHRUBS																				
Dasiphora fruticosa	51	26	54	13	40	72	42.67	100	56	78	68	48	62.50	100	16	26	21.00	100		
Juniperus horizontalis										1			0.25	25						
Ribes setosum											0.3	0.08	25							
Rosa woodsii		1					0.17	17												
Salix bebbiana			6				1.00	17				1	0.25	25						
TOTAL SHRUBS	51.0	27.0	60.0	13.0	40.0	72.0	43.83	100	56.0	79.0	68.0	49.3	63.08	100	16.0	26.0	21.00	100		
TOTAL VEGETATION (Stratified)	179.7	277.7	219.2	172.9	203.2	168.8	203.58	100	200.3	176.1	181.7	239.7	199.45	100	154.1	149.8	151.95	100		

*Footnotes are given on cover page B-ii.
Nomenclature follows Lesica (2012).

Table B17
 Percent Canopy Cover by Class and Species for Thirteen Sample Sites in the *SALIX BEBBIANA*
 RIPARIAN AND WETLAND SERIES, Black Butte Baseline Study Area, 2015.

SALIX BEBBIANA SERIES															
	PLOT NUMBER													Mean Cover	Con- stancy
	120	122	123	125	156	157	158	159	161	171	181	183	184		
n=13															
SITE PARAMETERS*															
Slope (percent)	5-7	8-20	6-7	5-8	3-4	3-4	3-4	3-4	2	1-2	3	1-2	1-2		
Aspect (degrees)	348	320	090	058	110	040	038	044	350	055	070	065	038		
Topography	Swale	Toe/Bot	Bot/Swale	Bot	Toe	Bot	Bot	Bot	Bot	Bot	Bot	Bot	Bot		
Configuration	V (S)	V	V	V	V	S (V)	S (V)	S (V)	V	V	V	V (S)	S (V)		
Photo # (Digital)	1380-83	1386-89	1393-96	1403-06	1880-83	1884-87	1888-91	1892-95	1900-03	1868-71	1840-43	1852-55	1848-51		
Investigator	KS/ED	KS/ED	KS/ED	KS/ED	KS/ED	KS/ED	KS/ED	KS/ED	KS/ED	KS/ED	KS/ED	KS/ED	KS/ED		
Date	8/16/14	8/16/14	8/17/14	8/17/14	7/19/15	7/19/15	7/19/15	7/19/15	7/19/15	7/18/15	7/17/15	7/18/15	7/18/15		
GROUND COVER															
Bare Ground	0.3	0.3	1	0.3		1		0.3	0.3			1		0.35	62
Rock		15	0.3											1.18	15
Litter	11	27	83	88	53	78	70	80	84	91	84	74	72	68.85	100
Lichens		0.3												0.02	8
Moss	80	46	4	1	35	13	7	12	2	1	0.3	5	20	17.41	100
Water		3	4	3	4		14		6		8	12		4.15	62
Basal Vegetation	9	8	8	8	8	8	9	8	8	8	8	8	8	8.15	100
VEGETATION STRUCTURE (nonstratified cover)															
Total Vegetation	99	99	98	94	92	98	84	88	98	94	93	94	98	94.54	100
Perennial Graminoids	95	92	96	88	82	84	80	76	58	86	78	80	82	82.85	100
Annual Graminoids															
Perennial Forbs and Subshrubs	32	38	56	50	14	40	5	8	46	18	16	18	62	31.00	100
Annual/Biennial Forbs	0.3		1	2							0.3		0.3	0.30	38
Shrubs	32	50	42	18	58	68	16	64	88	64	68	63	68	53.77	100
Trees (0.01-acre)				0.3	0.3					0.3			4	0.38	31
Trees (0.1-acre)	0.3	0.3			0.3	0.3				0.3			2	0.27	46

Table B17
Percent Canopy Cover by Class and Species for Thirteen Sample Sites in the *SALIX BEBBIANA*
RIPARIAN AND WETLAND SERIES, Black Butte Baseline Study Area, 2015.

CLASS\SPECIES	SALIX BEBBIANA SERIES														Mean Cover	Con- stancy
	PLOT NUMBER															
	120	122	123	125	156	157	158	159	161	171	181	183	184	n=13		
NATIVE PERENNIAL GRAMINOIDS																
Agropyron trachycaulum									1		0.3			0.10	15	
Bromus ciliatus		1												0.08	8	
Bromus pumpellianus		0.3										1		0.10	15	
Calamagrostis canadensis												1		0.08	8	
Calamagrostis stricta	1							2	2		1			0.46	31	
Carex aquatilis								7		16	8			2.38	23	
Carex aurea	0.3					0.3							0.3	0.07	23	
Carex interior		3				3			3					0.69	23	
Carex microptera				1									1	0.15	15	
Carex nebrascensis	18		26	16	6	22	24	6						9.08	54	
Carex pachystachya		3												0.23	8	
Carex pellita	56	36						8						7.69	23	
Carex praegracilis						3		8			5	10		2.00	31	
Carex simulata					30									2.31	8	
Carex utriculata	3	28	38	8	56	30	70	62	38	44	64	58		38.38	92	
Deschampsia cespitosa	2	3				20			2	6		2		2.69	46	
Festuca rubra		0.3			3	10		4		4	3	4	8	2.79	62	
Glyceria striata		3	7			2			1	4	0.3			1.33	46	
Juncus balticus	42	10	4		7	8		3	3	30	3	18	58	14.31	85	
Juncus longistylis	14	0.3	0.3											1.12	23	
Muhlenbergia richardsonis							0.3				0.3			0.05	15	
TOTAL NPG	136.3	87.9	75.3	25.0	102.0	98.3	94.3	83.0	61.0	94.0	86.6	96.3	79.3	86.10	100	
INTRODUCED PERENNIAL GRAMINOIDS																
Agrostis stolonifera	16	12	5	5						4				3.23	38	
Alopecurus arundinaceus		3												0.23	8	
Alopecurus pratensis				0.3										0.02	8	
Bromus inermis				22										1.69	8	
Phleum pratense	8	10	36	8										4.77	31	
Poa palustris		3	1	2		2			5			3	4	1.54	54	
Poa pratensis	12	8	58	54		7			2	5			14	12.31	62	
Schedonorus pratensis		0.3												0.02	8	
TOTAL IPG	36.0	36.3	100.0	91.3	0.0	9.0	0.0	0.0	7.0	9.0	0.0	3.0	18.0	23.82	69	

Table B17
 Percent Canopy Cover by Class and Species for Thirteen Sample Sites in the *SALIX BEBBIANA*
 RIPARIAN AND WETLAND SERIES, Black Butte Baseline Study Area, 2015.

	SALIX BEBBIANA SERIES													Mean Cover	Con- stancy
	PLOT NUMBER														
	120	122	123	125	156	157	158	159	161	171	181	183	184		
	n=13														
NATIVE PERENNIAL FORBS AND SUBSHRUBS															
Achillea millefolium		0.3	0.3	1						0.3			0.3	0.17	38
Agoseris glauca				0.3										0.02	8
Antennaria neglecta									0.3				0.3	0.05	15
Astragalus alpinus		1												0.08	8
Castilleja miniata		0.3	0.3											0.05	15
Crepis runcinata	0.3	0.3								0.3				0.07	23
Dodecatheon pulchellum	0.3													0.02	8
Epilobium ciliatum		0.3	2	1			0.3			0.3	0.3			0.32	46
Epilobium palustre							0.3			0.3	0.3			0.07	23
Erigeron lonchophyllus												0.3		0.02	8
Fragaria virginiana	3	2			3	2		2	7	2			9	2.31	62
Galium boreale	1	1							4			0.3		0.48	31
Galium trifidum										0.3	0.3	0.3	0.3	0.09	31
Gentiana affinis	0.3				0.3									0.05	15
Geranium richardsonii		4												0.31	8
Geranium viscosissimum			4	1										0.38	15
Geum aleppicum			3											0.23	8
Geum macrophyllum		4		2					2					0.62	23
Geum rivale					7	26	1	4	6	8		6	30	6.77	62
Heracleum lanatum				14										1.08	8
Lysimachia ciliata									9					0.69	8
Mentha arvensis		0.3							4		8	4		1.25	31
Mimulus guttatus		1												0.08	8
Moehringia lateriflora		0.3				0.3								0.05	15
Parnassia palustris		3			0.3	1				0.3				0.35	31
Pedicularis groenlandica			2											0.15	8
Petasites frigidus		4												0.31	8
Platanthera hyperborea	0.3	0.3	0.3											0.07	23
Potentilla gracilis	0.3	1	2						1					0.33	31
Prunella vulgaris		0.3				3								0.25	15
Pyrola asarifolia	0.3	0.3			0.3	3		0.3		0.3				0.35	46
Ranunculus macounii		0.3	0.3	1										0.12	23
Rumex occidentalis							1		1		2	1		0.38	31
Rumex salicifolius			0.3											0.02	8
Senecio pauperculus		1												0.08	8
Senecio sphaerocephalus	2									0.3				0.18	15
Smilacina stellata		0.3							0.3	0.3				0.07	23
Solidago canadensis (S. lepida)	2	1	0.3	16					0.3		0.3	1		1.61	54
Spiranthes romanoffiana	0.3	0.3											0.3	0.07	23
Stachys palustris				0.3					0.3					0.05	15

Table B17
Percent Canopy Cover by Class and Species for Thirteen Sample Sites in the *SALIX BEBBIANA*
RIPARIAN AND WETLAND SERIES, Black Butte Baseline Study Area, 2015.

	SALIX BEBBIANA SERIES													Mean Cover	Con- stancy
	PLOT NUMBER														
	120	122	123	125	156	157	158	159	161	171	181	183	184		
	n=13														
<i>Stellaria longifolia</i>		0.3						2			0.3	0.3	0.22	31	
<i>Stellaria longipes</i>						0.3	0.3						0.05	15	
<i>Symphyotrichum ascendens</i>			8										0.62	8	
<i>Symphyotrichum foliaceum</i>		9											0.69	8	
<i>Symphyotrichum subspicatum</i>	5		16	6	1	2		0.3	10	5	3	1	28	5.95	85
<i>Thalictrum venulosum</i>						0.3							0.02	8	
<i>Trifolium longipes</i>		0.3											0.02	8	
<i>Valeriana dioica</i>		0.3			0.3							0.3	0.07	23	
<i>Veronica americana</i>			1					0.3					0.10	15	
<i>Viola adunca</i>										0.3			0.02	8	
<i>Viola canadensis</i>										0.3			0.02	8	
<i>Viola nephrophylla</i>	18		2		2	6	2	2	4	0.3	1	4	2	3.33	85
<i>Zizia aptera</i>	0.3										0.3			0.05	15
TOTAL NPF	33.4	36.5	33.8	50.6	14.2	43.9	5.2	8.6	50.9	18.3	15.8	18.5	70.8	30.81	100
INTRODUCED PERENNIAL FORBS															
<i>Cerastium fontanum</i>	0.3	0.3	0.3											0.07	23
<i>Cirsium arvense</i>		2		3					2					0.54	23
<i>Plantago major</i>		0.3	0.3											0.05	15
<i>Taraxacum officinale</i>	2	4	8	4		0.3				0.3			0.3	1.45	54
<i>Trifolium hybridum</i>		0.3	18											1.41	15
TOTAL IPF	2.3	6.9	26.6	7.0	0.0	0.3	0.0	0.0	2.0	0.3	0.0	0.0	0.3	3.52	62
FERNS AND ALLIES															
<i>Botrychium minganense</i>												0.3		0.02	8
<i>Equisetum arvense</i>		0.3	3									0.3	0.3	0.30	31
<i>Equisetum laevigatum</i>	0.3	0.3			0.3				0.3	0.3				0.12	38
TOTAL FA	0.3	0.6	3.0	0.0	0.3	0.0	0.0	0.0	0.3	0.3	0.0	0.3	0.6	0.44	62
NATIVE ANNUAL/BIENNIAL FORBS															
<i>Androsace septentrionalis</i>			0.3											0.02	8
<i>Cardamine pensylvanica</i>										0.3				0.02	8
<i>Turritis glabra</i>												0.3		0.02	8
TOTAL NA/BF	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.3	0.07	23
INTRODUCED ANNUAL/BIENNIAL FORBS															
<i>Cynoglossum officinale</i>			1	2										0.23	15
<i>Medicago lupulina</i>	0.3													0.02	8
TOTAL IA/BF	0.3	0.0	1.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.25	23

Table B17
 Percent Canopy Cover by Class and Species for Thirteen Sample Sites in the *SALIX BEBBIANA*
 RIPARIAN AND WETLAND SERIES, Black Butte Baseline Study Area, 2015.

	SALIX BEBBIANA SERIES													Mean Cover	Con- stancy
	PLOT NUMBER														
	120	122	123	125	156	157	158	159	161	171	181	183	184		
	n=13														
SHRUBS															
Arctostaphylos uva-ursi					4			3						0.54	15
Betula glandulosa		22			1									1.77	15
Dasiphora fruticosa	17	11	8		26	36	5	20	6	20	18	12	30	16.08	92
Juniperus communis		2	5		3	3				2		0.3	0.3	1.20	54
Ribes inerme		1												0.08	8
Ribes setosum			1		0.3	1				0.3			0.3	0.22	38
Rosa acicularis		2												0.15	8
Rosa woodsii			2		0.3				2	0.3		1		0.43	38
Salix bebbiana	12	10	34	12	24	38	6	24	56	44		48	40	26.77	92
Salix boothii									2				1	0.23	15
Salix brachycarpa	7										8			1.15	15
Salix geyeriana								2			2		4	0.62	23
Salix melanopsis						1								0.08	8
Salix planifolia					6		5	8	18	4	46	3		6.92	54
Salix pseudomonticola		8		8	2		1	14	16	2		3	1	4.23	69
Shepherdia canadensis	1													0.08	8
TOTAL SHRUBS	37.0	56.0	50.0	20.0	66.6	79.0	17.0	71.0	100.3	72.3	74.0	67.3	76.6	60.55	100
TREES (0.01-acre)															
Juniperus scopulorum					0.3					0.3			4	0.35	23
Pinus flexilis						0.3								0.02	8
TOTAL TREES (0.01-acre)	0.0	0.0	0.0	0.0	0.3	0.3	0.0	0.0	0.0	0.3	0.0	0.0	4.0	0.38	31
TREES (0.1-acre)															
Juniperus scopulorum		0.3			0.3					0.3			2	0.22	31
Picea engelmannii	0.3													0.02	8
Pinus flexilis						0.3								0.02	8
Populus tremuloides						0.3								0.02	8
TOTAL TREES (0.1-acre)	0.3	0.3	0.0	0.0	0.3	0.6	0.0	0.0	0.0	0.3	0.0	0.0	2.0	0.29	46
TOTAL VEGETATION (Stratified)	245.6	224.2	290.0	195.9	183.4	230.8	116.5	162.6	221.5	194.5	176.7	185.4	249.9	205.92	100

*Footnotes are given on cover page B-ii.
 Nomenclature follows Lesica (2012).

Table B18
 Percent Canopy Cover by Class and Species for Twelve Sample Sites in the *SALIX GEYERIANA*
 RIPARIAN AND WETLAND SERIES, Black Butte Baseline Study Area, 2015.

SALIX GEYERIANA SERIES														
	PLOT NUMBER												Mean Cover	Con- stancy
	119	121	128	130	131	132	136	137	142	147	150	154		
n=12														
SITE PARAMETERS*														
Slope (percent)	1-2	1-2	1-3	0-4	0-1	1	1-2	0-1	0-2	1-5	0-2	1-2		
Aspect (degrees)	324	354	270	000	000	000	000	000	000	000	000	000		
Topography	Bot	Bot	Bot	Bot	Flo Ter	Bot	Bot	Bot	Bot	Bot	Bot	Ter		
Configuration	V (S)	V	V	V	S (Und)	V	V	V (S)	V (Und)	V (Und)	V (Und)	S		
Photo # (Digital)	1912-15		1760-63	1768-71	1772-75	1747-50		1407-10	1720-23	1728-1730	1704-07	1904-07		
Investigator	KS/ED	KS/ED	KS/ED	KS/ED	KS/ED	KS/ED	KS/ED	KS/ED	KS/ED	KS/ED	KS/ED	KS/ED		
Date	7/20/15	7/20/15	7/15/15	7/15/15	7/15/15	7/14/15	7/15/15	8/17/14	7/14/15	7/14/15	7/13/15	7/19/15		
GROUND COVER														
Bare Ground	5			2							4		0.92	25
Rock				1									0.08	8
Litter	80	75	48	84	90	42	85	41	82	90	87	92	74.67	100
Lichens														
Moss	5	16	40	1	2	50	2	50	10	3	1		15.00	92
Water	2		5	4			5	1					1.42	42
Basal Vegetation	8	9	7	8	8	8	8	8	8	7	8	8	7.92	100
VEGETATION STRUCTURE (nonstratified cover)														
Total Vegetation	97	96	99	98	99	97	96	99	98	100	98	99	98.00	100
Perennial Graminoids	90	60	46	76	16	43	65	86	72	18	36	64	56.00	100
Annual Graminoids														
Perennial Forbs and Subshrubs	30	39	35	42	20	48	22	10	62	52	27	13	33.33	100
Annual/Biennial Forbs	0.3		0.3	0.3				0.3		0.3	8	8	1.46	58
Shrubs	58	62	90	76	94	84	80	80	70	96	92	60	78.50	100
Trees (0.01-acre)														
Trees (0.1-acre)														

Table B18
Percent Canopy Cover by Class and Species for Twelve Sample Sites in the *SALIX GEYERIANA*
RIPARIAN AND WETLAND SERIES, Black Butte Baseline Study Area, 2015.

CLASS\SPECIES	SALIX GEYERIANA SERIES													Mean Cover	Con- stancy
	PLOT NUMBER														
	119	121	128	130	131	132	136	137	142	147	150	154			
	n=12														
NATIVE PERENNIAL GRAMINOIDS															
Agropyron trachycaulum								7					0.58	8	
Anthoxanthum hirtum								4					0.33	8	
Bromus pumpellianus				1				1					0.17	17	
Calamagrostis canadensis	2	1		2				14		8	1		2.33	50	
Calamagrostis stricta		2			1								0.25	17	
Carex aurea									0.3				0.03	8	
Carex interior		0.3											0.03	8	
Carex nebrascensis	18	8	4					4					2.83	33	
Carex pellita								28	3		4		2.92	25	
Carex praegracilis			4		3				15			0.3	1.86	33	
Carex utriculata	74	38	18	42	4	36	22	74		3	12		26.92	83	
Deschampsia cespitosa		4	3						2				0.75	25	
Festuca rubra		2	4			7		0.3	8				1.78	42	
Glyceria grandis				1									0.08	8	
Glyceria striata	0.3			2							3		0.44	25	
Juncus balticus		18	12	20			7		12	2	8		6.58	58	
Juncus nodosus				0.3									0.03	8	
Phalaris arundinacea							6						0.50	8	
Scirpus microcarpus				4			8						1.00	17	
TOTAL NPG	94.3	73.3	45.0	72.3	8.0	43.0	61.0	103.3	51.3	13.0	28.0	0.3	49.40	100	
INTRODUCED PERENNIAL GRAMINOIDS															
Agrostis stolonifera	3			2								10	1.25	25	
Alopecurus pratensis												2	0.17	8	
Bromus inermis											0.3	13	1.11	17	
Phleum pratense								28	1			26	4.58	25	
Poa palustris			7	18	5	3	14	4	8	4	8	6	6.42	83	
Poa pratensis	12		0.3	4	3	1		4		1	4	20	4.11	75	
TOTAL IPG	15.0	0.0	7.3	24.0	8.0	4.0	14.0	8.0	36.0	6.0	12.3	77.0	17.63	92	
NATIVE PERENNIAL FORBS AND SUBSHRUBS															
Achillea millefolium									1	0.3			0.11	17	
Arnica chamissonis				0.3					2				0.19	17	
Canadanthus modestus				3	3		8		3	18	2		3.08	50	
Castilleja miniata									1				0.08	8	
Cicuta maculata				0.3									0.03	8	
Epilobium ciliatum	2			1			0.3				4	0.3	0.63	42	
Fragaria virginiana		1				0.3			7				0.69	25	
Galium boreale			1		0.3		0.3		3	3			0.63	42	

Table B18
Percent Canopy Cover by Class and Species for Twelve Sample Sites in the *SALIX GEYERIANA*
RIPARIAN AND WETLAND SERIES, Black Butte Baseline Study Area, 2015.

	SALIX GEYERIANA SERIES													Mean Cover	Con- stancy
	PLOT NUMBER														
	119	121	128	130	131	132	136	137	142	147	150	154			
	n=12														
<i>Galium trifidum</i>				0.3				0.3			0.3			0.08	25
<i>Geum aleppicum</i>										2		0.3		0.19	17
<i>Geum macrophyllum</i>	4			4	7		6	4		5	1			2.58	58
<i>Geum rivale</i>	10	7	12			6			28	10				6.08	50
<i>Mentha arvensis</i>	3		0.3	4	1		1			2	7			1.53	58
<i>Moehringia lateriflora</i>				0.3										0.03	8
<i>Parnassia palustris</i>			0.3											0.03	8
<i>Petasites frigidus</i>	10	30				38								6.50	25
<i>Platanthera hyperborea</i>		0.3	0.3											0.05	17
<i>Polygonum amphibium</i>						1								0.08	8
<i>Potentilla anserina</i>				4			0.3		0.3	0.3	0.3			0.43	42
<i>Potentilla gracilis</i>	0.3		0.3						1					0.13	25
<i>Prunella vulgaris</i>							0.3				0.3			0.05	17
<i>Pyrola asarifolia</i>		0.3												0.03	8
<i>Ranunculus macounii</i>				0.3										0.03	8
<i>Rumex occidentalis</i>	2			0.3							4			0.53	25
<i>Scutellaria galericulata</i>				0.3			1				0.3			0.13	25
<i>Senecio pauperculus</i>									0.3					0.03	8
<i>Senecio pseud aureus</i>	0.3			4	2					1				0.61	33
<i>Senecio sphaerocephalus</i>			8			0.3								0.69	17
<i>Smilacina stellata</i>			0.3			0.3			0.3	1				0.16	33
<i>Solidago canadensis (S. lepida)</i>				2		1			3					0.50	25
<i>Sparganium angustifolium</i>											0.3			0.03	8
<i>Stachys palustris</i>											0.3	2		0.19	17
<i>Stellaria longifolia</i>	0.3		0.3	1	0.3	1	0.3	1			0.3			0.38	67
<i>Symphyotrichum boreale</i>								2						0.17	8
<i>Symphyotrichum subspicatum</i>	0.3	1	10	18	4	1	2		7	3	3	2		4.28	92
<i>Thalictrum venulosum</i>			0.3							4				0.36	17
<i>Trifolium longipes</i>									4					0.33	8
<i>Valeriana dioica</i>									0.3					0.03	8
<i>Veronica americana</i>	0.3			0.3				0.3			2			0.24	33
<i>Viola adunca</i>		0.3										0.3		0.05	17
<i>Viola canadensis</i>							2	0.3			1			0.28	25
<i>Viola nephrophylla</i>	1	2	5	1	3	4	1	2						1.58	67
TOTAL NPF	33.5	41.9	38.1	44.4	20.6	52.9	22.5	9.9	61.2	49.6	26.1	4.9		33.80	100

Table B18
Percent Canopy Cover by Class and Species for Twelve Sample Sites in the *SALIX GEYERIANA*
RIPARIAN AND WETLAND SERIES, Black Butte Baseline Study Area, 2015.

	SALIX GEYERIANA SERIES												Mean Cover	Con- stancy
	PLOT NUMBER													
	119	121	128	130	131	132	136	137	142	147	150	154		
													n=12	
INTRODUCED PERENNIAL FORBS														
Cerastium fontanum								0.3					0.03	8
Cirsium arvense				1			1		2	1		4	0.75	42
Knautia arvensis												0.3	0.03	8
Plantago major				0.3							0.3	0.3	0.08	25
Taraxacum officinale			0.3	0.3					9	2	2	3	1.38	50
Trifolium hybridum			0.3						4			1	0.44	25
TOTAL IPF	0.0	0.0	0.6	1.6	0.0	0.0	1.0	0.0	13.3	4.0	3.3	8.6	2.70	58
FERNS AND ALLIES														
Equisetum arvense		0.3		0.3	1					7			0.72	33
Equisetum laevigatum									0.3				0.03	8
TOTAL FA	0.0	0.3	0.0	0.3	1.0	0.0	0.0	0.0	0.3	7.0	0.0	0.0	0.74	42
NATIVE ANNUAL/BIENNIAL FORBS														
Arabis hirsuta			0.3										0.03	8
Artemisia biennis												0.3	0.03	8
Cardamine pensylvanica	0.3			0.3							2		0.22	25
Erysimum cheiranthoides											2		0.17	8
Rorippa palustris								0.3			4		0.36	17
TOTAL NA/BF	0.3	0.0	0.3	0.3	0.0	0.0	0.0	0.3	0.0	0.0	8.0	0.3	0.79	50
INTRODUCED ANNUAL/BIENNIAL FORBS														
Cirsium vulgare										0.3			0.03	8
Cynoglossum officinale												3	0.25	8
Galeopsis tetrahit												4	0.33	8
Thlaspi arvense												0.3	0.03	8
TOTAL IA/BF	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	7.3	0.63	17
SHRUBS														
Betula glandulosa									12			8	1.67	17
Dasiphora fruticosa		1	24		6	5		6	22	1	4	14	6.92	75
Ribes inerme		5	0.3	2	2	7	0.3		0.3	5	2	4	2.33	83
Ribes setosum	0.3							8					0.69	17
Rosa woodsii		0.3				0.3			0.3	0.3		0.3	0.13	42
Salix bebbiana	4	28		12				65	16	5		2	11.00	58
Salix boothii	16	22		56	55	8	68	5	34	72	72		34.00	83
Salix brachycarpa												1	0.08	8
Salix drummondiana				2				26					2.33	17

Table B18
 Percent Canopy Cover by Class and Species for Twelve Sample Sites in the *SALIX GEYERIANA*
 RIPARIAN AND WETLAND SERIES, Black Butte Baseline Study Area, 2015.

	<i>SALIX GEYERIANA</i> SERIES														Mean Cover	Con- stancy
	PLOT NUMBER												n=12			
	119	121	128	130	131	132	136	137	142	147	150	154				
Salix geyeriana	25	8	72	26	60	64		16	4		38	36	29.08	83		
Salix melanopsis							12						1.00	8		
Salix planifolia	18	6	16			30				28	16	4	9.83	58		
Salix pseudomonticola	5	1											0.50	17		
TOTAL SHRUBS	68.3	71.3	112.3	98.0	123.0	114.3	106.3	100.0	88.6	111.3	132.0	69.3	99.56	100		
TOTAL VEGETATION (Stratified)	211.4	186.8	203.6	240.9	160.6	214.2	204.8	221.5	250.7	191.2	209.7	167.7	205.26	100		

*Footnotes are given on cover page B-ii.
 Nomenclature follows Lesica (2012).

Table B19
 Percent Canopy Cover by Class and Species for Four Sample
 Sites in Two DECIDUOUS FOREST RIPARIAN AND WETLAND
 Vegetation Types, Black Butte Baseline Study Area, 2015.

	POP TRE/ OSM OCC H.T.	POPULUS TREMULOIDES/POA PRATENSIS COMMUNITY TYPE				
	PLOT	PLOT NUMBER			Mean Cover	Con- stancy
		8	2	3		
						n=3
SITE PARAMETERS*						
Slope (percent)	18	3	7	4-8		
Aspect (degrees)	016	136	078	104		
Topography	Mid	Saddle	Mid	Bot/Swale		
Configuration	Concave	S (V)	V (S)	Concave		
Photo # (Digital)	981-984	965-68	949-952	1399-1402		
Investigator	DB	DB	DB	KS/ED		
Date	7/17/15	7/16/15	7/16/15	8/17/14		
GROUND COVER						
Bare Ground	7	5	10		5.00	67
Rock						
Litter	86	85	77	91	84.33	100
Lichens		1	2		1.00	67
Moss		2	5	0.3	2.43	100
Water						
Basal Vegetation	7	7	6	9	7.33	100
VEGETATION STRUCTURE (nonstratified cover)						
Total Vegetation	95	95	91	99	95.00	100
Perennial Graminoids	74	60	65	94	73.00	100
Annual Graminoids						
Perennial Forbs and Subshrubs	48	37	40	76	51.00	100
Annual/Biennial Forbs	2	0.3	4	0.3	1.53	100
Shrubs	5	10	19	45	24.67	100
Trees (0.01-acre)	52	48	39	70	52.33	100
Trees (0.1-acre)	52	62	44	48	51.33	100

Table B19
 Percent Canopy Cover by Class and Species for Four Sample
 Sites in Two DECIDUOUS FOREST RIPARIAN AND WETLAND
 Vegetation Types, Black Butte Baseline Study Area, 2015.

POP TRE/ OSM OCC H.T.	POPULUS TREMULOIDES/POA PRATENSIS COMMUNITY TYPE					
	PLOT	PLOT NUMBER			Mean Cover	Con- stancy
		2	3	124		
	8					n=3
CLASS\SPECIES						
NATIVE PERENNIAL GRAMINOIDS						
Agropyron trachycaulum	3		2		0.67	33
Agrostis scabra		1			0.33	33
Bromus carinatus	2	2		0.3	0.77	67
Calamagrostis rubescens	30	4			1.33	33
Carex petasata		1			0.33	33
Danthonia intermedia		1			0.33	33
Festuca campestris		1			0.33	33
Festuca idahoensis		1			0.33	33
TOTAL NPG	35.0	11.0	2.0	0.3	4.43	100
INTRODUCED PERENNIAL GRAMINOIDS						
Bromus inermis				2	0.67	33
Phleum pratense	32	20	25	22	22.33	100
Poa pratensis	18	38	42	82	54.00	100
TOTAL IPG	50.0	58.0	67.0	106.0	77.00	100
NATIVE PERENNIAL FORBS AND SUBSHRUBS						
Achillea millefolium	1	1	1	8	3.33	100
Actaea rubra	7					
Allium brevistylum	0.3			0.3	0.10	33
Allium cernuum		0.3			0.10	33
Allium geveryi				0.3	0.10	33
Antennaria anaphaloides		0.3			0.10	33
Arnica cordifolia		4			1.33	33
Arnica fulgens		0.3			0.10	33
Campanula rotundifolia		0.3	0.3	0.3	0.30	100
Castilleja miniata	0.3			0.3	0.10	33
Cerastium arvense			1		0.33	33
Epilobium ciliatum		0.3			0.10	33
Eurybia integrifolia		20			6.67	33
Fragaria virginiana	3		9	2	3.67	67
Galium boreale	1	2	1	4	2.33	100
Geranium richardsonii	25					
Geranium viscosissimum		6	18	6	10.00	100
Geum aleppicum				1	0.33	33
Geum macrophyllum	2		2		0.67	33
Geum triflorum		1			0.33	33
Heracleum lanatum				1	0.33	33

Table B19
 Percent Canopy Cover by Class and Species for Four Sample
 Sites in Two DECIDUOUS FOREST RIPARIAN AND WETLAND
 Vegetation Types, Black Butte Baseline Study Area, 2015.

POP TRE/ OSM OCC H.T.	POPULUS TREMULOIDES/POA PRATENSIS COMMUNITY TYPE					
	PLOT	PLOT NUMBER			Mean Cover	Con- stancy
		2	3	124		
	8					n=3
Ligusticum filicinum				1	0.33	33
Lupinus leucophyllus		3			1.00	33
Osmorhiza occidentalis	13					
Perideridia montana	0.3	1	1	1	1.00	100
Potentilla gracilis		4	3	4	3.67	100
Ranunculus uncinatus	1					
Smilacina racemosa	0.3					
Solidago canadensis (S. lepida)				0.3	0.10	33
Symphotrichum subspicatum				6	2.00	33
Thalictrum venulosum	1		2		0.67	33
Zigadenus elegans				0.3	0.10	33
TOTAL NPF	55.2	43.5	38.3	35.8	39.20	100
INTRODUCED PERENNIAL FORBS						
Cirsium arvense				0.3	0.10	33
Taraxacum officinale	1	2	6	56	21.33	100
TOTAL IPF	1.0	2.0	6.0	56.3	21.43	100
NATIVE ANNUAL/BIENNIAL FORBS						
Collomia linearis		0.3	0.3		0.20	67
TOTAL NA/BF	0.0	0.3	0.3	0.0	0.20	67
INTRODUCED ANNUAL/BIENNIAL FORBS						
Cirsium vulgare			1		0.33	33
Cynoglossum officinale	2		3	0.3	1.10	67
TOTAL IA/BF	2.0	0.0	4.0	0.3	1.43	67
SHRUBS						
Dasiphora fruticosa				1	0.33	33
Ribes inerme				0.3	0.10	33
Ribes setosum				1	0.33	33
Rosa woodsii	3	10	15	44	23.00	100
Symphoricarpos albus	3		4		1.33	33
Symphoricarpos occidentalis				0.3	0.10	33
TOTAL SHRUBS	6.0	10.0	19.0	46.6	25.20	100
TREES (0.01-acre)						
Picea engelmannii				1	0.33	33
Populus tremuloides	52	48	39	70	52.33	100
TOTAL TREES (0.01-acre)	52.0	48.0	39.0	71.0	52.67	100

Table B19
 Percent Canopy Cover by Class and Species for Four Sample
 Sites in Two DECIDUOUS FOREST RIPARIAN AND WETLAND
 Vegetation Types, Black Butte Baseline Study Area, 2015.

POP TRE/ OSM OCC H.T.	POPULUS TREMULOIDES/POA PRATENSIS COMMUNITY TYPE					
	PLOT	PLOT NUMBER			Mean Cover	Con- stancy
8	2	3	124			
						n=3
TREES (0.1-acre)						
Picea engelmannii	1			0.3	0.10	33
Pinus flexilis	0.3					
Populus tremuloides	52	62	42	48	50.67	100
Pseudotsuga menziesii			3		1.00	33
TOTAL TREES (0.1-acre)	53.3	62.0	45.0	48.3	51.77	100
TOTAL VEGETATION (Stratified)	201.2	172.8	175.6	316.3	221.57	100

*Footnotes are given on cover page B-ii.
 Nomenclature follows Lesica (2012).

APPENDIX C
Shrub Density (Plants Per Acre) by Plot for Vegetation Types Identified in the
Black Butte Baseline Study Area, Meagher County, Montana, 2015.

TABLE	VEGETATION TYPE ¹	PAGE
UPLAND GRASSLAND		
C1	Upland Altered Grassland c.t.	C-1
C2	<i>Festuca idahoensis</i> / <i>Agropyron spicatum</i> h.t.	C-2
	<i>Festuca idahoensis</i> / <i>Stipa richardsonii</i> h.t.	
	<i>Festuca campestris</i> / <i>Agropyron spicatum</i> h.t.	
C3	<i>Festuca campestris</i> / <i>Festuca idahoensis</i> h.t.	C-3
UPLAND SHRUBLAND		
C4	<i>Artemisia tridentata</i> / <i>Poa pratensis</i> c.t.	C-4
C5	<i>Artemisia tridentata</i> / <i>Festuca idahoensis</i> h.t.	C-5
C6	<i>Artemisia tridentata</i> / <i>Festuca campestris</i> h.t.	C-6
C7	<i>Artemisia tridentata</i> - <i>Dasiphora fruticosa</i> / <i>Poa pratensis</i> c.t.	C-7
	<i>Dasiphora fruticosa</i> - <i>Artemisia tridentata</i> / <i>Festuca campestris</i> c.t.	
	Mixed Shrub-Shale Outcrop c.t.	
CONIFER FOREST AND WOODLAND		
C8	<i>Pseudotsuga menziesii</i> / <i>Festuca idahoensis</i> h.t.	C-8
	<i>Pseudotsuga menziesii</i> / <i>Festuca campestris</i> h.t.	
C9	<i>Pseudotsuga menziesii</i> / <i>Juniperus communis</i> h.t.	C-10
	<i>Pseudotsuga menziesii</i> / <i>Calamagrostis rubescens</i> h.t.	
C10	<i>Pseudotsuga menziesii</i> / <i>Symphoricarpos albus</i> h.t.	C-12
C11	<i>Pseudotsuga menziesii</i> / <i>Linnaea borealis</i> h.t.	C-15
	<i>Picea engelmannii</i> / <i>Linnaea borealis</i> h.t.	
LOWLAND ALTERED GRASSLAND		
C12	Lowland Altered Grassland (Hay Meadow) c.t.	C-17
RIPARIAN AND WETLAND (RW)³		
Herbaceous RW types		
C13	<i>Juncus balticus</i> c.t.	C-18
	<i>Carex nebrascensis</i> c.t.	
C14	<i>Carex utriculata</i> h.t.	C-19
Shrub RW types		
C15	<i>Dasiphora fruticosa</i> / <i>Poa pratensis</i> c.t.	C-20
	<i>Dasiphora fruticosa</i> / <i>Deschampsia cespitosa</i> c.t.	
	<i>Dasiphora fruticosa</i> / <i>Carex utriculata</i> c.t.	
C16	<i>Salix bebbiana</i> series	C-22
C17	<i>Salix geyeriana</i> series	C-25
Deciduous Forest RW types		
C18	<i>Populus tremuloides</i> / <i>Osmorhiza occidentalis</i> h.t.	C-28
	<i>Populus tremuloides</i> / <i>Poa pratensis</i> c.t.	

Footnotes for the tables in Appendix C:

¹In this classification, community types are named according to the following convention:

A slash (/) indicates a separation of species dominating one or more strata, namely the herbaceous, shrub and/or tree layers.

A hyphen (-) indicates species dominating the same stratum (understory, middle story or overstory) either or both of which may be dominant or codominant at a given sample site.

All plot locations are shown on the vegetation type map (Plate 1).

Binomials follow Lesica (2012).

Density counts in each 2 x 20-meter belt transect were converted to shrubs per acre using a conversion factor of 101.18.

Table C1
 Shrub Density (Plants Per Acre) by Species for Nine Sample Sites in the
 UPLAND ALTERED GRASSLAND Vegetation Type, Black Butte Baseline
 Study Area, 2015.

UPLAND ALTERED GRASSLAND										
PLOT NUMBER										
	44	45	46	47	50	52	67	78	85	Mean n=9
SHRUB SPECIES/AGE CLASS	Plants Per Acre									
Artemisia tridentata										
immature/mature					405			405	1821	292.3
decadent										
Total live					405			405	1821	292.3
Dasiphora fruticosa										
immature/mature								202	101	33.7
decadent										
Total live								202	101	33.7
Rosa woodsii										
immature/mature			405	2024						269.8
decadent										
Total live			405	2024						269.8
TOTAL SHRUBS										
IMMATURE/MATURE			405	2024	405			607	1922	595.8
DECADENT										
TOTAL LIVE			405	2024	405			607	1922	595.8

Table C2
 Shrub Density (Plants Per Acre) by Species for Six Sample Sites in
 Three UPLAND GRASSLAND Habitat Types, Black Butte Baseline
 Study Area, 2015.

SHRUB SPECIES/AGE CLASS	FESTUCA IDAHOENSIS/ AGROPYRON SPICATUM HABITAT TYPE				FESTUCA IDAHOENSIS/ STIPA RICHARDSONII HABITAT TYPE			FES CAM/ AGR SPI HABITAT TYPE
	PLOT NUMBER			Mean n=3	PLOT NUMBER		Mean n=2	PLOT
	63	68	69		Plants Per Acre	61		107
	Plants Per Acre				Plants Per Acre			Plants
Artemisia tridentata								
immature/mature	101			33.7	405	1720	1062.4	
decadent								
Total live	101			33.7	405	1720	1062.4	
Juniperus communis								
immature/mature								101
decadent								
Total live								101
Rosa woodsii								
immature/mature						3744	1871.8	
decadent								
Total live						3744	1871.8	
TOTAL SHRUBS								
IMMATURE/MATURE	101			33.7	405	5464	2934.2	101
DECADENT								
TOTAL LIVE	101			33.7	405	5464	2934.2	101

Table C3
 Shrub Density (Plants Per Acre) by Species for Thirteen Sample Sites in the *FESTUCA CAMPESTRIS*/
FESTUCA IDAHOENSIS Habitat Type, Black Butte Baseline Study Area, 2015.

<i>FESTUCA CAMPESTRIS</i> / <i>FESTUCA IDAHOENSIS</i> HABITAT TYPE														
PLOT NUMBER														
SHRUB SPECIES/AGE CLASS	56	62	64	65	66	70	71	72	73	74	75	93	108	Mean n=13
	Plants Per Acre													
Artemisia tridentata														
immature/mature	506			708						1518	708	202	911	350.2
decadent														
Total live	506			708						1518	708	202	911	350.2
Dasiphora fruticosa														
immature/mature							101						2530	202.4
decadent														
Total live							101						2530	202.4
TOTAL SHRUBS														
IMMATURE/MATURE	506			708			101			1518	708	202	3440	552.6
DECADENT														
TOTAL LIVE	506			708			101			1518	708	202	3440	552.6

Table C4
 Shrub Density (Plants Per Acre) by Species for Thirteen Sample Sites in the *ARTEMISIA TRIDENTATA*/
POA PRATENSIS Community Type, Black Butte Baseline Study Area, 2015.

ARTEMISIA TRIDENTATA/POA PRATENSIS COMMUNITY TYPE														
SHRUB SPECIES/AGE CLASS	PLOT NUMBER												Mean n=13	
	51	53	54	57	77	83	84	88	92	95	97	100		101
	Plants Per Acre													
Artemisia tridentata														
immature/mature	4654	4148	4250	5261	4047	8904	4452	6779	5666	4654	6577	5767	5261	5417.0
decadent	1417	1214	1619	304				506			708	405		474.8
Total live	6071	5363	5868	5565	4047	8904	4452	7285	5666	4654	7285	6172	5261	5891.8
Dasiphora fruticosa														
immature/mature				1012									202	93.4
decadent														
Total live				1012									202	93.4
TOTAL SHRUBS														
IMMATURE/MATURE	4654	4148	4250	6273	4047	8904	4452	6779	5666	4654	6577	5767	5464	5510.4
DECADENT	1417	1214	1619	304				506			708	405		474.8
TOTAL LIVE	6071	5363	5868	6577	4047	8904	4452	7285	5666	4654	7285	6172	5464	5985.2

Table C5
 Shrub Density (Plants Per Acre) by Species for Three
 Sample Sites in the *ARTEMISIA TRIDENTATA*/
FESTUCA IDAHOENSIS Habitat Type, Black Butte
 Baseline Study Area, 2015.

<i>ARTEMISIA TRIDENTATA</i> / <i>FESTUCA IDAHOENSIS</i>					
PLOT NUMBER					
		99	105	111	Mean
SHRUB SPECIES/AGE CLASS	Plants Per Acre			n=3	
Artemisia tridentata					
immature/mature	3440	6678	4654	4924.1	
decadent			1214	404.7	
Total live	3440	6678	5868	5328.8	
Juniperus communis					
immature/mature		101		33.7	
decadent					
Total live		101		33.7	
TOTAL SHRUBS					
IMMATURE/MATURE	3440	6779	4654	4957.8	
DECADENT			1214	404.7	
TOTAL LIVE	3440	6779	5868	5362.5	

Table C6
 Shrub Density (Plants Per Acre) by Species for Seventeen Sample Sites in the *ARTEMISIA TRIDENTATA/FESTUCA CAMPESTRIS* Habitat Type,
 Black Butte Baseline Study Area, 2015.

<i>ARTEMISIA TRIDENTATA/FESTUCA CAMPESTRIS</i> HABITAT TYPE																		
PLOT NUMBER																		
SHRUB SPECIES/AGE CLASS	49	55	58	59	60	76	79	81	90	91	94	98	102	103	104	114	115	Mean n=17
Plants Per Acre																		
Artemisia tridentata																		
immature/mature	6374	5464	5160	3642	3642	6374	3845	3035	5464	4148	5464	6071	3541	3845	9207	2631	6577	4969.7
decadent	1214	607	1012	607	809			405									1518	363.1
Total live	7589	6071	6172	4250	4452	6374	3845	3440	5464	4148	5464	6071	3541	3845	9207	2631	8094	5332.8
Juniperus communis																		
immature/mature										101			101					11.9
decadent																		0.0
Total live										101			101					11.9
Rosa woodsii																		
immature/mature								1619	202									107.1
decadent																		0.0
Total live								1619	202									107.1
TOTAL SHRUBS																		
IMMATURE/MATURE	6374	5464	5160	3642	3642	6374	3845	4654	5666	4250	5464	6071	3642	3845	9207	2631	6577	5088.8
DECADENT	1214	607	1012	607	809			405									1518	363.1
TOTAL LIVE	7589	6071	6172	4250	4452	6374	3845	5059	5666	4250	5464	6071	3642	3845	9207	2631	8094	5451.8

Table C7
 Shrub Density (Plants Per Acre) by Species for Eleven Sample Sites in Three UPLAND SHRUBLAND
 Community Types, Black Butte Baseline Study Area, 2015.

SHRUB SPECIES/AGE CLASS	ARTEMISIA TRIDENTATA-DASIPHORA FRUTICOSA/POA PRATENSIS COMMUNITY TYPE						DASIPHORA FRUTICOSA- ARTEMISIA TRIDENTATA/ FESTUCA CAMPESTRIS COMMUNITY TYPE				MIXED SHRUB-SHALE OUTCROP COMMUNITY TYPE			
	PLOT NUMBER						PLOT NUMBER				PLOT NUMBER			
	89	96	109	110	112	116	Mean n=6	80	106	113	Mean n=3	86	87	Mean n=2
	Plants Per Acre							Plants Per Acre				Plants Per Acre		
Artemisia tridentata														
immature/mature	3642	4654	4047	2833	911	5767	3642.5	405	708	607	573.4		1214	607.1
decadent		304	1214	304		304	354.1	101			33.7			
Total live	3642	4958	5261	3137	911	6071	3996.6	506	708	607	607.1		1214	607.1
Dasiphora fruticosa														
immature/mature	2631	1417	1720	202	1113	911	1332.2	3440	2125	1113	2226.0	304	202	253.0
decadent														
Total live	2631	1417	1720	202	1113	911	1332.2	3440	2125	1113	2226.0	304	202	253.0
Juniperus horizontalis														
immature/mature												101		50.6
decadent														
Total live												101		50.6
Rosa woodsii														
immature/mature			405				67.5						1214	607.1
decadent														
Total live			405				67.5						1214	607.1
TOTAL SHRUBS														
IMMATURE/MATURE	6273	6071	6172	3035	2024	6678	5042.1	3845	2833	1720	2799.3	405	2631	1517.7
DECADENT		304	1214	304		304	354.1	101			33.7			
TOTAL LIVE	6273	6374	7386	3339	2024	6981	5396.3	3946	2833	1720	2833.0	405	2631	1517.7

Table C8
 Shrub Density (Plants Per Acre) Species for Thirteen Sample Sites in Two CONIFER FOREST AND
 WOODLAND Habitat Types, Black Butte Baseline Study Area, 2015.

SHRUB SPECIES/AGE CLASS	PSE MEN/ FES IDA	PSEUDOTSUGA MENZIESII/FESTUCA CAMPESTRIS HABITAT TYPE												Mean n=12	
	PLOT	PLOT NUMBER													
	13	11	12	15	17	19	20	23	28	34	38	42	43		
Plants	Plants Per Acre														
Arctostaphylos uva-ursi															
immature/mature							5666		6779	101					1045.5
decadent															
Total live							5666		6779	101					1045.5
Artemisia tridentata															
immature/mature	1214			405	1821	1012	202	1012			405				404.7
decadent	1012			202	1417	809									202.4
Total live	2226			607	3238	1821	202	1012			405				607.1
Juniperus communis															
immature/mature					202	202			304		101				67.5
decadent															
Total live					202	202			304		101				67.5
Juniperus horizontalis															
immature/mature										101			304		33.7
decadent															
Total live										101			304		33.7
Ribes inerme															
immature/mature											101	101			16.9
decadent															
Total live											101	101			16.9
Ribes setosum															
immature/mature				202											16.9
decadent															
Total live				202											16.9

Table C8
 Shrub Density (Plants Per Acre) Species for Thirteen Sample Sites in Two CONIFER FOREST AND
 WOODLAND Habitat Types, Black Butte Baseline Study Area, 2015.

SHRUB SPECIES/AGE CLASS	PSE MEN/ FES IDA	PSEUDOTSUGA MENZIESII/FESTUCA CAMPESTRIS HABITAT TYPE												Mean n=12
	PLOT	PLOT NUMBER												
	13	11	12	15	17	19	20	23	28	34	38	42	43	
	Plants	Plants Per Acre												
Rosa woodsii														
immature/mature		1113			2530		2631		5666					994.9
decadent														
Total live		1113			2530		2631		5666					994.9
Shepherdia canadensis														
immature/mature							202		304					42.2
decadent														
Total live							202		304					42.2
Spiraea betulifolia														
immature/mature			5970	1417			7285		1417					1340.6
decadent														
Total live			5970	1417			7285		1417					1340.6
Symphoricarpos albus														
immature/mature		202		8600			3440				2125		708	1256.3
decadent														
Total live		202		8600			3440				2125		708	1256.3
TOTAL SHRUBS														
IMMATURE/MATURE	1214	1315	5970	10624	4553	1214	19427	1012	14469	202	2631	101	1113	5219.2
DECADENT	1012			202	1417	809								202.4
TOTAL LIVE	2226	1315	5970	10826	5970	2024	19427	1012	14469	202	2631	101	1113	5421.6

Table C9
 Shrub Density (Plants Per Acre) by Species for Ten Sample Sites in Two CONIFER FOREST AND
 WOODLAND Habitat Types, Black Butte Baseline Study Area, 2015.

SHRUB SPECIES/AGE CLASS	PSEUDOTSUGA MENZIESII/JUNIPERUS COMMUNIS HABITAT TYPE								PSEUDOTSUGA MENZIESII/ CALAMAGROSTIS RUBESCENS HABITAT TYPE			
	PLOT NUMBER								PLOT NUMBER			
	14	24	25	26	29	32	33	40	Mean n=8	31	35	Mean n=2
	Plants Per Acre									Plants Per Acre		
Arctostaphylos uva-ursi												
immature/mature		5464	8701	4452	1720	202		6880	3427.5			
decadent												
Total live		5464	8701	4452	1720	202		6880	3427.5			
Artemisia tridentata												
immature/mature		101							12.6			
decadent												
Total live		101							12.6			
Dasiphora fruticosa												
immature/mature								1012	126.5			
decadent												
Total live								1012	126.5			
Juniperus communis												
immature/mature	101	202	1417	202	607	1012	1214	2226	872.7			
decadent												
Total live	101	202	1417	202	607	1012	1214	2226	872.7			
Ribes setosum												
immature/mature	405								50.6			
decadent												
Total live	405								50.6			
Rosa woodsii												
immature/mature	405	4553	1821		5363			3642	1973.0			
decadent												
Total live	405	4553	1821		5363			3642	1973.0			

Table C9
 Shrub Density (Plants Per Acre) by Species for Ten Sample Sites in Two CONIFER FOREST AND
 WOODLAND Habitat Types, Black Butte Baseline Study Area, 2015.

SHRUB SPECIES/AGE CLASS	PSEUDOTSUGA MENZIESII/JUNIPERUS COMMUNIS HABITAT TYPE								PSEUDOTSUGA MENZIESII/ CALAMAGROSTIS RUBESCENS HABITAT TYPE			
	PLOT NUMBER								PLOT NUMBER			
	14	24	25	26	29	32	33	40	Mean n=8	31	35	Mean n=2
	Plants Per Acre								Plants Per Acre			
Rubus idaeus												
immature/mature	202								25.3			
decadent												
Total live	202								25.3			
Shepherdia canadensis												
immature/mature					304			405	88.5			
decadent												
Total live					304			405	88.5			
Spiraea betulifolia												
immature/mature	4250	20034	1821	4047	8398	1922		12546	6627.3			
decadent												
Total live	4250	20034	1821	4047	8398	1922		12546	6627.3			
Symphoricarpos albus												
immature/mature			809		4148			11838	2099.5			
decadent												
Total live			809		4148			11838	2099.5			
TOTAL SHRUBS												
IMMATURE/MATURE	5363	30354	14570	8701	20540	3137	17707	22057	15303.5			0.0
DECADENT												
TOTAL LIVE	5363	30354	14570	8701	20540	3137	17707	22057	15303.5			0.0

Table C10
 Shrub Density (Plants Per Acre) by Species for Eleven Sample Sites in the *PSEUDOTSUGA MENZIESII/SYMPHORICARPOS ALBUS* Habitat Type, Black Butte Baseline Study Area, 2015.

PSEUDOTSUGA MENZIESII/SYMPHORICARPOS ALBUS HABITAT TYPE												
PLOT NUMBER												
	1	4	5	7	16	18	27	30	36	37	39	Mean
SHRUB SPECIES/AGE CLASS	Plants Per Acre											n=11
Arctostaphylos uva-ursi												
immature/mature	4250	2631		10320		8904	5059	4958		1720		3440.1
decadent												
Total live	4250	2631		10320		8904	5059	4958		1720		3440.1
Artemisia tridentata												
immature/mature							202		101			27.6
decadent												
Total live							202		101			27.6
Clematis occidentalis												
immature/mature			1214									110.4
decadent												
Total live			1214									110.4
Dasiphora fruticosa												
immature/mature									304			27.6
decadent												
Total live									304			27.6
Juniperus communis												
immature/mature										506		46.0
decadent												
Total live										506		46.0
Ribes cereum												
immature/mature	202	101										27.6
decadent												
Total live	202	101										27.6

Table C10
 Shrub Density (Plants Per Acre) by Species for Eleven Sample Sites in the *PSEUDOTSUGA MENZIESII/SYMPHORICARPOS ALBUS* Habitat Type, Black Butte Baseline Study Area, 2015.

PSEUDOTSUGA MENZIESII/SYMPHORICARPOS ALBUS HABITAT TYPE												
PLOT NUMBER												
	1	4	5	7	16	18	27	30	36	37	39	Mean
SHRUB SPECIES/AGE CLASS	Plants Per Acre											n=11
Ribes setosum												
immature/mature	101	708		304	405						405	174.8
decadent												
Total live	101	708		304	405						405	174.8
Rosa woodsii												
immature/mature	1113	1315	2024	2428	304	911	1417	1720	304	405		1085.4
decadent												
Total live	1113	1315	2024	2428	304	911	1417	1720	304	405		1085.4
Rubus idaeus												
immature/mature	506										3440	358.7
decadent												
Total live	506										3440	358.7
Shepherdia canadensis												
immature/mature			202			1012						110.4
decadent												
Total live			202			1012						110.4
Spiraea betulifolia												
immature/mature	31973	5565	11737	2530		20641	1821					6751.5
decadent												
Total live	31973	5565	11737	2530		20641	1821					6751.5
Symphoricarpos albus												
immature/mature	56863	21248	12951	10725	1214	17808	9106	1417	4857	1619	1012	12619.9
decadent												
Total live	56863	21248	12951	10725	1214	17808	9106	1417	4857	1619	1012	12619.9

Table C10

Shrub Density (Plants Per Acre) by Species for Eleven Sample Sites in the *PSEUDOTSUGA MENZIESII/SYMPHORICARPOS ALBUS* Habitat Type, Black Butte Baseline Study Area, 2015.

<i>PSEUDOTSUGA MENZIESII/SYMPHORICARPOS ALBUS</i> HABITAT TYPE												
PLOT NUMBER												
	1	4	5	7	16	18	27	30	36	37	39	Mean
SHRUB SPECIES/AGE CLASS	Plants Per Acre											n=11
TOTAL SHRUBS												
IMMATURE/MATURE	95008	31568	28128	26307	1922	49275	17605	8094	5565	4250	4857	24779.9
DECADENT												
TOTAL LIVE	95008	31568	28128	26307	1922	49275	17605	8094	5565	4250	4857	24779.9

Table C11
 Shrub Density (Plants Per Acre) by Species for Six Sample Sites in
 Two CONIFER FOREST AND WOODLAND Habitat Types, Black
 Butte Baseline Study Area, 2015.

SHRUB SPECIES/AGE CLASS	PSEUDOTSUGA MENZIESII/LINNAEA BOREALIS HABITAT TYPE				Mean n=4	PICEA ENGELMANNII/ LINNAEA BOREALIS HABITAT TYPE		
	PLOT NUMBER					PLOT NUMBER		
	10	21	22	41		6	9	Mean n=2
	Plants Per Acre					Plants Per Acre		
Arctostaphylos uva-ursi								
immature/mature	2833	10523		1214	3642.5			
decadent								
Total live	2833	10523		1214	3642.5			
Clematis occidentalis								
immature/mature						809		404.7
decadent								
Total live						809		404.7
Dasiphora fruticosa								
immature/mature		202			50.6			
decadent								
Total live		202			50.6			
Juniperus communis								
immature/mature	101	2428		4654	1795.9	202		101.2
decadent								
Total live	101	2428		4654	1795.9	202		101.2
Lonicera utahensis								
immature/mature				101	25.3			
decadent								
Total live				101	25.3			
Ribes setosum								
immature/mature	506				126.5	202	1821	1011.8
decadent								
Total live	506				126.5	202	1821	1011.8
Rosa acicularis								
immature/mature						2125		1062.4
decadent								
Total live						2125		1062.4
Rosa woodsii								
immature/mature	2530	4452	1821	1012	2453.6		1619	809.4
decadent								
Total live	2530	4452	1821	1012	2453.6		1619	809.4

Table C11
 Shrub Density (Plants Per Acre) by Species for Six Sample Sites in
 Two CONIFER FOREST AND WOODLAND Habitat Types, Black
 Butte Baseline Study Area, 2015.

SHRUB SPECIES/AGE CLASS	PSEUDOTSUGA MENZIESII/LINNAEA BOREALIS HABITAT TYPE				Mean n=4	PICEA ENGELMANNII/ LINNAEA BOREALIS HABITAT TYPE		
	PLOT NUMBER					PLOT NUMBER		
	10	21	22	41		6	9	Mean n=2
	Plants Per Acre					Plants Per Acre		
Rubus idaeus								
immature/mature	405		15379		3946.0		1417	708.3
decadent								
Total live	405		15379		3946.0		1417	708.3
Salix bebbiana								
immature/mature						607		303.5
decadent								
Total live						607		303.5
Shepherdia canadensis								
immature/mature		202		202	101.2	101		50.6
decadent								
Total live		202		202	101.2	101		50.6
Spiraea betulifolia								
immature/mature	3744	2226		607	1644.2		3541	1770.7
decadent								
Total live	3744	2226		607	1644.2		3541	1770.7
Symphoricarpos albus								
immature/mature	20843	2428	8297		7892.0		10725	5362.5
decadent								
Total live	20843	2428	8297		7892.0		10725	5362.5
TOTAL SHRUBS								
IMMATURE/MATURE	30961	22462	25497	7791	21677.8	3238	19932	11585.1
DECADENT								
TOTAL LIVE	30961	22462	25497	7791	21677.8	3238	19932	11585.1

Table C12
 Shrub Density (Plants Per Acre) by Species for Sixteen Sample Sites in the LOWLAND ALTERED GRASSLAND (HAY MEADOW)
 Community Type, Black Butte Baseline Study Area, 2015.

LOWLAND ALTERED GRASSLAND (HAY MEADOW) COMMUNITY TYPE																	
PLOT NUMBER																	
	117	133	134	135	138	139	140	141	143	144	145	148	151	152	153	165	Mean
SHRUB SPECIES/AGE CLASS	Plants Per Acre																n=16
TOTAL SHRUBS																	
IMMATURE/MATURE																	
DECADENT																	
TOTAL LIVE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0

Table C13
 Shrub Density (Plants Per Acre) by Species for Seven Sample Sites in
 Two HERBACEOUS RIPARIAN AND WETLAND Community Types, Black
 Butte Baseline Study Area, 2015.

SHRUB SPECIES/AGE CLASS	JUNCUS BALTICUS COMMUNITY TYPE					CAREX NEBRASCENSIS COMMUNITY TYPE			
	PLOT NUMBER					PLOT NUMBER			
	129	149	163	164	176	Mean n=5	127	166	Mean n=2
	Plants Per Acre						Plants Per Acre		
Dasiphora fruticosa									
immature/mature		101			3238	667.8	1518	101	809.4
decadent									
Total live		101			3238	667.8	1518	101	809.4
Salix bebbiana									
immature/mature			202			40.5	3035		1517.7
decadent									
Total live			202			40.5	3035		1517.7
Salix boothii									
immature/mature			101			20.2	202		101.2
decadent									
Total live			101			20.2	202		101.2
Salix brachycarpa									
immature/mature		405				80.9			
decadent									
Total live		405				80.9			
Salix planifolia									
immature/mature		506				101.2			
decadent									
Total live		506				101.2			
TOTAL SHRUBS									
IMMATURE/MATURE		1012	304		3238	910.6	4755	101	2428.3
DECADENT									
TOTAL LIVE		1012	304		3238	910.6	4755	101	2428.3

Table C14
 Shrub Density (Plants Per Acre) by Species for Eight Sample Sites in the
CAREX UTRICULATA Habitat Type, Black Butte Baseline Study Area, 2015.

CAREX UTRICULATA HABITAT TYPE									
PLOT NUMBER									
Plants Per Acre									
SHRUB SPECIES/AGE CLASS	126	146	167	168	172	174	178	179	Mean n=8
Dasiphora fruticosa									
immature/mature					3541	3238		809	948.6
decadent						101		304	50.6
Total live					3541	3339		1113	999.2
Salix bebbiana									
immature/mature					405		101		63.2
decadent									
Total live					405		101		63.2
Salix planifolia									
immature/mature					304				37.9
decadent									
Total live					304				37.9
TOTAL SHRUBS									
IMMATURE/MATURE					4250	3238	101	809	1049.7
DECADENT						101		304	50.6
TOTAL LIVE					4250	3339	101	1113	1100.3

Table C15
 Shrub Density (Plants Per Acre) by Class and Species for Twelve Sample Sites in Three *DASIPHORA FRUTICOSA*
 RIPARIAN AND WETLAND Community Types, Black Butte Baseline Study Area, 2015.

SHRUB SPECIES/AGE CLASS	DASIPHORA FRUTICOSA/POA PRATENSIS COMMUNITY TYPE						DASIPHORA FRUTICOSA/DESCHAMPSIA CESPITOSA COMMUNITY TYPE					DASIPHORA FRUTICOSA/CAREX UTRICULATA COMMUNITY TYPE				
	PLOT NUMBER						PLOT NUMBER					PLOT NUMBER				
	82	118	160	169	170	177	Mean n=6	175	180	182	185	Mean n=4	155	173	Mean n=2	
	Plants Per Acre							Plants Per Acre						Plants Per Acre		
Dasiphora fruticosa																
immature/mature	3541	2732	3339	2125	5363	4047	3524.4	4047	5464	5059	3440	4502.5	2125	4857	3490.7	
decadent						405	67.5	1113	101	202		354.1		304	151.8	
Total live	3541	2732	3339	2125	5363	4452	3591.9	5160	5565	5261	3440	4856.6	2125	5160	3642.5	
Juniperus horizontalis																
immature/mature									101			25.3				
decadent																
Total live									101			25.3				
Ribes setosum																
immature/mature											405	101.2				
decadent																
Total live											405	101.2				
Rosa woodsii																
immature/mature		304					50.6									
decadent																
Total live		304					50.6									
Salix bebbiana																
immature/mature			1315				219.2				202	50.6				
decadent																
Total live			1315				219.2				202	50.6				
Salix geyeriana																
immature/mature											304	75.9				
decadent																
Total live											304	75.9				

Table C15
 Shrub Density (Plants Per Acre) by Class and Species for Twelve Sample Sites in Three *DASIPHORA FRUTICOSA*
 RIPARIAN AND WETLAND Community Types, Black Butte Baseline Study Area, 2015.

SHRUB SPECIES/AGE CLASS	<i>DASIPHORA FRUTICOSA</i> / <i>POA PRATENSIS</i> COMMUNITY TYPE							<i>DASIPHORA FRUTICOSA</i> / <i>DESCHAMPSIA CESPITOSA</i> COMMUNITY TYPE					<i>DASIPHORA FRUTICOSA</i> / <i>CAREX UTRICULATA</i> COMMUNITY TYPE		
	PLOT NUMBER							PLOT NUMBER					PLOT NUMBER		
	82	118	160	169	170	177	Mean n=6	175	180	182	185	Mean n=4	155	173	Mean n=2
	Plants Per Acre							Plants Per Acre					Plants Per Acre		
Salix planifolia															
immature/mature			405				67.5								
decadent															
Total live			405				67.5								
Salix pseudomonticola															
immature/mature			304				50.6								
decadent															
Total live			304				50.6								
TOTAL SHRUBS															
IMMATURE/MATURE	3541	3035	5363	2125	5363	4047	3912.3	4047	5565	5059	4351	4755.5	2125	4857	3490.7
DECADENT						405	67.5	1113	101	202		354.1		304	151.8
TOTAL LIVE	3541	3035	5363	2125	5363	4452	3979.7	5160	5666	5261	4351	5109.6	2125	5160	3642.5

Table C16
 Shrub Density (Plants Per Acre) by Species for Twelve Sample Sites in the *SALIX BEBBIANA*
 RIPARIAN AND WETLAND SERIES, Black Butte Baseline Study Area, 2015.

SALIX BEBBIANA SERIES													
PLOT NUMBER													
	120	122	123	156	157	158	159	161	171	181	183	184	Mean
SHRUB SPECIES/AGE CLASS	Plants Per Acre												n=12
Arctostaphylos uva-ursi													
immature/mature				304		101	202						50.6
decadent													
Total live				304		101	202						50.6
Betula glandulosa													
immature/mature		809		1315				101					185.5
decadent													
Total live		809		1315				101					185.5
Dasiphora fruticosa													
immature/mature	2327	708	405	3339	5970	2327	4857	2428	2327	3238	2833	3744	2875.2
decadent									101				8.4
Total live	2327	708	405	3339	5970	2327	4857	2428	2428	3238	2833	3744	2883.6
Juniperus communis													
immature/mature		202	202	202					101				59.0
decadent													
Total live		202	202	202					101				59.0
Ribes inerme													
immature/mature		202							202				33.7
decadent													
Total live		202							202				33.7
Ribes setosum													
immature/mature			506		911			202				304	160.2
decadent													
Total live			506		911			202				304	160.2

Table C16
 Shrub Density (Plants Per Acre) by Species for Twelve Sample Sites in the *SALIX BEBBIANA*
 RIPARIAN AND WETLAND SERIES, Black Butte Baseline Study Area, 2015.

SALIX BEBBIANA SERIES													
PLOT NUMBER													
	120	122	123	156	157	158	159	161	171	181	183	184	Mean
SHRUB SPECIES/AGE CLASS	Plants Per Acre												n=12
Rosa acicularis													
immature/mature		1619							405				168.6
decadent													
Total live		1619							405				168.6
Rosa woodsii													
immature/mature			1315	101				405	607				202.4
decadent													
Total live			1315	101				405	607				202.4
Salix bebbiana													
immature/mature	3035	202	304	1619	6374	1417	4755	708	1720		3440	11838	2951.1
decadent				101	304		202		506		202		109.6
Total live	3035	202	304	1720	6678	1417	4958	708	2226		3642	11838	3060.7
Salix boothii													
immature/mature								101					8.4
decadent													
Total live								101					8.4
Salix brachycarpa													
immature/mature	2024									2125			345.7
decadent													
Total live	2024									2125			345.7
Salix geyeriana													
immature/mature							607	202		202		1113	177.1
decadent													
Total live							607	202		202		1113	177.1

Table C16
 Shrub Density (Plants Per Acre) by Species for Twelve Sample Sites in the *SALIX BEBBIANA*
 RIPARIAN AND WETLAND SERIES, Black Butte Baseline Study Area, 2015.

SALIX BEBBIANA SERIES													
PLOT NUMBER													
	120	122	123	156	157	158	159	161	171	181	183	184	Mean
SHRUB SPECIES/AGE CLASS	Plants Per Acre												n=12
Salix melanopsis													
immature/mature					304								25.3
decadent													
Total live					304								25.3
Salix planifolia													
immature/mature				4755		1518	3238	1619	506	1619	1214		1205.7
decadent													
Total live				4755		1518	3238	1619	506	1619	1214		1205.7
Salix pseudomonticola													
immature/mature		506	101	1113		607	3845	202	101		304	202	581.8
decadent													
Total live		506	101	1113		607	3845	202	101		304	202	581.8
Shepherdia canadensis													
immature/mature	101												8.4
decadent													
Total live	101												8.4
TOTAL SHRUBS													
IMMATURE/MATURE	7487	4250	2833	12749	13558	5970	17504	5970	5970	7184	7791	17201	9038.7
DECADENT				101	304		202		607		202		118.0
TOTAL LIVE	7487	4250	2833	12850	13862	5970	17707	5970	6577	7184	7993	17201	9156.8

Table C17
 Shrub Density (Plants Per Acre) by Species for Twelve Sample Sites in the *SALIX GEYERIANA*
 RIPARIAN AND WETLAND SERIES, Black Butte Baseline Study Area, 2015.

SALIX GEYERIANA SERIES													
PLOT NUMBER													
	119	121	128	130	131	132	136	137	142	147	150	154	Mean n=12
SHRUB SPECIES/AGE CLASS	Plants Per Acre												
Betula glandulosa													
immature/mature									304			607	75.9
decadent									101				8.4
Total live									405			607	84.3
Dasiphora fruticosa													
immature/mature		708	2732	708	506	708		607	1821		708	1821	860.0
decadent												101	8.4
Total live		708	2732	708	506	708		607	1821		708	1922	868.5
Ribes inerme													
immature/mature		1417		1619	607	1720	809		202	607	1315	1214	792.6
decadent													
Total live		1417		1619	607	1720	809		202	607	1315	1214	792.6
Ribes setosum													
immature/mature								506					42.2
decadent													
Total live								506					42.2
Rosa woodsii													
immature/mature		101				101				202		202	50.6
decadent													
Total live		101				101				202		202	50.6
Salix bebbiana													
immature/mature	708	708	101	708	809			1315	202	506		607	472.2
decadent		101											8.4
Total live	708	809	101	708	809			1315	202	506		607	480.6

Table C17
 Shrub Density (Plants Per Acre) by Species for Twelve Sample Sites in the *SALIX GEYERIANA*
 RIPARIAN AND WETLAND SERIES, Black Butte Baseline Study Area, 2015.

SALIX GEYERIANA SERIES													
PLOT NUMBER													
	119	121	128	130	131	132	136	137	142	147	150	154	Mean n=12
SHRUB SPECIES/AGE CLASS	Plants Per Acre												
Salix boothii													
immature/mature	101	202		1821	1720	607	1417	101	1113	1417	1619		843.2
decadent													
Total live	101	202		1821	1720	607	1417	101	1113	1417	1619		843.2
Salix brachycarpa													
immature/mature												202	16.9
decadent													
Total live												202	16.9
Salix drummondiana													
immature/mature	101			202	405		1113						151.8
decadent													
Total live	101			202	405		1113						151.8
Salix geyeriana													
immature/mature	304	101	1922	607	506	1417		304	202		708	506	548.1
decadent						101							8.4
Total live	304	101	1922	607	506	1518		304	202		708	506	556.5
Salix melanopsis													
immature/mature							708						59.0
decadent													
Total live							708						59.0
Salix planifolia													
immature/mature	304	1417				1113				506	304	405	337.3
decadent						101							8.4
Total live	304	1417				1214				506	304	405	345.7

Table C17
 Shrub Density (Plants Per Acre) by Species for Twelve Sample Sites in the *SALIX GEYERIANA*
 RIPARIAN AND WETLAND SERIES, Black Butte Baseline Study Area, 2015.

SALIX GEYERIANA SERIES													
PLOT NUMBER													
	119	121	128	130	131	132	136	137	142	147	150	154	Mean
SHRUB SPECIES/AGE CLASS	Plants Per Acre												n=12
Salix pseudomonticola													
immature/mature	101	101											16.9
decadent													
Total live	101	101											16.9
TOTAL SHRUBS													
IMMATURE/MATURE	1619	4755	4755	5666	4553	5666	4047	2833	3845	3238	4654	5565	4266.4
DECADENT		101				202			101			101	42.2
TOTAL LIVE	1619	4857	4755	5666	4553	5868	4047	2833	3946	3238	4654	5666	4308.6

Table C18
 Shrub Density (Plants Per Acre) by Species for Four Sample Sites
 in Two DECIDUOUS FOREST RIPARIAN AND WETLAND
 Vegetation Types, Black Butte Baseline Study Area, 2015.

SHRUB SPECIES/AGE CLASS	POP TRE/ OSM OCC H.T.	POPULUS TREMULOIDES/POA PRATENSIS COMMUNITY TYPE				Mean n=3
	PLOT	PLOT NUMBER				
	8	2	3	124		
	Plants	Plants Per Acre				
Dasiphora fruticosa						
immature/mature				809	269.8	
decadent						
Total live				809	269.8	
Ribes inerme						
immature/mature				101	33.7	
decadent						
Total live				101	33.7	
Ribes setosum						
immature/mature				506	168.6	
decadent						
Total live				506	168.6	
Rosa woodsii						
immature/mature	3137	8398	4857	18212	10489.0	
decadent						
Total live	3137	8398	4857	18212	10489.0	
Symphoricarpos albus						
immature/mature	5261		911		303.5	
decadent						
Total live	5261		911		303.5	
Symphoricarpos occidentalis						
immature/mature				405	134.9	
decadent						
Total live				405	134.9	
TOTAL SHRUBS						
IMMATURE/MATURE	8398	8398	5767	20034	11399.6	
DECADENT						
TOTAL LIVE	8398	8398	5767	20034	11399.6	

APPENDIX D
Live Tree Density (Trees Per Acre) by Plot for Vegetation Types Identified in the
Black Butte Baseline Study Area, Meagher County, Montana, 2015.

TABLE	VEGETATION TYPE	PAGE
UPLAND GRASSLAND		
D1	Upland Altered Grassland c.t.	D-1
	<i>Festuca idahoensis</i> / <i>Agropyron spicatum</i> h.t.	
	<i>Festuca idahoensis</i> / <i>Stipa richardsonii</i> h.t.	
	<i>Festuca campestris</i> / <i>Agropyron spicatum</i> h.t.	
	<i>Festuca campestris</i> / <i>Festuca idahoensis</i> h.t.	
UPLAND SHRUBLAND		
D2	<i>Artemisia tridentata</i> / <i>Poa pratensis</i> c.t.	D-2
D3	<i>Artemisia tridentata</i> / <i>Festuca idahoensis</i> h.t.	D-3
D4	<i>Artemisia tridentata</i> / <i>Festuca campestris</i> h.t.	D-4
D5	<i>Artemisia tridentata</i> - <i>Dasiphora fruticosa</i> / <i>Poa pratensis</i> c.t.	D-5
	<i>Dasiphora fruticosa</i> - <i>Artemisia tridentata</i> / <i>Festuca campestris</i> c.t.	
	Mixed Shrub-Shale Outcrop c.t.	
CONIFER FOREST AND WOODLAND		
D6	<i>Pseudotsuga menziesii</i> / <i>Festuca idahoensis</i> h.t.	D-6
	<i>Pseudotsuga menziesii</i> / <i>Festuca campestris</i> h.t.	
D7	<i>Pseudotsuga menziesii</i> / <i>Juniperus communis</i> h.t.	D-9
	<i>Pseudotsuga menziesii</i> / <i>Calamagrostis rubescens</i> h.t.	
D8	<i>Pseudotsuga menziesii</i> / <i>Symphoricarpos albus</i> h.t.	D-12
D9	<i>Pseudotsuga menziesii</i> / <i>Linnaea borealis</i> h.t.	D-14
	<i>Picea engelmannii</i> / <i>Linnaea borealis</i> h.t.	
LOWLAND ALTERED GRASSLAND		
D10	Lowland Altered Grassland (Hay Meadow) c.t.	D-16
RIPARIAN AND WETLAND (RW)³		
Herbaceous RW types		
D10	<i>Juncus balticus</i> c.t.	D-16
	<i>Carex nebrascensis</i> c.t.	
	<i>Carex utriculata</i> h.t.	
Shrub RW types		
D11	<i>Dasiphora fruticosa</i> / <i>Poa pratensis</i> c.t.	D-17
	<i>Dasiphora fruticosa</i> / <i>Deschampsia cespitosa</i> c.t.	
	<i>Dasiphora fruticosa</i> / <i>Carex utriculata</i> c.t.	
D12	<i>Salix bebbiana</i> series	D-18
	<i>Salix geyeriana</i> series	
Deciduous Forest RW types		
D13	<i>Populus tremuloides</i> / <i>Osmorhiza occidentalis</i> h.t.	D-20
	<i>Populus tremuloides</i> / <i>Poa pratensis</i> c.t.	

Footnotes for the tables in Appendix D:

All plot locations are shown on the vegetation type map (Plate 1).

Binomials follow Lesica (2012).

Density counts in each 0.1-acre circular plot were converted to trees per acre using a conversion factor of 10.

Table D1
 Tree Density (Trees Per Acre) by Species for Five
 UPLAND GRASSLAND Vegetation Types, Black Butte
 Baseline Study Area, 2015.

TREE SPECIES DBH CLASS - LIVE TREES	UPLAND ALTERED GRASSLAND	FES IDA/ AGR SPI	FES IDA/ STI RIC	FES CAM/ AGR SPI	FES CAM/FES IDA	
	Mean n=9	Mean n=3	Mean n=2	Mean n=1	Plot 64	Mean n=13
Pseudotsuga menziesii						
<1"					10	0.77
1-4"						
4-8"						
8-12"						
12-16"						
16-20"						
TOTAL LIVE TREES					10	0.77
TOTAL TREE SPECIES - LIVE						
<1"					10	0.77
1-4"						
4-8"						
8-12"						
12-16"						
16-20"						
*TOTAL LIVE TREES	0.00	0.00	0.00	0	10	0.77

*Note: Sample Sites (0.1-acre circular plots) in which no trees were recorded are not shown in this table, but are included in the calculation of mean density.

Table D2
 Tree Density (Trees Per Acre) by Species for Thirteen Sample Sites in the *ARTEMISIA TRIDENTATA*/
POA PRATENSIS Community Type, Black Butte Baseline Study Area, 2015.

ARTEMISIA TRIDENTATA/POA PRATENSIS														
PLOT NUMBER														
TREE SPECIES	51	53	54	57	77	83	84	88	92	95	97	100	101	Mean
DBH CLASS - LIVE TREES	Trees Per Acre													n=13
Juniperus scopulorum														
<1"							10	10					10	2.31
1-4"														
4-8"														
8-12"														
12-16"														
16-20"														
TOTAL LIVE TREES							10	10					10	2.31
Pseudotsuga menziesii														
<1"	10	60		10										6.15
1-4"		100												7.69
4-8"														
8-12"														
12-16"														
16-20"														
TOTAL LIVE TREES	10	160		10										13.85
TOTAL TREE SPECIES - LIVE														
<1"	10	60		10			10	10					10	8.46
1-4"		100												7.69
4-8"														
8-12"														
12-16"														
16-20"														
TOTAL LIVE TREES	10	160		10			10	10					10	16.15

Table D3
 Tree Density (Trees Per Acre) by Species for Three Sample Sites in
 the *ARTEMISIA TRIDENTATA/FESTUCA IDAHOENSIS* Habitat Type,
 Black Butte Baseline Study Area, 2015.

<i>ARTEMISIA TRIDENTATA/ FESTUCA IDAHOENSIS</i>				
PLOT NUMBER				
TREE SPECIES	99	105	111	Mean
DBH CLASS - LIVE TREES	Trees Per Acre			n=3
TOTAL TREE SPECIES - LIVE				
<1"				
1-4"				
4-8"				
8-12"				
12-16"				
16-20"				
TOTAL LIVE TREES	0	0	0	0.00

Table D4
 Tree Density (Trees Per Acre) by Species for Seventeen Sample Sites in the *ARTEMISIA TRIDENTATA/FESTUCA CAMPESTRIS* Habitat Type,
 Black Butte Baseline Study Area, 2015.

<i>ARTEMISIA TRIDENTATA/FESTUCA CAMPESTRIS</i>																		
PLOT NUMBER																		
TREE SPECIES	49	55	58	59	60	76	79	81	90	91	94	98	102	103	104	114	115	Mean
DBH CLASS - LIVE TREES	Trees Per Acre																	n=17
Juniperus scopulorum																		
<1"			10		10								20					2.35
1-4"																		
4-8"																		
8-12"																		
12-16"																		
16-20"																		
TOTAL LIVE TREES			10		10								20					2.35
Pseudotsuga menziesii																		
<1"		30	10						30	70			10					8.82
1-4"											30							1.76
4-8"																		
8-12"																		
12-16"																		
16-20"																		
TOTAL LIVE TREES		30	10						30	70	30		10					10.59
TOTAL TREE SPECIES - LIVE																		
<1"		30	20		10				30	70			30					11.18
1-4"											30							1.76
4-8"																		
8-12"																		
12-16"																		
16-20"																		
TOTAL LIVE TREES	0	30	20	0	10	0	0	0	30	70	30	0	30	0	0	0	0	12.94

Table D5
 Tree Density (Trees Per Acre) by Species for Eleven Sample Sites in Three UPLAND SHRUBLAND Community
 Types, Black Butte Baseline Study Area, 2015.

	ARTEMISIA TRIDENTATA-DASIPHORA FRUTICOSA/POA PRATENSIS						DASIPHORA FRUTICOSA- ARTEMISIA TRIDENTATA/ FESTUCA CAMPESTRIS			MIXED SHRUB-SHALE OUTCROP				
	PLOT NUMBER						PLOT NUMBER			PLOT NUMBER				
TREE SPECIES	89	96	109	110	112	116	Mean	80	106	113	Mean	86	87	Mean
DBH CLASS - LIVE TREES	Trees Per Acre						n=6	Trees Per Acre			n=3	Trees		n=2
Pinus ponderosa														
<1"												10		5.00
1-4"														
4-8"														
8-12"														
12-16"														
16-20"														
TOTAL LIVE TREES												10		5.00
Pseudotsuga menziesii														
<1"												50		25.00
1-4"														
4-8"														
8-12"														
12-16"														
16-20"														
TOTAL LIVE TREES												50		25.00
TOTAL TREE SPECIES - LIVE														
<1"												60		30.00
1-4"														
4-8"														
8-12"														
12-16"														
16-20"														
TOTAL LIVE TREES	0	0	0	0	0	0	0.00	0	0	0	0.00	0	60	30.00

Table D6
 Tree Density (Trees Per Acre) by Species for Thirteen Sample Sites in Two CONIFER FOREST AND WOODLAND
 Habitat Types, Black Butte Baseline Study Area, 2015.

	PSE MEN/ FES IDA	PSEUDOTSUGA MENZIESII/FESTUCA CAMPESTRIS HABITAT TYPE												Mean n=12
		PLOT NUMBER												
TREE SPECIES	13	11	12	15	17	19	20	23	28	34	38	42	43	
DBH CLASS - LIVE TREES	Trees	Trees Per Acre												
Juniperus scopulorum														
<1"			10	560	20	30	20	10			10	90	40	65.83
1-4"				80		10					10			8.33
4-8"				10										0.83
8-12"														
12-16"														
16-20"														
20-24"														
24-28"														
28-32"														
TOTAL LIVE TREES			10	650	20	40	20	10			20	90	40	75.00
Pinus contorta														
<1"														
1-4"														
4-8"									20					1.67
8-12"														
12-16"														
16-20"														
20-24"														
24-28"														
28-32"														
TOTAL LIVE TREES									20					1.67

Table D6
 Tree Density (Trees Per Acre) by Species for Thirteen Sample Sites in Two CONIFER FOREST AND WOODLAND
 Habitat Types, Black Butte Baseline Study Area, 2015.

	<i>PSE MEN/ FES IDA</i>	<i>PSEUDOTSUGA MENZIESII/FESTUCA CAMPESTRIS</i> HABITAT TYPE												
	PLOT	PLOT NUMBER												
TREE SPECIES	13	11	12	15	17	19	20	23	28	34	38	42	43	Mean
DBH CLASS - LIVE TREES	Trees	Trees Per Acre												n=12
Pinus ponderosa														
<1"				20							10			2.50
1-4"														
4-8"														
8-12"						10						10		1.67
12-16"														
16-20"											10			0.83
20-24"														
24-28"														
28-32"														
TOTAL LIVE TREES				20		10					20	10		5.00
Pseudotsuga menziesii														
<1"	170	470		310	90	140	140	90		410	460	30		178.33
1-4"	420	30	110	10	120	270	50	140	160	60	80	30	100	96.67
4-8"	100		40	10	160	140	70	120	80	110	40	80	110	80.00
8-12"	10				70	20	90	90	50	60	40	70	50	45.00
12-16"		40		30	10	20	30	10	50	40		50	90	30.83
16-20"		30		20			60				10			10.00
20-24"		10		10		10	10				10	10		5.00
24-28"										10				0.83
28-32"										10		10		1.67
TOTAL LIVE TREES	700	580	150	390	450	600	450	450	340	700	640	280	350	448.33

Table D6
 Tree Density (Trees Per Acre) by Species for Thirteen Sample Sites in Two CONIFER FOREST AND WOODLAND
 Habitat Types, Black Butte Baseline Study Area, 2015.

	<i>PSE MEN/ FES IDA</i>	<i>PSEUDOTSUGA MENZIESII/FESTUCA CAMPESTRIS</i> HABITAT TYPE												
	PLOT	PLOT NUMBER												
TREE SPECIES	13	11	12	15	17	19	20	23	28	34	38	42	43	Mean
DBH CLASS - LIVE TREES	Trees	Trees Per Acre												n=12
TOTAL TREE SPECIES - LIVE														
<1"	170	470	10	890	110	170	160	100		410	480	120	40	246.67
1-4"	420	30	110	90	120	280	50	140	160	60	90	30	100	105.00
4-8"	100		40	20	160	140	70	120	100	110	40	80	110	82.50
8-12"	10				70	30	90	90	50	60	40	80	50	46.67
12-16"		40		30	10	20	30	10	50	40		50	90	30.83
16-20"		30		20			60				20			10.83
20-24"		10		10		10	10				10	10		5.00
24-28"										10				0.83
28-32"										10		10		1.67
TOTAL LIVE TREES	700	580	160	1060	470	650	470	460	360	700	680	380	390	530.00

Table D7
 Tree Density (Trees Per Acre) by Species for Ten Sample Sites in Two CONIFER FOREST AND
 WOODLAND Habitat Types, Black Butte Baseline Study Area, 2015.

	PSEUDOTSUGA MENZIESII/JUNIPERUS COMMUNIS HABITAT TYPE								PSEUDOTSUGA MENZIESII/ CALAMAGROSTIS RUBESCENS HABITAT TYPE			
	PLOT NUMBER								PLOT NUMBER			
TREE SPECIES	14	24	25	26	29	32	33	40	Mean	31	35	Mean
DBH CLASS - LIVE TREES	Trees Per Acre								n=8	Trees		n=2
Juniperus scopulorum												
<1"	20			10			60		11.25			
1-4"	10								1.25			
4-8"												
8-12"												
12-16"												
16-20"												
20-24"												
24-28"												
TOTAL LIVE TREES	30			10			60		12.50			
Pinus contorta												
<1"	10	200		10			10		28.75			
1-4"		1560			20				197.50			
4-8"		360					10		46.25			
8-12"							20		2.50			
12-16"												
16-20"												
20-24"												
24-28"												
TOTAL LIVE TREES	10	2120		10	20		40		275.00			

Table D7
 Tree Density (Trees Per Acre) by Species for Ten Sample Sites in Two CONIFER FOREST AND
 WOODLAND Habitat Types, Black Butte Baseline Study Area, 2015.

	PSEUDOTSUGA MENZIESII/JUNIPERUS COMMUNIS HABITAT TYPE								PSEUDOTSUGA MENZIESII/ CALAMAGROSTIS RUBESCENS HABITAT TYPE			
	PLOT NUMBER								PLOT NUMBER			
TREE SPECIES	14	24	25	26	29	32	33	40	Mean	31	35	Mean
DBH CLASS - LIVE TREES	Trees Per Acre								n=8	Trees		n=2
Pinus flexilis												
<1"		90		10					12.50			
1-4"					20				2.50			
4-8"												
8-12"												
12-16"												
16-20"												
20-24"												
24-28"												
TOTAL LIVE TREES		90		10	20				15.00			
Pinus ponderosa												
<1"												
1-4"			10						1.25			
4-8"			10						1.25			
8-12"												
12-16"												
16-20"												
20-24"												
24-28"												
TOTAL LIVE TREES			20						2.50			

Table D7
 Tree Density (Trees Per Acre) by Species for Ten Sample Sites in Two CONIFER FOREST AND
 WOODLAND Habitat Types, Black Butte Baseline Study Area, 2015.

	PSEUDOTSUGA MENZIESII/JUNIPERUS COMMUNIS HABITAT TYPE								PSEUDOTSUGA MENZIESII/ CALAMAGROSTIS RUBESCENS HABITAT TYPE			
	PLOT NUMBER								PLOT NUMBER			
TREE SPECIES	14	24	25	26	29	32	33	40	Mean	31	35	Mean
DBH CLASS - LIVE TREES	Trees Per Acre								n=8	Trees		n=2
Pseudotsuga menziesii												
<1"	1620	20				810	1960	770	647.50	100		50.00
1-4"			10	40	730	10	50	40	110.00		50	25.00
4-8"	190		80	40	160	30	80	120	87.50	90	170	130.00
8-12"	160		140	30		30	20	40	52.50	120	200	160.00
12-16"	20		30	40		10	20	20	17.50	50	10	30.00
16-20"				10				20	3.75	20		10.00
20-24"						10			1.25			
24-28"						10			1.25			
TOTAL LIVE TREES	1990	20	260	160	890	910	2130	1010	921.25	380	430	405.00
TOTAL TREE SPECIES - LIVE												
<1"	1650	310		30		810	2020	780	700.00	100		50.00
1-4"	10	1560	20	40	770	10	50	40	312.50		50	25.00
4-8"	190	360	90	40	160	30	80	130	135.00	90	170	130.00
8-12"	160		140	30		30	20	60	55.00	120	200	160.00
12-16"	20		30	40		10	20	20	17.50	50	10	30.00
16-20"				10				20	3.75	20		10.00
20-24"						10			1.25			
24-28"						10			1.25			
TOTAL LIVE TREES	2030	2230	280	190	930	910	2190	1050	1226.25	380	430	405.00

Table D8
 Tree Density (Trees Per Acre) by Species for Eleven Sample Sites in the *PSEUDOTSUGA MENZIESII/SYMPHORICARPOS ALBUS* Habitat Type, Black Butte Baseline Study Area, 2015.

PSEUDOTSUGA MENZIESII/SYMPHORICARPOS ALBUS HABITAT TYPE												
PLOT NUMBER												
TREE SPECIES	1	4	5	7	16	18	27	30	36	37	39	Mean
DBH CLASS - LIVE TREES	Trees Per Acre											n=11
Juniperus scopulorum												
<1"						30	10					3.64
1-4"												
4-8"												
8-12"												
12-16"												
16-20"												
20-24"												
24-28"												
TOTAL LIVE TREES						30	10					3.64
Pinus contorta												
<1"							50					4.55
1-4"							30					2.73
4-8"							10			10		1.82
8-12"												
12-16"												
16-20"												
20-24"												
24-28"												
TOTAL LIVE TREES							90			10		9.09

Table D8
 Tree Density (Trees Per Acre) by Species for Eleven Sample Sites in the *PSEUDOTSUGA MENZIESII/SYMPHORICARPOS ALBUS* Habitat Type, Black Butte Baseline Study Area, 2015.

PSEUDOTSUGA MENZIESII/SYMPHORICARPOS ALBUS HABITAT TYPE												
TREE SPECIES	PLOT NUMBER											Mean n=11
	1	4	5	7	16	18	27	30	36	37	39	
DBH CLASS - LIVE TREES	Trees Per Acre											
Pinus flexilis												
<1"							10					0.91
1-4"												
4-8"												
8-12"												
12-16"												
16-20"												
20-24"												
24-28"												
TOTAL LIVE TREES							10					0.91
Pseudotsuga menziesii												
<1"	20	30	20	260		510	1560	1110	590	330		402.73
1-4"		10	10			30	30	50	50	10		17.27
4-8"	20	40	120	10	20	120		40	20	10	20	38.18
8-12"	50	50	90	90	260	50		40	40	30	60	69.09
12-16"	70	40	50	40	100	20			50	70	70	46.36
16-20"		10	10		10				10	20	20	7.27
20-24"												
24-28"							10					0.91
TOTAL LIVE TREES	160	180	300	400	390	730	1600	1240	760	470	170	581.82
TOTAL TREE SPECIES - LIVE												
<1"	20	30	20	260		540	1630	1110	590	330		411.82
1-4"		10	10			30	60	50	50	10		20.00
4-8"	20	40	120	10	20	120	10	40	20	20	20	40.00
8-12"	50	50	90	90	260	50		40	40	30	60	69.09
12-16"	70	40	50	40	100	20			50	70	70	46.36
16-20"		10	10		10				10	20	20	7.27
20-24"												
24-28"							10					0.91
TOTAL LIVE TREES	160	180	300	400	390	760	1710	1240	760	480	170	595.45

Table D9
 Tree Density (Trees Per Acre) by Species for Six Sample Sites
 in Two CONIFER FOREST AND WOODLAND Habitat Types,
 Black Butte Baseline Study Area, 2015.

	PSEUDOTSUGA MENZIESII/LINNAEA BOREALIS HABITAT TYPE				Mean	PICEA ENGELMANNII/ LINNAEA BOREALIS HABITAT TYPE		
	PLOT NUMBER					PLOT NUMBER		
TREE SPECIES	10	21	22	41	Mean	6	9	Mean
DBH CLASS - LIVE TREES	Trees Per Acre				n=4	Trees		n=2
Juniperus scopulorum								
<1"				30	7.50			
1-4"								
4-8"								
8-12"								
12-16"								
16-20"								
20-24"								
TOTAL LIVE TREES				30	7.50			
Picea engelmannii								
<1"						210	50	130.00
1-4"						100	50	75.00
4-8"						110		55.00
8-12"						90		45.00
12-16"						10		5.00
16-20"								
20-24"								
TOTAL LIVE TREES						520	100	310.00
Pinus contorta								
<1"	10			40	12.50		90	45.00
1-4"		10			2.50		50	25.00
4-8"				60	15.00			
8-12"			10	40	12.50			
12-16"								
16-20"								
20-24"								
TOTAL LIVE TREES	10	10	10	140	42.50	0	140	70.00
Pinus flexilis								
<1"						10		5.00
1-4"								
4-8"								
8-12"								
12-16"								
16-20"								
20-24"								
TOTAL LIVE TREES						10		5.00

Table D9
 Tree Density (Trees Per Acre) by Species for Six Sample Sites
 in Two CONIFER FOREST AND WOODLAND Habitat Types,
 Black Butte Baseline Study Area, 2015.

	PSEUDOTSUGA MENZIESII/LINNAEA BOREALIS HABITAT TYPE				Mean	PICEA ENGELMANNII/ LINNAEA BOREALIS HABITAT TYPE		Mean
	PLOT NUMBER					PLOT NUMBER		
TREE SPECIES	10	21	22	41		6	9	
DBH CLASS - LIVE TREES	Trees Per Acre				n=4	Trees		n=2
Populus tremuloides								
<1"	10				2.50		10	5.00
1-4"								
4-8"								
8-12"								
12-16"								
16-20"								
20-24"								
TOTAL LIVE TREES	10				2.50		10	5.00
Pseudotsuga menziesii								
<1"	970	120		280	342.50	30	320	175.00
1-4"	50	120	60		57.50	20	10	15.00
4-8"	90	90	70	60	77.50		150	75.00
8-12"	60	40	140	60	75.00		50	25.00
12-16"	30	20	50		25.00			
16-20"		20			5.00			
20-24"		10			2.50			
TOTAL LIVE TREES	1200	420	320	400	585.00	50	530	290.00
TOTAL TREE SPECIES - LIVE								
<1"	990	120		350	365.00	250	470	360.00
1-4"	50	130	60		60.00	120	110	115.00
4-8"	90	90	70	120	92.50	110	150	130.00
8-12"	60	40	150	100	87.50	90	50	70.00
12-16"	30	20	50		25.00	10		5.00
16-20"		20			5.00			
20-24"		10			2.50			
TOTAL LIVE TREES	1220	430	330	570	637.50	580	780	680.00

Table D10
 Tree Density (Trees Per Acre) by Species for 31 Sample Sites in
 the LOWLAND ALTERED GRASSLAND (HAY MEADOW) and
 Three HERBACEOUS RIPARIAN AND WETLAND Community
 Types, Black Butte Baseline Study Area, 2015.

	LOWLAND ALTERED GRASSLAND (HAY MEADOW)	<i>JUNCUS BALTICUS</i>	<i>CAREX NEBRASCENSIS</i>	<i>CAREX UTRICULATA</i>
TREE SPECIES	n=16	n=5	n=2	n=8
DBH CLASS - LIVE TREES				
TOTAL TREE SPECIES - LIVE				
<1"				
1-4"				
4-8"				
8-12"				
12-16"				
16-20"				
20-24"				
24-28"				
TOTAL LIVE TREES	0	0	0	0

*Note: Sample Sites (0.1-acre circular plots) in which no trees were recorded are not shown in this table, but are included in the calculation of mean density.

Table D11
 Tree Density (Trees Per Acre) by Species for Twelve Sample Sites in Three *DASIPHORA FRUTICOSA* RIPARIAN AND
 WETLAND Community Types, Black Butte Baseline Study Area, 2015.

	<i>DASIPHORA FRUTICOSA</i> / <i>POA PRATENSIS</i>						<i>DASIPHORA FRUTICOSA</i> / <i>DESCHAMPSIA CESPITOSA</i>				<i>DASIPHORA FRUTICOSA</i> / <i>CAREX UTRICULATA</i>				
	PLOT NUMBER						PLOT NUMBER				PLOT NUMBER				
TREE SPECIES	82	118	160	169	170	177	Mean	175	180	182	185	Mean	155	173	Mean
DBH CLASS - LIVE TREES	Trees Per Acre						n=6	Trees Per Acre				n=4	Trees Per Acre		n=2
TOTAL TREE SPECIES - LIVE															
<1"															
1-4"															
4-8"															
8-12"															
12-16"															
16-20"															
20-24"															
24-28"															
*TOTAL LIVE TREES	0	0	0	0	0	0	0.00	0	0	0	0	0.00	0	0	0.00

Table D12
 Tree Density (Trees Per Acre) by Species for Twelve Sample Sites in the *SALIX BEBBIANA* and Twelve
 Sample Sites in the *SALIX GEYERIANA* RIPARIAN AND WETLAND SERIES,
 Black Butte Baseline Study Area, 2015.

	SALIX BEBBIANA SERIES												SALIX GEYERIANA	
	PLOT NUMBER													
TREE SPECIES	120	122	123	156	157	158	159	161	171	181	183	184	Mean	Mean
DBH CLASS - LIVE TREES	Trees Per Acre												n=12	n=12
Juniperus scopulorum														
<1"		10		30					20			100	13.33	
1-4"														
4-8"														
8-12"														
12-16"														
16-20"														
TOTAL LIVE TREES		10		30					20			100	13.33	
Picea engelmannii														
<1"	10												0.83	
1-4"														
4-8"														
8-12"														
12-16"														
16-20"														
TOTAL LIVE TREES	10												0.83	
Pinus flexilis														
<1"					10								0.83	
1-4"														
4-8"														
8-12"														
12-16"														
16-20"														
TOTAL LIVE TREES					10								0.83	

Table D12
 Tree Density (Trees Per Acre) by Species for Twelve Sample Sites in the *SALIX BEBBIANA* and Twelve
 Sample Sites in the *SALIX GEYERIANA* RIPARIAN AND WETLAND SERIES,
 Black Butte Baseline Study Area, 2015.

	SALIX BEBBIANA SERIES												SALIX GEYERIANA	
	PLOT NUMBER													
TREE SPECIES	120	122	123	156	157	158	159	161	171	181	183	184	Mean	Mean
DBH CLASS - LIVE TREES	Trees Per Acre												n=12	n=12
Populus tremuloides														
<1"					10								0.83	
1-4"														
4-8"														
8-12"														
12-16"														
16-20"														
TOTAL LIVE TREES					10								0.83	
TOTAL TREE SPECIES - LIVE														
<1"	10	10		30	20				20			100	15.83	
1-4"														
4-8"														
8-12"														
12-16"														
16-20"														
*TOTAL LIVE TREES	10	10		30	20				20			100	15.83	0.00

*Note: *Salix geyeriana* sample sites (0.1-acre circular plots) in which no trees were recorded are not shown in this table, but are included in the calculation of mean density.

Table D13
 Tree Density (Trees Per Acre) by Species for Four Sample
 Sites in Two DECIDUOUS FOREST RIPARIAN AND WETLAND
 Vegetation Types, Black Butte Baseline Study Area, 2015.

	<i>POP TRE/ OSM OCC</i>	<i>POPULUS TREMULOIDES/ POA PRATENSIS</i>				
	PLOT	PLOT NUMBER				
TREE SPECIES	8	2	3	124	Mean	
DBH CLASS - LIVE TREES	Trees	Trees Per Acre				n=3
Picea engelmannii						
<1"				10	3.33	
1-4"	10					
4-8"						
8-12"						
12-16"						
16-20"						
TOTAL LIVE TREES	10			10	3.33	
Pinus flexilis						
<1"	10					
1-4"						
4-8"						
8-12"						
12-16"						
16-20"						
TOTAL LIVE TREES	10					
Populus tremuloides						
<1"	400	620	250	80	316.67	
1-4"	430	910	630	20	520.00	
4-8"	10	100		10	36.67	
8-12"	280	50	40		30.00	
12-16"		10		50	20.00	
16-20"						
TOTAL LIVE TREES	1120	1690	920	160	923.33	
Pseudotsuga menziesii						
<1"						
1-4"						
4-8"						
8-12"						
12-16"						
16-20"			10		3.33	
TOTAL LIVE TREES			10		3.33	

Table D13
 Tree Density (Trees Per Acre) by Species for Four Sample
 Sites in Two DECIDUOUS FOREST RIPARIAN AND WETLAND
 Vegetation Types, Black Butte Baseline Study Area, 2015.

	<i>POP TRE/ OSM OCC</i>	<i>POPULUS TREMULOIDES/ POA PRATENSIS</i>				
	PLOT	PLOT NUMBER				
TREE SPECIES	8	2	3	124	Mean	
DBH CLASS - LIVE TREES	Trees	Trees Per Acre				n=3
TOTAL TREE SPECIES - LIVE						
<1"	410	620	250	90	320.00	
1-4"	440	910	630	20	520.00	
4-8"	10	100		10	36.67	
8-12"	280	50	40		30.00	
12-16"		10		50	20.00	
16-20"			10		3.33	
TOTAL LIVE TREES	1140	1690	930	170	930.00	

APPENDIX E

Soil Type and Ecological Site by Plot for Vegetation Types in the Black Butte Baseline Study Area, Meagher County, Montana, 2015.

PHYSIOGNOMIC TYPE	PAGE
UPLAND GRASSLAND	E-1
UPLAND SHRUBLAND	E-1
CONIFER FOREST AND WOODLAND	E-2
LOWLAND ALTERED GRASSLAND	E-3
RIPARIAN AND WETLAND	E-3

Map Symbol ¹	Soil Mapping Unit ¹
Ad-b	Adel loams, 5-15%
Ch-b	Cheadle, channery loams, 5-15%
Cl-a	Clunton, clay loams - frequently flooded, 0-5%
Cp-c	Caseypeak, skeletal loams, 15-40%
Cp-d	Caseypeak, skeletal loams – steep, 40-70%
Dc-a	Duckcreek, clay loams, 0-5%
Fa-b	Farlin, clay loams, 0-5%
Hi-b	Houlihan, sandy loams, 5-15%
Kp-c	Kimpton, skeletal loams, 15-40%
Kp-d	Kimpton, skeletal loams – steep, 40-70%
Lb-b	Libeg, clay loams, 5-15%
Ml-a	Medicinelodge - frequently flooded, 0-5%
Ml-b	Medicinelodge - occasionally flooded, 5-15%
Pn-b	Poin, skeletal sandy loams, 5-15%
Rc-b	Redchief, silty loams, 5-15%
Rf-a	Redfish, occasionally flooded, 0-5%
Ry-b	Raynesford, silty clay loams, 5-15%
Se-b	Sebud, gravelly loams, 5-15%
Wa-b	Woodhall, skeletal loams, 5-15%
Wg-b	Wineglass, channery clay loams, 5-15%
Wu-b	Woodhurst, skeletal loams, 5-15%
DL	Disturbed Land, varies
RO	Rock Outcrop, 30-90%

¹Ecological sites were determined using the baseline soils study and descriptions in the Meagher County Soil Survey (USDA Natural Resources Conservation Service 2015).

All plot locations are shown on the vegetation type map (Plate 1).

APPENDIX E
Soil Type and Ecological Site by Plot for Vegetation Types in the Black Butte
Baseline Study Area, Meagher County, Montana, 2015.

VEGETATION TYPE	Vegetation Plot Number	Soil Mapping Unit ¹	Ecological Site ² (15-19" and 20+ " ppz)
UPLAND GRASSLAND (n=28)			
Upland Altered Grassland (n=9)	44	Lb-b	Loamy Droughty
	45	Hl-b	Loamy
	46	Lb-b	Loamy Droughty
	47		
	50	Hl-b	Loamy
	52	Rc-b	Droughty
	67	Wg-b	Loamy
	78	Ml-b	Subirrigated
	85	Wg-b	Loamy
<i>Festuca idahoensis</i> / <i>Agropyron spicatum</i> (n=3)	63	Cp-c	Shallow Droughty
	68	Lb-b	Loamy Droughty
	69	Ch-b	Shallow Droughty
<i>Festuca idahoensis</i> / <i>Stipa richardsonii</i> (n=2)	61	Ch-b	Shallow Droughty
	107	Fa-b	Droughty
<i>Festuca campestris</i> / <i>Agropyron spicatum</i> (n=1)	48	Lb-b	Loamy Droughty
<i>Festuca campestris</i> / <i>Festuca idahoensis</i> (n=13)	56	Ch-b	Shallow Droughty
	62	Wa-b	Droughty
	64	Lb-b	Loamy Droughty
	65		
	66	Wg-b	Loamy
	70	Ch-b	Shallow Droughty
	71		
	72	Wa-b	Droughty
	73		
	74		
	75		
	93	Ch-b	Shallow Droughty
	108	Fa-b	Droughty
UPLAND SHRUBLAND (n=44)			
<i>Artemisia tridentata</i> / <i>Poa pratensis</i> (n=13)	51	Rc-b	Droughty
	53	Wu-b	
	54	Rc-b	
	57	Wa-b	
	77	Ml-b	Subirrigated
	83	Wg-b	Loamy
	84		
	88		
	92	Ch-b	Shallow Droughty
	95		
	97		
	100		
101			
<i>Artemisia tridentata</i> / <i>Festuca idahoensis</i> (n=3)	99	Ch-b	Shallow Droughty
	105		
	111		

APPENDIX E
Soil Type and Ecological Site by Plot for Vegetation Types in the Black Butte
Baseline Study Area, Meagher County, Montana, 2015.

VEGETATION TYPE	Vegetation Plot Number	Soil Mapping Unit ¹	Ecological Site ² (15-19" and 20+" ppz)	
<i>Artemisia tridentata/Festuca campestris</i> (n=17)	49	Kp-d	Shallow Droughty	
	55	Ch-b		
	58	Cp-c		
	59	Ch-b		
	60			
	76	HI-b	Loamy	
	<i>Artemisia tridentata-Dasiphora fruticosa / Poa pratensis</i> (n=6)	79	Pn-b	Shallow Droughty
		81	Ch-b	
		90		
		91	Pn-b	
		94	Ch-b	
		98		
		102		
		103		
		104		
114				
<i>Dasiphora fruticosa-Artemisia tridentata / Festuca campestris</i> (n=3)	115	Ch-b		
	89		HI-b	Loamy
	96		Ml-a	Subirrigated
	109		Ry-b	Loamy
	110		Dc-a	Loamy Argillic
	112			
Mixed Shrub-Shale Outcrop (n=2)	116	Ch-b	Shallow Droughty	
	80	Ch-b	Shallow Droughty	
	106	Dc-a	Loamy Argillic	
113				
CONIFER FOREST AND WOODLAND (n=40)				
<i>Pseudotsuga menziesii/Festuca idahoensis</i> (n=1)	13	Cp-c	Douglas-fir/rough fescue	
<i>Pseudotsuga menziesii/Festuca campestris</i> (n=12)	11	Kp-d	Douglas-fir/rough fescue	
	12	Cp-d		
	15			
	17	Wa-b		
	19	Cp-c		
	20	Wa-b		
	23	Pn-b		
	28	Cp-c		
	34	Pn-b		
	38	Cp-c		
	42	Cp-d		
<i>Pseudotsuga menziesii/Juniperus communis</i> (n=8)	43	Kp-c		
	14	Wa-b	Douglas-fir/common juniper	
	24	Pn-b		
	25	Kp-c		
	26	Pn-b		
	29	Kp-c		
	32	Cp-c		
	33	Kp-c		
40	Kp-d			

APPENDIX E
Soil Type and Ecological Site by Plot for Vegetation Types in the Black Butte
Baseline Study Area, Meagher County, Montana, 2015.

VEGETATION TYPE	Vegetation Plot Number	Soil Mapping Unit ¹	Ecological Site ² (15-19" and 20+ " ppz)
<i>Pseudotsuga menziesii/Calamagrostis rubescens</i> (n=2)	31	Kp-c	Douglas-fir/snowberry
	35		
<i>Pseudotsuga menziesii/Symphoricarpos albus</i> (n=11)	1	Wa-b	Douglas-fir/snowberry
	4		
	5	Kp-c	
	7	Rc-b	
	16	Kp-c	
	18	Cp-c	
	27	Kp-c	
	30		
	36		
	37	Pn-b	
39			
<i>Pseudotsuga menziesii/Linnaea borealis</i> (n=4)	10	Kp-d	Douglas-fir/twinflower
	21		
	22		
	41		
<i>Picea engelmannii/Linnaea borealis</i> (n=2)	6	Kp-c	Spruce/twinflower
	9	Kp-d	
LOWLAND ALTERED GRASSLAND (n=17)			
Noxious Weed Tailings c.t. (2014/2015) (n=1)	162	MI-a	Subirrigated
Lowland Altered Grassland (Hay Meadow) (n=16)	117	Cl-a	Wet Meadow
	133	Rf-a	Subirrigated
	134		Wet Meadow
	135	MI-a	
	138	Rf-a	Subirrigated
	139	MI-a	Wet Meadow
	140	Ad-b	Overflow
	141	MI-a	Subirrigated
	143		
	144	Rf-a	Wet Meadow
	145		
	148	MI-a	
	151	Rf-a	Subirrigated
	152		
	153		
	165	Dc-a	
RIPARIAN AND WETLAND (RW) (n=56)			
Herbaceous RW types (n=15)			
<i>Juncus balticus</i> (n=5)	129	Se-b	Subirrigated
	149	MI-a	Wet Meadow
	163	MI-b	Subirrigated
	164	MI-a	Wet Meadow
	176		
<i>Carex nebrascensis</i> (n=2)	127	MI-a	Wet Meadow
	166		

APPENDIX E
Soil Type and Ecological Site by Plot for Vegetation Types in the Black Butte
Baseline Study Area, Meagher County, Montana, 2015.

VEGETATION TYPE	Vegetation Plot Number	Soil Mapping Unit ¹	Ecological Site ² (15-19" and 20+" ppz)	
<i>Carex utriculata</i> (n=8)	126	MI-a	Wet Meadow	
	146			
	167			
	168			
	172	MI-b		
	174	MI-a		
	178			
	179			
Shrub RW types (n=37)				
<i>Dasiphora fruticosa</i> / <i>Poa pratensis</i> (n=6)	82	MI-a	Subirrigated	
	118	Cl-a		
	160	MI-b		
	169	Dc-a		Loamy Argillic
	170	MI-a		Wet Meadow
	177			Subirrigated
<i>Dasiphora fruticosa</i> / <i>Deschampsia cespitosa</i> (n=4)	175	MI-a	Subirrigated	
	180			
	182			
	185			
<i>Dasiphora fruticosa</i> / <i>Carex utriculata</i> (n=2)	155	MI-b	Wet Meadow	
	173			
<i>Salix bebbiana</i> series (n=13)	120	MI-b	Wet Meadow	
	122			
	123			
	125			
	156			
	157			
	158			
	159			
	161			
	171			
	181	MI-a		
	183			
	184			
<i>Salix geyeriana</i> series (n=12)	119	Cl-a	Subirrigated	
	121	MI-b		
	128	MI-a	Wet Meadow	
	130			
	131			
	132			
	136			
	137			
	142			
	147			
	150			
	154			Subirrigated
	Deciduous Forest RW types (n=4)			
<i>Populus tremuloides</i> / <i>Osmorhiza occidentalis</i> (n=1)	8	Rc-b		Quaking aspen/Kentucky bluegrass
<i>Populus tremuloides</i> / <i>Poa pratensis</i> (n=3)	2	Lb-b	Loamy Droughty	
	3	Rc-b		
	124	MI-b		Quaking aspen/Kentucky bluegrass

APPENDIX F

Summary of Site Parameters for Vegetation Types in the Black Butte Baseline Study Area, Meagher County, Montana, 2015.

SITE PARAMETER	TABLE	PAGE
TOPOGRAPHICAL POSITION	F1	F-1
SLOPE GRADIENT	F2	F-3
ASPECT	F3	F-5

Footnotes for the tables in Appendix F:

Appendix F tables summarize the site parameters given for each sample site in Appendix B.

Table F1

Summary of TOPOGRAPHICAL Categories by Vegetation Type, Black Butte Baseline Study Area, Meagher County, Montana, 2015.

COMMUNITY TYPE	n	TOPOGRAPHY									
		Bottom/ Bank	Terrace/ Floodplain	Swale	Bench	Toeslope	Lower Slope	Middle Slope	Upper Slope	Ridge/ Shoulder	Plateau
		Number of Vegetation Sample Sites									
UPLAND GRASSLAND	28										
Upland Altered Grassland c.t.	9			1		3	1	3		1	
<i>Festuca idahoensis</i> / <i>Agropyron spicatum</i> h.t.	3						1			2	
<i>Festuca idahoensis</i> / <i>Stipa richardsonii</i> h.t.	2				1			1			
<i>Festuca campestris</i> / <i>Agropyron spicatum</i> h.t.	1							1			
<i>Festuca campestris</i> / <i>Festuca idahoensis</i> h.t.	13				1		1	8	3		
UPLAND SHRUBLAND	44										
<i>Artemisia tridentata</i> / <i>Poa pratensis</i> c.t.	13			3		1	1	5	2	1	
<i>Artemisia tridentata</i> / <i>Festuca idahoensis</i> h.t.	3				1		2				
<i>Artemisia tridentata</i> / <i>Festuca campestris</i> h.t.	17			1	4	1	1	7		3	
<i>Artemisia tridentata</i> - <i>Dasiphora fruticosa</i> / <i>Poa pratensis</i> c.t.	6			2	1	2	1				
<i>Dasiphora fruticosa</i> - <i>Artemisia tridentata</i> / <i>Festuca campestris</i> c.t.	3		1				1	1			
Mixed Shrub-Shale Outcrop c.t.	2							1		1	
CONIFER FOREST AND WOODLAND	40										
<i>Pseudotsuga menziesii</i> / <i>Festuca idahoensis</i> h.t.	1								1		
<i>Pseudotsuga menziesii</i> / <i>Festuca campestris</i> h.t.	12							3	5	4	
<i>Pseudotsuga menziesii</i> / <i>Juniperus communis</i> h.t.	8						2	4	2		
<i>Pseudotsuga menziesii</i> / <i>Calamagrostis rubescens</i> h.t.	2					1		1			
<i>Pseudotsuga menziesii</i> / <i>Symphoricarpos albus</i> h.t.	11					2	2	4	2	1	
<i>Pseudotsuga menziesii</i> / <i>Linnaea borealis</i> h.t.	4						1	3			
<i>Picea engelmannii</i> / <i>Linnaea borealis</i> h.t.	2	1						1			
LOWLAND ALTERED GRASSLAND	17										
Noxious Weed Tailings c.t. (2014/2015)	1				1						
Lowland Altered Grassland (Hay Meadow) c.t.	16		16								
RIPARIAN AND WETLAND (RW)	56										
Herbaceous RW types	(15)										
<i>Juncus balticus</i> c.t.	5	2	2			1					
<i>Carex nebrascensis</i> c.t.	2	2									
<i>Carex utriculata</i> h.t.	8	6	2								

Table F1

Summary of TOPOGRAPHICAL Categories by Vegetation Type, Black Butte Baseline Study Area, Meagher County, Montana, 2015.

COMMUNITY TYPE	n	TOPOGRAPHY									
		Bottom/ Bank	Terrace/ Floodplain	Swale	Bench	Toeslope	Lower Slope	Middle Slope	Upper Slope	Ridge/ Shoulder	Plateau
		Number of Vegetation Sample Sites									
Shrub RW types	(37)										
<i>Dasiphora fruticosa</i> / <i>Poa pratensis</i> c.t.	6	2	3					1			
<i>Dasiphora fruticosa</i> / <i>Deschampsia cespitosa</i> c.t.	4	1	2				1				
<i>Dasiphora fruticosa</i> / <i>Carex utriculata</i> c.t.	2	2									
<i>Salix bebbiana</i> series	13	10		1		2					
<i>Salix geyeriana</i> series	12	10	2								
Deciduous Forest RW types	(4)										
<i>Populus tremuloides</i> / <i>Osmorhiza occidentalis</i> h.t.	1							1			
<i>Populus tremuloides</i> / <i>Poa pratensis</i> c.t.	3	1						1		1	
TOTAL PLOTS	185	37	28	8	9	13	15	46	15	14	0

Table F2

Summary of SLOPE GRADIENT Categories by Vegetation Type, Black Butte Baseline Study Area, Meagher County, Montana, 2015.

COMMUNITY TYPE	n	SLOPE GRADIENT (percent)												
		0-5	6-10	11-15	16-20	21-25	26-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100
		Number of Vegetation Sample Sites												
UPLAND GRASSLAND	28													
Upland Altered Grassland c.t.	9	4	4	1										
<i>Festuca idahoensis</i> / <i>Agropyron spicatum</i> h.t.	3		2	1										
<i>Festuca idahoensis</i> / <i>Stipa richardsonii</i> h.t.	2	1	1											
<i>Festuca campestris</i> / <i>Agropyron spicatum</i> h.t.	1				1									
<i>Festuca campestris</i> / <i>Festuca idahoensis</i> h.t.	13	1	7	4	1									
UPLAND SHRUBLAND	44													
<i>Artemisia tridentata</i> / <i>Poa pratensis</i> c.t.	13	5	4	4										
<i>Artemisia tridentata</i> / <i>Festuca idahoensis</i> h.t.	3	3												
<i>Artemisia tridentata</i> / <i>Festuca campestris</i> h.t.	17	9	3	2	2	1								
<i>Artemisia tridentata</i> - <i>Dasiphora fruticosa</i> / <i>Poa pratensis</i> c.t.	6	3	3											
<i>Dasiphora fruticosa</i> - <i>Artemisia tridentata</i> / <i>Festuca campestris</i> c.t.	3	1	1		1									
Mixed Shrub-Shale Outcrop c.t.	2				1		1							
CONIFER FOREST AND WOODLAND	40													
<i>Pseudotsuga menziesii</i> / <i>Festuca idahoensis</i> h.t.	1			1										
<i>Pseudotsuga menziesii</i> / <i>Festuca campestris</i> h.t.	12	1	2	1	4			2	2					
<i>Pseudotsuga menziesii</i> / <i>Juniperus communis</i> h.t.	8		1	1	2	2		1		1				
<i>Pseudotsuga menziesii</i> / <i>Calamagrostis rubescens</i> h.t.	2							1	1					
<i>Pseudotsuga menziesii</i> / <i>Symphoricarpos albus</i> h.t.	11	1	2	1	1		3	1		2				
<i>Pseudotsuga menziesii</i> / <i>Linnaea borealis</i> h.t.	4						1	1	1			1		
<i>Picea engelmannii</i> / <i>Linnaea borealis</i> h.t.	2		1					1						
LOWLAND ALTERED GRASSLAND	17													
Noxious Weed Tailings c.t. (2014/2015)	1	1												
Lowland Altered Grassland (Hay Meadow) c.t.	16	16												
RIPARIAN AND WETLAND (RW)	56													
Herbaceous RW types	(15)													
<i>Juncus balticus</i> c.t.	5	4	1											
<i>Carex nebrascensis</i> c.t.	2	2												
<i>Carex utriculata</i> h.t.	8	8												

Table F2

Summary of SLOPE GRADIENT Categories by Vegetation Type, Black Butte Baseline Study Area, Meagher County, Montana, 2015.

COMMUNITY TYPE	n	SLOPE GRADIENT (percent)													
		0-5	6-10	11-15	16-20	21-25	26-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100	100-110
		Number of Vegetation Sample Sites													
Shrub RW types	(37)														
<i>Dasiphora fruticosa</i> / <i>Poa pratensis</i> c.t.	6	6													
<i>Dasiphora fruticosa</i> / <i>Deschampsia cespitosa</i> c.t.	4	4													
<i>Dasiphora fruticosa</i> / <i>Carex utriculata</i> c.t.	2	2													
<i>Salix bebbiana</i> series	13	9	3	1											
<i>Salix geyeriana</i> series	12	12													
Deciduous Forest RW types	(4)														
<i>Populus tremuloides</i> / <i>Osmorhiza occidentalis</i> h.t.	1				1										
<i>Populus tremuloides</i> / <i>Poa pratensis</i> c.t.	3	1	2												
TOTAL PLOTS	185	94	37	17	14	3	5	7	4	3	0	1	0	0	0

Table F3

Summary of ASPECT Categories by Vegetation Type, Black Butte Baseline Study Area, Meagher County, Montana, 2015.

COMMUNITY TYPE	n	ASPECT									
		N	NE	E	SE	S	SW	W	NW	None	Variable
		Number of Vegetation Sample Plots									
UPLAND GRASSLAND	28										
Upland Altered Grassland c.t.	9	1	1	2	1	1		3			
<i>Festuca idahoensis</i> / <i>Agropyron spicatum</i> h.t.	3				1	2					
<i>Festuca idahoensis</i> / <i>Stipa richardsonii</i> h.t.	2	2									
<i>Festuca campestris</i> / <i>Agropyron spicatum</i> h.t.	1					1					
<i>Festuca campestris</i> / <i>Festuca idahoensis</i> h.t.	13	6	2		1	1			3		
UPLAND SHRUBLAND	44										
<i>Artemisia tridentata</i> / <i>Poa pratensis</i> c.t.	13	2	2	4	2	1			1	1	
<i>Artemisia tridentata</i> / <i>Festuca idahoensis</i> h.t.	3		1	1	1						
<i>Artemisia tridentata</i> / <i>Festuca campestris</i> h.t.	17	3	2	1	3	4		1	1	2	
<i>Artemisia tridentata</i> - <i>Dasiphora fruticosa</i> / <i>Poa pratensis</i> c.t.	6		1				1	1	1	2	
<i>Dasiphora fruticosa</i> - <i>Artemisia tridentata</i> / <i>Festuca campestris</i> c.t.	3	1							2		
Mixed Shrub-Shale Outcrop c.t.	2					1		1			
CONIFER FOREST AND WOODLAND	40										
<i>Pseudotsuga menziesii</i> / <i>Festuca idahoensis</i> h.t.	1				1						
<i>Pseudotsuga menziesii</i> / <i>Festuca campestris</i> h.t.	12		2	1	3	4			2		
<i>Pseudotsuga menziesii</i> / <i>Juniperus communis</i> h.t.	8	3	1		1	1		1	1		
<i>Pseudotsuga menziesii</i> / <i>Calamagrostis rubescens</i> h.t.	2	1							1		
<i>Pseudotsuga menziesii</i> / <i>Symphoricarpos albus</i> h.t.	11	3	2	3	1				2		
<i>Pseudotsuga menziesii</i> / <i>Linnaea borealis</i> h.t.	4	2	1						1		
<i>Picea engelmannii</i> / <i>Linnaea borealis</i> h.t.	2	1	1								
LOWLAND ALTERED GRASSLAND	17										
Noxious Weed Tailings c.t. (2014/2015)	1									1	
Lowland Altered Grassland (Hay Meadow) c.t.	16		1					1		14	
RIPARIAN AND WETLAND (RW)	56										
Herbaceous RW types	(15)										
<i>Juncus balticus</i> c.t.	5				1				1	3	
<i>Carex nebrascensis</i> c.t.	2							2			
<i>Carex utriculata</i> h.t.	8	2	2					3		1	

Table F3

Summary of ASPECT Categories by Vegetation Type, Black Butte Baseline Study Area, Meagher County, Montana, 2015.

COMMUNITY TYPE	n	ASPECT									
		N	NE	E	SE	S	SW	W	NW	None	Variable
		Number of Vegetation Sample Plots									
Shrub RW types	(37)										
<i>Dasiphora fruticosa /Poa pratensis</i> c.t.	6	1	1					2	2		
<i>Dasiphora fruticosa /Deschampsia cespitosa</i> c.t.	4	2	2								
<i>Dasiphora fruticosa /Carex utriculata</i> c.t.	2		2								
<i>Salix bebbiana</i> series	13	2	7	3					1		
<i>Salix geyeriana</i> series	12	1						1	1	9	
Deciduous Forest RW types	(4)										
<i>Populus tremuloides/Osmorhiza occidentalis</i> h.t.	1	1									
<i>Populus tremuloides/Poa pratensis</i> c.t.	3			2	1						
TOTAL PLOTS	185	34	31	17	17	16	1	16	20	33	0

<u>Aspect Direction</u>	<u>Degree Interval</u>
N	337.5 - 22.5
NE	22.5 - 67.5
E	67.5 - 112.5
SE	112.5 - 157.5
S	157.5 - 202.5
SW	202.5 - 247.5
W	247.5 - 292.5
NW	292.5 - 337.5
None	approx.level

APPENDIX G

Synoptic Literature Review of Community Types Occurring in the Region of the Black Butte Baseline Study Area, Meagher County, Montana, 2015.

Appendix G
Published and Unpublished Literature Reviewed for the Black Butte Baseline
Vegetation Type Classification, 2015.

STUDY CITATION	STUDY/PROJECT	LOCATION
Allewalt and Scow (2013)	Wetland Mitigation Bank	Madison County, Montana
Beaver and Scow (2011)	Wetland Mitigation Bank	Powell County, Montana
Cooper <i>et al.</i> (1991)	Forest Habitat Types	Northern Idaho
Cooper and Scow (1998)	Potter TNC Easement	Missoula County, Montana
Culwell <i>et al.</i> (1985)	Loon Lake TNC Easement	Lincoln County, Montana
Culwell and Scow (1982)	Jardine Project	Park County, Montana
Culwell and Scow (1993)	Diamond Hill Exploration Area	Broadwater County, Montana
Culwell and Scow (2003)	Beal Mountain Mine	Silver Bow County, Montana
Culwell and Scow (2005)	Montanore Project	Lincoln and Sanders Counties, Montana
Culwell <i>et al.</i> (1984)	Montana Tunnels Mine	Jefferson County, Montana
Culwell <i>et al.</i> (1998)	Yellowstone Pipeline Project	Missoula, Mineral, Sanders and Lake Counties, Montana; Shoshone County, Idaho
Culwell <i>et al.</i> (1990)	Little Rocky Mountains Environmental Study Area	Phillips County, Montana
Culwell <i>et al.</i> (1993)	McDonald Project Wetlands	Lewis and Clark County, Montana
Culwell <i>et al.</i> (1987)	Guide to Natural Vegetation	Montana
Hansen <i>et al.</i> (1995)	Classification of Riparian And Wetland Sites	Montana
Hironaka <i>et al.</i> (1983)	Sagebrush-Grass Habitat Types	Southern Idaho
Larsen <i>et al.</i> (1987)	Lewis and Clark Caverns State Park	Jefferson County, Montana
Mueggler and Stewart (1980)	Grassland and Shrubland Habitat Types	Western Montana
Pfister <i>et al.</i> (1977)	Forest Habitat Types	Montana
Roberts (1980)	Forest Habitat Types	Bear's Paw and Little Rocky Mountains, Montana
Roberts <i>et al.</i> (1979)	Forest and Woodland Habitat Types	Missouri River Breaks, Montana
Scow (1988)	Yellow Band Project	Beaverhead County, Montana
Scow (1989)	Yellowstone Talc Mine	Madison County, Montana
Scow (1990)	Dancing Prairie TNC Preserve	Lincoln County, Montana
Scow (1995a)	Basin Gulch Project	Granite County, Montana
Scow (1995b)	Golden Sunlight Mine	Jefferson County, Montana
Scow (1997)	Norris Gold Project	Madison County, Montana
Scow (2001); Scow (2005b)	Limestone Hills and Fort Harrison	Broadwater and Lewis & Clark Counties, Montana
Scow (2005a); Scow (2006a)	Indian Creek Project	Broadwater County, Montana
Scow (2006b)	Limestone Hills LEIS	Broadwater County, Montana
Scow (2009)	Bull Mountains Mine	Musselshell County, Montana
Scow (2014)	Montana Limestone Resources Project	Granite County, Montana
Scow and Beaver (1999a)	Fort Harrison	Lewis and Clark County, Montana
Scow and Beaver (1999b)	Limestone Hills	Broadwater County, Montana
Scow and Beaver (1999c)	Peters TNC Easement	Beaverhead County, Montana
Scow and Beaver (1999d)	Staudenmeyer TNC Easement	Beaverhead and Madison Counties, Montana
Scow and Culwell (1988)	Beal Project	Silverbow County, Montana
Scow and Culwell (1990)	Seven-Up Pete Project	Lewis and Clark County, Montana
Scow and Culwell (1994)	Elkhorn Project	Jefferson County, Montana
Scow <i>et al.</i> (1993)	McDonald Project	Lewis & Clark County, Montana
Scow <i>et al.</i> (1986)	Chartam Project	Broadwater County, Montana
Scow <i>et al.</i> (1987a)	Valley View Hills TNC Easement	Lake County, Montana
Scow <i>et al.</i> (1987b)	Rock Creek Project	Sanders County, Montana
Scow <i>et al.</i> (1989)	Basin Creek Mine	Jefferson and Lewis & Clark Counties, Montana
Scow <i>et al.</i> (1992)	New World Project	Park County, Montana
Steele <i>et al.</i> (1983)	Forest Habitat Types	Eastern Idaho – Western Wyoming
Steele <i>et al.</i> (1981)	Forest Habitat Types	Central Idaho
Thompson and Kuijt (1976)	Montane and Subalpine Plants	Sweetgrass Hills, Montana
Tuhy and Jensen (1982)	Riparian Classification	Upper Salmon/Middle Fork Salmon Rivers, Idaho
WESTECH Environmental Services, Inc. (2009)	Williams Property (Lazy Y 3 Ranch) PPLT Easement	Lewis & Clark County, Montana
WESTECH Environmental Services, Inc. (2010)	Milburn Property PPLT Easement	Lewis & Clark County, Montana
WESTECH Environmental Services, Inc. (2012)	Aspen Trails PPLT Easement	Lewis & Clark County, Montana
WESTECH Environmental Services, Inc. (2014)	Johnston Property PPLT Easement	Lewis & Clark County, Montana
WESTECH Environmental Services, Inc. (2015)	Welch Property PPLT Easement	Lewis & Clark County, Montana
Western Technology and Engineering, Inc. (1988)	Kendall Venture Project	Fergus County, Montana
Western Technology and Engineering, Inc. (1991a)	Bar None Ranch (Sixteen Mile Creek) TNC Easement	Broadwater and Gallatin Counties, Montana
Western Technology and Engineering, Inc. (1991b)	Flying D Ranch (Spanish Peaks) TNC Easement	Madison and Gallatin Counties, Montana
Youngblood <i>et al.</i> (1985)	Riparian Classification	Eastern Idaho - Western Wyoming

Full citations are given in References Cited Section 4.0.

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 Representative Photographs of Vegetation Sample Plots,
 Black Butte Project, July 2015

UPLAND GRASSLAND

Upland Altered Grassland c.t.	
Plot 45.....	H-1
Plot 67.....	H-1
<i>Festuca idahoensis/Agropyron spicatum</i> h.t.	
Plot 69.....	H-2
<i>Festuca idahoensis/Stipa richardsonii</i> h.t.	
Plot 107	H-2
<i>Festuca campestris/Agropyron spicatum</i> h.t.	
Plot 48.....	H-3
<i>Festuca campestris/Festuca idahoensis</i> h.t.	
Plot 62.....	H-3
Plot 66.....	H-4
Plot 73.....	H-4
Plot 74.....	H-5

UPLAND SHRUBLAND

<i>Artemisia tridentata/Poa pratensis</i> c.t.	
Plot 51.....	H-5
Plot 53.....	H-6
Plot 84.....	H-6
Plot 100	H-7
<i>Artemisia tridentata/ Festuca idahoensis</i> h.t.	
Plot 99.....	H-7
<i>Artemisia tridentata/Festuca campestris</i> h.t.	
Plot 58.....	H-8
Plot 76.....	H-8
Plot 81.....	H-9
Plot 98.....	H-9
Plot 104	H-10
<i>Artemisia tridentata-Dasiphora fruticosa/Poa pratensis</i> c.t.	
Plot 89.....	H-10
Plot 109	H-11
<i>Dasiphora fruticosa-Artemisia tridentata/Festuca campestris</i> c.t.	
Plot 106	H-11
Mixed Shrub-Shale Outcrop c.t.	
Plot 86.....	H-12

CONIFER FOREST AND WOODLAND

<i>Pseudotsuga menziesii/Festuca idahoensis</i> h.t.	
Plot 13.....	H-12
<i>Pseudotsuga menziesii/Festuca campestris</i> h.t.	
Plot 15.....	H-13
Plot 23.....	H-13
Plot 34.....	H-14
Plot 43.....	H-14

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Pseudotsuga menziesii/Juniperus communis h.t.
 Plot 25.....H-15
 Plot 32.....H-15
 Plot 40.....H-16

Pseudotsuga menziesii/Calamagrostis rubescens h.t.
 Plot 35.....H-16

Pseudotsuga menziesii/Symphoricarpos albus h.t.
 Plot 4.....H-17
 Plot 5.....H-17
 Plot 16.....H-18
 Plot 18.....H-18

Pseudotsuga menziesii/Linnaea borealis h.t.
 Plot 10.....H-19
 Plot 41.....H-19

Picea engelmannii/Linnaea borealis h.t.
 Plot 6.....H-20
 Plot 9.....H-20

LOWLAND ALTERED GRASSLAND

Noxious Weed Tailings c.t.
 Plot 162 (2014/2015 facing north)H-21
 Plot 162 (2014/2015 facing south)H-22

Lowland Altered Grassland (Hay Meadow) c.t.
 Plot 117H-23
 Plot 135H-23
 Plot 139H-24
 Plot 140H-24
 Plot 143H-25
 Plot 165H-25

RIPARIAN AND WETLAND (RW)

Juncus balticus c.t.
 Plot 129H-26
 Plot 149H-26
 Plot 176H-27

Carex nebrascensis c.t.
 Plot 166H-27

Carex utriculata h.t.
 Plot 174H-28
 Plot 178H-28
 Plot 179H-29

Dasiphora fruticosa/Poa pratensis c.t.
 Plot 160H-29
 Plot 170H-30
 Plot 177H-30

Dasiphora fruticosa/Deschampsia cespitosa c.t.
 Plot 175H-31
 Plot 182H-31

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Dasiphora fruticosa/Carex utriculata c.t.
 Plot 173H-32

Salix bebbiana series
 Plot 120H-32
 Plot 123H-33
 Plot 156H-33
 Plot 161H-34
 Plot 171H-34
 Plot 183H-35
 Plot 184H-35

Salix geyeriana series
 Plot 128H-36
 Plot 130H-36
 Plot 132H-37
 Plot 142H-37
 Plot 150H-38
 Plot 154H-38

Populus tremuloides/Osmorhiza occidentalis h.t.
 Plot 8.....H-39

Populus tremuloides/Poa pratensis c.t.
 Plot 124H-39

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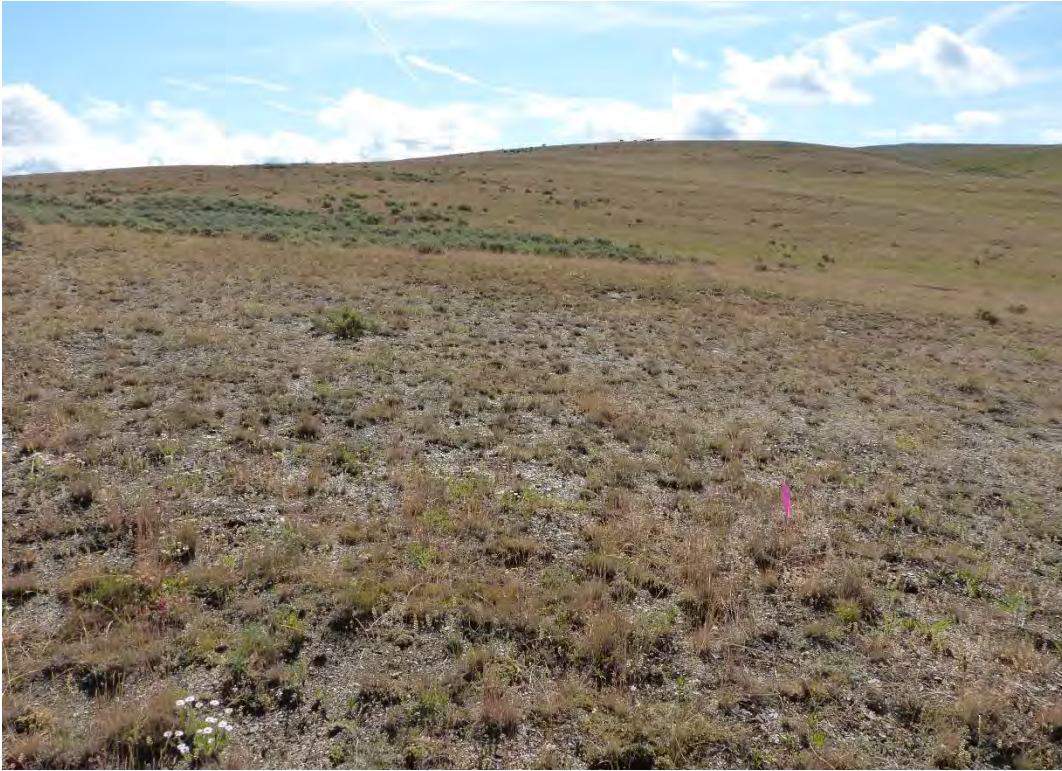


Plot 45 Facing South Upland Altered Grassland c.t.



Plot 67 Facing South Upland Altered Grassland c.t.

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Plot 69 Facing East *Festuca idahoensis*/*Agropyron spicatum* h.t.



Plot 107 Facing East *Festuca idahoensis*/*Stipa richardsonii* h.t.

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Plot 48 Facing South *Festuca campestris*/*Agropyron spicatum* h.t.



Plot 62 Facing North *Festuca campestris*/*Festuca idahoensis* h.t.

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Plot 66 Facing North *Festuca campestris*/*Festuca idahoensis* h.t.



Plot 73 Facing East *Festuca campestris*/*Festuca idahoensis* h.t.

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Plot 74 Facing North *Festuca campestris* /*Festuca idahoensis* h.t.

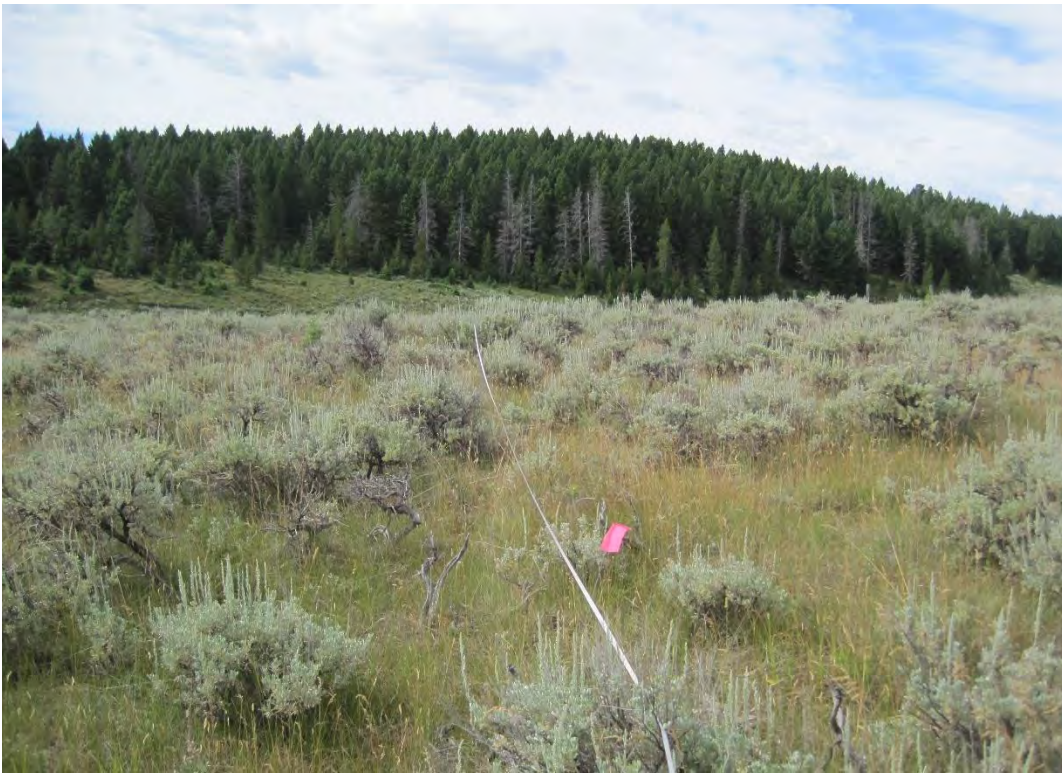


Plot 51 Facing North *Artemisia tridentata*/Poa pratensis c.t.

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Plot 53 Facing East *Artemisia tridentata/Poa pratensis* c.t.

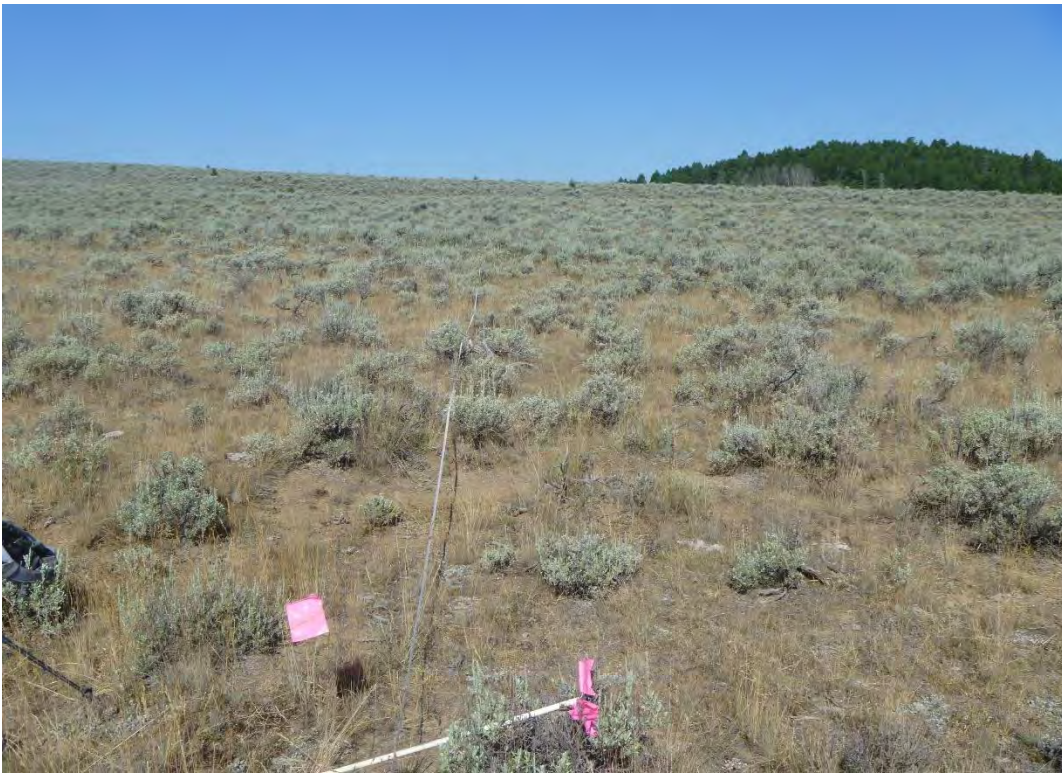


Plot 84 Facing South *Artemisia tridentata/Poa pratensis* c.t.

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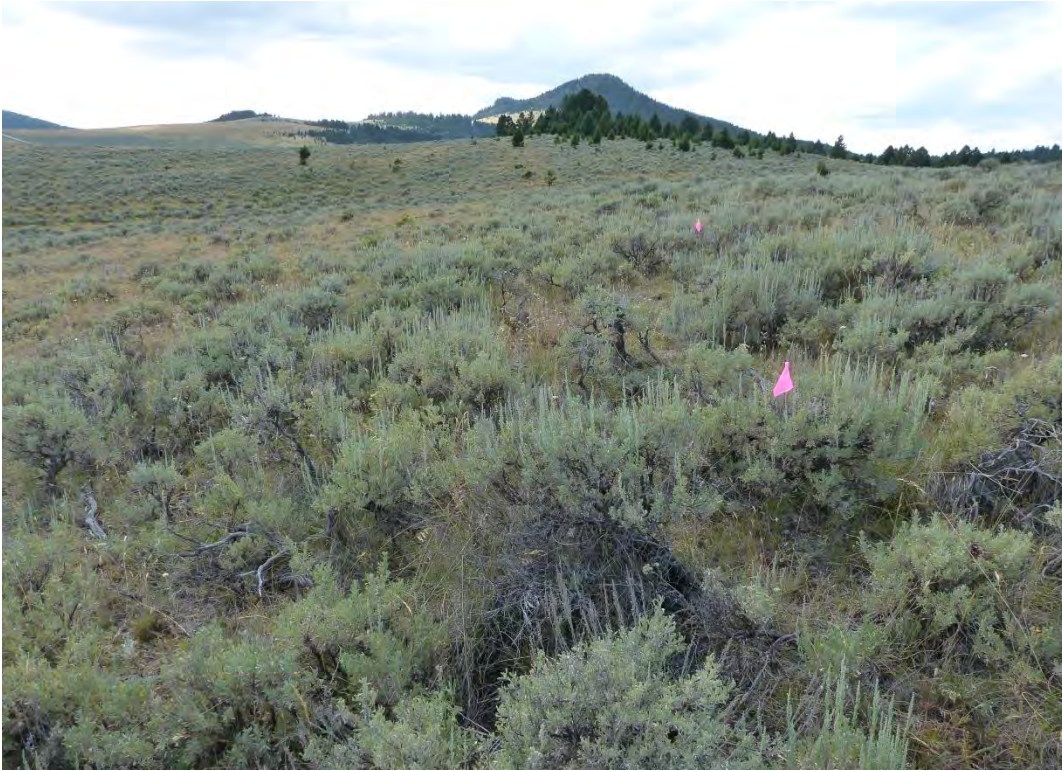


Plot 100 Facing East *Artemisia tridentata/Poa pratensis* c.t.

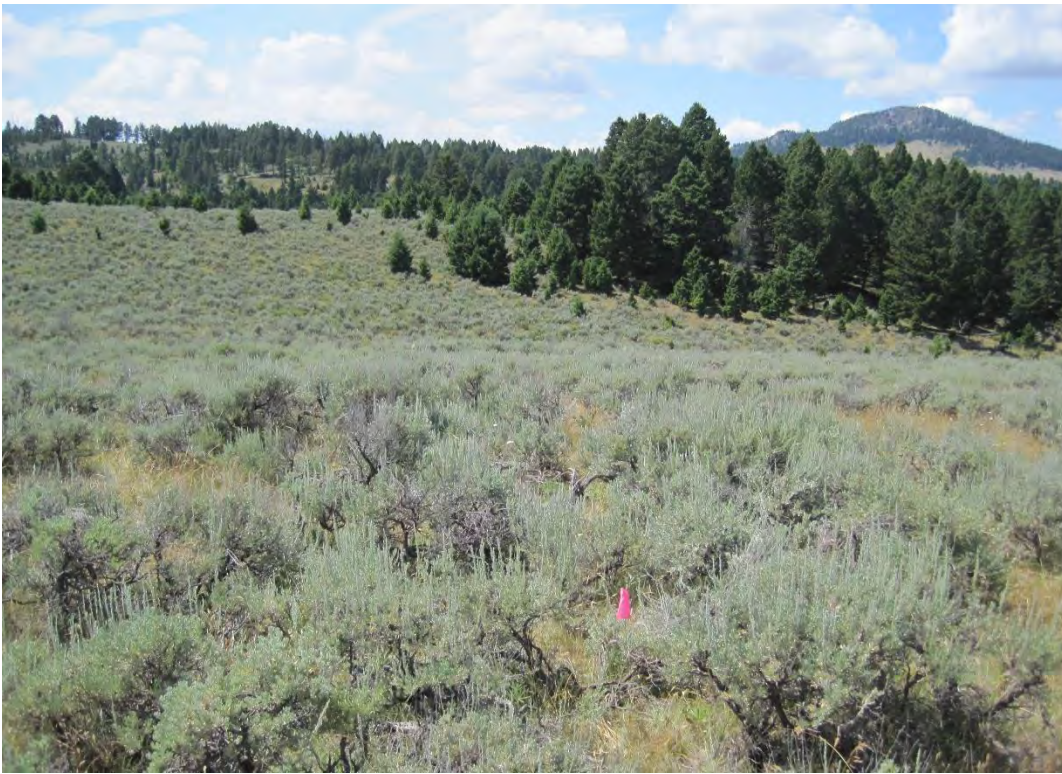


Plot 99 Facing West *Artemisia tridentata/Festuca idahoensis* h.t.

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Plot 58 Facing West *Artemisia tridentata*/*Festuca campestris* h.t.

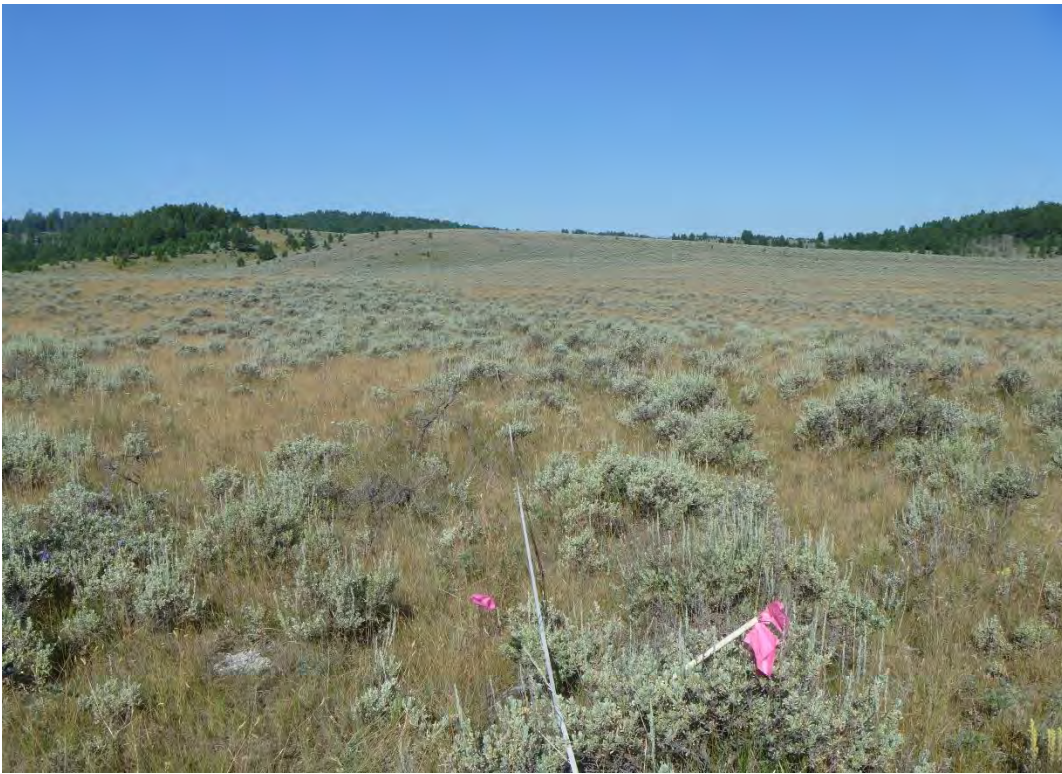


Plot 76 Facing West *Artemisia tridentata*/*Festuca campestris* h.t.

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Plot 81 Facing West *Artemisia tridentata/Festuca campestris* h.t.



Plot 98 Facing West *Artemisia tridentata/Festuca campestris* h.t.

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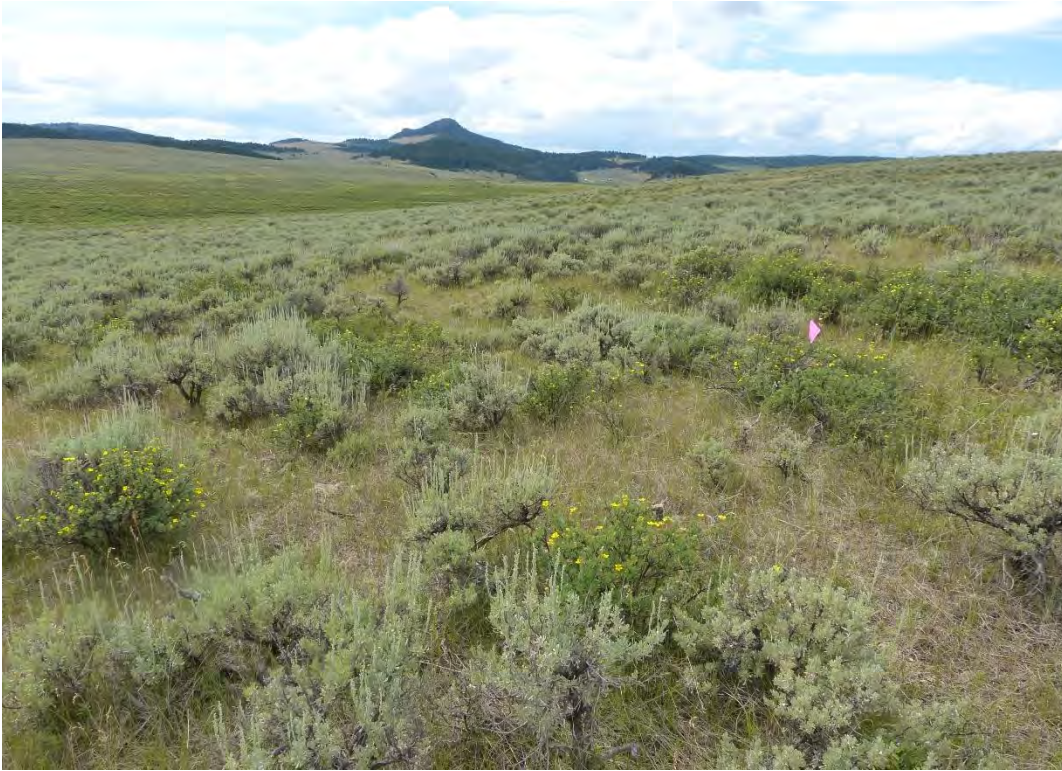


Plot 104 Facing East *Artemisia tridentata*/*Festuca campestris* h.t.



Plot 89 Facing West *Artemisia tridentata*-*Dasiphora fruticosa*/*Poa pratensis* c.t.

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Plot 109 Facing West *Artemisia tridentata*-*Dasiphora fruticosa*/*Poa pratensis* c.t.



Plot 106 Facing East *Dasiphora fruticosa*-*Artemisia tridentata*/*Festuca campestris* c.t.

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Plot 86 Facing South Mixed Shrub-Shale Outcrop c.t.



Plot 13 Facing North *Pseudotsuga menziesii*/*Festuca idahoensis* h.t.

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Plot 15 Facing East *Pseudotsuga menziesii*/*Festuca campestris* h.t.



Plot 23 Facing North *Pseudotsuga menziesii*/*Festuca campestris* h.t.

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Plot 34 Facing West *Pseudotsuga menziesii*/*Festuca campestris* h.t.



Plot 43 Facing East *Pseudotsuga menziesii*/*Festuca campestris* h.t.

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Plot 25 Facing North *Pseudotsuga menziesii*/*Juniperus communis* h.t.



Plot 32 Facing South *Pseudotsuga menziesii*/*Juniperus communis* h.t.

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Plot 40 Facing East *Pseudotsuga menziesii*/*Juniperus communis* h.t.



Plot 35 Facing East *Pseudotsuga menziesii*/*Calamagrostis rubescens* h.t.

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Plot 4 Facing East *Pseudotsuga menziesii*/*Symphoricarpos albus* h.t.



Plot 5 Facing East *Pseudotsuga menziesii*/*Symphoricarpos albus* h.t.

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Plot 16 Facing East *Pseudotsuga menziesii*/*Symphoricarpos albus* h.t.



Plot 18 Facing North *Pseudotsuga menziesii*/*Symphoricarpos albus* h.t.

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Plot 10 Facing South *Pseudotsuga menziesii*/*Linnaea borealis* h.t.



Plot 41 Facing South *Pseudotsuga menziesii*/*Linnaea borealis* h.t.

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Plot 6 Facing South *Picea engelmannii*/*Linnaea borealis* h.t.



Plot 9 Facing South *Picea engelmannii*/*Linnaea borealis* h.t.

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Plot 162 (2014) Facing North Noxious Weed Tailings c.t.



Plot 162 (2015) Facing North Noxious Weed Tailings c.t.

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Plot 162 (2014) Facing South Noxious Weed Tailings c.t.



Plot 162 (2015) Facing South Noxious Weed Tailings c.t.

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Representative Photographs of Vegetation Sample Plots,
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Plot 117 Facing South Lowland Altered Grassland (Hay Meadow) c.t.



Plot 135 Facing West Lowland Altered Grassland (Hay Meadow) c.t.

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Plot 139 Facing South Lowland Altered Grassland (Hay Meadow) c.t.



Plot 140 Facing South Lowland Altered Grassland (Hay Meadow) c.t.

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Plot 143 Facing West Lowland Altered Grassland (Hay Meadow) c.t.



Plot 165 Facing West Lowland Altered Grassland (Hay Meadow) c.t.

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Plot 129 Facing North *Juncus balticus* c.t.



Plot 149 Facing North *Juncus balticus* c.t.

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Plot 176 Facing South *Juncus balticus* c.t.



Plot 166 Facing North *Carex nebrascensis* c.t.

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Plot 174 Facing North *Carex utriculata* h.t.



Plot 178 Facing North *Carex utriculata* h.t.

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Plot 179 Facing South *Carex utriculata* h.t.



Plot 160 Facing West *Dasiphora fruticosa/Poa pratensis* c.t.

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Representative Photographs of Vegetation Sample Plots,
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Plot 170 Facing North *Dasiphora fruticosa/Poa pratensis* c.t.



Plot 177 Facing North *Dasiphora fruticosa/Poa pratensis* c.t.

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Plot 175 Facing South *Dasiphora fruticosa*/*Deschampsia cespitosa* c.t.



Plot 182 Facing North *Dasiphora fruticosa*/*Deschampsia cespitosa* c.t.

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Plot 173 Facing West *Dasiphora fruticosa*/*Carex utriculata* c.t.



Plot 120 Facing North *Salix bebbiana* series

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Plot 123 Facing East *Salix bebbiana* series



Plot 156 Facing East *Salix bebbiana* series

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Plot 161 Facing South *Salix bebbiana* series



Plot 171 Facing East *Salix bebbiana* series

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Plot 183 Facing South *Salix bebbiana* series



Plot 184 Facing South *Salix bebbiana* series

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Plot 128 Facing North *Salix geyeriana* series



Plot 130 Facing North *Salix geyeriana* series

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Plot 132 Facing North *Salix geyeriana* series



Plot 142 Facing West *Salix geyeriana* series

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Plot 150 Facing South *Salix geyeriana* series



Plot 154 Facing North *Salix geyeriana* series

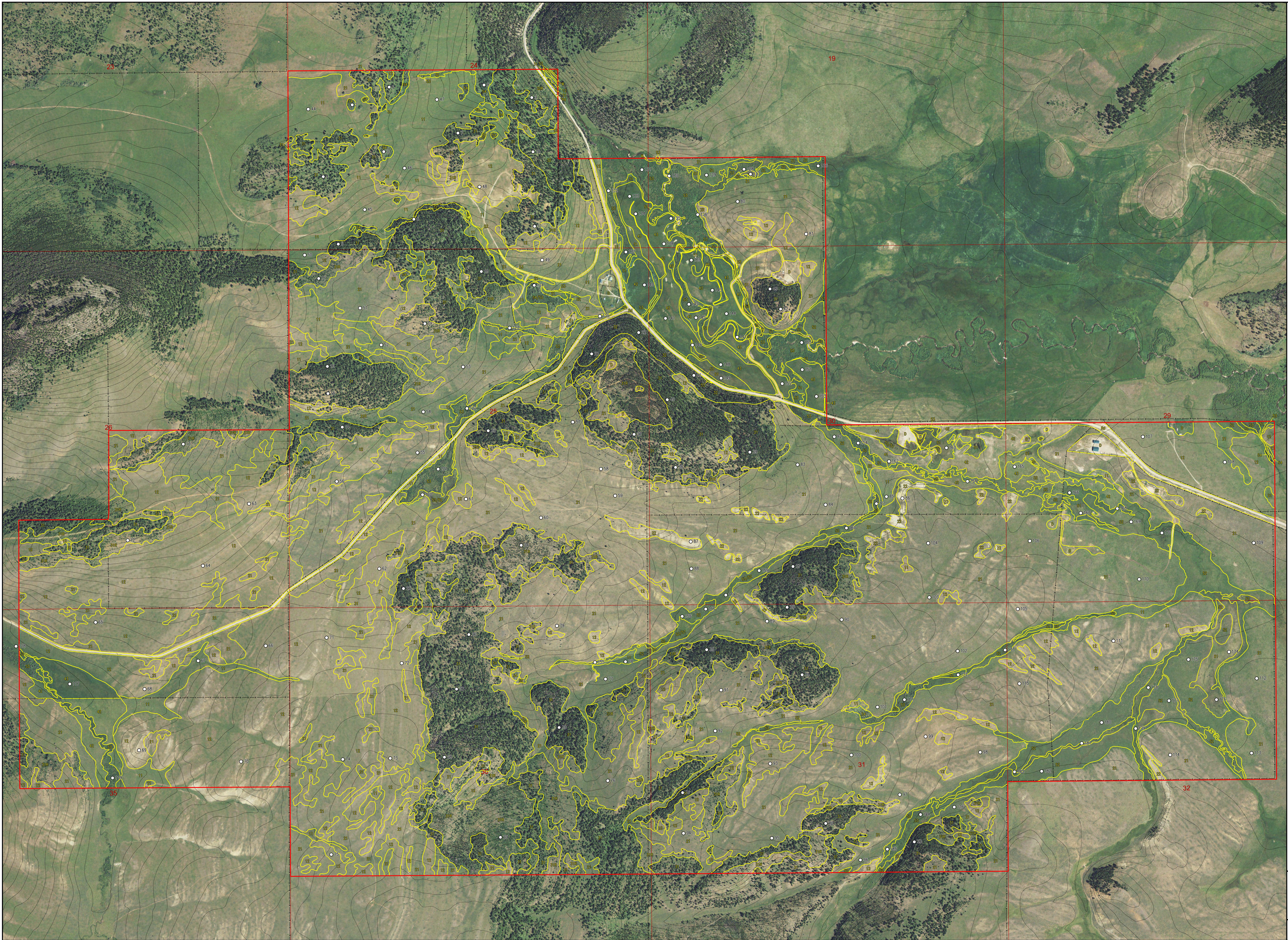
APPENDIX H
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Plot 8 Facing East *Populus tremuloides*/*Osmorhiza occidentalis* h.t.



Plot 124 Facing East *Populus tremuloides*/*Poa pratensis* c.t.



LEGEND

- Study Area Boundary
- Vegetation Type Boundary
- Vegetation Sample Site
- Fence

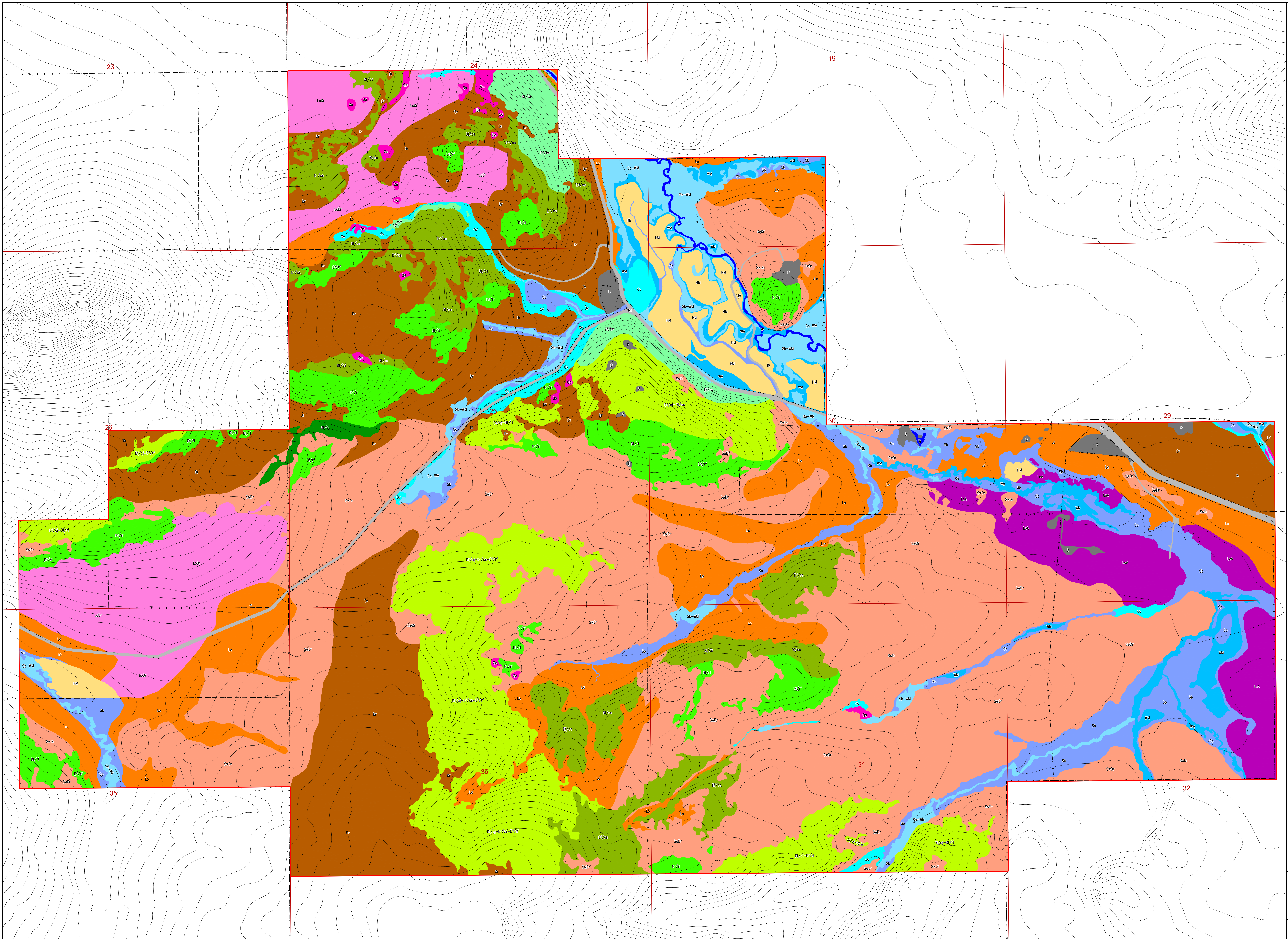
MAP UNIT	VEGETATION TYPE
UPLAND GRASSLAND	
11	Upland Altered Grassland c.t. Upland Native Grassland <i>Festuca idahoensis</i> / <i>Agropyron spicatum</i> h.t. <i>Festuca idahoensis</i> / <i>Stipa richardsonii</i> h.t.
12	<i>Festuca campestris</i> / <i>Agropyron spicatum</i> h.t. <i>Festuca campestris</i> / <i>Festuca idahoensis</i> h.t.
UPLAND SHRUBLAND	
21	<i>Artemisia tridentata</i> / <i>Poa pratensis</i> c.t. <i>Artemisia tridentata</i> / <i>Festuca idahoensis</i> h.t. <i>Artemisia tridentata</i> / <i>Festuca campestris</i> h.t. <i>Artemisia tridentata</i> - <i>Dasiphora fruticosa</i> / <i>Poa pratensis</i> c.t. <i>Dasiphora fruticosa</i> - <i>Artemisia tridentata</i> / <i>Festuca campestris</i> c.t.
22	Mixed Shrub-Shale Outcrop c.t.
CONIFER FOREST AND WOODLAND	
31 and 31R*	<i>Pseudotsuga menziesii</i> / <i>Festuca idahoensis</i> h.t. <i>Pseudotsuga menziesii</i> / <i>Festuca campestris</i> h.t. <i>Pseudotsuga menziesii</i> / <i>Juniperus communis</i> h.t. <i>Pseudotsuga menziesii</i> / <i>Cotoneaster rubescens</i> h.t. <i>Pseudotsuga menziesii</i> / <i>Symphoricarpos albus</i> h.t.
32 and 32R*	<i>Pseudotsuga menziesii</i> / <i>Linnaea borealis</i> h.t. <i>Picea engelmannii</i> / <i>Linnaea borealis</i> h.t.
LOWLAND ALTERED GRASSLAND	
41	Noxious Weed Tallings c.t.
42	Lowland Altered Grassland c.t.
43	Hay Meadow
RIPARIAN AND WETLAND (RW)	
Herbaceous RW types	
51	<i>Juncus bollicus</i> c.t. <i>Carex nebroscensis</i> c.t. <i>Carex utricularia</i> h.t.
Low Shrub (Cinquefoil) RW types	
52	<i>Dasiphora fruticosa</i> / <i>Poa pratensis</i> c.t. <i>Dasiphora fruticosa</i> / <i>Deschampsia cespitosa</i> c.t. <i>Dasiphora fruticosa</i> / <i>Carex utricularia</i> c.t.
Tall Shrub (Willow) RW types	
53	<i>Salix bebbiana</i> series <i>Salix geyeriana</i> series
Deciduous Forest (Aspen) RW types	
54	<i>Populus tremuloides</i> / <i>Osmorhiza occidentalis</i> h.t. <i>Populus tremuloides</i> / <i>Poa pratensis</i> c.t.
MISCELLANEOUS	
D	Disturbed
Rd	Road
W	Water

* R = immature stands of seedling, sapling, pole-sized trees in logged areas with conifer recruitment or where conifers are encroaching into grassland and shrubland areas.

Note: Acreage for composite map units (mosaic of vegetation types) is generated using the following percentages:
Map Unit Percent of Acreage
XY 60/40

Aerial: 2013 MAP
Topo: 20 Generated from 1/2 second NED

Scale 1" = 400'
Feet



LEGEND

- Study Area Boundary

Ecological Site

- Droughty
- Loamy
- Loamy Argillic
- Loamy Droughty
- Shallow Droughty
- Douglas-fir / rough lescue
- Douglas-fir / common juniper
- Douglas-fir / common snowberry
- Douglas-fir / twinflower
- Douglas-fir Complex
- Quaking aspen / Kentucky bluegrass
- Overflow
- Subirrigated
- Wet Meadow
- Subirrigated - Wet Meadow Complex

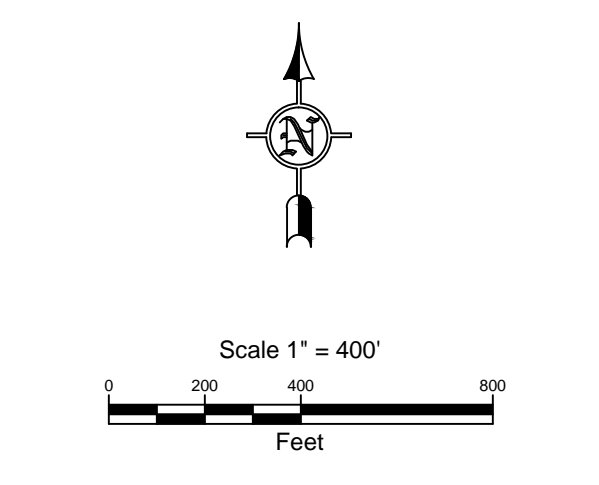
Hay Meadow

- Hay Meadow

Miscellaneous

- Disturbed
- Road
- Water

Topo: 20' Generated from 1/2" second NED



TINTINA RESOURCES
 Black Butte Copper Project
 Ecological Site Map