ISSUE 7: FISHERIES

Changes from the Draft to the Final EIS

With respect to fisheries, only few changes occurred between the Draft and Final EIS. However, among these few changes were some that provide significant additional protections for aquatic habitats and biota. First, changes within the proposed Goals, Standards and Guidelines improved safeguards for aquatic habitats and biota in several ways. Standard E-4 was modified to give fishless streams and those with less significant fisheries (formerly stream classes C and D) a level of protection that ensures non-impairment, and potential actions in watersheds of all classes would be evaluated with respect to impacts on habitat connectivity, disturbance regimes, and organism metapopulations, again with the intent that actions would not lead to aquatic impairment. Standard E-5 was modified to include language precluding construction of roads and trails within floodplains of rivers and streams, or wetlands, except at stream crossings, so that impacts would be reduced to riparian areas as well as rivers, streams, and wetlands.

A second significant change occurred within the Deer Creeks Travel Planning Area (TPA), where changes between the Draft and Final EIS reduce impacts to Yellowstone cutthroat trout populations. To reduce impacts to Yellowstone cutthroat trout, Alternative 7-M would allow motorcycle use of Lower Deer Creek #5 between the junction of #5 with #156 and Deer Creek cabin only after the facility is sufficiently modified to not allow degradation of Yellowstone cutthroat trout habitat. ATV use would be restricted along #5 between #256 and Deer Creek cabin, and again would only be allowed after the facility is sufficiently modified to not allow degradation of Yellowstone cutthroat trout habitat. On #5 south of the cabin, motorized use would be restricted because crossings sufficient to reduce impacts to Yellowstone cutthroat trout would be difficult to construct. In summary, these changes meet the intent of protecting Yellowstone cutthroat trout populations in Lower Deer Creek.

Finally, in the Bangtails TPA, the Draft EIS contained a standard stipulating that no new construction could occur within this TPA until sediment delivery standards were met by decommissioning existing roads. This standard is dropped in the FEIS because this road decommissioning work is currently being implemented by a separate decision. This decommissioning work meets the intent of the standard, which is to provide habitat conditions suitable for the maintenance of the Yellowstone cutthroat trout populations present in this TPA.

Introduction

This section addresses the environmental consequences of the Travel Plan alternatives to aquatic resources. This includes the potential effects of various modes of travel (i.e., motorized and non-motorized) on Gallatin National Forest roads and trails on aquatic habitat and biota in the 39 Travel Planning Areas (TPAs).

Affected Environment

The 39 TPAs within the project area encompass portions of the Madison, Gallatin, Yellowstone, Boulder and Shields River drainages, containing over 1,700 miles of fishable streams and over 700 high mountain lakes and reservoirs. These rivers, lakes and their tributaries support several internationally known "blue ribbon" trout fisheries, as well as populations of important endemic fish and amphibians.

Fish and Amphibian Distribution and Population Characteristics

Sensitive fish and amphibian species potentially present in the project area are westslope cutthroat trout (*Oncorhynchus clarki lewisi*), Yellowstone cutthroat trout (*O. clarki bouvieri*) fluvial Arctic grayling (*Thymallus arcticus*), northern leopard frog (*Rana pipiens*) and boreal toad (*Bufo boreas*), although fluvial Arctic grayling are not currently known to be present within the project area. Of these, Yellowstone cutthroat are more common than westslope cutthroat, and boreal toads are more widely-distributed than northern leopard frogs. All wild trout are Management Indicator Species (MIS) for project area streams. MIS occurring in the project area include the sensitive trout species mentioned above and brook (*Salvelinus fontinalis*), rainbow (*O. mykiss*), and brown trout (*Salmo trutta*). At least one MIS is present in every TPA.

Table 3.7.1 (below) displays sensitive species presence, open road density, sediment delivery and riparian habitat condition for the Forest TPAs. These TPAs are approximately 6th Code Hydrologic Unit Codes (HUCs) but do not follow exact watershed boundaries. Sediment values are from Story (2006, Issue 20: Water Quality), riparian habitat values are from Feigley (2004). Cutthroat designation indicates 75% or greater genetic purity.

Table 3.7. 1 Known sensitive species presence, total open road density, sediment delivery, and riparian habitat condition in Gallatin National Forest, by TPA.

Travel Planning Area	KEY: YCT = Yellowstone cutthroat trout WCT = westslope cutthroat trout BT= boreal toad NLF= northern leopard frog					
	YCT (miles of stream)	WCT (miles of stream)	Sensitive Amphibians Present	Road Density (mi/sq mi)	Sediment Delivery (% > Natural)	Riparian Habitat Lost (%)
AB Beartooth Plateau	--	--	--	0.0	0.1	4.8
AB Wilderness	74.8	--	--	0.0	1.0	10.1
Bangtails	8.8	--	--	3.0	24.1	36.7
Bear Canyon	2.4	--	BT	1.6	41.7**	22.0
Big Sky	--	9.1	--	2.1	55.2*	19.4
Bozeman Creek	--	--	BT	0.9	5.1	25.8
Bridger Canyon	--	--	--	3.6	14.5	31.7
Cabin Creek	--	12.4	--	0.2	13.6	14.0
Cherry Creek	--	--	BT	0.4	2.5	8.6
Cooke City	6.0	--	BT	1.2	5.0	21.4
Deer Creeks	20.7	--	--	0.6	5.0	26.9

Travel Planning Area	KEY: YCT = Yellowstone cutthroat trout WCT = westslope cutthroat trout BT= boreal toad NLF= northern leopard frog					
	YCT (miles of stream)	WCT (miles of stream)	Sensitive Amphibians Present	Road Density (mi/sq mi)	Sediment Delivery (% > Natural)	Riparian Habitat Lost (%)
East Boulder	8.0	--	--	0.6	3.6	12.2
East Crazies	14.1	--	--	0.7	3.3	10.2
Fairy Lake	13.2	--	--	2.0	12.3	33.3
Gallatin Crest	2.8	--	--	0.1	1.7	20.7
Gallatin River Canyon	--	--	--	0.7	2.3	19.2
Gallatin Roaded		1.9#	BT, NLF	2.3	19.6	35.4
Gardiner Basin	1.4	--	--	1.3	7.8	21.9
Hebgen Lake Basin	--	--	BT	1.8	10.5	13.4
Hyalite		1.5#	BT	1.7	12.5	50.1
Ibex	14.8	--	--	2.3	10.6	28.4
Lionhead	--	2.0	BT	0.7	3.6	17.9
LM Wilderness Hilgards	--	--	--	0.0	0.2	9.0
LM Wilderness Monument	--	--	--	0.0	0.2	8.2
LM Wilderness Spanish Peaks	--	--	BT	0.0	0.3	11.1
Main Boulder	10.6	--	BT	1.0	2.0	10.0
Mill Creek	31.3	--	--	0.9	6.1	26.2
Mission	5.7	--	--	0.9	8.3	18.3
North Bridgers	0.9	--	BT	1.4	7.7	31.2
Porcupine-Buffalo Horn	8.2	--	--	0.0	1.1	17.6
Sawtooth	5.0	--	--	0.1	0.4	6.4
Shields	32.0	--	BT	1.4	12.7	42.3
South Plateau	--	1.2#	--	1.7	12.4	35.0
Taylor Fork	--	2.1	BT	0.5	4.4	22.2
Tom Miner Rock	14.3	--	--	1.4	13.4	18.7
West Bridgers North	--	--	BT	0.3	1.8	17.3
West Bridgers South	--	--	--	0.0	6.2	33.1
Yankee Jim Canyon	4.7	--	--	1.7	5.2	12.3
Yellowstone	6.6	--	--	2.7	21.8	37.3

* TPAs exceeding Gallatin Forest Class A sediment delivery guidelines.
** TPA exceeding Gallatin Forest Class B sediment delivery guidelines. This TPA includes both Trail Creek, which is Gallatin Forest Class A and Bear Canyon Creek, Gallatin Forest Class B.
# Population segments isolated by culverts.

Watershed Condition and Stream Habitat Characteristics

Project area streams are classified B-1 for water quality beneficial uses using the state Department of Environmental Quality water quality classification system, with the exception of streams that fall within the boundaries of the Lee Metcalf and Absaroka Beartooth Wildernesses and municipal watersheds (Hyalite and Bozeman Creeks); streams within the latter are A-1 streams. Story (2006) fully details the respective designations of these classifications; significant among them for this analysis is the growth and propagation of salmonid fish.

The most common Gallatin Forest channel types are Rosgen A and B, but all types are present (Rosgen 1996, Table 3.7.2). Stream channel types in this system are alphanumeric classifications of streams based on geomorphologic and stream substrate characteristics. Channel type designation can also describe the way the stream accesses its floodplain, which has important land management implications. This classification system can give an accurate indication of the sensitivity of the stream channel to disturbance from land management activities and the potential for recovery of degraded areas.

Table 3.7. 2 Rosgen stream channel types (Rosgen 1996).

The base channel type (A-G) is further described by a number corresponding to the predominate streambed substrate within a reach (1 = bedrock, 2 = boulder, 3 = cobble, 4 = gravel, 5 = sand, 6 = silt). For example, a C4 channel is a low gradient, gravel bedded, sinuous stream that is very sensitive to disturbance, has high erosion potential and is sensitive to loss of riparian vegetation.

Channel Type	Gradient (%)	Entrenchment	W/D Ratio	Sinuousity	Sensitivity *	Erosion Potential *	Vegetative Control# *
A	>4	High	<12	Low	Low to Extreme	Low to Extreme	Low
B	2-4	Moderate	>12	Moderate	Low to Moderate	Low to Moderate	Low to Moderate
C	<2	Low	>12	High	Low to Extreme	Low to Extreme	Moderate to Extreme
D	<4	Low	>40	None	Extreme	Extreme	Moderate
E	<2	Low	<12	High	Extreme	Moderate to High	Extreme
F	<2	High	>12	High	Low to Extreme	Moderate to Extreme	Low to Moderate
G	2-4	High	<12	Moderate	Low to Extreme	Low to Extreme	Low to High

*In general, low values for these columns indicate large channel substrates (bedrock and boulder). Moderate to extreme values indicate smaller substrates (silt, sand, gravel, and cobble).
Vegetative control number indicates the relative importance of riparian vegetation in maintaining streambank stability, and therefore stream channel form.

Generalizations of watershed conditions on the Forest, and stream habitat characteristics within TPAs relative to travel routes, can be inferred from road density, sediment delivery and riparian habitat loss estimates (Story 2006, Feigley 2004, Table 3.7.1). Both sediment delivery and riparian habitat loss are generally positively related to road density, and generally but not universally indicative of reduced aquatic habitat capability (e.g., Furniss et al. 1991, Dunham and Rieman 1999, Forman et al. 2003, Table 3.7.1). Furthermore, a cursory analysis of habitat and channel type data collected for streams throughout the Forest shows that residual pool volume and maximum pool depth decreased slightly in some stream channels in watersheds with extensive road development, similar to other studies (e.g., McIntosh et al. 2000). Habitat quality within TPAs is variable, in part because of other land use activities and because the ultimate effects of travel routes also depend on location of those routes, geology and soils of the watershed, maintenance of the routes, and other factors (Furniss et al. 1991). Currently, annual sediment delivery guidelines for Gallatin National Forest Class A streams (the highest stream classification on the Forest, at 30% over natural annual sediment delivery), are exceeded in two (5%) of the 39 TPAs, Bear Canyon and Big Sky (Table

3.7.1). A third, Bangtails TPA, which exceeded these sediment delivery thresholds in the FEIS, is currently undergoing road decommissioning work to bring it within compliance. All of these TPAs have relatively high road densities. However, stream habitat quality within TPAs, including those with overall high sediment delivery, is variable. High quality habitat may be present in TPAs with relatively high travel route densities or riparian habitat loss, and vice versa. This is because of effects other land-use activities, because TPAs may contain multiple watersheds with differing conditions, and because the ultimate effects of travel routes also depend on location of those routes, geology of the watershed, sensitivity of the stream type, maintenance of the travel routes and other factors (Furniss et al. 1991, Rosgen 1996). For those reasons, travel routes will be analyzed individually within TPAs.

Although the presence of sensitive fish species is often negatively correlated with travel route density (e.g., Dunham and Rieman 1999), in some cases on the Forest, current sensitive fish species presence (particularly westslope cutthroat trout) is actually directly related to the presence of travel routes. Culverts on these travel routes are fish passage barriers that fragmented fish populations and an inadvertent consequence of this fragmentation was that it prevented immigration of competitive or introgressing non-native fish species. The three westslope cutthroat populations isolated by culverts are the only pure populations of that subspecies remaining on the Forest (Table 3.7.1). Of those watersheds with road densities $\geq$1 mi/sq mi, 88% (16 out of 18) contained cutthroat trout; 57% of all Forest stream segments containing cutthroat trout are in watersheds with road densities $\geq$mi/sq mi. Story and Williams (2003) completed a survey that evaluated fish passage at all culverts on the Forest. The result of that survey is a priority list of those culverts requiring modification or replacement. The top priorities are those culverts on cutthroat streams where restoring fish passage will reconnect cutthroat populations to ensure long-term population viability without exposing them to risks of hybridizing or competitive non-native fish (e.g., Harig et al. 2000, Harig and Fausch 2002). Conversely, some culvert barriers will be maintained in the short-term to protect genetic integrity of some populations until a long-term solution to the threats facing the population (limited habitat space, threats from introgression and competition) can be addressed.

There is a distinction between travel route effects and the effects of various modes of travel. In most cases, the actual use, or mode of travel (motorized versus non-motorized) is inconsequential. Rather, it is the facility (road or trail) that has the potential to impact aquatic habitat and biota. In general, roads have more impacts than trails because of their wider prisms, larger cut-and-fill slopes and more extensive ditch routing systems. However, some uses have higher potential to disturb soils and increase erosion potential on both roads and trails, and therefore segregation of uses is maintained throughout the report. For example, Dale and Weaver (1974) found horses trails to be deeper than those used only by hikers. Deluca et al. (1998) found horses consistently made more sediment available for erosion than hikers or llamas. Wilson and Seney (1994) measured sediment yield from hikers, mountain bikers, motorcycles and horses and found horses produced higher sediment yields on both dry and pre-wetted trails than the other users. Weaver and Dale (1978) found that damage generally increased from hiker to motorcycle to horse. Facility improvements and maintenance in many cases can mitigate potential for adverse effects.

Potential effects of travel routes and various modes of travel on aquatic habitat and populations are combined under one primary aquatic issue (aquatic habitat and biota effects). However, the issue is segregated into various components of concern. Those components are:

1) Travel route effects on stream channel form and function, including sediment delivery to streams and subsequent effects on aquatic habitat and biota.
2) Travel route effects on riparian ecosystems.
3) Travel route effects on habitat fragmentation.
4) Travel route effects on exploitation and modification of recreational and native fisheries.

Effects on Stream Channel Form and Function

Travel routes may affect stream channel form and function, including sediment delivery to streams and subsequent effects on aquatic habitat and biota.

Roads and trails constructed for Forest travel disturb soils and increase the potential for erosion and sediment transport and deposition in streams (Furniss et al. 1991, Forman et al. 2003). Likewise, summer motorized and non-motorized uses (motorcycles, ATVs, horses, mountain bikes, hikers) can further disturb soils and increase potential for erosion and sediment delivery. Sediment concerns are generally highest when roads and trails are not sufficiently drained (Furniss et al. 1991). Water and sediment can concentrate on roads and trails during spring snowmelt runoff or periods of intense rain and be delivered to streams. With sufficient drainage, water and sediment from upland segments of trails and roads can be diverted off trails or roads, filtered through forest vegetation, and not routed to streams (Furniss et al. 1991). As such, upland segments of roads and trails can generally be designed to mitigate sediment delivery concerns. The primary concern is erosion and sediment delivery from road and trail segments near stream crossings (Furniss et al. 1991, Forman et al. 2003).

Sediment entering stream channels can affect channel shape and form, stream substrates, the structure of fish habitats and the structure and abundance of fish populations (Everest et al. 1987, Hicks et al. 1991, Waters 1995, McIntosh et al. 2000). To evaluate the effects travel routes and modes of travel have on sediment and fish habitats and populations, one must project changes in erosion and sediment delivery against the structural framework of the channel. Streams are not similar in terms of their inherent sensitivity to changes in streamflow or sediment discharge, their inherent stability, or their ability to recover from sediment related change (Rosgen 1996, Hogan and Ward 1997). Furthermore, stream habitats described in terms of pools, riffles and spawning gravel are geomorphic entities that are selectively influenced or controlled by channel type, streamflows and sediment inputs (Rosgen 1996, Hogan and Ward 1997). Thus, it is important to integrate the sensitivity of streams or channel types with the geomorphic processes that influence various stream habitats in order to evaluate past, present and future effects on channel stability and fish habitat quality. Second, potential sediment effects to trout vary according to life-stage specific habitat requirements, habitat conditions (quality) and habitat availability (quantity) (Everest et al. 1987, Bjornn and Reiser 1991, Hicks et al. 1991, Hogan and Ward 1997). This is because different life-stages utilize different habitats. Adults typically prefer pool habitats and juveniles utilize pools, runs and some riffle habitats. Sediment effects on adult and juvenile trout can occur when sediment concentrations exceed the capacity of the channel and pools fill or riffles become more embedded. Young-of-the-year fish require low-gradient rearing areas like side channels and channel margins. Incubating eggs require clean spawning gravels. Adverse effects to young trout (egg through fry life stages) can occur when fine sediment concentrations increase in spawning gravels (Bjornn and Reiser 1991, Hicks et al. 1991, Waters 1995).

Spawning gravel is the sorted product of bed scour and redeposition from which sand and finer material has been removed and transported downstream. The maintenance of good spawning gravel requires that the stream's normal sediment supply contain relatively low amounts of fine material, and that stream-flows and gradients be sufficiently high to flush out fines (Bjornn and Reiser 1991, Waters 1995, Kondolf 2000). Travel routes that minimize the influx of fine sediments will favor the maintenance of spawning gravel. If inputs exceed the stream's sediment transport capacity, then concentrations can increase in spawning gravels and affect survival of incubating eggs and swim-up fry. This effects analysis addresses interactions between erosion potential, predicted sediment yield over natural rates and potential for sediment in streams to adversely affect embryo survival.

Pools are the result of local scour or impoundment induced by structural controls (e.g., boulders, large woody debris) in the channel or streambank (Rosgen 1996, Hogan and Ward 1997). Pools are areas of higher velocity during peak flows, but at low flows their depth creates a depositional environment for fine sediment. Increased sediment from roads and trails can influence the amount and quality of juvenile and adult pool habitat if sediment increases are sufficient to alter channel morphology by filling in pools and increase width/depth ratios. For lower-gradient, more sensitive channel types like B4 and B4c and C type reaches with moderate sensitivity to increased sediment, excessive sediment loading can reduce maximum pool depth and residual pool volume thereby reducing the quality and availability of pool habitats important to juvenile and adult salmonids (Rosgen 1996, Hogan and Ward 1997). A cursory analysis of habitat and channel type data collected for streams throughout the Forest shows that residual pool volume and maximum pool depth decreased slightly in B4 and C4 channels in watersheds with extensive road development.

Effects on Riparian Ecosystems

Forest roads and trails constructed for travel activities within riparian corridors can alter or remove riparian vegetative communities, with direct and indirect impacts on riparian and stream ecosystems (Furniss et al. 1991, Forman 2003). 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. Removal of riparian vegetation may indirectly result in reduced streambank stability and sediment filtering capacity of vegetation, both of which can result in increased sediment delivery rates with effects as described above (e.g., Thornton et al. 1998). Riparian vegetation modification may also change stream channel form and function, and may modify aquatic food webs and nutrient cycles. Potential for changes in channel form and function is also related to the inherent stability of various channel types. Removal of riparian vegetation in amphibian breeding, incubating and rearing habitats may reduce its suitability for those functions and may increase vulnerability of the amphibians to predation (Maxell 2000, Forman et al. 2003).

These impacts to riparian vegetation are most often a concern where roads and trails are constructed adjacent to streams and where the trail or road course follows the stream course. Vegetation disturbance at trail and road crossings for most streams are localized and occur only at the crossing. Because crossings generally comprise a very small percentage of the total stream or riparian corridor, effects are generally minimal for the stream as a whole. However, some roads or trails cross streams numerous times. Effects in those instances can be more pronounced. Thus, this component of the issue is addressed for roads or trails that follow stream courses, and for roads or

trails with numerous crossings. Feigley (2004) separately analyzed the general impacts of roads and trails on riparian habitats across the TPAs, including riparian vegetation loss. In this analysis, travel routes with specific riparian habitat-related fisheries and amphibian impacts will be addressed.

Effects on Habitat Fragmentation

Roads and trails can fragment aquatic habitats where stream crossings create barriers for upstream movement of fish and amphibians (Furniss et al. 1991, Maxell 2000). This typically occurs where culverts and fords are not designed to allow for upstream fish and amphibian passage. Crossings with culverts can be barriers usually because of outfall barriers, excessive velocities, insufficient water depths, disorienting turbulent flow patterns, lack of resting pools below the barrier or a combination of these conditions. Fish and amphibians upstream of the barrier are then geographically and hence, reproductively isolated from the downstream population. Habitat fragmentation can reduce viability of fish and amphibian populations by a variety of stochastic, deterministic and genetic mechanisms (e.g., Rieman et al. 1993).

This concern has been addressed through a Forest-wide culvert inventory completed in 2003 that evaluated culverts to determine fish passage capabilities (Story and Williams 2003). Culverts where fish passage is a concern have been prioritized for replacement. Because fish passage has been addressed through the Forest-wide culvert inventory and fish passage analysis, and because impacts can be mitigated through facility design or replacement, this component of the overall travel management aquatic issue is dismissed from further detailed discussion in this EIS.

Effects on Exploitation of Recreational and Native Fisheries

Travel routes that lead to popular fishing destinations may have an indirect effect on fish populations by over-exploiting fish stocks that are vulnerable to high angling pressure. Over-exploitation of fish stocks may result in population declines (e.g., Rieman and McIntyre 1993). Population declines in small fish populations may render them at higher risk of extinction (Rieman et al. 1993).

The Montana Department of Fish, Wildlife and Parks (MFWP) manages fish and wildlife populations throughout the state. Lake management plans have been developed for most high mountain lakes throughout the Gallatin Forest. These plans address recruitment potential and angling pressure effects. Where natural recruitment does not meet population goals, supplemental stocking is generally prescribed. Thus, the issue is largely focused on over-exploitation of native fish populations inhabiting Forest streams. The MFWP regulates over-exploitation of recreational and native stream fisheries with special regulations that either determines catch limits or prohibit keeping of fish. For example, there is currently a catch-and-release regulation in effect for native Yellowstone and westslope cutthroat trout in all streams supporting native stocks. Lake management plans and special regulations effectively mitigate the over-exploitation component of the aquatics issue. Thus, this component is dismissed from further detailed discussion in this EIS.

Direct and Indirect Effects

Analysis Methodology

Uses Dismissed from Detailed Discussion

Winter motorized and non-motorized use
There is no literature or evidence in streams throughout the Forest that suggests winter motorized or non-motorized uses affect aquatic habitat and biota via any of the issue components. Generally, ice and snow cover over aquatic habitats provides sufficient protection from snow machines, skiers and other winter recreational activities. Therefore, winter motorized and non-motorized uses are dismissed from further discussion in this EIS.

Motorized use in Wilderness
Motorized uses are not allowed in designated Wilderness. Therefore, motorized uses are dismissed from detailed analysis for all Wilderness TPAs.

Measurement Indicators
1) Sensitive channel types based on Rosgen 1994 classification scheme; sediment yield from travel routes compared with Forest sediment guidelines; known significant changes in stream channel form and function; travel routes where related habitat degradation is occurring based on site specific data.
2) Relative percent riparian vegetation loss where loss or changes in riparian vegetation are affecting aquatic habitat and biota via significant reductions in stream shading, security cover, increased erosion and sediment delivery or changes in channel form and function.

Fish and Amphibians and their Habitat

Potential travel management effects on fish, amphibians and their habitats were analyzed by reviewing existing Forest Service data and analyses, reviewing literature, compiling data from other resource agencies and assessing the potential impacts of roads, trails and their uses for each TPA, and then by route within each TPA. This assessment evaluated the effects of alternatives by TPA, the effects of travel and travel routes on riparian and aquatic habitats within each unit and the effects or potential effects of travel on sediment delivery to waterbodies within or adjacent to each unit. Indicators used in effect determinations included sensitivity of channel types based on Rosgen's (1996) classification scheme (Table 3.7.2) include: sediment yield from travel routes compared with Forest sediment guidelines, known significant changes in stream channel form and function, travel routes where related habitat degradation is occurring based on site specific data and where loss or changes in riparian vegetation are affecting aquatic habitat and biota via significant reductions in stream shading, security cover, increased erosion and sediment delivery or changes is channel form and function. Effects determinations shown in Table 3.7.3 through Table 3.7.37 are based on a review of these indicators. Where effects to aquatic habitat and biota are occurring based on these indicators, or where there is potential for an effect because of new travel management, rationale for the determination is also provided in these tables.

Two components of potential travel management impacts were fully analyzed:
1) Modifications to riparian vegetative communities relative to fish and their habitat.
2) Modifications to stream channel form and function, including sediment delivery, relative to fish and their habitat.

Furniss et al. (1991), Maxell (2000) and Forman et al. (2003) summarize these effects on fish and amphibians, and their habitats. Hydrologic effects or changes in hydrologic processes such as changes in the timing and intensity of spring runoff were addressed by Story (2006).

Spatial Bounds

Aquatic environments in forested ecosystems are heavily influenced by the physical and biological processes within the watershed as a whole (Vannote et al. 1980). For this reason, the analysis area for both fish and amphibians will encompass all watersheds within the project area boundary. The sediment modeling incorporates watershed level variables along with specific roads and trails. Watersheds include the Gallatin, Madison, Yellowstone, Shields and Boulder River drainages and tributaries that may be impacted by Forest travel management activities.

Temporal Bounds

Stream fish habitats may continue to be impacted by human activities for many decades after the initial disturbance. Amphibian habitats may also be, or remain, negatively impacted long after certain types of anthropogenic actions begin, including travel management activities (Maxell 2000). Therefore, temporal cumulative effects for fish, amphibians and their habitats will span the breadth of known human activity in each TPA. As such, the temporal bounds for direct, indirect, and cumulative effects includes all past, present and reasonably foreseeable actions through 2010.

Activities considered in the cumulative effects analysis include those directly modifying fish and amphibian habitat as well as those indirectly modifying sediment delivery and routing, and modifying hydrologic regimes. These activities include past road construction and stabilization, vegetation management, grazing, recreation, trail maintenance and past wildfires.

Definition of Direct and Indirect Effects

Direct effects are those resulting in the direct mortality of fish or amphibians, or the destruction of fish or amphibian habitat. Indirect effects are those resulting in changes to fish and amphibian habitat as a result to changes in the aquatic environment, such as the potential for altering the rate in which sediment or woody debris enters the stream channel, modifying temperature regimes by reducing riparian shading and changes in stream bank stability due to near-bank activities.

General Comparison of Alternatives

Alternative 1 retains existing travel route direct and indirect effects, as it represents the status quo and incorporates neither the TPA specific mitigations for existing impacts on aquatic habitats, nor the goals, objectives, standards and guidelines proposed for the other alternatives that address

existing impacts of travel management. By contrast, Alternatives 2 through 7-M incorporate the proposed goals, objectives, standards and guidelines for all TPAs (as refined in the Final EIS from what was presented in the Draft EIS) and specific travel route mitigations in 12 TPAs (Table 3.7.3 through Table 3.7.37, Story 2006) which effectively reduce existing direct and indirect effects and represent an improvement from current conditions, and this is reflected in effects determinations for most TPAs (Table 3.7.3 through Table 3.7.37). Three of these TPAs had route exceptions that could not be mitigated under various Alternatives 2 through 7-M: Cooke City (Alternative 2); Deer Creek (Alternatives 2 through 7-M) and Porcupine Buffalo Horn (Alternatives 2-4). Of these, only Deer Creek TPA retains some negative impacts in Alternative 7-M (to be discussed below).

Alternatives 2 through 7-M would also close uninventoried motorized routes (including "go-down" roads), which are not maintained Forest infrastructure and which are often significant sediment sources because user-built trails are often not constructed in a manner that minimizes sediment delivery to streams. These closures, combined with the general trend of travel route reduction from Alternative 1 to Alternative 6, would result in sediment delivery reductions in TPAs (Story 2006). Alternative 7-M, the preferred alternative, is most similar to Alternative 4 with regard to sediment delivery and therefore represents a reduction in sediment delivery from Alternatives 1-3. It should be noted, however, that changes in sediment production in across the range of alternatives are less than 0.5% (Story 2006). Total road densities (all roads including administrative roads) either remain static or decrease in all TPAs, and total route densities (all roads and all trails) remain static or decrease in all TPAs with three exceptions: Bangtails, Big Sky and Cooke City, where slight increases are proposed. Therefore, areas currently not impacted by travel routes and their management will remain in that condition.

Specific routes in other TPAs would require mitigation to alleviate impacts. These TPAs are: Bear Canyon, Deer Creeks, East Boulder, East Crazies, Hyalite, Ibex, Mill Creek, and Shields. Specific route mitigation measures are detailed in Table 3.7.5, Table 3.7.12, Table 3.7.13, Table 3.7.14, Table 3.7.21, Table 3.7.22, Table 3.7.25, Table 3.7.30. Significant among them are routes in Bear Canyon and Shields TPA that require facility closures until sediment standards (Table 3.7.38) are met through facility improvements. In Bear Canyon TPA, which exceeds Forest sediment guidelines, very sensitive soils are easily disturbed by any activity. Existing travel route facilities are responsible for elevated sediment delivery in Bear Canyon Creek in particular, although management activities outside Forest jurisdictions have been far more impactive with regard to both sediment delivery and to modifications of stream habitats (Story and Taylor 2003, Barndt and Bay 2004). To reduce management effects to this watershed and its biota from Forest activities, this facility should be closed until it can be brought to standard and its sediment delivery lowered to Forest guidelines. In Shields TPA, the majority of sediment delivery in the watershed results from roads (Story 2006), and these roads are typically located near streams, as indicated in Table 3.7.1 by the large degree of riparian habitat loss in this TPA. Significant facility improvements are necessary in this TPA to reduce excessive localized sediment sources and resulting impacts to Yellowstone cutthroat trout before construction of any new routes

For the Deer Creeks TPA, Alternative 7-M will reduce impacts from the existing condition, but impacts may not be completely mitigateable. In the area of these routes, Deer Creek flows through sensitive soils, resulting in sensitive stream channel types. The trails cross Lower Deer Creek in numerous locations where steep banks comprised of loose unconsolidated material are eroding and

delivering sediment directly into the stream. To reduce impacts to Yellowstone cutthroat trout, Alternative 7-M would allow motorcycle use of Lower Deer Creek #5 between the junction of #5 with #156 and Deer Creek cabin only after the facility is sufficiently modified so that no measurable degradation of Yellowstone cutthroat trout habitat is occurring. ATV use would be restricted along #5 between #256 and Deer Creek cabin, and again would only be allowed after significant facility improvements are implemented. It is now believed that certain stream crossing designs can be implemented that will significantly reduce sediment impacts. During summer 2004 and 2005, a stream crossing restoration project was successfully implemented on the Placer Gulch Trail #256. On #5 south of the cabin, motorized use would be restricted because crossings sufficient to reduce impacts to Yellowstone cutthroat trout would be difficult to construct.

In 19 TPAs, uninventoried motorized routes were not mitigated, thereby resulting in negative impacts to aquatic resources under Alternative 1 (Table 3.7.3 through Table 3.7.37). Impacts of these routes include increase sediment delivery to streams and wetlands, destruction of riparian vegetation, disturbance of streambeds and banks and modification of stream channel form and function in sensitive channel types (generally Rosgen B4, C4 types). As described above, Alternatives 2 through 7-M, including the preferred Alternative 7-M, would close these uninventoried routes.

Overall, with the potential exception of the routes in the Deer Creek TPA described above, Alternative 7-M would have "no effect" to fish, amphibians, and their habitats. Alternatives 2 through 7-M also contain TPA specific mitigations which reduce negative impacts to acceptable levels in two TPAs, whereas negative impacts are retained under Alternative 2 for Cooke City TPA and Alternatives 2-4 for Porcupine Buffalo Horn TPA.

Key to Tables 3.7.3 through 3.7.37	
DIS	Dismissed
NI	No impact.
MIIH	May impact individuals or habitat, but will not likely contribute to a trend towards federal listing or cause a loss of viability to the population or species.
A – C	Mitigation; described by TPA.
1 – 6	Exceptions, described by TPA.

Table 3.7. 3 Comparison of effects to fish, amphibians, and their habitats by alternative.

AB Wilderness, AB Beartooth Plateau, LM Wilderness Hilgards, LM Wilderness Monument, LM Wilderness Spanish Peaks TPAs								
Season / Type of Travel		Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7-M
Summer Motorized	Passenger Car	N/A						
	Hi Clearance							
	ATV							
	Motorcycle							
Summer Non-Motorized	Mountain Bike	N/A						
	Stock	NI	NI	NI	NI	NI	NI	NI
	Hiking	DIS	DIS	DIS	DIS	DIS	DIS	DIS
Winter	Snowmobile	N/A						
	Ski/Snowshoe	DIS	DIS	DIS	DIS	DIS	DIS	DIS

Table 3.7. 4 Comparison of effects to fish, amphibians, and their habitats by alternative.

Bangtails TPA								
Season / Type of Travel		**Alt. 1**	**Alt. 2**	**Alt. 3**	**Alt. 4**	**Alt. 5**	**Alt. 6**	**Alt. 7-M**
Summer Motorized	Passenger Car	NI (A)	NI	NI	NI	NI	NI	NI
	Hi Clearance	NI (A)	NI	NI	NI	NI	NI	NI
	ATV	NI (A)	NI	NI	NI	NI	NI	NI
	Motorcycle	NI (A)	NI	NI	NI	NI	NI	NI
Summer Non-Motorized	Mountain Bike	NI	NI	NI	NI	NI	NI	NI
	Stock	NI	NI	NI	NI	NI	NI	NI
	Hiking	DIS	DIS	DIS	DIS	DIS	DIS	DIS
Winter	Snowmobile	DIS	DIS	DIS	DIS	DIS	DIS	DIS
	Ski/Snowshoe	DIS	DIS	DIS	DIS	DIS	DIS	DIS

Code	**Road or Trail**	**Explanation**
A	Uninventoried motorized routes	YCT concerns. Motorized use needs to be restricted to specific routes so problem sediment sources can be mitigated. Alternative 1 could result in unidentified point source sediment problems.

Table 3.7. 5 Comparison of effects to fish, amphibians, and their habitats by alternative.

Bear Canyon TPA								
Season / Type of Travel		Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7-M
Summer Motorized	Passenger Car	MIIH (A)	NI	NI	NI	NI	NI	NI
	Hi Clearance	MIIH (A)	NI	NI	NI	NI	NI	NI
	ATV	MIIH (A,1)	NI (1)	NI (1)	NI (1)	NI	NI	NI (1)
	Motorcycle	MIIH (A,1)	NI (1)	NI (1)	NI (1)	NI	NI	NI (1)
Summer Non-Motorized	Mountain Bike	MIIH (A,1)	NI (1)	NI (1)	NI (1)	NI	NI	NI (1)
	Stock	MIIH (A,1)	NI (1)	NI (1)	NI (1)	NI	NI	NI (1)
	Hiking	DIS	DIS	DIS	DIS	DIS	DIS	DIS
Winter	Snowmobile	DIS	DIS	DIS	DIS	DIS	DIS	DIS
	Ski/Snowshoe	DIS	DIS	DIS	DIS	DIS	DIS	DIS

Code	**Road or Trail**	**Explanation**
A	Uninventoried motorized routes	YCT, MIS, sensitive amphibian concerns. Motorized use needs to be restricted to specific routes so problem sediment sources can be mitigated. Alternative 1 could result in unidentified point source sediment problems.
1	Trail 440	Facility should be closed to motorized use until road restoration, stabilization and improvements result in sediment deliveries within Forest 75% habitat capability guidelines. Facility currently follows and crosses stream-course three times. Standards M1-6 would apply.

Table 3.7. 6 Comparison of effects to fish, amphibians, and their habitats by alternative.

Big Sky TPA								
Season / Type of Travel		Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7-M
Summer Motorized	Passenger Car	NI	NI	NI	NI	NI	NI	NI
	Hi Clearance	NI	NI	NI	NI	NI	NI	NI
	ATV	NI	NI	NI	NI	NI	NI	NI
	Motorcycle	NI	NI	NI	NI	NI	NI	NI
Summer Non-Motorized	Mountain Bike	NI	NI	NI	NI	NI	NI	NI
	Stock	NI	NI	NI	NI	NI	NI	NI
	Hiking	DIS	DIS	DIS	DIS	DIS	DIS	DIS
Winter	Snowmobile	DIS	DIS	DIS	DIS	DIS	DIS	DIS
	Ski/Snowshoe	DIS	DIS	DIS	DIS	DIS	DIS	DIS

Table 3.7. 7 Comparison of effects to fish, amphibians, and their habitats by alternative.

Bozeman Creek TPA								
Season / Type of Travel		Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7-M
Summer Motorized	Passenger Car	NI	NI	NI	NI	NI	NI	NI
	Hi Clearance	NI	NI	NI	NI	NI	NI	NI
	ATV	NI	NI	NI	NI	NI	NI	NI
	Motorcycle	NI	NI	NI	NI	NI	NI	NI
Summer Non-Motorized	Mountain Bike	NI	NI	NI	NI	NI	NI	NI
	Stock	NI	NI	NI	NI	NI	NI	NI
	Hiking	DIS	DIS	DIS	DIS	DIS	DIS	DIS
Winter	Snowmobile	DIS	DIS	DIS	DIS	DIS	DIS	DIS
	Ski/Snowshoe	DIS	DIS	DIS	DIS	DIS	DIS	DIS

Table 3.7. 8 Comparison of effects to fish, amphibians, and their habitats by alternative.

Bridger Canyon TPA								
Season / Type of Travel		Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7-M
Summer Motorized	Passenger Car	NI	NI	NI	NI	NI	NI	NI
	Hi Clearance	NI	NI	NI	NI	NI	NI	NI
	ATV	NI	NI	NI	NI	NI	NI	NI
	Motorcycle	NI	NI	NI	NI	NI	NI	NI
Summer Non-Motorized	Mountain Bike	NI	NI	NI	NI	NI	NI	NI
	Stock	NI	NI	NI	NI	NI	NI	NI
	Hiking	DIS	DIS	DIS	DIS	DIS	DIS	DIS
Winter	Snowmobile	DIS	DIS	DIS	DIS	DIS	DIS	DIS
	Ski/Snowshoe	DIS	DIS	DIS	DIS	DIS	DIS	DIS

Table 3.7. 9 Comparison of effects to fish, amphibians, and their habitats by alternative.

Cabin Creek TPA								
Season / Type of Travel		Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7-M
Summer Motorized	Passenger Car	NI	NI	NI	NI	NI	NI	NI
	Hi Clearance	NI	NI	NI	NI	NI	NI	NI
	ATV	NI	NI	NI	NI	NI	NI	NI
	Motorcycle	NI	NI	NI	NI	NI	NI	NI
Summer Non-Motorized	Mountain Bike	NI	NI	NI	NI	NI	NI	NI
	Stock	NI	NI	NI	NI	NI	NI	NI
	Hiking	DIS	DIS	DIS	DIS	DIS	DIS	DIS
Winter	Snowmobile	DIS	DIS	DIS	DIS	DIS	DIS	DIS
	Ski/Snowshoe	DIS	DIS	DIS	DIS	DIS	DIS	DIS

Table 3.7. 10 Comparison of effects to fish, amphibians, and their habitats by alternative.

Cherry Creek TPA								
Season / Type of Travel		Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7-M
Summer Motorized	Passenger Car	NI	NI	NI	NI	NI	NI	NI
	Hi Clearance	NI	NI	NI	NI	NI	NI	NI
	ATV	NI	NI	NI	NI	NI	NI	NI
	Motorcycle	NI	NI	NI	NI	NI	NI	NI
Summer Non-Motorized	Mountain Bike	NI	NI	NI	NI	NI	NI	NI
	Stock	NI	NI	NI	NI	NI	NI	NI
	Hiking	DIS	DIS	DIS	DIS	DIS	DIS	DIS
Winter	Snowmobile	DIS	DIS	DIS	DIS	DIS	DIS	DIS
	Ski/Snowshoe	DIS	DIS	DIS	DIS	DIS	DIS	DIS

Table 3.7. 11 Comparison of effects to fish, amphibians, and their habitats by alternative.

Cooke City TPA								
Season / Type of Travel		Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7-M
Summer Motorized	Passenger Car	NI (A,1) MIIH (B)	NI (1) MIIH (B)	NI (1)	NI (1)	NI (1)	NI (1)	NI (1)
	Hi Clearance	NI (A,1) MIIH (B)	NI (1) MIIH (B)	NI (1)	NI (1)	NI (1)	NI (1)	NI (1)
	ATV	NI (A,1) MIIH (B)	NI (1) MIIH (B)	NI (1)	NI (1)	NI (1)	NI (1)	NI (1)
	Motorcycle	NI (A,1) MIIH (B)	NI (1) MIIH (B)	NI (1)	NI (1)	NI (1)	NI (1)	NI (1)
Summer Non-Motorized	Mountain Bike	NI	NI	NI (1)	NI (1)	NI (1)	NI (1)	NI (1)
	Stock	NI (1) MIIH (B)	NI (1) MIIH (B)	NI (1)	NI (1)	NI (1)	NI (1)	NI (1)
	Hiking	DIS	DIS	DIS	DIS	DIS	DIS	DIS
Winter	Snowmobile	DIS	DIS	DIS	DIS	DIS	DIS	DIS
	Ski/Snowshoe	DIS	DIS	DIS	DIS	DIS	DIS	DIS

Code	Road or Trail	Explanation
A	Uninventoried motorized routes	YCT, sensitive amphibian concerns. Motorized use on these routes is currently restricted to specific routes so problem sediment sources can be mitigated. Alternative 1 could result in unidentified point source sediment problems if this restriction were lifted.
B	Applies to all roads without seasonal closures.	The MIIH applies to all roads without seasonal closures in alternatives 1 and 2. Motorized and stock use of these road segments will likely increase sediment delivery to streams during spring snowmelt runoff. The Cooke City area receives significant snow accumulation and area roads are extremely wet during spring thaw. Elevated sediment levels for streams draining into Soda Butte Creek could affect trout reproduction. Seasonal closures would be in effect in Alternative 2 for the following roads (Lake Abundance Rd #3219, Rommell Mill Rd #3216, Lulu-Fisher Cutoff Rd #3227, Henderson Mt Rd #3223, Woody Cr Rd #3221 and #1172).
1	Kersey Lake Rd #3223	Alternatives 1 through 7-M for the Kersey Lake Rd includes seasonal restrictions for summer motorized and stock use. However, segments of the Kersey Lake Road are located in the riparian zone of the Clarks Fork and Broadwater rivers. Seasonal closures will help reduce sediment yield to those streams but will not eliminate it. Improved drainage and some road surfacing would be necessary to mitigate sediment impacts from the Kersey Lake Road. The NI determination assumes that road improvements would be made. For all other roads, seasonal closures during the spring snowmelt runoff period will effectively mitigate road/sediment related concerns.

Table 3.7. 12 Comparison of effects to fish, amphibians, and their habitats by alternative.

Deer Creeks TPA								
Season / Type of Travel		Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7-M
Summer Motorized	Passenger Car	NI (A, 1)	NI	NI	NI	NI	NI	NI
	Hi Clearance	NI (A, 1)	NI	NI	NI	NI	NI	NI
	ATV	NI (1, 2) MIIH (B,C)	NI MIIH (B,C)	NI (1)	NI (1,2)	NI (1)	NI	NI MIIH (B,C)
	Motorcycle	NI (1, 2) MIIH (B,C)	NI (1, 2) MIIH (B,C)	NI (1) MIIH[C]	NI (1,2) MIIH (C)	NI (1) MIIH (B)	NI MIIH (B)	NI MIIH (B,C)
Summer Non-Motorized	Mountain Bike	NI	NI	NI	NI	NI	NI	NI
	Stock	NI (1, 2) MIIH (B,C)	NI (1, 2) MIIH (B,C)	NI (1) MIIH (C)	NI (1,2) MIIH (C)	NI (1) MIIH (C)	NI MIIH (C)	NI MIIH (B,C)
	Hiking	DIS	DIS	DIS	DIS	DIS	DIS	DIS
Winter	Snowmobile	DIS	DIS	DIS	DIS	DIS	DIS	DIS
	Ski/Snowshoe	DIS	DIS	DIS	DIS	DIS	DIS	DIS

Code	Road or Trail	Explanation
A	Uninventoried motorized routes	YCT concerns. Motorized use needs to be restricted to specific routes so problem sediment sources can be mitigated. Alternative 1 could result in unidentified point source sediment problems.
B	Middle Fork Upper Deer Trail #112	Trail follows Middle Fork of the West Fork Upper Deer its entire length, through several wet, boggy areas. Could be re-routed but would take significant rerouting efforts. Stream does not support a fishery but could contribute sediment to Upper Deer Creek. Facility improvements are needed. MIIH if trail is open to motorized.
C	Lower Deer #5	Trail crosses Lower Deer Creek numerous times between Deer Cr cabin and Tomato Can trail junction. Crossings need to be hardened to mitigate impacts MIIH if trail is open to motorized.
1	Iron Mt Rd #482 Seg 1, Derby Gulch Rd #6674, Cherry Cr. Rd. #206, Dore Cr, Tomato Can #156, Boone Peak #2, W. Fk. Upper Deer #108, Lodgepole #124, Placer Gulch #256, West Bridger #129	Road or trail segment needs seasonal restrictions to reduce sediment delivery during spring (MIIH w/o restrictions)

Table 3.7. 13 Comparison of effects to fish, amphibians, and their habitats by alternative.

East Boulder TPA								
Season / Type of Travel		Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7-M
Summer Motorized	Passenger Car	NI (A,2)	NI (2)	NI (2)	NI (2)	NI (2)	NI (2)	NI (2)
	Hi Clearance	NI (A,2)	NI (2)	NI (2)	NI (2)	NI (2)	NI (2)	NI (2)
	ATV	NI (A,1,2)	NI (2)	NI (2)	NI (2)	NI (2)	NI (2)	NI (2)
	Motorcycle	NI (A,1,2)	NI (1,2)	NI (1,2)	NI (2)	NI (2)	NI (2)	NI (1)
Summer Non-Motorized	Mountain Bike	NI	NI	NI	NI	NI	NI	NI
	Stock	NI (1,2)	NI (1,2)	NI (1,2)	NI (2)	NI (2)	NI (2)	NI (1)
	Hiking	DIS	DIS	DIS	DIS	DIS	DIS	DIS
Winter	Snowmobile	DIS	DIS	DIS	DIS	DIS	DIS	DIS
	Ski/Snowshoe	DIS	DIS	DIS	DIS	DIS	DIS	DIS

Code	Road or Trail	Explanation
A	Uninventoried motorized routes	YCT concerns. Motorized use needs to be restricted to specific routes so problem sediment sources can be mitigated. Alternative 1 could result in unidentified point source sediment problems.
1	Dry Fork #20	One stream crossing at lower end of upper meadow needs to be restored to reduce sediment. Need seasonal restrictions to maintain bank stability during spring snowmelt runoff.
2	Picket Pin Rd #140, Boone Peak #2, Placer Basin #20, Graham Cr #117	Need seasonal restrictions to mitigate sediment impacts during spring snowmelt runoff.

Table 3.7. 14 Comparison of effects to fish, amphibians, and their habitats by alternative.

East Crazies TPA								
Season / Type of Travel		Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7-M
Summer Motorized	Passenger Car	NI	NI	NI	NI	NI	NI	NI
	Hi Clearance	NI	NI	NI	NI	NI	NI	NI
	ATV	NI	NI	NI (1)	NI	NI	NI	NI
	Motorcycle	NI (1,2)	NI (1,2)	NI (1,2)	NI	NI	NI	NI
Summer Non-Motorized	Mountain Bike	NI	NI	NI	NI	NI	NI	NI
	Stock	NI (1,2)	NI (1,2)	NI (1,2)	NI	NI	NI	NI (1)
	Hiking	DIS	DIS	DIS	DIS	DIS	DIS	DIS
Winter	Snowmobile	DIS	DIS	DIS	DIS	DIS	DIS	DIS
	Ski/Snowshoe	DIS	DIS	DIS	DIS	DIS	DIS	DIS

Code	Road or Trail	Explanation
1	Cottonwood Lake #197 to junction #270	Some resource damage is occurring in sensitive riparian meadows. Would need to mitigate with trail improvements and possible rerouting in the meadow reach.
2	South Fork Shields #265	YCT sediment concerns. Trail is adjacent to South Fork Shields Creek that supports pure YCT. Mitigate with improved drainage and tributary crossings to reduce sediment delivery. For Alternative 1, seasonal restrictions would be required to reduce sediment related impacts during spring snowmelt runoff.

Table 3.7. 15 Comparison of effects to fish, amphibians, and their habitats by alternative.

Fairy Lake TPA								
Season / Type of Travel		Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7-M
Summer Motorized	Passenger Car	NI	NI	NI	NI	NI	NI	NI
	Hi Clearance	NI	NI	NI	NI	NI	NI	NI
	ATV	NI (A)	NI	NI	NI	NI	NI	NI
	Motorcycle	NI	NI	NI	NI	NI	NI	NI
Summer Non-Motorized	Mountain Bike	NI	NI	NI	NI	NI	NI	NI
	Stock	NI	NI	NI	NI	NI	NI	NI
	Hiking	DIS	DIS	DIS	DIS	DIS	DIS	DIS
Winter	Snowmobile	DIS	DIS	DIS	DIS	DIS	DIS	DIS
	Ski/Snowshoe	DIS	DIS	DIS	DIS	DIS	DIS	DIS

Code	Road or Trail	Explanation
A	Uninventoried motorized routes	YCT concerns. Motorized use needs to be restricted to specific routes so problem sediment sources can be mitigated. Alternative 1 could result in unidentified point source sediment problems.

Table 3.7. 16 Comparison of effects to fish, amphibians, and their habitats by alternative.

Gallatin Crest TPA								
Season / Type of Travel		Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7-M
Summer Motorized	Passenger Car	NI	NI	NI	NI	NI	NI	NI
	Hi Clearance	NI	NI	NI	NI	NI	NI	NI
	ATV	NI (A,1,2,3)	NI	NI	NI	NI	NI	NI
	Motorcycle	NI (A,1,2,3)	NI (1,2)	NI (1)	NI (1)	NI	NI	NI
Summer Non-Motorized	Mountain Bike	NI	NI	NI	NI	NI	NI	NI
	Stock	NI (1,2,3)	NI (1,2)	NI (1)	NI (1)	NI	NI	NI
	Hiking	DIS	DIS	DIS	DIS	DIS	DIS	DIS
Winter	Snowmobile	DIS	DIS	DIS	DIS	DIS	DIS	DIS
	Ski/Snowshoe	DIS	DIS	DIS	DIS	DIS	DIS	DIS

Code	Road or Trail	Explanation
A	Uninventoried motorized routes	YCT concerns. Motorized use needs to be restricted to specific routes so problem sediment sources can be mitigated. Alternative 1 could result in unidentified point source sediment problems.
1	Upper Big Cr trails, Big Cr side trails	Trails are muddy throughout summer. Facility improvements would be necessary in wet areas before Emphasized motorcycle use. Applies to alternatives 2-4 in upper Big Creek trails.
2	Fridley Area trails	YCT concerns, facility improvements may be needed before emphasized motorcycle use.
3	Gallatin Crest #96 (seg 2), Big Creek side trails and Upper Big Creek trails, Mist Cr #196, Fridley area trails	For alternative 1 seasonal restrictions would be needed to reduce sediment related impacts during spring snowmelt runoff

Table 3.7. 17 Comparison of effects to fish, amphibians, and their habitats by alternative.

Gallatin River Canyon TPA								
Season / Type of Travel		Alt. 1		Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7-M
Summer Motorized	Passenger Car	NI	NI	NI	NI	NI	NI	NI
	Hi Clearance	NI	NI	NI	NI	NI	NI	NI
	ATV	NI	NI	NI	NI	NI	NI	NI
	Motorcycle	NI	NI	NI	NI	NI	NI	NI
Summer	Mountain Bike	NI	NI	NI	NI	NI	NI	NI
	Stock	NI	NI	NI	NI	NI	NI	NI
	Hiking	DIS	DIS	DIS	DIS	DIS	DIS	DIS
	Snowmobile	DIS	DIS	DIS	DIS	DIS	DIS	DIS
	Ski/Snowshoe	DIS	DIS	DIS	DIS	DIS	DIS	DIS

Table 3.7. 18 Comparison of effects to fish, amphibians, and their habitats by alternative.

Gallatin Roaded TPA								
Season / Type of Travel		Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7-M
Summer Motorized	Passenger Car	NI (A)	NI	NI	NI	NI	NI	NI
	Hi Clearance	NI (A)	NI	NI	NI	NI	NI	NI
	ATV	NI (A,1)	NI	NI	NI	NI	NI	NI
	Motorcycle	NI (A,1)	NI	NI	NI	NI	NI	NI
Summer	Mountain Bike	NI (A,1)	NI	NI	NI	NI	NI	NI
	Stock	NI (A,1)	NI	NI	NI	NI	NI	NI
	Hiking	DIS	DIS	DIS	DIS	DIS	DIS	DIS
Winter	Snowmobile	DIS	DIS	DIS	DIS	DIS	DIS	DIS
	Ski/Snowshoe	DIS	DIS	DIS	DIS	DIS	DIS	DIS

Code	Road or Trail	Explanation
A	Uninventoried motorized routes	WCT, MIS, sensitive amphibian concerns. Motorized use needs to be restricted to specific routes so problem sediment sources can be mitigated. Alternative 1 could result in unidentified point source sediment problems.
1	Swan Creek Trail 186	Seasonal closures are necessary to mitigate sediment delivery and resource damage when trail is wet.

Table 3.7. 19 Comparison of effects to fish, amphibians, and their habitats by alternative.

Gardiner Basin TPA								
		Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	
Motorized	Passenger Car	NI (A)	NI	NI	NI	NI	NI	NI
	Hi Clearance	NI (A)	NI	NI	NI	NI	NI	NI
	ATV	NI (A)	NI	NI	NI	NI	NI	NI
	Motorcycle	NI (A)	NI	NI	NI	NI	NI	NI
Summer Non-Motorized	Mountain Bike	NI	NI	NI	NI	NI	NI	NI
	Stock	NI	NI	NI	NI	NI	NI	NI
	Hiking	DIS	DIS	DIS	DIS	DIS	DIS	DIS
Winter	Snowmobile	DIS	DIS	DIS	DIS	DIS	DIS	DIS
	Ski/Snowshoe	DIS	DIS	DIS	DIS	DIS	DIS	DIS

Code	Road or Trail	Explanation
A	Uninventoried motorized routes	YCT concerns. Motorized use needs to be restricted to specific routes so problem sediment sources can be mitigated. Alternative 1 could result in unidentified point source sediment problems.

Table 3.7. 20 Comparison of effects to fish, amphibians, and their habitats by alternative.

Hebgen Lake Basin TPA								
Season / Type of Travel		Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7-M
Summer Motorized	Passenger Car	NI (A)	NI	NI	NI	NI	NI	NI
	Hi Clearance	NI (A)	NI	NI	NI	NI	NI	NI
	ATV	NI (A)	NI	NI	NI	NI	NI	NI
	Motorcycle	NI (A)	NI	NI	NI	NI	NI	NI
Summer Non-Motorized	Mountain Bike	NI	NI	NI	NI	NI	NI	NI
	Stock	NI	NI	NI	NI	NI	NI	NI
	Hiking	DIS	DIS	DIS	DIS	DIS	DIS	DIS
Winter	Snowmobile	DIS	DIS	DIS	DIS	DIS	DIS	DIS
	Ski/Snowshoe	DIS	DIS	DIS	DIS	DIS	DIS	DIS

Code	Road or Trail	Explanation
A	Uninventoried motorized routes	MIS, sensitive amphibian concerns. Motorized use needs to be restricted to specific routes so problem sediment sources can be mitigated. Alternative 1 could result in unidentified point source sediment problems.

Table 3.7. 21 Comparison of effects to fish, amphibians, and their habitats by alternative.

Hyalite TPA								
Season / Type of Travel		Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7-M
Summer Motorized	Passenger Car	NI (A)	NI	NI	NI	NI	NI	NI
	Hi Clearance	NI (A)	NI	NI	NI	NI	NI	NI
	ATV	NI (A)	NI	NI	NI	NI	NI	NI
	Motorcycle	NI (A)	NI	NI	NI	NI	NI	NI
Summer Non-Motorized	Mountain Bike	NI	NI	NI (1)	NI (1)	NI	NI	NI (1)
	Stock	NI	NI	NI	NI	NI	NI	NI
	Hiking	DIS	DIS	DIS	DIS	DIS	DIS	DIS
Winter	Snowmobile	DIS	DIS	DIS	DIS	DIS	DIS	DIS
	Ski/Snowshoe	DIS	DIS	DIS	DIS	DIS	DIS	DIS

Code	Road or Trail	Explanation
A	Uninventoried motorized routes	WCT, MIS, sensitive amphibian concerns. Motorized use needs to be restricted to specific routes so problem sediment sources can be mitigated. Alternative 1 could result in unidentified point source sediment problems.
1	Hyalite Canyon Trail	Assumes trail will be built on side of existing road and will conform to habitat guidelines.

Table 3.7. 22 Comparison of effects to fish, amphibians, and their habitats by alternative.

Ibex TPA								
Season / Type of Travel		Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7-M
Summer Motorized	Passenger Car	NI	NI	NI	NI	NI	NI	NI
	Hi Clearance	NI	NI	NI	NI	NI	NI	NI
	ATV	NI (A,1)	NI (2)	NI	NI	NI	NI	NI (2)
	Motorcycle	NI (A,1)	NI (2)	NI	NI	NI	NI	NI (2)
Summer Non-Motorized	Mountain Bike	NI	NI	NI	NI	NI	NI	NI
	Stock	NI	NI	NI	NI	NI	NI	NI
	Hiking	DIS	DIS	DIS	DIS	DIS	DIS	DIS
Winter	Snowmobile	DIS	DIS	DIS	DIS	DIS	DIS	DIS
	Ski/Snowshoe	DIS	DIS	DIS	DIS	DIS	DIS	DIS

Code	Road or Trail	Explanation
A	Uninventoried motorized routes	YCT concerns. Motorized use needs to be restricted to specific routes so problem sediment sources can be mitigated. Alternative 1 could result in unidentified point source sediment problems.
1	North Fk Elk #195, Shields Low Line #258, South Fk Shields #265, Porcupine Low Line #267, Trespass #268, Horse Cr Tie #269, Ibex #271, Cottonwood Low Line #272	Seasonal restrictions are necessary to reduce sediment related impacts during spring snowmelt runoff.
2	South Fk Shields #265	Facility improvements (e.g., stream crossings and trail drainage) would be necessary to mitigate sediment related impacts before emphasizing motorized use. Streams are inhabited by pure YCT.

Table 3.7. 23 Comparison of effects to fish, amphibians, and their habitats by alternative.

Lionhead TPA								
Season / Type of Travel		Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7-M
Summer Motorized	Passenger Car	NI (A)	NI	NI	NI	NI	NI	NI
	Hi Clearance	NI (A)	NI	NI	NI	NI	NI	NI
	ATV	NI (A)	NI	NI	NI	NI	NI	NI
	Motorcycle	NI (A)	NI	NI	NI	NI	NI	NI
Summer Non-Motorized	Mountain Bike	NI	NI	NI	NI	NI	NI	NI
	Stock	NI	NI	NI	NI	NI	NI	NI
	Hiking	DIS	DIS	DIS	DIS	DIS	DIS	DIS
Winter	Snowmobile	DIS	DIS	DIS	DIS	DIS	DIS	DIS
	Ski/Snowshoe	DIS	DIS	DIS	DIS	DIS	DIS	DIS

Code	Road or Trail	Explanation
A	Uninventoried motorized routes	WCT, MIS, sensitive amphibian concerns. Motorized use needs to be restricted to specific routes so problem sediment sources can be mitigated. Alternative 1 could result in unidentified point source sediment problems.

Table 3.7. 24 Comparison of effects to fish, amphibians, and their habitats by alternative.

Main Boulder TPA								
Season / Type of Travel		Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7-M
Summer Motorized	Passenger Car	NI	NI	NI	NI	NI	NI	NI
	Hi Clearance	NI	NI	NI	NI	NI	NI	NI
	ATV	NI (1)	NI	NI	NI	NI	NI	NI
	Motorcycle	NI (1)	NI	NI	NI	NI	NI	NI
Summer Non-Motorized	Mountain Bike	NI	NI	NI	NI	NI	NI	NI
	Stock	NI[1]	NI	NI	NI	NI	NI	NI
	Hiking	DIS	DIS	DIS	DIS	DIS	DIS	DIS
Winter	Snowmobile	DIS	DIS	DIS	DIS	DIS	DIS	DIS
	Ski/Snowshoe	DIS	DIS	DIS	DIS	DIS	DIS	DIS

Code	Road or Trail	Explanation
1	Grouse Cr #14, Green Mt #94, Graham Cr #117	Seasonal restrictions are necessary to reduce sediment delivery to streams during spring snowmelt runoff.

Table 3.7. 25 Comparison of effects to fish, amphibians, and their habitats by alternative.

Mill Creek TPA								
Season / Type of Travel		Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7-M
Summer Motorized	Passenger Car	NI (A,1,2)	NI (1,2)	NI (1,2,4)	NI (1,2,4)	NI (1,2)	NI (1,2)	NI (1,2)
	Hi Clearance	NI (A,1,2)	NI (1,2)	NI (1,2,4)	NI (1,2,4)	NI (1,2)	NI (1,2)	NI (1,2)
	ATV	NI (A,5,6)	NI (5)	NI (3,4,5)	NI (3,4)	NI	NI	NI(4)
	Motorcycle	NI (A,5,6)	NI (5)	NI (3,4,5)	NI (3,4)	NI	NI	NI (4)
Summer Non-Motorized	Mountain Bike	NI	NI	NI	NI	NI	NI	NI
	Stock	NI (5,6)	NI (5)	NI (3,4,5)	NI (3,4)	NI	NI	NI (4)
	Hiking	DIS	DIS	DIS	DIS	DIS	DIS	DIS
Winter	Snowmobile	DIS	DIS	DIS	DIS	DIS	DIS	DIS
	Ski/Snowshoe	DIS	DIS	DIS	DIS	DIS	DIS	DIS

Code	Road or Trail	Explanation
A	Uninventoried motorized routes	YCT concerns. Motorized use needs to be restricted to specific routes so problem sediment sources can be mitigated. Alternative 1 could result in unidentified point source sediment problems.
1	Sixmile Road #348	Road needs to be surfaced where it runs adjacent to stream. There is high sediment delivery directly to the stream in those reaches. Sixmile Creek is inhabited by pure YCT. Note: there is no difference among alternatives.
2	Mill Creek Road #486	YCT present, known sediment source, road needs to be surfaced or sloped with improved drainage near Colley Creek culvert crossing. Note: there is no difference in any of the alternatives.
3	Counts Cr. Road #1764	Counts Creek drains directly into a critical spawning reach of Mill Creek that is inhabited by pure YCT. Road drainage and or surfacing may need to be improved to mitigate sediment related effects on spawning habitat.
4	Upper Snowbank Rd. # 6998	YCT sediment concerns. Would first need to ensure that drainage from road surface is sufficient to allow for summer use. Would also need to ensure that all logging spur roads are made inaccessible to motorized. July 15 opening date affectively mitigates most sediment concerns.
5	Passage Cr. Trail #59	Facility improvements necessary before motorized use or heavy stock use. There are segments of the Passage Creek trail that are located adjacent to the stream.
6	Highland #69, #54, Lambert #280, Colley #275, E Fk Mill #51	Seasonal restriction would be necessary to mitigate sediment delivery to streams during spring snowmelt runoff. Trail #51 crossings in East Fork Mill Creek would need improvements before motorized use or heavy stock use. Motorized use could increase sediment delivery to streams inhabited by pure YCT.

Table 3.7. 26 Comparison of effects to fish, amphibians, and their habitats by alternative.

Mission TPA								
Season / Type of Travel		Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7-M
Summer Motorized	Passenger Car	NI	NI	NI	NI	NI	NI	NI
	Hi Clearance	NI	NI	NI	NI	NI	NI	NI
	ATV	NI	NI	NI	NI	NI	NI	NI
	Motorcycle	NI	NI	NI	NI	NI	NI	NI
Summer Non-Motorized	Mountain Bike	NI	NI	NI	NI	NI	NI	NI
	Stock	NI	NI	NI	NI	NI	NI	NI
	Hiking	DIS	DIS	DIS	DIS	DIS	DIS	DIS
Winter	Snowmobile	DIS	DIS	DIS	DIS	DIS	DIS	DIS
	Ski/Snowshoe	DIS	DIS	DIS	DIS	DIS	DIS	DIS

Table 3.7. 27 Comparison of effects to fish, amphibians, and their habitats by alternative.

North Bridgers TPA								
Season / Type of Travel		Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7-M
Summer Motorized	Passenger Car	NI (A)	NI	NI	NI	NI	NI	NI
	Hi Clearance	NI (A)	NI	NI	NI	NI	NI	NI
	ATV	NI (A)	NI	NI	NI	NI	NI	NI
	Motorcycle	NI (A)	NI	NI	NI	NI	NI	NI
Summer Non-Motorized	Mountain Bike	NI	NI	NI	NI	NI	NI	NI
	Stock	NI	NI	NI	NI	NI	NI	NI
	Hiking	DIS	DIS	DIS	DIS	DIS	DIS	DIS
Winter	Snowmobile	DIS	DIS	DIS	DIS	DIS	DIS	DIS
	Ski/Snowshoe	DIS	DIS	DIS	DIS	DIS	DIS	DIS

Code	Road or Trail	Explanation
A	Uninventoried motorized routes	WCT, MIS, sensitive amphibian concerns. Motorized use needs to be restricted to specific routes so problem sediment sources can be mitigated. Alternative 1 could result in unidentified point source sediment problems.

Table 3.7. 28 Comparison of effects to fish, amphibians, and their habitats by alternative.

Porcupine-Buffalo Horn								
Season / Type of Travel		Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7-M
Summer Motorized	Passenger Car	N/A						
	Hi Clearance							
	ATV	NI (1) MIIH (B)	NI (1) MIIH (B)	NI	NI	NI	NI	NI
	Motorcycle	NI (1) MIIH (B)	NI (1) MIIH (B)	NI (1) MIIH (B)	NI (1) MIIH (B)	NI	NI	NI
Summer Non-Motorized	Mountain Bike	NI	NI	NI	NI	NI	NI	NI
	Stock	NI (1) MIIH (B)	NI (1) MIIH (B)	NI (1) MIIH (B)	NI (1) MIIH (B)	NI	NI	NI
	Hiking	DIS	DIS	DIS	DIS	DIS	DIS	DIS
Winter	Snowmobile	DIS	DIS	DIS	DIS	DIS	DIS	DIS
	Ski/Snowshoe	DIS	DIS	DIS	DIS	DIS	DIS	DIS

Code	Road or Trail	Explanation
B	Rock Creek South #178	There are sensitive soils with high erosion potential. Accelerated bank erosion currently exists at stream crossings. Stream type is such that facility improvements would not mitigate effects. The stream is inhabited by pure YCT
1	Meadows #167	YCT concerns. Trail is currently contributing high sediment loads at a few crossings. Alternate user built route much better for ATVs and motorcycles. Reroute out of the bottom of Steele Creek and up on the ridge would be better from sediment perspective. Obliterate existing trail to motorized use. Facility improvements necessary for stock.

Table 3.7. 29 Comparison of effects to fish, amphibians, and their habitats by alternative.

Sawtooth TPA								
Season / Type of Travel		Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7-M
Summer Motorized	Passenger Car	N/A						
	Hi Clearance							
	ATV	NI	NI	NI	NI	NI	NI	NI
	Motorcycle	NI	NI	NI	NI	NI	NI	NI
Summer Non-Motorized	Mountain Bike	NI	NI	NI	NI	NI	NI	NI
	Stock	NI	NI	NI	NI	NI	NI	NI
	Hiking	DIS	DIS	DIS	DIS	DIS	DIS	DIS
Winter	Snowmobile	DIS	DIS	DIS	DIS	DIS	DIS	DIS
	Ski/Snowshoe	DIS	DIS	DIS	DIS	DIS	DIS	DIS

Table 3.7. 30 Comparison of effects to fish, amphibians, and their habitats by alternative.

Shields TPA								
Season / Type of Travel		Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7-M
Summer Motorized	Passenger Car	NI (A,1)	NI (2)	NI (2)	NI (2)	NI (2)	NI (2)	NI (2)
	Hi Clearance	NI (A,1)	NI (2)	NI (2)	NI (2)	NI (2)	NI (2)	NI (2)
	ATV	NI (A,1,3)	NI (2,3)	NI (2,3)	NI (2,3)	NI (2,3)	NI (2,3)	NI (2,3)
	Motorcycle	NI (A,1,3)	NI (2,3)	NI (2,3)	NI (2,3)	NI (2,3)	NI (2,3)	NI (2,3)
Summer Non-Motorized	Mountain Bike	NI	NI	NI	NI	NI	NI	NI
	Stock	NI (1,3)	NI (2,3)	NI (2,3)	NI (2,3)	NI (2,3)	NI (2,3)	NI (2,3)
	Hiking	DIS	DIS	DIS	DIS	DIS	DIS	DIS
Winter	Snowmobile	DIS	DIS	DIS	DIS	DIS	DIS	DIS
	Ski/Snowshoe	DIS	DIS	DIS	DIS	DIS	DIS	DIS

Code	Road or Trail	Explanation
A	Uninventoried motorized routes	YCT, MIS, sensitive amphibian concerns. Motorized use needs to be restricted to specific routes so problem sediment sources can be mitigated. Alternative 1 could result in unidentified point source sediment problems.
1	Shields River Rd #844 (seg. 3 and 4), Sunlight Cr Rd #6630, Buck Cr Rd #6631, Turkey Cr Rd #6634, Crandall Cr Rd. #66, Smith Cr Rd #991 (seg 2), East Fk Smith Cr Rd #6635 (seg 2,3), Bitter Cr Rd #6637, Lodgepole Cr #266 (seg 1), Crandall Cr loops	Seasonal restrictions are necessary some years due to reduce sediment related impacts during spring snowmelt runoff. YCT sediment concerns.
2	Shields River Rd #844 (seg 3 and 4), Buck Cr Rd #6631, Turkey Cr Rd #6634, Crandall Cr Rd #66, Smith Cr Rd #991 (seg 2), East Fk Smith Cr Rd #6635 (seg 2,3), Lodgepole Cr #266, Bitter Cr Rd #6637, Crandall Cr loops, Bitter/Honey Run loops, Goat Cr loops	Additional road or trail drainage and/or surfacing at locations with potential for road or trail sediment delivery to streams. YCT sediment concerns. For Crandall Creek Road #66, extensive facility improvements would be necessary to reduce existing sediment impacts.
3	Buck Cr. loop, Bitter Cr loop, Turkey/Lodgepole loops, Crandall Cr loop, Crandall/East Fk connector, East Fk Smith loops, East Fk/Bitter connector, Bitter/Honey Run loops, Goat Cr loops, Turkey/Buck loop	Sediment standards would need to be met before construction of new routes. Routes would need to be designed so for no increased sediment delivery to streams. Standards M1-6 would apply.

Table 3.7. 31 Comparison of effects to fish, amphibians, and their habitats by alternative.

South Plateau TPA								
Season / Type of Travel		Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7-M
Summer Motorized	Passenger Car	NI (A)	NI	NI	NI	NI	NI	NI
	Hi Clearance	NI (A)	NI	NI	NI	NI	NI	NI
	ATV	NI (A)	NI	NI	NI	NI	NI	NI
	Motorcycle	NI (A)	NI	NI	NI	NI	NI	NI
Summer Non-Motorized	Mountain Bike	NI	NI	NI	NI	NI	NI	NI
	Stock	NI	NI	NI	NI	NI	NI	NI
	Hiking	DIS	DIS	DIS	DIS	DIS	DIS	DIS
Winter	Snowmobile	DIS	DIS	DIS	DIS	DIS	DIS	DIS
	Ski/Snowshoe	DIS	DIS	DIS	DIS	DIS	DIS	DIS

Code	Road or Trail	Explanation
A	Uninventoried motorized routes	WCT, MIS concerns. Motorized use needs to be restricted to specific routes so problem sediment sources can be mitigated. Alternative 1 could result in unidentified point source sediment problems.

Table 3.7. 32 Comparison of effects to fish, amphibians, and their habitats by alternative.

Taylor Fork TPA								
Season / Type of Travel		Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7-M
Summer Motorized	Passenger Car	NI (A)	NI	NI	NI	NI	NI	NI
	Hi Clearance	NI (A)	NI	NI	NI	NI	NI	NI
	ATV	NI	NI	NI	NI	NI	NI	NI
	Motorcycle	NI	NI	NI	NI	NI	NI	NI
Summer Non-Motorized	Mountain Bike	NI	NI	NI	NI	NI	NI	NI
	Stock	NI	NI	NI	NI	NI	NI	NI
	Hiking	DIS	DIS	DIS	DIS	DIS	DIS	DIS
Winter	Snowmobile	DIS	DIS	DIS	DIS	DIS	DIS	DIS
	Ski/Snowshoe	DIS	DIS	DIS	DIS	DIS	DIS	DIS

Code	Road or Trail	Explanation
A	Uninventoried motorized routes	WCT, MIS, sensitive amphibian concerns. Motorized use needs to be restricted to specific routes so problem sediment sources can be mitigated. Alternative 1 could result in unidentified point source sediment problems.

Table 3.7. 33 Comparison of effects to fish, amphibians, and their habitats by alternative.

Tom Miner Rock TPA								
Season / Type of Travel		Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7-M
Summer Motorized	Passenger Car	NI	NI	NI	NI	NI	NI	NI
	Hi Clearance	NI	NI	NI	NI	NI	NI	NI
	ATV	NI	NI	NI	NI	NI	NI	NI
	Motorcycle	NI	NI	NI	NI	NI	NI	NI
Summer Non-Motorized	Mountain Bike	NI	NI	NI	NI	NI	NI	NI
	Stock	NI	NI	NI	NI	NI	NI	NI
	Hiking	DIS	DIS	DIS	DIS	DIS	DIS	DIS
Winter	Snowmobile	DIS	DIS	DIS	DIS	DIS	DIS	DIS
	Ski/Snowshoe	DIS	DIS	DIS	DIS	DIS	DIS	DIS

Code	Road or Trail	Explanation
A	Uninventoried motorized routes	YCT concerns. Motorized use needs to be restricted to specific routes so problem sediment sources can be mitigated. Alternative 1 could result in unidentified point source sediment problems.

Table 3.7. 34 Comparison of effects to fish, amphibians, and their habitats by alternative.

West Bridgers North TPA								
Season / Type of Travel		Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7-M
Summer Motorized	Passenger Car	NI (A)	NI	NI	NI	NI	NI	NI
	Hi Clearance	NI (A)	NI	NI	NI	NI	NI	NI
	ATV	NI (A)	NI	NI	NI	NI	NI	NI
	Motorcycle	NI (A)	NI	NI	NI	NI	NI	NI
Summer Non-Motorized	Mountain Bike	NI	NI	NI	NI	NI	NI	NI
	Stock	NI	NI	NI	NI	NI	NI	NI
	Hiking	DIS	DIS	DIS	DIS	DIS	DIS	DIS
Winter	Snowmobile	DIS	DIS	DIS	DIS	DIS	DIS	DIS
	Ski/Snowshoe	DIS	DIS	DIS	DIS	DIS	DIS	DIS

Code	Road or Trail	Explanation
A	Uninventoried motorized routes	MIS, sensitive amphibian concerns. Motorized use needs to be restricted to specific routes so problem sediment sources can be mitigated. Alternative 1 could result in unidentified point source sediment problems.

Table 3.7. 35 Comparison of effects to fish, amphibians, and their habitats by alternative.

West Bridgers South TPA								
Season / Type of Travel		Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7-M
Summer Motorized	Passenger Car	NI	NI	NI	NI	NI	NI	NI
	Hi Clearance	NI	NI	NI	NI	NI	NI	NI
	ATV	NI	NI	NI	NI	NI	NI	NI
	Motorcycle	NI (A)	NI	NI	NI	NI	NI	NI
Summer Non-Motorized	Mountain Bike	NI	NI	NI	NI	NI	NI	NI
	Stock	NI	NI	NI	NI	NI	NI	NI
	Hiking	DIS	DIS	DIS	DIS	DIS	DIS	DIS
Winter	Snowmobile	DIS	DIS	DIS	DIS	DIS	DIS	DIS
	Ski/Snowshoe	DIS	DIS	DIS	DIS	DIS	DIS	DIS

Code	Road or Trail	Explanation
A	Uninventoried motorized routes	MIS, sensitive amphibian concerns. Motorized use needs to be restricted to specific routes so problem sediment sources can be mitigated. Alternative 1 could result in unidentified point source sediment problems.

Table 3.7. 36 Comparison of effects to fish, amphibians, and their habitats by alternative.

Yankee Jim Canyon TPA								
Season / Type of Travel		Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7-M
Summer Motorized	Passenger Car	NI	NI	NI	NI	NI	NI	NI
	Hi Clearance	NI	NI	NI	NI	NI	NI	NI
	ATV	NI	NI	NI	NI	NI	NI	NI
	Motorcycle	NI	NI	NI	NI	NI	NI	NI
Summer Non-Motorized	Mountain Bike	NI	NI	NI	NI	NI	NI	NI
	Stock	NI	NI	NI	NI	NI	NI	NI
	Hiking	DIS	DIS	DIS	DIS	DIS	DIS	DIS
Winter	Snowmobile	DIS	DIS	DIS	DIS	DIS	DIS	DIS
	Ski/Snowshoe	DIS	DIS	DIS	DIS	DIS	DIS	DIS

Table 3.7. 37 Comparison of effects to fish, amphibians, and their habitats by alternative.

Yellowstone TPA								
Season / Type of Travel		Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7-M
Summer Motorized	Passenger Car	NI (1)	NI	NI (2)	NI (2)	NI	NI (2)	NI
	Hi Clearance	NI (1)	NI	NI (2)	NI (2)	NI	NI (2)	NI
	ATV	NI (1)	NI	NI (2)	NI (2)	NI	NI (2)	NI
	Motorcycle	NI (1)	NI	NI (2)	NI (2)	NI	NI (2)	NI
Summer Non-Motorized	Mountain Bike	NI	NI	NI	NI	NI	NI	NI
	Stock	NI	NI	NI	NI	NI	NI	NI
	Hiking	DIS	DIS	DIS	DIS	DIS	DIS	DIS
Winter	Snowmobile	DIS	DIS	DIS	DIS	DIS	DIS	DIS
	Ski/Snowshoe	DIS	DIS	DIS	DIS	DIS	DIS	DIS

Code	Road or Trail	Explanation
1	West Pine Cr Rd #978 (seg 2), South Fk West Pine Rd #976, Lewis Cr #181	Seasonal restrictions are necessary to mitigate sediment delivery to streams during spring snowmelt runoff.
2	N. Dry Cr. Road #2613 West	Segments of road beyond gate are located along stream. Sensitive soils. Motorized will cause ruts, especially during hunting season with freeze thaw, snow and high motorized use anticipated during hunting season. Need to restrict motorized travel to improved section of road east of gate. Significant improvements would be necessary to mitigate impacts of traveling on road west of gate during wet periods. Primarily a water quality concern. Although Dry Creek does not support fish, there is potential for cumulative sediment effects on downstream fisheries.

Cumulative Effects

Cumulative effects are the combined impacts of past, present and reasonably foreseeable events on fish, amphibians, and their habitats. These habitats have been altered in many cases by mining, grazing, vegetation management, road and trail construction, and other factors. The following analysis was derived by reviewing the compilation of past and present programs and activities presented by Christiansen (2006 - see project file), and by analyzing each type of program and activity in a cumulative effects worksheet (project file).

Net Effects of Past and Present Programs and Activities

The net effect of past programs and activities was a reduction in aquatic habitat quantity and quality from pristine conditions. However, these effects are highly variable and localized. In general, present programs and activities are either maintaining or reducing impacts, with the net effects combining to reduce negative effects to aquatic resources. Most important among these activities, in terms of magnitude of beneficial effects, has been road decommissioning and stream crossing modification, modification of range management methods, and reduced timber harvest. Locally significant beneficial effects have come from mine reclamation and fish population and habitat restoration. Thus, although localized areas retain degraded habitats, the overall GNF trend in aquatic habitat and biota is positive. These localized areas of degraded habitat were identified, where pertinent, in the Fisheries analysis of the Travel Management Plan alternatives, and resulted in mitigations where possible.

Projected Combined Effects of Reasonably Foreseeable Programs and Activities

Although some programs and activities will maintain existing effects on aquatic biota and their habitats, and others may have localized short-term negative effects, the net combined effects of reasonably foreseeable programs and activities are also beneficial with regard to aquatic habitats and biota. Remaining degraded aquatic habitats will continue to be targeted for restoration, such as Bear Canyon, the Bangtails, West Pine Creek, and the SF Madison River, all of which have projects of various kinds (road decommissioning, trail and road maintenance, in-stream habitat restoration) scheduled for Fiscal Year 2006. Native species restoration will occur in places like Cherry Creek and Soda Butte Creek. Range allotments with degraded habitats will be given updated management plans to improve livestock management with respect to riparian areas and stream channels. Additional stream crossings will be modified to improve aquatic organism passage, and reduce impacts to stream channels and aquatic habitats.

Cumulative Effects of Past, Present and Reasonably Foreseeable Programs and Activities with the Travel Plan Alternatives

Alternative 1 retains existing cumulative effects, as it represents the status quo and incorporates neither the TPA specific mitigation measures for existing impacts on aquatic habitats, nor the goals, objectives, standards and guidelines proposed for the other alternatives that address existing impacts of travel management. By contrast, Alternatives 2 through 7-M incorporate the proposed goals, objectives, standards and guidelines for all TPAs and specific travel route mitigation measures in 12 TPAs (see Fisheries analysis tables and Issue 20, Water Quality), which effectively reduce existing effects and thus cumulative effects of travel routes with other activities to fish, amphibians and their habitats. Three of the TPAs had route exceptions that could not be fully mitigated under various alternatives.

Cumulative effects related to sediment delivery decrease from Alternative 1 to Alternative 6 (see Issue 20: Water Quality). Cumulative effects of sediment delivery under Alternative 7-M are less than those for Alternatives 1-4, but are overall somewhat greater than Alternatives 5 and 6. However, relative changes are again very small, and TPAs will remain within existing Forest sediment guidelines with the exception of Big Sky and Bear Canyon TPAs. Bear Canyon TPA would require mitigation as noted previously (see Fisheries analysis tables and Issue 20: Water Quality) to bring streams into compliance with Forest habitat and other guidance for sediment. These mitigations are common to Alternatives 2 through 7-M. Sediment delivery in the Big Sky TPA cannot be mitigated by Forest Service actions, as the majority of impacts are occurring on private land (see Issue 20: Water Quality). The Shields TPA, although not out of compliance with sediment delivery guidelines as a TPA, would require significant mitigation in Alternatives 2 through 7-M in parts of the TPA, so that Yellowstone cutthroat trout are not impacted by travel route proposals. Similarly, as noted previously, specific routes within the Deer Creeks TPA will require mitigations to reduce impacts to Yellowstone cutthroat trout.

The proposed action (Alternative 7-M) includes all mitigations for riparian and aquatic resources that were proposed during the development of the alternative. In other words, mitigation measures

designed to protect riparian and aquatic resources are an integral part of this alternative. Travel route proposals in this alternative were designed to accommodate aquatic mitigation measures. Therefore, Alternative 7-M would not be implemented without mitigation measures described in the fisheries analysis. Thus, direct and indirect effects result in no impacts to fish, amphibians and their habitats in Alternative 7-M (with the exception noted above, which maintains existing effects), therefore, the proposed action is expected to cumulatively have *no effect* to fish, amphibians, and their habitat.

Effects of Proposed Goals, Objectives, Standards and Guidelines

Alternative 1 does not propose new goals, objectives, standards or guidelines. Alternatives 2 through 7-M propose a number of goals and objectives to provide for recreation opportunity, access and to improve other resource conditions that may have been adversely affected by the Forest's transportation system. Goals and objectives, by themselves, have no environmental effect because they do not constitute final agency decisions. Environmental effect under NEPA is more appropriately addressed at such time that specific actions are proposed to achieve these goals and objectives. The proposed Travel Management Plan does include the final agency decisions for management of public travel and this reflects implementation of the goals and objectives proposed for recreation opportunity (for example Forest-wide Goal A, Objective A-1, and Travel Planning Area Goals 1 and 2 and Objectives 1-1 and 2-1). The predicted direct, indirect and cumulative effects of public travel on Fisheries, and hence the implementation of these goals and objectives are addressed earlier in this section.

Alternatives 2 through 7-M also propose standards and guidelines to provide for protection of other resources during Travel Plan implementation. Standards and guidelines include protection measures within which future proposals for road and trail construction, reconstruction, maintenance and decommissioning must take place. These are considered final agency decisions because they set limitations within which future actions must take place.

Among these objectives and standards are a proposed objective and a proposed standard relative to backcountry airstrip construction, under Alternatives 3 and 7-M. Those proposed under Alternative 7-M limit the geographic area open to such proposals. No decision is being made to allow construction or authorize landings at this time; such a proposal would require site-specific analysis. However, potential impacts that construction of an airstrip potentially could have are similar to any ground disturbing activity: increased sediment delivery to streams, modification of riparian vegetation, and so forth.

The proposed goals, objectives, standards and guidelines that are relevant to the protection and improvement of Fisheries are discussed below. Alternatives 2-6 proposed new goals, objectives, standards and guidelines as presented in the Draft EIS; these were refined between the Draft and Final EIS, in part in response to comments received, to remove redundancy and duplication, particularly with existing direction. For example, in the Draft EIS, there were two Objectives and two Standards addressing stream crossing issues, separately addressing potential impacts to stream morphology and biota movements; these have been combined into one standard and one objective. The most significant change between the Draft EIS and Final EIS is represented in Standard E-4. The modified standard would increase aquatic habitat protection by considering impacts to aquatic

metapopulations, by increasing protection of 'non-fishery' streams, and by incorporating more complete analysis of the spatial and temporal impacts of sedimentation in relation to other aquatic habitat parameters. The rationale of this standard is to avoid stressing aquatic habitats and their organisms in multiple ways, to protect aquatic populations at risk, and ensure non-impairment of GNF water bodies. Proposed goals, objectives, standards and guidelines that apply to Forest fish and amphibians in Alternative 7-M are listed below:

GOAL D. Resources (General). "Manage a system of roads and trails and associated use that is consistent with Forest Plan goals for water quality; wildlife habitat; fish habitat; threatened and endangered species recovery; and historical resources (Note: Until Forest Plan revision refer to Forest Plan (9/87), pages II-1, II-2, and Amendment 19)."

OBJ. D-1. Road Rehabilitation. "Close and rehabilitate existing roads that are in excess to administrative, recreation and access needs."

OBJ. D-2. Trail Rehabilitation. "Close and rehabilitate existing non-system trail not otherwise designated for public travel."

OBJ. D-3. Road and Trail Maintenance. "Maintain and reconstruct a road and trail system to be consistent with Goal D."

GOAL E. Water Quality, Riparian, Fisheries and Aquatic Life. "Manage a road and trail system that fully supports the protection of water quality, and habitat for fish, riparian dependent species and other aquatic organisms."

OBJ. E-1. Fisheries. "For streams supporting westslope and Yellowstone cutthroat trout or blue ribbon fisheries (Category A), maintain or progress toward providing habitat that is 90% or greater of its inherent habitat capability or reference condition. See travel management area direction for specific objectives."

OBJ. E-2. Fisheries. "For all other streams (Category B through D), maintain or progress toward providing habitat that is 75% or greater of its inherent habitat capability or reference condition. See travel management area direction for specific objectives."

OBJ. E-3. Fisheries. "Bring existing stream crossings to a condition that allows for passage of aquatic organisms, by avoiding stream channel constriction or alteration of the hydraulic flow pattern, except where passage restriction is desired to isolate genetically pure cutthroat trout populations from exposure to hybridization or competition by non-native salmonids."

STANDARD E-4. Water, Fisheries, and Aquatic Life. Proposals for road and trail construction, reconstruction, maintenance, and other ground disturbing projects (timber sales, fuel treatment projects, mineral activities, etc.) will be designed to not exceed annual sediment delivery levels in excess of those in Table 3.7.38. Sixth-code Hydrologic Unit Codes (HUCs) are the analysis unit for sediment delivery (and other habitat parameters), except where a sixth code HUC artificially bisects a watershed

and is therefore inadequate for analysis of impacts to aquatic habitat and aquatic organism metapopulations. In such cases, appropriate larger units will be analyzed (e.g. 5th code HUCs). Within the analysis unit, sediment delivery values in Table 3.7.38 will serve as guidelines; however, sediment delivery values denoted in individual 7th code HUCs may only temporarily exceed sediment delivery rates denoted in Table 3.7.38, in the following circumstances:

1. The 7th code HUC does not contain a fragmented **fish population of special management designation**;
2. The majority of 7th code HUCs in the analysis unit remain within sediment delivery values listed in Table 3.7.38;
3. Other core stream habitat (e.g. pool frequency, pool quality) or biotic (e.g. macroinvertebrates, fish populations) parameters within the 7th code HUC do not indicate impairment as defined by Montana Department of Environmental Quality (MDEQ); and
4. Sediment delivery levels will return to values listed in Table 3.7.38 within 5 years of project completion, and thereby do not lead to stream impairment as defined by Montana Department of Environmental Quality (MDEQ).

Table 3.7. 38 Substrate sediment and sediment delivery by Forest stream category. Bold values are provisional pending final analysis of Forest reference data.

Category	Management Objective (% of reference*)	% Fine Substrate Sediment (<6.3mm)	Annual % > Reference* Sediment Delivery
A Sensitive Species and/or Blue Ribbon fisheries	90%	**0 – 26 %**	**30%**
B All other streams (formerly Classes B, C, D)	75%	**0 – 30 %**	**50%**

*% of reference = % similarity to mean reference condition

STANDARD E-5. Water, Fisheries, and Aquatic Life. "Proposed roads and trails shall not be located in the floodplains of rivers and streams or in wetlands except where necessary to cross a stream or wetland with appropriate permits."

STANDARD E-6. Water, Fisheries, and Aquatic Life. Stream crossing facilities for proposed roads and trails shall allow for passage of aquatic organisms, by avoiding stream channel constriction or alteration of the flow pattern, except where passage restriction is desired to isolate genetically pure cutthroat trout populations from exposure to hybridization or competition by non-native salmonids.

STANDARD E-7. Water, Fisheries, and Aquatic Life. "Road materials should not be side-cast into streams or wetlands**.**"

As discussed in the Affected Environment section above, travel routes may affect stream channel form and function, including sediment delivery to streams with its subsequent effects on aquatic habitat and biota; degrade riparian ecosystems; and fragment aquatic habitats. These proposed goals, objectives, standards and guidelines address the impacts of both existing and potential travel routes on Forest fish and amphibians. Specifically, Goal D and associated objectives address existing infrastructure, acknowledging the need to lower travel route density by removing unneeded travel routes and to reduce impacts through appropriate maintenance and modification of those routes considered necessary for Forest management. Goal E and associated standards and guidelines address any future travel route construction, and specifically eliminate the potential negative impacts of those routes to the degree possible, including aquatic habitat fragmentation, riparian habitat degradation, and modification of stream channel form and function, including sediment delivery. Adoption of these goals, standards, objectives and guidelines into the Travel Plan decreases the risk that current and future travel management will negatively impact aquatic organisms and their habitats in the various ways discussed herein.

Biological Evaluation Determination

Fish Species

Westslope cutthroat trout (*Oncorhynchus clarki lewisi*) and fluvial Arctic grayling (*Thymallus arcticus*) are Forest Service Region 1 sensitive fish species that historically inhabited the upper Missouri River drainage (Benke 1992, Vincent 1962). Thus, the Gallatin River and Madison River drainages are classified as historical habitat for these two species, therefore, although Arctic grayling are not documented in the project area currently, it is likely that they were present in the project area in the past. An attempt has been made by MFWP to reintroduce fluvial Arctic grayling into the upper Gallatin River over the past several years. The success of this effort is not known.

Westslope cutthroat trout are present in the project area, although likely in only a small portion of historically occupied habitat (Table 3.7.1). Genetic introgression is believed to be the most important cause for decline of westslope cutthroat trout population in Montana (Liknes 1984, Liknes and Graham 1988). Fausch (1988, 1989) concluded that the persistence of cutthroat trout is jeopardized in streams containing brook or brown trout, because of competition.

The Yellowstone cutthroat trout (*O. clarki bouvieri*) is a Forest Service Region 1 sensitive fish species that historically inhabited the Yellowstone River drainage (Benke 1992). They remain in the project area, but occupy a smaller proportion of available habitat than historically for the same reasons as described above for westslope cutthroat trout (Table 3.7.1).

Alternatives 2 through 7-M are expected to improve facilities within all of the TPAs analyzed, and the preferred alternative does this to a greater extent than the other alternatives. Therefore, this action may impact individual westslope or Yellowstone cutthroat trout in isolated cases, but will not impact populations of these species.

Amphibian Species

The northern leopard frog (*Rana pipiens*) and the western toad (*Bufo boreas boreas*) are Region 1

sensitive amphibian species. The northern leopard frog is widely distributed at lower elevations, but is not documented in the project area. The majority of the project area exceeds 6,000 feet elevation, and northern leopard frogs are not generally found at elevations above 6,000 feet (Maxell 2000). Western toads are documented as present in the Cherry Creek drainage.

Northern leopard frogs breed from mid-March to early June. Mating occurs when males congregate in shallow water and begin calling during the day. Eggs are laid at the water surface in large, globular masses of 150 to 500. Young and adult frogs often disperse into marsh and forest habitats, but are not usually found far from open water (Maxell 2000).

Western toads inhabit all types of aquatic habitats ranging from sea level to 12,000 feet in elevation. They breed in lakes, ponds, and slow streams, preferring shallow areas with mud bottoms. Western toads breed from May to July and lay long, clear double-strings of eggs. Tadpoles metamorphose in 40 to 70 days. Because of their narrow environmental tolerance (10-25 degrees Centigrade throughout the year), adults must utilize thermally buffered microhabitats during the day, and can be found under logs or in rodent burrows. Adults are active at night and can be found foraging for insects in warm, low-lying areas (Maxell 2000).

The proposed action is expected to improve facilities within all of the TPAs analyzed. Therefore, this action may impact individual boreal toad and northern leopard frogs in isolated cases, but will not impact populations of these species.

Biological Evaluation Determination for Sensitive Species

Table 3.7. 39 Sensitive species impact determinations.

Species	Determination	Comments
Westslope cutthroat	MIIH	See Table 3.7. 3 through Table 3.7. 37 for specific route and alternative determinations
Yellowstone cutthroat	MIIH	See Table 3.7. 3 through Table 3.7. 37 for specific route and alternative determinations
Arctic grayling	NI	
Northern leopard frog	MIIH	See Table 3.7. 3 through Table 3.7. 37 for specific route and alternative determinations
Western toad	MIIH	See Table 3.7. 3 through Table 3.7. 37 for specific route and alternative determinations

NI = No Impact; no environmental effects on habitat, individuals, or populations of sensitive species
MIIH = May Impact Individuals or their habitat but will not lead toward listing or loss of viability of the species.

Consistency with Laws, Regulations, Policy, and Federal, Regional, State and Local Land Use Plans (including the Forest Plan)

The following laws, regulations, and Forest Plan guidelines apply to the alternatives considered (consistency discussion is at the end of the section):

Clean Water Act and Montana Water Quality Act

The Clean Water Act provides overall direction for the protection of waters of the United States, from both point and non-point source of water pollution. The Montana Water Quality Act establishes general guidelines for water quality protection in the state. It requires the protection of water, as well as the full protection of its existing and future beneficial uses. Most of the streams within the analysis area are classified as B-1 streams under the Montana Water Classification system, with the exception those stream segments falling within the Lee Metcalf Wilderness, which are classified as A-1 streams. The Administrative Rules of Montana (ARM 17.30.623) require that waters classified as A-1 or B-1 are suitable for the *"growth and propagation of salmonid fishes and associated aquatic life,"* among other things.

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."*

Land-Use Strategy for Implementation of the 1999 Memorandum of Understanding and Conservation Agreement for Westslope Cutthroat Trout in Montana

The Memorandum of Understanding and Conservation Agreement (MOUCA) for westslope cutthroat trout in Montana includes as objectives:

1) Protect all pure and slightly introgressed (90% or greater purity) westslope cutthroat trout populations.
2) Ensure the long-term persistence of westslope cutthroat within their native range.

The Land-Use Strategy for implementation of the 1999 Memorandum of Understanding and Conservation Agreement for westslope cutthroat trout in Montana for the MOUCA, adopted by the Forest Service and Bureau of Land Management in 2002, further defines how the MOUCA will be implemented by federal land management agencies. For new activities, the strategy stipulates that the Forest Service will:

1) Provide watersheds supporting conservation populations of westslope cutthroat trout with the level of protection necessary to ensure their long-term persistence.
2) Defer any new federal land management action if it cannot be modified to prevent unacceptable aquatic/riparian habitat degradation.
3) Maintain westslope cutthroat trout habitat at 90% of optimum habitat conditions.

If 90% of optimum condition criteria are not met, only activities resulting in habitat improvement are to be considered. The strategy also states that Forest Service biological evaluations (FSM 2670)

prepared for new activities should, in most cases, conclude that there would be a "beneficial effect" or "no effect" to the westslope cutthroat trout population or its habitat. The strategy was adopted by the Gallatin Forest for watersheds containing Yellowstone cutthroat, as well as those containing westslope cutthroat.

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 10 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 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.

Gallatin National Forest Plan

Goals of the Gallatin National Forest Plan (USDA 1987) as they relates to fisheries include:
1) Maintain and enhance fish habitat to provide for an increased fish population.
2) Meet or exceed State of Montana Water Quality standards.

Forest Plan implementation guidelines further define how fish habitat will be maintained and enhanced through the development of a stream classification system, which corresponds to the sensitivity and importance of streams relative to their aquatic communities and environments (May 1996). The intent of this classification system is to provide specific management objectives, along with a description of optimal habitat attributes that would be associated with the habitat objectives (Table 3.7.40).

Table 3.7. 40 Gallatin National Forest Plan implementation guidelines (May 1996) for optimal habitat attributes for streams within the analysis area. Percent fines is the amount of fine sediments (<6.3 mm) deposited as a percentage of overall substrate composition.

Stream Class	Class Description	Management Objective	% Fines	Annual %>N Sediment Delivery	Cumulative %>N Sediment Delivery
A	Streams with sensitive species or blue ribbon fisheries.	90% (of pristine)	< 25	30%	300%

Stream Class	Class Description	Management Objective	% Fines	Annual %>N Sediment Delivery	Cumulative %>N Sediment Delivery
B	Streams of regional or local importance as a fishery.	75% (of pristine)	< 30	50%	500%
C	Streams that support fish but have limited recreational value.	60% (of pristine)	< 35	60%	600%
D	Streams that do not support fish.	Maintain water quality and channel integrity	N/A	100%	1,000%

The Gallatin Forest Plan Management Area 7 goal is to *"manage the riparian resource to protect the soil, water, vegetation, fish and wildlife dependent upon it."* (USDA 1987). Specific direction for roads and trails includes:

1) Locate roads and trails outside of riparian areas.
2) Minimize amount of material from road and trail construction wasted into riparian areas.
3) Design road drainage to minimize sediment entry into streams.
4) Design roads to minimize risk of drainage failure and mass failure.
5) Minimize stream crossings and minimize damage to streams and riparian areas at crossings.
6) Design crossings to ensure fish passage.
7) Avoid channel realignment.
8) Minimize short-term sedimentation during bridge or culvert installation.

Because Alternative 1 does not include mitigations necessary to protect sensitive cutthroat populations or Management Indicator Species in specific cases, including reducing sediment impacts, it is not consistent with most of the direction listed above. Mitigations included in Alternatives 2 through 7-M do provide consistency with this direction with the exceptions noted previously. The guidance listed above (referred to as "guidelines") has not been amended to the Forest Plan, and thus are not binding; this guidance is proposed to be replaced by standard E-4.