Chapter 2 – LCGMA Environment and Resources Description

A. General

Louse Canyon GMA occupies nearly 523,000 acres of public land located in the southeastern corner of Malheur County, OR. This area is administered by Jordan Resource Area, Vale District, BLM (Map 1, Geographic Management Areas and Map 2, Grazing Allotments and Pastures) and is bordered by Nevada and Idaho to the south and east, by Main Fork Owyhee River on the northeast, and by Fort McDermitt Indian Reservation to the southwest. McDermitt, Nevada (pop. 400) is the nearest community.

Two allotments, the Quinn River and Little Owyhee, include approximately 11,240 acres in Nevada and are contiguous with the Louse Canyon Community and Star Valley Community Allotments, respectively. Grazing in these Nevada allotments is administered by the Vale District Office via an agreement with Winnemucca District, BLM, effective April 30, 1968. Because the Quinn River and Little Owyhee allotments are not fenced separately from the Oregon allotments, grazing use is the same as in adjoining Louse Canyon and Star Valley Community allotments.

Elevations in LCGMA range from about 4,000 feet near Five Bar on Main Fork Owyhee River to 6,440 feet at Horse Hill in the southwestern quarter (Map 3, Painted Relief of Interior Columbia Basin Ecosystem Management Area). The GMA averages 5,000-6,000 feet in elevation.

Louse Canyon GMA encompasses portions of 9 watersheds which are components primarily of Middle Owyhee and East Little Owyhee subbasins, with minor portions in three other subbasins (South Fork Owyhee, Crooked-Rattlesnake, and Upper Quinn). The GMA has open, rolling topography with steep canyon descents into major drainages such as the Owyhee River, West Little Owyhee River, and Antelope Creek. Headwaters of these streams arise at about 6,000 feet to the southwest and are characterized by open meadows with springs. As the streams flow to the north and east, their channels cut down through rhyolites and basalts, forming spectacular dissected canyons.

Refer to Appendix J, Photos, for a series of representative landscape photos taken in LCGMA riparian and upland communities.

B. Climate

Climate in this semiarid area is influenced by maritime air moving east from the Pacific Ocean over the Sierra and Cascade Mountain ranges. As air masses rise to cross these mountains, moisture condenses and falls, making the air relatively dry by the time it reaches this corner of southeastern Oregon.

Average annual precipitation in LCGMA ranges between 8 and 22 inches (Map 10, Precipitation Isobars). As recorded at the McDermitt, Nevada, weather station, most precipitation (51 percent), occurs from March through June. About 21 percent occurs from September through November and 21 percent from December through February, most of this falling as snow.

Snowpack usually melts by April at elevations below 6,000 feet, with snow at higher elevations remaining until mid-June. Localized flooding often follows late winter or spring snowmelt. The amount of precipitation in any particular location within the GMA depends on topography—precipitation increases with elevation. Some precipitation occurs as thunderstorms, occasionally accompanied by hail, with isolated high-intensity, short-duration thunderstorms occurring frequently between April and October. Storms that occur July through August are typically drier with more lightning strikes than those in September or October.

Total annual precipitation in the area varies greatly by year which is shown by Crop Year (CY) precipitation data recorded between 1961 and 2002. To calculate CY precipitation, the last four months of the previous year are added to the first six months of the current year. The lowest CY precipitation occurred in 1966 (3.05 inches) while the highest was in 1984 (14.28 inches). Below average precipitation occurred during two intervals, 1988-1992 (CY precipitation = 5.95-8.63 inches) and 1999-2002 (CY precipitation = 4.55-8.47 inches), with above average precipitation occurring from 1993-1998 (CY precipitation = 9.32-11.94 inches) between the two droughty cycles.

This area also receives an abundance of sunshine and air temperatures have wide daily fluctuations. Generally, the last spring frost occurs in late May and first frost by early September. The frost-free period (temperatures above 32 ^{o} F) varies from approximately 139 days at lower elevations to 74 days at higher elevations. However, frost may occur during any month of the year.

Prevailing winds are west-southwest, with the most intense winds occurring during March and April. December and January are usually the calmest months.

C. General Description of Rangeland Vegetation

Native Rangelands

LCGMA falls within sagebrush steppe communities of the Snake River Plain (Miller and Eddleman 2000) and predominantly supports sagebrush/grass communities. (Map 4, Vegetation Types). There are no forest habitat types present, although the western edge of Idaho's juniper woodlands are scattered within parts of the unit. Quaking aspen and occasional narrowleaf cottonwoods are found in the headwater and rim areas of several watersheds.

Predominant shrubs in the GMA are Wyoming big sagebrush, two species of low sagebrush (*A. arbuscula*, and *A. longiloba*), green and gray rabbitbrush, shadscale, horsebrush, and spiny hopsage. Mountain sagebrush is present but only as a subdominant type or in scattered communities at upper elevations. Basin big sagebrush occurs in low elevations in association with certain major drainages. Dominant perennial grasses include bluebunch wheatgrass, Idaho fescue, bottlebrush squirreltail, Sandberg bluegrass, crested wheatgrass, and Thurber's needlegrass. Common forb species include phlox, penstemon, hawksbeard, aster, fleabane, buckwheat, biscuit root, onion, and milk-vetch.

Generally, the GMA's southwest portion (about 25% of total land area) is dominated by the two species of low sagebrush and Idaho fescue/bluebunch wheatgrass habitat types while the remainder of the GMA is predominately Wyoming big sagebrush and bluebunch wheatgrass

types (Map 4). Scattered communities of mountain shrubs, such as mountain mahogany and snowberry, occur at high elevations near the Nevada state line. Salt desert shrub habitat types interspersed with drier phases of Wyoming big sagebrush types typically occur at low elevations areas such as the southeastern GMA corner. These drier Wyoming big sagebrush communities have understories of bottlebrush squirreltail, Sandberg bluegrass, and Thurber's needlegrass, whereas understories in the wetter Wyoming big sagebrush types are primarily bluebunch wheatgrass, Idaho fescue, and Sandberg bluegrass.

Modified Rangelands

Crested wheatgrass seedings occupy about 5% of LCGMA (Map 13). The three seeded pastures are Starvation Seeding (14,000 seeded acres or 96% of pasture), Steer Canyon Seeding (6,300 seeded acres or 56% of pasture) and Pole Creek Seeding (4,000 seeded acres or 26% of pasture).

Seedings and brush control projects were completed during the Vale Project era that spanned a period from 1962 to1973. The Vale Project was a major range rehabilitation effort that was politically and financially supported by the US Congress. About 10 million dollars were expended to improve rangeland conditions and increase forage production for livestock and wildlife, primarily through construction of water developments, fencing public land into manageable grazing units, and creation of a reliable forage base in those rangelands that were severely depleted from decades of improper grazing use.

Starvation Seeding has a grassland appearance and, except for a trace of Sandberg bluegrass and Wyoming big sagebrush, few plant species other than crested wheatgrass are present (Photo 10, Appendix J). The other two seedings have greater plant diversity and support Wyoming big sagebrush, rabbitbrush, spiny hopsage, bottlebrush squirreltail, bluebunch wheatgrass, Sandberg bluegrass, asters, buckwheats, and annual mustards.

Vale Project was also involved in removing shrubs from rangelands in an effort to create forage for livestock and wildlife. In Campbell Allotment, 20,000 acres of Starvation Brush Control Pasture were sprayed with the herbicide 2, 4-D but were not seeded. Sagebrush recolonization has occurred within this treatment area and has now established a 14-16% canopy cover (Photo 12, Appendix J).

D. Grazing Allotments

Introduction

Public lands within the GMA are an important source of annual forage for five permittees in four grazing allotments (Map 2). Table 2 (Allotment Active Preferences and RPS Objectives) and Table 3 (Allotment Actual Use, Utilizations, Production, and Ownership) provide specific information for these allotments. Table 2 gives Rangeland Program Summary (RPS) objectives and active preference (Animal Unit Months, or AUMs). Table 3 shows monitoring data for each pasture (from 1978 to 2001), including utilization and actual use. All acreages for allotment and pasture data were derived from the Vale District BLM Geographical Information System (GIS), which is periodically updated with new data as it becomes available. GIS data for all rangeland grazing use calculations are from years 1997, 2000, and 2001.

Louse Canyon GMA permittees with their current grazing preferences are shown below:

Permittee	Total Preference	Active Preference	Suspended Preference	Allotment
Thomas R. Harry	14,157	14,257	0	Campbell
Kimble Wilkinson Ranch	6,202	6,202	0	Louse Canyon Community
Owyhee Grazing Association, LLC	2,857	2,857	0	Anderson
	3,098	3,098	0	Louse Canyon Community
John Nouque	1,746	1,746	0	Star Valley Community
	2006	2006	0	Louse Canyon Community
	447	447	0	Quinn River
Fort McDermitt Stockmen's Association (FMSA)	5,092	5,092	0	Star Valley Community
	892	892	0	Little Owyhee

Upland Vegetation Trend Assessment

The BLM periodically evaluates trend in health of upland vegetation using the following methods at exact relocation plots: 3 ft. by 3 ft. photo plots; general overview photos; % utilization from utilization transects; stocking levels; % basal cover of plant species using line intercepts (canopy cover of shrubs is also recorded for some years); precipitation data; and professional judgment. The line intercept transects are used in association with trend photo plots to show basal cover of key forage species along a 100 foot line. Changes in basal cover of 25% or more over time are considered significant in determining trends in upland vegetation health. A combined professional assessment of both photo plot and line-intercept trend data is used to assign a trend determination to the pasture as a whole. Trend information is gathered at specific sites in each pasture, and many sites have 20 + years of trend data available. These trend data were incorporated into the LCGMA evaluation.

In addition to upland trend, the GMA evaluation used other methods to assess upland rangeland health, following guidelines specified in "Sampling Vegetation Attributes," (USDI, BLM Tech. Ref. 1734-4, 1996) and "Interpreting Indicators of Rangeland Health" (USDI, BLM Tech. Ref 1736-4, 2000). At some locations, 500 step-points were conducted to determine rooted frequency of shrubs, forbs, and grasses (composition by frequency). All data forms (from 2000) and images (from 1970 to 2000) used in trend determinations may be found on the attached compact disk in JPEG or Acrobat reader (pdf) files which can be viewed on most computers.

The following table summarizes trend information for each pasture within LCGMA, by allotment. Trend may be one of three designations: Upward (greater than 25% increase in plant basal cover); Downward (greater than 25% decrease in plant basal cover); or Not Apparent, (between 25% decrease and 25% increase in basal cover). Trend plot sites are numbered in pastures with more than one site.

2000 Upland Vegetation Trend in LCGMA Pastures

Allotment	Pasture	Overall Trend
Anderson	North	Not Apparent

Allotment	Pasture	Overall Trend
	Bull Flat	Not Apparent
	Spring	Not Apparent
Louse Canyon Community	Drummond Basin	Upward
	Steer Canyon Seeding	*Native* - Not Apparent *Seeding* - Downward
	Pole Creek Seeding	1. Not Apparent 2. Not Apparent
	Louse Canyon	Not Apparent
Star Valley Community	North Stony Corral	Not Apparent
	North Tent Creek	Not Apparent
	Tristate	Not Apparent
	South Tent Creek	Upward
Campbell	Peacock	Not Apparent
	Twin Springs	Not Apparent
	Sacramento Hill	Not Apparent
	Starvation Seeding	Not Apparent
	Starvation Brush Control	Not Apparent
	Horse Hill	1. Not Apparent 2. Not Apparent 3. Not Apparent
Ambrose Maher	Ambrose Maher	Not Apparent

Key Forage Plant Code for Upland Trend

The following codes are used in this document for common forage grasses that appear in trend plots and studies.

Common Name	Genus and Species Code
Bluebunch wheatgrass	AGSP
Idaho fescue	FEID
Bottlebrush squirreltail	SIHY
Thurber's needlegrass	STTH

Crested wheatgrass	AGCR
Sandberg bluegrass	POSE

Data for Individual Allotments and Pastures

Specific data for allotments and pastures are given below, including range improvement projects, grazing usages, and rationales for vegetation trend based on monitoring studies.

(a) Anderson Allotment (# 01401)

Background

Anderson Allotment is divided into three pastures grazed March 1 to July 31. The Southern Malheur Rangeland Program Summary (RPS) of 1986 indicated an active preference of 2,964 AUMs for Anderson Allotment and a proposed RPS livestock allocation of 6,564 AUMs. In accordance with Civil No. 97-98-RE: Order of Modified Injunction (see Section M., Owyhee River Litigation), portions of this allotment which allowed livestock access to areas of concern on the West Little Owyhee and Upper Main Owyhee Wild and Scenic Rivers were closed to livestock grazing, and permitted use was reduced to 2,857 AUMs of active preference.

Rangeland Health Standard 3 (Ecological Processes--Uplands)

Uplands within Anderson Allotment currently support an ecologically functioning vegetative community with diverse structure and composition of perennial grasses, forbs, and shrubs. Impacts to uplands from livestock grazing are localized, very limited in extent, and are not detrimental to the ecological function and sustainability of the existing vegetative community. Assessment data showed that all pastures in Anderson Allotment met Rangeland Health Standard 3 (Ecological Processes). See Chapter 3, Rangeland Health Determinations, for specific assessment results for each pasture. Rangeland Health Standard 1 (Watershed Function—Uplands) is discussed in Section Q., Soil Resources.

Current Grazing System

Due to inadequate late season water availability, the current permitted season from March 1 to July 31 results in slight to light levels of utilization when livestock water is available. Annual turnout statements are being used to set specific pasture use periods within the permitted dates. The basic pasture rotation for Anderson Allotment is as follows:

Pasture	Season
North	3/1 – 3/31
Bull Flat	4/1 – 7/31
Spring	4/1 –7/31

Summary of Actual Livestock Use and Utilization Data

Actual use data has been gathered annually since 1979, but has not been reported by individual pasture. Most reports have combined AUM use for the allotment as a whole rather than by pasture. Actual use for Anderson Allotment is:

Average Actual Use (AUMs) (from 1979 – 2001)	Acres / AUM Actual Use
2533	15.6

Utilization studies are conducted in every grazed pasture along established transects in the allotment and are summarized below. Maximum allowable utilization (50%) was not exceeded over the period. See Table 3 for utilization data by year.

Utilization 1978 - 2001

Pasture	Average Utilization	Maximum Utilization	Minimum Utilization
North	13%	19% (1980)	8% (2002)
Bull Flat	27%	43% (1978, 1988)	12% (1980, 1981)
Spring	27%	44% (1992)	10% (1983)

Trend Data

Photo plots in Anderson Allotment were established and read in 1990, and again in 2000. Photo comparison indicates trend in North and Spring pasture plots as Upward, while trend in Bull Flat Pasture was Downward. Narrative photo plot trend determinations for Anderson Allotment are found below.

North Pasture

Photo Plot 1 – Although some individual AGSP plants have been lost, there was an increase in basal cover within the plot between 1990 and 2000. Plant mortality was likely due to persisting drought conditions, and, in turn, the survival and apparent vigor of older plants was likely due to their ability to withstand these conditions better than the younger plants. Numerous POSE plants appeared in the plot. Inspection of the general view photos showed that considerably more residual was retained (or was re-growing) with the existing grazing system. Trend was upward due to the increase in AGSP basal cover despite loss of some plants and ongoing drought conditions.

Bull Flat Pasture

Photo Plot 1 – Both AGSP and FEID plants within the plot decreased in basal cover, likely a result of continued drought. The general view photo showed a slight change in the dominant visual aspect, with less herbaceous residual and the loss of some sagebrush plants in the 2000 photo. Trend was downward.

Spring Pasture

Photo Plot 1 – AGSP in this plot appeared to be doing well despite drought conditions. The mature plants increased in basal cover between 1990 and 2000. The general view photos showed an increase in amount of residual plant material. Trend was upward.

Line-intercept data - Transects were established in 1990 in North and Bull Flat pastures. No transect was established in Spring Pasture until 2000, and thus no trend can be determined in Spring Pasture. The following table compares line-intercept data from 1990 and 2000 in each pasture in the Anderson Allotment.

Pasture	Key Species	% Cover 1990	% Cover 2000	% Change Total Cover
North	AGSP FEID	3.60	4.05	+12.5
Bull Flat	AGSP FEID	3.05	5.75	+89
Spring	AGSP SIHY	No Data	7.60	No Data

North Pasture

North Pasture Transect # 1 exhibited increased AGSP basal cover and decreased FEID basal cover between 1990 and 2000. With persisting drought conditions, the shallower-rooted FEID may not be as able to persist, thus the decline in basal cover. The overall change in percent basal cover of key herbaceous species was not significant, and therefore trend was not apparent. In general, this pasture was a good representation of high-quality, late seral to Potential Natural Community (PNC) sagebrush type rangelands which are ecologically intact, diverse, and healthy.

Bull Flat Pasture

Approximately the northeast ⅔ of the pasture was nearly pristine, late seral to PNC rangeland composed of AGSP, FEID, and Wyoming big sagebrush. The southwest ⅓ had greater shrub cover and more bare ground, based on the dominant visual aspect from field observations and photos. Increases in basal cover of AGSP and FEID in Bull Flat Pasture indicated upward trend of key forage species.

Spring Pasture

No numerical data were available for the line-intercept study conducted in 1990 within Spring Pasture, and therefore no comparison can be made. Trend was not apparent.

Overall trend- Overall trend of key forage plants, which combines data from photo plots, line-intercept measurements, and professional judgment, is summarized by pasture below.

North Pasture

Overall trend was not apparent in this pasture. Slight to light levels of utilization across all years was reflected in the maintenance of key species basal cover in line-intercept and photo plots. Despite continuing drought conditions in this area, indicator forage species maintained vigor and persistence under the current grazing regime.

Bull Flat Pasture

Overall trend of key species was not apparent. Despite having the most reliable water in the allotment, utilizations typically were slight to light. Upward trend of basal cover along the line-intercept plot, coupled with downward trend of basal cover in the photo plot made designation of trend determination difficult.

Spring Pasture

Overall trend was not apparent in Spring Pasture. Lack of data from the line-intercept transect for 1990, slight to light utilization across years, and upward photo-plot trend did not yield a clear trend in basal cover of key species or trend in conditions toward or away from established objectives.

Range Improvement Projects

Anderson Allotment had 17 range improvement projects (15 reservoirs, 2 fences) all in good functional condition. One reservoir provided little livestock water due to poor catchment of runoff. The boundary fence between Bull Flat and Spring pastures did not prevent livestock movement due to numerous gaps in the rimrock along Toppin Creek. This fence never extended to these gaps. See Table 6, Range Improvement Project Summary, for more information.

(b) Campbell Allotment (#11306)

Background

Campbell Allotment is divided into six pastures grazed March 1 to September 30 by one permittee. The RPS showed Campbell Allotment to have an active preference of 14,514 AUMs and a proposed RPS livestock allocation of 35,064 AUMs. In accordance with Civil No. 97-98-RE: Order of Modified Injunction (Section L., Owyhee River Litigation), portions of this allotment which allowed access to the West Little Owyhee Wild and Scenic River were closed to livestock grazing, and permitted use was reduced to 14,157 AUMs of active preference.

Rangeland Health Standard 3 (Ecological Processes--Uplands)

Uplands within Campbell Allotment currently support an ecologically functioning vegetative community with diverse structure and composition of perennial grasses, forbs, and shrubs. Impacts to uplands due to livestock grazing were localized, very limited in extent, and were not detrimental to ecological function and sustainability of the existing vegetative community. Assessment data showed that pastures in Campbell Allotment were meeting Rangeland Health Standard 3, with the exception of Starvation Seeding Pasture which was seeded with non-native crested wheatgrass. The seeding lacks forbs and diversity of herbaceous species, and was dominated by AGCR and POSE. Starvation Seeding is currently being managed as a relief pasture to ensure proper use of the native pastures in the allotment. See Chapter 3, Rangeland Health Determinations, for specific assessment results for each pasture. Rangeland Health Standard 1 (Watershed Function—Uplands) is discussed in Section Q., Soil Resources.

Current grazing system

Permitted grazing use in Campbell Allotment is consistent with the Campbell Allotment Management Plan (1971). The grazing schedule for each pasture is listed in the table below. Larribeau Pasture, listed below, is composed of two distinct areas. Only the eastern part of Larribeau Pasture was assessed because the western portion was outside the assessment area. Larribeau Pasture is used for short-term holding and trailing in the late fall and has no trend or utilization information. Another pasture, the FFR (Fenced Federal Range), lies completely outside the current assessment boundary.

Pasture	Season
Peacock	Rest (year 1) 3/01--6/15 (year 2)

Twin Springs	3/01--6/15 (year 1) Rest (year 2)
Sacramento Hill	3/01 – 6/15 (year 1 and 2) (first calf heifers) Rest (year 3)
Starvation Brush Control	6/01--9/01 (year 1) 7/15--9/01 (year 2)
Starvation Seeding	7/15--9/01 (year 1) 6/01--9/01 (year 2)
Horse Hill	8/01 – 10/30 (annually)
Larribeau	Trailing - 9/01--10/31 (annually)

Summary of Actual Livestock Use and Utilization Data

Actual use data for Campbell Allotment from 1978 to 2002 is summarized below. See Table 3. for actual use data by year.

Pasture	Average Actual Use (AUMs) from 1978-2002	Acres / AUM Actual Use
Peacock	3,944	7
Twin Springs (N, S, Middle)	3,930	8
Sacramento Hill	1,504	13
Starvation Brush Control	2,023	9
Starvation Seeding	4,764	3
Horse Hill	2,709	16

Utilization studies are conducted annually in every grazed pasture along established transects in the allotment, typically within 15 days of livestock removal. Utilization data from 1978 to 2001 for Campbell Allotment are summarized below. Average utilization ranged between 22 and 35%. Maximum utilization exceeded the established utilization limits (50%) in five of six pastures during drought periods.

Utilization 1978 - 2001

Pasture	Average Utilization	Maximum Utilization	Minimum Utilization
Peacock	29 %	66 % (1993)	11 % (1984)
Twin Springs	32 %	57 % (1992)	10 % (1981)
Starvation Seeding	35 %	70 % (1992)	10 % (1980)
Starvation Brush Control	34.5 %	65 % (1995)	15 % (1979)
Sacramento Hill	22 %	41 % (1991, 1992)	10 % (1979, 1982)
Horse Hill	22.7 %	58 % (1992)	10 % (1981)

Trend Data

Photo plot information and images were obtained periodically from 1970 to 2000 within Campbell Allotment. Narrative photo plot trend determinations for each pasture are found below.

Peacock Pasture

Photo Plot 1 – While photos from 1990, 1995, and 2000 showed basal plant cover in the plot to have increased somewhat, general view photos did not show a notable difference in litter, shrub, grass, and crust cover across all years. Trend at this site was not apparent.

Photo Plot 2 – Key perennial forage species appeared healthy and were persisting under drought conditions. Basal cover increased. Photos of the immediate area show many dying sagebrush, but grasses appeared healthy and maintained basal cover on the site in general. Trend at this site was upward.

Twin Springs

Photo Plot 1 – This plot, established in 1970, maintained its perennial plant basal cover. General view photos also did not change between years 1990, 1995, and 2000. Trend was not apparent.

Sacramento Hill

Photo Plot 1 – No changes in plant basal cover in this plot were apparent over time, although amount of residual herbaceous canopy cover increased. Trend of this plot was not apparent.

Starvation Brush Control

Photo Plot 2 – Basal plant cover in this plot has decreased since establishment of the monitoring site in 1978. While perennial grass plants have survived, they exhibited low vigor, likely a product of drought. Trend was downward.

Starvation Seeding

Photo Plot 4 – Mature AGCR plants on the site maintained their health and vigor despite drought conditions, although one seedling died between 1995 and 2000. Trend was not apparent.

Horse Hill

Photo Plot 1 – FEID here was in better condition in 2000 than in 1995 despite drought conditions. However, basal cover of other perennial herbaceous species was unchanged between 1990 and 2000. Trend of this plot was not apparent.

Photo Plot 2 – The photo of this plot taken in 1970 showed greater canopy cover of shrubs and residual cover of herbaceous species than in 2000. Drought conditions likely have influenced plant health. However, basal cover of the plants showed no net gain or loss. Trend indicated was not apparent.

Photo Plot 3 – AGSP only slightly increased in basal size, with much of the previous year's growth still present. SIHY, while having greatly reduced bases compared to 1970 photos, were persisting. Trend of this plot was not apparent.

Line-intercept data – The following table compares line-intercept data for the years 1982, 1987, 1990, and 2000 in each pasture within Campbell Allotment.

Line Intercept Trend Data-Campbell Allotment									
Pasture	**Transect Plot #**	**Key Species**	**% Cover 1982**	**% Cover 1987**	**% Cover 1990**	**% Cover 1995**	**% Cover 2000**	**% Change Total Cover**	
								Short-Term Change[1]	**Long-Term Change[2]**
Peacock	1	AGSP SIHY	1.11	1.20	1.55	0.50	0.60	+20	-46
	2	AGSP SIHY	No Data	1.55	No Data	0.55	1.15	+109	-26
Twin Springs	1	AGSP SIHY	1.16	0.95	0.15	0.25	0.25	0	-78
Sacramento Hill	1	AGSP SIHY	3.27	2.90	3.20	3.95	5.40	+37	+65
Starvation Seeding	1	AGCR SIHY	No Data	12.4	6.8	6.85	11.55	+69	-7
Starvation Brush Control	1	AGSP SIHY	No Data	2.30	No Data	No Data	10.10	No Data	+339
	2	AGSP SIHY	No Data	No Data	No Data	0.90	4.90	+444	No Data
Horse Hill	1	FEID SIHY	0.61	1.20	1.30	0.75	0.85	+13	+39
	2	SIHY	0.5	No Data	No Data	0.2	0.2	0	-60
	3	AGSP FEID SIHY	0.93	1.30	1.65	1.65	0.4	-76	-57

[1]Short term change compares key species % cover between 2000 and 1995.
[2] Long term change compares key species % cover between 2000 and 1982, or the earliest year of data.

Peacock Pasture

Trend data was available for two transects for this pasture. Between 1995 and 2000, Plot 1 showed a minor increase in basal cover but the increase was not significant; in Plot 2 both AGSP and SIHY increased, indicating upward trend. Relative to 1987, however, the long trend in both transects was downward. Effects of drought appeared to have impacted these sites. A major drought period for eastern Oregon lasted between 1987 and 1993.

Twin Springs Pastures (Middle, North, South)

Trend data were available at one site for Twin Springs North Pasture only. Long term trend was downward between 1982 and 1990, but between 1995 and 2000 basal cover of AGSP was maintained and short term trend was not apparent.

Sacramento Hill

Line-intercept data indicated a moderate increase in AGSP basal cover since 1987. SIHY plants along the transect had disappeared, however. A moderate increase in basal cover of AGSP and the minimal loss of basal cover of SIHY suggested that trend is upward.

Starvation Brush Control

Trend data at plot 1 was collected in 1987, and again in 2000. Trend data was not available prior to 1995 at plot 2. Long term trend at Plot 1 was upward with a large increase in basal cover. Short term trend was strongly upward at Plot 2. Differences in soil ecological potential and site capability coupled with historic grazing have played a role in the southern third of the pasture, with perceptibly less herbaceous cover (based on photos and site visits).

Starvation Seeding

Plant diversity and structure was lacking in this pasture because it was seeded to AGCR during the Vale Project. Long term trend was slightly downward from 1987 to 1995 but short term trend was upward between 1995 and 2000. Drought may explain this fluctuation, especially since AGCR seedings typically show drought effects more so than native plant communities. However, reader error may also have been a factor. Trend is not apparent in this pasture.

Horse Hill

Short term line-intercept data (1987-2000) exhibited no apparent trend at Plot # 1 and #2, and a downward trend at Plot # 3. Long term trend in basal cover was upward at plot #1 and downward at plots #2 and #3. Plots #1 and #2 both showed decreases in SIHY basal cover, although AGSP basal cover decreased while SIHY and FEID increased in Plot #3.

Overall trend- Overall trend of key forage plants, which combines data from photo plots, line-intercept measurements, and professional judgment, is summarized by pasture below.

Peacock Pasture

Overall trend was not apparent in Peacock Pasture. Light livestock utilizations were typical for this pasture, with fair water availability throughout. Areas with traditionally heavier use may be receiving lighter utilization due to decreased water availability because of extended drought, which may explain the upward trend at photo Plot #2, as cattle use is shifted away from the area. Non-apparent trend at photo Plot #1 may indicate that with these shifts in cattle use, maintenance of key perennial species was still achieved.

Twin Springs Pastures (Middle, North, South)

Overall trend is not apparent in Twin Springs Pastures. Light utilization during the spring season in combination with biennial rest is allowing for key species to maintain basal cover and vigor at the pasture scale. Although long-term line-intercept trend was downward, the photo plot and general view photos did not indicate perceptible changes in cover.

Sacramento Hill

Overall trend was upward in this pasture. Slight to light utilization in combination with one in three years rest from grazing has allowed key herbaceous species to maintain or

increase basal cover over the monitoring period. More evenly spread water sources would likely maintain this trend.

Starvation Brush Control

Overall trend was not apparent. This pasture received deferred use annually, with utilizations in the light category on average. Water sources in this pasture were evenly distributed, and the pasture appeared to be maintaining key species cover.

Starvation Seeding

Overall trend in this seeding was not apparent. Deferment during the summer allowed AGCR to withstand drought with only a slight reduction in plant vigor. The pipeline through this pasture, in addition to reservoirs, provided well-distributed water late in the season to effectively spread grazing use across the pasture.

Horse Hill

Overall trend in Horse Hill Pasture was not apparent. Key herbaceous species maintained cover and vigor with late season use. Water availability was fair, with many sources in north and west portions of the pasture. Utilization was typically slight to light.

Range Improvement Projects

Campbell Allotment has 32 reservoirs, 7 cattle guards, six developed springs, one well, one irrigation diversion, three pipelines, and 19 fences, exclosures, or test plots. Of these 69 projects, 11 were in need of repair, replacement, or removal. See Tables 6.1 - 6.4 for projects other than exclosures, and Table 6.5 for information and recommendations on exclosures.

Project inadequacies included five poorly sealed reservoirs, two springs, and three fencing projects. The reservoirs required cleaning and addition of bentonite to seal the collection area. Spring maintenance needs included rehabilitation or redevelopment and repositioning of two troughs. Two livestock holding facilities and one reservoir exclosure fence were in disrepair.

(c) Louse Canyon Community Allotment (# 01307)

Background

Louse Canyon Community Allotment is composed of seven pastures grazed March 1 to October 31 by three permittees. Frenchman Seeding Pasture, Horse Pasture, and Wilkinson FFR Pasture are parts of the allotment, but are not within the boundaries of the assessment area and are not discussed here. An eighth pasture, south of West Little Owyhee River, is not yet designated but was effectively split from Louse Canyon Pasture following closure of the river canyon to grazing. This pasture is here identified as "Upper" Louse Canyon Pasture and is recognized as a distinct pasture for management purposes. The portion of Louse Canyon Pasture north and west of the river is here identified as "Lower" Louse Canyon Pasture.

The southern portion of Upper Louse Canyon Pasture extends into Nevada and is separately designated as Quinn River Allotment, although lack of fencing allows livestock to freely move between Louse Canyon Community and Quinn River allotments. Quinn River Allotment has one permittee, the Nouque Family Trust, and is grazed in common with Upper Louse Canyon Pasture. Grazing administration of this allotment is currently being conducted by Vale District through an agreement initiated in April 1968 with Winnemucca, NV, District.

Louse Canyon Community Allotment has an active preference of 11,533 AUMs and a proposed RPS livestock allocation of 15,113 AUMs. In accordance with Civil No. 97-98-RE: Order of Modified Injunction (Section L., Owyhee River Litigation), portions of this allotment which allowed access to West Little Owyhee Wild and Scenic River were closed to livestock grazing, and permitted use was reduced to 11,306 AUMs of active preference. Quinn River Allotment has 447 AUMs active preference.

***Rangeland Health Standard** 3 (Ecological Processes--Uplands)*
Uplands within Louse Canyon Community Allotment currently support a diverse, ecologically functioning vegetative community with diverse structure and composition of perennial grasses, forbs, and shrubs. Impacts to uplands due to livestock grazing were localized, very limited in extent, and were not detrimental to ecological function and sustainability of existing plant communities. Assessment data shows that all pastures in Louse Canyon Community Allotment were meeting Rangeland Health Standard 3. See Chapter 3, Rangeland Health Determinations, for specific assessment results for each pasture. Rangeland Health Standard 1 (Watershed Function—Uplands) is discussed in Section Q., Soil Resources.

Current grazing system
Permitted grazing use in Louse Canyon Allotment is authorized as follows:

Pasture	Season
Drummond Basin	3/01-5/15
Steer Canyon Seeding (aka Rawhide Seeding)	5/01-6/15 8/01-9/30
Pole Creek Seeding	5/20-5/30 9/15-10/15
Louse Canyon (Upper[1] & Lower[2])	4/15-10/31
Quinn River Allotment	3/16-10/31

[1]South of West Little Owyhee River

[2]North and west of West Little Owyhee River

Summary of Actual Livestock Use and Utilization Data
Actual use data for Louse Canyon Community Allotment has been gathered annually from 1978 through 2001 and is summarized below. See Table 3 for actual use data by year.

Actual Use 1978 - 2001

Pasture	Average Actual Use (AUMs)	Acres / AUM Actual Use
Drummond Basin	1378	23
Steer Canyon Seeding (aka Rawhide Seeding)	1472	7
Pole Creek Seeding	880	10
Louse Canyon (Upper[1] & Lower[2], not	6887	11

including Quinn River Allotment)		

[1]South of West Little Owyhee River

[2] North and west of West Little Owyhee River

Utilization studies are conducted annually in every grazed pasture along established transects in the allotment, typically within 15 days of livestock removal. Annual utilization data from 1978 to 2001 for Louse Canyon Allotment are summarized below. While fluctuation in utilization was evident, averages fell well within the Light to Moderate use categories. See Table 3 for utilization data by year.

Utilization 1978 - 2001

Pasture	Average Utilization	Maximum Utilization	Minimum Utilization
Drummond Basin	15.5 %	32 % (1992)	6 % (1998)
Steer Canyon Seeding	38 %	64 % (1992)	10 % (1994)
Pole Creek Seeding	31.5 %	55 % (1989-1991)	5 % (1994)
Louse Canyon (Upper[1] & Lower[2], including Quinn River Allotment)	40 %	62 % (1992)	22 % (1994)

[1] South of West Little Owyhee River

[2] North and west of West Little Owyhee River

Trend Data

Photo-plot trend information and images were obtained 1990, 1994, and 2000 within Louse Canyon Community Allotment. Narrative photo plot trend determinations for each pasture are found below.

Drummond Basin

Photo Plot 1 – Trend at this location was upward as indicated by expansion of AGSP basal cover.

Steer Canyon Seeding

Photo Plot 1 – This plot was located in the seeded portion of Steer Canyon Seeding, which makes up about 56% of the pasture. The remainder of Steer Canyon Seeding consists of native vegetation. This seeding showed effects of drought. AGCR plants present in 1994 were either dead or dying in 2000 photos, with decreased basal area and increased amounts of bare soil. Trend was downward.

Pole Creek Seeding

Photo Plot 1 – (Seeded area, 20% of the pasture)-Plants in this plot appeared to be suffering from the combination of drought and livestock use. AGCR basal area decreased with the loss of some smaller plants. Trend was downward.

Photo Plot 2 – (Native plant community, 80% of the pasture)-Trend in this plot was not apparent because basal cover of established perennial plants remained stable over time. Plants showed signs of reduced vigor due to drought.

Louse Canyon (Upper and Lower)

Photo Plot 1 – FEID were reduced in vigor, but plants were persisting. Little change was apparent between 1994 and 2000, and thus trend was not apparent.

Photo Plot 2 – This plot contained vigorous plants which were resistant to drought conditions. AGSP basal cover remained similar between years. Trend was not apparent.

Line intercept data

The following table compares line-intercept data for pastures within Louse Canyon Community Allotment for 1990, 1994, and 2000.

Pasture	Transect Plot #	Key Species	% Cover 1990	% Cover 1994	% Cover 2000	% Change Total Cover	
						Short-Term Change[1]	Long-Term Change[2]
Steer Canyon Seeding	1	AGCR	1.85	2.9	4.2	+45	+127
Pole Creek Seeding	1	SIHY	1.15	1.45	1.2	-17	+4
	2	AGCR SIHY	4.1	3.15	4.15	+32	+1
Drummond Basin	1	AGSP	1.3	1.6	3	+88	+131
Louse Canyon (Upper & Lower)	1	FEID	1.4	1.7	3.1	+82	+121
	2	AGSP STTH SIHY	2.75	2.35	5.55	+136	+102
	3	AGSP SIHY	2.00	No Data	No Data	No Data	No Data

[1]Short term change compares key species % cover between 2000 and 1994.
[2] Long term change compares key species % cover between 2000 and 1990.

Drummond Basin

Both short term and long term trends were strongly upward.

Steer Canyon Seeding

Long and short term trend was significantly upward. Because this pasture is an AGCR seeding, plant species diversity is low in a majority of the pasture.

Pole Creek Seeding

Long term trend was not apparent in Plots 1 and 2. Short term trend was not apparent at Plot # 1 and was upward at Plot # 2. The native portion of the pasture (Plot #2) lacked herbaceous cover and diversity, and was heavily dominated by sagebrush with few forbs and less than expected grass cover. The seeded part of the pasture (Plot #1) actually had higher species diversity than the native portion because native species had re-established themselves in the transect area.

Louse Canyon (Upper and Lower)

Long and short term trend is strongly upward at Plots 1 and 2. Plot three was not found in 2000, and lacked data for the period after 1990.

Overall trend

Overall trend of key forage plants, which combines data from photo plots, line-intercept measurements, and professional judgment, is summarized by pasture below.

Drummond Basin

Overall trend was upward, as indicated by increased basal cover shown by range studies and patterns of use over the monitoring period. Drummond Basin typically receives slight utilization in early season with water sources primarily in the north half of the pasture.

Steer Canyon Seeding

Overall trend was not apparent in the native portion of the pasture (44%) and downward in the seeding (56%). This pasture typically receives light to moderate levels of utilization, with most use occurring in the eastern, AGCR third of the pasture. Water is situated primarily in the east of the pasture, except during drought periods, when water is made available in the western portions. The native west side typically receives less use than the non-native east side. The combination of drought and use impacted the eastern third of this pasture, and plants showed decreased vigor and reduced basal cover (as indicated by ocular assessments). The other areas of the pasture were maintaining cover and plant vigor.

Pole Creek Seeding

Overall trend for this pasture was not apparent. Utilization was typically light with fair distribution of grazing use. Cattle congregated in the seeded portion at water sources in both public and private lands. When the pipeline in the east was fully operating, utilization and distribution was evenly spread between native and non-native areas of the pasture. With the brief early-season use and 30 days of late season use of the grazing system, key herbaceous species were maintaining basal cover.

Louse Canyon (Upper, Lower, and Quinn River Allotment)

Overall trend in Louse Canyon Pasture was not apparent. Average utilization in a majority of this pasture ranged from slight to light, with moderate to heavy utilization periodically occurring near Steer Canyon Reservoir (primarily because cattle funnel through the area twice annually). However, there is the potential risk of downward trend in some areas if utilizations continue to be moderate to heavy. Water was available throughout the pastures, allowing wide cattle distribution. Key herbaceous species were maintaining or increasing basal cover.

Range Improvement Projects
Louse Canyon Community Allotment has 53 range improvement projects, including 16 reservoirs, 2 cattle guards, 18 spring developments, 3 water pipelines, 1 diversion ditch, and 13 fence projects. Twenty-one projects were in various levels of disrepair at the time of assessment, including 1 deteriorating reservoir; 6 damaged spring developments; 8 nonfunctioning spring developments; minor problems on 2 pipeline systems; major trough and pipe repair on 1 pipeline; 1 fence project repair; and removal or rehabilitation of 2 fences. The boundary fence with Fort McDermitt Reservation, owned and maintained by tribal members, is currently in poor condition due to snow and lack of maintenance and allows access of trespass livestock. See Tables 6.1 - 6.4 for projects other than exclosures, and Table 6.5 for information and recommendations on exclosures. The boundary fence with Fort McDermitt Reservation, owned and maintained by tribal members, is currently in poor condition due to snow and lack of maintenance and allows access of trespass livestock.

(d) Star Valley Community Allotment (# 01402)

Background
Star Valley Community Allotment is divided into four pastures grazed March 1 to September 30 by two permittees. The RPS incorrectly shows Star Valley Allotment to have an active preference of 6,495 AUMs and a proposed RPS livestock allocation of 7,717 AUMs. The correct AUM figures for the 1986 RPS update should be 6,849 AUMs current active preference and a proposed increase to 7,714 AUMs. This discrepancy in preference was due to the state land exchange of 1974, where BLM obtained ownership of lands within the allotment previously managed by the state of Oregon. These acquired lands held AUMs that were then allocated to existing permittees. In accordance with Civil No. 97-98-RE: Order of Modified Injunction (Section M., Owyhee River Litigation), portions of this allotment which allowed access to the West Little Owyhee Wild and Scenic River were closed to livestock grazing, and permitted use was reduced to 6,838 AUMs of active preference.

The southern portion of South Tent Creek Pasture extends into Nevada and is separately designated as Little Owyhee Allotment, although lack of fencing allows livestock to freely move between Star Valley Community Allotment and Little Owyhee allotments. Little Owyhee Allotment has one permittee, the Fort McDermitt Stockmen's Association (FMSA), and is grazed in common with South Tent Creek Pasture. Grazing administration of this allotment is currently conducted by Vale District through an agreement initiated in April 1968 with Winnemucca, NV, District.

Rangeland Health Standard 3 (Ecological Processes--Uplands)
Uplands within Star Valley Community Allotment currently support an ecologically functioning vegetative community with diverse structure and composition of perennial grasses, forbs, and shrubs. Impacts to uplands due to livestock grazing were localized, very limited in extent, and were not detrimental to ecological function and sustainability of existing plant communities. Assessment data shows that all pastures in Star Valley Community Allotment were meeting Rangeland Health Standard 3. See Chapter 3, Rangeland Health Determinations, for specific assessment results for each pasture. Rangeland Health Standard 1 (Watershed Function—Uplands) is discussed in Section Q., Soil Resources.

Current grazing system:
Permitted grazing use in Star Valley Allotment is authorized as follows:

Pasture	Season
North Stoney Corral	3/01 – 5/30 FMSA
Tristate	3/01- 5/30 Nouque
North Tent Creek	6/01—9/30 (year 1) Rest (year 2) FMSA
South Tent Creek	6/01--9/30 FMSA & Nouque
Little Owyhee Allotment	6/01-9/30 FMSA

Summary of Actual Use and Utilization Data
Actual use data has been gathered for Star Valley Allotment from 1979 to 2001 and is summarized below:

Actual Use 1979 - 2001

Pasture	Average Actual Use (AUMs)	Acres / AUM Actual Use
North Stoney Corral	1,418	40
Tristate	909	50
North Tent Creek	790	55
South Tent Creek (not including Little Owyhee Allotment)	2,326	19

Utilizations studies are conducted in every grazed pasture along established transects in Star Valley Community Allotment and are summarized below. Utilization in the allotment often fell into the "Light" category, averaging less than 35% over approximately the last 20 years.

Utilization 1979 - 2001

Pasture	Average Utilization	Maximum Utilization	Minimum Utilization
North Stoney Corral	18 %	34 % (1991, 1992)	10 % (1982-1984)
Tristate	23.5 %	48 % (1994)	9 % (1985)
North Tent Creek	26 %	45 % (1989)	14 % (1998)
South Tent Creek (including the Little Owyhee Allotment)	32 %	58 % (1992)	14 % (1995)

Trend Data

Photo-plot trend information and images for Star Valley Community Allotment were obtained only in 1990 and 2000. Photo-plot monitoring showed no apparent trend at plots located in native communities in North Stoney Corral and North Tent Creek pastures, while South Tent Creek Pasture exhibited upward trend of perennial vegetation over the monitoring period. No photo plots had been established in Tristate Pasture no trend information was available. Narrative photo plot trend determinations for each pasture are found below.

North Stoney Corral

Photo Plot 1 – Perennial grasses were surviving in current drought conditions. Some crowns had dying portions in the centers, but recovery of existing plants would be likely with relief from drought. Trend at this site was not apparent.

Tristate

No trend plot has been established in this pasture. Early season use, low utilization ratings, and average actual use at 49 acres/AUM suggests that upland conditions should be sustainable and current grazing levels are compatible with community function.

North Tent Creek

Photo Plot 1 – STTH recorded in 1990 was likely a misidentification, truly being AGSP. Recruitment of AGSP occurred in the plot, while some mature SIHY plants have decreased basal area. Trend at this plot was not apparent.

South Tent Creek

Photo Plot 1 – This plot changed significantly between readings. There was AGSP recruitment and a decrease in FEID basal cover. POSE increased, but trend was upward due to significant increases in perennial grass basal cover.

Line intercept data

The following table shows line-intercept data for pastures within Star Valley Community Allotment for 1990 and 2000.

Pasture	Transect Plot #	Key Species	% Cover 1990	% Cover 2000	% Change Total Cover
North Stoney Corral	1	SIHY STTH AGSP	1.65	4.40	+167
	2	FEID AGSP SIHY	No Data	5.85	No Data
North Tent Creek	1	AGSP SIHY STTH	1.55	3.50	+126
South Tent Creek	1	FEID AGSP SIHY	2.35	6.25	+166
Tristate	No Data				

North Stoney Corral

Plot # 2 was established in 2000 and therefore trend was lacking at that site. Trend for Plot #1 was upward due to increases in SIHY and AGSP basal cover.

North Tent Creek

Trend was upward based on an increase in AGSP basal cover.

South Tent Creek

Trend was upward, due to an increase in FEID basal cover.

Overall trend

Overall trend of key forage plants, which combines data from photo plots, line-intercept measurements, and professional judgment, is summarized by pasture below.

North Stoney Corral

Overall trend for this pasture was not apparent. Typical annual utilization was slight, with a low stocking level (approximately 40 acres/AUM) due to lack of water in the pasture. Reservoirs were the only sources of water, and with current drought, few were able to retain spring/winter runoff into the grazing season. Key herbaceous species were maintaining cover.

North Tent Creek

Overall trend was not apparent. This pasture was infrequently used due to lack of water, with utilization typically in the light category. When water was available, cattle distribution was uniform across the pasture. The light stocking and current use of this pasture allowed key species to maintain or increase basal cover and vigor.

South Tent Creek

Overall trend was upward. While stocked somewhat heavier than other pastures in the allotment, use was typically light, with many areas receiving only slight use due to lack of water. Key species increased basal cover and maintained vigor with the current grazing regime.

Tristate

Overall trend in Tristate Pasture was not apparent. Due to lack of data for comparisons, only professional judgment was used to make a determination for this pasture. With the current stocking level and regular light utilization, the key species in this pasture appeared to be maintaining vigor. Many areas were inaccessible to livestock due to lack of water. The current grazing system was maintaining key upland species.

Range Improvement Projects

Star Valley Community Allotment contains 62 range improvements projects, including 47 reservoirs, 1 cattle-guard, 3 spring developments, 3 wells, and 8 fences. See Tables 6.1 - 6.4 for projects other than exclosures, and Table 6.5 for information and recommendations on exclosures.

Nine projects were inoperable at time of inspection. These include 3 reservoirs requiring bentonite for sealing; 1 reservoir with poor water catchment; 2 wells needing pumps; and 2 spring developments with leaking troughs and misaligned inlets or outlets.

(e) Ambrose Maher (# 01102)

Background

Ambrose Maher Allotment consists of one pasture grazed annually from February to May and during October. The RPS (1986) indicated an active preference of 580 AUMs for Ambrose Maher Allotment. In accordance with Civil No. 97-98-RE: Order of Modified Injunction (see Section M., Owyhee River Litigation), portions of this allotment which allowed livestock access to areas of concern on the Owyhee River were closed to livestock grazing, and permitted use was reduced to 517 AUMs of active preference. There are no suspended AUMs for this allotment.

Rangeland Health Standard 3 (Ecological Processes--Uplands)

Uplands within Ambrose Maher Allotment currently support an ecologically functioning vegetative community with diverse structure and composition of perennial grasses and forbs. Wyoming big sagebrush is absent in most of the area due to wildfire. Impacts to uplands from livestock grazing are localized, very limited in extent, and are not detrimental to the ecological function and sustainability of the existing vegetative community. Assessment data showed that the Ambrose Maher Allotment met Rangeland Health Standard 3 (Ecological Processes). See Chapter 3, Rangeland Health Determinations, for specific assessment results the allotment. Rangeland Health Standard 1 (Watershed Function—Uplands) is discussed in Section Q., Soil Resources.

Current Grazing System

Due to often inadequate late season water availability, the current permitted split grazing season results in slight levels of utilization when livestock water is available. Annual turnout statements are being used to set specific pasture use periods within the permitted dates. The basic pasture rotation for Ambrose Maher Allotment is as follows:

Pasture	Season
Ambrose Maher	2/12 - 5/30 10/15 - 10/21

Summary of Actual Livestock Use and Utilization Data

Actual use data has been gathered for certain years between 1978 and 1990 and is summarized below. See Table 3.16 for actual use data by year.

Average Actual Use (AUMs) (from 1978 – 2001)	Acres / AUM Actual Use
397	7.32

One utilization study was conducted in 1979 in the pasture, the only year the transect was read. Utilization was 10% for that year.

Trend Data

One photo plot in Ambrose Maher Allotment was established and read only in 1979, and therefore no trend comparisons can be made. The general view photos show that herbaceous vegetation was the dominant visual aspect in 1979, suggesting that wildfire occurred in the allotment well before the wildfire that burned approximately 2500 acres in 1985.

Line-intercept data

A transect was established in Ambrose Maher Pasture in 1979. This plot was read in 1982, but was not relocated in 2000 and no recent trend comparisons can be made. Basal cover of the key species declined significantly between 1979 and 1982, indicating downward trend. The 1979 and 1982 data are presented below:

Pasture	Key Species	% Cover 1979	% Cover 1982	% Change Total Cover
Ambrose Maher	AGSP FEID	8.5	3.4	- 60.0

Overall trend

Overall trend of upland perennial vegetation, which combines data from photo plots, line-intercept measurements, site visits, and professional judgment, is summarized below.

Ambrose Maher Pasture

The trailing nature of grazing in this allotment allows the maintenance and expression of the herbaceous species AGSP, POSE, and SIHY. This pasture is predominantly grassland with minor shrub inclusions that were not burned in the 1985 Lone Tree Fire. Due to lack of data, no recent trend can be determined for this allotment, but all indications from site visits and actual use data suggest that all critical life processes of the key forage species are being maintained and current levels of use are sustainable. Trend is not apparent.

Range Improvement Projects

Ambrose Maher Allotment has 3 range improvement projects (fences), all in good functional condition. See Tables 6.1 - 6.4 for projects other than exclosures, and Table 6.5 for information and recommendations on exclosures.

E. Fire History

According to Vale District geographic information system (GIS) fire data, about 7,200 acres of native range in LCGMA have been disturbed by wildfire, and no prescribed fires have been ignited in the unit. Apparently, for the past several decades LCGMA has had a low incidence of lightning storm patterns that ignite wildfires. Even in significant fire years such as 1986, 2000, and 2001, LCGMA has not sustained appreciable shrub cover loss due to fire.

Evidence of fire disturbance was observed in the following locations:

- Toppin Butte / Sharon Creek vicinity - Approximately 1,500 acres in Anderson Allotment; incident date is unknown but likely occurred in the 1970's or early 1980's (Tom Forre, former Rangeland Specialist, Jordan Resource Area, pers. comm.)
- Massey Canyon vicinity - Approximately 360 acres in Louse Canyon Community Allotment; incident date was 1999.
- Peacock Pasture - Approximately 2800 acres in Campbell Allotment; incident date was 1985.
- Chipmunk Basin vicinity - A military jet crash in 1999 ignited a 5-10 acre fire in T39S, R45E, Section 3 NE¼; Chipmunk Basin Quad. The crash site is marked with a small tower and will be easy to relocate for vegetation studies if desired.
- Ambrose Maher Allotment - Approximately 2500 acres; incident date was 1985.

F. Special Status Plants

While there are no known plant species listed under the Endangered Species Act in LCGMA, the management area encompasses habitat supporting a number of special status plant species. There are no studies within the GMA which would indicate population trends of the following species. Two of the List 1 species described below are protected at Anderson Crossing, and studies should be established for profuse-flowered mesa mint (*Pogogyne floribunda*) and Davis' peppergrass (*Lepidium davisii*) to determine trends of the species at their respective playas. List 2 and 4 species are considered secure at this time due to lack of threats, number of sites identified within the GMA, and/or protection of their specific habitats. Little is known about List 3 species.

Bureau Sensitive Species are those found on List 1 of the Oregon Natural Heritage Program (ONHP), which was updated in 2003. Species on this list are considered endangered or threatened throughout their range. Within LCGMA these species include Barren Valley collomia (*Collomia renacta*) and disappearing monkeyflower (*Mimulus evanescens*), both found in talus at Anderson Crossing; Davis' peppergrass at Pigeontoe playa; and profuse-flowered mesa mint, found at Bull Flat Playa near Toppin Butte. The sites supporting the monkeyflower and mint are the only ones known for these species in Vale District. The collomia occurs at two other sites in the District. Davis peppergrass is listed by the State of Oregon as Threatened. It occurs at five other sites in the district and is the least rare globally of the List 1 species.

Bureau Assessment Species are those found on List 2 of the ONHP. These species are considered threatened or endangered in Oregon but are stable or more common elsewhere. Five Bureau Assessment species occur within LCGMA: Owyhee sagebrush (*Artemisia papposa*) which is discussed below, Cusick's primrose (*Primula cusickiana*), broad fleabane (*Erigeron latus*), Shockley's ivesia (*Ivesia shockleyi*), and Bolander's spikerush (*Eleocharis bolanderi*).

Bureau Tracking Species are on List 3 (species for which more information is needed before status can be determined, but which may be threatened or endangered in Oregon or throughout their range) and List 4 (taxa of concern which are not currently threatened or endangered) of the ONHP. List 3 species in LCGMA include a King's bladderpod variety (*Lesquerella kingii* var.

cobrensis), Rocky Mount helianthella (*Helianthella uniflora* var. *uniflora*), and Ibapah wavewing (*Cymopterus longipes* ssp. *ibapensis*). List 4 species include: Webber needlegrass (*Achnatherum webberi*), inverted pale paintbrush (*Castilleja pallescens* var. *inverta*), two-stemmed onion (*Allium bisceptrum*), flowering quillwort (*Lilaea scilloides*), narrow-leaved cottonwood (*Populus angustifolia*), and weak-stemmed stonecrop (*Sedum debile*).

Two species of sagebrush (*Artemisia* sp.) are worthy of mention for consideration in activity level planning. One of the most notable, *Artemisia longiloba*, is part of the low sagebrush (*Artemisia arbuscula*) complex. There are several taxonomic treatments of this species, all of which identify its early blooming (mid-July to mid-August) habit. Although it had not received species status in Intermountain Flora **(**Cronquist *et al*. 1994**)**, sagebrush expert, Dr. Al Winward (US Forest Service, Region 4 Ecologist), has specifically identified specimens of plants collected in this area as *A. longiloba*. Vast expanses of the species are found in LCGMA, along with pockets of the more common low sagebrush. *A. longiloba* is distinguished by huge blooming scapes which present a yellow hue across the landscape in late June and early July, followed by persistent rust-colored heads. This is the only area in Oregon known to support these kinds of extensive stands of this otherwise rather uncommon species. While *A. longiloba* is indicative of shallow, clay soils, specific habitat features that distinguish this species from low sagebrush have not been determined.

The other unusual species of sagebrush found in the area is Owyhee sagebrush, which occurs at the western edge of its global range in this GMA. Owyhee sagebrush is found on rocky swales, dry meadows, and mud flats in LCGMA and throughout its range in Idaho, where it is abundant. Although the sites it occupies are not large, numerous localities supporting the species have been found throughout the LCGMA. There do not appear to be threats that would imperil the existence of Owyhee sagebrush in Oregon at this time.

G. Noxious Weeds and Invasive Species

In general, noxious weeds and invasive plant species are uncommon in LCGMA, with cheatgrass being the most prevalent weedy species found. Cheatgrass occurred in trace amounts along roads and in disturbed areas throughout the GMA. In some pastures, cheatgrass composed about 1% of the vegetation sampled. Cheatgrass was found in a 60'x 60' wildlife guzzler exclosure in Campbell Allotment (Twin Springs South Pasture) and made up about 1% of the total vegetation cover there.

Whitetop (*Cardaria* spp) was found in small patches near Bell Springs and Stoney Corral, and is invading at an alarming rate along main access roads within the assessment area. The spread of whitetop represents a significant threat to habitat integrity in both upland and riparian communities.

Scotch thistle and puncture-vine have been treated at Anderson Crossing Air Strip in Louse Canyon Allotment (Louse Canyon Pasture). Clasping pepperweed and several other annual mustard species were observed at various locations in the GMA. No other weeds were found during the GMA assessment. Overall, the assessment showed approximately 1% of total plant cover in LCGMA occupied by weeds.

The limited amount of weed invasion is likely attributable to several factors including relatively low levels of recreational use, overall upland plant community health, and limited seed dispersal by livestock or wildlife. Weeds traveling via waterways within the GMA have not been identified as a problem, probably due to lack of major farming or community activities near the West Little Owyhee or Antelope drainages. However, the Main Owyhee River currently transports weeds downstream from source areas in Idaho and Nevada.

H. Water Resources and Riparian/Wetland Areas

Water Resources

LCGMA encompasses three major stream systems that flow to the Owyhee River--West Little Owyhee River, Antelope Creek, and Tent Creek--and one small system that drains south to Quinn River. Each stream system contains interrupted perennial and intermittent seasonally flowing segments (Map 9, Perennial and Fish-bearing Reaches). Subsurface recharge and overland flow to these streams are mainly from snowmelt, with peak flows and overland runoff occurring in April and tailing off by late May. By late June and early July surface flow in many streams are reduced to only short, discontinuous segments.

Interrupted perennial streams within the GMA are characterized by submergence and emergence of surface water along the stream length, such that flow is interrupted by dry reaches. Perennial stream flow usually occurs as: (1) a continuous surface flow originating within the stream channel and flowing from ¼ mile to several miles before disappearing into channel substrates; (2) a series of short, perennial flowing segments (<¼ mile); or (3) a series of perennial scour pools that receive subsurface water from alluvial fill. No streams within the GMA flow continuously from headwaters to confluence. All are interrupted by stretches of subsidence or flow briefly during seasonal recharge and runoff from uplands.

In segments of all streams within the GMA, water quality and quantity were affected by incised channels, absent or reduced streamside vegetation, excessive concentration and duration of livestock use, and unstable streambank structure (see Chapter 3, Range Health Determinations, Rangeland Health Standards 2 and 4). Increased water temperature may occur in incised streams where riparian vegetation does not provide adequate shade for surface flows. Lack of riparian vegetation may also lead to increased erosion, higher stream velocities, and accelerated migration of headcuts and lateral stream movement.

Current and historic livestock grazing during “hot season” months have affected riparian vegetation composition and channel stability in LCGMA. With warmer weather, livestock tend to concentrate in riparian areas seeking quality forage, browse, water, and shade. If livestock are removed following late spring use, regrowth of herbaceous species occurs throughout the summer as long as available moisture is present in riparian area soils. When livestock concentrate in riparian areas and moderate to heavy grazing use occurs in late-spring, summer and into early autumn, herbaceous and woody riparian vegetation is affected. During this season active leader growth on woody riparian species, such as willows, becomes vulnerable to livestock utilization. Livestock use during this period typically provides no rest during the growing period to ensure plant vigor, reproduction, or litter accumulation. If rest is not provided, riparian plants do not replace food reserves in roots and seed may not be produced. Concentrated use along drainages generally results in heavy utilization of woody riparian

vegetation, trampling, bank shearing damage, soil compaction, and accelerated streambank erosion. Amount of available water storage in riparian areas and peak flow quantity and duration are also reduced by excessive levels of livestock utilization during the hot season.

For LCGMA, existing water quality data include water temperatures recorded by BLM in West Little Owyhee River at Anderson Crossing and detailed water chemistry, temperature, and invertebrates gathered by US Geologic Survey (2002) for BLM at sites on the Owyhee River, including the confluence with West Little Owyhee River. Because water temperatures were not in compliance with State standards for salmonid streams, BLM's data led to placement of West Little Owyhee River on the 1998 303(d) list by Oregon Department of Environmental Quality from Anderson Crossing upstream. The data were suspect, however, because the recording thermograph was inadvertently placed in a reach where surface flows recede in mid-summer. Because these data were not representative of perennial flow, the West Little Owyhee River was recommended by ODEQ to be withdrawn from the 2002 303(d) list for streams affected by temperature. The Environmental Protection Agency subsequently approved the delisting.

Because available site-specific water quality data were limited for LCGMA, assessing Rangeland Health Standard 4 (Water Quality) was done through evaluation of pertinent data from several sources:

1. Waterbody status, whether the stream is on the State 303(d) list (ODEQ)
2. Limitations on Beneficial Uses identified for the stream's river basin
3. Existing water quality data
4. Existing supporting data, such as range monitoring data, soil surveys, slope steepness, and aerial photography
5. Assessments for Rangeland Health Standards 1 (Watershed Function –Uplands), Standard 3 (Watershed Function –Riparian), and Standard 3 (Ecological Processes)
6. Drainage patterns
7. Land ownership within watersheds

Main Drainages of Louse Canyon GMA

West Little Owyhee River

The West Little Owyhee River drains about 200,000 acres (312 square miles) with a main channel length of approximately 60 miles. West Little Owyhee has numerous perennial segments, many with scour pools, which cover about two-thirds of its length and vary considerably in water quantity. Many of these perennial segments receive their flow from small, perennial side channels and from Toppin Creek, Jack Creek, and Massey Canyon.

Toppin Creek (76,000 acres), Jack Creek (23,000 acres), and Deer Creek, a major tributary to Jack Creek, are intermittent streams with small, perennial scour pools scattered throughout. Massey Canyon (10,000 acres) drainage has many short, perennial stream segments and scour pools. These four tributaries comprise about fifty-five percent of the West Little Owyhee River drainage area.

Antelope Creek

Antelope Creek has four major tributaries, Pole, Little Antelope, Trail, and Hansen Flat creeks,

as well as several smaller tributaries. This system drains about 220,633 acres (345 square miles) with a main channel length of 46 miles. Antelope Creek has several short, perennial segments in its headwaters, transitions to intermittent flow in its mid reaches, and becomes perennial for the lowest eight miles. About 43 percent of Antelope Creek has perennial flow.

Pole Creek, the main tributary to Antelope Creek, is also comprised of short, perennial segments and scour pools draining about 77,300 acres (121 square miles). Pole Creek's main channel consists of short perennial reaches with scour pools. Spring/meadow complexes are distributed throughout the length of Pole Creek. Three main tributaries to Pole Creek are Field Creek, Chipmunk Creek, and the Steer Canyon drainage. Field Creek, draining 17,030 acres (26.5 square miles), has a few perennial scour holes and a short perennial reach starting at Disaster Spring, a spring/meadow complex. Chipmunk Creek and Steer Canyon drainage are intermittent streams with only two wet meadow/spring areas located in Chipmunk Creek. The entire Pole Creek watershed contains only 9.5 stream miles of perennial flow.

Little Antelope Creek, the second largest tributary to Antelope Creek, is an intermittent system that drains about 55,980 acres (87.5 square miles) and usually goes dry by mid-June to early-July. This creek does not have reliable year-round water sources.

Trail Creek and Hansen Flat Creek watersheds drain areas with several springs and small perennial scour pools. The headwaters of Trail and Hansen Flat creeks, located west and southwest of the GMA, occur at higher elevations that have quaking aspen clumps and small discontinuous channel segments of flowing water.

Tent Creek

Tent Creek is an intermittent stream system with only one perennially flowing reach about 0.25 miles in length and with no large tributaries. Tent Creek watershed drains about 80,160 acres or 125.5 square miles and has several spring/wet meadow complexes.

Riparian/Wetland Areas in LCGMA

The BLM Manual (Tech. Ref. 1737-9) defines riparian areas as ". . . a form of wetland transition between permanently saturated wetlands and upland areas. These areas exhibit vegetation or physical characteristics reflective of permanent surface or subsurface water influence. Typical riparian areas are land along, adjacent to, or contiguous with perennially and intermittently flowing rivers and streams, glacial potholes, and the shores of lakes and reservoirs with stable water levels. Excluded are sites such as ephemeral streams or washes that do not have vegetation dependent upon free water in the soil." In the GMA, wetlands occur wherever the water table is usually at or near the surface, or where the land is at least seasonally covered by shallow water. This includes sloughs or scour pools, seeps, and wet meadows.

Riparian areas provide food and shelter for the animal community and are critically important to fish, birds, and other wildlife species. Riparian areas affect the quantity and quality of water for on-site and downstream water uses, such as irrigation, water for wildlife, livestock and wild horses, and recreation. Riparian areas also help store water and reduce risk of flash floods. For riparian areas to provide these benefits, they must have the plant species diversity, structure, and abundance appropriate for the area.

In LCGMA, riparian and wetland areas occur along approximately 200 miles of stream channels. Riparian vegetation, both herbaceous and woody, is found in upland meadows, at springs and seeps, and in drainage channels that vary from short, interrupted perennial systems to seasonal streams that only flow until mid June and early July in most years.

Seep and spring areas are mainly associated with wet meadows in upper watershed areas. These seeps and springs occur in shallow soils on broad, gently sloping uplands or in dissected, rocky stream bottoms. Meadows associated with seeps and springs on upland slopes range in size from less than an acre to five or more acres, and support many herbaceous sedge and rush species.

In stream channels in upper watersheds, riparian vegetation is mostly herbaceous, but sparsely scattered woody species, such as yellow willow and quaking aspen, are found in wetter protected areas. Positioned lower downstream are perennial stream segments that support a wider diversity of both herbaceous and woody riparian species, including coyote, yellow, lemmon, and whiplash willow. These areas are usually located in slightly steeper and rockier terrain where woody species may become established when large hydrologic events scour stream channels and allow seed establishment. At lower elevations where slopes become flatter and channels are usually wider, riparian vegetation is again dominated by sedges and rushes and, like the upper watershed areas, contains scattered willow species.

Although riparian areas and wetlands cover less than 1 percent of the GMA, their ecological significance far exceeds their limited physical area. Riparian and wetland areas are major contributors to ecosystem productivity and structural and biological diversity, particularly in drier climates (Elmore and Beschta 1987).

Rangeland Health Standard 2: (Watershed Function - Riparian/Wetland Areas) Proper Functioning Condition and Other Ratings

Riparian Assessment Methods

The quality of riparian productivity and diversity has been evaluated using two methods (Appendix I, Riparian/wetland Areas and Assessment Methods). One method, *long-term trend*, assesses trends in riparian health over time. The second method, *Proper Functioning Condition (PFC)*, assesses condition of riparian function, which is a result of interactions between geology, soil, water, and vegetation (USDI,BLM, TR1737-9, 1993). In general, both assessment methods address physical as well as biological attributes and their interrelationships. These attributes include the abundance, structure, and diversity of riparian vegetation and the stability of streambanks. The BLM has adopted the PFC assessment as a standard for evaluating riparian areas and will use it to supplement existing stream channel and riparian evaluations and assessments.

The PFC Rating System

The term “Proper Functioning Condition” is used to describe both the assessment process and the condition of a specific riparian/wetland area. PFC assessments provide a consistent approach that considers hydrology, vegetation, erosion, and depositional processes in the evaluation of the condition of riparian/wetland areas. A specific riparian area whose condition is designated to be “at PFC” is in a state of resiliency that will hold together during high-flow events with a high degree of reliability. Riparian areas rated PFC are also considered to be meeting Rangeland Health Standard 2 (Watershed Function—Riparian/wetland Areas).

Proper Functioning Condition assessments were conducted on approximately 200 miles of stream riparian habitat within the GMA. These stream miles were divided into lengths with similar physical characteristics that are referred to as "reaches." Reaches that were rated PFC supported the minimum amount and type of plant components needed to store water and resist bank detachment during large flow events (5-20 year return intervals). However, many reaches that were rated PFC (and meeting Rangeland Health Standard 2) still may not support the desired quantity and composition of vegetation associated with healthier, more resilient systems. For instance, in wet meadows, early- to mid-seral plants (such as Douglas sedge) are less desirable than mid- to late-seral plants (such as Nebraska sedge). In those PFC-rated riparian/wetland areas with early seral vegetation, a change in management is needed to attain desired plant composition and to improve stream channel physical conditions.

One of five possible ratings was assigned to each stream reach and wetland area:

- Proper Function Condition (PFC) = Meeting Rangeland Health Standard 2
- Functioning at Risk, Upward Trend (FARU) = Meeting Rangeland Health Standard 2
- Functioning at Risk, Trend not Apparent (FARN) = Not Meeting Rangeland Health Standard 2
- Function at Risk, Downward Trend (FARD) = Not Meeting Rangeland Health Standard 2
- Non Functioning (NF) = Not Meeting Rangeland Health Standard 2

See Appendix I for more information on the PFC assessment method and ratings, and refer to Table 4, Riparian PFC Summary; Map 7, Streams and PFC; and Map 8, Springs/seeps and PFC, for detailed information on all reach ratings.

PFC Assessment Results for LCGMA

Sites Rated as *Proper Functioning Condition*

Approximately 52 percent of all riparian stream miles within the GMA were rated PFC (Table 4a, Streams--Riparian PFC Summary).

All riparian reaches of the West Little Owyhee River were rated PFC. This river is the only stream in the GMA with additional assessment data in the form of long-term trend information for some of its reaches. Long-term trend data were assembled from monumented photopoints, habitat surveys conducted between 1979 and 2000, and low level aerial photography (1982, 1991, 1994, 1998). Long-term trend data is not available for other riparian areas within the GMA because information was not recorded prior to the 2000 PFC assessments. These riparian areas now have baseline information established through the PFC assessments but will require additional years of study before definitive long-term trend can be established.

The long-term trend studies indicated upward trend in riparian vegetation for West Little Owyhee River, although the level of improvement varied between reaches. Presently, the river is excluded by corridor fencing from livestock entry. In general, substantial increases in abundance and diversity of woody (whiplash, yellow, and lemmon willow) and herbaceous (sedges and rushes) species have occurred from Anderson Crossing to the headwaters. In some upper reaches, woody plant recruitment is restricted due to intermittent flows and competition with

thick-rooted herbaceous plants. Conversely, limited increase in herbaceous cover occurs where porous cobble and boulder substrates allow fine soil particles to pass easily through the rock matrix. In most reaches, increased vegetative cover along streambanks has captured fine sediments, resulting in improved bank stabilization and channel narrowing.

Sites Rated as *Functioning at Risk, Upward Trend* (FARU)
Antelope Creek, Reach #2 (1.3 mi), in Twin Springs South and Sacramento Hill pastures was the only stream segment designated FARU (Table 4a). Although no long-term trend information was available, the Interdisciplinary Team gave this reach an Upward Trend rating based on abundant herbaceous and woody plant reproduction along channel banks and floodplain terraces. The presence of several age classes of whiplash and yellow willows indicated that recruitment and expansion of willow species has occurred for many years.

Sites Rated as *Functioning at Risk, Trend not Apparent* (FARN)
Approximately 43 percent of all riparian stream miles within the GMA were rated FARN (Table 4a). A Functioning at Risk rating with a trend of "Not Apparent" indicates that one or more physical or vegetative attributes in that stream reach are significantly impaired. These attributes may include excessive erosion or headcutting, hydrologic heaving (hummocking) and compacted soils, bank trampling, lack of plant cover, low plant diversity or lack of reproduction, and impacts from irrigation, water developments, or roads. Although the Interdisciplinary Team determined that these reaches were Functioning at Risk, a trend rating of Not Apparent was applicable due to lack of prior baseline or long-term trend information.

Most FARN ratings in the GMA resulted from livestock grazing which caused soil and bank damage and affected riparian vegetation. However, some FARN designations were caused by other factors. For example, New Road Spring drainage, Reach #1, in Louse Canyon Pasture has a spring development within a wet meadow (which concentrates livestock), an access road to Jeff Reservoir that crosses the wet meadow, and a major headcut immediately below the road. Three Week Spring, Reach #2, in Louse Canyon Pasture also has a road crossing that intercepts most stream flow, desiccating riparian vegetation and subsurface saturation downstream.

Twenty-three springs with wet meadows were rated FARN (Table 4b, Springs—Riparian PFC Summary; and Map 8). Most FARN meadows were hummocked from livestock trampling and lacked plant diversity and reproduction from livestock concentration around spring troughs and headboxes. Hummocks decrease vegetative cover and increase bare soil, directly affecting potential saturation and water yield of the site.

All reaches with a FARN rating will be addressed by changes in management that focus on factors, such as current livestock grazing or water developments, which contribute to existing conditions**.** Many reaches will respond quickly to minor adjustments in management while others may need more intense treatment.

Sites Rated as *Functioning at Risk, Downward Trend* (FARD)
Five stream reaches received a FARD rating, four reaches along Pole Creek (#5, 6, 9, 11) in Louse Canyon Pasture and one on Tent Creek in South Tent Creek Pasture (Table 4a). A spring/meadow complex adjoining Chipmunk Creek, a tributary to Pole Creek, was also rated FARD (Table 4b). Although long-term trend information was not available, the FARD ratings were based on representative indicators of downward trend, such as active channel erosion;

sloughing, unvegetated streambanks; deeply incised stream channels; severely hedged willows; and lack of reproduction for woody riparian species. For one reach, conditions were caused in part by inappropriate trough and pipeline placement.

Pole Creek, Reach #5, downstream of private land, had a six to eight foot entrenched stream channel with raw banks. The streambed consisted of boulders and exposed bedrock, with siltation caused by lateral erosion. Riparian vegetation received intense livestock utilization; sedges and rushes were patchy and willows severely hedged and lacking reproduction. Reach #6, upstream of the private parcel, had impaired components similar to Reach #5. Reach #9, located between private parcels, had perennial flow, although the channel was incised four to eight feet in the central third of the reach. Active headcutting, downcutting, and lateral erosion was occurring along channel bed and banks. Riparian vegetation consisted of sedges, rushes, grasses, some rose, and currant that were all heavily utilized by livestock.

A perennial spring and pipeline system developed for livestock water is located in Reach #11 at the headwaters of Pole Creek. This delivery system conveys large quantities of water to storage tanks and troughs located outside of the drainage channel. Three problems are associated with Reach #11. First, exporting water away from the headwaters reduces the amount available to maintain saturation of meadows and stream channels in Reach #11. Second, the pipeline system that connects to the spring source bisects the meadow and extends downstream over half the meadow's length. At the time of development in the 1970's, this pipeline route was chosen because deep, saturated (*hydric)* meadow soils were easy to excavate. Over many years, runoff following the natural meadow contour and the buried pipeline trench has eroded the surface, re-exposing the pipeline. Currently, two to three foot eroded areas extend over many sections of the meadow. The third problem in Reach #11 is that the spring source, trough, and wet meadow adjacent to the trough receive concentrated use by livestock, reducing the potential of riparian herbaceous vegetation and limiting expansion of the meadow's wetted perimeter.

Chipmunk Creek Tributary #1, Reach #1, has a spring development and associated wet meadow. The small meadow area feeds a collection gallery for a livestock trough located approximately 100 yards downstream. The meadow and trough area receive concentrated livestock use which limits the potential extent of surface area able to support riparian herbaceous plants.

Tent Creek, Reach #5, begins as a spring-fed perennial stream and meadow complex, transitions into a wet meadow with scour pools, and ends as an intermittent channel which is entrenched and scoured during spring runoff. Historically, this reach received concentrated use by livestock as the only reliable source of water for many miles. Although intensely utilized by livestock, riparian vegetation, both sedges/rushes and yellow willows, was well established in the perennial upper third of the reach. Downstream, riparian vegetation rapidly diminished with decreasing stream flow. Over time, heavy grazing combined with low potential for regrowth have caused gradual upstream migration of scour pools, continual channel widening, and loss of hydric soils.

Sites Rated as *Non-Functioning* (NF)

Non-functioning assessment ratings were assigned to three reaches in three pastures. Field Creek, Reach #1, in Steer Canyon Seeding was located downstream of private land. Field Creek flows only briefly in spring, diminishing by mid-June or early July. By late spring, available flow in Field Creek has been diverted for irrigation on the private parcel, dewatering Reach #1 below and resulting in the non-functioning rating. Riparian vegetation in Reach #1 was minimal,

consisting of only scattered patches of Baltic rush and Douglas sedge.

Massey Canyon, Reach #2, in the Louse Canyon Pasture, also rated NF, was located in a tributary immediately upstream of Jeff's Reservoir. The reach was straight, with large cobble and boulder substrates and scattered upland vegetation, such as Wyoming big sagebrush, on upper edges of the streambanks. Seasonal flows pass through this reach very quickly, scouring the streambed and depositing rocky debris at the entrance to the reservoir. This non-functioning rating is likely a result of geomorphology rather than livestock use.

Jack Creek, Reach #3a and b, in South Tent Creek and Louse Canyon pastures, is also rated NF. Riparian vegetation consisted of scattered coyote willow in the stream channel and Douglas sedge and Baltic rush on the terraces. The stream channel was incised six to eight feet, with raw silty banks and scour pools with permanent water. Because this reach is the only perennial source of water for many miles, it receives concentrated use by livestock. Livestock utilization, trampling, and soil compaction have lead to low riparian plant diversity and reduced reproduction of existing plants. Loss of vegetative cover has decreased bank stability and accelerated erosion.

I. Terrestrial Wildlife and Habitats

Overall conclusions in this section pertaining to sagebrush habitat health and suitability for wildlife are based on a comparison of LCGMA conditions with current wildlife habitat management literature related to greater sage-grouse, sagebrush steppe land-birds other than sage grouse, and habitat relationships information described in "Wildlife Habitats in Managed Rangelands; The Great Basin of Southeastern Oregon" (Maser *et al*. 1984). Evaluation narratives that follow are derived from field estimates of resource attributes, quantitative field data, professional judgment, and data available from other agencies such as US Fish and Wildlife Service Breeding Bird Surveys (LCGMA wildlife habitat file stored at the Vale District Office).

The topics and the desired conditions for communities of wildlife on public land addressed in this evaluation are also based on the SEORMP (Chapter 2 and Appendix F). More specific details and supporting information that pertain to observed conditions for wildlife are cited in Chapter 3, Range Health Determinations, and References.

Terrestrial Wildlife Species of Management Importance in LCGMA

Northern bald eagles (Federally Threatened) are the only federally listed vertebrate species known to occupy LCGMA. Eagles winter on the Owyhee River at the edge of LCGMA but do not nest there.

Bald eagles usually require tall trees for roosting, but tree species such as cottonwoods are not established in the upper reaches of the Owyhee River due to site potential limitations including severe hydrologic scouring events. Mature trees upstream that could potentially recruit cottonwoods from seed sources are absent. Cottonwoods are common and fairly well developed as gallery stands on parts of the Owyhee Reservoir outside of LCGMA. Based on observations made during winter surveys, bald eagles that occupy LCGMA roost on cliffs because it is the only substrate available for them to use.

Grazing practices and recreational river floating activities are not likely to adversely affect wintering bald eagle populations within LCGMA. Consequently, there are no violations of the Endangered Species Act (Section 7) and consultation with the U. S. Fish and Wildlife Service is not necessary. Refer to the Biological Assessment for the SEORMP, Vale District Office, for further information

Terrestrial special status vertebrate species and other species of interest likely to inhabit LCGMA are listed below. Species associated with shrub steppe habitats that have declined substantially in the ICBEMP area since historical times are denoted with an asterisk (*). FT = Federally Threatened; BT = Bureau Tracking species; BA = Bureau Assessment species.

Landbirds *Brewer's sparrow, *horned lark, *western meadowlark, *black-throated sparrow, *sage sparrow, *loggerhead shrike, *sage thrasher, *greater sage-grouse (BA), northern bald eagle (FT)

Mammals California bighorn sheep (BT), *pygmy rabbit, pronghorn

Reptiles Northern sagebrush lizard (BT), short-horned lizard

Terrestrial Source Habitats

With the exception of LCGMA seedings, the assessment area is comprised of plant communities that meet the criteria of Terrestrial Source Habitats referred to in Source Habitats for Terrestrial Vertebrates of Focus in the Interior Columbia Basin: Broad-Scale Trends and Management Implications; Volumes 1 through 3, (May 2000).

ICBEMP defined Terrestrial Source Habitats for wildlife and used a broad scale predictive model to estimate their locations within the Interior Columbia Basin. The location of source habitats was identified geographically within areas referred to as "T" watersheds ("T" watersheds and source habitats are therefore related to one another). "'T' watersheds contain source habitats that are relatively similar in pattern across the landscape compared with historical vegetation patterns (that is, they have low departure from historical patterns)" (ICBEMP Supplemental Draft EIS, Chapter 3, page 124).

The greatest volume of Wyoming, mountain, and basin big sagebrush habitats within LCGMA conform to what ICBEMP termed "Closed Mid Shrub" structural types, meaning that sagebrush canopy cover is 15% or greater as measured by line intercept. "Open Mid Shrub" structural types, meaning that sagebrush canopy cover is less than 15% as measured by line intercept, are present in low sagebrush and mesic Wyoming big sagebrush communities. Mid to upper elevation sagebrush habitats within LCGMA generally support a good complement of forbs and deep rooted perennial grass species that provide food and cover for wildlife. These rangeland conditions are indicative of quality wildlife habitats.

Assessment Criteria for Wildlife and Special Status Species (Rangeland Health Standard 5- Native, T&E, and Locally Important Species)

LCGMA wildlife habitats were evaluated in relation to the SEORMP, which described a variety of desired habitat conditions and management considerations that, when met, would result in the

support of healthy, self-sustaining populations and communities of wildlife on public land. These attributes (SEORMP/FEIS, Appendix F, pages 283 to 298) of riparian and upland habitats are to be assessed periodically within each GMA and then used as the basis for determining conformance with Rangeland Health Standard 5.

Upland habitats

Wildlife diversity and productivity is profoundly influenced by the relative abundance, structure, and spatial arrangement of sagebrush communities (Graph 1, Comparison of Crested Wheatgrass Grasslands to Big Sagebrush Shrublands). Management of sagebrush communities that is appropriate to soil, climate, and landform needs to incorporate the following overstory and understory components which contribute towards healthy wildlife habitats:

> *Shrub overstory:* Big sagebrush, low sagebrush, and other shrubby species within the genus *Artemisia* provide wildlife habitat structure, food, and cover.
>
> *Herbaceous understory:* Grasses and forbs provide wildlife habitat structure, food, and cover. Herbaceous cover also produces insects that are consumed by birds and other small animals.

Sagebrush upland management criteria suitable for Rangeland Health assessments for wildlife habitat values (SEORMP, Appendix F, Section F-5) are described below. See Table 9, Shrub Cover Canopy Classes, for a description of sagebrush canopy cover Classes 1-5.

(a) Shrub structural characteristics and general distribution at mid landscape scales (GMA's)

Shrub cover capable of supporting life history requirements of sage grouse and other wildlife (e.g., Classes 3, 4, and 5 that use sagebrush habitats should be present at multiple spatial scales, over a large area, and in a variety of spatial arrangements (e.g., at a landscape level and with connectivity present). Shrub cover should include a central core of sagebrush habitat present in large contiguous blocks as well as some other habitat arrangements such as islands, corridors, and mosaic patterns. Each of these patterns has significance to wildlife within geographic areas. Shrub cover should be some mix of height and age classes but with an overall emphasis on shrub communities with a mature structural status (Maser *et al.* 1984).

*(b)Big sagebrush shrub cover on **native range** at fine landscape scales (pastures)*

Where a native range pasture is capable of supporting a big sagebrush community, shrub overstories suitable for sage grouse and other sagebrush-dependent species should be present on at least 50 to 75 percent of the pasture. For example, a 1000-acre native range pasture that can support Wyoming, mountain, or basin big sagebrush should provide adequate wildlife shrub cover on at least 500 to 750 acres (e.g., Shrub Classes 3, 4, and 5).

*(c) Big sagebrush shrub cover on **seeded range** at fine landscape scales (pastures)*

Where a seeded pasture is capable of supporting a big sagebrush community, shrub overstories suitable for sage grouse and other sagebrush-dependent species should be present on at least 25 to 50 percent of the pasture. For example, a 1000-acre seeded pasture that can support Wyoming, mountain, or basin big sagebrush should provide adequate wildlife shrub cover on at least 250 to 500 acres (e.g., Shrub Classes 3, 4, and 5).

*(d) Herbaceous understory on **native range** at fine landscape scales (pastures)*

Herbaceous understory composition throughout most native range habitats should exhibit a diversity of native forbs and grasses consistent with site potential at mid, late, or PNC seral stages.

*(e) Herbaceous understory on **seeded range** at fine landscape scales (pastures)*
In seedings, herbaceous cover should include one or more forb species.

Riparian habitats
In riparian habitats, grazing use at a minimum should promote properly functioning riparian/wetland areas.

Rangeland Fragmentation and Affects on Wildlife Habitat

Wildlife habitat fragmentation in sagebrush steppe is a concern throughout the intermountain west and it is highlighted as an issue in the SEORMP. Habitat fragmentation impacts to species such as greater sage-grouse can be caused by a variety of factors such as physical disturbance to plant communities (e.g., wildfire or land treatments), powerlines, roads, and fences. In this LCGMA assessment, fragmented habitats are defined as rangelands with Shrub Cover Class 1 or 2 (Table 9). These seeded or native rangelands exhibit a strong grassland appearance (with either perennial or annual vegetation) and lack the shrub structure necessary to provide wildlife life history functions such as foraging, nesting, hiding, and thermal relief. Site potential and presence of invasive species may affect the capability of Class 1 or 2 areas to support a complete array of native plant components without management intervention such as seeding.

Fragmentation may have significance at very fine scales (tens of acres) for some species where surrounding rangelands have already suffered losses in shrub structure and remaining sagebrush steppe is in limited supply. Fragmentation at a scale of thousands of acres can threaten native wildlife such as greater sage-grouse and sage sparrows since both species require large areas of connected shrub overstory. Both species have declining population trends within the Interior Columbia Basin area.

Fragmented habitats do not always pose a threat to sagebrush steppe wildlife, as they are simply one stage of ecological succession with both positive and negative impacts on the life histories of wildlife. Fragmented habitats may in fact be desirable and provide the requirements for species such as grasshopper sparrows and pronghorn. Fine scale habitat mosaics (see Landscape Appearance Photos #1 - 6, 12, and 14) are desirable in that they can provide an abundance of plant-based resources used by wildlife.

The size, spatial arrangement, and likelihood of further fragmentation of Class 1 and 2 habitats define potential risks and impacts to wildlife.

Overview of LCGMA Wildlife Habitat Conditions

(a)Uplands

Upland communities within LCGMA show attributes that can be expected to result in the long-term persistence of terrestrial wildlife, including greater sage-grouse and a wide variety of other animals that occupy sagebrush habitats. These are desired conditions that are in conformance with the SEORMP.

Important sagebrush steppe wildlife habitat components, which include forage, cover, and structure, are well distributed spatially across the assessment area. The structure and composition of plant species in the GMA are sufficient to sustain healthy, reproducing communities of wildlife. With certain isolated exceptions (see Specific Upland Wildlife Habitat Assessment Results, this section), the structure and continuity of sagebrush overstory is excellent for wildlife. Potentially negative consequences of habitat fragmentation from fires and vegetation treatments (i.e. seedings and chemical applications) over the last four decades are localized and proportionally small in relation to the evaluation area. Starvation Seeding is the only treated rangeland without substantial sagebrush recolonization.

About 96% of the LCGMA landscape (including all native, chemically treated, or seeded rangeland) consists of complex shrubland communities capable of supporting life history requirements of sage grouse and other shrub-dependent species (see Table 5, Shrub Cover Characteristics Summary by Pasture). These shrub habitats conform to desired canopy cover conditions, and are described as Shrub Class 3, 4, or 5 wildlife habitats (Table 9). Ninety-six percent of the 394,100 acres in LCGMA with big sagebrush communities (Wyoming, basin, or mountain big sagebrush) is in Class 3, 4, or 5 status.

The remaining 4% of LCGMA is composed of native or seeded rangeland that exhibits a grassland appearance. These grass / forb dominated habitats are classified as Class 1 and 2 wildlife habitats.

In contrast to LCGMA, the adjacent GMA to the north (Jackies Butte) and neighboring areas south in Nevada (Winnemucca District, BLM and Santa Rosa Mountains, Humboldt National Forest) have been impacted by substantial wildfire impacts due to the combined effects of severe summer storm patterns and cheat-grass presence. In both these adjoining areas, fires have taken a serious toll on shrub overstory continuity and have left thousands of acres with little or no native shrub canopy.

Native rangeland (about 90% of LCGMA) is a nearly complete block of sagebrush steppe with relatively minor, fine-scale inclusions of habitat with a grassland appearance. Habitat patterns that appear as corridors, mosaics, or islands of shrubland are observable only at very fine scales, and are consistent with soil/climate/landform differences rather than recent disturbance.

Composition of the herbaceous understory in most native range is diverse, made up of predominantly native species with specific site capabilities determined by soil, climate, and landform. Even where understory diversity and density is relatively weak, the communities are not high fire risk areas because cheatgrass is limited or absent. Invasive plant species with potential for direct and indirect adverse impacts on wildlife habitats presently have only minor and localized influences.

Due to relatively low livestock stocking rates and large pasture sizes, residual cover and ungrazed plants were well distributed throughout most of the assessment unit. “Thorough search” grazing use, which can have potentially negative influences on wildlife by reducing hiding cover for small animals and forage availability for wildlife, is generally limited. Poor shrub structural quality (i.e., umbrella-form shrubs with heavily grazed understories (USDI, BLM Tech. Ref., 1996) due to livestock use was observed in some tall big sagebrush patches

found within low sagebrush communities. Generally, however, impacts from grazing were confined to areas close to water sources.

(b) Streams and Meadows
LCGMA supports an extensive network of dry and wet meadow complexes that are especially prevalent in southern reaches of the assessment area (Table 4b). All wet meadow habitats showed heavy livestock utilization leaving little residual cover available in the fall. For the past few decades, summer and fall grazing use has been authorized annually in higher elevation areas where riparian habitats are most abundant

Pronghorn, mule deer, and other wildlife also utilize riparian areas, but, due to their current low numbers, big game have significantly fewer impacts to riparian areas than domestic livestock.

In most meadow areas, plant community composition is diverse and comprised of grasses, sedges, rushes, and forbs. Invasive and noxious plant species are limited in their presence and dominance. Nevertheless, rest and/or other seasonal grazing adjustments that avoid repeated summer use are needed to promote revegetation of bare banks and improvement in plant vigor and composition.

Quaking aspen occur in the headwaters of Antelope Creek, upper West Little Owyhee River, Bob's Draw, and Pole Creek. Private lands near Hoppin Springs and Fort McDermitt Reservation lands also support aspen. Small stands of narrow-leaf cottonwood occur on upper West Little Owyhee River.

Woody riparian habitat quality and structural character varied significantly by stream. Refer to Table 4, Riparian PFC Summary, Chapter 3, Range Health Determinations, and Appendix J, Photos, for specific information. Isolated water sources that support aspen and are accessible by livestock (in both wet meadow and stream habitats) were heavily utilized and trampled. These areas show highly modified aspen and willow growth forms consistent with severe hedging as described in the Cole browse monitoring methodology.

Specific Upland Wildlife Habitat Assessment Results

(a) Native Uplands
Wyoming big sagebrush habitats occupy about 70% (365,000 acres) or more of LCGMA (Table 5). Both xeric (8-10 inch or less precipitation zones) and mesic (> 10 inch precipitation zones) Wyoming big sagebrush variants were observed, showing very different understory composition and shrub structure. Consequently, these variants are described separately below.

Due to site differences in rainfall and soils, productivity of xeric and mesic Wyoming big sagebrush types did not correlate exactly with changes in elevation. Lower elevation communities were often more productive, with better wildlife habitat quality compared to communities at higher elevations. For example, compare Landscape Appearance Photo #4 (5180' elevation, high relative productivity) in Anderson Allotment with Photo #9 (5370' elevation, low relative productivity) in Star Valley Community Allotment.

Most *mesic Wyoming big sagebrush* shrub cover types exhibited fine scale patchiness comprised of co-mingled shrub cover Classes 3 and 4. In the GMA, Wyoming big sagebrush canopy cover

ranged between 5% and 25%. Heavier sagebrush canopies were considered to be between 15% to 20% cover, while lighter canopies were between 5% and 10% cover. These arrays of cover densities provide both shrub cover and quality herbaceous understories that support communities of shrub steppe wildlife.

Mesic Wyoming big sagebrush types also showed heterogeneous shrub ages, densities, and canopy heights which were desirable for wildlife forage and habitat structure (see Landscape Appearance Photos #1- #6, #12 in Appendix J). Sage grouse nesting and wintering cover was abundant. Virtually all mesic Wyoming big sagebrush communities showed forb compositions and densities consistent with mid-seral ecological conditions or higher.

Sagebrush and bluebunch wheatgrass heights were sampled in mesic Wyoming big sagebrush communities to determine habitat structure for wildlife. Field data showed that sagebrush and grass height characteristics met the lateral and overhead cover nesting requirements of sage grouse as well as many other ground or canopy nesting landbird species.

Xeric Wyoming big sagebrush types, such as those found in Star Valley Community Allotment, tended to exhibit herbaceous understories weak in both composition and density. Moreover, xeric shrub overstories tended to be smaller in stature and exhibited a more homogeneous, denser canopy cover than observed in mesic Wyoming big sagebrush communities (See Landscape Appearance Photos #8, 9, Appendix J). Xeric Wyoming big sagebrush cover was typically 20% to 25%, or slightly higher.

Based on OAESIS range survey data, early seral ecological conditions were present in parts or all of Sacramento Hill, Pole Creek Seeding, North Stoney Corral, North Tent Creek, and South Tent Creek pastures. These areas did not meet Rangeland Health Standard 5 (Wildlife). Although shrub overstory was adequate, the herbaceous understory conditions were not consistent with mid, late, or PNC ecological conditions.

No sagebrush or grass height measurements were taken in xeric Wyoming big sagebrush types, but photos from Star Valley Allotment clearly showed the appearance of the xeric community and enabled comparisons to mesic Wyoming big sagebrush. Due to low site capability based on soil types and precipitation, grasses and forbs in xeric Wyoming sage sites in LCGMA were not able to produce the lateral cover associated with successful sage grouse nesting, e.g. plant heights of 7 inches or more. However, based availability of better quality nesting habitat and water sources elsewhere in LCGMA, it is questionable whether sage grouse would choose to nest in these xeric Wyoming big sagebrush habitats.

Although historic livestock and wild horse grazing likely contributed to weak herbaceous understories in xeric Wyoming big sagebrush communities in LCGMA's lower elevations, ongoing livestock grazing practices do not appear to be causing current conditions. Outside of the immediate areas around water, signs of extensive trampling damage and heavy utilization were not observed. Based on the relatively small stature of un-grazed xeric sagebrush habitats, site potential and productivity appears to be naturally low.

Low sagebrush communities occupied the highest elevations, especially regions south of Star Valley Road. Low sagebrush was present as a subdominant inclusion along the rims of the Owyhee River. Low sagebrush communities made up about 25% (133,000 acres) of the GMA,

and were comprised of a combination of shrub cover Classes 3 and 4. Low sagebrush communities typically supported a robust and diverse understory of grasses and forbs that are of value to nearly all species of terrestrial wildlife.

Although *mountain sagebrush communities* were present in LCGMA, they were not abundant. They were generally confined to small, scattered patches (tens of acres or less) that are subdominant communities nested within low sagebrush at about 5800' elevation or higher. Mountain sagebrush canopy cover appeared to be primarily within the 20% to 30%+ range, i.e., shrub cover Class 4 and 5. No line intercept or shrub height measures were taken in mountain sagebrush communities.

Based on aerial and vehicle reconnaissance, it was estimated that about 10% or less of low sagebrush types also support subdominant communities of tall sage (mountain, basin big, and Wyoming big sagebrush). Many of these "nested" habitat types are particularly valuable for sage grouse nesting and escape cover. They are also excellent habitat patches for landbirds such as sage thrashers, gray flycatchers, and loggerhead shrikes. These species were frequently flushed from tall sagebrush cover during the assessment process.

Basin big sagebrush occupied many low elevation drainages including Tent Creek, Toppin Creek, Pole Creek and Antelope Creek. It generally occurred in narrow and often discontinuous patches of deeper soils. OAESIS range survey data did not delineate basin big sagebrush communities and they were not mapped in the assessment process. Canopy cover within these communities was also not measured, but based on visual estimates cover appeared to be 25% or more; e.g. Classes 4 and 5. Basin big sagebrush communities typically showed well connected overstories but generally tended to have weak herbaceous understories, presumably from historic grazing practices and diminished site capability.

Bitterbrush and mountain mahogany communities are present but limited to a few sites in Little Owyhee Allotment. No data were collected about their growth forms or reproductive success.

Salt desert communities, which include shadscale, budsage, and spiny hopsage, were present as minor components of shrublands within Star Valley Allotment. Salt desert communities were not continuous and homogeneous as is the case in other parts of the intermountain west. Overall, salt desert generally comprises a very small proportion of the rangeland in LCGMA.

(b) Seeded and chemically treated uplands

Seedings and brush control projects have influenced about 43,500 acres, over 8% of LCGMA**.** All existing land treatments occurred during the Vale Project era between late 1960's through the mid 1970's. Locations of the projects have been mapped in the Vale District Geographic Information System. In contrast to other rangeland within Malheur County, LCGMA has sustained a relatively small proportion of land treatment disturbance. Class 1 and 2 crested wheatgrass rangelands support substantially fewer species of wildlife in comparison to native shrublands (see Graph 1).

Starvation Seeding was the only pasture which showed a strong grassland appearance (shrub cover Classes 1 and 2) and it is the only project area that does not meet Rangeland Health Standard 5 for wildlife forage, structure, and cover. None of the LCGMA seedings were planted with forbs and so they do not currently meet the minimum wildlife habitat standard for forb

composition in seedings specified in the SEORMP.

Starvation Seeding, Campbell Allotment (14,000 acres seeded in 1964)
Approximately 91% of Starvation Seeding was seeded to crested wheatgrass. This seeding exhibited a shrub cover Class 1 aspect with little or no shrub overstory. Starvation Seeding comprises less than 3% of LCGMA and thus wildlife habitat values are impacted only locally. There are no recent burns or Class 1 seedings nearby that would increase the impacts of grassland habitat conditions present in Starvation Seeding. The original seeding project left a corridor of Wyoming big sagebrush cover along Big Antelope Creek, amounting to about 10% of the pasture. The sagebrush extends out several hundred yards to either side of the creek, which bisects the pasture. Shrub cover within the corridor was a combination of Class 3 and 4 types; herbaceous understory conditions there were generally weak, both in terms of species composition and density.

Pole Creek Seeding, Louse Canyon Allotment (4,000 acres were seeded in 1970, out of 19,600 total pasture acres)
Pole Creek Seeding is one of several pastures referred to as "seedings" in BLM records but which were only partially impacted by the effects of vegetation treatment. Approximately 26% of Pole Creek Seeding (about 4,000 acres) supported a Wyoming big sagebrush/ crested wheatgrass community. The seeded area has had substantial post-treatment shrub overstory recovery (shrub cover =10%) and currently could provide habitat for some wildlife. Sagebrush canopy character (volume, maturity, height, and ability to conceal animals) in the seeded area was of a lower quality than on native range due to the young age of the plants and physical disturbances caused by the concentrated livestock grazing use typical of seedings.

The remaining 74% (15,600 acres) of Pole Creek Seeding had native plant cover that was not treated. Shrubs in these undisturbed areas were cover Classes 4 and 5.

Steer Canyon Seeding, Louse Canyon Allotment (6,300 acres seeded in 1965)
About 56% of the Steer Canyon Seeding was planted with crested wheatgrass. The seeded area showed substantial post-treatment shrub recovery (shrub cover = 10% to 15%) and currently could support wildlife that use sagebrush habitats. Sagebrush canopy character (volume, maturity, height, and ability to conceal animals) in the seeded area was a lower quality than on native range due to the young age of the plants and physical disturbance from concentrated livestock grazing use.

The remaining 44% of the pasture supports sagebrush cover predominantly in Class 4, with a weak herbaceous understory.

Starvation Brush Control (20,000 acres chemically treated (sprayed) with 2-4D in 1963)
Starvation Brush Control showed a substantial post-treatment shrub canopy recovery and supported a heterogeneous mix of Class 3, 4, and 5 shrub cover types. There was little visible evidence, such as low canopy density and presence of shrub skeletons, of the 1963 treatment. Sagebrush cover in Starvation Brush Control was not substantially different from the cover character of adjoining native rangelands. Due to the combined effects of droughty soils and heavy historic livestock grazing, Class 5 shrub cover types had a depleted herbaceous understory.

(C) General livestock utilization patterns and extent of use by livestock observed
Livestock utilization levels and impacts to wildlife habitat vary from year to year depending on a variety of factors. Nevertheless, it is possible to get a general sense of recent historical grazing patterns and how they may be influencing wildlife habitat by looking at factors such as residual cover, fence-line contrasts, trampling effects, plant composition, and shrub canopy conditions.

Substantial livestock grazing use impacts in LCGMA uplands are typically confined to areas within ¼ mile or less of developed and natural water sources. Because most LCGMA pasture units are quite large, natural water is limited, and stocking rates have been comparatively low, livestock use has generally not resulted in thorough understory search over large areas. Consequently, the forage, structure, and cover values associated with herbaceous plants are generally abundant and available for wildlife to use. It is significant that these good upland herbaceous cover conditions were observed in 2000, which was a drought period with relatively low plant production.

It is not uncommon to see perennial upland grasses and forbs growing at the edge of reservoirs used by livestock in LCGMA. This condition is indicative of favorable moisture conditions and grazing use practices that sustain the productivity of native rangelands over a prolonged time period.

Exceptions to the generally favorable patterns of livestock utilization observed in LCGMA include the following:

* Terrace uplands adjoining streams and meadows (such as Chipmunk Basin and Deer Creek) showed signs of high livestock utilization and generally weak understory conditions.

* Isolated mountain and/or basin big sagebrush communities (those "nested" within low sagebrush types) often showed heavy livestock grazing use such as damaged shrub structure and depleted understory conditions. Some of these shrub habitat patches were tall enough to be used as shading areas for livestock.

* Livestock utilization around troughs in seedings was particularly severe, but the overall impacts of this use were limited in spatial extent and impact to wildlife cover and forage values. Crested wheatgrass seedings generally provide limited herbaceous forage values for wildlife. No invasive weed species were observed in these severely used areas, but they would be vulnerable to noxious and invasive weeds over the long term.

Big Game Forage Demand
Refer to Appendix E, Calculation of Big Game Forage Demand, for an explanation about the origin and calculation of forage demand for mule deer, pronghorn and bighorn sheep. The Oregon Department of Fish and Wildlife was unable to supply the information necessary to calculate a forage demand for bighorn sheep on a pasture or allotment basis in LCGMA so sheep are not listed in the following table.

The current *seasonally adjusted* competitive forage demand for big game at state management plan objective levels is as follows:

Allotment	Pronghorn	Mule Deer
Campbell	171 animals, summer use 43 animals, winter use ***21 total competitive AUM's***	11 animals, summer use 11 animals, winter use ***4 total competitive AUM's***
Louse Canyon	86 animals, summer use 0 animals, winter use ***9 total competitive AUM's***	170 animals, summer use 23 animals, winter use ***35 total competitive AUM's***
Anderson	43 animals, summer use 21 animals, winter use ***6 total competitive AUM's***	28 animals, summer use 57 animals, winter use ***15 total competitive AUM's***
Star Valley	107 animals, summer use 0 animals, winter use ***11 total competitive AUM's***	28 animals, summer use 0 animals, winter use ***5 total competitive AUM's***

Based on the general habitat conditions observed, upland habitats (exclusive of meadows) are providing more than enough forage to support healthy and sustaining mule deer, pronghorn, and bighorn populations. Summer and fall forage availability for wildlife using upland meadows and riparian habitats is being limited significantly due to livestock grazing use. This situation could be remedied by incorporating periods of rest or removing livestock earlier in the fall so re-growth of vegetation in meadows and riparian areas may occur.

There does not appear to be any need to adjust big game forage demand figures disclosed in the SEORMP. Oregon Department of Fish and Wildlife (ODFW) has not made changes in their management objectives or benchmark population levels that would require an adjustment in forage demand.

Selected Terrestrial Wildlife Species Accounts

Greater sage –grouse

Field measurements of sagebrush community distributions, heights, and canopies compare favorably with the seasonally variable habitat requirements reported in sage-grouse scientific literature (Connelly *et al*. 2000b). Over 95% of the assessment unit provides sagebrush canopy cover that meets sage-grouse nesting or wintering requirements. Herbaceous understory composition in nesting and brood rearing habitats was sufficient to provide abundant plant and (probably) insect food sources for sage grouse.

Breeding and Brood Rearing Habitats – Sage-grouse breeding and brood rearing habitat in LCGMA is moderately productive relative to other geographic areas within Malheur County. Based on 2001 data, there are 28 sage grouse leks located within LCGMA. Lekking habitat occurs near Horse Hill and along small buttes or low sagebrush rims that adjoin the Owyhee River (Map 12, Greater Sage-Grouse Leks). Of the 15 other GMA's in Malheur County, only the Trout Creek (43 leks), Soldier Creek (29 leks), and Bully Creek (30 leks) GMA's have more leks within their boundaries (see Graph 2, Number of Leks per GMA).

Spatial distribution of leks in LCGMA tends to be more widely scattered than in other GMA's. The highest lek densities in Malheur County are associated with low sagebrush communities that

are close to mountainous topography with abundant natural water sources. LCGMA has less relief and fewer natural water sources than highly productive habitats.

The best nesting and brood rearing areas for Malheur County are typically moist mid to upper elevation rangelands comprised of low sagebrush and mountain or Wyoming big sagebrush communities with a network of springs, meadows, and streams. Xeric Wyoming sage communities in LCGMA provide too few water sources and spring/meadow complexes to support significant late season brood rearing or yearlong use.

Winter range - No sage-grouse winter survey data are available from LCGMA. However, as evidenced by observation of winter pellet groups in 2000, most low and big sagebrush communities showed some winter sage-grouse use, even on lowest elevation (5500' - 6000') Wyoming big sagebrush terraces. Sagebrush habitats in general are so well connected, exhibit so few grassy openings of significant size, and provide such good structure and forage, that winter habitat availability for sage-grouse appears to be abundant and of a generally high quality.

Landbirds (formerly known as Neotropical Migrants)

In addition to sage-grouse, LCGMA supports several birds that have been described as species of interest in ICEBMP and the Conservation Strategy for Landbirds in the Columbia Plateau of Eastern Oregon and Washington (Altman 2000). These species include: *gray flycatcher*, *horned lark*, *sage thrasher*, *sage sparrow* and *Brewer's sparrow*.

Data from the U. S. Fish and Wildlife Service Lookout Lake and Louse Canyon Breeding Bird Surveys are used as reference material for characterizing landbird presence and relative abundance in LCGMA. Although there is not an identical overlap between these routes and the LCGMA boundary, the habitat types surveyed on these routes are virtually identical to those present in LCGMA. Based on these data, landbirds dependent upon sagebrush types are well represented in LCGMA. Although no systematic bird surveys were conducted during this assessment, the species of interest were commonly encountered during summer fieldwork.

Mature shrub habitat structure, good landscape connectivity, and generally favorable understory conditions in this unit likely account for good diversity and relative abundance of sagebrush associated birds. Landbirds of management importance were most abundant in mid to upper elevation sagebrush types and frequently associated with tall shrubs and canopy cover of 15% or more. These areas are typically associated with small changes in topography and aspect that foster the most productive and diverse steppe habitat conditions.

Based on general observations throughout the summer, raptors are not particularly abundant or diverse in LCGMA. Although small rodent burrows were common, ground squirrels and black-tailed jackrabbits were not frequently encountered. In short, raptor mammalian food sources appear to be relatively limited. Only 1 ferruginous hawk was observed within the assessment unit in 2000. Cliff nesting habitats for golden eagles and prairie falcons are largely confined to canyons of West Little Owyhee River. Tree species such as aspen and juniper are also limited in their abundance and distribution.

White-tailed jackrabbit

This nocturnal species can be seen in low and big sagebrush complexes of high elevation rangelands but is not common in Malheur County. Over the last few decades, BLM and ODFW biologists have observed significant numbers of white-tailed jackrabbits in the area, and a few rabbits were seen by day during the assessment process. It is not known whether the population residing within LCGMA is of a size and distribution typical for the species. Based on general habitat requirements for the rabbit and overall quality of sagebrush habitat available in LCGMA, no significant limiting factors related to BLM authorizations are apparent.

Snowshoe Hare

Bruce Easterday (McDermitt, NV, rancher) reported seeing snowshoe hare in Jack Creek meadows around Nouque Cow Camp. BLM range technicians John Whitley and Doug Wiggins also reported snowshoe hares near Jackson Summit east of the LCGMA boundary. Bill Olson (retired ODFW biologist) and Bob Kindschy (retired BLM biologist) suggested that these observations were most likely white-tailed jackrabbits. Neither of these retired wildlife professionals has seen snowshoe hare in LCGMA. Moreover, Verts and Carraway (2000) indicated that snowshoe hares occupy forest types, not sagebrush steppe habitats.

Pygmy Rabbit

LCGMA likely supports pygmy rabbits along major drainages with tall sagebrush (basin big or Wyoming big sagebrush) and in mixed big sagebrush / low sagebrush areas. BLM pygmy rabbit surveys conducted in Lake and Harney Counties (Oregon) during 2002 and 2003 have revealed that substantial populations of pygmy rabbits are found in big sagebrush / low sagebrush complexes not previously considered prime habitat for the species. The greatest concentration of basin big sagebrush occurs from Rawhide Springs and the lowlands east towards Pole Creek. We did not observe pygmy rabbits in 2000 and historical surveys for the species did not include the assessment area.

Challenge Cost Share pygmy rabbit survey work in LCGMA was conducted between February 6 and November 6, 2001, by Peggy Bartels. Field data were collected near Anderson Crossing, Horse Hill, and Big Antelope Creek. No confirmed observations of pygmy rabbits or burrows were made but some areas near Horse Hill appeared be potential habitat. More detailed survey work would be needed to confirm pygmy rabbit presence in LCGMA.

California Bighorn Sheep

Based on ODFW data from the early 1990's, approximately 65,000 acres of public land are currently occupied by California bighorn sheep in LCGMA. The SEORMP identified a total of 183,000+ acres of "Bighorn Range" within LCGMA which is defined as the area in which ODFW is authorized to pursue new releases, supplemental releases, and captures of bighorn for the purpose of implementing state management goals for the species.

As of 2001, ODFW indicated that bighorn numbers in this unit were low. Predation by cougar was suspected to be one of the primary limiting factors to their current population level. There are no known forage or security issues related to BLM authorizations currently affecting bighorn populations in LCGMA. Domestic sheep grazing does not occur within LCGMA so there are no conflicts concerning disease transmission that would require resolution.

Reptiles

Several reptile species occupy LCGMA habitats and were seen regularly during the course of the assessment. Site locations were recorded on field maps and entered into the District wildlife observations database, though standardized surveys were not conducted. Most GMA reptiles had no special status designation, indicating a widespread, common distribution. Some species were designated Bureau tracking, which is a status conferred on species for which more information is needed or which no longer need active management. BLM collects occurrence data on tracking species but does not consider them special status species for management purposes.

The *northern sagebrush lizard*, Bureau tracking, is the only special status reptile observed within the GMA. Its distribution was widespread and it was observed in nearly every pasture assessed. Sagebrush lizards are ground dwellers and inhabit open, brushy flats, using shrubs for cover or hiding in rodent burrows.

The *short-horned lizard* also utilizes open sagebrush habitats, and can live on hardpan and rocky soils but requires patches of loose soil for burrowing. It is less dependent on shrubs for cover than sagebrush lizards, but is not likely to be found in seedings. Its diet includes a high proportion of ants and thus lizard densities are higher where anthills are abundant. The short-horned lizard is more cold tolerant than many lizards, and its live-bearing mode of reproduction allows it to incubate its eggs internally. These lizards were widely distributed throughout the GMA and were frequently found at the same sites as sagebrush lizards.

Except for crested wheat seedings and rimrock areas, the GMA provides extensive areas of suitable habitat for both sagebrush and short-horned lizards, which were widespread and utilized sagebrush with a variety of canopy densities. However, neither species frequented seeded pastures. In an Idaho study investigating responses of sagebrush steppe reptiles to crested wheatgrass plantings, the relative densities of sagebrush and short-horned lizards in seedings were significantly below those of ungrazed sagebrush/squirreltail habitats (Reynolds and Trost 1980). The study also showed that lizard densities on sagebrush habitats grazed by sheep were not different from the ungrazed sagebrush, suggesting that upland livestock use in LCGMA may have little impact on these reptiles.

Western fence lizards and *side-blotched lizards* tend to be restricted to rocky habitats with a vertical component, such as cliffs, boulders, and rimrock. In the GMA, these lizards were found along rock canyons such as Pole Creek and West Little Owyhee River and were absent from open sagebrush flats. These rock-dwellers were encountered less frequently than sagebrush or short-horned lizards during the assessment, undoubtedly because the assessment focused on open rangeland where they do not occur. LCGMA provides suitable habitat for these species.

Other lizard species may occur in the GMA but have not been observed. *Mohave black-collared lizard* (Bureau tracking), which require sparsely vegetated, rocky slopes, and *longnose leopard lizards* (Bureau tracking), common in greasewood flats with sandy soils, are documented in the Sheephead Mountains, near Burns Junction, and in the Owyhee River canyon. The desert horned lizard occurs in lower elevations near McDermitt and Burns Junction, but usually does not co-occur with its short-horned relative. *Western whiptail lizards* utilize a variety of sagebrush and rocky habitats and occur in the Owyhee River Canyon, but have not been observed in LCGMA.

Wandering garter snakes occupy riparian and aquatic habitats and were abundant in the GMA. See Section J, Aquatic Species and Habitats, for the species account.

A few sightings of *gopher snakes* and *western rattlesnakes* were made during the assessment but no systematic snake inventories were done. Both species typically inhabit dry upland areas that are sparsely vegetated but which must include rocky denning sites. There is no indication that current upland grazing levels in the GMA impact habitat of these snakes.

Other snake species may occur in Louse Canyon GMA. The *striped whipsnake*, a sagebrush flat and rocky canyon dweller which is wary and difficult to observe, has been documented from the Owyhee River corridor adjacent to Bull Flat Pasture. However, it is generally found at elevations lower than the GMA. *Racers* are documented from sagebrush steppe habitats to the north and west, and likely occur within the GMA. *Western ground snake*, a Bureau tracking species, is small and secretive and may be overlooked, but is generally found at elevations lower than the GMA.

J. Aquatic Species and Habitats

The SEORMP provides guidance for management of fish and aquatic habitat in LCGMA. The primary objective for aquatic habitat management is to restore, maintain, or improve habitat to provide for diverse and self-sustaining communities of fishes and other aquatic organisms.

In general, riparian areas and stream habitat conditions are considered beneficial for aquatic species when riparian/wetland vegetation structure and diversity are significantly progressing toward controlling erosion, stabilizing streambanks, healing incised channels, shading water areas, filtering sediment, aiding in floodplain development, dissipating energy, delaying floodwater, and increasing recharge of ground water. In addition, riparian/wetland vegetation should be increasing in ground cover and canopy volume (height and width), and key woody plants should exhibit multiple age-classes, where appropriate.

Pastures with riparian/wetland habitats that meet Rangeland Health Standard 2 (Watershed Processes--Riparian) are also considered to meet Rangeland Health Standard 5 (Native, T&E, and Locally Important Species—Riparian). See Table 4, Map 7, and Map 8 for information on PFC assessment results for both streams and wetlands.

Fisheries in Louse Canyon GMA

At least four native fish species occur in LCGMA streams and include *interior redband trout*, *redside shiner*, *specked dace*, and *bridgelip sucker* (Map 9, Perennial and Fish-bearing stream reaches). None are Federally listed and only redband trout (see below) have special status designation (Bureau Tracking). In the Owyhee River drainage, anadromous *steelhead, chinook salmon,* and *Pacific lamprey* were lost with completion of Owyhee Dam in 1932. Redband trout probably existed throughout much of the mainstem Owyhee River, but dam construction and chemical treatment projects may have reduced their numbers. Several nonnative fish species have been introduced in the main Owyhee

River downstream of GMA streams. *Smallmouth bass* and *channel catfish* originated from a 1970 stocking project where ODFW treated the Main Owyhee River with chemicals applied at Three Forks, and then introduced bass, catfish, and *hatchery rainbow trout* (ODFW Report, Buckman, 1969). ODFW fish surveys conducted on the upper and lower sections of the Main Owyhee in 1988, 1996 and 1997 (Wayne Bowers, ODFW, Hines, OR) observed few trout of any species, but recorded an abundance of smallmouth bass and channel catfish. BLM surveys in side tributaries have located bass spawning sites and small populations of native fishes. Although exotic species have access to lower reaches of Antelope Creek and West Little Owyhee River, they are not known to be present upstream.

ODFW periodically stocks a coastal strain of hatchery rainbow trout in Steer Canyon, Cavieta (a.k.a.Chico), Coyote Holes, and Jeff's reservoirs. In most reservoirs, spawning habitat is lacking, and natural reproduction does not occur. However, rainbow trout stocked in Jeffs Reservoir have successfully spawned in Massey Canyon and probably have access to West Little Owyhee River during high flows. When Cavietta and Steer Canyon reservoirs spill, stocked trout may be able to move downstream toward Pole Creek, but perennial refuges for trout would be extremely limited.

Interior Redband Trout

Native redband trout in southeastern Oregon have evolved adaptations to live in harsh environments characterized by great extremes of water temperature and flow. In these situations, hatchery strains of rainbow trout may not be effective predators or competitors. However, hatchery trout have hybridized with most populations of resident redband trout in much of the Columbia River basin and undoubtedly a considerable amount of genetic diversity has been lost during the last 100 years. In 1994, allozyme genetic testing of 25 trout from Cold Spring on West Little Owyhee River showed that these fish had allelic frequencies characteristic of native inland Columbia Basin redband trout, with some genetic drift but no evidence of hybridization with hatchery stock (Currens 1994, 1996). Consequently, maintenance and improvement of habitat for this headwaters trout population is a high priority.

The genetic makeup of trout downstream of the Cold Springs area has not been determined. The downstream extent of the distribution of West Little Owyhee River redband trout is unknown, but it is possible that they move extensively during spring runoff. A BLM survey conducted in August 1979 recorded large trout in isolated pools from Cold Spring to within a few miles of the mouth, but no recent surveys have occurred. An attempt in 2001 by ODFW and BLM biologists to sample genetic material from trout at Anderson Crossing, 43 miles below Cold Spring, was unsuccessful. The potential exists for intermingling of native West Little Owyhee River redband trout with Jeffs Reservoir hatchery trout in Massey Canyon. As a result, the BLM negotiated an agreement with ODFW to terminate planting of hatchery trout in reservoirs with outflows to the West Little Owyhee in order to protect the native trout from hybridization.

In order to investigate the relatedness of West Little Owyhee River redband trout with populations in other basins, BLM and ODFW biologists collected additional tissue

samples in 2001 from Cold Spring trout, which will be analyzed using mitochondrial DNA technology.

Amphibians and Aquatic Reptiles in LCGMA

No special status amphibians have been documented from LCGMA. The *Pacific treefrog* is abundant and well distributed along GMA streams, breeding in side channels, sloughs, and pools. Treefrogs also occur at springs and reservoirs, often isolated by several miles of inhospitable sagebrush steppe. Pacific treefrogs are particularly adapted to arid ecosystems, opportunistically laying eggs in almost any small body of temporary water and, during dry periods, taking refuge under rocks or in rodent burrows. Habitat for treefrogs in the GMA is generally heavily utilized by livestock and is characterized by reduced vegetative cover and trampling of pool margins. While lack of cover probably affects vulnerability of treefrogs to predation, few studies have quantified the impacts of grazing on amphibians.

Columbia spotted frog, a Federal candidate species, and *blotched tiger salamanders*, Bureau Tracking, occur north of LCGMA and east in Idaho, but have not been documented in Vale District south of the Main Owyhee River.

Wandering garter snakes were found near water along GMA streams such as Antelope Creek, Toppin Creek, and West Little Owyhee River and were especially abundant where fish and tadpole prey was concentrated in isolated pools and sloughs. Although wandering garter snakes forage on open stream banks, they utilize vegetative or structural cover, such as shrubs, herbaceous plants, or rock, for escape and may be impacted by complete removal of riparian cover by livestock. In a study of a willow riparian community in New Mexico, wandering garter snake captures were five times greater in exclosures with 17% shrub cover than in adjacent grazed areas that lacked vegetative cover (Szaro *et al*. 1985).

Aquatic Invertebrates in LCGMA

Limited information is available on invertebrates, and more is known about aquatic than terrestrial species. Stream invertebrates are routinely collected as part of the fisheries habitat monitoring program. These collections are analyzed for species composition, abundance of organisms, and the presence of certain indicator species. If many species that are adapted to polluted or degraded environments are found, then the stream being assessed may be a candidate for restoration or improvement. Conversely, the presence of invertebrates found only in clean water, such as certain stoneflies or mayflies, indicates good stream conditions.

Invertebrate samples collected in 1995 from the perennial portion of West Little Owyhee River below Cold Spring showed that the invertebrate community was dominated by three mayfly species: *Paraleptophlebia* and *Epeorus*, mayflies with low tolerances to pollution or nutrient enrichment; and *Baetis*, a somewhat more tolerant species. Midge larvae, which are adapted to high sediment loads and organic enrichment, were common. Other pollution tolerant taxa included dragonflies, damselflies, and water mites. The stonefly *Zapada*, an indicator of clean water, was present in low numbers. In general, invertebrate species with low tolerances to nutrient enrichment made up 30% of the benthic community, a proportion that suggests slight organic enrichment of this portion of West Little Owyhee River.

Springs can be a source of unique, often endemic, assemblages of invertebrates that are adapted to the constant temperatures and distinctive geochemical environments that springs provide. Because these habitats are uncommon and isolated, a particular species, such as a snail or beetle, may be found only at that site and may have little opportunity for dispersal or migration to other areas. In some cases, these invertebrates are vulnerable to development that eliminates shallow pools and surrounding riparian vegetation. It is expected that spring systems that meet Standard 2 (Watershed Function--Riparian) should provide habitat that sustains healthy invertebrate communities, and that these systems will also meet Standard 5 for riparian species.

Overview of Aquatic Habitat Conditions

The quality of aquatic habitat for fish and other species is closely related to the condition of riparian areas and the stream channel (Table 8, Riparian Trend Analysis). Riparian vegetation moderates water temperatures, adds structure to the banks to reduce erosion, and provides overhead cover. Intact vegetated floodplains dissipate stream energy, store water for later release, and provide rearing areas for juveniles. Water quality, especially in regard to factors such as temperature, sediment, and dissolved oxygen, also greatly affects aquatic habitat.

Fisheries and aquatic habitats in LCGMA include perennial streams, intermittent streams that support fish and other species through at least a portion of the year, and four stocked reservoirs. There are about 68 miles of fishbearing waters which include portions of West Little Owyhee River, Antelope Creek, Pole Creek, and Field Creek (Map 9). Non-fishbearing stream reaches, springs, and seeps support other aquatic species such as amphibians, reptiles (wandering garter snakes), and invertebrates.

West Little Owyhee River

The entire length of West Little Owyhee River lies within LCGMA. The river's interrupted upper reaches start on Larribeau Field of Campbell Allotment at an elevation of 6400 ft, but perennial flow begins 8 miles downstream at Cold Spring, where spring waters emerge at 9^{o} C, and continues approximately 3 miles until the river once again becomes interrupted. West Little Owyhee River is dry at its mouth (el. 4100 ft) after spring runoff.

Except for the perennial reach, the river's discharge is dependent on spring snow melt and flow is generally reduced to isolated sloughs and pools by early summer. Most of the deeper or spring-fed pools retain fish throughout the summer, even in the highest reaches above Cold Spring where typically 70% of the channel is dry in summer. These fishes include redside shiners, speckled dace, bridgelip suckers, and redband trout. Pacific treefrogs and wandering garter snakes are also abundant in isolated pools.

Although West Little Owyhee River has limited potential for fisheries due to low summer discharge, the stream provides good spawning and rearing fish habitat in the cool water and clean substrates of its perennial reach, and where water is retained in deep pools in intermittent reaches. Currently, grazing is excluded from most of the river canyon and livestock impacts are minimal.

Tributaries to West Little Owyhee River
Except for portions of Massey Canyon, none of the tributaries of West Little Owyhee River are known to be fish-bearing. Substantial seasonal flows occur from Jack Creek, Dry Canyon, Spring Creek, and Toppin Creek, but these streams have barriers or are short with steep gradients.

Based on PFC assessments for Rangeland Health Standard 2 (Watershed Function--Riparian), riparian conditions observed on 49% of Jack and Deer Creeks, 60% of Massey Canyon streams, and 85% of Dry Canyon were not sufficient to dissipate stream energy, reduce erosion, store water for later release, or provide rearing and foraging areas for fish, amphibians, or invertebrates. These habitats were adversely affected by livestock grazing, which reduced plant cover and compacted wet soils. However, Toppin Creek (4.7 miles) was in properly functioning condition.

Antelope Creek
This watershed is comprised of Antelope Creek and its main tributaries, Pole Creek and Field Creek. As with West Little Owyhee River, discharge of these streams is dependent on spring snow melt. During the brief spring runoff period, flows are apparently sufficient to allow free movement of fishes throughout the drainage, but distribution is restricted by early summer when water is reduced to isolated pools. In some reaches, the deeper or spring-fed pools may retain fish throughout the summer, and provide breeding areas for amphibians.

Antelope Creek is the dominant stream in the watershed, maintaining some perennial reaches even during drought years. The channel originates at 6100 feet elevation in Horse Hill Pasture of Campbell Allotment and travels 25 miles to its confluence with the Main Owyhee River (el. 4000 ft).

The upper 15 miles of Antelope Creek is an interrupted system, and redside shiners, bridgelip suckers, Pacific treefrogs, and wandering garter snakes inhabit isolated pools to within 1.5 miles of the top of the drainage. Because of limited availability of stock water in the vicinity, this fishbearing reach is adversely affected by watering livestock concentrations, which impair the habitat quality for aquatic species. The lowest 9.5 miles of Antelope Creek are perennial and provide good habitat for native fishes and probably amphibians. Redside shiners, speckled dace, and bridgelip suckers were abundant in this perennial reach.

Pole Creek
Pole Creek arises from springs and meadow systems in Louse Canyon Pasture of Louse Canyon Allotment (el. 5900 ft) and flows north to its confluence with Antelope Creek. Several miles of Pole Creek are privately owned. An interrupted system, the upper half of Pole Creek retains water late in the season in scattered spring-fed pools inhabited by redside shiners, speckled dace, bridgelip suckers, and Pacific treefrogs. About three miles of this fishbearing portion of Pole Creek does not meet Standard 2 or Standard 5 criteria. Aquatic habitats are impacted by vegetation removal, soil compaction, and reduced water quality due to livestock.

Field Creek
Field Creek has the lowest flow of streams in this watershed and has the least potential for fish habitat, although at least one fish species traverses it during runoff and may persist later in isolated pools. During drought years few pools retain water throughout the summer, though speckled dace were observed in one isolated pool in September. Field Creek provides breeding sites for Pacific treefrogs and possibly other amphibians. Though water is limiting, trampling and utilization from grazing lowers the quality and extent of aquatic habitat.

Tent Creek
Riparian conditions on segments of upper Tent Creek and its tributaries were not sufficient to dissipate stream energy, reduce erosion, or store water for later release. These habitats were adversely affected by livestock grazing, which reduced plant cover and compacted wet soils. Fish do not occur in the Tent Creek watershed, but these riparian areas provide rearing and foraging areas for Pacific treefrog and possibly other amphibians, garter snakes, and aquatic invertebrates.

Springs, seeps, and wetlands
In LCGMA, seventy-five percent of approximately 80 acres of meadow/wetland complexes and almost 30 springs were assessed as not functioning properly due to livestock trampling, overgrazing, or dewatering by developments (Table 4b; Map 8). These habitat conditions impact amphibians, aquatic reptiles and invertebrates, and upland species that use wetlands for water sources, breeding, or forage.

K. Recreation

Primary recreation activities and opportunities within LCGMA include big game hunting (mainly deer and antelope, with occasional bighorn sheep), backpacking, wildlife viewing, fishing and nature study. Due to the area's extreme remoteness and abundance of rough, 4-wheel-drive access routes, recreational visitation numbers for most years, including 2001, are estimated to total less than 2000 to 3000 visitor-days. Most of that amount probably comes during late summer antelope season and autumn deer season. In an average runoff year, one or two hundred visitor-days typically derive from springtime upper Owyhee River float trips.

The GMA includes all of the 62,500-acre Upper West Little Owyhee River Wilderness Study Area (WSA) and all of the 65,200-acre Lookout Butte WSA. Also included are over 100,000 acres of the 190,700-acre Owyhee River Canyon WSA. (See Map 11, Wilderness Study Areas and Wild and Scenic Rivers.)

Upper West Little Owyhee WSA is bisected by18 miles of West Little Owyhee River, a federally designated "Wild" river. This WSA contains the largest summer concentration of antelope, sage-grouse and white-tailed jackrabbits in Malheur County and offers outstanding opportunities for solitude and primitive, unconfined recreation, as well as special opportunities for scientific and educational study of diverse flora and fauna. Because drivable roads and trails are limited, off-highway vehicle (OHV) impacts are a constant threat to BLM's efforts to preserve wilderness values. Pressure during hunting seasons can be particularly intense, as hunters venture out in the WSA to scout wildlife and retrieve game, often up to the rims of canyons. Rocky, hardened

ground surfaces protect some sites, but crushed vegetation and topsoil disturbance are indications of potential scarring that such reckless OHV activities can produce. Sites within this WSA that receive heaviest visitation (primarily for hunting and fishing) are Jeff's Reservoir, Bell Spring, and Anderson Crossing.

Lookout Butte WSA consists mostly of gently sloped buttes and several playas. It has not been recommended for wilderness designation by BLM due to lack of outstanding scenery, landform diversity, or challenging terrain. On the other hand, it does offer exceptional opportunities for solitude. In fact, BLM estimates that the entire WSA probably receives fewer than 200 to 300 recreational visitor-days in any given year. Favorable big game or sage-grouse habitat is lacking, and consequently this WSA receives very light hunting pressure.

Dramatic 500 to 1000-foot canyons, spectacular scenery, and abundant wildlife characterize Owyhee River Canyon WSA. It offers solitude and a primitive, challenging environment. Recreational activities include nationally renowned whitewater boating, hunting, fishing, hiking, photography, camping, and nature study. The river is a federally designated "Wild" river within the National Wild and Scenic Rivers system. The Owyhee drainage also contains many cultural sites, from prehistoric to early 1900's era.

WSA's are currently managed in accordance with BLM's Interim Management Policy for Lands Under Wilderness Review. Under this direction, surface-disturbing activities requiring reclamation are generally precluded from the WSA's until Congress makes a decision on wilderness designation.

L. Areas of Critical Environmental Concern/Research Natural Areas

Toppin Butte ACEC/RNA (3996 acres) is located 30 miles northeast of McDermitt, Nevada, adjacent to the Idaho state line, and is part of Star Valley Community Allotment. The relevant and important values for which this ACEC/RNA was designated are low sagebrush/bluebunch wheatgrass communities in excellent condition and low sagebrush/Idaho fescue plant community cells identified by Oregon Natural Heritage Program. These plant communities will be specially managed for current and future research. Other relevant and important values are sage-grouse and associated habitat for landbirds (see Section I, "Selected Terrestrial Wildlife Species Accounts", for more details on landbirds).

Little water has been available for livestock in Toppin Butte ACEC, and topography limits livestock use on the upper slopes of the butte. Two playas at the base of Toppin Butte have playa and silver sagebrush plant communities but have diminished research potential due to disturbance from a road and a water development.

Current recreation use within the ACEC/RNA is extremely light due to remoteness and poor accessibility. Recreation opportunities include hiking, sightseeing, wildlife/nature study, photography, and hunting.

M. Owyhee Wild & Scenic River (WSR)

The Main Owyhee River was included in the Wild and Scenic Rivers System in 1984. The West Little Owyhee was added in 1988. Both rivers are classified as "Wild." Formal designation recognized recreation, scenic and wildlife values as "outstandingly remarkable values" (ORVs) for these rivers. Moreover, geologic and cultural values are two additional ORVs for the Main Owyhee.

Within the formal WSR boundaries of the Main Owyhee that lies within the GMA, whitewater boating, hunting, fishing, photography, nature study, rockhounding and sightseeing probably comprise the majority of human uses. The West Little Owyhee lacks boatable flows and is more remotely accessed. On the other hand, the upper reaches of the West Little Owyhee tend to open up considerably from the steep and deep, rocky confines of the canyon downstream. As a result, hunting, fishing and hiking/backpacking uses tend to increase. The more open nature of the river canyon in the upper West Little Owyhee also offers much easier access by livestock, deer and pronghorn antelope. With the exception of just a half dozen or so vehicular access points, reaching the river's edge throughout the entire GMA requires long hikes over rocky, broken terrain. Reaching the river by vehicle requires one- to three-hours over rocky, dusty backroads.

On June 6, 1998, a lawsuit concerning grazing in Owyhee River Wild and Scenic River corridors was collectively brought against BLM by Oregon Natural Desert Association (ONDA), Oregon Wildlife Federation, Idaho Watersheds Project and Committee for Idaho's High Desert.

The lawsuit challenged the BLM's management of Main, West Little, and North Fork Owyhee River corridors, contending that BLM failed to comply with the National Environmental Policy Act (NEPA) because the agency did not prepare an environmental impact statement (EIS) analyzing the effect of cattle grazing on the area. The lawsuit also contended that grazing violates BLM's mandate under the Wild and Scenic Rivers Act.

Judge James A. Redden, U. S. District Judge, issued the first opinion and order on November 3, 1998, requiring the completion of an EIS, but reserved his opinion on an injunction on grazing pending further briefings and hearings.

On November 18, 1999, Judge Redden issued his second opinion and order, ruling grazing of cattle in twelve areas of concern totaling 18 miles would be permanently closed, or in certain cases restricted, beginning April 1, 2000. The court subsequently changed this date to May 1, 2000. LCGMA includes and/or influences four of the areas of concern which were closed to grazing – Five Bar, Anderson Crossing, Three Forks, and Louse Canyon Water Gap.

Subsequent to a failed attempt at a mediated agreement, Judge Redden ordered BLM to present an alternative that the agency believed would both eliminate livestock impacts in the areas of concern, and negate the full effects of the injunction on the upper pastures and allotments within the canyon.

On March 13, 2000, BLM submitted its declaration (Declaration 5) on implementation and a proposal on what modifications to the order the agency believed could be made to eliminate grazing impacts within the areas of concern, but allow for livestock grazing in the upper allotments and pasture. The proposals included strategically placed gap fences within WSAs. Gap fences are short lengths of fence that are constructed between natural barriers to impede livestock access to the river.

An "Order of Modified Injunction" was filed in the District Court of Oregon on April 28, 2000. The order directed that certain fences and water developments (wells, pipelines and troughs) could be constructed by the grazing permittees to facilitate the elimination of grazing at the previously identified areas of concern. The order also directed BLM to complete an Environmental Impact Statement (EIS) specific to grazing in areas still open to grazing within the Wild and Scenic River corridor.

Specifically, within the Louse Canyon GMA, the court ordered construction of gap fencing necessary to exclude livestock from the four affected areas of concern. All new fencing is located within either the Upper West Little Owyhee WSA or the Owyhee River Canyon WSA. Intensive monitoring of the river corridor since the initial 2000 fence construction indicated the need for two additional, small gap fences to further "plug holes" and prevent livestock entry into the areas of concern. These were built soon after their need was identified. Periodic surveys by BLM staff on foot, horseback or vehicle have seemed to indicate that the new fencing is adequately excluding livestock from the areas of concern. BLM will continue to closely monitor the area to ensure adherence to terms of the court orders. The current grazing and that proposed under this evaluation is in accordance with the Modified Order of Injunction, pending the outcome of the court-ordered EIS.

N. Cultural Resources

Prehistoric

Archaeological evidence from Dirty Shame Rockshelter, located on Antelope Creek within LCGMA, indicates this immediate area of southeastern Oregon has been inhabited by humans for at least 9,500 years, and evidence from surrounding areas suggests human have occupied the region for at least 12,000 years. Occupation has been continuous, although population locations and densities have varied according to climatological cycles. Small, semi-nomadic groups of hunters and gatherers appear to have been the norm. Evidence of sedentary fixed-place groups has not been found, although the archaeological record suggests certain areas were utilized for seasons at a time. The mobile lifestyle implied by the present archaeological record represents a functional adaptation to the scarce, scattered resources of the western high desert.

Ethnographically, the Mono-Bannock speaking Northern Paiute and Western Shoshone peoples are known to have occupied southeastern Oregon as well as southwestern Idaho and northwestern Nevada. Information on population densities is incomplete at this time. Evidence of cultural influences from the Columbia Plateau as well as the Great Basin culture areas intermix in southeastern Oregon, complicating a regional cultural chronology. Traditionally, LCGMA appears to have been most closely affiliated with Northern Great Basin cultures.

Northern Paiute people occupied the area beginning about 1000 A.D. Paiute settlements were of two types: villages and camps. Winter villages of up to fifty huts have been reported in the historical record, but generally winter villages consisted of small, unstable groups of about three families located near a major lake or river. Seasonal camps were located near water and food. Living structures were typically a fence-like windbreak of sagebrush for a temporary or summer camp with a tree or brush sunshade or domed wickiup for both winter and summer use. The subsistence economy of Northern Paiutes was strongly oriented toward gathering and collecting because plant foods were more abundant and dependable than fowl, fish or mammals, and could be used for medicines and fiber. However, when mammals were available almost all parts were utilized, providing skins, furs, tools and many other by-products of aesthetic and practical value. Insects, including beetles, locusts, and caterpillars, were also eaten and provided a readily available source of protein.

Identified prehistoric sites in the area consist of hunting-related lithic scatters and rock alignments, multi-task occupation sites, toolstone quarries, rockshelters, rock art, and other rock structures such as cairns. Pithouses have been located nearby along the Owyhee River. None have been found in LCGMA, but potential for these structures exists.

No American Indian subsistence or traditional use areas have been identified in LCGMA. Traditional use resources include edible roots such as biscuitroot, camas, and onions; goosefoot and Indian ricegrass seeds and basin wild rye; willow; quaking aspen posts for hide working; lichens; basketry grasses; various berries; and toolstone sources such as obsidian, basalt, and cryptocrystalline silicates. The tribes may have used specific places as fish harvest areas as well.

Although sacred sites and traditional use resource sites may exist in LCGMA, the BLM is unaware of any. The tribes historically associated with the area have chosen not to share specific site and use areas with the Vale BLM office. Coordination efforts are ongoing in the form of annual meetings with the tribes, and project specific consultation.

Approximately .01% of LCGMA has been inventoried for cultural resources. Fourteen rockshelters, 44 prehistoric lithic scatters, rock art sites, hunting blinds and camps, and 3 areas of camas root concentrations are known to exist in LCGMA.

Many of the prehistoric sites occur at springs and other areas where water is present. Surface sites located at these areas exhibit disturbance by livestock in the form of congregation areas and trails. These disturbances cause artifacts to be broken and moved from their original locations through livestock trampling. In wet areas, hooves penetrating the soil profile may move artifacts vertically through the soil profile, further damaging site integrity. In addition, the destruction of vegetative cover allows erosional activity that causes artifacts to be moved from their original locations, and may cause subsurface site disturbance if the erosion is deeper than 10cm.

Livestock also congregate in rockshelters and overhangs, seeking shade. Fourteen rockshelters occur in the LCGMA and livestock are known to frequent one of them. Cultural artifacts in areas such as this are vulnerable to breakage and sites are open to

destruction of surface integrity by the moving of artifacts from their original locations by getting stuck in hooves and kicked.

No complaints have been filed under the environmental justice program by American Indians concerned about the effects of BLM plans, programs or policies in the planning area.

Historic

Fur trappers represented the first non-Indian presence in southeastern Oregon early in the 19th century. Euro-American development undermined native subsistence patterns and provoked conflicts between European and American Indian cultures. From 1821 to 1846, contact between Native Americans and immigrants increased with European exploration westward. The movement to exploit new fur trapping areas and to establish overland migration routes formed the basis for more intensive settlement and development. After 1847, pressures on the indigenous peoples increased with more concentrated use of overland travel routes by miners and settlers.

From 1864 to 1867, numerous military maps were completed, roads were constructed and posts were established throughout eastern Oregon. The army functioned primarily as protection for transport routes to the Owyhee Mines near Silver City, Idaho, and protection for new civilian settlements. The Ft McDermitt to Silver City and Winnemucca Wagon Road ran through LCGMA. Parts of this route have had continuous use and exist now as two-track and gravel roads.

When General Crook's campaign ended in 1868, Indians in southeastern Oregon were subdued and confined to reservations where they attempted to sustain their cultures within a context established and regulated by unreliable agents of the United States Government. Some Paiutes accompanied the Fort Hall Bannocks in a brief uprising (the Bannock War) of 1878.

Historic sites identified within LCGMA include rock cabins and corrals, trash dumps, and dryland farms. Themes of the historical development of the area include the Bannock War, early settlement of ranches, a dryland farming boom and bust of the early 20th century, Prohibition whiskey production, and Depression era Civilian Conservation Corps camps and constructions.

Summary

More than 30 cultural properties, historic and prehistoric, have been recorded in LCGMA. An additional 44 sites have been reported and have yet to be formally recorded. Only about 6500 acres (approximately .012%) of the GMA have been surveyed for cultural resources. Although the percentage of surveyed areas is currently inadequate to draw reliable conclusions, using evidence from surrounding areas it would appear that density of scientifically significant prehistoric and historic sites is high along major drainages, rimrock areas, and around springs. Low site density is expected in large areas of undifferentiated uplands where surface water and various life-sustaining resources are less prevalent.

Impacts to cultural resources located in the LCGMA include illegal digging, surface collection, livestock congregation and trampling, and natural forces such as erosion. In

some cases, development of water sources and other ground disturbing activities such as vehicle traffic and livestock congregation and trailing constitute potential threats to cultural resources in the area. Stabilization of head cuts and stream migrations, locating livestock troughs outside riparian areas, including surface site boundaries within exclusion fences, and maintenance of healthy vegetative cover all aid in the stabilization of cultural resource sites.

O. Paleontology

Miocene, Pliocene, and Pleistocene fossils are located in volcanic tuffs, sandstone and siltstone beds and Pleistocene gravels in areas of southeastern Oregon near LCGMA, but little paleontological work has been conducted within the GMA. Vertebrate and plant fossils are known to be present at Rome, Oregon, and in other tuffaceous sediments associated with the large pluvial lakebeds that existed when climatic conditions were wetter. Most finds in southeastern Oregon have been exposed through erosion by wind, water or road traffic.

P. Economics

During the 1880s when settlement increased in southeast Oregon, small communities were established near reliable water sources. Most communities were in the northern part of Malheur County and all did not survive. By 1884, sheep had become more profitable than cattle and were moved to market in Idaho along the same routes that brought settlers west. The advent of the railroad facilitated livestock shipment to stockyards, and the cattle and sheep industries prospered during the 1890s. Sheep outfits tended to be small and numerous, while cattle operations were larger and fewer. The Taylor Grazing Act of 1934, along with the Great Depression, led to an abrupt and permanent drop in the number of sheep, but fostered a long-term increase in beef cattle, which has continued to the present.

Major industries in Malheur County today are agriculture, food processing, and recreation. Agricultural production includes grains (barley and wheat), onions, sugar beets, corn, potatoes, and livestock. Crops have led to a growing food products industry, dominated by Simplot and Ore-Ida. Two cinnabar (mercury) mines, the Bretz and Opalite, operated near McDermitt until shortly after World War II. Although numerous mining claims have been staked in the mineralized McDermitt Caldera area, commercial quantities of minerals other than cinnabar have not been found.

Q. Soil Resources

Soil resources found in LCGMA occur predominantly on gently sloping to rolling lava plateau uplands underlain by basaltic or rhyolitic flows and tuffs. Soils were surveyed and described in Oregon's Long Range Requirements for Water (1969), Appendix I-11, Owyhee Drainage Basin. The GMA consists of eighteen soil mapping units from this Order IV soil survey. Soil mapping units are complexes of soils that are made up of one or more soil types, known as classification units, or CUs. The GMA's eighteen soil mapping units incorporate eight classification units (CU) which, in turn, have slope groups (1-6) that range between 0 and ≥60 percent slope. See Map 14, General Soil

Map, to locate soil mapping units and CUs in the GMA. Descriptions of soil mapping units, CUs, slopes, and individual CUs are found at end of this section.

Two classification units (76 and 77) comprise about 92 percent of the major soil components within the GMA. CU S76 and CU 76L are variants of CU 76 and make up about 6 percent of the GMA. The remaining 2 percent of the GMA consists of CUs 15, 31, and 41 which are soils that are associated with seasonal lake basins and spring/meadow areas. CU 96 is a minor soil type occurring as rock outcrops or escarpments along lava plateaus.

Soils within the eight CUs range are well drained, except for CUs 15, 31, and 41 in lake basins or meadows. Soil surface textures range from silty clay to loam, and rock fragments in the soil profile range from gravely to very stony. The effective rooting depth in most of the GMA (CUs 76, 76L, S76, and 77) is very shallow to shallow (10-20 inches) and is limited primarily by parent material and low annual precipitation. Effective rooting depth in the other CUs is moderately deep to deep and limited by precipitation.

Soil CU 76L is located primarily in small portions of Drummond Basin Pasture, Spring Pasture, and Starvation Brush Control. This soil occurs on relatively flat slopes that allow surface water, from precipitation and snowmelt, to pond-up and not runoff into drainages. Ponding creates a fine-textured compaction lens in the soil horizon about two to four inches below the surface, restricting soil permeability. This compaction layer reduces effective rooting depth for herbaceous plants and limits their distribution. Consequently, plant communities in areas with CU 76L are less diverse and productive than in other CUs because of increased fine mineral particle accumulation on the surface and in the soil profile. Where large plants, such as big sagebrush, become established, their more robust root systems can penetrate and break up this horizon, allowing smaller rooted herbaceous species to colonize.

Descriptions of Soil Mapping Units, Slopes, and CUs for LCGMA

Soil Mapping Units	*Classification Units and Slopes*
15-31	CU 15 soils; 30 % CU 31 soils; 0-3 % slopes
41	CU 41 soils, 0-3 % slopes
76/2-3	CU 76 soils, 3-12 % slopes.
76/4	CU 76 soils, 12-20 % slopes
76/5-6	CU 76 soils, 20-60+ % slopes
76-76L/2-3	CU 76 soils, 3-7 % slopes; 30 % CU 76L soils, 7-12 % slopes
76-S76/2-3	CU 76 soils, 3-7 % slopes; 30 % CU S76 soils, 7-12 % slopes
76-77/2-3	CU 76 soils, 3-7 % slopes; 30 % CU 77 soils, 7-12 % slopes
76-77/4-5	CU 76 soils, 12-20 % slopes; 30 % CU 77 soils, 20-35 % slopes
76-96/5-6	CU 76 soils, 20-35 % slopes; 30 % CU 96 soils, 35-60 % slopes
76L/2-3	CU 76L soils, 3-12 % slopes
S76/2-3	CU S76 soils, 3-12 % slopes
S76-76/2-3	CU S76 soils, 3-7 % slopes; 30 % CU 76 soils, 7-12 % slopes
77/2-3	CU 77 soils, 3-12 % slopes
77/4-5	CU 77 soils, 12-35 % slopes
77-76/4-5	CU 77 soils, 12-20 % slopes; 30 % CU 76 soils, 20-35 % slopes

77-S76/2-3	CU 77 soils, 3-7 % slopes; 30 % CU S76 soils, 7-12 % slopes
77-96/4-6	CU 77 soils, 20-35 % slopes; 30 % CU 96 soils, 35-60 % slopes

CU 15
Soils are deep, silty, poorly drained, on nearly level stream bottomlands. Soils occur usually at elevations of 3,000 to 4,500 feet and have a high potential for range seeding. Average annual precipitation ranges from 9-12 inches and mean annual air temperature centers around 47 degrees F. The soil profile by depth consist of dark brown peaty silt loam, black silty clay loam, grayish-brown silty clay loam to grayish-brown silt loam. The soil profile becomes coarser textured with depth. Native vegetation consists mostly of water tolerant grasses and sedges.

CU 31
Soils are deep, somewhat poorly drained, and are derived from fine-textured alluvium. They occur on flat basins, old playa bottoms, and sometimes on subdued clayey dune areas, leeward of playas. Soils occur usually at elevations of 4,000 to 5,000 feet and have a high potential for range seeding. Average annual precipitation ranges from 8-10 inches and mean annual air temperature centers around 45 degrees F. The soil profile by depth consists of light gray silty clay, light brownish-gray silty clay to light gray silty clay loam. Native vegetation consists mostly of western wheatgrass, big sagebrush, and rabbitbrush.

CU 41
Soils are deep, somewhat poorly drained, and are derived from fine-textured alluvium. They occur on flat basins, old playa bottoms. Soils occur usually at elevations of 4,000 to 4,500 feet and have a high potential for range seeding. Average annual precipitation ranges from 8-10 inches and mean annual air temperature centers around 45 degrees F. The soil profile consists of silt loam, clay, to silty clay loam. Native vegetation is mainly western wheatgrass, big sagebrush, and rabbitbrush.

CU 76
Soils are shallow, clayey, very stony, well drained soils over basalt, rhyolite, or welded tuff. They occur on gently undulating to rolling lava plateaus and some very steep faulted and dissected terrain. Soils occur at elevations from 3,500 to 6,500 feet and stones limit potential for range seeding. Average annual precipitation ranges from 8 to 11 inches, and mean annual air temperature centers around 47 degrees F. The soil profile by depth consists of gray, very stony, silt loam, brown stony silty clay, to brown stony and channery, heavy, silty clay loams over fractured bedrock at 18+ inches. Native vegetation consists mostly of bluebunch wheatgrass, Sandberg bluegrass, big and low sagebrush.

CU 76L
Soils are shallow, clayey, stony, well drained soils over basalt, rhyolite, or welded tuff. They occur on gently undulating to rolling lava plateaus. Soils occur at elevations from 4,000 to 5,500 feet and have a high potential for range seeding. Average annual precipitation ranges from 8 to 11 inches, and mean annual air temperature centers around 45 degrees F. The soil profile consists of stony silt loam, stony heavy silty clay loam over basalt bedrock at 18+ inches. Native vegetation consists mostly of bluebunch wheatgrass, Sandberg bluegrass, big and low sagebrush.

CU S76
Soils are shallow, extremely stony, well drained soils over basalt, rhyolite, or welded tuff. They occur on gently undulating to steep plateaus. Soils occur at elevations from 4,000 to 6,000 feet and have little potential for range seeding due to the large amount of rocks. Average annual precipitation ranges from 8 to 11 inches, and mean annual air temperature centers around 45 degrees F. The soil profile by depth consist of stony loam, extremely stony clay loam, extremely stony clay over fractured bedrock at 11+ inches. Native vegetation consists mostly of low sagebrush, Sandberg bluegrass, and bluebunch wheatgrass.

CU 77
Soils are very shallow, very stony, rocky, well drained soils over basalt, rhyolite, or welded tuff. They occur on gently undulating to rolling lava plateaus. Soils occur at elevations from 3,500 to 6,000 feet and have no potential for range seeding due to depth to bedrock and stoniness. Average annual precipitation ranges from 8 to 11 inches, and mean annual air temperature centers around 45 degrees F. The soil profile consists of very stony gravelly loam, very stony gravelly loam over basalt bedrock at 10+ inches. Native vegetation consists mostly of low sagebrush, big sagebrush, and Sandberg bluegrass.

CU 96 (Steep rock land)
This is a miscellaneous land unit consisting of rough, steeply sloping areas that are predominantly shallow, very stony soils interspersed with rock outcrop. Steep rock land occurs mainly as canyons and escarpments along margins and dissected portions of lava plateaus.

Rangeland Health Standard 1 (Watershed Function – Uplands)

As part of Standards of Rangeland Health, soil resources in the GMA were assessed for upland watershed function. This assessment focused on basic physical functions of upland soils that support plant communities and promote dependable flows of water from the watershed. Seventeen upland rangeland health indicators (BLM Tech Ref. 1734-6, 2000) were assessed at forty-three sites in twenty-one pastures for Soil/Site Stability (capacity to limit redistribution and loss of soil resources, including nutrients and organic matter, by wind and water), Hydrologic Function (capacity to capture, store, and safely release water, to resist a reduction in this capacity, and to recover this capacity following degradation), and Integrity of the Biotic Community (capacity to support functional and structural communities, to resist losses due to disturbance, and to recover following disturbance). At each assessment site, all indicators were compared to indicators obtained at relatively pristine reference areas.

All LCGMA pastures met Rangeland Standard 1. At twenty-two assessment sites, all indicators were equivalent to the reference area or to ecological site descriptions from OAESIS (Map 6). The remaining twenty-one assessment sites had some indicators which were somewhat impaired relative to the reference sites. In most cases, the impairments were associated with Biotic Integrity and not Soil Stability or Hydrologic Function. Over all, the soil, hydrologic, and biotic characteristics in all pastures were very comparable to reference sites and ecological site descriptions.

Microbiotic Crusts

Microbiotic crusts consist of lichens, bryophytes, algae, microfungi, cyanobacteria, and bacteria growing on or just below the soil surface (Eldridge and Greene 1994). Found in open spaces between larger plants, these crusts play a role in fixing nitrogen, filtering water, retaining soil moisture, and controlling soil erosion (Friedmann and Galun 1974; Belnap 1994). Cover types in the GMA that are associated with biological crust development include salt desert shrub, low sagebrush, and big sagebrush. Occurrence of curst in these cover types is directly related to elevation, precipitation, soil depth, soil texture, and interspaces between vascular plant cover. Crust is usually in greater abundance in salt-desert shrub communities occurring in lower elevations that receive limited precipitation, and have shallow soils depths and fine soil textures.

Microbiotic crust information was recorded at forty-three LCGMA assessment sites as percentage of total vegetative cover and percentage of ground cover. Crust ranged up to categories of 31-50 percent of total vegetative cover and to 16-30 percent of ground cover throughout the GMA. The highest percentage of crust in both categories occurred in the salt-desert transition cover type found in North Stoney Corral, Pole Creek Seeding, and Tristate pastures. Refer to Chapter 3, Rangeland Health Determinations, for microbiotic crust cover percentages for individual pastures. Because no Ecological Site Guides for microbiotic crusts exist, the cover values recorded in the GMA cannot be compared to Potential Natural Community or to microbiotic cover that existed historically (Roger Rosentreter, Botanist, BLM, Idaho State Office, pers. com., 2002).