

# **UPPER NORTH PLATTE WATERSHED STANDARDS AND GUIDELINES ASSESSMENT**

**2004 Field Season**



**Rawlins Field Office**

**Document for Agency, Permittee, and Interested Public Information  
September 2005**

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## INTRODUCTION

The analysis area considered in this document includes North Platte River drainage upstream from its confluence with Jack Creek to the Wyoming-Colorado state line. The analysis area occupies 364,300 acres within the Rawlins Field Office in Carbon County of south-central Wyoming. Land ownership consists of 32% federal lands, 62% private lands, and 6% state lands. Federal ownership includes 115,800 acres administered by the Bureau of Land Management (Map #1).

Land ownership patterns vary from small blocks of public lands to various mixtures of public and non-public lands. Improved management has been initiated in most of the assessment area to better manage livestock and address issues such as riparian condition, erosion problems, wildlife/fisheries habitat, and noxious weeds. Various government entities (local, state and federal), private individuals, livestock operators, and non-profit organizations have all contributed to these efforts. In project planning and implementation, monitoring, education, and cost-sharing, these groups and their employees have been a tremendous help in improving the resource conditions on public and private/state lands.

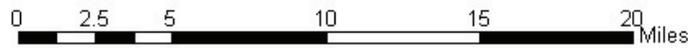
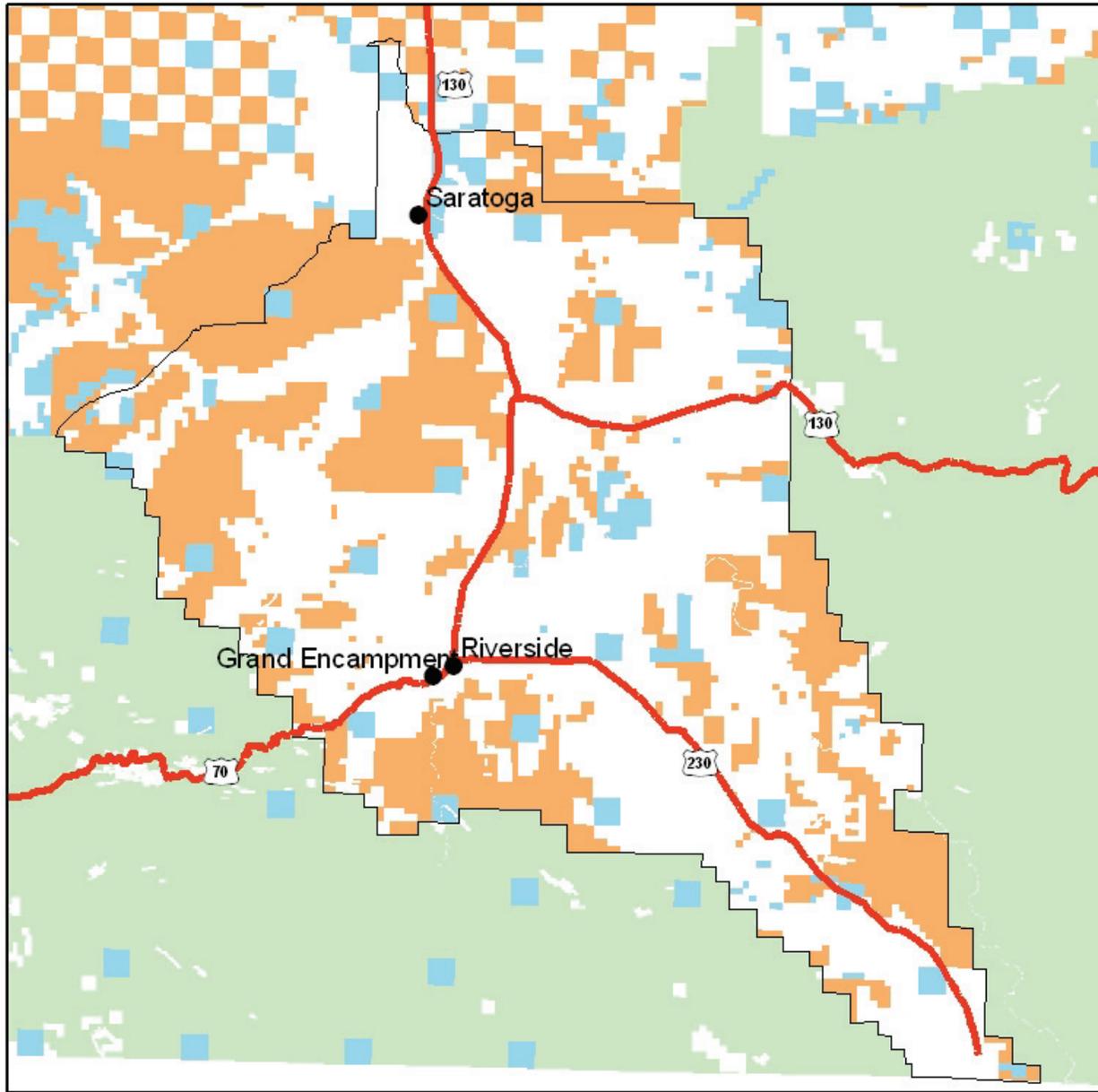
The 1995 rangeland reform process modified the grazing regulations to address the fundamentals of rangeland health. In August 1997, the *Standards for Healthy Rangelands and Guidelines for Livestock Grazing Management for the Public Lands Administered by the Bureau of Land Management in the State of Wyoming* were approved by the Wyoming State Director. The objectives of the rangeland health regulations are to “promote healthy sustainable rangeland ecosystems; to accelerate restoration and improvement of public rangelands to properly functioning conditions... and to provide for the sustainability of the western livestock industry and communities that are dependent upon productive, healthy public rangelands.” The fundamentals of rangeland health combine the basic precepts or physical function and biological health with elements of law relating to water quality and plant and animal populations and communities. Initially the standards focused on livestock grazing on BLM-administered lands, but the standards were developed to apply to all uses and resources.

In the Rawlins Field Office, rangeland standards were assessed on an allotment basis from 1998 through 2000. Some of the allotments contained within this watershed assessment were already evaluated, and that information and determination has been incorporated into this document. However, allotment assessments tend to emphasize management and impacts from livestock grazing, rather than on all uses which occur to and potentially impact public lands. In addition, assessing watersheds, water quality, and habitat for wildlife, fisheries, and threatened and endangered species, often does not correspond to allotment boundaries and is more logically evaluated at a larger scale. In January 2001, Instruction Memorandum No. 2001-079, Guidance for Conducting Watershed-Based Land Health Assessments, was sent to Field Offices from the Director of the BLM. This IM transmitted the 4180 Manual Section and 4180-1 Rangeland Health Standards Handbook and provides guidance for conducting assessments and evaluations for ascertaining rangeland health on a watershed basis. Under Policy/Action it states: "The Field Offices are to consider all assessment requirements for the watershed being assessed and select methods which will provide information needed to fulfill those requirements. When a field office invests its resources in an assessment, the end product should substantially meet all assessment needs to avoid conducting multiple assessments for multiple needs. For example, a well-planned, watershed-based assessment can provide the information needed for allotment evaluations, biological assessments for Section 7 Endangered Species Act consultation, and developing habitat management plans, Water Quality Improvement Plans for Total Maximum Daily Loads on impaired waters, and watershed restoration actions." In order to complete all Standard Assessments within the original 10-year timeframe, watersheds have been divided into seven units, the Upper North Platte is the fourth unit to be completed (see Map #2).

The standards are the basis for assessing and monitoring rangeland conditions and trend. The assessments evaluate the standards and are conducted by an interdisciplinary team with participation from permittees and other interested

# Map 1

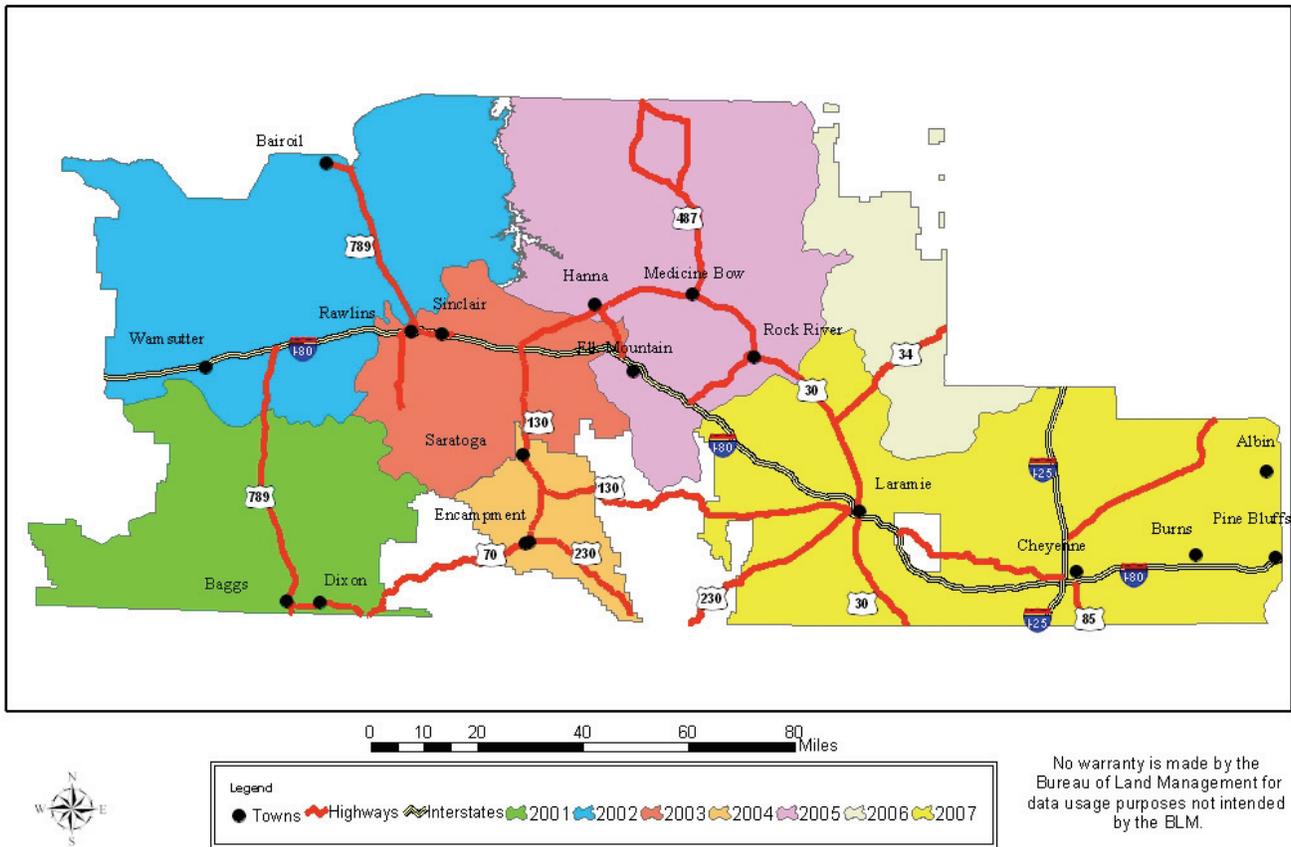
## Surface Ownership in the 2004 Assessment Area



Legend		
	Towns	
	Highways	
	2004 Boundary	
		Bureau of Land Management
		Forest Service
		State
		Private

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Map 2  
Standards and Guidelines Assessment Area by Year



parties. Assessments are only conducted on BLM-administered public land, however, interpretation of watershed health and water quality may reflect on all land ownerships within the area of analysis. The six standards are as follows:

**Standard 1- Watershed** Within the potential of the ecological site (soil type, landform, climate, and geology), soils are stable and allow for water infiltration to provide for optimal plant growth and minimal surface runoff.

The standard is considered met if upland soil cover generally exceeds 30% and obvious signs of soil erosion are not apparent, and stream channels are stable and improving morphologically.

**Standard 2 – Riparian/Wetland**: Riparian and wetland vegetation have structural, age, and species diversity characteristic of the state of channel succession and is resilient and capable of recovering from natural and human disturbance in order to provide forage and cover, capture sediment, dissipate energy, and provide for ground water recharge.

The standard is considered met if riparian/wetland habitat is rated in Proper Functioning Condition (PFC) and existing management will lead to maintaining or improving resource conditions.

Standard 3 – Upland Vegetation Upland vegetation on each ecological site consists of plant communities appropriate to the site, which are resilient, diverse, and able to recover from natural and human disturbance.

The standard is considered met if plant communities are sustaining themselves under existing conditions and management.

Standard 4 – Wildlife/Threatened and Endangered Species Habitat , Fisheries Habitat, Weeds: Rangelands are capable of sustaining viable populations and a diversity of native plant and animal species appropriate to the habitat. Habitats that support or could support threatened species, endangered species, species of special concern, or sensitive species will be maintained or enhanced.

The standard is considered met if habitat needed to support wildlife species is being sustained under existing conditions and management.

Standard 5 – Water Quality: Water quality meets State standards.

The standard is considered unknown unless information provided by the State of Wyoming determines the status of a water body as impaired (not meeting) or is meeting its beneficial uses.

Standard 6 – Air Quality: Air quality meets State standards.

The standard is considered met or impaired based on information provided by the State of Wyoming.

If an assessment shows that a standard(s) is not being met, factors contributing to the non-attainment are identified and management recommendations developed so the standard may be attained. If livestock are contributing to the non-attainment of a standard, as soon as practical but no later than the start of the next grazing season, management practices will be implemented to ensure that progress is being made toward attainment of the standard(s). The rangeland standards establish a threshold, however, the desired resource condition will usually be at a higher level than the threshold.

The desired range of conditions portrays the land or resource values that would exist in the future if management goals are achieved. The length of time to achieve the desired range of conditions would vary depending on the resources involved, the management actions required, and the speed at which different resources can effectively change. For instance, improving plant cover and litter, or changing species composition with treatments may be achieved relatively quickly in 5 to 10 years. However, developing a mixed age structure of willows along a stream by changing livestock management may take 20 to 30 years, even though it may be properly functioning. Other actions, such as restoring aspen woodlands within lodgepole pine communities by using prescribed or natural fire, may take 50 years or more.

The following regulatory constraints or special management considerations govern some of the resource values in the area:

- State of Wyoming water quality classifications and regulations on water rights, reservoir permitting, well permitting, and stormwater discharge permitting.
- Section 7 of the Endangered Species Act of 1973 (ESA), as amended (16 USC 1531 et. seq.) and the Interagency Cooperation Regulation (50 CFR 402), concerning water depletions in the Platte River System.
- Army Corp of Engineer permitting for dredged and fill materials in wetland areas located in the North Platte River Basin authorized under Section 404 of the Clean Water Act.

The framework for this report will be an introduction and background information, followed by discussion of each rangeland standard in the order described earlier in this document. Within the discussion for each standard will be a map and description of how the standard will be addressed. The outline of discussion for each standard will follow the six-step process for ecosystem analysis at the watershed scale. The six steps are: 1) Characterization of the watershed, 2) Identification of issues and key questions, 3) Description of current conditions, 4) Description of reference conditions, 5) Synthesis and interpretation of information, and 6) Recommendations. Core topics will be discussed under the appropriate standard, with erosion processes, hydrology, and stream channels under Standard 1; vegetation split into wetland/riparian or upland under Standards 2 and 3; species and habitats under Standard 4; water quality under Standard 5, and air quality under Standard 6. Human uses would be discussed under each Standard where appropriate. Standard 1 – Watershed has been split into two descriptions for different hydrologic units, while the Standards 2 through 6 are each described as one unit for the entire Upper North Platte report area. Where discussion items are similar between watersheds, previous sections will be referenced and only additional, specific information will be noted.

## **BACKGROUND**

Topography of the Upper North Platte watershed is dominated by gentle to moderately-sloping flats, terraces and rolling hills along the North Platte River, becoming moderately steep to steep slopes adjacent to or within Forest Service lands. A few higher points exist along the valley such as Bennett and Barcus Peaks, Prospect Mountain and the Baggot Rocks. The eastern, southern and western borders are framed by the Snowy Range and the Sierra Madre Mountains. Elevation ranges from 6,800 feet along the North Platte River downstream from Saratoga to highs of 12,050 at Medicine Bow Peak, 11,042 at Blackhall Mountain to the south, and 11,068 at Bridger Peak to the west. Elevation of BLM administered public lands generally range from 6,900 to 8,250 feet, with Prospect Mountain the highest point at 8,544 feet.

Climate varies from arid to semi-arid depending mostly on changes in elevation. The Snowy and Sierra Madre mountain ranges are the highest points and in general accumulate more snow than the lower elevation regions. Snow distribution at lower elevations is influenced by wind with drifts forming behind taller plants and topographic features. The elevation at the Saratoga weather station is 6,850 ft., where the average annual precipitation was 9.8 inches from 1907-2000. Precipitation occurs in the form of both snow and rain, with April and May being the wettest months on average, however, 74 percent of the annual precipitation comes between April and October. The mean summer temperature for this region is 62 degrees and the mean winter temperature is 27 degrees.

The North Platte River originates in Colorado, then flows through the report area from south to north. The Encampment River is the largest tributary, although numerous smaller streams also enter the North Platte River fed by snowmelt from the Sierra Madre and Medicine Bow Mountain Ranges. The State of Wyoming has classified the main stem of the North Platte River and the Encampment River as Class 1 waters, which is the designation with the highest standards. Tributaries in the area that flow into the North Platte are mostly designated as 2AB or 3AB, depending if the tributary has perennial, intermittent, or ephemeral surface waters. Waters that are designated as 2AB are perennial and support native and game fisheries and are protected for all categories, whereas waters designated as 3AB are mostly ephemeral and protected for aquatic life, but not fish.

Soils in the lower elevations formed in residuum or alluvium derived dominantly from shales or sandstones, whereas the upper valley is made up of alluvium, colluvium, outwash deposits, and eolian deposits over sedimentary bedrock. Textures range from clay loams to loams to sandy loams and from very shallow to deep. All soil types receive enough precipitation and development to leach salts sufficiently to allow them to function (effective rooting depth) as moderate to deep soils. Fine-textured soils have lower infiltration rates and higher rates of runoff with high to severe potential for soil erosion, while loam to sandy soils have moderate to high rates of







infiltration and produce low to moderate runoff with low to medium potential for soil erosion. Finer-textured soils will usually have lower amounts of vegetative cover and litter.

Vegetation is predominantly sagebrush-grass intermixing with mountain shrub and aspen communities at higher elevations. Mountain big sagebrush is the most common species of sagebrush, with basin and black sagebrush the next two principle types found in this area. Mountain shrubs, which include bitterbrush, snowberry, serviceberry, chokecherry, and mountain mahogany, occur in 10-inch or higher precipitation zones and are usually intermixed themselves or with sagebrush and aspen. Aspen woodland is usually found above 7,000 feet in small pockets on north and east-facing slopes where snow accumulates or there is some other source of additional moisture. Conifer woodlands occur above 7,500 feet, with limber pine and juniper on drier sites and lodgepole pine, subalpine fir, and spruce on wetter sites. Riparian and wetland habitats occur on a small percentage of these public lands. Herbaceous and shrub-dominated riparian communities are the most common, with tree-dominated habitat such as cottonwood being the least common in occurrence.

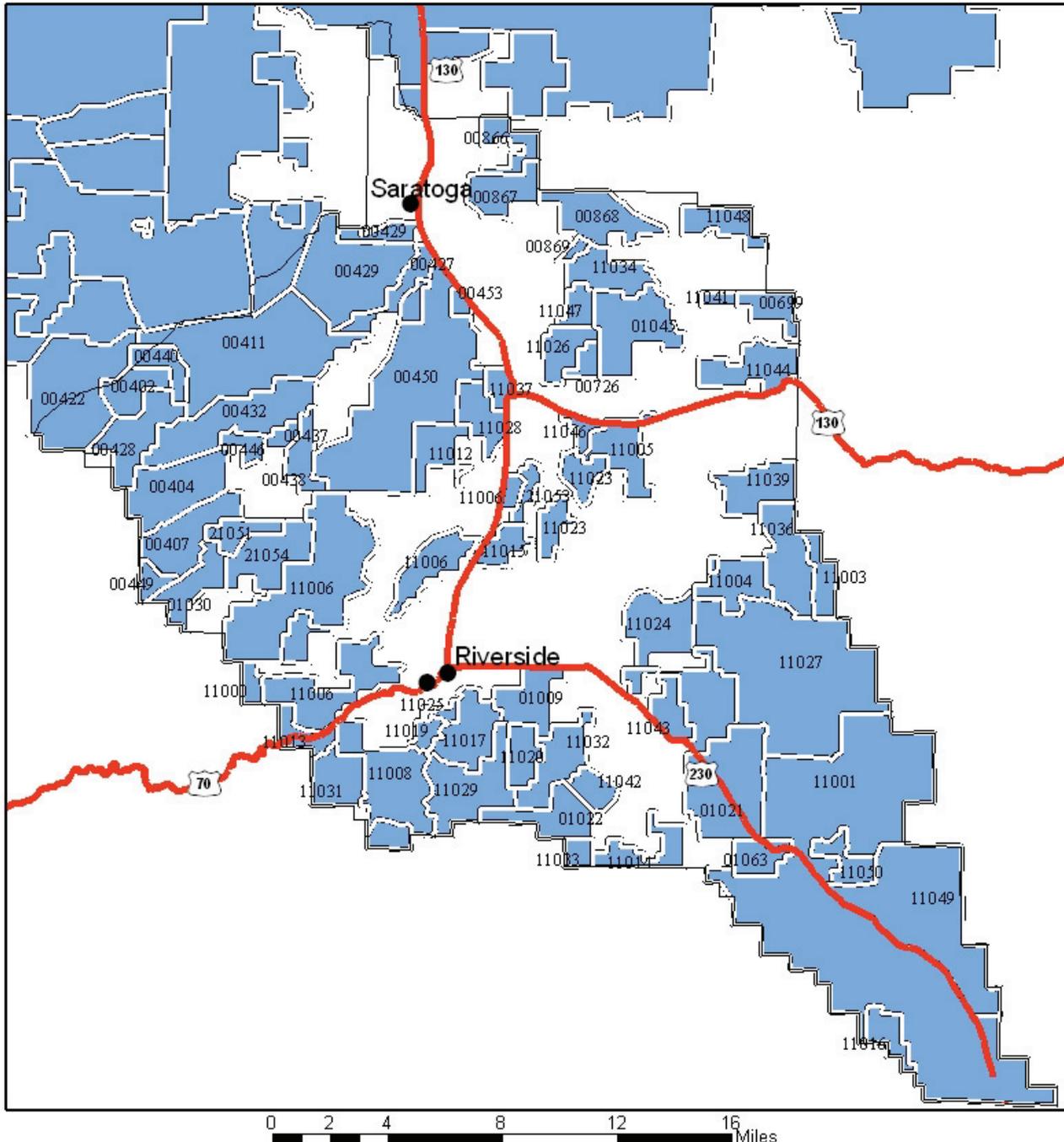
Wildlife is abundant and diverse. Antelope, mule deer and elk are common big game species, with limited numbers of bighorn sheep and moose. Greater sage-grouse are an important species of interest. Raptors include golden and bald eagles; ferruginous, red-tailed and Swainson's hawks; burrowing owls; and other hawks, harriers, and owls. Other commonly observed wildlife are coyotes, badger, beaver, muskrat, cottontail and jackrabbits, prairie dogs, ground squirrels, waterfowl, and songbirds. Fisheries are most recognized for various species of trout, which have all been introduced into streams and ponds for recreational use. Increasing attention is being directed at non-game fish species found in the North Platte River drainage.

Human population levels are low, with approximately 21,000 in Carbon County and 3,000 and 1,000 in the principle two towns within the watershed, Saratoga and Encampment, respectively. Improved roads are limited to the paved state highways and dirt and graveled roads maintained by the county, federal agencies, and private parties. Human use on public lands within the assessment area is generally related to livestock grazing and recreation.

There are 75 allotments permitted for grazing use on public lands in the watershed analysis area. Grazing use is primarily cattle, with only one permit that still retains sheep AUMs. Historical use in this area has always been primarily by cattle with most ranches maintaining small farm flocks of sheep. Abundant water and grass dominated vegetations favored the use of cattle over sheep. Larger sheep flocks using adjacent forest lands would trail through this area with home ranches in Rawlins, Baggs and other desert locations. Since that time, cattle numbers have risen through the years, with a gradual decline in sheep numbers. The Taylor Grazing Act in 1934 began a process of creating allotments and developing range improvements, which has led to greater stewardship and on-the-ground management. Fencing of allotments has been an ongoing, long-term process, with pasture fencing becoming more common in recent times. Table #1 lists the allotment name, number, and the factors for each allotment, which were used to prioritize monitoring in the standards assessment, and corresponds to Map #3 depicting allotments within the watershed. This table was created using monitoring data, PFC assessments, and professional knowledge, as well as information or knowledge about these allotments from other agencies. Typically, the allotments with the most boxes checked will be the areas needing the most attention. Best Management Practices (BMPs) describe various actions which have or can be implemented to change impacts from grazing management. They include altering the season, duration, or type of livestock use, as well as the use of herding, fencing, water developments, vegetation treatments, or other tools where appropriate.

Recreation use includes hunting, fishing, camping, rafting, ORV use, and wildlife-viewing. The numbers of people involved in these activities are generally low except fishing along the Platte, rafting during spring high water and fall hunting seasons.

# Map 3 Allotments in the 2004 Assessment Area



**Legend**

- Towns
- Highways
- 2004 Boundary
- Allotments

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## STANDARD 1 – WATERSHED

*Within the potential of the ecological site (soil type, landform, climate, and geology), soils are stable and allow for water infiltration to provide for optimal plant growth and minimal surface runoff.*

The analysis area contains portions of the North Platte River Basin within the RFO boundary (Maps #4). Table #2 depicts the 4<sup>th</sup> Order HUCs, acreages, and groupings of these watersheds that will be discussed for Standard 1. Watershed discussions are grouped where the general environment, current condition, and impacts are generally the same.

**Table # 2 –Sub-Area Acreage Included in the Analysis Area**

Sub-Area (report sections)	Acreage	4 <sup>th</sup> Level HUCs*	Assessment Name
North Platte River-Cow Creek	116,000	10180002 – Upper North Platte	Cow & Spring Creeks
North Platte River-Spring Creek	59,000		Cow & Spring Creeks
North Platte River-Big Creek	41,400		Big, Brush, & French Creeks
North Platte River-Brush Creek	15,800		Big, Brush, & French Creeks
North Platte River-French Creek	79,700		Big, Brush, & French Creeks
North Platte River-Douglas Creek	400		Big, Brush, & French Creeks
Encampment River	52,000		Encampment River
<b>Total</b>	<b>364,300</b>		

\* HUCs – United States Geological Survey Hydrologic Unit Codes.

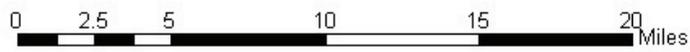
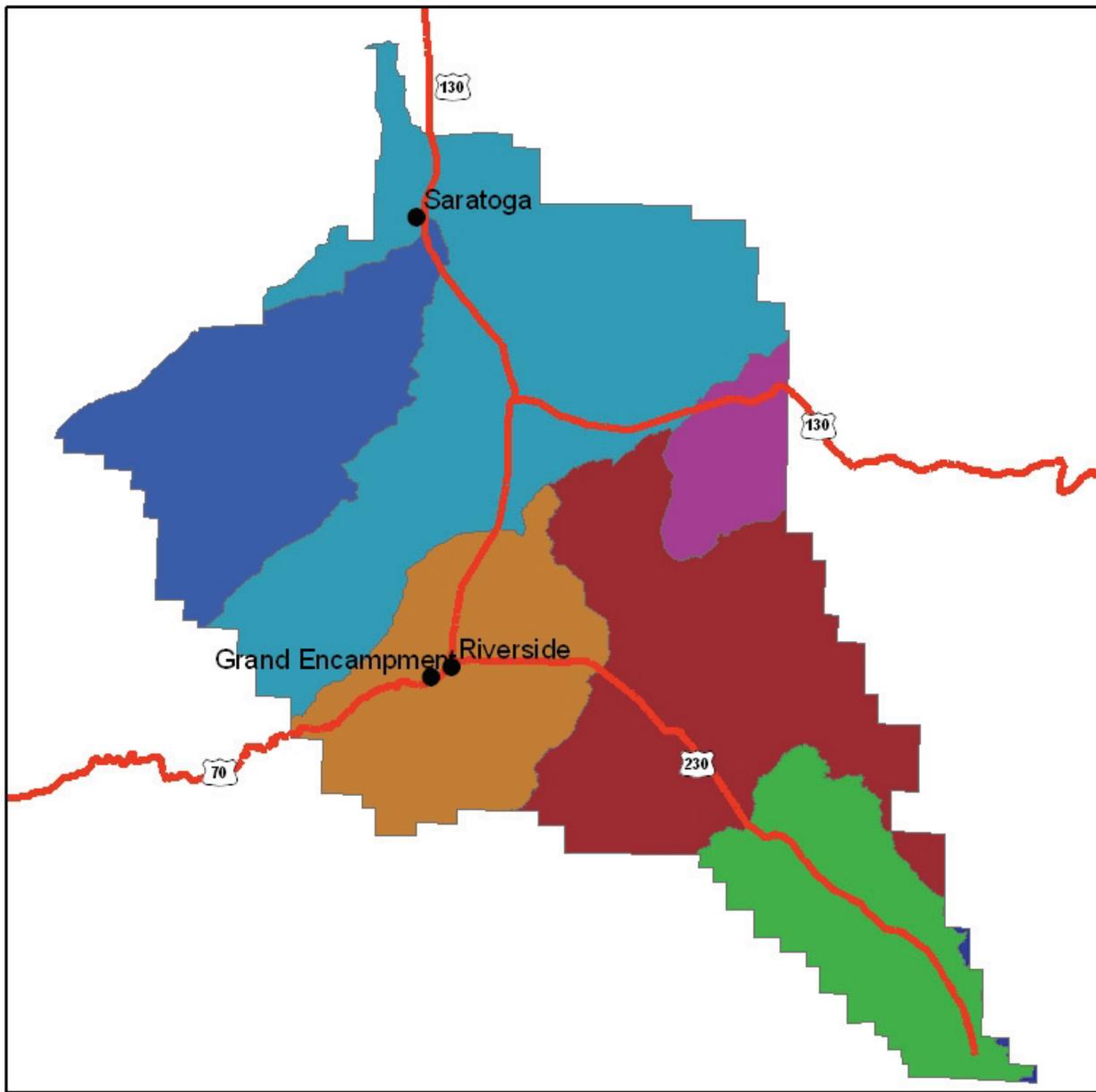
### North Platte River-Cow Creek and Spring Creek

#### 1) Characterization:

This discussion includes the following sub-areas: Cedar Creek, Cow Creek, and Spring Creek which have perennial headwaters derived from the Sierra Madre and Medicine Bow Mountains, and the North Platte River. In addition, there are many smaller creeks that include: Methodist, Centennial, Beaver, Heather, Calf, Otto, Teddy, Cottonwood, and Elk Hollow. Soils are predominantly shale and sandy clay-loam soils, with short portions of perennial and intermittent stream segments in the higher elevations, turning into ephemeral drainages in the lower elevations. Rapid snowmelt or thunderstorms can produce moderate to high runoff with medium to high erosion potential. Topography is flat to gently rolling landscape at lower elevations, becoming moderately steep to steep closer to the mountain ranges. This creates high gradient changes near headwater areas, potentially increasing the potential for head-cuts and gullies. The lower elevation drainages have low gradients with lower potential for gullies. All of these stream segments (when flowing) make their way into the North Platte River system.

Stream flow is often intermittent on lower reaches away from the mountains, with flows diverted for irrigation on private lands, and return flow leading to increased water in the fall. Early homesteads were developed in the wider valleys and gentler terrain along the larger streams, such as Cedar, Cow and Spring Creeks. Irrigation for hay meadows is reliable, but is more variable due to climate at lower elevations in the drainages. Higher elevation streams have a rocky base which promotes more lateral stream movement with disturbance, rather than down-cutting. Stream channels are generally stable with rocks and perennial vegetation cover, including willows,

# Map 4 Fifth Order Watersheds in 2004 Assessment Area



Legend		
●	Towns	Big Creek
⚡	Highways	Brush Creek
		Encampment River
		North Platte River-Cow Creek
		North Platte River-Douglas Creek
		North Platte River-French Creek
		Spring Creek

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waterbirch, cottonwood, aspen and other shrubs. There has been no annual flow monitoring for any of the streams in this area. Flows are highest in May and lowest during August or September.

The majority of stream channels in this watershed are C6 and B3 stream types. The C6 stream type is a slightly entrenched, meandering, silt-clay dominated, riffle-pool channel with a well-developed floodplain (Rosgen 1996). It occurs in broad valleys with gentle gradients of less than two percent (photo 13-1). Rates of lateral adjustment are influenced by the presence and condition of riparian condition. Headwater streams on steeper gradients are B3 stream types. This stream type is found in narrow, moderately steep colluvial valleys, with gradients of two to four percent and channel materials composed predominantly of cobble with lesser amounts of boulders, gravels, and sand (photo 13-2). The B3 stream type is considered relatively stable and is not a high sediment supply stream channel (Rosgen 1996).

The North Platte River is a C3, meaning a slightly entrenched, meandering, riffle/pool, cobble-dominated channel with a well developed floodplain (Rosgen 1996)(photo 13-3). It is found in U-shaped valleys. C3 Channels have gentle gradients of less than 2%, display a high width/depth ratio, are slightly more sinuous and have a high meander width ratio. Rates of lateral adjustment are influenced by the presence and condition of riparian vegetation. This is not a high sediment channel, with this stretch heavily used by floaters and fishermen.

Principal human uses in this watershed are livestock grazing, hay production and recreation. Livestock use is primarily cattle, employing both cow/calf and yearling operations. Seasons of use are primarily winter and spring at lower elevations and summer and fall at higher elevations. Hay production includes both alfalfa and grass hay, with ground preparation and fertilization in the spring, summer irrigation, putting up hay during the summer and fall. Recreation is primarily related to hunting, fishing, and camping. The Platte River receives a high percentage of recreational use related to fishing, boating and other water activities. In addition, hunting is also prevalent during the fall (September through October).

## **2) Issues and Key Questions:**

**1. Livestock Grazing:** Livestock grazing has been and continues to be a factor affecting watershed values in terms of vegetative cover and litter. Management issues relate to the season, duration, and distribution of use rather than stocking rates. The key question is in what locations do further refinements in BMPs or other actions still need to be made to improve watershed condition and meet desired resource objectives?

**2. Woody Plants:** The age and canopy cover of big sagebrush, mountain shrub, and conifer encroachment into aspen woodland plant communities is increasing, leading to lower herbaceous ground cover and possibly water yield. Prescribed burns conducted in adjacent watersheds have shown improvements in ground cover. The key question is: How do we as an agency decide on what amounts of treatments should occur to promote desired plant communities and still address all of the resource values that we are obligated to manage?

**3. Erosion:** Erosion from roads, both improved and unimproved, is also an important factor relating to watershed condition. The BLM, Carbon County, and to a small extent private parties maintain improved roads within the watershed. The principal problem with improved roads is inadequate water control features, such as culverts, wing-ditches, and water-bars, to mitigate the effects of roads on upland runoff hydrology. Road standards are based on how to build and maintain a safe road in addition to the effect the road has on altering the natural hydrology of the landscape. As a result, roads tend to collect water off a broad area and then release it in a more concentrated volume, in a draw or flared onto a hillside undeveloped for this flow, causing accelerated erosion. Where public access via two-track roads occur, there are often associated problems. In these areas, for each mile of improved road there are probably five miles of unimproved roads or two-track roads. Many of these two-tracks do not cause increased erosion, but where it does occur there is usually no mitigation to correct the problem. Use of road systems by all users, particularly in bad weather or when roads are wet, leads to increased erosion from roads. The increasing use of parts of this watershed for recreation, and the increasing use of 4-wheel drives and off-highway

vehicles, is creating new roads and new sources of erosion. The key questions here are: How do we improve the adequacy of water control features on improved roads? How can erosion sources from two-track roads best be addressed? How can we develop a long term strategy to address erosional issues from these roads? What educational and management tools should be employed to reduce erosion impacts from recreation and other users of public lands?

### **3) Current Conditions:**

Quantifiable data about current erosion levels and stream flows is available to some extent for most streams by the USGS. Additional information is available from photo-points and personal observations show that the trend for watershed values is upward. Specific management implemented along with range improvements and vegetative treatments, at least indirectly, should also relate to improved resource conditions in most areas.

Stream channels are generally stable, with good vegetative cover and/or rock for armoring, with good width-to-depth ratios. Some channel narrowing will still occur. As the channels narrow, the active floodplain width expands, including both lateral expansion on cobble, gravel, and silt-bottomed streams. In-channel bank sloughing on outer corners and gradient adjustment of ephemeral side drainages are the primary sources of erosion. The one exception to this is segments like Heather Creek which have extensive conifer encroachment with downed timber and reduced cover, leading to wider, shallower channels that even become braided at times. This is simply a condition reached under a mature to decadent forest. However, reduction of bank cover due to the duration and season of cattle use has and continues to be the principle impacts to channels on public lands. The limited availability of water and associated dewatering by irrigation primarily affects channels on private lands. Changes in livestock management, including fencing, upland water developments and/or exclusion will be implemented. Beaver are still present on upper portions of some of these streams, and contribute to stream stability and sediment storage.

Vegetative cover and litter on uplands varies with the soils, slope, aspect, elevation and precipitation. Research conducted in Wyoming indicated that upland plant communities often can be maintained with ground cover above 30%, while sediment yield increased dramatically when cover declined to less than 30% (Linse, Smith and Trlica, 1992). Ground cover ranges from 50% to nearly 100% on big sagebrush plant communities, the most common vegetation types in this watershed. At higher elevations, plant cover is usually higher due to increased moisture and density of plants. In general, the overall ground cover appears good, but in many locations can still be improved with the use of BMPs.

### **4) Reference Conditions:**

Both John C. Fremont (1843) and Howard Stansbury (1850) traveled through the area from Atlantic Rim to the Platte and their accounts as stated before were very similar. Stansbury's account follows: "After the crossing of Sage Creek [about four miles above its mouth], upon approaching the Platte, we encountered many ravines coming down from a ridge on our right, the intervening ground being washed almost entirely bare of grass or vegetation of any kind. At the Platte were gigantic cottonwoods and luxuriant grass. The cottonwoods were 60 feet high and 2-3 feet in diameter. They killed several buffalo and saw several herds."

### **5) Synthesis and Interpretation:**

The descriptions for the North Platte River and Sage Creek generally document impacts and conditions similar to those observed currently in this watershed. The only change is that the ravines and erosive soils decrease as one moves up the Platte River and become minimal above the confluence with the Encampment River. Vegetation and ground cover are the primary factors that will reduce fluvial and alluvial erosion in the uplands. Erosion can result in the loss of topsoil and reductions in site productivity in the uplands and horizontal adjustments of stream

channels. The primary influences upon these factors that may impact watershed function are current livestock use, wildfire suppression, and roads/off-highway vehicle activities.

Best Management Practices (BMPs) for livestock grazing that have been implemented in this watershed include: pasture grazing systems to control duration of use, deferment of riparian pastures to late summer or fall use when possible, and development of upland water sources to reduce dependence on streams as water sources. Monitoring has shown improvement in bank cover and stability, which has led to surface stream width (at base flows) reductions. Vegetative bank cover has increased significantly, and, therefore, reduced the unprotected bank area vulnerable to in-channel erosion. The bank building and expansion of riparian habitat (due to narrowing of stream channels), have led to increased late season flows in all perennial streams. In most cases there are adequate pastures for rotational grazing, the key is to control the duration and season of use on streams where improvement is still needed.

Fluvial erosional processes dominate in the upper elevations due to the higher precipitation and higher ground cover. Flood events due to summer rainstorms are the most likely cause of changes in channel conditions if vegetation is degraded. Forested systems on the Medicine Bow Mountains are in poor health in some areas and have high fuel loading since there have not been any major fires for decades due to fire suppression. Promoting forest health in the headwaters by mechanical thinning in diseased stands can be an effective method to improve the sustainability of headwater vegetation. Prescribed fire is needed as a management tool in this area to lower fuel loads and provide a mosaic of vegetation and increased diversity of species and age classes for both woodlands and shrublands.

As roads are upgraded and improved, problems associated with them are generally reduced. Main roads need to be graveled or a harder surface developed to reduce long-term maintenance. Simple practices such as wing-ditching have become a standard operating procedure on new roads but need to be added to older roads. Water flows are flared out into the vegetation where it benefits plant growth and infiltrates the soil instead of running down the middle or side of the road until it reaches a stream. Greater use of culverts prevents water from running along the road and creating gullies by moving the water to the down hill side where it can access a wing-ditch. Off-road vehicle use, particularly four-wheelers, continues to be a problem where people drive them off existing roads and are creating new roads. These are often in an attempt to get higher on the mountain, in steeper terrain, that is more susceptible to erosion once the ground cover is removed.

## **6) Recommendations:**

Due to the existing diversity and amount of vegetative cover on uplands, the existing and improving trend in stream vegetation and channel morphology, and the small number of remaining management issues, it is determined that the North Platte River – Cow Creek and Spring Creek watershed within the report area is meeting Standard #1. The following recommendations would expand upon the success already achieved and help to meet desired resource conditions in the future.

Continue to implement or manage using BMPs for livestock grazing. This primarily means controlling the season, duration, and distribution of livestock use to meet desired resource objectives for both riparian and upland habitats. Specific dates or times must be decided on a case-by-case basis. Methods to achieve this include, but are not limited to, herding, pasture fencing, water developments, and vegetation treatments.

Identify and correct any problems with improved and two-track roads, with erosional areas identified and fixed or the road should be closed and reclaimed.

Implement vegetation treatments to restore plant communities with diverse species, age classes, and cover types. Promote composition of communities to maximize herbaceous cover and litter, and therefore, minimize surface runoff and soil erosion, and promote reliable, late-season stream flows.

Reintroduce beaver into suitable habitats whenever possible.

Expand public education about its role in public land management, particularly regarding impacts from road and off-highway vehicular activities.

## **North Platte River - Big Creek, Brush Creek, Douglas Creek and French Creek**

### **1)Characterization:**

This discussion includes the following sub-areas: Big Creek, Brush Creek, Douglas Creek and French Creek which have perennial headwaters derived from the Sierra Madre and Medicine Bow Mountains, and the North Platte River. Other smaller tributaries include Indian, Dufunny, Beaver, Deer, North and South Cottonwood, Corral, Moores, School and Prospect Creeks. Soils are predominately sandy clay-loam to clay-loam soils, with generally perennial and intermittent stream segments that empty into the North Platte River. Rapid snowmelt or thunderstorms can produce moderate to high runoff with low to medium erosion potential. Topography is flat to gently rolling landscape at lower elevations, becoming moderately steep to steep closer to the mountain ranges (photo 16-1). This creates high gradient changes near headwater areas, potentially increasing the potential for head-cuts and gullies. The lower elevation drainages have low gradients with lower potential for gullies.

Early homesteads were developed in the wider valleys and gentler terrain along the larger streams, such as Brush and Beaver Creeks, as well as the North Platte River. Irrigation for hay meadows is generally reliable, due to the proximity of the nearby National Forest. All streams have a rocky base which promotes more lateral stream movement with disturbance, rather than down-cutting. Stream channels are generally stable with rocks and perennial vegetation cover, including willows, waterbirch, cottonwood, aspen and other shrubs. There has been little flow monitoring for any of the streams in this area. Flows are highest in May and lowest during August or September.

The majority of stream channels in this watershed are B3 stream types. These headwater streams are on steeper gradients, found in narrow, moderately steep colluvial valleys, with gradients of two to four percent and channel materials composed predominantly of cobble with lesser amounts of boulders, gravel, and sand (photo 16-2). The B3 stream type is considered relatively stable and is not a high sediment supply stream channel (Rosgen 1996).

The North Platte River above its confluence with the Encampment River is a C3, meaning a slightly entrenched, meandering, riffle/pool, cobble-dominated channel with a well developed floodplain (Rosgen 1996). It is found in U-shaped valleys. C3 Channels have gentle gradients of less than 2%, display a high width/depth ratio, are slightly more sinuous and have a high meander width ratio. Rates of lateral adjustment are influenced by the presence and condition of riparian vegetation. Above its' confluence with Big Creek, the North Platte River is a B3 stream type, with higher gradient and more confined with the adjacent hills and canyons. The bed and bank materials of this stream type are stable and contribute only small quantities of sediment during runoff events. Large woody debris is an important component for fisheries habitat when available (Rosgen 1996).

Principal human uses in this watershed are livestock grazing, hay production and recreation. Livestock use is primarily cattle, employing both cow/calf and yearling operations. Seasons of use are primarily winter and spring at lower elevations and summer and fall at higher elevations. Hay production is primarily just grass hay due to the elevation and short growing season, with ground preparation and fertilization in the spring, summer irrigation, putting up hay during the summer and fall. Recreation is primarily related to hunting, fishing, and camping. The

Platte River receives a high percentage of recreational use related to fishing, boating and other water activities. In addition, hunting is also prevalent during the fall (September through October).

## **2) Issues and Key Questions:**

1. *Livestock Grazing*: (please refer to issues identified for NPR – Cow Creek and Spring Creek)

2. *Woody Plants*: (please refer to issues identified for NPR – Cow Creek and Spring Creek)

3. *Erosion*: (please refer to issues identified for NPR – Cow Creek and Spring Creek)

## **3) Current Conditions:**

Quantifiable data about current erosion levels and stream flows is available to some extent for most streams by the USGS. Additional information is available from photo-points and personal observations show that the trend for watershed values is upward. Specific management implemented along with range improvements and vegetative treatments, at least indirectly, should also relate to improved resource conditions in most areas.

Stream channels are generally stable, with good vegetative cover and/or rock for armoring, with good width-to-depth ratios. Some channel narrowing will still occur. As the channels narrow, the active floodplain width expands, including both lateral expansion on cobble, gravel, and silt-bottomed streams. In-channel bank sloughing on outer corners and gradient adjustment of ephemeral side drainages are the primary sources of erosion. Reduction of bank cover due to the duration and season of cattle use has and continues to be the principle impacts to channels on public lands. Changes in livestock management, including fencing, upland water developments and/or exclusion will be implemented. Beaver are still present on upper portions of these streams, and contribute to stream stability and sediment storage.

Vegetative cover and litter on uplands varies with the soils, slope, aspect, elevation and precipitation. Research conducted in Wyoming indicated that upland plant communities often can be maintained with ground cover above 30%, while sediment yield increased dramatically when cover declined to less than 30% (Linse, Smith and Trlica, 1992). Ground cover ranges from 50% to nearly 100% on big sagebrush plant communities, the most common vegetation types in this watershed. At higher elevations, plant cover is usually higher due to increased moisture and density of plants. In general, the overall ground cover appears good, but in many locations can still be improved with the use of BMPs.

## **4) Reference Conditions:**

Accounts by John C. Fremont (1843) and Howard Stansbury (1850) for the North Platte River downstream of Saratoga are the closest to this watershed, and in general describe the abundance of “*Artemisia*” (sagebrush) across the landscape. Grass was noted as scanty in some areas (Sage Creek) or during drought years, and otherwise not referenced. Bison and other big game species were documented as common in the watershed and nearby North Park in Colorado, and therefore, influenced native vegetation and soil cover through both grazing and browsing.

## **5) Synthesis and Interpretation:**

The descriptions made by early explorers when they crossed the North Platte River generally document impacts and conditions similar to those observed currently in this watershed. Vegetation and ground cover are the primary factors that will reduce fluvial and alluvial erosion in the uplands. Erosion can result in the loss of topsoil and reductions in site productivity in the uplands and horizontal adjustments of stream channels. The primary

influences upon these factors that may impact watershed function are current livestock use, wildfire suppression, and roads/off-highway vehicle activities.

Best Management Practices (BMPs) for livestock grazing that have been implemented in this watershed include: pasture grazing systems to control duration of use, deferment of riparian pastures to late summer or fall use when possible, and development of upland water sources to reduce dependence on streams as water sources. Monitoring has shown improvement in bank cover and stability, which has led to surface stream width (at base flows) reductions. Vegetative bank cover has increased significantly, and, therefore, reduced the unprotected bank area vulnerable to in-channel erosion. The bank building and expansion of riparian habitat (due to narrowing of stream channels), have led to increased late season flows in all perennial streams. In most cases there are adequate pastures for rotational grazing, the key is to control the duration and season of use on streams where improvement is still needed.

Fluvial erosional processes dominate in the upper elevations due to the higher precipitation and higher ground cover. Flood events due to summer rainstorms are the most likely cause of changes in channel conditions if vegetation is degraded. Forested systems on the Medicine Bow Mountains are in poor health in some areas and have high fuel loading since there have not been any major fires for decades due to fire suppression. Promoting forest health in the headwaters by mechanical thinning in diseased stands can be an effective method to improve the sustainability of headwater vegetation. Prescribed fire is needed as a management tool in this area to lower fuel loads and provide a mosaic of vegetation and increased diversity of species and age classes for both woodlands and shrublands.

As roads are upgraded and improved, problems associated with them are generally reduced. Main roads need to be graveled or a harder surface developed to reduce long-term maintenance. Simple practices such as wing-ditching have become a standard operating procedure on new roads but need to be added to older roads. Water flows are flared out into the vegetation where it benefits plant growth and infiltrates the soil instead of running down the middle or side of the road until it reaches a stream. Greater use of culverts prevents water from running along the road and creating gullies. Off-road vehicle use, particularly four-wheelers, continues to be a problem where people drive them off existing roads and are creating new roads. These are often in an attempt to get higher on the mountain, in steeper terrain, that is more susceptible to erosion once the ground cover is removed. The worst of these areas is the access route to the North Platte River at Prospect Mountain, that has multiple routes up steep slopes with severe erosion occurring in the oldest and deepest set of ruts (photo 18-1). This erosion eventually ends up in the North Platte River during spring or seasonal high flow events.

## **6) Recommendations:**

Due to the existing diversity and amount of vegetative cover on uplands, the existing and improving trend in stream vegetation and channel morphology, and the small number of remaining management issues, it is determined that the majority of the Upper North Platte River – Big Creek, Brush Creek, Douglas Creek and French Creek watershed within the report area is meeting Standard #1. The one area not meeting this Standard is a five acre site at Prospect Mountain along the access road to the North Platte River. The following recommendations would expand upon the success already achieved and help to meet desired resource conditions in the future.

Continue to implement or manage using BMPs for livestock grazing. This primarily means controlling the season, duration, and distribution of livestock use to meet desired resource objectives for both riparian and upland habitats. Specific dates or times must be decided on a case-by-case basis. Methods to achieve this include, but are not limited to, herding, pasture fencing, water developments, and vegetation treatments.

Identify and correct any problems with improved and two-track roads, with erosional areas identified and fixed or the road should be closed and reclaimed.

Implement vegetation treatments to restore plant communities with diverse species, age classes, and cover types. Promote composition of communities to maximize herbaceous cover and litter, and therefore, minimize surface runoff and soil erosion, and promote reliable, late-season stream flows.

Reintroduce beaver into suitable habitats whenever possible.

Expand public education about its role in public land management, particularly regarding impacts from road and off-highway vehicular activities.

## **Encampment River**

### **1) Characterization:**

The Encampment River, which also includes Badger, Copper, Cottonwood and Miner Creeks, have perennial headwaters derived from the Sierra Madre Mountains. Soils are predominantly sandy clay-loam to clay-loam soils, with a lot of rock in places that make deep soils into shallow acting soils supporting shrublands. Rapid snowmelt or thunderstorms can produce moderate to high runoff with low to medium erosion potential. Topography is flat to gently rolling landscape at lower elevations, becoming moderately steep to steep closer to the mountain ranges (photo 19-1). The Encampment River canyon and Miner Creek both cut through steeply sloped landscapes. This creates high gradient changes near headwater areas, potentially increasing the potential for head-cuts and gullies. The lower elevation drainages have low gradients with lower potential for gullies.

Early homesteads were developed in the wider valleys and gentler terrain along the larger streams, such as the Encampment River. Irrigation for hay meadows is reliable, due to the proximity of the National Forest. Streams have a rocky base which promotes more lateral stream movement with disturbance, rather than down-cutting. Stream channels are generally stable with rocks and perennial vegetation cover, including willows, waterbirch, cottonwood, aspen and other shrubs. There has been no annual flow monitoring for any of the streams in this area. Flows are highest in May and lowest during August or September.

The majority of stream channels in this watershed are B3 stream types. This stream type is found in narrow, moderately steep colluvial valleys, with gradients of two to four percent and channel materials composed predominantly of gravel with lesser amounts of boulders, cobble, and sand (photo 19-2 through 4). The B3 stream type is considered relatively stable and is not a high sediment supply stream channel (Rosgen 1996).

Principal human uses in this watershed are livestock grazing, hay production and recreation. Livestock use is primarily cattle, employing both cow/calf and yearling operations. Seasons of use are primarily winter and spring at lower elevations and summer and fall at higher elevations. Hay production consists of native and agricultural grass hay, due to the elevation and short growing season, with ground preparation and fertilization in the spring, summer irrigation, putting up hay during the summer and fall. Recreation is primarily related to hunting, fishing, and camping.

### **2) Issues and Key Questions:**

**1. Livestock Grazing:** (please refer to issues identified for NPR – Cow Creek and Spring Creek)

**2. Woody Plants:** (please refer to issues identified for NPR – Cow Creek and Spring Creek)

**3. Erosion:** (please refer to issues identified for NPR – Cow Creek and Spring Creek)

### **3) Current Conditions:**

Quantifiable data about current erosion levels and stream flows is available to some extent for most streams by the USGS. Additional information is available from photo-points and personal observations show that the trend for watershed values is static or upward. Specific management implemented along with range improvements and vegetative treatments, at least indirectly, should also relate to improved resource conditions in most areas.

Stream channels are generally stable, with good vegetative cover and/or rock for armoring, with good width-to-depth ratios. Some channel narrowing will still occur. As the channels narrow, the active floodplain width expands, including both lateral expansion on cobble, gravel, and silt-bottomed streams. In-channel bank sloughing on outer corners and gradient adjustment of ephemeral side drainages are the primary sources of erosion. Reduction of bank cover due to the duration and season of cattle use has and continues to be the principle impacts to channels on public lands. Changes in livestock management, including fencing, upland water developments and/or exclusion will be implemented. Beaver are still present on upper portions of these streams, and contribute to stream stability and sediment storage.

Vegetative cover and litter on uplands varies with the soils, slope, aspect, elevation and precipitation. Research conducted in Wyoming indicated that upland plant communities often can be maintained with ground cover above 30%, while sediment yield increased dramatically when cover declined to less than 30% (Linse, Smith and Trlica, 1992). Ground cover ranges from 50% to nearly 100% on big sagebrush plant communities, the most common vegetation types in this watershed. At higher elevations, plant cover is usually higher due to increased moisture and density of plants. In general, the overall ground cover appears good, but in many locations can still be improved with the use of BMPs.

### **4) Reference Conditions:**

John C. Fremont (1843-44) crossed “Potter’s fork” (Encampment River) and described it as “a clear and swift stream, 40 yards wide, and in many places deep enough to swim our animals”.

### **5) Synthesis and Interpretation:**

The Encampment River where it leaves the canyon still looks today as Fremont described it 165 years ago. The topography and vegetation are probably very similar to the historic conditions described in this and other sections for this watershed. Vegetation and ground cover are the primary factors that will reduce fluvial and alluvial erosion in the uplands. Erosion can result in the loss of topsoil and reductions in site productivity in the uplands and horizontal adjustments of stream channels. The primary influences upon these factors that may impact watershed function are current livestock use, wildfire suppression, and roads/off-highway vehicle activities.

Best Management Practices (BMPs) for livestock grazing that have been implemented in this watershed include: pasture grazing systems to control duration of use, deferment of riparian pastures to late summer or fall use when possible, and development of upland water sources to reduce dependence on streams as water sources. In most cases there are adequate pastures for rotational grazing, the key is to control the duration and season of use on streams where improvement is still needed.

Fluvial erosional processes dominate in the upper elevations due to the higher precipitation and higher ground cover. Flood events due to summer rainstorms are the most likely cause of changes in channel conditions if vegetation is degraded. Forested systems on the Medicine Bow Mountains are in poor health in some areas and have high fuel loading since there have not been any major fires for decades due to fire suppression. Promoting forest health in the headwaters by mechanical thinning in diseased stands can be an effective method to improve the sustainability of headwater vegetation. Prescribed fire is needed as a management tool in this area to lower fuel

loads and provide a mosaic of vegetation and increased diversity of species and age classes for both woodlands and shrublands.

As roads are upgraded and improved, problems associated with them are generally reduced. Main roads need to be graveled or a harder surface developed to reduce long-term maintenance. Simple practices such as wing-ditching have become a standard operating procedure on new roads but need to be added to older roads. Water flows are flared out into the vegetation where it benefits plant growth and infiltrates the soil instead of running down the middle or side of the road until it reaches a stream. Greater use of culverts prevents water from running along the road and creating gullies. Off-road vehicle use, particularly four-wheelers, continue to be a problem where people drive them off existing roads and are creating new roads. These are often in an attempt to get higher on the mountain, in steeper terrain, that is more susceptible to erosion once the ground cover is removed.

## **6) Recommendations:**

Due to the existing diversity and amount of vegetative cover on uplands, the existing and improving trend in stream vegetation and channel morphology, and the small number of remaining management issues, it is determined that the Encampment River watershed within the report area is meeting Standard #1. The following recommendations would expand upon the success already achieved and help to meet desired resource conditions in the future.

Continue to implement or manage using BMPs for livestock grazing. This primarily means controlling the season, duration, and distribution of livestock use to meet desired resource objectives for both riparian and upland habitats. Specific dates or times must be decided on a case-by-case basis. Methods to achieve this include, but are not limited to, herding, pasture fencing, water developments, and vegetation treatments.

Identify and correct any problems with improved and two-track roads, with erosional areas identified and fixed or the road should be closed and reclaimed.

Implement vegetation treatments to restore plant communities with diverse species, age classes, and cover types. Promote composition of communities to maximize herbaceous cover and litter, and therefore, minimize surface runoff and soil erosion, and promote reliable, late-season stream flows.

Reintroduce beaver into suitable habitats whenever possible.

Expand public education about its role in public land management, particularly regarding impacts from road and off-highway vehicular activities.

## STANDARD 2-RIPARIAN/WETLANDS

*Riparian and wetland vegetation have structural, age, and species diversity characteristic of the state of channel success and is resilient and capable of recovering from natural and human disturbance in order to provide forage and cover, capture sediment, dissipate energy, and provide for ground water recharge.*

Riparian zones are the interfaces between terrestrial and aquatic ecosystems. As ecotones, they encompass sharp gradients of environmental factors, ecological processes, and plant communities (Gregory et.al., 1991). Riparian/wetland habitat makes up a relatively small percentage of the Upper Platte River Report Area. Although this is a small area, these important communities are some of the most productive found on public lands. They are important for recreation, fish and wildlife habitat, water supply, cultural and historic values, as well as livestock production. The discussion of riparian/wetland habitat will be divided into two geographic regions, upper elevation perennial streams (including the Platte River) and intermittent streams in the lower elevations.

### 1) Characterization:

Riparian-wetland habitats within the assessment area are described in the following groups: springs and streams that flow out from the higher mountains; snow supported seeps, impoundments for recreational fisheries and/or irrigation, man-made wetlands around artesian wells. Streams in this assessment area generally flow perennially in the higher elevations and support riparian vegetation. At lower elevations the flow is more intermittent. Riparian grassland habitat types are the most common form of vegetation, but also include several willow riparian shrublands, aspen/spruce riparian woodlands, and cottonwood woodlands. Riparian grasslands are wetland, stream, or spring-associated grass and grass-like communities, which are maintained by water tables within rooting depth during most of the growing season. Willow riparian shrublands occur as scattered individuals or as denser communities, on wet sites that are somewhat thermally protected along drainages. Aspen riparian woodlands occur at higher elevations in the foothills of the mountain ranges in deep, loamy soils and on north and east aspects where snow drifts protect and support their moisture requirements. Cottonwood woodlands occur along drainages leaving the Medicine Bow Mountains and line the larger water courses including the Platte and Encampment Rivers, and major contributors such as the forks of Spring and Cow Creek, Minor Creek, and lower reaches of Big Creek. Spruce/fir woodlands occur along the highest elevation foothill and mountain streams within steep gradients and confining canyons such as Indian, Prospect, Centennial, and Heather Creeks.

Mid and lower elevation seeps and springs primarily support riparian grassland habitat types (photo 22-1). Common species include Nebraska and beaked sedges, Baltic rush, spike-sedge, tufted hairgrass, basin wildrye, wheatgrass, saltgrass, Kentucky bluegrass, redbud, mat muhly, alkali sacaton, cinquefoil, horsetail, plantain, mint, aster and thistle. Streams may flow for short distances or for several miles from these sources. Examples within the assessment area include: Deep Draw, Mason Gulch, Snow Creek, Antelope Springs Draw, and numerous unnamed tributary draws to perennial creeks.

The seeps, springs and streams in the higher elevations support a mixture of riparian grassland and willow riparian shrubland habitat types (photo 22-2). Riparian grassland species are generally the same as those listed above. The willow riparian shrubland is dominated by Geyer, Booth, sandbar, and yellow willows. Additional shrubs found here include chokecherry, dogwood, waterbirch, currant, snowberry, rose, and individual quaking aspen. The herbaceous understory generally includes Nebraska sedge, beaked sedge, tufted hairgrass, Kentucky bluegrass and redbud. The main drainages are Big Creek, Prospect Creek, North and South Spring Creek, Indian Creek, Miner Creek, Heather Creek, Methodist Creek, Cow Creek, and the Encampment and North Platte Rivers. Streams are diverse in both gradient and flow regimes, which creates greater diversity in vegetative communities and species composition. Adjacent to these habitats are cottonwood, aspen and in some cases spruce/fir riparian woodlands. These sites closer to the mountains occur on all aspects below and adjacent to springs, streams or ponds, typically at 6,000 to 8,100 ft. Soils are generally poorly-drained and water tables are within root depth during most of the growing season. Overstory species are aspen, willow, spruce, subalpine fir, and lodgepole pine. The shrub layer is

more open than the willow riparian sites and is dominated by serviceberry, chokecherry, common juniper, currants, rose and big sagebrush (photo 23-1). Other species associated with this habitat type are shrubby cinquefoil, tufted hairgrass, Columbia needlegrass, elk and other sedges, bluegrasses, wildrye, rushes, and various forbs in the herbaceous layer. At middle and higher elevations quaking aspen can also be added to this list, and where abundant, these sites are classified as aspen riparian woodlands. Cottonwood riparian woodlands are found on lower gradient and sometimes drier sites along the Encampment and Platte Rivers, lower Miner and Big Creeks, and dispersed portions of the lesser feeder creeks (photo 23-2.) Understory species include many of those already listed above, with a tendency towards those shrubs and herbaceous plants that like drier meadow habitats.

The remaining portion of the basin consists of the valley bottom, where almost all of the perennial water courses lie on deeded land where the majority constitutes irrigated meadows. Water courses on public land within this portion of the watershed consist of intermittent to ephemeral drainages, and include draws and associated tributaries of Cedar Creek, both forks of Spring Creek, Cow Creek, Beaver Creek, Trent Creek and Big Creek. Where water is more reliable, usually tied to springs or snowmelt, these areas may support riparian habitat. As water becomes more limiting they do not support wetland vegetation nor do they have hydric soils. Hydric soils are formed when there are at least two weeks of water saturation during an average year, which produces anaerobic conditions within the soil.

There are several man-made wetlands within the assessment area; some provide recreational fisheries, while others are primarily for irrigation. Saratoga Lake is a developed recreation site with facilities (photo 23-3), located entirely on state trust and deeded land. Haines, Antelope, and Buck Draw Reservoirs, all catchments constructed for irrigation purposes, and many other small ponds provide important waterfowl habitat during wet years and support riparian grassland and open aquatic-emergent wetland habitat. Vegetation must be tolerant of salt and/or alkaline conditions, especially in the lower elevations. Common plant species include Nuttall's alkaligrass, alkali cordgrass, saltgrass, Baltic rush, cattails, tufted hairgrass, American bulrush, slim sedge, greasewood, arrowgrass, alkali plantain, sea milkwort, buttercup, cinquefoil, hairy goldaster, Rocky Mountain glasswort, as well as many of the lower elevation willow species such as yellow and coyote willow. Due to the extreme fluctuations in water levels, riparian vegetation can range from extremely limited/non-existent, to quite abundant and healthy.

#### Evaluation Method:

The primary method used in evaluating this standard is through a qualitative assessment procedure called Proper Functioning Condition (PFC). This process evaluates physical functioning of riparian/wetland areas through consideration of hydrology, vegetation, and soil/landform attributes. A properly functioning riparian /wetland area will provide the elements contained in the definition:

- Dissipate stream energy associated with high water flows, thereby reducing erosion and improving water quality
- Filter sediment, capture bed load and aid floodplain development
- Improve flood-water retention and ground water recharge
- Develop root masses that stabilize streambanks against cutting action (TR 1737-15 1998)

It is important to note that the PFC assessment provides information on whether an area is physically functioning in a manner that allows maintenance or recovery of desired values (e.g., fish habitat, neotropical birds, or forage) over time. PFC is not desired or future condition (TR 1737-15 1998). PFC assessments are used along with other existing information such as stream cross-sections, photo-points, and habitat assessments to evaluate this standard of rangeland health.

## **2) Issues and Key Questions:**

The area has been in official drought status since 2000 and has had several years of extremely low precipitation. The summer of 2004 exhibited above-normal moisture in the area, but, because of a relative snow-free winter prior,

could not be considered “recovered” from the drought. The spring of 2005 provided above-normal moisture, but was followed by a dry summer season. How have these drier conditions impacted many of the riparian/wetland areas in the S&G area in the long-term?

Noxious and invasive weeds along creeks, reservoirs, hay meadows and especially the North Platte River is an important factor relating to riparian condition within the assessment area. How will the spread of these weeds be addressed, especially in complex land ownership patterns? (The weeds issue will be also be addressed in Standard 4)

Livestock use of riparian habitats has been and continues to be an important factor relating to riparian condition within the assessment area. Historic livestock grazing use that included grazing and trailing large numbers of livestock and much longer durations of use, trapping beaver out of the systems, and the lack of upland water sources contributed to the decline in riparian conditions. Current livestock grazing use can negatively impact establishment and/or production of woody riparian plant species such as aspen, willows, dogwood, waterbirch or cottonwood in some portions of the watershed. Movement of animals through riparian areas can affect functionality by increasing bare ground, usually observed in the form of trails and crossings. Higher numbers or an increased duration of use will create a greater impact from bank shear and trampling, leading to more bare ground. Increased bare ground reduces the ability of the system to function properly in high flow events. In many cases, best management practices have been implemented which reduce the duration and/or change the season of grazing use for livestock. Continued refinement of these practices will address the current livestock grazing use aspect.

There are certain areas within the assessment areas where hummock areas occur adjacent to riparian areas (photo 24-1). Many of these are a factor of the soil involved and the historic long duration of livestock use that has occurred within the area. Will implementation of best management grazing practices address these areas at risk?

Vertical instability is a problem in some areas (photo 24-2). Some of these head-cuts have been stabilized within the watershed; however, there are still areas that need to be addressed or maintained. Manmade structures such as reservoirs also have instability problems due to naturally fine sediments and lack of pipes on older projects. Cutting of the spillways on reservoirs or around or through dikes are ongoing problems affecting functionality. What is practical to address these instability issues?

Another factor affecting riparian condition is roads and their associated impacts on these areas. Roads that are directly adjacent to riparian systems in many cases channel sediments directly into creeks and reservoirs. In addition, improper size or placement of culverts can increase erosion directly into riparian systems. If the amount of sediment is high enough, it can reduce vegetation, reduce functionality, decrease water quality, and change the channel dynamics. Roads can also interrupt surface and subsurface flow, which can effectively change the type of riparian system from one side to the other. Can road related concerns be addressed through culverts, improved crossings, rerouting, water bars, and roadside pits or are there additional solutions that can be implemented?

Additionally, overall changes in historic use of and impacts on riparian zones have altered the conditions of these areas. Many portions of these streams historically involved the presence of beavers and their associated activities and alterations of the systems. Subsequent loss of beaver populations due to trapping or the animals removal of their main food source has allowed the systems of dams and ponds to collapse and increased erosion and sedimentation into the systems (photo 24-3). Lack of turnover has led to the predominance of spruce/fir type communities adjacent to the streams precluding recolonization by beaver which could aid in riparian system recovery. How can shifts in vegetation species composition be addressed and recolonization by aspen/will types be encouraged?

### 3) Current Conditions

PFC assessments have been conducted in the watershed since the mid 1990s, with the most recent assessments occurring throughout the spring/summer/fall of 2004, concluded during the summer of 2005. Documentation of riparian condition in addition to PFC may include photo-points, channel cross-sections, ground-water wells, habitat quality assessments, and woody plant studies.

The assessment area had been in official drought status from 2000 through 2004 only recently beginning to climb out of this cycle, and has had several years of low precipitation followed by a wet summer in 2004 and a wet spring in 2005. These drier conditions have impacted many of the riparian/wetland areas in the S&G area. Wetland areas in the assessment area are fed by groundwater or snowpack, therefore impact to these features is generally delayed and can be expected in the following years. The riparian/wetland areas around the mountains tend to flow from a combination of groundwater and snowmelt. Many of these riparian areas have had much lower flows overall, and even in some cases have stopped flowing earlier than usual. In addition, the drought has made a significant difference in some wetland areas, where normally perennial springs, seeps, and reservoirs have dried up.

In many cases, livestock grazing over the last few years has been reduced by grazing permittees due to drought conditions. However, with less water available many of these wetland/riparian areas have been less productive and may show signs of drought stress. Assessments for PFC have been completed from the late 1990's (on an individual allotment basis) until 2005 (as part of the watershed assessment), and several limited areas (along Antelope Springs Draw) have been reassessed. Reassessments of these limited areas showed stable or improved condition, generally moving from functioning-at-risk with a stable trend to functioning-at-risk upward trend or even properly functioning due to implementation of BMPs.

#### LENTIC SYSTEMS

Lentic systems within the assessment area primarily consist of natural spring and/or seep sites either perched within mostly upland portions of drainages or within water courses either below the upland vegetation line or immediately above it. Regardless of location, these sites are generally relatively small (less than an acre to an acre or two), and during a normal year flow water only a short distance down slope or stream, sometimes drying completely by late summer prior to fall moisture. Some of these water sources have been fenced to protect wetland vegetation and provide water sources for livestock and wildlife using troughs outside the fencing. The condition of these developments ranges from very good and functional to almost non-existent due to a lack of maintenance. Other natural water sources which are unfenced have been (and currently are in many cases) used seasonally by livestock and year-round by wildlife, resulting in high amounts of trampling and utilization with changes or loss of species composition. Changes in species composition include increases in undesirable (from a forage point of view) species such as Baltic rush and arrowgrass; increased amounts of grazing resistant species like Kentucky bluegrass and mat muhly; greater amounts of early successional forbs like strawberry cinquefoil and dandelion; and almost total loss of vegetative cover.

The current condition of Haines and Antelope Reservoirs are meeting proper functioning guidelines in accordance with their capability and potential. Banks are generally stable and vegetated with native species where capable are already listed in the characterization section for this Standard. Although neither is excluded from grazing, short duration use has ensured healthy riparian vegetation alongside the reservoir where water fluctuation is not excessive.

Lentic sites in the foothills and mountains area include natural ponds, seeps, and bogs, and a few smaller man-made reservoirs. For the most part, these sites have good species composition (already described) and bank cover, and are in proper functioning condition.

***Lentic areas not meeting PFC that are livestock related:***

*A Bar A allotment:*

For the most part, the lentic systems on public land in the A Bar A allotment are either functional, at-risk with an upward trend or are properly functioning. Lentic sites consist almost entirely of seep/spring site areas within or at the headwaters of intermittent draws which contain either static water or no surface water, or have limited flow for only a short distance, with no distinct channel in evidence. Several Platte River and Big Creek tributaries contain short stretches of lentic riparian sites in their headwaters, which have been impacted by summer season livestock grazing leading to hummocked areas, encroachment of upland vegetation, and suppressed riparian species recruitment and/or regeneration. In most cases, trend was estimated to be static because similar livestock use has been occurring on these sites since domestic livestock were moved into the valley, and there is little evidence that conditions on the specific sites have dramatically changed since. Two of these sites were rated as functional, at-risk with downward, static, or not-apparent trend. One of the evaluated sites had been developed with the addition of a pipe and trough system placed in the draw, emptying into a small water catchment below. There was no provision for removing livestock use from the riparian area, therefore the impacts continue similar to adjacent undeveloped sites. Additionally, a lentic seep/bog riparian tributary to Henry ditch and subsequently Spring Creek was rated as functional, at-risk with static trend (photo 26-1).

*Prospect Mountain allotment:*

High elevation springs and seeps in the Prospect Mountain allotment were general rated as properly functioning or functional, at risk with upward trends. These conditions are most likely due to the short duration and/or intensity of livestock use either due to limited access to the sites or limited grazing duration throughout the pasture(s) where they are located. The lentic riparian areas within this allotment that do not meet PFC minimum standards mostly consist of middle to lower elevation seep sites within or adjacent to ephemeral or intermittent draws where the mountains and foothills open up towards the valley bottom. The rolling, open topography adjacent to springs and draws in this portion of the grazing allotment allows livestock ample access to the sites, where they concentrate during summer grazing periods. Seeps within three tributaries to Spring Creek and the seeps near the top of Deerhorn draw were rated as functional, at-risk with downward and/or stable trend. Two specific spring developments had dirt-work performed on them several years ago which effectively removed portions of the riparian zone from the water sources and area immediately surrounding them. These seeps, within draws contributing to Big Creek, were rated as non-functional because of the alteration to the riparian zone, not directly related to livestock grazing effects. Efforts to protect these areas by development and fencing has been discussed with the operator, and is tentatively planned for 2006. Additionally, adjustments to grazing duration and timing within each pasture is being discussed to ease impacts throughout the allotment, but most specifically towards riparian areas.

*Platt Mine allotment:*

Portions of the riparian habitat within this allotment passed the riparian standards, most specifically, the armored lower (northern) reach of Big Creek. A seep site perched at the highest portion of a tributary draw to Big Creek was rated as functional, at-risk because of impacts associated with summer, season-long livestock use of the allotment.

*Beaver Creek Hills allotment:*

Long durations of use by cattle during the growing season has negatively impacted a spring source above Beaver Creek, resulting in a rating of functional, at-risk. Fencing and development of the water source to protect the lentic area has been discussed.

*Miner Creek allotment:*

A complex of seep/spring sites on public land above Soldier Creek are not currently meeting riparian standards, assessed as functional, at-risk with no apparent trend. Livestock tend to concentrate along the top of ridges and benches in the allotment where the more gentle terrain allows access, as opposed to the steep canyons constituting the remainder of the pastures. These springs are located within the more gentle terrain, resulting in heavy lounging and use by cattle throughout the summer (photo 27-1). Development of the water sources and fencing of the riparian areas would easily result in improved riparian area conditions in and around these seeps.

*Tennant Creek allotment:*

A formerly developed spring site above Tram Gulch has since fallen into disrepair, allowing livestock use of the riparian area throughout the grazing period. A split grazing period provides for allotment-wide recovery and deferment during the majority of the summer, alleviating impacts to riparian areas. Development of the water source and fencing of the riparian area would easily result in improved riparian area conditions in and around this spring.

*Centennial Creek allotment:*

Several relatively small seeps along an ephemeral draw in the eastern (lower) portion of the allotment have been affected by historical summer, season-long livestock use, as well as the current drought conditions which have led to decreases in water flow (related to amounts and durations.) Rated as functional, at-risk with stable trend, this reach may well recover with retreat of drought conditions. More importantly, the livestock operator has instituted a rotational grazing system within three pastures including the lowest, allowing deferment and recovery periods which are improving the condition of riparian areas within the allotment and pastures (photo 27-2).

**LOTIC SYSTEMS:**

The major perennial streams that drain the basin include Beaver, Big French, Brush, Cedar, Spring, Cow, Miner, and Indian Creeks, the Encampment River, and the North Platte River. The majority of these creek and water courses lie across deeded land, split by public lands for only short, infrequent sections. Higher elevation public lands encompass many of the feeder draws tributaries, and forks of these creeks, constituting the majority of lotic riparian habitat on public lands in the valley. The numerous creeks that originate in the mountains are diverse and support grassland, shrubland and woodland riparian plant communities.

In most cases, the highest elevation streams consist of high gradient, highly armored type systems originating higher in the mountains from springs or snowmelt, fed from additional seeps and springs along their routes. These resilient, highly armored systems are for all practical purposes, functioning properly throughout the valley. As elevation drops, stream gradients tend to become lower, and surrounding topography is, for the most part, more gentle, allowing for more meandering, less armored systems which are more influenced by outside uses such as livestock grazing, road encroachment, beaver activity, etc. At these elevations, lotic systems tend to exhibit more sinuosity, greater vegetation diversity, and more erosion/deposition evidence.

Beaver are common in certain areas (photo 28-1), in other areas old remnants of old dams and gnawed off aspen trees are still visible reminders of their presence. The loss of aspen habitat to conifer succession will be further discussed in Standard #3 – Upland Plant Communities. Beaver can still be found on public land riparian areas, but are scattered, occupying a fraction of historical habitat. Additional beaver activities are evident in private land irrigated meadow areas. The processes that occur with the hydrologic modification by beaver are natural, so many areas in stages of readjustment are normal under these influences. In some instances, conifer encroachment into historical beaver habitat has completely altered the habitat, making it unsuitable for beaver use due to a lack of suitable dam/lodge building materials and preferred food sources. Most of the gradient readjustment and revegetation of dams and ponds that comes after the beaver have gone seems to be actively occurring at this time, although there are instances where it has already successfully occurred, or has yet to earnestly begin. The riparian evaluations revealed that throughout the valley, this process can still be observed. In many cases, historical beaver activity has readjusted through natural processes, and has resulted in intermittent stream channels with scattered seep sites emerging from old pond areas, classified as lentic. In areas where aspen and willow stands support beaver activity, the structures are stable and the riparian areas which they support are, for the most part, properly functioning and healthy.

Most streams have good species composition and stability, due to the deep-rooted sedges, grasses and willows, which dominate these sites. Woody plant communities are diverse in species composition and vertical structure, with good regeneration of young plants where good management is in place. Near the edge of the mountains the amount of hedging on young shrubs and trees is higher, and may be attributable to more frequent use by big game species. In general, many of these streams meet proper functioning condition. Little to no bare ground, channel sloughing, or instability in these systems is present today, with the exception of a few isolated areas. However, some changes to meet desired future condition should still occur, such as greater cover or age class structure of a particular grass, shrub or tree.

In the Antelope Draw and Centennial Creek allotments (photo 28-2,3), aspen and willow riparian communities still exist which support beaver populations in many of the major drainages. This particular area was originally rated as functional and/or functioning, at-risk with a stable trend in 2000 and was revisited during the summer of 2005, at which time the rating was similar, and identified that the system was obviously positively adjusting to management changes. Factors identified that contributed to the original rating were long durations of livestock use, and gradient adjustments due to loss of beaver ponds. Vigorous sedge and rush communities, with willows stabilize the majority of this drainage. The majority of the streambanks are lined with both obligate and facultative riparian plants that are capable of holding together the riparian area even in high flows. These plants have deep and extensive root systems that stabilize the channels and also play an important part in channel roughness during high flows and filtration of sediments. Regeneration of woody shrubs and trees is occurring with a mixed age class and vertical structure of plants.

### **Intermittent and Ephemeral drainages**

In the lower elevations of this analysis area, water courses on public lands consist of mainly intermittent and ephemeral drainages. Most of the true riparian habitat in the valley bottoms has been homesteaded and currently consists of deeded hay-lands where flows are augmented and/or controlled by irrigation practices. Naturally occurring riparian communities on public lands vary from riparian herbaceous-dominated to coyote willow-dominated to an absence of riparian vegetation of any kind. In many cases, riparian communities occur sparingly enough that individual stretches are described under lentic system parameters.

An additional riparian community that is found throughout the valley is irrigation ditches which have constant enough flows to support riparian species, mostly mixed willow stands, with some cottonwood galleries occurring along the backslopes of ditches. Although riparian in nature, these man-made features are totally dependant on augmented flows and their sole function is to carry water from one location to another. Technically, these ditches are functioning properly as long as they flow water to irrigated meadows. Therefore, even though meeting the

definition of riparian, these systems were not evaluated as to functionality. Overall, draws and water courses in the majority of the lowest portion of the assessment area are ephemeral with no riparian vegetation.

***Lotic areas not meeting PFC that are livestock related:***

*A Bar A allotment-*

The vast majority of lotic riparian habitat on the scattered public lands in the A Bar A allotment is in functional condition or exhibits upward trend if at risk. This includes a significant portion of Big Creek which empties into the North Platte River which is a blue ribbon trout fishery. A stretch of Two Creek which feeds Big Creek was found to be functional, at-risk with no apparent trend direction. The reach had been impacted by intense livestock use, even though it was not summer, season-long. This stretch of creek is the only water source within a relatively small pasture and receives a high proportion of use. The overall duration of use on this section of creek may need to be adjusted in order to move the conditions towards an upward trend. There may be other solutions that will also address this extremely limited area of public land.

*Prospect Mountain allotment-*

The majority of lotic riparian sites within this high elevation allotment are functional or functional, at-risk with upward trend. The highest elevations of the allotment contain typical high-gradient, mountain foothill streams and riparian draws which are well armored, both in terms of stream-bed stability and vegetation components. There high elevation, high amounts of surrounding vegetation, and steep surrounding topography tend to discourage extended use by livestock as loafing areas, minimizing impacts to the systems. Almost all of the Prospect Creek drainage was found to be properly functioning or had obvious upward trends, the single exception due to road encroachment and erosion, with little livestock influence (see ***Lotic areas not meeting PFC that are not livestock related, following.***) As elevation is lost, topography and gradient become more gentle, and armoring of the various lotic systems drops. Several reaches, including a tributary to Spring Creek and two Big Creek tributaries received rating of functional, at-risk with either non-apparent or stable trends. Most notable impacts to these reaches were hummocking within the channel, a lack of vegetative cover along stretches of the banks, and inclusions of upland species within the riparian zones. Impacts appear to stem from long durations of livestock use within the individual pastures, and adjustments to the use periods have been discussed with the operator, as well as additional fencing for livestock control and upland and riparian water development.

*Platte Mine allotment-*

A portion of Big creek flows through the public lands within the Platt Mine allotment. The most southerly (higher) stretch of the creek serves an easily accessible water-gap area where livestock using the relatively small allotment can concentrate during the summer-long grazing period (photo 29-1). Additionally, trails created by fishermen from the surrounding ridges to the creek have been widened and deepened by livestock use and overland water flow, resulting in increased erosion and sedimentation directly down the sidehills into the creek (photo 29-2). The northern (downstream) reach of Big Creek was rated as properly functioning. Riparian habitat in four tributaries to Big Creek on its east slope were rated as functional, at-risk, with trend not apparent. Most of the concerns center around vegetation aspects of the riparian area, specifically the lack of new willow recruitment, hedging on the existing mature/decadent willows, and replacement of riparian plant species with upland types, indicating dropping water table levels. The topography surrounding these draws is gentle and open enough that livestock can loiter in the bottoms, affecting desirable riparian species. Additionally, heavy concentrations of wildlife in the area during the late fall, winter, and spring result in heavy hedging of shrub species including willow in the bottoms of draws.

*Beaver Hills allotment:*

The Beaver Hills allotment contains only limited stretches of riparian habitat located on public lands. A tributary to Big Hollow and Beaver Creek cuts through around a quarter mile of public land and was rated as functional, at-risk with a stable trend, mostly due to vegetation concerns. Willow recruitment was lacking and heavy seasonal browsing by wildlife was evident on the mature willow present in the draw. On the other (east) side of the divide, a tributary to Barcus Creek was rated as functional, at-risk with stable trend, mostly due to vertical and horizontal adjustments which are occurring in areas where steeper gradients occur. Grazing management within the last 10 years has changed to short-duration, rotational use, which has positively affected uplands and riparian areas on public and deeded lands. Additionally, the livestock operator on the allotment has fenced several perched seeps on deeded lands and a prescribed burn completed in the spring of 2005 should help to draw livestock use from the riparian bottoms to upland sites, alleviating pressure on this habitat.

*Corral Creek allotment:*

Several creeks in the Corral Creek allotment were rated as functional, at-risk, with downward trends. South Cottonwood Creek, both branches of Corral Creek, and the South Fork of Corral Creek were all rated similarly, affected by season-long livestock use which is concentrated in the riparian bottoms due to the relatively steep surrounding topography.

*Bennett Peak allotment:*

The North Platte River was rated as functional, at-risk, in this allotment, with both upwards and downward trends, dependent on the location along the river. North Cottonwood Creek and Corral Creek were rated as functional, at-risk with static and no apparent trend, respectively. Concerns with the riparian areas in this allotment centered on season-long livestock use which concentrates on the creek bottoms due to steep upland topography.

*Little Beaver Creek allotment:*

The Stretch of Little Beaver Creek in this allotment was rated as functional, at-risk, with no apparent trend, mostly due to livestock impacts to the riparian zone amplified by summer, season-long use and concentrated use in the bottoms within steep upland topography.

*Horn and Meason allotment:*

A quarter mile stretch of Cottonwood Creek that crosses through public lands in the Horn and Meason allotment, was rated as functional, at-risk with no apparent trend. Similar to other riparian areas in the Cedar hills area, it is one of the limited riparian areas within the allotment, which tends to concentrate livestock use throughout the grazing period.

*Cottonwood-Corral Creek allotment:*

The Cottonwood-Corral Creek allotment is rugged and cut by drainages. A portion of North Cottonwood Creek was rated as functional, at-risk with no apparent trend, because it is accessible to livestock in a drainage that is otherwise steep with little access. This portion of the creek receive the majority of the livestock pressure, and the remainder of the drainage is properly functioning. The livestock operator has a grazing plan in place and trend is upward overall in the allotment.

*Sanger allotment:*

The Sanger allotment is split by numerous riparian areas on public lands, including Moore's, School, and French Creek, the North Platte River, and Bear Gulch, all of which are properly functioning or functional, at-risk with an upward trend. Several minor, un-named riparian draws were found to be functional, at-risk with static trend when the analysis was completed. Public lands in this allotment suffer similar livestock distribution problems as many other allotments in the foothills, in that the stock tend to congregate on numerous riparian areas. Since the analysis was completed, practices were implemented, including a prescribed burn and mechanical thinning of juniper in the riparian drainages. Analysis in several years should show an upward trend in riparian areas.

*Saulcy allotment:*

A tributary to the West Fork of Indian Creek, where it passes through the northeast pasture of the Saulcy allotment was rated as functional, at-risk, with a stable to upward trend. Concerns related mostly to the series of seeps at the upper end which feed the reach, and an incised channel at the lower end below a small cottonwood gallery where the channel is cutting and adjusting. The majority of the reach is properly functioning between the two sections. Either an adjustment in the duration of livestock use and/or development of the seeps at the head of the draw could assure and/or hasten upward trends in the draw.

*Miner Creek allotment:*

Copper Creek flows through the southwest corner of the Miner Creek allotment where it flows into Miner Creek. Approximately a half mile of this stretch is located on public lands, and the upper and lower portions of the reach lie along the main access road to the National Forest and the Water-Valley Ranch. These easily accessible sections are impacted by season-long livestock use and were rated as functional, at-risk, most likely with stable trend. The Cow Camp tributary to Soldier Creek flows through a quarter mile of the allotment in the southeast corner beside the main access road, which is impacted by summer, season-long livestock use as well, and was rated as functional, at-risk, with no apparent trend. The vast majority of riparian areas within this allotment, including over 3 miles of Miner Creek and over two mile of the Encampment River, as well as numerous riparian tributary draws are properly functioning.

*Plattoga Ranch allotment:*

An extremely short stretch of Cow Creek passes through public lands in the Plattoga Ranch allotment, and was rated as functional, at-risk with static trend. This short section supplies water to an allotment with limited sources, acting essentially as a water-gap, and receives concentrated livestock use throughout the grazing period.

*Pierson allotment:*

Another short stretch (<1/4 mile) of Cow Creek passes through public lands in the Pierson allotment. Similar to the stretch in Plattoga Ranch, it was rated as functional, at-risk with no apparent trend.

*Silver Spur allotment:*

Within the sprawling Silver Spur allotment, several stretches of riparian areas run across the scattered sections and tracts of public lands, mostly enclosed by deeded or state trust lands on either side. Of these, Tram Gulch and numerous unnamed draws, seeps, and springs were rated as functional, at-risk with static trend. An allotment management plan has been proposed encompassing all of the Silver Spur BLM allotments in Wyoming, including Silver Spur, Plattoga Ranch, and Pierson. This management plan would address the riparian areas that are functioning, at-risk.

*Cottonwood allotment:*

Several riparian tributaries to the Encampment River run through public lands on the Cottonwood allotment. The portion of Deep Draw and Boxelder Draw lying within this allotment were rated as functional, at-risk, with no apparent trend and stable trend (respectively). Livestock concentrate along the bottom of deep draw due to the steep topography surrounding the bottom, and have subsequently impacted the riparian vegetation. Additionally, and of more concern is the invasion of undesirable upland species into the riparian zone, specifically cheatgrass and juniper. Cheatgrass carpets the surrounding slopes and has made its way into the riparian zone in the bottom of the draw. The riparian zone in Boxelder Draw is the result of a long-ago spring development above which provides overflow water into the draw which is really an upland site. Consistent with the site characteristics, this flow produces accelerated erosion in the draw. The site would be a good candidate for re-development, but access by equipment would be an issue. Adjustments to the timing and duration of use in the pasture would also affect riparian conditions in these reaches.

*Antelope Draw allotment:*

A tributary to North Spring Creek in the extreme northwest corner of the allotment was rated as functional, at-risk with a stable trend due to season long livestock impacts to vegetation and bank stabilization, as well as a road crossing perpendicular to the riparian zone. First evaluated in the summer of 2000, a rotational grazing system has been implemented which provides deferment and recovery periods to the pasture and encouraged revegetation of sloughed banks and re-establishment of desirable riparian species adjacent to the creek.

*Methodist allotment:*

The majority of riparian areas on public lands in the Methodist allotment were rated as properly functioning. One stretch of a draw below the Methodist Spring development was rated as functional, at-risk, with no apparent trend. The spring above this stretch was developed in the 1980's and dirt tanks were constructed below it to water livestock, with overflow feeding the riparian draw. Placement of the tanks within the draw tends to concentrate livestock use in the riparian area, encouraging upland vegetation in the riparian zone, hummocking of the channel and floodplain, and bank sloughing. The spring development was modified in the summer of 2005 and water from the spring development was piped out of the riparian zone to troughs placed on adjacent uplands, which will shift grazing pressure out of the draw bottom. Flows from the spring source should remain constant enough to feed the riparian draw below.

***Lotic areas not meeting PFC that are not livestock related:***

*Prospect Mountain allotment-*

Again, the majority of lotic riparian sites within this high elevation allotment are functional or functional, at-risk with upward trend. Generally, the higher elevation stretches are located in rougher topography, with higher gradients and more armored streambeds. In all cases but one, these systems were functioning properly or demonstrated positive upward trend. The single reach of this type that failed the riparian standard was a stretch of Prospect Creek leading into the North Platte River which was impacted by erosion and deposition from upland watershed conditions above, specifically gully erosion from a series of roads leading into the draw. Fortunately, historic beaver ponds located immediately below this stretch have served to filter and settle sediment prior to the draw dropping into the North Platte River.

*Heather Creek allotment:*

The Heather Creek allotment, located in the northwest edge of the watershed evaluation area, contains several stretches of significant tributary creeks flowing from the higher elevations of the Sierra Madre mountains. The

upper reaches of these creeks, including the North and South Forks of Heather Creek, Shingle Creek, and South Spring Creek are all historically dominated by Beaver activity, with dams and ponds stair-stepped down the drainages. At this point, the food source at the higher elevations (aspen and/or willow) has been depleted by the beaver, causing them to move on to other drainages, a natural succession of events. Re-establishment of aspen and willow plants, however, has been precluded by the encroachment of spruce-fir type overstory, which now dominates the drainages, including significant amounts of dead and down material within the drainages. The beaver dams have subsequently fallen into complete disrepair, and the streams, adjusting through silted-in ponds, have cut deep channels carrying heavy loads of sediment down-stream (photo 33-1). Although this is a natural successional occurrence following beaver activity, the predominance of spruce-fir overstory tends to preclude aspen regeneration, necessary for beaver to re-colonize and stabilize the reaches. Dependant on the point of view, the existing situation in these drainages can be viewed as a natural phenomenon which will be resolved following an event which removes the dominant overstory community present (spruce-fir) and replaces it with an earlier seral community (aspen woodland.) On the other hand, practical and political considerations tend to preclude intentional implementation of the type of event that would remove the existing community (i.e. a stand replacement fire), resulting in the current conditions continuing until a natural event occurs which alters the system.

Because of the extent of this situation within the upper ends of these drainages, they were rated as functional, at-risk, but trend was not established. The functional rating of these reaches was attributed to causes other than livestock grazing. This situation is by no means limited to the Heather Creek allotment, and was noted in portions of the Centennial Creek, Antelope Draw, Tennant Creek and North Fork allotments, but not to the extent as Heather Creek. Because of the more limited extent of the situation in these allotments, reaches exhibiting these characteristics were rated as properly functioning, adjusting to natural succession. The loss of aspen habitat to conifer succession will be further discussed in Standard #3 – Upland Plant Communities.

#### *Methodist allotment:*

A short stretch of Methodist Creek flows through public lands in the Methodist allotment. Similar to other creeks in the watershed, historical beaver activity has altered the system to the point that it could be considered dependant on the structures. Although conifer encroachment has not taken place in this reach to the extent found in Heather Creek, the structures are degraded to the point that this portion of the creek is at risk from adjustments during base and high flows. The reach was rated functional, at-risk with a downward trend (possibly temporary as natural adjustments occur) due to factors other than livestock use.

### **RIPARIAN REFERENCE REACHES**

During the field season of 2005 a project was undertaken to establish reference reaches along select major drainages in each of the seven Standards and Guidelines Assessment Areas contained within the lands administered by the Rawlins Field Office. Each reference reach encompassed approximately 400 linear feet along the stream. Site selection criteria included ease of access and significant amounts of adjacent BLM administered lands.

Objectives for the establishment of riparian reference reaches along major lotic drainages in the Rawlins Field Office included (1) the acquisition of baseline physical, chemical, and biological data, (2) to assess current riparian conditions, (3) to establish standardized protocols for riparian reference reach assessment to allow for the monitoring of riparian condition over time by utilizing repeated measures, and (4) the documentation of protocols to facilitate the establishment of additional reference reaches by BLM personnel in perpetuity.

Establishment and assessment of riparian reference reaches included the collection of a suite of biological, physical, and chemical data. Peer reviewed data collection protocols were selected for their utility in establishing baseline data used in assessment of riparian and instream habitat among years and repeated measures. Analyses of these data are currently underway and will be presented in a riparian reference reach report in the near future.

### *Biological Data*

Quantitative and qualitative aquatic macroinvertebrate samples were collected based on protocols provided by the BLM / Utah State University National Aquatic Monitoring Center ([www.usu.edu/buglab/](http://www.usu.edu/buglab/)). These data will provide insight into the ecological health and productivity associated with riparian reference reaches. Extensive data for vegetation resources contained within riparian reference reaches was also collected based on protocols developed by the United States Forest Service – Rocky Mountain Research Station in Ogden, Utah (Winward 2000). These data will allow for the assessment of changes in riparian vegetation and woody species community compositions within the riparian reference reaches.

### *Physical Data*

Substrates within the stream bed were characterized and quantified with pebble counts of at least 100 randomly selected measurements throughout the reference reach (Wolman 1954; Harrelson et al.1994). Size-frequency distributions will be generated to monitor potential changes in channel form, erosion rates, and sediment supply. In addition, sediment grab-samples were collected in depositional pools to assess what types of sediments are depositing within the reference reach.

In each riparian reference reach two monumented channel cross-sections were established and surveyed with rod and level (Harrelson et al.1994). This will allow for repeated measures and assessment of changes in channel form in the long term.

### *Chemical Data*

Water grab-samples were collected and sent to Energy Laboratories, Inc. located in Casper, Wyoming. This provided additional baseline data. Grab samples were analyzed for chemical properties including dissolved metals and major ions.

Water grab-samples were collected and sent to Energy Laboratories, Inc. located in Casper, Wyoming. This provided additional baseline data. Grab samples were analyzed for physical properties including: conductivity, hardness, pH, total dissolved solids, total suspended solids, calcium, magnesium, and sodium.

### *Reference Reach Locations*

Within the assessment area two reference reaches were established in 2005. One reference reach was established on the Encampment River upstream of Encampment, Wyoming, in proximity to a BLM administered campground (photo 34-1). A second site was established on Big Creek, approximately 0.75 miles downstream of the Highway 230 crossing (photo 34-2). Detailed location information for riparian reference reaches will be provided in a subsequent summary report of reference reaches established during 2005.

## **4) Reference Conditions:**

Reference conditions are also described under Standard 1. Mention of water in the area usually centers on the difficulty or ease of crossing encountered by various parties, or the quality of water encountered at layover spots.

It is clear that the Upper Platte Valley was rich in game, and that beaver abounded in its streams and drainages as late as the mid to later part of the 19<sup>th</sup> century. It is possible that beaver activity along the various drainages in the valley played the one of the earliest roles in shaping the current systems. Trappers' descriptions of the area, where winter camps or small rendezvous were held, spoke of streams rich in fur. On June 14, 1844, John C. Fremont wrote: "Buffalo, antelope, and elk were frequent during the day..." and that "We halted at noon on Potter's Fork [the Encampment River] a clear and swift stream 40 yards wide, and in many places deep enough to swim our animals and in evening encamped on a pretty stream, where there were several beaver dams, and many trees recently cut down by the beaver. We gave to this the name of Beaver Dam Creek, as now they are becoming sufficiently rare to distinguish by their name the streams on which they are found. In these mountains they

occurred more abundantly than elsewhere.” As late as 1868 through 1869 the Savage brothers were said to have made a good living trapping beaver on Cow, Spring, Brush, and Cedar creeks.

The watershed has always been impacted by grazing ungulates, being home to elk, deer, antelope, and bighorn sheep, and probably most importantly, herds of buffalo. During the late 1870’s, streams and riparian areas within the valley saw the first influences of domestic livestock, with the arrival of the first longhorn cattle. This roughly coincided with the removal of buffalo from the Upper North Platte Valley and the North Park area. Cattlemen put up hay for the winter from the very beginning, and therefore weathered the winter of 1886 better than others. Sheep utilized the valley as well, but not in the numbers seen to the north and west of the Sierra Madre mountains, limited mostly to farm flocks. Since this time, almost all of the riparian areas in the watershed have been utilized for livestock productions, either through direct grazing by stock, or conversion to hay lands, usually through the use of water diversion.

During the late 1860’s, the first tie camps were established in the mountains surrounding the valley, supplying ties and firewood to Fort Fred Steele and the Union Pacific Railroad. Tie camps continued from the 1870’s into the first decade of the next century, with huge tie drives clogging the rivers as ties were floated downstream. On June 12, 1903, the Grand Encampment Herald stated that “Half a million ties have been floated down from Hog Park during the last few weeks bound for Fort Fred Steel.” (Moulton, 1997) On a smaller scale, tie drives through the valley continued into the 1930’s and 40’s, when truck transport replaced them.

One other use of the land which influenced many of the valleys streams and creeks, although mostly at higher elevations, was the mining boom of the late 1800’s and early 1900’s when small deposits of gold were first discovered, followed by the copper boom of 1897-1908. Mining activities altered the watershed in the form of tailings and further removal and transport of timber for mine shaft supports and railroad spurs.

Riparian vegetation is specifically identified in *The Wyoming Landscape 1805-1878*. Quoting Fremont, it states: “Around North Spring Creek about 10 miles southwest of Saratoga the country had now become very beautiful – rich in water, grass, and game...along the base of the mountains toward Encampment, almost every hollow had a clear, cool mountain stream... variously wooded with groves of aspen and cottonwood, with willow, cherry, and other shrubby trees.”

## **5) Synthesis and Interpretation:**

Because of favorable growing conditions in the valleys between the mountain ranges, many homesteads were developed during the late 1800’s and well into the 1900’s. The early settlers to the valley realized the value of irrigation and putting up hay for the sometimes harsh winters and therefore the major river bottoms were converted to productive hay meadows that provided a base operation for livestock grazing. Originally almost exclusively cattle, later some of the operations in the valley ran sheep as well which trailed from the lower elevations along the Platte River all the way up to summer sheep grounds on the National Forest, as well as wintering on the high desert of the Great Divide to the north and west. Sheep operations have been converted to cattle, and therefore have changed significantly the way these lands are managed today.

As the ranches in the valley had always put up hay towards winter grazing, they tended to weather the harsh winters which occurred in the late 1800’s better than some of the larger operations elsewhere. Although running in-common on vacant lands in the foothills of the valley, for the most part the operators tended to delineate their own use areas to more of an extent than other areas. There tended to be less early competition to get the best, first grass, and more ownership in individual use areas.

An important natural element in riparian and wetland habitats that is seen are beaver. Beaver are considered hydrologic modifiers in the PFC process. This means they can directly affect stability of those systems that have a woody component. Their dams often provide gradient control on steeper slopes, extend the stream flow period later

into the year, and create more diverse vegetation and wildlife habitat. Loss of aspen habitat, trapping, and browsing of aspen and willow by cattle and elk has contributed to the reduction in beaver. There is more than adequate willow-waterbirch riparian habitat along some streams to support beavers. However, they seem to prefer irrigated hay meadows which leads to their removal via trapping. Long-term improvement in the aspen communities, which is discussed in Standard #3, would result in expanding beaver populations and the positive impacts they can have on riparian and wetland systems.

Following the Taylor Grazing Act, grazing districts were established and priority rights for grazing determined. In addition to fencing of private allotments, it also led to adjustments in stocking rates and AUMs available for livestock use to maintain or improve range conditions. In the southern portion of the valley, federal lands fell outside of the established grazing districts, and grazing leases were issued in conjunction with adjacent deeded property to account for private grazing on the public land resource. From a management perspective, grazing leases outside of established grazing districts have become more synonymous with permits, and are held to the same standards as the permits. When addressing livestock management issues over the last twenty years, it has not been necessary to reduce livestock numbers to achieve resource (primarily riparian) objectives. Depending on the specific situation, best management practices for livestock grazing have been implemented on a case-by-case basis in the majority of the watershed. In some cases, many practices and improvements needed to be implemented. In others, just a slight adjustment was needed.

In addition to adjusting duration and season of use by livestock in riparian areas, additional water sources have helped to greatly improve riparian areas. Upland water developments such as spring developments, reservoirs, and pipelines reduce the dependence of livestock on riparian habitats and result in better distribution of the animals in a pasture (photo 36-1). Specifically, spring developments protect the water source, improve water quality and flow, and provide greater flexibility in grazing rotations. In some cases, pastures with riparian habitat are either used early or deferred to late summer or fall use.

Vegetation treatments, prescribed burning and herbicide applications, also improve distribution of both livestock and wildlife, while diversifying upland shrub communities and age classes. These treatments also increase water recharge into the overall riparian system resulting in higher and longer duration of flows. In some cases, springs may start to flow that hadn't prior to treatment. To date, use of treatments within the assessment area has been fairly limited, occurring on Pennock Mountain, West Barrett Ridge, within the Encampment River Canyon, the southern end of the Beaver Hills, and above Bennett Peak on the Medicine Bow National Forest.

Fencing has been used to reduce duration of grazing on riparian habitats within most allotments. For the most part, there are few exclosures (besides spring/seep developments) within the watershed (photo 36-2). Managing livestock use across the watershed by strategic placement of fences and other improvements has resulted in decreased grazing duration on riparian communities overall without the need for exclusion, complete rest, or decreasing AUMs.

The principle impacts of livestock management upon the condition of riparian-wetland habitat, are long duration of use (from two months to all summer) and hot-season use (primarily late June through early September). Historic (long-term) livestock use in this manner has led to many of these areas being dominated by upland grass species such as Kentucky bluegrass, redtop, and mat muhly that are adapted to drier riparian zone areas and increase because of heavier grazing use. Upland forbs and grass species resistant to grazing consequently increased along stream channels. These species may endure overgrazing but provide very little riparian stability. They have shallow roots that are not capable of stabilizing soils adjacent to riparian areas especially in high flows. With only upland species protecting the stream bank, bank sloughing, bare ground, and vertical cutting were commonly observed results. Platts et al. (1987) states that the highest rating for stream bank alteration is when less than 25 percent of the stream bank is false, broken down, or eroding. Where BMPs for livestock grazing have been implemented, riparian herbaceous communities have responded quickly. Early successional plants such as spike-sedge, brookgrass and creeping potentilla respond initially by increasing in bank cover and encroaching into the

stream channel. Then sedges, rushes and desired grasses begin to expand and later dominate the riparian community. Shortening duration of use, frequency of use, and timing of use has resulted in a vigorous, productive and, most importantly, stable vegetative communities.

Examples of allotments where more intensive management has been implemented are described below:

### **Antelope Draw/Centennial Creek**

The Antelope Draw and Centennial Creek allotment lie along the northeast slope of the Sierra Madre Mountains, split by numerous creeks and riparian draws which feed Spring Creek, irrigated meadows, and the North Platte River. Historically part of a large block of vacant land which was grazed in common by at least five different cattle operations, fencing was completed in the 1970's and 1980's to break the area into four different grazing allotments, for the most part individual. Antelope Draw and Centennial Creek were both utilized by cattle operations in a summer, season-long manner which led to deteriorated riparian conditions as the livestock tended to concentrate in the creek bottoms until the feed ran out before spreading onto the adjacent uplands. In the late 1990's and early 2000, a cross-fence was constructed splitting Antelope Draw into two pastures and an existing cross-fence was utilized in Centennial Creek to do the same. Splitting the allotments into separate pastures has allowed summer use by two livestock operations while adjusting the season and duration of use in the allotments and providing for deferment and rest periods within each pasture during the summer.

In addition, spring developments have been discussed on the lower ends of each respective allotment in order to ensure reliable water sources for late summer use in dry years and to protect important spring sites. Because of these changes in livestock management riparian and upland vegetation communities have improved. Willows, wild rye and sedge communities have responded dramatically to the shorter duration of use in this allotment. Channel stability and bank cover along perennial and intermittent to ephemeral drainages has benefited throughout. Woody species including dogwood, waterbirch and currant are more common as are a higher diversity of herbaceous riparian vegetation.

### **Prospect Mountain Allotment**

Gates Rubber Company, currently dba Cody Resources, LP, has operated in the Prospect Mountain and A Bar A Ranch allotments since 1967. The ranch operates by rotating livestock in over a dozen pastures total, and three larger public pastures in the Prospect Mountain allotment. Although much of the riparian areas in the pastures are properly functioning, there are instances where lentic and lotic systems in the middle and lower pastures are at risk. In order to address these concerns, half a dozen spring developments and a cross-fence have been initiated, and a prescribed burn is being planned for the spring of 2006 in the higher elevations. The addition of a cross fence will allow the ranch to better control livestock from moving down into the more easily accessible riparian areas (which did not meet PFC) and will allow for more overall deferment and rest to be applied to the pastures. Although many riparian areas rated PFC, and many were determined to meet desired future condition in relation to herbaceous and woody composition and health, riparian and upland improvement is a continued objective for this area, and will be one of the primary focuses of continuing management actions.

### **6) Recommendations:**

There has been significant improvement in riparian/wetland condition within the assessment area over the last 10 years, however, there are still some specific areas that need attention. Allotments containing riparian/wetland habitat that do not meet this standard have been described previously and include: A Bar A, Prospect Mountain, Platt Mine, Beaver Creek Hills, Miner Creek, Tennant Creek, Centennial Creek, Beaver Hills, Corral Creek, Bennett Peak, Little Beaver Creek, Horn and Meason, Cottonwood-Corral Creek, Sanger, Saulcy, Plattoga Ranch, Pierson, Cottonwood, Silver Spur, Antelope Draw, and Methodist allotments. For riparian systems along streams and creeks (lotic systems), only those portions of streams and creeks that have riparian on BLM land were included.

The non-riparian lengths and portions of streams and creeks not on BLM land were not assessed. For the Lentic values, the total acres of water bodies and wetland features were calculated. For example a lake with a portion of the shore line as wetland was tallied for the entire portion of the lake that could exhibit open water or wetland characteristics.

Many of the lentic and lotic sites not meeting the standard have been, or are in the process of being addressed in management plans or as range improvement projects. Continued progress in grazing management of livestock will ensure further improvement of all riparian areas within this area. Although there are areas where desired future condition is yet to be reached in woody species dominance and composition, these areas still meet the minimum standard of rangeland health. Other than the specific allotments listed previously, the remainder of the allotments within this assessment area are meeting Standard #2 – Riparian/Wetland.

*Specific recommendations are:*

Continue to implement or manage using BMPs for livestock grazing. This primarily means controlling the season, duration, and distribution of livestock use to meet desired resource objectives for riparian habitats. Specific dates and timing of use must be determined on a case-by-case basis. Methods to achieve this include, but are not limited to: herding, additional wildlife-friendly fencing, water developments, and vegetation treatments. Address trespass livestock problems where needed.

Continue existing projects to protect riparian habitat and provide off-site water for livestock and wildlife.

Identify and correct impacts from improved roads, including water flows and erosion into riparian systems. Two-tracks that are negatively impacting riparian areas should be identified and addressed.

Plantings may be undertaken where needed within the watershed. Species diversity and vertical structure of wetland and riparian communities can be easily enhanced through vegetative plantings. When just a few individuals are planted, they establish exceedingly well.

Continue to expand the beneficial practices that improve riparian condition and maximize public involvement and education regarding resource issues.

## STANDARD 3 – UPLANDS

*Upland vegetation on each ecological site consists of plant communities appropriate to the site which are resilient, diverse, and able to recover from natural and human disturbance.*

Vegetation in the Upper Platte River Basin watershed in this assessment area is a mix of a variety of habitat and range types, interspersed within and between, and/or transitioning from one to another. An assortment of environmental factors influence the location(s), extent, seral stage(s), and/or types of vegetation found throughout the area. Elevation, precipitation zone, topography, soils and underlying parent materials, slopes, and exposures all contribute to the general vegetation composition throughout the watershed. In order to simplify the overall descriptions of vegetation types, this analysis will address vegetation types in relation to the elevation and topography in which they occur and closely tie to the associated precipitation zones. The description will begin at the higher portions of the watershed and descending to the lower portions of the analysis area.

### 1) Characterization:

As mentioned in the background section, the most common vegetation type within the watershed is the sagebrush-grass type, which occurs to varying degrees (and with varying composition) throughout the elevation and precipitation ranges of the study area. Interspersed throughout the landscape are other assorted communities including sagebrush/mountain shrubs, and aspen, cottonwood, spruce, ponderosa pine, lodgepole, spruce and limber pine/juniper woodlands.

From around 7,000 feet to nearly 11,000 feet, the most abundant vegetation cover type and principle example of the sagebrush-grass community is that dominated by mountain big sagebrush (photo 39-1). The mountain big sagebrush-grassland community occurs throughout the foothills and bases of mountain ranges and is intermixed with and surrounds many conifer and/or aspen woodlands. Shrub heights range from 6 to 30 inches, and canopy cover can reach up to 60%. After removal, mountain big sagebrush is relatively quick to re-colonize, reaching predisturbance levels (when not rested from grazing) in as little as 20 to 30 years. Understory herbaceous species include buckwheat, larkspur, lupine, paintbrush, sandwort, mulesear wyethia, yarrows, Oregon grape, and penstemons. Grasses found in these communities include green and Columbia needlegrass, elk sedge, mountain brome, king-spike and Idaho fescue, Kentucky and big bluegrasses, and slender, thickspike, bluebunch, and western wheatgrasses. In many instances within the sagebrush community at these elevations, a large percentage of the overall shrub community is comprised of various other mountain shrubs including serviceberry, snowberry, antelope bitterbrush, mountain mahogany, chokecherry, and rose (photo 39-2). Lying in sandier sites at these higher elevations, the sagebrush-grassland community may be intermingled with bitterbrush shrub-steppe type communities, where antelope bitterbrush is either the dominant shrub species or is co-dominant with other mountain shrubs. Along some of the higher, windswept ridges, limber pine can be found clinging to the shallow soil.

At these relatively high elevations and precipitation ranges, so-called “dark timber” can be found. These forested areas are limited to sheltered locations where more moisture is gathered and retained throughout the year (mostly in steep draws facing north and/or east and along the slopes immediately adjacent to and climbing out of perennial and/or ephemeral riparian bottoms) (photo 39-3). These stands are limited to the highest and wettest pockets of the evaluation area, occurring along the high slopes in the Sierra Madre front and the Medicine Bow mountains. Vegetation in these pockets is dominated by coniferous trees sometimes intermixed with aspens and various understory shrubs, grasses, and forbs which can withstand being shaded by the overstory. Overstory tree growth may include subalpine fir, lodgepole pine, spruce and aspen. Although limited by litter and shading, understory

species within these stands includes species such as shrubby cinquefoil, currants, Oregon grape, grouse whortleberry, arnica, hieraceum, and woods rose.

Limited to sites that are inherently wetter or retain moisture for longer periods (mostly north and east facing bowls and slopes which trap more winter snow and less evaporation), aspen woodlands are scattered throughout the high-to-mid-level elevations in the area (photo 40-1). Obviously dominated by aspens, understory species include snowberry, serviceberry, Scouler's willow, creeping juniper, rose, Oregon grape, geranium, bluebells, elkweed, columbine, licorice-root, sweet cicely, aster, elk sedge, Columbia needlegrass, blue wildrye, mountain brome, and slender wheatgrass. Forage is limited by litter/leaf cover and shading of the floors of the stands. Aspen stands are limited to the southern and eastern portion of the watershed, carpeting the foothills of the Sierra Madre and Snowy Range Mountains. Common at the higher elevations, and in many cases surrounding and/or intermingled with aspen stands, the mesic upland shrub steppe vegetation type is widespread. It is dominated by serviceberry and/or chokecherry and occurs on moderately-deep to deep soils. The dominant shrubs in this type can reach heights of ten to fifteen feet and occur in open to dense stands. Understory species include snowberry, rose, and currants, along with basin wildrye, green and Columbia needlegrass, Kentucky bluegrass, bluebells, columbine, aster, violets, elkweed, chickweed, and stinging nettle.

As soil depth increases on floodplains and draws mountain big sagebrush gives way to basin big sagebrush stands and varying soil conditions also promote big sagebrush/grass/mountain shrub mixtures. Mountain shrub vegetation types encountered throughout this zone on shallow soils and/or shallow rocky sites include relatively monotypical and intermingled xeric upland shrub steppe sites. This vegetation type contains true mountain mahogany, in some cases as the dominant shrub species, but more often intermixed with other mountain shrubs including bitterbrush, snowberry, serviceberry, and basin big sagebrush. Dependent on soils, precipitation, and browsing levels, the dominant shrubs may reach up to five to seven feet in height. Common understory species are green needlegrass, needleandthread, bluebunch wheatgrass, Indian ricegrass, Sandberg's and mutton bluegrass, and mat forbs such as phlox, buckwheat, locoweed, and goldenweed. Wetter sites nestled within the rolling terrain are dominated by stands of basin wildrye.

Principal human uses throughout the area, which impact the vegetation resource, tend to center around allocations of forage for livestock (in some cases and/or areas, forage is not specifically allocated, and may be used by wildlife), removal of native vegetation during the course of mineral exploration and extraction, and recreation uses. Additionally, vegetation in the watershed is directly influenced by human activity through the application or repression of intentional and/or naturally occurring "vegetation treatments," including wildfire, prescribed fire, chemical, and mechanical vegetation removal.

Livestock use is primarily comprised of cattle grazing. Seasons of use is restricted to late spring, summer, and early fall, during which time the area can be accessed and the vegetation utilized by grazing ungulates – snow usually precludes year-round use. Cattle operations vary between grazing of cow-calf pairs, yearling steers, and yearling and/or second-year heifers. Grazing use occurs during various portions of the spring/summer/fall seasons, ranging from season-long to deferred and/or rotational use.

Recreation primarily takes place during the late-summer and fall months as hunting (mid-August through November), although spring/summer/fall use occurs along the Platte River, and springtime recreational uses such as shed-antler hunting continue to increase at an accelerated pace. Associated with this use are an ever-increasing number of roads, trails, and tracks, which wind through all of the vegetation types and are restricted only by topographical impediments.

Additional human uses of the watershed include commercial seed collection, off-highway vehicle use not associated with the previously-mentioned activities, and the collection of moss-rock for commercial decorative purposes. All of these activities influence the vegetative component of the watershed where they occur, either indirectly via associated changes, or directly by contact with and/or removal of vegetation.

## 2) Issues and Key Questions:

Removal of vegetation in the form of grazing forage for large ungulates has been and continues to be the principal factor affecting vegetation throughout the Upper Platte River watershed. Domestic livestock grazing tends to provide the most impacts to the vegetation of the watershed, throughout its area, although localized portions of the watershed (or specific vegetation communities and/or species) may be more influenced by grazing of wildlife.

Through varied management processes, including rangeland inventories, management agreements and grazing plans, and implementation of various “best management practices,” stocking rates have been adjusted to fit available livestock forage on public lands throughout the watershed since inception of the Taylor Grazing Act. Because of these adjustments, livestock management issues relate to the season, duration, and distribution of use rather than stocking rates (although limited exceptions exist.) These issues are primarily directed at impacts to sagebrush/grassland and sagebrush-mountain shrub/grassland vegetation types in the form of the following impacts:

- Uneven use patterns (heavier grazing use associated with reliable water sources as opposed to light to nonexistent forage utilization in other, more isolated locations).
- Shifts in vegetation species types that favor increaser species (e.g., big sagebrush) over cool-season, perennial bunchgrasses where uninterrupted, season-long livestock grazing occurs.
- Variations in herbaceous vegetation availability where season long and/or growing season livestock use has pushed more desirable forage species from open, “easily accessible” locations (spaces between shrubs) to more protected, “sheltered” spots (e.g., under and within sagebrush and other shrubs.) This allows less desirable species such as rhizomatous, single-stalked grasses (e.g., western wheatgrass) to colonize and spread, thus lowering overall ground cover and forage value.

The key question that arises from these impacts focuses on implementation and refinement of best management practices for livestock grazing. What opportunities exist to implement or refine best management practices for livestock grazing or other actions that will maintain and/or improve the overall condition and value of upland vegetation and meet desired resource conditions and allow for grazing of the vegetation resource use by domestic livestock as called for under the Bureau’s multiple use mandate?

Policies that govern the use of vegetation treatments and the suppression of such vegetative community alteration, have played and continue to play an important role in the existing make-up and continual alteration of vegetation in the watershed. Aggressive wildfire suppression, and an inability to successfully implement manipulation of shrubland communities within the watershed at the level which is required, has led to a predominance of uniform, older age-class shrub stands throughout the analysis area. A large percentage of sagebrush, mixed sagebrush/mountain shrub stands, and aspen woodlands have reached a level of overly mature to decadent, leading to lower herbaceous ground cover, species diversity, plant vigor, forage, and nutritional value (for livestock and many big game wildlife species.) Additionally, large, uninterrupted expanses of vegetation allow for large-scale losses of key habitat types if and when natural disturbances occur. The key question is how do the BLM and other natural resource management agencies and partners determine the level of vegetation treatment which should occur in order to promote better overall landscape diversity for all species? To what extent should portions of key vegetation types and habitats be temporarily altered in order for the overall condition of the vegetation/habitat/watershed to be maintained or improved?

The next most important factor relating to upland vegetation condition throughout the watershed is use of varied vegetation resources by native wildlife, in particular, ungulate big game species. The principal issues that should be addressed regarding big game management relate to seasonal habitat forage requirements for mule deer, elk, and pronghorn antelope. Although transitional, winter/yearlong, and crucial winter ranges for all species have traditionally been the habitats of concern (limiting the populations), relatively recent research has elevated the

importance of quality spring/summer/fall habitat to healthy individual and population conditions. Key questions to be addressed include how to manage vegetation resources on key seasonal habitats to provide adequate quality forage for wildlife species, yet continue to provide forage for seasonal, managed livestock use. How can the mix of uses of the vegetation resource in the watershed be managed so that vegetative condition is maintained or enhanced? Additionally, how do the principal players (agencies and landowners) involved in the management of vegetation and wildlife within the watershed balance the sometimes necessary impacts of multiple use management (and/or livestock management) activities with habitat requirements on seasonal big game ranges?

Finally, an increase in the expansion of unimproved roads and trails where access is available, with the associated increase in the amount of off-highway vehicle (OHV) use, is apparent throughout the watershed. This use is most associated with general recreational activities by the public and is not usually associated with development actions described previously (although those actions may alter the landscape in ways that encourage further OHV expansion.) The popularity and affordability of small, all-terrain vehicles leads to their use farther and farther into previously remote and unroaded areas, creating or “pioneering” unauthorized and illegal trails through the vegetation wherever possible, which are then repeatedly traveled until vegetation is lost along the route, and it becomes a road for all practical purposes. This disturbance leads to vegetation shifts and losses similar to those associated with the expansion of oil and gas exploration and extraction. Unfortunately it becomes a much longer-term disturbance as there is no reclamation unless a pioneered road or trail is left to naturally revegetate through lack of use (which, with ever-increasing recreational use of these lands, rarely, if ever, happens). As the only barriers to this travel are terrain and rules governing off-highway travel (which are difficult to enforce), only vegetation in the roughest topography is currently or potentially free from this disturbance. Additionally, recreational OHVs are not subject to minerals management stipulations designed to mitigate the spread of weed seeds, and so have the potential to add weed infestation to their impacts. The key questions which should be addressed center around the need for the Bureau to decide if limits should be set which regulate off-highway vehicle use, what they should be, and how to effectively enforce these limits. Additionally, what educational tools should be employed to reduce impacts from recreational uses of public lands?

### **3) Current Conditions:**

The entire watershed area is allotted to some form of livestock grazing use during various periods of the year and is also utilized for wildlife grazing use in its entirety (although in most cases, significant wildlife use is seasonal.) Impacts to vegetation from grazing can, therefore, be expected to occur to measurable extents throughout the analysis area.

Quantifiable data about current vegetation conditions, vigor, and trends throughout the watershed varies as to availability, content, and quality. Upland monitoring information is available for varied grazing allotments and sub-basins within the watershed in the form of photo-points, aerial and basal cover transects, utilization studies, shrub belt density transects, and other, more species and/or impact-specific studies. Studies vary by amount, type, and content throughout the watershed in relation to the relative priority of the area/allotment, the level of management that was or is implemented, and/or the urgency of determining specific impacts. In the past, monitoring efforts focused on the collection of utilization information (what animals do to the plant), rather than on trend information (what the plant response is to animal use).

Vegetation and forage inventories of the watershed area have occurred periodically during the relatively recent past, the last of which, the Soil Vegetation Inventory Method (SVIM) occurred during the early 1980s. Data from this one-time inventory suggested that rangeland conditions throughout the watershed fell into the acceptable range, mostly rated as “good” condition, but including “excellent” and “fair” condition rangelands. It should be noted, however, that these inventories and associated conditional assessments were one-time snapshots of the vegetation communities and did not and/or have not been altered or updated to take into account trends in ecological vegetation conditions. They also tended to undervalue shrub communities, resulting in mule deer habitat rated as fair, which should have been found to be good to excellent.

In general, varied livestock uses have resulted in assorted impacts to vegetation throughout the watershed. In many grazing allotments, summer grazing by cattle is the best-suited use by domestic livestock due to environmental, topographical, and climatic limitations. Vegetation may be impacted to various extents when grazed during its growing period. This type of use also tends to primarily impact the herbaceous component of the vegetation community, except where young, available, palatable shrub seedlings are abundant. Wildlife use in the watershed, usually seasonal, tends to impact different components of the vegetation communities than does domestic livestock use. Mule deer use concentrates primarily on shrub or “browse” species and is most pronounced on winter ranges where the animals concentrate for extended periods. Elk use impacts both the herbaceous and browse components of the communities, usually at higher elevations throughout the year (dependent on the severity of winter weather). Pronghorn use impacts tend to be most noticeable in the lower elevation sagebrush, where they may be concentrated during the winter, but more nomadic than other species (somewhat mitigating their impacts). These differences in impacts tend to affect vegetation communities as species are favored or shunned in various management/use scenarios, leading to shifts in overall community make-up. Vegetative traits such as species abundance, vigor, diversity, and age/structure classes are all affected. These trends occur in addition to those which are influenced as a function of natural conditions (e.g., wetter to dryer sites, slope, aspect, soil depth, and material).

In many cases (dependent on the specific situation), best management practices for livestock grazing have been implemented on a case-by-case basis throughout portions of the watershed. In some cases, multiple practices and improvements were necessary to maintain or improve overall vegetative condition, and in others, only minor adjustments to grazing management have been or are required. Direct changes to grazing timeframes, including adjustments to duration, intensity, and season of use, have been implemented to remove constant, repetitive pressure on key forage communities during the heart of their growth period. Rotational grazing schedules that include deferment and recovery periods allow for preferred vegetation species to concentrate energy reserves towards vegetative growth. Upland water developments, including small stockponds and reservoirs, water wells, spring developments, and pipeline systems have led to better overall distribution of livestock use and facilitate grazing rotations and pasture systems. Fencing has been implemented to control livestock movement, allowing rotational grazing systems, and better distributing livestock use. Finally, vegetation treatments have been applied to limited areas within the watershed in order to introduce, or in some cases accelerate, the rate at which vegetation communities evolve and develop towards different seral stages. Very seldom (if ever) are vegetation treatment projects initiated with the objective of *converting* vegetation permanently to another type, but instead are intended to set the existing community back to an earlier seral stage and stratify the overall age class and structural variation to promote landscape diversity similar to what probably existed prior to European settlement when natural fires occurred (photos 43-1,2). Treatment of (mostly) shrub stands can also be used to improve livestock distribution, diversify shrub age classes and structure, and increase forage quality and herbaceous content (through the removal of competition for nutrients and moisture) (photos 43-3,4). Overall, livestock management throughout the watershed has been improved through the use of rangeland improvements and more intensive management without resorting to grazing exclusion, complete rest, or reducing permitted use.

The lack of treatments and aggressive suppression of all natural fire within this watershed has also affected the condition of aspen and conifer stands by allowing them to over-mature and/or become decadent, diseased, and increased encroachment of understory shrubs and coniferous vegetation (fir and pine at the highest elevations, photo 43-5) within the stands. Bleeding rust is present in many aspen stands, primarily affecting larger trees, but spreads through the root systems to younger trees in the same clone. Removing these larger, diseased trees can prevent the bleeding rust from spreading to young trees. As the older trees die or fall to wind events, they are not replaced by juveniles or suckers, and eventually, the stand dies or is reduced to a few remnants, dominated by big sagebrush, serviceberry, or other mountain shrubs. Leaf blight is also common, but many stands exhibit reprofiting and good vigor in the understory aspen trees. Of course, historical season-long livestock grazing has concentrated use on the seedlings in the past, but relatively recent implementation of rotational use and other upland grazing management tools currently mitigates these impacts, leaving a lack of stand replacement events as the missing

element to enhanced aspen health. Prescribed burns are being planned and implemented to restore aspen health by stimulating sucker regeneration and removing other plant species that compete with aspen.

Similar to higher elevation shrub stands, vegetation within the mule deer and elk winter habitat zone has been largely untreated and natural treatment events have been aggressively suppressed before large acreages can be burned. As with higher elevation vegetation, this has allowed monotypic shrub stands to be dominated by mature-to-decadent, even-age classes of shrubs. Vegetation generally exhibits high vigor, plant density, and diversity where BMPs have been initiated. However, at the lower portions of the valley, mule deer concentrate along drainage bottoms and rockpiles. The majority of these drainages are on private land and have been converted to hay meadows. These areas still provide some habitat and forage, but habitat has been lost that results in more concentrated animal use of undisturbed habitat. The Baggott Rocks is one of these places, and it shows severe hedging and browsing of big sagebrush and mountain shrubs, with a poor age-class structure. This area is not able to recruit new establishment of young shrubs, and is being slowly overtaken by juniper and pine trees (photo 44-1).

At the lowest elevations and often wind-blown plateaus that are usually available and stay relatively snow-free in all but the most severe winters, wintering and/or migrating wildlife make use of them as transitional or crucial winter range. Because vegetation communities in these specific areas are used throughout the year by wildlife, and become heavily-used by concentrated populations during most, if not all, winter months, the preferred browse species are comprised of even-aged and structured, mature-to-decadent shrub stands. Although high levels of grazing use from pronghorn can harm shrubs such as big sagebrush during the winter if animals are concentrated in a limited area for a long time period, it does not appear at this point that extreme impacts are occurring to vegetation from wintering antelope.

Overall, vegetation in the Upper Platte River watershed can be considered to be in good condition relative to the seral stage to which it has developed. Desirable species (including herbaceous and browse species important for livestock and wildlife forage, as well as those important for ground cover) are present at worst, usually found in locations where they are less available or vulnerable to grazing animals, and are prevalent at best, found interspersed throughout the various plant communities, with high vigor and density. Although less desirable increaser species are present in varying degrees throughout the watershed, in most cases, their presence does not indicate poor health or nonfunctional vegetation communities. The majority of the watershed has undergone the implementation of various BMPs, to some extent, which favor more desirable forage species over increasers, and the results can be readily observed in the form of more plentiful bunchgrasses, higher ground cover, greater plant diversity, and higher vigor and nutritional value of individual plants. Throughout various portions of the watershed, upland invader and weed species can be found, but these populations exist at relatively low levels and have not converted entire communities. Additionally, implementation of various BMPs, as well as application of various control methods, are being and can be utilized to manage, if not eliminate, many of these small-scale infestations. All of these observations are indications of properly functioning upland vegetation communities.

#### **4) Reference Conditions:**

Generally, historical influences on vegetation in the watershed were similar to those that shape the communities today. Environmental conditions, including soil conditions, climate, topography, and elevation determined the general composition, location, and interaction of vegetation communities, which were and are influenced by additional, less constant factors. Due to low human population levels in this remote area, influences by native peoples were probably relatively minor and/or secondary in nature (e.g., the influence that hunting cultures had on seasonal use of certain areas by grazing game animals). Prior to settlement of the area by Euro-Americans, additional factors that probably had the most influence on vegetation conditions would have been limited to grazing impacts from native ungulates and catastrophic stand-replacement type natural events such as wildfires. The combination of varied, wandering use patterns and the random occurrence of wildfire, which removed vegetation in a haphazard pattern, probably led to a diversified vegetation pattern that was thoroughly stratified in age class and

seral stage, as well as vertical and horizontal structure. It is such diversity at the landscape scale and maintenance of age class stratification and structure diversity that past and future vegetation treatments are intended to simulate.

The early descriptions of portions of the watershed suggest the presence of grazing ungulates throughout, including seasonally migratory species such as bison, pronghorn, mule deer (called black-tailed deer in many early journals), and elk. Additionally, bighorn sheep and grizzly bears could be found, even at lower elevations. Although wildlife population levels prior to the adoption of structured harvest strategies and conservation measures in the first half of the 1900s can only be estimated, most of the species remain (excepting wild bison, bighorn sheep, and the large predators including wolves and grizzly bears). Topographic and climatic factors would have dictated seasonal use areas and migration patterns then, much as they do today. Although, as indicated by various accounts, herds of bison could be found through the watershed on a resident basis, the area was also used by extremely large herds of the animals in more of a cyclic nature as their wanderings covered an extremely vast amount of country. This use is evidenced within the watershed by the prevalence of journal entries, and the presence of buffalo jumps.

Historical documentation, mostly in the form of journals, descriptions, and writings of explorers who traversed the area in the mid-1800s, compared and contrasted with additional accounts made in the same area during the same general time frame, can paint a picture of the overall landscape. Although generally vague to the point that overall vegetation, range, and/or habitat communities and sites cannot be delineated, they do provide a fairly recognizable overview of the area.

Overall, the general historical vegetation description of the Upper North Platte watershed appears to closely correspond to the existing communities. Although the popular perception of western rangelands prior to Euro-American settlement is that of rolling grasslands and foothills bounded by timbered mountains, which have only relatively recently (in the last century and a half) been turned to shrub-dominated steppe type communities due to grass use by livestock, accounts offer a different view, indicating shrub dominance in this area through the mid- and late-1800s. John C. Fremont's party viewed the general area as early as 1843-44 and indicated that in the area west of Overland Crossing of the Platte River there was "nothing to be seen but artemisia bushes." F.V. Hayden traveled through the area in September, 1868, performing geological exploration and wrote; "This vast barren sage plain stretches far westward [from Pass Creek] to Bitter Creek and Green River, with very little grass or water for the traveler . . . ."

If taken as a whole and compared to and against each other, these specific accounts and those presented in Standard 1 and 2, tend to suggest that the majority of the upland vegetation in the Upper North Platte River watershed varied little from that which is noted today, dominated by big sagebrush and mountain shrubs with inclusions of aspen and conifer woodlands.

Historical or reference vegetation conditions in the Upper North Platte River watershed prior to extended human influence appear to mimic those found today; i.e. species composition and general distribution are probably very similar. Although, in the higher elevations, fire suppression may have affected the seral stage of communities and age class structure and the virtual eradication of large-scale, random, stand-replacement type vegetation treatments throughout the majority of the watershed and the manipulation and management of those that do occur.

## **5) Synthesis and Interpretation:**

As described and discussed previously, upland vegetative species within the Upper Platte River watershed are very similar at present to that which would have been encountered prior to settlement of the area. The principal changes are in the type of animals, which utilize the resource, and the amount of disturbance that is levied towards the vegetation from other human activities. Bison were obviously present in this area during the spring through fall seasons, similar to current seasons of use, and eat the same types of plants favored by cattle. However, bison would come and go that probably provided more rest periods for vegetative recovery than under cattle grazing. Another important issue was the settlement of the valley by families into small ranches and putting up hay for the winter.

These practices allowed for more stable levels of livestock and better care and management of such “private use” areas that led to longer term better management of upland vegetation. This is reflected in the plant communities and species observed at the current time.

Sagebrush and mixed sagebrush-mountain shrub grasslands and aspen and conifer woodlands continue to dominate the landscape throughout the watershed. The most obvious changes in vegetation on the landscape are evident where all or a portion of an existing community has been removed or “converted” to some other type. This can be observed along roads and trails in the landscape, which cut through and dissect large-scale community types; or agricultural conversion such as irrigated or dry-land farming where the native vegetation has been removed to make way for croplands (most commonly alfalfa or native grass hay land in various portions of the watershed). These types of actions have probably affected basin big sagebrush plant communities that grow on floodplains bordering riparian habitat. Less obvious are changes within vegetation communities that have occurred naturally as communities evolve or have gradually been altered through the addition, subtraction, or manipulation of additional influences (e.g., a shift in vegetation consumed as traditional livestock uses are supplanted by animals with different dietary preferences).

Shifts in vegetation communities from historical conditions are partially the result of use by grazing ungulates. Generally, grazing use throughout the watershed has placed pressure on developing vegetation through various portions of its seasonal life cycle. Late spring and early summer grazing by cattle, historic sheep, and/or big game wildlife species places the majority of grazing pressure on growing herbaceous material. As the summer hot season progresses, cattle use within the watershed continues to primarily remove grasses, while wildlife use tends to shift towards browse species on uplands. Fall and winter use by cattle, and wintering elk herds, although still focused on grasses, removes mostly dead and dormant material, and pronghorn, and winter mule deer use removes portions of the summer’s growth mostly on shrub species mixed with dried and desiccated forbs. Shifts in composition that have occurred internally in various upland vegetation communities in the watershed (due to grazing pressure by ungulates) have been primarily driven by the following factors: continuous, repeated, and sustained grazing pressure on selected, preferred herbaceous species through their peak growth periods (primarily on cool-season bunchgrasses during late spring and early-to-mid-summer), and intense, concentrated, and sustained seasonal browse use on preferred shrub species (by wintering big game herds) in stands that have reached a high overall level of late-maturity to decadence.

Historically, the higher elevations within the watershed were grazed by cattle, both as summer and transitional (spring and fall) range. Lower elevations were traditionally used as late fall through spring range by cattle, usually adjacent to hay meadows. The summer, season-long grazing that occurred repeatedly during the last century has generally allowed more of an influence by increaser species within communities and tended to push more desirable decreases to more unavailable locations (such as within shrubs and in rougher terrain). Availability and predominance by more desirable forage species is enhanced as distance is gained from water sources, and terrain becomes steeper. Livestock grazing management changes have and can be implemented in order to mitigate the effects of growing season grazing pressure and include pasture or use area rotational systems that manipulate the duration, intensity, and timing of use to provide deferment and/or recovery periods for vegetation growth. Fencing and/or herding are used to control the livestock’s activities during use periods, facilitating implementation of rotational systems, and upland water developments are designed to more evenly distribute levels of vegetation use throughout pastures and allotments, protect isolated riparian sites, and provide watering locations to dry pastures. Additionally, the predominant vegetation (typically shrubs) can be treated or removed, allowing increases in more productive herbaceous vegetation which creates higher amounts of forage, higher overall nutritional value, and can create useable forage in areas which were previously underutilized. These types of treatments are usually temporary in nature, and revert to pre-treatment conditions after the passage of various time frames, allowing other areas to be manipulated during the interim and creating a mosaic of vegetation types. During the last half of the 20<sup>th</sup> century, all of these practices have been implemented, to various extents; throughout the watershed where summer cattle grazing use occurs.

Wildlife impacts to vegetation, although applied across the watershed, tend to most directly impact preferred, desirable shrub species on transitional, winter-yearlong, and to a lesser extent truly “crucial” winter habitat for mule deer. Most intensive negative impacts can be observed on the mid-elevation transitional and wintering habitat, where large herds have settled in for the last several “easy” winters and removed large portions of the current and previous years’ vegetative growth. As the individual plants reach a stage of over-maturity and decadence, annual vegetative production decreases, and as the current and/or portions of the previous years’ growth is removed, the plants become more and more hedged, further deteriorating overall stands. New, juvenile plants are removed quickly if they are available, due to the higher palatability and/or nutritional content, leading to an overall loss of productivity and further aging of the stand. Additionally, as stands age, rival vegetation surrounding the shrubs, such as junipers, tends to spread into and intermingle with the shrubs, out-competing them and shifting the overall community composition. Management changes that would focus on stratifying shrub stands and diversifying overall community composition, stand age and structural class, and habitat production would center on setting portions of the communities back to early seral stages, in staggered time frames. This would involve the application of treatments to remove portions of the existing vegetation in a mosaic pattern, allowing recolonization of new, juvenile shrub species, new and additional herbaceous species, and shifting the community composition immediately following conversion. Treatments can be designed in scope, coverage, seasonality, and implementation methods to achieve predetermined objectives and to allow medium to long-term community development towards habitat objectives. Treatments can also be planned and implemented so that total vegetation community conversion is not achieved or encouraged, allowing shrub stands to evolve towards pre-treatment conditions over an extended timeframe. In many areas considered “crucial” winter range in the watershed, shrub stands appear to be in better overall condition, most likely due to more limited seasonal use, affecting less of the current year’s growth, and very rarely extending into the previous year’s production. Recent cooperative efforts on a large scale have been undertaken to diversify these important shrublands.

Loss of vegetation that occurs due to the proliferation of roads and trails, although proportionally smaller than other impacts, tends to be more evident and can be equally severe on a small scale because all vegetation is totally removed along the entire area of impact. Even improved roads, if not adequately designed and/or drained, lead to vegetation loss/community conversion on adjoining lands through increased erosion/sedimentation immediately along the route and introduction of less desirable species from disturbance along the route. As noted in the watershed section, there is a large need for further work on nearly all improved roads to reach an adequate level of improvement practices (graveling, additional culverts, wing-ditching, water-bars) to minimize or eliminate overland flow alterations and vegetation species movement/colonization. Equipment used to sustain or improve highly traveled routes should be maintained in a weed-free status, as noxious weed infestations have arisen in areas of recent maintenance in various portions of the watershed. Recreational use of roads and trails, and particularly the pioneering of new trails by illegal off-highway driving is increasing dramatically, including problems stemming from hunting, joy-riding and (especially noted during the last few years) the increasing popularity of antler hunting in the late winter and spring. Greater availability of disposable wealth has led to greater availability of all terrain vehicles (particularly 4-wheelers) and pickup trucks, which have exacerbated this impact, particularly in areas with easy access and proximity to towns, but also at an alarming pace in remote portions of the watershed.

## **6) Recommendations:**

At the present, the review of upland vegetation conditions in the Upper North Platte River watershed reveals generally good overall community health. Natural ecological and biological processes appear to be functioning adequately overall, although concerns about current, and especially near-future, functionality of certain community types remain. Specifically, the review group has determined that the majority of upland vegetation communities are properly functioning in relation to the seral stage to which they have evolved.

The diversity, vigor, productivity, and overall amount of upland vegetation within the watershed, as well as the cooperation exhibited by the majority of livestock permittees towards grazing management, suggest that no insurmountable vegetation problems are evident on a significant scale in most vegetation communities. Due to the

existing conditions and general vegetation community health on uplands, the management responsibility by private industry, agricultural interests, and agencies which design and mitigate impacts to the vegetative resources from natural resource uses, and the generally small number of management issues that need to be dealt with, it is determined that the majority of the Upper Platte River watershed is meeting Standard #3 – Uplands. The only area failing Standard #3 is the Baggott Rocks area, 2160 acres of public land, containing juniper, pine, sagebrush and mountain shrubs, due to the declining health of the shrub community and high use by mule deer. The following recommendations would expand upon the successes already achieved and help to meet desired resource conditions in the future.

Continue to implement or manage using best management practices (BMPs) for livestock grazing. These practices utilize, but are not limited to, the control of season, duration, intensity, and distribution of livestock use to meet desired resource objectives for upland vegetation as well as riparian habitat. Specific dates or timing of use must be decided on a case-by-case basis specific to the management unit and/or site limitations. Methods that can be used to achieve resource conditions include, but are not limited to, livestock control by pasture fencing or herding, water developments, vegetation treatments, and/or the manipulation of livestock turn-out/removal dates.

Identify and correct problems with improved roads which affect vegetation community health and/or composition, including the implementation of mitigation and/or improvements to improved travel routes that will modify overland flow regimes and erosion/deposition patterns which influence the surrounding and adjacent vegetation communities.

Vegetation treatments designed to modify the age and structural composition of predominant shrub stands and stratify the seral stage mix within stands should be continued and/or initiated and implemented throughout the watershed. Where treatments are utilized to improve the health and productivity of sagebrush and sagebrush/mountain shrub communities, they should attempt to promote juvenile, palatable shrub seedlings within the community in addition to increasing the herbaceous component. Mechanical treatments are necessary to thin areas in the Medicine Bow mountains that have been neglected. Treatment methods designed to improve watershed conditions should (at least initially) maximize herbaceous vegetation and litter in order to provide healthy, productive forage and habitat for livestock and wildlife. On a long-term basis, treatments and pre/post-treatment management should be designed to promote healthy, diverse, natural rangeland conditions rather than the creation of homogeneous monotype communities covering large tracts of land.

## **STANDARD 4 – Wildlife/Threatened and Endangered Species/Fisheries Habitat and Weeds**

*Rangelands are capable of sustaining viable populations and a diversity of native plant and animal species appropriate to the habitat. Habitats that support or could support threatened species, endangered species, species of special concern, or sensitive species will be maintained or enhanced.*

### **Wildlife/Threatened and Endangered Species**

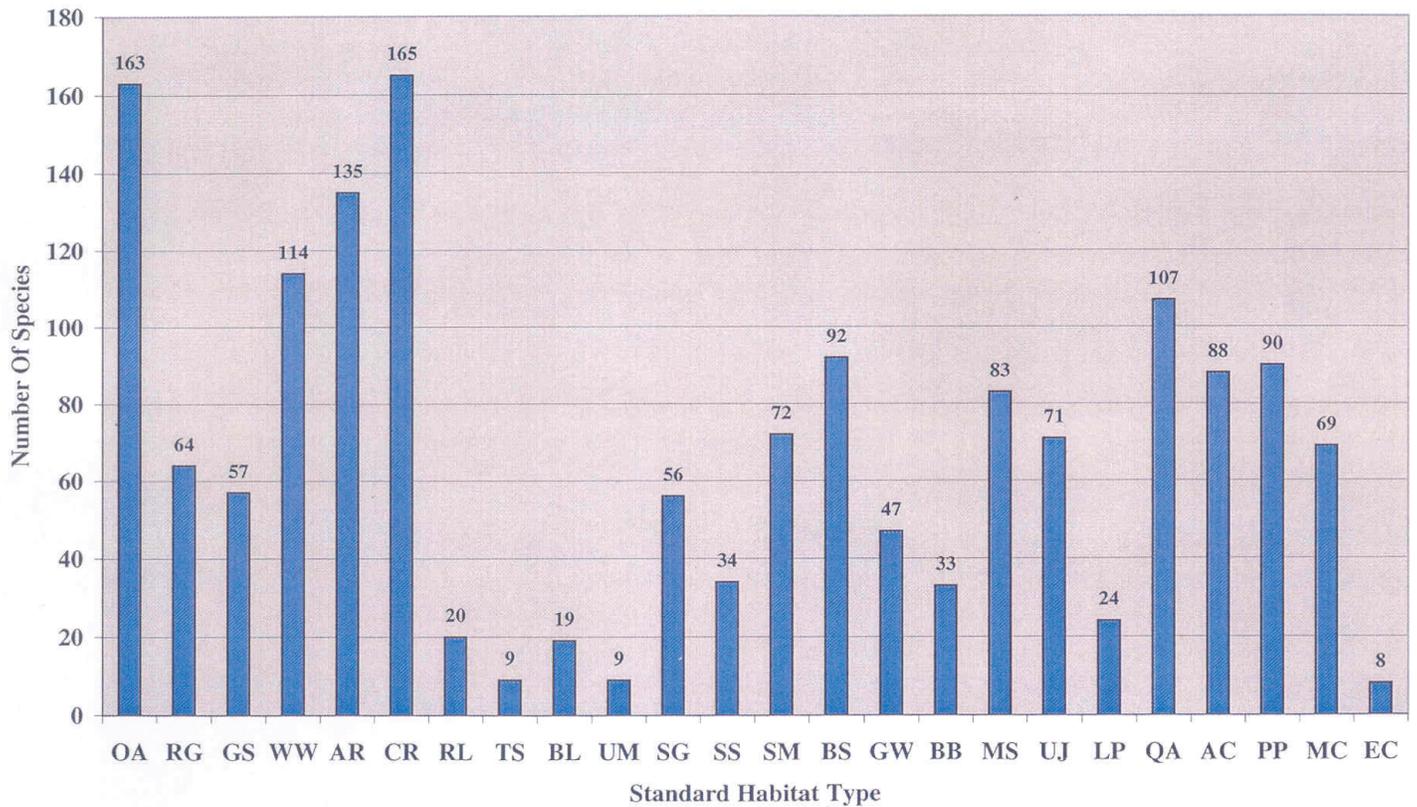
#### **1) Characterization**

The plant communities/habitat types that occur within the Upper Platte Watershed have been described under the Characterization section of Standard 2 (Wetland/Riparian Health) and Standard 3 (Upland Plant Health). These habitat types vary greatly in their ability to support wildlife, depending on species composition, age classes, single-species dominance, horizontal and vertical structure, type abundance, mosaic mix with other habitats, and proximity to features such as migration corridors and winter concentration areas. Over 374 species of wildlife, including birds, mammals, reptiles, and amphibians, are known or expected to occur within the Rawlins Field Office (RFO). Graph #5 lists the number of wildlife vertebrate species by standard habitat types that are found within the RFO and have the potential to be located within this watershed. In general, aquatic habitats support the greatest diversity of species (up to 165) and are the least common types of habitat, comprising about one percent of the landscape. Aspen woodlands are next in terms of supporting the greatest diversity of species, followed by big sagebrush, conifer, mountain shrub, and juniper woodland habitat types. Big sagebrush and sagebrush/mixed grass are the most common plant communities in this watershed. Habitats with the lowest diversity of plants, cover, and structure, such as sand dunes, badlands, and rock outcrops, correspondingly support the lowest number of wildlife species (USDI-BLM, 2002).

The RFO Resource Management Plan (RMP) management objectives for wildlife species are to provide habitat quality (food, cover, space, and water) adequate to support a natural diversity of wildlife and fisheries, including big game, upland game, waterfowl, non-game species, game fish, sensitive, threatened, and endangered species, species of special management interest in Wyoming, as well as to assist in meeting goals of recovery plans. The RMP has an objective to maintain or improve vegetation condition and/or avoid long-term disturbance in high priority standard habitat sites and fisheries areas. In addition, there is an objective to also maintain or improve overall ecological quality, thus providing good wildlife habitat, within the constraints of multiple-use management in moderate and low priority standard habitat sites (USDI-BLM 1990). Although the RMP gives direction to manage the higher priority habitats first, there are circumstances when managing moderate and low priority habitats will take priority. Management of all three of these habitat types to obtain a diversity of vegetative species, cover, age classes, and structure is essential to maintain healthy wildlife populations and their associated habitat types.

The most commonly observed wildlife is big game, particularly antelope and mule deer in open habitat, and elk in shrub and woodland habitat. Bighorn sheep also inhabit portions of the upper elevations of the watershed analysis area. Raptors are also very abundant and include golden and bald eagles; ferruginous, red-tailed and Swainson's hawks; burrowing owls; and other hawks, harriers, and owls. Other commonly observed mammals are coyotes, red fox, badger (photo 49-1), cottontail and jackrabbits, prairie dogs, ground squirrels, voles and mice. Shorebirds and waterfowl include great-blue herons, avocet, stilt, phalarope, sandpipers, coots, Canada geese, white pelicans, and

**Graph: 1**  
**Number Of Vertebrate Species By Standard Habitat Type**



**Key to Graph: 1**

**Guide To The Standard  
Habitat Types**

1. Open Aspen - OA
2. Riparian Grassland - RG
3. Greasewood/Sagebrush Riparian Shrubland - GS
4. Willow/Waterbirch Riparian Shrubland - WW
5. Aspen Riparian Woodland - AR
6. Cottonwood Riparian Woodland - CR
7. Rockland - RL
8. True Sand Dune - TS
9. Badland - BL
10. Upland Meadow - UM
11. Short Grassland - SG
12. Saltbush Steppe - SS
13. Sagebrush/Mixed Grass Steppe - SM
14. Big Sagebrush/Rabbitbrush Steppe - BS
15. Greasewood Steppe - GW
16. Bitterbrush/Sagebrush Steppe - BB
17. Mountain Shrubland - MS
18. Utah Juniper Woodland - UJ
19. Limber Pine Woodland - LP
20. Quaking Aspen Woodland - QA
21. Aspen/Conifer Woodland - AC
22. Ponderosa Pine/Douglas Fir Forest - PP
23. Mixed Conifer Forest - MC
24. Early Successional Conifer Forest - EC

other various ducks (primarily dabblers). Songbirds vary by habitat type, with sparrows, meadowlark and horned lark most often seen in sagebrush and saltbush areas, and warblers, swallows and flycatcher species observed in riparian habitats. Greater sage-grouse are an important species of interest. Blue grouse are found in higher elevation aspen and conifer woodlands (photo 51-1). Horned lizards and prairie rattlesnakes are the most common reptiles, while tiger salamanders are the most abundant amphibian species.

### Species of Interest or Concern

There are numerous species of special interest and or concern that inhabit the watershed area, or use parts of the watershed area for migration, transitional zones and/or other corridors. There are three antelope herds, two elk herds, and one mule deer herd – all managed by the Wyoming Game and Fish Department (WGFD) - that are primarily or partially located within this watershed. In addition, other species of special interest and or concern within this watershed include threatened, endangered, proposed, and candidate species (T&E species), BLM-State Sensitive Species, greater sage-grouse and raptors. Accounts of these are described in the following paragraphs. Crucial winter range for big game species are shown on Map #5.

### *Antelope*

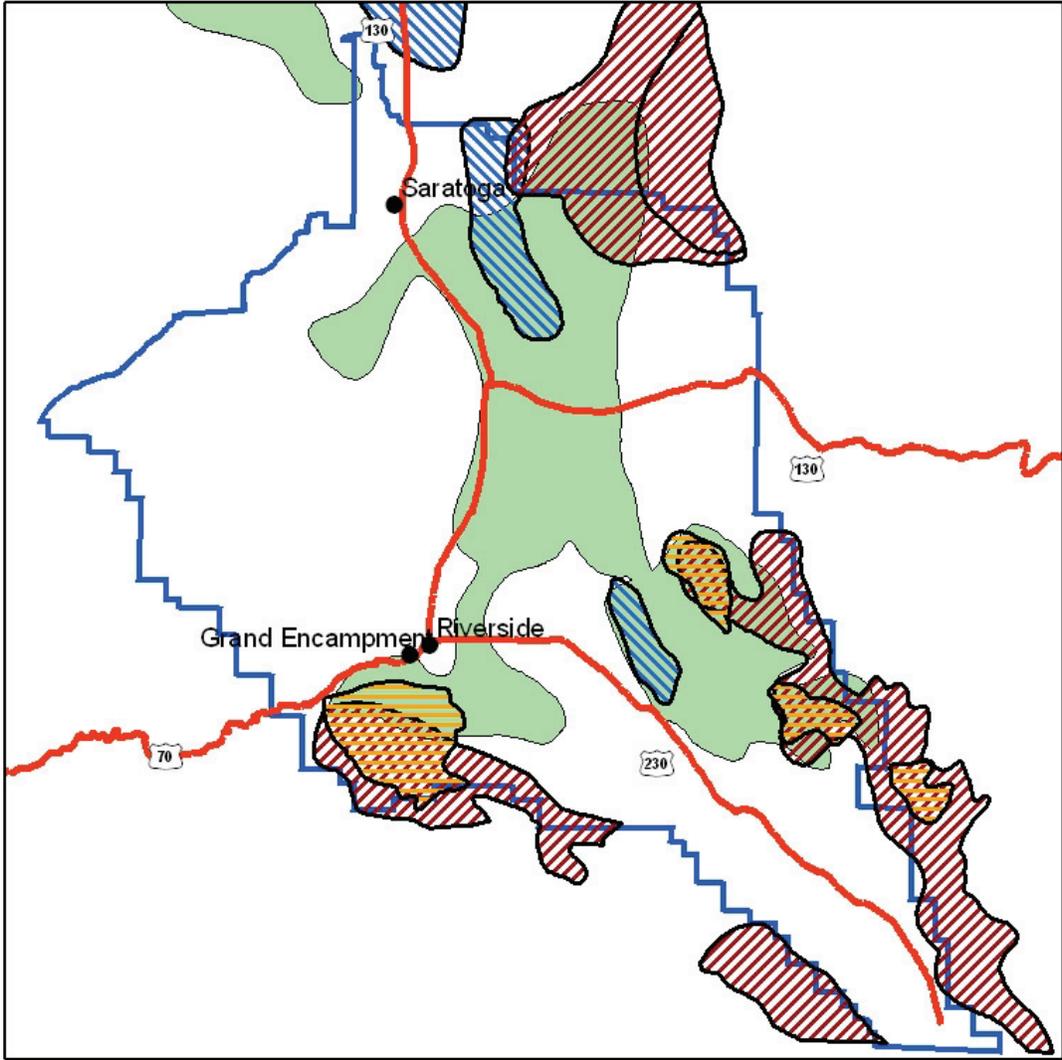
Pronghorn antelope is the most visible and numerous big game specie in the Upper North Platte watershed (photo 51-2). Antelope rely heavily on Wyoming big sagebrush habitat, in addition to other ‘open’ communities like saltbush steppe, greasewood, and short grasslands, as well as open juniper woodlands. During the winter, antelope diets consist of primarily Wyoming big sagebrush. However, spring and summer diets include higher amounts of forbs, grasses, and other shrubs. There are portions of three antelope herd units that are located within the watershed area. These herd unit areas are identified as the: (1) Elk Mountain Herd Unit; (2) Iron Springs Herd Unit; and (3) Big Creek Herd Unit.

Elk Mountain Antelope Herd Unit The Elk Mountain antelope herd unit is bounded by Interstate 80 on the north, the Colorado state line on the south, the North Platte River on the west, and east by the divide between the Laramie and North Platte Rivers. This herd unit contains WGFD Hunt Area 50; whereas only the southwest corner of Hunt Area 50 is located within this watershed. This portion of Hunt Area 50 is classified as spring-summer-fall, winter-yearlong, and crucial winter-yearlong habitat for antelope.

Iron Springs Antelope Herd Unit The Iron Springs antelope herd unit extends south from Rawlins to Sage Creek then to the southeast along the continental divide and is bounded by the Colorado state line to the south, Interstate 80 to the north, the North Platte River to the east. Roughly the southern third of the herd unit lies within the watershed analysis area. This herd unit contains WGFD Hunt Areas 52, 56 and 108. Almost all of hunt area 52 is within this watershed. This portion of the herd unit is classified as spring-summer-fall and winter-yearlong habitat.

Big Creek Antelope Herd Unit The Big Creek antelope herd unit is located south and southeast of Encampment-Riverside and is bounded by the Colorado-Wyoming state line on the south, the North Platte River on the east and the Encampment River on the west. This herd unit contains WGFD Hunt Area 51. All of this hunt area and herd unit is within the watershed analysis area. This area contains spring-summer-fall, winter-yearlong, and crucial winter-yearlong habitat for antelope, and is the smallest herd unit (in terms of numbers of animals) within the analysis area.

# Map 5 Crucial Winter Range in the 2004 Assessment Area



0 2.5 5 10 15 20 Miles

Legend		Crucial Winter Ranges	
●	Towns		Bighorn Sheep
	Highways		Antelope
	2004 Boundary		Elk
			Muledeer



No warranty is made by the Bureau of Land Management for data usage purposes not intended by the BLM.

## *Elk*

Elk are the third most common of the big game wildlife species that are in this watershed (photo 53-1). Elk normally prefer staying close to hiding cover, so are most often associated with conifer and aspen woodlands or tall shrublands. They prefer grasses and have a high diet overlap with cattle, but will include more forbs in their spring diets and more shrubs in their winter diets. There are two elk herd units that are primarily located within the watershed area. These herd unit areas are identified as the: (1) Sierra Madre Herd Unit; and (2) Snowy Range Herd Unit.

*Sierra Madre Elk Herd Unit* This herd unit includes the forest and rangelands south of Rawlins and between Saratoga and Baggs. It is comprised of the WGFD Hunt Areas 13, 14, 15, 21, and 108, of which only Hunt Areas 13, 14, and 15 are located within this area. Significant interchange of elk between Wyoming and Colorado occurs within this herd unit. Habitat within the analysis area in this herd unit includes spring-summer-fall, winter, winter-yearlong, and crucial-winter/yearlong ranges.

*Snowy Range Elk Herd Unit* This herd unit surrounds the Snowy Range of the Medicine Bow Mountains southeast of Rawlins to Laramie. It includes WGFD Hunt Areas 8, 9, 10, 11, 12, 110, 114 and 125. The southern half of hunt area 12 and all of 110 are located within this watershed accounting for nearly a quarter of the herd unit. Elk within this unit summer at higher elevations, but winter at lower elevations near or outside of lower timberline, avoiding areas with high human activities. The portion of the watershed which covers this herd unit includes spring-summer-fall, winter, winter-yearlong, crucial winter, and crucial winter-yearlong habitat.

## *Mule Deer*

Mule deer are the second most abundant big game species following antelope in this watershed (photo 53-2). However, mule deer are not found evenly distributed across the landscape. They prefer areas with hiding cover and higher precipitation sites with forbs, which tend to occur close to the mountains, rims, and along stream drainages and lakes. Mule deer select forbs and grasses when green and more nutritious, shifting to primarily shrubs in the fall and winter. Compared to antelope, mule deer prefer a mixture of sagebrush and other shrubs during the winter. There is one mule deer herd unit that is primarily located within the watershed area. This herd unit area is identified as the: (1) Platte Valley Herd Unit.

*Platte Valley Mule Deer Herd Unit*: This herd unit lies south and east of Rawlins including areas on the west slope of the Snowy Range to the east slope of the Sierra Madre Range. It is comprised of WGFD Hunt Areas 78, 79, 80, 81, 83 and 161. All of hunt areas 78 and 81, and most of hunt areas 79 and 80 are within this watershed. Many of these deer summer at higher elevations, but will migrate to lower elevations to winter. All of the hunt areas within the watershed analysis area contain habitat categorized as spring-summer-fall, winter-yearlong, and crucial winter-yearlong habitat.

## *Whitetail Deer*

Whitetail deer also inhabit a portion of the watershed analysis area. They are mostly limited to the bottoms of major creeks and drainages containing the heavy cover which they prefer. Found mainly in the valley bottoms and on irrigated agricultural land in the drainage, they are limited to predominantly deeded land, although can be found sporadically on public tracts, usually when leaving cover to travel from one riparian corridor to another. Considered a part of the Southeast Wyoming Whitetail Deer Herd Unit, they occupy habitat in hunt areas 78, 79 80, and 81. Habitat for whitetail deer within the analysis unit includes yearlong and winter-yearlong habitat.

### *Bighorn Sheep*

Two bighorn sheep herd units occur in portions of the analysis area (photo 54-1). The Douglas Creek Herd occupies the southwestern portion of the Snowy Range on the east side of the watershed, and the Encampment River Herd occupies the Encampment River Canyon in the Sierra Madre Mountains on the southern tip of the watershed. Sheep herds in both areas appear to be declining to stagnant. Wildlife managers in the WGFD predict that there is a high likelihood that the Encampment River herd will be again be extirpated, and are concentrating management efforts in southeast Wyoming on the Douglas Creek and Laramie Peak herds.

*Douglas Creek Herd Unit* The Douglas Creek bighorn sheep herd unit is located in the Snowy Range, bounded on the west by Wyoming State Highways 130/230, on the south by the Wyoming-Colorado state line, Wyoming State Highway 230 north from the Colorado line to Laramie on the east, and Highway 130 the Snowy Range Road on the north. It comprises hunt area 19. Bighorn sheep habitat located on public lands in the analysis area are limited, but contain spring-summer-fall, yearlong, winter-yearlong, and crucial winter range.

*Encampment River Herd Unit* Located in the southeast portion of the Sierra Madre mountains, the Encampment River Herd Unit is bounded on the west by the Medicine Bow National Forest boundary and the Sage Creek Road (Carbon County road 401), Sage Creek and the North Platte River on the north and northeast, and Wyoming Highway 130/230 on the east to the Colorado state line. The majority of the habitat in this herd unit lies within the Encampment River Canyon. The Encampment River herd occupies habitat in hunt area 21. Bighorn sheep habitat located on public lands in the analysis area are limited, but contain spring-summer-fall, yearlong, winter-yearlong, and crucial winter range.

### *Moose*

Moose occupy forest and drainage bottom lands within the analysis area (photo 54-2) and have recently attained population levels which allow a limited annual harvest in the Snowy Range Mountains. The species is not considered native to the area. The current population has colonized into Wyoming from populations introduced into the North Park area of Colorado during the late 1970's. Moose, although located in habitat in both the Sierra Madre and Snowy Range mountains, are considered to be the Snowy Range Herd Unit. The herd unit comprises hunt area 38 in the Snowy Range, where seasonal status of habitats is undetermined at this time.

### *Turkeys*

A relatively small but stable and expanding population of wild Merriam's turkeys inhabits the Upper Platte River Valley within the analysis area. Located primarily within drainage bottoms between the town of Saratoga and the upper reaches of the drainage south of Encampment, flocks and individual birds have been sighted and harvested as far up the drainage as upper Miner Creek and Deadhorse Park southwest of Encampment. The hunt area, unit 12, runs along the Continental Divide from the Wyoming-Colorado State line to the Sage Creek Road (Carbon County Road 401) and north to Wyoming Highway 71, the north boundary is Interstate Highway 80, the east boundary the Medicine Bow River to Medicine Bow Peak and the divide between the Laramie River and the North Platte River back to the Wyoming-Colorado state line. A quota of 20 birds is allowed to be taken from this unit during the spring hunt period.

### *Raptors*

There are several raptor species that have been observed within the watershed area, or their nests have been identified within the area (photos 54-3 through 5). Raptors that have known nests within the area include the bald eagle, ferruginous hawk, golden eagle, Swainson's hawk, northern goshawk, great-horned owl, Cooper's hawk, prairie falcon, red-tailed hawk, burrowing owl, and kestrel. Although nests have not been identified for the northern harrier, long-eared owl, short-eared owl, and sharp-shinned hawk, these species have the potential to nest

within this watershed. The bald eagle is a threatened species; the ferruginous hawk, burrowing owl, and northern goshawk have been identified as BLM-State Sensitive Species. These species will be discussed in their respective section of the document as well.

### *Hawks*

The sharp-shinned hawk is found in mixed deciduous and coniferous woods during the summer season; and winters in woods and near bird feeders. These hawks feed by catching small birds in midair and carrying them off to eat. They may also be seen hunting among bird feeders. The Cooper's hawk inhabits mixed forests and open woodlands. This hawk has regular feeding routes during the breeding season where it hunts for common medium-sized birds such as mourning doves, jays, and starlings. The northern goshawk inhabits deep woods with mostly conifers. These hawks feed on birds by catching them in the air, and feed on mammals by swooping down on them. They eat medium size birds and mammals such as grouse and squirrels. The Swainson's hawk inhabits prairies and open arid land. This hawk often feeds by hopping on the ground, eating insects such as grasshoppers and crickets. They soar and catch mice, rabbits, lizards, frogs, and birds. The red-tailed hawk inhabits a variety of open habitats. This hawk may perch, hover, or hold still into the wind when hunting. This hawk eats small mammals, birds, and reptiles. The ferruginous hawk inhabits arid open land and grasslands. This hawk feeds by swooping down on prey from the air. They eat mostly medium-sized mammals, reptiles, and insects.

### *Owls*

The great-horned owl inhabits extremely varied areas including woods, deserts, and suburbs. This large fearsome hunter will capture a wide variety of prey, ranging from insects to prey the size of a great blue heron. They eat squirrels, mice, rabbits, snakes, skunks, weasels, porcupines, domestic cats, crows, ospreys, as well as other owls and hawks, including barred owls and red-tailed hawks. The burrowing owl inhabits open plains, grasslands, and desert scrub. These owls eat insects, scorpions, crayfish, mice, ground squirrels, young prairie dogs, rabbits, amphibians, snakes, and rarely birds. The long-eared owl inhabits woods and willow patches near open fields and marshes. This owl eats mostly voles and mice, but has been known to eat amphibians, reptiles, and insects. The short-eared owl inhabits open fields, marshes, dunes, and grasslands. This owl feeds mostly on voles, but will also hunt songbirds and some game birds. They hunt mainly at dawn and dusk.

### *Other Raptors*

The golden eagle inhabits mountains, foothills, and adjacent grasslands. This bird hunts by soaring and then diving down on prey such as rabbits and rodents and some birds, and they also feed on road-killed animals as well. The prairie falcon inhabits the plains, grasslands, and other open country. This raptor catches birds in midair or on the ground; and mammals after a swift swoop. The northern harrier inhabits open fields, grasslands, prairies, and marshes. This raptor feeds by coursing close to the ground and quickly swooping down on its prey. They eat mice, rats, birds, snakes, frogs, and other small mammals. The kestrel inhabits a wide variety of open habitats, including urban areas. This raptor hunts by perching or hovering, then diving to catch prey. They eat voles, mice, birds, and insects (Stokes 1996).

### *Threatened, Endangered, Proposed, and Candidate Species*

There are four threatened, endangered, proposed, and candidate species (T&E species) that occur, or have the potential to occur, within the watershed, and six species – the North Platte River species – that do not physically occur within this watershed, but may be affected by actions that occur within the watershed. These include the bald eagle, black-footed ferret, Canada lynx, North Platte River species (least tern, pallid sturgeon, piping plover, whooping crane, Eskimo curlew, and western prairie fringed orchid), and Ute ladies' tresses. T&E species that are located within the RFO, but that do not occur, or do not have the potential to occur and/or are not affected by

actions within this watershed include the blowout penstemon, Colorado butterfly plant, Colorado River species (bonytail chub, Colorado pike-minnow, humpback chub, and razorback sucker), Preble's meadow jumping mouse, Wyoming toad, and yellow-billed cuckoo.

### *Bald Eagle*

The current status of the bald eagle is threatened. Bald eagles are found in conifer, cottonwood-riparian, and river ecosystems. They feed mainly on fish, but will also eat carrion and some small mammals. There is one known bald eagle nest located within the watershed area.

### *Black-footed Ferret*

The black-footed ferret is considered endangered and is the rarest and most endangered mammal in North America and receives full protection under the Endangered Species Act of 1973 (Act). This species lives in prairie dog towns and relies on prairie dogs for both food and shelter. The original range of the black-footed ferret corresponded closely with the prairie dog, extending over the Great Plains area from southern Canada to the west-Texas plains and from east of the 100<sup>th</sup> Meridian to Utah and Arizona (USDI-BLM 2002).

### *Canada Lynx*

The current status of the Canada lynx is threatened. Lynx occur in the boreal, sub-boreal, and western montane-forests of North America. Snowshoe hares are the primary food source of lynx, comprising 35-97 percent of their diet throughout the range. Other prey species include red squirrels, ground squirrels, mice, voles, porcupine, beaver, and ungulates as carrion or occasionally as prey. Lynx prefer to move through continuous forests and use ridges, saddles and riparian areas. Lynx have been known to cross large rivers and lakes and have been documented in habitats such as shrub-steppe, juniper, and ponderosa pine (USDI-FWS, 1999a).

### *North Platte River Species: Least Tern, Pallid Sturgeon, Piping Plover, Whooping Crane, Eskimo Curlew, and Western Prairie Fringed Orchid*

The North Platte River species include the endangered Eskimo curlew, interior least tern, pallid sturgeon, whooping crane; and the threatened piping plover and, Western prairie fringed orchid. These species are downstream residents of the Platte River, and the whooping crane is a migrant along the central Platte River in Nebraska. The bald eagle is also a downstream winter resident of the Platte River (FWS March 2004).

### *Ute Ladies' Tresses*

Ute ladies' tresses is considered a threatened species under the ESA of 1973. This plant is a perennial, terrestrial orchid. This plant blooms from late July through August; however, depending on location and climatic conditions, orchids may bloom in early July or still be in flower as late as early October. This orchid is endemic to moist soils in mesic or wet meadows near springs, lakes, seeps, and riparian areas within the 100-year flood plain of perennial streams ranging from 4,300-7,000 feet in elevation. It colonizes early successional riparian habitats such as point bars, sand bars, and low laying gravelly, sandy, or cobbly edges, persisting in those areas where the hydrology provides continual dampness in the root zone through the growing season (USDI-BLM 2002).

### BLM State Sensitive Species

Many wildlife and plant species are experiencing population declines. The BLM developed a sensitive species list to better manage species and their habitats. There are 25 BLM-state sensitive species that have the potential to

occur within this watershed. These species include six mammals, fourteen birds, and four plants. The BLM state sensitive fish, reptiles, and amphibians that may occur within this watershed are discussed in the Fisheries section. The BLM state sensitive mammals that have the potential to occur in this watershed, or that may migrate and/or travel through the watershed area include the long-eared myotis, fringed myotis, Townsend’s big-eared bat, white-tailed prairie dog, Wyoming pocket gopher, and swift fox. The BLM state sensitive amphibian that has the potential to use this area is the western boreal toad. The BLM state sensitive birds that have the potential to use this area include the white-faced ibis, trumpeter swan, northern goshawk, ferruginous hawk, peregrine falcon, greater sage-grouse, long-billed curlew, burrowing owl, mountain plover, sage thrasher, loggerhead shrike, Brewer’s sparrow, sage sparrow, and Baird’s sparrow. The BLM state sensitive plants that may occur in this watershed, or have the potential to occur in the watershed include the Nelson’s milkvetch, cedar rim thistle, Gibbens’ beardtongue, and persistent sepal yellowcress. A description of the habitat type that each species is associated with is shown in Table 3.

**Table 3: BLM State Sensitive Species That May Occur In the Watershed**

<b>Mammals</b>		
<b>Common Name</b>	<b>Scientific Name</b>	<b>Habitat Types</b>
Long-eared myotis	<i>Myotis evotis</i>	Conifer and deciduous forests, caves and mines
Fringed myotis	<i>Myotis thysanodes</i>	Conifer forest, woodland, caves and mines
Townsend’s big-eared bat	<i>Corynorhinus townsendii</i>	Forests, basin-prairie shrub, caves and mines
White-tailed prairie dog	<i>Cynomys leucurus</i>	Basin-prairie shrub, grasslands
Wyoming pocket gopher	<i>Thomomys clusius</i>	Meadows with loose soil
Swift fox	<i>Vulpes velox</i>	Grasslands
<b>Amphibians</b>		
<b>Common Name</b>	<b>Scientific Name</b>	
Western Boreal Toad	<i>Bufo boreas boreas</i>	Pond Margins, Wet Meadows and Riparian Areas
<b>Birds</b>		
<b>Common Name</b>	<b>Scientific Name</b>	<b>Habitat Types</b>
White-faced ibis	<i>Plegadis chihi</i>	Marshes, wet meadows
Trumpeter Swan	<i>Cygnus buccinator</i>	Lakes, ponds, rivers
Northern goshawk	<i>Accipiter gentilis</i>	Conifer and deciduous forests
Ferruginous hawk	<i>Buteo regalis</i>	Basin-prairie shrub, grassland, rock outcrops
Peregrine falcon	<i>Falco peregrinus</i>	Tall cliffs
Greater sage-grouse	<i>Centrocercus urophasianus</i>	Basin-prairie shrub, mountain-foothill shrub
Long-billed curlew	<i>Numenius americanus</i>	Grasslands, plains, foothills, wet meadows
Burrowing owl	<i>Athene cunicularia</i>	Grasslands, basin-prairie shrub
Mountain plover	<i>Charadrius montanus</i>	Short-grass prairie, shrub-steppe, prairie dog towns
Sage thrasher	<i>Oreoscoptes montanus</i>	Basin-prairie shrub, mountain-foothill shrub
Loggerhead shrike	<i>Lanius ludovicianus</i>	Basin-prairie shrub, mountain-foothill shrub
Brewer’s sparrow	<i>Spizella breweri</i>	Basin-prairie shrub
Sage sparrow	<i>Amphispiza billineata</i>	Basin-prairie shrub, mountain-foothill shrub
Baird’s sparrow	<i>Ammodramus bairdii</i>	Grasslands, weedy fields
<b>Plants</b>		
<b>Common Name</b>	<b>Scientific Name</b>	<b>Habitat Types</b>
Nelson’s milkvetch	<i>Astragalus nelsonianus</i> – or – <i>Astragalus pectinatus</i> var. <i>platyphyllus</i>	Alkaline clay flats, shale bluffs and gullies, pebbly slopes, and volcanic cinders in sparsely vegetated sagebrush, juniper, cushion plant communities at 5200’-7600’
Cedar rim thistle	<i>Cirsium aridum</i>	Barren, chalky hills, gravelly slopes, & fine textured, sandy-shaley draws at 6,700’-7,200’
Gibbens’ beardtongue	<i>Penstemon gibbensii</i>	Sparsely vegetated shale or clay slopes – 5,500’ to 7,700’
Persistent sepal yellowcress	<i>Rorippa calycina</i>	Riverbanks & shorelines, sandy soils near high water line

**The objective of the sensitive species designation is to ensure that the BLM considers the overall welfare of these species when undertaking actions on public lands, and do not contribute to the need to list the species under the provisions of the ESA. The lack of demographic, distribution, and habitat requirement information compounds the difficulty of taking management actions for many of these species. It is the intent of the sensitive species policy to emphasize the inventory,**

*planning consideration, management implementation, monitoring, and information exchange for the sensitive species on the list in light of the statutory and administrative priorities (USDI-BLM 2002).*

### *Greater Sage-Grouse*

Greater sage-grouse (grouse) are common inhabitants within this watershed (photo 58-1). Grouse populations have exhibited long-term declines throughout North America, with a 33% decline over the past 30 to 40 years. No one causal factor has been identified for these declines. Wyoming supports the largest populations of grouse, more than all the other states combined; however, there are population declines occurring in Wyoming as well. Grouse are a sagebrush obligate species and each aspect of their life cycle requires slightly different elements within the sagebrush communities. Grass height and cover play an important role in the nesting success of grouse. Early brood rearing habitats consist of relatively open stands of sagebrush or narrow, shrub-free stringers of meadows in draws or other areas with somewhat more soil moisture. Sagebrush, sometimes dense, often has invaded the latter habitats, thus making them less desirable or unsuited for brood habitat (Klebenow, D.A. 1972). During the summer months, grouse move to more mesic sites seeking succulent forbs. Movements to winter ranges are slow and meandering and occur from late August to December. During the winter months, grouse feed almost exclusively on sagebrush leaves (USDI-BLM 2002).

Some winter habitat has been identified for parts of this watershed. Specific, project related areas were flown for winter habitat within this watershed; therefore, there is always the possibility that additional winter habitat areas for greater sage-grouse will be identified in other areas of the watershed unit. Winter habitat must be assessed during very specific time periods and under specific winter conditions.

## **2) Issues and Key Questions**

There are several issues and key questions that have been identified for wildlife species. The major issues that concern wildlife species include the overall health of the ecosystem including both the quality and quantity of a diversity of habitat types that species depend on throughout their life cycles; the availability of these habitat types for wildlife species; and existing or potential disturbance of these habitat types. Priority wildlife habitats include riparian grassland, willow-waterbirch riparian, aspen and cottonwood woodlands, and wet forested meadow areas; in addition to open aquatic; sagebrush-grass communities, mountain shrub, saltbush steppe, conifer forest, and rockland areas (USDI-BLM 1990). Habitat diversity includes vegetation cover types and age distribution, as well as the need for disturbance-such as fire, disease, and/or climatic change. Factors that affect the availability of these habitat types for wildlife include livestock management, development of private lands, natural fire suppression, and inter- and intra-species competition for available forage and associated diet overlap. Existing and potential disturbances to wildlife species include impacts to priority habitats from fencing, water development projects, vegetative treatments, and livestock use; disturbance to individual life cycles from human activity, including recreational activities, OHV use, and noise. The following describes issues and key questions that pertain to specific wildlife and impacts that may occur as a result of activities occurring.

### Species of Interest and Concern

#### *Antelope*

Issues that relate to antelope across the watershed include impacts of fences and roads upon animal movement; these will be discussed for all herd areas at one time. Issues that affect antelope which are more specific to particular herd areas (and will be discussed by herd area) include vegetation treatments, livestock management practices relating and type/season of use by livestock, and the development of private lands within the valley and in the mountains and foothills.

Much of the fencing in the assessment area was constructed prior to standards being created to reduce impacts on wildlife. Additionally, many road rights-of-ways are bounded by woven wire fences as well. Few adults will jump over fences; the majority of antelope prefer to pass under or through fences. Woven wire fences prevent passage under or through them, forcing antelope to find low spots such as gully crossings where they can get under the fence. During severe winter conditions, antelope have to expend additional time and energy to get through these types of fences while migrating, which may reduce their chance for survival. They may even get stuck in fences, where they are likely to die. Older fences built to control cattle were made with four to six strands of barbed wire, and the bottom strands are lower than the height recommended in BLM fencing standards. Although antelope can often pass through these fences or find low spots to go underneath them, they still impede migration movements to some degree. Modifications continue to be made to sheep style (woven wire) fences, in particular, to reduce the impacts to antelope migrating between spring/summer/fall and winter ranges. Even though some of these have been modified to BLM fencing standards, to assist antelope in moving through fences, more needs to be done. In some cases, installing gates in corners that could be left open during the winter would help a lot. Since not all of this work can be done at once, what locations should have the highest priority to be modified, and what areas should be targeted for future years? How can we accomplish the modification of a significant amount of fence each year to help resolve this issue in a reasonable amount of time?

Livestock management practices primarily relate to water, both in terms of new developments and their management, as well as protection of natural seeps and streams. When new water sources are developed, which are usually for summer cattle use, antelope and other wildlife will use them and become dependent upon them, especially during times of drought. However, if these water developments are wells, they may only be available during specific times of the year and the wildlife must look for water elsewhere. There have been incidents where antelope get stuck in certain pastures due to woven wire fences and can't move to new locations when the water they were using is no longer available. How can these situations be avoided? Are there certain times or locations when water should remain available, either through continuing to pump water or development of other sources? In other situations, water developments have been created for wildlife, such as guzzlers or other projects. These are often developed and maintained by individuals working for state or federal agencies, but may not be properly maintained when these individuals retire or move to other jobs. How can this situation be rectified to maintain the use of these facilities for the long-term benefit of antelope and other wildlife? Almost 100% of all livestock use is made by cattle, which have a low overlap in diet similarities with antelope. However, cattle can have a significant impact on riparian habitat that is important to antelope. Through the use of riparian pastures or exclosures, these areas are managed or protected from a livestock perspective, but from a wildlife viewpoint, what mix of vegetative species and structure should be promoted and what form of management will it take to achieve this?

Private land developments are another issue influencing antelope within the assessment area. These developments, primarily subdivisions, are resulting in a net loss of habitat that is important to antelope. Additionally, increased human activity associated with these developments may also result in an effective habitat loss of these areas.

*Elk Mountain Antelope Herd Unit* Less than a quarter of this herd unit lies within the watershed boundary with a large amount of that area on the Medicine Bow National Forest, and much of the remainder in private ownership. In addition to livestock management and fencing (discussed under general heading for antelope), subdivision development within this herd unit is slowly removing small portions of usable habitat. These developments may restrict movements as well as increase the amount of noise and disturbance.

*Iron Springs Antelope Herd Unit* This herd unit is primarily influenced by fencing and livestock management issues that are discussed under the general heading of antelope. Vegetation treatments within this herd unit area, occurring within crucial winter ranges, could have positive or negative impacts, depending upon design and implementation. How can vegetation treatments be designed and implemented to maximize benefits and reduce adverse impacts to antelope?

*Big Creek Antelope Herd Unit* This herd unit is primarily influenced by fencing, roads and livestock management issues as discussed under the general heading of antelope. Antelope in the Big Creek Unit are generally less affected by water developments or the lack thereof, because there is so much naturally occurring water in the area draining from both of the mountain ranges. Many of the fences in this area lie on private lands or between public and private, and are generally not influenced by federal regulation or recommendations. Possible livestock management strategies could involve fences to control cattle use periods in certain areas. Additionally, vegetation treatments have been discussed and proposed in the area in order to manage shrub stands and achieve a more natural age and structural class. How can livestock management structures such as fencing, and vegetation treatments be designed and implemented to maximize benefits and reduce adverse impacts to antelope?

## *Elk*

The major issues affecting elk are fence impacts on animal movement, competition with cattle for forage, reduced health and productivity of forest, aspen, and shrublands due to the lack of natural fire, and increased human activities. Fencing and competition with cattle are issues common to both herd units and are discussed together. Topics of concern that are not common to all herd units are discussed for each individual herd unit.

Elk movement is affected by fences much differently than with antelope. Elk, being considerably larger, will generally jump over fences or run right through them, (sometimes causing considerable damage.) Young elk, however, will have to pass under or through fences for a time and can get stuck behind a fence they can't get through or get a leg caught while attempting to jump a fence. Woven wire fences constructed for sheep present problems for very young elk, but these fences usually are not over 40 inches tall, and can be jumped fairly easily by adult elk. Old style fences built for cattle may be 50 to 55 inches tall and present considerable problems for both young and adult elk. Elk which summer on the national forest may not have many fences to pass over until they migrate in the spring and fall to and from the winter range. Fence locations requiring annual maintenance due to big game movement are good indicators of areas where fence modifications should occur to reduce both the cost of maintenance and the impact to big game species. How can a program be implemented to modify fences where needed in the short-term, and correct all fences to meet BLM standards in the long-term? As noted in the antelope section previous, possible livestock management strategies could involve fences to control cattle use periods in certain areas. How can livestock management structures such as fencing be designed and implemented to maximize benefits and reduce adverse impacts to antelope?

Competition for forage between elk and cattle occurs to some degree. The percent diet overlap is around 80% for these two species. The fact that both elk herds are at or near herd population objectives would indicate that current levels of livestock use are not affecting elk numbers. In terms of there being available forage for use by both types of animals, this is probably true, but distribution of livestock use will affect where adequate forage is available and where elk have to move in order to find forage. Water development and improved riparian and upland range conditions are also affecting elk distribution and how long they stay in a particular area. Should more attention be paid to these changes in elk distribution and use patterns, and how does this reflect back on the management of cattle or other activities in these areas?

Increased human presence on critical winter ranges has introduced stress to elk, as well as other big game species by pushing the animals off of their preferred winter habitat onto less desirable, and less accessible ranges. This is especially true during the late winter months of February and March, and early April, when the animals are weakest and most vulnerable to weather and poor forage conditions. Many people flock to the winter ranges during this period to pick up shed antlers, and cause big game to move onto adjacent, less desirable habitat. How can land management agencies manage the public land users so that negative impacts to wintering big game and their habitats are removed?

Sierra Madre Elk Herd Unit The portions of the Sierra Madre herd unit within the assessment area are primarily affected by interactions with livestock, generally during late spring, summer and fall when stock is utilizing the public lands in the valley. Many of the ranch operations within this part of the valley allow late-season cow elk harvest by the public for a minimal or no fee, allowing management and harvest objectives to be met in most cases and minimize conflicts on winter habitats. Much of the cattle use in the assessment area occurs on public lands which constitute the lower fringe of spring-summer-fall elk use areas, which may tend to minimize impacts between the species during this period. Most management proposals which are intended to improve rangelands conditions in livestock grazing allotments should also benefit elk in the long term. How can rangeland management practices be designed and implemented so that benefits outweigh short-term liabilities to elk herds and livestock operations?

Snowy Range Elk Herd Unit This herd unit is primarily influenced by competition with cattle for forage, reduced health and productivity of forest and shrublands due to the lack of natural fire, and increased human activities, which is discussed under the general heading for elk. A small segment of the northeast portion of the assessment area covers a habitat management unit (Pennock Mountain Big Game Crucial Winter Range - BGCWR) which is maintained to provide forage for elk during the winter and minimize conflicts with surrounding landowners. To a large extent the unit has been spurned by elk in favor of neighboring haystacks and agricultural lands. Habitat treatments during the last several years on the unit are attempting to draw elk use back onto the public and WGF D lands. It remains to be seen what results these actions will have on elk depredation in this part of the valley. The revision of the Rawlins Field Office RMP calls for classifying the Pennock Mountain unit as a "vacant" grazing allotment, which opens the possibility that livestock operations may apply for grazing use on it. How can the Pennock Mountain BGCWR be utilized by domestic livestock while providing suitable habitat for wintering wildlife? Under what circumstances should livestock use be allowed? How can livestock grazing be used as a management tool to achieve wildlife objectives on the Pennock Mountain BGCWR? How can rangeland management practices be designed and implemented in throughout the Snowy Range foothills to enhance big game wildlife habitat as well as livestock management?

### *Mule Deer*

The issues that relate to mule deer include fence impacts on animal movement, livestock management practices, health of shrub and woodland habitats, and development of private lands. The affect of fences upon mule deer are similar to those described for elk. Mule deer will typically jump over fences, with concerns relating to fence height and the spacing of the top two wires. Young deer may have to pass under or through fences, so that woven wire fences raise the greatest concerns. The affect of development of private lands are similar to those described for antelope.

Livestock management practices that have the greatest effect on mule deer are fencing (already discussed), type of livestock use (cattle versus sheep), and management impacts to mule deer habitat, particularly riparian plant communities. Sheep diets are very similar to mule deer and antelope, so competition for forage can be an important factor. However, current use levels by sheep make up, at most, a fraction of all livestock use in the valley, and almost none of the permitted use on public BLM lands within the assessment area. Use by cattle and mule deer primarily overlap in riparian habitat. Spring through fall use of riparian habitat by cattle has degraded the value of these sites for mule deer use, especially the woody plants which are important as forage and cover. Use of best management practices for cattle has improved many of these areas. However, how can these BMPs become the standard operating procedure so that these kind of issues are no longer present? How can BMPs such as rotational grazing implemented through the use of pasture fencing be implemented so as to not cause unacceptable negative impacts to mule deer and other wildlife?

As with elk, increased human presence on critical winter ranges has introduced stress to mule deer, as well as other big game species by pushing the animals off of their preferred winter habitat onto less desirable, and less accessible

ranges. This is especially true during the late winter months of February and March, and early April, when the animals are weakest and most vulnerable to weather and poor forage conditions. Many people flock to the winter ranges during this period to pick up shed antlers, and cause big game to move onto adjacent, less desirable habitat. How can human disturbance to wintering mule deer be minimized or mitigated?

*Platte Valley Deer Herd Unit* The mule deer in this unit summer at higher elevations on the National Forest, but migrate to winter ranges at lower elevations. Therefore, most importantly at this point, *habitat quality on transitional and winter ranges is a management consideration*. Fire suppression and a relative lack of natural and man-made stand replacement disturbances to most of the shrub stands comprising winter, year-long and crucial winter ranges in the valley has allowed large tracts of sagebrush and mixed mountain shrub stands to reach maturity to decadence across the landscape. These even age-class and structured mature to decadent mountain shrub communities increase inter- and intra-specific competition. Can habitat improvement projects, including the use of prescribed fire be used to improve habitat conditions? Perhaps more importantly, how can this habitat be treated so that short-term impacts to mule-deer and other big game species do not negatively impact herds more than long-term impacts benefit them? Can landscape-scale vegetation treatment be carried out in the valley without the risk of removing too much vegetation from wildlife populations which currently are thought to exceed carrying capacity, without resulting in unacceptable population crashes?

#### *Whitetail Deer*

Whitetail deer are found mostly in valley habitat that occurs predominantly on deeded land. Management practices on public lands have little potential to impact whitetail deer or their preferred habitat. The WGFD has no special management strategies which are directed towards whitetail deer in this area, and harvest occurs as part of the overall deer harvest in the valley, with no special seasons or quotas. Whitetail deer are considered by most to be a species of secondary importance to mule deer and, in fact, are thought by some to be a threat to healthy mule deer populations where the two species interact. Therefore, issues and key questions regarding whitetail deer in the analysis area center on promoting mule deer habitat and populations over considerations for whitetail deer. How can management actions in the valley promote healthy mule deer populations so that they are better equipped to withstand competition from whitetail where interactions occur?

#### *Bighorn Sheep*

Issues which affect bighorn sheep populations in the valley are related to maintaining healthy, viable herds where they currently occur, and in time, expanding population numbers in these areas. Interactions with domestic sheep appear to be one of the most influencing factors which affect bighorn sheep populations in the Rocky Mountains. Because there is so little domestic sheep grazing permitted on BLM public lands within the valley, interactions between the two species on BLM should be non-existent at best, and minimal at worst. National BLM policy centers on the removal of the possibility of interactions between wild and domestic sheep, which usually precludes conversion of cattle permits or leases to sheep use in BLM grazing allotments in proximity to wild sheep herd units. Where domestic sheep permits are authorized in proximity to wild sheep herd units, conversions to cattle will be considered and encouraged. Only one allotment within the analysis area carries sheep use on the permit, (which has not been activated within the last decade), and this allotment, Snow Creek, is located on the north edge of the Encampment River Herd Unit boundary, more than ten miles from the primary habitat area in the Encampment River Canyon. Because of the lack of permitted sheep use on BLM lands within the valley, habitat conditions within sheep habitat are of more importance and impact to bighorn sheep. Many of the same habitat issues affecting mule deer and elk impact bighorn sheep, most notably mature to decadent, even-aged sagebrush and mixed mountain shrub stands found in the mountain foothills surrounding the valley. Additionally, conifer encroachment into decadent aspen, riparian woodland, and mountain shrub stands throughout bighorn ranges in the valley has degraded habitat conditions. What vegetation management actions can be taken to restore important mountain shrub, riparian woodland, and aspen stands within the valley that will benefit, or at least not negatively impact existing bighorn sheep populations and herd units?

Douglas Creek Herd Unit Habitat for the Douglas Creek Herd Unit in the analysis area consists mostly of winter-yearlong and crucial winter range along the south-west flank of the Snowy Range to the Bennett Peak area. Habitat issues in this area are similar to those which affect mule deer and elk seasonal habitat in the area, specifically the overall maturity to decadence of mixed sagebrush/mountain shrub stands and the decline of aspen habitat coupled with coniferous species invasion into formerly open shrub and aspen stands. Implementation of BMPs for livestock grazing benefit upland and riparian habitat for sheep in this area, but it appears that more direct, hands-on manipulation of open, upland shrub habitats may be required to move these vegetation communities towards the desired, future conditions of a more natural, mixed mosaic of vertical structures, age, and seral stages. How much vegetation treatment should be implemented and over what time frame should it occur to ensure that the desired, future conditions eventually predominate, while minimizing short-term impacts from habitat change and losses to seasonal forage for bighorn sheep and other species of concern?

Encampment River Herd Unit Habitat for the Encampment River Herd Unit in the analysis area consists almost completely of crucial winter-yearlong range, with some additional yearlong range around the fringes. The population in this unit is considered to be stagnant to declining. Issues that the WGFD has identified which negatively impact this herd include drought, long-term fire suppression, incompatible land uses, lack of strong seasonal migrations, and lower habitat quality. Due to recent decisions in the Medicine Bow National Forest Plan revision which favor domestic sheep values over wild sheep values in the Sierra Madre portion of the forest, the WGFD has decided that management emphasis will be placed on the Douglas Creek Herd Unit in this area and that the Encampment River Herd will be de-emphasized, and will most likely be extirpated from the area in the future.

Of the identified issues facing this herd, habitat quality can be most strongly affected by management actions within the habitat. Unfortunately, cheatgrass infestations within the Encampment River Canyon and its tributaries including Miner Creek and Deep Draw (both within the identified crucial winter range) have tended to negate habitat improvement projects which have been implemented during the last 20 years, specifically a series of prescribed burns on steep slopes. How much emphasis should be placed on improving habitat conditions for a population of sheep which the management agency with primary responsibility has, for the most part, written off? What type of vegetation treatments can be carried out where history has shown marginal results due to aggressive, invasive species dominance? How can management actions, if not directed primarily towards this resource, benefit, or at least not negatively impact the sheep?

### *Moose*

Moose habitat in the analysis area ranges from aspen and willow riparian bottoms, dark spruce/fir and lodgepole pine timber, to moderately steep sagebrush slopes at the higher elevations of the analysis area. At this time, little is known about the issues facing moose in this area, but it can be inferred that healthy, productive riparian areas and upland habitat conditions are beneficial to moose populations. Key questions pertaining to vegetation and habitat for moose should focus on how to manage to encourage health and productive willow riparian communities within the mountain foothills, and what, if any special considerations should be addressed when analyzing positive and/or negative impacts of management actions. Additionally, seasonal habitat delineations should be further defined as recommended by the WGFD.

### *Turkeys*

Turkey habitat within the analysis area is found, for the most part, on deeded land in lower to middle elevations in the valley, although there is evidence that portions of the turkey population in the valley utilize creek bottoms and uplands on public land surrounding the river bottoms. Although management for turkeys is not a high priority, key questions that should influence management actions in this species habitat would include asking what management actions would benefit their habitat, which would be a detriment, and what would not affect it one way or the other.

How much should requirements for this species affect management actions in this type of habitat? How can beneficial management actions for turkeys be incorporated into multiple use management plans?

### *Raptors*

Raptors are primarily affected by the abundance of their prey species, which will fluctuate annually as a result of habitat and climate conditions. Factors that influence habitat condition and availability include the impacts that may occur from recreation (falconry practices), subdivision development, and livestock management (condition of habitat for food base). What types of impacts are affecting raptors and what types of mitigation can be implemented to reduce and or eliminate these impacts?

### *T& E Species*

The issues are closely associated with the health and diversity of habitat types. In general, a healthy ecosystem lends to the survivability and vigor of T&E and BLM-State Sensitive species.

The only issue relating to bald eagles in this watershed center around the health of riparian vegetation, specifically the health and vigor of cottonwood trees along the North Platte River and Encampment River system. Livestock may affect tree health and vigor along the river system if there is excessive rubbing and browsing that can damage young trees. Lack of high flow events may reduce the regeneration of young cottonwood trees. What areas on public lands are being used by bald eagles; is there nesting activity; and if so, how successful are they? What types of impacts are attributable to other land uses and what actions can be implemented to reduce and or eliminate them?

The only issue relating to black-footed ferrets would be potential impacts to white-tailed prairie dog towns (the major food base and habitat for black-footed ferret) that may occur as a result of recreational activities and subdivision development. In general, livestock management should not impact potential black-footed ferret habitat. Where are impacts to white-tailed prairie dog towns occurring? What affects has plague had on prairie dog populations?

There should not be any management issues with the Canada lynx since this species only use the riparian habitats between ranges during dispersal and it would be unlikely that this species would be traveling through the watershed, although this may occur. There should not be any impacts to this species as a result of implementing actions within the watershed.

The North Platte River threatened and endangered species utilize habitat located in Nebraska along the North Platte River. Factors which may affect these species relate to water depletions in the North Platte River system as a result of implementing proposed projects. A proposed project that may result in a water depletion, including evaporative losses, triggers a "may affect" situation and requires a biological assessment to be prepared. Formal consultation with the U.S. Fish and Wildlife Service is required. How many projects within this watershed that have been determined to cause a water depletion to the North Platte River system and have these depletions had any affect on local populations?

Ute ladies' tresses is a plant that is located in riparian habitats. This plant is listed as a threatened species and may be impacted by livestock grazing, but grazing may not cause irreversible impacts to the species. What locations are most likely to support this plant in order to inventory and determine if it even exists in this watershed? If populations are found then further steps in analyzing current and future management practices would occur.

## BLM State Sensitive Species

There are six mammals, one amphibian, fourteen birds, and four plants that have been identified as BLM state sensitive species and may occur, or have the potential to occur, within this watershed area. The main key issues include the lack of information concerning exact locations of most of these species and the affects that authorized actions may have on these species.

Monitoring has occurred, and will continue to occur, throughout the watershed area for these species. There are numerous questions concerning these species - for example, what affects do vegetation treatments (prescribed burns, chemical treatments), grazing management, recreational activities, private land development, and roads have on these species? What affects do management practices have on other sensitive species located within the watershed? How much information should be obtained concerning specific species before land management actions are implemented?

### *Greater Sage-Grouse*

Approximately 25 greater sage-grouse leks and associated nesting habitat occurs within the upper watershed. Upland drought reduces the amount and height of vegetative cover, which may lead to lower nesting success and chick survival for the next year. Drought also affects the production of understory forbs, which may have negative impacts to early brood-rearing, specifically from April through June, which is their critical time period. Water sources placed in the uplands may increase cattle use in areas that grouse use for nesting. This may affect grouse nesting success and survival of chicks by further reducing herbaceous cover. Livestock use on some riparian habitats has led to degradation of species, vigor and cover that is important to late season brood-rearing by sage grouse. What levels and seasons of use by livestock in upland and riparian habitat are appropriate in conjunction with the needs of sage grouse and other wildlife? Habitat loss from subdivision activities continues (WGFD 2003e). Large scale sagebrush treatments may cause negative impacts if located in nesting habitat, but smaller scale sagebrush habitat conversions (less than 200 acres in size) may actually cause beneficial impacts to nesting grouse. Fences constructed next to strutting grounds may also cause negative impacts to grouse by becoming perches for raptors or obstructions to fly into. What are the cumulative impacts to greater sage-grouse as a result of authorizing actions including livestock management and associated projects (water development, fences, habitat treatments), and recreation activities? What educational programs can BLM become involved in with to reduce and or eliminate impacts to grouse within and adjacent to private parcels?

### **3) Current Conditions:**

The following describes the current conditions of wildlife populations and their habitat for those species that inhabit the watershed, or have the potential to use habitats within the watershed.

### Species of Interest or Concern

#### *Antelope*

Elk Mountain Antelope Herd Unit The population objective for this herd is set at 5,000 antelope, with the current population estimated at approximately 4,600. This herd has been stable for the past ten years with no signs of population increase. The lack of apparent population growth is attributed to drought conditions, since the summer of 2000. Current data also suggest that the sagebrush habitat in the area is monotypic, old-aged decadent stands, which may not be able to support substantial increases in the antelope herd in the area (WGFD 2004c).

Iron Springs Antelope Herd Unit The population objective for this herd is set at 12,000 antelope. The 2004 post hunt estimate for the herd showed approximately 9,900 antelope. Low fawn production in the past has slowed the

growth of this herd since heavy winter losses in 1992-1993. Fawn production has improved in the past five years with a fawn:doe ratio of 55:100 observed in 2003. Once again, the recruitment into this herd may be slowed by drought conditions in the past, and may continue into the future if conditions remain the same (WGFD 2004a).

*Big Creek Antelope Herd Unit* This herd unit has a population objective of 600 antelope and is currently estimated to be at or near objective with a stable trend. The fawn:doe ratio was low at an estimated 28:100. The slow increase in population may be due to the drought conditions that have persisted since 2000.

## *Elk*

*Sierra Madre Elk Herd Unit* Population estimates for this herd have been complicated due to the extensive interchange of elk between Wyoming and Colorado. The herd has been above population objective since the mid-1980s, with post-season populations of nearly 8,000 animals. Adjustments in annual harvest have lowered elk populations to around 5,000 animals and closer to the objective of 4,200 animals (WGFD 2004b). The National Forest and surrounding foothills have been less affected by drought than areas to the west, north and east. There is generally good distribution of reliable water sources between streams and man-made developments. Over the last fifty years there have been many vegetation treatments on public, private and state lands to promote more grass and forbs, and renew mountain shrub stands, which also benefits elk. Removal of 600 head of wild horses in 1986 from this herd unit also benefited elk, particularly on their winter range, due to the high diet overlap between these two species. An improvement in livestock management with adoption of BMPs has improved range conditions that benefit elk. All of these factors are reflected in both the productivity of this herd and their expansion of use into areas further away from the forest.

*Snowy Range Elk Herd Unit* The population objective of this herd is set at 6,000 elk. The population was expected to number 5,450 elk, following the 2003 hunting season. An estimated calf:cow ratio of 40:100 and excellent bull:cow ratios has been documented in the herd. Due to drought conditions that threaten to continue, there is concern over habitat quality and livestock conflicts within this herd unit, especially on seasonal ranges off the National Forest. Due to these factors, the herd will be managed, for a time, to reduce herd size even further, mainly by a reduction in the number of cows in the population (WGFD 2004c). By maintaining the herd below objective, substantial habitat degradation, due to drought conditions, can be minimized in this area. The Pennock Mountain BGCWR on the northeast edge of the assessment area is intended to supply winter forage for the Snowy Range elk herd.

## *Mule Deer*

*Platte Valley Mule Deer Herd Unit* This herd remains above the population objective of 20,000 deer by nearly 6,000. Even though this herd is above objective, public concern has been raised that this herd area could support a significantly larger population. Precipitation was only 75% of normal during the winter of 2002-2003. Additionally, browse production was 27% lower than in 2001. The buck to doe ratio was similar to 2001, but the fawn to doe ratio was 9 fawns per 100 does higher than in 2001, at 65:100, similar to the previous year which was 66:100 (WGFD 2004c). Because this herd has not shown much improvement in population size, it is believed that habitat conditions are a large factor affecting this herd. As drought conditions persist, habitat conditions within the herd unit may show little improvement. A cooperative, interagency program has been initiated to treat big game habitat that is dominated by decadent stands of sagebrush in order to improve habitat conditions in the area. The plan, spanning 25 years, is intended to improve habitat conditions in the area and hopefully alleviate some of the problems relating to historic overuse by big game and livestock and the effects of continual fire suppression in the area. Several vegetation treatments have already taken place along the west face of the Snowy Range within winter habitat during the last three years.

### *Whitetail Deer*

There are no set population objectives for whitetail deer specific to the the Platte valley. Whitetail deer are managed as part of the Southeast Wyoming White-tailed Deer Herd Unit, which has an objective of 4,000 animals. The herd shows a fawn:doe ratio of 73:100. It should be noted that this herd unit is immense, stretching from the Wyoming-Nebraska border to the Continental Divide and Platte River, and that the Platte valley portion of the herd makes up a small portion on a landscape surface basis, and is even less significant on a population basis. White-tailed deer in the Platte valley are considered an after-thought in the overall white-tailed deer management strategy for Wyoming, and their presence and significance could be considered to be incidental.

### *Bighorn Sheep*

Douglas Creek Herd Unit This herd remains below the population objective of 350 animals at slightly less than 100. The latest juvenile:adult female ratio was 50:100, which is up from the previous 24:100 in 2003. Numerous factors discussed previously appear to affect the lack of improvement in this herd, including lack of strong seasonal migration, fire suppression and the resulting dominance of mature to decadent shrub stands, past disease transmission from domestic sheep, and competition from elk and deer on winter ranges. Mostly because of land-use decisions in recent years, this population is being emphasized over the neighboring Encampment River Herd Unit.

Encampment River Herd Unit The estimated population of the Encampment River Sheep Herd is 45 animals, which is below objective. It is considered to be stagnant to declining. Juvenile:adult female ratios have not been reliably estimated during the last few years. Because this herd unit is being de-emphasized in favor of the Douglas Creek herd, there is no population objective specific to the herd at this time.

### *Moose*

Moose populations in the Snowy Range Moose Herd Unit are currently estimated at 150, above a tentative population objective of 100 animals. The juvenile:adult female ratio is currently at 43:100 with a very good bull:cow ratio. The trend of this population is increasing. It should be noted that current population estimates come mostly from observations by WGFD personnel and the public, rather than established transects. The harvest strategy for moose in the Snowy Range herd is very conservative, as in order to maintain the trophy status of this herd. Harvest success rates are high, as is recreation opportunity and trophy potential in this herd. As noted previously, this herd unit is not native to the area, colonizing from the North Park area of Colorado, from moose transplanted to the area in the late 1970's. Moose are most likely still expanding into new habitat areas, and there is a study currently underway to further determine and document seasonal habitat preferences for the species in this herd unit. Many of the higher drainages in the assessment area contain a high amount of moose sign, ranging from Cedar Creek at the north boundary, to Bear Gulch and Prospect Creek in the south extremes. Although present in the Sierra Madre Mountain foothills, they are much more predominant in the Snowy Range foothills on the east end of the drainage.

### *Turkeys*

The wild turkey population in the Platte Valley has recently reached a point that limited harvest of the birds was deemed possible by the WGFD. In the spring of 2004, 20 limited quota permits were issued for male turkeys in the valley, with a harvest of six birds. Success was rated as 44% as only 14 of the 20 permit holders hunted. As mentioned previously, the birds are mostly noted for residing in the Platte River floodplain between Saratoga and Encampment, but range as far into the mountains as the upper reaches of Miner Creek and the North Fork of the Encampment River.

## *Raptors*

The raptors previously listed all nest and forage within the watershed. Bald and golden eagles often stay year-long, while other species migrate to warmer climates. The rough-legged hawk spends the winter in the watershed and migrates further north to nest. Prey species are common, with their abundance varying year to year due to climate. Monitoring occurs in some areas of the watershed to determine nest activity and status. Timing stipulations to avoid disturbance during nesting seasons are used on a project specific basis. Most Nest sites are found on natural substrates, however, artificial nests are used to mitigate conflicts between human activities and nest locations by ferruginous hawks and golden eagles.

## *Threatened, Endangered, Proposed, and Candidate Species*

*The following paragraphs describe the current status of threatened, endangered, proposed, and candidate species that may occur, or have the potential to occur within this watershed. Species may use portions of the watershed during their entire life cycle or portions of their life cycle.*

### *Bald Eagle*

Although there is only one known, documented bald eagle nest located along the North Platte River drainage at this time, the actual number of nests that may occur within the watershed have not been updated. Winter habitat has not been identified in the RFO area.

### *Black-footed Ferret*

There are white-tailed prairie dog towns located within this watershed and many of these towns are active. At this time, an actual map of all of these towns has not been completed. Survey and intensive mapping would be needed to refine any map that is prepared. Although prairie dog towns are located within this watershed, and some have the potential to support black-footed ferrets, no known black-footed ferrets have been recently identified within the watershed area. Ferret surveys will be required for all projects proposed within the (non-block cleared) Saratoga prairie-dog complex.

### *Canada Lynx*

Although it is highly unlikely that lynx will reside within this watershed, there is the potential for travel corridors through the watershed, specifically using riparian habitats. Lynx are very secretive and are difficult to monitor; therefore, numbers of lynx are hard to obtain.

### *North Platte River Species: Least Tern, Pallid Sturgeon, Piping Plover, Whooping Crane, Eskimo Curlew, and Western Prairie Fringed Orchid*

The North Platte River species include the endangered Eskimo curlew, interior least tern, pallid sturgeon, whooping crane and the threatened piping plover, bald eagle, and Western prairie fringed orchid. Although these other species are not located within the watershed, other than the bald eagle, any proposed projects leading to water depletion within the North Platte River ecosystem must evaluate impacts to these downstream species.

### *Ute Ladies' Tresses*

Although the Ute ladies' tresses has not been identified to exist in this watershed, it has the potential to occur and the Service has concluded that it may occur in this area.

### *BLM State Sensitive Species*

All of the BLM-state sensitive species have the potential to occur within this watershed. There are known nests for ferruginous hawks, and burrowing owls have been observed with some nesting habitat identified. Greater sage-grouse leks are monitored throughout the watershed by the WGFD and the BLM wildlife biologists from March through mid-May each year to determine activity status of each lek. Populations of greater sage-grouse are declining across the West and in Wyoming; however, the actual cause(s) for this decline is unknown. Less is known of other BLM-sensitive state species; however, the habitats for these species are present and inventory or monitoring should occur to determine abundance and habitat use in the future.

#### **4) Reference Conditions:**

There are several historical accounts that have described wildlife species that were present within the watershed area during different eras. It seems apparent that the upper end of the Platte River valley was rich in game and revered as hunting grounds for many Indian tribes in the area, although claimed exclusively by none. Sioux, Cheyenne, Snakes, Crow, Arapahoe and Utes favored the valley for its ample herds of wildlife, and early trappers began winter encampments in the valley, drawn to its ample beaver populations in the surrounding foothills and mountains. Early accounts of the area mention antelope, [mule or blacktail] deer, elk, bison, grizzly bears, and bighorn sheep.

John C. Fremont, the army topographer, crossed the northwest end of the Sierra Madre mountains in June of 1844. As he proceeded east around the Sierra Madres, "they began seeing buffalo. On "St. Vrain's fork" (Savery Creek) they killed some bighorn sheep and buffalo...A band of elk was chased from one of these groves. Antelope were running over the hills and herds of buffalo could be seen on the opposite river plains. They also shot some deer. Fremont noted "The country here appeared more variously stocked with game than any part of the Rocky mountains we had visited; and its abundance is owing to the excellent pasturage, and its dangerous character as a war ground." (Dorn 1986)

As they turned south into the Platte Valley, Fremont noted that "Buffalo, antelope, and elk were frequent during the day...We halted at noon on Potter's Fork (the Encampment River) – a clear and swift stream, 40 yards wide, and in many places deep enough to swim our animals and in evening encamped on a pretty stream, where there were several beaver dams, and many trees recently cut down by the beaver. We gave to this the name of Beaver Dam Creek, as now they are becoming sufficiently rare to distinguish by their name the streams on which they are found. In this mountain they occurred more abundantly than elsewhere in all our journey, in which their vestiges had been scarcely seen." (Fremont 1845) They also attempted to lasso a grizzly bear near the Colorado-Wyoming border. (Dorn 1986)

As the party crossed into North Park, Fremont noted the translation of the Indian name for North Park which meant "Cow Lodge" where large numbers of the animals spent the winters: "...in the east rim of the north park or buffalow pen...the Indians call it...here we killed an elk and buffalow... more old plain trails are to be seen here leading into and out of this park than ever I seen on the same ground. Several hundred heads of buffalows are here piled in one pile, a pile of bones on one side of it and a pile of horns on the other side..."

Cherokee Trail diarists noted in June of 1850 that near Twin Groves they “killed two sage hens larger than our hens...we camped near the gap in the mountain...we had fine grass, would and water...plenty of buffalo in sight nearly all the time and antilopes.” (Fletcher, et al )

By the time that the first livestock were herded into the valley, the late 1870s and early 1880s, the last of the buffalo had left the valley.

Dorn summarizes that “the only detectable change is the disappearance of buffalo and grizzly bears sometime between 1844 and 1873. The area looks much the same today as in this earlier period except for the absence or decline of some animals like buffalo, grizzly bear, and bighorn sheep.

## **5) Synthesis and Interpretation:**

From the accounts above, the detectable changes in wildlife are the disappearance of the buffalo, bighorn sheep, and grizzly bear within this watershed. Livestock impacts, although still present, have been reduced, and range conditions on upland and riparian habitats are improving in most areas (USDI-BLM 2002). Antelope, elk, and mule deer are generally thriving, and Wyoming has the largest population of greater sage-grouse in the country. Development in Wyoming has not occurred at the rate that it has in other states; thereby reducing the habitat loss and fragmentation. Native plant species are still present; weeds, although present in some areas, have not taken over large areas of the range. Impacts from off-highway vehicle use and loss of or modification to habitats from developments on private land in mixed land ownership areas continue to increase (USDI-BLM 2002). The lack of fire has led to a predominance of mature to decadent shrubs in some areas. The following analysis specific habitat conditions within the watershed and the effects these may have on wildlife species.

### *Species of Interest or Concern*

#### *Antelope*

The presence of antelope in Wyoming was noted by all of the early explorers and emigrants that moved to or across the state. Antelope are still the most visible and abundant big game species in this area, due to open expanses of a sagebrush dominated landscape. The health of Wyoming big sagebrush communities that antelope depend upon is generally good. High cover and density of shrubs that limit understory species is only observed at higher elevations and precipitation. In this assessment area the antelope crucial winter ranges do not receive enough concentrated animal use to show high utilization rates or severe hedge classes. There appears to be a good mix of winter, summer and transitional habitat to support existing populations and objective levels of antelope. Antelope, being the smallest of the big game species, is probably more susceptible to die-offs during severe winters. However, their reproductive capacity also allows them to respond more quickly after such events to repopulate their habitat.

The presence of woven wire fencing and its effect in hindering or altering antelope movement is the most important issue needing to be addressed. Research conducted in the early 1980's in the Red Desert antelope herd unit showed that woven wire fences were a significant impediment to antelope movement during severe winter weather. Modification of fence corners and other key locations should continue to be part of the annual goals and accomplishments of the Rawlins Field Office, in order to address this issue.

Private land that is developed into home sites could pose impacts, at an incremental rate, on antelope habitat and movement in broken land ownership areas. Informing people about the potential impact to wildlife of these actions may help address this situation, or on a broader scale, exchanging lands to block up public land to maintain wildlife habitat should be pursued.

Livestock management affects antelope in a number of ways in addition to fencing. Sheep compete with antelope for forage; however, sheep use only makes up only 10% of all livestock use currently occurring in the Rawlins Field Office, so this issue is not as important as it would have been 50 years ago. Water development also can affect antelope. The creation of new sources of water has allowed antelope to expand their use into areas that formerly did not have reliable water. On summer range this is a benefit, but increasing seasonal use on winter range may have a negative affect on the vegetative resource. In these latter areas, the use of controllable facilities, like wells, is preferred in order to discourage year-long use of winter range by antelope. The problem of livestock water being turned off when wildlife use is still needed should be addressed on a case by case basis. This may vary depending on the climatic conditions experienced each year, what other water sources are available, and whether animals can move to water sources in other pastures or allotments. BLM sponsored water projects, developed for wildlife, that are in disrepair should be maintained or removed. Interest groups or individuals may be willing to voluntarily oversee and maintain these types of projects.

The Wyoming big sagebrush habitat that antelope depend upon as their principle habitat and forage source is stable and long-lived. While plant succession in this community type is relatively slow, it is occurring and changing over time. For antelope, greater sage-grouse, and other sagebrush obligate species, it is important to maintain healthy stands of big sagebrush, with a diverse mixture of grasses, forbs and shrubs. The use of prescribed fire, natural fire, or chemical treatments and their respective affects in this plant community are currently being studied in this watershed to try and answer some of the questions and improve future management.

### *Elk*

Prior to the arrival of white men, elk were common plains inhabitants, but probably competed with bison for forage and space. At this time, elk are doing well across Wyoming and this watershed area follows a similar trend. Both herd units have current populations that are near or exceed population objectives. This would indicate that elk are thriving, have good reproductive rates, survival rates, and have the habitat to support them. In general, there are no significant problems with any winter or summer ranges that elk utilize. Drier conditions than average may have lowered calf survival rates. Although diet overlap is high between elk and cattle, there appears to be enough forage to provide for the needs of both at current levels of use. As best management practices for cattle continue to be implemented or improved, forage production and availability for elk should be increased. The practice of leaving gates open in pasture fences when they are not needed should also be promoted. In many cases this simple idea could help wildlife passage, especially during severe conditions.

In addition to fences and livestock management, these elk herds are affected by the increasing age and decadence of shrub and woodland communities, especially on crucial winter ranges. The loss of aspen habitat for cover and forage, especially later in the summer when forage in other areas has dried up, has negative impacts on elk. Water developments, improved livestock management, and vegetative treatments could all help improve the habitat for and distribution of elk in this watershed. Within the Pennock Mountain BGCWR, treatment of mountain shrubs has already occurred in 2003. Although heavy grass production and very good bitterbrush re-establishment has been observed, the effects on winter elk use are not fully known at this time, and will probably not be for some time to come.

### *Mule Deer*

Mule deer were common in this watershed historically, and are still common today. Trends in mule deer populations may be highly affected by conditions on crucial winter ranges. Crucial winter range in the Baggot Rocks area exhibits characteristics of unacceptable habitat: shrubs have shown extremely high utilization and hedging, low reproduction and vigor, and overall decadence of stands. Crucial winter range and transition range within the remainder of the watershed, although in some cases not at a desired future condition, has not reached the point that this core habitat has. Poor fawn crops and die-offs during severe winter weather are climate related

factors that can't be altered, but habitat and forage for mule deer are the factors that can be manipulated by land managers. The descriptions for Standards 2 and 3 indicate where improvement could occur, primarily in riparian habitat and shrub and woodland communities on and adjacent to the mountains. The dominance of mature to decadent mountain shrub communities is also affecting mule deer. The use of vegetative treatments or natural fire to promote a diverse mixture of species, age classes, and structure would also benefit mule deer populations. Several areas within and around Barrett Ridge, Prospect Mountain and the Beaver Hills have been treated within the last several years or are scheduled to be treated within the next year or two. Riparian habitat is primarily influenced by cattle grazing. Use of best management practices would improve shrub and herbaceous species important to mule deer.

Development of private lands continues to slowly reduce the available winter range available to mule deer. Fences also impose barriers to mule deer in transition areas, especially during severe weather and also to fawns during the spring and early summer months.

### *Whitetail Deer*

Whitetail deer in the valley are not noted as a high priority species within the valley, and their presence may, in fact, be detrimental to mule deer which are of higher priority. At this time, there are no identified habitat management practices which would be considered solely for the management of whitetail deer. The use of BMPs for grazing management would continue to improve riparian and upland conditions and shrub and herbaceous species important to whitetail deer.

### *Bighorn Sheep*

Prior to the arrival of eastern white settlers, it is apparent that bighorn sheep were common across the Rocky Mountain west, including the entirety of the analysis area. Since the late 1800's, wild sheep have been almost entirely extirpated within this watershed. Transplant attempts in the 1970's resulted in the herds that currently inhabit the two herd units. Initial successes have been followed more recently by static to declining population trends in both units. Trends in bighorn sheep populations across the analysis area that can be influenced by federal vegetation and land management decisions and actions are limited to habitat quality and interactions with domestic livestock. Because of the relative lack of domestic sheep preference within the watershed, direct livestock interactions with wild sheep are not the highest concern at this time, at least on BLM administered public lands. Requests for conversions of cattle preference to sheep use should be addressed on a case by case basis in the watershed, but will be directed overall by national Bureau policy towards domestic/wild sheep interactions. Habitat management and manipulations which affect sheep would be similar to those which would affect mule deer and elk in the valley. The use of vegetative treatments or natural fire to promote a diverse mixture of species, age classes, and structure would benefit bighorn sheep populations. Mechanical treatments can be utilized in order to reverse negative trends and impacts to habitat from encroachment of coniferous species over time. Analysis of the amount, timing, and location of various treatments will be important to ensure that treatments are beneficial, or, at worst, benign towards resident wild sheep populations and habitat. Use of BMPs would improve riparian and upland shrub and herbaceous species important to bighorn.

### *Moose*

Moose, although a relatively recent arrival to the valley, have been demonstrated to be a species of considerable importance, both locally and on a landscape-wide scale. At this time, limited opportunities exist on BLM lands within the watershed to manage directly for benefits to moose, mostly due to a lack of knowledge of the preferred and seasonal habitat selections of this particular population. Overall, BMPs which positively affect riparian and upland vegetation conditions should be beneficial to moose. Encouragement of woody species, especially willows, in riparian drainage bottoms should encourage use of these areas by moose. Additionally, upland vegetation

treatments such as those mentioned previously for mule deer and elk will positively affect moose populations in the affected areas.

### *Turkey*

At this time, the Rawlins BLM Field Office has little experience with management for turkeys and their habitat. Most of the habitat that turkey occupy in the valley lies on deeded river bottom lands towards the bottom of drainages. Where noted on public lands towards the head of the watershed, the birds seem to prefer typical turkey habitat consisting of wooded drainages with good cover and adequate water and resulting herbaceous and succulent forage. BMPs which emphasize healthy riparian areas and encourage water retention in riparian drainages, extend flow periods, and raise water tables should encourage habitat desirable to these birds.

### *Raptors*

Raptors are primarily affected by climate (indirect affects on prey species) and human activities around nesting and perching areas. Ferruginous hawks and to a lesser extent golden eagles, will sometimes nest on or near man-made structures such as windmills, and old corrals buildings; or in areas with high levels of activity. Artificial nests are used to draw the birds away from these sites so that human activities do not force the abandonment of active nest sites. These artificial nests have also been documented to be more productive in terms of the number of birds fledged per nest compared to natural sites. Within the Rawlins Field Office, there are currently 101 artificial nest sites, with about 50% being actively used, none of which are currently located in the assessment area. The BLM has a timing stipulation for raptors attached to any proposed project that is located within  $\frac{3}{4}$  of a mile to one mile (depending on each species) from any nest, which prohibits surface disturbing and other activities from occurring between February 1 and July 31. In addition, the Bald Eagle and Golden Eagle Protection Act, 16 U.S.C. 668, prohibits knowingly taking, or taking with wanton disregard for the consequences of an activity, any bald or golden eagles or their body parts, nests, or eggs, which includes collection, molestation, disturbance, or killing. The ferruginous hawk, northern goshawk and burrowing owl are BLM-State Sensitive species that are found within this watershed, while the peregrine falcon has the same status and has the potential to occur within this watershed.

### *Threatened, Endangered, Proposed, and Candidate Species*

The threatened, endangered, candidate, and proposed species that have the potential to occur within this watershed include the bald eagle, Canada lynx, Ute ladies' tresses (threatened); and black-footed ferret. The North Platte River species (least tern, pallid sturgeon, piping plover, whooping crane, Eskimo curlew, and Western prairie fringed orchid) are not actually physically located within this watershed; however, water depletions that occur within the North Platte River system, and within this watershed, may cause an impact to these downriver species. The BLM wildlife biologists complete informal and/or formal conferencing and/or consultation with the Service for all proposed projects that may contain habitat, or the species themselves, to avoid adverse impacts to threatened, endangered, candidate, and proposed species.

### *Threatened Species*

There are known bald eagle nests located within this watershed area and birds are commonly observed along the North Platte River. According to the Wyoming Game and Fish Department Bald Eagle Completion Report of 2002, the population of bald eagles statewide has continued to increase. In 2002, there were 95 pairs of bald eagles that produced 98 young in Wyoming (WGFD 2002d). Bald eagles are most commonly observed using cottonwood woodland habitat along major rivers. The majority of the habitat type within the RFO is located on private, state, and BOR administered lands. Bald eagles observed using BLM administered public lands are usually found scavenging big game or other wildlife carcasses in wintering areas. The BLM has a timing stipulation attached to any proposed project that prohibits surface disturbing and other activities from occurring between February 1 and

July 31. This stipulation is attached to any project or activity that is located within one mile of a bald eagle nest. Generally, projects are not located beneath or even close to bald eagle nests; therefore, there should not be any impacts to nesting bald eagles as a result of authorizing actions on BLM-administered lands. In addition, the BLM has a winter raptor timing stipulation that prohibits surface disturbing and other activities from occurring between November 15 and April 30 for the protection of winter concentration areas.

The Canada lynx may travel through the watershed and use woodland and adjacent riparian habitats. The closest known lynx populations occur in the Colorado Rocky Mountains to the south and in the Wind River Mountains to the northwest. In general, there should not be any impacts to dispersing Canada lynx as a result of authorizing actions on BLM-administered lands.

The Ute ladies' tresses has not been specifically identified within this watershed. The only known locations within the State of Wyoming are located in Converse, Goshen, Laramie, and Niobrara counties at elevations between 5,000 and 6,000 feet. However, since the plant has been located in adjacent states, the Service believes it may occur in more locations within Wyoming. Site specific field investigations occur for all projects; therefore, the Ute ladies' tresses will be surveyed on any project that may be located within or near riparian habitat.

### *Endangered Species*

The black-footed ferret has the potential to occur within the watershed. Since ferrets inhabit prairie dog towns, these sites are identified and delineated over broad areas or on a site specific project basis. All proposed projects have a field site investigation completed prior to disturbance to determine if suitable habitat for the ferret exists. Projects are located outside of suitable habitat or black-footed ferret surveys are completed to determine the presence or absence of ferrets. The BLM biologists informally or formally consult with the Service when black-footed ferret surveys are completed. There have not been any black-footed ferrets found in any surveys that have been conducted within this assessment area. In general, there should not be any impacts to the black-footed ferret as a result of authorizing actions on BLM-administered lands.

### *BLM State Sensitive Species*

Protection measures for BLM-State Sensitive Species, other than those required for raptor, mountain plover and greater sage-grouse, have not been identified in the RFO area. The Migratory Bird Treaty Act, 16 U.S.C. 703, enacted in 1918, prohibits the taking of any migratory birds, their parts, nests, or eggs except as permitted by regulations and does not require intent to be proven. This Act and its regulations should protect the white-faced ibis, long-billed curlew, sage thrasher, loggerhead shrike, Brewer's sparrow, sage sparrow, and Baird's sparrow from actual destruction of the nests and or the bird itself. Habitat loss and/or degradation are more difficult to measure and mitigate for these species. The long-eared myotis, fringed myotis, spotted bat, and Townsend's big-eared bat usually inhabit caves, rocky outcrops, and abandoned buildings. Again, habitat loss and/or degradation are more difficult to measure and mitigate for these species. Wildlife biologists monitor white-tailed prairie dog towns for potential black-footed ferret habitat and protect these habitats by moving projects outside of the towns. There are occasions when a project may be constructed within white-tailed prairie dog towns after the towns are surveyed for black-footed ferrets and no ferrets or their parts are observed. Generally, project proponents are encouraged to move the projects outside of existing white-tailed prairie dog towns, not only for the protection of the prairie dogs themselves, but for other species such as the mountain plover and burrowing owl that depend on the prairie dog town ecosystem. The swift fox may travel through the watershed and should not be impacted by proposed projects that occur as a result of implementing BLM-authorized actions. A field site investigation is completed for all proposed projects and the BLM-State Sensitive plant species can be monitored at that time, and/or their likelihood of occurring should be noted in the event that additional field site investigations are required.

## *Greater Sage-Grouse*

The greater sage-grouse is commonly found throughout the watershed area. Although Wyoming has a healthy but declining population of this species, there are opportunities to improve both upland and riparian habitats used by these birds. In many areas, existing grouse habitat exhibits reduced species diversity, forb abundance, and lacks sufficient residual cover for high nesting success. Greater sage-grouse habitat recommendations developed for Wyoming, which are based on research conducted within Wyoming, can be used for assessments to determine current conditions and where the need exists for vegetative treatments. Reclamation efforts should also receive more attention in terms of how they are completed, so that benefits to grouse can be maximized. In particular, the use of more forbs, including succulent species, should be considered in seed mixtures. Summer and fall brood-rearing habitat is especially dependent on riparian habitat, which is most influenced by livestock management. Stream segments that are in degraded condition are also not likely to provide high quality habitat for sage grouse. Implementation of livestock grazing BMPs would improve the use of both riparian and upland habitats for greater sage-grouse. Creating new water sources for wildlife use and operating livestock water sources for wildlife when livestock are not present are two other methods of improving habitat use by grouse. Because of the increased habitat available, the dispersion of grouse throughout an area may reduce losses due to predation. Another tool the BLM uses is a timing stipulation attached to any proposed project that is located within two miles of a lek that prohibits surface disturbing and other activities from occurring between March 1 and June 30 for the protection of strutting and nesting greater sage-grouse. Generally, projects are not constructed within ¼ mile of an identified lek; and proposed projects should be moved as far away from an active lek as possible. The timing stipulation reduces impacts to breeding and strutting grouse; however, the two mile buffer has been debated by wildlife biologists. Recent research conducted within Wyoming indicates that only 64% of the hens nest within this two mile buffer. Suitable nesting habitat may be selected as far away as 20 miles from the lek. Because of this, suitable nesting habitat should be mapped in association with leks, in order to allow management of all nesting habitat available to the hens, not just within two miles of lek locations. The BLM has a winter greater sage-grouse timing stipulation that prohibits surface disturbing and other activities from occurring between November 15 and April 30 for the protection of winter concentration areas.

### **6) Recommendations:**

Habitat needed to support healthy wildlife populations and listed or proposed threatened and endangered species is generally in acceptable condition. This does not mean that there aren't problems or concerns about wildlife habitat. The discussion under Standard #2 – Wetland/Riparian Health and Standard; #3 – Upland Plant Health; outlines the current conditions and recommendations for improving management of these resources. Although an area may meet a standard, it still may not be at our “desired or future” condition. On the other hand, our composition of native species is good, with some weed problems at this time. Due to the existing good condition of native vegetation and its ability to support the diverse wildlife populations we currently residing in the watershed, it is determined that the majority of Upper Platte assessment area is meeting Standard #4 with respect to wildlife. Two specific areas fail Standard #4 with respect to wildlife: The crucial winter range for mule deer in the Baggot Rocks area fails due to the preponderance of overly mature to decadent shrub species coupled with the high amounts of utilization on these species during the critical winter period by mule deer herds which migrate to the area from throughout the valley (2,160 Acres.) The crucial winter-yearlong range for bighorn sheep in the Encampment River Canyon fails due to the predominance of cheatgrass on steep, south-facing slopes throughout the drainage and its tributaries, which has virtually converted the habitat in much of the area to poor quality forage (6,700 Acres.) These areas are also referenced in Standard 3 – Uplands. The following recommendations address actions to address these deficiencies, as well as to help meet future desired resource conditions in other habitat throughout the assessment area.

Implement recommendations described for Standards #2 and #3. Improving the health of riparian/wetland and upland plant communities will help meet the needs of all wildlife, which use this watershed.

## Species of Interest or Concern

### *Antelope, Elk, Mule Deer, White-tailed Deer, Moose, and Turkey*

Management actions within mule deer crucial winter range in the Baggot Rocks area will emphasize improvement of this habitat as one of the primary considerations. An area-specific assessment of this region should be considered in order to determine what management actions may be necessary to move this habitat towards the standard for healthy wildlife habitat. Cooperative management actions should be implemented involving livestock permittees, the BLM, and the WGFD in order to coordinate benefits to multiple public lands resource uses.

Throughout the assessment area, continue to modify existing woven wire fences and older cattle-type fences to meet BLM standards. This should be accomplished in key locations in the short-term, while working towards all fences in the long-term. Cooperative efforts should be pursued with grazing permittees, WGFD, and conservation districts. When possible, relocate or remove fences to reduce impacts to wildlife movements. Encourage livestock permittees to leave gates open through as much of the fall through spring seasons and/or when not needed, in order to help wildlife move between seasonal ranges. Documentation of locations where fences are affecting big game movements should continue. Construct new fences to BLM standards for controlling livestock in habitat occupied by the affected big game. New fence locations should attempt to avoid highly traveled concentration areas or migration paths. If avoidance is not possible, management practices such as sections of let-down, drop panels, or pole-tops should be incorporated into fence designs to facilitate wildlife passage.

Management plans should consider other grazers, such as wildlife in making recommendations and to properly assess impacts. Water developments should benefit as many species as possible, and should consider sustaining water in the summer, even after livestock have been moved. In winter ranges, projects should be controllable (ephemeral) in nature, to not encourage year-round wildlife use. Isolated water sources and associated riparian habitat should be protected and managed to meet the needs of wildlife. Monitoring information, particularly trend data for big game crucial winter range, should be coordinated with the WGFD for use in evaluating and changing herd objective levels.

Continue to implement vegetative treatments in shrub and woodland habitats to improve the diversity of cover, species, age-class, vertical structure, and mosaic mix of plant communities. Management efforts should also emphasize the use of naturally ignited fires to benefit resource values in accordance to preplanned conditions and objectives outlined in a Wildland Fire Implementation Plan. Monitor the effects for all treatment projects, to document and analyze results and improve future prescriptions to achieve management objectives. Utilize habitat recommendations for greater sage-grouse and other species where available in both assessing and planning habitat treatments. Begin to implement mechanical treatments to a greater extent where prescribed burns or chemical treatments are impractical, in order to stimulate native, desirable, or obligate species and remove late seral increaser species such as juniper in riparian systems and aspen woodlands. Begin to implement mechanical treatments in other upland woodland types where increaser species have established and/or become dominant. Encourage the development of interagency long-term habitat treatment plans (WGFD 2004b). Coordinate vegetation treatments in critical wildlife habitat with the WGFD so that the determination can be made to change herd objective levels if significant amounts of habitat are temporarily modified, and critical forage is reduced in the short-term.

Evaluate the need and institute measures where necessary to reduce disturbance to big game species on crucial winter ranges, or other habitat areas where needed. This could involve seasonal closures of roads, seasonal closures of habitat for antler collecting, general off-highway vehicle use, and other activities. Private landowners should be encouraged to leave their lands unfenced, or use fence designs that are compatible with big game movements (WGFD 2004a).

Develop a comprehensive, cooperative grazing plan for the Pennock Mountain BGCWR including infrastructure necessary for implementation, if it is to be used for domestic livestock grazing in addition to winter habitat for elk. The management plan should be cooperative in nature, and should include guidelines for determining (1) if the unit is to be used by domestic livestock, (2) under what circumstances will domestic livestock be allowed to utilize the unit, and (3) how that use will be made.

### *Bighorn Sheep*

Although the critical winter habitat for bighorn sheep in the Encampment River Canyon fails the standard for wildlife habitat health, recent policy shifts which de-emphasize this herd unit preclude placing a priority towards management actions specifically designed towards enhancement of wild sheep in this area. Additionally, the predominance of invasive species (cheatgrass) within past habitat enhancement projects in the canyon and its tributaries tends to discourage similar future treatments. Management actions within this habitat should stress the improvement of uplands and riparian areas in this area for the benefit of the overall vegetation component, rather than species-specific objectives. Analysis of management actions in this area should determine the best course of action *which will not negatively affect* bighorn sheep or their habitat within the habitat to the benefit of any other use. Cheatgrass treatment should be considered throughout the area where possible, by the best, most practical methods available to the manager at the time. Any management actions considered for vegetation, watershed, or riparian enhancement in this area should be analyzed to ensure that cheatgrass infestations are not spread to new areas within and outside of this habitat as a result. BMPs for livestock grazing should be considered for this area, with the primary objective of riparian habitat enhancement, which is the resource most impacted by current grazing practices (refer to Standard 2 – Riparian/Wetlands.) BMPs and specific management recommendations outlined previously for elk, mule deer, antelope, et. al., will also benefit bighorn sheep in this area and should be implemented where possible.

Habitat for bighorn sheep in the Douglas Creek Herd Unit, although not failing the standard for wildlife habitat, in many cases does not necessarily meet the desired future condition ideal for this species. Mixed mountain shrub habitat within this seasonal habitat should be considered for treatment in order to enhance the health of the vegetation overall in the area, and the methods employed (specific to the treatment) should be designed so that importance is placed on objectives which emphasize benefits to bighorn sheep habitat (i.e. maximize mosaics, enhance edge effect, enhance herbaceous and bitterbrush production following treatment, etc.) Additionally, mechanical treatments which enhance riparian and upland woodlands by creating a more natural, early seral vegetation community dominated by desirable shrubs and aspen should be stressed. Opportunities to influence vegetation communities in this area through treatment, implementation of livestock grazing BMPs, or other methods should be considered and pursued on a cooperative basis with willing partners regardless of the landownership pattern or political boundaries. BMPs and specific management recommendations outlined previously for elk, mule deer, antelope, et.al., will also benefit bighorn sheep in this area and should be implemented where possible.

### *Raptors*

The BLM should continue to use the seasonal restriction stipulation for breeding and nesting raptors which prohibits construction and other activities from occurring between February 1 and July 31. In addition, the BLM should continue to use the seasonal restriction stipulation for identified raptor winter habitat areas which prohibits construction and other activities from occurring between November 15 and April 30. Monitoring efforts should continue, in order to determine the activity status of known raptor nests and to identify new nest locations.

### Threatened, Endangered, Proposed, and Candidate Species

#### *Bald Eagle*

The BLM should continue to use the seasonal restriction stipulation for breeding and nesting bald eagles which prohibits construction and other activities from occurring between February 1 and July 31. In addition, the BLM should continue to use the seasonal restriction stipulation for bald eagle winter habitat areas which prohibits construction and other activities from occurring between November 15 and April 30.

#### *Black-footed Ferret, Canada Lynx, and Ute Ladies' Tresses*

The BLM should continue to complete informal and/or formal consultation with the Service for any proposed project that may be constructed within potential black-footed ferret habitat. Identified stipulations will be attached to all projects to avoid adverse impacts to the species.

#### *North Platte River Species: Least Tern, Pallid Sturgeon, Piping Plover, Whooping Crane, Eskimo Curlew, and Western Prairie Fringed Orchid*

The BLM should continue to identify any proposed project that may cause depletions within the North Platte River system and should initiate formal consultation with the Service for each proposed project. Projects should not be implemented until after formal consultation has been completed.

### BLM State Sensitive Species

#### *Greater Sage-Grouse*

The BLM should continue to use the seasonal restriction stipulation for breeding and nesting greater sage-grouse which prohibits construction and other activities from occurring between March 1 and June 30 of each year. In addition, the BLM should continue to use the seasonal restriction stipulation for greater sage-grouse winter habitat areas which prohibits construction and other activities from occurring between November 15 and April 30 of each year. The WGFD should continue to delay the opening date of the grouse hunting season to the middle of September, as well as maintaining a short open season, which should reduce hunter numbers and harvest. This delay reduces the vulnerability of grouse, particularly productive hens, by delaying harvest until after broods have broken up flocks and moved from the easily hunted riparian habitats into the more difficult open sagebrush (WGFD 2003e). Implement (or continue) management and projects to improve greater sage-grouse habitat, including nesting cover and species diversity and age class structure in upland and riparian habitat (particularly forbs). Continue monitoring habitat trends and grouse use where possible before and after projects have been implemented.

## **Fisheries**

### **1) Characterization**

#### **Regionally or Locally Important Recreational Fisheries:**

Recreational fisheries within the assessment area that include significant portions of BLM-administered lands include the North Platte River, Encampment River, Big Creek, and Miner Creek and several small impoundments. These fisheries afford the opportunity to catch several species of salmonid fishes (i.e., trout), including brown trout, rainbow trout, and brook trout. These fisheries represent a somewhat limited resource in this arid region of Wyoming. Specifically, the North Platte River, Encampment River, and Big Creek receive significant use within the assessment area and therefore are a priority for the BLM and cooperating agencies.

### **2) Issues and Key Questions**

#### **Vegetation Management**

The potential impacts of livestock grazing on stream processes and fish habitats have been well documented (Armour et al. 1991, White 1996, Rinne 1999). They include the loss of stabilizing riparian vegetation which can lead to stream instability and an associated loss of habitat complexity, the loss of shading vegetation which can lead to elevated stream temperatures, increased sediment delivery, and loss of stream channel complexity provided by fluvial processes and woody debris.

The importance of landscape-scale disturbances resulting from either wildfire or prescribed fires to aquatic species and riparian ecosystems has recently received additional attention (Bisson et al. 2003). Natural disturbance regimes maintain the diversity of riparian ecosystems (Naiman et al. 1993). These disturbances can include fire and fire-related flooding, debris flows and landslides (Dwire and Kauffman in press). Additional riparian influences result from the vegetative responses to fires outside the riparian zone. A key example of this influence is the regeneration of quaking aspen that can result from the top-killing of aspen during a fire. The regenerated aspen are then available for instream uses by beaver.

#### **Beaver Habitat**

Beaver activity can have several benefits to aquatic ecosystems including elevated water tables that enhance riparian vegetation, reduction of stream water velocities that reduce erosional forces, stabilization of stream flows throughout the summer and droughts, improvement of fish habitats, improvement of terrestrial wildlife habitats (Olsen and Hubert 1994). The historic distribution of beaver colonies throughout the assessment area is unknown, but was likely correlated to areas containing healthy communities of willow or aspen. Limited availability of aspen and willow in the majority of the assessment area is thought to currently limit the suitability of the area for beaver colonization. This loss of woody vegetation can be related to many causes including livestock grazing, herbicide spraying, conifer encroachment, fire suppression, and wildlife grazing. A negative feedback mechanism often exists between the loss of woody vegetation and the water table of riparian systems. As woody vegetation is lost, the stream channel can become unstable and begin to actively incise. As this incision proceeds, the water table can be lowered and result in a reduction in the amount and area of woody vegetation available for beaver use.

#### **Energy Development**

Energy development activities are currently limited throughout the assessment area and are not thought to significantly affect fish habitats.

## Transportation and Access Planning

Roads can affect fish populations through fragmentation of habitats at road crossings, concentration of overland flow which can result in stream channel adjustments, and increased sediment delivery. Fragmentation of stream habitats can limit access to habitat features that are required by stream fishes. Stream fishes require habitats for spawning, rearing, feeding, and refuge from environmental extremes (Schlosser and Angermeier 1995). The spatial distribution of these required habitats can necessitate the seasonal movement of fishes among habitats. If barriers to movement are present, such as those caused by improperly designed road crossings, fish may not have access to all of the habitats necessary to fulfill their life history requirements. Additionally, barriers can interrupt metapopulation dynamics that allow for the recolonization of habitats that have experienced local extirpations.

Roads can also concentrate overland flow. This concentration of flow may generate greater water velocities that are foreign to the stream channel. The stream channel can, in turn, adjust to these increased velocities by changing its geometry through erosional processes such as channel incision.

Additional impacts of roads on fish communities are associated with increased sedimentation. The concentration of overland flow and increased rill and gully erosion associated with roads can affect required fish habitats. Increased sediment delivery to the stream can lead to the embedding of stream gravels. Some stream fishes, such as trout species, require clean gravels for successful reproduction. Clean stream gravels are also necessary for the production of macroinvertebrates – a key food source for many stream fishes.

Public access to popular recreational fisheries such as the North Platte River remains limited throughout the assessment area. Public demand for access to recreational fisheries continues to increase within the Platte River Valley. Though the pursuit of additional access points has remained a priority, additional interest in private land easements or acquisition of access through land trades is needed to meet public demand.

An example of a North Platte River access road currently affecting both sedimentation rates and public access is the Prospect Mountain Road. Incorporation of appropriate design criteria to limit erosion and increase its effectiveness and safety as an access road to the North Platte River would be a benefit to both fish habitats and recreationists.

## Invasive Species

On February 3, 1999, Executive Order 13112 on Invasive Species was signed. This order directed federal agencies to:

“use relevant programs and authorities to: (i) prevent the introduction of invasive species; (ii) detect and respond rapidly to and control populations of such species in a cost-effective and environmentally sound manner; (iii) monitor invasive species populations accurately and reliably; (iv) provide for restoration of native species and habitat conditions in ecosystems that have been invaded; (v) conduct research on invasive species and develop technologies to prevent introduction and provide for environmentally sound control of invasive species; and (vi) promote public education on invasive species and the means to address them...” as well as “...not authorize, fund, or carry out actions that it believes are likely to cause or promote the introduction or spread of invasive species in the United States or elsewhere unless, pursuant to guidelines that it has prescribed, the agency has determined and made public its determination that the benefits of such actions clearly outweigh the potential harm caused by invasive species; and that all feasible and prudent measures to minimize risk of harm will be taken in conjunction with the actions.”

Introduced pathogens of concern in the assessment area include *Myxobolus cerebralis*, which can cause whirling disease in salmonid fishes, and Chytrid fungus, which can impact amphibian populations. Whirling disease is a parasitic infection that attacks the nerves and cartilage of small trout, reducing their ability to feed and avoid predators. These infections can significantly impact wild trout populations. The parasite responsible for causing

whirling disease is known to occur at locations in the North Platte River drainage within the assessment area. Chytrid fungus has been cited as a major cause of declines in amphibian populations. Chytrid fungus attacks keratin of metamorphosed amphibians and can lead to 90-100% mortality in some species. The Boreal Toad Recovery Team (BTRT) has cited Chytrid fungus as a major concern in the southern Rocky Mountain population (BTRT, 2001). The occurrence of Chytrid fungus has not been documented in the assessment area. Both of these pathogens can be transported via contaminated waders or other equipment.

Invasive species of concern in the assessment area include zebra mussel and New Zealand mud snail. Zebra mussels have become widely distributed in the United States, particularly east of the 100<sup>th</sup> meridian. These exotic mussels have recently been discovered as near as Colorado, likely the result of overland transport by trailered boats. These mussels can be found in large lakes, ponds, and river systems throughout their range in the U.S. A major transport mechanism of these mussels is through attachment to boats and trailers. New Zealand mud snails appear to prefer flowing water habitats with stable flows. Springs, spring creeks, and river sections downstream from dams are all places that they thrive in. They are most typically found on larger cobble substrates or on pieces of wood. These snails are known to occur in the Great Lakes region, as well as in isolated regions of the west, including Yellowstone National Park. New Zealand mud snails can be transported with fishing waders or other equipment that has been exposed to infected waters. The dispersal of these snails has been associated with recreational fisheries exhibiting high angler use. Neither the zebra mussels nor the New Zealand mud snails are currently known to occur in the analysis area and preventing their spread into this region will be particularly challenging.



Figure 1. Zebra mussel. Actual size is approximately  $\frac{3}{4}$  inch.



Figure 2. New Zealand mud snail.

The spread of several invasive species has been contributed to transport via anglers. Education of the angling community in relation to effective disinfection procedures has proven a difficult undertaking to many State and Federal resource management agencies.

Nonnative fishes have been introduced and become naturalized in much of the assessment area. Their impact on native fishes is not fully described in this area. As in other areas of the West, the use of desirable nonnative fishes for their recreational and aesthetic values will need to be balanced with the needs of native fishes. Emphasis should be placed on managing habitats for a diversity of fishes, including providing habitats for native and desirable nonnative fishes.

### **3) Current Conditions**

Fish habitat investigations have not been recently completed for recreational fisheries within the assessment area. Though PFC and riparian reference reach assessments do not specifically constitute assessments of fish habitat conditions, they are useful to determine the stability of riparian and wetland systems. See Standards 2 and 5 for accounts of riparian habitat conditions. Subsequent investigations will be necessary to describe stream or wetland conditions that may be limiting the productivity of specific fisheries.

### **4) Reference Conditions**

References to historical stream conditions are limited. See Standards 2 and 5 for historical accounts of stream habitat conditions. Distributional changes of native fishes east of the Continental Divide were recently assessed by Patton et al. (1998).

### **5) Synthesis and Interpretation**

The assessment area contains several aquatic resources. These include regionally and nationally important recreational fisheries such as the North Platte River, Encampment River, Big Creek, and several small impoundments. The importance of these fisheries to the local economy and to the quality of life of the citizens of the area is significant.

The description for Standard 2 (Riparian/Wetland) also applies in most cases to fisheries. Based on results from Standard 2, livestock grazing is the principle factor affecting riparian and wetland systems in the assessment area. Changing the season of use and/or shortening the duration of use are two methods for improving fish habitat conditions within streams affected by livestock grazing. As streams improve in vegetative condition, instream habitat complexity increases, water flows improve, and water temperatures decrease, all of which are more likely to be supportive of coldwater game species such as trout.

Baseline inventory information is lacking for native species of fish and wildlife throughout much of the assessment area. Though some broad-scale inventories have been conducted to identify trends in populations of native fishes in Wyoming (Patton et al. 1998), site-specific information required for effective land management is presently lacking.

## **6) Recommendations**

The improved management of riparian habitats through the use of grazing BMPs indicates both an upward trend and meeting Standard #4 for fisheries for some of the streams in the assessment area. Standard #4 for fisheries is not being met on streams which currently fail Standard #2 – Riparian/Wetland. There are also sites that are rated in proper functioning condition, but lack specific habitat components required by fishes. However, these sites have not yet been defined. Describing the condition of aquatic systems using methods that incorporate the habitat requirements of fishes should be a priority.

There are currently no special status native fish species known to occur within the assessment area, though additional investigations would be required to assess the distribution and status of native fishes. Completing inventories for native fishes and native amphibians, including boreal toads, should be a high priority for the fisheries program in coming years in order to identify site-specific land management opportunities for these species. Whether Standard #4 is being met for native fishes and amphibians or not remains unknown.

### **Vegetation Management**

In areas not meeting Standard 2, implement allotment management plans that will provide the amount of vegetation necessary to ensure adequate watershed protection under grazing use to perpetuate vegetation, enhance woody plant vigor, and assure soil stability.

### **Transportation and Access Planning**

Designing road crossings that simulate natural stream processes would allow for the passage of aquatic organisms and allow stream fishes to move freely among required habitats. This can be accomplished by using a number of designs including bridges, bottomless culverts, and baffled culverts. Several references are available to help in this design process. Road designs should also consider appropriate energy dissipation in order to limit the concentration of overland flows and resulting sedimentation.

The design of an effective transportation network within the assessment area that considers the effects of road design criteria on fish habitat conditions and the benefits of increased public access to popular recreational fisheries should become a major focus of land management activities within the assessment area.

### **Invasive Species**

Avoiding the transportation of invasive species to new habitats should be considered a high priority for the Rawlins Field Office. Angler use and, therefore, the potential for angler movement of invasive species are at their greatest within this portion of the RFO. The BLM's opportunities to educate anglers about the problems associated with invasive species and appropriate disinfection procedures also have their greatest potential within this portion of the

RFO. The use of interpretive sites at access points along the North Platte River, Encampment River, and Big Creek to provide the angling public with information relative to invasive species represents the Rawlins Field Office's greatest potential to control the spread of invasive aquatic species.

As the distribution of invasive species is not fully known, disinfecting equipment and materials that have been used in riparian or wetland environments should be considered standard precautions for BLM operations. All programs should use the chlorine bath maintained by the fisheries crew for disinfecting their equipment and materials before they are used in a new location. Instructional Memorandum No. WY-030-99-007 outlines required disinfection procedures for the Rawlins Field Office.

## Weeds

### 1) Characterization:

Weeds, invasive non-native plants, ecologically threaten natural ecosystems and greatly impact natural plant communities throughout the West. The reduction of light, water, nutrients, and space available to native species can change the hydrological patterns, soil chemistry, erodibility, and may even change fire patterns on a localized basis (NPS ref). These invaders can reduce biodiversity, affect threatened and endangered species, change habitats and natural plant/animal associations, and prevent native species from remaining or encroaching upon a site. Weed infestations reduce forage availability for livestock and wildlife. Unlike many areas of the West, the Rawlins Field Office has a comparatively smaller weed problem than other areas in the Rocky Mountain region. The analysis area is relatively noxious weed free, with just small problem areas. The term *noxious* is a legal designation used specifically for plant species that have been determined to be a major threat to agricultural and/or natural ecosystems and are subject, by law, to certain restrictions. Invasive species include those that increase and invade disturbed areas, may or may not be able to invade native rangeland, and include noxious species. Within the analysis area, noxious and invasive species are predominantly found along roadways and other disturbed areas, and perennial waterways associated with recreational use, agriculture, and animal grazing activities. Road building, development, grazing, fire suppression, recreation, and other activities can directly increase weed establishment, introduction, and/or maintain their presence within the ecosystem.

The main noxious species present within the area are leafy spurge and musk thistle. Other noxious species include Canada thistle, spotted knapweed, Dalmation and yellow toadflax, Russian knapweed, Houndstongue, and saltcedar. There are also several invasive species present which are normally restricted to disturbed areas. These include Russian olive, Russian thistle, gumweed, cheatgrass, bull thistle, cutleaf nightshade, wild licorice, and several annual mustards. Most invasive species are not treated.

### 2) Issues and Key Questions:

The area is seeing an expansion of noxious and invasive weed species. Current issues in the assessment area follow:

- Noxious weeds and invasive species are spreading into undisturbed rangeland from the initial sites of introduction along many roadsides, livestock water developments, fishing access points, campgrounds, and other disturbed areas.
- Adequate mitigation measures are in place to address weed control on disturbed areas; however, enforcement of existing stipulations is spotty.
- Some private landowners adjacent to BLM land, especially in the intermixed land pattern areas, have yet to implement noxious weed management programs, thereby negating some of the potential effectiveness of treatments on BLM lands.
- Livestock movements are increasing weed presence in some allotments and more direct action is needed.
- Recreation is a factor in weed establishment and spread along the river and more direct action is needed.
- There are no reasonable measures available to control wildlife movements that spread weeds.
- Budget constraints do not allow for the treatment of all areas with weed infestations.

### 3) Current Conditions:

Weed locations are primarily restricted to disturbed areas associated with roads, irrigation, recreational use, and livestock grazing activities such as water developments. There are many areas where the noxious weeds are spread

throughout native rangeland. Some of these areas are being treated to contain the weeds where they are. A goal is to avoid having them spread elsewhere by vehicle, equipment, water, or animal movements. Most Federal, State, and county improved roads are being treated for weeds.

As stated earlier, the principle noxious species found within the analysis area include leafy spurge and musk thistle.

Leafy Spurge is a perennial, up to three feet tall, which grows basically anywhere (photo 86-1). It is highly competitive and extremely difficult to manage. Spurge contains milky latex, an irritant that causes lesions around the mouth and eyes of cattle when ingested. Spurge occurs along the North Platte River corridor and to the east; most is being treated. Wildlife appear to spread the spurge and are carrying it up from the river. This is observed along draws and shrub patches in small amounts of an acre or less in size. Altogether there are (at this time on BLM lands) an estimated known 300 acres of leafy spurge scattered in this analysis area which are aggressively growing that do not meet this standard, some of which are not being treated.

Musk thistle is a biennial up to six feet tall which also grows basically anywhere (photo 86-2). It spreads rapidly, forming dense stands which crown out other plants. The flowers are readily eaten by most wildlife and livestock, and, together with the wind, help spread this plant. Most heavily infested areas on BLM lands have been treated with chemicals and/or insects released in the mid 1990s. There is one area which has not been treated yet, at the Black Hall wildfire site of 2000 (photo 86-3). This site is estimated at 1100 acres and does not meet this standard, with another estimated 1500 to 2000 acres with scattered plants.

Other noxious species present in the analysis area are:

Canada thistle occurs in and along riparian habitat, and in some cases along roads where runoff water accumulates. As long as the riparian habitat is being properly managed, Canada thistle is not expanding and occupies the niche between the riparian and upland habitats. Canada thistle occurs basically throughout the assessment area and is treated along most main roads.

Spotted knapweed is a biennial or usually a short-lived perennial, up to three feet tall. It grows along roadsides, disturbed areas, and dry rangelands, especially liking bitterbrush/bunchgrass communities on light, well-drained soils. Spotted knapweed occurs in one known location south-east of Saratoga and has had mechanical treatment. This area encompasses approximately 1/2 acre in Bennett Peak campground; and approximately 200 acres are at risk from infestation. It is being spread by vehicles along roads and wildlife up from the roads coming off the Forest Service and private lands around Brush Creek/Ryan Park/Cedar Pass/Kennedy Peak, and Saratoga Lake.

Dalmation toadflax is a mildly poisonous perennial up to three feet tall, and yellow toadflax is a perennial up to two feet tall, both of which reproduce by seed and underground root stalks. They are very aggressive, with a deep root system, which render them very difficult to eradicate. Dalmation usually prefers well-drained, relatively coarse-textured soils with low precipitation or soil disturbance. Yellow prefers more fertile, moister soils. Toadflax can establish in naturally occurring disturbances or small openings in pristine areas and on rangeland in excellent condition. Once growth begins, condition of the rangeland does little to slow expansion of the infestation. Toadflax is commonly sold to flower gardeners and then may spread elsewhere. Dalmation toadflax occurs in one area and is being treated. Yellow toadflax occurs in eight known locations on BLM lands and is not being treated at this time. Eight acres fail to meet the standard.

Russian knapweed is a poisonous perennial, which forms dense colonies (photo 86-4). It spreads by seeds and adventitious roots that can penetrate up to eight feet, it is allelopathic, and is toxic to horses. Russian knapweed is known to be found in one general area west of Saratoga in the assessment area and is not on BLM lands, yet. Most of the patches in this area are not presently being treated and are expanding.

Houndstongue is biennial growing up to three feet tall and is poisonous to all classes of livestock (photo 87-1). It has alkaloids which cause liver cells to stop reproducing. It occurs in one general area along the Snowy Range road and irrigation ditches putting approximately 160 acres of BLM lands at risk.

Saltcedar is a deciduous shrub introduced from Eurasia as an ornamental. In many places it has become naturalized along streams and reservoirs and tends to form monocultures that limit biodiversity. Saltcedar can transpire up to 200 gallons of water per plant each day and can dry up ponds and streams. In addition, they bring large amounts of salt up from the soil and deposit it on the surface, thus rendering adjacent sites uninhabitable by native species. This shrub is difficult and expensive to control. It occurs in one known remaining patch (less than one acre) in the analysis area, above Cedar Breaks, which will be treated summer of 2005. One other site has been treated and has not re-grown.

The invasive species of concern are Russian olive, Russian thistle, gumweed, and cheatgrass. Other invasive species include bull thistle, cutleaf nightshade, wild licorice, and several annual mustards. Russian olive is a fast-growing tree found in isolated patches along the river and some reservoirs. Gumweed is native but excels in disturbed areas, especially during dry times. It can form nearly pure stands along roadsides and is unpalatable forage for all animals. Cheatgrass occurs sporadically throughout the assessment area (photo 87-2). Disturbed areas along roads, corrals and salting sites are common locations. However, it can also be found on rangelands on well-drained, disturbed soils, particularly on south and west facing slopes. Annual mustards and Russian thistle occur along disturbed roadsides throughout the area. These generally are not large-scale problems, but patchy ones. Most invasive species are not treated unless they are interfering with reclamation of disturbances or are a potential safety or access hazard around campgrounds.

#### **4) Reference Conditions:**

“Early European settlers in North America inadvertently brought weed seeds with them, perhaps in the hay they brought for their animals or in the dirt they used as ballast for their ships, or even in their clothes or bedding. Some activities, such as clearing the land, opened up niches that created places for weeds to grow. Settlers also purposely brought plants from their ‘home country’ to reseed areas, make dye for clothing and use as ornamental plants. Some of these non-native plants became invasive, reducing the diversity and quantity of native plants. Weeds are continuing to spread rapidly in many areas across the country. Weeds spread to an estimated 4,000 acres each day on public lands managed by the BLM and Forest Service” (BLM Noxious Weed Webpage).

Settlers along riparian corridors have historically impacted these areas by clearing the land, irrigation, and overall human presence-associated disturbances. These areas also tended to have higher concentrations of livestock, especially historically, when riparian systems were “sacrifice areas” and did not receive the management attention that they receive today.

#### **5) Syntheses and Interpretation:**

Although the majority of the watershed assessment area is relatively free from weeds, the potential for introduction and/or spread from existing sites is high. Transportation of weed seeds across great distances via vehicles, wind and animals poses threats for introduction of new species throughout the assessment area. Although many sites have been treated over the last ten to fifteen years, there are still many sites that remain untreated. Wildfires, as witnessed in the Blackhall fire, also open the door to exposure and expansion of weeds.

The highest priorities for treatment are the aggressive noxious weed species, such as the knapweeds, toadflax, saltcedar, and leafy spurge, which are able to spread throughout stable native plant communities. These are promptly treated and monitored where possible, and are not specifically related to livestock grazing. Weed movement by recreational vehicles, and adequate weed control on mostly private land that could spread to public

lands needs to be addressed. Where livestock grazing is contributing to the invasion or expansion of weed species, management must be adjusted.

Locations and size of cheatgrass infestations are being mapped on a statewide basis to help with assessing the overall problem and identifying treatment priorities. Although good management of existing native plant communities may minimize this threat, there are still sites that will require more active treatment. Cheatgrass appears to thrive on south and west slopes where effective temperatures are higher and where runoff from rocks or steep slopes promotes site disturbance. An area of high concern for cheatgrass is the Encampment River canyon, where cheatgrass occurs on 6,700 acres, including both areas previously prescribed burned and on undisturbed sites. Much of this area is within the Encampment River WSA and is crucial winter range for bighorn sheep, mule deer and elk.

Less than half of the watershed has not been inventoried for weeds, but it is generally assumed that unless there are disturbances or close proximity to the recreation areas, there probably are not any weedy species present other than Canada thistle or Musk thistle. The exceptions are where noxious weeds are already established in an area, and buffer zone inventories around the patches are not complete. In addition, weedy species along the North Platte River are increasing and a cooperative effort for control is needed due to the intermingled land pattern. As native vegetation is reestablished, many of the invasive species will be crowded out. The species of long-term concern within the assessment area are the noxious species, Russian olive, and cheatgrass.

#### **6) Recommendations:**

Due to the existing good condition of native vegetation and the weed treatment program in place to control and/or eradicate identified weed problem areas, it is determined that the majority of the watershed is meeting Standard #4 with respect to weeds. There are known areas of noxious weeds that are rapidly expanding and are not being treated, and therefore, fail Standard #4. These areas affect approximately 3000 acres. In addition, there are 6,700 acres of cheatgrass infestation in the Encampment River canyon that also fail this Standard. The following recommendations, in addition to following the Rawlins Weed Prevention Plan (BLM, 1999), would expand upon the success already achieved and help to meet desired resource conditions in the future.

Continue inventory and treatment efforts in the area to identify and contain or eradicate noxious weeds. Continue to work with landowners on concurrent treatments with private lands. Enforcement of stipulations on ROWs to control weeds must occur.

Identify all weed species that need to be treated throughout the assessment area. Although some may not be a major focus for treatment, they can be a significant problem within localized areas. In addition, more education on weedy species (including landowners, recreationists, and equipment operators), and innovative ways to address weed infestation is needed for this watershed. The BLM proposes to ask for increased funding for ways to address these weed issues, especially along the North Platte River.

## STANDARD 5 – WATER QUALITY

*Water quality meets state standards.*

### 1) Characterization:

In 1972, the Federal Water Pollution Control Act, commonly referred to as the Clean Water Act, was signed into law. Its purpose is to “restore and maintain the chemical, physical, and biological integrity of the Nation’s waters.” The Act gave the Environmental Protection Agency the authority to implement pollution control programs through partnerships with individual states. Provisions for establishing water quality standards were included in the Clean Water Act, as amended, and in the Wyoming Environmental Quality Act, as amended. Regulations are found in Part 40 of the Code of Federal Regulations and in Wyoming’s Water Quality Rules and Regulations. The latter regulations contain Quality Standards for Wyoming Surface Waters.

The State of Wyoming has surface water quality standards for water bodies rated from class 1 to 4. Each rating class has specific numeric and narrative water quality standards. Class 1 waters of the State are waters where no additional water quality degradation will be allowed. Classes 2 through 4 waters are differentiated based on their ability to support aquatic life, fish and other human and wildlife uses. In general, Class 2 waters support game fisheries, Class 3 waters are non-game fisheries protected for aquatic life, and Class 4 waters do not have the potential to support fish and contain few areas that support aquatic life. An additional, the classification scheme describes the multiple goals of a water body, for example supporting both drinking water and game fish (Class 2AB). The “A” refers to the ability to support drinking water and the “B” refers to its ability to support aquatic life. For example, a 3B classification would be non-game protected for aquatic life, but does not protected for drinking water.

The North Platte River is mostly designated Class 2AB due to the game fisheries on the river and municipal drinking water sources in the basin and downstream. Class 2AB is the highest numeric classification for Wyoming water bodies. Water bodies that do not meet their designated beneficial uses are placed on the State 303(d) list for factors identified that contribute to the impairment.

### 2) Issues and Key Questions:

Non-point source impacts to water quality can result from localized erosion due to surface disturbance and also from poorly maintained upland habitats and riparian/wetland systems. These impacts can also result from increased erosion from roads which can result in altered surface hydrology and decreased vegetative cover. Decreased vegetation can increase erosion by exposing soil to wind or water. Overuse of water sources can cause reductions or near riparian/wetland areas can cause disturbance to vegetation and soils in localized areas and as a result of hoof action can lower the water table in localized areas.

Point source impacts include the potential for toxic spills along the I-80 corridor and other highway systems, industrial, agricultural and municipal discharges. Municipal sources include the towns of Saratoga, Riverside and Encampment. About the only industrial source is the small lumber mill in Encampment.

### 3) Current Conditions:

In general, water quality is excellent in the North Platte watershed and is evident by the water quality classifications described in the characterization section. In most cases, classifications are based on the beneficial uses supported by the water quality present. The USGS has collected water samples from stations located on the North Platte River that represent current water quality conditions.

## Upper North Platte Sub-basin (HUC 10180002)

The Upper North Platte Sub-basin is that area upstream of Seminoe Reservoir to the Colorado Line. The upper portion of this sub-basin, like most of the high elevation basins in Wyoming, contains bottom lands which are privately owned and irrigated for hay production. Generally, the uplands are grazed early and/or late in the year, and the higher elevations are grazed in the summer. Much of the forested area in the Upper North Platte was harvested for railroad ties historically. Many of the larger mountain streams were straightened and had logs and boulders removed to facilitate tie driving, i.e. running the ties down streams to be picked up by the railroad. There are no large scale mining operations, but historically there has been considerable gold and copper mining in both the Sierra Madre and Medicine Bow mountains. There are gravel mines scattered throughout the watershed. Natural hot springs in and near Saratoga slightly increase the temperature and dissolved solids content of the river.

### **4) Reference Conditions:**

Reference conditions are taken mostly from the historic accounts by Col. John Charles Fremont, other explorers and later travelers on the Overland Trail that bisects the analysis area north to south.

*The Life of col. John Charles Fremont, and his narrative of exploration and adventures, in Kansas, Nebraska, Oregon and California.*

Fremont's narrative includes portions of the North Platte and Sweetwater River as traveled in June and August of 1843-44. Fremont on June 14 describes the Encampment River (Potter's Fork) as "a clear and swift stream, 40 yards wide, and in many places deep enough to swim our animals".

The majority of the land area is 7,000 to 8,000 ft. Snow storms can happen year round at the higher elevations, and as late as July in the majority of the area. On June 16, 1865 Lewis Byrum Hull noted that it was cold and snowed nearly all day at the Pass Creek station along the overland trail. Rattlesnake Canyon below Rattlesnake Pass was described by emigrant J. Zeamer as, "thickly lined with bushes and whose current in many places was interrupted with beaver dams." The overland trail crosses Pass Creek after this canyon and not much is mentioned of this crossing (Dorn, R.D. 1986).

The Overland Trail crossed the North Platte River at Johnson Island formed by an oxbow in the river abundant with cottonwood and willow. A ferry was operated on this site and the main channel of the river is described as deep and swift in July 1865, by emigrant J. Zeamer. Driftwood was abundant and the oxbow could be waded over to Johnson Island and crossed by horses without wagons. In June 22, 1866 the North Platte at this locations was described a rushing torrent that was too swift and deep to be crossed, other than by ferry. On this day the rope broke and the ferry was lost on a crossing.

### **5) Synthesis and Interpretations:**

A review of the reference conditions shows that the loss of buffalo and beavers in this area was most likely the most significant change from pre-European settlement. Disturbance from buffalo includes intense use in alternating areas, hoof action and grazing on uplands. Not very much is known about ecosystem interactions with buffalo in sagebrush, however the lack of biologic crusts in areas where buffalo were know to be abundant and some indication that sagebrush has expanded East of Laramie indicate that buffalo may have been a significant factor in vegetation composition and range. Beavers certainly have a great influence on riparian systems, ponding water behind dams and introducing disturbance in riparian systems with a woody component. From early accounts it can be assumed beavers were higher in number and greater in range in the past compared with present conditions.

Managing livestock and evaluating road designs on a project and allotment basis is the best way to address human contributions and can be measured and evaluated on a case-by-case basis or in monitoring vegetation condition. Livestock grazing, road density and other human practices contribute to non-point pollution. Human disturbances may be additive to natural disturbance that may lead to exceedences; however separating human from natural disturbance sources is difficult at best.

### Non-Point Pollution Sources

Livestock can contribute to vegetation disturbances altering the developed soil profile by degrading protective vegetation and the structure of the soil horizons. This disturbance can reduce infiltration, increase runoff, and create more soil compaction. Soil compaction increases water runoff and thereby promotes sheet, rill and gully erosion on site and stream down cutting and gullying off site. The greatest compaction occurs when soils are moist or wet. Compacted soils are less accommodating to plant roots, and seed germination is difficult in such soils. This physically reduces soil productivity.

Roads, off-road travel with vehicles, and other human practices that remove the protective vegetative cover from soils and funnel water down ruts or through culverts and ditches can degrade water quality. These affects may be short-term if the vegetation can recover, or may be long-term if down-cutting and gullying occur. Water tables may drop, reducing moisture available for plant growth that in turn leads to lower site productivity and cover, and therefore, more long-term potential for soil erosion and degradation of water quality.

Disturbance in or adjacent to riparian areas can increase sediment into channels and degrade water quality. The PFC analysis method is designed to evaluate if a given riparian or wetland system is sustainable during a typical disturbance such as flooding. If a stream channel is degraded it is an indication that the system will contribute to water quality problems by eroding during a storm event. Riparian and wetland systems can also be an effective buffer by trapping suspended sediment during storm events, therefore if they are degraded the quality of the water downstream will generally be lower than if the system was healthy.

### **6) Recommendations:**

Within the assessment area, water quality impairment has not been identified in any water bodies by the State of Wyoming by listing them on the State's 303(d) list. There are indirect indications that water quality parameters are being influenced by livestock grazing, roads and other human practices within this watershed.

The BLM will continue to implement or refine BMPs for livestock grazing, which promote perennial vegetation to stabilize stream banks and improve cover and litter on uplands. Season and duration of use are the principal factors in considering management changes to maintain meeting this standard. BLM will continue to identify and correct existing road problems that alter surface water flows and result in accelerated erosion. The BLM will continue to promote mixed-age shrub and woodland communities with higher proportions of young and middle-aged stands, which have greater amounts of herbaceous cover to reduce runoff and soil erosion and increase infiltration and ground water recharge.

## STANDARD 6- AIR QUALITY

### *Air Quality Meets State Standards.*

#### **1) Characterization:**

Air quality within the field office cannot be easily documented, since monitoring data has not been gathered for the most part, except for site-specific projects. Air quality regulations consist of the National Ambient Air Quality Standards (NAAQS) and the Prevention of Significant Deterioration (PSD) increments. The NAAQS limit the amount of specific pollutants allowed in the atmosphere. All BLM-administered lands are classified PSD Class II, which means that moderate, controlled growth can take place. However, adjacent to this field office is a high priority airshed for the Mt. Zirkel Wilderness Area.

In 1999, EPA issued regulations to address regional haze, which are visibility impaired areas caused by numerous sources located across a wide geographical range. Visibility impairment happens when light is scattered or absorbed by particles and gases in the atmosphere. It is most easily described as haze that obscures the clarity, color, texture, and form of what we see (NAQETR, 1999).

#### **2) Issues and Key Questions:**

Several different factors can greatly affect air quality within this analysis area, but most are unrelated to livestock grazing. Vehicle traffic contributes pollutants through the combustion of fossil fuels. Where interstates or highways are present, more motor vehicle traffic will result in increased levels of these pollutants. In less developed areas, such as along two-tracks these levels of pollutants will be greatly reduced due to less traffic. Traffic along these dirt roads also affects air quality over the short term, especially during dry conditions. How can we reduce pollutants that enter the air at their source, and also address associated air quality issues such as dust abatement from vehicular travel?

Prescribed burns and wildfires affect air quality in a localized area for a short period of time. Prescribed burns are implemented in coordination with and permitted by the Wyoming Department of Environmental Quality. Most are planned in a way to minimize impacts to more-populated areas. Large-scale fires are becoming much more common due to decades of fire suppression. If fuel breaks aren't created occasionally by prior burned areas, could we be looking at larger wildfires with associated air quality issues?

#### **3) Current Conditions:**

Overall air quality is good within the area, which is due in large part to the presence of reliable winds. According to a letter received from the Wyoming Department of Environmental Quality there are no air quality criteria pollutant non-attainment areas for either state or federal standards within the boundaries of the Rawlins Field Office. Lichens (an important air quality indicator) are prevalent throughout the assessment area and the field office.

Current annual average conditions range from 18-40 miles in the rural portions of the eastern United States to 35-90 miles in the rural western portions. On an average basis, they are estimated at approximately 80-90 miles in the east and up to 140 miles in the west (NAQETR, 1999). Three figures (1, 2, and 3) from this report document the clearest, middle, and haziest days across the country. On a local basis, visibility as reported from the Rawlins airport is on average 60 miles. On days that are hazy due to drift smoke this visibility can be less than 10 miles.

Some roads have been surfaced to reduce dust levels, but there is still much that should be done. Dry soil conditions exacerbate the problem, so in the summer dust is increased. This not only affects air quality but also public safety, as visibility when traveling by vehicle can be severely hindered.

Short-term impacts from prescribed burning and/or wildfires can also impact air quality. There have been very limited prescribed burns in this area conducted mainly in the fall. The burns usually only take a few days to implement and generally require winds in the burn plan prescription. If they are close to communities, the burn plan tries to mitigate short-term impacts to air quality.

No large wildfires have burned in the assessment area in recent times. The majority of wildfires are less than 10 acres and tend to be associated with railroad or highway right of ways. These wildfires have had a minimal impact on air quality in this assessment area. However, large-scale fires in the Intermountain West can affect air quality within the area as drift smoke. Depending on the fire season, these impacts can be short or long-term.

Depending on the type of grazing management implemented, number of animals, and habitat type, pollution from livestock presence varies. Season-long use and/or heavy use levels can increase bare ground, thereby increasing dust. In periods of drier climate conditions, dust created by livestock trailing, herding, and day to day movements increases.

#### **4) Reference Conditions:**

Information gathered from longtime residents has alluded to the increased haziness in the area. Clear vistas were the norm, and being able to see over 100 miles from a high point was an everyday occurrence. At this time, most information is anecdotal since there is very little documentation. Possible causes of this long-term reduction in air quality could be the increased mineral development and associated powerplants to the west that contribute air pollutants. Days that have clear skies are relatively rare.

Historic livestock use tended to be much heavier and for longer periods of time that increased bare ground and decreased plant cover. Large bands of sheep trailed back and forth across the field office, and dust from their movements could be seen for miles.

#### **5) Synthesis and Interpretation:**

Vehicular traffic related to increased development results in numerous trips through these areas by anything motorized ranging from ATVs, pickup trucks, semis, large seismic semis, and miscellaneous heavy equipment. Vegetation along these roads has reduced vigor and production and is generally covered in dust particles.

Catastrophic wildfires throughout the West are a problem beyond the scope of this document. Forest fires both regionally and locally could continue to have a significant impact on the area's air quality. Continued efforts to address this widespread problem are being implemented on a national basis, however, in the short-term there will continue to be large-scale wildfires. On the local level, creating fuel breaks and diversifying vegetation communities will help to ensure that wildfires in this area do not become catastrophic in scope.

Best management practices for livestock grazing will continue to reduce particulate pollution caused by this use. Reducing the size of disturbed areas, reestablishing vegetation on disturbed sites, and managing livestock to reduce bare ground will reduce soils susceptible to wind erosion (dust).

## **6) Recommendations:**

Within this assessment area there is no air quality criteria pollutant non-attainment areas for either state or federal standards as determined by the Wyoming DEQ. Due to prevailing winds, limited pollution within the general area, overall air quality meets this Standard.

Dust abatement due to vehicle traffic is an important concern, both on a resource basis and a public safety basis.

Continue prescribed burning and other vegetation treatment operations to provide for fuel breaks to ensure catastrophic wildfires do not occur. Treatments will greatly reduce the risk of large amounts of particulate matter in the air from local wildfires burning out of control.

## **SUMMARY**

### **Standard 1 – Watershed**

Due to the existing diversity and amount of vegetative cover on uplands, the existing conditions and improving trend in stream vegetation and channel morphology, and the small number of remaining management issues, it is determined that the majority of the Upper North Platte watershed within the report area is meeting Standard #1. The only area of the watershed not meeting this Standard is approximately five acres by Prospect Mountain along the access road to the North Platte River.

### **Standard 2 – Riparian/Wetlands**

There has been improvement in riparian/wetland condition within the assessment area over the last 10 to 15 years, however, there are still some specific areas that need attention. Allotments containing riparian/wetland habitat that do not meet this standard have been described previously and include: A Bar A, Antelope Draw, Beaver Hills, Bennett Peak, Corral Creek, Cottonwood Creek, Cottonwood/Corral Creek Horn and Meason, Little Beaver, Methodist, Miner Creek, Pierson, Platt Mine, Plattoga Ranch, Prospect Mountain, Sanger, Saulcy and Silver Spur allotments.

Most of the lentic and lotic sites not meeting the standard have been, or are in the process of being addressed in management plans or as range improvement projects. Continued progress in grazing management of livestock will ensure further improvement of all riparian areas within this area. Although there are areas where desired future condition is yet to be reached in woody species dominance and composition in the upper watersheds, these areas still meet the minimum standard of rangeland health. Other than the specific allotments listed previously, the remainder of the allotments within this assessment area are meeting Standard #2 – Riparian/Wetland.

### **Standard 3 – Uplands**

At the present, the review of upland vegetation conditions in the Upper North Platte River watershed reveals generally good overall community health. Natural ecological and biological processes appear to be functioning adequately overall, although concerns about current, and especially near-future, functionality of certain community types remain. Specifically, the review group has determined that the majority of upland vegetation communities are properly functioning in relation to the seral stage to which they have evolved. However, the juniper, pine and mountain shrub communities in the Baggott Rocks area does not appear to be properly functioning, with severe hedging and browsing and poor age-class structure. This area totals 2,160 acres in size. Although aspen stands show various symptoms of disease and decadence – particularly encroachment by conifers, most upland sites are not deemed to be failing this Standard at this time. Livestock grazing is a component in the management scenario of these plant communities, but it is not the principle factor in non-attainment of this Standard.

### **Standard 4 – Wildlife/Threatened and Endangered Species/Fisheries Habitat, Weeds**

Habitat needed to support healthy wildlife populations and listed or proposed threatened and endangered species is generally in acceptable condition. This does not mean that there aren't problems or concerns about wildlife habitat. The discussion under Standard #2 – Wetland/Riparian Health and Standard; #3 – Upland Plant Health; outlines the current conditions and recommendations for improving management of these resources. Although an area may meet a standard, it still may not be at our "desired or future" condition. On the other hand, our composition of native species is good, with some weed problems at this time. Due to the existing good condition of native vegetation and its ability to support the diverse wildlife

populations we currently have, it is determined that the majority of Upper North Platte assessment area is meeting Standard #4 with respect to wildlife. However, the Baggott Rocks area that is crucial winter range for mule deer (2,160 acres), and crucial-winter/yearlong bighorn sheep habitat in the Encampment River Canyon (6,700 acres) is not meeting this standard. This area totals 8,860 acres in total size.

The improved management of riparian habitats through the use of grazing BMPs indicates both an upward trend and meeting Standard #4 for fisheries for some of the streams in the assessment area. However, many other sites that should support fisheries currently do not. Standard #4 for fisheries is not being met on streams, which currently fail Standard #2 – Riparian/Wetland. There are also sites that are rated in proper functioning condition, but due to the lack of overhead cover (stream shading) exceed temperature requirements for some fish species and won't support them. However, these sites have not yet been defined. Due to the lack of credible data on the status of native fishes in the watershed, whether Standard #4 is being met for these species is unknown.

Due to the existing good condition of native vegetation and the weed treatment program in place to control and/or eradicate identified weed problem areas, it is determined that the majority of the watershed is meeting Standard #4 with respect to weeds. There are known areas of noxious weeds that are rapidly expanding and are not being treated. These areas affect approximately 3,000 acres. In addition, there are approximately 6,700 acres of habitat occupied by cheatgrass that fails this standard within the assessment area.

#### **Standard 5 – Water Quality**

Within the assessment area, water quality impairment has not been identified by the State of Wyoming for the Upper North Platte River drainage. Although specific compliance for some stream segments is unknown, nothing within available data indicates this Standard is not being met.

#### **Standard 6 – Air Quality**

Within this assessment area there is no air quality criteria pollutant non-attainment areas for either state or federal standards as determined by the Wyoming DEQ. Due to prevailing winds, limited pollution within the general area, overall air quality meets this standard.

#### **Allotments described in this report that do not meet Standards due to Livestock Grazing:**

- A Bar A: Standard #2 - Riparian/Wetland
- Antelope Draw: Standard #2 – Riparian/Wetland
- Beaver Hills: Standard #2 – Riparian/Wetland
- Bennett Peak: Standard #2 – Riparian/Wetland
- Corral Creek: Standard #2 – Riparian /Wetland
- Cottonwood: Standard #2 – Riparian/Wetland
- Cottonwood/Corral Creek: Standard #2 – Riparian/Wetland
- Horn and Meason: Standard #2 – Riparian/Wetland
- Little Beaver: Standard #2 – Riparian/Wetland
- Methodist: Standard #2 – Riparian/Wetland
- Miner Creek: Standard #2 – Riparian/Wetland
- Pierson: Standard #2 – Riparian/Wetland

- Platt Mine: Standard #2 – Riparian/Wetland
- Plattoga Ranch: Standard #2 – Riparian/Wetland
- Prospect Mountain: #2 – Riparian/Wetland
- Sanger: Standard #2 – Riparian/Wetland
- Sauley: Standard #2 – Riparian/Wetland
- Silver Spur: Standard #2 – Riparian/Wetland

**Standards not being met due to causes other than livestock grazing:**

- Standard #1 - Prospect Mountain: Erosion from road encroachment/recreation use.
- Standard #2 - Prospect Mountain: Erosion from roads; Heather Creek and Methodist: Loss of beaver dams and conifer encroachment
- Standard #3 - Juniper, pine and mountain shrubs in Baggott Rocks area
- Standard #4 - Mule deer CWR at Baggott Rocks, Big Game habitat in Encampment River Canyon, Streams on public land that do not meet Standard #2 and are capable of supporting fish populations on public lands; responsibility – BLM. Expansion of noxious weeds, invasive species – BLM, private landowners, County Weed and Pest District.
- Standard #5 - None
- Standard #6 - None

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