EFFECTS ON FISH HABITAT AND FISH POPULATIONS.

There is concern about the impacts of roads and trails on fisheries habitats in specific streams as well as across the project area in general. Stream sedimentation and disruption of spawning habitat at stream crossings are the greatest concerns. There is also concern about too much human access to streams supporting sensitive fisheries.

1. EXISTING CONDITION

a. Natural Characteristics, Past Events and Conditions

The project area supports a variety of native and introduced fish species. Westslope cutthroat trout are the only native trout species present, but introduced rainbow and brook trout have become the most abundant game fish in the project area. Mountain whitefish and mottled sculpin are the other two most abundant and widespread native fishes.

The streams naturally yield high water quality that is moderately or highly productive of aquatic life (algae, invertebrates, and coldwater fish). Late summer and winter stream flow is the most common natural limiting factor for fish populations in smaller streams in the project area that are affected by drought or subject to natural dewatering due to geology and climate. Lake fisheries are relatively scarce in the project area and generally less affected by roads and trails, except for issues of access and potential overuse.

Fires, floods, and drought have historically affected fish habitat in the project area. These tend to be pulse disturbances that may temporarily reduce the quality of fish habitat in some drainages while leaving other streams largely unaffected. Natural disturbances are typically followed by longer periods of stability, during which fish habitats and populations recover. Population recovery in disturbed streams may be facilitated by fish immigration from nearby drainages less affected by the catastrophic event. However, drought can have a more pervasive effect in the project area and can lead to widespread fisheries declines that require longer recovery times.

The Sandpoint Fire (1985) is probably the most notable wildfire in the project area in recent history that altered miles of fish habitat in the Lost Fork Judith River. The last major flooding took place in the project area in 1981 when Belt Creek greatly overflowed its banks, took out bridges and inundated Highway 89 in several places. These events undoubtedly caused major disruptions of fish habitat which are likely still influencing portions of area streams.

b. Human Influence

Some drainages have been seriously degraded by historic mining activities (e.g., Dry Fork Belt Creek, Carpenter Creek, Yogo Creek, Placer Creek), and many streams are impacted by ongoing livestock grazing which breaks down banks, widens channels and removes vegetative cover. In addition, roads and trails have localized effects on nearby stream segments or at stream crossing sites, especially fords. In some cases, effects are more extensive and may impair fish habitat for longer reaches of streams, such as along Middle Fork Judith River, King Creek, North Fork Running Wolf Creek, Hoover Creek, Jefferson Creek, Sheep Creek, Deadman Creek, lower Tenderfoot Creek, Daisy Dean Creek, and Haymaker Creek. Timber harvests have altered the recruitment of large woody debris and reduced canopy closures for some streams. In most cases, little data is available to quantify the magnitude of these human-caused changes in stream conditions and their effects on fish

populations. However, water quality monitoring efforts have documenting the pollution of the Dry Fork Belt Creek drainage from mine effluents, waste rock deposits and old tailings ponds.

The other major human influence has been the introduction of non-native trout species into nearly all project area drainages, primarily rainbow trout, Yellowstone cutthroat trout and brook trout. Rainbow and Yellowstone cutthroat trout have hybridized with the native westslope cutthroat trout in many streams, and brook trout have displaced the native cutthroats in other streams, especially those altered by sedimentation and increased water temperatures due to human activities. Brown trout have colonized lower Belt Creek and been introduced to the Smith, Judith and Musselshell river drainages.

c. Future Trends

Clean-up and rehabilitation of historic mining areas is ongoing in Dry Fork Belt Creek and Carpenter Creek. These activities should gradually improve water quality and allow further recovery of fish populations, but full restoration will take decades to achieve. Improvements in grazing management, off-stream water development, and expanded riparian exclosures are expected to promote stream channel and riparian restoration, and subsequent improvement in fish habitat. Capital improvement funds will continue to be used to address identified road and trail erosion problems through relocation or improvement, while other routes may be decommissioned. However, it is likely that many roads and trails will continue to impact water quality and fish habitat, and the maintenance backlog will persist, given expected funding levels.

d. Desired Condition

Given that access is necessary for public use and forest management, and that all roads and trails are compacted surfaces that alter watershed function and potentially affect aquatic habitats, the desired condition is to provide necessary access and recreation opportunity with the minimum transportation system possible. This condition also recognizes the limited funding available for proper travel way maintenance to avoid adverse effects on aquatic resources, and limited capability of the agencies to enforce travel management regulations. The desired condition for fish habitats would be to provide adequate buffer zones between travel ways and streams, and to minimize stream crossings. Routes with chronic erosion problems that cause stream sedimentation or excessive channel damage would be corrected (repaired, relocated, restricted or closed).

2. ENVIRONMENTAL CONSEQUENCES

a. Summer Alternative 1 - No Action Alternative

Quantitative information relating travel management to fish habitat condition is largely lacking for the project area. The difficulties of modeling sediment delivery to streams from roads and trails, then estimating instream transport and deposition rates in a highly variable natural system were discussed in the WATER QUALITY section. These limitations necessitate a more qualitative assessment of the effects of roads and trails on fisheries, based on field observations of conditions at sites across the project area and impact risk levels tied to the amount of disturbance within 100-foot stream buffer zones (e.g., miles of roads/trails, number of stream crossings).

1. Direct and Indirect Effects

Most Jefferson Division watersheds have moderate to high road and trail densities with an extensive network of non-system or unauthorized routes receiving motorized and non-motorized use. Maintenance work and enforcement actions have been unable to keep up with the need, and as a result, drainage features are lacking or not functioning properly, travel ways have been created in inappropriate locations, ATV use is occurring on trails not designed for such use, and closures or restrictions are being routinely ignored, either willfully or due to lack of clear information and signing. In addition to the unavoidable impacts of designated roads and trails, the use of non-system or unauthorized routes is adversely affecting the quality of fisheries habitats in many parts of the project area (e.g., Dry Fork Belt Creek, Jefferson Creek, Deadman Creek, Middle Fork Judith River, Tenderfoot Creek).

Although nearly all streams supporting fisheries in the project area have considerable road or trail access, there is no evidence to suggest that accessibility to humans has yet threatened the viability of resident fish populations. Whirling disease has not been detected in the project area except for a portion of the Smith River drainage. Fishing pressure on most streams is concentrated near road crossings, campgrounds, dispersed camping areas and within a few miles of trailheads. This tends to deplete the number of older, larger trout in the immediate vicinity but leaves considerable lengths of streams with only light or moderate fishing pressure. Also, many streams within the project area are too small or brushy to attract more than the occasional angler. Ultimately, stream fisheries are dependent on Montana Fish, Wildlife and Parks to set adequate fishing regulations to protect fish populations from over-harvest. Travel restrictions can provide some measure of habitat security, but the more traditional approach has been to improve or relocate problem trail sections to reduce direct impacts to aquatic habitat.

The effects of roads and trails on streams described in the WATER QUALITY section are generally relevant to fisheries effects. Road and trail mileages within 100 feet of streams (herein referred to as “riparian roads and trails”) and number of stream crossings in 6th code HUCs provides a general index of potential impact. When standardized as percentages of stream miles managed by the Forest Service having roads or trails within the 100-foot stream buffer, these values can allow further evaluation of risk levels to fisheries. Effects on fish habitat should reflect spatial considerations, in that individual stream reaches with few crossings or lying upstream from most road and trail impact zones would be less affected and more likely to provide some low-impact “refuge” habitats for fish. The amount, type and season of use will also influence the level of impact of roads and trails on adjacent fish habitats and fish populations, generally increasing from foot to horse or motorized use, and from dry to wet conditions. This complexity makes quantitative analysis of effects from roads and trails on fish habitat very difficult.

Using GIS analysis, all watersheds (6th code HUCs) with at least 50% of the stream miles managed by the Forest Service were screened to identify drainage basins where there are 20 or more stream crossings (perennial and intermittent channels) by FS roads or trails (Table III-98). Further review of the data from the hydrologic analysis showed that this list included all watersheds (with at least 50% stream mileage managed by the FS) where there are five or more miles of riparian road segments or riparian trail segments, or where 10% or more of the stream miles in the HUC have riparian road or trail along side them. Although Running Wolf, Daisy Dean and Haymaker creeks were not captured in the initial screening process because less than 50% of the stream miles in those HUCs are managed by the FS, they are included in Table III-98 due to the extensive number of FS road or trail crossings in those watersheds and the highly visible impacts to fish habitat in streams of interest.

Table III-98. Watersheds with Highest Potential Impact on Fisheries Habitat from Forest Service Roads and Trails: Existing Condition / Summer Alternative 1

6th Code Watershed	Major Stream or Streams in Watershed	Road Stream Crossings	Trail Stream Crossings	Road Miles Within 100 ft. of Streams[1]	Percent of Stream w/ Riparian Road	Trail Miles Within 100 ft. of Streams[1]	Percent of Stream w/ Riparian Trail
100301030101	NF Smith R.	23	0	1.7	3	0	0
100301030104	Fourmile Cr.	19	25	2.7	8	3.8	11
100301030401	Newlan Cr.	52	0	9.4	14	0	0
100301030701	Sheep Cr. (upper)	75	3	8.7	10	0.4	0
100301030703	Moose Cr.	29	7	4.8	7	1.2	2
100301030901	Tenderfoot Cr. (upper)	21	56	2.5	4	6.2	9
100301030902	Tenderfoot Cr. (middle)	2	30	0.2	0	3.9	7
100301030903	Tenderfoot Cr. (lower & SF)	5[2]	15[2]	0.9	2	1.4[3]	3
100301031006	Deep Cr.	0	60	0	0	7.0	9
100301050101	Belt Cr. (headwater/Jefferson)	42	6	7.2	10	0.7	1
100301050102	Belt Cr. (upper)	27	29	6.1	11	2.6	5
100301050103	Belt Cr. (middle)	31	99	7.8	10	12.0	15
100301050104	Dry Fork Belt Cr.	65	85	9.3	7	8.1	6
100301050203	Logging Cr.	63	16	10.4	14	2.2	3
100401030101	Cleveland and Harrison Cr.	5	45	0.4	0	3.3	3
100401030102	SF Judith R./Deadhorse Cr.	36	49	3.4	4	5.1	6
100401030104	South Fork Judith R. (lower)	87	69	14.1	19	6.9	9
100401030105	Yogo Cr.	47	21	11.9	12	2.6	3
100401030106	Middle Fork Judith R.	29[4]	10	3.0	3	1.7	2
100401031001	Dry Wolf Cr. (upper)	40	13	6.5	7	2.0	2
100401031003	Running Wolf Cr.	28	23	3.8	9	1.3	3
100402010107	Cottonwood Cr. (WF & MF)	22	32	2.5	4	5.5	8
100402010203	Flagstaff Cr.	21	0	2.6	8	0	0
100402010204	Spring Cr.	24	16	3.0	3	5.3	5
100402010301	Daisy Dean Cr.	4	21[4]	1.1	4	4.1	13
100402010303	Haymaker Cr.	63	40	8.3	13	9.3	15
100402010501	WF Hopley Cr.	46	1	6.2	7	0.1	0

[1] Includes perennial and intermittent streams
[2] Does not include 30 road and trail crossings on intermingled ownership lands
[3] Does not include 4.5 miles of riparian trail on intermingled ownership lands
[4] Corrected with field data

Note: The number of road and trail stream crossings shown above may not be exact due to GIS data limitations and accuracy. For example, when trail locations closely parallel streams, GIS intersection points may not represent actual stream crossings. Also, as stream channels move over time, or trail segments are relocated, some stream crossings may not be depicted accurately in the GIS data layers. These values should be considered approximate and used comparatively.

As discussed in the WATER QUALITY section, roads and trails inevitably alter watershed functional processes, so fewer stream crossings and travel routes in riparian areas means less risk to stream channels and fish habitats. Although the specific effect of a road or trail on fish habitat depends largely on grade, soil type, stream crossing characteristics and type of use, the impacts become increasingly difficult to mitigate on routes that follow stream courses for more than a half mile. Therefore, Table III-98 represents a list of watersheds where fish habitats are most likely to be affected by the transportation system. Comparing the list with field observations confirms that it includes the streams where road and trail impacts to fish habitat have been observed in recent years. The more notable problem areas and impacts on fish habitat from roads or trails are described below (westslope cutthroat trout habitats are discussed in the next issue section).

Smith River – Vehicle fording sites on the river in the Deep Creek area disturb stream substrates and increase bank erosion.

Newlan Creek – High road densities, over 50 stream crossings, and on-going grazing impacts in the Newlan Creek drainage result in visible stream sedimentation and unfavorable channel conditions for resident fish.

Sheep Creek and Belt Creek – Highway 89 encroaches on the floodplains of these streams, with grossly inadequate filtering zones for the tons of sand applied to the road surface during winter. Consequently, large volumes of sediment are routed to both streams from sanding operations, in addition to sediment loading from tributary basins with high road and trail densities. As indicated in Table III-98, there are about 75 road crossing in the upper Sheep Creek watershed alone, while the middle Belt Creek watershed has about 30 road crossings and nearly 100 trail crossings. Additionally, 16% of the stream miles in the upper Belt Creek watershed have a road or trail within 100 feet, and 25% of stream miles in the middle Belt Creek watershed have a riparian road or trail alongside them. These are among the highest values for indicating transportation system impacts in the analysis area.

Tenderfoot Creek – Escalating ATV trespass and unauthorized use on public and private lands in the lower drainage is directly impacting the stream channel at fording sites; 4WD vehicle and ATV drivers use portions of the stream corridor as a roadway, threatening resident fish habitat and spawning sites for trout from the Smith River. The upper Tenderfoot drainage has over 50 trail crossings in it.

Dry Fork Belt Creek – Periodic pulses of pollution from historic mining wastes severely limit fish populations in Galena Creek and the Dry Fork downstream from Galena. The heavily-used main access road, popular streamside dispersed recreation sites, user-created fords and network of ATV trails all further reduce habitat quality for resident fish in this watershed. About 65 road crossings and 85 trail crossings were tallied for the basin (Table III-98). (Oti Park Creek in the headwater basin supports westslope cutthroat trout and will be discussed in the next section.)

South Fork Judith River (lower) – Over 150 road and trail crossings in this naturally sediment-rich basin help to explain the characteristically high levels of sedimentation observed in the lower South Fork. This watershed also showed the highest impact values for riparian roads (14.1 miles) and percentage of stream with encroaching road (19%). The mostly hybrid and non-native trout fishery is limited by summer de-watering below Dry Pole Canyon, and all major tributary basins in this part of the watershed have intermittent or dry stream channels.

Yogo Creek – Nearly 50 road crossings on national forest in this watershed, plus numerous fords on private mining claims, create chronic stream channel disturbances that reduce habitat quality for a popular recreational fishery.

Middle Fork and Lost Fork Judith River – The primitive Middle Fork Road routes motorized traffic right up the stream corridor with little or no sediment filter, no official or regular maintenance, and over 25 fords that have become more damaging to the stream with escalating use (USDA 2002 photo record, Newhall 1998). Current motorized use churns the streambed, creates a wake effect on raw banks, and produces a deeply-rutted roadway. This disturbance greatly elevates sediment loads in the river, causing severe sedimentation and degrading fish habitat. Fish populations have been shown to be depressed in this reach of stream (Moser et al. 2005). Further upstream in the main tributary watershed of Cleveland and Harrison creeks, the multiple use trail system requires about 45 stream crossings, contributing additional sediment loads to the system. In the Lost Fork basin, ATV trespass is starting to convert single-track trails to two-track motorized routes, thus increasing potential impact to adjacent streams.

Daisy Dean Creek – High ATV use (authorized) of trail in the stream corridor along with about 20 fording sites have destabilized stream banks, increased sedimentation and reduced fish habitat quality. Recent surveys confirmed unexpectedly low trout population densities in this stream (Tews 2007).

East Fork Haymaker Creek – The Haymaker basin has about 100 total road and trail stream crossings (mostly fords) and high ATV use of the trail along the East Fork, which degrade channel conditions and habitat quality for a unique Yellowstone cutthroat trout fishery. With 28% of the stream miles having a road or trail within 100 feet, this watershed ranks as one of the two highest in the analysis area for that indicator of transportation system impacts (Table III-98).

Castle Lake – Forest Service trail access is currently open to motorbike and ATV use but the routes are challenging and/or require traverse over private property. Current use levels are not excessive, but the fish population is not self-sustaining and requires State stocking effort.

Alternative 1 will result in a continuation and acceleration of the existing level of impact of roads and trails in all of these drainages. Given the predicted level of funding for enforcement, maintenance and improvement of the transportation system, and the likely increases in use, it is unrealistic to expect this impact to be substantially mitigated.

2. Cumulative Effects

Grazing, mining, past and current timber harvests, fires and recreational uses all have cumulative effects with the transportation system on fish habitats and fisheries, but available data does not allow for a meaningful analysis across the project area. For some streams, the risk of significant cumulative effects can be inferred from the level of other activities (past, present and foreseeable) in the immediate area. Trampling of stream banks, loss of riparian vegetation and channel alterations caused by grazing contribute to cumulative effects on fish habitat in Newlan Creek, Sheep Creek, Tenderfoot Creek, Eagle Creek, Oti Park Creek, Logging Creek, King Creek, Harrison Creek, Lost Fork Judith River, Spring Creek, Daisy Dean Creek and Haymaker Creek. Historic mining activities contribute to cumulative effects on fish habitat in Belt Creek, Dry Fork Belt Creek and Yogo Creek. Impacts from dispersed recreation are often related to the development of unauthorized ATV trails but also include damaged stream banks and loss of riparian vegetation at dispersed campsites. These problems are most evident in Dry Fork Belt Creek, Jefferson Creek, and S. Fork Judith River.

Cumulative effects will continue to reduce the quality of aquatic habitat in these streams under Alternative 1. With "No Action", fish populations will be below potential but appear to have enough refuge areas and resiliency to remain viable in most watersheds. Though based on qualitative assessment, our understanding of cumulative effects of the transportation system and other human activities on fish habitats is sufficient to indicate that we need to reduce the direct effects of roads and trails in many watersheds if we hope to maintain our stream fisheries for the long term, especially in the face of increasing use.

b. Action Alternatives – Potential for Impacts to Fisheries Habitats

Tables III-99 and III-100 display watersheds from Table III-98 that will have a reduction of at least three stream crossings or at least 0.5 miles of riparian road and trail segments under one or more action alternatives. In general, though, all action alternatives show significant reductions from the existing condition (Alternative 1) in number of stream crossings for both roads and trails in most watersheds that have high potential to impact fish habitat (Table III-99). Riparian road and trail mileage also drops significantly for most of these watersheds in the action alternatives (Table III-100). This is largely due to the shrinking network of undetermined, non-system routes with the implementation of a new Travel Management Plan. Implications for specific fisheries habitats will be discussed in the subsequent sections.

c. Summer Alternative 3

1. *Direct and Indirect Effects*

Table III-73 (WATER QUALITY section) shows that about 27 miles of riparian road segments and 10 miles of riparian trail segments would be eliminated under Alternative 3. An additional 15 miles of riparian trail segments would be restricted yearlong to trail bikes but about 12 more miles of riparian trail segments would be available unrestricted to ATV users. Road decommissioning would eliminate 212 stream crossings while trail decommissioning would remove 86 stream crossings (Table III-74). Although 20 new crossings would be created, the total number of perennial and intermittent stream crossing sites would be reduced 14% from the existing situation. Because of these changes, effects on fish habitats from roads and trails in the project area overall would be expected to decrease. However, impacts to some streams and fish from more or new ATV traffic on certain riparian trails are likely to increase.

Reductions in road and trail impacts in specific watersheds are shown in Tables III-99 and III-100. Effects on fisheries habitats include:

Smith River – Vehicle fording sites would continue to disturb stream substrates and increase bank erosion; effects could intensify with increasing motorized use of the stream corridor.

Newlan Creek – Dropping several non-essential routes from the system results in about 20 fewer road crossings and three less miles of riparian road, which would ease impacts on a watershed that receives heavy grazing pressure.

Sheep Creek and Belt Creek – Closure of some streamside routes in upper Sheep Creek reduces road crossings by about 30 and riparian road miles by about three. These changes would help reduce sediment loads and benefit fisheries. In upper Belt Creek, most of the reduction in road crossings and riparian road miles is offset by conversion to motorized trails, with minor improvement expected in effects on fish habitat. However, major problems with sediment from winter road sanding would continue in both watersheds, which could easily mask any reductions in tributary sediment loading to the mainstem reaches.

Table III-99. Stream Crossings by Alternative for Watersheds with Highest Potential Impact on Fisheries Habitat from Forest Service Roads and Trails

6th Code Watershed	Major Stream or Streams in Watershed[1]	Summer Alt 1		Summer Alt 3		Summer Alt 4		Summer Alt 5	
		Road	Trail	Road	Trail	Road	Trail	Road	Trail
100301030101	NF Smith R.	23	0	18	0	15	3	15	3
100301030104	Fourmile Cr.	19	25	14	25	14	25	14	25
100301030401	Newlan Cr.	52	0	30	0	30	0	30	0
100301030701	Sheep Cr. (upper)	75	3	42	7	42	7	39	6
100301030703	Moose Cr.	29	7	25	7	25	7	25	7
100301030901	Tenderfoot Cr. (upper)	21	56	14	58	14	56	14	46
100301030902	Tenderfoot Cr. (middle)	2	30	1	32	1	30	1	23
100301030903	Tenderfoot Cr. (lower & SF)[2]	5	15	2	15	2	15	2	15
100301050101	Belt Cr. (headwater/Jefferson)	42	6	27	6	27	6	28	6
100301050102	Belt Cr. (upper)	27	29	15	37	15	14	15	15
100301050103	Belt Cr. (middle)	31	99	29	99	29	95	29	95
100301050104	Dry Fork Belt Cr.	65	85	47	59	47	62	50	58
100301050203	Logging Cr.	63	16	47	28	48	27	48	21
100401030101	Cleveland and Harrison Cr.	5	45	3	14	3	13	3	2
100401030102	SF Judith R./Deadhorse Cr.	36	49	24	48	24	48	24	48
100401030104	South Fork Judith R. (lower)	87	69	31	108	69	82	30	33
100401030105	Yogo Cr.	47	21	42	22	38	21	34	18
100401030106	Middle Fork Judith R.[3]	29	10	11	15	11	10	15	9
100402010204	Spring Cr.	24	16	20	16	20	16	20	16
100402010303	Haymaker Cr.	63	40	62	40	62	40	22	40

[1] Includes perennial and intermittent streams

[2] Does not include 30 road and trail crossings on intermingled ownership lands

[3] Corrected with field data

Note: The number of road and trail stream crossings shown above may not be exact due to GIS data limitations and accuracy. For example, when trail locations closely parallel streams, GIS intersection points may not represent actual stream crossings. Also, as stream channels move over time, or trail segments are relocated, some stream crossings may not be depicted accurately in the GIS data layers. These values should be considered approximate and used comparatively.

Table III-100. Riparian Road and Trail Miles by Alternative for Watersheds with Highest Potential Impact on Fisheries Habitat from Forest Service Roads and Trails

Major Stream or Streams in Watershed[1]	Summer Alt 1		Summer Alt 3		Summer Alt 4		Summer Alt 5	
	Riparian Road Miles	Riparian Trail Miles	Riparian Road Miles	Riparian Trail Miles	Riparian Road Miles	Riparian Trail Miles	Riparian Road Miles	Riparian Trail Miles
Newlan Cr.	9.4	0	6.1	0	6.1	0	6.1	0
Sheep Cr. (upper)	8.7	5.0	5.6	4.9	5.6	4.9	5.2	2.2
Tenderfoot Cr. (upper)	2.5	6.2	1.5	6.8	1.5	6.2	1.5	4.8
Tenderfoot Cr. (middle)	0.2	3.9	0.1	4.4	0.1	3.9	0.1	2.8
Tenderfoot Cr. (lower & SF)[2]	0.9	1.4	0.3	1.4	0.3	1.4	0.3	1.4
Belt Cr. (headwater/Jefferson)	7.2	0.7	5.1	0.3	5.1	0.3	5.1	0.3
Belt Cr. (upper)	6.1	2.6	4.6	4.4	4.6	1.7	4.6	1.8
Belt Cr. (middle)	7.8	12.0	7.5	12.0	7.5	11.2	7.5	11.2
Dry Fork Belt Cr.	9.3	8.1	7.8	6.0	7.8	6.2	8.0	5.9
Logging Cr.	10.4	2.2	8.1	3.9	8.3	3.7	7.9	3.1
Cleveland and Harrison Cr.	0.4	3.3	0.1	1.7	0.1	1.2	0.1	0.2
SF Judith R./Deadhorse Cr.	3.4	5.1	2.2	5.0	2.2	5.0	2.2	5.0
South Fork Judith R. (lower)	14.1	6.9	6.2	11.4	9.4	11.0	6.6	6.1
Yogo Cr.	11.9	2.6	10.6	2.1	10.0	2.6	9.3	1.8
Middle Fork Judith R.	3.0	1.7	2.2	2.0	2.2	1.7	2.6	1.4
Haymaker Cr.	8.3	9.3	8.2	9.3	8.2	9.3	4.6	9.3

[1] Includes perennial and intermittent streams

[2] Does not include 4.5 miles of riparian trail on intermingled ownership lands

Tenderfoot Creek – Several road crossings and about two miles of riparian road segments are eliminated in the upper and lower watersheds, although riparian trail mileage increases by a mile. Trail crossings and motorized use are largely unchanged. Without more cooperative and effective enforcement among public agencies and landowners, effects of illegal ATV use on fish habitat (see Alternative 1 discussion) are likely to worsen.

Dry Fork Belt Creek – Consolidating travel in the Dry Fork would result in 18 fewer road crossings and 26 fewer trail crossings, which represents a 30% decrease in total stream crossings. Riparian road and trail miles would decrease by over three miles (20%). These changes would help reduce impacts on fish habitat. However, if the network of unauthorized ATV trails and fords is not controlled and other impacts of dispersed streamside camping are not reduced, fish habitat would continue to be adversely impacted in this drainage (also see westslope cutthroat trout issue for headwater tributary Oti Park Creek).

South Fork Judith River (lower) – Roads crossings and riparian road mileage are reduced by more than half but are mostly replaced with trail crossings and riparian trail mileage for a small net decrease in potential effect on fish habitat. With likely increasing vehicle and ATV use of roads and trails in this popular recreation area, sedimentation levels in the South Fork would not be expected to decrease noticeably, nor would fish populations benefit from the change in travel management.

Yogo Creek – There would be about a mile fewer riparian road segments in this drainage but only a slight decrease in road and trail impacts to the mixed fishery of this stream is expected. Unrestricted fords on mining claims would continue to disturb the stream channel and impair habitat quality.

Middle Fork and Lost Fork Judith River – Rerouting the lower section of the Middle Fork Road through Arch Coulee and relocating portions of the upper section to provide more stream buffer would eliminate almost two thirds of the road fords and alleviate much of the damage to fish habitat in that area. The reduction in riparian road mileage of almost 30% is especially significant due to the detrimental effects of this travel corridor on the stream. A measurable positive response in the fish population of this reach of stream would be expected. However, continued motorized use of the upper section of the Middle Fork Road to private property, and construction of new motorized trails around private property would impact aquatic resources when the routes cross or enter streamside zones. On the other hand, closure of King Creek trail and other stream corridor routes in the Cleveland/Harrison tributary basin would eliminate about 30 trail crossings and reduce existing effects on fish habitat. If ATV trespass continues into the Lost Fork basin, increased effects on fish habitat are expected.

Daisy Dean Creek – Bank damage and sedimentation from high ATV use of the streamside trail with about 20 fording sites would continue to limit habitat for adult brook trout through reduced pool depths and loss of bank cover. Mitigation is possible with partial rerouting away from the stream, hardened fords, and additional bridge installations.

East Fork Haymaker Creek – No reduction in riparian road and trail mileage or stream crossings and continued high ATV use of streamside trail with multiple fords would undermine channel stability and reduce habitat quality for the Yellowstone cutthroat trout fishery. Mitigation may be possible with improved crossing sites.

Castle Lake – Improved motorized accessibility could result in overuse of this small alpine lake. The fishery could be maintained by stocking but the physical setting and aesthetics of the lake are vulnerable to excessive use.

2. Cumulative Effects

These effects are similar to Alternative 1, but would be lessened overall in several watersheds by the positive effects of roads and trails decommissioned.

d. Summer Alternative 4

1. Direct and Indirect Effects

Table III-73 shows that about 28 miles of riparian road segments and 10 miles of riparian trail segments would be eliminated under Alternative 4. An additional 78 miles of riparian trail segments would be restricted yearlong to trail bikes and 19 more miles of riparian trail segments would be restricted yearlong to ATV users. Road decommissioning would eliminate 217 stream crossings while trail decommissioning would remove 105 stream crossings (Table III-74). Only 4 new stream crossings would be created, resulting in a net reduction of 318 perennial and intermittent stream crossings, or 15%. Consequently, effects on fish habitats from roads and trails in the project area overall would be expected to decrease. Although restrictions on trail bikes may increase security slightly for isolated fish populations, impacts to fish habitat would likely remain the same for most trails, especially those used for horse travel.

Reductions in road and trail impacts in specific watersheds are shown in Tables III-99 and III-100. Effects on fisheries habitats include:

Smith River/Tenderfoot Creek/Deep Creek area – Effective conversion of this part of the Smith basin into a non-motorized travel zone and cessation of ATV trespass would significantly reduce existing road and trail impacts on fish habitats (see Alternative 1) and improve security for sensitive fish populations. The Smith River fishery would benefit from improved spawning and rearing habitat in lower Tenderfoot Creek; however, effects from trails that continue to be used for horse travel are not likely to decrease.

Newlan Creek – Dropping several non-essential routes from the system results in about 20 fewer road crossings and three less miles of riparian road, which would ease impacts on a watershed that receives heavy grazing pressure.

Sheep Creek and Belt Creek – Closure of some streamside routes in upper Sheep Creek reduces road crossings by about 30 and riparian road segments by about three miles. These changes would help reduce sediment loads and benefit fisheries. In upper Belt Creek, both road and trail crossings would decrease by about half from current numbers, which should help reduce sediment delivery to stream channels. However, major problems with sediment from winter road sanding would continue in both watersheds, which could easily mask any reductions in tributary sediment loading to the mainstem reaches.

Dry Fork Belt Creek – Although a reduced emphasis on motorized recreation in this basin could result in less impact to streams, it would be difficult to change the existing patterns of use there. Consolidating travel in the Dry Fork would result in 18 fewer road crossings and 23 fewer trail crossings, which represents a 30% decrease in total stream crossings. Riparian road and trail miles would decrease by over three miles (20%). These changes would help reduce impacts on fish habitat. However, if the network of unauthorized ATV trails and fords is not controlled and other impacts of dispersed streamside camping are not reduced, fish habitat would continue to be adversely impacted in this drainage (also see westslope cutthroat trout issue for headwater tributary Oti Park Creek).

South Fork Judith River (lower) – Little net change in stream crossings or riparian road and trail mileage would occur in this watershed, and fish habitats would likely remain in the existing impaired condition.

Yogo Creek – There would be 9 fewer road crossings in this drainage and about two fewer miles of riparian road segments. Road and trail impacts to the mixed fishery of this stream would decrease, but unrestricted fords on mining claims would continue to disturb the stream channel and impair habitat quality.

Middle Fork and Lost Fork Judith River – Rerouting the lower section of the Middle Fork Road through Arch Coulee and relocating portions of the upper section to provide more stream buffer would eliminate almost two thirds of the road fords and alleviate much of the damage to fish habitat in that area. The reduction in riparian road mileage of almost 30% is especially significant due to the detrimental effects of this travel corridor on the stream. A measurable positive response in the fish population of this reach of stream would be expected. There would still be adverse effects to fish habitat from landowner use of the upper section of the Middle Fork Road. Nevertheless, effective conversion of the remainder of the Middle Fork basin to non-motorized travel would produce the greatest reduction in impact to fish habitats and provide more security for resident fish populations than any alternative. In the Cleveland/Harrison tributary basin, closure of King Creek trail and other stream corridor routes would eliminate about 30 trail crossings and also reduce existing effects on fish habitat. Eliminating motorbike travel in the Lost Fork would not likely lessen trail impacts on fish habitat because horse use would continue at current or higher levels.

Daisy Dean Creek – Cessation of heavy motorized travel through the streamside corridor would significantly reduce effects on fish habitat and promote channel recovery which leads to deeper pools, more stable banks and improved overhead cover. Resident brook trout populations would be expected to increase measurably.

East Fork Haymaker Creek – Restricting this trail to non-motorized use would result in less sedimentation, increased channel stability and improved riparian conditions, all of which would benefit the Yellowstone cutthroat trout fishery.

Castle Lake – Only the route from the southeast, which requires access across private lands, would remain open to motorized travel. Most use of the lake's fishery would likely remain under local control, and the physical setting would not change.

2. Cumulative Effects

These effects are similar to Alternative 1 but lessened by the reduced impacts from roads and trails in specific watersheds as described above.

e. Summer Alternative 5

1. Direct and Indirect Effects

Table III-73 shows that about 39 miles of riparian road segments and 22 miles of riparian trail segments would be eliminated under Alternative 5. An additional 37 miles of riparian trail segments would be restricted yearlong to trail bikes, while the total miles of riparian trail segments with yearlong restrictions to ATV users remains unchanged from the existing situation. Road decommissioning would eliminate 342 stream crossings while trail decommissioning would remove 197 stream crossings (Table III-74). Only 6 new stream crossings would be created, resulting in a net reduction of 533 perennial and intermittent

stream crossing sites, or 15%. Consequently, effects on fish habitats from roads and trails in the project area overall would be expected to decrease very significantly. Although restrictions on trail bikes may increase security slightly for some sensitive fish populations, impacts to fish habitat would likely remain the same for most trails, especially those used for horse travel.

Reductions in road and trail impacts in specific watersheds are shown in Tables III-99 and III-100. Effects on fisheries habitats include:

Smith River – Development of an ATV loop in Deep Creek Park with a connector trail to Monument Peak is likely to increase vehicle fording across the Smith River on the primary access road. This will result in more streambed disturbance and bank erosion, which reduces habitat quality for the Smith River fishery.

Newlan Creek – Dropping several non-essential routes from the system results in about 20 fewer road crossings and three less miles of riparian road, which would ease impacts on a watershed that receives heavy grazing pressure.

Sheep Creek and Belt Creek – Closure of some streamside routes in upper Sheep Creek reduces road crossings by 36 and riparian road segments by 3.5 miles. These changes would help reduce sediment loads and benefit fisheries. In upper Belt Creek, both road and trail crossings would decrease by about half from current numbers, which should help reduce sediment delivery to stream channels. However, major problems with sediment from winter road sanding would continue in both watersheds, which could easily mask any reductions in tributary sediment loading to the mainstem reaches.

Tenderfoot Creek – In addition to eight road crossings, 17 trail crossings would be removed from the system in the Tenderfoot Creek basin, reducing sediment delivery to important fisheries. About 1.7 miles of riparian road segments and 2.5 miles of riparian trail segments would also be eliminated, providing clear benefits for fish habitat. However, without more cooperative and effective enforcement among public agencies and landowners, effects of illegal ATV use on fish habitat in lower Tenderfoot Creek (see Alternative 1 discussion) are likely to worsen.

Dry Fork Belt Creek – Consolidating travel in the Dry Fork would result in 15 fewer road crossings and 27 fewer trail crossings, which represents a 30% decrease in total stream crossings. Riparian road and trail miles would decrease by about 3.5 miles (20%). These changes would help reduce impacts on fish habitat. However, if the network of unauthorized ATV trails and fords is not controlled and other impacts of dispersed streamside camping are not reduced, fish habitat would continue to be adversely impacted in this drainage (also see westslope cutthroat trout issue for headwater tributary Oti Park Creek).

South Fork Judith River (lower) – Consolidation of the travel system would result in major reductions in road and trail impacts to streams because about 90 crossing sites on perennial and intermittent channels would eventually be removed in this watershed. This represents a 60% decrease overall and is very likely to have a beneficial effect on aquatic habitats and resident fish populations.

Yogo Creek – There would be reductions of 13 road crossings, 3 trail crossings, and 3.4 miles of riparian road and trail segments in this drainage. Impacts to the fishery would decrease in the vicinity of those closures, but unrestricted fords on mining claims would continue to disturb the stream channel and impair habitat quality in other areas of Yogo Creek.

Middle Fork and Lost Fork Judith River – Rerouting the lower section of the Middle Fork Road through Arch Coulee would eliminate about half of the road fords and alleviate much of

the damage to fish habitat in that area. The reduction in riparian road mileage of about 15% is significant due to the detrimental effects of this road segment on the stream. A measurable positive response in the fish population of this reach of stream would be expected. However, continued motorized use of the upper portion of the Middle Fork Road to private property (un-relocated and unimproved in this alternative) would continue to adversely impact aquatic resources. In the Cleveland/Harrison tributary basin, closure of King Creek trail and other stream corridor routes would eliminate about 40 trail crossings and substantially reduce existing effects on local fish habitat. Elimination of ATV trespass into the Lost Fork basin would prevent future damage to fish habitat, but other trail impacts in the area would remain largely unchanged due to continued horse use.

Daisy Dean Creek – Bank damage and sedimentation from continued high ATV use of streamside trail with multiple fording sites would continue to limit habitat for larger brook trout through reduced pool depths and loss of bank cover. Mitigation is possible with partial rerouting away from the stream, hardened fords, and bridge construction.

East Fork Haymaker Creek – Riparian road mileage would decrease by nearly four miles and 40 road crossings would be eliminated in the Haymaker basin, but there would be no reduction in trail crossings or riparian trails in the East Fork. Continued high ATV use of the East Fork trail with multiple fords would undermine channel stability and reduce habitat quality for the Yellowstone cutthroat trout fishery. Mitigation may be possible with improved crossing sites.

Castle Lake – Motorized use of access trails would be discontinued. Accessibility would be limited and the physical setting preserved.

2. Cumulative Effects

These effects are similar to Alternative 1 but lessened by the reduced impacts from roads and trails in specific watersheds as described above.

f. Winter Alternatives 1-3

1. Direct and Indirect Effects

Because winter routes are greatly restricted by snow and ground disturbance is generally not a concern for that time of year, effects of winter travel on water quality were not considered to be a significant issue for this analysis. Although snow compaction on recreational trails used by snowmobilers and skiers can alter local runoff patterns, the effects are considered minor in the context of natural events. Consequently, the effects of winter travel and recreation in the project area were not deemed to be a significant issue for fisheries. Streams are closed to fishing and generally unfishable (ice cover, cold water) during winter, so accessibility and security of sensitive fisheries is also not a concern.

EFFECTS ON WESTSLOPE CUTTHROAT TROUT.

There is concern about the impacts of roads and trails on habitat for westslope cutthroat trout (WCT), especially in Tenderfoot Creek/Smith River, S.F. Judith River, N.F./S.F. Deep Creek, Hoover Creek and Graveyard Creek. The primary concerns are sedimentation, damage to spawning gravels, and population security.

1. EXISTING CONDITION

a. Natural Characteristics, Past Events and Conditions

Nearly all of the Belt Creek, Smith River and Judith River basins were historically occupied by WCT. However, only about 15% of Belt Creek, 3% of Smith River, and 2% of Judith River drainages currently support genetically unaltered WCT. The pure populations are distributed across at least 25 streams, with about 30 streams supporting nearly pure (90-99.9%) WCT populations in the project area (see Map 14). The reasons for the decline of native WCT include overharvesting, introduction of non-native trout, and habitat degradation. Most remaining pure WCT populations exist upstream of natural or manmade barriers that block non-native trout invasions. This largely isolated condition precludes population recovery by immigration from other streams after loss of resident fish due to natural disturbances like fires, floods, and drought. Due to population threats and a limited amount of occupied habitat, WCT are designated a Forest Service Region 1 Sensitive Species.

b. Human Influence

Although the introduction of competing or hybridizing non-native species like brook and rainbow trout has had a major impact on native WCT populations, the displacement appears to have been facilitated or accelerated by habitat changes due to land management activities. Among these, development of an extensive road and trail system inevitably increased sediment delivery to adjacent streams, raised water temperature by reducing overstory shading, and exposed vulnerable WCT populations to overharvest. Collaborative efforts by state, private and federal entities have recently begun to protect and restore WCT populations and habitat in the project area. Barriers have been built to stop non-native fish invasions, some riparian areas have been exclosed to livestock grazing, and intensive efforts to remove non-native trout are underway (Moser et al. 2007). Anglers are now required to release cutthroat trout from nearly all streams in the analysis area. Because the remaining WCT populations tend to be located in remote headwater reaches, they are generally not threatened by excessive human access. Currently, there is no evidence that WCT in accessible streams such as Pilgrim or Deep Creek need greater security from human disturbance.

c. Future Trends

Trends for WCT habitat are similar to those discussed for fish habitat in general in the previous section. Due to a conservation agreement and higher priority for WCT fisheries, some WCT streams may improve more rapidly than streams supporting other fisheries as new management actions are taken. However, WCT populations may decline in streams where the influence of non-native trout can not be controlled, despite any efforts to protect or improve habitat.

d. Desired Condition

The desired condition would be to ensure that WCT habitats in the project area are not being adversely affected by the road and trail system. Where impacts are occurring, travel management would be used to reduce effects to acceptable levels by restricting seasons and type of use, relocating or closing routes, or employing other mitigation measures to offset the impacts. In a few cases, access may be reduced to protect WCT populations from threats like disease introduction and illegal harvest.

2. ENVIRONMENTAL CONSEQUENCES

a. Summer Alternative 1 - No Action Alternative

The lack of quantitative information and reliable modeling tools limits the ability to analyze road and trail effects on WCT habitats, but empirical observations of erosion problems, stream conditions, and current use patterns allow some assessments to be made. Where native WCT are forced to compete with introduced brook trout, the effects of roads and trails can tip the balance toward the more sediment-tolerant brook trout, which also favor higher water temperatures and are more resistant to angling pressure than WCT.

1. Direct and Indirect Effects

As described in the previous section, the existing network and type of use of roads and trails in the project area affects water quality and fish habitats, including watersheds that support WCT. In this section, the analysis has been stepped down to evaluate travel plan impacts on the smaller 7th code watersheds occupied by WCT in the project area. However, Belt Creek headwaters, Pilgrim Creek, and South Fork Judith River, which support extensive WCT populations, were evaluated at the larger 6th code watershed level. Table III-101 displays total stream crossings by WCT-occupied watershed for all alternatives, and Tables III-102 and III-103 provide road and trail mileage within 100 feet of streams in WCT watersheds for all alternatives.

With some notable exceptions (discussed below), most WCT streams currently have a low number of road crossings and less than one mile of road closer than 100 feet (Tables III-101 and III-102). On the other hand, trail crossings and trail mileage within 100 feet of many WCT streams are substantial (Tables III-101 and III-103) and, in some cases, impactive to aquatic habitats. In total, GIS analysis detected 140 road crossings and 286 trail crossings in the listed WCT watersheds. The following situations are most notable and would remain largely unchanged under Alternative 1 (existing condition):

South Fork/North Fork Deep Creek – Security for WCT populations is reduced by increased accessibility, although they remain stable and disease-free. The trail system is open to motorbike travel, but with present use levels, there is no evidence of significant adverse effects to WCT habitat from the crossings and riparian trail segments.

O'Brien Creek – A user-created ATV trail (partly overlapping a ski trail) encroaches within 100 feet of O'Brien Creek for nearly two miles, creating about 15 stream crossings in the drainage. With unrestricted motorized use and connectivity to Neihart, this trail is vulnerable to erosion problems and is likely to cause increasing adverse impacts to WCT habitats.

Table III-101. Total Stream Crossings (Motorized and Non-motorized) in WCT Watersheds Managed by Forest Service

Road / Trail Crossings by Alternative[1]											
Watershed HUC	Principal Stream	Stream Miles[2] Managed by FS in HUC	% of Stream Miles Managed by FS in HUC	Summer Alt 1 Existing		Summer Alt 3		Summer Alt 4		Summer Alt 5	
				Road	Trail	Road	Trail	Road	Trail	Road	Trail
10030103090105	Iron Mines	5.5	100	1	0	1	0	1	0	1	0
10030103090301	S Fk Tenderfoot	5.8	42	2	0	2	0	2	0	2	0
10030103100601	S Fk Deep	19.4	100	0	27	0	27	0	26	0	26
10030103100602	N Fk Deep	14.8	100	0	8	0	9	0	8	0	8
10030105010201	O'Brien	13.1	90	3	21	2	21	2	0	2	0
10030105010202	Carpenter	14.4	57	8	2	7	2	7	0	7	1
10030105010203	Harley/Graveyard	15.3	99	11	0	4	7	4	7	4	7
10030105010302	Crawford	3.2	57	0	14	0	14	0	14	0	14
10030105010304	Hoover	35.0	99	1	56	1	56	1	52	1	52
10030105010401	Oti Park	31.7	100	1	19	0	19	0	19	1	19
10030105010407	Goldrun	5.1	84	1	0	1	0	1	0	1	0
10030105010408	Spruce	3.7	100	2	0	1	1	1	0	0	2
10030105010412	Bender	4.8	100	1	10	1	10	1	10	1	10
10030105010416	Sawmill	10.2	98	1	15	1	15	1	15	1	15
10040103010102	Weatherwax	14.2	100	1	0	0	0	0	0	0	0
10040103010103	King	5.1	94	0	29	0	0	0	0	0	0
10040103010104	Harrison	36.4	94	3	3	3	0	3	0	3	0
10040103100101	Upper Dry Wolf	36.7	100	5	9	5	9	5	9	5	9
10040103100301	N Fk Running Wolf	14.9	97	21	1	21	0	21	0	21	0
100301050101	Belt headwtr/Jefferson	69.6	100	42	6	27	6	27	6	28	6
100301050202	Pilgrim	52.4	96	0	17	0	17	0	17	0	17
100401030102	S Fk Judith/Deadhorse	82.7	97	36	49	24	48	24	48	24	48
Totals		**494.0**		**140**	**286**	**101**	**261**	**101**	**231**	**102**	**234**

[1] Number of crossings may not be exact due to GIS accuracy (i.e., when trail locations closely parallel streams, GIS intersection points may not represent actual stream crossings). These values should be considered approximate and used comparatively.

[2] Includes perennial and intermittent streams.

Table III-102. Riparian Road Miles in WCT Watersheds Managed by Forest Service

Road Miles within 100 feet of Stream											
Watershed HUC	Principal Stream	Stream Miles[1] Managed by FS in HUC	% of Stream Miles Managed By FS in HUC	Summer Alt 1 Existing		Summer Alt 3		Summer Alt 4		Summer Alt 5	
				Miles	%[2]	Miles	%[2]	Miles	%[2]	Miles	%[2]
10030103090105	Iron Mines	5.5	100	0.1	2	0.1	2	0.1	2	0.1	2
10030103090301	S Fk Tenderfoot	5.8	42	0.2	4	0.2	3	0.2	3	0.2	3
10030103100601	S Fk Deep	19.4	100	0	0	0	0	0	0	0	0
10030103100602	N Fk Deep	14.8	100	0	0	0	0	0	0	0	0
10030105010201	O'Brien	13.1	90	0.2	2	0.1	1	0.1	1	0.1	1
10030105010202	Carpenter	14.4	57	2.6	18	2.4	17	2.4	17	2.4	17
10030105010203	Harley/Graveyard	15.3	99	2.0	13	1.0	7	1.0	7	1.0	7
10030105010302	Crawford	3.2	57	0	0	0	0	0	0	0	0
10030105010304	Hoover	35.0	99	0.5	1	0.5	1	0.5	1	0.5	1
10030105010401	Oti Park	31.7	100	0	0	0	0	0	0	0	0
10030105010407	Goldrun	5.1	84	0	0	0	0	0	0	0	0
10030105010408	Spruce	3.7	100	0.2	5	0.1	3	0	0	0	0
10030105010412	Bender	4.8	100	0.1	1	0.1	2	0.1	2	0.1	2
10030105010416	Sawmill	10.2	98	0	0	0	0	0	0	0	0
10040103010102	Weatherwax	14.2	100	0.1	1	0	0	0	0	0	0
10040103010103	King	5.1	94	0	0	0	0	0	0	0	0
10040103010104	Harrison	36.4	94	0.1	<1	0.1	<1	0.1	<1	0.1	<1
10040103100101	Upper Dry Wolf	36.7	100	0.4	1	0.4	1	0.4	1	0.4	1
10040103100301	N Fk Running Wolf	14.9	97	3.0	20	3.0	20	3.0	20	3.0	20
100301050101	Belt headwtr/Jefferson	69.6	100	7.2	10	5.1	7	5.1	7	5.1	7
100301050202	Pilgrim	52.4	96	0	0	0	0	0	0	0	0
100401030102	S Fk Judith/Deadhorse	82.7	97	3.4	4	2.2	3	2.2	3	2.2	3
Totals		**494.0**		**20.1**	**4**	**15.3**	**3**	**15.2**	**3**	**15.2**	**3**

[1] Includes perennial and intermittent streams.

[2] Percent of stream miles having roads within 100' buffer for stream segments managed by FS.

Table III-103. Riparian Trail Miles in WCT Watersheds Managed by Forest Service

Trail Miles within 100 feet of Stream											
Watershed HUC	Stream	Stream Miles[1] Managed by FS in HUC	% of Stream Miles Managed By FS in HUC	Summer Alt 1 Existing		Summer Alt 3		Summer Alt 4		Summer Alt 5	
				Miles	%[2]	Miles	%[2]	Miles	%[2]	Miles	%[2]
10030103090105	Iron Mines	5.5	100	0	0	0	0	0	0	0	0
10030103090301	S Fk Tenderfoot	5.8	42	0	0	0	0	0	0	0	0
10030103100601	S Fk Deep	19.4	100	2.0	10	2.0	10	1.9	10	1.9	10
10030103100602	N Fk Deep	14.8	100	2.4	16	2.4	16	2.4	16	2.4	16
10030105010201	O'Brien	13.1	90	1.9	15	1.9	15	0	0	0	0
10030105010202	Carpenter	14.4	57	0.1	1	0.2	1	0.2	1	0.2	1
10030105010203	Harley/Graveyard	15.3	99	0	0	1.7	11	1.0	7	1.0	7
10030105010302	Crawford	3.2	57	1.5	47	1.5	47	1.5	47	1.5	47
10030105010304	Hoover	35.0	99	7.7	22	7.7	22	6.9	20	6.9	20
10030105010401	Oti Park	31.7	100	1.4	4	1.4	4	1.4	4	1.4	4
10030105010407	Goldrun	5.1	84	0	0	0	0	0	0	0	0
10030105010408	Spruce	3.7	100	0	0	0.1	3	0.1	3	0.2	5
10030105010412	Bender	4.8	100	1.4	29	1.4	29	1.4	29	1.4	29
10030105010416	Sawmill	10.2	98	2.1	21	2.1	21	2.1	21	2.1	21
10040103010102	Weatherwax	14.2	100	0	0	0	0	0	0	0	0
10040103010103	King	5.1	94	1.7	33	0	0	0	0	0	0
10040103010104	Harrison	36.4	94	0.5	1	0	0	0	0	0	0
10040103100101	Upper Dry Wolf	36.7	100	1.3	4	1.3	4	1.3	4	1.3	4
10040103100301	N Fk Running Wolf	14.9	97	0	0	0	0	0	0	0	0
100301050101	Belt headwtr/Jefferson	69.6	100	0.7	1	0.3	<1	0.3	<1	0.3	<1
100301050202	Pilgrim	52.4	96	3.6	7	3.6	7	3.6	7	3.6	7
100401030102	S Fk Judith/Deadhorse	82.7	97	5.1	6	5.0	6	5.0	6	5.0	6
Totals		494.0		33.4	7	32.6	7	29.1	6	29.2	6

[1] Includes perennial and intermittent streams.

[2] Percent of stream miles having trails within 100' buffer for stream segments managed by FS.

Carpenter Creek – Due to historic mining pollution along most of this stream, WCT reside only in the headwater reach, where the population is affected by two fords and a portion of the riparian road in the watershed. Current impacts to WCT from this road segment are minor, but because the upper road connects to a motorized trail network via non-system routes, increased use in the future could increase sedimentation and adversely affect the limited WCT habitat.

Harley and Graveyard Creeks – There are 11 road crossings and about two miles of riparian road impacting Harley Creek. The ATV trail on the flood-damaged upper road does not have an adequate sediment filter zone between stream and trail, and the former road prism is unstable, erodable and vulnerable to flood damage. These road problems will continue to affect WCT habitat.

Hoover Creek – This watershed has over 50 trail crossings and the highest riparian trail mileage (7.7 miles) of any WCT watershed in the analysis area. The main trail is located in the stream corridor and requires frequent fording, which reduces bank stability, increases sediment delivery rates, and disturbs cutthroat trout spawning gravels which often occur at fording sites. Trail bike and horse traffic occurs during the incubation period for cutthroat trout (June-August) and can displace or crush trout embryos. Non-native brook trout spawn in fall and are less affected by the fords, gaining competitive advantages over the struggling WCT population.

Dry Fork/Oti Park/Villars Creeks – The existing trail system includes about 19 crossings in the Oti Park Creek drainage, sometimes resulting in overwidened channels and chronic sediment delivery to the stream system. Coupled with grazing impacts, the expansion of motorized use in this area (primarily unauthorized ATV traffic) has created erosion problems which increase sediment loads to adjacent streams and threaten WCT rearing habitat in Villars Creek.

Bender Creek – Habitat for WCT is limited in this small Dry Fork tributary, and it is potentially impacted by 10 trail crossings, steep erodible trail sections and lack of sediment filtering zones. The trail encroaches within 100 feet of Bender Creek for nearly 30% of the stream's length. An ongoing reconstruction/relocation project is intended to reduce those impacts by hardening some crossing sites, reducing grades and improving drainage.

Sawmill Gulch – About two miles of perennial stream provides habitat for WCT in the uppermost reach of this drainage. An old jeep trail encroaches on over two miles of the lower channel, including occupied habitat, and requires about 15 fords which jeopardize bank stability. There is no public right-of-way across private property for this trail, and it is now closed to motorized use.

King and Harrison Creeks – King Creek, though small, is heavily impacted by motorized and other use on 1.7 miles of riparian trail segments along 33% of its length, the highest impact value for ATV and motorbike use in any WCT watershed. The 29 indicated fording sites in the drainage disrupt channel function and deliver sediment from uncontrolled rutting and rill erosion, thereby degrading WCT rearing habitat. Trail impacts on Harrison Creek occur mostly at three fording sites where multiple users introduce additional sediment during the cutthroat trout incubation period.

NF Running Wolf – An access road to private inholdings requires over 20 fords which deliver sediment directly to limited habitat occupied by a small isolated remnant WCT population. The county road encroaches on three miles (20%) of stream length in the watershed and nearly all of the uppermost reach of North Fork Running Wolf which is occupied by WCT. This represents the highest road impact value of any WCT watershed.

Belt Creek headwaters and Jefferson Creek – This watershed has about 40 road stream crossings and more than seven miles of riparian road segments encroaching on about 10% of the total

stream length. It is impacted by the Highway 89 corridor, the main Jefferson Creek road and secondary roads in tributary basins. Along Jefferson Creek, numerous dispersed recreation site access roads are located in the floodplain and are routinely inundated during runoff, increasing sediment delivery to the stream and reducing the quality of fish habitat; fording by motorized vehicles is occurring routinely at several sites, causing further damage to stream banks. There is also some potential impact to WCT habitat in the headwater zone from a motorized trail in the upper reach of Jefferson Creek, although this does not appear to be significant with current use levels.

Pilgrim Creek – This WCT watershed is unroaded but has almost four miles of riparian trail segments with about 17 crossings. There is no evidence that multiple use of this trail (hiking, horseback, and motorbike) is affecting WCT habitat. It is likely that the population is especially resilient because it occupies over 10 miles of high-quality stream habitat in an undeveloped roadless basin and is protected from non-native trout by a barrier.

Upper South Fork Judith River and Deadhorse Creek – This basin has the highest number of road and trail crossings (80 total) of any WCT watershed in the analysis area. Fisheries surveys have noted high instream sediment levels in Deadhorse, Big Hill, Cabin, and Smith creeks, as well as finding half or more of the substrate comprised of silt and sand at survey sites on the South Fork itself (Shepard 2001). Altered habitat conditions like these may be facilitating the encroachment of non-native brook trout into the upper basin, which poses an increasing threat to WCT populations.

Fourmile and SF Willow Creeks – These streams support remnant WCT populations in their upper reaches but incongruent HUC boundaries precluded GIS analysis of stream crossing frequency and riparian trail mileage. The trail system is currently open to motorbikes with ATV use occurring along some ridgelines and connector trails. Evidence of impact to WCT habitats is presently lacking, but accessibility may reduce WCT population security in these drainages.

2. Cumulative Effects

Recreational uses, livestock grazing, historic mining, past and current timber harvests, and competing or hybridizing non-native fish species all have cumulative effects with the transportation system on WCT habitats and populations. Although available data does not allow for a quantitative analysis across the project area, a summary of cumulative effects and current status of WCT populations by watershed is shown in Table III-104. For some streams, the risk of significant cumulative effects can be inferred from the level of other activities in the immediate area. Livestock grazing is likely to have the most significant cumulative effect on WCT habitat in Oti Park, Villars, King and Harrison Creeks. Damage from livestock grazing exacerbates the adverse effects of trails and roads on fish habitat. Impacts to aquatic habitats from heavily-used streamside camping areas, such as those in Jefferson Creek, can be difficult to manage, but most other land management activities can usually be mitigated to minimize impact on WCT fisheries. However, the lingering effects of past mining activities (primarily toxic effluents from tailings deposits and mine adits) will limit habitat for WCT in Dry Fork Belt Creek and Carpenter Creek drainages for the reasonably foreseeable future to only those stream reaches that are upstream from sources of mining pollution.

All WCT populations that have been given a “tenuous” status rating in Table III-104 are primarily at risk because they are small and isolated to short stream segments, and/or are threatened by the presence of non-native fish species. Because stable WCT populations can be found in non-pristine habitats, the determining factor for their long term survival is often

considered to be the influence of competing and hybridizing species, primarily brook and rainbow trout in this analysis area.

b. Summer Alternative 3

1. *Direct and Indirect Effects*

Closure of certain undetermined routes and decommissioning others would reduce road crossings of perennial and intermittent streams in WCT watersheds by 28% (about 40 crossings) and eliminate 9% of the trail crossings (about 25 crossings). The benefits to WCT habitat from the crossing reductions would mostly occur in three watersheds. These effects and others are discussed below.

South Fork/North Fork Deep Creek – The increased ATV accessibility to this watershed via Trail 338 would reduce security for WCT populations and create temptation for ATV trespass into WCT-occupied habitat.

O'Brien Creek – Establishing a legal motorized trail in the stream corridor would greatly increase sediment loading on WCT habitat and decrease population security.

Carpenter Creek – Authorizing a motorized loop system from the terminus of the Carpenter Creek road would place a small isolated WCT population at greater risk from increasing use of a riparian road with two fords and inadequate sediment filtering zones.

Harley and Graveyard Creeks – The ATV trail on the flood-damaged upper section of the Harley Creek road would remain a sediment source due to an inadequate filter zone and unstable road prism. Additional adverse effects would be expected from a new motorized trail down the steep narrow valley bottom of Graveyard Creek, which would increase sediment loads on a rare genetically-pure population of WCT. The new ATV loop system would also reduce security for WCT populations in both creeks.

Hoover Creek – The adverse effects on fish habitat of the existing trail system would continue (no change from Alternative 1).

Dry Fork/Oti Park/Villars Creeks – The ATV loop through Oti Park and Villars Creek is likely to cause increased sediment loading and threaten resident WCT populations. For the most part, the effects described under Alternative 1 would escalate.

Bender Creek – Adverse effects of the riparian trail up Bender Creek would be magnified by the addition of ATV traffic with the proposed loop opportunities.

Sawmill Gulch – The trail up Sawmill would remain non-motorized (no change from Alternative 1).

King and Harrison Creeks – Trail closures in this area would account for the elimination of over 30 stream crossings and would greatly alleviate impacts to WCT habitats.

NF Running Wolf – Existing threats to the isolated WCT population from the county access road would continue (no change from Alternative 1).

Belt Creek headwaters and Jefferson Creek – Road crossings would decrease by 15 (35%) and riparian road and trail segments by about 2.5 miles (30%) due to elimination of nonsystem routes, but adverse effects on fisheries habitat from the main road and dispersed recreation sites in Jefferson Creek would continue.

Table III-104. Cumulative Effects Summary for WCT Watersheds

WCT Population	Cumulative Effects							Population Status
	Roads	Trails	Recreation	Grazing	Mining	Logging	Non-native Fish	
Iron Mines	X				X	X		stable
S Fk Tenderfoot	X			X		X		tenuous
S Fk Deep		X						stable
N Fk Deep		X						stable
O'Brien		X				X		stable
Carpenter	X				X	X		stable
Harley/Graveyard	X	X				X	X	tenuous
Crawford		X		X				re-founded[1]
Hoover		X					X	tenuous
Oti Park		X	X	X	X		X	tenuous
Goldrun					X			tenuous
Spruce							X	tenuous
Bender		X					X	tenuous
Sawmill		X				X		stable
Weatherwax		X				X	X	stable
King		X		X			X	stable
Harrison		X		X		X	X	stable
Upper Dry Wolf		X	X	X		X	X	tenuous
N Fk Running Wolf	X							tenuous
Belt headwtr/Jefferson	X	X	X			X	X	tenuous
Pilgrim		X						stable
S Fk Judith/Deadhorse	X	X	X	X		X	X	re-founded[1]
Fourmile/Richardson	X	X		X			X	tenuous
SF Willow		X					X	stable

[1] "re-founded" means hybrid and non-native fish have been removed to allow for replacement by genetically-pure WCT.

Pilgrim Creek – There would be no change from the existing condition described for Alternative 1.

Upper South Fork Judith River and Deadhorse Creek – A new motorized ATV loop paralleling and crossing the South Fork Judith River and Deadhorse Creek through the heart of the WCT restoration area would cause major impacts due to lack of sediment filtering zones, numerous fords, increased tread widths and erodible soils. Security for WCT populations would be greatly reduced. These adverse effects would far outweigh the benefits expected from elimination of about 12 stream crossings in the watershed through decommissioning of excess roads. (Note: This proposed ATV trail was a hold-over from the Alternative 2 template and not specifically proposed by motorized use advocates.)

Fourmile and SF Willow Creeks – The new ATV loops in the headwater reaches of these streams would reduce WCT security and potentially increase sediment delivery to fish habitat.

2. Cumulative Effects

Cumulative effects on WCT would be similar to Alternative 1 except that overall adverse effects would increase for certain drainages as described above. Trail closures would greatly reduce cumulative effects on WCT habitats in King and Harrison Creeks, and travel consolidation in the Belt Creek headwaters would alleviate cumulative effects on WCT habitat there.

c. Summer Alternative 4

1. Direct and Indirect Effects

With decommissioning and closure of various routes, road crossings on perennial and intermittent streams in WCT watersheds would decrease by 28% (about 40 crossings), the same amount as in Alternative 3. Trail crossings, however, would decrease by over twice the amount in Alternative 3 – about 55 crossings (19% reduction). These and other effects on WCT watersheds are described below.

South Fork/North Fork Deep Creek – Evidence of effects on fish habitat from motorbike use is lacking, and restricting travel to non-motorized means is unlikely to reduce trail impacts. However, closing this area to motorized travel would reduce accessibility and therefore could increase security somewhat for the WCT populations that occur there.

O'Brien Creek – There would be no motorized trail along the stream to threaten WCT habitat, and the number of trail crossings on perennial and intermittent streams would decrease by 21 (100% reduction) in this watershed.

Carpenter Creek – No trails would be established off the upper Carpenter Creek road. Existing and new risks to the resident WCT population would be averted.

Harley and Graveyard Creeks – The ATV trail on the flood-damaged section of the Harley Creek road would remain a sediment source due to inadequate filter zone and unstable road prism. No additional trail development in this watershed would mean no additional threat to WCT populations.

Hoover Creek – Discontinuing motorbike use on this trail network is unlikely to reduce impacts on fisheries because moderate to heavy use by horses and packstock would continue to damage stream banks, deliver sediment to the stream, and disturb spawning gravels.

Dry Fork/Oti Park/Villars Creeks – Dry Fork and Villars Creek would continue to be impacted by sediment from increasing motorized use and ATV trails, but the trail up Oti Park Creek would become non-motorized. Although no trail crossings would be eliminated, minor improvement over the existing condition for WCT habitat would be expected.

Bender Creek – Bender Creek trail would become non-motorized, reducing potential habitat impacts from motorbike travel on the steep trail grades and crossing sites. No ATV loops would be created in this area, avoiding additional risks to WCT habitat.

Sawmill Gulch – The trail would remain non-motorized (no change from Alternative 1).

King and Harrison Creeks – As in the other action alternatives, trail closures in this area would account for the elimination of over 30 stream crossings and would greatly alleviate impacts to WCT habitats.

NF Running Wolf – Existing threats to the isolated WCT population from the county access road would continue (no change from Alternative 1).

Belt Creek headwaters and Jefferson Creek – Road crossings would decrease by 15 (35%) and riparian road and trail segments by about 2.5 miles (30%) due to elimination of nonsystem routes, but adverse effects on fisheries habitat from the main road and dispersed recreation sites in Jefferson Creek would continue.

Pilgrim Creek – There is no clear evidence of effects on fish habitat from motorbike use on this trail system. Restricting travel to non-motorized means is unlikely to significantly reduce trail impacts over foot and horse traffic. However, closing the area to motorized travel would reduce accessibility and therefore could increase security somewhat for the WCT population, although no specific threats appear to be imminent.

Upper South Fork Judith River and Deadhorse Creek – As in Alternative 3, a new motorized ATV loop paralleling and crossing the South Fork Judith River and Deadhorse Creek through the heart of the WCT restoration area would cause major impacts due to lack of sediment filtering zones, numerous fords, increased tread widths and erodible soils. Security for WCT populations would be greatly reduced. These adverse effects would far outweigh the benefits expected from elimination of about 12 stream crossings in the watershed through decommissioning of excess roads. (Note: This proposed ATV trail was a hold-over from the Alternative 2 template and not specifically proposed by quiet trails advocates.)

Fourmile and SF Willow Creeks – Conversion of the trail system to non-motorized travel would be unlikely to improve habitat conditions for WCT in these watersheds because motorized use impacts are currently low. However, restricting travel to non-motorized means could improve the security of WCT in headwater reaches.

2. Cumulative Effects

Cumulative effects on WCT would be reduced from the existing situation proportionately to reduced impacts from motorized use described above. WCT habitats in O'Brien, King and Harrison Creeks would experience decreasing cumulative effects as the number of stream crossings is reduced with implementation of this travel plan alternative.

d. Summer Alternative 5

1. Direct and Indirect Effects

Similar to Alternative 4, Alternative 5 would result in reductions of almost 40 road crossings (27%) and about 52 trail crossings (18%) on perennial and intermittent streams in WCT watersheds. These and other effects on WCT watersheds are described below.

South Fork/North Fork Deep Creek – Compliance with travel restrictions is difficult to predict, but improved ATV access to the Deep Creek area may reduce security for WCT populations even though the South Fork and North Fork trails would remain open to motorbike use only (existing condition).

O'Brien Creek – There would be no motorized trail along the stream to threaten WCT habitat, and the number of trail crossings on perennial and intermittent streams would decrease by 21 (100% reduction) in this watershed.

Carpenter Creek – No trails would be established off the upper Carpenter Creek road. Existing and new risks to the resident WCT population would be averted.

Harley and Graveyard Creeks – The ATV trail on the flood-damaged section of the Harley Creek road would remain a sediment source due to inadequate filter zone and unstable road prism. No additional trail development in this watershed would mean no additional threat to WCT populations.

Hoover Creek – The adverse effects on WCT and other fish habitat from current trail use patterns would continue, despite the establishment of a non-motorized core area in the basin. Horse traffic would continue to impact the stream at many of the 50-plus crossings on perennial and intermittent channels in the watershed. Mixed traffic (motorbike and horse) on the mainstem trail would compound effects in the lower reach of Hoover Creek. Partial mitigation may be possible with trail relocation and reduction or improvement of stream crossing sites.

Dry Fork/Oti Park/Villars Creeks – Restriction of ATV travel to authorized roads and trails in the upper Dry Fork, and elimination of motorized use in the Oti Park/Villars Creek area would significantly reduce impacts to WCT habitats.

Bender Creek – Realignment and improved drainage of the Bender Creek trail would reduce erosion and sediment delivery to Bender Creek. The trail would be open to motorbikes but not to ATVs. Effects on WCT habitat would decrease.

Sawmill Gulch – The trail would remain non-motorized (no change from Alternative 1).

King and Harrison Creeks – As in the other action alternatives, trail closures in this area would account for the elimination of over 30 stream crossings and would greatly alleviate impacts to WCT habitats.

NF Running Wolf – Closing the last section of the road along the stream to motorized use (except for property owners) would reduce the adverse effects of multiple fords on a small isolated WCT population. (Note: New information indicates the road is under county jurisdiction and an inter-governmental agreement is needed to address access needs.)

Belt Creek headwaters and Jefferson Creek – Road crossings would decrease by 14 (33%) and riparian road and trail segments by about 2.5 miles (30%) due to elimination of nonsystem routes, but adverse effects on fisheries habitat from the main road and dispersed recreation sites in Jefferson Creek would continue.

Pilgrim Creek – There is no clear evidence of effects on fish habitat from motorbike use on this trail system. Restricting travel to non-motorized means is unlikely to significantly reduce trail impacts over foot and horse traffic. However, closing the area to motorized travel would reduce accessibility and therefore could increase security somewhat for the WCT population, although no specific threats appear to be imminent.

Upper South Fork Judith River and Deadhorse Creek – Conversion of most of the trail system along the SF Judith River, Deadhorse Creek and Russian Creek to non-motorized use would increase security for the fishery in this WCT restoration area. Other trail impacts are likely to remain unchanged unless horse travel increases, which would cause more sedimentation at the many crossing sites. The elimination of about 12 stream crossings in the watershed through decommissioning of excess roads is expected to further benefit WCT habitats.

Fourmile and SF Willow Creeks – While a new ATV loop would reduce WCT security and potentially increase sediment delivery for SF Willow Creek, restricting motorized use in the core areas of Richardson and Fourmile Creeks would increase security for the resident WCT populations.

2. Cumulative Effects

Cumulative effects on WCT would be reduced from the existing situation (described for Alternative 1) in proportion to the reduced impacts described above. WCT habitats in O'Brien Creek, King Creek, Harrison Creek, and upper South Fork Judith River would experience decreasing cumulative effects as the number of stream crossings is reduced with implementation of this travel plan alternative.

e. Winter Alternatives 1-3

1. Direct and Indirect Effects

Because winter routes are greatly restricted by snow and ground disturbance is generally not a concern for that time of year, effects of winter travel on water quality were not considered to be a significant issue for this analysis. Although snow compaction on recreational trails used by snowmobilers and skiers can alter local runoff patterns, the effects are considered minor in the context of natural events. Consequently, the effects of winter travel and recreation in the project area were not deemed to be a significant issue for westslope cutthroat trout. Streams are closed to fishing and generally unfishable (ice cover, cold water) during winter, so accessibility and security of sensitive fisheries is also not a concern.