NWO

A CONCEPT OF NATURAL VEGETATIONAL PATTERNS and OTHER OBSERVATIONS

SILVER CREEK PRESERVE, IDAHO

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ABSTRACT

This Concept of Natural Vegetational Patterns for the Silver Creek Preserve identifies those plant communities associated, generally, with the soil(s) and climatic (environmental) characteristics which prescribe and/or constrain vegetational growth. Evaluation of these characteristics permits assignment or identity of plant communities thought applicable to the Preserve.

Man's influence has had and continues a profound effect upon vegetational characteristics and distribution. Domestic livestock grazing, agricultural development, and urbanization - each and in combination have drastically altered vegetative patterns, soil characteristics, and hydrologic relationships.

Elimination of domestic livestock grazing from the Preserve has resulted in a stabilization of certain vegetative patterns. An initial re-establishment of native and introduced species is evidenced on noncultivated areas. This will continue, absent livestock grazing.

The cultivated lands pose a problem and threat of erosion and water quality impairment. So long as these areas continue in cultivation, so long will the situation continue and worsen. Thus, these areas, with the possible exception of the alfalfa field (W½ sec. 26) should be retired from cultivation and seeded to permanent cover immediately.

Hydrologic relationships pose a not fully understood or appreciated threat to the Silver Creek Preserve. Recent geologic/hydrologic investigations reveal on-going activities of land conversion and water appropriation and application having potential of serious adverse impact upon the Preserve. Such impact is one of lower water table, diminished spring flow to Silver Creek, and the conversion of an essentially wet saline edaphic environment to a dry saline habitat, the sum total of which would result in a consequent and significant change in soils, vegetation, and aquatic environment.

In sum, the Silver Creek Preserve is an area blessed with attributes important to many people. This report provides guidance as to what the natural vegetational patterns of the general area may have been as baseline to restoration efforts. Of more importance, perhaps, is a confirmation of known problems and the threat that on-going activities of land conversion and water appropriation/application poses for the Preserve. Thus, restoration of the area, in the author's view, must be geared to immediate soil stabilization with concurrent in-depth

assessment of the hydrologic threat.

In the final analysis it is not so much that the area be restored using only native species as it is that it be secured against erosion hazard and water depletion. The first is possible by a continued exclusion of livestock and re-seeding of cultivated parcels through use of adapted species (both native and introduced). The latter will require political-social-economic change in attitude and practice.

INTRODUCTION

The Nature Conservancy acquired the SILVER CREEK PRESERVE in 1976. Since acquisition The Nature Conservancy has undertaken many endeavors seeking information about the Preserve, its biophysical character and other influences and data, in a manner by and from which a comprehensive management program would evolve. This "study" is no exception. Its purpose was charted to "----prepare a set of maps and textural description of an artificial vegetational baseline situation for the Silver Creek Preserve-----." This to be derived from "best" approximation of the vegetational condition of the Preserve as it existed prior to World War II. Securing such "baseline data" will be "used as an ecological standard against which restoration efforts at Silver Creek can be measured in the future."

Achievement of this purpose must, necessarily, require much reliance upon subjective input to a mosaic of vegetational patterns representative of "natural conditions." This input is predicated upon soils, vegetation, climate, and other environmental factors. It is tempered by an assessment of these factors, man's use of the area, and full knowledge that vegetational conditions derived represent only an "educated guess" that, hopefully, will provide realistic management guideline criteria.

OBJECTIVES

The objective of this report is to synthesize a mosaic of vegetational characteristic(s)/condition(s) representative of the ecological niche in which the Silver Creek Preserve occurs. Realization of this objective, therefore, relies upon the resources of soil, water, climate (environment) within which the Preserve occurs with an interpretation of these factors as they relate to the Preserve. This must be done with full awareness of man's use and impact upon the Preserve and adjacent lands, thus:

- research available data to ascertain materials applicable to the Silver Creek Preserve,
- assess applicable data, provide interpretation, and identify probable vegetational characteristics,
- conduct field reconnaissance to "spot check" data (both on and off-site of the Preserve), with pictorial recordation of influences, sites, or other factors bearing upon the Preserve and its vegetational patterns,
- compile a report which projects a mosaic of vegetational characteristics thought applicable to the Silver Creek Preserve in "natural" state; and,
- provide recommendations and/or identity of procedure(s) and factor(s) having bearing upon the restoration of the Silver Creek Preserve.

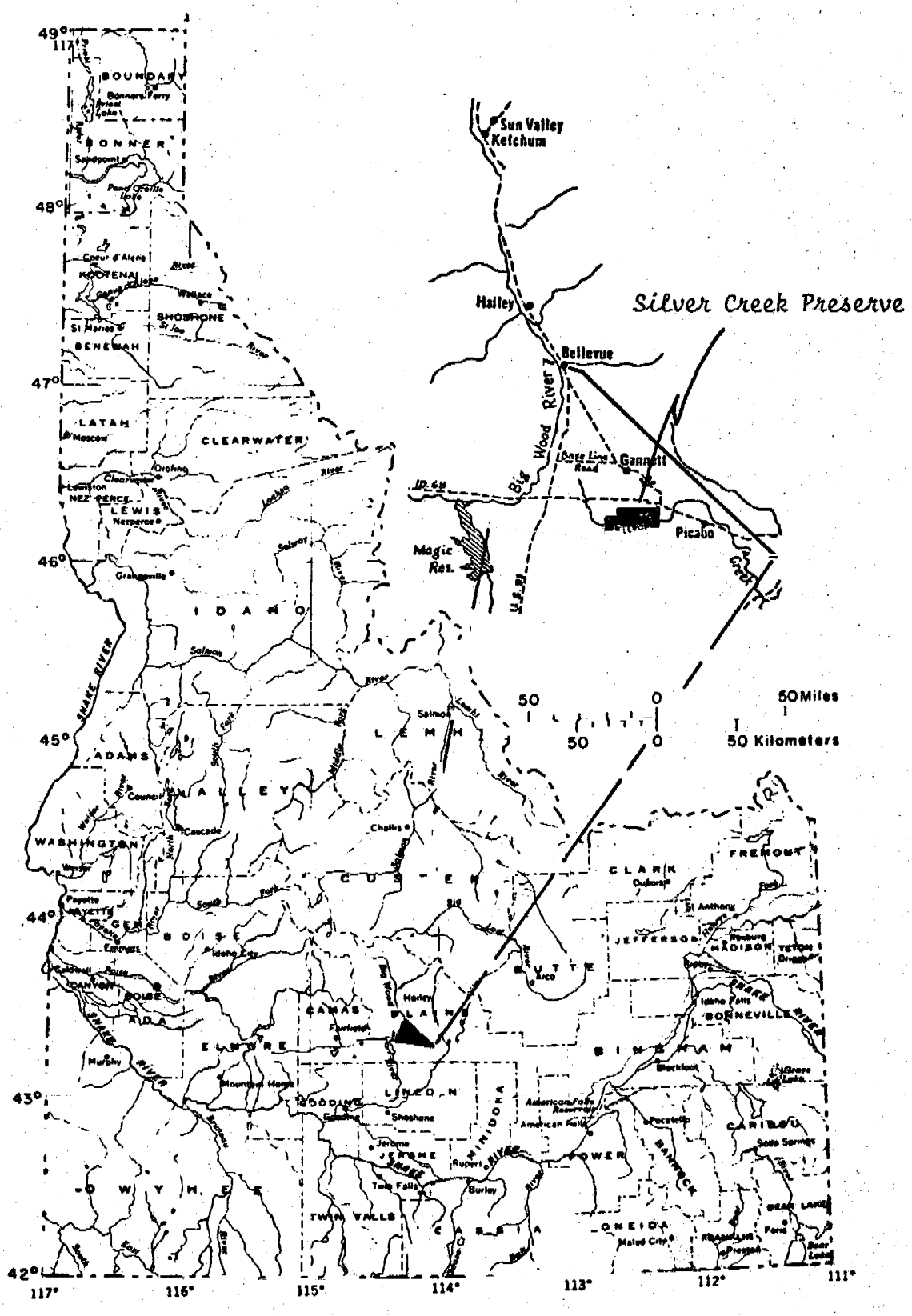


Figure 1. Location Map: Silver Creek Preserve

LOCALE and LEGAL DESCRIPTION

The Silver Creek Preserve is located in Blaine County, Idaho, Figure 1. It lies about thirty miles south of Sun Valley via State Highway 75; fifty miles north of Twin Falls via U.S. Highway 93; and some one hundred thirty miles east of Boise via U.S. Highway 20. Access to the Preserve is by way of a gravelled road (Kilpatrick Road) which intersects Highway 20 two miles south of Gannett, Idaho. The road enters the Preserve approximately one-quarter miles after crossing Stocker Creek, follows the Preserve boundary along the base of the Picabo Hills, crosses Silver Creek at Kilpatrick Bridge, and connects back with Highway 20 about one-half mile east of the Hayspur Fish Hatchery road juncture.

The Preserve lies in a broad valley, a 479 acre tract surrounded by a mixture of cultivated land, pasture, and rangeland that comprise the valley floor and adjacent hills. It encompasses the headwaters of Silver Creek and is described, legally, as:

TOWNSHIP 1 SOUTH, RANGE 19 EAST, BOISE MERIDIAN,
BLAINE COUNTY, IDAHO

SECTION 23: SE ¼ SE ¼
SECTION 24: S ½ S ½
SECTION 25: N ½ NW ¼, NW ¼ NE ¼ and Tax Lot No. 1245 in the NE ¼ NE ¼, being all the NE ¼ NE ¼, EXCEPT the following tract:

Beginning at a point 490 feet South of the Northeast corner of said Section 25; thence
North 200 feet; thence
West 200 feet; thence
South 200 feet; thence
East 200 feet to the POINT OF BEGINNING.

SECTION 26: NE ¼ NE ¼ and W ½ NE ¼;
EXCEPTING THEREFROM THE RIGHT OF WAY FOR SILVER CREEK; and

SUBJECT TO THE TERMS AND CONDITIONS OF AN AGREEMENT BETWEEN SUN VALLEY CO., INC. AND LOUIS HUBSHMAN, JR. TO CONSTRUCT FENCING AND USE ACCESS ROAD LYING WITHIN PROPERTY DESCRIBED HEREIN, RECORDED OCTOBER 13, 1969, AS INSTRUMENT NO. 133843, RECORDS OF BLAINE COUNTY, IDAHO.

Figure 2. Silver Creek Preserve, a biological oasis, a challenge to restore its diversity and maintain its integrity.

HISTORICAL NOTE

Wiley, 1977, provides this historical background leading to the present day status of the Silver Creek Preserve:

> For some time prior to 1940 the area encompassing the Silver Creek Preserve was split into two separate and small ranches. Roughly the downstream half was owned by a family by the name of Gillahan and was known as the Gillahan Ranch. The upper section was owned by a Boise attorney by the name of Sullivan who gave his name to the body of water still known today as Sullivan's Lake.
>
> By 1940 the Union Pacific Railroad's purpose in building the Sun Valley resort had been largely fulfilled. The quality of its skiing and the glamour associated with its clientele had established the area as America's premier winter retreat. By this time too, however, Sun Valley was beginning to become something of a summer draw. A nine-hole golf course, tennis courts, and horseback riding facilities were available to an increasing number of off-season visitors. With an eye toward increasing the recreation potential of the resort and offering more year around opportunities for vacationers, Pat Rogers, who managed the resort for the railroad from

1938 to 1952, negotiated the purchase in 1940 of the Gillihan and Sullivan properties for $8,000. Duck shooting and trout fishing became, for those who wanted them, part of the Sun Valley program.

The run-down structures at the tip of the west arm of Sullivan's Lake were constructed shortly after the railroad assumed ownership. Originally two cabins and a dog kennel, they were used to house guides and entertain clients where action was slow on the creek. Guests at that time would often take the train from Sun Valley to the railroad spur at Hay (near the present site of the Hayspur Fish Hatchery), disembark, and by buck-board, be taken to the cabins on Sullivan's Lake.

Pat Rogers' tenure as manager of the resort was apparently marked by a legendary hospitality, congeniality and generosity. Accounts of his reign at Sun Valley center around his exploits as an unparalleled host and mention, in passing, his somewhat casual approach to the profit-and-loss aspect of the business. That attitude is reflected in the way the Silver Creek property was utilized prior to his departure. Up until the early 1950s the major usage of the property was recreation. Horses owned by the resort were pastured there in the fall, but intensive agricultural use didn't begin until after Rogers left in 1952. Aerial photographs taken in 1957 show that by that time nearly all the tillable land on the property was under cultivation.

When Sun Valley was purchased in 1964 by Bill Janss the Silver Creek property, known at the time as the Sun Valley Ranch, was also part of the deal. On the advice of Don Anderson, a long-time Sun Valley guide and out-fitter and now Sports Director for the resort, Janss removed all cattle from the property to halt what Anderson felt was drastic overgrazing. Since that time the cultivation of barley has been the major agricultural use of the Preserve.

In 1976 the Sun Valley Ranch became the Silver Creek Preserve with its purchase by The Nature Conservancy from Janss' Sun Valley Company.

HISTORIC PICTORIAL COMPARISON

Figure 3. Silver Creek Preserve-Aerial View, 1950. Fences are in place but few areas have been put under the plow as compared to the 1977 aerial view (Figure 4). Other differences are evident such as less streamside vegetation and fewer aspen. In addition, the 1977 aerial view shows effects of cultivation, wet and saline-alkali spots.

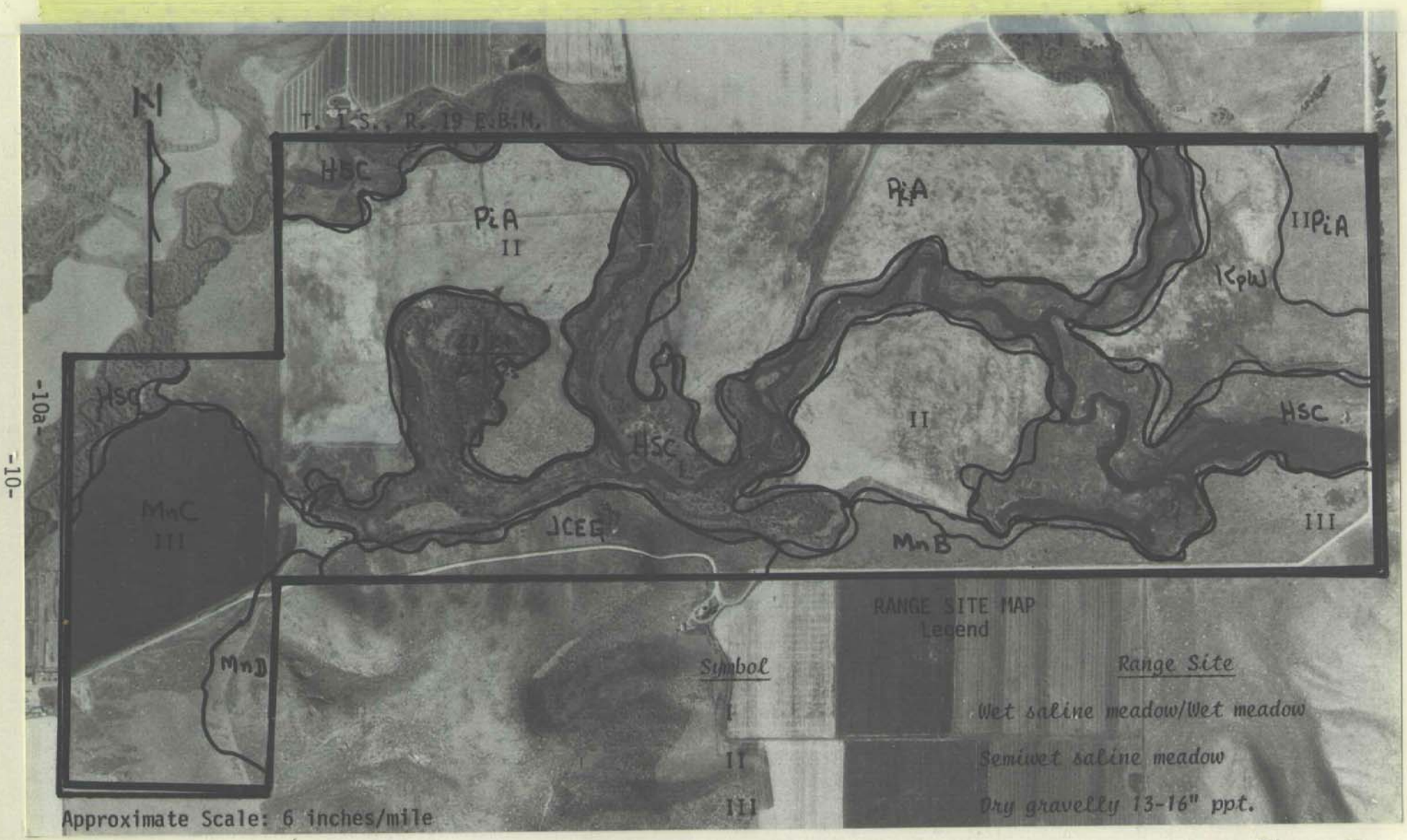
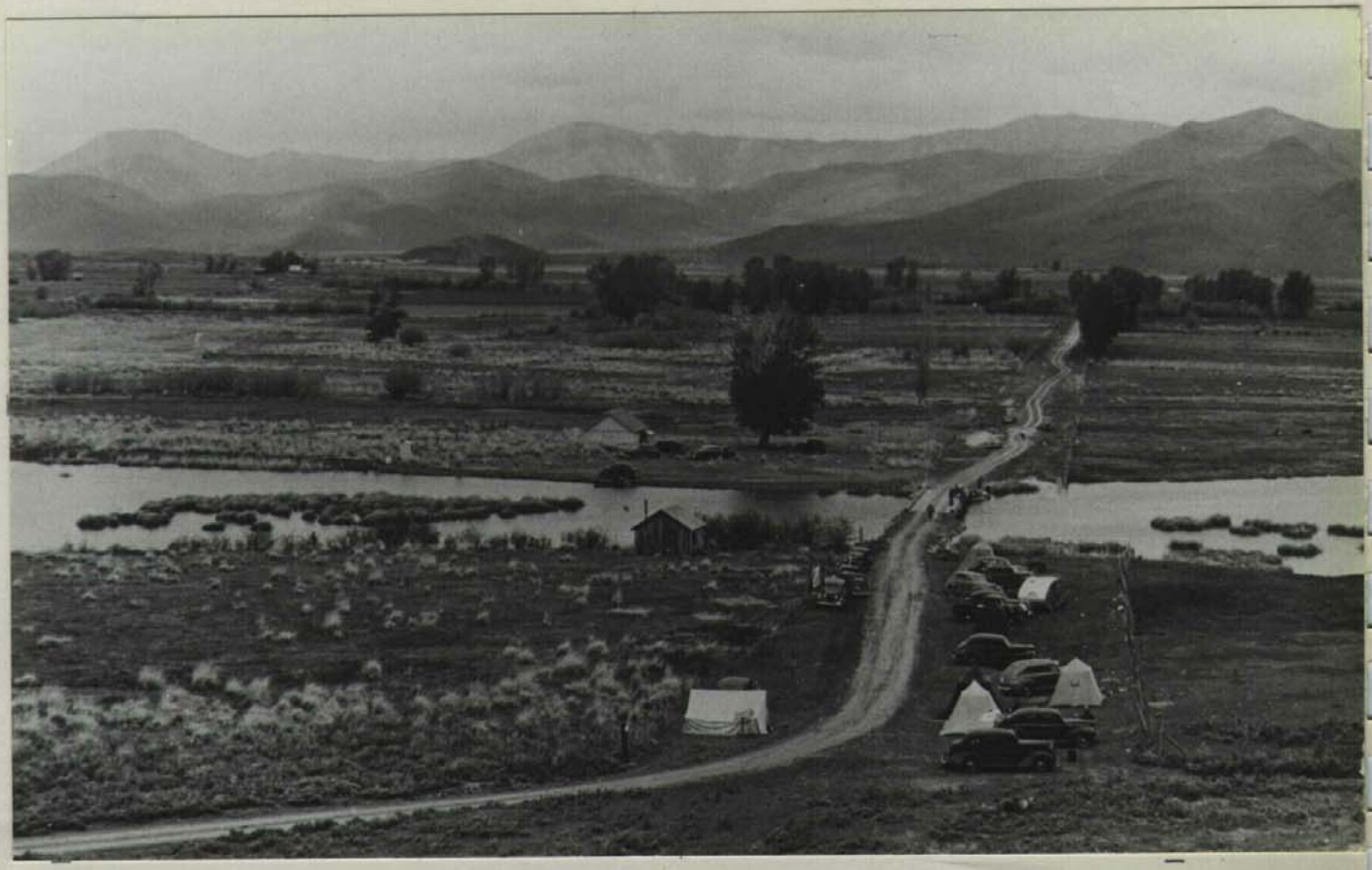


Figure 4. Silver Creek Preserve - Soils Map. Soils: (HSC) Hayspur silty clay loam, 0-2 percent slope; (JCEG) Justesen stony loam, 30-60 percent slope; (KpW) Kilpatrick fine sandy loam, 0-2 percent slope; (MnB) Molyneux loam, 2-4 percent slope; (MnC) Molyneux loam, 4-8 percent slope; (MnD) Molyneux loam, 8-12 percent slope; and, (PiA) Picabo silt loam, 0-2 percent slope.

Figure 4A.



Klotz 1934

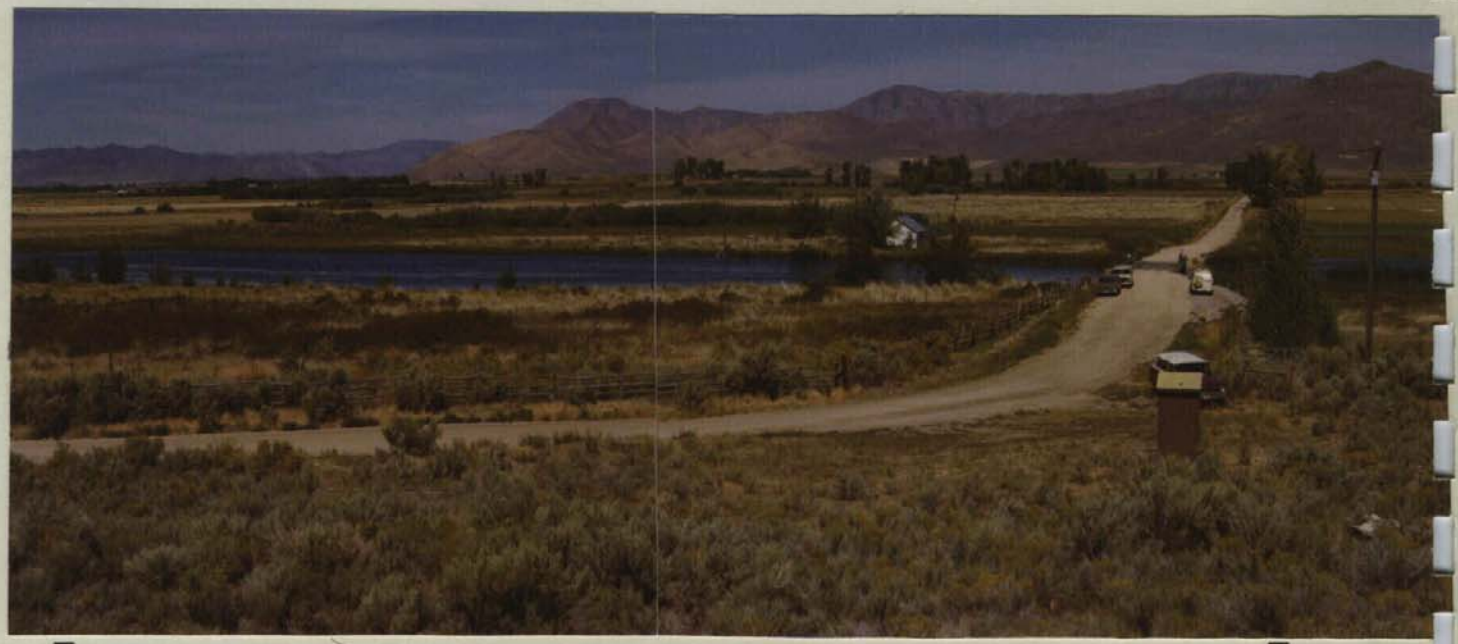


Figure 5. Kilpatrick Bridge opening day of fishing season, 1934; Labor Day, 1979. Note any changes?

Klotz 1934

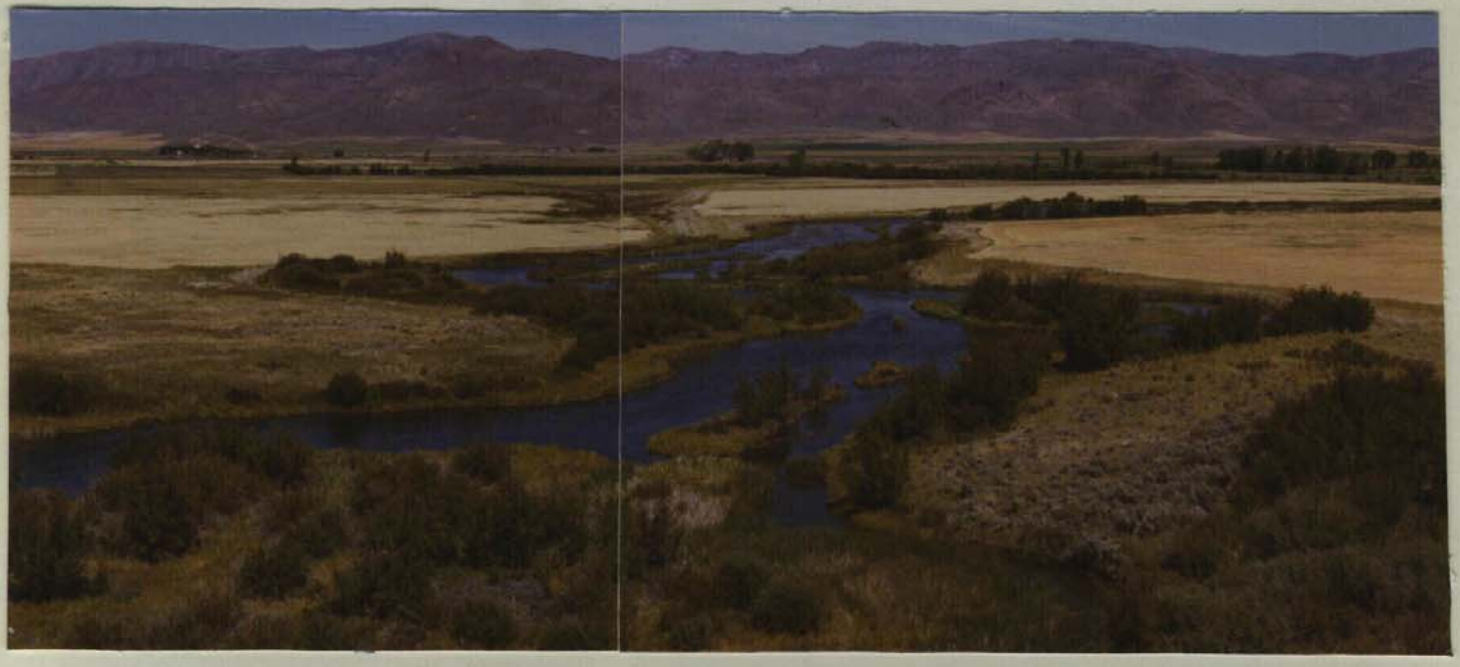


Figure 6. Below Sullivan Lake, 1934-1979. Photos taken from approximate same photo point. There is a difference.

PHYSICAL DATA

Climate

The Silver Creek Preserve experiences a climate of moderately cold winters and warm, dry summers. The mountains surrounding the valley in which the Preserve is found shield the valley floor from high winds as well as intercept much of the moisture-laden storm fronts deriving from the north and northwest.

The nearest weather station is at Hailey, some fifteen miles north of the Preserve. Data would indicate a mean annual temperature of 43.3°F(6.3°C) with a mean monthly maximum of 67°F(19.4°C) occurring in July and the mean monthly minimum of 18.7°F(-7.4°C) occurring in January. Precipitation at Hailey averages 18.31 inches annually while annual precipitation at Picabo, some five miles east of the Preserve, for the same ten-year period (1961-1971) is 13.74 inches.

A mean annual precipitation for the Preserve would range from 12-16 inches including 3-7 feet of snow. Snow may lay on the ground for extended periods from November through March. The average freeze-free period is 80-110 days.

Geohydrology

Bordering and underlying the valley are consolidated sedimentary, volcanic, and intrusive rocks of Tertiary and older age. The various rocks have been described in detail by Schmidt (1961).

Using these data as well as other applicable material, Moreland (1977) and Brockway and Grover (1978) have concluded investigations relative to ground/surface water relations and evaluation of urbanization and changes in land use, respectively, for the immediate Silver Creek-Big Wood River Area. These studies are of importance to the Preserve in that they identify potential adverse impacts that could occur were present trends of agricultural development and urbanization to continue.

The geologic origin of the valley bears on the problem(s) at hand. The rocks that underlie the valley (Schmidt, 1961) are virtually impermeable compared to the valley fill material and basalts of the Quaternary Snake River Group (Moreland, 1977).

The valley is filled to depths of as much as 500 feet (150m) with a sequence of interbedded clay, silt, sand, and gravel of Pleistocene and Holocene age

This valley fill is the primary source of ground water in the area. In the southern part of the valley, Pleistocene basalt flows underlie the valley fill and are part of the aquifer system (Moreland, 1977).

According to Moreland (1977), to understand the character of the fluvioglacial sediments (valley fill materials), an understanding of the sequence of geologic events that caused their deposition is essential. Also, it is necessary to grasp the significance of events now occurring and their potential impact upon the Preserve.

Figure 7. Big Wood River/Silver Creek genesis. Geologic events have forged the valley and its waters, man's use will determine their continued beauty and diversity or degradation and destruction.

During Pliocene time, the Big Wood River flowed from the deep, narrow canyon upstream from Bellevue onto a partly erosional and partly structural depression, which is the present-day valley. At that time, the Big Wood River flowed southeastward and exited the valley through the gap now occupied by Silver Creek.

In the early part of the Pleistocene Epoch, a basalt flow occurred in the vicinity of the southeastern outflow gap. The flow blocked the river causing a lake to form. Sediments were deposited in the lake with coarse-grained materials being dropped from the river at the upper end of the valley and fine-grained

sediments deposited over the floor of the lake at the southern end of the valley. The regraded valley floor received finer grained sediments as the floor flattened. The lake eventually filled to an elevation sufficient to overflow through the western gap, resulting in the diversion of the Big Wood River to its present-day channel.

Sometime later, a second basalt flow occurred near the southwest gap, which dammed the new channel of the Big Wood River and caused a second lake to form. The second basalt flow resulted in the Big Wood River being rediverted to the former southeast flow gap.

Several more lava flows occurred alternately at the southeast and southwest outflow gaps. Each successive flow dammed the river, which resulted in additional deposition across the valley floor. Although not all flows caused the river to change course from one gap to the other, the river did alternate between the gaps several times.

Concurrent with the repeated damming and diversion of the river, at least two periods of glaciation occurred. Glaciers formed in the upstream part of the Big Wood River drainage basin and provided large quantities of glacier-melt runoff and high loads of detritus to the river. This glacial outwash spread over the valley floor, resulting in extensive deposits of poorly sorted coarse-grained material.

The last glacial period spread a layer of coarse sand and gravel over the entire valley. Some windblown sand and silt has since been deposited over the most recent glacial outwash. The sediments have been reworked by the Big Wood River and Silver Creek, and organic matter has accumulated in swampy areas to form the present-day valley floor.

The lithology of the valley fill material is a controlling factor in the movement of ground water. Ground water is transmitted easily through coarse sand and gravel but moves slowly through fine-grained silt and clay. Some thick, extensive layers of fine-grained materials serve as barriers to ground water flow and effectively retard movement. Thus, to understand ground water flow patterns in the valley, an understanding of the spatial and vertical distribution of sand, gravel, silt, and clay is important.

In general, the northern part of the valley is underlain by predominantly coarse sand and gravel; however, a few thin and discontinuous deposits of fine-

grained material are present. Because of the limited areal extent of the fine-grained material, confinement of ground water is limited or nonexistent.

In the central part of the basin, more fine-grained sediments are evident, but again, sand and gravel predominate.

From approximately Baseline Road south, significant amounts of fine-grained sediments occur. Continuous layers are found below depths of about 150 ft. (45m). The amount of fine-grained material increases to the south, and confinement of water is indicated clearly over all the southern part of the valley from Hayspur Fish Hatchery to Stanton Crossing. South of U.S. Highway 20, sand and gravel compose less than 25 percent of the total thickness of the valley fill.

Lithologic investigation clearly indicate the northernmost advance of the basalts which dammed the Big Wood River in earlier times. Basalt occurs as far north as T. 1 S., R. 19 E., sec. 15. In the southeastern part of the valley (near Picabo) basalt is the unit of predominance across the gap through which Silver Creek leaves the valley.

Moreland (1977) provides detailed discussion of the complexity and interrelation of deep/shallow aquifer systems and their impact upon ground water movement. Without going into further detail, the following background is included as it relates to the Silver Creek Preserve.

In the shallow system, ground water movement generally follows the surface drainage moving southwestward toward Stanton Crossing or southeastward toward Picabo. As the water moves southward, it overrides the fine-grained confining beds. Higher percentages of fine-grained material in the southern part of the valley cause a rapid decrease in transmissivity of the shallow sediments and ground water is forced to the surface. This is the spring discharge which feeds Silver Creek and the tributaries to the Big Wood River.

Because of the higher percentage of fine-grained material south of U.S. Highway 20, probably only a small amount of water in the shallow sediments passes the areas of spring discharge. On the Silver Creek side of the valley, most of the discharge occurs in T. 1 S., R. 19 E., secs. 8, 9, 10, 11, 14, 15, and 16. On the Big Wood River side, springs occur mostly in T. 1 S., R. 18 E., secs. 11 and 13.

The deep ground water which moves toward the Silver Creek side of the valley moves eastward through the confined aquifer toward the basalt aquifer underlying the southeastern part of the valley. The fluvioglacial deposits which overlie

the basalt become thinner and the fine-grained sediments disappear. With no confining beds present, the deep and shallow aquifers merge into a single system near the line separating T. 19 S. and T. 20 S. Ground water in the basalt aquifer flows southward and eastward toward Picabo and out of the valley. The gradient steepens rapidly southeast of Picabo as the ground water decends to levels in the Snake Plain aquifer.

Figure 8. Water, Silver Creek's life-blood is threatened by land conversion, "improved" irrigation practice and urbanization.

In the vicinity of Picabo, a layer of fine-grained sediments, apparently deposited by Silver Creek, overlies the basalt aquifer. Water from irrigated crops and seepage from Silver Creek are perched by the fine-grained layer. Several shallow wells obtain small amounts of domestic water from this local perched water body.

Thus the geohydrologic origin and characteristics have profound influence upon the basin in which the Silver Creek Preserve is located. This influence is apparent in the origin of Silver Creek, its continued viability as a spring-fed stream, its soils, and the vegetation that grows relative to the water, soil, and climate. This will be discussed in later text.

Soils

Soils reflect the various soil-forming processes, the geologic origin of the valley, and the climate in which they occur. An early Utilitarian Soil Survey of the Preserve was made by the Soil Conservation Service in 1950. This early survey has been interpreted to a Standard Soil Survey basis with five soil series assigned as applicable, thus:

Mapping Symbol	Series
HSC	Hayspur silty clay loam, 0-2 percent slopes
JCEG	Justesen stony loam, 30-60 percent slopes
KpW	Kilpatrick fine sandy loam, 0-2 percent slopes
MnB	Molyneux loam, 2-4 percent slopes
MnC	Molyneux loam, 4-8 percent slopes
MnD	Molyneux loam, 8-12 percent slopes
PiA	Picabo silt loam, 0-2 percent slopes

(Soil series descriptions are found in Appendix A. Soils as they have been mapped and interpreted to series are shown on Figure 4.)

The Hayspur, Kilpatrick, and Picabo soils have severe limitations of wetness, salinity, and alkalinity to limit their use, especially the production of cultivated crops. In like manner, inherent soil limitation, limit or prescribe the kinds and/or amount of natural vegetative growth.

The inherent soil limitations of salinity and alkalinity have been further aggravated by man's use - cultivation and overgrazing. These uses have (and are, re: present cultivation) exposed soil surfaces thereby accentuating saline-alkaline concentration, destroyed tilth and structure, and compacted soil surfaces to render much of the Preserve an area of complex soil problems inclusive of a serious wind erosion hazard. Continued cultivation serves only to continue the problem with the exception of the area occupied by Molyneux silt loam (alfalfa field: W ½, sec. 26.), a soil better suited for cultivation than is the Picabo or Kilpatrick soils. Elimination of grazing is seeing a slow improvement as vegetative growth becomes reestablished in depleted, non-cultivated areas.

Vegetation

The vegetative cover, except for the "eyebrow" comprised of the Justesen soils

(toe-slope to the Picabo Hills) and those areas comprised of the Molyneux soils (southern and southwestern portion of the Preserve, sections 25 and 26, Soils Map, Figure 4) reflect and is determined by the saline-alkali soils which comprise the valley floor - a wet saline meadow, Figure 9. Daubenmire (1970) makes the following comments about such areas:

> All parts of the Washington steppe except the moist margins have local areas, mainly on poorly-drained valley fill, where salt accumulated as inflowing subsurface water evaporated. Not only does salinity exceed the tolerance limits of the average land plant, but the Na ion is so abundant that these saline soils seem always to have detrimentally high pH as well. Texturally, they run the gamut from sands to very heavy loams.

Figure 9. A wet saline meadow in excellent condition. Alkali cordgrass is the dominant plant present, a species found at Silver Creek as a scattered remnant of a probable former abundance.

Saline-alkali soils in Washington are linked by a common carpet of *Distichlis stricta*, (salt grass) a perennial, strongly rhizomatous grass that forms a dense sward with practically all the herbage below 20cm. Ecotones where this *Distichlis* sward meets upland types of vegetation are usually very sharp. Unlike most of our dominant grasses, *Distichlis*

remains dormant all winter. New tillers appear only after the return of warmth in late April; but once the shoots appear, they remain green in summer when the upland grasses go into aestivation.

Another outstanding even if less conspicuous character of all the h.ts. (habitat types) in this series is the apparent bareness of the fine-textured soils between the vascular plants. In all other h.ts. of the steppe save the *Eriogonum microthecum Physaria* (buckwheat) h.t., the soil is covered by an essentially continuous crust of fine-textured mosses and lichens.

Superimposed over the *Distichlis* sward, one usually finds an open stand of either the deciduous, succulent-leaved shrub *Sarcobatus vermiculatus*, (greasewood) or the large, coarse bunchgrass *Elymus cinereus* (basin wild rye). Often the *Sarcobatus-Distichlis* and *Elymus-Distichlis* associations are distinct, even when contiguous, but intergrades are common. The floras of all three of the halophytic h.ts. recognized are typically rather impoverished.

Except where artificial drainage has been installed, almost the only use of saline-alkali areas has been grazing, because they furnish green forage all summer while upland grasses desiccate, it seems impossible to find areas where one can be confident that the vegetation has not been somewhat altered by domestic animals. For this reason, vegetation analyses have been made only at the reconnaissance level.

The heavy grazing to which most saline-alkali areas have been subjected leads ultimately to dominance by annuals such as *Bromus tectorum*, *Lepidium perfoliatum* and *Bassia byssopifolia* (cheatgrass, pepper grass or black mustard, and bassia), but the *Distichlis* itself is highly tolerant of grazing. Only severe use, involving some use also of the less palatable associates *Elymus* and *Sarcobatus*, will bring about its displacement. The introduced *Lepidium*, a very common plant on severely disturbed upland soils, is most successful in competition with native vegetation in the saline-alkali h.ts.

Daubenmire's description "fits" well though written as applicable to eastern Washington, inclusive of overgrazing by domestic livestock. Additionally, large areas of both the Preserve and adjacent lands have been and are cultivated thereby further altering the original plant cover. This makes difficult the task of

portraying an original or "climax" vegetative cover applicable to the Preserve.

To further confuse the issue is the presence of vegetation which ought not be there, given the predominant saline-alkali soils which characterize the valley floor. Such plants as aspen, willow, rose, and various grasses and forbs (broad-leafed or fleshy-leafed plants) have limited, if any, tolerance of salinity or alkalinity, yet they are present and appear as wet meadows and stringers adjacent to fresh-water bodies, springs and streams, Figure 10. Given the geo-hydrological characteristics of the area, this "odd" occurrence is perhaps explained as associated with water bodies as they emerge and flow from depths not influenced by the adjacent highly saline-alkaline surface and subsurface soil bodies. These wet meadows and stringers are not large in areal extent, but do add interest and diversity to the vegetative mosaic. Such areas are improving in condition since cessation of livestock grazing in the mid-1060s and should return to an original plant cover, given sufficient time.

Areas above the valley floor, the "eyebrow" or toe-slope to the Picabo Hills and the alluvial terrace occupied by the Molyneux soils (Soils Map, Figure 4), soil and vegetation are different. Soils are not saline-alkali. They support a vegetative cover associated with the sagebrush-grassland as described by Daubenmire (1952). Wiley (1977) further describes this plant community in some detail and has developed a plant list for the Preserve, Appendix B.

Figure 11 portrays an area (between the Kilpatrick road and the Preserve south boundary fence) which approaches a climax plant community associated with the Molyneau/Justesen soils. It is a mixture of big and threetip sagebrush, buckwheat, and other shrubs. The grass cover is predominantly bluebunch wheatgrass and Idaho fescue. This plant community probably was once widespread as associated with the Molyneux, Justesen, and other loamy non-saline soils in the general area.

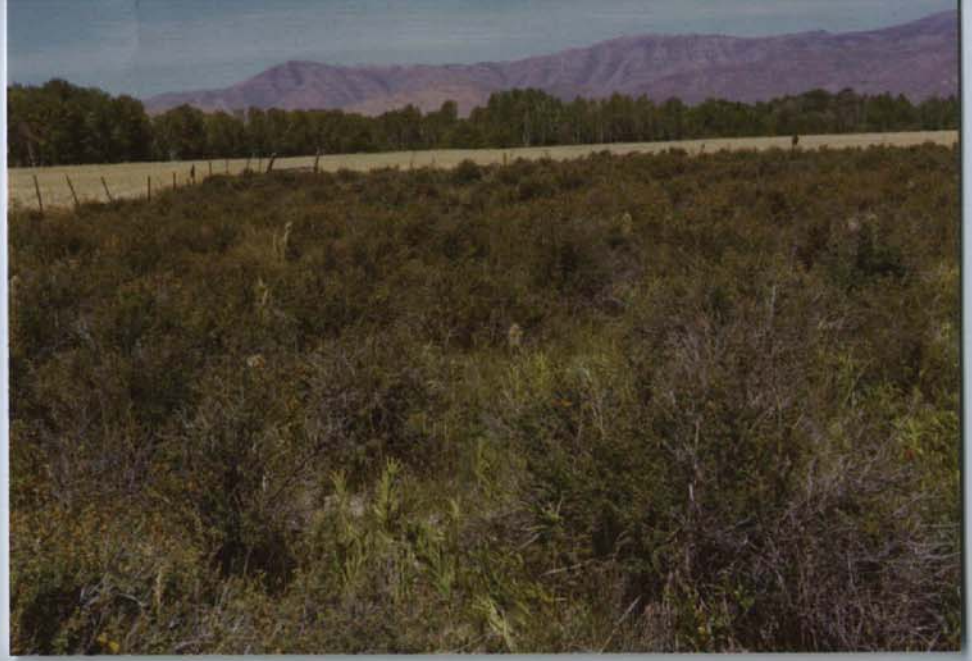
Natural Vegetational Patterns

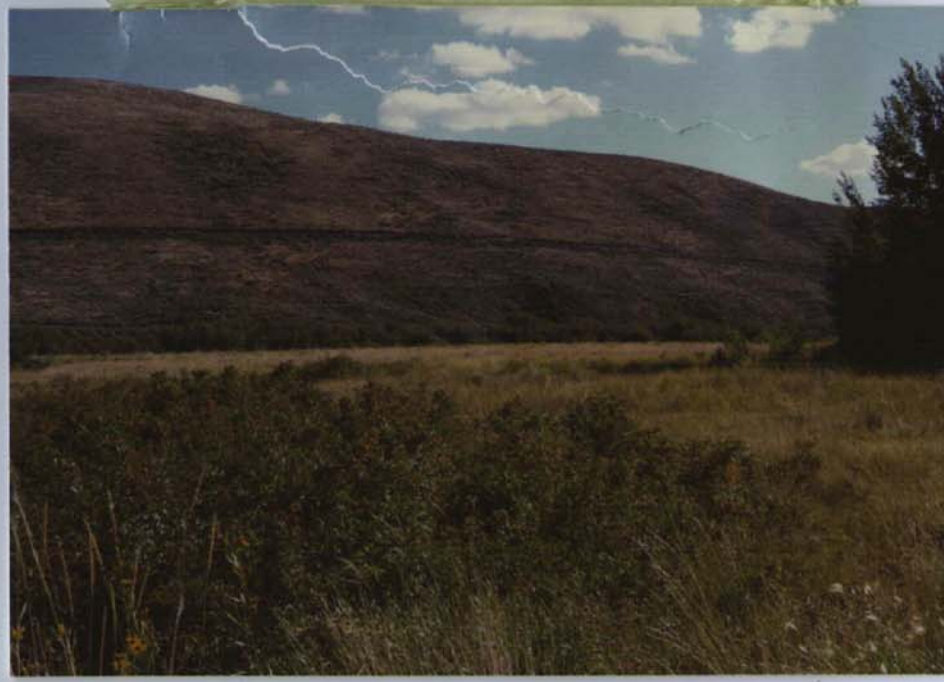
The Soil Conservation Service has identified and described range sites 1/ that occur in southern Idaho and adjacent states. Certain of these range sites

1/ A range site is a distinctive kind of rangeland that differs from other kinds of rangeland in its ability to produce a characteristic natural plant community. A range site is the product of all the environmental factors responsible for its development. It is capable of supporting a native plant community typified by an association of species that differs from that of other range sites in the kind or proportion of species or in total production (Soil Conservation Service, National Range Handbook, July, 1976.).

Figure 10. Wet meadow islands and stringers owe their existence to a limited fresh-water habitat amidst the predominant saline-alkali soils of the valley floor.

Figure 11. The "eyebrow." An original or near climax, excellent condition sagebrush-grass community along southern boundary. Silver Creek Preserve





Dry Gravelly 13-16" ppt. Range Site, SW¼, sec. 26. This area varies from good to poor condition relative to the disturbance that has occurred. Composition finds a mixture of shrubs: both big and threetip sagebrush, buckwheat, rabbitbrush and horsebrush; the understory finds bluebunch wheatgrass, Idaho fescue, needlegrasses, squirreltail, Sandberg's bluegrass, and an assortment of annuals.

Wet Saline Meadow/Wet Meadow, NE ¼ NW ¼, sec. 26. This area is probably more wet than saline. It shows evidence of past, heavy grazing use with dominant shrub now present being shrubby cinquefoil. Again, by patience and time, restoration is probably best achieved.

Wet Saline Meadow/Wet Meadow Range Site
SW ¼ SW ¼, sec. 24. This picture portrays a combination of both range sites inclusive of a portion of the wet saline meadow which was cultivated at one time. Removal of livestock and retirement from cultivation finds the area recovering. It still has a way to go, it has both native and introduced species present, the soil is stabilized. All that is required for complete restoration is more of same and time.

Semiwet Saline Meadow Range Site
NE ¼ NW ¼, sec. 26. This area of Picabo soils has apparently "escaped" the plow to remain an example of how these soils may have appeared before cultivation. Various saline-alkali species occur in something short of excellent condition. Basin wild ryegrass, alkali cordgrass, saltgrass, and many others offer hope the area will return to a natural state - given time.

Figure 12. Vegetational patterns on the Silver Creek Preserve.

appear applicable to the Silver Creek Preserve and, lacking a more precise or better data base, are used as the best available data upon which to project natural vegetational patterns for the Silver Creek Preserve.

Soils are a key to the identity of a range site and together with climate and other physical factors serve to determine a range site. Vegetation serves to provide a clue but in instances where the vegetative cover has been altered, soil and environmental factors provide the basis for range site determination. On the Silver Creek Preserve four range sites emerge as associated with the a) Hayspur, b) Picabo and Kilpatrick, and c) Molyneux and Justesen soils. The fourth range site is limited in distribution and is combined with the Hayspur soils as an inclusion. Hence, applicable range sites are:

Wet Saline Meadow/Wet Meadow - Hayspur silty clay loam,
Semiwet Saline Meadow - Picabo silt loam and Kilpatrick fine sandy loam, and
Dry Gravelly 13-16" ppt. - Molyneux loam and Justesen stony loam.
(Figure 4A portrays the range site(s) occurrence on the Preserve.)

Description of these range sites are found in Appendix C inclusive of natural vegetation applicable to each site. Additionally, notation is made as to possible threatened or endangered species that could occur on each site (None were noted on the Preserve; however, no detailed search was made for this determination.).

Figure 12 portrays four photographs depicting various vegetational patterns found on two range sites on the Silver Creek Preserve, namely: Dry Gravelly 13-16"ppt. and Semiwet Saline Meadows. Each shows a differing vegetative cover in probable response to past use (Captions on each photo provide a more complete explanation of each situation.).

Not all sites are a perfect "fit," noteably the Dry Gravelly 13-16" ppt. range site designation. Yet there are sufficient similarities in soils and vegetation to enable its use as a projection of an applicable natural plant cover. In sum, the natural vegetational patterns so determined by range site designation(s) is a "best estimate," no more. An in-depth study would be required to further define the "patterns." It is doubtful, however, that in-depth study would materially add to a broad concept of the natural vegetational patterns required to establish baseline guidance for restoration efforts. In essence, the natural plant communities applicable to each range site is that plant community in dynamic balance with the environment - no better baseline is available as gui-

Figure 13. *Land use, a changing situation at Silver Creek Preserve. East and west views from a point above Sullivan Lake, note the almost continuous pattern of agricultural development, an event that has occurred since the mid-1950s.*

dance to restoration efforts.

Agricultural Development

Figure 14 depicts a fall, 1979, situation, a photographic recordation of land conversion to agricultural development on and adjacent to the Silver Creek Preserve. It is significant to note that much of the land adjacent to the Preserve and approximately 160 acres on the Preserve is cultivated. This land use change has occurred, primarily since the mid-1950s. This land use change and urbanization that is occurring in upper reaches of the watershed appear to pose potential impacts having an adverse effect upon the Silver Creek Preserve.

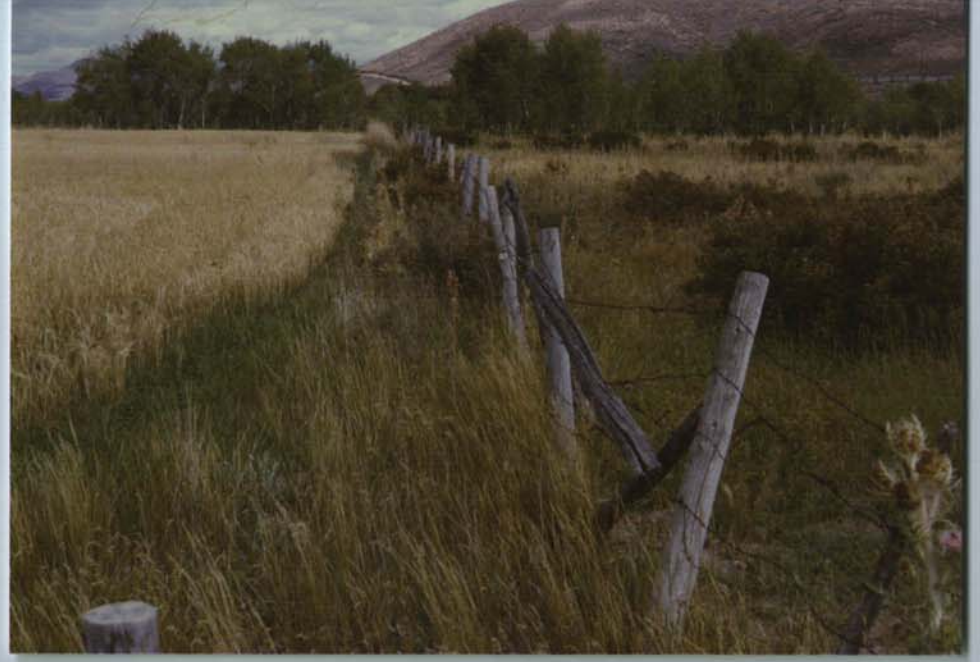
Brockway and Grover (1978) relate the following scenario of agricultural development:

> The earliest available aerial photography for the entire area was taken in 1943. A comparison of these photographs with 1975 U-2 high altitude photographs show significant changes in cropped or cultivated acreage, but no other significant changes in land use within the study area. Between the period 1943 to 1975 a total of 4,760 new acres were brought under cultivation, however, 3,810 acres went out of production. The net gain in cultivated acreage for the period was 950 acres. Most of the added acreage is in the southern part of the area with 3,670 acres being added. This reflects the increase in land reclamation near Silver Creek where non-irrigated grass land and brush has been cultivated for grain production. Over 2,000 acres have gone out of production north of Base Line Road since 1943 reflecting the selective elimination of non-productive acreages.

Given this land use conversion, as centered in the southern part of the valley surrounding the Silver Creek Preserve, and the geohydrological characteristics, as depicted by Moreland (1977) and outlined in earlier text, the potential impact upon Silver Creek becomes apparent.

Wiley (1977) alluded to this problem. Moreland (1977) and Brockway and Grover (1978) make a more specific reference to impacts affecting water resources and, in turn, Silver Creek. At the moment such impacts might appear remote. However, they are real and do have potential for significant adverse impact upon both the quantity and quality of water which is Silver Creek.

The impact(s) is both simple and complex, direct and indirect.



An additional problem to overgrazing is the use of herbicides for removal of willow and other streamside vegetation. This results in increased water temperatures, streambank erosion, and loss of aquatic habitat.

Cereal grain production on left, undeveloped land on the right. Many areas of ill-suited soils have been converted to production of barley to provide questionable returns relative to cost of production and resource degradation.

Silver Creek Preserve on left, grazed area on right. Livestock grazing has been removed from the Preserve since the mid-1960s, some areas have been reseeded - the result is an improving vegetative cover on uncultivated land.

Overgrazing is a common problem in the Big Wood River/Silver Creek Valley. This has resulted in extensive changes in the native plant community. Overuse likewise creates a serious erosion hazard through exposure of bare soil, trampling, and soil compaction.

Many areas that have been converted to cereal grain production are upon soils ill-suited for such use. Picabo silt loam is one such soil having inherent limitations of salinity, alkalinity, wetness, low fertility, and subject to severe wind erosion.

Conversion from surface to sprinkler irrigation is an on-going activity that may have adverse impact upon aquifer recharge and Silver Creek flows.

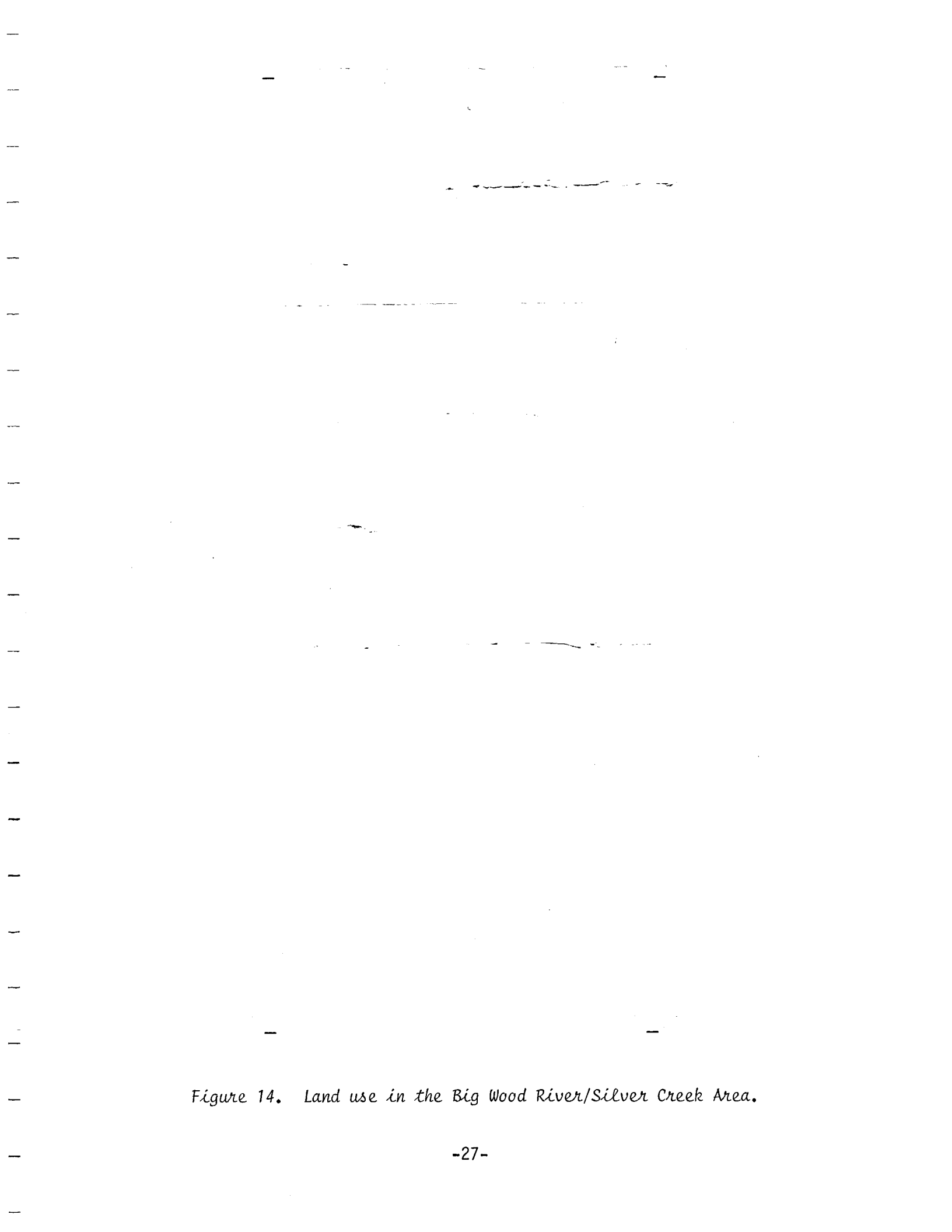


Figure 14. Land use in the Big Wood River/Silver Creek Area.

Conversion of what was once a wet, marshy saline meadow to production of cereal crops through plowing, drainage, and supplemental irrigation has interrupted and destroyed the natural state, Figure 14 (See captions on reverse side of photos.). A majority of the soils "converted" (Picabo) are ill-suited for this purpose. A consequence thereof is the creation of a severe wind erosion hazard and the "salinization" of exposed soil surfaces through increased evaporation with movement and accumulation of inherent saline, alkaline "salts" at or on the soil surface. It is therefore increasingly difficult to establish a vegetative cover on such lands with wind-blown "silts" deposited as sediment in Silver Creek and other water bodies.

Yet another related activity is the conversion of irrigation systems from surface to sprinkler irrigation. The latter is more efficient. However, as Moreland (1977) and Brockway and Grover (1978) point out, this "conversion" as well as additional pumping for additional irrigation development and other water appropriation have the potential to effect water flow in Silver Creek.

Figure 15. An adapted, introduced species, tall wheatgrass is doing well and achieving desired soil stability, Silver Creek Preserve.

Forewarned, there are, perhaps, things that can be done to avert the problem.

On-site, this should be an early and earnest effort to "retire" lands, composed of Picabo and Kilpatrick soils, from cultivation. These should be reseeded to an adapted grass and/or grass/legume mixture, Figure 15 (be it native or introduced) to achieve a land cover and soil stabilization as soon as possible. This may prove difficult, given the soil conditions, but should be undertaken (repeatedly, if necessary) until a vegetative cover is achieved. Areas of Molyneux soils (present alfalfa field, west side of Preserve) are better adapted to cultivation and could remain if desired, otherwise it, too, should be re-seeded. Uncultivated lands should be left alone as they are progressing nicely to full recovery of a natural cover.

Off-site, is a major problem that will require full community awareness, cooperation, and participation to resolve the problem. Although there is little doubt as to the "facts" and to what is occurring, additional investigation is, perhaps, necessary to refine and define the exact impact(s). It would then seem necessary to have and invoke some form of comprehensive community control of those factors and/or activities creating the problem. This appears necessary if Silver Creek, generally, and the Silver Creek Preserve are to retain their beauty and diversity and the life style of those who live there.

SUMMARY/RECOMMENDATION

This report has projected an approximation of the vegetational condition applicable to the Preserve in a natural or undisturbed state. Additionally, it has reviewed certain problem areas having potential effect upon the Silver Creek Preserve. Thus:

- Baseline data have been assembled to provide an approximation of natural vegetational patterns applicable to the Silver Creek Preserve, Appendix C. Evaluation of available data, field data check, and analysis found that Range Site Descriptions (as developed by the Soil Conservation Service) provided a practicable and usable data base for this purpose.

  An in-depth study (over several years) would be required to further define natural vegetational patterns on the Preserve. It is doubtful, however, that in-depth study would materially add to a broad concept of vegetational patterns nor would it significantly improve the baseline guidance necessary for restoration efforts. The bottom line is that the natural community applicable to each range site is that plant community in balance with the environment in which it is found - no better baseline is available as guidance to restoration efforts.

- Restoring the "---terrestrial flora of the Preserve to its pre-World War II status----" (as called for in the 1979 Management Plan) is really not a desireable goal.

  From all indications the Silver Creek Preserve boasts a far better vegetative condition now (except for cultivated areas) than occurred pre-World War II. Removal of livestock in the mid-1960s has resulted in initiation of "natural" recovery that is well underway. All that is needed to restore these areas is time and a continuation of exclusion of grazing.[1/]

1/ There may be some claim for livestock grazing as a benefit or instrument for improvement/restoration - perhaps, in certain instances to achieve specific goals. Silver Creek Preserve, however, is not such a situation. Grazing, in this instance, would require extensive fencing to exclude and protect all water (springs and creeks). It would also have to be limited to a short season when soils are dry and firm enough to permit use without trampling and other damage. The cost would far exceed return to TNC and it is unlikely such use would contribute to TNC management goals and objectives for the Preserve.

- Cereal crop production on the Preserve is a no-win situation. It is imposed on soils ill-suited, yes, not suited for production of such crops - hay and pasture, perhaps.

The Picabo soils, and to lesser extent the Kilpatrick soils, simply do not have the capability for such use. Their inherent limitations of salinity, alkalinity, and wetness makes their use for crop production a gamble and threat to the Preserve and Silver Creek. Exposed soils create a severe wind erosion hazard.

Restoration of these areas to a permanent vegetative cover is of high priority to stabilize such areas and eliminate their siltation of Silver Creek and other water bodies. An adapted grass or mixture of grass and legume should be used (native and/or introduced) for the restoration of these areas; Suggested grass or grass-legume mixtures are:

Grass or grass/legume	lbs/acre
1. Alkar tall wheatgrass	8
2. Alkar tall wheatgrass	8
Granger lotus	1
3. Alkar tall wheatgrass	8
Strawberry clover	4
Lemmons alkali grass (1 lb/ac) can be broadcast on extremely sodic spots only.	
4. Meadow foxtail	8
Strawberry clover	4

Basin wild rye and yellow blossom sweet clover could be added (at 6 and 2 lbs/ac., each) to any of the above, 1 through 4. The overall goal is to get a vegetative cover established to stabilize the soil. Fall seeding into the barley stubble is recommended with a dressing of fertilizer (ammonium sulphate: 100 lbs/ac) to aid seedling establishment.

The Molyneux soils are another matter. A portion is presently being cropped to alfalfa and could so remain, if needed for revenue purposes, as they are more suitable for cultivation. There is an

acreage south of the road (SW ¼, sec. 26) that could be cropped or reseeded. Reseeding is recommended for that portion which appears to have been cropped or otherwise disturbed - perhaps, 20 acres. A suggested seed mixture is:

	lbs/acre
Whitmar beardless wheatgrass	6
Sherman big bluegrass	2
Basin wild rye grass	1
Big sagebrush	½
Bitterbrush	½

A creeping alfalfa such as Rambler or Nomad could be added at 1 pound per acre.

- The reports by Moreland (1977) and Brockway and Grover (1978) have more than a passing significance to the future well-being of the Silver Creek Preserve.

  The Silver Creek Preserve Management Plan takes note of these studies. It, however, prescribes no TNC action to cope with the problem other than a general statement of intent. TNC, of course, is limited in what it can do outside the Preserve, but must take the problems seriously as a real threat to the Preserve. It is likewise a real threat to all those living in the southern part of the valley and to those having a fondness for Silver Creek, its uniqueness and integrity.

  It is not a panic situation, the threat does not appear imminent. There is time, therefore, to rationalize, to see what can be done. It is a community problem and it will require "community" for its resolution.

In conclusion, management of the Silver Creek Preserve should be geared to let Nature conclude her restoration program now in progress. TNC can assist by retiring and restoring cultivated areas (cereal production areas) for soil stabilization and erosion control. TNC can also assist by sparking and supporting community awareness and action to resolve the social-economic-water problem that is emerging as a threat to the Big Wood River/Silver Creek Valley, generally, and to the Silver Creek Preserve.

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SOIL SERIES DESCRIPTIONS

Acknowledgement and thanks is given the Soil Conservation Service for the following soil descriptions. They represent "Tentative" and "Initial Review Draft" copies as may contribute to the National Cooperative Soil Survey. They are subject to revision, they have been reproduced verbatum.

APPENDIX A

HAYSPUR SERIES

The Hayspur series is a member of the fine-loamy, mixed, frigid family of Fluvaquentic Haplaquolls. Typically, Hayspur soils are wet and have gray, slightly calcareous silty clay loam A1 horizons, light gray and white non-calcareous clay loam IICg horizons over sand and gravel below 40 inches.

Typifying Pedon: Hayspur silty clay loam - wet meadow pasture. (Colors are for dry soils unless otherwise noted.)

A1 -- 0-5" -- Gray (10YR 5/1) silty clay loam, very dark gray (10YR 3/1) moist; weak medium granular structure; hard, firm, sticky, plastic; many very fine and fine roots; many very fine and fine interstitial pores; slightly calcareous; strongly alkaline (pH 8.6) on hummocks and moderately alkaline (pH 8.2) between hummocks; clear wavy boundary. (2 to 7 inches thick.)

C1g -- 5-15" -- Light gray (5Y 6/1) silty clay loam, dark gray (5Y 4/1) moist; massive; hard, firm sticky, plastic; many very fine and fine roots; common very fine tubular pores; mildly alkaline (pH 7.8); abrupt smooth boundary. (8 to 12 inches thick.)

IIC2g -- 15-20" -- White (5Y 7/1) clay loam, gray (5Y 5/1) moist; massive; hard, firm, slightly sticky, plastic; common very fine and fine roots; common very fine and fine tubular pores; mildly alkaline (pH 7.8); abrupt smooth boundary. (3 to 7 inches thick.)

IIC3g -- 20-38" -- Light gray (5Y 6/1) clay loam, dark gray (5Y 4/1) moist; massive; hard, firm, slightly sticky, slightly plastic; few fine roots, common very fine and fine tubular pores; mildly alkaline (pH 7.8); clear smooth boundary.

IIC4g -- 38-42" -- Light gray (5Y 6/1) fine sandy loam, dark gray (5Y 4/1) moist; massive; hard, firm, nonsticky, nonplastic; few fine roots; common fine tubular pores; clear wavy boundary. (2 to 6 inches thick.)

IIIC5 -- 42" -- Coarse sand and gravel, noncalcareous.

Type Location: Blaine County, Idaho; profile was taken on the southwest corner of the NW¼ of sec. 23, T. 1 S., R. 19 E., about 2½ miles south of Gannett.

Range in Characteristics: The mean annual soil temperature ranges from 42° to

47° F., and the mean summer soil temperature at 20 inches ranges from 59° to 65° F. The soils are saturated throughout for several months each year unless drained, and are not dry in the 4- to 12- inch section for any period longer than 30 to 40 consecutive days. The minerology is mixed. The 10 to 40 inch control section is dominantly medium textured and has a weighted average 18 to 27 percent clay, more than 15 percent particles coarser than very fine sand and less than 10 percent rock fragments. No strongly contrasting texture and no bedrock are above 40 inches. The profile ranges from slightly to moderately calcareous in the upper part, but is non-calcareous below 10 to 20 inches. The A1 horizons have color values of 4 or 5 dry, 2 or 3 moist, chroma of 1.5 or less in hue of 10YR. The A1 horizon texture ranges from silt loam or silty clay loam to loam. The IIC have color values of 6 or 7 dry, 4 or 5 moist; and chroma of 1.5 or less. Reaction ranges from mildly to strongly alkaline in the upper 20 inches and neutral to mildly alkaline below. The soils are underlain by coarse sand and gravel at depths ranging from 40 to 60 inches.

Competing Series and Their Differentiae: These are the Dilworth, Hussa, Ozamis, Settlemeyer and Zohner series. Dilworth soils have more than 35 percent clay in their control sections. Hussa soils are calcareous throughout the control section. Ozamis and Settlemeyer soils have mean annual soil temperatures warmer than 47° F. Zohner soils are calcareous and have mean summer temperatures less than 59° F.

Setting: These soils are on level or very gently undulating or channeled bottomlands. Elevations are 4,700 to 5,000 feet. Slopes are 0 to 2 percent. The soils formed in mixed alluvium. The climate has an average freeze-free period of 80 to 110 days. The mean annual precipitation ranges from 12 to 16 inches including 3 to 7 feet of snow.

Principal Associated Soils: These are the Picabo and Patterson soils. Picabo soils calcareous throughout the control section. Patterson soils are somewhat poorly drained.

Drainage and Permeability: Poorly drained. Permeability of the upper horizon is moderate, with the lower horizons moderately rapid or rapid and with the loose sand and gravel very rapid. The water table is high for several months and overflowing is common in the spring.

Use and Vegetation: These soils are used for wet meadow pasture. Natural vegetation includes rushes, sedges, red top, saltgrass, shrubby cinquefoil, wild rose and willows.

Distribution and Extent: The series is inextensive in Blaine County, Idaho.
Series Proposed: Silver Creek area, Blaine County, Idaho, 1956.
Remarks: The series was classified formerly as a Humic Gley.

JUSTESEN SERIES

The Justesen series is a member of the fine-loamy, mixed, frigid family of Calcic Argixerolls. Typically, Justesen soils have grayish brown neutral loam A horizons, pale brown neutral clay loam B22t and loam C horizons.

Typifying Pedon: Justesen loam - sagebrush.
(Colors are for dry soil unless otherwise noted.)

A11 -- 0-4" -- Grayish brown (10YR 5/2) loam, dark brown (10YR 3/3) moist; weak fine and very fine granular structure; soft, very friable, slightly sticky, slightly plastic; many very fine and fine and common medium roots; many very fine and fine interstitial and tubular pores; noncalcareous; neutral (pH 6.8); abrupt smooth boundary. (3 to 5 inches thick.)

A12 -- 4-7" -- Grayish brown (10YR 5/2) loam, dark brown (10YR 3/3) moist; weak very thin and thin platy and very weak medium subangular blocky structure; slightly hard, very friable, slightly sticky, slightly plastic; many very fine and fine and common medium roots; few fine tubular and common very fine interstitial pores; noncalcareous; neutral (pH 6.9); abrupt smooth boundary. (2 to 4 inches thick.)

B21t -- 7-11" -- Brown (10YR 5/3) light clay loam, very dark grayish brown (10YR 3/2) moist; moderate medium subangular blocky structure; hard, very friable, slightly sticky, plastic; common very fine to coarse roots; many very fine and fine tubular pores; common thin clay films on ped and pore surfaces; noncalcareous; neutral (pH 7.2); clear smooth boundary. (3 to 5 inches thick.)

B22t -- 11-22" -- Pale brown (10YR 6/3) clay loam, dark grayish brown (10YR 4/2) moist; moderate medium and fine prismatic structure which parts to moderate medium and fine subangular blocky structure; hard, very friable, sticky, plastic; common very fine to coarse roots; many very fine

and fine tubular pores; continuous thin clay films on the ped and pore surfaces; noncalcareous; neutral (pH 7.2); clear wavy boundary. (10 to 15 inches thick.)

B3 -- 22-31" -- Pale brown (10YR 6/3) light clay loam, grayish brown (10YR 5/2) moist; weak medium subangular blocky structure; hard, friable, slightly sticky, plastic; common very fine and few medium and coarse roots; common very fine and fine tubular pores; noncalcareous; mildly alkaline (pH 7.6); clear smooth boundary. (8 to 11 inches thick.)

C1 -- 31-45" -- Light brownish gray (10YR 6/2) loam, grayish brown (10YR 5/2) moist; very weak medium and coarse subangular blocky structure; slightly hard, very friable, slightly sticky, plastic; common very fine and fine roots; few rounded and subrounded (¼ to ½ inch) nodules; noncalcareous; mildly alkaline (pH 7.7); clear smooth boundary. (0 to 14 inches thick.)

C2ca -- 45-60" -- Pale brown (10YR 6/3) loam, brown (10YR 5/3) moist; massive; slightly hard, very friable, slightly sticky, slightly plastic; common very fine and fine roots; slightly calcareous; common very fine veins of lime; mildly alkaline (pH 7.7).

Type Location: Blaine County, Idaho. Near northwest corner of borrow pit and 25 feet west of the west line of NW¼SE¼ sec. 31, T. 1 S., R. 21 E., approximately 3 miles southeast of Picabo.

Range in Characteristics: The mean annual soil temperature ranges from 44° to 47° F. The soils are usually moist, but are dry in all parts between 4 and 12 inches for 45 to 70 consecutive days in late summer. The minerology is mixed. No bedrock or strongly contrasting layer is above 40 inches. The series has a mollic epipedon 8 to 14 inches thick and has an argillic horizon. The solum is 25 to 35 inches thick and ranges from neutral to mildly alkaline. The Ap or A1 horizon, when mixed to 7 inches, has a color value of 4 or 5 dry and 2 or 3 moist; and a chroma of 2 or 3. The organic matter content is 1.5 to 3 percent. The Bt horizon has a color value of 5 or 6 dry and 3 or 4 moist. Its structure ranges from weak to moderate prismatic or subangular blocky and clay films are common to continuous on ped and pore surfaces. The texture ranges from heavy loam to clay loam and

contains 25 to 35 percent clay. Depth to the upper boundary of a weak or moderate calcium carbonate accumulation is about 36 to 44 inches. Rock fragments range from 0 to 20 percent. In places, the horizons below 40 inches consist of stratified soil material or buried horizons.

Competing Series and Their Differentiae: These are the Broad, Chesnimnus, Elkcreek, Elmore, Searla, and Timpanogos series. Broad and Searla soils have more than 35 percent rock fragments in the control sections. Chesnimnus soils are 24 to 42 inches deep to glacial gravel, and are influenced by recent volcanic ash in the upper solum. Elkcreek soils are 20 to 40 inches deep to bedrock. Elmore and Timpanogos soils have mean annual temperatures warmer than 47^{o} F.

Setting: The Justesen series is on nearly level to moderately steep alluvial and colluvial fans at the foot of hill and mountain slopes. Slopes range from 0 to 30 percent, but are principally 2 to 20 percent. The soils are derived from rhyolitic rock sources. Elevations range from 4,600 to 5,800 feet. The climate is semiarid to subhumid and summers are dry. The mean annual precipitation is 13 to 16 inches and includes 4 to 8 feet of snow. The average freeze-free period is 80 to 105 days.

Principal Associated Soils: These include the Bancroft, Drage and Goodington soils. Bancroft soils have less than 15 percent coarser than very fine sand in their control sections. Drage soils have more than 35 percent rock fragments in their control sections. Goodington soils have more than 35 percent clay which is dominated by montmorillonite and an abrupt boundary between the A2 and Bt horizons.

Drainage and Permeability: Well drained. Surface runoff moderate. Permeability is moderate or moderately slow.

Use and Vegetation: The major use is grazing, but some is cultivated, producing small grains and hay. Native vegetation is big sagebrush, Idaho fescue, bluebunch wheatgrass and bitterbrush in places.

Distribution and Extent: South central Idaho. The series is moderately extensive.

Series Proposed: Blaine County, Idaho. 1956 (Name is coined).

Remarks: Formerly classified as Chestnut soils.

KILPATRICK SERIES

The Kilpatrick series is a member of a coarse loamy, mixed, frigid family of Aquic Haplustolls (or Entic Haplustoll). They are developed in low alluvial fans or terraces. They are derived from alluvium, principally from quartzite, rhyolite, and andesite sources. The alluvium is dominantly moderately coarse textured, but it includes some medium and coarse textured layers. The Natural vegetation consisted of semiwet meadow type perennial grasses and shrubs; now most of the soil is cultivated and irrigated and produces moderate yields of alfalfa hay, cereal grains, and pasture. Surface drainage is slow, and the profile is somewhat poorly drained. The water table usually stands at 6 to 8 feet, but occasionally rises to near 2 feet. The soils developed in a cool climate with an average annual precipitation of 11 to 14 inches, with most of it falling during the winter as snow. Elevation ranges from 4,700 to 4,900. Mean annual soil temperature is less than 47° F.; the mean summer soil temperature at 20 inches exceeds 60° F. The soils are associated with the very wet Hayspur soils that occur along both sides of the channels of Silver Creek. They are intermingled with the better drained phases of the strongly calcareous Picabo soils. In a few areas the loessal McCain soils, occuring on a basalt plain, lie on slightly higher positions above the Kilpatrick soils. Patterson also is associated.

The soils are characterized by very dark brown to very dark grayish-brown loam to loamy sand, slightly calcareous surface soils; and gray to olive-gray, massive, strongly calcareous, moderately coarse textured subsoils. The subsoils are underlain by gravel, which is sometimes weakly cemented.

Similar Soils		Differences
Kilpatrick	Aquic Haplustoll C L mf	
Bruneel	Aquic Haplustoll CL/SSK mf	Less than 40" deep
Egin Bench	Aquic Haplustoll S mf	Sandy control
Blackfoot	Aquic Haplustoll FL mf	Loamy control
Adamson	Typic Haplustoll CL/S SK mf	Well drained
Sellars	Typic Haplustoll CL mf	40" and well drained
Waddoups	Entic Haplustoll CL mf	No B has developed

The soils occur in the lower Silver Creek Valley, particularly in the vicinity of the town of Picabo. Three types and nine phases are mapped. This is an inextensive series in the district, comprising roughly about 1 percent of the area.

KpM Kilpatrick loamy fine sand, MODERATELY DEEP VARIENT - 20 to 40 inches deep, 0 to 2 percent slopes, drained. --The following description of a modal profile was taken ¼ miles east of Kilpatrick's store in a gravel pit on the south side of Idaho Highway No. 22 in the SE ¼, SE ¼, sec. 27, T. 1S., R. 20 E.

A11 0-10" Very dark brown to very dark grayish-brown (10 YR 2.5/2), very friable, loamy fine sand to coarse-textured fine sandy loam, which is dark grayish-brown (10 YR 4/2) when dry; massive; slightly calcareous on surface, but noncalcareous through most of horizon.

A12 10-16" Very dark grayish-brown (10 YR 3/2), very friable fine sandy loam, which is grayish brown to dark grayish-brown (10 YR 4.5/2.5) when dry; massive; noncalcareous.

C1ca 16-25" Gray to light-gray (5 Y 6/1), friable fine sandy loam, which is white (5 Y 8/1) when dry; massive; very strongly calcareous.

C2ca 25-38" Olive-gray (5 Y 5/2), friable fine sandy loam; massive; strongly calcareous. In some places weakly cemented.

11c3 38"+ Loose, well-rounded gravel and sand that is strongly calcareous. In some places weakly cemented.

Variations: Sometimes the entire A horizon is slightly calcareous. The Cca horizon is not always so distinct as in the profile described. Depth to gravel ranges from 20 inches to 40 inches. Occasionally, finer textured layers occur in the C horizons. A few pebbles are common on the surface and throughout the profile. In many places the C horizon is mottled. These soils are mainly level, with occasional slopes up to 4 percent.

This Kilpatrick phase is characterized by the following qualities: Runoff is slow; erosion hazard is slight; permeability is 5 to 10 inches per hour, while the infiltration is 2.50 to 5 inches per hour; available water-holding capacity is 1.9 inches per foot of soil and the organic matter content ranges from 1.2 to 2.2 percent.

KpA WELL DRAINED VARIENT - Kilpatrick fine sandy loam, 20 to 40 inches deep, 0 to 2 percent slopes. Except for the sandy loam surface decreasing slightly the infiltration rate, this soil is very similar to the detailed description of Kilpatrick loamy fine sand.

KpB WELL DRAINED VARIENT - Kilpatrick loam, 20 to 40 inches deep, 0 to 2

percent slopes. This soil has a loam surface soil and is a little finer textured throughout than the Kilpatrick loamy fine sand described. Depth to gravel ranges from 20 to 40 inches.

KpX DEEP WELL DRAINED VARIENT - Kilpatrick loamy fine sand, over 40 inches deep, 0 to 2 percent slopes. This soil is deeper than the profile described. The texture of the C horizons is finer, usually a loam to light loam. This soil is associated with McCarey soils, which occur on a basalt plain; consequently, a few areas are underlain by basalt. Color and horizonation are similar to the shallower Kilpatrick soils.

KpJ DEEP - WELL DRAINED VARIENT - Kilpatrick loamy fine sand, over 40 inches deep, 2 to 4 percent slopes. This soil occurs along the edge of the valley between the basalt plains and alluvial valley and is very gently sloping. With the exception of slope it is very similar to the level, very deep phase of Kilpatrick described above.

KpW DEEP VARIENT - Kilpatrick fine sandy loam, over 40 inches deep, 0 to 2 percent slopes, slightly alkali, slightly wet. This soil occurs intermingled with the more poorly drained and alkali Picabo soils, hence, the slightly alkali and slightly wet condition. However, they more nearly resemble the Kilpatrick soils.

KpN DEEP - WELL DRAINED VARIENT - Kilpatrick loam, over 40 inches deep, 0 to 2 percent slopes. This soil has a loam A horizon and is a little finer textured throughout than the profile described. It is also a little better drained and less calcareous. However, color and thickness of horizons are similar to the coarser textured Kilpatrick soils.

MOLYNEUX SERIES

The Molyneux series consists of a very deep, well drained soils that formed in mixed alluvium. Molyneux soils are on fan terraces and have slopes of 2 to 15 percent. Permeability is moderately slow. The average annual precipitation is about 14 inches, and the average annual temperature is about 41° F.

Taxonomic Class: Fine-loamy, mixed, frigid, Ultic Argixerolls.

Typical Pedon: Molyneux loam - on 3 percent east facing slope at an elevation of 5,520 feet in rangeland. (Colors are for dry soil unless otherwise noted. When described on September 27, 1978, the soil was dry throughout.)

A11--0 to 8 inches; dark grayish brown (10YR 4/2) loam, very dark brown (10YR 2/2) moist; moderate fine to medium platy structure; soft, very friable, slightly sticky and slightly plastic; many very fine, fine, medium and coarse roots; common very fine interstitial pores; about 10 percent gravel; slightly acid (pH 6.2); clear wavy boundary. (3 to 10 inches thick.)

A12--8 to 13 inches; brown (10YR 5/3) loam, very dark grayish brown (10YR 3/2) moist; moderate fine to medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; few very fine, fine, medium and coarse roots; many very fine, fine, and medium interstitial pores; about 5 percent gravel; slightly acid (pH 6.2); abrupt wavy boundary. (5 to 10 inches thick.)

B21t-13 to 24 inches; yellowish brown (10YR 5/4) clay loam, dark yellowish brown (10YR 3/4) moist; moderate medium prismatic structure; hard, friable, sticky, and plastic; few very fine, fine, medium, and coarse roots; many fine and medium tubular pores; about 10 percent gravel; slightly acid (pH 6.4); clear wavy boundary. (10 to 25 inches thick.)

B22t--24 to 50 inches; yellowish brown (10YR 5/4) clay loam, dark yellowish brown (10YR 4/4) moist; strong fine to medium angular blocky structure; very hard, firm, sticky and plastic; few very fine and medium roots; many fine and medium interstitial pores; many thin clay films on faces of peds; about 10 percent gravel; neutral (pH 6.6); clear wavy boundary. (15 to 30 inches thick.)

B3t--50 to 75 inches; yellowish brown (10YR 5/4) gravelly sandy clay loam, dark yellowish brown (10YR 3/4) moist; moderate medium subangular blocky structure; very hard, firm, sticky and plastic; few very fine, fine,

and medium roots; many fine and medium interstitial pores; many thin clay films on faces of peds; about 15 percent gravel; neutral (pH 6.8).

Type Location: Blaine County, Idaho about 3 miles west and 1 mile north from Hailey; 500 feet south and 1,000 feet west of the NE corner of sec. 24, T.2N., R.17E.

Range in Characteristics:

Depth to bedrock	more than 60 inches
Average annual soil temperature	42 to 47 degrees F.
Reaction	slightly acid to neutral
Thickness of mollic epipedon	10 to 20 inches
A horizon	
Color value, moist	4 or 5
chroma, dry	2 or 3
chroma, moisture or dry	2 or 3
Clay content	10 to 15 percent
Coarse fragments	0 to 10 percent
B2 horizon	
Color value, dry	3 through 5
value, moist	2 through 4
chroma, moisture or dry	2 through 4
Clay content	27 to 35 percent
Coarse fragments	5 to 15 percent
B3 horizon	
Color value, moist	3 through 5
chroma, moisture and dry	3 or 4
Texture	gravelly clay loam, gravelly sandy clay loam
Coarse fragments	15 to 25 percent

Competing Series: These are the Elkcreek, Johnson, Suloaf, Simonton and Trojan series. Elkcreek soils are 20 to 40 inches deep to bedrock. Johnson and Trojan soils have hues of 7.5YR and 5YR in the Argillic horizon. Trojan soils have a O horizon, and are dry more than 80 consecutive days. Suloaf soils have bedrock between 40 and 60 inches. Simonton soils have a solum that is 30 to 40 inches thick.

Geographic Settings: Molyneux soils are on fan terraces. Slopes range from 2 to 15 percent. Elevation ranges from 4,800 to 6,000 feet. The soil formed in mixed alluvium from quartzitic sandstone, basalt or limestone. The average annual precipitation is 12 to 16 inches, most of which falls as snow and early spring rain. The average annual temperature is about 39 to 43 degrees F. The frost free season is 60 to 90 days.

Geographic Associated Soils: These are Drage, Elkcreek, Littlewood, Polecreek, and Winu soils. Drage and Littlewood soils contain more than 35 rock fragments in the B2t horizons. Elkcreek soils are moderately deep. Polecreek soils are less than 20 inches deep. Winu soils have mollic epipedons thicker than 16 inches.

Drainage and Permeability: Well drained and moderately slow permeability.

Use and Vegetation: Mainly used for range, irrigated hay and pasture, and some cropland. Vegetation is basin big sagebrush, Idaho fescue; and, bluebunch wheatgrass.

Distribution and Extent: South-central Idaho. This series is inextensive.

Series Proposed: Blaine County, Idaho, 1955.

Remarks: Previously proposed in 1955. Named from a locality. This series was formerly classified as Typic Argixerolls. Results from laboratory data indicates it to be "Ultic." This description replaces the old series description dated March 6, 1972.

PICABO SERIES

The Picabo series is a member of the fine-loamy, mixed, frigid family of Aquic Duric Calciorthids. Typically, Picabo soils have bray moderately calcareous silt loam A horizons, light brownish gray strongly calcareous clay loam Cgca horizons, and weakly cemented 11C2ca horizons intermittently mixed with durinodes over stratified sandy loam and sand.

Typifying Pedon: Picabo silt loam-wet meadow grasses.

(Colors are for dry soil unless otherwise noted.)

A1 -- 0-8" -- Gray (10YR 6/1) silt loam, very dark grayish brown (10YR 3/2) moist; weak thin platy structure which parts to moderate fine granular structure; slightly hard, friable, slightly sticky, slightly plastic; many very

fine and fine roots; many very fine tubular pores; moderately calcareous; strongly alkaline (pH 8.5); gradual smooth boundary. (6 to 10 inches thick.)

A12 -- 8-15" -- Gray (10YR 6/1) silt loam, very dark grayish brown (10YR 3/2) moist; very weak coarse and medium prismatic structure which parts to weak fine subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; many very fine and fine roots; many very fine and fine tubular pores; moderately calcareous; strongly alkaline (pH 8.6); gradual smooth boundary. (5 to 10 inches thick.)

IIC1gca -- 15-24" -- Light brownish gray (2.5Y 6/2) clay loam, dark grayish brown (2.5Y 4/2) moist; weak medium subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; common fine roots; common very fine tubular pores; strongly calcareous; moderately alkaline (pH 8.2); abrupt smooth boundary. (6 to 18 inches thick.)

IIC2ca -- 24-32" -- White (5Y 8/1) clay loam, gray (5Y 6/1) moist; massive; hard, firm, slightly sticky, slightly plastic; about 10 to 20 percent by volume of nodules; few fine roots; few fine tubular pores; moderately dense and firm in place; weakly cemented, with 2 to 5 thin (about 1 to 2mm.) lenses of indurated lime-silica; strongly calcareous; moderately alkaline (pH 8.2); clear smooth boundary. (5 to 12 inches thick.)

IIIC3g -- 32-36" -- Light olive gray (5Y 6/2) sandy loam, olive gray (5Y 4/2) moist; common medium prominent strong brown (7.5YR 5/6) moist mottles; massive; slightly hard, firm, nonsticky, nonplastic; very few fine roots; few fine tubular pores; noncalcareous, except for a few white lime veins; mildly alkaline (pH 7.6); gradual smooth boundary. (2 to 6 inches thick.)

IIIC4g -- 36-59" -- Gray (N 6.0) fine sand, dark gray (N 4/0) moist; few fine prominent strong brown (7.5Y 5/6) moist mottles; massive; slightly hard, firm, nonsticky, nonplastic;

noncalcareous; moderately alkaline (pH 8.2); gradual smooth boundary. (15 to 26 inches thick.)

IVC5 -- 59" -- Coarse sand and gravel.

Type Location: Blaine County, Idaho; 100 feet west and 35 feet south of the northeast corner sec. 23, T. 1 S., R. 19 E., in an unimproved pasture; about 2 miles south and 3/4 miles east of Gannett.

Range in Characteristics: Picabo soils are usually saturated within 40 inches for at least two months or more during most years. The mean annual soil temperature ranges 41° to 45° F., and the mean annual summer temperature at a depth of 20 inches ranges from 62° to 67° F. Minerology is mixed. Depth to the weakly cemented nodular calcic horizon ranges from 12 to 36 inches. Texture of the control section is predominantly clay loam, but may include strata of silt loam, loam or silty clay loam. When mixed, the control section contains more than 15 percent fine sand or coarser. The soils are calcareous from the surface down through the calcic horizon, and range from strongly to violently effervescent. In most pedons, the calcareousness decreases with depth in the sandy, or gravelly substrata. The soils are mildly to strongly alkaline, with the higher values near the soil surface. Color of the A1 horizons includes hues of 10YR and 2.5Y, values of 5 to 7 and 3 or 4 moist and chromas of 1 or 2. The A horizons have weak thin platy, or weak or moderate very fine to medium granular structure. The indurated lenses occur intermittently. Gravel generally underlies the soil at 36 to 60 inches. Mottles have hues of 10YR, 2.5Y, and 5Y. The IIC2ca horizon contains 10 to 35 percent durinodes which are ¼ to 3/4 inch ovular and cylindrical in size and shape. Consistence of the durinodes ranges from hard to extremely hard, they are firm and brittle.

Competing Series and Their Differentiae: These are the Decker, Gooch, Honey, Kisring, Leeton, Snake and Trident series. Decker, Gooch, Honey, Leeton and Snake soils lack horizons containing more than 10 percent durinodes within the control section. Honey, Kisring and Trident have mean annual soil temperatures warmer than 47° F. Trident soils have less than 15 percent coarser than very fine sand in the control section.

Setting: The soils occur on nearly level to very gently sloping alluvial bottom lands. The soils developed from medium to moderately fine textured older alluvium, which overlies gravel or moderately coarse textured alluvium. Elevation ranges from 4,700 to 4,900 feet. The semiarid climate has a mean

PLANT SPECIES

Identified on the Silver Creek Preserve,
Blaine County, Idaho, after Wiley, 1977.

APPENDIX B

SCIENTIFIC NAME	COMMON NAME
Grass and Grass-like plants:	
Agropyron cristatum	crested wheatgrass
A. elogatum	tall wheatgrass
A. intermedium	intermediate wheatgrass
A. repens	quackgrass
A. spicatum	bluebunch wheatgrass
Avena fatua	wild oat
Bromus inermis	smooth brome
B. tectorum	downy cheatgrass
Calamagrostis inexpansa	northern reedgrass
Carex retrorsa	sedge
Carex spp.	sedge
Dactylis glorerata	orchard grass
Distichlis stricta	desert saltgrass
Eleocharis spp.	spike rush
Elymus cinereus	great basin wild rye
E. triticoides	beardless wild rye
Festuca arundinacea	tall fescue
F. idahoensis	Idaho fescue
F. octoflora	six-weeks fescue
Hordeum jubatum	foxtail barley
H. vulgare	cultivated barley
Juncus balticus	Baltic rush
J. ensifolius	rush
Koelaria cristata	Junegrass
Muhlenbergia asperifolia	scratchgrass
Orysopsis hymenoides	Indian ricegrass
Panicum spp.	panicgrass
Phleum pratense	Timothy
Poa juncifolia	alkali bluegrass
P. palustris	fowl bluegrass
P. pratensis	Kentucky bluegrass
P. secunda	Sandberg's bluegrass
Sitanion hustrix	squirreltail
Spartina gracilis	alkali cordgrass
Sporobolus airoides	alkali sacaton

SCIENTIFIC NAME	COMMON NAME
Stipa comata	needle and thread
S. occidentalis	western needlegrass
Herbs and Forbs (broad-leafed plants):	
Achillea millefolium	yarrow
Agoseris glanca	false dandelion
Amaranthus graecizans	prostrate pigweed
A. retroflexus	redroot
Anaphalis margaritacea	pearly everlasting
Antennaria dimorpha	pussytoes
Arabis holboellii	rock cress
Arctium minus	burdock
Asclepias speciosa	pink milkweed
Astralagus spp.	locoweed
Balsamorhiza sagittata	arrowleaf balsamroot
Castilleja spp.	paintbrush
Chara spp.	stonewort
Chenopodium spp.	lamb's quarter
Circuta douglasii	water hemlock
Cirsium arvense	Canada thistle
C. foliosum	elk thistle
Cleome serrulata	Rocky Mountain beeplant
Convolvulus arvensis	morning glory
Crepis acuminata	hawksbeard
Cynoglossum spp.	houndstongue
Delphinium nelsoni	larkspur
Elodea spp.	waterweed
Equisetum spp.	horsetail
Erigeron speciosus	showy daisy
Erigeron spp.	daisy
Erodium cicutarium	storksbill
Fontinalis spp.	spring moss
Galium boreale	bedstraw
Gentiana affinis	gentian
Geranium viscosissium	sticky geranium
Geum macrophyllum	avens
Gilia agregatta	scarlet gilia

SCIENTIFIC NAME	COMMON NAME
Grindelia squarrosa	gumweed
Habenaria hyperborea	green bog-orchid
Helianthus annuas	sunflower
H. nuttaillii	sunflower
Hippuris montana	marestail
H. volgaris	marestail
Hyoscyamus niger	henbane
Hypericum spp.	St. Johnswort
Iliamna rivularis	mountain hollyhock
Iris missouriensis	wild iris
Iva axillaris	poverty weed
I. santhifolia	marsh elder
Lactuca scariola	wild lettuce
Lappula spp.	sticktight
Lemna minor	duckweed
L. trisulca	duckweed
Lepidium spp.	peppergrass
Linaria vulgaris	butter and eggs
Linum perenne	wild flax
Lithospermum ruderale	Western gromwell
Lupinus spp.	lupine
Melilotus officinalis	yellow sweetclover
Mentha arvensis	mint
M. spicata	mint
Mertensia ciliata	mountain bluebell
Mimulus gattatus	yellow monkeyflower
Myriophyllum spicatum	water milfoil
Paspalum distichum	knotgrass
Penstemon speciosus	penstemon
Phlox hoodii	Hood's phlox
Polemonium pulcherriumum	Jacob's ladder
Polygonum spp.	smartweed
Potamogeton pectinatus	pondweed
Potentilla anserina	silverweed
P. gracilis	cinquefoil
Ranunculus aquatilis	water buttercut

SCIENTIFIC NAME	COMMON NAME
C. vicidiflorus	rabbitbrush
Cornus stolonifera	red-osier dogwood
Elaeagnus angustifolia	Russian olive
Eriogonum spp.	desert buckwheat
Populus angustifolia	narrow-leafed cottonwood
P. tremuloides	quaking aspen
Potentilla fruiticosa	shrubby cinquefoil
Prunus virginiana	chokecherry
Purshia tridentata	bitterbrush
Ribes aureum	golden currant
Robinia spp.	black locust
Rosa woodsii	wild rose
Salix exigua	gray sandbar willow
Salix spp.	willow
Sarcobatus vermiculatus	greasewood
Symphoricarpos rivularis	snowberry
Tetradynia glabrata	horsebrush

RANGE SITE DESCRIPTIONS

Acknowledgement and thanks is given the Soil Conservation Service for the following range site descriptions. These are in a developmental stage and may change as new or better information may become available.

APPENDIX C

RANGE SITE DESCRIPTION

Correlated Range Site No. D28-2-IU
Idaho: Wet saline meadows
Utah: Salt meadows
Rev. August 1976

MLRA's
D28, E47
All MLRA's in Southern Idaho

A. PHYSICAL CHARACTERISTICS

1. Physiographic Features

This site occurs on low lake plains, broad low lake terraces, alluvial river bottoms and poorly drained flood plains usually adjacent to rivers, creeks and lakes. Slopes vary from 0 to 6 percent, but mostly less than 2 percent. Elevation ranges from 3,000 to 6,500 feet.

2. Climatic Features

a. The climate is characterized by cold winters and warm dry summers. Average annual precipitation ranges from 6 to 20 inches. Most of the moisture for plant production is obtained from a water table which is near the surface through most of the plant growth period. However, some fluctuation in the water table and variation in salinity affects kinds and amount of vegetation produced. This site differs from the alkali bottoms site in that the water table is closer to the surface (within 10 inches) for most of the plant growth period and this site has salinity, but very litte sodium (alkali) as is present in semiwet saline meadows. In late summer and fall the surface soil may become dry due to lowered water table. During the period June to October, evapotranspiration rate exceeds precipitation. However, this factor does not influence plant growth on this site to any great extent because plant roots are in contact with a plentiful supply of moisture for most of the growing season.

b. Plant growth period usually starts about April 1 to 15 and will continue until October 1 to 15. In water short years, the water table may drop and plant growth will slow down in late July and August. The optimum growth period is usually May 10 to July 15. Plant growth is affected by fluctuations in salt content of the soil. The frost-free period fluctuates from year to year and from place to place where this site is located; however, this does not affect the kind and amount of vegetation greatly enough to be considered as more than one site. Frost-free period varies from 90 to 150 days, but is mostly 120 to 130 days.

3. Native (climax) Vegetation

a. The climax plant community consists primarily of water and salt and alkali tolerant grasses, a small amount of salt and water tolerant forbs, and a very small amount of salt and water tolerant shrubs. Grasses and grass-like plants comprise approximately 85 percent of the composition by weight, forbs 10 percent, and shrubs 5 percent.

b. Plant species and percentage of the total plant community by weight that each normally contributes are:

Grasses and Grass-Like Plants	Percent
Alkali bluegrass	25
Alkali cordgrass	5
Alkali sacaton	15
Basin wildrye	2
Bottlebrush squirreltail	1
Common reed	1
Creeping wildrye	5
Foxtail barley	2
Kentucky bluegrass	1
Meadow foxtail	5
Redtop	5
Rush	25
Saltgrass	20
Sedge	5
Spikerush	5
Tufted hairgrass	15
Weeping alkaligrass	1
Western wheatgrass	5
Baltic Rush (wiregrass)	5
Forbs	
Arrowgrass	1
Aster	5
Black medic	1
Buckhorn plantain	1
Clover	1
Curly dock	1
Silverscale saltweed	1
Silver cinquefoil	1
Tolmei owlclover	2

Shrubs and Trees	Percent
Shrubby Cinquefoil	2
Fourwing saltbush	1
Black greasewood	2
Nuttals saltbush	1
Pickleweed	5
Tall gray rabbitbrush	1
Woods rose	1
Dwarf green rabbitbrush	1

The most important plants are underlined.

c. No trees are present

d. Vegetative cover varies from 80 to 90 percent.

e. Plant species not a part of the climax plant community that are most likely to invade the site if plant cover deteriorates are: cheatgrass, annual weeds, fivehook bassia, beeplant, curlycup gumweed, povertyweed, Russian thistle and saltcedar. Saltgrass increases with excessive grazing use and may become the dominant plant if heavy grazing continues. Saltgrass may be the only plant present in some conditions.

4. Total Annual Production

Favorable years	4000 pounds per acre air dry
Median years	3000 pounds per acre air dry
Unfavorable years	2000 pounds per acre air dry

ESTIMATED YIELDS BY CONDITION CLASSES

		EXCELLENT	GOOD	FAIR	POOR
Percent of Potential		100%-76%	75%-51%	50%-26%	25%-0%
Lbs./Acre Air Dry	Favorable Yrs.	4000-1750	3750-1750	2500-1000	2000-1250
Total Annual Yield	Unfavorable Yrs.	2000-1000	2500-1500	1500- 750	1000- 800

The above is based on 71 plots in good condition and 51 plots in fair condition.

5. Soils

a. The soils in this site are deep and affected by wetness, salt and alkali. The water table fluctuates during the growing season and is generally within 20 inches of the surface. Drainage characteristics range from imperfectly to poorly drained, with the imperfectly drained soils having a shallow water table. Salt and alkali concentrations, along with the shallow water table depth characterize this site. Textures range from loam to clay. These soils may

have natric horizons or they may lack these horizons and have only concentrations of sodium or salt. Calcium carbonate ranges from slightly calcareous to very strongly calcareous. These soils occur in low lying areas on nearly level to sloping topography. Parent materials are derived from a wide range of parent rocks and lucustrine sediments. Salt and alkali restrict root development above the water table. Rate of water penetration is variable. Soils with high sodium percentage, natric horizons, or fine textures are slowly to very slowly permeable. Soils with low sodium content, high salt content and coarser textured are permeable. The high water table helps dilute the salt and sodium content as well as provide a source of moisture for the vegetative cover.

b. Significant soil series, types and phases:

Soil Taxonomic Unit	SCD or County	Modifiers	Wildlife Suitability Group	Hydrologic Group
Arave SICL	Northern Utah		4424	D
Gooch SIL, SIL strongly alkali	Davis, Weber Northern Utah		4424	D
Lakeshore FSL	Northern Utah	Shallow Water Table	4424-I	D
Woods Cross SICL mod saline	Northern Utah		4424-I	D
Levelton SICL	Jefferson		4424	D
Lahontan SICL	Gem		4424	D
Gooch SICL, saline alkali	Jefferson		4424	D
Logan SICL	Oneida		4424	D
McBeth SIL	Oneida		4424	D

B. MAJOR USES AND INTERPRETATIONS

1. Grazing

This site is so located that it has received excessive grazing use in the past. It provides grazing during spring, fall and summer for cattle, sheep and horses. It is occasionally used for winter grazing but supplemental feed should be provided.

2. Wood Products

None.

3. Wildlife

This range site is in wildlife suitability groups 4424 and 3222. The potential is very poor to poor for openland habitat, very poor to fair for woodland habitat, fair for wetland habitat, and very poor to fair for rangeland habitat. By developing this site it can become a fair overall habitat for waterfowl, shorebirds and muskrats. This site does provide some cover for pheasants where it occurs adjacent to cropland.

4. Watershed (Hydrologic Interpretations)

Soil series in this site are grouped into C and D hydrologic groups. They have moderately high to high runoff potential. When the vegetation is in climax, the hydrologic curves for the soils in C hydrologic group are 75 to 73 and for D hydrologic group are 86 to 84. Refer to SCS National Engineering Handbook, Section 4, to determine runoff quantities from these curves. When range condition has declined from the climax, field investigations are needed in order to determine hydrologic curve numbers.

5. Recreation and Natural Beauty

This site has a distinct and different characteristic value for esthetics and natural beauty from other range sites because of meadow-like appearance and occurrence of salt and alkali tolerant species. It has very poor characteristics for camping and picnicking from a vegetative standpoint. Hunting is sometimes fair for pheasants, but generally poor for other species.

6. Threatened or Endangered Plants and Animals

Alkali bluegrass

7. Location of Typical Examples of Site

a. State examples:

Utah

(1) Blacksmith Fork SDC - Northwest of the Bear River bridge south of Amalga.

(2) North Cache SCD - Northwest of the Bear River bridge south of Amalga.

(3) West Box Elder SCD - Charles Kunzler, Harold Kunzler and Jess James ranches on Dove Creek.

Idaho

Salt meadows along Snake River between Grandview and Marsing.

b. Best sample location for Field Office.

8. Relative Quality of Plants for Animal Use

Cattle

High	Medium	Low
Alkali bluegrass	Bottlebrush squirreltail	Commonreed
Alkali cordgrass	Kentucky bluegrass	Spike rush
Alkali sacaton	Saltgrass	Foxtail barley
Basin wildrye	Weeping alkaligrass	Rush
Creeping wildrye	Western wheatgrass	Baltic Rush (Wiregrass)
Meadow foxtail		Aster
Nebraska sedge		Greasewood
Redtop		Pickleweed
Sedge		
Tufted hairgrass		
Clover		
Fourwing saltbush		
Nuttalls saltbush		

High	Medium	Low
	Sheep	
Alkali bluegrass	Alkali sacaton	Commonreed
Alkali cordgrass	Basin wildrye	Foxtail barley
Creeping Wildrye	Nebraska sedge	Rush
Meadow foxtail	Sedge	Baltic Rush
Redtop	Bottlebrush squirreltail	Pickleweed
Tufted hairgrass	Kentucky bluegrass	
Clover	Saltgrass	
Fourwing saltbush	Weeping alkaligrass	
Nuttalls saltbush	Western wheatgrass	
	Aster	
	Black greasewood	

9. Field Offices

Utah

Beaver	Loa	Provo
Castle Dale	Logan	Richfield
Cedar City	Manti	Roosevelt
Delta	Monticello	Salt Lake City
Fillmore	Nephi	St. George
Kanab	Ogden	Tooele
Layton	Panguitch	Tremonton
	Price	Vernal

Idaho

All South Idaho field offices

SITE NAME: Wet Meadow

A. PHYSICAL CHARACTERISTICS

1. Physiographic Features

This site generally occurs on gently sloping to nearly level streams valleys and high mountain valleys with slopes of 0-4 percent. This site is frequently crossed by old stream courses, oxbows, and potholes. Elevation ranges between 3500-8500 feet (1050-2400 m).

2. Climatic Features

a. Average annual precipitation varies from 12-33 inches (30-83 cm). Soil moisture is influenced more by runoff, seepage or water table than from precipitation. Seasonal fluctuations in soil moisture or depth to water table seldom become critical to plant growth.

b. Plant growth usually begins as soon as ice, snow and flood waters recede. This may occur any time after mid-April. Heavy frosts may occur until June and at higher elevations may come throughout the summer. Summer temperatures are usually cool and winters cold with heavy snowfall. Plant growth continues, in most years, until Sept 1 to Oct 1, depending on killing frosts. Optimum growth is from May 15 to August 15.

3. Potential Natural Plant Community

a. The dominant visual aspect of this site is grass with scattered forbs and shrubs. Composition by weight is 80-90 percent grasses, 5-15 percent forbs and 2-10 percent shrubs. (Primarily water tolerant grasses and/or grass-like plants, forbs and shrubs).

b. Location of Typical Example of Site

1.

c. Potential Natural Plant Community Composition and Production

Common Name	Symbol	% Composition By Weight (Air-Dry)	1/ Range in Production (Air-Dry) Lbs/Ac	kg/ha
Grasses and Grass-like		80-90	2400-3600	2688-4032
*Tufted hairgrass	DECA5	10-20	300-800	336-896
Nebraska sedge	CANE2	10-20	300-800	336-896
Nevada bluegrass	PONE3	0-3	0-120	0-134
*Sedges	CAREX	15-30	450-1200	504-1344
Baltic rush	JUBA	2-8	60-320	67-358
Bulrush	SCIRP	0-1	0-40	0-45
Western wheatgrass	AGSM	0-3	0-120	0-134
Slender wheatgrass	AGTR	0-1	0-40	0-45
Streambank wheatgrass	AGRI	0-3	0-120	0-134
**Redtop bentgrass	AGAL3	0-5	0-200	0-224
**Kentucky bluegrass	POPR	0-5	0-200	0-224
Rush	JUNCU	1-5	30-200	34-224
Needlegrass	STIPA	0-3	0-120	0-134
American sloughgrass	BESY	0-3	0-120	0-134
**Meadow foxtail	ALPR3	0-5	0-200	0-224
Foxtail barley	HOJU	0-1	0-40	0-45
Alpine timothy	PHAL2	T-2	T-60	T-70
Trisetum	TRISE	0-2	0-80	0-90
Other grass-like plants	PNGL	0-5	0-200	0-224
Other perennial grasses	PPGG	1-5	30-200	34-224
Forbs		5-15	150-600	168-672
Lupine	LUPIN	0-3	0-120	0-134
Goldenpea thermopsis	THMO3	0-2	0-80	0-90
Arrowgrass	TRIGL	0-1	0-40	0-45
Common dandelion	TAOF	0-1	0-40	0-45
Common camas	CAQU2	T-8	T-320	T-358
*Cinquefoil	POTEN	1-5	30-200	34-224
Elephanthead lousewort	PEGR2	0-2	0-80	0-90
Vetches	VICIA	0-2	0-80	0-90
Groundsel	SENEC	0-1	0-40	0-45
Dock	RUMEX	0-1	0-40	0-45
Plantain	PLANT	0-1	0-40	0-45
Thistles	CIRSI	T-1	T-40	T-45
Herbaceous sagewort	ARDR4	0-1	0-40	0-45

c. Potential Natural Plant Community Composition and Production

Common Name	Symbol	% Composition By Weight (Air-Dry)	Range in Production (Air-Dry) Lbs/Ac	kg/ha
Common yarrow	ACMI2	0-1	0-40	0-45
Aster	ASTER	0-2	0-80	0-90
Valerian	VALER	0-2	0-80	0-90
Venuscup teasel	DISY	0-1	0-40	0-45
*Clovers	TRIFO	1-5	30-200	34-224
Avens	GEUM	0-2	0-80	0-90
Other perennials	PPFF	1-5	30-200	34-224
***Draba	DRAPD			
***Lost river silene	SISCL			
***Idaho corydalis	COCAH			
***Swamp onion	ALMA6			
***Priestlake tofieldia	TOGLA			
***Yellow springbeauty	CLLAF			
***Idaho falsestrawberry	WAID			
***Indian paintbrush	CACH9			
Shrubs		2-10	60-400	67-448
Willow	SALIX	1-5	30-200	34-224
*Shrubby cinquefoil	POFR4	1-5	30-200	34-224
Silver sagebrush	ARCA13	0-2	0-80	0-90
Tall rabbitbrush	CHRYS	0-1	0-40	0-45
Bearberry honeysuckle	LOIN5	0-1	0-40	0-45
Woods rose	ROWO	0-3	0-120	0-134

*Major species
**Not a part of original climax vegetation but has now established and ecological niche in the potential plant community.
***May occur - listed on Proposed Endangered and Threatened Plants of Idaho.

Total Average Annual Production

Favorable years - - - - - - - - 4500 Lbs/Ac (5040 kg/ha)
Median years- - - - - - - - - - 3600 Lbs/Ac (4032 kg/ha)
Unfavorable years - - - - - - - 3000 Lbs/Ac (3360 kg/ha)

d. Ground cover by vegetation, litter, and rock is 90-95 percent.

1/ The range in percent composition and production relate to the dynamics within the plant community and the annual fluctuations due to favorable and unfavorable growing seasons.

4. Soils

a. Soils on this site are mainly clays, clay loams, or silty clay loams over 20 inches (50 cm) deep, alluvial in origin and may be somewhat stony or gravelly. The soils range from mildly alkaline to slightly acid in pH. Available water capacity is moderate to high and is supplemented by upward capillary movement from the shallow water table. Erosion hazard is slight, however, the peaty and high organic soils tend to hummock severely from trampling.

b. Typical Soils

Chance loam
Blackwell clay loam

c. Mapping Units

B. MAJOR INTERPRETATIONS

1. Grazing

This site is most suited to livestock grazing in late spring, summer and fall. If conditions decline through livestock use, low growing sodforming grasses dominate, followed by increase in forbs and shrubs as condition further departs from potential. Excessive overgrazing of this site generally results in erosion lowering the stream bed level, consequently, lowering of the water table and complete alteration of site. Due to proximity of streams and lakes by this site, water quality may deteriorate as condition greatly departs from potential and ground cover is seriously depleted.

1/ Considers animal preference, palatability, nutritive value and availability based on field estimates and existing utilization data.

Plants not listed are considered to be less desirable as forage for grazing animals.

8. Seeding

Moderate to severe seeding limitations on this site due to difficulty in preparing adequate seedbed. Elimination of existing vegetation prior to planting is difficult in wet seasons and high water table periods.

9. Topography

Livestock can move freely over this site during period most suited to grazing use.

10. Brush Management

Moderate to severe limitations for brush management by mechanical methods on this site during wet seasons or high water table periods. Moderate to severe limitations for brush management by chemicals on this site due to proximity to streams and lakes and valuable wildlife food and habitat.

11. Offices

Aberdeen
American Falls
Arco
Blackfoot
Boise
Burley
Caldwell
Council
Donnelly
Driggs
Emmett
Gooding
Grandview
Hailey
Idaho Falls
Jerome
Malad
Marsing
Meridian
Montpelier
Mountain Home
Payette
Pocatello
Preston
Rexburg
Ribgy
Rupert
Shoshone
St. Anthony
Salmon
Soda Springs
Twin Falls
Weiser

2. Wildlife

This site is poor to fair for openland wildlife habitat, fair for woodland wildlife habitat for fair to good for wetland wildlife habitat. It is good for waterfoul, shorebirds, muskrat and beaver whenever it is adjacent to stream and ponds. It provides some food for moose, elk, deer, some upland game birds and songbirds, and provides brood rearing areas for sagegrouse.

3. Watershed

Soils in this site are generally grouped in hydrologic group D. When hydrologic condition of the vegetative cover is good, natural erosion hazard is slight.

4. Recreation and Natural Beauty

This site presents an aesthetically pleasing view of lush vegetation consisting primarily of grasses and grass-like plants. When livestock or big game are grazing or browsing on the site it presents a pleasant pastoral panorama. Hikers and fishermen often traverse the edges of this site. Picnickers and campers frequent the site in late summer and early fall as sometime adjacent shaded wooded areas become less pleasant on cool days. Vehicular use can be very detrimental to this site, especially during wet weather and high water table conditions.

5. Threatened or Endangered Plants and Animals

Draba apiculata var. daviesiae - listed as threatened
Silene scaposa var. lobata - listed as threatened
Corydalis caseana var. hastata - listed as threatened
Tofieldia glutinosa var. absona - listed as threatened
Primula cusickiana - listed as endangered
Claytonia flava - listed as threatened
Waldstenia idahoensis - listed as threatened
Castilleja christii - listed as threatened

None others known to be listed for the site at present.

6. Archeological Values

This site may contain cultural values, especially near aboriginally accessible sources of water, shelter, edible plants, native grazers, workable stone, view and access to or from other areas.

7. Relative Forage Quality 1/ of the Potential Natural Plant Community

Cattle, Elk and Horses

Preferred	Desirable
Tufted hairgrass	Sedges
Slender wheatgrass	Woods rose
Redtop bentgrass	Willow
Clovers	
Trisetum	
Nebraska sedge	
Kentucky bluegrass	
Nevada bluegrass	
Western wheatgrass	
Streambank wheatgrass	
Alpine timothy	
Needlegrass	
Vetches	
Meadow foxtail	

Sheep and Deer

Slender wheatgrass	Tufted hairgrass
Clovers	Sedges
Kentucky bluegrass	Redtop bentgrass
Nevada bluegrass	Trisetum
Woods rose	Meadow foxtail
Vetches	Alpine timothy
	Western wheatgrass
	Streambank wheatgrass
	Needlegrass
	Willow
	Nebraska sedge
	Common dandelion
	Aster
	Groundsel
	Cinquefoil
	Bearberry honeysuckle

RANGE SITE DESCRIPTION
Correlated Range Site No. D28-1-IUW
Idaho: Semiwet Saline meadows
Utah: Alkali Bottoms
Wyoming: Saline Sub-Irrigated 7-19"
Rev. August 1976

MLRA's
D28, E47
All MLRA's in Southern Idaho

A. PHYSICAL CHARACTERISTICS

1. Physiographic Features

This site occurs on alluvial bottoms and poorly drained bottom lands adjacent to stream channels. It is also found on broad low lake terraces, lake plains, flood plains, broad swales and depression areas of old Lake Bonneville. These areas receive additional run-in water from higher sites and from a fluctuating water table well within the root zone. Slopes range from 0 to 10 percent, but most commonly are less than 3 percent. Elevation is mostly from 3,000 to 5,200 feet, but will range up to 6,500 feet.

2. Climatic Features

a. The climate is characterized by cold snowy winters and warm dry summers. The average annual precipitation ranges from 6 to 20 inches. Most of the moisture for plant production on this site is obtained from run-in or from a water table. The total annual production and kind of plants present are influenced more by a fluctuating water table and saline-alkaline soil condition than by precipitation. This site differs from the wet saline meadows site in that it has sodium as well as saline conditions and the water table is deeper than 20 inches while that of salt meadow is within 0 to 20 inches for most of the plant growth period. In late summer and fall the surface is usually dry due to a lowering water table.

b. Plant growth period usually starts about April 1 to 10. Plant growth ends at variable times due to fluctuations in the water table and the severity of saline-alkaline conditions varying from August 1 to September 1. When water table holds up, frost becomes the factor which stops plant growth. This occurs around October 1 to 15. Frost-free period varies from 90 to 130 days at various locations of the site in the states. This causes some fluctuation in forage yield, but not a significant difference. The optimum growth period is from May 10 to July 10.

3. Native (climax) Vegetation

a. This plant community consists primarily of salt and alkali tolerant perennial grasses which can tolerate a fluctuating water table which is generally deeper than 20 inches, but within the root zone most of the growing season. Grasses and grass-like plants comprise approximately 84 percent of the total annual yield, forbs 1 percent and shrubs 15 percent.

b. Plant species and percentage of the total plant community by weight that each normally contributes are:

Grasses & Grass-Like Plants	Percent
Alkali bluegrass	20
Alkali cordgrass	5
Alkali sacaton	25
Basin wildrye	15
Bottlebrush squirreltail	5
Creeping wildrye	2
Foxtail barley	1
Rush	5
Saltgrass	30
Sedges	10
Tufted hairgrass	5
Western wheatgrass	2
Forbs	
Belvedere summercyprus	1
Seepweed	1
Clover	1
Fivehook bassia	1
Silverscale saltweed	1
Shrubs and Trees	
Fourwing saltbush	5
Greenmolly summercyprus	2
Shrubby Cinquefoil	4
Black greasewood	10
Nuttall saltbush	5
Pickleweed	5
Tall Gray rabbitbrush	2

Underlined species are the most important plants.

c. No tree species are present on this site

d. Vegetative density by ocular estimate is 45 to 50 percent.

e. Plant species which are not a part of the climax plant community that are most likely to invade the site if plant cover deteriorates are: cheatgrass, annual weeds, curlycup gumweed, halogeton, slatcedar and snakeweed. Black greasewood, silverscale saltweed, Belvedere summercyprus, seepweed and fivehood bassia greatly increase with excessive grazing use and one or more may become dormant.

4. Total Annual Production

Favorable years	2500 pounds per acre air dry
Median years	1750 pounds per acre air dry
Unfavorable years	1000 pounds per acre air dry

ESTIMATED YIELDS BY CONDITION CLASSES

Percent of Potential		EXCELLENT 100%-76%	GOOD 75%-51%	FAIR 50%-26%	POOR 25%-0
Lbs./Acre Air Dry	Favorable Years	2500-1700	1900-1350	1600-1500	1000-2500
Total Annual Yield	Unfavorable Years	1000- 650	750- 450	650- 500	500- 800

The above data is based on 2 plots in excellent condition and 10 in good condition.

5. Soils

a. The soils in this site are deep and affected by wetness, salt and alkali. The water table fluctuates during the growing season and is generally beween 20 and 40 inches. Drainage characteristics range from somewhat poorly to poorly drained, with the poorly drained soils having a water table below 20 inches. Moderate to strong salt and alkali concentrations in conjunction with moderately deep water tables, characterize these soils. Textures range from loamy fine sand to clay with loam, clays and silty clays being most common. These soils may have natric horizons or they may lack these horizons and have only concentrations of sodium or salt. These soils range in calcium carbonate from slightly calcareous to very strong calcareous. They occur in low lying areas on nearly level to sloping topography. Parent materials are derived from a wide range of parent rock and lucustrine sediments. Salt and alkali restrict the movement of roots through the profile above the water table. Rate of water penetration is variable. Soils with high sodium percentages, natric horizons or fine textures are slowly to very slowly permeable. Soils of low sodium content, high salt content and coarser textures are permeable. These soils frequently disperse and puddle and are erodible where runoff occurs.

b. Significant soil series, types and phases:

Soil Taxonomic Unit	SCD or County	Modifiers	Wildlife Suitability Group	Hydrologic Group
Airport SIL; SICL	Cache, Davis, Weber, Northern Utah		3323-I	D
Airport SIL; strongly alkali	Northern Utah		4424-I	D
Arave SIL, SICL	Utah, Northern Utah		4424-I	D
Fridlo SIL;SIL mod alkali	Northern Utah		3323-I	C
Greenson SIL strongly alkali	Northern Utah		3323-I	D
Jordan SICL; SIL; soil	Cache, Salt Lake, Utah		4424-I	D
Kirkham SIL strongly alkali	Cache		3323-I	C
Lakeshore FSL	Davis, Weber Northern Utah		4424-I	D
Lasil soil	Cache		4424-I	D
Lewiston FSL strongly alkali	Cache		4424-I	C
Magna SICL	Northern Utah		3323-I	D
Payson SIL; SICL	Alpine, Cache, Davis, Nebo, Northern Utah, Timpanogos, Utah, Weber		4424-I	D
Quinney SIL	Cache		3323-I	C
Refuge L	Davis, Weber Northern Utah		4424-I	C
Syracuse FSL strongly alkali	Northern Utah		4424-I	B

USDA - Soil Conservation Service

cont'd

Soil Taxonomic Unit	SCD or County	Modifiers	Wildlife Suitability Group	Hydrologic Group
Trenton SICL; SIL	Cache, Davis, Weber, Salt Lake		3323-I	D
Trenton SICL mod. deep water table	Cache		3323-I	D
Bramwell SIL	Gem		4424	C
Letha FSL	Payette		4424	C
Abo clay loam alkali variant	Minidoka		4424	C
Baldock SIL & SICL	Payette		4424	C
Pringal L.	Bingham		4424	C

B. MAJOR USES AND INTERPRETATIONS

1. Grazing

This site is usually near ranch headquarters or near a town so is usually excessively grazed. It provides nutritious feed for spring, fall and summer grazing for sheep, cattle and horses. It is often used for winter grrazing, but supplemental feed should be provided.

2. Wood Products

None

3. Wildlife

This range site is in wildlife suitability groups 4424-I and 3323-I dependent primarily on different degrees of salinity and alkalinity. The potential is very poor to poor for open-wetland habitat, and very poor to poor for rangeland habitat. It has a fair potential for wetland wildlife if developed for this purpose, but without development is very poor. A few rabbits, pheasants, small rodents and songbirds are occasionally found on this site. Where ponds are adjacent to this site, ducks and geese may be found.

4. Watershed (Hydrologic Interpretations)

Soil series in thi site are grouped mainly into C and D hydrologic groups with Sunset and Syracuse soils in group B.

These soils generally have moderately high to high runoff potential. When the vegetation is in climax condition, the hydrologic curves for the soils in C hydrologic group are from 81 to 79 and those in D group from 90 to 88. Refer to SCS National Engineering Handbook, Section 4, to determine runoff quantities from these curves. When range condition has declined from the potential or climax, field investigations are needed in order to determine hydrologic curve numbers.

5. Recreation and Natural Beauty

This site has poor to fair values for esthetics and natural beauty. It has a limited number of species which are alkali and salt tolerant. It has very poor values from a vegetation standpoint for camping and picnicking. Hunting for rabbits and pheasants is poor. No fishing is available.

6. Threatened or Endangered Plants and Animals

Alkali bluegrass

7. Location of Typical Examples of the Site

a. Statewide

(1) Logan - West of Amalga Cheese Plant

(2) Layton - 800 feet east and 500 feet north of the south quarter corner of Section 3, T1N, R1W, one mile west of Cudahy meat packing plant, Woods Cross, Utah.

(3) Delta SCD - One-fourth mile east of Rulon James farmstead, Section 24, T16S, R7W.

(4) Millard SCD - One-half mile east of Clifford Peterson's farmstead in Mills.

(5) North Cach SCD - West of Amalga Cheese Plant.

(6) Weber SCD

(a) NW1/4, Section 21, T5N, R2W, photo 119, grid coordinate A-1.

(b) Section 23, T6N, R3W, photo 47, grid coordinate S-13.

(7) West Cassia SCD - 3 miles east of Burley in Snake River Bottom.

b. Best sample location for field office.

8. Relative Quality of Plants for Animal Use

Cattle

High Value	Moderate Value	Low Value
Alkali bluegrass	Bottlebrush squirreltail	Foxtail barley
Alkali cordgrass	Saltgrass	Rush
Alkali sacaton	Western wheatgrass	Wiregrass
Basin wildry		Belvedere summercyprus
Creeping wildrye		seepweed
Sedges		Fivehood bassia
Tufted hairgrass		Silverscale saltweed
Clover		Gray molly
Fourwing saltbush		Black greasewood
Nuttall saltbush		Pickleweed
		Rabbitbrush

Sheep

Alkali bluegrass	Alkali sacaton	Foxtail barley
Alkali cordgrass	Basin wildrye	Rush
Creeping wildrye	Bottlebrush squirreltail	Baltic Rush
Sedges	Saltgrass	Belvedere summercyprus
Tufted hairgrass	Western sheatgrass	seepweed
Clover	Fivehook bassia	Gray molly
Fourwing saltbush	Silverscale saltweed	Pickleweed
Nuttall saltbush	Rabbitbrush	

9. Field Offices

Utah

Beaver	Ogden
Castle Dale	Price
Cedar City	Provo
Delta	Richfield
Fillmore	Roosevelt
Layton	Salt Lake City
Logan	Tooele
Manti	Tremonton
Nephi	Vernal

Idaho

All South Idaho field offices.

Site Name: Dry Gravelly 13-16" ppt. (33-40 cm) - ARTR4/AGSP Threetip sagebrush/ Bluebunch wheatgrass

A. Physical Characteristics

1. Physiographic Features

This site occurs on alluvial and colluvial foothills, mountain slopes, and hillsides. Slopes are usually less than 30%. It occurs on all aspects and elevation ranges from 5500 to 7000 feet (1690-2150 m).

2. Climatic Features

a. Annual precipitation of this site ranges from 13-16 inches (33-40 cm). Approximately 40-50% comes in the winter plant dormant period (October to March) and 50-60% during the plant growing season (April-September). May and June usually receive 25-30% of the annual precipitation.

b. Plant growth begins from April 1-May 1, and grasses and forbs are usually matured by July 15-August 1. Grass regrowth may occur if fall rains are sufficient. Shrubs continue to grow during the summer dormant period but at a reduced rate. The optimum plant growth period is from May 15 to July 1. The average frost-free period is 50-80 days.

3. Potential Natural Plant Community

a. The dominant visual aspect of this site is threetip sagebrush and bluebunch wheatgrass. The composition is approximately 55-65% grass, 1-5% forbs, and 20-30% shrubs by weight.

b. Plant species, percent composition by weight, and approximate production for each species are:

POTENTIAL NATURAL PLANT COMMUNITY COMPOSITION AND PRODUCTION

Common Name	Symbol	% Composition by Weight	Range in Production 1/ lbs/ac Air Dry	Range in Production 1/ kg/ha Air Dry
Grasses		55-65	200-500	224-560
bluebunch wheatgrass	AGSP	40-50	150-400	168-449
Idaho fescue	FEID	5-10	30-100	34-112
Nevada bluegrass	PONE3	1-3	10-30	11-34
Sandberg bluegrass	POSE	2-5	10-40	11-45
bottlebrush squirreltail	SIHY	T-1	T-10	T-11
prairie junegrass	KOCR	1-3	10-30	11-34
needle-and-threadgrass	STCO4	T-1	T-10	T-11
sod wheatgrass	AGROP	0-2	0-20	0-22
Forbs		5-15	50-125	57-140
Hoods phlox	PHHO	1-5	10-50	11-57
astragalus	ASTRA	1-2	10-20	11-22
death camas	ZYPA	T-1	T-10	T-11
musk phlox	PHMU	T-2	T-20	T-22
cushion eriogonum	EROV	T-1	T-10	T-11
eriogonum spp.	ERIOG	T-1	T-10	T-11
Indian paintbrush	CASTI	1-2	10-20	11-22
tailcup lupine	LUCA	T-1	T-10	T-11
sego lily	CANU	T-1	T-10	T-11
rose pussytoes	ANRO	1-3	10-30	11-34
tapertip hawksbeard	CRAC2	T-3	10-30	11-34
other perennial forbs	PPFF	1-3	10-30	11-34
Shrubs		20-30	100-250	112-280
threetip sagebrush	ARTR4	15-25	75-200	84-224
grey horsebrush	TECA	1-2	10-20	11-22
shrubby eriogonum	ERIOG	1-2	10-20	11-22
tall green rabbitbrush	CHVI8	1-2	10-20	11-22
rubber rabbitbrush	CHNA	T-1	T-10	T-11
broadleaf rabbitbrush	CHVIP	T-1	T-10	T-11
plains prickly pear	OPPO	T-1	T-10	T-11
prickly gilia	LEPU	T-1	T-10	T-11

Total Potential Annual Production:

Favorable Years	900 lbs/ac air dry (1009 kg/ha)
Median Years	500 lbs/ac air dry (560 kg/ha)
Unfavorable Years	300 lbs/ac air dry (336 kg/ha)

1/ The range shown approximates the variation within the plant community and the normal fluctuation due to favorable and unfavorable growing seasons. It does not reflect the extremes in production.

c. Vegetation cover is approximately 20-30%.

d. Variations

Idaho fescue occurs in this site and bluebunch wheatgrass occurs in the threetip sagebrush/Idaho fescue site. Each one dominates in its own site, however. In the transition between the two sites, they may attain equal dominance.

At the lower end of this site where precipitation and available water is less, there is a transition to the Wyoming big sagebrush site. Transition areas occur between threetip sagebrush/bluebunch wheatgrass sites and low sagebrush/bluebunch wheatgrass sites in the Little Lost-Birch Crrek area. These transition zones have plant species present typical of both sites.

4. Soils

a. The soils of this site are loamy to extremely gravelly loams. They are deep and well drained. The parent material is alluvium and colluvium from sedimentary and metamorphic rock. Gravels often exceed 60% by volume in the soil profile below a depth of 10-12".

b. Typical Soil Series Are:

Little Lost-Birch Creek	Challis
Firebox	Sink
	Zeebar dry phase
	Zeale warm phase
	Surrett dry phase
	Hoskin
	Reck
	Vano dry phase

5. Location of Site:

a. Typical Example:

SW¼NW¼, Section 7, T. 8 N., R. 30 E., Clark County, Idaho.

SW¼SW¼, Section 9, T. 10 N., R. 29 E., Butte County, Idaho.

b. Counties occuring in:

Idaho: Butte
Custer

B. Interpretations

1. Livestock Grazing

This site is best adapted to livestock grazing in the late spring, summer, and fall. Water is usually available in nearby streams or springs. Some areas, especially in limestone hills, may be lacking in natural water.

This site produces a good forage if range condition is good. If range condition declines due to livestock grazing, the sagebrush increases and the grass decreases.

The visual aspect of this site in poor condition is threetip sagebrush with a sparse absent grass understory.

2. Wildlife

This site provides spring, summer, and fall range to pronghorn antelope on the alluvial fan position. Antelope fawning occurs on this portion of the site. Deer use is slight in mild winters and moderate to heavy in severe winters.

Sage grouse strutting and brood-rearing occurs on this site. Raptors nest and hunt on this site. Many species of non-game mammals, birds, and reptiles utilize this site as yearlong habitat.

The forbs and succulent grasses are high protein and energy food sources to the wildlife in the spring and summer. Shrubs provide cover to the resident wildlife as well as food to antelope and wintering deer.

3. Recreation Value and Natural Beauty

Antelope and sage grouse hunting are the major recreation uses of this site. The site is mostly open space with smooth terrain, varied slopes, and low-growing vegetation. The sites high elevation and close proximity to good fishing streams gives it added general recreation value.

4. Threatened or Endangered Plants and Animals

None known.

5. Relative Forage Quality

	Common Name	Cattle*	Domestic Sheep*	Wild Horses1/	Mule Deer2/	Elk2/	Antelope2/	Bighorn Sheep 2/
G	bluebunch wheatgrass	H	M	H	H	H	L	H
R	Idaho fescue	H	H	H	M	M	?	M
A	Nevada bluegrass	M	H	M	?	?	?	-
S	Sandberg bluegrass	L	H	M	H	M	M	L
S	bottlebrush squirreltail	L	L	L	L	L	L	-
E	prairie junegrass	M	H	M	L	M	?	-
S	needle-and-threadgrass	H	L	L	L	M	L	L
	sod wheatgrass	H	M	M	?	?	?	-
	Hoods phlox	-	-	M3	L	L	?	-
	astragalus	-	-	L	L	L	L	-
F	death camas	-	-	-	L	?	?	-
O	musk phlox	-	-	L	L	L	?	-
R	cushion eriogonum	L	L	L	L	L	L	L
B	eriogonum	L	L	L	L	L	L	L
S	Indian paintbrush	-	-	-	L	L	?	-
	tailcup lupine	-	L	L	M	H	L	-
	sego lily	L	L	-	?	L	?	-
	rose pussytoes	-	-	-	L	L	L	-
	tapertip hawksbeard	M	H	-	L	?	L	-
	threetip sagebrush	L	L	L	M	M	L	-
S	grey horsebrush	-	L	-	L	L	?	-
H	shrubby eriogonum	L	L	-	L	L	M	L
R	tall green rabbitbrush	-	L	L	M	M	M	L
U	rubber rabbitbrush	-	L	L	M	M	M	-
B	broadleaf rabbitbrush	-	-	L	M	?	?	-
S	plains prickly pear	-	-	-	L	L	L	-
	prickly gilia	-	L	-	L	L	?	L

* Interpreted mostly from Instruction Memo Id-78-132.
1= Based on fecal studies.
2= Based on generalized relative consumption rates from studies and research.
3= Mostly winter and spring.
H= high
M= moderate
L= low
-= not used
?= no data

6. Seeding

Much of this site is adapted to range seeding with slight limitations due to low precipitation and gravelly soils. Steeper slopes of this site have a severe limitation for seeding.

7. Brush Management

Chemical treatment is best adapted to this site. As threetip is a semi-sprouter, above ground mechanical and burning usually result in resprouting.

8. Topography

Domestic livestock and wildlife can move freely over this site. Most of the terrain is smooth-to-rolling with gentle slopes. Occasionally, steep slopes may limit livestock movement dependent upon availability of water.