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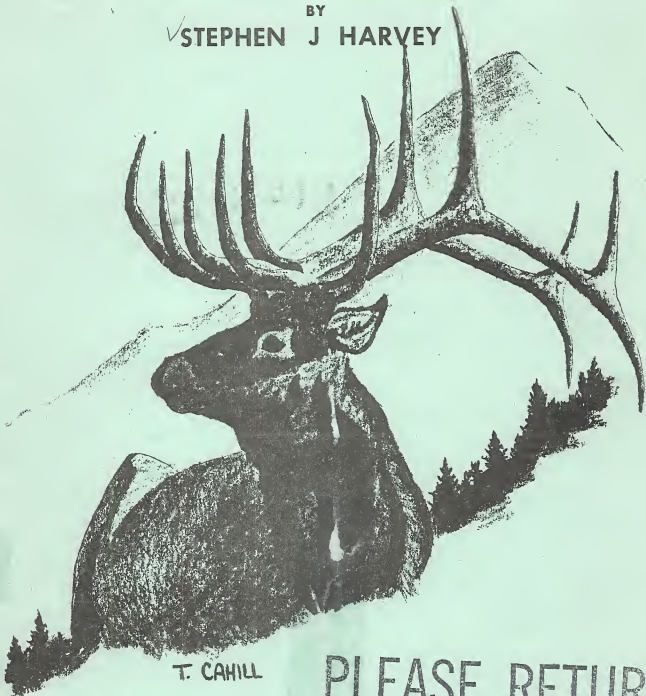
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# THE POTENTIAL AND CURRENT VEGETATION OF THE SUN RIVER GAME RANGE

BY

✓STEPHEN J HARVEY



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THE POTENTIAL AND CURRENT  
VEGETATION OF THE SUN RIVER GAME RANGE

Steven J. Harvey

Montana Department of Fish, Wildlife and Parks

Helena, Montana

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1980



## SUMMARY

Since acquisition of the Sun River Game Range, native perennial species have become dominant over most of the range. Management practices from 1948 to 1978 have promoted succession toward the climax plant communities and have succeeded in all but a few areas of the range. Near climax communities now exist in most of the non-forest vegetation. The Douglas Fir forest remains in a non-climax condition due to fires that occurred long before purchase of the Game Range. Several areas of grassland are also below climax as a result of long-lasting effects of poor management practices that were used prior to the purchase of the Game Range.

The current management practices are recommended for continued use on the majority of the range. Fertilization and prescribed burning are suggested as possible new programs for some areas.

Descriptions of the major plant communities and maps of the climax communities and the major deviations from the climax community are included. Plant species and their presence in each community is listed.

A plant collection, full size mylar maps and a full size color map of the climax communities is available for limited use at both the Sun River Game Range Headquarters and the regional Montana Fish and Game Office in Great Falls, Montana.

21 September 1979



#### ACKNOWLEDGMENTS

Mr. Bert Goodman (manager, Sun River Game Range) generously provided assistance in details of management procedures since acquisition, transportation to remote areas and for lodging at the game range. Thanks also for his patience where horses are concerned and his family for their friendship and wonderful meals.

J. Mitchell provided R. Hodder's 1953 report and original data sheets. Forest service personnel in Augusta provided information on fire and grazing history of the area.

Dr. J. Rumely visited the area to help with difficult plant identification. Thanks also for his identification of the voucher specimens sent to the Montana State University herbarium.

CONTENTS

ACKNOWLEDGMENTS . . . . .	1
TABLE OF CONTENTS . . . . .	ii
I. INTRODUCTION . . . . .	1
Objectives . . . . .	1
Discussion . . . . .	1
II. METHODS . . . . .	3
III. PHYSICAL SETTING . . . . .	4
Topography and Geology . . . . .	4
Climate . . . . .	5
IV. CLIMAX VEGETATION . . . . .	7
Definitions . . . . .	7
Grasslands . . . . .	8
G-1. <i>Agropyron spicatum/Bouteloua gracilis</i> h.t. . . . .	8
G-2. <i>Agropyron spicatum/A. smithii-A. dasystachyum</i> h.t. . . . .	8
G-3. <i>Agropyron spicatum/Poa sandbergii</i> h.t. . . . .	9
G-4. <i>Festuca scabrella/Agropyron spicatum</i> h.t. . . . .	10
G-5. <i>Festuca scabrella/Festuca idahoensis</i> h.t. . . . .	11
G-6. <i>Festuca idahoensis/Agropyron spicatum</i> h.t. . . . .	12
G-7. <i>Agropyron spicatum scree</i> . . . . .	12
Shrublands . . . . .	12
S-1. <i>Potentilla fruticosa/Festuca scabrella</i> h.t. . . . .	13
S-2. <i>Amelanchier alnifolia/Agropyron spicatum</i> c.t. . . . .	13
S-3. <i>Artemisia tridentata/Festuca idahoensis</i> h.t. . . . .	14
Riparian . . . . .	14
R-1. <i>Juncus balticus/Carex</i> spp. c.t. . . . .	14
R-2. <i>Salix hebbiana/Carex</i> spp. c.t. . . . .	14
R-3. <i>Eleagnus commutata/Carex</i> spp. c.t. . . . .	15
R-4. <i>Populus trichocarpa/Salix hebbiana</i> c.t. . . . .	15
Deciduous Forest . . . . .	16
D-1. <i>Populus tremuloides/Rosa acicularis</i> c.t. . . . .	16
D-2. <i>Populus tremuloides/Symphoricarpos albus</i> c.t. . . . .	16
D-3. <i>Populus tremuloides/Salix hebbiana</i> c.t. . . . .	17
Conifer Forest . . . . .	18
F-1. <i>Pinus flexilis/Festuca idahoensis</i> h.t. . . . .	18
F-2. <i>Pinus flexilis/Juniperus communis</i> h.t. . . . .	19
F-3. <i>Pseudotsuga menziesii/Symphoricarpos albus</i> h.t. . . . .	19
F-4. <i>Pseudotsuga menziesii/Calamagrostis rubescens</i> h.t. . . . .	20
F-5. <i>Pseudotsuga menziesii/Carex geyeri</i> h.t. . . . .	20
F-6. <i>Pseudotsuga menziesii/Arnica cordifolia</i> h.t. . . . .	21
F-7. <i>Pseudotsuga menziesii</i> complex . . . . .	21
Alpine . . . . .	22
A-1. <i>Dryas octopetala/Carex rupestris</i> c.t. . . . .	22
V. VEGETATION TYPES . . . . .	23
Comparison to Previous Vegetation . . . . .	23
Background . . . . .	23
Hodder's Range Survey . . . . .	23
Vegetation Comparison . . . . .	24
Game Range Vegetation Types . . . . .	25
A. Border Grasslands . . . . .	25
B. Potholes Grasslands . . . . .	26
C. Alkali Flats . . . . .	26



C1.	Schoolhouse Flats . . . . .	26
D.	Willow Creek Canal Erosion Gully . . . . .	27
E.	Headquarters Pasture . . . . .	27
F.	Headquarters Pasture . . . . .	28
G.	Hay Meadow . . . . .	28
H.	Meadow Pond Pasture . . . . .	28
I.	Rose Creek Hay Meadow . . . . .	29
J.	Stove Creek Logging Area . . . . .	29
K.	East Sawtooth Forest Burn . . . . .	29
L.	Coyote Basin/Burdoff Meadow . . . . .	29
S.	West Sawtooth Ridge Burn . . . . .	30
	Vegetation Types Outside the Game Range . . . . .	31
M.	Stecker Ranch . . . . .	31
N.	Home Gulch Fescue Grasslands . . . . .	31
O.	North Sawtooth Forest Burn . . . . .	31
P.	Home Gulch/Burdoff Ridge Burn . . . . .	32
Q.	Lower Home Gulch Burn . . . . .	32
R.	Agropyron Flats . . . . .	32
VI.	USING GAME RANGE MAPS . . . . .	33
VII.	MAPS . . . . .	34
	Augusta and Vicinity . . . . .	35
	Sun River Game Ran . . . . .	36
	Climax Plant Communities . . . . .	37
	Vegetation Types . . . . .	50
VIII.	APPENDICES . . . . .	63
	A. Species, Species Abbreviations and Common Names . . . . .	64
	B. Native and Naturalized Plants of Habitat and Community Types . . . . .	75
	C. Lake and Vernal Pond Plants . . . . .	83
	D. Weedy Plants . . . . .	84
IX.	BIBLIOGRAPHY . . . . .	85



## I. INTRODUCTION

### OBJECTIVES

1. To map the current vegetation of the Sun River Game Range.
2. To compare the vegetation condition in 1953 (determined by R. L. Hodder) and the current vegetation.
3. To prepare a collection of the plants of the Sun River Game Range.

### DISCUSSION

To map vegetation, the investigator must know the ecology of the area in considerable detail before he can begin to map. This relates particularly to knowing the indicator value of individual species or groups of species and the ecological effects of site factors, such as geology, soil characteristics and disturbance variations (Mueller - Dombois and Ellenberg, 1974).

In western Montana, the major portion of this groundwork has already been done by several investigators, notably the grasslands and shrublands (Mueggler and Handl, 1974) and the conifer forests (Pfister, Kovalchik, Arno and Presby, 1977). Their work has established the species that are indicators of communities and/or disturbance and the important site factors, particularly geological and pedological. The communities covered by these works comprise over 80% of the area. The remaining area, mostly riparian, deciduous forest and alpine communities, have not been comprehensively covered but have been studied locally throughout the northern Rocky Mountains.

Mapping vegetation not only provides a spatial representation of the vegetation pattern but provides a documentation 'frozen' in time that can be used in the future to provide information on disturbance, succession, management, etc. Along with the sampling data he collected, Richard Hodder's 1953 map of the game range provides the comparison needed for the second objective.

Mapping also aids in classifying vegetation by providing a framework for research. The pretyped communities and obvious patterns on air photographs can be outlined in the laboratory and by means of repeated field reconnaissance the classification can be tested and then corrected where necessary. New categories can be established as needed until the whole of the area is covered.

Vegetation mapping also aids in the causal research of plant and animal communities. Soil, climate, history, geology, etc., can be overlaid on the vegetation map in order to help understand the environmental influences. Animal populations can be plotted on the map to better understand the interrelationship between the animal and its environment, and the management that may be required as a result. This objective of mapping is only lightly dealt with in this report.

While mapping of vegetation types (current vegetation) is useful for past evaluations and current planning, it is limited in its usefulness for long-range future planning. Emphasis on potentialities, regardless of current status of the vegetation, permits the closest possible correlation among vegetation, microclimate and soil (Davbemmire, 1968). The most desirable potential vegetation to map for a game range are those plant associations

which, in the absence of disturbance, are relatively stable. These are called climax vegetation. The aggregate of all areas that support, or can support, the same primary climax is a habitat type, the unit that is mapped in the primary map of this study (Daubenmire, 1970).

## II. METHODS

The initial phase of this study was spent collecting specimens and getting familiarized with the plant associations and topography of the game range and vicinity. Plant collecting (the third objective) continued throughout the field portion of the study. Voucher specimens are on file at the Montana State University herbarium.

Laboratory mapping of pretyped vegetation and roads, rock, water and other readily apparent units was then undertaken. The apparent differences in vegetation and other features were outlined on stereo pair aerial photographs (1:20,000). Most stands of different tree species, different shrub types and different grass types was discernable from the photographs. The drier grass types and the *Potentilla fruticosa* areas were not readily apparent.

Field reconnaissance was then undertaken to confirm the validity of the geographical limits of the outlined unit and to determine the vegetation and habitat type of each unit. Additional units were added or units lumped as necessary. Cover of the dominant perennials were recorded and a species list made for each unit.

After reconnaissance was completed, the outlines of the units were transferred to a 7.5 minute (1:24,000) topographic map. From this map, final revisions were made for both the climax vegetation map and the vegetation type map. Many stands were revisited to make final boundary adjustments and/or to make final evaluation as to successional statue of the stand.

Final map production was made on Mylar enlargements of USGS topographic maps at a scale of 1:15,750 (4 inches = 1 mile). These maps can be used to make blueprint reproductions for field use.

### III. PHYSICAL SETTING

#### TOPOGRAPHY AND GEOLOGY

The Sun River Game Range is situated along the foothills of the Rocky Mountains at the western edge of the Northern Great Plains (High Plains physiographic province).

The game range is composed of three areas of different geological influence on the vegetation. The lower game range (east of the line from Black Butte to Long Lake to Dicken's Lake) is influenced mostly by glacial geology. The area west and south of a line from Black Butte to Long Lake to the Burdoff - Home Gulch Divide (upper game range) is mostly influenced by the bedrock geology. The remaining area (Burdoff drainage and Coyote Basin) is influenced by both bedrock and glacial geology. (Geology compiled from Mudge (1965, 1967)).

THE LOWER GAME RANGE - It slopes upward to the southwest from an elevation of 1,310 meters (4,300 feet) up to approximately 1,500 meters (4,925 feet). During pleistocene glaciation, ice spread over the Burdoff - Home Gulch Divide and the Coyote Basin and spread south just over present day Barr Creek. Barr Creek itself is the remnant of a lateral melt-water channel. The area north of Barr Creek is covered by Pinedale age till forming ground moraine and recessional moraines. The terrain is very hummocky as a result. There are abundant kettles, as evidenced by the numerous lakes in this area. Not all kettles are water filled, as erosion has drained many and filled others. Glacial scours abound and many drumlins are evident.

The soils formed on the ground moraine are moderately shallow to moderately deep with abundant carbonate rock fragments. The drainage areas have gravelly soils (derived from glacial outwash) with a sandy matrix and a thin covering of fine textured particles washed in from the surrounding morainal soils.

The underlying bedrock projects to the surface along ridges and some deep-cut drainages. It consists of Cretaceous mudstones, siltstones and sandstones of the Two Medicine, Virgelle, Telegraph Creek, Marias River and Blackleaf Formations, of which half are calcareous in nature.

THE UPPER GAME RANGE - The Sawtooth Ridge, the first major thrust of the Rocky Mountains of the area, dominates the landscape. From the glaciated margin of the lower game range (at about 1,500 meters) the ridge rises to 2,483 meters (8,147 feet). The bedrock is composed of limestone and dolomite of the Madison Group (Allan Mountain and Castle Reef Formations) of Mississippian age and some Devonian limestone and dolomite of the Jefferson Formation. Where bedrock is not directly near the surface, rockfall avalanche deposit, rockslide deposit, rock glacier deposit or talus derived from the above bedrock is found. Most of the slope east of the Sawtooth Ridge crest is Pinedale age rockfall avalanche deposit while west of the crest bedrock predominates.

The soils are calcareous because of their derivation directly from calcareous parent material. The sites are also drier than the precipitation might indicate, because of the porous bedrock on which they are located.

THE BURDOFF - COYOTE BASIN AREA - The topography here is highly influenced by the bedrock geology but has been tempered by glaciation.

The Coyote Basin is two parallel ridges of lower cretaceous sandstone and siltstone. The eastern-most is Kootenai Formation, the western is Blackleaf Formation. The Burdoff - Home Gulch Divide was created by the Diversion Thrust and is composed of Castle Reef dolomite (Mississippian) and Jurassic mudstones and sandstones (Morrison, Swift and Rierdon Formations). The Burdoff drainage between these two areas is in an imbricated fault zone.

Glaciers completely covered the area below 1,615 meters (5,300 feet), leaving glacial grooves with preserved striations as evidence on the higher ridge points. A few kettles also remain. Most of the ground moraine (Pinedale age) on the ridges has since been removed by erosion, but down in the Burdoff drainage much of it still remains and is now covered by Douglas fir forest.

The soils over bedrock areas are generally shallow to moderately shallow, while the morainal soils are moderately deep. The southern-most fork of Burdoff Creek, and the lowest part of Burdoff Creek near the range boundary (1,370 meters; 4,500 feet) have substantial deposits of Neoglacial age alluvium that are now largely occupied by willow and aspen.

#### CLIMATE

No long-term weather records have been kept on the game range, therefore only estimates of temperature and precipitation can be made. Weather data from Augusta (elevation 1,250 meters; 4,100 feet) and Gibson Dam (elevation 1,399 meters; 4,590 feet) were used for these estimations. Augusta is 17 air kilometers (11 air miles) from the game range headquarters; Gibson Dam 13 air kilometers (8 air miles).

The mean annual temperature at both Augusta and Gibson Dam is 5.4°C (41.8°F). This is surely the same on the game range. The January mean is -5.2°C (22.7°F) and the July mean is 16.9°C (62.4°F) at Gibson Dam. These temperatures are within 1°C of the Augusta means (cooler during winter, warmer during summer), and should correspond well to the game range.

Precipitation on the lower grasslands is estimated to be 38 centimeters (15 inches) annually. Augusta receives a mean annual precipitation of 34.5 centimeters (13.6 inches), Gibson Dam receives 43.8 centimeters (17.2 inches). Precipitation at the base of the Douglas fir forest is probably close to 47 centimeters (18.5 inches), as the elevation is higher than Gibson Dam, and Pfister, et al. (1977) report 47 to 49 centimeters precipitation for PSME/SYAL habitat type. The upper reaches of the Sawtooth Ridge probably receive 70 centimeters (28 inches) of precipitation (Ross and Hunter, 1976).

One third of the annual precipitation of the area is received in the months of May and June. An additional third is received from July to mid October.

The weather in this area is also characterized by frequent westerly winds that often exceed 60 kilometers per hour (37 miles per hour). These "chinook" winds are warm due to their descent off the high Rocky Mountains. During the winter, both the strength and warmth of the winds contribute to quick removal of snowfall from the open grasslands of the game range. Snow accumulates in the wind protected areas, forming large drifts. Chinook winds are most prominent in winter and early spring but also occur at other seasons.



#### IV. CLIMAX VEGETATION

##### DEFINITIONS

##### HABITAT TYPES

All parts of the landscape that support, or are capable of supporting, the same kind of relatively stable plant association (i.e., climax community), in the absence of disturbance, comprise one habitat type (Daubenmire, 1968). This habitat type, in reality, represents the sum total of the environment; the climate, the soil, the geology, the vegetation, etc. The plants, since they are essentially immobile, are the indicators of the environment as a whole. No single plant is representative, but the combination of plants that comprise the stable association are.

The grassland/shrubland habitat types for western Montana have been worked out by Mueggler and Handl (1974). The coniferous forest habitat types have been established by Pfister, et al. (1977).

##### COMMUNITY TYPES

For those areas where established habitat types have not been worked out, I have used the term "Community Type" to indicate what I feel is climax vegetation. A stand of vegetation was considered climax if: 1) Young perennials that appeared successful in the community were represented by old individuals in the same stand; 2) Alien species were absent, or if present were represented by few individuals of low vigor; 3) Fire sensitive species native to the area were not conspicuously absent.

The alpine, deciduous forest, riparian and one shrubland community fall into this category. Only extensive research over a large area, such as western Montana, can establish whether these community types will stand up to the test of a habitat type. These community types should only be considered to represent the Sun River Game Range vicinity.

##### OTHER AREAS

Rock, talus, scree, water and roads comprise the remaining landscape. Talus and scree were combined in this study, so long as some fairly visible vegetation was present. Talus without much vegetation is lumped with rock under the rock heading.

## GRASSLANDS

The most extensive grasslands of the Sun River Game Range occur within the area once covered with glacial ice; the area north and east of Barr Creek, including Coyote Basin and The Home Gulch - Burdoff Creek ridge. This is probably due to the finer textured and deeper soils that developed on the ground moraine left by the glaciers. The area between Shed Creek and Rose Creek drainages also has substantial grassland, even though this area was not glaciated. The grasslands here occur as much smaller stands than in the glaciated area.

Six grassland habitat types, as described by Mueggler and Handl (1974), are found on the game range. Some modification of their types was necessary in order to increase the specificity of habitats as they occur on the game range. One grassland scree unit was created (G-7).

The order of discussion generally follows increasing moisture and elevation (except G-7).

### G-1 *Agropyron spicatum/Bouteloua gracilis* habitat type (AGSP/BOGR).

This habitat type is found in the northeast corner of the game range in sections 2, 3, 11, 12 and 13. It occurs mostly on south or southwest facing slopes or windblown flats that have dry, shallow, rocky soils.

*A. spicatum* and *Stipa comata* share the greatest cover. *B. gracilis* is always present, though quite variable in canopy cover. Alkali Flats and the area northeast of the Chain-O-Lakes have more cover of *B. gracilis* because of pre-acquisition disturbance. *Carex filifolia* follows the same pattern as *B. gracilis*.

*Agropyron smithii* and *Koeleria cristata* are always present. *Bromus tectorum* is present in minor amounts.

The most consistent forbs are *Artemisia frigida* and *Gutierrezia sarothrae*. Less stony soils commonly have *Liatrus punctata* and *Achillea millefolium*.

*Calamagrostis montanensis* and *Opuntia polyacantha* are notably absent from this habitat type on the game range. This is the most depauperate of the grassland habitat types on the game range, with only 30 species present.

### G-2 *Agropyron spicatum/Agropyron smithii* - *A. dasystachyum* habitat type. (AGSP/AGSM)

Two variants of this type are described for the game range. Both are of considerable deviation from the type described by Mueggler and Handl and may be more appropriately described as separate associations.

The first variant occurs only at the very southeast corner of the game range along the flood plain of Barr Creek. The soil is clayey and was plowed prior to 1948, though the only evidence now of that disturbance is the decrease in slope. 1938 aerial photographs show the plowing clearly.

This site most closely resembles the habitat type described by Mueggler and Handl. The grass cover is dominated by *A. smithii*, with *A. spicatum*, *Stipa comata* and *Phleum pratense* secondary in cover. *Elymus cinereus* clumps are conspicuous but add little to the total cover.

*Symphoricarpos albus* and *Rosa arkansana* form large clones and *Artemisia frigida* is common. Many weedy forbs are found at this site because of its close proximity to the county road and the clayey soil.

The second variant occurs in low angle drainages adjacent to pot-holes from the Chain-O-Lakes to Schoolhouse Flats and the county road in Section 2. The soils are mostly clay and are alkaline because of the poor drainage and the high amount of wind evaporation.

*A. smithii* dominates the cover at most sites, forming nearly pure stands in some areas. *Bromus inermis* and other rhizomatous graminoids occupy a secondary position. Few forbs are present.

*Distichlis stricta* is common in the marshy drainage by the county road in section 2. In two other locations it dominates, with *A. smithii* present only in small amounts. These two locations (the west facing slopes at the east ends of Neal Lake and the Chain-O-Lakes) receive wind-borne spray from their respective lakes during high winds. The spray is rapidly evaporated, leaving behind the dissolved salts that were in the spray. This creates a highly alkaline soil even though the soil appears well drained and is gravelly. Precipitation from rain must be less than spray precipitation in order to perpetuate this alkaline condition.

Even though the area occupied by this habitat type as a whole is small, 42 species were identified. This is the result of the moist nature of the habitat type.

#### G-3 *Agropyron spicatum*/*Poa sandbergii* habitat type. (AGSP/POSA)

This habitat type occurs throughout the grassland area of the game range. Two subdivisions have been created here to further delineate this habitat type on the game range. The first subdivision is the *Stipa comata* phase as described by Mueggler and Handl, found on rocky soils with a higher presence of fine material than the juniper phase. The second subdivision is here designated the *Juniperus horizontalis* phase, characterized by the presence of horizontal juniper clones in a *S. comata* phase matrix. These soils have less fine textured material at the surface.

Both of these phases are found throughout the lower game range in areas exposed to the frequent winds of the area. Some small areas also occur in the Shed and Rose Creek drainages.

G-3, *Stipa comata* phase - *A. spicatum* is the dominant grass. *A. smithii* and *Bouteloua gracilis* are absent. *Muhlenbergia cuspidata* and *Koeleria cristata* are present in varying amounts. Either *S. comata* or *S. spartea* or both are consistently present. *Poa sandbergii* was not specifically identified but, as the study was started in mid-summer, this spring blooming species may have been overlooked because of the absence of inflorescences. Grasses of the *Poa* genus are present throughout the habitat.

The most consistent forbs are *Comandra umbellata*, *Linum perenne*, *Gaura coccinea*, *Achillea millefolium*, *Artemisia frigida* and *Gutierrezia sarothrae*.

G-3j, *Juniperus horizontalis* phase. - This designation is not recognized by Mueggler and Handl and is described here only for the use in delineating a more specific division of the habitat type on the Sun River Game Range.

This phase is characterized by large mats of *J. horizontalis* interspersed through the *A. spicatum*/*P. sandbergii* grassland. The grassland between the mats is like that of the previous phase. The *Juriper* mats, however, act as a catchment for soil, and under its canopy a more favorable environment for species requiring deeper soil and/or greater moisture is found. *Festuca scabrella*, *Agropyron dasystachyum*, *Bromus carinatus* var. *linearis*, *Calamagrostis purpurascens*, *Bupleurium americanum* and *Lomatium tritermatum* are examples of species present within the shrub canopy that are found only in more moist or deeper soiled habitats.

101 species were found present in these two phases combined, due in part to the extensive area covered by this habitat type.

G-4 *Festuca scabrella*/*Agropyron spicatum* habitat type, *Stipa comata* phase (FESC/AGSP)

This is the most extensive type of grassland on the game range, occurring from the low elevations in the northeast and southeast corners up to the border of the *Pseudotsuga* forest as high as the Home Gulch-Burdoff Creek divide. The soils are moderately deep and lower in coarse fragments than the previous habitat type.

*F. scabrella* and *A. spicatum* dominate the cover with *F. idahoensis* and *S. comata* (and/or *S. spartea*) always present but not conspicuous. This habitat type has the greatest diversity of grasses, although the species other than the four above contribute little to the overall cover.

*Danthonia parryi* in some areas replaces or is codominant with *F. scabrella*. Moss and Campbell (1947) found *D. parryi* to be an increaser under grazing in Alberta. Morris (1978) feels that large quantities of this grass indicate past grazing abuse and that codominance may occur once grazing is halted. The description of the region from historical reports and Hodders study (1953) indicate a greater presence of *D. parryi* than is evident now. This tends to support the view that it is an increaser with the ability to compete with the perennial grasses that it replaced, once the disturbance is removed.

*Andropogon scoparius* is present in one stand at the Barr Creek enclosure. This area was disturbed by grazing prior to the acquisition of the range and has been slower to recover than most of the other stands of this habitat type. The enclosure, constructed in 1948, indicates that pressure continues on this site. *F. scabrella* and *A. spicatum* have both increased under this protection, with a corresponding decrease in *F. idahoensis*, *D. parryi*, *S. comata* and *A. scoparius*. The area outside the enclosure still has a high presence of *A. scoparius* and *S. comata* along with some *D. parryi*. High winds funneled across this area by the Barr Creek glacial overflow channel probably help keep this area retarded in recovery by slowing down the soil rebuilding process. The fence surrounding the enclosure surely provides some measure of wind protection along with the added canopy of ungrazed grasses. This is evident with a slightly deeper and more humus rich soil within.

*Comandra umbellata*, *Lupinus sericeus*, *Linum lewisii*, *Achillea millefolium*, *Antennaria parvifolia*, *Artemisia frigida*, *Gutierrezia sarothrae*, *Chrysoopsis villosa* and *Liatrus punctata* are the most consistent forbs present. *Balsamorhiza sativata* is locally abundant, as is *L. sericeus*.

G-4d. *F. scabrella*/*A. spicatum* habitat type, drift complex. These areas fall within the habitat type description but have the added feature of being on protected slopes where snowdrifts accumulate and persist for longer periods. This creates exceptionally wet patches which contain a canopy dominated by shrubs and forbs. These patches are generally too small to map individually,

but are important wildlife habitats, as evidenced by droppings and browsing evidence found in those areas.

The most conspicuous shrubs are *Amelanchier alnifolia*, *Prunus virginiana*, *Spiraea betulifolia* and *Symphoricarpos albus*. Usually only one shrub species dominates a drift patch. An abundance of forbs occur at these sites. The most consistent are *Fragaria virginiana*, *Geum triflorum*, *Potentilla gracilis*, *Geranium viscosissimum*, *Lomatium triternatum*, *Galium boreale*, *Antennaria parvifolia* and *Antennaria microphylla*. *Carex hoodii*, *Agropyron dasystachium*, and *Elymus cinereus* are the most consistent graminoids.

This habitat type, when drift site species are included, has the second greatest diversity of the grasslands, with 99 species.

Wildlife evidence is abundant throughout this habitat type. Elk droppings are common to abundant. Near the *Pinus flexilis* forest evidence of bear foraging is common. Rabbit burrows and droppings are also evident. Coyotes, Sharp-tailed Grouse and Pronghorn Antelope were also observed in this habitat type.

#### G-5 *Festuca scabrella*/*Festuca idahoensis* habitat type (FESC/FEID)

The stands of this type occur on generally deep soils south of Barr Creek from the game range entrance to the headquarters area and on the west slope of the Burdoff-Home Gulch divide. Elk droppings are common in this community. Sharp-tailed grouse and Whitetail Jackrabbit were often seen in this habitat type.

*F. scabrella* is the dominant cover on game range sites. *F. idahoensis* and *Agropyron spicatum* on game range sites are present but contribute only about 10% of the cover, but on the grazed Home Gulch area outside the game range, both are high in cover, even predominating over *F. scabrella*.

The area on the north slope of Lookout Point is dominated by *Danthonia parryi*, with only a minor presence of *F. scabrella*. Mueggler and Handl found that *D. parryi* can be codominant in this habitat type. As discussed in the FESC/AGSP habitat type, this may be a case of very slow recovery from overgrazing and *D. parryi* may, eventually, be totally replaced by *F. scabrella*. This area has high elk use, which may contribute to a long recovery period by keeping *Festuca* suppressed.

The most consistent forbs of this habitat type are *Cerastium arvense*, *Anemone multifida*, *Clematis hirsutissima*, *Geum triflorum*, *Lupinus sericeus*, *Galium boreale* and *Campanula rotundifolia*.

Although the type has comparatively rich soils, grazing in the Home Gulch area and high litter production of *F. scabrella* on the game range has kept the number of species identified (78) from being higher.

Two particular management considerations present themselves in this habitat type on the game range, especially in the Fescue Flats and Swazey Lake areas. *F. scabrella* production, especially on Fescue Flats, has been so high in the past that ground between grass bunches is totally covered by *F. scabrella* litter. This litter has shaded out much of the other grasses and forbs, and even has reduced the production of *F. scabrella* itself by preventing new plants from establishing. The second potential problem is the establishment of *Pinus flexilis* in the grassland, especially on the north slope of the ridge northeast of Swazey Lake. The growth of these trees in the grassland could eventually reduce grass production by shading.

Both of the above conditions are probably the result of fire suppression. Periodic natural fires consume excess litter and destroy new pine seedlings. While the tree encroachment concerns a very small area, the over-production of grass litter concerns a very large area, with a potential for very good production of elk forage.

Prescribed burning should be given consideration to improve *Festuca* production. A study to evaluate the effect of fire should be instituted, with attention given to species composition change as well as production. Several burns should be conducted at different times to evaluate the effects of fire intensity as well as season of treatment.

#### G-6 *Festuca idahoensis*/Agropyron spicatum habitat type (FEID/AGSP)

These small stands occur mostly in the Coyote Basin and Upper Barr Creek areas on protected, moderately steep slopes and in cold air pockets. A variety of soils were encountered.

*F. idahoensis* and *A. spicatum* share dominance. *A. dasystachyum* and *A. caninum* var. *majus* are both present but not conspicuous.

Few forbs are present, the most common being *Galium boreale* and *Sedum lanceolatum*. The stands on the steep slopes on the east side of Coyote Basin have fewer forbs than stands above Barr Creek or Burdoff Creek because of the drier conditions (the soils are rockier and better drained).

Only 38 species were identified in this type, due largely to the small area it covers.

#### G-7 *Agropyron spicatum* scree (AGSP SCREE)

This scree habitat is found only on the west side of Home Gulch, from Agropyron Flats to the Sun River Canyon. *A. spicatum* and *F. idahoensis* are the most conspicuous grasses although a variety of dry site grasses are found scattered along the stretch of this grass type.

*Amelanchier alnifolia* is the most abundant shrub. The shrubs and many of the forbs occur at the base of the slope where water accumulation is greatest.

Small areas of this type too small to map can be found at the base of many of the vertical rock ridges from Coyote Basin west. All are rocky soils derived from the limestone or dolomite rock of the ridge. Only 39 species were recognized here, but many forbs may have been missed due to their drying and disintegration before this site was visited in late summer.

### SHRUBLANDS

The shrublands described here do not include the tall shrub communities along streams and in some vernal drainages (described in the following Riparian Section). The three shrub communities described here are occupied by medium shrubs with a grass-dominated understory that in some cases may even hide the presence of the shrubs.

The dominant shrubs of these three types are unimportant as forage and the potential for increasing in cover is minimal. Management should be directed toward the grass understory.

The *Amelanchier alnifolia*/*Agropyron spicatum* community type is not recognized by Mueggler and Handl, but the two other shrublands are.

S-1 Potentilla fruticosa/Festuca scabrella habitat type. (POFR/FESC)

This community occurs on gently sloping sites with deep, rich soils from the lowest elevations of the game range to the Cutrock Creek-Home Gulch divide. The stands in the lower elevations are more commonly found in drainages and wet meadows.

The similarity of the drainage and wet meadow communities to the upland, well drained communities was not determined by Mueggler and Handl. Their habitat type description concerns the upland communities and no description similar to the drainage and wet meadow sites on the game range is given. I have elected, however, to include both upland and lowland sites under this one habitat type because of two factors. A) Separation of the types would create many small units too small to map and therefore the effectiveness of delineating two types would be lost. B) The two variants often occur together and merge one into the other, making clear separation difficult. When working in this habitat type, it is suggested that note be made whether it is an upland area, or drainage-wet meadow site. Further work on this habitat type may delineate separate habitat types and management considerations may be different for each. Species composition of the two is certainly different in many cases.

*P. fruticosa* individuals may not be readily visible. Grasses and forbs are sometimes taller than the shrubs and, without careful inspection, the extent of shrub cover may be severely underestimated. *P. fruticosa* shrubs in the drainages and wet meadows are generally taller and more robust than those on well drained upland sites.

Grasses on upland sites are dominated by *F. scabrella*. *F. idahoensis* and *A. spicatum* are present and conspicuous. Areas that were heavily grazed before acquisition of the game range have less *F. scabrella* cover.

*Clematis hirsutissima*, *Gewm triflorum*, *Lupinus sericeus*, *Gallium boreale*, *Campanula rotundifolia*, *Achillea millefolium* and *Antennaria parvifolia* are the most consistently present forbs. A great diversity of forbs are found in this type.

Wet meadow and drainage stands are generally narrow strips with few forbs. Rhizomatous graminoids dominate the understory. *Phleum pratense* and *Poa pratensis* have become well established. *F. scabrella* is restricted to the outer edges of the community or may even be lacking. *Artemisia ludoviciana* var. *ludoviciana* is the only consistent forb. In the drier drainages not dominated by rhizomatous grasses, *Iris missouriensis*, *Achillea millefolium*, *Solidago missouriensis* and *Potentilla gracilis* are often found.

This widely distributed habitat type has 70 species.

S-2 Amelanchier alnifolia/Agropyron spicatum community type (AMAL/AGSP)

This is restricted to one stand on a gravelly alluvial fan near the upper Burdoff campsite. This community has large patches of *A. alnifolia* interspersed with rocky areas with *A. spicatum*. *Phleum pratense* and *Poa* spp. are also present. Several species of weedy forbs are also common.

This alluvial fan probably originated from erosion following the burning of the forest at the head of the drainage (vegetation type areas O and P). Until soil is built up to fill the gravel interspaces, this community will probably remain. Since this community has now persisted for at least 50 years, this process will probably take at least as long to significantly change the community composition.

Because of the rocky nature and small size of this community, only 13 species were identified.

S-3 *Artemisia tridentata*/*Festuca idahoensis* habitat type (ARTR/FEID)

One small stand just above the game range headquarters pasture is the only representative of this habitat type. *A. tridentata* does occur at the very northeast corner of Coyote Basin, but is mostly dispersed among the conifer trees.

*F. idahoensis* and *Agropyron spicatum* are the principle grasses. *Sedum lanceolatum*, *Comandra umbellata*, *Lupinus sericeus*, *Linum perenne*, and *Taraxacum officinale* are the common forbs.

RIPARIAN

This section describes communities that occur only along permanent streams or snowmelt drainages that remain wet much of the summer.

None of the four communities are established habitat types. The descriptions below describe communities in the immediate vicinity of the Sun River Game Range and are not meant to be applied to areas much removed from this vicinity. *Populus tremuloides* communities are described separately as Deciduous Forest because of their presence in upland sites not associated with free water, as well as along free water drainages.

R-1 *Juncus balticus*/*Carex* spp. community type (JUBA/CAREX)

This community occurs along the flood plains of permanent streams, in low relief snowmelt drainages and as rings around many vernal ponds and potholes. It occurs as small units throughout the game range except the steep forested slopes. This type is most abundant in the lower elevations. The soils of this grassy appearing community are deep, with few coarse fragments and are often alkaline because of poor drainage.

*J. balticus* dominates, with the rhizomatous *Carex* species secondary in cover. *C. praegracilis*, and *C. scirpiformis* are always present. The wetter areas contain *C. aquatilis*, *C. lanuginosa* and *C. rostrata*. *Eleocharis* and *Scirpus* are usually present but minor.

*Poa pratensis* and *Phleum pratense* contribute much cover in many areas. *Agropyron smithii*, *Agrostis alba*, and *Deschampsia caespitosa* are common. *Bromus inermis* and *Phalaris arundinaceae* are locally abundant.

The most common forbs are *Equisetum arvense*, *Urtica dioica*, *Ranunculus acrifolius*, *Geum macrophyllum*, *Mentha arvensis*, *Senecio serra* and *Iris missouriensis*.

Occasional shrubs are found along stream banks but are present only as widely scattered individuals. *Potentilla fruticosa* is found bordering the snowmelt drainages, especially in the lower elevations of the northeast sections.

Because of the dominance of rhizomatous plants, only 46 species were present in this rather lush looking community.

R-2 *Salix bebbiana*/*Carex* spp. community type. (SABE/CAREX)

This community, found throughout the game range, is found in wetter sites than R-1 and is rarely dry. Most stands are along permanent streams.

This community has a great deal of wildlife activity including beavers (active and inactive dams), deer (browsing and bedding) and elk (droppings). Areas of inactive beaver dams show good *Salix* regeneration. This community has the highest passerine bird activity of any of the types I observed.



*S. bebbiana* is present in all but a few isolated pure *S. exigua* stands. *S. exigua* is also present in many mixed stands and is usually found on the driest ground of the site. *S. rigida* is present in most stands of this community type.

*C. aquatilis*, *C. lanuginosa* and *C. rostrata* are common and form significant cover in marshy sites or slow, shallow water. *Juncus balticus* is present in moist sites, but absent entirely where high streambanks border the drainage. *Agrostis alba*, *Glyceria grandis* and *Phalaris arundinaceae* are usually present. *Bromis inermis*, *Poa pratensis* and *Phleum pratense* are common to abundant, especially in the drier areas of a stand.

Common forbs include *Urtica dioica*, *Ranunculus acrifolius*, *Epilobium watsonii*, *Veronica americana* and *Senecio triangularis*. Because of the narrow nature of the stands in this community and the great variability from aquatic to dry sites within a stand, a great diversity of forb species is found.

The high diversity, the presence of this community type throughout the game range and the presence of readily available water make this community type the richest in species (117) of the entire game range.

#### R-3 *Eleagnus commutata*/Carex spp. community type. (ELCO/CAREX)

Rose and Barr Creek drainages are the only locations of this on the game range. Beaver activity is evident in several locations. The streambanks are generally abruptly elevated above the stream level, giving the community a generally drier aspect than JUBA/CAREX or SABE/CAREX.

*E. commutata* dominates the overstory but *Salix* is always present and locally may codominate with *E. commutata*. *S. bebbiana* and *S. exigua* are the common willows present. *Prunus virginiana* and *Amelanchier alnifolia* are present in some areas.

*Bromus inermis*, *Poa pratensis* and *Phleum pratense* are common introduced grasses that have flourished along these sites. *Agrostis alba*, *Glyceria grandis*, and *Phalaris arundinaceae* are found along the stream and *Juncus balticus* is present on moist, fine textured soil near stream level. *C. aquatilis*, *C. lanuginosa* and *C. rostrata* are found around beaver ponds and streamside.

The same forbs present in R-2 are present here, but are less abundant. There is less diversity here than in SABE/CAREX and because the community is limited in area, only 51 species were present.

#### R-4 *Populus trichocarpa*/Salix bebbiana community type. (POTRI/SABE)

This community occurs as small stands on gravelly alluvium in the Barr Creek and Burdoff Creek drainages. The largest stand occurs along the lower Burdoff Creek.

*P. trichocarpa* forms an open overstory with an open *Salix* canopy below (*S. bebbiana* and *S. exigua* are the common species).

An abundance of species preferring disturbed sites is found in these narrow stands. Disturbance is mostly from periodic spring flooding. *Poa pratensis* and *Phleum pratense* are the most common grasses. *Rosa*, *Ribes* and *Symphoricarpos* form dense patches along some sections of streambank.

23 species were recorded for this community type.

## DECIDUOUS FOREST

Only *Populus tremuloides* communities are included here, because *P. trichocarpa* (the only other tall tree species on the game range) is restricted to narrow stands along permanent streams and is discussed as a riparian community.

*P. tremuloides* communities occur throughout the zone between the lower limits of the *Pinus flexilis* savanna and the dense *Pseudotsuga* forests of the higher slopes. Only those stands that showed evidence of long standing existence were considered. Small cold air pockets of a few tens of meters or less across in the conifer forest have *P. tremuloides* but usually have *Picea* or *Pseudotsuga* present in equal amounts and were therefore not mapped.

Although some conifer individuals are present in many *P. tremuloides* stands, the stand was not considered successional to *P. menziesii* unless conifer reproduction was common. Successional aspen stands were mapped as conifer forest.

### D-1 *Populus tremuloides/Rosa acicularis* community type. (POTR/ROAC)

This community occurs on well drained east and northeast facing slopes on the east side of the Sawtooth Ridge. The soils are deep with a moderate amount of coarse fragments. This community occupies the driest sites of this series.

*P. tremuloides* forms a moderately open canopy. The trees are well spaced and most stands are even aged. There is little deadfall.

The shrub understory is *R. acicularis* that may be as high as one and a half meters in the wetter areas. Most plants are only a few decimeters high. *Symphoricarpos albus* is usually present but has much less cover. No other shrubs have significant cover.

Introduced grasses (*Poa pratensis*, *Phleum pratense* and *Bromus inermis*) are common, as is *Carex hoodii*.

*Fragaria virginiana*, *Potentilla gracilis*, *Geranium richardsonii*, *Galium boreale*, *Achillea millefolium* and *Taraxacum officinale* are common forbs. *Aster conspicuus* and *Cerastium arvense* are abundant in some stands.

37 total species were recorded in this community.

### D-2 *Populus tremuloides/Symphoricarpos albus* community type (POTR/SYAL)

The stands of this type are generally small and occur on well drained slopes with loamy soils with a moderate content of coarse fragments.

The *P. tremuloides* canopy is more closed than the previous community. The trees are even aged and there is generally little deadfall.

The shrub layer is more sparse than in the previous type and in some stands is nearly lacking. *S. albus* has a low profile compared to its appearance in full sun. *R. acicularis*, when it is present, has less cover than *S. albus*.

Introduced grasses are again prominent. *Festuca idahoensis*, *Bromus carinatus* and *Carex hoodii* are the common native graminoids. *Calamagrostis rubescens* is present in some stands.

More forbs are found in this community type than in POTR/ROAC, probably because of the more favorable moisture conditions. *Cerastium arvense*, *Fragaria virginiana*, *Potentilla arguta*, *Galium boreale*, *Achillea millefolium*, *Aster conspicuus* and *Taraxacum officinale* are the most consistent species.

48 species were identified in this community type.

D-3 *Populus tremuloides*/*Salix bebbiana* Community type. (POTR/SABE)

Two phases of this community are found on the game range and will be described separately. They are distinguished by the presence or absence of free water and are designated the wet and dry phases respectively.

D-3d. Potr/Sabe, dry phase. (POTR/SABE, Dry) The *P. tremuloides* canopy is more open than in the wet phase. The trees are even aged and there is generally substantial deadfall.

Considerable variability in the shrub canopy is found between stands and even between different parts of the same stand. The *Salix* shrubs have multi-stemmed bases that radiate up and out from their center. In stands with closely spaced shrubs, this creates a tightly closed canopy with a maze of tunnel-like openings beneath. Stands with more widely spaced shrubs created a network of grassy parks connected by grass carpeted tunnels. Deer activity was most evident in the latter type stands, and deer beds were found only in the latter for this community type. *S. bebbiana* was always present; *S. rigida* and *S. monticola* often present.

The grass cover varies proportionally to the lack of moisture and lack of light. Open, moist sites have less grass and more forbs; closed and dry stands have fewer forbs and more grass cover. Introduce grasses again pre-dominate (*Poa pratensis* and *Phleum pratense*).

*Fragaria virginia* and *Viola canadensis* are the most consistent forbs. *Cerastium arvense* and *Gallium boreale* are common in dry stands while *Osmorhiza chilensis* and *Aster conspicuus* are common in the more moist stands.

A total of 35 species is present in this phase.

D-3w. Potr/Sabe, wet phase. (POTR/SABE, Wet) The composition of the understory is considerably different here than in the dry phase. This phase is distinguished by having standing water or slow moving water present through most or all of the year. These stands occur in a few potholes but most often along low angle stretches of streams that have been or are occupied repeatedly by beavers.

Some of these wet phase stands, if beaver activity were removed permanently, would revert to a dry phase. However, these stands show repeated use by beavers as evidenced by some stands that are almost totally silted in but maintain a marshy aspect with beaver trails throughout. These stands will most likely be perpetuated as wet phase stands as long as a permanent source of water remains available.

Considerable variability in stand age and canopy cover occur. Stands with current beaver activity have standing water either in the center or up-stream limits of the stand. *P. tremuloides* is often absent in these areas both because of beaver eliminating them and from disease rotting the base of the trees until they fall. The stands are not even aged and there is usually an abundance of young suckering stems wherever the canopy is open. Considerable deadfall is encountered in all stands.

The shrub density is greatest around ponded water where the tree canopy is open. *Salix monticola* and *S. rigida* are the common willow species; *S. bebbiana* is always present. In pothole stands the shrub canopy is nearly uniform throughout and deadfall from *Salix* is abundant.

The proliferation of forbs in this phase shades out most grasses. Along the standing water areas, *Agrostis alba* and *Glyceria grandis* are common and patches of *Carex aquatilis*, *C. rostrata* and *C. lanuginosa* are locally abundant.

*Thalictrum occidentale*, *Fragaria virginiana*, *Viola canadensis*, *Heraclium lanatum*, *Osmorhiza occidentalis*, *Gallium boreale*, *Senecio triangularis*, and *Taraxacum officinalis* are consistently present. *H. lanatum* in some areas has

considerable cover. *Equisetum arvense* and *E. laevigatum* form almost pure stands in marshy areas where shrub and tree canopy are open.

This phase is rich in species diversity, having a total of 74 species.

#### CONIFER FOREST

The conifer forests of the Sun River Game Range are dominated by only two species, *Pinus flexilis* and *Pseudotsuga menziesii*. Though *Pinus contorta* and *Abies lasiocarpa* are found abundantly only a few miles to the east, they exist only as scattered individuals along the Sawtooth Ridge. The dominance of porous limestone-dolomite rock and the drying effect of the chinook winds combine to make the area too dry for their presence in any quantity. The series of ridges to the west provides wind protection from the chinooks and *Pinus contorta* in those areas (west of Norwegian Culch) forms large forests. *Picea engelmannii* is limited to cold air pockets.

Most of the game range *P. menziesii* forest was burned by forest fires early in the current century. The fires were intense, as few charred logs or trees remain as evidence and the forest stands are mostly even aged. Only a few stands of mature forest remain in the heavily forested areas above the grasslands. A few spur ridges off the Sawtooth Ridge have small stands at their crest that are repeatedly damaged by wind and the trees present almost a tall krummholz farm.

#### LIMBER PINE SERIES

##### F-1 *Pinus flexilis*/*Festuca idahoensis* habitat type, *F. scabrella* phase. (PIFL/FEID)

This habitat type is found from Diversion Lake to Shed Creek on calcareous soils of rocky wind exposed ridges. It forms a transition of patchy forest stands between the grasslands of the lower elevations and the dense *Pseudotsuga* forests of the upper slopes. *Pinus flexilis* density is greatly varied, from savanna-like stands to closed canopy stands. In some areas adjacent to *Festuca scabrella* grasslands, *Pinus flexilis* is successfully reproducing in the grassland. This is probably a result of fire suppression. Periodic grass fires would destroy those seedlings growing in grassland habitats.

Deer and elk droppings are common in this habitat type. Black bears and coyotes were both observed in this habitat and evidence of foraging by bears was also found. Clark's Nutcrackers use this type extensively, feeding on the pine nuts for several weeks.

*P. flexilis* is the only dominant tree in the lower elevation stands, but stands adjacent to *Pseudotsuga* forest often have *P. menziesii* sharing climax status with *P. flexilis*.

The undergrowth is dominated by bunchgrasses, primarily *F. idahoensis*, *F. scabrella* and *Agropyron spicatum*. *F. scabrella* is present in the more open areas of all stands and therefore all have been designated *F. scabrella* phase. Closed canopy stands may not have *F. scabrella* but it is felt that as these stands mature and become more open, *F. scabrella* will increase. *A. spicatum* has the greatest cover. *Koeleria cristata*, *Muhlenbergia cuspidata* and *Stipa*

*comata* are present in all but the most closed portions of the stands. *Danthonia parryi*, when present, never attains the dominance it does in FESC/AGSP or FESC/FEID habitat types.

*Comandra umbellata*, *Geum triflorum*, *Lupinus sericeus*, *Linum perenne*, *Lithospermum ruderales*, *Campanula rotundifolia*, *Achillea millefolium*, *Artemisia frigida* and *Balsamorhiza sagittata* are the most common forbs. Open stands have more forb diversity as well as quantity.

Because of the transitional position this habitat plays and because it occupies considerable area, this habitat type had the greatest number of species (89) of the forest types.

#### F-2 *Pinus flexilis*/*Juniperus communis* habitat type (PIFL/JUCO)

This habitat type is found on dry limestone ridges amongst the *Pseudotsuga* forest east of the Sawtooth ridge. *P. menziesii* shares climax status with *P. flexilis*. The ecotone separating this habitat type from the surrounding *P. menziesii* habitat types (most often F-4, PSME/CARU) is often large and sometimes totally indistinct because of the close spacing of ridges emanating from the Sawtooth Ridge. The map unit therefore truly represents a mosaic of forest types where PIFL/JUCO occupies at least 50% of that area. PSME/CARU is usually the remaining area but PSME/SYAL is found at the lower extremes of some units.

The soils of the PIFL/JUCO habitat type are calcareous and considerable rock is exposed at the surface. These stands are mostly uneven-aged, with many trees being older than the *P. menziesii* of the adjacent forest. Deadfall is often encountered some with fire scars still evident. It appears the fires that ravaged the forest around did not carry well through the open canopy and sparse undergrowth found in many of these stands. Wind damaged trees are found on some spur ridges of the Sawtooth Ridge.

*Juniperus communis* and *J. horizontalis* both occur, either separately or together. *Berberis repens* and *Shepherdia canadensis* shrubs are also present.

*Festuca idahoensis* and *Koeleria cristata* are the most abundant grasses. *Secum lanceolatum*, *Lithospermum ruderales*, *Campanula rotundifolia* and *Achillea millefolium* are the common forbs.

Deer pellets and numerous game trails indicate this habitat type is commonly used by wildlife.

Because of the small area occupied by this type and the dry nature of the habitat, only 44 species were recorded.

### DOUGLAS FIR SERIES

#### F-3 *Pseudotsuga menziesii*/*Symphoricarpos albus* habitat type (PSME/SYAL)

This habitat type is the lowest elevation of the *P. menziesii* types. Most stands have calcareous soils with little rock evident at the surface. Most stands are even-aged and have a closed canopy. This prevents much undergrowth from developing and in some stands, an understory of needle litter and an occasional forb is all that exists. *P. menziesii* is the only reproducing tree species. *Picea engelmannii* is found in some cold depressions but amount to only a few individuals.

In open stands, *S. albus* forms shrub patches 3 to 6 decimeters high. *Shepherdia canadensis* is often present.

Bunch grasses are poorly represented. *Phleum pratense*, *Bromus carinatus* variety *carinatus*, and *Bromus inermis* subspecies *pumpellianus* var. *p.* are present in most stands. *Festuca idahoensis* and *Calamagrostis rubescens* are present in the more open stands.

The open, moist stands and the small grassy parks encountered in some stands are abundant with forbs. *Polygonum bistortoides*, *Anemone multifida*, *Thalictrum occidentale*, *Fragaria virginiana*, *Penstemon confertus*, *Galium boreale* and *Antennaria microphyla* are abundant in these areas.

Mainly because of the few moist meadows and stands, the total number of species encountered is high (80).

F-4 *Pseudotsuga menziesii*/Calamagrostis rubescens habitat type C. rubescens phase. (PSME/CARU)

This habitat type is found on the upper slopes of the east and north sides of Sawtooth Ridge. The soils are calcareous. The canopy in all but two stands is even aged and very closed. This condition is the result of the fires early in this century. Little deadfall is present because those fires consumed the timber so completely and the current forest is young enough that it has not contributed much yet. The closed canopy of these young stands effectively limits light and the forest floor is therefore nearly devoid of vegetation. Deer and elk droppings are found in these stands but only along well established game trails traversing the mountain slope.

*P. menziesii* is the only tree dominating the overstory. Some cold air pockets have *Picea engelmannii* and a few wet depressions have *Populus tremuloides* but never more than a few individuals. In most areas the stands are so closed that even *P. menziesii* is not reproducing.

In the closed stands, no grasses are present. *Clematis columbiana* and *Antennaria racemosa* are the best indicators for this habitat type in these closed stands. *Thalictrum occidentale*, *Berberis repens* and *Spiraea betulifolia* are also present where the canopy is open more.

In those few stands that were not destroyed by fire a lush green grassy layer dominates the understory. *Calamagrostis rubescens* and *Carex geyeri* dominate, but are conspicuously without inflorescences. *Spiraea betulifolia*, *Antennaria racemosa*, *Arnica cordifolia* and *Aster conspicuus* are the most commonly encountered forbs. The oldest and largest *P. menziesii* of the game range are to be found in these mature stands.

50 species were encountered in this habitat type.

F-5 *Pseudotsuga menziesii*/Carex geyeri habitat type (PSME/CAGE)

This forest type is found on the west side of the Sawtooth Ridge, south of the main massif and below 7,400 feet elevation. Here again, fire has consumed this entire slope and erosion following the fire has removed considerable soil, exposing a great deal of rock. Forest regeneration has been retarded because of this erosion. Deadfall remains from the time of the burn. The only remaining unburned area in this type is at the base of the ridge near Cutrock Creek and a few small stands at the southern edge of the ridge at the slope break into Cutrock Creek.

In the mature, unburned stands that remain, *P. menziesii* is the dominant tree, with an occasional *Pinus flexilis* tree present. A carpet of *C. geyeri* covers the ground. Occasional *Juniperus communis* shrubs occur and *Spiraea betulifolia* is common. *Galium boreale* and *Antennaria microphyla* are present in the moist, shady areas.

In the large burned areas, *P. menziesii* and *P. flexilis* are abundant with an occasional *Picea engelmannii* or *Abies lasiocarpa*. *Juniperus communis*, *J. horizontalis* and *Amelanchier alnifolia* are abundant in the understory. Grasses are restricted to the areas with remaining soil of depth. *Festuca idahoensis* is the most abundant.

This is a dry habitat type, whether in the burned or unburned areas and therefore only 29 species were found.

#### F-6 *Pseudotsuga menziesii*/Arnica cordifolia habitat type. (PSME/ARCO)

This habitat type is found on low angle slopes in Home Gulch in the vicinity of Agropyron Flats. All existing stands were burned early in this century and are now even-aged with a closed overstory. The soil is calcareous alluvium and the surface soil is gravelly. Considerable duff is present.

The overstory is *P. menziesii* with an occasional *Pinus flexilis*. The undergrowth is dominated by *A. cordifolia* with *Thalictrum occidentale*, *Antennaria racemosa* and *Aster conspicuus* are sometimes present in significant cover. Grasses are essentially absent except when the stand is disturbed. Agropyron Flats, once covered by this habitat type, is now covered with *Agropyron spicatum*, *Festuca idahoensis* and *F. scabrella*.

Not only does this habitat type cover little area, but it is a depauperate community, with only 15 species found.

#### F-7 *Pseudotsuga menziesii* complex (PSME CMLPX)

The majority of the forest on the west side of the Sawtooth Ridge was burned sometime shortly after the turn of the century. The forest on the generally uniform slope south of the main Sawtooth massif was totally consumed. The area directly west of the main massif, however, is a complex of sharp ridges, talus and moderate slopes and therefore the fires did not carry uniformly. Isolated stands on good soil, scree stands and trees on rocky or talus slopes devoid of much undergrowth were not burned. The lower slopes with relatively good stands were burned. Following the fire(s), much of the soil was removed by erosion. The loss of soil has severely retarded the rate of succession, and the ability to recognize what habitat type a given stand belongs to.

PSME/SYAL (F-3), PSME/CAGE (F-5) and PSME/ARCO (F-6) are all evidently present from small stands that were not burned or eroded severely. The extent of their occurrence, however, is not readily evident. Because of this inability to place stands in particular habitat types, the complex nature of the terrain and the small size of many of the stands, one large map unit was used rather than many small units.

*P. menziesii* and *Pinus flexilis* are abundant but seldom exceed 5 to 6 meters high. *Picea engelmannii* is occasionally found in moist, cold spots. *Juniperus communis*, *J. horizontalis*, *Amelanchier alnifolia*, *Shepherdia canadensis*, *Spiraea betulifolia*, *Berberis repens* and *Arctostaphylos wa-ursi* are the common shrubs.

*Agropyron spicatum*, *Festuca idahoensis* and *Carex geyeri* are found in varying amounts dependent upon the amount of soil present. A great variety of forbs can be found because of the diversity of the terrain and soil amount. *Galium boreale*, *Antennaria microphylla*, *Aster conspicuus* and *Sedum lanceolatum* are the most common forbs.

In the scree and high ridge areas, plants of the alpine community extend down into the forest area. This probably is accentuated by the loss of soil and the reduced shade over what would be present in a mature forest.

Bighorn sheep were observed using this area. It is not clear how much use other big game animals make of the area. Pica and marmot, as well as a variety of birds, are found in this area as well.

A total of 51 plant species (more than would be expected for a single habitat type) are found here, due largely to the open nature of the forest.

#### ALPINE

##### A-1 *Dryas octopetala*/*Carex rupestris* community type. (DROC/CARUP)

This community occurs only on the Sawtooth Ridge crest south of the main buttress. Because of the limestone-dolomite rock and the frequent winds of this site, this habitat is extremely dry. There are few species and therefore each contributes substantially to the total cover. The soil is a thin covering over bedrock. Bighorn sheep use of this community is evident.

*Dryas octopetala* has the greatest cover, with *Carex rupestris* second. *Arenaria obtusiloba*, *A. rossii* and *Saxifraga bronchialis* have about equal cover. *Androsace Lehmanniana* and *Cryptantha nubigena* are present as scattered individuals throughout the area.

Only one trip to this community was made and this was in late summer when almost all the plants had dried and curled up. The following list of species are likely to be found upon close inspection, especially in late spring or early summer: *Carex nardina*, *C. albonigra*, *C. phaeocephala*, *Poa rupicola*, *P. scabrella*, *Agrostis scabra*, *Oxyria digyna*, *Ivesia gordonii* and *Hulsea algida*. *Penstemon albertinus* is found on lower elevation ridges further west and may occur here also.



## V. VEGETATION TYPES

### COMPARISON TO PREVIOUS VEGETATION

#### BACKGROUND

The recent trend in North American range management is the recognition that proper management requires an understanding of the autecologies of four to five hundred plant species. The development and use of the habitat type concept is one of the results of this trend. Prior to this recent trend, range management in North America has been dominated by the narrow view that only those plant species of direct use or detriment to the animal being managed for, usually domestic livestock, are worth consideration (Daubenmire, 1970).

The Forest Service range survey procedure (Kelley, 1941) used by R. Hodder in 1952 and 1953 was designed under the latter view and was directed principally at cattle grazing. This procedure emphasizes classification of vegetation by very general cover type (1 dry grassland, 2 wet meadow, 4 sagebrush, 5 browse/mt. shrub, 6 conifer, and 10 broadleaf tree). All forb species are considered weeds. The disturbed or unfavorable grazing areas were placed in the following groups: 3 perennial weeds (forbs), 7 waste (including forest with no grazing value), 8 barren, 18 bottomland, annual and cultivated land.

#### HODDER'S RANGE SURVEY

By cover type, Hodder's units are 22.5% dry grass, 22.0% conifer, 19.5% browse/mt. shrub, 17.9% perennial weed, 11.4% wet meadow, 3.3% bottomlands, 2.5% broadleaf trees and 0.9% other.

Following each general category number, one to three plant species names were used to name the unit (for example, unit W-120: 3 *Lupinus-Festuca-Tragopogon*). Percent plant density was also given for each unit. The data sheets also provide species composition estimates (given as percent of total basal cover). The unit names generally did not reflect the dominance of the plants at that site (eg. W-141: 5 *Juniperus horizontalis* - *Stipa comata* - *Rock*; more *Bouteloua gracilis* and *Muhlenbergia cuspidata* were present than *S. comata*). Considerable emphasis was placed on plants harmful to cattle or at least highly unpalatable. Four forb species alone are found in 22.5% of the unit names (*Lupinus sericeus* 19.4%, *Balsamorhiza sagittata* 10.0%, *Oxytropus* spp. 9.4% and *Astragalus* spp. 2.7%). Forbs were rarely present in greater basal cover than even the third greatest present perennial grass. W-51: 5 *Juniperus* - *Festuca* - *Oxytropus* had, for example, 20% *Agropyron spicatum*, 15% *Festuca scabrella*, 13% *Festuca idahoensis*, 5% *Carex*, 10% *Phlox* and only 3% *Oxytropus*.

The season that field work takes place can have considerable influence on one's estimation of plant cover, especially when trying to estimate basal cover. Plants with large foliage or showy flowers are often overestimated. This is particularly true when working in early summer when many forbs are blooming and have lots of fresh green foliage out. A wet winter and spring can increase this problem even more, because more plants usually bloom following that condition. Plants that are often grouped together on a slope can often appear more abundant than they really are. This is particularly true of *L. sericeus* and *B. sagittata*.

## VEGETATION COMPARISON

The most evident change since 1953 is that plant density is greater in all grassland and open forest areas of the game range. This is particularly pronounced in the *Festuca scabrella* habitat types, where grass cover has nearly doubled in some areas. In the *Agropyron spicatum* habitat types, *A. spicatum* has increased considerably, with a corresponding reduction in *Bouteloua gracilis*, *Stipa comata* and forb increasers (esp. *Artemisia frigida*). The grasslands along the eastern boundary have had the least increase in grass cover since Hodder's survey and are discussed further under vegetation areas A, B, C and CI below.

The second most notable change is the decrease in invader and increaser species. *Bromus tectorum*, *Melilotus officinale*, *Hordeum jubatum* and *Tragopogon dubius* (invaders) have been markedly reduced in all areas. The increasers that are most evidently reduced are *Artemisia frigida*, *Gutierrezia sarothrae*, *Chrysopsis villosa*, *Grindelia squarrosa*, *Antennaria* spp., *Bouteloua gracilis*, *Danthonia parryi* and *Carex filifolia*.

Mueggler and Handl (1974) found *Lupinus sericeus* to be an increaser in the *A. spicatum* series, and found *Balsamorhiza sagittata* to be an increaser in the *Festuca scabrella* series. However, their cover on the game range does not appear to have changed since 1952-53. Even though these two species were given great emphasis by Hodder, the basal cover was low in almost all areas. Some sites that had high cover of these two species in 1953 also have a large amount now, and these are usually in snow drift areas. *Oxytropis* spp., *Astragalus* spp. and *Thermopsis rhombifolia* were also emphasized by Hodder and these do appear to have decreased substantially.

The *Pinus flexilis* forest has changed little. *Pinus flexilis* young trees are found invading the adjacent grasslands in some areas, probably because of the absence of periodic range fires.

The *Pseudotsuga menziesii* forest appears to have increased slightly in canopy cover, especially in the stands higher up on the slopes. No tree cover data was taken by Hodder, but the understory cover appears to have decreased since 1953. If Hodder's sampling was done only in the lower stands, little change has occurred, but if his data truly represents the majority of the forest, both forbs and grasses have decreased, most likely caused by shading due to increased tree canopy cover.

The forest burns west of the Sawtooth Ridge crest and in the Home Gulch drainage have more conifer growth. Tree density has not increased much, but the height has. Shrub density is less and grass cover is greater than in 1952-53.

The unburned areas in Home Gulch have fewer forbs than 1952-53. The continued grazing, however, has kept down the cover of the palatable grasses.

Special mention should be made of three species; *Phleum pratense*, *Poa pratensis* and *Taraxacum officinale*. These three species are found throughout the communities on the game range from the lowest elevations to nearly the alpine. All three are introduced species that have become naturalized. *Phleum* was seeded in mountain grazing ranges by the Forest Service in the 1930's and has since spread widely; in the low elevation grasslands it is restricted to wet depressions and drainages. *Poa* and *Taraxacum* are more common in the open forests and grasslands and least common in the dense and higher forest stands. Because these three species are so common, they have been included in community descriptions rather than excluded as weeds. Their

presence will probably remain indefinitely, increasing with disturbance and decreasing as disturbance is reduced.

Where *Bromus inermis* was planted for hay, and to some extent in the drainages adjacent to those areas, it has persisted. Native perennial grasses are gradually invading the stands but the process is slow and will take several decades before the native grasses become very prominent.

Overall, the grassland, shrubland, riparian, deciduous forest and *Pinus flexilis* habitat types and community types have recovered remarkably from the overgrazed condition they were in when the game range was purchased. With the exception of the areas discussed below, the vegetation has the characteristics of the climax condition. The *Pseudotsuga* forest will take longer to reach the climax condition because of the slow rate of maturation of the forest canopy.

#### GAME RANGE VEGETATION TYPES

The following list of areas are those areas on the game range that differ significantly from what is considered fairly representative of, at least, a young climax community. The burn areas, most of the *Pseudotsuga* forest, and the lowest elevation grasslands are in this list of secondary seres. The pasture area around the headquarters is also included because of the ongoing grazing.

##### A. Border Grasslands; *Agropyron spicatum*

Much of the grasslands along the eastern boundary in sections 13, 24, 25 and 36 still show the effects of overgrazing and/or fires prior to acquisition of the game range. Loss of fine textured soil particles by wind and water erosion has left the surface soil with an abundance of coarse fragments.

The habitat types in this area are AGSP/POSA, STCO phase and FESC/AGSP, STCO phase. The current vegetation has a reduced grass cover dominated by *Stipa comata* and *Agropyron spicatum*. *Koeleria cristata*, *Muhlenbergia cuspidata* and *Festuca scabrella* are present in varying amounts. *Carex filifolia*, *Artemisia frigida* and other increaser species (*Gutierrezia sarothrae*, *Bouteloua gracilis*, *Chrysopsis villosa*, *Gaura coccinea* and *Bromus tectorum*) have more cover than would be expected if this area was in a mature or climax condition.

*Andropogon scoparius* is not found in this area of the game range, but it was present in some quantity in 1952 when R. Hodder mapped the game range. Along with a decrease in the density of increasers and invaders since 1952, this is an indication that succession is progressing toward a climax condition.

A1 and A2 are small units that have burned in recent years and are dominated by *A. smithii*.

Management considerations - This area, as well as areas B, C and Cl have been overgrazed and/or burned and are still showing the effects of that treatment. The most profound effect has been loss of the fine textured particles in the surface soil horizon.

Any management program which will prevent further wind and water erosion or which will increase the capture of fine particles should speed the return to a mature or climax condition. A fertilization study should be initiated to determine if forage production and/or plant density can be increased, since this area is heavily used by elk during the winter. Heady (1952) applied manure in native range near Havre, Montana, and increased the stand and yield of grasses after the first two years of application. Lodge (1959) found similar results in southwest Saskatchewan. Rogler and Lorenz (1957 and 1965)

Smoliak (1965) Whitman (1962) and Goetz (1969 and 1970) have studied the effects of nitrogen fertilization in native range in North Dakota grasslands. Plant heights were increased but change in density was dependent on species, site and rate of application. Yield of grass species was increased with nitrogen application.

An initial trial by B. Goodman done in 1964 in area B indicates fertilizer effects may be long lasting, as his trial plots still show differences from the surrounding grassland. Any fertilizer trial study should also encompass what effect fertilization has on elk use of these study plots. Application over large areas may reduce elk concentrations if that is found to be a problem.

#### B. Potholes *Bouteloua gracilis*, *Stipa comata* grasslands

These areas have been affected as section A areas have. The habitat type is AGSP/BOGR, but the current vegetation is lacking in appreciable cover of *A. spicatum*. *S. comata* and *B. gracilis* dominate the cover in most areas, with *Carex filifolia* having substantially greater cover than is expected in an undisturbed community. *Artemisia frigida*, *Gutierrezia sarothrae* and *Chrysoopsis villosa* are also more abundant than expected.

Management considerations - The same management programs applied to area A should be applied here.

#### C. Alkali Flats

The presence of *Medicago sativa* and the abrupt change in angle in some areas along the foot of the slope to the south suggests this flat expanse was once plowed and planted for hay.

The habitat type is AGSP/BOGR. However, *Agropyron spicatum* is common only west of Keller Lake along with *Stipa comata* and *Muhlenbergia cuspidata*. East of Keller Lake, the vegetation is predominantly increaser species; *Bromus tectorum*, *Poa sandbergii*, *Carex filifolia*, *Artemisia frigida*, *Gutierrezia sarothrae*, and *Grindelia squarrosa*. *Caryopsis* and *Astragalus* species are also common.

This area appears to have remained essentially unchanged since 1952 when R. Hodder mapped this area.

Management Considerations - The same programs apply to this area that apply to areas A and B.

#### Cl. Schoolhouse Flats

This flat valley in section 11 shows evidence of substantial loss of soil (silt and clay) prior to the building of the Willow Creek Canal. Silt and clay deposition in the valleys downstream drainage (since blocked by the canal) is substantial. Wind erosion could also have removed silt from the soil surface. The soil surface now is high in gravel. Similar terrain nearby is high in fine textured material. Livestock overgrazing is the likely cause of vegetation removal which allowed the wind and water to remove the fines. Horses were known to be present (because of the school) and cattle herds were prominent in the area.

Similar topography nearby is occupied by FESC/AGSP h.t. The current vegetation of Schoolhouse Flats contains all the elements of that habitat type, but is dominated by *Agropyron spicatum* and *Stipa comata*, with *Festuca scabrella* relegated to a minor presence. *Artemisia frigida* is abundant, often indicative of disturbance. *Koeleria cristata* and *Muhlenbergia cuspidata* are also present.

Management Considerations - Any program which will prevent further erosion of the soil or increase the amount of fine textured particles should speed the return to a FESC/AGSP h.t. or at least increase the productivity of the site.

A study of the effect of fertilization of this site as described under vegetation unit A would be beneficial.

#### D. Willow Creek Canal Erosion Gully

When the Willow Creek Canal was built, construction was terminated at a pothole in the southeast quarter of section 12. A channel was created through the ridge to the east in order to facilitate drainage of this lake into a natural drainage that would carry this canal water eastward into the dry plains below the game range.

This natural drainage is a silt filled valley between two parallel ridges. It trends south for  $\frac{1}{2}$  mile, then widens and turns east. Prior to the canal construction, grasslands extended to the center of valley where a narrow strip of JUBA/CAREX c.t. occupied the valley bottom.

With the addition of the water from the canal, the silt valley was eroded into a steep walled gully up to 20 feet deep. The ridge separating the lake from the valley drainage is resistant to erosion, and a series of waterfall cascades was created at the head of the valley as a result. This has increased the erosional force of the water, and erosion is still taking place.

Because erosion is ongoing, the native perennial grasslands have not become reestablished and will not until erosion is controlled and the vertical relief decreased.

The current vegetation is sparse. Rhizomatous grasses and grass-like plants and annual grasses are dominant over any presence of grasses from surrounding grasslands. *Juncus balticus*, *Carex praegracilis*, *C. scirpiformis*, *Poa compressa*, *Poa pratensis*, *Agropyron smithii*, *Bromus inermis* and *Spartina gracilis* are all present. *Distichlis stricta* is found along the wider, flat, alkaline areas. *Bromus tectorum* and *Hordeum jubatum* are common on the newly eroded areas and the flats that get repeatedly silted over.

*Melilotus officinalis*, *Melilotus albus* and *Salix exigua* form loose stands on low angle or flat slopes.

Management - Creating check dams of rock or other erosion resistant material at intervals along the length of the gully will retard the loss of silt. Knocking down the vertical sides of the gully will help fill the erosion gully and will decrease the slope angle of the sides to facilitate revegetation.

#### E. Headquarters Pasture - Low angle grasslands

This area is AGSP/POSA, STCO phase habitat type on the dryer sites and POFR/FESC habitat type in the cold air pockets.

The area has been maintained as a horse pasture since acquisition of the game range. Prior to that time the wetter areas were plowed and used for hay meadow. In 1952, *Medicago sativa* was present but it is no longer found in this area. *Bromus inermis*, *Phleum pratense* and *Poa pratensis* were the dominant grasses at that time. Though the presence of the above grasses is still considerable, *Agropyron spicatum*, *Festuca idahoensis*, *F. scabrella* and *Koeleria cristata* are invading the stands of introduced grasses. *Melilotus officinalis*, *Trifolium pratense* and *Thermopsis rhombifolia* have also decreased since 1952.

Management Considerations - The current program of rotated grazing is desirable as long as this area is to be maintained as pasture. Reestablishment of native grasses will probably continue to take place at a slow rate, but the introduced grasses will persist as long as grazing is maintained (desirable for forage).

#### F. Headquarters Pasture - Hillside Grasslands

AGSP/POSA, JUHO phase and FESC/AGSP, STCO phase habitat types occur here. The species composition of the current vegetation is not markedly different than a climax community except in those sites where *Bromus inermis* ssp. *inermis* forms nearly pure stands. *Phleum pratense* does, however, have substantial cover throughout.

*Danthonia parryi*, *Melilotus officinalis* and *Medicago sativa* were all common in 1952. *M. sativa* is no longer present and *D. parryi* and *M. officinalis* are present only in the most disturbed areas.

Management Considerations - The same program for area E is applicable here.

#### G. Bromus inermis Hay Meadow

This site, a combination of FESC/AGSP, STCO phase and POFR/FESC habitat types, was plowed and planted as a hay meadow before the game range was acquired in 1948. When R. Hodder mapped the area in 1952, *Bromus inermis* ssp. *inermis* and *Melilotus officinalis* dominated with both *Medicago sativa* and *Agropyron cristatum* present. Some areas that had not been plowed for some time or were never plowed had *Danthonia parryi*, *Agropyron spicatum* or *Festuca idahoensis* in combination with *B. inermis*.

*D. parryi*, *M. officinalis* and *M. sativa* are no longer present and *A. cristatum* has all but been eliminated. *Bromus inermis* dominates most of the area but *F. idahoensis* and *A. spicatum* are invading the drier areas. *Potentilla fruticosa* is present in small amounts.

Management Considerations - *B. inermis* would be difficult to eliminate without doing considerable damage to the native species which are now getting reestablished, and possibly causing erosion problems. The presence of this introduced grass certainly does not cause any difficulties and could even be used as a hay source in an emergency. Most of this grass will eventually be eliminated by the native species in all but the very wet sites.

#### H. Meadow Pond Pasture

This POFR/FESC habitat type was also plowed at one time. The result has been an elimination of *P. fruticosa*. *Poa pratensis*, *Juncus balticus* and the wet site *Carex* species are the dominant grass-like species. It is not clear if this site was ever planted for hay. No *B. inermis* of consequence is present now or was in 1952. *Melilotus officinalis* was abundant in 1952 but inconsequential now. Plowing may have been used to eliminate the shrub cover so that hay harvesting by mechanical equipment could be facilitated.

Management Considerations - Because of the wet nature of this site, soil compaction by horses is common. This increases the amount of bare ground and could cause soil loss by water erosion. Grazing in this area should be reduced in the wet season if erosion becomes a problem. Management of this area and areas E, F and G since the game range has been established has been excellent in reducing undesirable forbs and increasing the overall cover of grasses.

I. Rose Creek Hay Meadow

The area in the bend of Rose Creek behind the headquarters area was another location which was plowed and planted for hay prior to the purchase of the game range. The area is mostly POFR/FESC h. t. with a small section of JUBA/Carex c. t.

The presence of *Onobrychis viciifolia* and *Melilotus officinalis* is the only obvious plowing evidence. *Agropyron spicatum*, *Festuca idahoensis*, *F. scabrella* and *Potentilla fruticosa* dominate except in the wet area which is dominated by *Juncus balticus*, *Poa pratensis* and the wet *Carex* species. Increasers such as *Galium boreale*, *Solidago missouriensis* and *Antennaria* spp. have decreased since R. Hodder's study in 1952.

Management Considerations - The current management program as established by B. Goodman should be maintained.

J. Stove Creek Logging Area

Prior to the game range establishment, two small areas were clearcut. These areas, PIFL/FEID, FESC phase habitat type, have been invaded by *Potentilla fruticosa*. *Agropyron spicatum*, *Festuca idahoensis* and *F. scabrella* are the dominant grasses. *Danthonia parryi* was common in 1952 but is nearly absent now. Some *Bromus inermis* ssp. *inermis* is present also. Tree reestablishment is very slow on these two sites.

Management Considerations - The current program of leaving the area to natural succession is desirable.

K. East Sawtooth Forest Burn

This large unit has been delineated to indicate the east side forests that were burned early in this century and are not mature or near a climax condition. PIFL/JUCO, PSME/SYAL and PSME/CARU habitat types are included. Small stands of each of these habitat types that were not burned are in a mature condition. They cover less than 2% of the forest, however, and were not separately mapped. The description for both the immature and mature stands is found under the appropriate habitat type description (F-2, F-3 and F-4).

Management Considerations - It is unlikely an economical program could be designed to improve wildlife forage production in this area. The dense, closed canopies of the even-aged stands of this forest intercept a considerable amount of light and therefore shade out grasses, forbs and shrubs that are present in mature, all-aged stands.

Thinning these forests by selective cutting would open the forest to more light and therefore more understorey growth. However, the slash created would be undesirable fuel for forest fire propagation and any program to remove that slash would necessitate road building and damage to the forest understorey caused by dragging the harvested trees to collection points.

Natural succession will gradually thin the forests with a resulting increase in undergrowth production. Deadfall could eventually pose a fire hazard if natural thinning occurs rapidly because of the even-aged structure of the forest. Construction of permanent fire pits at hunter-camper overnight camp sites can help reduce the man-caused fire potential.

L. Coyote Basin/Burdoff Meadow

*Agropyron caninum* ssp. *majus* var. *latiglume*, *Poa pratensis*, *Phleum pratense* and *Agropyron smithii* are abundant here in this FESC/AGSP habitat type. *Festuca scabrella* is common but *F. idahoensis* is quite sparse. The presence of several increaser species of forbs and the grasses above indicate

that this area has been disturbed in the past, most probably by overgrazing.

The vegetation in 1952, as recorded by R. Hodder, was dominated by *Symphoricarpos albus*, *Lupinus sericeus*, *Agoseris glauca*, *A. caninum* spp. m. var. l., and *Artemisia frigida*. Although all these same species are still present, the domination has now shifted to grasses and the increaser species are decreased.

Management Consideration - Bert Goodman's program of letting natural succession take its course is surely the best approach. The area is small and the effect on wildlife minimal. Native wildlife forage should continue to increase as the bunchgrasses (notably *Festuca scabrella* and *F. idahoensis*) become reestablished.

M through R. See VEGETATION TYPES OUTSIDE THE GAME RANGE

S. West Sawtooth Ridge Burn

This area is discussed under both the PSME/CAGE and PSME CMLX habitat types.

The portion of the ridge below about 7,400 feet has lost the least soil and therefore has a greater presence of graminoids. The upper part of the slope may well belong to the PSME/CAGE habitat type but the presence of indicator species for several habitat types and the lack of unburned areas for comparison prevents certain identification. Natural succession will probably take many more decades before enough soil is formed to substantially change the species composition.

Management Considerations - Soil formation is the main factor in the rate of development of this area. Leaving nature to its own course, as the current management does, is the only feasible program since creating soil is not a viable possibility. Fire suppression is desirable in order to reduce any further erosion.



## VEGETATION TYPES OUTSIDE THE GAME RANGE

Although areas M through R are mostly outside the Sun River Game Range boundary, I have included them here because they are in areas of known wildlife migration and/or the vegetation type unit overlaps into the game range.

No attempt has been made to discuss any management considerations of these areas because the jurisdiction of these areas are not controlled by the Department of Fish and Game.

Those portions of areas M, N, O and P which overlap onto the game range are small, have little effect on the wildlife and are best left to natural succession as they have been by Bert Goodman.

### M. Stecker Ranch

This PIFL/FEID, FESC/AGSP complex is currently grazed by livestock and is a good area to compare these two habitat types in grazed and ungrazed condition. The species composition is essentially the same as ungrazed sites on the game range, but more bare ground is present and increased cover of increaser species is found on the Stecker Ranch. *Festuca scabrella* has less cover and *F. idahoensis* has more cover than ungrazed sites. *Juniperus horizontalis* also has more cover on the Stecker site.

A small portion of area M extends into the game range and grass cover is higher and forbs lower than on the Stecker side of the fence.

### N. Home Gulch Fescue Grasslands

The area is currently under livestock grazing.

A marked reduction in *Festuca scabrella* and an increase in *Agropyron spicatum* characterize these FESC/FEID habitat type sites. *Artemisia frigida*, *Lupinus sericeus*, *Balsamorhiza sagittata*, *Chrysopsis villosa*, *Gallium boreale*, *Juniperus horizontalis*, *Antennaria* spp. and *Aster* spp. have all increased cover. *F. idahoensis* is more prominent here than on ungrazed sites of this type, but probably due to greater visibility because of the loss of taller grasses like *F. scabrella*.

### O. North Sawtooth Forest Burn

This area was burned more recently than the area east of the Sawtooth Ridge. The higher part of the slope is PSME/CARU habitat type, the lower is PSME/SYAL. The entire area is in an early state of succession, with conifer regeneration just beginning. Most of the conifer reproduction is *Pseudotsuga menziesii* but some *Pinus flexilis* is also found.

*Acer glabrum*, *Symphoricarpos albus*, *Prunus virginiana*, *Shepherdia canadensis*, *Rosa* spp., *Potentilla fruticosa*, *Juniperus horizontalis* and *Arctostaphylos uva-ursi* are common throughout the burn. The lower areas have *Populus tremuloides* as a seral dominant. A wide variety of forbs are found.

*Agropyron spicatum* and *Carex geyeri* are the most common grasses. Introduced species (*Bromus inermis*, *Poa pratensis* and *Phleum pratense*) are locally common. *Festuca idahoensis* and *Calamagrostis rubescens* are present in small amounts.

Considerable water erosion has taken place since the burn occurred. This may have slowed the recovery of this area. Grazing is allowed on this site currently.

A small portion of this area and area P overlap the boundary into the game range. Erosion of these two adjacent areas caused some alluvium to be transported into the upper Burdoff campsite area. No erosion of consequence is now occurring.

P. Home Gulch/Burdoff Ridge Burn

The area northeast of area O was also burned, but prior to that burn but later than the east Sawtooth Ridge area. A mosaic of FESC/FEID, POTR/SYAL and PSME/Syal habitat types occupies this site.

Much of the former *P. menziesii* forest has been eliminated and grassland dominated by *Agropyron spicatum*, *Festuca idahoensis* and *Calamagrostis rubescens* has replaced it. Scattered *P. menziesii* and *Pinus flexilis* dot the grass expanse, but conifer reproduction is limited. *F. scabrella* is conspicuously depressed because of the grazing currently occurring.

Q. Lower Home Gulch Burn

This burn occurred at the same time as the north Sawtooth burn (area O). This area is a mosaic of FESC/FEID, POTR/SYAL and PSME/SYAL habitat types. Erosion has removed a considerable amount of soil from these west-facing slopes.

*Agropyron spicatum* and *Festuca idahoensis* are the dominant grasses. *F. scabrella* is mostly absent. *Poa pratensis*, *Phleum pratense* and *Bromus inermis* are common. *Symphoricarpos albus* is common throughout the site. *Spiraea betulifolia* is locally abundant. The wetter sites have *Populus tremuloides*, *Potentilla fruticosa* and *Aster* spp.

This area is also used for livestock grazing.

R. Agropyron Flats

This grassland site was once occupied by a *Pseudotsuga menziesii* forest. Fire and erosion has since removed most evidence of the former forest. Several stumps with burn scars and the adjacent PSME/ARCO habitat type stand, along with the presence of *Agropyron spicatum*, *Festuca idahoensis*, and *F. scabrella* (seral species; Pfister, et. al. 1977), indicate this site is a PSME/ARCO habitat type. *Juniperus horizontalis*, *Symphoricarpos albus*, *Lupinus sericeus* and *Galium boreale* are also common.

No indication of regeneration of the forest is evident. Occasional *P. menziesii* and *Pinus flexilis* trees are found, but no significant amount of seedlings are apparent and this burn is at least 50 years old. It is therefore highly likely that this grassy condition will persist for many years to come.

## VI. USING GAME RANGE MAPS

When using the maps of either climax vegetation or vegetation types, it should be remembered that real vegetation seldom has a linear contact between communities, but has a zone of intergradation called an ecotone. Ecotones between contiguous communities may be wide or narrow, and the line that is placed on a map is the best separation of the two communities in the judgment of the mapper. Each user of the map may want to shift that boundary line toward one community or the other, depending on which he is emphasizing.

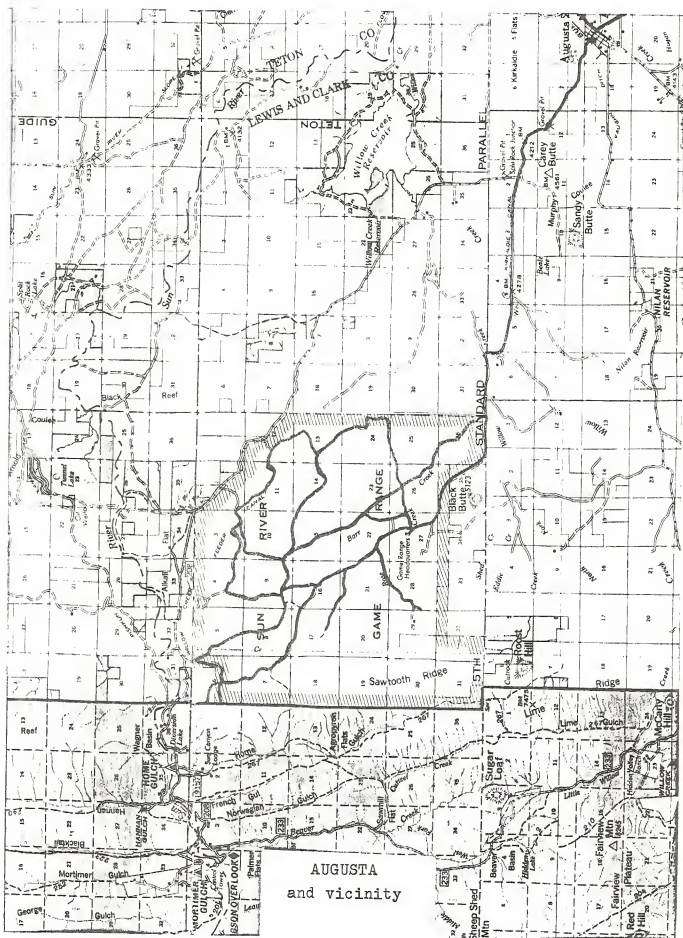
Single stands or even all stands of an ecosystem-type in one local area may lack one or more of the characters that usually distinguish that ecosystem-type. This stand can still be placed in its proper category by noting the remainder of the defining characteristic species. The absence of one or two of these species is usually due to accidents of dispersal in naturally pristine stands and in previously disturbed stands it is often due to lack of a nearby seed source (Daubenmire, 1968).

Some areas that have stands of such a small size that they are impractical to map have been mapped as a single large unit composed of a mosaic or complex of two or more types. In these areas it is necessary for the user to recognize the difference between the ecosystem types of the mozaic and to determine the emphasis to be placed on each.



VII. MAPS

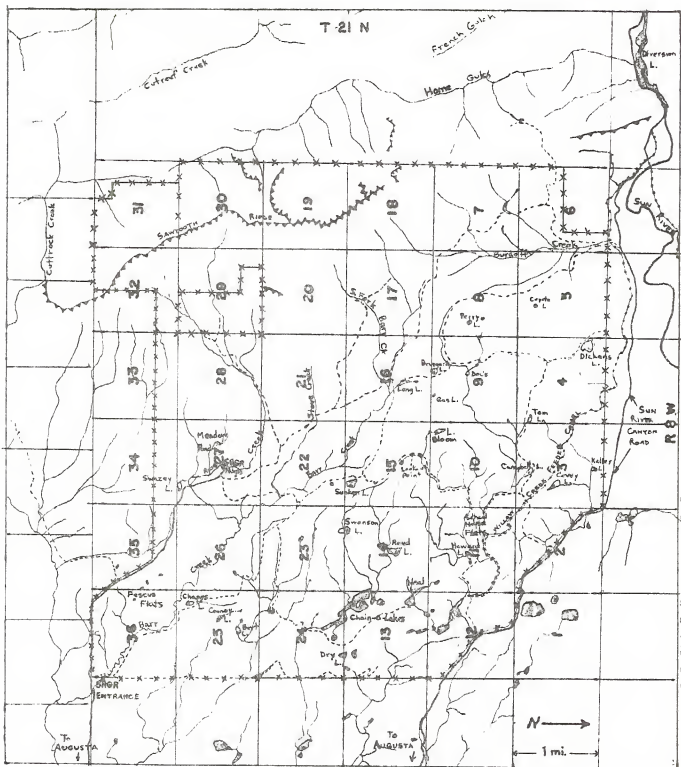




AUGUSTA  
and vicinity







**SUN RIVER GAME RANGE**  
 Montana Department of Fish & Game

Game Range Boundary	—x—x—x—x—	Stream	~~~~~
Improved Road	—————	Canal	- - - - -
Unimproved Road	- - - - -	Lake	⊕
Section Number	12	Cliff	⌒

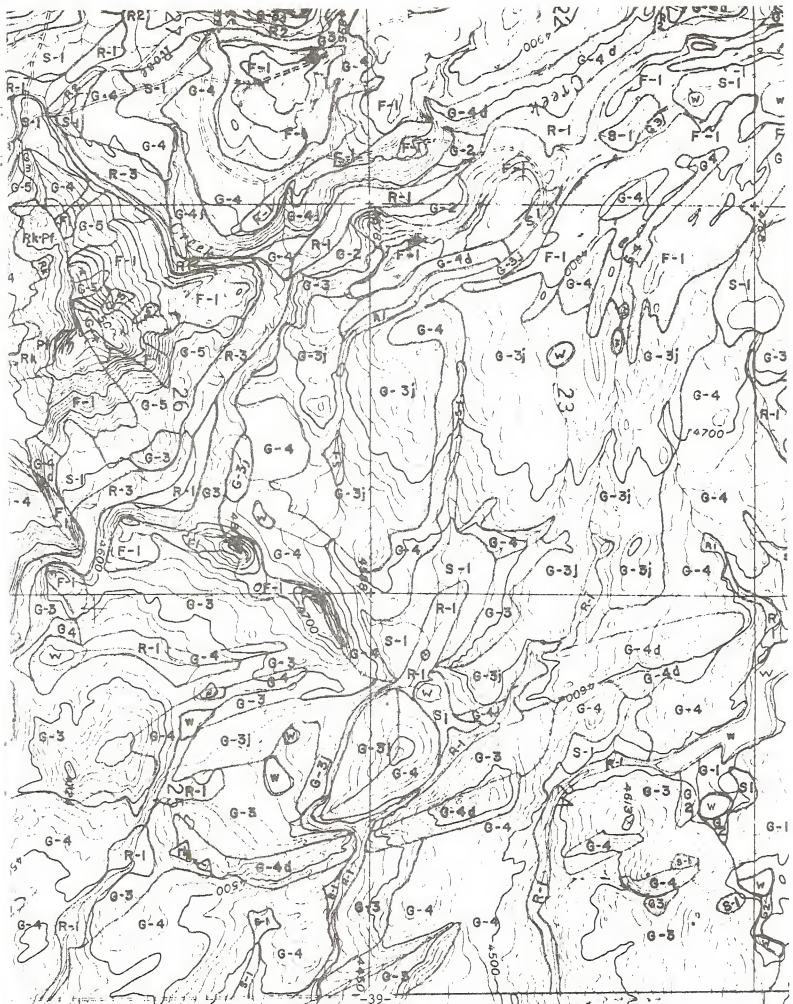


CLIMAX PLANT COMMUNITIES







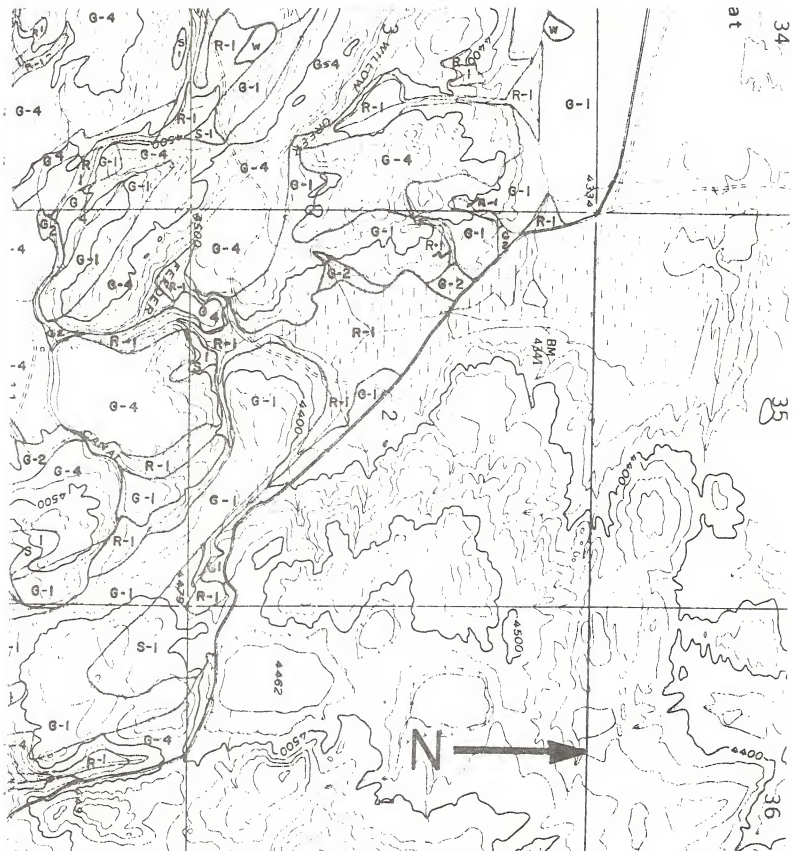










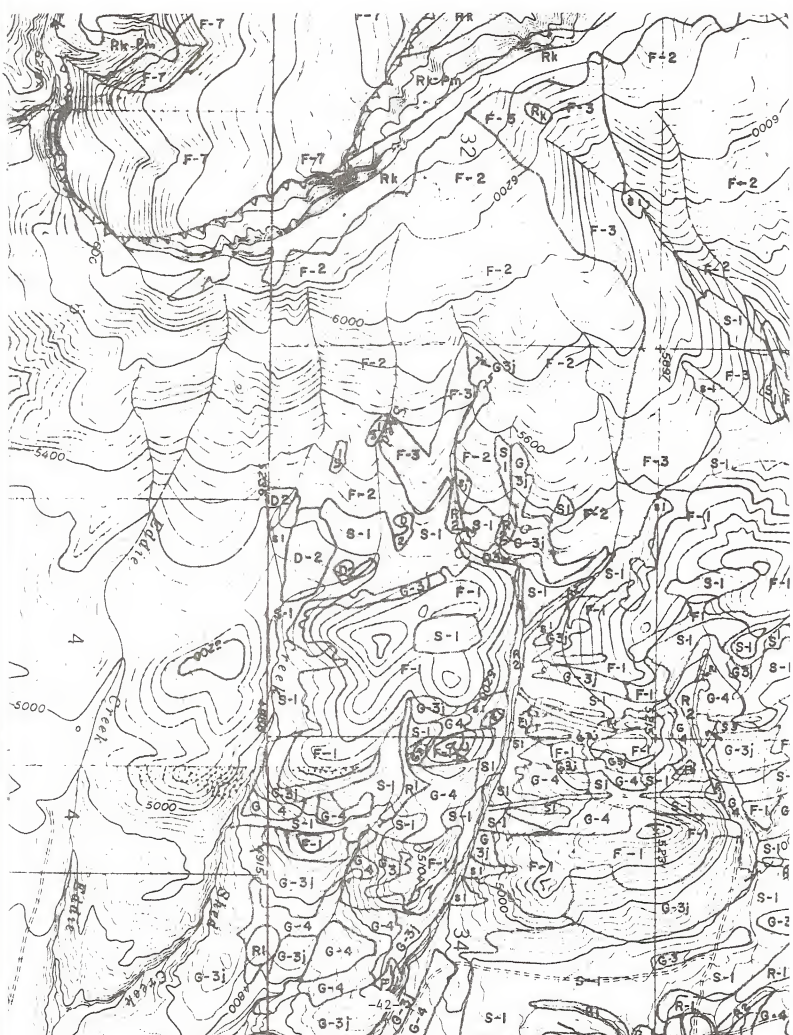


# SUN RIVER GAME RANGE, Augusta, Montana

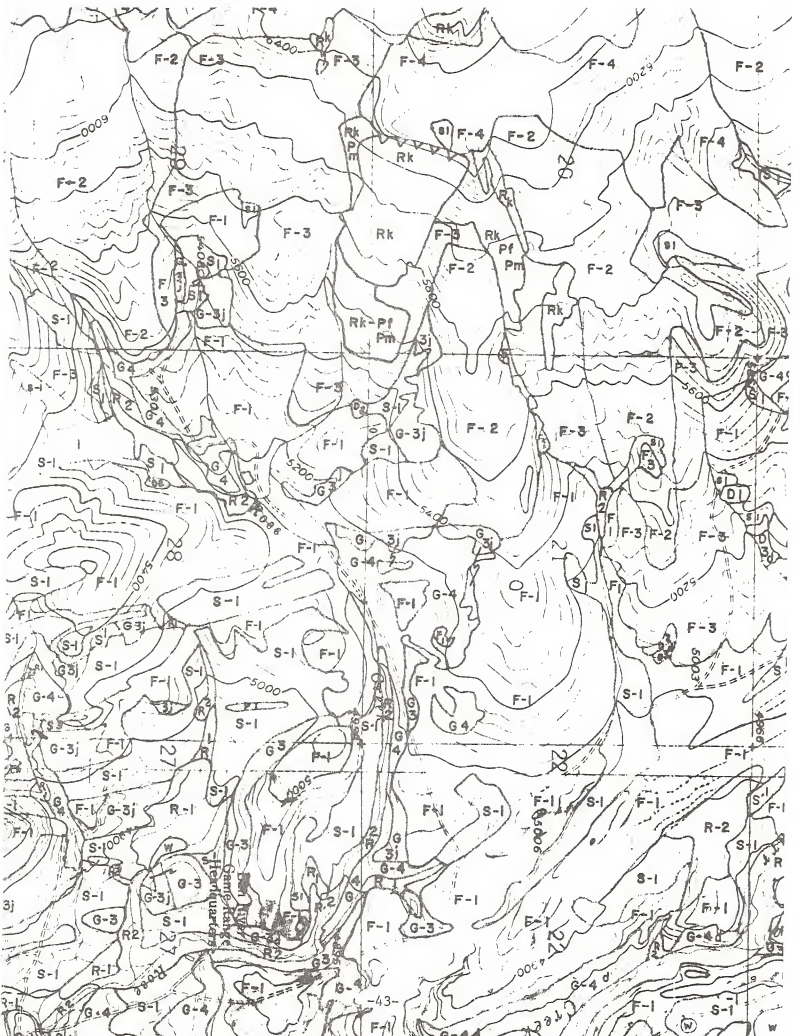
MONTANA DEPARTMENT OF FISH AND GAME

T.21N. R.8W., MPM scale 4 in. = 1 mile



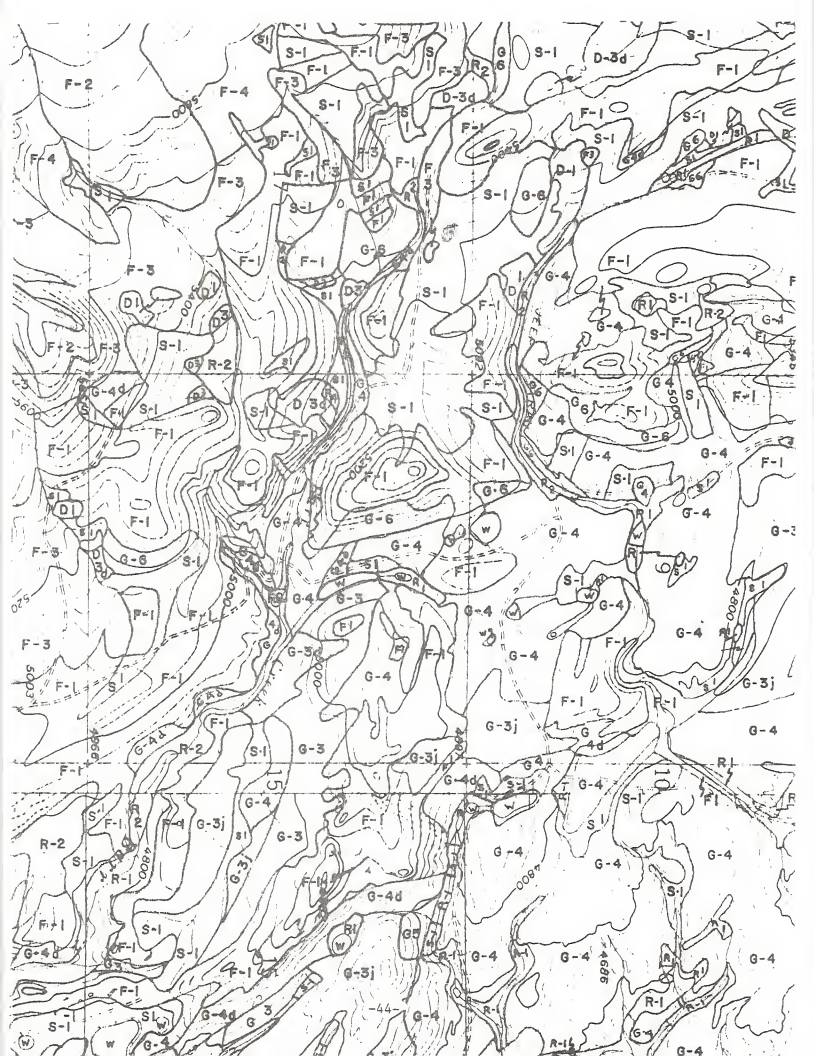




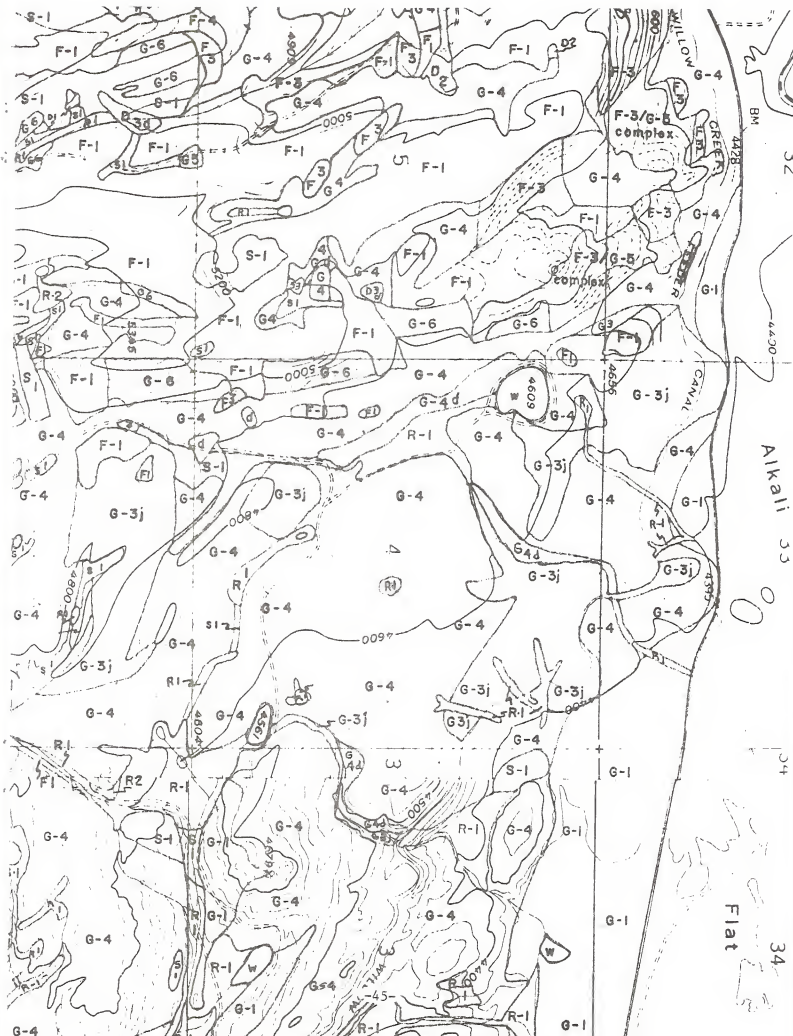












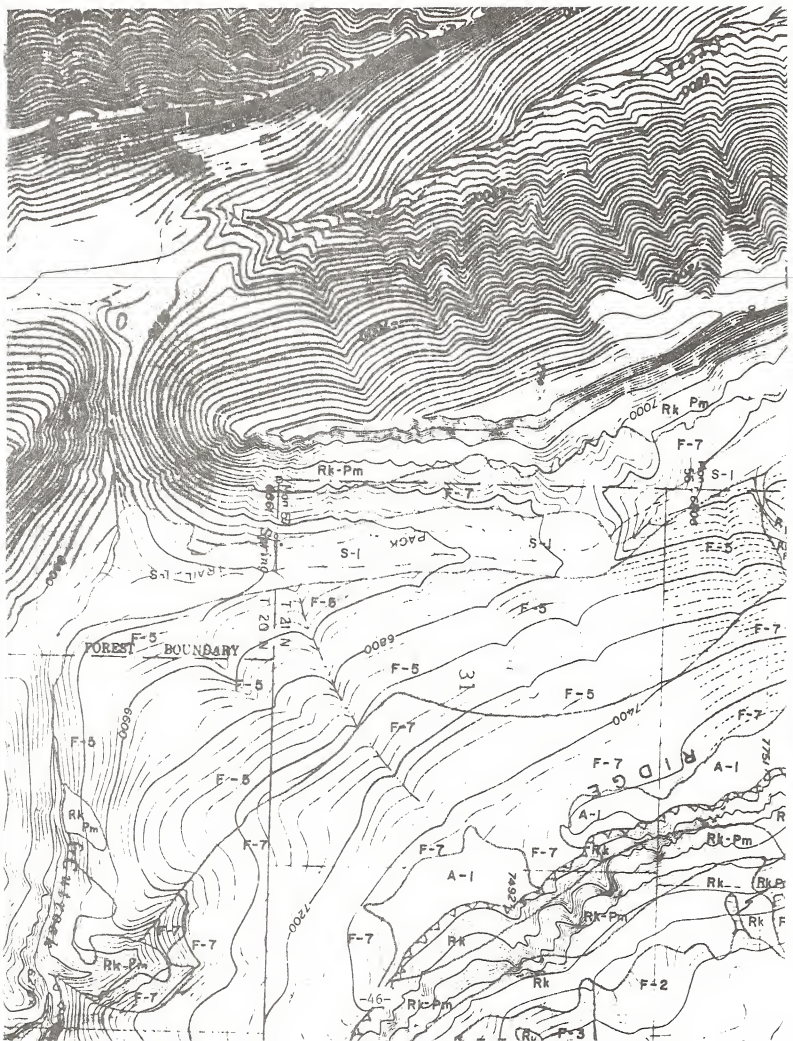
Alkali 33

34

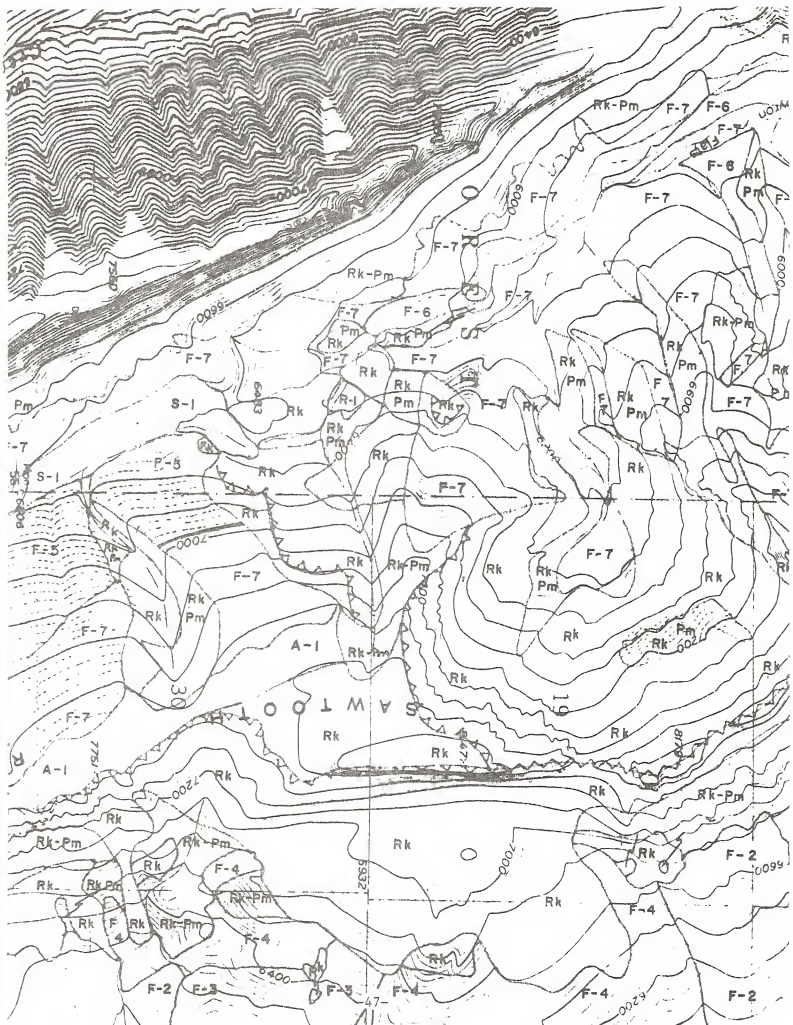
Flat

34



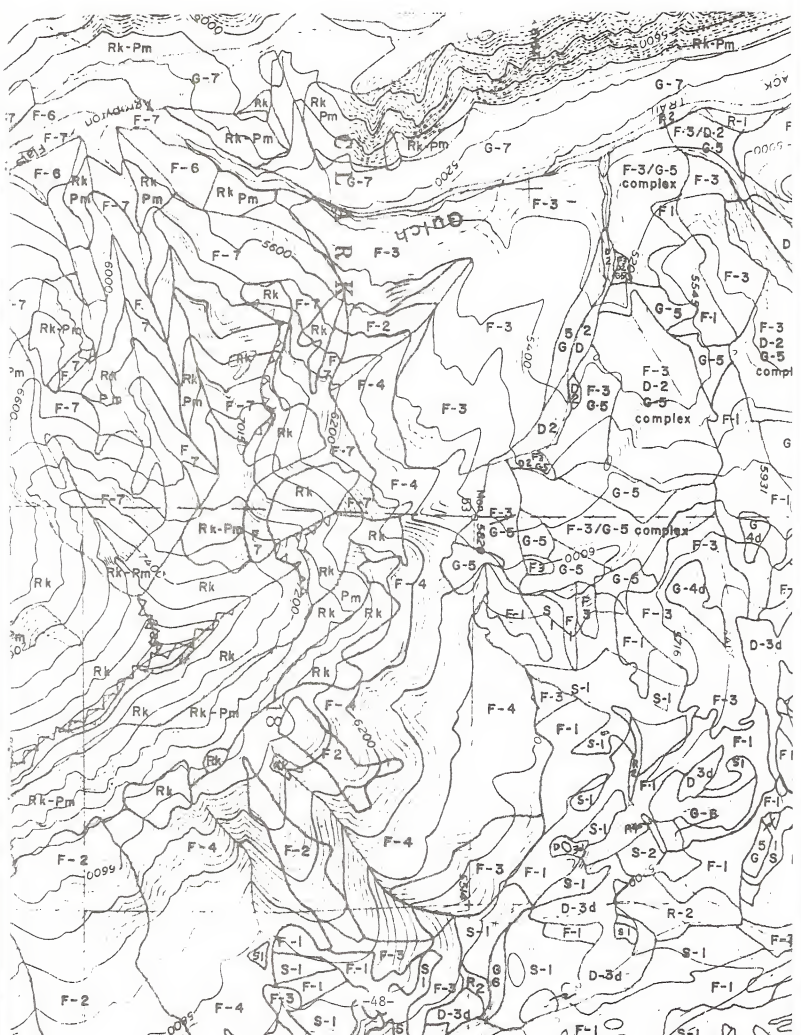




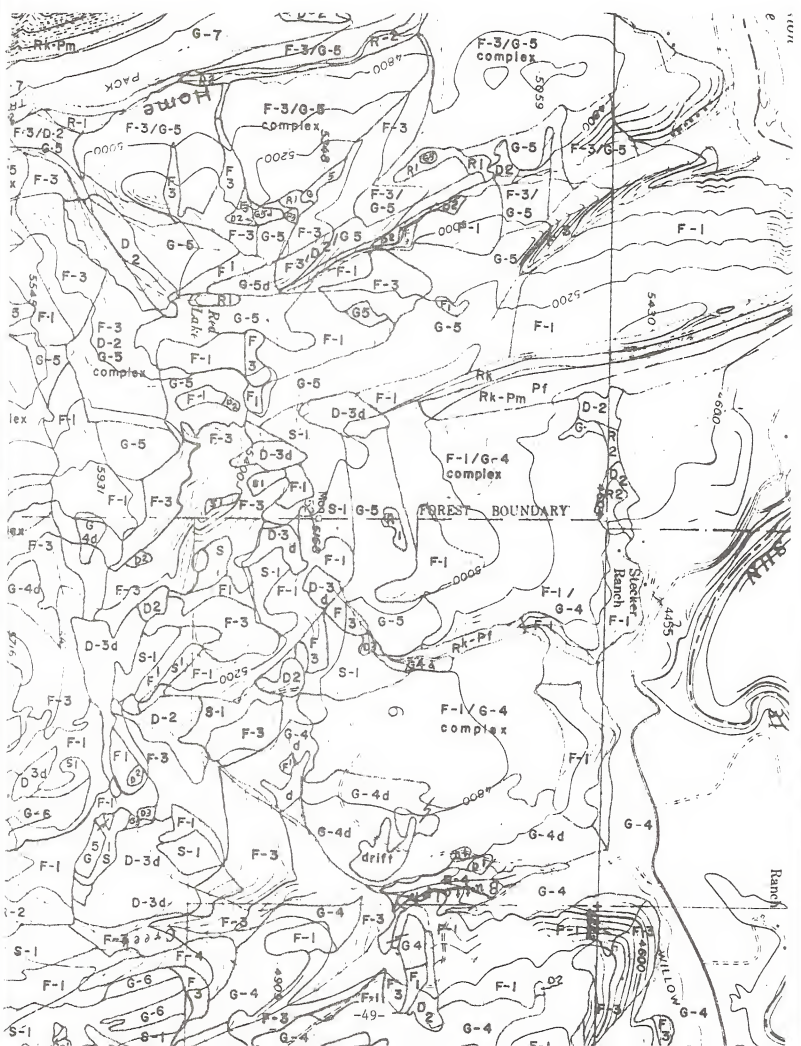














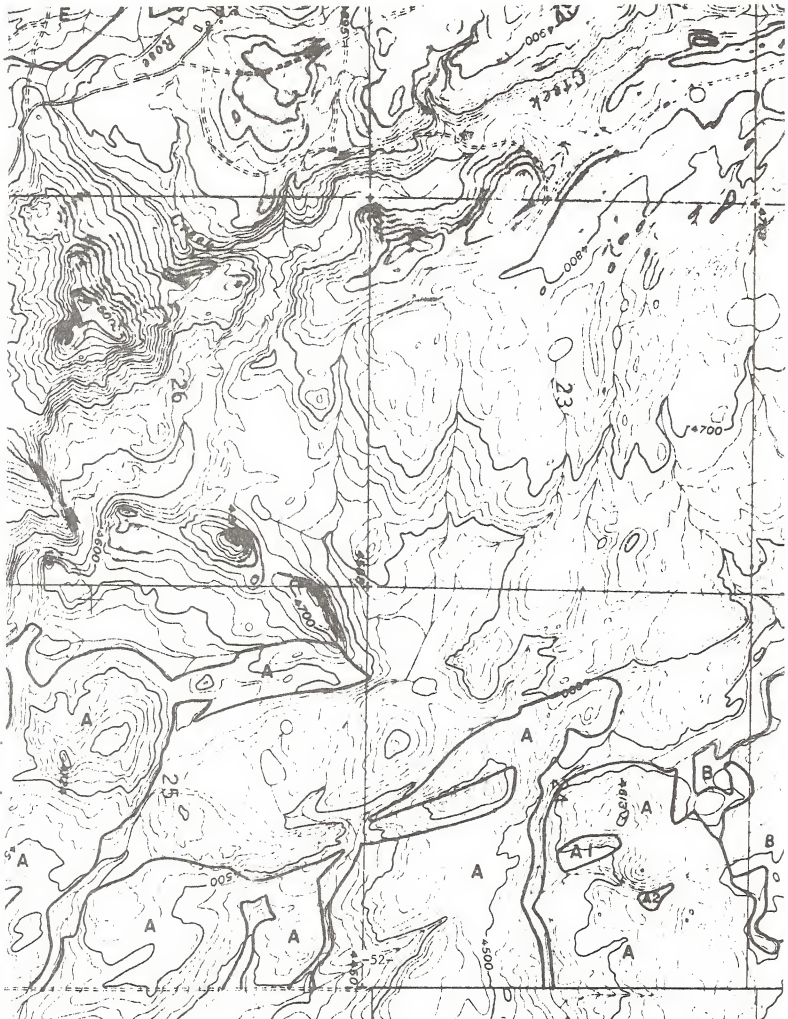
VEGETATION TYPES



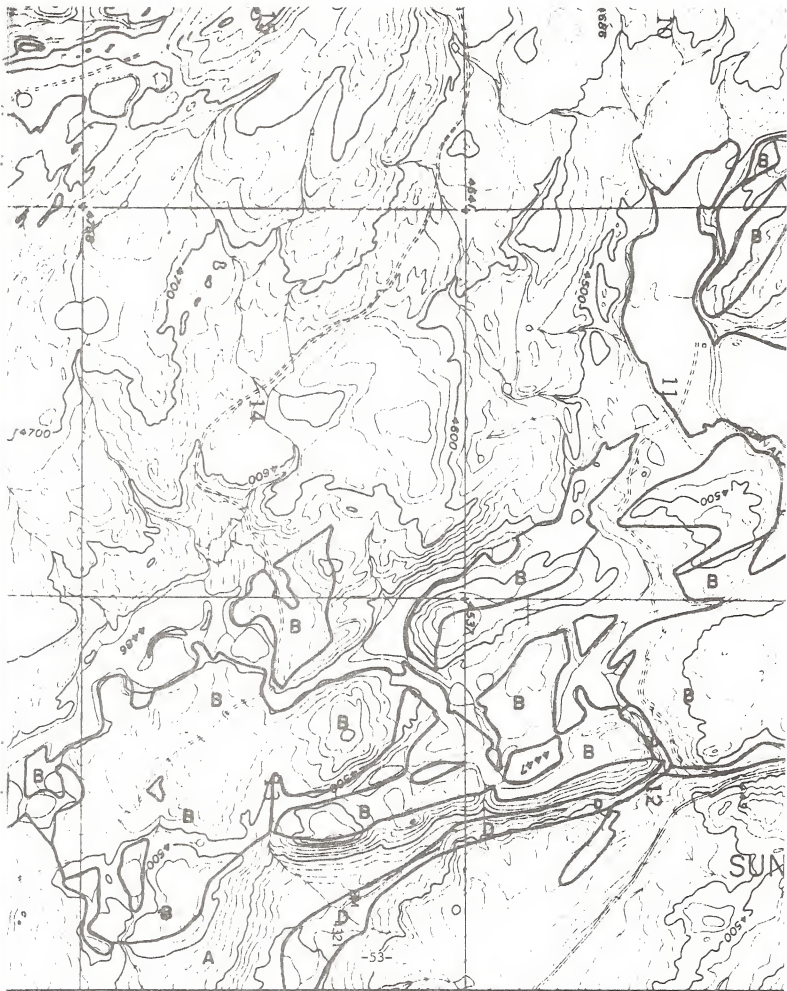






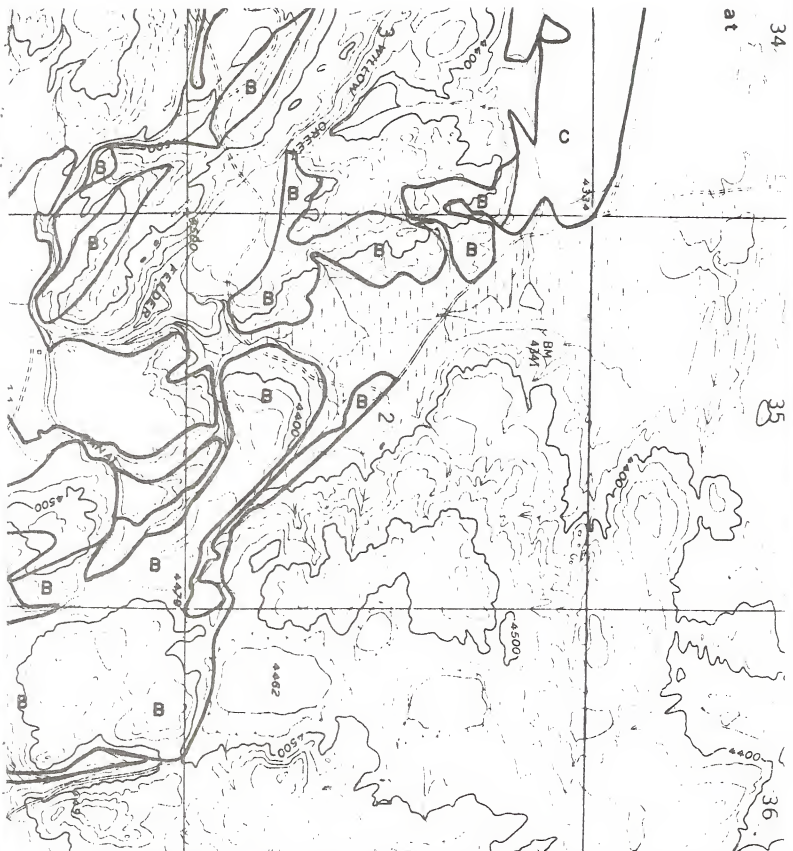








34  
at



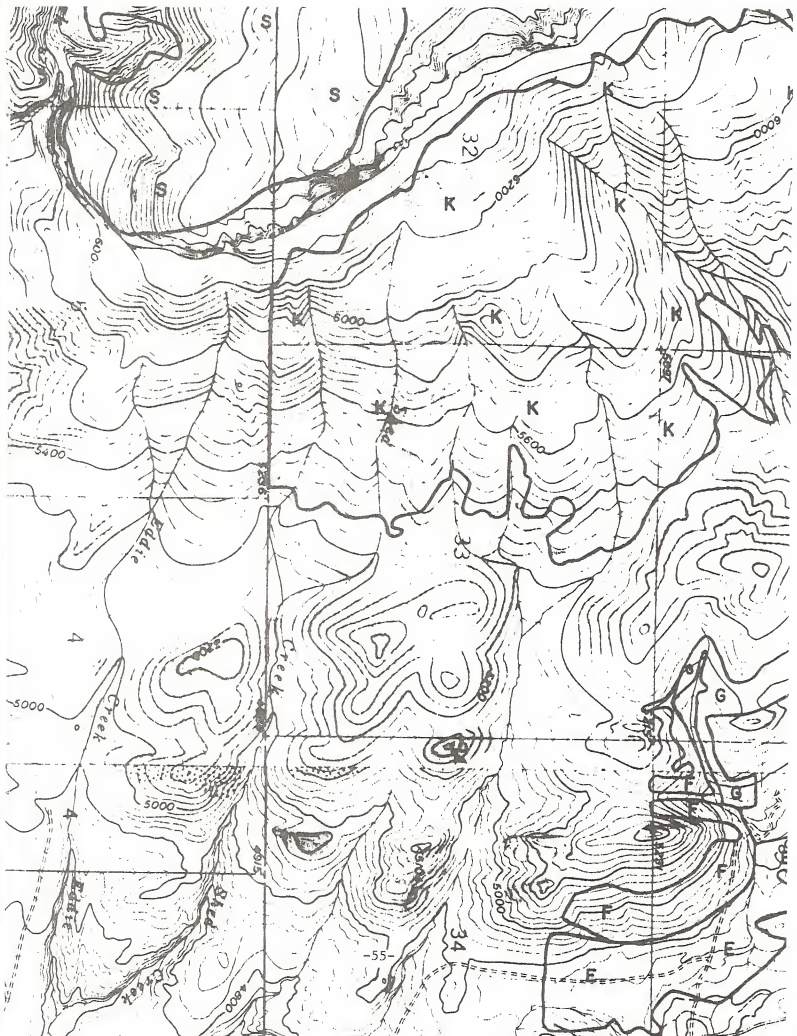
SUN RIVER GAME RANGE, Augusta Montana

MONTANA DEPARTMENT of FISH and GAME

T.21 N. R.8 W. MPM. scale 4 in. = 1 mile

4400



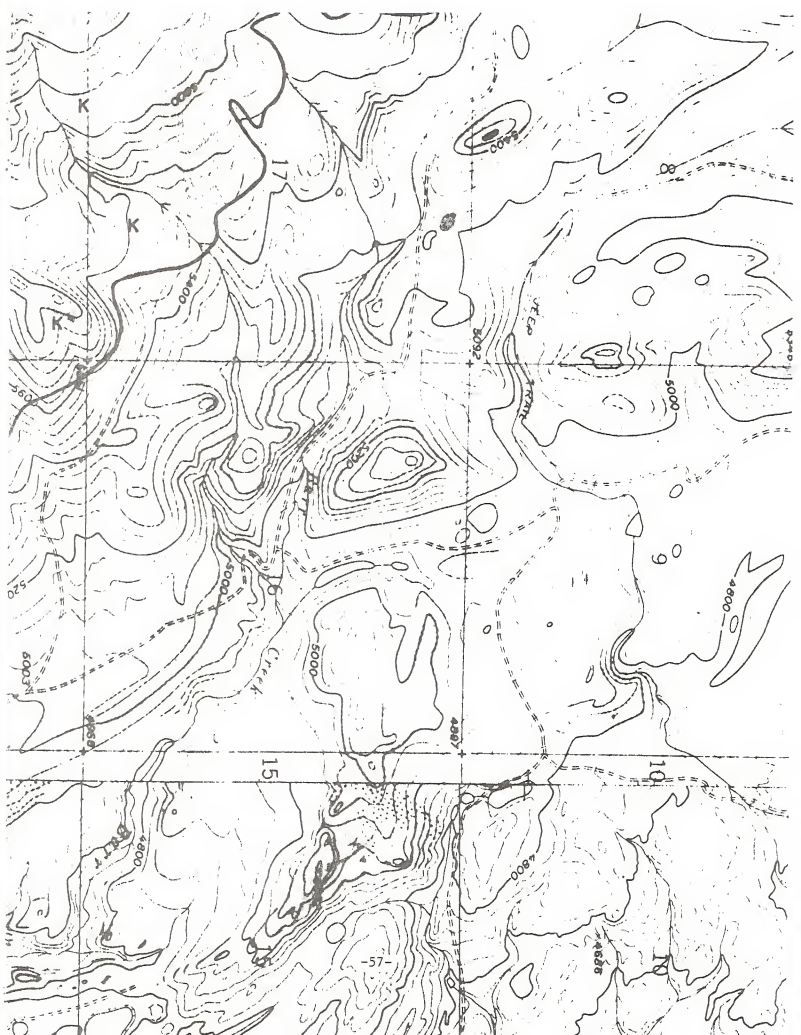




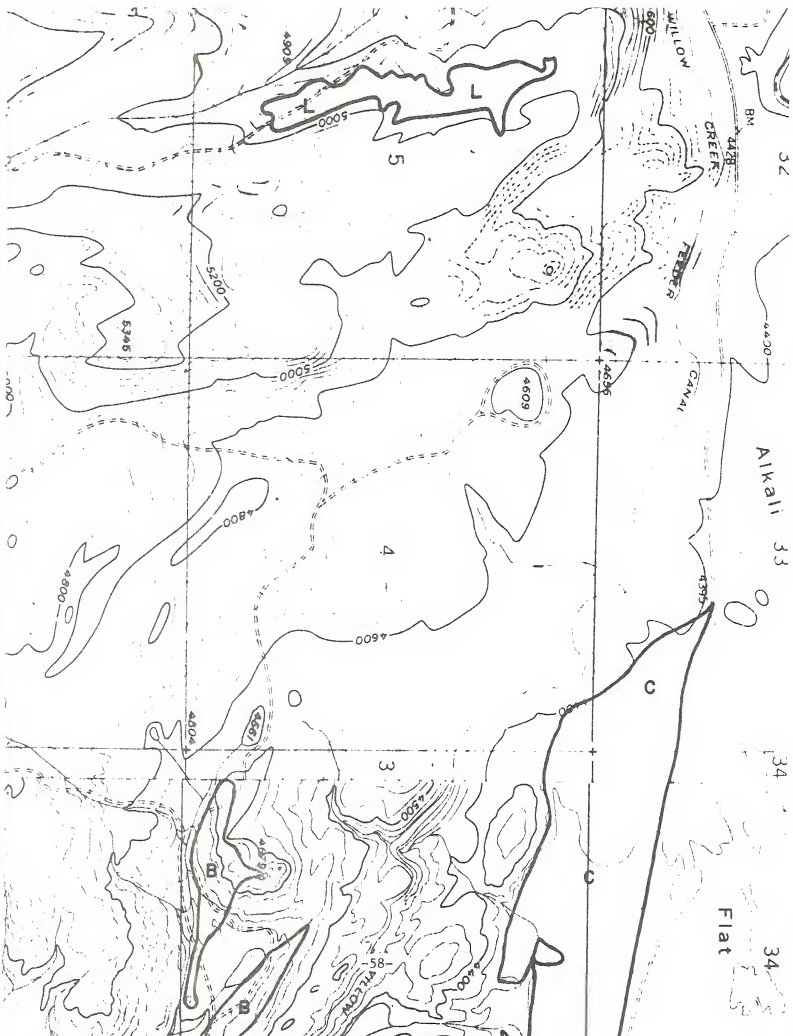




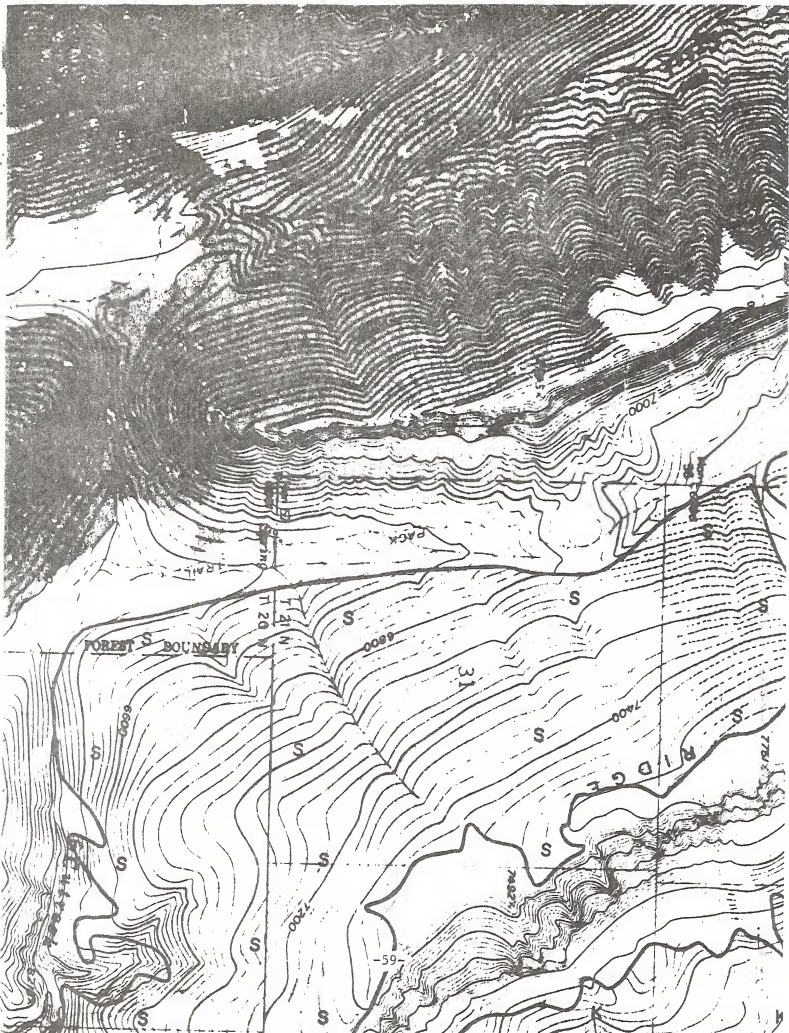






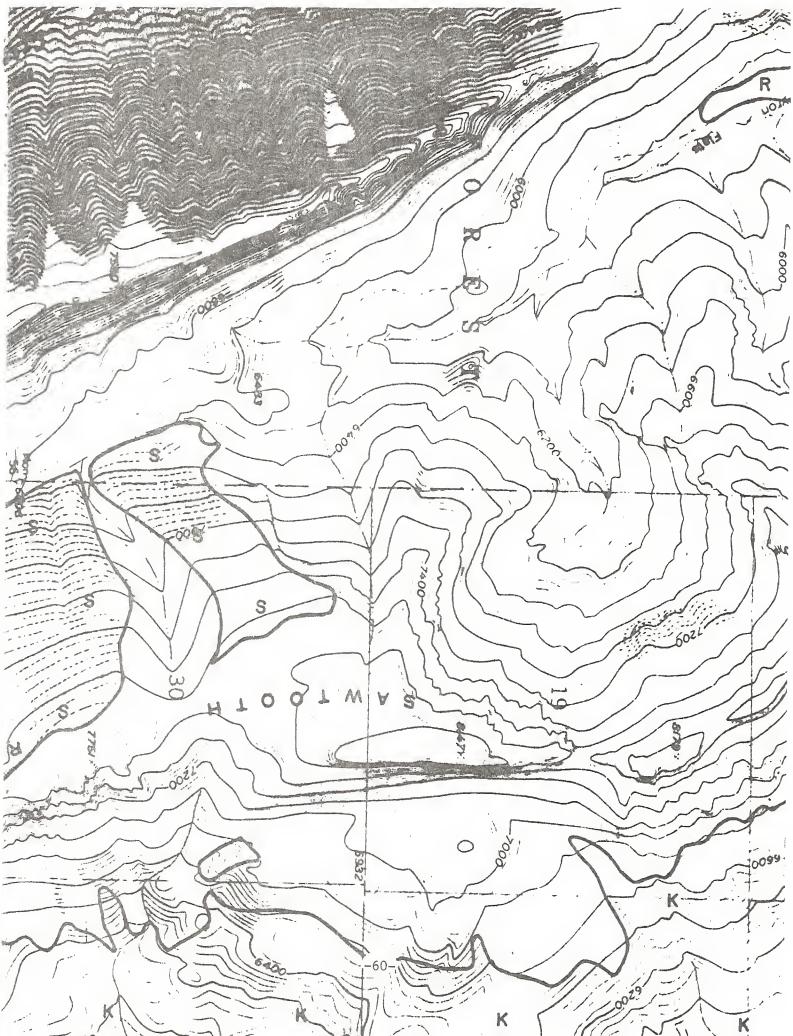




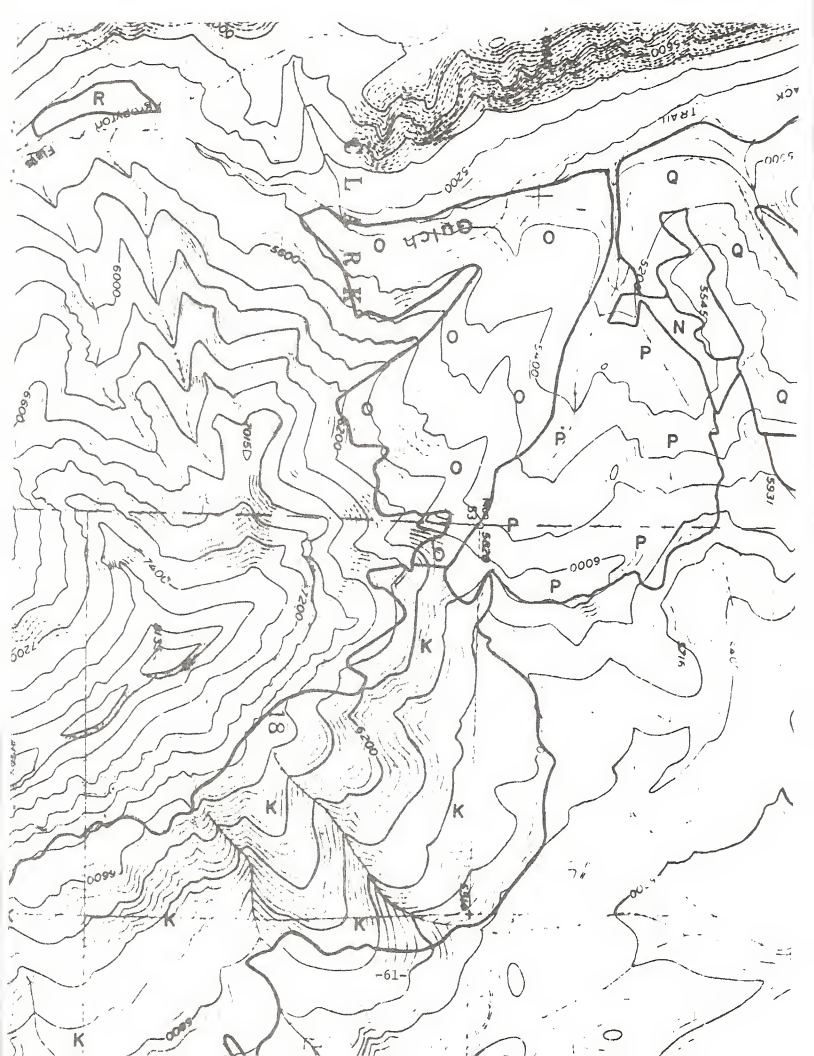




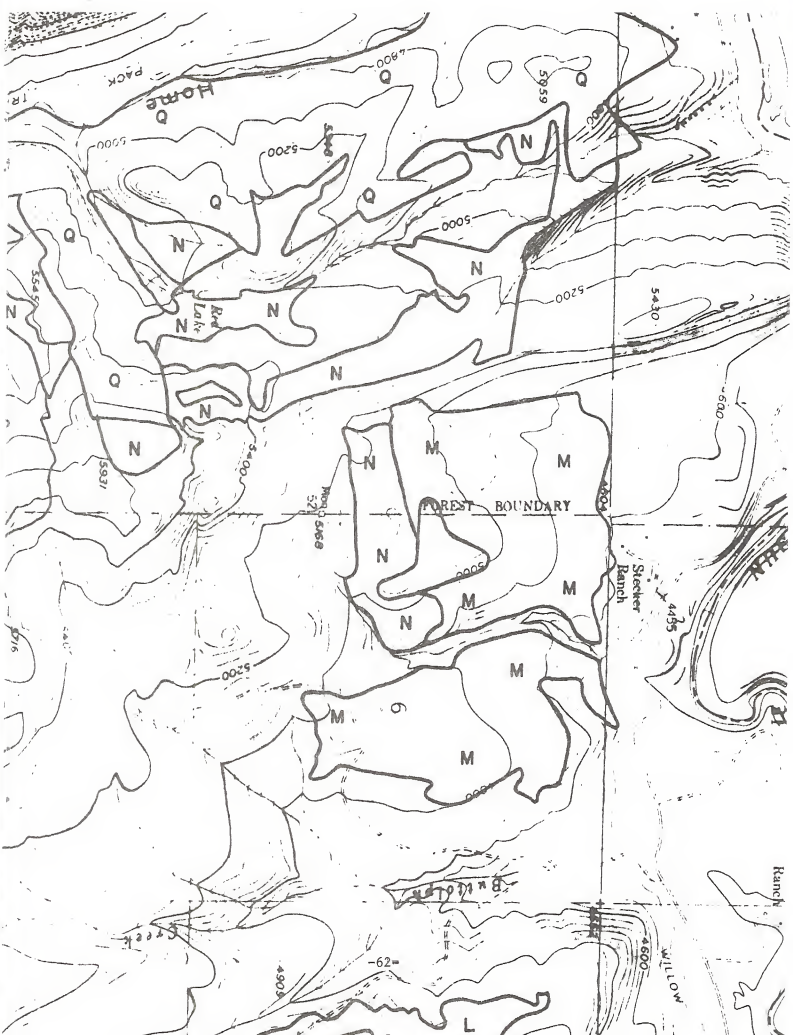












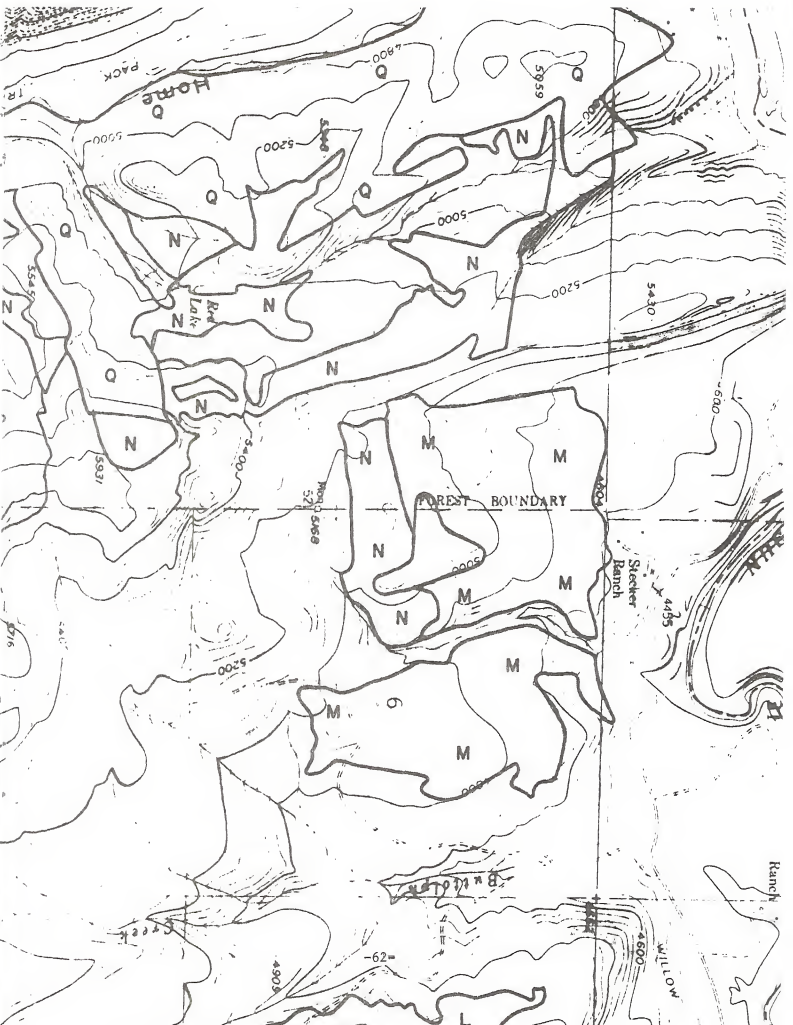
Home Pack

FOREST BOUNDARY

Stecker Ranch

WILLOW CREEK

Ranch



Home Pack

FOREST BOUNDARY

Stecker Ranch

WILLOW CREEK

Ranch



VIII. APPENDICES

## APPENDIX A

Species, Species Abbreviations and Common Names of Sun River Game Range Plants.  
 Arranged alphabetically by life form. Nomenclature follows Hitchcock and Cronquist (1974).  
 (*Carex* follows Hermann, 1970).

SCIENTIFIC BINOMIAL	ABBREV.	COMMON NAME
<b>TREES</b>		
Juniperus scopulorum	JUN SCO	Rocky Mountain Juniper
Picea engelmannii	PIC ENG	Engelmann Spruce
Pinus contorta var. latifolia	PIN CON	Lodgepole Pine
Pinus flexilis	PIN FLE	Limber Pine
Populus tremuloides	POP TRE	Quaking Aspen
Populus trichocarpa	POP TRI	Black Cottonwood
Pseudotsuga menziesii var. glauca	PSE MEN	Rocky Mountain Douglas Fir
<b>TALL SHRUBS</b>		
Acer glabrum var. glabrum	ACE GLA	Rocky Mountain Maple
Betula occidentalis var. occidentalis	BET OCC	Water Birch
Cornus stolonifera var. stolonifera	COR STO	Red-osier Dogwood
Eleagnus commutata	ELE COM	Silverberry
Salix bebbiana var. perrostrata	SAL BEB	Bebb Willow
Salix exigua ssp. exigua var. stenophylla	SAL EXI	Narrow-leaf Willow
Salix monticola	SAL MON	Mountain Willow
Salix myrtillifolia	SAL MYR	Blueberry Willow
Salix rigida var. mackensleana	SAL RIG	Mackenzie Willow
Salix scouleriana	SAL SCO	Scouler Willow
<b>MEDIUM SHRUBS</b>		
Amelanchier alnifolia var. alnifolia	AME ALN	Western Serviceberry
Artemisia tridentata ssp. vaseyana	ART TRI	Mountain Big Sagebrush
Chrysothamnus nauseosus var. petrophilus	CHR NAU	Rubber Rabbitbrush
Juniperus communis var. montana	JUN COM	Common Juniper
Philadelphus lewisii	PHI LEW	Mockorange
Potentilla fruticosa	POT FRU	Shrubby Cinquefoil
Prunus virginiana var. melanocarpa	PRU VIR	Common Chokecherry
Rhus trilobata	RHU TRI	Skunkbush Sumac
Ribes cereum var. inebrians	RIB CER	Squaw Currant
Ribes inerme	RIB INE	Whitestem Gooseberry



## APPENDIX A (Continued)

SCIENTIFIC BINOMIAL	ABBREV.	COMMON NAME
<b>MEDIUM SHRUBS (Cont.)</b>		
<i>Ribes lacustre</i>	RIB LAC	Prickly Currant
<i>Rosa acicularis</i>	ROS ACI	Prickly Rose
<i>Rosa arkansana</i>	ROS ARK	Arkansas Rose
<i>Rosa woodsii</i> var. <i>ultramontana</i>	ROS WOO	Pearhip Rose
<i>Rubus idaeus</i> var. <i>paramoenus</i>	RUB IDA	Red Raspberry
<i>Rubus parviflorus</i>	RUB PAR	Thimbleberry
<i>Shepherdia canadensis</i>	SHE CAN	Canada Buffalo-berry
<i>Spiraea betulifolia</i> var. <i>lucida</i>	SPI BET	Shiny-leaf Spirea
<i>Symphoricarpos albus</i> var. <i>albus</i>	SYM ALB	Common Snowberry
<i>Tetradymia canescens</i>	TET CAN	Gray Horse-brush
<b>LOW SHRUBS AND VINES</b>		
<i>Arctostaphylos uva-ursi</i>	ARC UVA	Kinnikinnick
<i>Artemisia frigida</i>	ART FRI	Fringed Sagewort
<i>Berberis repens</i>	BER REP	Creeping Oregongrape
<i>Clematis columbiana</i> var. <i>columbiana</i>	CLE COL	Columbia Clematis
<i>Clematis ligusticifolia</i>	CLE LIG	Western Clematis
<i>Dryas octopetala</i> var. <i>hookeriana</i>	DRY OCT	White Dryas
<i>Gutierrezia sarothrae</i>	GUT SAR	Broom Snakeweed
<i>Juniperus horizontalis</i>	JUN HOR	Creeping Juniper
<i>Oppuntia polycantha</i>	OPP POL	Prickly-pear Cactus
<b>FERNS AND FERN ALLIES</b>		
<i>Equisetum arvense</i>	EQU ARV	Common Horsetail
<i>Equisetum laevigatum</i>	EQU LAE	Smooth Scouring-rush
<i>Cystopteris fragilis</i>	CYS FRA	Brittle Bladder-fern
<i>Selaginella densa</i> var. <i>densa</i>	SEL DEN	Compact Club-moss
<b>GRAMINOIDES</b>		
<i>Agropyron caninum</i> ssp. <i>majus</i> var. <i>majus</i>	AGR CANma	Slender Wheatgrass
<i>Agropyron caninum</i> ssp. <i>majus</i> var. <i>andinum</i>	AGR CANan	Bearded Wheatgrass
<i>Agropyron cristatum</i>	AGR CRI	Crested Wheatgrass
<i>Agropyron dasystachyum</i>	AGR DAS	Thick-spiked Wheatgrass
<i>Agropyron repens</i>	AGR REP	Quack Grass
<i>Agropyron smithii</i>	AGR SMI	Western Wheatgrass

## APPENDIX A (Continued)

SCIENTIFIC BINOMIAL	ABBREV.	COMMON NAME
GRAMINOIDES (Cont.)		
<i>Agropyron spicatum</i> var. <i>spicatum</i>	AGR SPI	Bluebunch Wheatgrass
<i>Agrostis alba</i> var. <i>alba</i>	AGR ALB	Redtop
<i>Alopecurus alpinus</i>	ALO ALP	Alpine Foxtail
<i>Andropogon scoparius</i>	AND SCO	Little Bluestem
<i>Aristida fendleriana</i>	ARI FEN	Fendler's Threeawn
<i>Aristida longiseta</i> var. <i>robusta</i>	ARI LON	Red Threeawn
<i>Avena fatua</i>	AVE FAT	Wild Oats
<i>Beckmannia syzigachne</i>	BEC SYZ	American Sloughgrass
<i>Bouteloua gracilis</i>	BOU GRA	Blue Grama
<i>Bromus carinatus</i> var. <i>carinatus</i>	BRO CARca	Mountain Brome
<i>Bromus carinatus</i> var. <i>linearis</i>	BRO CARli	California Brome
<i>Bromus inermis</i> ssp. <i>inermis</i>	BRO INEIn	Smooth Brome
<i>Bromus inermis</i> ssp. <i>pumpellianus</i> var. <i>pumpellianus</i>	BRO INEpu	Pumpelly Brome
<i>Bromus japonicus</i>	BRO JAP	Japanese Brome
<i>Bromus tectorum</i>	BRO TEC	Cheat Grass (Downy Brome)
<i>Calamagrostis inexpansa</i> var. <i>inexpansa</i>	CAL INE	Narrow-spiked Reedgrass
<i>Calamagrostis neglecta</i> var. <i>neglecta</i>	CAL NEG	Slimstem Reedgrass
<i>Calamagrostis purpurascens</i>	CAL PUR	Purple Pinegrass
<i>Calamagrostis rubescens</i>	CAL RUB	Pinegrass
<i>Calamovilfa longifolia</i>	CAL LON	Prairie Sand Reedgrass
<i>Carex aquatilis</i>	CAR AQU	Water Sedge
<i>Carex filifolia</i>	CAR FIL	Thread-leaved Sedge
<i>Carex geyeri</i>	CAR GEY	Elk Sedge
<i>Carex hoodii</i>	CAR HOO	Wire Sedge
<i>Carex lanuginosa</i>	CAR LAN	Wooly Sedge
<i>Carex praegracilis</i>	CAR PRA	Clustered Field Sedge
<i>Carex rostrata</i>	CAR ROS	Beaked Sedge
<i>Carex rupestris</i> var. <i>drummondiana</i>	CAR RUP	Curly Sedge
<i>Carex scirpiformis</i>	CAR SCI	Single-spike Sedge
<i>Dactylis glomerata</i>	DAC GLO	Orchard Grass
<i>Danthonia parryi</i>	DAN PAR	Parry's Oatgrass
<i>Deschampsia cespitosa</i> var. <i>cespitosa</i>	DEC CES	Tufted Hairgrass

## APPENDIX A (Continued)

SCIENTIFIC BINOMIAL	ABBREV.	COMMON NAME
GRAMINOIDES (Cont.)		
<i>Distichlis stricta</i> var. <i>stricta</i>	DIS STR	Alkali Saltgrass
<i>Eleocharis acicularis</i>	ELE ACI	Needle Spike-rush
<i>Eleocharis palustris</i>	ELE PAL	Common Spike-rush
<i>Elymus cinereus</i> var. <i>cinereus</i>	ELY CIN	Basin Wildrye
<i>Festuca idahoensis</i> var. <i>idahoensis</i>	FES IDA	Idaho Fescue
<i>Festuca pratensis</i>	FES PRA	Meadow Fescue
<i>Festuca scabrella</i>	FES SCA	Rough Fescue
<i>Glyceria grandis</i>	GLY GRA	American Mannagrass
<i>Helictotrichon hookeri</i>	HEL HOO	Spike-oat
<i>Hordeum jubatum</i>	HOR JUB	Foxtail Barley
<i>Juncus alpinus</i>	JUN ALP	Northern Rush
<i>Juncus balticus</i> var. <i>montanus</i>	JUN BAL	Wire Rush
<i>Juncus nodosus</i>	JUN NOD	Tuberous Rush
<i>Juncus tracyi</i>	JUN TRA	Tracy's Rush
<i>Koeleria cristata</i>	KOE CRI	Prairie Junegrass
<i>Muhlenbergia cuspidata</i>	MUH CUS	Plains Muhly
<i>Oryzopsis hymenoides</i>	ORY HYM	Indian Ricegrass
<i>Phalaris arundinacea</i>	PHA ARU	Reed Canarygrass
<i>Phleum pratense</i>	PHL PRA	Common Timothy
<i>Poa compressa</i>	POA COM	Canada Bluegrass
<i>Poa nervosa</i> var. <i>wheeleri</i>	POA NER	Wheeler's Bluegrass
<i>Poa nevadensis</i>	POA NEV	Nevada Bluegrass
<i>Poa pratensis</i>	POA PRA	Kentucky Bluegrass
<i>Poa sandbergii</i>	POA SAN	Sandberg's Bluegrass
<i>Scirpus acutus</i>	SCI ACU	Hardstem Bulrush
<i>Scirpus microcarpus</i>	SCI MIC	Small-fruited Bulrush
<i>Spartina gracilis</i>	SPA GRA	Alkali Cordgrass
<i>Stipa comata</i> var. <i>comata</i>	STI COM	Needle and Thread
<i>Stipa occidentalis</i> var. <i>minor</i>	STI OCC	Western Needlegrass
<i>Stipa spartea</i> var. <i>curtiseta</i>	STI SPA	Porcupine Needlegrass
<i>Stipa viridula</i>	STI VIR	Green Needlegrass

## APPENDIX A (Continued)

SCIENTIFIC BINOMIAL	ABBREV.	COMMON NAME
FORBS		
<i>Achillea millefolium</i> ssp. <i>lanulosa</i> var. <i>lanulosa</i>	ACH MIL	Common Yarrow
<i>Actaea rubra</i> f. <i>rubra</i>	ACT RUB	Western Red Baneberry
<i>Actaea rubra</i> f. <i>neglecta</i>	ACT RUB	Western White Baneberry
<i>Agoseris glauca</i> var. <i>dasycephala</i>	AGO GLA	Pale Agoseris
<i>Allium cernuum</i>	ALL CER	Nodding Onion
<i>Allium textile</i>	ALL TEX	Textile Onion
<i>Alyssum alyssoides</i>	ALY ALY	Pale Alyssum
<i>Amaranthus californicus</i>	AMA CAL	California Amaranthus
<i>Androsace lehmanniana</i>	AND LEH	Sweet-flowered Androsace
<i>Androsace septendrialis</i>	AND SEP	Northern Androsace
<i>Anemone multifida</i> var. <i>multifida</i>	ANE MUL	Pacific Anemone
<i>Angelica arguta</i>	ANG ARG	Sharptooth Angelica
<i>Antennaria anaphaloides</i>	ANT ANA	Tall Pussytoes
<i>Antennaria microphylla</i>	ANT MIC	Rosy Pussytoes
<i>Antennaria parvifolia</i>	ANT PAR	Nuttall's Pussytoes
<i>Antennaria racemosa</i>	ANT RAC	Raceme Pussytoes
<i>Apocynum medium</i>	APO MED	Western Dogbane
<i>Aquilegia flavescens</i>	AQU FLA	Yellow Columbine
<i>Arenaria capillaris</i> var. <i>americana</i>	ARE CAP	Thread-leaved Sandwort
<i>Arenaria obtusiloba</i>	ARE OBT	Arctic Sandwort
<i>Arenaria rossii</i> var. <i>apetala</i>	ARE ROS	Ross Sandwort
<i>Arnica cordifolia</i> var. <i>cordifolia</i>	ARN COR	Heart-leaf Arnica
<i>Arnica fulgens</i>	ARN FUL	Orange Arnica
<i>Artemisia biennis</i>	ART BIE	Biennial Wormwood
<i>Artemisia campestris</i> ssp. <i>borealis</i> var. <i>scouleriana</i>	ART CAM	Northern Wormwood
<i>Artemisia dracunculus</i>	ART DRA	Dragon Sagewort
<i>Artemisia ludoviciana</i> var. <i>ludoviciana</i>	ART LUDlu	Cudweed Sagewort
<i>Artemisia ludoviciana</i> var. <i>latifolia</i>	ART LUDla	Western Mugwort
<i>Artemisia michauxiana</i>	ART MIC	Michaux Mugwort
<i>Aster chilensis</i> ssp. <i>adscendens</i>	AST CHI	Long-leaved Aster
<i>Aster conspicuus</i>	AST CON	Showy Aster
<i>Aster foliaceus</i> var. <i>parryi</i>	AST FOL	Leafy Aster

## APPENDIX A (Continued)

SCIENTIFIC BINOMIAL	ABBREV.	COMMON NAME
<u>FORBS (Cont.)</u>		
Aster hesperius	AST HES	Western Willow Aster
Aster laevis var. geyeri	AST LAE	Smooth Aster
Aster modestus	AST MOD	Few-flowered Aster
Aster pansus	AST PAN	White Prairie Aster
Astragalus argophyllus var. argophyllus	AST ARG	Silver-leaved Milk-vetch
Astragalus bisulcatus	AST BIS	Two-groove Milk-vetch
Astragalus cibarius	AST CIB	Browse Milk-vetch
Astragalus drummondii	AST DRU	Drummond's Milk-vetch
Astragalus gilviflorus	AST GIL	Plains Orophaca
Astragalus purshii var. purshii	AST PUR	Pursh's Milk-vetch
Bahia oppositifolia	BAH OPP	Bahia
Balsamorhiza sagittata	BAL SAG	Arrowleaf Balsamroot
Barbarea orthoceras	BAR ORT	American Wintercress
Bupleurum americanum	BUP AME	American Thorough-wax
Campanula rotundifolia	CAM ROT	Scotch Bluebell
Capsella bursa-pastoris	CAP BUR	Shepherd's-purse
Carum carvi	CAR CAR	Caraway
Castilleja lutescens	CAS LUT	Yellowish Paintbrush
Castilleja miniata var. miniata	CAS MIN	Common Paintbrush
Castilleja sessiliflora	CAS SES	Downy Painted-cup
Centaurea maculosa	CEN MAC	Spotted Knapweed
Cerastium arvense	CER ARV	Field Chickweed
Chenopodium album	CHE ALB	Lambsquarter
Chenopodium fremontii var. atrovirens	CHE FRE	Fremont's Goosefoot
Chenopodium rubrum	CHE RUB	Red Goosefoot
Chrysopsis villosa var. foliosa	CHR VIL	Hairy Golden-aster
Cicuta douglasii	CIC DOU	Douglas' Water-hemlock
Cirsium arvense var. horridum	CIR ARV	Canadian Thistle
Cirsium undulatum	CIR UND	Wavy-leaved Thistle
Cirsium vulgare	CIR VUL	Bull Thistle
Clematis hirsutissima	CLE HIR	Douglas' Clematis
Collomia linearis	COL LIN	Narrow-leaf Collomia
Comandra umbellata	COM UMB	Bastard Toad-flax

## APPENDIX A (Continued)

SCIENTIFIC BINOMIAL	ABBREV.	COMMON NAME
FORBS (Cont.)		
<i>Conimitella williamsii</i>	CON WIL	William's Conimitella
<i>Conringia orientalis</i>	CON ORI	Hare's-ear Mustard
<i>Convolvulus arvensis</i>	CON ARV	Small Bindweed
<i>Coryphantha vivipara</i>	COR VIV	Cushion Cactus
<i>Crepis acuminata</i> ssp. <i>acuminata</i>	CRE ACU	Long-leaved Hawksbeard
<i>Cryptantha interrupta</i>	CRY INT	Bristly Cryptantha
<i>Cryptantha nubigena</i>	CRY NUB	Sierra Cryptantha
<i>Cynoglossum officinale</i>	CYN OFF	Common Hound's-tongue
<i>Descurainia sophia</i>	DES SOP	Flixweed
<i>Diplotaxis muralis</i>	DIP MUR	Wallrocket
<i>Disporum trachycarpum</i>	DIS TRA	Rough-fruited Fairy-bell
<i>Douglasia montana</i>	DOU MON	Rocky Mountain Douglasia
<i>Draba oligosperma</i> var. <i>oligosperma</i>	DRA OLI	Few-seeded Draba
<i>Epilobium angustifolium</i>	EPI ANG	Fireweed
<i>Epilobium watsonii</i> var. <i>watsonii</i>	EPI WAT	Watson's Willow-herb
<i>Erigeron caespitosus</i>	ERI CAE	Tufted Fleabane
<i>Erigeron compositus</i> var. <i>glabratus</i>	ERI COM	Cut-leaved Daisy
<i>Erigeron ochroleucus</i> var. <i>ochroleucus</i>	ERI OCH	Buff Fleabane
<i>Erigeron speciosus</i> var. <i>speciosus</i>	ERI SPE	Showy Fleabane
<i>Eriogonum flavum</i> var. <i>flavum</i>	ERI FLA	Yellow Buckwheat
<i>Eriogonum ovalifolium</i> var. <i>macropodium</i>	ERI OVA	Cushion Buckwheat
<i>Eriogonum umbellatum</i> var. <i>subalpinum</i>	ERI UMB	Sulphur Buckwheat
<i>Erodium cicutarium</i>	ERO CIC	Stork's-bill
<i>Fragaria virginiana</i> var. <i>glauca</i>	FRA VIR	Blueleaf Strawberry
<i>Fritillaria pudica</i>	FRI PUD	Yellowbell
<i>Gaillardia aristata</i>	GAI ARI	Blanket-flower Gaillardia
<i>Gallium boreale</i>	GAL BOR	Northern Bedstraw
<i>Gallium triflorum</i>	GAL TRI	Fragrant 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> var. <i>viscosissimum</i>	GER VIS	Sticky Geranium
<i>Geum aleppicum</i>	GEU ALE	Yellow Geranium

## APPENDIX A (Continued)

SCIENTIFIC BINOMIAL	ABBREV.	COMMON NAME
FORBS (Cont.)		
<i>Geum macrophyllum</i> var. <i>macrophyllum</i>	GEU MAC	Largeleaved Avens
<i>Geum triflorum</i> var. <i>triflorum</i>	GEU TRI	Prairie Smoke
<i>Glycyrrhiza lepidota</i> var. <i>lepidota</i>	GLY LEP	American Licorice
<i>Grindelia squarrosa</i> var. <i>quasiperennis</i>	GRI SQU	Curly-cup Gumweed
<i>Habenaria dilata</i>	HAB DIL	White Bog-orchid
<i>Habenaria hyperborea</i>	HAB HYP	Northern Green Bog-orchid
<i>Hedysarum boreale</i> var. <i>cinerascens</i>	HED BOR	Northern Hedysarum
<i>Hedysarum sulphurescens</i>	HED SUL	Yellow Hedysarum
<i>Helianthus annuus</i>	HEL ANU	Common Sunflower
<i>Helianthus nuttallii</i> var. <i>nuttallii</i>	HEL NUT	Nuttall's Sunflower
<i>Helianthus rigidus</i> var. <i>subrhombioides</i>	HEL RIG	Showy Sunflower
<i>Heracleum lanatum</i>	HER LAN	Cow Parsnip
<i>Heuchera cylindrica</i> var. <i>glabella</i>	HEU CYL	Roundleaf Alumroot
<i>Heuchera parvifolia</i> var. <i>dissecta</i>	HEU PAR	Common Alumroot
<i>Hymenopappus filifolius</i> var. <i>polycephalus</i>	HYM FIL	Cut-leaved Hymenopappus
<i>Hymenoxys acaulis</i> var. <i>acaulis</i>	HYM ACA	Stemless Hymenoxys
<i>Hymenoxys richardsonii</i> var. <i>richardsonii</i>	HYM RIC	Richardson's Hymenoxys
<i>Iliamna rivularis</i> var. <i>rivularis</i>	ILI RIV	Streambank Globemallow
<i>Iris missouriensis</i>	TRI MIS	Rocky Mountain Iris
<i>Lactuca pulchella</i>	LAC PUL	Blue Lettuce
<i>Lactuca serriola</i>	LAC SER	Prickly Lettuce
<i>Lappula redowskii</i> var. <i>redowskii</i>	LAP RED	Western Stickseed
<i>Lathyrus ochroleucus</i>	LAT OCH	Cream-flowered Peavine
<i>Lepidium campestre</i>	LEP CAM	Field Pepperweed
<i>Lesquerella alpina</i>	LES ALP	Alpine Bladderpod
<i>Liatrus punctata</i>	LIA PUN	Blazing-star
<i>Linum perenne</i> var. <i>lewisii</i>	LIN PER	Wild Blue Flax
<i>Linum rigidum</i>	LIN RIG	Yellow Flax
<i>Lithospermum ruderalis</i>	LIT RUD	Western Groundwell
<i>Lomatium dissectum</i> var. <i>multifidum</i>	LOM DIS	Fern-leaved Lomatium
<i>Lomatium macrocarpum</i>	LOM MAC	Large-leaved Lomatium
<i>Lomatium triternatum</i> ssp. <i>platycarpum</i>	LOM TRI	Nine-leaf Lomatium
<i>Lupinus sericeus</i> var. <i>sericeus</i>	LUP SER	Silky Lupine

## APPENDIX A (Continued)

SCIENTIFIC BINOMIAL	ABBREV.	COMMON NAME
FORBS (Cont.)		
<i>Medicago lupulina</i>	MED LUP	Black Medic
<i>Medicago sativa</i>	MED SAT	Alfalfa
<i>Melilotus alba</i>	MEL ALB	White Sweet-clover
<i>Melilotus officinalis</i>	MEL OFF	Yellow Sweet-clover
<i>Mentha arvensis</i> var. <i>glabrata</i>	MEN ARV	Field Mint
<i>Mentzelia laevicaulis</i> var. <i>laevicaulis</i>	MEN LAE	Blazing-star <i>Mentzelia</i>
<i>Mentzelia ciliata</i> var. <i>ciliata</i>	MER CIL	Broad-leaf Bluebells
<i>Mimulus guttatus</i> var. <i>guttatus</i>	MIM GUT	Yellow Monkey-flower
<i>Monarda fistulosa</i> var. <i>menthaefolia</i>	MON FIS	Wild Bergamot
<i>Monolepsis nuttalliana</i>	MON NUT	Patata
<i>Musineon divaricatum</i>	MUS DIV	Leafy Musineon
<i>Myriophyllum spicatum</i> var. <i>exalbescens</i>	MYR SPI	Spiked Water-milfoil
<i>Oenothera caespitosa</i> var. <i>caespitosa</i>	OEN GAE	Desert Evening-primrose
<i>Oenothera flava</i>	OEN FLA	Long-tubed Evening-primrose
<i>Oenothera strigosa</i>	OEN STR	Common Evening-primrose
<i>Onobrychis viciaefolia</i>	ONO VIS	Saintfoin
<i>Osmorhiza chilensis</i>	OSM CHI	Mountain Sweet-cicely
<i>Osmorhiza occidentalis</i>	OSM OCC	Western Sweet-cicely
<i>Oxytropis campestris</i> var. <i>gracilis</i>	OXY CAM	Field Crazyweed
<i>Oxytropis sericea</i> var. <i>spicata</i>	OXY SER	Silky Crazyweed
<i>Oxytropis splendens</i>	OXY SPL	Showy Crazyweed
<i>Oxytropis viscida</i>	OXY VIS	Sticky Crazyweed
<i>Parnassia fimbriata</i> var. <i>fimbriata</i>	PAR FIM	Fringed Grass-of-Parnassia
<i>Paronychia sessiliflora</i>	PAR SES	Whitlow Wort
<i>Pedicularis contorta</i> var. <i>contorta</i>	PED CON	White Coiled-beak Lousewort
<i>Penstemon albertinus</i>	PEN ALB	Alberta Penstemon
<i>Penstemon confertus</i>	PEN CON	Yellow Penstemon
<i>Penstemon eriantherus</i> var. <i>eriantherus</i>	PEN ERI	Fuzzy-tongue Penstemon
<i>Penstemon nitidus</i> var. <i>nitidus</i>	PEN NIT	Shining Penstemon
<i>Penstemon procerus</i> var. <i>procerus</i>	PEN PRO	Small-flowered Penstemon
<i>Perideridia gairdneri</i> ssp. <i>borealis</i>	PER GAI	Gairdner's Yampah
<i>Petalostemon candidum</i>	PET CAN	White Prairie-clover
<i>Petalostemon purpureum</i>	PET PUR	Purple Prairie-clover



## APPENDIX A (Continued)

SCIENTIFIC BINOMIAL	ABBREV.	COMMON NAME
FORBS (Cont.)		
<i>Phacelia hastata</i> var. <i>alpina</i>	PHA HAS	Silver-leaf Phacelia
<i>Phlox alyssifolia</i>	PHL ALY	Alyssum-leaved Phlox
<i>Physaria didymocarpa</i>	PHY DID	Common Twinpod
<i>Plantago major</i> var. <i>major</i>	PLA MAJ	Common Plantain
<i>Polygonum achoreum</i>	POL ACH	Striated Knotweed
<i>Polygonum amphibium</i>	POL AMP	Water Smartweed
<i>Polygonum bistortoides</i>	POL BIS	American Bistort
<i>Potentilla anserina</i>	POT ANS	Common Silverweed
<i>Potentilla arguta</i> var. <i>convallaria</i>	POT ARG	Glandular Cinquefoil
<i>Potentilla diversifolia</i> var. <i>diversifolia</i>	POT DIV	Diverse-leaved Cinquefoil
<i>Potentilla gracilis</i> var. <i>glabrata</i>	POT GRA	Slender Cinquefoil
<i>Potentilla hippiana</i>	POT HIP	Wooly Cinquefoil
<i>Potentilla pensylvanica</i>	POT PEN	Prairie Cinquefoil
<i>Potentilla rivalis</i>	POT RIV	River Cinquefoil
<i>Ranunculus acriformis</i> var. <i>montanensis</i>	RAN ACR	Sharp Buttercup
<i>Ranunculus aquatilis</i> var. <i>capillaceus</i>	RAN AQU	White Water-buttercup
<i>Ranunculus cymbalaria</i>	RAN CYM	Shore Buttercup
<i>Ranunculus macounii</i> var. <i>macounii</i>	RAN MAC	Macoun's Buttercup
<i>Ranunculus orthorhynchus</i>	RAN ORT	Straightbeak Buttercup
<i>Ranunculus sceleratus</i> var. <i>multifidus</i>	RAN SCE	Celeryleaved Buttercup
<i>Ratibida columnifera</i>	RAT COL	Prairie Coneflower
<i>Rudbeckia laciniata</i> var. <i>ampla</i>	RUD LAC	Tall Coneflower
<i>Rumex crispus</i>	RUM CRI	Curly Dock
<i>Ruppia maritima</i>	RUP MAR	Seaside Arrow-grass
<i>Salsola kali</i>	SAL KAL	Russian Thistle
<i>Sanicula marilandica</i>	SAN MAR	Black Snake-root
<i>Saxifraga bronchialis</i> var. <i>austromontana</i>	SAX BRO	Spotted Saxifrage
<i>Sedum lanceolatum</i> var. <i>lanceolatum</i>	SED LAN	Lanceleaved Stonecrop
<i>Senecio canus</i>	SEN CAN	Wooly Groundsel
<i>Senecio pseud aureus</i> var. <i>pseud aureus</i>	SEN PSE	Streambank Butterweed
<i>Senecio serra</i> var. <i>serra</i>	SEN SER	Butterweed Groundsel
<i>Senecio triangularis</i> var. <i>triangularis</i>	SEN TRI	Arrow-leaf Groundsel
<i>Sisyrinchium angustifolium</i>	SIS ANG	Common Blue-eyed Grass

## APPENDIX A (Continued)

SCIENTIFIC BINOMIAL	ABBREV.	COMMON NAME
FORBS (Cont.)		
<i>Sisymbrium altissimum</i>	SIS ALT	Tumblemustard
<i>Smilacina racemosa</i>	SMI RAC	Feather Solomon's Seal
<i>Smilacina stellata</i>	SMI STE	Starry False Solomon's Seal
<i>Solidago canadensis</i> var. <i>salebrosa</i>	SOL CAN	Canada Goldenrod
<i>Solidago gigantea</i> var. <i>serotina</i>	SOL GIG	Smooth Goldenrod
<i>Solidago missouriensis</i> var. <i>missouriensis</i>	SOL MIS	Missouri Goldenrod
<i>Solidago rigida</i> var. <i>humilis</i>	SOL RIG	Stiff Goldenrod
<i>Sonchus asper</i>	SON ASP	Prickly Sowthistle
<i>Sphaeralcea coccinea</i>	SPH COC	Red Globemallow
<i>Stachys palustris</i> var. <i>pilosa</i>	STA PAL	Swamp Hedge-nettle
<i>Streptopus amplexifolius</i> var. <i>chalazatus</i>	STR AMP	Large Twisted-Stalk
<i>Taraxacum officinale</i>	TAR OFF	Common Dandelion
<i>Thalictrum occidentale</i>	THA OCC	Western Meadowrue
<i>Thelesperma subnudum</i> var. <i>marginatum</i>	THE SUB	Thelesperma
<i>Thermopsis rhombifolia</i>	THE RHO	Round-leaved Thermopsis
<i>Thlaspi arvense</i>	THL ARV	Field Pennycress
<i>Townsendia parryi</i>	TOW PAR	Parry's Townsendia
<i>Tragopogon dubius</i>	TRA DUB	Yellow Salsify
<i>Trifolium pratense</i>	TRI PRA	Red Clover
<i>Trifolium repens</i>	TRI REP	White Clover
<i>Triglochin maritimum</i>	TRI MAR	Seaside Arrow-grass
<i>Typha latifolia</i>	TYP LAT	Common Cat-tail
<i>Urtica dioica</i> ssp. <i>gracilis</i> var. <i>gracilis</i>	URT DIO	Slim Nettle
<i>Urtica dioica</i> ssp. <i>gracilis</i> var. <i>procera</i>	URT DIO	Stinging Nettle
<i>Verbena bracteata</i>	VER BRA	Bracted Verbena
<i>Veronica americana</i>	VER AME	American Brookline
<i>Vicia americana</i> var. <i>truncata</i>	VIC AME	American Vetch
<i>Viola canadensis</i> var. <i>rugulosa</i>	VIO CAN	Western Canada Violet
<i>Zigadenus elegans</i>	ZIG ELE	Mountain Death Camas
<i>Zigadenus venosus</i> var. <i>gramineus</i>	ZIG VEN	Meadow Death Camas
<i>Zizia aptera</i> var. <i>occidentalis</i>	ZIZ APT	Zizia



## APPENDIX B

(Continued)

Presence of native and naturalized plants in Habitat Types and Community Types of the Sun River Game Range.

GRASSLAND							SHRUBLAND			RIPARIAN				DECIDUOUS FOREST				CONIFEROUS FOREST							ALPINE		OTHER			
A. SPICATUM			F. SCARRELLIA		FEID	AGSP	POFR	ANAL	ANTR	JURA	SABE	ELOD	POTRI	POPULUS TREMULOIDES				P. FLXIFLIS			PSEUDOTSUGA MENZIESII							DROG	SNOW	SCR
BOGR h.t.	ACSM h.t.	POSA h.t.	AGSP h.t.	FEID h.t.	AGSP h.t.	SCREE	FESC h.t.	AGSP c.t.	FEID h.t.	CAREX c.t.	CAREX c.t.	CAREX c.t.	SABE c.t.	PDAC c.t.	SYAL c.t.	SABE c.t.	SABE c.t.	FEID h.t.	JUCO h.t.	SYAL h.t.	CARU h.t.	CAGE h.t.	ARCO h.t.	CMPLX	CARUP c.t.	DRIPT	SCR			
G-1	G-2	G-3 G-3	G-4	G-5	G-6	G-7	S-1	S-2	S-3	R-1	R-2	R-3	R-4	D-1	D-2	D-3 D-3w Dry	D-3w Sec	F-1	F-2	F-3	F-4	F-5	F-6	F-7	A-1	d	scr			

## LOW SHRUBS and VINES

ARG UVA	-	-	-	-	-	X	X	-	-	-	-	-	-	-	X	-	-	X	-	X	X	-	-	X	-	-	X
ART FRI	X	X	X	X	X	-	X	X	-	-	-	-	-	-	-	-	-	X	X	X	X	-	-	-	-	-	X
BER REP	-	-	-	-	-	X	-	-	-	-	-	-	-	-	X	-	-	X	X	X	X	X	-	X	-	-	-
CLE GOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	X	-	-	X	-	-	-	-
CLE LIG	-	-	-	-	-	-	-	-	-	-	X	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-
DRY OCT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	-	X
GUT SAR	X	X	X	X	-	-	-	-	-	-	-	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-
JUN HOR	-	-	X	X	-	-	X	-	-	-	-	-	-	X	-	-	-	X	X	X	-	X	-	X	-	-	X
OPP POL	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	-	-	X

## FERNS and FERN ALLIES

EQU ARV	-	-	-	-	-	-	-	-	-	X	X	X	X	-	-	X	X	-	-	-	-	-	-	-	-	-	-
EQU LAE	-	-	-	-	-	-	-	-	-	X	X	X	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-
CYS FRA	-	-	-	-	-	-	-	-	-	-	X	-	-	-	-	-	-	-	X	X	-	-	-	-	-	X	-
SEL DEN	-	-	X	X	-	-	X	-	-	-	-	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-

## GRAMINOIDS

AGR CALne	-	-	X	X	X	X	-	X	-	-	-	-	X	-	-	-	-	X	X	-	-	-	-	-	-	-	-
AGR CALne	-	-	-	X	X	-	-	-	-	-	-	-	-	X	-	-	-	X	-	-	-	-	-	-	-	-	X
AGR CRI	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-
AGR DAS	-	X	X	X	X	X	X	X	-	-	X	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-	X
AGR SMI	X	X	X	X	-	-	-	-	-	X	X	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X
AGR SFI	X	X	X	X	X	X	X	X	-	-	X	X	-	X	-	-	-	X	X	X	X	X	X	X	X	X	X
AGR ALB	-	-	-	-	-	-	-	-	-	X	X	X	-	-	-	-	X	-	-	-	-	-	-	-	-	-	-
ALE ALP	-	-	-	-	-	-	-	-	-	-	X	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-	-
AND SCO	-	-	X	X	-	-	-	-	-	-	-	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-
ARI FEN	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ARI LOW	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-
BEC SEZ	-	-	-	-	-	-	-	-	-	X	X	X	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-
BOU GRA	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-
BRO GARca	-	-	-	X	-	-	-	X	-	-	X	-	-	-	X	-	-	-	X	X	X	X	-	X	-	-	-
BRO CAB1a	-	-	X	X	-	-	X	-	-	-	-	-	-	-	X	-	-	X	-	-	-	-	-	-	-	-	-
BRO INE1a	-	X	X	X	X	-	-	-	-	X	X	X	-	X	-	X	-	X	-	-	-	-	-	-	-	-	-
BRO INEpu	-	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	X	-	-	-	-	-	-	-	X	-
BRO JAP	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BRO TEC	X	X	X	X	X	X	X	X	-	-	X	X	X	-	X	-	-	X	X	X	-	-	-	-	-	-	-
CAL INE	-	-	-	-	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CAL NBC	-	-	-	-	-	-	-	-	-	X	-	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-
CAL PUR	-	-	X	X	-	-	X	-	-	-	-	-	-	-	-	-	-	X	X	X	-	-	-	-	-	-	-
CAL RUB	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	X	-	X	-	-	-
CAL LON	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	X	-	X	-	-	X

## APPENDIX B

(Continued)

Presence of native and naturalized plants in Habitat Types and Community Types of the Sun River Game Range.

		GRASSLAND						SHRUBLAND				RIPARIAN				DECIDUOUS FOREST				CONIFEROUS FOREST							ALPINE	OTHER			
		A. SPICATUM		F. SCABRELLA		FRID	AGSP	POFR	AMAL	ARTR	JUSA	SABE	ELCO	POTRI	POPULUS TREMULOIDES		P. FLEXILIS		PSEUDOTSUGA MENZIESII							DROC	SNOW	SCREE			
ROGR	AGSM	POSA	ACSP	FRID	AGSP	SCREE	FESC	AGSP	FRID	CAREX	CAREX	ELCO	SARE	ROAC	SYAL	SARE	SARE	FRID	JUDO	SYAL	CARU	CACH	ARCO	ARCO	CMPLX	CAMP	DROG	SNOW	SCREE		
h.t.	h.t.	h.t.	h.t.	h.t.	h.t.		h.t.	c.t.	h.t.	c.t.	c.t.	c.t.	c.t.	c.t.	c.t.	c.t.	c.t.	h.t.	h.t.	h.t.	h.t.	h.t.	h.t.	h.t.	c.t.	c.t.	c.t.	d	scr		
G-1	C-2	C-3	C-4	C-5	C-6	C-7	S-1	S-2	S-3	R-1	R-2	R-3	R-4	D-1	D-2	D-3d	D-3w	F-1	F-2	F-3	F-4	F-5	F-6	F-7	A-1						
CARANINOIDE																															
CAR ARU										X	X	X					X														
CAR PFL	X	X	X					X										X	X												
CAR GEY																				X	X										
CAR HOO																				X	X	X									
CAR LAN							X				X			X	X	X	X			X								X			
CAR FRA											X									X											
CAR ROS										X	X	X					X														
CAR RUP																															
CAR SCI		X								X															X	X		X			
DAN PAR			X	X			X											X													
DES CES										X	X							X													
DIS STR		X									X							X													
ELE PAL		X								X																					
ELY CIN		X	X				X										X														
FES IDA			X	X	X	X	X	X						X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	
FES SCA			X	X	X	X	X	X						X				X		X				X	X		X		X		
GLY GRA										X	X	X						X													
HEL HOO			X	X			X	X										X													
JUN ALP										X	X	X																			
JUN BAL										X	X	X						X													
JUN NOD										X	X	X						X													
JUN TRA										X	X	X						X													
KOE CRI	X	X	X	X	X	X	X	X						X				X	X	X	X	X	X	X	X	X	X	X	X	X	
MUH CUS		X	X	X			X											X	X												
ORX HYN	X		X				X											X													
PFA ARU			X							X	X	X																			
PFL FRA		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
POA COM		X		X						X	X																				
POA NER											X			X	X																
POA NEV																		X													
POA PRA	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
POA SAN			X	X				X																							
SCI NIC											X							X													
SPA CRA										X																					
STI CON	X	X	X	X			X																								
STI OCC			X	X			X								X			X	X												
STI SPA			X	X														X													
STI VIR	X	X	X	X																											

## APPENDIX B

(Continued)

Presence of native and naturalized plants in Habitat Types and Community Types of the Sun River Game Range.

		GRASSLAND						SHRUBLAND				RIPARIAN				DECIDUOUS FOREST				CONIFEROUS FOREST						ALPINE		OTHER	
A. SPICATUM		F. SCABRELLA		FEID	AGSP	POFR	AMAL	ARTR	JURA	SABE	ELCO	POTRI	POPULUS		TREMULOIDES		P. FLEXILIS		PSEUDOTSUGA MENZIESII						DROC	SNOW			
BOGR	AGSN	POSA	AGSP	FEID	AGSP	POFR	FESC	AGSP	FEID	CAREN	CAREX	CAREX	SABE	ROAC	STAL	SABE	SABE	FEID	JOCO	STAL	CARU	CAGE	ARCO	CHPLX	CARUP	DRIFT	SCREE		
h.t.	h.t.	h.t.	h.t.	h.t.	h.t.	h.t.	h.t.	c.t.	h.t.	c.t.	c.t.	c.t.	c.t.	c.t.	c.t.	c.t.	c.t.	h.t.	h.t.	h.t.	h.t.	h.t.	h.t.	c.t.	c.t.				
G-1	G-2	G-3	G-4	G-5	G-6	G-7	S-1	S-2	S-3	R-1	R-2	R-3	R-4	D-1	D-2	D-3	D-3a	F-1	F-2	F-3	F-4	F-5	F-6	F-7	A-1	d	scr		

## FORBS

ACH MIL	X	X	X	X	X	X	X	-	-	-	X	-	-	X	X	X	-	X	X	X	X	X	-	X	-	X	X
ACT R 3	-	-	-	-	-	-	-	-	-	-	-	-	-	X	X	-	-	X	X	X	X	-	-	-	-	-	-
AGO GLA	-	-	X	X	X	X	-	-	-	-	-	-	-	-	X	-	-	X	X	-	-	-	-	X	-	-	-
ALL CER	-	-	X	X	X	-	-	X	-	-	-	-	-	-	-	-	-	X	X	X	X	-	-	-	-	-	-
AND LEH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	X	-	X
AND SEP	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	X	-	X
ANE MUL	-	-	-	X	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ANG ARG	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	X	-	-	X	-	-	-	-	-	-
ANT AHA	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	X	-	-	-	-	-
ANT MIC	-	-	X	X	X	X	-	X	-	-	-	-	-	-	X	-	-	-	-	X	X	X	-	X	-	X	-
ANT PAR	X	X	X	X	X	-	-	X	-	-	-	-	-	-	-	-	-	X	X	X	X	-	-	-	-	-	X
ANT RAC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	X	X	-	-	-	-
APO MED	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
AQU FLA	-	-	-	-	-	-	-	X	-	-	-	-	X	-	-	-	-	X	-	X	-	-	-	-	-	-	-
ARE CAP	-	-	X	-	-	-	-	X	-	-	-	-	-	-	-	-	-	X	-	X	-	-	-	-	-	-	-
ARE OBT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	X	-
ARE ROS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	X	-
ARM COR	-	-	-	-	-	-	-	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-	-	X	X	-
ARN PUL	-	-	X	X	X	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ART CAM	-	-	X	X	-	-	X	X	-	-	-	-	-	-	-	-	-	X	X	X	-	-	-	-	-	-	-
ART DRA	-	X	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ART LUD1a	X	X	X	X	X	-	-	X	-	-	-	-	X	-	-	-	-	X	-	X	-	-	-	-	-	-	-
ART LUD1a	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X
ART MIC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	X	-	-	-	-	X
AST CHI	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	X	-	-	-	-	-	-
AST CON	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	X	-	-	-	-	-	-
AST FOL	-	-	-	-	-	-	-	-	-	-	-	X	X	X	-	-	-	X	X	X	-	-	-	-	-	-	-
AST HES	-	-	-	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
AST LAE	-	-	-	X	-	-	-	X	-	-	-	-	-	X	X	-	-	-	-	-	-	-	-	-	-	-	-
AST MOD	-	-	-	-	-	-	-	-	-	-	-	-	X	-	-	-	-	X	X	-	-	-	-	-	-	-	-
AST PAN	-	-	X	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-
AST ARG	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
AST BIS	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
AST CIB	-	-	X	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
AST DSU	X	X	X	X	-	-	-	-	-	-	-	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-
AST GIL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X
AST PUR	X	X	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	X	X	-	-	-	-	-	-	-
BAL SAC	-	-	X	X	X	-	-	-	-	-	-	-	-	-	-	-	-	X	X	X	-	-	-	-	-	-	-
BUP AME	-	-	X	-	-	X	-	X	-	-	-	-	-	-	-	-	-	X	-	X	X	-	-	X	-	-	X

APPENDIX B  
(Continued)

Presence of native and naturalized plants in Habitat Types and Community Types of the Sun River Game Range.

GRASSLAND						SHRUBLAND			RIPARIAN				DECIDUOUS FOREST				GONIPEROUS FOREST							ALPINE	OTHER		
A. SPIGATUM			F. GABRIELLA			ACSP	POFR	ANAL	ARTR	JUBA	SARE	ELCO	POTR1	POPULUS TRIMULOIDES		F. FLEXILIS		PSEUDOTSUGA MENTZESII							DRUC	SNOW	SCREE
BOCR h.t.	AGSM h.t.	POSA h.t.	ACSP h.t.	FEID h.t.	ACSP h.t.	SCREE	FESC h.t.	ACSP c.t.	FEID h.t.	GAREX c.t.	CAREX c.t.	SASE c.t.	BOAC c.t.	STAL c.t.	SARE c.t.	SARE c.t.	FEID h.t.	JUDO h.t.	SYAL h.t.	CAREX h.t.	GAGE h.t.	ARGO h.t.	CNPLX	CARUP c.t.	DRIFT	SCREE	
G-1	G-2	G-3 C31	G-4	G-5	G-6	G-7	S-1	S-2	S-3	R-1	R-2	R-3	R-4	D-1	D-2	D-1d Dry	D-3d Wet	F-1	F-2	F-3	F-4	F-5	F-6	F-7	A-1	d	scr
GAM ROT	-	-	X	X	X	-	X	-	-	-	-	-	-	X	X	-	-	X	X	X	X	X	-	X	-	-	-
GAS LIT	-	-	X	X	X	-	-	-	-	-	-	-	-	-	-	-	-	X	X	-	-	-	-	-	-	-	-
GAS MIN	-	-	-	-	-	-	-	-	-	-	X	-	-	-	-	-	-	X	-	-	-	-	-	-	-	X	-
GAS SES	-	-	X	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CER ARV	-	X	X	X	X	X	X	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CHR VIL	X	X	X	X	-	-	X	X	-	-	-	-	-	X	X	X	-	X	-	X	X	X	-	-	-	-	-
GIC DOU	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-
CIR UND	-	-	X	-	-	-	-	-	-	-	X	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-
GLE HIR	-	-	X	-	X	X	-	X	-	-	-	-	-	-	-	-	-	X	-	-	-	-	-	-	-	X	-
GOL LIN	-	-	X	X	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	-
GRK UMS	X	-	X	X	-	X	-	X	-	X	-	-	-	-	-	-	-	X	-	-	-	-	-	X	-	-	-
CON WIL	-	-	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-	X	-	-	-	-	-	-	X	-	-
GDR VIV	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GRE AGU	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GRY INT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	X	X	-	-	-	X	-	-	-
GRY SUB	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	-	-	-	-	-	-	X	-	X
GTN OFF	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-
DIS TRA	-	-	-	-	-	-	-	-	-	X	-	-	-	-	-	-	-	X	-	-	-	-	-	-	-	X	-
DOU HON	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DRA OLI	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-	X
EPI ANG	-	-	X	-	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	X	-	-	X
EPI WAT	-	-	-	-	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ERI GAE	-	-	X	X	-	X	-	-	-	-	-	-	-	-	-	-	-	X	X	X	-	-	-	-	-	-	-
EPI GOM	-	-	X	-	-	X	-	-	-	-	-	-	-	-	-	-	-	X	X	-	-	-	-	X	-	-	-
ERI OCH	-	-	X	X	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ERI SPE	-	-	-	X	X	-	-	-	-	-	-	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-
ERI FLA	-	-	X	X	X	-	X	X	-	-	-	-	-	X	-	-	-	X	X	-	-	-	-	-	-	X	-
ERI OVA	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ERI UMB	-	-	X	X	X	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X
FRA VIR	-	-	-	-	-	X	-	X	-	-	-	-	-	X	-	-	-	X	X	X	-	-	-	X	-	-	-
FRI PUB	-	-	X	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	-
CAI ARI	-	X	X	X	X	-	X	-	-	-	-	-	-	-	-	-	-	-	X	X	X	-	-	-	-	X	-
GAL BOR	-	-	X	X	X	-	X	-	-	-	-	-	-	X	-	-	-	X	X	X	-	-	-	X	-	X	X
GAL TRI	-	-	-	-	-	-	-	-	-	-	-	-	X	X	X	X	X	X	X	X	X	-	-	-	-	X	-
GAU OGC	X	-	X	X	-	-	-	-	-	-	-	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-
GEN AFF	-	-	-	X	-	-	-	X	-	-	-	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-

FORBS

## APPENDIX B

(Continued)

Presence of native and naturalized plants in Habitat Types and Community Types of the San River Game Range.

A. SPICATUM		GRASSLAND					SHRUBLAND				RIPARIAN				DECIDUOUS FOREST				CONIFEROUS FOREST							ALPINE	OTHER									
BOGR h.t.	AGSM h.t.	POSA h.t.	F. SCABRILLA h.t.	FEID h.t.	ACSP h.t.	ACSP SCREE	POFR h.t.	AMAL c.t.	AKTR h.t.	JURA c.t.	SABE c.t.	ELCO c.t.	POTRI c.t.	CAREX c.t.	SABE c.t.	POAC c.t.	SYAL c.t.	SABE c.t.	SABE D-3d Ket	P. FLEXILIS h.t.	JUCO h.t.	SYAL h.t.	CARU h.t.	CAGE h.t.	ARCO h.t.	CHPLX c.t.	CARIP c.t.	DROC	SNOW	DRIFT	SCREE					
G-1	G-2	G-3 G31	G-4	G-5	G-6	G-7	S-1	S-2	S-3	R-1	R-2	R-3	R-4	D-1	D-2	D-3d Dry	D-3d Ket	F-1	F-2	F-3	F-4	F-5	F-6	F-7	A-1	A-1	d	scr								
GER RIC	-	-	-	-	-	-	-	-	-	-	X	-	-	X	X	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-					
GER VIS	-	-	-	X	-	-	-	-	-	X	X	X	-	-	X	-	X	-	-	-	-	X	-	-	-	-	-	-	-	-	X	-				
GEU ALE	-	-	-	-	-	-	-	-	-	-	X	-	-	-	-	-	X	-	-	-	-	X	-	-	-	-	-	-	-	-	-	-				
GEU MAC	-	-	-	-	-	-	-	-	-	X	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
GEU TRI	-	-	X	X	X	-	-	X	-	-	-	-	-	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-	X	-			
GLY LEP	-	-	X	X	-	-	X	-	-	-	-	-	-	-	-	X	-	-	-	X	-	X	-	-	-	-	-	-	-	-	-	-	-			
HAB DYL	-	-	-	-	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-			
HAB HYP	-	-	-	-	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-			
HED BOR	-	-	X	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-			
HED SPL	-	-	-	-	X	-	-	-	-	-	-	-	-	X	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-			
HEL NUT	-	-	-	-	-	-	X	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
HEL RIG	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
HER LAN	-	-	-	-	-	-	-	-	-	-	X	X	-	-	-	-	-	-	X	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
HEU CTL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-	X		
HEU PAR	-	-	X	X	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	-	-	X	-	-	-	-	-	-	-	-	-	-	-		
HYM ACA	-	-	X	X	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
TRI MIS	-	X	-	-	X	-	-	-	-	-	X	X	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	-	
LAT OCH	-	-	-	-	-	-	-	-	-	X	X	-	-	-	X	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
LES ALP	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	-	X		
LIA PUN	X	X	X	X	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
LIN PER	X	X	X	X	X	X	X	X	-	X	-	-	-	-	-	-	-	-	-	X	X	X	-	X	-	-	-	-	-	-	-	-	-	-	X	
LIT HUD	-	-	X	X	X	-	X	-	-	-	-	-	-	-	-	-	-	-	-	X	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
LON DIS	-	-	X	-	-	-	-	-	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
LON MAC	-	X	X	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
LPM TRI	-	-	X	X	X	-	X	-	-	-	-	-	-	-	-	-	-	-	X	-	X	X	-	X	-	-	-	-	-	-	-	-	-	-	X	
LUP SFR	X	X	X	X	X	X	X	X	-	X	-	-	-	-	X	X	-	-	-	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
MEL OFF	-	X	-	-	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
MEN ARV	-	-	-	-	-	-	-	-	-	-	X	X	-	-	-	-	-	-	-	X	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
MER CIL	-	-	-	-	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-	X	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
MIN GUT	-	-	-	-	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
MON FIS	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
MUS DIV	X	X	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	X	
OEN PLA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
OEN STR	-	-	-	-	-	-	-	-	-	-	X	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
OSM CHI	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
OSM OCC	-	-	-	-	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
OXY CAM	-	-	-	X	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
OXY SER	-	-	X	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
OXY SPL	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	

## FORBS



## APPENDIX B

(Continued)

Presence of native and naturalized plants in Habitat Types and Community Types of the San River Game Range.

GRASSLAND							SHADBLAND			RIPARIAN				DECIDUOUS FOREST				CONIFEROUS FOREST						ALPINE		OTHER					
A. SPICATUM		F. SCABRELLA		FELD		AGSP	POFR	AMAL	ARKR	JUEA	SABE	ELCO	POTRI	POPULUS TREMULOIDES		P. FLEXILIS		PSUDOTSUGA MENZIESII		ALPINE		OTHER									
BOGR	AGSM	POSA	AGSP	FFID	AGSP	SCREE	POFR	AMAL	ARKR	JUEA	SABE	ELCO	POTRI	POAC	SYAL	ROAC	SYAL	JUCO	SYAL	CARU	CAGE	ARCO	CNFLX	DRIF	SCREE						
h.f.	h.f.	h.f.	h.f.	h.f.	h.f.		h.f.	h.f.	h.f.	h.f.	h.f.	h.f.	h.f.	h.f.	h.f.	h.f.	h.f.	h.f.	h.f.	h.f.	h.f.	h.f.	h.f.	h.f.	h.f.	h.f.					
G-1	G-2	G-3	G-3	G-4	G-5	G-6	G-7	S-1	S-2	S-3	R-1	R-2	R-3	R-4	D-1	D-2	D-3d	D-3v	Met	F-1	F-2	F-3	F-4	F-5	F-6	F-7	A-1	d	scr		
OXY VIS	-	-	-	X	X	-	-	X	-	-	-	-	-	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-	-	
PAR FHM	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
PAR SES	X	-	X	-	-	-	-	-	-	-	-	X	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	
PED CON	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	X	-	-	-	-	-	-	-	X	-	-	
PEN ALB	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	-	X	-	-	-	-	-	-	-	-	-	
PEN COH	-	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
PEN ERI	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
PEN HIT	-	-	X	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
PEN PFO	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-	
PER GAI	-	-	-	-	-	X	-	X	-	-	-	-	-	-	-	-	X	-	-	X	X	-	-	-	-	-	-	-	-	-	
PET CAN	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
PET POR	-	-	X	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
PHA HAS	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
PHL ALY	-	-	X	X	-	-	-	X	-	-	-	-	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-	
PHY DID	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
POL ACH	-	-	-	-	-	-	-	-	-	-	X	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-
POL BIS	-	-	-	-	-	X	-	-	-	X	X	-	-	-	-	-	-	-	-	X	X	-	-	-	-	-	X	-	-	-	-
POT ANS	-	-	-	-	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
POT ARG	-	-	-	X	-	-	-	X	-	-	X	X	-	-	X	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-	X
POT DIV	-	-	-	-	-	-	-	-	-	X	X	-	-	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-
POT GRA	-	-	-	X	X	X	-	X	-	X	X	-	-	-	X	-	-	-	-	X	X	-	-	-	-	-	-	-	-	-	X
POT HIP	-	-	-	X	X	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
POT PEN	-	-	X	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X
POT RIV	-	-	-	-	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X
RAN ACR	-	-	-	-	-	-	-	-	-	X	X	X	X	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-
RAN AQU	-	-	-	-	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-
RAN CYM	-	-	-	-	-	-	-	-	-	X	X	-	-	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-
RAN MAC	-	-	-	-	-	-	-	-	-	X	X	-	-	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-
RAN ORT	-	-	-	-	-	-	-	-	-	-	X	X	-	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-
RAN SCE	-	-	-	-	-	-	-	-	-	X	X	-	-	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-
RAT COL	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RHD LAC	-	-	-	-	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-
SAN MAR	-	-	-	-	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SAX BRO	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SEN LAM	-	-	X	-	X	X	X	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	-	-	X	-
SEN CAN	-	-	X	X	X	-	X	X	-	X	-	-	-	-	-	-	-	-	-	X	X	X	-	-	-	-	X	-	-	-	X
SEN PSE	-	-	-	-	-	-	-	-	-	-	X	X	X	-	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-	-
SEN SER	-	-	-	X	-	-	-	-	-	-	X	X	-	-	X	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-	-
SEN TRI	-	-	-	-	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-	-

FORBS

- 10 -



## APPENDIX C

Species occurring in or around lakes and vernal ponds.

<i>Agropyron smithii</i>	<i>Myriophyllum spicatum</i> var. <i>exalbescens</i>
<i>Amaranthus californicus</i>	<i>Oenothera flava</i>
<i>Beckmannia syzigachne</i>	<i>Phleum pratense</i>
<i>Calamagrostis inexpansa</i> var. <i>inexpansa</i>	<i>Poa compressa</i>
<i>Calamagrostis neglecta</i> var. <i>neglecta</i>	<i>Polygonum achoreum</i>
<i>Carex aquatilis</i>	<i>Polygonum amphibium</i>
<i>Carex lanuginosa</i>	<i>Potentilla anserina</i>
<i>Carex rostrata</i>	<i>Potentilla rivalis</i>
<i>Deschampsia cespitosa</i> var. <i>cespitosa</i>	<i>Ranunculus aquatilis</i> var. <i>capillaceus</i>
<i>Distichlis stricta</i> var. <i>stricta</i>	<i>Ranunculus cymbalaria</i>
<i>Eleocharis acicularis</i>	<i>Ranunculus sceleratus</i> var. <i>multifidus</i>
<i>Eleocharis palustris</i>	<i>Ruppia maritima</i>
<i>Iris missouriensis</i>	<i>Scirpus acutus</i>
<i>Juncus alpinus</i>	<i>Scirpus microcarpus</i>
<i>Juncus nodosus</i>	<i>Solidago rigida</i> var. <i>humilis</i>
<i>Juncus tracyi</i>	<i>Triglochin maritimum</i>
<i>Mentha arvensis</i> var. <i>glabrata</i>	<i>Typha latifolia</i>

APPENDIX D

Weedy plants of the Sun River Game Range.

Found almost exclusively along roads or in the headquarters area.

<i>Agropyron repens</i>	<i>Grindelia aquarrosa</i>
<i>Allium textile</i>	<i>Helianthus annuus</i>
<i>Alyssum alyssoides</i>	<i>Hordeum jubatum</i>
<i>Artemisia biennis</i>	<i>Hymenopappus filifolius</i> var. <i>polycephalus</i>
<i>Avena fatua</i>	<i>Hymenoxys richardsonii</i>
<i>Bahia oppositifolia</i>	<i>Lactuca pulchella</i>
<i>Barbarea orthoceras</i>	<i>Lactuca serriola</i>
<i>Capsella bursa-pastoris</i>	<i>Lappula redowskii</i>
<i>Carum carvi</i>	<i>Lepidium campestre</i>
<i>Centavrea maculosa</i>	<i>Linum rigidum</i>
<i>Chenopodium album</i>	<i>Melilotus alba</i>
<i>Chenopodium fremontii</i> var. <i>atrovirens</i>	<i>Mentzelia laevicaulis</i> var. <i>laevicaulis</i>
<i>Chenopodium rubrum</i>	<i>Monolepis nuttalliana</i>
<i>Chrysothamnus nauseosus</i> var. <i>petrophilus</i>	<i>Oenothera caespitosa</i> var. <i>caespitosa</i>
<i>Cirsium arvense</i> var. <i>horridum</i>	<i>Plantago major</i>
<i>Cirsium vulgare</i>	<i>Rumex crispus</i>
<i>Conringia orientalis</i>	<i>Salsola kali</i>
<i>Convolvulus arvensis</i>	<i>Sisymbrium altissimum</i>
<i>Dactylis glomerata</i>	<i>Sonchus asper</i>
<i>Descurainia sophia</i>	<i>Thlaspi arvense</i>
<i>Diplotaxis muralis</i>	<i>Trifolium pratense</i>
<i>Erodium cicutarium</i>	<i>Trifolium repens</i>
<i>Festuca pratensis</i>	<i>Verbena bracteata</i>

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