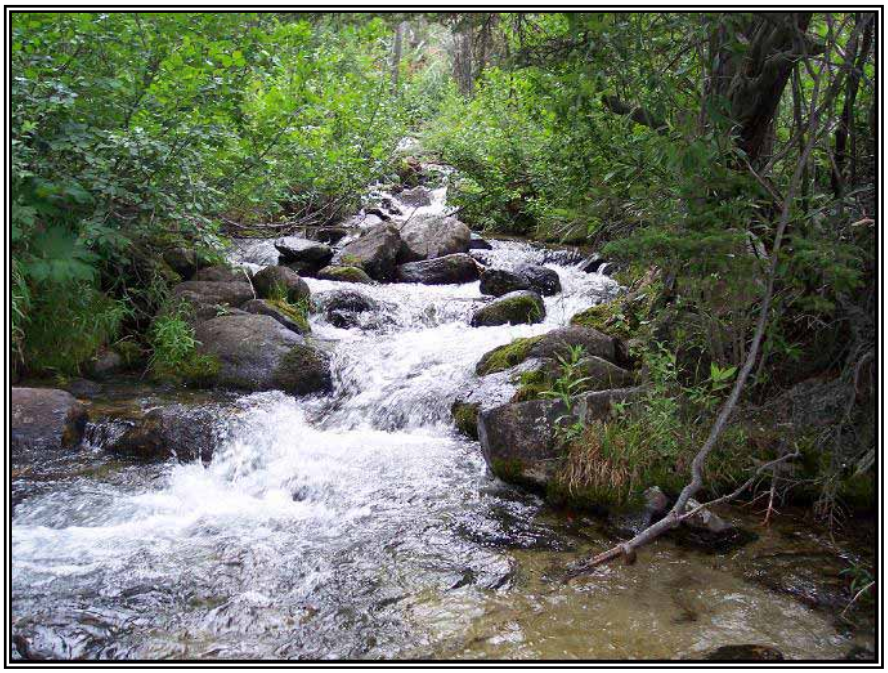
APPENDIX IV

FISHERIES/AQUATICS REPORT
AND
BIOLOGICAL EVALUATION
FOR
ENVIRONMENTAL ASSESSMENT

EAST ROSEBUD, WEST ROSEBUD, BUTCHER CREEK, RED LODGE CREEK ALLOTMENTS & BLACK BUTTE WILDLIFE HABITAT AREA

RANGELAND PROJECT



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INTRODUCTION

This report addresses the potential effects of domestic livestock grazing on fish and amphibian resources within the Butcher Creek, Red Lodge Creek, East Rosebud, and West Rosebud Allotments of the Beartooth Ranger District, Custer National Forest, Montana. Affected environment descriptions and environmental analyses are based on general reviews of the project area, site-specific field reviews**,** Proper Functioning Condition (PFC) methodology, and fish and amphibian population survey and distribution data. The analysis area includes all surface waters within the Forest boundary of the allotments covered in this analysis.

The Report is organized as follows:

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- **a. Federal**
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- **b. State - Montana Water Quality Law**
  - ***- Surface Water Classification***
  - ***- Surface Water Quality Standards***

- **c. Forest Service**
  - ***- Custer National Forest Land and Resources Management Plan***
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  - ***- Memorandum of Understanding and Conservation Agreement for Westslope Cutthroat Trout and Yellowstone Cutthroat Trout in Montana***

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APPLICABLE LAWS, REGULATION AND POLICY

a. Federal

Clean Water Act

The Clean Water Act provides the overall direction for the protection of waters of the United States, from both point and nonpoint source of water pollution. This Act requires Federal Agencies to comply with all Federal, State, and local requirements, administrative authority, process and sanctions related to the control and abatement of water pollution (CWA, Sections 313(a) and 319(k)). The Act gives authority to individual States to develop, review, and enforce water quality standards under Section 303. This section also requires the States to identify existing water bodies that do not meet water quality standards, and develop plans to meet them. These plans are commonly called TMDLs, or total maximum daily load.

Presidential Executive Order 12962

Presidential Executive Order 12962, signed June 7, 1995, furthered the purpose of the Fish and Wildlife Act of 1956, the National Environmental Policy Act of 1969, and the Fish and Wildlife Coordination Act, seeking to conserve, restore, and enhance aquatic systems to provide for increased recreational fishing opportunities nationwide. This order directs Federal agencies to “improve the quantity, function, sustainable productivity, and distribution of aquatic resources for increased recreational fishing opportunity by evaluating the effects of Federally funded, permitted, or authorized actions on aquatic systems and recreational fisheries and document those effects relative to the purpose of this order.”

b. State - Montana Water Quality Law

The Montana Water Quality Act establishes general guidelines for water quality protection in Montana. It requires the protection of Montana’s water, as well as the full protection of existing and future beneficial uses.

Surface Water Classification

The Montana Department of Environmental Quality has classified all waters within the project area as B-1 waters. The beneficial uses associated with this classification include; drinking, culinary and food processing purposes, after conventional treatment; bathing, swimming, and recreation; growth and propagation of salmonid fishes and associated aquatic life, waterfowl, and furbearers; and agricultural and industrial water supply (Administrative Rules of Montana (ARM) 16.20.607/618).

Surface Water Quality Standards

The Montana Water Quality Act, Surface Water Quality Standards require that land management activities must not generate pollutants in excess of those that are naturally occurring, regardless of the stream's classification. Under ARM 17.30.623 (2) (f) "No increases are allowed above naturally occurring concentrations of sediment, settleable solids, oils, or floating solids, which will or are likely to create a nuisance or render the waters harmful, detrimental, or injurious to public health, recreation, safety, welfare, livestock, wild animals, birds, fish, or other wildlife."

c. Forest Service

Custer National Forest Land and Resources Management Plan

Management goals for wildlife and fisheries management are identified in the Forest Plan under Chapter II - Forest Wide Management Direction and Chapter III – Management Area Direction.

The Forest Plan goal for wildlife and fisheries management is to:

"[M]anage and/or improve key wildlife and fisheries habitats, to enhance habitat quality and diversity, and to provide wildlife and fish-oriented recreation opportunities. Most of the critical habitat areas have been incorporated into management areas that maintain or improve these key habitats. Wildlife and fisheries management is considered in all management areas and the level of wildlife habitat management will increase over time." (page 3)

Forest Plan management standards for wildlife and fisheries management state:

"[M]anage the land to maintain at least viable populations of existing native and desirable non-native vertebrate species promote the conservation of federally listed threatened and endangered species and coordinate and cooperate with appropriate state, federal and private agencies in the management of habitats for major interest species." (page 16)

Goals for Management Area M (Riparian) are:

"Adequate tree and shrub vegetation to contribute to stable bank and stream cover will be maintained unless project analysis indicates a need to reduce cover to meet fish or wildlife habitat objectives. Water quality will be protected or improved." (page 80)

Forest Plan direction for Management Indicator Species:

"Management Indicator Species include both biological indicators (those species which represent a whole group of other species that use the habitat similarly), as well as species of high interest, such as the major hunted species and those listed as threatened or endangered. The Custer National Forest has established a list of management indicator species and habitat indicators based upon National Forest Management Act (NFMA) and planning regulations criteria which include the following categories". (page 18).

Category: Habitat Indicator Species (page 18)

Native-strain Yellowstone cutthroat trout *Oncorhynchus clarki bouvieri* are designated in the Forest Plan as an aquatic Habitat Indicator Species for cold water habitats. Physiological and biological requirements of wild, nonnative salmonid species found throughout the project area are comparable to that of cutthroat trout. Therefore, for the purpose of this report, all wild trout within the project area are considered Management Indicator Species (MIS).

Category; Fisheries (page19)

Management of fisheries resources include:

1) “Fish species and habitats will be managed in cooperation with state and other Federal agencies.”

2) “An inventory will be made of warm and cold water fisheries potential. In suitable areas, activities will be designed to maintain, develop or create cold and warm water fisheries. Streams and lakes supporting pure strains of fish species will be managed to maintain or expand these populations.”

3) “Resource management activities will be conducted in such a manner to assure maintaining water quality and quantity in order to maintain fish habitat. An implementation program will be designed to identify specific activity constraints and will be guided by the following guidelines:”

Guidelines:

d)”Riparian vegetation, including shrub and overstory tree cover, will be managed along all perennial streams with defined channels to provide shade, to maintain streambank stability and in-stream cover, and to promote filtering of overland flows.”

e) “Shorelines along reservoirs and lakes that support cold or warm water fisheries will be managed to encourage the establishment of bank vegetation and maintenance [or] improvement of water quality.”

Sensitive Species

Sensitive species are those animal species identified by a Regional Forester for which population viability is a concern as evidenced by a significant current or predicted downward trend in population numbers, density, or in habitat capability that will reduce a species' existing distribution (FSM 2670.5.19). There are ten species listed as sensitive for Region 1.

Protection of sensitive species and their habitats is a response to the mandate of the National Forest Management Act (NFMA) to maintain viable populations of all native and desired non-native vertebrate species (36 CFR 219.19). The sensitive species program is intended to be pro-active by identifying potentially vulnerable species and taking positive action to prevent declines that will result in listing under the Endangered Species Act.

As part of the National Environmental Policy Act (NEPA) decision-making process, proposed Forest Service programs or activities are to be reviewed to determine how an action will affect any sensitive species (FSM 2670.32). The goal of the analysis should be to avoid or minimize impacts to sensitive species, if impacts cannot be avoided the degree of potential adverse effects on the population or its habitat within the project area and on the species as a whole needs to be assessed.

Memorandum of Understanding and Conservation Agreement for Westslope Cutthroat Trout and Yellowstone Cutthroat Trout within Montana.

The Custer National Forest is a cooperator in the Memorandum of Understanding and Conservation Agreement for Westslope and Yellowstone Cutthroat Trout within Montana (MOUCA) (MTFWP 2007). The management goals of the MOUCA are to: 1) ensure the long-term, self-sustaining persistence of each subspecies distributed across their historical ranges, 2) maintain the genetic integrity and diversity of non-introgressed populations, as well as the diversity of life histories, represented by remaining cutthroat trout populations, and 3) protect the ecological, recreational, and economic values associated with each subspecies (MTFWP 2007). The MOUCA specifies that maintaining, securing, or enhancing populations entail: 1) protecting, conserving, or restoring habitat (including watersheds that currently support or have a high potential to support cutthroat trout), 2) reestablishing connectivity among isolated populations, and 3) applying regulations that protect cutthroat trout (MTFWP 2007). No known YCT populations persist within the project area of this analysis. However, all perennial waters in the project area are within the historic distribution of YCT and therefore qualify as potential restoration habitats for this subspecies.

ASSUMPTIONS, METHODOLOGY AND SCIENTIFIC ACCURACY

Riparian systems within the allotment review area were assessed during the 2005 field season following the Proper Functioning Condition (PFC) Assessment process (USDI Bureau of Land Management 1998, 2003). This process allowed for independent evaluation of both lentic (standing water) and lotic (flowing water) systems. The PFC process is currently the most effective tool on the Forest for protecting and improving fish and amphibian habitat from the impacts of livestock grazing, and should receive the highest consideration for evaluating allotment management relative to fisheries. Therefore, the previous information concerning riparian condition (see Appendix III, Riparian Ecosystem Report) forms the basis for determining effects to fisheries. For this report, descriptions of affected environment and the environmental analysis are based on general reviews of the project area, site-specific field reviews**,** Proper Functioning Condition (PFC) Assessments, and fish and amphibian population and distribution data.

AFFECTED ENVIRONMENT

Introduction

Fish bearing streams occurring within the project area include: 1) West Rosebud Creek and Morris Creek in the West Rosebud Allotment, 2) East Rosebud Creek and Hellroaring Creek in the East Rosebud Allotment, and 3) West Red Lodge Creek in the Red Lodge Creek Allotment. The remaining perennial systems in the project area, including East Fork Butcher Creek, Cold Creek, Black Canyon Creek, and 9 unnamed headwater tributaries, are not known to support fish. Amphibian habitats are present in all allotments. These include abandoned and active beaver ponds, and low gradient reaches of low-flow perennial channels.

a. Grazing Influences on Aquatic Species and Habitat

Natural disturbance and human induced activities can and to some extent have, adversely impacted aquatic resources within the project area (Table 1). Of the activities listed in Table 1, livestock grazing throughout the allotments analyzed in this report has and holds potential to impact aquatic systems and biota to varying degrees. Livestock grazing has occurred within the project area since the early 1900s.

Table 1. Degree of impact from past, present and reasonably Foreseeable activities on aquatic resources in the project area

Activity	Common type of habitat alteration or affects on aquatic species	Degree of impact in analysis area
Fire Suppression	Fire fighting that interrupts the natural ecological processes affected by wildland fire.	Moderate to High
Wild Fire	In the East Rosebud drainage; the 1996 Shepard Mountain Fire.	Moderate to High
Grazing	Bank alteration, channel over widening, sediment introduction, fish habitat modification	Low to High
Beaver Reduction	Lower water tables, smaller willow communities and less wetland/riparian/aquatic habitat	Low to High
Nonnative Trout Introduction	Competition for food and space, hybridization and predation by the non-native trout	High
Dams	Altered water temperatures, fish migration barriers, altered sediment transportation, altered aquatic communities, altered flow regimes (Mystic Lake Dam in the West Rosebud Drainage[1])	Low to Moderate
Fishing	Injury due to catch & released fishing, and harvesting of catchable fish (E and W Rosebud Creek)	Low to Moderate

Activity	Common type of habitat alteration or affects on aquatic species	Degree of impact in analysis area
Recreation (non-fishing)	Introduction of sediment and non-biodegradable products into the water (E and W Rosebud Creek)	Low to Moderate
Water Diversion	Diversion of water from streams, lakes, ponds, and springs to irrigate crops and/or livestock	Low
Timber Harvesting	Past timber harvest in the project area (Red Lodge Creek) has not been located near any streams.	Low
Road Maintenance	Introduction of fine sediments where roads cross or parallel streams	Low
Herbicide and Pesticide Application	Spraying for noxious weeds, treatment for non-native fishes.	None to Low
Foot & Horse Trails	Sediment introduction	None to Low

[1]A recent re-licensing effort of the Mystic Lake hydro-electric facility involved substantial monitoring of water and fisheries resources. Monitoring data suggests that, in general, aquatic resources have not been significantly influenced by dam operations. Although dam operations are not expected to change, fisheries population and habitat monitoring will continue under the new license to determine if hydro-electric operations impact aquatic resources in West Rosebud Creek (FERC 2007).

Domestic livestock grazing activities can negatively affect sensitive fish and amphibian species, aquatic Management Indicator Species (MIS), and other portions of aquatic communities. Streambank trampling, removal of overhanging vegetation and increased sedimentation are the primary impacts to aquatic habitat from livestock grazing in riparian reaches (Platts 1991). Studies have shown that overgrazing can impair fish habitat by altering channel morphology and reducing late summer stream flows (Armour et al. 1994). Typically, grazing mostly impacts lower gradient reaches where stream banks are not armored by large rocks, and riparian vegetation is susceptible to browsing or trampling by livestock. These impacts often result in increased water temperatures, decreased cover, increased sedimentation, and decreased fish numbers (Platts 1991; Kauffman and Krueger 1984).

Maintenance of streamside vegetation is an important component of aquatic food web function. Both trout and amphibian species rely on terrestrial invertebrates as a critical element of their diet. Research in forest and grassland streams has demonstrated that terrestrial invertebrates falling into streams comprise about 50% of the annual energy budget for stream salmonids (as reported in Saunders and Fausch 2005). Saunders and Fausch (2005) revealed that terrestrial insect biomass delivered to the stream channel was 70% lower in season-long grazed (SLG) riparian areas than in high-intensity/short duration (HISD) grazing pastures (both vegetation production and cover were significantly greater in HISD pastures). Therefore, livestock grazing may have substantial indirect effects on aquatic and amphibian communities when their presence results in a direct loss of riparian vegetation.

Streamside vegetation along riparian areas provide amphibians with critical breeding, hiding, foraging, and overwintering habitat, and serves as migration and dispersal corridors (Maxell 2000). Riparian areas are also frequented by livestock, which may have negative impacts on amphibians (Maxell 2000). Very few studies of the effects of livestock on amphibians exist. However, direct mortality of amphibians from trampling by livestock has been documented. Northern leopard frogs have been found crushed at the bottoms of cattle hoofprints at the edges of some wetlands in eastern Montana and in some instances livestock trampling has resulted in severe population level impacts (Maxell 2000). For example, thousands of western toad metamorphs died from livestock trampling or desiccation due to trampling of vegetation at a site in southeastern Idaho (Bartelt 1998; as reported in Maxell 2000).

The majority of livestock induced indirect impacts to amphibians are likely to be negative (Maxell 2000). The collapse of overhanging banks, loss of stream-side vegetation, and compaction of riparian soils limits critical foraging habitat and may eliminate the the ability of many amphibains to borrow underground to prevent freezing in winter (Maxell 2000). Loss of off-channel riparian areas due to water appropriation for livestock can also decrease amphibian habitat. However, stock tanks placed away from source areas, streams, and other riparian zones can reduce trampling pressure on wetlands, thereby compensating for other losses. Livestock can have

positive impacts on amphibian populations by thinning dense vegetation and creating localized basking sites, and by providing additional habitat when springs and small impoundments are developed for livestock use (Maxell 2000).

b. Sensitive Aquatic Species of the Beartooth Ranger District

Yellowstone Cutthroat Trout (*Oncorhynchus clarki bouvieri*)

Yellowstone cutthroat trout (*Oncorhynchus clarki bouvieri*), a member of the family Salmonidae, were first described by C. E. Bendire in 1882 based on a sample from a population in Waha Lake, Idaho; however, many explorers had made earlier observations of this subspecies in Montana and Wyoming (Behnke 1992; May 1996; as reported in Young 2001). Yellowstone cutthroat trout (YCT) historically occupied approximately 17,397 miles of habitat in the western U.S., including, from east to west, the upper portions of the Yellowstone River drainage within Montana and Wyoming and the upper Snake River drainage in Idaho, Wyoming, Nevada and Utah (Behnke 1992; as reported in May et al. 2003). In Montana, YCT were historically widely distributed throughout the upper Yellowstone River basin and its tributary streams, ranging as far downstream as the Tongue River (MTFWP 2005).

Yellowstone cutthroat trout inhabit relatively clear, cold stream, river, and lake environments (Young 2001). Spawning typically occurs in spring and early summer, after flows have declined from their seasonal peak, in sites with suitable substrate (gravel less than 85 mm in diameter), water depth (9-30 cm), and water velocity (16-60 cm/s) (Varley and Gresswell 1988; Byorth 1990; Thurow and King 1994; as reported in Young 2001). Upon emergence, fry immediately begin feeding, typically in nearby stream margin habitats, but they may also undertake migrations to other waters (Gresswell 1995; as reported in Young 2001). Sexual maturity is generally achieved by age 3 or older. Yellowstone cutthroat trout and rainbow trout readily hybridize, producing fertile offspring; sympatric populations often form hybrid swarms (Allendorf and Leary 1988; Henderson et al. 2000; as reported in Young 2001).

Yellowstone cutthroat trout exhibit three primary life history patterns: resident, fluvial, and adfluvial (Gresswell 1995; as reported in MTFWP 2005). Resident life forms occupy home ranges entirely within relatively short reaches of streams; fluvial fish migrate from larger streams or rivers to smaller streams to reproduce; adfluvial life history forms of YCT exhibit a similar pattern, but migrate, sometimes many kilometers, as mature adults from lakes to inlet or outlet streams to spawn (Young 2001).

Throughout their historic range, YCT trout have undergone substantial declines in distribution and abundance (Young 2001). Genetically unaltered YCT occupy about 7 to 25% of historical habitats (May et al. 2003). The distribution of stream resident YCT on the Custer National Forest (CNF) is restricted from its historic range; five genetically pure YCT populations currently occupying less than 18 miles of stream habitat on CNF. Few lake dwelling populations of YCT are thought to have existed in Montana historically (MTFWP 2006). At present, a purported 179 lakes support pure populations in Montana (118 of these lakes reside in the Absaroka-Beartooth Wilderness Area; MTFWP 2006). Most stream populations of YCT are at risk of extinction from either hybridization or demographic or stochastic influences (MTFWP 2005). Although the allotments analyzed in this report are within the historic range of YCT, no genetically unaltered YCT have been documented within the analysis area. However, all waters within the project area possess potential for restoration of the subspecies.

Northeren Leopard Frog (*Rana pipiens*)

The Northern leopard frog (*Rana pipiens*) historically ranged from Newfoundland and northern Alberta in the north to the Great Lakes region, the desert Southwest and the Great Basin in the south (Maxell 2000). A number of isolated populations historically existed in the Pacific Northwest and California (Stebbins 1985; as reported in Maxell 2000). In Montana they have been documented across the eastern plains and in many of the mountain valleys on both sides of the Continental Divide at elevations up to 6,700 feet (Werner et al. 2004).

The Northern leopard frog is found in and adjacent to permanent slow moving or standing water bodies with considerable vegetation, but may range widely into moist meadows, grassy woodlands and even agricultural areas (Nussbaum et al. 1983; as reported in Maxell 2000). Adults feed on invertebrates, but may cannibalize

smaller individuals. Adults overwinter on the bottom surface of permanent water bodies, under rubble in streams or in underground crevices that don't freeze. Northern leopard frogs breed from mid-March to early June (Maxell 2000). Mating occurs when males congregate in shallow water and begin calling during the day (Maxell 2000). Eggs are laid at the water surface in large, globular masses of 150 to 500 (Maxell 2000). Juveniles may move as much as 8 kilometers from their natal ponds to their adult seasonal territories (Dole 1971; Seburn et al. 1997; as reported in Maxell 2000). Young and adult frogs often disperse into marsh and forest habitats, but are not usually found far from open water (Maxell 2000).

Over the last few decades the Northern leopard frog has undergone declines across much of the western portion of their range (Stebbins and Cohen 1995; as reported in Maxell 2000). Most Northern leopard frogs in western Montana became extinct in the 1970's or early 1980's. The only 2 population centers known to exist in western Montana are near Kalispell and Eureka (Maxell 2000). However, the northern leopard frog is still abundant and widespread in southeastern Montana and northwestern South Dakota (Reichel 1995; as reported in Hendricks and Reichel 1996). This species was encountered at seven locations in 1995 on the Ashland District of the Custer National Forest (CNF), but breeding was confirmed at only one of the sites (Hendricks and Reichel 1996).

The Northern leopard frog *Rana pipiens* has been documented (3 recorded observations) in the East Rosebud Creek drainage (MTNH 2008). However, these observations were recorded pre 1970 and are about one mile upstream from the East Rosebud Creek Allotment boundary. There have been no recent Northern leopard frog observations throughout the Beartooth District.

Western Toad (Boreal Toad) (*Bufo boreas)*

The Western toad (*Bufo boreas)* is currently recognized as two subspecies ranging from the Rocky Mountains to the Pacific Coast and From Baja Mexico to southeast Alaska and the Yukon Territory (Stebbins 1985; as reported in Maxell 2000). They are found in a variety of habitats, including wetlands, forests, sagebrush meadows and floodplains. Western toads inhabit all types of aquatic habitats ranging from sea level to 12,000 ft in elevation (Maxell 2000). The subspecies of Western toad found in Montana is the boreal toad (*Bufo boreas boreas*).

Adult and juvenile toads are freeze intolerant and overwinter and shelter in underground caverns, or rodent burrows (Maxell 2000). Adults feed on a variety of ground dwelling invertebrates and are known to eat smaller individuals of their own species. Adults must utilize thermally buffered microhabitats during the day, and can be found under logs or in rodent burrows (Maxell 2000). Because of their narrow environmental tolerance (10-25 ^{o}C throughout the year), adults are active at night and can be found foraging for insects in warm, low-lying areas (Maxell 2000). Breeding typically occurs from May to July in shallow areas of large and small lakes, ponds, slow moving streams and backwater channels of rivers (Black 1970; Metter 1961; as reported in Maxell 2000). Tadpoles metamorphose in 40 to 70 days and can be found in dense aggregations adjacent to breeding grounds (Werner et al. 2004).

In the northern Rocky Mountains Western toads have undergone declines. Surveys in the late 1990's revealed they were absent from a number of areas they historically occupied. While they remain widespread across the landscape, they appear to be occupying only 5 –10%, or less, of the suitable habitat (Maxell 2000). Based on these findings the USFS listed the Western toad as sensitive in all of Region 1's National Forests, and initiated a regional inventory in Montana. As a result, a systematic inventory of standing water bodies in 40 randomly chosen 6th level hydrologic unit code (HUC) water sheds was completed across western Montana during the summer of 2000. Results indicated they were widespread, but extremely rare. Western toads have been found on the Beartooth Plateau, at altitudes as high as 9,200 ft (Werner et al. 2004). However, only two Western (Boreal) toad records exist for the Beartooth District and both observations were outside of the project area of this analysis.

c. Aquatic Species Distribution and Habitat Condition

Proper Functioning Condition and Stream Classification

Based on field reviews and Properly Functioning Condition (PFC) assessments, (see Appendix III, Riparian Ecosystem Report and Maps 5-A, 5-B & 5-C, Riparian Functioning Condition Plot Inventory), aquatic environments in PFC provide high quality habitat for fisheries and other riparian dependent species throughout

the allotments. Aquatic systems that were assessed as functioning at-risk exhibited degraded habitat for riparian dependent and aquatic species and therefore, likely do not comply with: 1) applicable State and Federal laws pertaining to water quality and associated beneficial uses, and 2) Forest Plan Direction.

It is important to understand the sensitivity of individual streams and ponds to livestock impacts in order to evaluate past, present and future grazing affects on channel stability and aquatic habitat quality. A stream channel sensitivity category (Low, Moderate, and High), based on the Rosgen Channel Classification System (Rosgen 1996), was applied to all perennial stream segments were PFC assessments were conducted (Table 1). Some channel types are inherently very stable and not susceptible to grazing impacts, while other channel types could be significantly altered (see Appendix III, Riparian Ecosystem Report). Allotment streams had considerable variability in: 1) inherent sensitivity to disturbance, 2) the role that riparian vegetation plays in maintaining their stability, and 3) the ability to recover from grazing induced damage. Ponds were also categorized in terms of sensitivity to livestock disturbance in relation to drainage, livestock accessibility, shoreline stability, and vegetation composition (Table 2).

Existing Condition

West Rosebud Creek and East Rosebud Creek are popular recreational fishing destinations on the Custer National Forest. Both drainages provide developed day use and camping areas and are frequented regularly throughout the summer months. Both East and West Rosebud creeks provide anglers with opportunity to harvest brook *Salvelinus fontinalis*, brown *Salmo trutta*, and rainbow trout *Oncorhynchus mykiss*, and mountain whitefish *Prosopium williamsoni*. Yellowstone cutthroat trout can be found in both of these large creeks also, but are only prevalent in high elevation lakes and isolated stream segments within the headwaters of the drainages. However, a few Yellowstone cutthroat/rainbow trout hybrids have been documented in the mainstem of both systems within the project area.

West Rosebud Creek Allotment: West Rosebud Creek is a tributary to the Stillwater River that emerges from the Absaroka Beartooth Wilderness Area. West Rosebud Creek drains an area of 213 square miles and flows about 37 miles to the northeast where it joins East Rosebud Creek to form Rosebud Creek, near the town of Absarokee. Within the project area, West Rosebud Creek transitions from a B3-4 channel, downstream to a C 3-4 channel type (total reach length is about 2 miles). The higher gradient B channel in the upper end of the allotment displays low channel sinuosity, low sensitivity to disturbance, good recovery potential, low streambank erosion potential, and is dominated by cobble and gravel substrates with some boulder (about 1.5 miles). The downstream C3-4 channel exhibits increased channel sinuosity, with prevalent meanders, point bars, side channels and smaller substrates. This 0.5 miles of stream channel is more susceptible to streambank erosion, with lower potential for recovery.

The lower gradient, C channel reach of West Rosebud Creek has abundant spawning and rearing habitat and supports a robust resident trout population that is dominated by brown trout. Population estimates for this reach of West Rosebud Creek (including waters downstream of the West Rosebud Allotment boundary) from 1986 - 2007 average over 1,000 brown trout per mile and around 150 rainbow trout per mile, while brook trout are relatively scarce (MFISH 2008; J. Olsen, Montana Fish, Wildlife, and Parks, personal communication). In addition to supporting a resident trout population, this reach of West Rosebud Creek receives spring spawning runs of rainbow trout and fall runs of brown trout. These fluvial spawners migrate annually upstream from as far as the Yellowstone River (over 30 miles) to reach the spawning grounds. Fall and spring redd counts have been conducted in this section of West Rosebud Creek from 2004 through 2007. Redd counts have revealed that 30 - 50 migrant spawning pairs of each species utilize this reach annually.

Morris Creek, a 2nd order tributary to East Rosebud Creek, is within the West Rosebud Creek Allotment area (Morris Creek Pasture). The 1.25 miles of Morris Creek flowing through the pasture can be characterized as a B3-4-5. Much of this reach is well armored with low sensitivity to grazing, while the lower 0.5 miles is lower in gradient, has smaller bed material (cobble and gravel), and has inclusions with wetland characteristics and historic beaver ponds. This portion of Morris Creek is sensitive to livestock use and has lower potential for recovery if impacted. Morris Creek contains brook trout and brown trout, but is dominated by brook trout within the allotment area. Brook trout estimates in this area are about 60 fish per 1,000 feet of stream (MFISH 2008). Cold Creek, Black Canyon Creek, Line Creek and 4 additional unnamed, small tributaries flow into West Rosebud

Creek within the West Rosebud Creek Allotment area. Of these tributaries, only the upper unnamed tributary (WB07; Table 2) harbors fish, and the only fish observed or captured in the unnamed tributary were a few brook trout within 200 feet of the mouth, downstream of FS Road 2072.

About 5 miles of perennial waters were evaluated in the West Rosebud Creek Allotment using Lotic Proper Functioning Condition (PFC) methodology (Table 2). Of these 4.78 stream miles, 0.47 miles were determined to be functioning at-risk, while the remaining 4.31 miles were determined to be properly functioning. Lentic PFC methodology was used to evaluate 3 ponds in the West Rosebud Creek Allotment Area. One pond (WB01) was determined to be less than properly functioning (Table 2). All fish bearing waters in the West Rosebud Creek Allotment Area were determined to be in properly functioning condition (Table 3).

Table 2. Riparian Reach Attributes and Aquatic Species Presence

REACH/ POND ID	NAME	ALLOTMENT/ PASTURE	LENGTH MILES	PFC RATING[1]	STREAM TYPE[2]	SENSITIVITY[3]	AQUATIC SPECIES[4]
EB01	EF Rosebud - lower mainstem	East Rosebud	0.35	PFC	C3/4a	High	BT, EB, RB
EB02	EF Rosebud - beaver pond	East Rosebud	na	PFC	na	Low	AM
EB03	EF Rosebud - middle mainstem	East Rosebud	0.98	PFC	C4/5	High	BT, EB, RB
EB04	EF Rosebud - beaver pond	East Rosebud	na	PFC	na	Moderate	AM
EB05	EF Rosebud - upper mainstem	East Rosebud	0.28	FAR	B3/4a	Moderate	BT, EB, RB
EB06	EF Rosebud - unnamed trib (lower)	East Rosebud	0.24	PFC	A2/3/4	Low	-----
BB01	EF Rosebud - unnamed trib (upper)	Black Butte Ad.	0.42	PFC	B4/A3	Moderate to Low	AM
BB02	EF Rosebud - beaver pond	Black Butte Ad.	na	PFC	na	High	AM
WB01	WF Rosebud - pond	West Rosebud	na	FAR	na	Low	AM
WB02	WF Rosebud - middle mainstem	West Rosebud	1.68	PFC	B/C3/4	Moderate to High	BT, EB, RB
WB03	Morris Creek	West Rosebud	1.25	PFC	B3/4/5	Moderate	BT, EB, AM
WB04	WF Rosebud - unnamed trib (south)	West Rosebud	0.38	PFC	B4/5	Moderate	-----
WB05	WF Rosebud - unnamed trib (north)	West Rosebud	0.40	PFC	A2/B/D4/5	Low to High	-----
WB06	WF Rosebud - pond	West Rosebud	na	PFC	na	High	AM
WB06A	WF Rosebud - unnamed low-flow trib	West Rosebud	0.09	PFC	np	Moderate	-----
WB07	WF Rosebud - unnamed trib (west)	West Rosebud	0.32	PFC	B2/3/4a	Moderate to Low	
WB08	WF Rosebud - pond (southside)	West Rosebud	na	PFC	na	High	AM
WB08A	WF Rosebud - unnamed low-flow trib	West Rosebud	0.31	FAR	np	High	-----
WB09	WF Rosebud - unnamed trib	West Rosebud	0.16	FAR	np	High	-----
WB10	WF Rosebud - unnamed trib	West Rosebud	0.19	PFC	B2/3/4/5a	Moderate to Low	-----
BC01	Butcher Creek - unnamed low-flow trib	Butcher Creek	0.08	FAR	np	Moderate	AM
BC02	Butcher Creek - unnamed trib	Butcher Creek	0.18	FAR	B4/5	Moderate	AM
BC02A	Butcher Creek - unnamed low-flow trib	Butcher Creek	na	FAR	G/B4/5	High	AM
BC03	Butcher Creek - unnamed trib (middle)	Butcher Creek	0.19	FAR	B4/5	Moderate	-----
BC04	Butcher Creek - unnamed trib (west)	Butcher Creek	0.35	FAR	G/F4/5	High	-----

[1] PFC= Proper Functioning Condition, FAR= Functioning At-Risk, NF= Non-Functioning
[2] Refer to Rosgen (1996) Classification System. na= not applicable to pond sites, np= not possible to type stream due to lack of bankfull features.
[3] Sensitivity based on either stream type classification or visual observations.
[4] Fish Species and Amphibians: BN = Brown Trout; EB = Eastern Brook Trout, RB = Rainbow Trout, AM = Amphibians Observed or Key Amphibian Habitat.

Table 3. Stream fish distribution and habitat condition within the project area

STREAM NAME	ALLOTMENT	REACH LENGTH IN ALLOTMENT SUPPORTING FISH (MILES)	PFC RATINGS[1] FOR FISH BEARING STREAMS, REACH LENGTH EVALUATED (MILES)	FISH SPECIES[2]
West Rosebud Creek	West Rosebud	2.0	PFC (1.68)	BT, EB, RB
Morris Creek	West Rosebud	1.25	PFC (1.25)	BT, EB
Unnamed Tributary to West Rosebud Creek (WB07)	West Rosebud	0.1	PFC (0.32)	EB
East Rosebud Creek	East Rosebud	4.0	PFC (1.33) FAR (0.28)	BT, EB, RB
Hellroaring Creek	East Rosebud	0.85	NS	BT
West Red Lodge Creek	Red Lodge Creek	1.0	NS	BT, EB

[1] PFC= Proper Functioning Condition, FAR= Functioning At-Risk, NF= Non-Functioning, NS= Not Surveyed
[2]Fish Species: BT = Brown trout; EB = Eastern Brook Trout, RB = Rainbow Trout

East Rosebud Creek Allotment: East Rosebud Creek flows from the Beartooth Mountain Range between Rock Creek to the east and West Rosebud Creek to the west. East Rosebud Creek drains 182 square miles of which 109 square miles are within the Custer National Forest boundary. East Rosebud Creek flows about 40 miles to the northeast where it joins West Rosebud Creek to form Rosebud Creek. Comparable to West Rosebud Creek, the portion of East Rosebud Creek within the analysis area (about 4 miles in length) transitions from an upstream B3-4, lower sensitivity channel (upper 1.5 miles) to a C3-4 channel that is more susceptible to impacts of livestock use in riparian, streambank, and instream habitats.

Similar to West Rosebud Creek, East Rosebud Creek supports wild populations of brown, rainbow, and brook trout, and like West Rosebud, the fishery is dominated primarily by brown trout. Population estimate averages near this reach of East Rosebud Creek (from the Custer Forest boundary downstream through private lands), conducted from 1985 through 1998, are about 800 brown trout per mile and 60 rainbow trout per mile, with a very low number of brook trout (MFISH 2008). Fluvial migrants also travel up East Rosebud Creek annually to spawn; however, no data exists to quantify this occurrence, other than ancillary fisherman reports in the spring and fall of the year. The lower 2.5 mile section of East Rosebud Creek in the project area holds abundant spawning habitat for resident and migrant spawners.

Slightly less than one mile of Hellroaring Creek, a 2nd order tributary to East Rosebud Creek, is within the East Rosebud Creek Allotment Area. This reach, from the allotment boundary to the mouth, contains low densities of brook trout. Hellroaring Creek transitions from a high gradient B2-3 channel (upstream of FS Road 2177) to a meandering C3-4 channel type from the mouth upstream to the road. This lower more sensitive reach (about 0.20 miles) also includes a few beaver ponds and possesses some wetland characteristics.

Downstream portions of 5 small unmanned, fishless tributaries flow into East Rosebud Creek within the East Rosebud Creek Allotment Area. These stream segments range from high gradient, rocky, perennial flowing creeks to spring like seeps.

Lotic PFC methodology was used to evaluate about 1.85 miles of perennial waters in the East Rosebud Creek Allotment Area. Of these, 0.28 miles were determined to be functioning at-risk, while the remaining 1.57 miles were determined to be properly functioning (Table 2). Lentic PFC methodology was used to evaluate 2 ponds in the East Rosebud Creek Allotment area and both of these ponds were determined to be properly functioning. The only fish bearing reach in the East Rosebud Creek Allotment determined to be less than properly functioning was the upper mainstem of East Rosebud Creek (EB05; Table 2). This rating was in part due to past grazing activity and associated impacts to riparian vegetation age class diversity. However, other criteria selected for this rating

included upland watershed contributions to degradation (1996 Shepard Mountain Fire) and lack of flood plain inundation (see Appenix III, Riparian Ecosystem Report). Although no PFC assessments were conducted in lower Hellroaring Creek, cursory field observations indicated that it was functioning properly, as the upper end is very steep and well armored and the lower end is well saturated and appears to deter prolonged livestock use.

Red Lodge Creek Allotment: West Red Lodge Creek flows a distance of about 18 miles from its headwaters in the Absaroka Beartooth Wilderness to East Red Lodge Creek, where together they form Red Lodge Creek. The West Red Lodge Creek drainage basin on Custer National Forest encompasses nearly 20 square miles. The reach of West Red Lodge Creek in the analysis area extends from the wilderness boundary downstream about one mile. The stream channel here is categorized as a A/B2/3, consisting of high gradient riffles, cascades, and abundant wood and boulder formed pools. Stream banks in this portion of West Red Lodge Creek are well armored with dominant bed material consisting of large gravel, cobble and boulder. This one mile reach of West Red Lodge Creek has a low sensitivity to disturbance and low streambank erosion potential. Within the analysis area, West Red Lodge Creek supports a limited number of brook and brown trout. The high gradient nature of West Red Lodge Creek, and possible downstream passage barriers, likely prohibit proliferation of a substantial wild fish population. PFC assessments were not conducted in this portion of West Red Lodge Creek, but field observations indicate that past and current livestock grazing has not impacted this stream reach.

Butcher Creek Allotment: There are no fish bearing streams within the Butcher Creek Allotment area. East Fork Butcher Creek flows 5.25 miles form its headwaters on Custer National Forest to West Fork Butcher Creek, were they form Butcher Creek. The 0.35 mile long headwater reach of East Fork Butcher Creek within the allotment area is characterized as a highly sensitive G/F4/5 channel type (Table 2). Other perennial waters within the Butcher Creek Allotment include 3 unnamed tributaries to the East Fork Butcher Creek (total combined length 0.45 miles). These unnamed tributaries were assessed as having moderate to high sensitivity to livestock use. Lotic PFC ratings for all perennial waters in the Butcher Creek Allotment area were determined to be functioning at-risk (Table 2). The lower end of East Fork Butcher Creek, off Forest, supports brown, brook, and a limited number of rainbow trout.

Black Butte Wildlife Habitat Area: There are no fish bearing streams within the Black Butte Wildlife Habitat Area. There is one unnamed tributary within the proposed allotment boundary. This high gradient (B4/A3), headwater stream, about 0.42 miles in length, was determined to be properly functioning. One of 3 ponds in the proposed allotment area was also evaluated and was also determined to be properly functioning

Amphibians: All of the allotments in this analysis contain amphibian habitats. Amphibians require a diversity of habitats for breeding, foraging, and overwintering, and benefit greatly from intact aquatic system that provide properly functioning streams, springs, ponds, and wetlands (Werner et al. 2004). The project area is within the native range of two sensitive amphibian species, the Western (Boreal) toad and the Northern leopard frog. However, no individuals of either species have been documented within the project boundary. Nonetheless, they may be present or could expand into this area and therefore, all riparian, stream, wetland, and spring environments are considered potential habitats for these species. Columbia spotted frogs *Rana luteiventris* are generally common in lower elevations habitats of the Beartooth Mountain Range, however cursory observations of individual adults during stream and field surveys across the project area in 2005 indicate that their distribution is isolated primarily in optimal locations with standing and/or slow-moving waters. Three such locations that support spotted frogs are the abandoned beaver ponds and wetland habitats in the: 1) Black Butte Administrative Allotment (BB02), and along the mainstem of both 2) East and 3) West Rosebud Creeks (EB02, EB04, WB01, WB06, and WB08). Low-gradient, low-flow tributaries found in several of the allotments including West Rosebud Creek and Butcher Creek also provide key amphibian habitats. Of the lotic and lentic PFC assessments in the project area, WB01, BC01, BC02, and BC02A were determined to be less than properly functioning.

Reaches found to be functioning at-risk have vegetative, hydrologic or soil attributes that are not adequately supported and therefore, do not provide properly functioning habitats for aquatic species. In general, the concerns in these systems include: 1) impairment of water storage and release processes, 2) reduced channel, bank and vertical stability, and 3) degraded habitat for riparian dependant wildlife and aquatic/semi-aquatic species.

Desired Future Condition

The Custer National Forest Land and Resources Management Plan provides specific direction for the desired

future condition for wildlife and fish habitat; "[W]ildlife and fish habitat conditions for game and nongame wildlife species will improve by the end of the next decade. Appropriate range management practices within livestock grazing allotments will also improve wildlife habitat values. Protection of riparian zones will result in maintenance of high quality water. Key areas for wildlife such as woody draws, bottoms, and riparian areas will receive major considerations for wildlife and vegetative management and these areas should improve." (page 10). The desired future condition for all riparian systems within the analysis area is to attain a properly functioning condition which provides the physical, chemical and biological attributes to **fully** support all beneficial uses including aquatic species.

ENVIRONMENTAL EFFECTS

a. Background

Issues and Concerns

Domestic livestock grazing and associated livestock activities can alter stream channel form and function, especially in sensitive stream types, by direct modification of the streambed and banks (e.g. hoof shear) and indirectly by modifying riparian vegetation and sediment delivery regimes (summarized by Platts 1991). Livestock may trample amphibians and salmonid spawning areas. Trampling of salmonid redds can crush incubating eggs, alevins, and emerging fry (Roberts and White 1992). Riparian vegetation modification may directly remove fish security cover and reduce stream shading, resulting in increased water temperatures in summer and colder temperatures in winter. Impacted stream channels may widen and aggrade, or become deeply incised, with associated reductions in important fish and amphibian habitats such as pools, undercut banks, overhead riparian vegetation, and spawning areas. Increased sediment delivery may result in increased entrainment of fine sediments (< 6.3 mm) in salmonid spawning gravels and may in-fill pools that function as rearing and overwintering habitats (Chapman 1988). Increased sediment delivery rates may also in-fill breeding, rearing, and over-wintering habitat for amphibian species (Maxell 2000). However, it is important to note that streamside areas have historically been grazed by herbivores with varying degrees of impact, both positive and negative, and grazing activities can be managed to minimize negative influences in riparian areas (May and Davis 1982)

b. Effects Common to All Alternatives

There are no effects to aquatic species or their habitat that are common to all alternatives.

<u>Short-term vs. Long-term Productivity</u>

There are no short-term versus long-term productivity issues for aquatic species or their habitats under any alternative.

<u>Irreversible/irretrievable Commitments</u>

There are no irreversible/irretrievable commitments on aquatic species or their habitats under any alternative.

<u>Unavoidable Adverse Effects</u>

There are no unavoidable adverse effects on aquatic species or their habitats under any alternative.

c. Effects Common to All Action Alternatives

Direct effects are those that "are caused by the action and occur at the same time and place" (40 CFR 1508.8). Direct effects are those effects resulting in the direct mortality of fish or amphibians, or the destruction of fish or amphibian habitat. Direct effects of livestock grazing to individuals and populations of fish could occur where instream trampling of spawning sites (redds) and early life stages that have yet to exit the streambed substrate result in mortality. Similarly, livestock trampling of other sessile forms of aquatic biota, particularly invertebrates, but also amphibians and amphibian egg masses, may result in mortality. The probability of such mortality varies

with the accessibility of habitats used by vulnerable life stages and the potential temporal overlap in grazing previous to maturation and movement.

Indirect effects “are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable” (ibid). Excessive grazing and trampling can strongly impact riparian vegetation and stream bank stability, resulting in a variety of disturbances to channel morphology, and the habitat of fish, amphibians, and invertebrates (Platts 1991). Indirect effects would be effects resulting in changes to fish and amphibian habitat as a result to changes in the aquatic environment. As with most land use activities, the intensity and duration of livestock grazing is an important factor in determining the indirect effects upon aquatic resource. Such indirect effects include: potential for altering the rate in which sediment or woody debris enters the stream channel, modifying temperature regimes by reducing riparian shading, changes in streambank stability due to near-bank activities, decreases in terrestrial invertebrate populations as a result of riparian vegetation loss, and fine sediment accumulation in the redd environment, leading to oxygen deficiency for maturing embryos and decreased survival.

Cumulative effects are defined as "the impact on the environment that results from the incremental impact of the action when added to other past, present, and reasonably foreseeable actions, regardless of what agency or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time" (CFR 40 1508.7).

Cumulative effects are therefore spatial and/or temporal environmental effects to fish and amphibian habitat resulting from the additive, repeated, and synergistic effects of other actions. Activities within the analysis area include fire, timber harvest, road maintenance, recreation, hydropower development, recreational fishing, and stocking of non-native salmonids (Table 1). These human induced and naturally occurring activities will continue to cumulatively affect aquatic habitat by modifying the way sediment, water, and wood enter and travel through stream channels, altering riparian vegetative community structure, and inducing other habitat perturbations. The introduction of non-native fish species has also affected native fish species assemblages through competitive interactions and hybridization in lower elevation stream reaches throughout the analysis area.

d. Mitigation Included Under All Alternatives

There is no mitigation included, aside from the proposed management, under any alternative.

e. Effects by Alternative

Fish and amphibian habitats of twenty stream reaches and five ponds are evaluated under the various alternatives displayed below. Those habitats currently functioning at-risk are evaluated for their potential to improve, while those areas currently functioning properly are evaluated for their potential to decline.

Alternative 1 – No Grazing

Direct and Indirect Effects

By removing livestock grazing from the allotments, all direct and indirect impacts to fish and amphibian individuals/populations relative to the purpose of this environmental analysis would no longer occur. Streambanks that are currently trampled from past grazing will gradually stabilize and over-utilized riparian vegetation will increase in vigor and density. Removal of livestock would decrease the possible occurrence of redd trampling and would remove potential for trampling of individual frogs and toads.

Cumulative Effects

The cumulative effects of Alternative 1 on aquatic resources - when combined with past, ongoing and reasonably foreseeable activities is considerably beneficial to populations of wild trout, amphibians, and other aquatic biota as levels of riparian livestock use (and associated direct and indirect effects to these species and their habitat) would be reduced at the most expedient rate relative to the purpose and need of this environmental assessment.

Forest Plan Consistency and Other Required Disclosures

Compliance with Forest Plan standards and state and federal water quality regulations would occur over a relatively short timeframe as at-risk riparian areas and impacted aquatic habitats attain a properly functioning condition which fully supports all beneficial uses including: aquatic and riparian dependent species and their habitats.

Conclusions for Environmental Consequences

Alternative 1 would be beneficial to trout and amphibian populations in stream reaches and spring locations currently affected by grazing. No livestock grazing would occur, thus there would be no direct or indirect effects to fish and amphibian species. New livestock grazing impacts to riparian vegetation, stream banks, instream habitats, wetlands, and springs would no longer occur, and the likelihood of trampling of embryonic or adult life stages of individual fish or amphibian species by livestock would be nonexistent. Any incidental redd trampling that may occur in sensitive reaches of East and West Rosebud Creeks would not occur.

Implementation of the No Grazing Alternative would initiate the most rapid rate of restoration of degraded stream and wetland habitat critical to populations of wild trout, in addition to aquatic habitats critical to amphibians dependent upon high quality, diverse, and connected stream, lake, pond, and wetland environments.

Lentic systems determined to be less than properly functioning would have potential to improve, resulting in an increase in habitat availability and quality for amphibian species overall.

Impaired stream reaches that influence downstream aquatic habitats, should recover rapidly under the no grazing alternative. Recovery of these reaches would be beneficial to local amphibian populations and downstream wild trout populations

Alternative 2 - Current Management

Direct and indirect Effects

Alternative 2 proposes no change from current management. Therefore, livestock grazing impacts are expected to continue at current levels and direct and indirect impacts to fish and amphibians relative to the purpose of this environmental analysis would remain unchanged. However, actual use in four of the five allotments has been lower than permitted use and there has been non-use in three of the five allotments. For the purpose of this analysis it is assumed that future management under Alternative 2 would reflect past management (actual use) and not fully permitted use. Under this assumption, less than properly functioning stream reaches and ponds that support fish and amphibian species will continue to provide less than optimal habitat, and impaired headwater reaches that have a negative influence on downstream aquatic habitats are expected to remain unchanged or worsen (Table 2). There may be a decrease in aquatic habitat quality and quantity and a decline in fish and amphibian numbers as impaired habitats would likely decline further in the future.

If future management reflects permitted use, grazing pressure on riparian systems is expected to increase from what has occurred historically under these permits. Therefore, sensitive stream and pond habitats could be impaired by increased livestock use (Table 2). Under this assumption, sensitive riparian and aquatic habitats that are currently *properly functioning* or that are currently *functioning less than properly* would be expected to decline in form and function. Properly functioning reaches that provide critical habitat for wild trout that could be impacted include EB01, EB03, and WB02 of the East and West Rosebud Creek Allotments. Streambank and riparian vegetation condition would be expected to remain static or decline in the upper mainstem reach of East Rosebud Creek (EB05).

No grazing is proposed for the Black Butte Wildlife Habitat Area under this alternative and therefore, there would be no risk of affecting amphibian habitats in that area.

Cumulative Effects

The cumulative effects of Alternative 2 on aquatic resources, when combined with past activities and natural processes, may have a negative impact on wild trout populations, native amphibian species, and other aquatic biota as levels of riparian utilization (and associated direct and indirect effects as described above) are expected to remain at current levels or increase. Adverse cumulative effects from this Alternative are possible because livestock have the potential to cause adverse direct and indirect effects to fish and amphibian populations thereby compounding the effects of past activities and natural processes on the aquatic ecosystem.

Forest Plan Consistency and Other Required Disclosures

Under this alternative some riparian and aquatic habitats are expected to continue to function less then properly or to become impaired beyond current levels. Habitats for riparian and aquatic dependant species will continue to be degraded and therefore beneficial uses will continue to be less than fully supported. Therefore, compliance with Forest Plan standards and state and federal water quality regulations will not be possible under this alternative.

Conclusions for Environmental Consequences

Less than properly functioning stream reaches and springs that currently support fish and amphibian species will continue to provide less than optimal habitat, and impaired headwater reaches that have a negative influence on downstream aquatic habitats are expected to remain unchanged. Depending on whether future management reflects past use or permitted use, there is a risk of properly functioning habitats becoming impaired due to increased livestock use in sensitive areas. Lentic systems determined to be less than properly functioning would continue to be impaired or decline further, would have low potential to recover, and could decline in habitat availability and quality for amphibian species throughout the allotments. Streambank and redd trampling, riparian vegetation loss, and fine sediment delivery could impair sensitive reaches in the East and West Rosebud Creeks. These reaches, EB01, EB03, and WB02, are critically important to wild trout populations in the project area.

Alternative 3 - Proposed Action

Under Alternative 3, several changes in grazing management would be implemented to improve grazing duration and livestock distribution. These changes in management (including: utilization standards, herding practices, use of mineral supplements and some fencing) are summarized elsewhere in this environmental analysis. One objective of these changes is to improve riparian and aquatic habitat condition in functioning at-risk areas, and to ultimately achieve properly functioning condition in these areas.

Direct and Indirect Effects by Allotment

West Rosebud Allotment

Management changes in this allotment include converting from a two pasture to a five pasture deferred rotation system and to implement high intensity or flash grazing management every 5-6 years under a Temporary Grazing Permit. The five pasture system should provide better distribution and more even use. The turn on date in this allotment would never be before the 15th of June. Livestock distribution and movement from riparian areas would be increased through herding and improved mineral distribution. Flash grazing would require herding of a high number of livestock (up to 2,500) for a short period of time (1 to 2 days).

Less than properly function lotic and lentic systems, including (0.47 miles of fishless unnamed tributaries and one pond) are expected to move towards properly functioning condition and should have a high potential for full recovery. These long-term improvements to aquatic habitats should benefit local amphibian populations and downstream fish habitats.

However, implementation of adaptive management that includes mid-season, end-of-season and long-term trend monitoring is the best way to ensure recovery of riparian areas currently at-risk and maintenance of other areas

currently functioning properly. Monitoring and adaptive management will be critically important to protect sensitive reaches in the West Rosebud Creek Allotment (lower mainstem of West Rosebud Creeks - WB02) to determine if a redistribution of livestock or flash grazing is impacting riparian and aquatic habitat, and if livestock are accessing side channel habitats of the mainstem West Rosebud Creek while incubating rainbow trout eggs are present in redds (late April – July).

East Rosebud Allotment

Permitted AUMs will remain at 150 in this allotment. However, livestock distribution is expected to improve by utilizing upland forage on both sides of East Rosebud Creek. Livestock distribution and movement from riparian areas would be increased through herding and improved mineral distribution.

There is one less than properly function fish-bearing lotic systems, the upper mainstem East Rosebud Creek (EB05), in the East Rosebud Creek Allotment. Impairments in this reach were related to historic grazing practices and fire, and in part by current grazing management. Under alternative 3, this reach is expected to move towards properly functioning condition and should have moderate potential for full recovery.

However, implementation of adaptive management that includes mid-season, end-of-season and long-term trend monitoring is the best way to ensure recovery of riparian areas currently at-risk and maintenance of other areas currently functioning properly. Monitoring and adaptive management will be critically important to protect sensitive reaches in the East Rosebud Creek Allotment (middle and lower mainstem of East Rosebud Creek – EB01 and EB03) to determine if a redistribution of livestock is impacting riparian and aquatic habitat.

Butcher Creek Allotment

Permitted AUMs in the Butcher Creek Allotment would be reduced by 30% under Alternative 3. Livestock distribution and movement from riparian areas would be increased through herding and improved mineral distribution.

Five non-fish bearing riparian systems in this allotment were determined to be functioning at-risk, due in part to recent grazing pressure (BC01, BC02, BC02a, BC03, and BC04). Under alternative 3, these systems are expected to move towards properly functioning condition and should have high potential for full recovery. Recovery of these areas will benefit local amphibian populations and downstream fish habitat in the East Fork of Butcher Creek.

Short duration grazing and a high level of herding will be required to minimize impacts to riparian systems. Implementation of adaptive management that includes mid-season, end-of-season and long-term trend monitoring would be the best way to ensure recovery of riparian areas currently at-risk.

Red Lodge Allotment

The most significant change in management in the Red Lodge Creek Allotment is a reduction in permitted AUMs from 191 to 134 (30%). No aquatic habitats within the Red Lodge Creek Allotment (1 mile of West Red Lodge Creek) were observed to be impacted from past or current livestock use and this reduction in AUMs will only decrease the potential for riparian/aquatic habitat degradation by livestock.

Black Butte Allotment

The Black Butte Wildlife Management Area has not been grazed since 1970. Under this alternative, 80 and 110 AUMs would be permitted for every other year and would rotate from early, mid and late season. High intensity or flash grazing management is also proposed in this allotment every 6-8 years. The lotic and lentic riparian systems in this area were determined to currently be functioning properly. However, water is limited in this allotment to 3 ponds and a perennial unnamed tributary. Under the flash grazing scenario, livestock would be herded away from riparian areas, would be well watered before entering the allotment, and would occupy the allotment for 1 to 2 days. Implementation of adaptive management that includes mid-season, end-of-season and long-term trend

monitoring would be critically important in this allotment, to ensure herding effectively keeps livestock from sensitive riparian areas and amphibian habitats.

Cumulative Effects

The cumulative effects of Alternative 3 on aquatic resources, when combined with past activities and natural processes, should be beneficial to wild trout populations, native amphibian species, and other aquatic biota as levels of riparian utilization (and associated direct and indirect effects as described above) are expected to decrease. Adverse cumulative effects from this Alternative are not likely as the potential for adverse direct and indirect effects to fish and amphibian populations is low.

Forest Plan Consistency and Other Required Disclosures

Under this alternative, riparian and aquatic habitats of fish and amphibian species are expected to improve over the long-term or maintain properly functioning condition. Therefore, compliance with Forest Plan standards and state and federal water quality regulations is possible under this alternative.

Conclusions for Environmental Consequences

Management changes under Alternative 3 are expected to reduce existing direct effects of livestock on aquatic organisms and their habitat. Direct effects of trampling of redds, early life stages of fish, amphibians, and aquatic environments, will be less likely to occur because livestock use of riparian zones and springs should be reduced. Overall, management changes included in the proposed action are expected to reduce indirect effects of livestock use in all allotments (with the exception of the Black Butte Wildlife Management Area) to fish and amphibian habitats by maintaining or improving riparian community health and stream channel form and function, and by reducing trampling impacts to impaired stream segments and springs. Overall, the increased riparian, wetland, and spring protections provided by this alternative are expected to improve the condition of fish and amphibian habitats.

Less than properly functioning stream reaches and springs that currently support fish and amphibian species are expected to improve, and impaired headwater reaches that have a negative influence on downstream aquatic habitats are expected to move towards a properly functioning condition. Lentic systems determined to be less than properly functioning would also be expected to improve and would have a high potential for full recovery. Livestock grazing in the Black Butte Wildlife Management Area would be implemented under this alternative and the impact of livestock grazing on lotic and lentic systems in this area would need to be monitored. Streambank and riparian vegetation conditions should improve in the upper mainstem reach of East Rosebud Creek (EB05).

Management changes that result in significant increases in grazing intensity (flash grazing as proposed in West Rosebud and Black Butte Allotments) could change distribution patterns and cause an increase in grazing pressure on some reaches currently functioning properly. Therefore, sensitive reaches in East and West Rosebud Creeks (EB01, EB03, and WB02) that are critically important to wild trout populations and that are expected to remain in properly functioning condition, should be monitored to determine if changes in grazing management have an affect on these areas. For these reason, monitoring and adaptive management will be key components of the proposed management.

Effects by Alternative Summary

No Federally listed threatened or endangered fish or amphibian species, designated critical habitat, fish or amphibian species proposed for Federal listing, or proposed critical habitat occur in the project area. No Forest Service sensitive fish or amphibian species are suspected present within the project area. The project area is within the historic distribution of the Yellowstone cutthroat trout, Western (Boreal) toad and Northern Leopard frog. However, no FS sensitive aquatic species have been documented in the vicinity of the project area. Wild nonnative trout species (rainbow, brown, and brook trout) and a native amphibian species (Columbia spotted frog) occupy aquatic environments throughout the project area.

Table 4 summarizes the potential effects to aquatic species (sensitive and Management Indicator Species) in the project area.

Table 4. Potential effects of the alternatives on sensitive and management indicator (MIS) aquatic species in the project area

Sensitive and MIS Species	Alternative 1	Alternative 2	Alternative 3
Yellowstone cutthroat trout	NI	NI	NI
Northern leopard frog	NI	NI	NI
Western (Boreal) toad	NI	NI	NI
Wild Trout*	BI	MIIH	MIIH

NI = No impact
***MIIH** = May impact Individuals or habitat but will not likely contribute to a trend towards federal listing or loss of viability to the population or species.
WIFV = Will impact individuals or habitat with a consequence that the action may contribute to a trend towards federal listing or cause a loss of viability of the population or species.
BI = Beneficial impact
MIS = Management Indicator Species (Wild Trout)

MONITORING

Effectiveness monitoring will be essential to determining if proposed prescriptions are effective at protecting or improving aquatics resource. A long-term trend monitoring plan is recommended to determine if the proposed management is improving riparian conditions at a satisfactory rate and maintaining areas currently functioning properly.

Riparian and stream function influence the condition of fish and amphibian habitat. As proposed in the Riparian/Hydrology report (See Appendix III, Riparian Ecosystem Report), monitoring of channel geometry, riparian vegetation, bank alteration and stability, instream surface fines, and establishment of photo points are all recommend methods for determining efficacy of proposed management changes and impacts (adverse or beneficial) to aquatic habitat.

In addition, overwintering habitat, particularly pools are important to the survival and recruitment of stream-dwelling trout populations. Therefore it is recommended that the quantity and quality of pools (measured as pool frequency, pool spacing, and residual pool depth; see Overton et al. 1997) be included in channel geometry assessments.

Lower reaches of East and West Rosebud Creeks in the project area (EB01, EB03, and WB02) contain sensitive spawning and rearing habitats for both resident and migratory trout species. Lotic and lentic amphibian habitats in the Black Butte Wildlife Habitat Area have not been subject to livestock use since 1970. High intensity or flash grazing management may be implemented under the proposed alternative in the West Rosebud Creek Allotment and Black Butte Wildlife Habitat Area. Livestock distribution and movement from riparian areas in all of these allotments would be managed through herding, improved mineral distribution, and pre-watering of livestock. In these areas, it is recommended that the Forest Fisheries Specialist be informed of the turn on date, particularly for flash grazing periods, to observe the effectiveness of herding management. If herding is not an effective tool for discouraging livestock use in sensitive aquatic habitats, then other mitigation measures including: temporary electric fence and temporary water storage tanks should be considered.

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