
# Rochester Basin and North Tobacco Root Watershed Assessment Report

**Dillon Field Office**

**January, 2009**

**Jefferson River Valley 2008**

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# Introduction

This document is a land health assessment of the public lands administered by the Bureau of Land Management (BLM) in the Rochester Basin and North Tobacco Roots Watershed (RNTW).

This is the first in a series of documents: the Watershed Assessment Report, the Authorized Officer's Determination of Standards, and the appropriate National Environmental Policy Act (NEPA) documentation and subsequent Decision(s) changing management where needed.

The Assessment reports the condition and/or function of public land resources within the RNTW to the authorized officer. The authorized officer reviews the findings in this report to determine if the five standards of rangeland health are currently being met. The authorized officer then signs a Determination of Standards documenting where Standards are met and where they are not.

In addition to the condition/function assessment, the report also contains initial recommendations developed by the interdisciplinary team (IDT) during field assessments. The recommendations in the report focus primarily on livestock grazing and timber and fuels management, but also include other programs, land uses, and activities. These include; noxious weed control, recreation activities, wildlife and fisheries habitat, and road maintenance. Impacts from all uses and programs were assessed and documented as part of this process.

The assessed condition, function and recommendations in the Assessment Report and Determination of Standards will be used in the NEPA process. An environmental assessment (EA) will be completed to address identified resource concerns in the watershed. The EA will include all BLM-administered public lands covered in the assessment.

Alternative management will be analyzed wherever it is determined that:

- specific grazing allotments are not meeting the Standards
- allotments are meeting the Standards but have site specific concerns
- fuels conditions are outside the natural range of variability
- other documented resource concerns

If existing grazing management practices or levels of grazing use on public lands are determined to be significant factors in failing to achieve one or more of the five Standards, the BLM is required by regulation (43 CFR 4180.1) to make grazing management adjustments.

Implementation of new plans will begin in 2009, but full implementation of revised grazing plans, range improvement projects, forest treatments and/or fuels projects associated with these plans may take several years.

The new plans will be developed in consultation and coordination with the affected lessees/permittees, the agency having lands or managing resources within the area and other interested parties.

The Dillon Field Office (DFO) completed a new Resource Management Plan (RMP) in February of 2006. This document will provide program guidance in the Dillon Field Office for the next 20 years. The RMP replaces The Dillon Resource Area Management Framework Plan (1979) and the Mountain Foothills Environmental Impact Statement (EIS) - Rangeland Management Program Summary (1981).

By working on a watershed basis, a broader landscape is considered and more consistent management can be applied. It is the BLM's intent to implement watershed management cooperatively. Any changes in livestock management will be implemented through grazing decisions that address allotments or groups of allotments with a common permittee. Forest health and fuels management treatments or projects and any other management projects or changes will be implemented through decisions appropriate for the respective programs.

As with all similar BLM decisions, affected parties will have an opportunity to protest and/or appeal these decisions.

## Background

The RNTW is located in Madison County, Montana and drains portions of the Highlands and Tobacco Root mountain ranges into the Jefferson River. The watershed lies within Townships 1 North through 3 South and Ranges 1 through 8 West, Montana Principal Meridian (MPM). Elevation range on BLM-administered lands varies from the Jefferson River valley at 4,200 ft to mountain ridge tops over 8,800 ft in the Highland Mountains. Average annual precipitation within the watershed varies from 10 inches in the lower elevation valley bottoms to 22 inches at higher elevations. Solis data are available in the Madison County Soils Survey.

The assessment area covers public lands administered by the BLM Dillon Field Office. The assessment area boundary shown on Map 1; follows grazing allotment boundaries and includes some allotments that are only partially within the watershed. Technically, the assessed area is not a distinct watershed. Watersheds are defined, and designated on maps, by natural topographical boundaries (ie. ridgelines/drainages). Grazing allotment boundaries have been determined by previous BLM decisions based partially on land ownership and these artificial boundaries may not follow topographical features. Therefore, some of the grazing allotments in the assessment area fall within one or more watersheds or hydrologic units.

Within the RNTW assessment area there are approximately 230,000 total acres of land, of which 32,366 are public lands administered by the BLM. Of the public lands total, 29,601 acres are allotted for grazing, 2,765 acres are unallotted. This report addresses only land health conditions on public (BLM) land.

Vegetation in the watershed reflects the diversity of ecological conditions across the landscape. The dominant plant communities and habitat types change according to soils, precipitation, elevation, slope and aspect (direction the slopes are facing). A wide variety of vegetation is found, from wetland and riparian species dependent on water and moist soils, to sagebrush and

grass dominated plant communities that thrive on dryer upland sites. Forested habitats cover the higher elevations. This diverse landscape provides habitat and structural niches for a wide variety and abundance of wildlife.

**Prehistory and History of Watershed**

In conjunction with the Mountain Foothills Grazing EIS in the late 1970s, a Class II cultural resource inventory was completed for a 10% sample of lands within the Dillon Resource Area. Results of the inventory located a mixture of prehistoric and historic sites throughout the watershed. Overall, the watershed exhibited a lower than normal likelihood for cultural sites. Prehistorically, the RNTW was occupied continuously from approximately 10,000 years ago. Prehistoric sites within the watershed consist primarily of small habitation and/or procurement sites (Earle 1980). Historically, portions of the RNTW were originally explored by Lewis and Clark in the summer of 1805 eventually leading to further explorations during the fur trade in the 1830s.

**Mining History and General Geology of Highlands and North Tobacco Roots Mountains**

The RNTW is part of a regionally mineralized belt with numerous mining districts crossing southwest Montana. It contains six important districts which have produced a variety of metals since the late 1800's, they are the: Rabbit (Rochester), Silver Star, Renova, Tidal Wave, Sand Creek and Melrose Districts.

The RNTW saw the discovery of the Watseca lode in 1866 bringing prospectors from all over the region in search of gold, eventually establishing the *Rabbit Mining District, (AKA the Rochester District).* Due to the large influx of people to the area, the mining camp of Rochester was eventually established nearby. Small-scale operations kept the district alive from the mid-1870s through the 1880s. In addition to gold mines, properties such as the Emma Mine (BLM) carried good values in silver and lead. In the mid to late 1890s, the Thistle Mine (BLM) dominated the Rabbit District, constructing a concentrator just below the mine along Rochester Creek. From early 1898 to 1905, the Watseca (private) proved to be the Rabbit Mining District's most productive claim, producing slightly less than $1.1 million and accounting for little more than half of the district's total production since its founding. A mill constructed at the Emma mine ran until 1932. During the heyday at the Watseca, the town of Rochester's population swelled to as many as 5,000 people, holding the distinction as the largest community in Madison County during that time. The mining district experienced other smaller gold booms between 1920 and 1940, however nothing compared to its earlier heyday. Total production for the district is estimated to be $2,500,000 (Sahinen 1935).

The Rabbit (Rochester) District lies on the south side of the Highland Mountains and is underlain by Archean gneisses and schists, which are intruded by granite dikes and sills. Diorite stocks and andesites flows are present in the eastern portion of the district and basalt flows are present in the western area. Ore deposits occur in north to northeast striking veins and dip steeply west (Montana DEQ 2008). In the late 1980s and early 1990s a cyanide vat leach operation was initiated at the Watseca, at this point there is an active claimant who holds the property, but no work in being conducted.

The *Silver Star District* is one of Montana's oldest lode districts with gold discovered in the 1860's. This district lies on the east side of the Highland Range and is underlain by schists, slates, quartzites, and limestone which are intruded by granite related to the Boulder Batholith. While the Green Campbell (private) was the first and highest grade mine discovered, numerous other mines including the Broadway (private) and Iron Rod (mixed ownership) were significant producers. Ore was processed, at numerous mills constructed from Silver Star to Iron Rod. While most mining had ceased by World War II, one chrome mine located 2.5 miles west of Silver Star processed 200 tons per day at the Iron Rod mill until 1944. Although production records are discontinuous, it is estimated that from 1866 to 1928 between $2,553,418 to $7,000,000 worth of gold, silver, copper, and lead was produced from the Silver Star district (Montana DEQ 2008). Presently Coronado Mining mine (private) is producing copper and gold ore which is being processed at Golden Sunlight Mine and some sporadic production has come from the Green Campbell.

The *Renova District* is located on the north side of the Tobacco Roots Mountains. It is predominantly underlain by sandstones and sandy shales, in the north these rocks are overlain by Bozeman Formation lake beds, and in the east and west they are in contact with Paleozoic rocks. Ore deposits occur as mineralized fractures and veins as well as a syenite intrusive. The Mayflower mine (private) is the most significant producer in the area. Estimated production of gold from telluride ore between 1896 and 1905 is believed to be $3,000,000 (Montana DEQ 2008). Potential resources at the Mayflower are presently being evaluated. The Gold Hill – Iron King- Surprise and Blue Grouse mines (private) are located west of the Mayflower. The most notable of these mines is the Gold Hill which is a vein deposit. Historic mine dumps from the Gold Hill are presently being reprocessed at Golden Sunlight Mine by the landowner (Montana DEQ 2088).

The Parrot Canal, located along the Jefferson River, was constructed in 1888 by a mining consortium headed by Butte copper king William Clark. The purpose of the canal was to provide water to the Parrot smelter, which would be relocated from Butte due to lack of sufficient water. The Parrot or Gaylord smelter was relocated to take advantage of the rich gold, silver, lead and copper ores being extracted from the nearby Mayflower Mine. About the time the smelter was completed in 1899, it was purchased by the Amalgamated Copper Company and subsequently never opened (Water Resources Survey 1956; Wolle 1963; Malone et al 1991). In 1910 the canal was purchased by the Madison Power Company, selling water from the canal to area farmers. In 1915, Helena real estate developer, Lewis Penwell, purchased the canal and organized the Parrot Ranch Company, a subsidiary of the Montana Power Company. In 1916, Penwell formed the Parrot Ditch Company to "acquire, own, hold, manage, control, operate and maintain the irrigation system owned by the Parrot Ranch Company." In 1953, the 26-mile long ditch served 48 users and delivered water to three other private ditch systems (Axline 1998).

The *Tidal Wave District* lies on the west slopes of the Tobacco Root Mountains from 7 miles north and south and 5 miles east and west of Twin Bridges. It contains Dry Creek, Coal Creek, Bear Gulch, Good Rich Creek and Dry Georgia Gulch. Geologically the area is complex with Precambrian gneisses and schists of the Pony Formation overlain by Paleozoic quartzites limestones and shales. These rocks are intruded by granite of the Tobacco Root batholith. Ore was first discovered in about 1864 at the Tidal Wave Mine. Deposits occur as intrusive-

limestone contacts, veins associated with the intrusions and veins earlier than the intrusion. Mineralization is predominantly associated with argentiferous lead ores, although some placer mining was conducted in Goodrich Gulch. From 1904 to 1944 the district produced $1,210,000 of gold, silver, copper, lead, and zinc (Montana DEQ 2008).

The *Sand Creek District* is located approximately 2 miles southeast of Sappington. The district, discovered in 1890, is described as unimportant due to its small size and limited mineralization (Montana DEQ). The mines in this district include the Chile, Good Friday and Whippoorwill, however there is little known about their location or production. The area is underlain by Paleozoic rocks in contact with gneisses and schists (Montana DEQ 2008).

The *Melrose District* is located on the southeast slopes of the Highland Mountains and includes Soap Gulch, Camp Creek, and Wickiup Creek. The upper end of Camp Creek is within the RNTW watershed. Placer claims in this district have been worked intermittently since 1866. Silver mines, located primarily in Soap Gulch, operated until 1900 when Hecla's Glendale Smelter closed. Production from this district is reported to be 504,194 tons of ore (Montana DEQ). Geologically this area is underlain in the west by Tertiary deposits of sand, gravel clay, and volcanic ash. East of the Tertiary rocks are Paleozoic outcrops which include the Flathead to the Madison Formations. Archean schists and gneisses occupy the areas creek origin in the eastern portion of the district.

Each mining town/camp brought their horses, mules and livestock (cattle and sheep). Grazing adjacent to these mining camps/towns was yearlong and unregulated prior to 1934. Use of timber and forest products to build these towns and mines, heat homes, etc. was also unregulated.

**Abandoned Mines**

The BLM Abandoned Mine Lands (AML) program is responsible for cleaning up sites determined to be hazardous to human health, to the environment, or those which present physical safety hazards to the public. This program addresses mine sites abandoned prior to January 1, 1981, the effective date of the BLM's surface management regulations (43 CFR 3809) that implement the "unnecessary or undue degradation" provisions of the Federal Land Policy and Management Act of 1976 (FLPMA).

Early mining prior to 1981 did not require reclamation or bonding, therefore, many of these abandoned mines have legacy features such as eroding dumps, abandoned tailings, or open mine features. As mining activity is directly related to the demand for materials, commodity price, and advancing technologies, it is a cyclic activity. Relationships between abandoned mines and active mines/exploration vary throughout time as demand for the resources changes. Changes in reclamation standards, technology, and bonding prohibit mining problems of the past from developing in the future. Mining activity after 1981 is administered by the 3809 Mineral Program.

# Authorized Uses

**Forest Products:**
Forest resources in the watershed have been utilized since the beginning of European settlement during the 1860's. Evidence in the form of old stumps can be found across all ownerships through forested habitats in the assessment area.

There has been less than ten acres of forest management activities (timber harvests) on BLM administered lands within the RNTW in the recent past.

**Special Recreational Uses:**
The RNTW is part of the Dillon Field Office's Extensive Recreation Management Area. (This designation applies to all lands within the Field Office that are not within a Special Recreation Management Area.) There are no current Special Recreation Permits within the area (i.e. – no outfitted uses or special events).

**Mining:**
The Mining and Minerals Policy Act of 1970, the Federal Land Policy and Management Act of 1976 (FLPMA), and the Natural Materials and Minerals Policy, Research and Development Act of 1980 direct that the Public lands be managed in a manner that recognizes the Nation's needs for domestic sources of mineral production. Under the 1872 Mining Law, claimants have a statutory right to develop their mineral deposits consistent with applicable environmental laws. Mining activities are addressed under Causal Use, Notices, or Plans of Operations.

Currently there are no active 43 CFR 3809 Notices in this watershed, but there is an approved Plan of Operation (43 CFR 3809) approximately one mile southeast of Rochester. Historic mill tails from the Rochester mines are being removed and hauled to an operating mill northeast of Whitehall, for further gold extraction. This area consists of approximately 3 acres directly adjacent to Rochester Creek, which is seasonaly dry in this area. Removal is expected to be completed in 2009 and BLM will finish reclamation by placing topcover over the disturbed area and reseeding. The Watseca Mine in Rochester Basin, is a small milling operation on patented land, adjacent to public land that has not been active for several years. In the Tobacco Root Mountains exploration is occurring on private ground at the Mayflower Mine, and private land owners are reprocessing some old dumps from the Gold Hill mine area at the Golden Sunlight Mine.

Just south of Silver Star and west of U.S. highway 41 is the Antler Chlorite Mine. This open pit chlorite mine has been inactive for almost 10 years and is mostly reclaimed. The waste dump adjacent to the pit was acquired by the BLM and is currently a community pit mineral material site (43 CFR 3600). The material is used as rip-rap.

Approximately four miles southeast of Rochester along the Rochester Road is another community mineral material site. This site is a cut in the hillside where decorative stone has been blasted and removed but has had very limited use in recent years.

Several miles west of Silver Star is the Coronado Resources underground copper and gold mine. This mine is located primarily on patented property but is has some minor BLM lands in the working area and is surrounded by BLM managed public lands containing numerous historic mine features. An access road and a pipeline that cross public lands, are currently authorized by the BLM.

**Livestock Grazing:**
There are 16 individual operators that have grazing permits/leases on 29,601 acres (22 allotments) of public land administered by the BLM in the watershed. The allotments are shown on Map 2. Public lands, administered by BLM, provide a large proportion of the late spring, summer and fall forage base in the watershed. There are 3,692 animal-unit months (AUMs) of livestock forage allocated on public lands within the 22 allotments included in this assessment. The livestock grazing allocation and management for allotments within the RNTW is displayed in Table 1.

All allotments in the Dillon Field Office have been categorized as *Improve* (I), *Maintain* (M), or *Custodial* (C), based on resource values and opportunities for improvement. Allotment category refers to BLM's level of management for a given grazing allotment and is used to establish priorities for distributing available funds and personnel during plan implementation to achieve cost-effective improvement of rangeland resources. Categorization is also used to organize allotments into similar groups for purposes of developing multiple use prescriptions, analyzing site-specific and cumulative impacts, and determining trade-offs. Allotments in the (I) category are managed more intensively and are monitored more frequently. Allotments in the (M) category are usually at a desired condition and are managed to maintain or improve that condition. Allotments in the (C) category are usually isolated parcels with few resource concerns that are fenced in with larger parcels of deeded land, are managed in conjunction with the permittee/lessee's normal livestock operation, and are monitored less frequently.

The BLM has worked cooperatively with individual livestock permittees/lessees in the watershed for many years to develop Allotment Management Plans (AMPs) that prescribe grazing management to improve natural resource conditions. About 72% of the BLM-administered lands in the watershed that are allotted for livestock grazing are managed under formal AMPs, or have agreed upon grazing systems, that prescribe rest rotation, deferred rotation, a deferred season of use, or dormant season use (Table 1). About 28% of the BLM-administered acres that are allotted for livestock grazing are managed as custodial allotments, where BLM management inputs are minimal because of the small proportion of public land in the allotments (see Map 2).

The stocking rate on BLM lands within the watershed averages 8.0 acres/AUM and varies from 3.4 to 42.5 acres/AUM. This wide variation is influenced by soils, vegetation, topography (aspect, elevation, and slope), distance from water, and local weather. Cattle (mature individuals or cow/calf pairs) are the primary type of livestock authorized on the allotments; however several allotments allow the flexibility to graze yearling cattle.

**Table 1. Livestock Grazing Allocation and Management**

| Allotment Name, Number, & Category | Livestock Number & Kind[1] | Season of Use | Grazing System[2] | BLM Stocking Rate (ac/aum) | BLM AUMs | BLM Acres | Acres in Other Ownership | Total Acres |
|---|---|---|---|---|---|---|---|---|
| Allen Individual, 20374, (C) | 4 C | 06/01-10/15 | CU | 10.8 | 18 | 194 | 0 | 194 |
| Ballard Custodial, 20379, (C) | 1 C | 04/01-09/30 | CU | 15.8 | 6 | 95 | 0 | 95 |
| Carpenter Indiv SGC, 10307, (C) | 5 C | 05/01-06/30 | CU | 10.6 | 10 | 106 | 0 | 106 |
| Dry Boulder, 30236, (C) | 40 C | 06/15-10/14 | | 12.8 | 160 | 2044 | 13474 | 15518 |
| Hells Canyon, 20325, (M) | 114 C | 07/01-09/28 | RR | 5.0 | 78 | 1242 | 17609 | 18851 |
| | 95 C | 07/01-09/28 | | | 53 | | | |
| | 95 C | 07/01-09/28 | | | 115 | | | |
| Iron Rod, 20268, (M) | 58 C | 05/15-10/15 | RR | 8.2 | 255 | 5675 | 4089 | 9764 |
| | 134 C | 05/15-10/15 | RR | | 434 | | | |
| Jackson Isolated, 20408, (C) | 11 C | 10/15-12/14 | DU | 42.5 | 22 | 935 | 0 | 935 |
| Kountz, 10443, (I) | 123 C | 06/15-10/14 | RR | 6.6 | 202 | 1329 | 2026 | 3355 |
| Landmark, 20312, (C) | 28 C | 06/15-09/14 | CU | 15.9 | 20 | 318 | 863 | 1181 |
| Lower Rochester, 10353, (M) | 38 C | 04/15-05/31 | CU | 15.8 | 59 | 930 | 7152 | 8082 |
| Mahogany Isolated, 20419, (C) | 7 C | 04/20-06/10 | CU | 23.8 | 12 | 286 | 0 | 286 |
| Nelson SGC, 20313, (I) | 235 | 10/01-10/15 | DU | 5.2 | 99 | 511 | 314 | 825 |
| Rochester Basin AMP, 20324, (I) | 976 C | 06/01-06/30 | RR | 7.4 | 693 | 12352 | 7682 | 20034 |
| | 388 C | 07/01-10/15 | | | 983 | | | |
| Sacry, 20430, (C) | 7 C | 06/01-10/27 | CU | 3.8 | 34 | 128 | 0 | 128 |
| Sand Creek, 30409, (C) | 5 C | 07/01-08/30 | CU | 6.3 | 10 | 63 | 0 | 63 |

| Allotment Name, Number, & Category | Livestock Number & Kind[1] | Season of Use | Grazing System[2] | BLM Stocking Rate (ac/aum) | BLM AUMs | BLM Acres | Acres in Other Ownership | Total Acres |
|---|---|---|---|---|---|---|---|---|
| Shakey Springs, 20349, (C) | 6 C | 05/15-11/14 | CU | 11.6 | 36 | 419 | 24 | 443 |
| Shaw Basin, 20433, (C) | 37 C | 06/15-09/14 | CU | 6.3 | 27 | 342 | 466 | 808 |
| | 37 C | 06/15-09/14 | CU | | 27 | | | |
| Sparrow Ditch AMP, 20377, (M) | 40 C | 06/15-08/14 | RR | 3.4 | 80 | 268 | 0 | 268 |
| Third Creek, 30237, (C) | 7 C | 07/15-10/15 | CU | 40.3 | 21 | 847 | 0 | 847 |
| Upper Rochester, 30661, (M) | 43 C | 06/01-10/31 | CU | 5.2 | 216 | 1120 | 89 | 1209 |
| Vern Shaw, 20432, (C) | 6 C | 04/20-06/10 | CU | 23.5 | 10 | 235 | 0 | 235 |
| Waterloo, 20361, (C) | 6 C | 07/16-09/14 | CU | 13.5 | 12 | 162 | 0 | 162 |
| **BLM Totals** | **2,546 C** | | | **AVG = 8.0** | **3,692** | **29,601** | **53,788** | **86,154** |

*[1]Livestock Kind: C=cattle*
*[2]Grazing System: SL=season long, RR=rest rotation, DR=deferred rotation, DU=deferred use, DS=dormant season use, CU=custodial use*

# Process

This assessment was done in accordance with the BLM regulations regarding Rangeland Health Standards (Standards).

- BLM Manual H-4180-1, Rangeland Health Standards Handbook and Guidance for Conducting Watershed-Based Land Health Assessments.
- Code of Federal Regulation 43 CFR, Subpart 4180
- Record of Decision (ROD) - Standards for Rangeland Health and Guidelines for Livestock Grazing Management (S&Gs) for Montana, North Dakota and South Dakota.
- National Fire Plan

Rangeland Health Standards are described in detail in the ROD Standards for Rangeland Health and Guidelines for Livestock Grazing Management for Montana, North Dakota, and South Dakota- Western Montana Standards.

The preamble of the Western Montana Standards states: "The purpose of the S&Gs are to facilitate the achievement and maintenance of healthy, properly functioning ecosystems within the historic and natural range of variability for long-term sustainable use." Standards are statements of physical and biological condition or degree of function required for healthy

sustainable lands. Achieving or making significant progress towards these functions and conditions is required of all uses of public lands as stated in 43 CFR 4180.1.

This assessment will report condition and/or function for the following five standards:

- Standard #1 Upland Health
- Standard #2 Riparian /Wetland Health
- Standard #3 Water Quality
- Standard #4 Air Quality
- Standard #5 Biodiversity

In addition, this assessment will report condition and/or function for forest health, fuels, and AML. Forest health can affect each of the five standards, but in this assessment will be reflected under Standard #5 Biodiversity, along with other factors that affect biodiversity. These assessments are made on an allotment scale, with the exception of Air Quality which is made at the watershed scale. Condition/function statements regarding the Standards are made as:

- Proper Functioning Condition (PFC);
- Functioning At Risk (FAR) which is assigned a trend (up, down, static, or not apparent); or
- Nonfunctioning (NF)

Land Health Standards are met when conditions across an allotment are at PFC or FAR with an upward trend. This is dependent on scope and scale and determined by the Authorized Officer. The Authorized Officer's Determination will be prepared and sent out to the public during the spring of 2009.

Available trend monitoring data, existing inventories, historical photographs and standardized methodology, along with extensive field visits throughout the watershed, are used by an IDT to assess condition and function. In addition, Ecological Reference Areas are identified by the IDT and used to compare health and productivity of similar sites and soils. Trend monitoring data, riparian assessment data and historic photographs used for this assessment are available at the Dillon Field Office. Technical references are also available at the Dillon Field Office or online at http://www.blm.gov/nstc/library/techref.htm.

**Format**

The Upland, Riparian, Air Quality, Water Quality, and Biodiversity Standards will follow the following format:

- **Affected Environment** - This section briefly describes the area and resources that were assessed.
- **Analysis and Recommendations** - This section describes the procedure to determine conformance with the Standard, analyzes the findings, and discloses initial recommendations developed by the IDT during the field assessments.

General watershed recommendations and AML recommendations will also be made at the end of this document.

# Uplands

## Western Montana Standard #1: *"Uplands are in Proper Functioning Condition."*

**Procedure to determine conformance with Standard:**
The uplands were assessed on an allotment basis according to Interagency Technical Reference 1734-6, *Interpreting Indicators of Rangeland Health*, which is available at the Dillon Field Office or online at http://www.blm.gov/nstc/library/techref.htm. This qualitative process evaluates 17 "indicators" (e.g., soil compaction, water flow patterns, plant community composition) to assess three interrelated components or "attributes" of rangeland health: soil/site stability, hydrological function, and biotic integrity. The Natural Resource Conservation Service (NRCS) has developed Ecological Site Descriptions based on specific soil types, precipitation zones and location. They describe various characteristics and attributes including what vegetative species and relative percentage of each are expected to be present on the site. The IDT refers to these site descriptions while completing the upland evaluation matrix.

The IDT reviewed the long term trend study data, conducted extensive field surveys, and used the Indicators of Upland Health to assess the functionality of the upland habitat in the RNTW.

The RNTW was also evaluated for weed infestations using treatment records and inventories from the Dillon Field Office, the Beaverhead and Madison County Weed Coordinators collective observations during the field assessments.

## Affected Environment

Sagebrush and grassland areas are considered uplands for purposes of this report. According to satellite imagery, 75 percent of BLM administered public land in the watershed is classified as uplands (33 percent grasslands, 42 percent sagebrush).

The variety and distribution of plant communities and seral stages in the watershed area is a function of climate, geology, and soil combined with:

- historic uses (mining, grazing, and timber harvest)
- short term weather patterns
- disturbance regimes (drought, fire, floods and herbivory)

Current vegetative cover was calculated using satellite imagery (SIMPPLLE data). Table 2. summarizes the different cover types on all land ownerships within the RNTW.

**Table 2. General Cover Types Summary**

| Cover Type | BLM Acreage | % of BLM Acreage | Total Watershed Acreage | % of Total Acreage |
|---|---|---|---|---|
| Forests | 5,945 | 18 | 41,806 | 18 |
| Grasslands | 10,650 | 33 | 104,072 | 45 |
| Sagebrush/Mountain Shrubs | 13,988 | 42 | 45,802 | 20 |
| Mountain Mahogany | 1925 | 6 | 6,534 | 3 |
| Riparian/Mesic Shrubs | 260 | < 1 | 11,250 | 5 |
| Aspen | 8 | < 1 | 600 | < 1 |
| Other (Rock /Water/Ag) | 160 | < 1 | 21,632 | 9 |
| **Totals** | **32,936** | **100** | **231,696** | **100** |

Most of the BLM-administered uplands within the watershed are dominated by grasslands (33%) or sagebrush (42%), including mountain big sagebrush, Wyoming big sagebrush, basin big sagebrush, and three-tip sagebrush. Winter fat and greasewood may be found on alkaline sites within the watershed. Some of the prominent herbaceous species included in the grasslands are bluebunch wheatgrass, western wheatgrass, Sandberg's bluegrass, needle and thread, prairie junegrass, and Idaho fescue. These same cool-season grasses are prominent understory vegetation in the sagebrush habitat types. Rubber rabbitbrush, green rabbitbrush, fringed sagewort, and broom snakeweed are common native shrubs found on numerous ecological sites throughout the watershed. If any of these shrubs have greater than five percent canopy cover on a site, it usually indicates that a site has been subjected to some kind of past disturbance.

**Upland Vegetative Treatments**

Three vegetation treatment projects were found in the project database. The Lower Hell's Canyon Spray #474893 occurred in June 1971 and involved spraying about 300 acres of BLM-administered land (T2S, R6W, Sec 30 & 32 and T1S, R7W Sec32), in Madison County, with 2,4-D and diesel oil at a rate of three gallons per acre.

The Rochester Spray #474789 occurred in June 1970. This project involved spraying 2,285 acres of public land and 2351 acres of deeded property (T1S, R7W, Sec. 32; T2S, R7W, Sec. 15, 16, 17, 20, 21, 22, 23, 27, 28, 29, 32; T3S, R7W, Sec. 4 & 5), in Madison County, with 2,4-D and #2 diesel oil and was followed by two-years of deferred livestock grazing.

The Dry Boulder Prescribed Burn #476275 occurred in 1983. This project burned sagebrush on 25 acres of BLM-administered land (T2S R5W SWNE Sec 35) in Madison County.

## Analysis and Recommendations

Members of the IDT visited all the grazing allotments, as well as the unleased and un-allotted public land in the RNTW during 2008 and completed 9 *Rangeland Health Indicator Evaluation Matrices* on various ecological sites and plant associations. In addition, 9 Daubenmire trend studies and 11 permanent photo plots established in the 1970s and early 1980s were duplicated in 2007 and 2008 to help determine vegetative trend. The data collected was summarized and compared to baseline data providing supporting information for interpreting the upland

indicators. (see Table 3, Upland Qualitative Assessment Summary). Descriptions of these upland monitoring methodologies are found in Interagency Technical Reference 1734-4, *Sampling Vegetation Attributes*, which is available at the Dillon Field Office or online at http://www.blm.gov/nstc/library/techref.htm.

The vast majority of the uplands in the watershed are functioning properly. Table 3. outlines the findings at 9 sites throughout the watershed where the IDT completed the Indicators of Rangeland Health evaluation matrix. A moderate departure from expected conditions is analogous to a FAR rating (DOI BLM 2000). Upland sites that were found to be in the -none to slight- or -slight to moderate- departure from expected conditions category are considered to be in PFC.

**Table 3. Upland Qualitative Assessment Summary**

| ALLOTMENT NAME, NUMBER, & CATEGORY | ECOLOGICAL SITE | PLANT ASSOCIATION | DEGREE OF DEPARTURE FROM EXPECTED | | |
|---|---|---|---|---|---|
| | | | Soil Site Stability | Hydrologic Function | Biotic Integrity |
| Dry Boulder, 30236, (C) | Silty-Droughty, 15-19" Precipitation Zone (PZ) | Mountain big sagebrush / Idaho fescue | None-Slight | None-Slight | None-Slight |
| Iron Rod, 20268, (M) | Silty-Limy, 11-14" PZ | Needle and thread / blue grama | None-Slight | None-Slight | None-Slight |
| Iron Rod, 20268, (M) | Silty-Limy, 15-19" PZ | Mountain big sagebrush / Idaho fescue | None-Slight | None-Slight | None-Slight |
| Kountz, 10443, (I) | Silty-Limy, 11-14" PZ | Needle and thread / blue grama | None-Slight | None-Slight | None-Slight |
| Kountz, 10443, (I) | Silty, 15-19" PZ | Idaho fescue / bluebunch wheatgrass | None-Slight | None-Slight | None-Slight |
| Nelson SGC, 20313, (I) | Silty, 15-19" PZ | Mountain big sagebrush / Idaho fescue | None-Slight | None-Slight | None-Slight |
| Rochester Basin AMP, 20324, (I) | Shallow, 11-14" PZ | Wyoming big sagebrush / bluebunch wheatgrass | Slight-Moderate | Slight-Moderate | None-Slight |
| Rochester Basin AMP, 20324, (I) | Silty, 11-14" PZ | Needle and thread / blue grama | Slight-Moderate | Slight-Moderate | Slight-Moderate |
| Rochester Basin AMP, 20324, (I) | Silty, 11-14" PZ | Wyoming big sagebrush / bluebunch wheatgrass | None-Slight | None-Slight | None-Slight |

On the sites rated PFC or FAR with an upward trend, the quantitative monitoring data supports the findings of the IDT. The ecological condition at these upland sites is stable or improving. Evidence of erosion appears to be remnant of historical impacts, and generally matches what is expected for that ecological site.

Tall cool-season bunchgrasses, specifically bluebunch wheatgrass, are slightly reduced in many sites throughout the watershed in comparison to the Ecological Site Guides. This is likely due to long-term spring and summer cattle grazing in these areas. The IDT also found sites that were in excellent ecological condition and used them as Ecological Reference Areas.

The uplands on 20 allotments and 4 unleased parcels, comprising about 97% of the public uplands in the RNTW assessment area, are functioning properly under existing management. Two allotments, comprising about 3% of the public uplands in the RNTW, are FAR with a static or downward trend. Historic impacts (soil loss) from unregulated livestock grazing were noticeable adjacent to historic mining camps/town, especially Rochester and Silver Star.

**Allen Individual** – While the herbaceous vegetation on this allotment was productive and vigorous, the big sagebrush, green rabbitbrush, curl-leaf mountain mahogany, and juniper have been severely browsed by wildlife. Scattered leafy spurge was noted in this area. The uplands on this allotment were rated PFC.

**Ballard Custodial** – This custodial allotment is primarily secondary range and no livestock impacts were observed. Much of the allotment is forested and open parks had good herbaceous production. The uplands on this allotment were rated PFC.

**Carpenter Individual SGC** – This custodial allotment was burned in the late 1990s, but the cool-season bunchgrasses (e.g., bluebunch wheatgrass, green needlegrass) are vigorous and productive, there are many forbs present, and mountain big sagebrush is reestablishing. Some spotted knapweed was noted along the road. The uplands on this allotment were rated PFC.

**Dry Boulder** – The uplands on this allotment are primarily forested, but the few open parks are dominated by Idaho fescue, elk sedge, bluebunch wheatgrass, and mountain big sagebrush. Intermediate wheatgrass and basin wildrye were also observed on some sites. Production, vigor, and reproductive capability of perennial vegetation were excellent. Some slight pedestalling and soil loss were noted, but there was less than five percent bare ground at the study site. Scattered pockets of cheatgrass and Canada thistle were noted. The uplands on this allotment were rated PFC.

**Hells Canyon** – Many of the uplands within this allotment are dominated by bluebunch wheatgrass, Idaho fescue, and mountain big sagebrush. Because this allotment is primarily located on ridge tops with coarser soils, the IDT found reduced annual production and larger plant interspaces, particularly for the mountain big sagebrush. Pastures on the adjacent allotment were sprayed to remove sagebrush in the early 1970s and portions of this allotment may have been sprayed, as well. The coarse texture of the soil has helped its stability. The uplands on this allotment were rated PFC.

**Iron Rod** – The herbaceous vegetation on uplands at lower elevations is dominated by needle and thread, Sandberg bluegrass, and threadleaf sedge. Rocky Mountain juniper and curl-leaf mountain mahogany are found on rock outcrops. These sites have experienced a slight decline in total canopy cover, particularly for needle and thread, but overall they appear static and were rated PFC by the IDT. At lower elevations, a number of areas within this allotment are infested

with leafy spurge and some spotted knapweed. The higher elevation upland sites were dominated by Idaho fescue, bluebunch wheatgrass, and mountain big sagebrush. There is some evidence of past soil surface loss and pedestalling, but overall, the uplands on this allotment were rated PFC.

**Jackson Isolated** – This allotment is primarily secondary range. Vegetation in areas that are accessible to livestock exhibited good production and vigor, and soils appeared to be stable. On the southern-most end of the allotment, the south-facing slope was dominated by cheatgrass, while the north-facing slope had a healthy composition of cool-season bunchgrasses, mountain big sagebrush, and Douglas-fir. The uplands on this allotment were rated PFC with concerns about the cheatgrass.

**Kountz** – The uplands in this allotment had good production and vigor of cool-season bunchgrasses, good representation and distribution of functional/structural groups, and the soils appeared to be stable. The higher elevation sites were dominated by bluebunch wheatgrass, needle and thread, and Sandberg bluegrass, while on lower elevation sites dominant species also included prairie junegrass, western wheatgrass, and blue grama. The primary concern on this allotment is noxious weeds (e.g., cheatgrass, leafy spurge, houndstongue, whitetop, and spotted knapweed). The uplands on this allotment were rated PFC with concerns about the noxious weeds.

**Landmark** – This custodial allotment is primarily secondary range. The trend data show increases in bluebunch wheatgrass, Idaho fescue, green needlegrass, and sedge, while prairie junegrass, fringed sagewort, and western yarrow are decreasing. Cheatgrass was noted on the south-facing slope and along the roads. Houndstongue and a trace of spotted knapweed were also found along the roads. The uplands on this allotment were rated PFC with concerns about the noxious weeds.

**Lower Rochester** – The north portion of this custodial allotment is in excellent ecological condition with a healthy composition of cool-season bunchgrasses, mountain big sagebrush, and curl-leaf mountain mahogany, with some Rocky Mountain juniper. As with the adjacent Allen Individual allotment, the mountain big sagebrush, green rabbitbrush, and curl-leaf mountain mahogany were severely browsed. On the south portion of the allotment, along the Rochester Creek road, the basin big sagebrush and black greasewood are dead and appear to have been sprayed with herbicide. While there is some needle and thread, blue grama, and Sandberg bluegrass, their vigor, productivity, and reproductive potential is greatly reduced, which has resulted in excessive bare ground. There is also a severe infestation of cheatgrass and prickly pear cactus is abundant. While the north portion of this allotment was rated PFC, the south portion, near the road, was rated as low FAR to NF.

**Mahogany Isolated** – The majority of the uplands in this custodial allotment are steep, secondary range. Cool-season bunchgrasses in these areas exhibited good production and vigor, with a few pockets of cheatgrass. The upper slopes are dominated by curl-leaf mountain mahogany and Douglas-fir, while lower slopes had skunkbush sumac, Rocky Mountain juniper, and curl-leaf mountain mahogany. The old railroad grade has scattered debris along its length and is flanked by spotted knapweed, leafy spurge, houndstongue, common mullen, and

cheatgrass. The IDT rated the uplands on this allotment as PFC, but assigned a FAR-static rating along the railroad grade because of the noxious weeds.

**Nelson SGC** – The area near the upland study was burned prior to 1979. Frequency and canopy cover of mountain big sagebrush has increased, Idaho fescue has remained fairly static, and bluebunch wheatgrass has declined. The uplands on this allotment were rated PFC.

**Rochester Basin AMP** – The Gilfoy pasture is dominated by blue grama, needle and thread, threadleaf sedge, and Wyoming big sagebrush. Pricklypear cactus is abundant and bluebunch wheatgrass is also present. A slight reduction in the amount of litter expected for a shallow site was noted. This pasture exhibits some active pedestalling, and some soil degradation has occurred in the past, but the rocky soil adds stability and reduces the proportion of bare ground. It appears that this pasture is recovering under current management and it was rated as PFC.

The Crystal Butte pasture is dominated by blue grama, needle and thread, Sandberg bluegrass, and Wyoming big sagebrush. Broom snakeweed, pricklypear cactus, and rubber rabbitbrush are also present. It appears that this pasture, historically, was very degraded and despite improving vegetative cover and composition, there is still some active erosion, as evidenced by water flow patterns, pedestals, and soil loss in plant interspaces. Annual production is slightly reduced, but reproductive capability of perennial plants matches what is expected for the site. Several patches of leafy spurge were observed. This pasture is recovering under current management and it was rated as FAR with an upward trend.

The vegetation in the Rochester pasture is dominated by bluebunch wheatgrass, Sandberg bluegrass, prairie junegrass, and mountain big sagebrush. Much of this pasture was burned about 10 years ago, but the bunchgrasses are vigorous and productive and the sagebrush is reestablishing. There has been soil surface degradation in the past, as evidenced by some water flow patterns and pedestals, and a slight shift in the dominance of functional/structural groups. Scattered patches of cheatgrass are present throughout the pasture and spotted knapweed is present along several roads. It appears that this pasture is recovering under current management and it was rated as PFC.

**Sacry** – This custodial allotment is mostly secondary range for livestock grazing. The upland vegetation had good representation among functional/structural groups and the plants were vigorous and productive. The dominant species are bluebunch wheatgrass, green needlegrass, prairie junegrass, and mountain big sagebrush. Patches of cheatgrass and houndstongue were noted in disturbed areas. The uplands on this allotment were rated PFC with concerns about the noxious weeds.

**Sand Creek** – This custodial allotment consists of several scattered parcels that are intermingled with private property. Many of these private parcels have been the site of historic mining activity, as evidenced by tailings and adits, and have been reseeded with crested and western wheatgrasses. Patches of cheatgrass were noted throughout the parcels. The uplands on this allotment were rated PFC with noted concerns.

**Shakey Springs** – The majority of this allotment is secondary range for livestock grazing. Dominant vegetation on this allotment is bluebunch wheatgrass, needle and thread, Sandberg bluegrass and prairie junegrass. There is also some sanfoin and alfalfa from an adjacent irrigated pasture. The uplands on this allotment were rated PFC.

**Shaw Basin** – This allotment is primarily secondary range, but does provide some livestock grazing below the timber. Dominant vegetation includes bluebunch wheatgrass, green needlegrass, prairie junegrass, and mountain big sagebrush. The soils exhibit good stability and the amount of vegetative litter contributes to the amount of organic matter. The uplands on this allotment were rated PFC.

**Sparrow Ditch AMP** – The higher elevation uplands of this allotment are primarily secondary range for livestock grazing and are dominated by bluebunch wheatgrass, green needlegrass, prairie junegrass, and mountain big sagebrush. There is also healthy curl-leaf mountain mahogany on rock outcrops. At lower elevations, near the ditch, needle and thread, bluebunch wheatgrass, and Sandberg bluegrass are the dominant vegetation. The uplands on this allotment were rated PFC.

**Third Creek** – This custodial allotment is mostly forested and provides for only limited livestock grazing. In areas where the overstory canopy is more open, there is good herbaceous cover of pine grass and elk sedge, and the soils appear to be stable. The uplands on this allotment were rated PFC.

**Upper Rochester** – The majority of this custodial allotment is steep, timbered, and is secondary range for livestock grazing. The lower elevations are dominated by Idaho fescue and mountain big sagebrush, which exhibited good production and vigor. There were also many forbs on these sites that contributed to the composition of functional/structural groups. The uplands on this allotment were rated PFC.

**Vern Shaw** – The majority of this allotment is secondary range for livestock grazing and the difficult access limits the ability of livestock to graze the more suitable areas. The vegetation on this custodial allotment is dominated by bluebunch wheatgrass and mountain big sagebrush, with some Douglas-fir and curl-leaf mountain mahogany. Spotted knapweed was observed along the road on adjacent private property, but there were no noxious weeds observed on the allotment. This may become a concern if unauthorized vehicle access continues from private property to the south. The uplands on this allotment were rated PFC.

**Waterloo** – The uplands of this 162-acre custodial allotment were severely infested with cheatgrass, leafy spurge, and spotted knapweed. While needle and thread, and some bluebunch wheatgrass, were still present, the IDT rated the uplands on this allotment as FAR with a static to downward trend.

**Unallotted – London Hills** – The majority of the uplands on this parcel are comprised of steep limestone hillsides, covered by curl-leaf mountain mahogany and Douglas-fir, which are inaccessible to livestock. Along the old railroad right-of-way, there are severe infestations of

houndstongue, spotted knapweed, leafy spurge, and common mullen. The uplands on this parcel were rated PFC.

**Unallotted – Point of Rocks** – The majority of this parcel is steep with curl-leaf mountain mahogany and Douglas-fir as the dominant vegetation. Leafy spurge is a concern along the Parrot Ditch. The uplands on this parcel were rated PFC.

**Unleased – High Mountain** – This parcel is comprised of a steep limestone hillside covered by curl-leaf mountain mahogany and is largely inaccessible. The uplands on this parcel were rated PFC.

**Unleased – Dry Gulch** – This parcel is predominantly forested, but some south and west-facing slopes were dominated by bluebunch wheatgrass. Infestations of spotted knapweed were observed along the road, but they appeared to have already been identified and treated. The uplands on this parcel were rated PFC.

**Recreational Uses**
Recreational use of the area is relatively limited, except during the big game hunting season when recreational use increases to moderate levels. Summer use includes light to moderate recreational OHV use, exploration of old mine sites (primarily on adjacent patented mining claims), rock hounding, etc. in the Rochester Basin area. There is very limited public recreational access to BLM public lands in the North Tobacco Roots area, and very little use with the exception of big game hunting season when use increases slightly.

**Travel Management**
Motorized vehicles were limited to designated routes only in the Dillon Field Office's 2006 RMP. Some mapping errors and other issues with these route designations were discovered during the course of the field assessment for this watershed. Two routes designated open to motorized use on BLM lands within R5W, T2S, one in Section 28, and one in Section23 were incorrectly mapped, and do not exist. These routes should be eliminated from the BLM roads database, and removed from the designated roads coverage in our GIS and future route mapping efforts. One designated route within the Waterloo allotment in Section 6 that would appear to connect Mill Creek with Wickham Creek also does not exist, and should be removed from the designated open routes. The designated route into Wickham Creek is not accessible to the public across adjacent private lands, and should be removed from the designated routes layer.

**Noxious Weed and Cheatgrass Infestations**
Leafy spurge, spotted knapweed and Russian knapweed were the primary noxious weeds of concern found in the RNTW.

- Large infestations of leafy spurge (*Euphorbia esula*), a very aggressive noxious weed with an extensive root system, are found in the Iron Rod, Hells Canyon, Rochester Basin AMP, and Kountz allotments, primarily along drainage bottoms, but also scattered in some uplands.

- Spotted knapweed (*Centaurea stoebe*), one of the more aggressive noxious weeds in the area administered by the Dillon Field Office, is found scattered throughout the watershed, primarily along roads accessible to the public.

- There are few known infestations of Russian knapweed (*Acroptilon repens*) in Madison County with the one located in the southwest portion of the Rochester Basin AMP allotment being the most extensive. This aggressive perennial, found along Rochester creek and some of the roads within the Rochester Basin, was discovered in 2003 during the Southwest Highlands watershed assessment. Since that time it has been treated annually in the fall with backpack sprayers. Areas that had high density infestations have been reseeded with a native seed mix.

Due to the location of these three invaders, the potential is high for them to be spread by vehicles, mining, livestock, water, wildlife, recreation and other activities.

Other noxious or invasive weeds present primarily as small patches and/or widely scattered infestations in the watershed include cheatgrass, common mullen, black henbane, and Canada thistle. Cheatgrass in found in small patches throughout the watershed, primarily on south and west facing slopes where there has been some past disturbance. Black henbane is found primarily along roads, and Canada thistle is common in disturbed riparian bottoms.

Since 1989, BLM has been involved in cooperative control efforts with Madison County. Throughout this period, the goal has been to prevent new noxious weed infestations and contain, control or eradicate existing infestations in the RNTW using Integrated Pest Management (IPM).

Weed control efforts in the RNTW area have been limited throughout the years due mainly to the inaccessibility to parts of the area and limited funding. In 2001, 600 acres of leafy spurge was aerially treated, in the Iron Rod allotment, using the lowest herbicide rate recommended by the manufacturer. Due to severe drought conditions in the area at the time, a number of mountain mahogany plants were killed. This led to a Field Office ban on aerial spraying anywhere mahogany is found. Numerous releases of leafy spurge flea beetles (*Aphthona lacertosa* and *nigriscutis*) and stem boring beetles (*Oberea erythrocephala*), which may provide long term control, have been distributed in the area.

Table 4 shows the acres inventoried and the acres treated with herbicide in the RNTW during the past five years.

**Table 4. Weed Treatments in RNTW**

| Year | Acres Treated | Acres Inventoried |
|---|---|---|
| 2004 | 50 | 900 |
| 2005 | 60 | 1,000 |
| 2006 | 40 | 1,500 |
| 2007 | 31 | 1,300 |
| 2008 | 25 | 1200 |

**Recommendations for Upland Health:**

1. Address site specific concerns noted above (eg. noxious weeds, cheatgrass) on the 20 allotments in which the uplands are generally healthy or improving.

2. Shorten and alternate season of use, and/or incorporate rest on the Lower Rochester allotment.

3. Treat the extensive noxious weed infestations on the Waterloo allotment; and adjust grazing management to facilitate the restoration of native vegetation. Disposing of the parcel via land exchange is another alternative.

4. Continue to work cooperatively with Madison County and other agencies, landowners and partners to manage noxious weeds within the RNTW.

5. Continue the existing education effort on weed identification and prevention measures with the primary education target being hunters and other dispersed recreation users.

6. Due to the size and density of the leafy spurge infestations, focus control toward containing it within the areas already infested by using biological control, to reduce density and vigor of large infestations. Herbicide treatments will be focused on areas most likely to contribute to spread (i.e. roads, trails and washes).

7. Continue treatment of Russian knapweed in Rochester Basin by using integrated weed management methods with the goal of eradicating this infestation.

8. Actively encourage private landowner participation to help control weed spread. Communicate and cooperate with private landowners to gain access across their land to treat or inventory weed infestations.

## Riparian and Wetland Areas

Western Montana Standard #2: *"Riparian and wetland areas are in proper functioning condition"*

**Procedure to determine conformance with Standard:**

The RNTW contains both lotic (e.g., streams) and lentic (e.g., springs, ponds, wet meadows) systems. BLM policy specifies using several complimentary monitoring and evaluation methodologies to determine conformance with the Riparian Health Standard. The IDT is required to use the Lotic and Lentic Riparian Area Management Assessment Methodologies (TR 1737 15 and 16), also known as PFC Assessment Methodologies, to evaluate riparian systems and wet meadows. A Guide to Managing, Restoring, and Conserving Springs in the Western United States (TR 1737-17) was used for springs. These technical references are available at the Dillon Field Office or online at http://www.blm.gov/nstc/library/techref.htm.

Wetlands, streams and their associated riparian areas in the RNTW were evaluated in 2007 and 2008 using the assessment methodologies listed above as well as the Montana Riparian Wetland Assessment (MRWA) and Riparian Cover Board monitoring methodologies. The PFC assessment evaluates stream geometry, channel dimensions, hydrological function, riparian vegetative conditions, as well as soil erosion and deposition. The MRWA inventories measure riparian vegetative species composition, canopy cover, vigor and regeneration. The Riparian Cover Boards measure changes in woody canopy cover. Streams were classified according to stream type using the Rosgen Classification System.

Monitoring data obtained through Montana Riparian Wetland Assessment (MRWA) and riparian coverboard methodologies were used to help support the IDT in the assessment process. Prior to the IDT's assessment, BLM personnel re-read established coverboard plots and inventoried streams and wetlands in the watershed using the MRWA method. Dillon Field Office staff assessed streams and wetlands during the 2007 and 2008 field seasons. MRWA and cover board monitoring data (where available) were evaluated and considered before making a functionality call on each stream.

Federal protection of wetlands and riparian systems became official policy under the authority of two Executive Orders issued in 1977. The majority of developed springs in the RNTW were developed prior to the issuance of these orders, other federal laws, directives, or regulations for the management and protection of wetlands (Mitsch 1986). Current management direction requires minimization of wetland loss or degradation as well as preservation and enhancement of natural and beneficial values. This includes maintenance of hydrology. Management, restoration and conservation of springs are resource management objectives for the BLM.

In the past, many of the riparian resources within the DFO stream and wetland database have been identified based upon mapped information, aerial photos, and USGS Quads. As part of the RNTW assessment process, the resource inventory has been updated based upon field visits, photographs and ground surveys. The riparian areas within the RNTW are illustrated on Maps 3 and 4 in the appendix.

## Affected Environment

Two large rivers, the Big Hole and Jefferson, flow through the RNTW. Approximately 20 miles of riparian habitat exists on Public Land within the larger Big Hole and Jefferson River watersheds. Major tributary streams in the west half of the watershed include Rochester Creek (Big Hole) and Hells Canyon Creek (Jefferson). In the east, the main stream reaches are Mill Creek, Wickham Creek and Dry Boulder Creek. These larger systems make up the bulk of riparian habitat within this watershed. Smaller tributaries in these drainages such as First and Third Creeks, which flow into Hells Canyon Creek and Little Camp Creek, which flows into Camp Creek and then into the Big Hole River to the Northwest also provide substantial riparian habitat in the assessment area.

Riparian habitat within the RNTW varies between the western and eastern slopes of the watershed. With the exception of the Hells Canyon drainage, systems on the western slopes are low flow systems dominated by sedge and cottonwood communities. The surrounding area tends to be drier grassland. The Hells Canyon drainage is a higher energy system dominated by a

Douglas fir - red-osier dogwood habitat type more typical of the east side of the assessment area. Third Creek is a tributary stream to Hells Canyon Creek dominated by Douglas-fir and Rocky Mountain juniper. Remaining aspen stands within the drainage are declining as a result of competition with increasing conifers. Streams on the eastern slopes are higher flow systems dominated by willow, Douglas-fir/dogwood and cottonwood.

The potential of many streams in the RNTW has been altered by historic mining activities, therefore, assessments were done based on the altered potential.

**Riparian, Aquatic and Wetland Habitat and Associated Species**

Riparian and wetland habitats comprise a very small portion of the RNTW. These habitats are generally dominated by willow/cottonwood, dogwood or sedge communities along foothills streams, and often represent stringers of habitat extending below forested areas into sagebrush/ grassland habitat into lower elevation private lands in the major stream bottoms. Riparian habitat and associated species are discussed further in-depth below under biodiversity.

## Analysis and Recommendations

Prior to the IDT's assessment, BLM personnel re-read established coverboard plots on Rochester Creek and its tributaries, and inventoried the perennial streams in the watershed using the MRWA method. During the 2008 field season while completing the field work for the Rochester Watershed Assessment, the IDT assessed 34 stream reaches. The MRWA and coverboard monitoring data (where available) was evaluated and considered before making a functionality call on each stream. Prior to this assessment, many of the stream reaches had been identified based upon mapped information, aerial photos, and USGS quads. A number of these reaches were found to be dry washes and have been or are in the process of being removed from the stream/wetland inventory.

Riparian condition of streams, springs, ponds, potholes and wet meadows was placed into one of five categories: Proper Functioning Condition (PFC), Functioning At Risk with an Upward trend (FAR Up), Functioning At Risk with a static trend or no apparent trend (FAR), Functioning At Risk with a Downward Trend (FAR Down), or Non Functional (NF) using the lentic and lotic methodologies described above. The functional ratings of perennial streams, springs, and meadows/ponds are shown in Table 6 below.

**Developed Springs**

Historically, the sole purpose for these spring developments was to provide water for livestock. As such, livestock exclosures around spring sources were minimal. The IDT did an inventory of developed springs, many of which date back fifty years or more. Construction techniques typically altered hydrology and diminished resource values. In some cases a small area was fenced to protect the spring, but in many cases the spring source was not protected. Often spring structures have fallen into disrepair and fences have become dysfunctional. Many of the spring sources have dried up. Well managed springs have the potential to support rare plants, macro invertebrates, insects, fish, springsnails, amphibians and migratory birds as well as to provide water for wildlife and livestock. There are 30 developed springs within RNTW on public land. Three of these were found to be dry, eleven were found to be in poor condition, seven were in

fair condition and one spring was found to be in good condition. One spring was found to be on private. Four springs were not located and may be on private or state land.
The most common reasons for low ratings were livestock impacts or lack of maintenance (including lack of wildlife escape ramps).

**Table 5. RNTW Riparian and Wetland Habitat, Hydrologic Unit Jefferson River**

| Major Stream | Minor Stream | Tributary Stream or Spring | Allotment | BLM Reach ID | Vegetation Type | Stream Reach Length |
|---|---|---|---|---|---|---|
| Jefferson River | Hells Canyon Creek | Hells Canyon Creek | Hells Canyon | 1000 | Doug fir/dogwood Cottonwood/herbaceous | 3.01 |
| | | First Creek | Ironrod | 1030 | Cottonwood/red-osier dogwood | .25 |
| | | Third Creek | Third Creek | 1021 | Doug fir/red-osier dogwood | 1.15 |
| | | Fourth Creek | Third Creek | 1009 | Doug fir/red-osier dogwood | 1.2 |
| | Jefferson River | Jefferson trib | Ironrod | 1023 | Cottonwood/herbaceous | .25 |
| | | Blackman Gulch | Ironrod | 1025 | Geyer willow/beaked sedge | .8 |
| | | Blackman Gulch | Ironrod | 1002 | Geyer willow/beaked sedge | .6 |
| | | Jefferson | Mahogany Iso | 1028 | Geyer Willow/beaked sedge | .50 |
| | | Jefferson | Unallotted | 1026 | Geyer willow/Beaked sedge | .9 |
| Big Hole River | Bone Basin Creek | Bone Basin | Kountz | 1036 | Baltic rush/ red-osier dogwood | .2 |
| | Dry Boulder | Dry Boulder | Dry Boulder | 1012 | Doug fir/red-osier dogwood | .99 |
| | Dry Boulder | Coal Creek | Dry Boulder | 1039 | Doug fir/red-osier dogwood | .4 |
| | Gold Hill Gulch | Gold Hill Gulch | Kountz | 1037 | Douglas-fir/dogwood/ Cottonwood/herbaceous | .51 |
| | Mill Creek | Mill Creek | Waterloo | 1034 | Cottonwood/red-osier dogwood | .3 |
| | | Wickam Creek | Waterloo | 1033 | Quaking aspen/red-osier dogwood | .27 |

| Major Stream | Minor Stream | Tributary Stream or Spring | Allotment | BLM Reach ID | Vegetation Type | Stream Reach Length |
|---|---|---|---|---|---|---|
| Big Hole River | Spring Creek | Spring Creek | Waterloo | 1031 | Quaking aspen/ red-osier dogwood | .25 |
| | Camp Creek | Camp Creek (Little) | Nelson SGC | 1032 | Geyer willow/beaked sedge | .42 |
| | Rochester Creek | Rochester Creek | Lower Rochester | 1015 | Cottonwood/herbaceous | 1.13 |
| | | Rochester Creek | Rochester Basin AMP | 1003 | Geyer willow/beaked sedge | .78 |
| | | Rochester Cr trib | Rochester Basin AMP | 1004 | Geyer willow/beaked sedge | .78 |
| | | Rochester Creek | Rochester Basin AMP | 1005 | Coyote willow | .78 |
| | | Rochester Cr trib | Rochester Basin AMP | 1006 | Geyer willow/beaked sedge | 2.15 |
| | | Rochester Creek | Rochester Basin AMP | 1008 | Nebraska sedge | .69 |
| | | Rochester Cr trib | Rochester Basin AMP | 1013 | Kentucky bluegrass | .25 |
| | | Rochester Creek | Rochester Basin AMP | 1007 | Baltic rush | .5 |
| | Cottonwood Creek | Cottonwood Cr. Trib | Rochester Basin AMP | 1035 | Nebraska sedge | .17 |
| | | Cottonwood Creek | Rochester Basin AMP | 1016 | Geyer willow/beaked sedge | .39 |
| | | Cottonwood Creek | Rochester Basin AMP | 1017 | Cottonwood/herbaceous | .68 |

Reaches 1014, 1018, 1019, 1020, 1022, and 1024 were found to be dry and were removed from the BLM riparian database. Reach 1031 was dropped from the riparian data base due to the entire reach being a maintained irrigation ditch

The IDT observed various riparian health concerns on some reaches including; alteration of stream morphology (channel shape and gradient) with resultant over-widening, loss of access to floodplains, and bank down cutting. Impacts to vegetation included some loss of species diversity and composition, reduced vegetative cover, limited species recruitment and regeneration, reduced structural diversity and decreased vigor of streamside vegetation. Increasing juniper cover is adversely affecting deciduous riparian habitat on some streams in the RNTW.

Reach specific findings are described below. Additional stream reach specific data is available at the Dillon Field Office.

**Table 6. Riparian Condition and Contributing Factors**

| Allotment | BLM Reach ID | Functionality Rating | Reach Length | Contributing Factors |
|---|---|---|---|---|
| Hells Canyon | 1000 | PFC | 3.01 | Healthy dogwood, chokecherry, Rocky Mountain maple and alder. Banks stabilized by boulders |
| Third Creek | 1021 | PFC | 1.15 | Good bank stability with a good sedge component. Doug fir/juniper increasing, aspen and alder are being heavily hedged. Willows are decadent. |
| Third Creek Trib | 1009 | PFC | 1.2 | Good vegetation and stable banks. Increasing Douglas-fir is likely impacting aspen. |
| Waterloo | 1031 | PFC | .25 | Good bank stability. Rocky Mountain maple and aspen. A-B channel. |
| Waterloo | 1034 | PFC | .30 | Old and current beaver activity present. Road and culvert affecting stream. WCT stream. Leafy spurge present in riparian area. |
| Waterloo | 1033 | PFC | .27 | Diverted to flow into Mill Creek on BLM, weeds. Good vegetation component. |
| Nelson SGC | 1032 | PFC | .42 | Old beaver activity present, no recent. Some livestock impacts along outside edge of riparian. Good sedge component stabilizing banks. |
| Rochester Basin AMP | 1035 | PFC | .17 | Trib to Cottonwood Creek. Good sedge and stable banks. |
| Rochester Basin AMP | 1003 | PFC | .78 | Reach well armored by willows. Overwidened at a few crossings. Scattered noxious weeds. |

| Allotment | BLM Reach ID | Functionality Rating | Reach Length | Contributing Factors |
|---|---|---|---|---|
| Rochester Basin AMP | 1004 | PFC | .78 | Mine tailings at upper end of reach. Reach well armored by willows. Several wetland areas along reach. Some bank shearing on lower end of reach. Scattered noxious weeds along reach. |
| Rochester Basin AMP | 1006 | PFC | 2.15 | Good sedge cover with woody component showing decadence, upper reach showing some trampling. Tailings along upper reach. |
| Ironrod | 1023 | FAR Static | .25 | Series of ponds (4) from historic mining activities. Mining debris scattered along drainage. Drainage excessively mined and altered. Livestock trailing, noxious weeds. |
| Ironrod | 1002 | FAR Static | .6 | Intermittent flow, old placer mining altered channel, presence of noxious weeds. |
| Ironrod | 1025 | FAR Static | .80 | Four road crossings in upper reach, extensive historic placer mining, reduced deep rooted riparian vegetation, noxious weeds, intermittent flow. |
| Ironrod | 1030 | PFC | .25 | Heavily vegetated. Very stable banks. High PFC. |
| Mahogany Iso | 1028 | FAR | .50 | Noxious weeds, altered banks from rail road grade. Debris from railroad. |
| Unallotted | 1026 | FAR Static | .9 | Noxious weeds, altered stream bank from railroad grade. Debris from railroad. |
| Kountz | 1036 | FAR Down | .2 | Livestock concentration area, over-widened, noxious weeds, |
| Kountz | 1037 | FAR | .51 | Mine tailings contributing sediment. Livestock trailing, decreased deep rooted riparian vegetation, increasing juniper. Noxious weeds. |
| Lower Rochester | 1015 | FAR Static | 1.13 | Stream has been diverted from original channel and is impacted from heavy livestock use, weeds. |

| Allotment | BLM Reach ID | Functionality Rating | Reach Length | Contributing Factors |
|---|---|---|---|---|
| Rochester Basin AMP | 1005 | FAR Static | .78 | Upper half of reach has no surface flow but vegetation and channel are PFC. Lower half was dry and is likely a seasonally wetted channel. Weeds were present in the channel with no facultative herbaceous riparian vegetation present other than scattered willow and cottonwoods. |
| Rochester Basin AMP | 1008 | FAR Static | .69 | This reach is primarily a series of springs and seeps in an intermittent channel. Stream channel is only present for about ¾ of the reach. Very little water in channel. Overwidened. |
| Rochester Basin AMP | 1013 | FAR Static | .25 | Stream was altered in past (dugout) to provide water for livestock. Older willows showing decadence and young willows are heavily browsed. Hummocks present along most of reach. |
| Rochester Basin AMP | 1016 | PFC | .39 | Steep narrow canyon. Stream stabilized by large rocks. Some low level livestock trailing occurring along reach, but not having an impact on functionality. ATV trail along lower part of reach |
| Rochester Basin AMP | 1017 | FAR Static | .68 | Heavy browsing on young willows and cottonwoods, lack of deep rooted riparian vegetation, over widened channel and weeds |
| Dry Boulder | 1012 | PFC | .99 | High energy stream. Well armored with large cobble and boulders. Conifer habitat type. |
| Dry Boulder | 1039 | PFC | .4 | High energy stream. Good composition of mountain maple, dogwood and conifer. Majority of the flow in this stream comes from a diversion originating in Dry Boulder Creek. |

Across the RNTW, 62% (12.5 miles) of the lotic (i.e., streams, rivers) resources are properly functioning or in an upward trend and 36% (7.3 miles) are functional-at-risk with a static or downward trend. An additional 5.8 miles were found to be dry and not riparian habitat and were removed from the riparian data base.

**Recreational Use**

One location on the Jefferson River, known as the Point of Rocks, receives moderately heavy use during the fishing season as an undeveloped boat launch and take-out. The site was once minimally developed by the BLM, providing a primitive wooden vault toilet, but no other facilities. The vault toilet was removed in the mid-1990s due to problems with repeated and pervasive vandalism. BLM explored the possibility of re-developing the site in the early 2000's somewhat contingent on the support of the nearby Whitehall community to provide some level of monitoring to reduce vandalism. There was not only a lack of support for assisting with monitoring, but expressed opposition to redevelopment due to concerns over the condition of the county road, and that the site development would create additional maintenance needs on the road. A nearby semi-developed hot spring is located on private lands, but users often park on the adjacent BLM land at Point Of Rocks, contributing to the litter, weed spread, and other resource issues there.

**Recommendations for Riparian Health:**

1. Current authorized livestock grazing is contributing to unacceptable riparian habitat conditions in Rochester Basin AMP, Lower Rochester, Kountz, and Iron Rod Allotments. In accordance with BLM regulations, new allotment management plans (AMPs) addressing grazing management in these allotments will be evaluated in an EA. Changes in timing, duration, frequency and/or intensity of grazing will be considered. Additional rest and/or deferment may be incorporated into grazing plans in these allotments.

2. Salting locations, herding, and/or applicable range improvement projects should be examined to determine how these tools can be used to mitigate riparian issues.

3. Where offsite water developments are proposed to mitigate riparian impacts, protect spring source to maintain/restore hydrology and resource values. Evaluate existing spring flows when looking for new offsite water developments to determine feasibility of development.

4. At existing spring developments, rebuild/expand exclosures to encompass the entire spring source. Repair deteriorated spring developments, replace troughs as needed and install wildlife escape ramps. Where possible, relocate tanks well beyond streams and wetlands to create a buffer.

5. Consider alternatives to reduce/contain noxious weeds along Jefferson reaches 1026 and 1028. Alternatives should consider bio-control, herbicides, and reseeding. There are currently no selective herbicides approved for BLM lands that can be used this close to water and effectively control leafy spurge and spotted knapweed. Rodeo, a non-selective herbicide, would be effective, but would need to be followed up with seeding.

6. Recommendations identified above under Uplands are also recommended to manage noxious weeds in riparian habitat.

# Water Quality

Western Montana Standard #3: *"Water quality meets State standards"*

**Procedure to determine conformance with Standard:**
The Montana DEQ is responsible for making calls on water quality. Montana DEQ has been in the process of assessing the condition of streams, establishing reference sites and developing water quality restoration plans for the Beaverhead and Ruby Watersheds. For the RNTW Assessment, the IDT used a combination of assessment methodologies to evaluate the watershed characteristics and stream systems. Upland, riparian and forest health assessments were used to determine how BLM management is affecting water quality. The IDT also looked for evidence of current and historic mining, abandoned beaver dams, and erosion from roads.

The goal of the Clean Water Act, the foundation for the Montana water quality law, is to "restore and maintain the chemical, physical and biological integrity of the Nations waters." To meet that goal, waters of Montana are required to support beneficial uses. According to Montana's Draft 2006 Integrated 303d/305b Water Quality Report, non-point source pollution accounts for 90 % of the stream and 80 % of the lake impairments statewide. Atmospheric deposition is the leading cause of impairment to lakes. Stream non-point source pollution, however, is directly related to land use. Farms and ranches cover two thirds of the state and agriculture is Montana's leading industry. Pollutants from agricultural non-point sources include sediment, nutrients, salinity, thermal impacts, bacteria and pesticides.

## Analysis and Recommendations

The Big Hole River from Divide Creek downstream to the Jefferson River, Rochester Creek, Hells Canyon Creek and the Jefferson river are listed as water quality impaired streams. Following is a list of beneficial uses and probable sources of impairment for streams within the assessment area that appear in the 2006 report.

**Table 7. Montana DEQ 303-d listed streams in the RNTW Assessment Area**

| Name | Beneficial Uses | Partially Impaired Uses or not Supporting | Probable Sources of Impairment |
|---|---|---|---|
| Big Hole River | Agriculture, Industrial | Aquatic Life, Cold Water Fishery, Drinking Water | historic mining, water diversion, suspended/bedload |
| Jefferson River | Agriculture | Aquatic Life, Cold Water Fishery, Drinking Water | historic mining, water diversion, suspended/bedload |
| Rochester Creek | Agriculture, Industrial | Aquatic Life, Cold Water Fishery, Drinking Water | historic mining, heavy metals, livestock grazing, suspended/bedload |
| Hells Canyon Creek | Agriculture, Industrial, Drinking water | Aquatic Life, Cold Water Fishery, | grazing in riparian, silviculture activities, flow alterations from water diversions, sedimentation, irrigated crop production |

The BLM understands that non-point source pollution needs to be addressed for waters of the state regardless of whether they are or are not meeting water quality standards and that non-degradation rules apply to waters that meet state standards.

Land use in the area includes hardrock mining and timber harvesting in addition to farming and ranching. Agricultural non-point sources tie back to sedimentation, nutrients, etc. In addition to sediment associated with agriculture, sediment running off unpaved roads is also a concern.

A large part of the AML program has been to inspect sites on the ground which has been identified as issues in the literature. Much of the early evaluation of mining impacts for 303-d listed streams was done by interpreting air photos, therefore it is essential to identify potential problem areas and evaluate any impacts of mining on the ground. This evaluation includes the review of waste products and the potential for acid rock drainage (ARD) on site, a product of decaying sulfides which acidifies the water and leaches metals into the environment. Work to date has proven that most historic mining on BLM lands has not adversely affected water quality in the RNTW. This is because most of the mine sites are generally small, they are located a significant distance from a stream, and most are dry, therefore, any mineralized material that could have been transported from the mine has not traveled a significant distance. A few larger AML sites that are known to have impacts on water are the Rochester and Emma tailings. The Watseca Mill, located on private land in the Rochester area, may have some downstream erosion impacts on water quality and BLM lands; however they are not well understood at present. The Emma tailings, Silver Star area tailings, and Short Shift mill are smaller sites which will be evaluated in the future. These issues are discussed in the AML Analysis and Recommendations section below.

Copper (Cu) and lead (Pb) in water samples from the Jefferson River are one of the reasons this river is on the 303(d) impaired stream list. The source for this metal contamination was thought to be mining in the tributaries of the Jefferson River (PBS&J, 2005 and Land & Water Consulting, 2005). However, follow-up water sampling done for the Upper Jefferson River Watershed council by Land and Water Consulting, Inc. (2005) identified elevated Cu and Pb levels near Three Forks, but found no violation in the Upper Jefferson River, from the headwaters to the Boulder River (Land and Water Consulting Inc., 2005).

**Recommendations for Water Quality:**

1. Continue working with Montana DEQ and local Watershed Committees in the development and implementation of water quality restoration plans.

2. Implement Best Management Practices to address non-point source pollution. The major land uses on BLM lands are grazing, timber harvesting, forest health, mining and roads associated with these activities.

3. Continue field level evaluations of mining districts and AML sites, including water samples taken to help locate sources of metals reported in rivers and streams.

4. Reclaim those mines where actions can improve water quality as funding and staffing allow.

Recommendations under Upland and Riparian Health above would also improve water quality.

# Air Quality

Western Montana Standard #4: *"Air quality meets State standards"*

**Procedure to determine conformance with Standard:**
The Clean Air Act of 1990 as amended (42 U.S.C. 7401 et seq) requires the BLM to protect air quality, maintain Federal and State designated air quality standards, and abide by the requirements of State Implementation Plans.

The Environmental Protection Agency has delegated the authority to implement the provisions of the Clean Air Act to the State of Montana. Determination of compliance with air quality standards is the responsibility of the State of Montana. All of southwest Montana is in attainment, meaning that the air resource meets or exceeds all National Ambient Air Quality Standards.

The RNTW is located within the Montana/Idaho Airshed Management Area. The closest population center in the vicinity is Dillon, Montana located to the SE of the RNTW. Dillon's population is 4,035, with a population of 8,950 for all of Beaverhead County, most of the latter living within a few miles of Dillon (www.exploredillon.com).

The 1977 Amendments to the Clean Air Act resulted in the development of Air Quality Classes under the provisions of Section 160, Prevention of Significant Deterioration. The RNTW is located within a Class II airshed.

The 1998 Interim Air Quality Policy for Wildland and Prescribed Fires requires states to develop smoke management plans. The Montana/Idaho Airshed Group developed the Montana/Idaho Smoke Management Program. Prescribed burning is done in accordance with the Montana/Dakotas Fire Management Plan and is coordinated with MT DEQ and the Montana/Idaho Airshed Group. During prescribed fire season, the Smoke Monitoring Unit supports the Montana/Idaho Airshed Group to prevent or reduce the impact of smoke on area communities–especially when that smoke could contribute to a violation of national air quality standards. During the summer wildfire season, the Smoke Monitoring Unit assists state and local governments in monitoring smoke levels and providing information about smoke to the public, firefighters, and land managers.

## Analysis and Recommendations

Air Quality in southwest Montana is excellent. The closest Ambient Air Quality monitoring site to the assessment area is located south of the area administered by the Dillon Field Office in Idaho Falls. Butte is the closest Montana State Particulate Matter (PM) 10 non-attainment area. A PM 2.5 emission is a pollutant level of concern and the State of Montana is charged with

developing a strategy to address PM 2.5 emissions. Most PM 2.5 emissions are generated by fire.

Predominant winds in RNTW are out of the northwest, west and southwest. For the major part of the year, the Air Quality Standard is met throughout southwest Montana. Air quality issues in the planning area center mainly around smoke. Smoke contributors include wildfire, prescribed fires, private debris burning, agricultural burning, slash burning, and wood burning stoves and fireplaces. Wildfire can produce short-term adverse effects on air quality. Air quality and visibility can deteriorate due to temporary air stagnation during wildfire events, which are most common during the months of July, August, and September. Concerns regarding human health revolve around smoke from wildland and prescribed fire.

**Recommendation for Air Quality**

1. Continue to develop and follow burn plans and to coordinate with the Smoke Monitoring Unit.

# Biodiversity

Western Montana Standard #5: *"Provide habitat as necessary, to maintain a viable and diverse population of native plant and animal species, including special status species"*

**Procedure to determine conformance with standard:**

This Standard is an overall assessment of biodiversity and wildlife habitat. The present state of each allotment and habitat type was compared to the natural and historic conditions. The indicators described under the definition of Standard #5, as well as condition/function of the other standards, specifically uplands and riparian, were considered to determine whether or not the Biodiversity Standard was met. The presence of noxious weeds was also considered in determining conformance with this standard, but noxious weeds are discussed under the upland and riparian standards.

The IDT considered the range of natural variation within this ecosystem, the species composition, condition of available habitat, and forest health to determine the condition/function of biodiversity. In broad terms, a healthy forest is one that maintains desirable ecosystem functions and processes. Aspects of forest health include biological diversity; soil, air, and water productivity; ability to withstand natural disturbances; and the capacity of the forest to provide a sustaining flow of goods and services for people.

The wildlife habitat niches expected are: grasslands (short and mid grasses), bare ground, small streams, riparian/wetlands, sagebrush steppe, conifer forests, aspen stands, and various mixes of these components. Providing habitat for special status plant and animal species is key to meeting the biodiversity standard.

## Affected Environment

### Special Status Species

"Special Status Species" refers to both plants and animals and includes proposed species, federally listed, and candidate species under the Endangered Species Act, State-listed species, and BLM State Director-designated sensitive species (USDI 2004). Special status species are vital to maintain the biodiversity in the watershed. Two species that occur in the watershed are listed under the Endangered Species Act (ESA).

Table 8. lists all special status species, including BLM sensitive species, that occur within the RNTW during all or part of the year.

**Table 8. Special Status Species Occurring Within the Watershed**

| Wildlife Species | Current Management Status | Occur on BLM lands | Preferred Habitat Type |
|---|---|---|---|
| Gray Wolf *(Canis lupus*) | Proposed threatened in experimental areas. | Transient | ALL |
| Bald Eagle (*Haliaeetus leucocephalus*) | Sensitive | Transient | Riparian/wetland |
| Grizzly Bear (*Ursus arctos horribilus*) | Sensitive | Transients possible | Forest |
| Brewer's sparrow *(Spizella breweri)* | Sensitive | Resident | Sagebrush shrubland |
| Ferruginous Hawk (*Buteo regalis*) | Sensitive | Resident | Sagebrush shrubland |
| Flammulated Owl (*Otus flammeolus*) | Sensitive | Resident | Forest |
| Fringed myotis *(Myotis thysanodes)* | Sensitive | Transient | Grassland/woodland |
| Golden Eagle (*Aquila chrysaetos*) | Sensitive | Resident | Riparian/wetland Sagebrush shrubland |
| Great Gray Owl (*Strix nebulosa*) | Sensitive | Resident | Forest |
| Loggerhead Shrike (*Lanius ludovicianus*) | Sensitive | Transient | Sagebrush shrubland |
| Long-billed Curlew (*Numenius americanus*) | Sensitive | Resident | Grassland |
| Long-eared Myotis *(Myotis evotis)* | Sensitive | Resident | Grassland/woodland |
| Long-legged myotis *(Myotis volans)* | Sensitive | Resident | Forest/Riparian |
| McCown's longspur *(Calcarius mccownii)* | Sensitive | Resident | Grasslands |
| Sage Grouse (*Centrocercus urophasianus*) | Sensitive | Resident | Sagebrush shrubland |
| Sage Sparrow (*Amphispiza belli*) | Sensitive | Resident | Sagebrush shrubland |

| Wildlife Species | Current Management Status | Occur on BLM lands | Preferred Habitat Type |
|---|---|---|---|
| Sage thrasher (*Oreoscoptes montanus*) | Sensitive | Resident | Sagebrush shrubland |
| Swainsons Hawk (*Buteo swainsoni*) | Sensitive | Resident | Riparian/wetland Sagebrush shrubland |
| Townsend's Big-eared Bat (*Corynorhinus townsendii*) | Sensitive | Transient | Forest |
| Trumpeter Swan (*Cygnus buccinator*) | Sensitive | Transient | Wetland |
| Westslope cutthroat trout *(Oncorhynchus clarki lewisi)* | Sensitive | Resident | Streams |
| **Plant Species** | | | |
| Ute Ladies' Tresses (*Spiranthes diluvialis*) | Threatened | NO | Riparian/Wetlands under 5000 feet |
| Buff Fleabane (*Erigeron parryi*) | Sensitive | YES | Ridge crests, slopes and outcrops at 5,200-7,000 feet |

**Gray Wolf**

Gray wolves were reinstated under ESA protections on July 18, 2008 in all of MT after a Federal district court ruling. Therefore wolves will continue to be managed under the ESA non-essential experimental population regulations (10j rule). Under cooperative agreements with the FWS, MT FWP continues to be the lead agency for wolf management activities in MT. There are currently no established packs within the RNTW.

**Grizzly Bear**

A 2004 genetics study assessed the Tobacco Root Mountains as a linkage corridor for grizzly bears (Lukins 2004). The hair samples analyzed confirmed a high black bear population in the Tobacco Root Mountains, and yielded negative results for grizzly bears. Unconfirmed grizzly bear sightings have occured in the Tobacco Root Mountains in the past few years, therefore transients may be possible. Since these sightings have not been confirmed, this mountain range is currently considered as unoccupied habitat (pers. com. Jay Frederick B-DNF, 2008). Grizzly bears were de-listed in the Greater Yellowstone Ecosystem in 2007 and remain on the BLM sensitive species list.

**Westslope Cutthroat Trout**

The westslope cutthroat trout (WCT) was historically wide spread throughout streams in southwester Montana. Due to competition with non-native eastern brook trout (*Salvelinus fontinalis)*, hybridization with rainbow trout (*Oncorhynchus mykiss*) and Yellowstone cutthroat trout (*Oncorhynchus clarki bouvieri),* and habitat degradation, genetically pure populations of WCT are currently known to occupy less than 3% of their historic range in SW Montana. The WCT in Montana is currently listed as a special status species by the State, Forest Service and BLM. Currently, Mill Creek and Wickam Creek are the only known streams in the assessment area that support populations of WCT. Both streams support populations of WCT with a genetic purity of 98%.

**Fluvial Arctic Grayling**
Historically the Big Hole and Jefferson Rivers supported native fluvial arctic grayling. Today the only remaining fluvial grayling survive in the upper 1/3 of the Big Hole River outside the assessment area.

**Ute Ladies' Tresses**
Ute Ladies' Tresses is a perennial orchid that is known from only a handful of occurrences in southwest and south-central Montana in the Missouri, Jefferson, Beaverhead, Ruby and Madison River drainages. It is found in highly restricted microhabitats that are linked to shallow, stable groundwater in temporarily inundated emergent wetlands on private lands within the watershed. These may be affected at some level by small water diversions, ditches, and irrigation discharges which are widespread. Noxious weeds including leafy spurge, spotted knapweed and Russian knapweed are the most pervasive immediate threats. These noxious weeds pose threats as competitors and in the indiscriminate spraying of herbicides to treat them.

**Buff Fleabane**
The one known population of Buff Fleabane within the watershed is in a historic mining district. This population is subject to livestock grazing, however the plant is probably not palatable and likely benefits from disturbance that reduces the dominant vegetation. Leafy spurge and spotted knapweed are existing threats while road construction and other mining-related activities could pose future threats.

The majority of the public land within the RNTW is low probability habitat for the 50 plants currently on the sensitive species list for the Dillon Field Office; however a few sensitive plant species, such as Idaho Fleabane, Mealy Primrose and Rocky Mountain Dandelion are found in nearby areas. Extensive field searches for sensitive plants haven't been conducted within the assessment area, so it's quite probable some of these sensitive species may be discovered when botanical surveys are completed in conjunction with proposed projects requiring surface disturbance.

**Sagebrush Habitats and Sagebrush Dependent Species**
Sagebrush grassland habitat types are the dominant vegetation communities comprising 75% of public lands in the analysis area. Mountain big sagebrush is the dominant habitat type that supports a diversity of sagebrush-dependent wildlife species. This habitat provides crucial winter habitat for mobile wildlife species such as mule deer, pronghorn antelope, and sage grouse and nesting and foraging habitat for golden eagles and other raptors. Intermingled occurrences of Basin big sagebrush, three-tip sagebrush, and several low sage species add to the diversity of vegetation and habitat structure.

Important sage grouse seasonal habitat is centered on breeding and winter complexes found in the Rochester Basin AMP allotment. Nesting usually occurs within two miles of the lek, where suitable habitat is available. Brood rearing habitats require a mix of forbs and insects for a high protein diet, usually in association with riparian habitats. Winter diets consist of almost 100% sagebrush.

The RNTW covers portions of Hunting Districts (HD) 320, 340, and 333 for deer and elk. HD 311, 321 and 341 for antelope, HD 340 for bighorn sheep and 320 and 340 for moose. Table 9 shows the primary game species found in the RNTW and the habitat used throughout the year.

**Table 9. Primary Game Species and Habitat Use Within the RNTW**

| Species | Forested | Sagebrush | Riparian |
|---|---|---|---|
| Antelope | | **Y** | |
| Bighorn sheep | | **Y** | |
| Black bear | **Y** | **S** | **S** |
| Blue grouse | **Y** | | **Y** |
| Elk | **S,C** | **W,C** | **Y** |
| Moose | **Y** | **Y** | **Y** |
| Mule deer | **S,C** | **Y** | **W** |
| Mountain lion | **Y** | | **Y** |
| Sage grouse | **S** | **Y** | **B** |
| White tail deer | | | **Y** |

Y=yearlong, W=winter, S= summer, C=calving/fawning, B=breeding/brooding

**Riparian, Aquatic and Wetland Habitat and Associated Species**

Riparian habitat and stream conditions are discussed above, under Riparian Health. Riparian and wetland habitats comprise < 1% of the RNTW, but receive a disproportionate amount of wildlife use with approximately 75% of all wildlife species in this area utilizing riparian habitat for at least some portion of their annual life cycle. These habitats are generally dominated by willow, aspen, or cottonwood communities along foothills, streams and often represent stringers of habitat extending below forested areas into sagebrush/grassland habitat and into lower elevation foothills. These riparian and wetland communities around springs and seeps in sagebrush habitats are crucial water sources for all wildlife and are essential to maintain biodiversity within the watershed.

In the Third Creek Allotment, mature aspen are slowly dying out, mature willows are sparse, and there is little to no aspen or willow regeneration. Where aspen/willow regeneration was present, it had been very heavily browsed. Rocky Mountain juniper is scattered throughout the riparian areas of the reach. The adjacent Forest Service land was treated with fire and juniper removal in the mid to late 1990s. This project was designed to stimulate aspen regeneration and provide additional sunlight to existing aspen. In most treated areas on Forest Service land in the Third Creek area, the aspen appears to be responding favorably.

There are approximately 6.5 miles of fisheries habitat on public lands within the RNTW. Most of the fish streams in the RNTW do not support popular fisheries due to low numbers of fish. The portion of the Big Hole River located within the assessment area supports a popular fishery from spring into early summer that annually provides over 6,000 angler use days. The portion of the Jefferson River in the assessment area supports minimal angler use (approximately 163 use days) due to a low numbers of sport fish. Hells Canyon Creek supports about 70 angler use days, mostly from local fishermen.

**Forest and Woodland Habitat, Forest Health and Fuels Management**

Forest and woodland habitats comprise approximately 18% of all ownerships, as well as 18% of BLM-administered public lands within the RNTW. The majority of forested land administered by the BLM in the RNTW is found in the Highland Mountains and on the slopes of the Tobacco Root Mountains. Low elevation forest/woodlands contain Douglas-fir, limber pine, mountain mahogany, and scattered Rocky Mountain juniper. Conifer expansion into openings and sagebrush/grasslands are most evident at the low to mid-elevations of the assessment area. Mid-elevation forests are dominated by Douglas-fir. With increasing elevation, Douglas-fir gives way to lodgepole pine dominated communities. Whitebark pine is a minor component found at the highest forested elevations, generally above 8,600 feet on wind-swept ridges. The close association of much of this forested habitat with adjoining sagebrush and riparian habitats supports a broad array of wildlife species. This habitat provides security cover for big game species and migration corridors between seasonal habitats.

Spruce budworm activity is present and increasing throughout most of the forested areas of the RNTW (see Figure 1). Defoliation caused by spruce budworm is most evident on Douglas-fir, but also affects subalpine fir and spruce species. While spruce budworm does not usually cause direct tree mortality, it will predispose trees to attacks by other insects or diseases. Budworms grow more vigorously in stressed trees, and budworm populations can increase dramatically during drought conditions. Prolonged budworm epidemics cause reduced diameter and height growth (Bulaon and Sturdevant, 2006). Western spruce budworm is favored by dry summer conditions and mild winters, and has the greatest impact on trees that are stressed from dense stocking and/or drought conditions (Kamps et al., 2008).

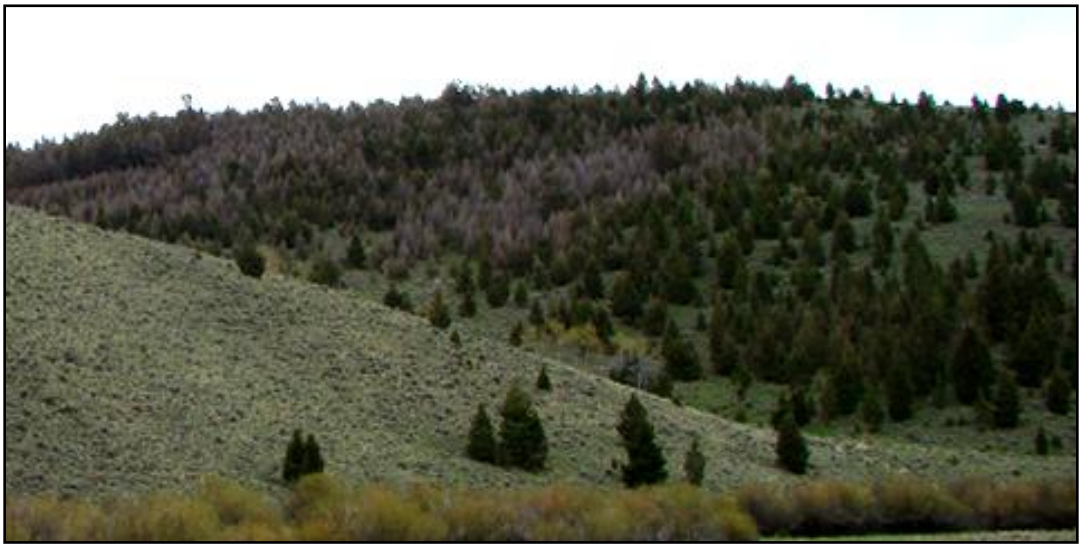

**Figure 1: Spruce budworm defoliation and conifer expansion in Nelson SGC allotment, June 2008.**

Douglas-fir beetle was not documented on BLM administered lands in the watershed, but is likely present at endemic levels. Limber pine and whitebark pine are being affected and killed by mountain pine beetle and/or white pine blister rust. Whitebark pine is declining rapidly across many parts of its range due to the combined effects of the exotic white pine blister rust,

the native mountain pine beetle, and the exclusion of fires (Arno, 1986; Kendall and Keane, 2000; Tomback and others, 2000).

Epidemic mountain pine beetle activity has also resulted in a high degree of lodgepole pine mortality (See Figure 2). During low beetle population levels, attacks occur primarily on trees under stress due to injury, drought, overcrowding, etc. However as beetle populations increase, attacks may involve mostly mature lodgepole pine trees, regardless of their apparent health. Mountain pine beetle has been noted to attack trees as small as three inches diameter at breast height on the Helena and Beaverhead-Deerlodge National Forests (pers. comm. Sturdevant, 2008).

**Figure 2: Mortality in lodgepole and limber pine caused by mountain pine beetle near the Upper Rochester Allotment, June 2008.**

Aerial photography of the Third Creek area from 1942 compared to 2008 observations shows a widespread increase in the extent of forest cover. The IDT observed some trees more than 200 years old with evidence of historic fire (i.e. fire scars). However, areas that appeared open in 1942 aerial photos are now covered with young (<120 years) Douglas-fir trees. In southwest Montana, the infilling of conifers following fire exclusion normally results in dense stand conditions. However, in the Third Creek area, the young cohort of Douglas-fir trees are fairly widely spaced, and in some places are self-thinning to maintain a natural Douglas-fir savannah (open, mature structure). This is likely a result of harsh site conditions and soils which limit the establishment of Douglas-fir trees. Rocky Mountain juniper, which is more tolerant of harsh growing conditions, has recently established in the understory of some stands resulting in increased stand density.

## Analysis and Recommendations

### Special Status Species

Gray wolf and grizzly bear are transients in the watershed and are sighted on occasion but there are no known wolf packs or grizzly territories established in the RNTW.

The Partners in Flight Bird Conservation Plan for Montana was prepared "to focus on restoring healthy ecosystems that will sustain productive and complete bird communities" (Montana Partners in Flight, 2000), and identified 141 species for priority status in five habitat groups. Most of these birds are summer residents that use habitats ranging from lower elevation wetlands to high elevation forests for breeding and raising young. Some species are migratory but small populations may be present yearlong depending on seasonal conditions. The USFWS has also identified a list of 28 "Birds of Conservation Concern" for the Rocky Mountain Region. Eight of these species have been documented to occur on public lands within the RNTW during part or all of the year (Table 10.) Most of these species are also on the BLM sensitive species list.

Long-eared myotis and Long-legged myotis are both BLM sensitive species and have been documented in the RNTW. Most of the habitat available to bats in the watershed is tied to abandon mine adits and shafts in or near sagebrush and forested habitats.

**Sagebrush Habitats and Sagebrush Dependent Species**

Sage grouse populations and sagebrush habitats have declined throughout the west due to significant habitat losses range-wide from wildfire and prescribed fire, habitat conversion for agricultural needs and urban growth, and livestock grazing. Previous petitions for listing the sage grouse under the ESA emphasize the need for region-wide assessments addressing habitat conditions and population stability. This emphasizes the importance of maintaining the integrity of mid- to late-seral sagebrush habitats on public lands, not only for sage grouse but for all sagebrush obligate species.

Due to the regional losses of sagebrush communities, and the dependent wildlife uses, maintenance and improvement of existing sagebrush habitat is important. Existing sage grouse habitat in the watershed is tied primarily to Rochester Basin AMP, Upper Rochester Carpenter Individual, Nelson SGC and the higher elevations in Iron Rod allotment. There are currently two known leks adjacent to the RNTW however; no leks have been identified within the RNTW. Recent lek monitoring efforts have failed to document leking activity, yet sage grouse are observed using these allotments yearlong. As stated earlier, upland habitat conditions were meeting the standard. However, some riparian habitats utilized during brood rearing were not found to be FAR in Rochester Basin AMP. Large scale habitat conversions adjacent to public lands in Rochester Basin AMP emphasize the importance to maintain the existing sagebrush habitats in the watershed. The *Management Plan and Conservation Strategies for Sage Grouse in Montana* completed by the Montana Sage Grouse Working Group will be used as a guideline for future management of sagebrush habitat.

Elk populations are stable in the RNTW. Mule deer and pronghorn antelope use is dispersed throughout the watershed in sagebrush habitat and are on the rise. Bighorn sheep population trends are on the decline, even after the population was augmented in 2007 and 2008 (pers com V. Boccadori MFWP 2008). Bighorn sheep are known to use Hells Canyon, Upper Rochester and Rochester Basin allotments. The higher elevation habitats that are typically used by bighorn sheep are in good condition. As stated earlier, black bear populations in the Tobacco Root Mountains remain high.

Fences can hinder wildlife movements or result in mortality to wildlife. BLM fence specifications were designed to reduce these conflicts, but some fences found in the RNTW were not meeting these standards or old fences no longer in use have not been removed.

**Riparian, Aquatic and Wetland Habitat and Associated Species**

Riparian areas provide essential habitat for moose, elk, beaver, sage grouse brood rearing and neo-tropical migrant songbirds. Bald eagles nest in the watershed along the Jefferson River on private lands and forage on adjoining Public Lands. Beaver activity is present on the upper reach of Little Camp Creek on the Nelson SGC allotment and on Mill Creek in the Waterloo allotment. Localized moose use is evident in mountain mahogany habitat in the Hells Canyon and Ironrod allotments and surrounding area. Drainages in the Dry Boulder allotment adjacent to the Beaverhead-Deerlodge National Forest, as well as habitat surrounding Little Camp Creek and Rochester Creek are known to provide yearlong moose habitat also. White tail deer occupy the Big Hole and Jefferson river valleys, but use on habitat on BLM in the RNTW is limited.

Spring developments can provide a clean water source for wildlife, but have often proved to be fatal when escape ramps are not installed in them. As stated in the Riparian standard above, many developments were found to be in disrepair, and were lacking escape ramps for birds and small mammals.

**Table 10. Fish streams, species present and habitat condition**

| Stream | Fish Species Present | Fish habitat condition |
|---|---|---|
| Mill Creek | WCT/98% | Fish habitat was in fair condition. Stream bed carried a high sediment load that was originating upstream of BLM. An old mining pond on the lower boundary provides important over-winter habitat as well as year round habitat for several hundred WCT. |
| Wickam Creek | WCT/98% | Habitat is in good condition. Stream banks were stable and generally well vegetated. |
| Dry Boulder | Rainbow trout | Habitat is in good condition. Stream banks were stable and generally well vegetated. |
| Jefferson River | Brook , brown and rainbow trout, mountain whitefish, rainbow x WCT hybrids, mottled sculpin, burbot, longnose dace, longnose, and white sucker, mottled sculpin, redside shiner, common carp | Portion located on BLM was primarily large rip rap-type boulders used to maintain a railroad bed. Very little riparian vegetation exists. Spotted knapweed, hounds-tongue and leafy spurge were present. |

| Stream | Fish Species Present | Fish habitat condition |
|---|---|---|
| Hells Canyon Creek | Brook , brown and rainbow trout, rainbow x WCT hybrids, longnose, mountain and white sucker, mottled sculpin, redside shiner. | Habitat in good condition. Stream banks were stable and generally well vegetated. |
| Rochester Creek | Brook trout | The portions on BLM were in fair to poor condition. The lower reach was likely incapable of supporting cold water species. The upper reaches could support a fishery. |

**Forest and Woodland Habitat, Forest Health and Fuels Management**

Forest Insects and Disease

Defoliation from spruce budworm was noted throughout the watershed, but was most extensive in the Upper Rochester and Nelson SGC allotments. If weather patterns improve mainly in the form of more precipitation, budworm and beetle activity may decrease (Sturdevant, 2007). Due to mortality caused by mountain pine beetle and/or white pine blister rust, some limber pine habitats may become non-existent over time, or may be converted to habitats dominated by Douglas-fir. Extensive lodgepole pine mortality caused by mountain pine beetle will result in increased fuel continuity on the forest floor as dead trees fall over.

Historical Fire Regimes

Fire exclusion, caused primarily by fire suppression and the removal of fine fuels by livestock grazing in the area since the 1860's, has changed the structure, density, and plant species composition within the RNTW. The need for and subsequent harvesting of forest products to support mining and agricultural activities in the late 1800's and early 1900's also greatly affected forest distribution, species composition and structure.

The change in forest structure, as well as increased insect and disease activity, leads to a higher likelihood of high-intensity fires occurring in areas that historically experienced more frequent low-intensity fires. Due to increasing fuel continuity, fires are also more likely to be of significantly greater size than those which historically occurred. Large-scale, high-severity fires present risks to human life and property, watershed stability and fish and wildlife habitat.

In fire adapted ecosystems, recurrent fire is the dominant disturbance that affects vegetation patterns. One method to describe this disturbance is using historical fire regimes (Table 11). The fire regime concept is used to characterize the personality of a fire in a given vegetation type, how often it visits the landscape, the type of pattern created, and the ecological effects. The historical fire regimes for the watershed are arranged based on fire severity and fire frequency.

**Table 11. Historical fire regimes for BLM-administered lands within the RNTW.**

| Historical Fire Regime | Severity (% Overstory Replacement) | Fire Interval (Years) | BLM Acres | % of BLM Forested | Representative Ecosystem |
|---|---|---|---|---|---|
| NL – non-lethal | low - <20% | 10 to 25 | 1,129 | 22% | Dry pine, conifer encroachment and juniper forests |
| MS1 – mixed severity, short interval | low - 20-30% | 20 to 40 | 2,023 | 40% | Lower elevation conifer forests |
| MS2 – mixed severity, long interval | mod - 30-80% | 40 to 120 | 1,209 | 24% | Shrublands, mixed conifer forests |
| MS3 – mixed severity, variable interval | variable - 10-90% | 45 to 275 | 8 | <1% | Higher elevation conifer forests |
| SR1 – stand replacement, short interval | high - >80% | 95 to 180 | 749 | 15% | Certain lodgepole pine, dry Douglas-fir forests |
| SR2 – stand replacement, long interval | high - >80% | 200 to 325 | 0 | 0% | High elevation whitebark pine, spruce-fir |
| SR3 – stand replacement, nonforest | high - >80% | <35 | 26,502 | | Grasslands, many shrub communities |

* The acreage calculation for each historical fire regime is based on the hydrologic unit scale. Acreage discrepancies occur through calculations made in GIS.

Fifty-five percent of forested habitats on BLM-administered lands within the RNTW are in short interval fire regimes and have missed two or more fire intervals.

Current Condition Classes

Fire Regime Condition Class (FRCC) is a classification of the amount of departure from the natural fire regime (Hann and Bunnell 2001). Coarse-scale FRCC classes have been defined and mapped by Hardy et al. (2001) and Schmidt et al. (2002), based on a relative measure describing the degree of departure from the historical natural fire regime. This departure is from changes to one (or more) of the following ecological components: vegetation characteristics (e.g., species composition, structural stages, stand age, canopy closure, and mosaic pattern); fuel composition; fire frequency, severity, and pattern; and other associated disturbances (e.g., insect and disease mortality, grazing, and drought).

Three Condition Classes were developed to categorize the current condition with respect to each of the historic Fire Regime Groups. The three classes are based on low (Condition Class 1), moderate (Condition Class 2), and high (Condition Class 3) departure from the natural (historical) regime (Hann and Bunnell 2001, Hardy et al. 2001, Schmidt et al. 2002). Criteria

used to determine current condition include the number of missed fire return intervals with respect to the historic fire return interval, and the current structure and composition of the system resulting from alterations to the disturbance regime. Low departure is considered to be within the natural (historical) range of variability, while moderate and high departures are outside. The relative risk of fire-caused losses of key ecosystem components increases as condition class designation increases.

The FRCC classifications for the RNTW based on the coarse-scale data are presented in Table 12. The data presented is the most current available and is valuable information to aid managers in estimating actual ground conditions. However, due to the limits of satellite-based imagery the coarse-scale estimates presented in Table 12. may differ from site-specific assessments made by members of the IDT. For example, the coarse-scale assessments obtained through satellite imagery do not take into account finer scale factors influencing condition class such as recent insect and/or disease outbreak, individual stand structure and associated biodiversity issues.

**Table 12. Fire regime condition class for BLM-administered lands within the RNTW**

| Condition Class | Description | BLM Acres* | % of BLM Forested | Example of Typical Management |
|---|---|---|---|---|
| 1 | Fire regimes are within a historical range, and the risk of losing key ecosystem components is low. Vegetation attributes (species composition and structure) are intact and functioning within a historical range. Fires burning in CC1 lands pose little risk to the ecosystem and have positive effects to biodiversity, soil productivity, and hydrologic processes. | 2,605 | 51% | Historical fire regime is replicated through periodic application of prescribed fire or through fire use. |

| Condition Class | Description | BLM Acres* | % of BLM Forested | Example of Typical Management |
|---|---|---|---|---|
| 2 | Fire regimes have been moderately altered from their historical range. The risk of losing key ecosystem components is moderate. Fire frequencies have departed from historical frequencies by one or more return intervals (either increased or decreased) resulting in moderate changes to one or more of the following: fire size, intensity and severity, and landscape patterns. Vegetation attributes have been moderately altered from their historical range. Wildland fires burning in CC2 lands can have moderately negative impacts to species composition, soil conditions, and hydrologic processes. | 27,436<br><br>(NOTE: Actual forested cover in this condition class is approx. 934 acres. The remainder is sagebrush/ grassland.) | 18% | Moderate levels of restoration treatments are required, such as a combination of prescribed fire with mechanical/hand treatment. |
| 3 | Fire regimes have been significantly altered from their historical range. The risk of losing key ecosystem components is high. Fire frequencies have departed from historical frequencies by multiple return intervals resulting in dramatic changes to one or more of the following: fire size, intensity, severity, and landscape patterns. Vegetation attributes have been significantly altered from their historical range. Wildland fires burning in CC3 lands may eliminate desired ecosystem components, exacerbate the spread of unwanted non-native species, and result in dramatically different ecological effects compared to reference conditions. | 1,580 | 31% | High levels of restoration treatments, such as mechanical treatments, are required before fire can be used to restore desired ecosystem function. Intensive efforts, which may include seeding, herbicide application, biomass removal, and other types of rehabilitation, are required for CC3 lands. |

| Condition Class | Description | BLM Acres* | % of BLM Forested | Example of Typical Management |
|---|---|---|---|---|
| Current conditions are a function of the degree of departure from historical fire regimes resulting in alterations of key ecosystem components such as species composition, structural stage, stand age, and canopy closure. One or more of the following activities may have caused this departure: fire suppression, timber harvesting, grazing, introduction, and establishment of exotic plant species, insects or disease (introduced or native), or other past management activities (Laverty, Williams 2000). | | | | |

*The acreage calculation for each condition class is based on the hydrologic unit scale. Acreage discrepancies occur through calculations made in GIS.

Based on the coarse-scale FRCC analysis, site-specific FRCC assessments, and historic photos of the area, the lower to mid elevation forested portions of the RNTW are moderately to severely departed from natural (historic) conditions.

**Recommendations for Biodiversity:**

1. Modify existing wildlife barrier fences wherever they occur. The need to construct new fences should be evaluated to minimize the potential to restrict wildlife movements. Remove fences no longer needed for management purposes.

2. Continue sagebrush habitat inventory to identify important sage grouse seasonal habitats with emphasis on locating active leks and brood-rearing habitats. Implement recommendations in the Management Plan and Conservation Strategies for Sage Grouse in Montana to improve habitat conditions for all sagebrush obligate species.

3. Work with the county and USFS to reduce sediment runoff from the Mill Creek road.

4. Analyze constructing a water control/fish barrier at the outlet of the small pond on Mill Creek to increase water depth to provide additional overwinter habitat for WCT.

5. Ensure that all stock tanks in the watershed are functioning and are outfitted with an operational wildlife escape ramp.

6. Analyze the use of prescribed fire and/or mechanical treatments to restore deciduous woody species in juniper-dominated riparian habitats where concerns were documented, particularly in the Third Creek Allotment.

7. Follow recommendations by the IDT for mitigating resource concerns in the riparian areas associated with the streams in the RNTW which will address fisheries habitat issues.

8. Survey all recommended AML closures for the potential for bat use. If use is determined, closures will be constructed to allow bat passage.

Recommendations for Upland and Riparian Health will also improve biodiversity.

# AML and Travel Management

**Abandoned Mine Lands**
Abandoned Mine Lands (AML) work in southwest Montana is conducted under a zoned program which incorporates Dillon, Missoula, and the Butte Field Offices. AML issues are generally divided into two categories- those with environmental issues and those with physical safety problems, it is not uncommon for these issues to overlap on the same project. Numerous inventories of mines with environmental and/or physical safety issues available from the Department of State Lands (Pioneer Technical Services, 1995), the Montana Bureau of Mining and Geology (MBMG, 1997), Tetra Tech, Inc. (2003), and BLM staff contributes to a list of sites

Mining activity is typically cyclic with the amount of exploration or development of resources directly related to the demand for the material, technology available, and the market price of the commodity. The RNTW contains several significant mineralized districts, including the Rochester, Silver Star, Renova, Tidal Wave and Sand Hill Districts. While much of the high-grade material in these areas has been discovered and removed, they still hold potential to contain additional resources. It is likely there will be future mining activity in these districts.

The AML program is an ongoing program which has been addressing legacy mining issues throughout southwest Montana. AML work will continue until all environmental and physical safety issues that can be resolved have been completed. Reclamation will be prioritized by the magnitude of the environmental problem, the severity of the safety risk, funding available, and/or the partnerships available to conduct the work. It will be conducted on a watershed or district scale when possible.

**Travel Management**
Motorized vehicles were limited to designated routes only in the Dillon Field Office's 2006 RMP. Some mapping errors and other issues with these route designations were discovered during the course of the field assessment for this watershed. Two routes designated open to motorized use on BLM lands within R5W, T2S, one in Section 28, and one in Section23 were incorrectly mapped, and do not exist. These routes should be eliminated from the BLM roads database, and removed from the designated roads coverage in our GIS and future route mapping efforts. One designated route within the Waterloo allotment in Section 6 that would appear to connect Mill Creek with Wickham Creek also does not exist, and should be removed from the designated open routes. The designated route into Wickham Creek is not accessible to the public across adjacent private lands, and should be removed from the designated routes layer. These routes will all be mapped and evaluated in the EA process.

## Analysis and Recommendations

To determine the best reclamation method for each mine a detailed field evaluation must be conducted. Sites with potential water quality issues are reviewed under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) process and only those with physical safety issues are addressed under the NEPA process. A site assessment includes a review for a potentially responsible party (PRP), the geochemical character of the waste rock and tailings impoundments, delineation of the extent of contaminant transport, a cultural inventory and clearance through SHPO, evaluation of the sites for potential animal habitat, and a sensitive

plant species review. The reclamation method chosen for each mine is based on the relative importance of the critical components of the site as well as the accessibility/workability of the area. As work progresses, mining areas which have not been sufficiently inventoried will be assessed. To date significant reclamation work has been conducted south of Dillon at Ermont and at 31 isolated open mines with safety issues throughout the DFO area.

**Rochester Nez Perce Mining District**

*Environmental Issues*

The BLM AML site with the largest environmental impact in the DFO is the Rochester Tailings. These tailings were deposited in an impoundment adjacent to Rochester Creek. While the impoundment was never breached sampling indicated that tailings material bearing lead (Pb) and arsenic (As) was being transported away from the impoundment by wind erosion and livestock tracking. Because stream flow in Rochester Creek is intermittent, downstream fluvial transport of mineralized material from the Rochester Tailings is interrupted (Tetra Tech Inc., 2003). These tailings are currently being removed from the site by the active claimant and reprocessed at the Golden Sunlight Mine. After processing they will be contained in Golden Sunlight's tailings impoundment. The work should be finished in early 2009, after which the BLM will reclaim the surface. Removal of the mineralized tailings from the floodplain will resolve the environmental problems from the tailings. The primary costs of this reclamation are being born by the claimant.

The Watseca, located on private lands in Rochester Basin, consists of a series of breached tailings impoundments, several slag piles and numerous waste rock piles. As with the other Rochester District sites As and some localized Pb are the principal metals of concern in sediment. Water quality samples taken downstream of the Watseca are elevated in arsenic (As), copper (Cu), iron (Fe), lead (Pb), and mercury (Hg). Water quality samples taken upstream of the Watseca are elevated in Fe, Pb, and Hg. Samples taken below the Rochester tailings also contain some elevated metal levels, however the metal levels are less than below the Watseca, suggesting the Watseca has a larger impact on the creek than the Rochester tailings (Tetra Tech 2003). The land ownership is very complex in the Rochester District and it is unclear to what level the tailings have eroded onto BLM lands from the Watseca. In the future, the BLM will determine the specific impacts on public lands in Rochester Creek and evaluate the effectiveness of a removal action.

The Emma tailings are located in an isolated breached impoundment located in a dry gully. Tailings material is being transported by seasonal runoff and wind erosion. As this impoundment is very isolated and the site is dry for most of the year, impacts from this erosion are considered moderate. The BLM will evaluate conducting a phytostabilization project on this site.

*Hazardous Mine Openings (HMO)*

Numerous HMO sites have been identified by Tetra Tech Inc. (EEE/CA, 2003) in the Rochester Nez Perce District. All of the required cultural inventories and bat surveys have been conducted as part of the process to close HMOs. The DFO has begun conducting in-house closures for some of these HMOs which are on BLM lands and have no active claimants. This work will continue until the work is completed.

**Silver Star District**

*Environmental Issues*

West of Silver Star are some tailings which have been transported onto BLM lands. These tailings are deposited in small isolated pods along a narrow steep unnamed drainage and in a flat area below the confluence of two unnamed drainages. Their impact is thought to be minimal because the amount of tailings appears to be small and for the most part they are revegetated with big sagebrush. The BLM will evaluate the extent of the tailings and their impact on the watershed in the future.

*Hazardous Mine Openings*

Most of the north portion of the Silver Star District has been inventoried for HMOs. Four sites in this area have been listed for future evaluation and potential closure. The southern Silver Star District, including the Iron Rod mine, has not been inventoried to date.

**Renova District**

*Environmental Issues*

The Renova District is smaller than many. However, detailed AML surveys of BLM lands have not been completed to date. No environmental issues on BLM have been recognized or are known in this district.

*Hazardous Mine Openings*

One small HMO has been recognized to date at the Mayflower mine and is fenced to discourage public entry. No sites are reported in the Gold Hill area. Continued inventory and closure work will be conducted in the Renova District as work in other areas is completed.

**Tidal Wave District**

*Environmental Issues*

Detailed AML surveys of BLM lands have not been completed in the Tidal Wave District, however no environmental issues on BLM have been recognized to date or are known in this area. AML reclamation work will be conducted as other areas are completed.

*Hazardous Mine Openings*

One HMO has been recognized at the Lead Queen Mine. Cultural and bat survey work to close this mine has been initiated. Continued inventory and closure work will be conducted in this district as work in other areas is completed.

**Sand Creek District**

*Environmental Issues*

There are no environmental issues in the Sand Creek District

*Hazardous Mine Openings*

A few small abandoned mines are present on BLM lands in the Sand Creek District. Some of these locations need clarification. While most are small and do not present a significant hazard they will be addressed in the future.

**Melrose District**

*Environmental Issues*

The Short Shift Mill is located in the upper reach of Camp Creek. Below the mill is a very small deposit of tailings, the extent and effect of which are unknown. This area and the effects of the tailings will be evaluated as a future AML project.

*Hazardous Mine Openings*

Six HMOs in Camp Creek were closed as part of an AML project which closed 66 mine sites in Camp Creek and Soap Gulch in 2008. Three sites are in the process of being closed. This work should complete the closures of HMOs in the lower portions of Camp Creek and Soap Gulch.

## General Recommendations for Watershed

1. Rochester District – significant background work is complete in the district, the Rochester Tailings are presently being removed, and reclamation will be completed in 2009. Evaluate the Emma Tailings phytostabilization potential, evaluate impacts of the Watseca on BLM lands, and finish the HMO closures.

2. Silver Star District - the northern portion of this area has been inventoried. Evaluate Silver Star tailings, inventory southern district, address HMO closures, and tailings if appropriate.

3. Tidal Wave District – Close the Lead Queen Mine, inventory historic mines indicated on maps, address HMOs as appropriate.

4. Renova District – Close the Mayflower Adit, inventory Gold Hill area, and address HMOs as appropriate.

5. Sand Hill District – Evaluate HMOs in relationship to land ownership, address HMOs as appropriate.

6. Melrose District – Assess, and reclaim if appropriate, the Short Shift tailings impoundment.

7. The travel routes identified above should be mapped and evaluated in the EA process.

## Interdisciplinary Team Composition

**Core IDT members for the RNTW Assessment include:**
Kelly Bockting, Wildlife Biologist - IDT leader
Brian Thrift, Rangeland Management Specialist
Kipper Blotkamp, Fuels Specialist
Paul Hutchinson, Fisheries Biologist
Steve Armiger, Hydrologist/Riparian Coordinator
Pat Fosse, Assistant Field Manager – Renewable Resources
Emily Guiberson, Forester

**Support IDT members include:**
Jason Strahl, Archaeologist
Katie Benzel, Wildlife Biologist
Michael Mooney, Weeds Specialist
Brian Hockett, Rangeland Management Specialist TES-plants
Rick Waldrup, Outdoor Recreation Planner/Wilderness Specialist
Bob Gunderson, Geologist
Joan Gabelman, Geologist
Aly Piwowar, Forester
Corey Meier, Soil Scientist

**Other specialists involved:**
David Early, Rangeland Management Specialist
Tim Bozorth, Dillon Field Manager
Carina Rosterolla, Biological Technician
Vicki Van Sickle, Biological Technician
Laura Cerruti, Biological Technician
Steve Lubinski, Range Technician
Shane Trautner, Range Technician
Brad Williams, Range Technician
Dustin Anderson, Range Technician
Kelly Urrestri, Range Technician
Jordan Wells, Range Technician
Mary Koerner, Range Technician

**Other agency staff consulted or involved:**
Dick Oswald, Fisheries Biologist, Montana Department of Fish, Wildlife and Parks
Bob Brannon, Game Biologist, Montana Department of Fish, Wildlife and Parks
Vanna Boccadori, Game Biologist, Montana Department of Fish, Wildlife and Parks

# GLOSSARY OF TERMS

**Allotment:** an area of land designated and managed for grazing of livestock.

**Allotment Management Plan (AMP):** a documented program developed as an activity plan, that focuses on, and contains the necessary instructions for, the management of livestock grazing on specified public lands to meet resource conditions, sustained yield, multiple use, economic and other objectives.

**Animal unit month (AUM):** amount of forage necessary for the sustenance of one cow or its equivalent for a period of 1 month.

**Bankfull stage:** "The bankfull stage corresponds to the discharge at which channel maintenance is most effective, that is, the discharge at which moving sediment, forming or removing bars, forming or changing bends and meanders, and generally doing the work that results in the average morphologic characteristics of channels." Dunne and Leopold (1978).

**Channel stability:** the ability of the stream, over time, to transport the flows and sediment of its watershed in such a manner that the dimension, pattern and profile of the river is maintained without either aggrading nor degrading.

**Entrenchment:** the vertical containment of river and the degree to which it is incised in the valley floor.

**Entrenchment ration:** a quantitative expression of the ratio of the floodprone width to the bankfull width.

**Floodprone width:** width measured at an elevation which is determined at twice the bankfull depth.

**Forest land**: land that is now, or has has the potential of being, at least 10 percent stocked by forest trees (based on crown closures) or 16.7 percent stocked (based on tree stocking).

**Functional at risk (FAR):** riparian wetland areas that are functional, but an existing soil, water, or vegetation attribute makes them susceptible to degradation.

**Hydric soil:** soil that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part.

**Lacustrine:** from the French "lacustre" or lake. Permanently flooded lakes and reservoirs, generally over 20 acres, exhibiting wave-formed or bedrock shoreline features (Cowardin *et al*., 1979)

**Lentic:** standing or still water such as lakes and ponds.

**Lotic**: flowing or actively moving water such as rivers and streams.

**Nonpoint source pollution:** pollution originating from difuse sources (land surface or atmosphere) having no well defined source.

**Palustrine:** from the Latin "palus" or marsh. non-tidal wetlands dominated by trees, shrubs, persistent emergent plants, emergent mosses or lichens. (Cowardin *et al.*, 1979)

**Proper functioning condition (PFC):** Lotic riparian-wetland areas are considered to be in proper functioning condition when adequate vegetation, landform, or large woody debris is present to:

- Dissipate stream energy associated with high waterflow, therEBy reducing erosion and improving water quality;
- Filter sediment, capture bedload, and aid floodplain development;
- Improve flood-water retention and ground-water recharge;
- Develop diverse ponding and channel characteristics to provide the habitat and the water depth, duration, and temperature necessary for fish production, waterfowl breeding, and other uses;
- Support greater biodiversity

**Riparian zone:** the banks and adjacent areas of water bodies, water coursed, seeps, and springs whose waters provide soil moisture sufficiently in excess of that otherwise available locally so as to provide a moister habitat than that of contiguous flood plains and uplands.

**Rosgen Classification System.** The Rosgen system classifies streams at five levels. Level I is a broad level delineation that takes into consideration landform, landscape position, slope, and profile. Streams are classified at this level using aerial photographs and maps. The Level II was developed by Rosgen using reference reaches, i.e. stable stream reaches. Dimensions, patterns and profiles were measured develop Level II. Field guides have been published to make field determinations at this level. Classifying streams to Level III, IV and V is beyond the scope of this document.

**Spring brook:** a channel that carries water from a spring. Where there is sufficient flow, the channel forms a perennial stream. Frequently in arid environments, the flow is insufficient to create a perennial stream. Groundwater emerges at the springhead, flows a short distance within the spring brook, and then submerges.

**Woodland:** forest communities occupied primarily by noncommercial species such as juniper, mountain mahogany, or quaking aspen groves. All western juniper forest lands are classified as woodlands, since juniper is classified as a noncommercial species. Woodland tree and shrub canopy cover varies, but generally individual plant crowns do not overlap.

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