

# **Rating Summaries for the Prioritization of Tributaries of the Upper Clark Fork River Basin for Fishery Enhancement**

Draft Final



**By:**

**Brad Liermann, Jason Lindstrom, Ladd Knotek and Pat Saffel**



**&**

**Tom Mostad and Carol Fox**



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# **Tributary Scoring Analysis**

## **PRIORITY 1**

**DRAINAGE:** German Gulch

**STREAM:** German Gulch

**REACH:** All

### **Value as a Recruitment/Restoration Fishery for Silver Bow Creek:**

**Species Present:** Westslope Cutthroat Trout, Brook Trout, and Rainbow Trout

**Fish Density/Number of Fish Produced:** Based on electrofishing conducted in 2008 and 2009, total trout densities are relatively high throughout much of German Gulch. However fish density does decline in the upper extent of the watershed where stream size and habitat quality are reduced. Throughout most of the stream, westslope cutthroat trout comprise much of the fish community. However, brook trout are also common throughout the lower half of the drainage. Rainbow trout have been observed in lower German Gulch during recent sampling, although at this time the species appears to be very rare.

**Recruitment to and Connectivity with Silver Bow Creek:** German Gulch is a direct tributary to Silver Bow Creek. Connectivity between the two streams is considered to be good, although an irrigation structure near the mouth of the stream can limit seasonal connectedness during periods of low flow. Nevertheless, given the relatively good densities of westslope cutthroat trout and brook trout in the stream, German Gulch is likely one of the most critical recruitment sources of fish for Silver Bow Creek.

**Current Value:** High

**Protection and Enhancement Value:** Very High

### **Value as a Tributary/Replacement Fishery:**

**Recreational Species Present:** Westslope Cutthroat Trout, Brook Trout, and Rainbow Trout

**Fish Density:** Based on electrofishing conducted in 2008 and 2009, total trout densities are relatively high throughout much of German Gulch. However fish density does decline in the upper extent of the watershed where stream size and habitat quality are reduced. Throughout most of the stream, westslope cutthroat trout comprise much of the fish community. However, brook trout are also common throughout the lower half of the drainage. Rainbow trout have been observed in lower German Gulch during recent sampling, although at this time the species appears to be very rare.

**Fish Size:** Catchable sized fish are present in relatively good numbers in German Gulch. While overall fish size tends to be relatively small, some individuals do reach a fairly large size. Westslope cutthroat trout tend to average about 5 to 6 inches in length although there are a number of fish present in the 9 to 11 inch range. The largest westslope cutthroat trout measured in German Gulch during recent sampling was 15 inches in total length. Brook trout have an average length of about 5 inches, and typically range up to about 8 or 9 inches in total length. However, brook trout as large as 16 inches have been observed during recent sampling.

**Recruitment to non Silver Bow Creek Fisheries:** N/A – German Gulch is a direct tributary to Silver Bow Creek.

***Current Value:*** Medium

***Protection and Enhancement Value:*** High

**Value as a Native Fishery:**

***Native Species Present:*** Westslope Cutthroat Trout

Genetic testing conducted in 1984 showed that German Gulch contained a pure strain of westslope cutthroat trout. However more recent sampling in 2002, 2003, and 2008 have indicated the population might now be slightly hybridized with rainbow trout. The relatively recent observations of rainbow trout in the stream support these more recent genetic results.

***Competitor and/or Hybridizing Species Present:*** Brook Trout and Rainbow Trout

Brook trout are relatively common throughout the lower reaches of German Gulch, and likely exert at least a moderate competitive pressure on westslope cutthroat trout where the species are sympatric. Rainbow trout also occur in German Gulch, but their densities appear to be very low. Nevertheless, the presence of the species appears to have compromised the genetic purity of westslope cutthroat trout in German Gulch.

Rainbow trout (along with brown trout) have been stocked in the Warm Springs Ponds for a number of years, but were long thought to be unable to reach German Gulch because Silver Bow Creek was considered too polluted for fish to inhabit. However, genetic testing in 2002 and 2003 found hybrids in the German Gulch drainage. The stocking policy at the Ponds has recently been changed, and beginning in 2009, only triploid (sterile) rainbow trout will be planted.

***Demographics and Connectivity:*** Westslope cutthroat trout presently exist in German Gulch in good densities and a diversity of age classes. This suggests the population is relatively strong. The largest westslope cutthroat trout measured in German Gulch during recent sampling was about 15 inches in total length.

German Gulch is a direct tributary to Silver Bow Creek. Connectivity between the two streams appears to be relatively good, although an irrigation structure near the mouth of

the stream can limit seasonal connectedness during periods of low flow. Nevertheless, it is likely that the stream supports fish with a migratory life history. Additionally, there are also several tributaries to Silver Bow Creek that sustain connected populations of westslope cutthroat trout. These include Browns Gulch and Blacktail Creek.

***Current Value: Medium***

***Protection and Enhancement Value: Medium***

**Habitat Description:**

**Habitat Quality:** Overall, habitat quality and riparian condition along German Gulch is mostly fair. Historic placer mining activity throughout much of the drainage has led to significant alterations to the channel and riparian zone in affected areas. The bulk of the available fish habitat consists of fast water riffles and pocket water. Other factors that have affected habitat quality to some extent in German Gulch are livestock grazing in the riparian zone, past timber harvest activities, and forest recreation. Additionally, water quality in the stream is somewhat impaired from the presence of the Beal Mountain Mine (no longer active) in the upper extent of the watershed. Past water quality monitoring downstream of the mine has shown elevated levels of cyanide and selenium above state water quality standards.

**Habitat Security:** Much of German Gulch flows through publicly owned lands administered by the U.S. Forest Service and the State of Montana (Mount Haggin Wildlife Management Area) where habitat security is generally considered to be fairly good. However, water quality is a major concern in this stream. The Beal Mountain Mine (no longer active) is situated at the head of the drainage and represents a significant risk to the aquatic health of German Gulch and Silver Bow Creek. Past water quality monitoring downstream of the mine has shown elevated levels of cyanide and selenium above state water quality standards. Additional factors that could potentially affect habitat security in German Gulch include livestock grazing in the riparian areas (much of the drainage is included in a Forest grazing allotment) and irrigation withdrawal. Only one active diversion is known to exist on German Gulch, but this diversion, which is located near the mouth of the stream, has the potential to completely dewater the lower 0.1 miles of the channel during periods of low flow. The George Grant Chapter of Trout Unlimited has sought to minimize this risk by working with the water rights holder to secure a 2 cfs in-stream flow agreement during the summer irrigation season. Additionally, a screen was installed in this ditch during the fall of 2008 to help prevent fish entrainment.

**DRAINAGE:** Little Blackfoot River

**STREAM:** Little Blackfoot River

**REACH:** Lower – Mouth to Telegraph Creek

### **Value as a Recruitment/Restoration Fishery for the Clark Fork River:**

**Species Present:** Brown Trout, Westslope Cutthroat Trout, and Brook Trout

**Fish Density/Number of Fish Produced:** Based on 2007 electrofishing, brown trout densities are relatively high in the Little Blackfoot River downstream of Telegraph Creek. Population estimates completed at two locations within the reach produced estimates of slightly over 1,000 brown trout greater than 6" (total length) per mile. Westslope cutthroat trout on the other hand, occur only rarely in the reach, and are primarily found in the upper portions. Similarly, brook trout are also relatively rare in the lower Little Blackfoot River.

**Recruitment to and Connectivity with the Clark Fork River:** The Little Blackfoot River is a large, direct tributary to the Clark Fork River, and is an extremely important spawning and rearing tributary for trout (especially brown trout) in the Clark Fork River. It is currently unknown how the many irrigation diversions on the lower river affect spawning movements and fish entrainment/loss.

**Current Value:** Very High

**Protection and Enhancement Value:** Very High

### **Value as a Tributary/Replacement Fishery:**

**Recreational Species Present:** Brown Trout, Westslope Cutthroat Trout, and Brook Trout

**Fish Density:** Based on 2007 electrofishing, brown trout densities are relatively high in the Little Blackfoot River downstream of Telegraph Creek. Population estimates completed at two locations within the reach produced estimates of slightly over 1,000 brown trout greater than 6 inches (total length) per mile. Westslope cutthroat trout on the other hand, occur only rarely in the reach, and are primarily found in the upper portions. Similarly, brook trout are also relatively rare in the lower Little Blackfoot River.

**Fish Size:** Brown trout comprise most of the trout composition in the lower Little Blackfoot River, and catchable size fish are rather abundant. Brown trout range in size from young-of-the-year to fish approximately 20 inches in length. The average length of brown trout captured in most 2007 electrofishing sections was approximately 10 inches. Westslope cutthroat trout, although rather rare, likely contribute an important component to the fishery in this reach. Fish handled in 2007 ranged up to 13 inches in length, although larger individuals are likely present. Brook trout are rare and site specific, likely contributing very little to the recreational fishery in this reach. The largest individual captured in 2007 was approximately 10 inches long.

**Recruitment to non Clark Fork River Fishery:** N/A – The Little Blackfoot River is a direct tributary to the Clark Fork River.

***Current Value:*** Very High

***Protection and Enhancement Value:*** Very High

**Value as a Native Fishery:**

**Native Species Present:** Westslope Cutthroat Trout.

Westslope cutthroat trout in the lower Little Blackfoot River have not been genetically tested, although phenotypic characteristics of handled fish suggest they are at least 95% pure.

**Competitor and/or Hybridizing Species Present:** Brown Trout and Brook Trout.

Brown trout are very abundant in the lower Little Blackfoot River, and are the dominant trout species in this reach. Competition/predation by brown trout is likely heavy for westslope cutthroat trout inhabiting this reach of the Little Blackfoot River. While brook trout are present, their abundance is low and their effect on westslope cutthroat trout is likely low. Rainbow trout, which are present in low densities in the upper Clark Fork River, have access to the Little Blackfoot River. However, none were captured during 2007 electrofishing.

**Demographics and Connectivity:** Based on sampling from 2007, the few westslope cutthroat trout captured in the lower Little Blackfoot River tended to be sub-adult and adult sized fish. No young-of-the-year were collected in the reaches sampled. Given these findings, it suggests that the lower extent of the Little Blackfoot River may not support a very viable westslope cutthroat trout population. It is probable that most of the fish present in the lower reaches of the river are out-migrants from tributaries or the upper Little Blackfoot River. Currently, the lower reaches of the river likely provide important juvenile rearing and adult habitat, which is somewhat limited by marginal habitat quality and the presence of high numbers of brown trout. Improvements to available habitat and water quality (i.e. increased summer flows and lower summer water temperatures) would likely enhance conditions for westslope cutthroat spawning and rearing in this reach, although competition with brown trout will continue to be a persistent problem.

In general, the lower Little Blackfoot River is well connected to the Clark Fork River and the upper Little Blackfoot River. Tributary connections within this reach are not well understood, and it is likely that many are isolated from the lower Little Blackfoot River via manmade barriers. There are many irrigation diversions in the lower segment of the Little Blackfoot River, but it is unclear how these diversions affect the movement and entrainment of westslope cutthroat trout.

***Current Value: Medium***

***Protection and Enhancement Value: Medium***

**Habitat Description:**

**Habitat Quality:** Overall, habitat quality and riparian condition in the lower Little Blackfoot River is fair, although some reaches do offer better than average fish habitat. Habitat quality has been affected by many factors including channelization from the railroad and Highway 12, and extensive hay production and livestock grazing/pasturing in the riparian zone. Water temperatures are of a concern in this reach and can reach upwards of 20° C (68° F) during the summer irrigation season.

**Habitat Security:** Almost the entirety of this reach lies on private lands used primarily for agricultural purposes including irrigated hay production and livestock grazing/pasturing. The nature of the ownership and land use makes habitat security a concern. Water diversions are very prevalent along the lower Little Blackfoot River, and the cumulative effect of these withdrawals can have notable impacts on summer flows in the lower extent of the river. Water temperatures are of concern in this reach, often climbing upwards of 20° C (68° F) during the summer irrigation season. There are also a number of abandoned mines in the upper Little Blackfoot drainage as well as in many of the connected tributaries. These old mine sites pose a potential threat to downstream water quality.

**DRAINAGE:** Racetrack Creek

**STREAM:** Racetrack Creek

**REACH:** Lower – Mouth to Falls above Forest Service Campground

### **Value as a Recruitment/Restoration Fishery for the Clark Fork River:**

**Species Present:** Brown Trout, Westslope Cutthroat Trout, Rainbow Trout, and Brook Trout

**Fish Density/Number of Fish Produced:** Trout densities in lower Racetrack Creek are somewhat variable, and range from relatively low to fairly high depending on location in the drainage. In the upper extent of the reach, brown trout and *Oncorhynchus* species (westslope cutthroat trout, rainbow trout, and their hybrids) make up the bulk of the fishery, with each appearing to occur in moderate densities. Brook trout are also present in the upper reaches of lower Racetrack Creek, although the species appears to be relatively uncommon. Closer to the mouth of the stream, electrofishing data from 2001 and 2002 shows that brown trout comprise the entire trout community in this portion of the stream, with densities appearing to be moderate to high. No recent electrofishing has been conducted in the middle portion of lower Racetrack Creek, as this segment of the stream is annually dewatered through much of the irrigation season.

**Recruitment to and Connectivity with the Clark Fork River:** Racetrack Creek is a direct tributary to the Clark Fork River, and is likely an important spawning and rearing tributary for trout in the Clark Fork River. The relatively high numbers of juvenile brown trout observed in the lower reaches of the stream during electrofishing in 2001 and 2002 suggests that the stream is an important recruitment source of brown trout. However, summer irrigation withdrawal that typically deters a large portion of the stream, as well as a number of fish movement impediments (i.e. diversions), likely limits the recruitment potential of lower Racetrack Creek.

***Current Value:*** High

***Protection and Enhancement Value:*** Very High

### **Value as a Tributary/Replacement Fishery:**

**Recreational Species Present:** Brown Trout, Westslope Cutthroat Trout, Rainbow Trout, and Brook Trout

**Fish Density:** Trout densities in lower Racetrack Creek are somewhat variable, and range from relatively low to fairly high depending on location in the drainage. In the upper extent of the reach, brown trout and *Oncorhynchus* species (westslope cutthroat trout, rainbow trout, and their hybrids) make up the bulk of the fishery, with each appearing to occur in moderate densities. Brook trout are also present in the upper reaches of lower Racetrack Creek, although the species appears to be relatively uncommon. Closer to the mouth of the stream, electrofishing data from 2001 and 2002 shows that brown trout comprise the entire trout community in this portion of the stream, with densities

appearing to be moderate to high. No recent electrofishing has been conducted in the middle portion of lower Racetrack Creek, as this segment of the stream is annually dewatered through much of the irrigation season.

**Fish Size:** Based on electrofishing conducted in 2007 and the early 2000's, fish of catchable size are rather common in parts of lower Racetrack Creek. In the upper portion of the reach sampled in 2007, *Oncorhynchus* species and brown trout had an average length of about 6 to 7 inches, with some fish reaching sizes of approximately 13 to 14 inches. As mentioned above, brook trout were not very common in this portion of the drainage, but the few present ranged in size from young-of-the-year to fish a little over 6 inches in length. Closer to the mouth of the stream, where brown trout dominate the fishery, fish as large as 17 inches in total length were measured during 2001 and 2002 sampling. However, many of the fish captured in these lower reaches appeared to be rather small juveniles, of which many were not of catchable size.

**Recruitment to non Clark Fork River Fishery:** N/A – Racetrack Creek is a direct tributary to the Clark Fork River.

**Current Value:** Medium

**Protection and Enhancement Value:** High

### **Value as a Native Fishery:**

**Native Species Present:** Westslope Cutthroat Trout

No genetic testing has been conducted on westslope cutthroat trout in lower Racetrack Creek. However, given the densities of rainbow trout in the stream, and the presence of obvious hybrids, it is reasonable to believe that genetic purity may be less than 90%.

Bull trout were historically present in lower Racetrack Creek, but recent electrofishing has failed to detect any. If future sampling detects bull trout in lower Racetrack Creek, scores will be adjusted accordingly.

**Competitor and/or Hybridizing Species Present:** Rainbow Trout, Brown Trout, and Brook Trout

Rainbow trout are rather common in lower Racetrack Creek and their presence has resulted in obvious hybridization among the westslope cutthroat trout population. Additionally, brown trout are also common in this portion of the drainage and likely exert a fairly heavy competitive pressure on the population as well. Brook trout occur in lower Racetrack Creek, but currently appear to be at low densities. Nevertheless, the presence of this species is of some concern for westslope cutthroat trout.

**Demographics and Connectivity:** Based on electrofishing conducted in 2007 and the early 2000's, westslope cutthroat trout appear to be largely restricted to the upper reaches of lower Racetrack Creek. However, many of the fish appear to be obvious hybrids with

rainbow trout. Nevertheless, the species occurs in moderate densities, and the observation of several different age classes of fish suggests that there is fairly regular recruitment to the population. The largest fish measured in lower Racetrack Creek in 2007 was about 13 inches in total length.

Racetrack Creek is a direct tributary to the Clark Fork River. However, summer irrigation withdrawal, as well as a number of fish movement impediments (i.e. diversions), limits the connectivity of the two streams. While it is possible for out-migrants to reach the Clark Fork River, and for migratory adults to return to the upper segment of the stream to spawn, the likelihood of this being a regular occurrence could be relatively low. Therefore, it is likely that fish with a resident life history and fish drifting down from upper Racetrack Creek (below the natural barrier at RM 13.0) maintain the westslope cutthroat trout population in lower portion of the stream.

***Current Value: Low***

***Protection and Enhancement Value: Low***

### **Habitat Description:**

**Habitat Quality:** Overall, habitat quality and riparian condition along lower Racetrack Creek is fair, with some segments of the stream ranging from poor to good depending on location in the drainage and time of year. The primary land uses that affect habitat quality in this segment of the watershed are irrigated hay and crop production, and livestock grazing and pasturing in the riparian zone. Irrigation withdrawal has the most notable effect on stream habitat during the summer months, as miles of lower Racetrack Creek (between Interstate 90 and the Upper Racetrack Road) are typically dried up during most years.

**Habitat Security:** Lower Racetrack Creek flows primarily through private lands used for agricultural purposes. Factors present in the drainage that could affect habitat security are irrigation withdrawal, livestock grazing in the riparian zone, and residential development. The nature of the ownership and land use makes habitat security a concern in much of lower Racetrack Creek.

**DRAINAGE:** Warm Springs Creek  
**STREAM:** Warm Springs Creek  
**REACH:** Lower – Mouth to Myers Dam

### **Value as a Recruitment/Restoration Fishery for the Clark Fork River:**

**Species Present:** Brown Trout, Westslope Cutthroat Trout, Rainbow Trout, and Brook Trout

**Fish Density/Number of Fish Produced:** Based on electrofishing conducted in 2007 and 2008, trout densities are fairly high in lower Warm Springs Creek. Brown trout are the primary species in the reach although *Oncorhynchus* species (westslope cutthroat trout, rainbow trout, and their hybrids) and brook trout are also present in rather low densities. These other species are most common in the upper extent of the reach, but still only comprise about 12% of the fish community combined (10% *Oncorhynchus* species, 2% brook trout) in this location. Population estimates were completed near river mile 1.8 in both 2007 and 2008, which generated estimates of around 1,300 brown trout greater than 6 inches (total length) per mile in both years. Catch-per-unit-effort values at upstream reaches (where population estimates were not conducted) were slightly less than those measured at river mile 1.8, but they still were indicative of relatively high brown trout abundance throughout the reach.

**Recruitment to and Connectivity with the Clark Fork River:** Warm Springs Creek is a large, direct tributary to the Clark Fork River. The lower reaches of the stream provide very important spawning and rearing habitat for trout (especially brown trout) in the Clark Fork. The reach is likely a major source of brown trout recruitment for the river.

**Current Value:** Very High

**Protection and Enhancement Value:** Very High

### **Value as a Tributary/Replacement Fishery:**

**Recreational Species Present:** Brown Trout, Westslope Cutthroat Trout, Rainbow Trout, and Brook Trout

**Fish Density:** Based on electrofishing conducted in 2007 and 2008, trout densities are fairly high in lower Warm Springs Creek. Brown trout are the primary species in the reach although *Oncorhynchus* species (westslope cutthroat trout, rainbow trout, and their hybrids) and brook trout are also present in rather low densities. These other species are most common in the upper extent of the reach, but still only comprise about 12% of the fish community combined (10% *Oncorhynchus* species, 2% brook trout) in this location. Population estimates were completed near river mile 1.8 in both 2007 and 2008, which generated estimates of around 1,300 brown trout greater than 6 inches (total length) per mile in both years. Catch-per-unit-effort values at upstream reaches (where population estimates were not conducted) were slightly less than those measured at river mile 1.8,

but they still were indicative of relatively high brown trout abundance throughout the reach.

**Fish Size:** Based on electrofishing conducted in 2007 and 2008, catchable size fish are rather common in lower Warm Springs Creek. Additionally some of the fish can attain a fairly good size. Brown trout, which are the primary species in the reach, range in size from young-of-the-year to fish approximately 21 inches in length. The average length of brown trout captured throughout the electrofishing sections was approximately 7 inches. *Oncorhynchus* species, although rather rare, likely contribute an important component to the fishery in this reach, especially in the upper extent where they tend to be more common. Fish handled during electrofishing ranged up to about 17 inches in length. Brook trout are rather rare in upper Warm Springs Creek, and contribute relatively little to the recreational fishery. Nevertheless, the largest individual captured during our sampling was approximately 9 inches long.

**Recruitment to non Clark Fork River Fishery:** N/A – Warm Springs Creek is a direct tributary to the Clark Fork River.

***Current Value: High***

***Protection and Enhancement Value: High***

### **Value as a Native Fishery:**

**Native Species Present:** Westslope Cutthroat Trout

No genetic testing has been conducted on westslope cutthroat trout in lower Warm Springs Creek. However, given the densities of rainbow trout in the stream, and the presence of obvious hybrids, it is reasonable to believe that genetic purity may be less than 90%.

Bull trout have been reported in the upper reaches of lower Warm Springs Creek in the past, but population density appears to be very low. It is likely that fish in this reach are incidental migrants from upper Warm Springs Creek (and its connected tributaries). If future sampling in lower Warm Springs Creek begins to turn up bull trout on a regular basis, the ranking will be adjusted accordingly.

**Competitor and/or Hybridizing Species Present:** Brown Trout, Rainbow Trout, and Brook Trout

Brown trout are very abundant in lower Warm Springs Creek, and are the dominant trout species in this reach. Competition and predation by brown trout is likely heavy for westslope cutthroat trout inhabiting this reach of the stream. Additionally, rainbow trout are present in lower Warm Springs Creek and their presence has resulted in obvious hybridization among the westslope cutthroat trout population. While brook trout are also present in the reach, their abundance is low and their effect on westslope cutthroat trout is likely low at this time.

**Demographics and Connectivity:** Based on electrofishing conducted in 2007 and 2008, westslope cutthroat trout appear to be mostly limited to the upper reaches of lower Warm Springs Creek. While fish do occur throughout the reach, the species is only incidental in the lower segments. Even in the upper portion of the reach where fish are more common, population density still appears to be relatively low. Additionally, some of the fish appear to be obvious hybrids with rainbow trout. While some juvenile age classes were observed during our sampling below Myers Dam in 2007, the majority of westslope cutthroat trout in the sample section appeared to be of larger, older size classes. The largest fish measured (that appeared to be a westslope cutthroat trout) was about 16 inches in total length.

In general, lower Warm Springs Creek is well connected to the Clark Fork River. Migratory fish that may originate from the reach appear to be able to return and spawn. However, migration above this reach into upper Warm Springs Creek may be somewhat restricted by the presence of Myers Dam. This diversion structure, which is located at river mile 16.6, appears to be at least a partial barrier to upstream fish movement.

***Current Value: Medium***

***Protection and Enhancement Value: Medium***

## **Habitat Description:**

**Habitat Quality:** Overall, habitat quality and riparian condition in lower Warm Springs Creek is relatively good. However, some portions of the reach show impacts from past mining activity, urbanization, and livestock grazing in the riparian zone. Past mining activity near Anaconda led to several areas of channelization as well as significant deposits of mine wastes along much of lower Warm Springs Creek. The presence of these deposits has affected riparian vegetation in some areas, and also presents a danger to overall water quality and fish health in the reach. In the upper portion of the reach, Warm Springs Creek flows through the communities of Anaconda and the West Valley. In these areas, residential development and urbanization has impacted stream and riparian habitat in a number of locations, mostly from riparian clearing and bank stabilization efforts (i.e. riprap). Livestock grazing is rather limited in this portion of the drainage, but where cattle do have access to the stream, impacts to streambank stability and riparian vegetation are evident (though not particularly widespread or severe). While this reach does have several major irrigation diversions in it, in-stream flows do not limit the fishery. Recent in-stream flow agreements made with upstream water users have led to fairly good summer base flows throughout the entire reach of lower Warm Springs Creek.

**Habitat Security:** Much of lower Warm Springs Creek flows through private lands used for residential and agricultural purposes. The nature of the ownership and land use poses some concerns for habitat security in much of the reach. However, the greatest threat to habitat security in lower Warm Springs Creek may be the presence of mine wastes along the stream. The presence of these deposits threatens water quality throughout much of the

reach. Cleanup activities associated with Superfund will address many of these deposits, but it is unlikely that all of the contamination will be able to be completely remediated.

## PRIORITY – 2

**DRAINAGE:** Flint Creek

**STREAM:** Boulder Creek

**REACH:** Entire stream

### **Value as a Recruitment/Restoration Fishery for the Clark Fork River:**

**Species Present:** Westslope Cutthroat Trout, Brown Trout, Brook Trout

**Fish Density/Number of Fish Produced:** Westslope cutthroat trout occur in moderate densities throughout most of Boulder Creek drainage. Brown trout are found in relatively low densities throughout most of the upper portion of the drainage and appear to be moderately abundant in the lower portion of the drainage (i.e. lower 3 miles). Brook trout are found only in the middle portion of the drainage and appear to maintain relatively low densities.

**Recruitment to and Connectivity with the Clark Fork River:** Boulder Creek likely provides a moderate amount of recruitment to the Clark Fork River. Electrofishing surveys indicate that migratory sized brown trout are present in the drainage and a portion of these fish likely out-migrate to the Clark Fork River. Some westslope cutthroat trout also likely out-migrate from Boulder Creek to the Clark Fork River. Connectivity between Boulder Creek and the Clark Fork River appears to be good other than potential seasonal fish passage issues at some diversion dams in lower mainstem Flint Creek. The effects these dams have on connectivity and fish passage are unclear at this point; however the results of a recent radio telemetry study indicate that these dams are at least seasonally passable by migrating adult salmonids.

**Current Value:** High

**Protection and Enhancement Value:** High

### **Value as a Tributary/Replacement Fishery:**

**Recreational Species Present:** Westslope Cutthroat Trout, Brown Trout, Brook Trout

**Fish Density:** Westslope cutthroat trout occur in moderate densities throughout most of Boulder Creek drainage. Brown trout are found in relatively low densities throughout most of the upper portion of the drainage and appear to be moderately abundant in the lower portion of the drainage (i.e. lower 3 miles). Brook trout are found only in the middle portion of the drainage and appear to maintain relatively low densities.

**Fish Size:** Fish size in Boulder Creek is relatively good for the size of the drainage. Westslope cutthroat trout greater than 14" were captured in the two lowest electrofishing sections on Boulder Creek and westslope cutthroat trout as large as 13" were captured at river mile 7.7. Relatively large brown trout were also observed in the Boulder Creek drainage with the maximum length of brown trout captured at the three lowest

electrofishing sections ranging from 15.5" to 16". The few brook trout sampled in the Boulder Creek were relatively small (average = 6", maximum = 7.5") and likely do not provide much for recreational fishing opportunities.

**Recruitment to non Clark Fork River Fisheries:** Boulder Creek likely provides a significant amount of recruitment to the Flint Creek fishery. A relatively large number of brown trout were sampled in the lower portion of the Boulder Creek drainage and a portion of these fish likely out-migrate to Flint Creek and later return to spawn as adults. Brown trout greater than 16" were sampled in lower portions of Boulder Creek and it is likely that these fish would not get this large without spending a portion of their life in Flint Creek or other larger stream systems. Westslope cutthroat also likely provide some recruitment to Flint Creek, although electrofishing surveys in Flint Creek indicate that westslope cutthroat trout do not represent a significant portion of the recreational fishery.

***Current Value: High***

***Protection and Enhancement Value: High***

**Value as a Native Fishery:**

**Native Species Present:** Bull trout are relatively abundant in the Boulder Creek drainage. Bull trout were captured at all five sections sampled in the drainage and densities were relatively high in the upper portion of the drainage. Redd surveys have been conducted in the Boulder Creek drainage for several years documenting continued reproduction of bull trout in the drainage.

Westslope cutthroat trout are also relatively abundant in the Boulder Creek drainage. Similar to bull trout, westslope cutthroat trout were captured at every site sampled in the drainage and maintained good densities even in the lower portion of the drainage. Genetic testing was completed for westslope cutthroat trout in the upper portion of Boulder Creek in 2008 and alleles characteristic of both westslope cutthroat trout and Yellowstone cutthroat trout were detected (only one fish had Yellowstone cutthroat trout alleles).

**Competitor and/or Hybridizing Species Present:** Both brown and brook trout are present in the Boulder Creek drainage. Brown trout are relatively abundant in the lower portion of the drainage and likely compete with and prey upon native bull and westslope cutthroat trout. Brook trout are found in low densities in the middle portion of the drainage and due to their low abundance, represent only a minor competitive threat to native bull and westslope cutthroat and a minor hybridization threat to bull trout. Genetic analysis conducted on westslope cutthroat trout in the upper portion of Boulder Creek indicate that some hybridization with Yellowstone cutthroat trout has occurred in the drainage. It is suspected that this threat is minimal due to the low number of fish that demonstrated hybridization during genetic analysis (1 out of 25).

**Demographics and Connectivity:** Both bull trout and westslope cutthroat trout maintain good densities and likely a healthy number of spawning adults in Boulder

Creek. Multiple age classes of both bull and westslope cutthroat trout were also observed with some age 0 bull trout also being captured. Bull trout in Boulder Creek do have demographic risks, as this population is the only bull trout population left in the Flint Creek drainage. If a large event occurred in the Boulder Creek drainage (i.e. large fire) that caused the bull trout population to decline or disappear, there are no founder populations in the Flint Creek drainage to replace it. However, with the current size of the population based on electrofishing surveys, it is unlikely that this would occur. Minimal land use currently occurs in the drainage and thus habitat conditions for both bull and westslope cutthroat trout are relatively stable in the drainage.

***Current Value:*** Very High

***Protection and Enhancement Value:*** Very High

### **Habitat Description:**

**Habitat Quality:** Habitat quality is considered quite good in the Boulder Creek drainage. A large portion of the Boulder Creek drainage is located within Forest Service land ownership. A majority of the Boulder Creek drainage maintains a thick forest canopy, which limits its value for grazing and subsequently limits potential habitat degradation caused by grazing impacts. Historic mining is apparent throughout the Boulder Creek drainage and some impacts on fish habitat were observed however this degradation generally only affected fish habitat on a small scale and did not have drainage-wide impacts. Several small ditches were observed in the lower portion of the Boulder Creek drainage; however in-stream flows are excellent throughout the drainage.

**Habitat Security:** A majority of the Boulder Creek drainage is located within the Beaverhead-Deerlodge National Forest and thus habitat security is generally quite good. Land use impacts that risk the security of fish habitat are also minimal with very little grazing, irrigation withdrawal, or other land use impacts currently occurring within the Boulder Creek drainage. Residential development near Boulder Creek has been relatively high in the lower portion of the drainage near Maxville; however a majority of this land has been subdivided with residents already in place. Thus further development is likely minimal. The residential development in the lower portion of the drainage represents a small portion of the entire drainage.

**DRAINAGE:** Cottonwood Creek

**STREAM:** Cottonwood Creek

**REACH:** Lower – Mouth to Confluence with Baggs Creek

### **Value as a Recruitment/Restoration Fishery for the Clark Fork River:**

**Species Present:** Brown Trout and Brook Trout

**Fish Density/Number of Fish Produced:** Based on 2007 electrofishing, fish density is rather variable in lower Cottonwood Creek. In the lower extent of the reach (downstream of Interstate 90), brown trout comprise the entire trout community and are present in moderate densities. In the upper portions of the reach (upstream of Interstate 90), fish density is very low and is comprised mostly of brook trout and a few brown trout.

**Recruitment to and Connectivity with the Clark Fork River:** Cottonwood Creek is a rather significant tributary to the Clark Fork River. However, annual irrigation withdrawal and a number of fish movement impediments (e.g. Kohrs-Manning Diversion, Interstate 90 culverts, etc.) have limited the recruitment value of the lower part of the drainage. While it is likely that the very lower extent of the stream (downstream of Interstate 90) provides a modest source of brown trout recruitment to the Clark Fork River, the reach overall is not likely at its potential.

**Current Value:** Medium

**Protection and Enhancement Value:** High

### **Value as a Tributary/Replacement Fishery:**

**Recreational Species Present:** Brown Trout and Brook Trout

**Fish Density:** Based on 2007 electrofishing, fish density is rather variable in lower Cottonwood Creek. In the lower extent of the reach (downstream of Interstate 90), brown trout comprise the entire trout community and are present in moderate densities. In the upper portions of the reach (upstream of Interstate 90), fish density is very low and is comprised mostly of brook trout and a few brown trout.

**Fish Size:** Similar to density, fish size is also variable in lower Cottonwood Creek. In the lower segment of the reach (downstream of Interstate 90) where brown trout occur in moderate densities, catchable sized fish are fairly common. Based on 2007 electrofishing, the average size of brown trout in this portion of the reach is about 7 inches, with some fish reaching lengths of up to about 17 inches. In contrast, in the upper portion of the reach (upstream of Interstate 90), fish appear to be smaller in size with both brook trout and brown trout reaching maximum lengths of about 7 inches. However, it should be noted that only a handful of fish were captured in this segment of the stream during our 2007 sampling effort.

**Recruitment to non Clark Fork River Fishery:** N/A – Cottonwood Creek is a direct tributary to the Clark Fork River.

***Current Value:*** Medium

***Protection and Enhancement Value:*** High

**Value as a Native Fishery:**

**Native Species Present:** None detected.

**Competitor and/or Hybridizing Species Present:** Brown Trout and Brook Trout

Brown trout are relatively common in the downstream segments of lower Cottonwood Creek, and are a significant competitive threat to native trout in this reach. Additionally, brook trout are also present in the upper portions of the reach, although densities appear to be fairly low. Nevertheless, the presence of this species is somewhat of a concern for native trout viability in lower Cottonwood Creek.

**Demographics and Connectivity:** No native trout were detected in lower Cottonwood Creek during 2007 electrofishing. However, westslope cutthroat trout are present in moderate densities in the upper portion of the drainage, and have open access to the lower reaches of the stream. Marginal habitat conditions (low seasonal flows) and numerous migration obstacles (e.g. diversions, Interstate 90 culverts, etc.) likely restrict the use of lower Cottonwood Creek by both resident as well as migratory westslope cutthroat trout. Nevertheless, Cottonwood Creek is a rather significant tributary to the Clark Fork River, and there is potential for the lower portion of the drainage to support native trout if habitat and connectivity issues can be adequately addressed.

***Current Value:*** Low

***Protection and Enhancement Value:*** Medium

**Habitat Description:**

**Habitat Quality:** Habitat quality along lower Cottonwood Creek is considered fair at best. In the lower portion of the reach, the stream flows through the city of Deer Lodge where it has been extensively urbanized. Upstream of Deer Lodge, the channel is bounded by lands used primarily for livestock grazing and rural residential development. While all of these land uses have negatively affected habitat quality to some extent, the most significant impacts to fish habitat in lower Cottonwood Creek are associated with irrigation withdrawal. Numerous diversions are located throughout this reach, and flows in Cottonwood Creek are typically very low during the irrigation season. Several segments of the channel are often annually dewatered, and water temperatures near the mouth of the stream can reach upwards of 20° C (68° F) during the summer irrigation season.

**Habitat Security:** Lower Cottonwood Creek flows primarily through private lands used for agricultural and residential purposes. Public ownership along this segment of the stream is limited to the lower 0.3 miles of channel where it flows through the Grant Kohrs Ranch administered by the National Park Service. Factors present in the drainage that could affect habitat security are irrigation withdrawal, livestock grazing in the riparian zone, further urbanization, and additional residential sub-development. The nature of the ownership and land use makes habitat security a concern in lower Cottonwood Creek.

**DRAINAGE:** Dempsey Creek

**STREAM:** Dempsey Creek

**REACH:** Lower – Mouth to Confluence with North Fork Dempsey Creek

### **Value as a Recruitment/Restoration Fishery for the Clark Fork River:**

**Species Present:** Brown Trout and Brook Trout

**Fish Density/Number of Fish Produced:** Based on limited electrofishing in 2008, fish density appears to be somewhat variable along lower Dempsey Creek, and is likely correlated with irrigation withdrawal. At one sample reach, brown trout were found to comprise much of the trout community, and the species was present in moderate densities. Brook trout were also shown to be present, but did not appear to be very common. At another sample reach a little farther downstream, no fish of any kind were observed. It was later discovered that this reach is annually dewatered during the irrigation season.

**Recruitment to and Connectivity with the Clark Fork River:** Dempsey Creek is a tributary to the Clark Fork River. However, connectivity between the two streams is not fully understood. Near its mouth, the stream flows into an unscreened irrigation ditch that originates off the river near Sager Lane. Downstream of the confluence with this ditch, Dempsey Creek seems to enter a rather marshy area. While there does appear to be surface connection to the river, this area may pose movement impediments to fish moving into and out of lower Dempsey Creek (this area has not been fully evaluated in the field). In addition to the marginal connectivity at the mouth, annual irrigation withdrawal and marginal habitat quality have limited the recruitment value of lower Dempsey Creek. While it is likely that the reach provides some brown trout recruitment to the Clark Fork River, the stream is not likely at its potential.

**Current Value:** Medium

**Protection and Enhancement Value:** High

### **Value as a Tributary/Replacement Fishery:**

**Recreational Species Present:** Brown Trout and Brook Trout

**Fish Density:** Based on limited electrofishing in 2008, fish density appears to be somewhat variable along lower Dempsey Creek, and is likely correlated with irrigation withdrawal. At one sample reach, brown trout were found to comprise much of the trout community, and the species was present in moderate densities. Brook trout were also shown to be present, but did not appear to be very common. At another sample reach a little farther downstream, no fish of any kind were observed. It was later discovered that this reach is annually dewatered during the irrigation season.

**Fish Size:** Based on limited electrofishing in 2008, catchable size fish occur in fair numbers in lower Dempsey Creek (where fish are present). At the one site sampled where

fish were found, brown trout averaged approximately 8 inches in length, with fish as long as 15 inches noted in the reach. Only one brook trout was captured during 2008 sampling, and this fish was approximately 8 inches in total length.

**Recruitment to non Clark Fork River Fishery:** N/A – Dempsey Creek is a tributary to the Clark Fork River.

***Current Value: Medium***

***Protection and Enhancement Value: High***

**Value as a Native Fishery:**

**Native Species Present:** None detected.

**Competitor and/or Hybridizing Species Present:** Brown Trout and Brook Trout

Based on limited electrofishing in 2008, brown trout appear to be fairly common in lower Dempsey Creek. Brook trout are also present in this part of the drainage, although densities appear to be relatively low. The presence of these species in lower Dempsey Creek is a concern for native trout.

**Demographics and Connectivity:** No native trout were detected in lower Dempsey Creek during 2008 electrofishing. However, westslope cutthroat trout are present in fair densities in the upper portion of the drainage, and appear to have open access to the lower reaches of the stream.

Dempsey Creek is a tributary to the Clark Fork River. However, connectivity between the two streams is not fully understood. Near its mouth, the stream flows into an unscreened irrigation ditch that originates off the river near Sager Lane. Downstream of the confluence with this ditch, Dempsey Creek seems to enter a rather marshy area. While there does appear to be surface connection to the river, this area may pose movement impediments to fish moving into and out of lower Dempsey Creek (this area has not fully been evaluated in the field).

***Current Value: Very Low***

***Protection and Enhancement Value: Low***

**Habitat Description:**

**Habitat Quality:** Habitat quality and riparian condition along lower Dempsey Creek is fair to poor. The stream flows extensively through irrigated hay meadows and livestock pastures where stream and riparian habitat has been fairly altered. Woody riparian vegetation along the channel tends to be absent or patchy, and the lack of woody vegetation has reduced stream shading and habitat complexity, as well as increased sedimentation by making the streambanks more susceptible to erosion. Additionally,

there are a number of irrigation diversions present in this reach that can severely impact summer base flows during the irrigation season. Water temperatures within the reach can reach upwards of 20° C (68° F) during the summer season.

**Habitat Security:** Lower Dempsey Creek flows primarily through private lands except where it crosses property managed by the Montana State Prison. Factors present throughout this reach that could affect habitat security include extensive hay production, irrigation withdrawal, livestock grazing in the riparian zone, and residential sub-development. The nature of the ownership and land use makes habitat security a concern in lower Dempsey Creek.

**DRAINAGE:** Little Blackfoot River

**STREAM:** Dog Creek

**REACH:** All

### **Value as a Recruitment/Restoration Fishery for the Clark Fork River:**

**Species Present:** Brown Trout and Westslope Cutthroat Trout

**Fish Density/Number of Fish Produced:** Based on 2007 electrofishing, total trout density tends to be fairly high in much of Dog Creek. Throughout most of the stream brown trout comprise a large amount of the fishery, with westslope cutthroat trout also present in relatively low densities. The only part of the stream that doesn't fit this general pattern is the upper most reach. In this area, westslope cutthroat trout dominate the species composition, and are present in more moderate densities. Brown trout are also present in the upper reaches of Dog Creek, but tend to be fairly uncommon.

**Recruitment to and Connectivity with the Clark Fork River:** Dog Creek is a rather large, well-connected tributary to the Little Blackfoot River. Given the relative densities of brown trout and westslope cutthroat trout in the stream, it likely provides an important source of recruitment for the Little Blackfoot River and possibly the Clark Fork River as well.

**Current Value:** Medium

**Protection and Enhancement Value:** High

### **Value as a Tributary/Replacement Fishery:**

**Recreational Species Present:** Brown Trout and Westslope Cutthroat Trout

**Fish Density:** Based on 2007 electrofishing, total trout density tends to be fairly high in much of Dog Creek. Throughout most of the stream brown trout comprise a large amount of the fishery, with westslope cutthroat trout also present in relatively low densities. The only part of the stream that doesn't fit this general pattern is the upper most reach. In this area, westslope cutthroat trout dominate the species composition, and are present in more moderate densities. Brown trout are also present in the upper reaches of Dog Creek, but tend to be fairly uncommon.

**Fish Size:** Based on 2007 electrofishing at four sample sites, catchable size fish are present in relatively good numbers throughout most of Dog Creek. While on average westslope cutthroat trout tend to be slightly larger than brown trout, brown trout have the propensity to obtain a much larger maximum size. At most of the sample sites, brown trout averaged about 5 to 6 inches in total length, but some fish reached lengths of up to 17 inches. Westslope cutthroat trout averaged about 6 to 7 inches in total length, with maximum fish size being about 11 inches.

**Recruitment to non Clark Fork River Fishery:** Dog Creek is a rather large, well-connected tributary to the Little Blackfoot River. Given the relative densities of brown trout and westslope cutthroat trout in the stream, it likely provides an important source of recruitment for the Little Blackfoot River.

***Current Value: Medium***

***Protection and Enhancement Value: High***

### **Value as a Native Fishery:**

**Native Species Present:** Westslope Cutthroat Trout

Genetic tests of westslope cutthroat trout collected throughout Dog Creek in 2007 suggest that the population is genetically pure.

**Competitor and/or Hybridizing Species Present:** Brown Trout

Brown trout are relatively common throughout much of Dog Creek, and likely compete with, and prey on, westslope cutthroat trout fairly heavily.

**Demographics and Connectivity:** Based on 2007 electrofishing, westslope cutthroat trout are present in relatively low densities throughout much of Dog Creek. However, at most sample sites multiple size classes were present, which included fish ranging from young-of-the-year to potential adults (i.e. > 6" total length). The largest westslope cutthroat trout captured in Dog Creek during 2007 electrofishing was about 11 inches in total length.

Dog Creek is a rather large, well-connected tributary to the Little Blackfoot River. The stream likely provides important spawning and rearing habitat for westslope cutthroat trout with both resident and migratory life history patterns.

***Current Value: Medium***

***Protection and Enhancement Value: Medium***

### **Habitat Description:**

**Habitat Quality:** Overall, habitat quality and riparian condition along Dog Creek is fair, with some segments of the stream ranging from poor to good depending on location in the drainage. The drainage is rather large and habitat quality has been affected by a number of factors. Among these are widespread livestock grazing in the riparian areas, channelization from the railroad, timber harvest activities, irrigated hay and pasture production, recreational use (including a few private cabin sites), and past mining. Water temperatures are of a concern throughout much of Dog Creek, and can reach upwards of 20° C (68° F) during the summer season.

**Habitat Security:** Lands along Dog Creek are primarily in private ownership. While there are publicly owned lands in the upper portion of the watershed that are administered by the Bureau of Land Management and the U.S. Forest Service, numerous privately owned mining claims encompass most of the upper stream length. The primary land uses in the Dog Creek drainage include cattle grazing, timber harvest, irrigated hay and pasture production, recreation, and historic mining. The nature of the ownership and land use makes habitat security a concern throughout most of the drainage.

**DRAINAGE:** Gold Creek

**STREAM:** Gold Creek

**REACH:** Lower – Mouth to Confluence with North Fork Gold Creek

### **Value as a Recruitment/Restoration Fishery for the Clark Fork River:**

**Species Present:** Brown Trout and Westslope Cutthroat Trout

**Fish Density/Number of Fish Produced:** Based on 2007 electrofishing, brown trout are common in lower Gold Creek, but are noticeably more abundant closer to the mouth. Westslope cutthroat trout occur only rarely near the mouth, but are relatively abundant farther upstream. Good densities of juvenile fish in the reach suggest that lower Gold Creek is an important spawning and early rearing tributary.

**Recruitment to and Connectivity with the Clark Fork River:** Gold Creek is well connected to the Clark Fork River and is one of the largest tributaries entering the river between the confluences of Flint Creek and the Little Blackfoot River. As mentioned above, good densities of juvenile fish in the reaches sampled in 2007 suggest that lower Gold Creek is an important spawning and early rearing tributary for Clark Fork River trout.

*Current Value: High*

*Protection and Enhancement Value: High*

### **Value as a Tributary/Replacement Fishery:**

**Recreational Species Present:** Brown Trout and Westslope Cutthroat Trout

**Fish Density:** Based on 2007 electrofishing, brown trout are common in lower Gold Creek, but are noticeably more abundant closer to the mouth. Westslope cutthroat trout occur only rarely near the mouth, but are relatively abundant farther upstream.

**Fish Size:** Based on 2007 sampling, catchable sized fish are present in fair numbers in lower Gold Creek. Brown trout as large as 21 inches in total length were captured, although fish of this size were likely migratory fish from the Clark Fork River. The average size (total length) of brown trout in the two sampled reaches was about 5 inches, though high densities of smaller, juvenile fish (especially at the site closer to the mouth) helped to reduce the average fish size. Westslope cutthroat trout in the reach were found to be as large as 11 inches in total length, with the average size being about 5 inches.

**Recruitment to non Clark Fork River Fishery:** N/A

*Current Value: High*

*Protection and Enhancement Value: High*

### **Value as a Native Fishery:**

**Native Species Present:** Westslope Cutthroat Trout.

Genetic testing conducted in 2007 suggests that the westslope cutthroat trout population in lower Gold Creek is hybridized with rainbow trout, although the predominant genetic contribution (99.7%) was found to be from westslope cutthroat trout.

**Competitor and/or Hybridizing Species Present:** Brown Trout.

Brown trout are very common in lower Gold Creek and likely exert heavy competition and predation on westslope cutthroat trout. This appears to be especially true in the lower portion of the reach where brown trout density seems to be at its highest. This issue is likely to be persistent and would make managing exclusively for westslope cutthroat trout impractical.

**Demographics and Connectivity:** Fish sampling was completed at two sections of lower Gold Creek in 2007. At the lowest site sampled, close to the mouth, westslope cutthroat trout were very rare. The ones captured in the reach were between 8 inches and 11 inches in total length, and were large enough to be resident adults, or possibly juveniles with a migratory life history. Farther upstream in the upper portion of the reach, the species was relatively abundant. Multiple size classes were present, which included young-of-the-year and fish capable of being resident adults (i.e. > 6 inches total length).

Gold Creek is well connected to the Clark Fork River and is one of the largest tributaries entering the river between the confluences of Flint Creek and the Little Blackfoot River. Good densities of juvenile westslope cutthroat trout in the upper portion of the reach suggests that lower Gold Creek is an important spawning and early rearing tributary for westslope cutthroat trout. It is highly likely that some westslope cutthroat trout in Gold Creek exhibit a more migratory life history, using both Gold Creek as well as the Clark Fork River.

**Current Value:** Medium

**Protection and Enhancement Value:** Medium

### **Habitat Description:**

**Habitat Quality:** Habitat quality in lower Gold Creek ranges from fair to good with habitat appearing to be in better condition (and close to potential) higher in the reach. Habitat quality in the reach has been affected by several factors including livestock grazing/pasturing in the riparian zone, and rather significant irrigation withdrawal for hay production. Several irrigation diversions are present within the stream segment that can greatly reduce streamflow during marginal flow years.

**DRAINAGE:** Little Blackfoot River

**STREAM:** Little Blackfoot River

**REACH:** Upper – Telegraph Creek to Headwaters

### **Value as a Recruitment/Restoration Fishery for the Clark Fork River:**

**Species Present:** Westslope Cutthroat Trout, Brown Trout, and Brook Trout

**Fish Density/Number of Fish Produced:** Westslope cutthroat trout occur at fairly good densities in the upper Little Blackfoot River. Electrofishing conducted at four sample sections between 2007 and 2008 showed that the species was relatively common and comprised over 50% of the trout community at all of the sites sampled. Brown trout are also relatively common throughout much of the upper Little Blackfoot River, although their density seems to decline upstream of the Ontario Creek confluence. Brook trout, while uncommon throughout much of the upper river, increase in abundance closer to the headwaters. At the most upstream section sampled near Kading Campground in 2007, brook trout comprised 44% of the trout community.

**Recruitment to and Connectivity with the Clark Fork River:** The Little Blackfoot River is a direct tributary to the Clark Fork River, and is likely an extremely important spawning and rearing tributary for trout in the Clark Fork River. It is currently unknown how the many irrigation diversions on the lower Little Blackfoot River affect spawning movements and fish entrainment/loss.

**Current Value:** High

**Protection and Enhancement Value:** High

### **Value as a Tributary/Replacement Fishery:**

**Recreational Species Present:** Westslope Cutthroat Trout, Brown Trout, and Brook Trout

**Fish Density:** Westslope cutthroat trout occur at fairly good densities in the upper Little Blackfoot River. Electrofishing conducted at four sample sections between 2007 and 2008 showed that the species was relatively common and comprised over 50% of the trout community at all of the sites sampled. Brown trout are also relatively common throughout much of the upper Little Blackfoot River, although their density seems to decline upstream of the Ontario Creek confluence. Brook trout, while uncommon throughout much of the upper river, increase in abundance closer to the headwaters. At the most upstream section sampled near Kading Campground in 2007, brook trout comprised 44% of the trout community.

**Fish Size:** Based on electrofishing results from four sections of the upper Little Blackfoot River sampled between 2007 and 2008, catchable sized fish are rather common throughout the reach. Westslope cutthroat trout range in size up to approximately 10 inches in length, with the average size being about 6 inches. Brown trout can attain sizes

of approximately 15 inches in length, although the average length throughout the reach tends to be closer to 5 inches. Brook trout have been found to be as large as 11 inches, but the average length is around 5 inches.

**Recruitment to non Clark Fork River Fishery:** N/A – The Little Blackfoot River is a direct tributary to the Clark Fork River.

***Current Value: High***

***Protection and Enhancement Value: High***

### **Value as a Native Fishery:**

**Native Species Present:** Westslope Cutthroat Trout.

Genetic tests conducted in 1989 showed that westslope cutthroat trout collected near Kading Campground were 100% pure. Additional samples were collected from a broader area from 2007 to 2008, and genetic purity of westslope cutthroat trout in the reach was again confirmed.

Bull trout were historically present in the upper Little Blackfoot River, but electrofishing in 2007 and 2008 failed to detect any. The last bull trout handled or observed by professional fisheries biologist in the upper Little Blackfoot drainage was approximately 10 years ago. Efforts will be continued to document whether this species is still present in the drainage. If future sampling detects bull trout in the upper Little Blackfoot River, scores will be adjusted accordingly.

**Competitor and/or Hybridizing Species Present:** Brown Trout and Brook Trout.

Brown trout are relatively common throughout much of the upper Little Blackfoot River, and likely compete with, and prey on, westslope cutthroat trout. Closer to the headwaters, brown trout become rare but brook trout seem to replace them in abundance. Brook trout likely compete with westslope cutthroat trout in these areas.

**Demographics and Connectivity:** Westslope cutthroat trout occur at fairly good densities and in a diversity of age classes (including young-of-the-year) throughout the upper Little Blackfoot River. This suggests that the population is viable. Electrofishing conducted at four sample sections between 2007 and 2008 showed that the species comprised over 50% of the trout community at all of the sites sampled. While it appears that westslope cutthroat trout are currently the dominant species in the reach, it is uncertain if this pattern is stable, or if it is trending downward over time.

In general, the upper Little Blackfoot River is well connected to the lower Little Blackfoot River and the Clark Fork River. Tributary connections within this reach are not completely understood, but it is likely that some are isolated via manmade barriers (e.g. Slate Creek). Additionally, there are many irrigation diversions in the lower Little

Blackfoot River, although it is unclear how these diversions affect the movement and entrainment of westslope cutthroat trout originating in the upper portion of the river.

***Current Value: High***

***Protection and Enhancement Value: High***

**Habitat Description:**

**Habitat Quality:** Habitat quality in the upper Little Blackfoot River ranges from fair to relatively good, with habitat quality tending to increase progressively in an upstream direction. Habitat quality has been affected by a number of factors including roads, recreational use, timber harvest, residential development, and historic mining. Water temperature is somewhat of a concern in the lower portion of this reach, as maximum summer temperatures near 20° C (68° F) have been documented downstream from Ontario Creek.

**Habitat Security:** Land ownership in the upper Little Blackfoot drainage is a mixture of private ownership and U.S. Forest Service lands. Most of the private lands are used for permanent and recreational residences, with some limited small-scale agriculture also present in the area. The U.S. Forest Service lands are popular with recreationists, and dispersed campsites, roads and trails are fairly widespread throughout the drainage. The mixed nature of the ownership and land use makes habitat security somewhat of a concern in this reach. Additionally, there are also a number of abandoned mines in the upper Little Blackfoot drainage, as well as in many of the connected tributaries. These old mine sites pose a potential threat to downstream water quality.

**DRAINAGE:** Lost Creek

**STREAM:** Lost Creek

**REACH:** Lower – Mouth to Gardiner Ditch Intersection

**Value as a Recruitment/Restoration Fishery for the Clark Fork River:**

**Species Present:** Brown Trout

**Fish Density/Number of Fish Produced:** Based on electrofishing conducted in 2008, brown trout comprise the entire fish community in lower Lost Creek. However, the species appears to be present in relatively low densities throughout much of the reach.

**Recruitment to and Connectivity with the Clark Fork River:** Lost Creek is a rather significant tributary to the upper Clark Fork River. The lower reaches of the stream are likely a fair source of brown trout recruitment for the river despite the relatively low densities of fish in the creek. However, the recruitment value of lower Lost Creek is not likely at its potential due to heavy summer irrigation withdrawal that limits habitat quality during the summer season. Additionally, several irrigation diversions (e.g. Gardiner Ditch and Dutchman Pond dam) appear to reduce connectivity within the reach.

*Current Value: Medium*

*Protection and Enhancement Value: High*

**Value as a Tributary/Replacement Fishery:**

**Recreational Species Present:** Brown Trout

**Fish Density:** Based on electrofishing conducted in 2008, brown trout comprise the entire fish community in lower Lost Creek. However, the species appears to be present in relatively low densities throughout much of the reach.

**Fish Size:** Based on electrofishing conducted in 2008, fish of catchable size make up a good proportion of the fish in lower Lost Creek. Additionally, some of the fish tend to reach fairly good size. At the two sites sampled in the reach in 2008, brown trout had an average length of about 8 inches. The largest fish measured during our sampling was 15 inches in total length.

**Recruitment to non Clark Fork River Fishery:** N/A – Lost Creek is a direct tributary to the Clark Fork River.

*Current Value: Medium*

*Protection and Enhancement Value: High*

**Value as a Native Fishery:**

**Native Species Present:** None detected.

### **Competitor and/or Hybridizing Species Present: Brown Trout**

Brown trout are relatively common in lower Lost Creek and pose a serious competitive concern for native trout that may utilize the reach.

**Demographics and Connectivity:** No native trout were observed in lower Lost Creek during 2008 electrofishing. While native trout have access to the lower reaches of Lost Creek (via sources in upper Lost Creek or the Gardiner Ditch), any fish that enter this portion of the stream are unable to move back upstream above the Gardiner Ditch. The intersection of the Gardiner Ditch with Lost Creek is an upstream fish movement barrier that limits connectivity in the stream.

***Current Value:*** Very Low

***Protection and Enhancement Value:*** Low

### **Habitat Description:**

**Habitat Quality:** Habitat quality and riparian condition along lower Lost Creek is somewhat variable, but tends to be fair overall. Habitat quality in the reach has been affected by several factors including irrigation withdrawal, hay/pasture production, and livestock grazing/pasturing in the riparian zone. Woody riparian vegetation along the channel tends to be patchy, and the lack of woody plants in some areas of the reach has reduced stream shading and habitat complexity, as well as increased sedimentation by making the streambanks susceptible to erosion. Several irrigation diversions are present in the reach that can severely limit summer flows in the stream close to its mouth. Water temperatures are of concern and can climb well over 20° C (68° F) during much of the summer irrigation season.

**Habitat Security:** The entirety of this reach currently lies on private lands used primarily for agricultural purposes including irrigated hay production and livestock grazing. The general nature of the ownership and land use makes habitat security a concern throughout much of this reach. However, there has been a significant amount of restoration and conservation work completed in lower Lost Creek in past years, and some of these efforts have come with riparian area protections such as fencing and conservation easements to name a few. Nevertheless, irrigation withdrawal continues to be a significant concern to habitat security throughout much of lower Lost Creek.

**DRAINAGE:** Flint Creek

**STREAM:** Flint Creek - Lower

**REACH:** Allendale Diversion-Mouth

### **Value as a Recruitment/Restoration Fishery for the Clark Fork River:**

**Species Present:** Brown Trout, Rainbow Trout, Westslope Cutthroat Trout

**Fish Density/Number of Fish Produced:** An electrofishing population estimate was attempted at one site (river mile 12.1) in this portion of the Flint Creek drainage in October 2007. However, due to relatively high flow conditions, the entire section was not sampled and only a shorter section was completed to estimate catch per unit effort (CPUE). This reach appeared to have moderate densities of brown trout. One westslope cutthroat trout was also sampled which was the only other salmonid species captured in the reach. While densities of brown trout in the reach appeared fair to good, a mark/recapture population estimate is necessary to better assess fish abundance in this reach.

**Recruitment to and Connectivity with the Clark Fork River:** Flint Creek is a direct tributary to the Clark Fork River, and is likely an important spawning and rearing tributary for brown trout in the Clark Fork River. With the moderate to high density of trout that this reach of Flint Creek appears to maintain, it is suspected that a relatively large number of fish also out-migrate to the Clark Fork River and return to spawn in Flint Creek or its immediate tributaries. A relatively large number of diversions exist in the lower Flint Creek Valley and the effect these structures have on connectivity between the Clark Fork River and Flint Creek is unclear at this time, although there is some evidence (radio telemetry) that fish can pass these structures seasonally.

**Current Value:** Very High

**Protection and Enhancement Value:** Very High

### **Value as a Tributary/Replacement Fishery:**

**Recreational Species Present:** Brown Trout, Rainbow Trout, Westslope Cutthroat Trout

**Fish Density:** An electrofishing population estimate was attempted at one site (river mile 12.1) in this portion of the Flint Creek drainage in October 2007. However, due to relatively high flow conditions, the entire section was not sampled and only a shorter section was completed to estimate catch per unit effort (CPUE). This reach appeared to have moderate densities of brown trout. One westslope cutthroat trout was also sampled which was the only other salmonid species captured in the reach. While densities of brown trout in the reach appeared fair to good, a mark/recapture population estimate is necessary to better assess fish abundance in this reach.

**Fish Size:** The mean length of brown trout captured in this electrofishing section was 10.5" with the largest fish captured measuring approximately 18".

**Recruitment to non Clark Fork River Fisheries:** N/A- Flint Creek is a direct tributary to the Clark Fork River.

***Current Value:*** Very High

***Protection and Enhancement Value:*** Very High

### **Value as a Native Fishery:**

**Native Species Present:** Westslope cutthroat trout were the only native salmonids sampled in this reach of Flint Creek. Only one westslope cutthroat trout was sampled indicating that this species is present in low numbers in this portion of the drainage. No genetic analyses have been completed for mainstem Flint Creek westslope cutthroat trout, but rainbow trout are present in the drainage suggesting that hybridization with westslope cutthroat trout has likely occurred.

**Competitor and/or Hybridizing Species Present:** Lower Flint Creek maintains moderate to high densities of brown trout throughout this reach, which likely compete with and prey on any westslope cutthroat trout that are present. Rainbow trout were also sampled in upper Flint Creek, which represent a hybridization threat for westslope cutthroat trout in this reach.

**Demographics and Connectivity:** Westslope cutthroat trout appear to maintain very low densities in this portion of the drainage with only one fish captured, suggesting that the viability of this population is questionable. Other westslope cutthroat trout populations do exist in tributaries to Flint Creek, however their use of lower mainstem Flint Creek may be minimal.

***Current Value:*** low

***Protection and Enhancement Value:*** medium

### **Habitat Description:**

**Habitat Quality:** Habitat quality in the lower Flint Creek drainage is considered fair. This reach flows almost entirely through private agricultural lands used primarily for cattle grazing and hay production. The primary impacts to fish habitat that have been observed are irrigation withdrawal and riparian grazing. The lower reach of Flint Creek has many irrigation diversions used to deliver water to irrigated pastures and hay crops. This reach of Flint Creek appears to experience dewatering during irrigation season due to these irrigation withdrawals. Fish entrainment into irrigation ditches is likely significant in this reach and diversion structures may also seasonally impede upstream fish migrations. Some portions of lower Flint Creek maintain healthy woody riparian vegetation while other reaches are quite grazed and maintain only sparse woody

vegetation. The lack of woody riparian vegetation in these reaches appears to cause channel instability, reduce stream shading, and reduce habitat diversity.

**Habitat Security:** Almost all of lower Flint Creek lies within private lands used primarily for agricultural purposes including irrigated hay production and livestock grazing. Thus, habitat security in this reach is relatively low. Primary concerns for future impacts to the reach include in-stream flows, riparian grazing, irrigation diversions impacts, and the potential for future residential development.

**DRAINAGE:** Mill Creek

**STREAM:** Mill Creek

**REACH:** Lower – Mouth to Waterfall (River Mile 11.0)

### **Value as a Recruitment/Restoration Fishery for the Clark Fork River:**

**Species Present:** Brown Trout, Westslope Cutthroat Trout, and Brook Trout

**Fish Density/Number of Fish Produced:** Based on electrofishing conducted in 2008, trout densities are moderate in lower Mill Creek. Brown trout comprise the bulk of the fishery throughout much of the reach, but westslope cutthroat trout are also relatively common in the upper extent. Brook trout are rare and do not appear to comprise a significant component of the fishery.

**Recruitment to and Connectivity with the Clark Fork River:** Mill Creek is a direct tributary to the Clark Fork River via the Mill-Willow Bypass. Connectivity between the two streams appears to be relatively good, although a rather long channelized portion of the Mill-Willow Bypass east of Interstate 90 may restrict upstream fish movement to some extent (Note: fish habitat in this segment of the Bypass has not been evaluated in the field, only by aerial photography). Nevertheless, it is likely that lower Mill Creek provides a reasonable source of brown trout recruitment for the Clark Fork River given the moderate densities of fish present in the stream. While it is likely that lower Mill Creek also offers a source of westslope cutthroat trout for the Clark Fork River, the overall contribution is likely very low given the rarity of the species in the lower reaches of the stream (as well as in the upper Clark Fork River).

**Current Value:** Medium

**Protection and Enhancement Value:** High

### **Value as a Tributary/Replacement Fishery:**

**Recreational Species Present:** Brown Trout, Westslope Cutthroat Trout, and Brook Trout

**Fish Density:** Based on electrofishing conducted in 2008, trout densities are moderate in lower Mill Creek. Brown trout comprise the bulk of the fishery throughout much of the reach, but westslope cutthroat trout are also relatively common in the upper extent. Brook trout are rare and do not appear to comprise a significant component of the fishery.

**Fish Size:** Based on 2008 electrofishing, catchable sized fish are present in relatively good numbers in lower Mill Creek. Additionally, a few of the fish (mostly brown trout) reach a fairly good size. Among the three sites that were sampled, brown trout averaged between about 6 and 8 inches in total length, with the largest fish captured being about 18 inches. Westslope cutthroat trout had an average length of just over 5 inches, and ranged up to about 10 inches in total length. As mentioned above, brook trout were relatively

rare, and the few that were captured during 2008 sampling were all less than 6 inches in total length.

**Recruitment to non Clark Fork River Fishery:** N/A – Mill Creek is a direct tributary to the Clark Fork River via the Mill-Willow Bypass.

***Current Value: Medium***

***Protection and Enhancement Value: High***

**Value as a Native Fishery:**

**Native Species Present:** Westslope Cutthroat Trout

Genetic testing conducted in 2008 suggests that the westslope cutthroat trout population in lower Mill Creek is genetically pure.

**Competitor and/or Hybridizing Species Present:** Brown Trout and Brook Trout

Brown trout are common in lower Mill Creek, and are the dominant trout species throughout much of the reach. Competition and predation by brown trout is likely heavy for westslope cutthroat trout inhabiting this reach of Mill Creek. While brook trout are present, their abundance is low and their effect on westslope cutthroat trout is likely low. Rainbow trout, which are present in low densities in the upper Clark Fork River, have access to lower Mill Creek. However, none were captured during 2008 electrofishing.

**Demographics and Connectivity:** Based on electrofishing conducted in 2008, westslope cutthroat trout are mostly limited to the upper portion of lower Mill Creek. However, in this portion of the reach, the species appears to be relatively common. The observation of multiple age classes suggests the population is relatively viable. The largest westslope cutthroat trout measured in lower Mill Creek during 2008 sampling was about 10 inches in total length.

Mill Creek is a direct tributary to the Clark Fork River via the Mill-Willow Bypass. Connectivity between the two streams appears to be relatively good, although a rather long channelized portion of the Mill-Willow Bypass east of Interstate 90 may restrict upstream fish movement to some extent (Note: fish habitat in this segment of the Bypass has not been evaluated in the field, only by aerial photography). Nevertheless, it is possible that the reach could support fish with a migratory life history. There are also several tributaries to lower Mill Creek (e.g. Clear Creek and South Fork Mill Creek) that likely support connected populations of westslope cutthroat trout. However, no recent sampling has been conducted in these streams to confirm this.

***Current Value: Medium***

***Protection and Enhancement Value: Medium***

### **Habitat Description:**

**Habitat Quality:** Habitat quality and riparian condition along lower Mill Creek ranges from marginal to relatively good depending on location. In the lower portion of the reach, the channel shows evidence of past and present disturbance. At the one site that was surveyed in this part of the reach in 2008, the channel was fairly entrenched and was also wide and shallow from what appeared to be historic channel degradation. Mid-channel bars and braided areas were common, and there was a significant amount of bedload present that the current channel was trying to rework to the extent possible. Many of the high banks present lacked significant woody vegetation, and there was evidence of past bank stabilization attempts, mostly associated with old cars bodies that were used as riprap. Flow was also relatively low, and was likely impacted by upstream irrigation withdrawal. In the upper reaches of lower Mill Creek, habitat condition was considered to be relatively good, but did show some impacts from residential development as well as limited livestock grazing along the channel in a few locations.

**Habitat Security:** Public land along lower Mill Creek is extremely limited, as most of the channel flows through lands in private ownership. In the upper half of the reach, much of the land along the stream has been subdivided. A few permanent and recreational residences are located near the stream in this area, with the potential for additional development in the future. In the lower portion of the reach, the stream flows largely through lands owned and managed by Atlantic Richfield (ARCO). Much of this land has, or is going through active remediation to promote vegetation growth on soils previously contaminated from past copper smelting activities at nearby Anaconda. There are several irrigation diversions located throughout lower Mill Creek that have the capacity to divert a fair amount of water during the irrigation season. Additionally, a golf course bounds the channel near the town of Opportunity. The nature of the ownership and land use makes habitat security a concern throughout much of the reach.

**DRAINAGE:** Little Blackfoot River

**STREAM:** Snowshoe Creek

**REACH:** Lower – Mouth to Lois Lake Dam

### **Value as a Recruitment/Restoration Fishery for the Clark Fork River:**

**Species Present:** Brown Trout

**Fish Density/Number of Fish Produced:** Based on limited electrofishing (one sample site) conducted in 2007, brown trout are present in moderate densities in lower Snowshoe Creek.

**Recruitment to and Connectivity with the Clark Fork River:** Snowshoe Creek is a fair sized tributary to the Little Blackfoot River. Connectivity between the two streams appears good, and it is likely that the lower reaches of Snowshoe Creek provide an important source of brown trout recruitment for the Little Blackfoot River.

*Current Value: Medium*

*Protection and Enhancement Value: High*

### **Value as a Tributary/Replacement Fishery:**

**Recreational Species Present:** Brown Trout

**Fish Density:** Based on limited electrofishing (one sample site) conducted in 2007, brown trout are present in moderate densities in lower Snowshoe Creek.

**Fish Size:** Based on 2007 electrofishing, catchable sized fish are present in relatively good numbers in lower Snowshoe Creek. At the one site sampled in this part of the drainage, brown trout averaged about 8 inches in length, with several fish approaching a maximum length of about 15 inches.

**Recruitment to non Clark Fork River Fishery:** Snowshoe Creek is a fair sized tributary to the Little Blackfoot River. Connectivity between the two streams appears good, and it is likely that the lower reaches of Snowshoe Creek provide an important source of brown trout recruitment for the Little Blackfoot River.

*Current Value: Medium*

*Protection and Enhancement Value: High*

### **Value as a Native Fishery:**

**Native Species Present:** None detected.

**Competitor and/or Hybridizing Species Present:** Brown Trout

Brown trout are relatively common throughout much of lower Snowshoe Creek, and the species likely exerts heavy competition and predation on any native trout that may be present in the reach.

**Demographics and Connectivity:** Based on limited electrofishing in 2007, no native trout were detected in lower Snowshoe Creek despite the reach being well connected to the Little Blackfoot River. However, westslope cutthroat trout are present in relatively low densities in upper Snowshoe Creek, so it is possible that the species occurs in small numbers in the lower reaches of the stream.

*Current Value: Very Low*

*Protection and Enhancement Value: Low*

### **Habitat Description:**

**Habitat Quality:** Habitat quality and riparian condition is mostly fair throughout lower Snowshoe Creek. In this part of the drainage, habitat is affected by multiple factors including widespread hay production, irrigation withdrawal, and livestock use of the riparian zone. Throughout much of this reach, woody riparian vegetation along the channel tends to be patchy, and the lack of woody plants in some areas of the stream has reduced stream shading and habitat complexity, as well as increased sedimentation by making the streambanks more susceptible to erosion. Active bank erosion is rather common in the lower portion of the drainage, and the channel shows signs of past downcutting.

**Habitat Security:** All of lower Snowshoe Creek flows through private lands used primarily for agricultural purposes. The primary land uses in this part of the drainage are irrigated hay production and livestock grazing. The nature of the ownership and land use makes habitat security a concern.

**DRAINAGE:** Little Blackfoot River

**STREAM:** Spotted Dog Creek

**REACH:** Lower – Mouth to Reservoir

### **Value as a Recruitment/Restoration Fishery for the Clark Fork River:**

**Species Present:** Westslope Cutthroat Trout, Brown Trout, and Brook Trout

**Fish Density/Number of Fish Produced:** Based on 2007 electrofishing, total trout density is fairly high in lower Spotted Dog Creek. However, species composition varies longitudinally through the reach. In the lower portion, brown trout provide the primary fishery, with westslope cutthroat trout also present, but at relatively low densities. Brook trout also occur in this part of the stream, but they appear to be rare and are not a significant component of the fishery. Farther upstream however (below the reservoir), all three species are somewhat common and occur in similar densities.

**Recruitment to and Connectivity with the Clark Fork River:** Spotted Dog Creek is a fair sized tributary to the Little Blackfoot River. Lower Spotted Dog Creek is likely an important source of brown trout recruitment for the Little Blackfoot River and the Clark Fork River. It is also possible that the reach provides a fair number of westslope cutthroat trout to both rivers. While brook trout are also present in lower Spotted Dog Creek, this species generally does not exhibit significant migratory tendencies, and thus has a rather low recruitment value.

**Current Value:** Medium

**Protection and Enhancement Value:** High

### **Value as a Tributary/Replacement Fishery:**

**Recreational Species Present:** Westslope Cutthroat Trout, Brown Trout, and Brook Trout

**Fish Density:** Based on 2007 electrofishing, total trout density is fairly high in lower Spotted Dog Creek. However, species composition varies longitudinally through the reach. In the lower portion, brown trout provide the primary fishery, with westslope cutthroat trout also present, but at relatively low densities. Brook trout also occur in this part of the stream, but they appear to be rare and are not a significant component of the fishery. Farther upstream however (below the reservoir), all three species are somewhat common and occur in similar densities.

**Fish Size:** Based on 2007 electrofishing at two sample sites, catchable sized fish are present in relatively good numbers in lower Spotted Dog Creek. Additionally, some of the fish tend to be rather large. At the lowest sample site, brown trout averaged just less than 9 inches in length, with the largest fish being about 17 inches. Westslope cutthroat trout also had an average length of just under 9 inches, and ranged up to about 15 inches in total length. Only one brook trout was captured in the lower sample site, although this

fish was relatively large at about 12 inches in length. At the uppermost sample site, fish size tended to be smaller, although catchable size fish with a maximum size of about 10-11 inches were still present in fair numbers.

**Recruitment to non Clark Fork River Fishery:** Spotted Dog Creek is a fair sized tributary to the Little Blackfoot River. Lower Spotted Dog Creek is likely an important source of brown trout recruitment for the Little Blackfoot River. It is also possible that the reach provides a fair number of westslope cutthroat trout to the river. While brook trout are also present in lower Spotted Dog Creek, this species generally does not exhibit significant migratory tendencies, and thus has a rather low recruitment value.

***Current Value:*** Medium

***Protection and Enhancement Value:*** High

**Value as a Native Fishery:**

**Native Species Present:** Westslope Cutthroat Trout

Genetic tests of westslope cutthroat trout collected from lower Spotted Dog Creek in 2007 showed that fish were slightly hybridized with rainbow trout. The overall purity was assigned at 99.5%.

**Competitor and/or Hybridizing Species Present:** Brown Trout and Brook Trout

Brown trout are relatively common throughout much of lower Spotted Dog Creek, and likely compete with, and prey on, westslope cutthroat trout. Additionally, brook trout are also relatively common in the upper portions of this reach, and likely compete with westslope cutthroat trout as well.

**Demographics and Connectivity:** Based on 2007 electrofishing, westslope cutthroat trout are present in relatively low densities in lower Spotted Dog Creek. This is especially true closer to the mouth of the stream where brown trout tend to dominate the fishery. In the upper portion of the reach, the species is more common and appears to comprise approximately 1/3 of the total trout density. While multiple age classes of westslope cutthroat trout were observed at both of the sites sampled in the reach in 2007, young juveniles tended to be relatively rare at both locations. Instead, larger fish over 6 inches in total length tended to dominate fishery. The lack of juvenile fish suggests that competition with non-native species as well as marginal habitat conditions may be limiting the survival and recruitment of westslope cutthroat trout in lower Spotted Dog Creek.

Lower Spotted Dog Creek is well connected to the Little Blackfoot River. The reach likely provides important spawning and rearing habitat for westslope cutthroat trout with both resident and migratory life history patterns.

***Current Value:*** Medium

***Protection and Enhancement Value: Medium***

**Habitat Description:**

**Habitat Quality:** Habitat quality and riparian condition along lower Spotted Dog Creek is fair. Habitat quality in the reach has been affected by several factors including livestock grazing/pasturing in the riparian zone, hay production in the lower extent of the drainage, and irrigation withdrawal. Woody riparian vegetation along the channel tends to be patchy, and the lack of woody plants in some areas of the reach has reduced stream shading and habitat complexity, as well as increased sedimentation by making the streambanks susceptible to widespread erosion. Water temperatures are also of concern in this reach and can reach upwards of 20° C (68° F) during the summer irrigation season.

**Habitat Security:** The entirety of this reach lies on private lands used primarily for agricultural purposes including livestock grazing and irrigated hay production. There are several irrigation diversions present in the reach that can notably reduce streamflow during marginal flow years. The nature of the ownership and land use makes habitat security a concern in lower Spotted Dog Creek.

**DRAINAGE:** Flint Creek

**STREAM:** Upper Flint Creek

**REACH:** Flint Creek Dam-Allendale Diversion

### **Value as a Recruitment/Restoration Fishery for the Clark Fork River:**

**Species Present:** Brown Trout, Rainbow Trout, Westslope Cutthroat Trout

**Fish Density/Number of Fish Produced:** Electrofishing population estimates were completed in two sections of upper Flint Creek in September 2007. These efforts yielded estimates of 1,288 brown trout per mile at river mile 35.5 and 940 brown trout per mile at river mile 23.4 and these estimates were calculated for fish greater than 6" in length. These estimates of catchable size fish are quite high for the Upper Clark Fork drainage and are similar to estimated fish densities on other highly valued recreational fisheries in western Montana (i.e. Rock Creek). Brown trout was the primary species captured in these sections although some rainbow trout and westslope cutthroat trout were also sampled. Rainbow and westslope cutthroat trout generally only comprised around 2% of the total fish sampled. Another one pass sample section was completed just below the Flint Creek Dam Powerhouse (RM 41.2), however densities and the size of fish sampled were significantly lower than observed in the lower reaches.

**Recruitment to and Connectivity with the Clark Fork River:** Flint Creek is a large, direct tributary to the Clark Fork River, and is an important spawning and rearing tributary for brown trout from the Clark Fork River. With the high density of trout that Flint Creek maintains, it is suspected that a large number of fish also out-migrate to the Clark Fork River and return to spawn in Flint Creek or its immediate tributaries. A relatively large number of diversions exist in both the upper and lower Flint Creek Valleys and the effect these structures have on connectivity between the Clark Fork River and Flint Creek is unclear at this time, although there is some evidence (radio telemetry) that fish can seasonally pass the irrigation diversions in the lower Flint Creek Valley.

**Current Value:** Very High

**Protection and Enhancement Value:** Very High

### **Value as a Tributary/Replacement Fishery:**

**Recreational Species Present:** Brown Trout, Rainbow Trout, Westslope Cutthroat Trout

**Fish Density:** Electrofishing population estimates were completed in two sections of upper Flint Creek in September 2007. These efforts yielded estimates of 1,288 brown trout per mile at river mile 35.5 and 940 brown trout per mile at river mile 23.4 and these estimates were calculated for fish greater than 6" in length. These estimates of catchable size fish are quite high for the Upper Clark Fork drainage and are similar to estimated fish densities on other highly valued recreational fisheries in western Montana (i.e. Rock Creek). Brown trout was the primary species captured in these sections although some

rainbow trout and westslope cutthroat trout were also sampled. Rainbow and westslope cutthroat trout generally only comprised around 2% of the total fish sampled. Another one pass sample section was completed just below the Flint Creek Dam Powerhouse (RM 41.2), however densities and the size of fish sampled were significantly lower than observed in the lower reaches.

**Fish Size:** Flint Creek provide an excellent fishery for quality-sized brown trout. The mean length of brown trout captured in the estimate section located at river mile 35.5 was approximately 10" with the largest fish captured measuring approximately 22". In the river mile 23.4 section, the mean length of brown trout captured was approximately 11" and the largest fish captured was 19". In the section located just below the Flint Creek Dam Powerhouse (RM 41.2), the size of brown trout captured was much smaller with the average fish captured measuring 7.5" and the largest fish measuring 11.5".

**Recruitment to non Clark Fork River Fisheries:** N/A- Flint Creek is a direct tributary to the Clark Fork River.

***Current Value:*** Very High

***Protection and Enhancement Value:*** Very High

### **Value as a Native Fishery:**

**Native Species Present:** Both westslope cutthroat trout and bull trout were captured in this reach of Flint Creek in 2007. However, only one bull trout was sampled indicating that this species is likely present in very low densities. Westslope cutthroat trout were sampled in both electrofishing sections in 2007, although this species was also found in low densities. Genetic analyses have not been completed for mainstem Flint Creek although rainbow trout were also sampled in both reaches and thus hybridization between rainbow and westslope cutthroat trout has likely occurred.

**Competitor and/or Hybridizing Species Present:** Flint Creek maintains very high densities of brown trout throughout this reach, which likely compete with and prey on westslope cutthroat trout and any bull trout that are potentially present. Rainbow trout are also present in this reach of Flint Creek, which represent a hybridization threat to westslope cutthroat trout. Brook trout were also sampled in low densities in the middle portion of this reach but likely present only a minimal threat to native species in this reach.

**Demographics and Connectivity:** Only one bull trout was captured in this reach and that fish was likely was an out-migrant from Boulder Creek. This population is not viable due to the low abundance of fish. The stability of the westslope cutthroat trout in this reach is also questionable due to the low number of fish captured. Westslope cutthroat trout in Flint Creek do maintain connectivity with several westslope cutthroat trout populations in its tributaries which allows for genetic exchange and potential re-founding of this population should it be lost.

**Current Value: Medium**

**Protection and Enhancement Value: Medium**

**Habitat Description:**

**Habitat Quality:** Habitat quality in the upper Flint Creek drainage is considered fair. This reach flows almost entirely through private agricultural lands used primarily for cattle grazing and hay production. The primary habitat degradation that is observed is riparian grazing and the impact it has on woody riparian vegetation and channel stability. Some portions of this reach maintain healthy woody riparian vegetation while other reaches are so heavily utilized that no woody riparian vegetation is discernible. The lack of woody riparian vegetation in portions of this reach causes channel instability, a lack of stream shading, and an overall lack of habitat diversity. While this reach does have a good number of irrigation diversions, in-stream flows do not limit the fishery in a majority of this reach (below the mouth of Trout Creek), as this portion of the drainage delivers water siphoned from the East Fork Rock Creek drainage to downstream water users lower in the Flint Creek Valley. These artificially high stream flows provide an exceptional amount of water to this reach throughout the irrigation season, negating the impacts irrigation could be having on in-stream flows.

**Habitat Security:** Almost the entire reach lies on private lands used primarily for agricultural purposes including irrigated hay production and livestock grazing. Thus, habitat security in this reach is a concern. A majority of this reach (below the mouth of Trout Creek) does not lack in-stream flows during irrigation season due to the trans-basin diversion of water from the East Fork Rock Creek drainage into the Flint Creek drainage. Primary concerns for future impacts to the reach include riparian grazing, irrigation diversions impacts on upstream fish passage and fish entrainment, and the potential for future residential development.

**DRAINAGE:** Warm Springs Creek

**STREAM:** Warm Springs Creek

**REACH:** Upper –Myers Dam to Headwaters

### **Value as a Recruitment/Restoration Fishery for the Clark Fork River:**

**Species Present:** Westslope Cutthroat Trout, Rainbow Trout, Brook Trout, and Brown Trout

**Fish Density/Number of Fish Produced:** Based on electrofishing conducted in 2007, trout densities tend to be relatively low throughout much of upper Warm Springs Creek. *Oncorhynchus* species (westslope cutthroat trout, rainbow trout, and their hybrids) comprise much of the fish community throughout the reach, although brook trout and brown trout are also present in low densities. Brook trout occur throughout much of the reach, although they appear to be more common in the upper extent. Brown trout are largely limited to the lower reaches of upper Warm Springs Creek.

**Recruitment to and Connectivity with the Clark Fork River:** Warm Springs Creek is a large, direct tributary to the Clark Fork River. The upper reaches of the stream likely provide some recruitment to the Clark Fork, but the overall level may be rather modest based on the relatively low densities of fish present in the reach. Additionally, much of the fish community is comprised of *Oncorhynchus* species, which tend to be rather incidental in the upper Clark Fork River. The rarity of these fish in downstream reaches suggests that the survival of migratory individuals may be limited. Additionally, the presence of Myers Dam, may also limit the recruitment potential of upper Warm Springs Creek. This diversion structure, which is located at river mile 16.6, appears to be at least a partial barrier restricting upstream fish movement (e.g. fish returning to spawn).

**Current Value:** Medium

**Protection and Enhancement Value:** High

### **Value as a Tributary/Replacement Fishery:**

**Recreational Species Present:** Westslope Cutthroat Trout, Rainbow Trout, Brook Trout, and Brown Trout

**Fish Density:** Based on electrofishing conducted in 2007, trout densities tend to be relatively low throughout much of upper Warm Springs Creek. *Oncorhynchus* species (westslope cutthroat trout, rainbow trout, and their hybrids) comprise much of the fish community throughout the reach, although brook trout and brown trout are also present in low densities. Brook trout occur throughout much of the reach, although they appear to be more common in the upper extent. Brown trout are largely limited to the lower reaches of upper Warm Springs Creek.

**Fish Size:** Based on electrofishing conducted in 2007, catchable sized fish are somewhat common in upper Warm Springs Creek. Furthermore, some of the fish in the lower

portion of the reach can attain fairly good size. *Oncorhynchus* species range in size up to approximately 17 inches in length, with the average size being about 6 inches. Brown trout can attain sizes of approximately 17 inches as well, with the average length being about 10 inches. Brook trout have been found to be as large as 12 inches in upper Warm Springs Creek, but the average length is closer to 7 inches.

**Recruitment to non Clark Fork River Fishery:** N/A – Warm Springs Creek is a direct tributary to the Clark Fork River.

**Current Value:** Medium

**Protection and Enhancement Value:** High

**Value as a Native Fishery:**

**Native Species Present:** Bull Trout and Westslope Cutthroat Trout

No genetic testing has been conducted on westslope cutthroat trout in upper Warm Springs Creek. However, given the presence of rainbow trout in the stream, and the existence of obvious hybrids, it is reasonable to believe that genetic purity may be less than 90%.

**Competitor and/or Hybridizing Species Present:** Rainbow Trout, Brook Trout, and Brown Trout.

Rainbow trout are relatively common in upper Warm Springs Creek, and their presence has resulted in obvious hybridization among some westslope cutthroat trout. Their existence is likely to be persistent and poses significant concerns to the viability of the westslope cutthroat trout population (genetically). Brook trout also occur in this segment of the stream and likely exert a measurable competitive pressure on both westslope cutthroat trout and bull trout in the upper portions of the reach where they tend to be more common. Additionally, the occurrence of this species poses significant hybridization risk for bull trout. Genetic sampling conducted in 2008 by the U.S. Fish and Wildlife Service documented the presence of a number of first generation hybrids in upper Warm Springs Creek. Brown trout are not very common in upper Warm Springs Creek and the species is not likely to be a significant competitive risk to native trout at this time.

**Demographics and Connectivity:** Based on electrofishing conducted in 2007, westslope cutthroat trout appear to comprise much of the fish community in upper Warm Springs Creek. However, the presence of rainbow trout and obvious hybrids raises concern about the genetic makeup of the population. Nevertheless, the species occurs in fair numbers throughout much of the reach, and the presence of several distinct age classes indicates that the population is relatively healthy. The largest westslope cutthroat trout (that looked like a westslope cutthroat trout) measured in upper Warm Springs Creek in 2007 was about 14 inches in total length. Bull trout also occur in upper Warm Springs Creek, but are present in relatively low densities. In the upper portion of the reach, most of the bull

trout captured during 2007 sampling were of a similar age and size. These fish were all around 9 inches in length and were likely sub adults or relatively small resident adults. Additional sampling conducted in this portion of the reach in 2008 by the U.S. Fish and Wildlife Service did turn up a few more size classes, but results still indicated the average fish size was around 9 inches. Very few young juveniles were observed. In the lower portion of upper Warm Springs Creek, bull trout showed a little more variability in size and age. Several distinct age classes of fish were observed including young-of-the-year and fish as large as 13 inches in length. Nevertheless, given the relatively low population size, the presence of hybridizing species (brook trout), and marginal connectivity with other populations, the viability of the bull trout population in upper Warm Spring Creek is of concern.

Upper Warm Springs Creek is only marginally connected to the Clark Fork River. Myers Dam, a diversion structure that is located at river mile 16.6, appears to be at least a partial barrier to upstream fish movement. While the presence of this feature has likely reduced the invasion of non-native brown trout into upper Warm Springs Creek, it has also reduced connectivity for bull trout and westslope cutthroat trout with migratory life histories.

***Current Value: High***

***Protection and Enhancement Value: High***

### **Habitat Description:**

**Habitat Quality:** Habitat quality and riparian condition along upper Warm Springs Creek is relatively good. The stream flows primarily through forested lands with a decent understory of woody shrubs present along much of the channel. However, fish habitat appears to be somewhat limited by a lack of pool habitat throughout much of the reach. Fast water riffles dominate the available habitat, which leaves relatively few places for fish to find velocity refuge. The primary land use throughout much of upper Warm Springs Creek is rural residential development, but the impacts to the stream from the current level of development appear to be rather negligible.

**Habitat Security:** Landownership along upper Warm Springs Creek is comprised of both private and public lands. Much of the upper portion of the reach lies on National Forest lands where habitat security is relatively good. However, the lower extent of the reach is bounded largely by privately owned lands used mainly for residential development. The nature of the ownership and land use in this portion of the drainage makes habitat security somewhat of a concern.

**DRAINAGE:** Willow Creek

**STREAM:** Willow Creek

**REACH:** All

### **Value as a Recruitment/Restoration Fishery for the Clark Fork River:**

**Species Present:** Brown Trout, Brook Trout, and Westslope Cutthroat Trout

**Fish Density/Number of Fish Produced:** Based on electrofishing conducted in 2008, trout densities in Willow Creek tend to be rather moderate, though species composition is variable and changes longitudinally. In the lower reaches of the stream, brown trout appear to comprise the bulk of the fish community, with brook trout also present in fair numbers. However, our sampling showed that many of the fish (both species) in this portion of the stream were juveniles that were likely one year of age or less (i.e. young-of-the-year). In the middle of the drainage, brook trout are the most common species in Willow Creek. While brown trout are still present, their densities appear to be very low. Westslope cutthroat trout also occur in the middle reaches of the stream, but like brown trout, are present in very low numbers. In the upper reaches of the stream, westslope cutthroat trout appear to comprise a good deal of the fish community, with brook trout also present but at slightly lower densities.

**Recruitment to and Connectivity with the Clark Fork River:** Willow Creek is a direct tributary to the Clark Fork River via the Mill-Willow Bypass. Connectivity between the two streams appears to be relatively good, although a rather long channelized portion of the Mill-Willow Bypass east of Interstate 90 may restrict upstream fish movement to some extent (Note: fish habitat in this segment of the Bypass has not been evaluated in the field, only by aerial photography). Nevertheless, it is likely that the lower reaches of Willow Creek provide at least some brown trout recruitment for the Clark Fork River given the fair densities of fish (especially juveniles) present in the stream. While it is likely that upper reaches of Willow Creek also offer a source of westslope cutthroat trout for the Clark Fork River, the overall contribution is likely very low given the rarity of the species in the lower reaches of the stream (as well as in the upper Clark Fork River). While brook trout are also rather common in Willow Creek, this species generally does not exhibit significant migratory tendencies, and thus has a rather low recruitment value.

**Current Value:** Medium

**Protection and Enhancement Value:** High

### **Value as a Tributary/Replacement Fishery:**

**Recreational Species Present:** Brown Trout, Brook Trout, and Westslope Cutthroat Trout

**Fish Density:** Based on electrofishing conducted in 2008, trout densities in Willow Creek tend to be rather moderate, though species composition is variable and changes longitudinally. In the lower reaches of the stream, brown trout appear to comprise the

bulk of the fish community, with brook trout also present in fair numbers. However, our sampling showed that many of the fish (both species) in this portion of the stream were juveniles that were likely one year of age or less (i.e. young-of-the-year). In the middle of the drainage, brook trout are the most common species in Willow Creek. While brown trout are still present, their densities appear to be very low. Westslope cutthroat trout also occur in the middle reaches of the stream, but like brown trout, are present in very low numbers. In the upper reaches of the stream, westslope cutthroat trout appear to comprise a good deal of the fish community, with brook trout also present but at slightly lower densities.

**Fish Size:** Based on 2008 electrofishing at three sample sites, catchable sized fish are present in fair numbers throughout much of Willow Creek. However, overall fish size tends to be relatively small. In the lower portion of the drainage, both brown trout and brook trout had an average length of about 4 inches, which was indicative of the number of young juveniles present in the sample. The largest brown trout captured in this segment of Willow Creek was about 12 inches, and the largest brook trout was 10 inches. In the middle and upper reaches of the stream where brook trout and westslope cutthroat trout comprise much of the fish community (respectively), both species tend to average about 4 to 5 inches in length, with maximum fish size being approximately 8 to 9 inches.

**Recruitment to non Clark Fork River Fishery:** N/A – Willow Creek is a direct tributary to the Clark Fork River via the Mill-Willow Bypass.

*Current Value: Medium*

*Protection and Enhancement Value: High*

### **Value as a Native Fishery:**

**Native Species Present:** Westslope Cutthroat Trout

Genetic testing conducted in 2008 suggests that the westslope cutthroat trout population in Willow Creek is genetically pure.

**Competitor and/or Hybridizing Species Present:** Brown Trout and Brook Trout

Brown trout are rather common in the lower reaches of Willow Creek, and competition and predation by brown trout is likely heavy for westslope cutthroat trout inhabiting this part of the stream. Brook trout are also common throughout much of Willow Creek, and likely exert a moderate to heavy competitive pressure on westslope cutthroat trout where the species are sympatric. Rainbow trout, which are present in low densities in the upper Clark Fork River, have access to Willow Creek. However, none were captured during 2008 electrofishing.

**Demographics and Connectivity:** Based on electrofishing conducted in 2008, westslope cutthroat trout are mostly limited to the upper reaches of Willow Creek. However, in this portion of the stream, the species appears to be relatively common. Additionally, the

observation of multiple age classes suggests the population is relatively viable. The largest westslope cutthroat trout measured in Willow Creek during 2008 sampling was about 9 inches in total length.

Willow Creek is a direct tributary to the Clark Fork River via the Mill-Willow Bypass. Connectivity between the two streams appears to be relatively good, although a rather long channelized portion of the Mill-Willow Bypass east of Interstate 90 may restrict upstream fish movement to some extent (Note: fish habitat in this segment of the Bypass has not been evaluated in the field, only by aerial photography). Nevertheless, it appears possible that the stream could support fish with a migratory life history. There are also several tributaries to upper Willow Creek that likely sustain connected populations of westslope cutthroat trout. However, no recent sampling has been conducted in these streams to confirm this.

***Current Value: Medium***

***Protection and Enhancement Value: Medium***

### **Habitat Description:**

**Habitat Quality:** Habitat quality throughout much of Willow Creek tends to be rather marginal although conditions tend to improve in the upper reaches of the stream. In the lower half of the drainage habitat quality has been most affected by widespread livestock use of the riparian zone, hay and pasture production, and irrigation withdrawal. Throughout much of this reach, woody riparian vegetation along the channel tends to be absent or patchy, and the lack of woody plants has reduced stream shading and habitat complexity, as well as increased sedimentation by making the streambanks more susceptible to erosion. Active bank erosion is rather severe in several areas, and livestock impacts on the riparian area (e.g.. bank trampling, heavy grazing pressure on riparian vegetation, etc) are especially notable in these locations. Several irrigation diversions are present in the lower portion of the drainage that can severely limit summer flows in the stream close to its mouth. Water temperatures are of concern and can climb well over 20° C (68° F) during much of the summer irrigation season. In the upper half of the drainage, riparian habitat tends to be in better condition. A relatively healthy willow community is present throughout much of this part of the drainage. However, impacts of livestock grazing in the riparian zone, past timber harvest, and roads have all affected habitat quality to some extent.

**Habitat Security:** Landownership along Willow Creek is comprised of both public and private lands. Much of the upper portion of the drainage lies within the Mount Haggin Wildlife Management Area where habitat security is considered to be relatively good. However, the lower portion of the watershed lies on private lands used primarily for agricultural purposes. The nature of the ownership and land use in this portion of the drainage makes habitat security a concern.

## PRIORITY – 3

**DRAINAGE:** German Gulch

**STREAM:** Beefstraight Creek

**REACH:** All

### **Value as a Recruitment/Restoration Fishery for Silver Bow Creek:**

**Species Present:** Westslope Cutthroat Trout and Brook Trout

**Fish Density/Number of Fish Produced:** Based on electrofishing conducted in 2008, total trout densities are relatively high throughout much of Beefstraight Creek. However fish density appears to be more moderate in the upper extent of the watershed where habitat is more limited. Throughout most of the stream, westslope cutthroat trout comprise much of the fish community. Brook trout are also present in the drainage, but their densities appear to be relatively low.

**Recruitment to and Connectivity with Silver Bow Creek:** Beefstraight Creek is a direct tributary to German Gulch. Connectivity between the two streams appears good. Given the relatively large size of the stream as well as the good numbers of fish present in it, Beefstraight Creek likely provides an important source of trout recruitment to mainstem German Gulch as well as Silver Bow Creek. Additionally, westslope cutthroat trout comprise much of the fish community in Beefstraight Creek, which increases the stream's recruitment value given the propensity of the species to exhibit migratory tendencies (unlike brook trout, which tend not to display significant migratory behavior).

**Current Value:** High

**Protection and Enhancement Value:** High

### **Value as a Tributary/Replacement Fishery:**

**Recreational Species Present:** Westslope Cutthroat Trout and Brook Trout

**Fish Density:** Based on electrofishing conducted in 2008, total trout densities are relatively high throughout much of Beefstraight Creek. However fish density appears to be more moderate in the upper extent of the watershed where habitat is more limited. Throughout most of the stream, westslope cutthroat trout comprise much of the fish community. Brook trout are also present in the drainage, but their densities appear to be relatively low.

**Fish Size:** Fish in Beefstraight Creek do not typically attain very large size, although fish of catchable length are present in fairly good numbers throughout much of the stream. At the two sites sampled in the drainage in 2008, westslope cutthroat trout had an average length between about 5 and 6 inches. The largest westslope cutthroat trout captured during our sampling was about 10 inches in total length. Brook trout had an average

length of a little less than 5 inches at both sample sites, with the biggest brook trout measured during our sampling being about 7 inches in total length.

**Recruitment to non Silver Bow Creek Fisheries:** Beefstraight Creek is a direct tributary to German Gulch. Connectivity between the two streams appears good. Given the relatively large size of the stream as well as the good numbers of fish present in it, Beefstraight Creek likely provides an important source of trout recruitment to mainstem German Gulch. Additionally, westslope cutthroat trout comprise much of the fish community, which increases the stream's recruitment value given the propensity of the species to exhibit migratory tendencies (unlike brook trout, which tend not to display significant migratory behavior).

***Current Value: Medium***

***Protection and Enhancement Value: Medium***

**Value as a Native Fishery:**

***Native Species Present: Westslope Cutthroat Trout***

Genetic testing conducted in 2002 and 2003 indicates the westslope cutthroat trout population in Beefstraight Creek may be slightly hybridized with rainbow trout. Genetic purity was assigned at approximately 98%.

***Competitor and/or Hybridizing Species Present: Brook Trout***

Brook trout are present throughout much of Beefstraight Creek. However, densities appear to be relatively low and therefore the species does not likely exert a major competitive pressure on the westslope cutthroat trout population at this time.

***Demographics and Connectivity:*** Westslope cutthroat trout presently occur in Beefstraight Creek in good densities and a diversity of age classes. This suggests the population is relatively strong. The largest westslope cutthroat trout measured in Beefstraight Creek during 2008 sampling was about 11 inches in total length.

Beefstraight Creek is a direct tributary to German Gulch. Connectivity to downstream waters appears good, although an irrigation structure near the mouth of German Gulch can limit seasonal connectedness with Silver Bow Creek during periods of low flow. Nevertheless, it is likely that Beefstraight Creek can support fish with a migratory life history. Additionally, there are also several tributaries within the Beefstraight Creek watershed as well as the broader German Gulch drainage that sustain connected populations of westslope cutthroat trout.

***Current Value: Medium***

***Protection and Enhancement Value: Medium***

### **Habitat Description:**

**Habitat Quality:** Overall, habitat quality and riparian condition along Beefstraight Creek is relatively good. In the lower reaches of the stream, the presence of livestock in the riparian zone was observed during our sampling, but habitat degradation was relatively negligible and was mostly associated with minor bank trampling. Other activities that have affected habitat quality to some extent in Beefstraight Creek are past timber harvest (especially in the upper reaches of the stream) and historic mining.

**Habitat Security:** Habitat security in Beefstraight Creek is relatively good. Land ownership along the stream is comprised entirely of lands administered by the U.S. Forest Service and the State of Montana (Mount Haggin Wildlife Management Area). The primary land uses in the drainage are livestock grazing and timber harvest. Livestock use of the riparian area is apparent throughout much of the drainage, and this activity could make habitat security somewhat of a concern if ever left unmanaged.

**DRAINAGE:** Blacktail Creek

**STREAM:** Blacktail Creek

**REACH:** All

### **Value as a Recruitment/Restoration Fishery for Silver Bow Creek:**

**Species Present:** Westslope Cutthroat Trout and Brook Trout

**Fish Density/Number of Fish Produced:** Based on electrofishing conducted in 2008, trout density is variable throughout Blacktail Creek, and ranges from low to relatively high depending on location in the drainage and the makeup of the fish community. In the lower reaches of the stream (near Butte), brook trout appear to comprise the entire trout community, and fish density appears to be relatively high. However, approximately 70% of the fish observed at our sample site in this part of the drainage in 2008 were young-of-the-year. Fish of at least one year of age or greater were present in more moderate densities. Farther upstream, near the Ninemile, brook trout and westslope cutthroat trout are both present, but each species occurs in relatively low densities (moderate densities when combined). However, brook trout appear to be slightly more common in this part of the drainage. In the upper reaches of the stream, westslope cutthroat trout appear to be more common than brook trout, but densities remain relatively low.

**Recruitment to and Connectivity with Silver Bow Creek:** Blacktail Creek is a direct, headwater tributary to Silver Bow Creek. Downstream connectivity between the two streams appears possible, but upstream fish passage is limited by a number of water control structures present in the lower half of the drainage. While some of these structures may only be minor impediments, several are likely complete barriers to upstream fish movement. Upstream passage concerns as well as relatively poor habitat quality in the lower reaches of Blacktail Creek likely limit the value of the stream as a recruitment source of westslope cutthroat trout. Nevertheless, the lower reaches of the stream do likely provide a fair source of brook trout for the upper reaches of Silver Bow Creek. However, brook trout generally do not exhibit significant migratory tendencies, and thus have a lower recruitment value.

***Current Value:* Medium**

***Protection and Enhancement Value:* High**

### **Value as a Tributary/Replacement Fishery:**

**Recreational Species Present:** Westslope Cutthroat Trout and Brook Trout

**Fish Density:** Based on electrofishing conducted in 2008, trout density is variable throughout Blacktail Creek, and ranges from low to relatively high depending on location in the drainage and the makeup of the fish community. In the lower reaches of the stream (near Butte), brook trout appear to comprise the entire trout community, and fish density appears to be relatively high. However, approximately 70% of the fish observed at our sample site in this part of the drainage in 2008 were young-of-the-year. Fish of at least

one year of age or greater were present in more moderate densities. Farther upstream, near the Ninemile, brook trout and westslope cutthroat trout are both present, but each species occurs in relatively low densities (moderate densities when combined). However, brook trout appear to be slightly more common in this part of the drainage. In the upper reaches of the stream, westslope cutthroat trout appear to be more common than brook trout, but densities remain relatively low.

**Fish Size:** Fish in Blacktail Creek do not typically attain very large size, although fish of catchable length are present throughout the drainage. At the five sites sampled in the drainage in 2008, westslope cutthroat trout had an average length between about 3.5 and 6.5 inches. Average fish size decreased in an upstream direction. The largest westslope cutthroat trout measured during 2008 sampling was about 8.5 inches in total length. At most of the sites sampled in 2008, brook trout had an average length of a little less than 5 inches. However at the lowest sample site, average fish size was only about 3 inches, which was indicative of the high densities of young-of-the-year present in the reach. The largest brook trout measured during our sampling was a little less than 8 inches in total length.

**Recruitment to non Silver Bow Creek Fisheries:** N/A – Blacktail Creek is a direct tributary to Silver Bow Creek.

***Current Value:*** Low

***Protection and Enhancement Value:*** Medium

### **Value as a Native Fishery:**

***Native Species Present:*** Westslope Cutthroat Trout

Limited genetic testing conducted in 1999 and 2008 indicates that the westslope cutthroat trout population in Blacktail Creek is genetically pure.

***Competitor and/or Hybridizing Species Present:*** Brook Trout

Brook trout are relatively common in Blacktail Creek, and are sympatric with westslope cutthroat trout throughout the drainage. Brook trout likely exert a fairly strong competitive pressure on westslope cutthroat trout in Blacktail Creek.

***Demographics and Connectivity:*** Based on electrofishing conducted in 2008, westslope cutthroat trout are mostly limited to the upper half of the Blacktail Creek watershed. However, even in this portion of the drainage, fish densities appear to be relatively low. While multiple age classes were observed at several of the 2008 sample sites (where westslope cutthroat trout were observed), it appeared that most of the younger juvenile size classes (one year old or less) were limited to the upper reaches of the stream. This suggests that successful spawning is likely limited to this area of Blacktail Creek, and survival and recruitment of these fish may be marginal in downstream

reaches. The largest westslope cutthroat trout measured in Blacktail Creek in 2008 was approximately 8.5 inches in length.

Blacktail Creek is a direct, headwater tributary to Silver Bow Creek. Downstream connectivity between the two streams appears possible, but upstream fish passage is limited by a number of water control structures present in the lower half of the drainage. While some of these structures may only be minor impediments, several are likely complete barriers to upstream fish movement. Upstream passage concerns as well as relatively poor habitat quality in the lower reaches of Blacktail Creek appear to have isolated the westslope cutthroat trout population in upper Blacktail Creek. The risks of isolation (i.e. inbreeding depression, local extinction, etc.) are of concern, especially given low population densities and competition with brook trout throughout the stream.

***Current Value: Medium***

***Protection and Enhancement Value: Medium***

### **Habitat Description:**

**Habitat Quality:** Overall, habitat quality and riparian condition along Blacktail Creek is mostly fair. However, there are several reaches of the stream that are in a relatively poor state. Land use in the Blacktail Creek drainage is varied and has a long history with its close proximity to Butte. In the lower half of the drainage (downstream of the Ninemile) residential and urban development, as well as small-scale agriculture, has significantly impacted the stream and riparian vegetation throughout much of the reach. Within this portion of the drainage, the stream shows evidence of past channelization in several locations, and riparian vegetation tends to be patchy or absent in some areas. Bank erosion is rather common, and is a significant source of fine sediment. Thompson Park, which is located in the upper portion of the Blacktail Creek watershed (upstream of the Ninemile), is a recreational area that is co-managed by Butte-Silver Bow County and the U.S. Forest Service. This area is heavily used for a variety of recreational activities. Highway 2 and Roosevelt Drive are directly adjacent to Blacktail Creek in the upper reaches of the stream, and the presence of these roadways has greatly constricted the active floodplain of Blacktail Creek, as well as created water quality concerns due to erosion and road runoff into the stream. Other observed land uses in the upper portion of the drainage that have affected habitat quality to some extent are timber harvest (both historic as well as recent), rural residential development, and some limited livestock grazing.

**Habitat Security:** Land ownership along Blacktail Creek is varied. In the lower half of the drainage much of the land consists of privately owned residential and small-scale agricultural parcels. Within this area, current land uses and future development possibilities make habitat security very much a concern. In the upper portion of the watershed, much of the land is owned and administered by Butte-Silver Bow County and the U.S. Forest Service. While habitat security is considered to be relatively good in this portion of the drainage, the presence of a fair sized subdivision along the upper reaches of

the stream does pose some risks given the more uncertain nature of future land use and development plans.

**DRAINAGE:** Clark Fork River

**STREAM:** Deer Creek

**REACH:** Entire stream

### **Value as a Recruitment/Restoration Fishery for the Clark Fork River:**

**Species Present:** Westslope Cutthroat Trout

**Fish Density/Number of Fish Produced:** Five single-pass electrofishing sections total were completed in Deer Creek in 1999 and 2001 in lower and middle portions of the drainage. Westslope cutthroat trout densities were very high in all electrofishing sections and two of the sections (in known spawning reaches) were continued as long-term population estimate sections. These two sections have been completed in five different years since 2001. Juvenile westslope cutthroat trout densities (age 1 and older) range from 30-60 per 100 linear ft. Deer Creek is a moderate size tributary system (~ 9 mi<sup>2</sup>) that has appears to have high productivity.

**Recruitment to and Connectivity with the Clark Fork River:** A series of enhancement projects has been completed in the past 3 years to ensure instream flows and connectivity of Deer Creek with the Clark Fork River. The final fish passage impediment (partial barrier) will be removed in 2010. Deer Creek is a major source of westslope cutthroat trout recruitment for the Clark Fork River based on adult telemetry work and redd counts in 1999-2001 (Schmetterling et al.).

**Current Value:** High

**Protection and Enhancement Value:** High

### **Value as a Tributary/Replacement Fishery:**

**Recreational Species Present:** Westslope Cutthroat Trout

**Fish Density:** Five single-pass electrofishing sections total were completed in Deer Creek in 1999 and 2001 in lower and middle portions of the drainage. Westslope cutthroat trout densities were very high in all electrofishing sections and two of the sections (in known spawning reaches) were established as long-term population estimate sections. These two sections have been completed in five different years since 2001. Juvenile westslope cutthroat trout densities (age 1 and older) range from 30-60 per 100 linear ft.

**Fish Size:** Westslope cutthroat trout in all electrofishing sections averaged ~ 4.5 inches and reached maximum lengths of ~ 9 inches. However, radio-telemetry and weir-trapping in 1999-2004 have documented a large number of fluvial adults from the Clark Fork River that migrate in April-May and range in size from 12 – 19 inches.

**Recruitment to non Clark Fork River Fishery:** N/A. Deer Creek flows directly into the Clark Fork River and thus cannot provide recruitment to a non Clark Fork River fishery.

***Current Value: Medium***

***Protection and Enhancement Value: Medium***

### **Value as a Native Fishery:**

**Native Species Present:** Westslope cutthroat trout are the only native trout and only fish species detected in the drainage. Genetic analyses were completed in 2001 for 50 samples taken from sites throughout lower and middle Deer Creek and alleles characteristic of only westslope cutthroat trout were detected, suggesting that this population is genetically non-introgressed (probability > 99% that as little as 1% hybridization could be detected). The stream contains both stream-resident and migratory life history forms.

**Competitor and/or Hybridizing Species Present:** No hybridization or non-native fish were detected in the Deer Creek drainage. Connectivity with the Clark Fork River can provide unobstructed passage for rainbow trout and rainbow x cutthroat trout hybrids – there is potential for invasion by nonnative species. However, no hybridization or nonnative fish presence has been detected in the stream despite > 70 years of being a predominantly open system that is directly accessible to rainbow trout, brown trout and other species in the Clark Fork River.

**Demographics and Connectivity:** Westslope cutthroat trout were highly abundant throughout the sites sampled in Deer Creek, connectivity will be fully restored in 2010 (only one partial barrier remains), and diverse life-history forms are already evident. The fluvial run from the Clark Fork River is one of the best in the area. All of these attributes suggest that the population is robust, with little demographic risk. Westslope cutthroat trout in Deer Creek are connected to other populations in the basin. Deer Creek is large enough that it likely contains 2-3 sub-populations within the watershed.

***Current Value: Very High***

***Protection and Enhancement Value: Very High***

### **Habitat Description:**

**Habitat Quality:** Habitat quality is generally good throughout Deer Creek. This stream has been a focus area for enhancement in the Missoula area. An assessment of fisheries and aquatic limiting factors was completed by MFWP in 1999-2001. Problems identified included 4 undersized road crossings which limit fish passage at certain flow levels (3 of 4 have been replaced and last is scheduled for 2010), sediment input and water quality problems associated with county road drainage in middle reach (scheduled for correction in 2010-2011), fish entrainment and dewatering at an irrigation diversion (diversion

eliminated in 2009), riparian encroachment and vegetation removal in lower reach (fencing project completed, vegetation removal stopped, etc. but work ongoing), private development and stream encroachment in some upper reaches (future work), high road densities in upper watershed, and connectivity with the Clark Fork River in Milltown Reservoir. The mouth of Deer Creek is within the Milltown Project Area and the lower reach will be restored as part of the Milltown restoration project in 2010-2011 (new channel to be built in area that was previously inundated by the reservoir).

**Habitat Security:** Until recently, the majority of the Deer Creek drainage was owned by Plum Creek Timber Company and the Lolo National Forest, with smaller parcels of DNRC and small private in-holdings. However, much of the drainage was part of Phase II of the Montana Legacy Project, which will permanently convert all of the PCTC lands to the Forest Service in 2010. With the exception of some small private in-holdings, the drainage is now predominantly in public ownership and conditions should improve over time.

**DRAINAGE:** Flint Creek

**STREAM:** Douglas Creek- lower Flint Creek drainage

**REACH:** mouth to dam

### **Value as a Recruitment/Restoration Fishery for the Clark Fork River:**

**Species Present:** Brown trout

**Fish Density/Number of Fish Produced:** One electrofishing section was completed in lower Douglas Creek and brown trout densities were very high in this reach.

**Recruitment to and Connectivity with the Clark Fork River:** Lower Douglas Creek is one of very few tributaries that maintain high densities of juvenile brown trout in the Flint Creek drainage. Lower Douglas Creek is located relatively low in the Flint Creek drainage and some juvenile brown trout likely out-migrate from lower Douglas Creek to the Clark Fork River. Based on both high densities of fish and its location in the Flint Creek drainage, lower Douglas Creek may be a significant source of brown trout recruitment to the Clark Fork River.

*Current Value: Medium*

*Protection and Enhancement Value: High*

### **Value as a Tributary/Replacement Fishery:**

**Recreational Species Present:** Brown trout

**Fish Density:** One electrofishing section was completed in lower Douglas Creek and brown trout densities were very high in this reach.

**Fish Size:** Brown trout in lower Douglas Creek averaged 4" in length and reached a maximum length of 12".

**Recruitment to non Clark Fork River Fishery:** Lower Douglas Creek is one of very few tributaries that maintain high densities of juvenile brown trout in the Flint Creek drainage. Based on these high densities of juvenile brown trout, it appears that lower Douglas Creek may be a relatively important source of brown trout recruitment to Flint Creek.

*Current Value: High*

*Protection and Enhancement Value: High*

### **Value as a Native Fishery:**

**Native Species Present:** No native trout were captured in lower Douglas Creek.

**Competitor and/or Hybridizing Species Present:** Brown trout were the only non-native trout captured in lower Douglas Creek and they were captured in very high densities. Brown trout in lower Douglas Creek represent a significant competition threat to westslope cutthroat trout, should westslope cutthroat trout from the upper portion of the drainage attempt to pioneer lower Douglas Creek.

**Demographics and Connectivity:** No native trout were captured in lower Douglas Creek.

***Current Value:*** Very Low

***Protection and Enhancement Value:*** Very Low

### **Habitat Description:**

**Habitat Quality:** Habitat quality in lower Douglas Creek was generally quite degraded due to riparian grazing impacts with overall conditions considered “poor” to “fair”. Riparian grazing in this reach had limited the recruitment of most woody riparian vegetation leading to bank instability, a lack of floodplain vegetation, and abundant fine sediment.

**Habitat Security:** Lower Douglas Creek flows entirely through private lands and thus is susceptible to future changes in land and water uses that could degrade the habitat in this reach.

**DRAINAGE:** Rock Creek

**STREAM:** Middle Fork Rock Creek

**REACH:** Entire stream

### **Value as a Recruitment/Restoration Fishery for the Clark Fork River:**

**Species Present:** Westslope Cutthroat Trout, Brown Trout, and brook trout

**Fish Density/Number of Fish Produced:** Four electrofishing sections were completed on Middle Fork Rock Creek in 2008. Westslope cutthroat trout densities were moderate to low in all sections except for the lower middle section (RM 11.0), where westslope cutthroat trout densities were relatively high. Brown trout were captured only in the lower two electrofishing sections and their densities were low in the lowest section and moderate in the lower middle section (RM 11.0). Brook trout were captured in all electrofishing sections except for the upper most section (RM 21.5), however their densities were low except in the lower middle reach where their densities were moderate.

**Recruitment to and Connectivity with the Clark Fork River:** Middle Fork Rock Creek is connected to the Clark Fork River via mainstem Rock Creek, however the large distance from the mouth of the Middle Fork to the Clark Fork River likely reduces outmigration of fish to the Clark Fork River. Nonetheless, Middle Fork Rock Creek appears to maintain migratory populations of westslope cutthroat trout (based on the size of fish sampled) and good densities of brown trout that likely provide some recruitment to the Clark Fork River. Fish passage from the Clark Fork River to the mouth of Middle Fork Rock Creek via Rock Creek is excellent.

**Current Value:** Medium

**Protection and Enhancement Value:** Medium

### **Value as a Tributary/Replacement Fishery:**

**Recreational Species Present:** Westslope Cutthroat Trout, Brown Trout, and brook trout

**Fish Density:** Four electrofishing sections were completed on Middle Fork Rock Creek in 2008. Westslope cutthroat trout densities were moderate to low in all sections except for the lower middle section (RM 11.0), where westslope cutthroat trout densities were relatively high. Brown trout were captured only in the lower two electrofishing sections and their densities were low in the lowest section and moderate in the lower middle section (RM 11.0). Brook trout were captured in all electrofishing sections except for the upper most section (RM 21.5), however their densities were low except in the lower middle reach where their densities were moderate.

**Fish Size:** Westslope cutthroat trout in the upper electrofishing section on Middle Fork Rock Creek averaged 5" and reached a maximum length of 9.5", while westslope cutthroat trout in the middle sections averaged 6" and reached maximum lengths of 11" in the upper middle section and 15" in the lower middle section. Westslope cutthroat

trout in the lower section averaged 7" and reached maximum lengths of 14". Brown trout averaged 6-6.5" in the lower two electrofishing sections are reached maximum lengths of 12.5-13". Brook trout captured in Middle Fork Rock Creek averaged 4.5" and reached maximum lengths of 9".

**Recruitment to non Clark Fork River Fishery:** Middle Fork Rock Creek is a large tributary that flows directly into upper Rock Creek and likely serves as a significant source of westslope cutthroat trout and brown trout recruitment to Rock Creek. Middle Fork Rock Creek provides a moderate number of westslope cutthroat trout including some large adult westslope cutthroat trout and low numbers of brown trout that utilize a large segment of Middle Fork Rock Creek for rearing habitat. A portion of these fish likely out-migrate and recruit into the mainstem Rock Creek fishery.

*Current Value: High*

*Protection and Enhancement Value: High*

**Value as a Native Fishery:**

**Native Species Present:** Both bull and westslope cutthroat trout are present throughout the Middle Fork Rock Creek drainage. Westslope cutthroat trout in the lower portion of Middle Fork Rock Creek were genetically tested in 1992 and alleles characteristic of both westslope cutthroat trout and rainbow trout were detected (96% westslope cutthroat trout, 4% rainbow trout).

**Competitor and/or Hybridizing Species Present:** Both brown and brook trout are present in the Middle Fork Rock Creek drainage, although densities of both species are moderate to low. Despite these relatively low densities, brook trout represent a threat for competition with both bull and westslope cutthroat trout and a hybridization threat to bull trout. Brown trout pose a competition threat and potentially a predation threat (individuals as large as 13" captured) for both bull and westslope cutthroat trout.

**Demographics and Connectivity:** Bull trout in the Middle Fork Rock Creek drainage appear to maintain moderate to low densities, although bull trout are well distributed throughout the drainage. Redd counts are conducted annually in Middle Fork Rock Creek and these counts have varied from 7 to 21 redds per year between 2006 and 2008 in the index reaches. Based on these data, it appears that the Middle Fork population is relatively stable. The presence of several other bull trout populations in the upper Rock Creek drainage provide possible sources of fish to maintain genetic variation within the Middle Fork Rock Creek population or to re-found the population should it be lost. This includes connection with the Carpp Creek and Copper Creek bull trout populations, both of which are tributaries to Middle Fork Rock Creek.

Westslope cutthroat trout are moderately abundant in the Middle Fork Rock Creek drainage and are found throughout the drainage, suggesting that this population is relatively strong. Connectivity between Middle Fork Rock Creek and other westslope cutthroat trout populations in the upper Rock Creek drainage is quite good.

**Current Value:** Very High

**Protection and Enhancement Value:** Very High

**Habitat Description:**

**Habitat Quality:** Habitat quality in the Middle Fork Rock Creek drainage is overall quite good. Some habitat degradation due to cattle grazing was observed in the two middle survey sites located at RM 18.5 and RM 11.0, however this degradation was relatively minor and these reaches still received relatively high riparian assessment scores.

**Habitat Security:** Approximately half of the Middle Fork Rock Creek drainage is located within National Forest lands and are quite secure. The lower portion of the drainage flows through private cattle ranching land and thus could potentially undergo future changes in land and water use that could significantly degrade habitat in this reach.

**DRAINAGE:** Rock Creek

**STREAM:** Ranch Creek

**REACH:** Entire stream

### **Value as a Recruitment/Restoration Fishery for the Clark Fork River:**

**Species Present:** Westslope Cutthroat Trout, Brown Trout, and brook trout

**Fish Density/Number of Fish Produced:** Three electrofishing sections were completed on Ranch Creek in 2008. Westslope cutthroat trout densities were moderate in the upper and middle electrofishing sections and low in the lowest electrofishing section. Both brown and brook trout maintained low densities throughout the sampled portion of the Ranch Creek drainage.

**Recruitment to and Connectivity with the Clark Fork River:** Ranch Creek is a large tributary that flows directly into lower Rock Creek and potentially serves as a significant source of recruitment to the Clark Fork River. Ranch Creek has moderate densities of westslope cutthroat trout and low densities of brown trout that utilize a large segment of Ranch Creek for rearing habitat. A portion of these fish likely out-migrate and recruit into the mainstem Clark Fork River fishery. Connectivity between Ranch Creek and the Clark Fork River via Rock Creek is excellent for both up- and downstream migrants.

**Current Value:** High

**Protection and Enhancement Value:** High

### **Value as a Tributary/Replacement Fishery:**

**Recreational Species Present:** Westslope Cutthroat Trout, Brown Trout, and brook trout

**Fish Density:** Three electrofishing sections were completed on Ranch Creek in 2008. Westslope cutthroat trout densities were moderate in the upper and middle electrofishing sections and low in the lowest electrofishing section. Both brown and brook trout maintained low densities throughout the sampled portion of the Ranch Creek drainage.

**Fish Size:** Westslope cutthroat trout in the lower and middle electrofishing sections on Ranch Creek averaged 6" and reached a maximum length of 11" while westslope cutthroat trout in the upper section averaged 7" and reached a maximum length of 10". Brown trout averaged from 7" to 9" between the three electrofishing sections and reached a maximum length of 13". Brook trout averaged 5" in the upper and middle electrofishing sections and reached a maximum length of 7" while brook trout in the lowest electrofishing section averaged 6" and reached a maximum length of 8.5".

**Recruitment to non Clark Fork River Fishery:** Ranch Creek is a larger tributary that flows directly into lower Rock Creek and likely serves as a significant source of westslope cutthroat trout and brown trout recruitment to Rock Creek. Ranch Creek provides a moderate number of westslope cutthroat trout and low numbers of brown trout

that utilize a large segment of Ranch Creek for rearing habitat. A portion of these fish likely out-migrate and recruit into the mainstem Rock Creek fishery.

***Current Value: High***

***Protection and Enhancement Value: High***

**Value as a Native Fishery:**

**Native Species Present:** Both bull and westslope cutthroat trout are present in the Ranch Creek drainage. No genetic analyses have been completed for westslope cutthroat trout in Ranch Creek although some hybridization may have occurred in the drainage due to its connectivity with lower Rock Creek.

**Competitor and/or Hybridizing Species Present:** Both brown and brook trout are present in the Ranch Creek drainage, although densities of both species are relatively low. Despite these low densities, brook trout represent a threat for competition with both bull and westslope cutthroat trout and a hybridization threat to bull trout. Brown trout pose a competition threat and potentially a predation threat (individuals as large as 13" captured) for both bull and westslope cutthroat trout.

**Demographics and Connectivity:** Electrofishing surveys indicate that bull trout are found throughout a good portion of the Ranch Creek drainage and redd counts indicate that there is still adequate bull trout spawning occurring in the drainage (9 redds in 2007 and 10 redds in 2008). The presence of several other bull trout populations in the middle and lower Rock Creek drainage provide possible sources of fish to maintain genetic variation within the Ranch Creek population or to re-found the population should it be lost. The connectivity between this population and other neighboring bull trout populations (i.e. Welcome Creek, Butte Cabin Creek, etc...) via Rock Creek is excellent.

Westslope cutthroat trout are moderately abundant in the Ranch Creek drainage and are found throughout the drainage, suggesting that this population is relatively stable. Connectivity between Ranch Creek and other westslope cutthroat trout populations in the lower Rock Creek drainage is excellent.

***Current Value: Very High***

***Protection and Enhancement Value: Very High***

**Habitat Description:**

**Habitat Quality:** Habitat quality in the upper portion of Ranch Creek was excellent with very little habitat degradation observed. At the middle site surveyed, riparian grazing by horses was significantly impacting the riparian vegetation and reducing overall habitat quality. At the lowest site sampled, habitat quality was good except for the presence of reed canary grass throughout much of the reach. Overall, fish habitat in the Ranch Creek drainage is still considered good to very good.

**Habitat Security:** A majority of the Ranch Creek drainage is located within lands administered by the Lolo National Forest and thus is quite secure from future land use changes. The only private lands present in the Ranch Creek drainage are private in-holdings in the middle and lower portions of the drainage.

**DRAINAGE:** Rock Creek

**STREAM:** Rock Creek

**REACH:** Entire mainstem

### **Value as a Recruitment/Restoration Fishery for the Clark Fork River:**

**Species Present:** Brown Trout, Rainbow Trout, and Westslope Cutthroat Trout

**Fish Density/Number of Fish Produced:** Three electrofishing sections are routinely sampled on Rock Creek to monitor long-term trends of the fishery. Brown trout densities are high throughout the drainage. Rainbow trout densities are moderate in the upper two electrofishing sections and high in the lower section. Westslope cutthroat trout densities are high in the upper electrofishing section and moderate to low in the two lower electrofishing sections.

**Recruitment to and Connectivity with the Clark Fork River:** Rock Creek is the largest tributary to the Clark Fork River upstream of its confluence with the Blackfoot River. Rock Creek provides good densities of brown, rainbow, and westslope cutthroat trout and a portion of all of these species out-migrate to the Clark Fork River. Rock Creek and its tributaries are well connected to the Clark Fork River and provide excellent spawning and rearing habitat for migratory salmonids from the Clark Fork River. Rock Creek is undoubtedly a key tributary for trout recruitment to the Clark Fork River.

**Current Value:** Very High

**Protection and Enhancement Value:** Very High

### **Value as a Tributary/Replacement Fishery:**

**Recreational Species Present:** Brown trout, Rainbow Trout, and westslope cutthroat trout

**Fish Density:** Three electrofishing sections are routinely sampled on Rock Creek to monitor long-term trends of the fishery. Brown trout densities are high throughout the drainage. Rainbow trout densities are moderate in the upper two electrofishing sections and high in the lower section. Westslope cutthroat trout densities are high in the upper electrofishing section and moderate to low in the two lower electrofishing sections.

**Fish Size:** Three electrofishing sections are routinely sampled on Rock Creek to monitor long-term trends of the fishery. A sampling effort was completed on these sections in 2008 and both brown and rainbow trout in the lowest section averaged 11.5" with brown trout reaching a maximum length of 15.5" and rainbow trout reaching a maximum length of 18". Westslope cutthroat trout in the lowest section averaged 10" and reached a maximum length of 12". In the middle electrofishing section, brown trout averaged 12" and reached a maximum length of 16" while rainbow trout averaged 12.5" and reached a maximum length of 19.5". Westslope cutthroat trout in the middle reach averaged 11.5" and reached a maximum length of 14.5". In the upper section, both brown and westslope

cutthroat trout averaged 13.5" with brown trout reaching a maximum length of 17.5" and westslope cutthroat trout reaching a maximum length of 17". Rainbow trout in this reach averaged 15" and reached a maximum length of 20.5".

**Recruitment to non Clark Fork River Fishery:** N/A- Rock Creek flows directly into the Clark Fork River.

**Current Value:** Very High

**Protection and Enhancement Value:** Very High

### **Value as a Native Fishery:**

**Native Species Present:** Both bull and westslope cutthroat trout are present in Rock Creek. No genetic analyses have been completed for westslope cutthroat trout in Rock Creek, but rainbow trout are common in the Rock Creek drainage and introgression between westslope cutthroat trout and rainbow trout is also likely common.

**Competitor and/or Hybridizing Species Present:** Brown, brook and rainbow trout are all present in Rock Creek, although brook trout maintain very low densities in mainstem Rock Creek. Brown and rainbow trout likely compete with bull and westslope cutthroat trout and brown trout also likely prey on both species. Rainbow trout represent a significant hybridization threat to westslope cutthroat trout.

**Demographics and Connectivity:** Bull trout and westslope cutthroat trout are relatively abundant in Rock Creek and are well distributed in the drainage. Many tributaries to Rock Creek maintain bull trout and westslope cutthroat trout populations and migratory adults and sub-adults of both species are relatively common in mainstem Rock Creek. Connectivity within mainstem Rock Creek and a majority of the tributary populations is excellent. This connectivity and the presence of migratory populations allows for genetic exchange between populations and the potential to re-found a population should it be lost.

**Current Value:** very high

**Protection and Enhancement Value:** very high

### **Habitat Description:**

**Habitat Quality:** Habitat quality in mainstem Rock Creek is quite high. Land use practices in the upper Rock Creek drainage do negatively impact fish habitat in this reach including riparian grazing and irrigation withdrawals for flood irrigation. However, the cumulative impacts are not severe and upper Rock Creek generally has adequate riparian vegetation and adequate stream flows to provide quality fish habitat. The lower portion of Rock Creek flows primarily through lands administered by the Lolo National Forest and land use impacts in this reach are quite minor.

**Habitat Security:** A majority of Rock Creek flows through lands administered by the Lolo National Forest and these lands are quite secure. The upper portion of the drainage

is dominated by private land ownership and future changes in land and water use could occur in this part of the drainage that could significantly degrade the habitat in the drainage. However, several large conservation easements have been completed in the upper Rock Creek drainage, preventing many potential negative impacts that could occur if these parcels were not protected by these easements.

**DRAINAGE:** Ross Fork Rock Creek

**STREAM:** Ross Fork Rock Creek

**REACH:** Entire stream

### **Value as a Recruitment/Restoration Fishery for the Clark Fork River:**

**Species Present:** Westslope Cutthroat Trout, Brown Trout, and brook trout

**Fish Density/Number of Fish Produced:** Westslope cutthroat trout densities were moderate throughout most of the Ross Fork Rock Creek drainage with densities appearing to be relatively similar from the lower to upper portions of the drainage. Brown trout densities were moderate to low in the lower portion of the drainage and low in the upper portion of the drainage with no brown trout being captured in the upper most electrofishing section (RM 14.6). Brook trout were found in low densities throughout the Ross Fork drainage.

**Recruitment to and Connectivity with the Clark Fork River:** Ross Fork Rock Creek is connected to the Upper Clark Fork River via mainstem Rock Creek, however the large distance from the mouth of the Ross Fork and the upper Rock Creek likely reduces outmigration of fish from Ross Fork Rock Creek to the Clark Fork River. Nonetheless, Ross Fork Rock Creek appears to maintain migratory populations of brown and westslope cutthroat trout (based on the size of fish sampled) that likely provide some recruitment to the Clark Fork River. Fish passage from the Clark Fork River to the mouth of Ross Fork Rock Creek via Rock Creek is excellent.

**Current Value:** Medium

**Protection and Enhancement Value:** Medium

### **Value as a Tributary/Replacement Fishery:**

**Recreational Species Present:** Westslope Cutthroat Trout, Brown Trout, and brook trout

**Fish Density:** Westslope cutthroat trout densities were moderate throughout most of the Ross Fork Rock Creek drainage with densities appearing to be relatively similar from the lower to upper portions of the drainage. Brown trout densities were moderate to low in the lower portion of the drainage and low in the upper portion of the drainage with no brown trout being captured in the upper most electrofishing section (RM 14.6). Brook trout were found in low densities throughout the Ross Fork drainage.

**Fish Size:** Westslope cutthroat trout were relatively large in the Ross Fork drainage with fish commonly attaining lengths of 14" in the lower portion of the drainage. Westslope cutthroat trout in the upper portion of the drainage reached approximately 12" in length. Large brown trout were also sampled in the lower portion of the drainage with one individual captured in the lowest section sampled measuring at approximately 18" and another fish sampled at river mile 4.9 measuring approximately 17". The brook trout

sampled in the Ross Fork drainage were relatively small, although one 14" brook trout was captured at the highest section sampled in the drainage (RM 14.6).

**Recruitment to non Clark Fork River Fishery:** Ross Fork Rock Creek likely provides significant recruitment of native and non-native sport fish to the mainstem Rock Creek drainage. A relatively large number of brown trout were sampled in the lower portion of the Ross Fork drainage and a portion of these fish likely out-migrate to Rock Creek and later return to spawn as adults. Brown trout greater than 16" were sampled in lower portions of Ross Fork Rock Creek and it is suspected that these fish likely spent a portion of their life in mainstem Rock Creek. The Ross Fork drainage also likely provides significant recruitment of westslope cutthroat trout to mainstem Rock Creek.

***Current Value:*** High

***Protection and Enhancement Value:*** High

**Value as a Native Fishery:**

**Native Species Present:** Bull trout were captured in nearly all sections sampled in Ross Fork Rock Creek in 2007. However, their abundance was generally low in the lower portion of the drainage and moderate to low in the upper portion of the drainage. Westslope cutthroat trout were found throughout the Ross Fork drainage with their densities of being moderate at nearly all sites sampled in 2007. Westslope cutthroat trout captured during the 2007 sampling effort did not appear hybridized, but due to the connectivity of Ross Fork Rock Creek with mainstem Rock Creek, it is assumed that some hybridization between westslope cutthroat trout and rainbow trout has occurred. No genetic analyses have been completed to determine the extent of hybridization in the drainage.

**Competitor and/or Hybridizing Species Present:** Brown trout are relatively abundant in the lower portion of the Ross Fork drainage and pose a significant threat to native bull trout and westslope cutthroat trout in the form of competition and predation, however, their abundance drops significantly higher in the drainage. Rainbow trout were not sampled in the drainage, however, due to the connectivity between the Ross Fork and mainstem Rock Creek, it is assumed that some hybridization between westslope cutthroat trout and rainbow trout has occurred. No barriers to upstream migration that could potentially protect westslope cutthroat trout from hybridization are known to occur in mainstem Ross Fork Rock Creek. Brook trout occur in relatively low densities in the drainage and thus provide only a minimal threat of hybridization with bull trout and competition with both bull and westslope cutthroat trout.

**Demographics and Connectivity:** Bull trout in the Ross Fork drainage appear to maintain moderate to low densities, despite their presence throughout the drainage. Based on the relatively low abundance of bull trout, there is some question as to the long-term viability of this population. However, the presence of several other bull trout populations in the upper Rock Creek drainage provide possible sources of fish to maintain genetic variation within the Ross Fork population or to re-found the population

should it be lost. The connectivity between this population and other neighboring bull trout populations (i.e. West Fork, Middle Fork, etc...) is quite good.

Westslope cutthroat trout are moderately abundant in the Ross Fork drainage and are found throughout the drainage, suggesting that this population is relatively strong. Connectivity between Ross Fork Rock Creek and other westslope cutthroat trout populations in the upper Rock Creek drainage is quite good.

***Current Value:*** High

***Protection and Enhancement Value:*** Very high

### **Habitat Description:**

**Habitat Quality:** Habitat quality in the Ross Fork Rock Creek drainage is considered fair to good. In the upper portion of the drainage, Ross Fork Rock Creek flows through primarily National Forest lands and the fish habitat in this reach is quite good. The lower portion of Ross Fork Rock Creek flows through primarily private agricultural lands and habitat in this reach is considered only fair. Habitat degradation in this reach is generally due to cattle grazing within the riparian area, dewatering due to irrigation practices, and subsequent fish entrainment into irrigation ditches.

**Habitat Security:** Over half of the Ross Fork Rock Creek drainage flows through lands administered by the Beaverhead-Deerlodge National Forest and thus habitat security in this portion of the drainage is quite high. However, the lower portion of the Ross Fork drainage flows through private lands that could potentially undergo future changes in land and water use that could significantly degrade habitat in this reach.

**DRAINAGE:** Rock Creek

**STREAM:** Stony Creek

**REACH:** Entire stream

### **Value as a Recruitment/Restoration Fishery for the Clark Fork River:**

**Species Present:** Westslope Cutthroat Trout, Brown Trout

**Fish Density/Number of Fish Produced:** Westslope cutthroat trout were captured in all three sections sampled in Stony Creek with their densities being low in the upper and lower sections and moderate to high in the middle section. Brown trout were captured only in the lowest section and their densities were low.

**Recruitment to and Connectivity with the Clark Fork River:** Stony Creek is a large tributary that flows directly into upper Rock Creek and likely serves as a source of recruitment to the Clark Fork River. Stony Creek maintains moderate densities of westslope cutthroat trout and low densities of brown trout, a portion of which likely outmigrate and recruit into the mainstem Clark Fork River fishery. Stony Creek is located relatively high in the Rock Creek drainage and this long distance may limit the amount of recruitment that it provides to the Clark Fork River. Connectivity between Stony Creek and the Clark Fork River via Rock Creek is excellent for both up- and downstream migrants.

**Current Value:** Medium

**Protection and Enhancement Value:** Medium

### **Value as a Tributary/Replacement Fishery:**

**Recreational Species Present:** Westslope Cutthroat Trout, Brown Trout

**Fish Density:** Westslope cutthroat trout were captured in all three sections sampled in Stony Creek with their densities being low in the upper and lower sections and moderate to high in the middle section. Brown trout were captured only in the lowest section and their densities were low.

**Fish Size:** Westslope cutthroat trout in Stony Creek averaged 5-5.5" throughout the drainage and reached maximum lengths of 7" in the upper section, 11" in the middle section and 8" in the lowest section. Brown trout averaged 6" and reached a maximum length of 11".

**Recruitment to non Clark Fork River Fishery:** Stony Creek is a large tributary that flows directly into upper Rock Creek and likely serves as an important source of westslope cutthroat trout and brown trout recruitment to Rock Creek. Stony Creek maintains moderate densities of westslope cutthroat trout and low densities of brown trout, a portion of which likely outmigrate and recruit into the mainstem Rock Creek fishery.

**Current Value:** High

**Protection and Enhancement Value:** High

### **Value as a Recruitment/Restoration Fishery for the Clark Fork River:**

**Species Present:** Westslope Cutthroat Trout, Brown Trout

**Fish Density/Number of Fish Produced:** Westslope cutthroat trout were captured in all three sections sampled in Stony Creek with their densities being low in the upper and lower sections and moderate to high in the middle section. Brown trout were captured only in the lowest section and their densities were low.

**Recruitment to and Connectivity with the Clark Fork River:** Stony Creek is a large tributary that flows directly into upper Rock Creek and likely serves as a source of recruitment to the Clark Fork River. Stony Creek maintains moderate densities of westslope cutthroat trout and low densities of brown trout, a portion of which likely outmigrate and recruit into the mainstem Clark Fork River fishery. Stony Creek is located relatively high in the Rock Creek drainage and this long distance may limit the amount of recruitment that it provides to the Clark Fork River. Connectivity between Stony Creek and the Clark Fork River via Rock Creek is excellent for both up- and downstream migrants.

**Current Value:** Medium

**Protection and Enhancement Value:** Medium

### **Value as a Native Fishery:**

**Native Species Present:** Both bull and westslope cutthroat trout are present in Stony Creek. Genetic analyses were completed for westslope cutthroat trout in Stony Creek in 1983 and significant hybridization with rainbow trout was observed (80% Westslope cutthroat trout/20% rainbow trout).

**Competitor and/or Hybridizing Species Present:** Brown trout are present in the Stony Creek drainage, although their densities are relatively low. Despite these low densities, brown trout pose a competition threat for both bull and westslope cutthroat trout. Genetic analyses indicate that rainbow trout have hybridized with westslope cutthroat trout in Stony Creek.

**Demographics and Connectivity:** Electrofishing surveys in Stony Creek indicate that bull trout maintain moderate densities in the drainage. Bull trout redd counts in Stony Creek demonstrate that bull trout spawning is still occurring in the drainage with 10-17 redds observed each year from 2006-2008. Based on this data, it appears that the Stony Creek population is still relatively stable. The presence of several other bull trout populations in the middle and upper Rock Creek drainage provide possible sources of fish to maintain genetic variation within the Stony Creek population or to re-found the

population should it be lost. The connectivity between this population and other neighboring bull trout populations (i.e. Hogback Creek, Middle Fork Rock Creek, etc...) via Rock Creek is excellent.

Westslope cutthroat trout maintain moderate to low densities in the Stony Creek drainage and are found throughout the drainage, suggesting that this population is relatively strong. Connectivity between Stony Creek and other westslope cutthroat trout populations in the middle and upper Rock Creek drainage is quite good which allows for genetic exchange with other populations and potentially re-founding of the population should it be lost.

***Current Value:*** Very high

***Protection and Enhancement Value:*** Very high

### **Habitat Description:**

**Habitat Quality:** Habitat quality in the Stony Creek drainage was found to be excellent at the three sites surveyed with minimal habitat degradation being observed. One irrigation diversion is present in the lower portion of Stony Creek that serves as a source of water for flood irrigation for a downstream water user. This ditch is known to entrain bull and westslope cutthroat trout (USFS and MFWP unpublished data).

**Habitat Security:** Most of the Stony Creek drainage is located within lands administered by the Lolo National Forest and thus is quite secure. A small portion of the lower drainage is comprised of privately owned parcels, which could be subject to future changes in land and water uses.

**DRAINAGE:** Flint Creek

**STREAM:** Trout Creek

**REACH:** Entire stream

### **Value as a Recruitment/Restoration Fishery for the Clark Fork River:**

**Species Present:** Brown trout

**Fish Density/Number of Fish Produced:** Two electrofishing sections were completed on Trout Creek in 2008 and brown trout densities were high in both sections sampled.

**Recruitment to and Connectivity with the Clark Fork River:** Trout Creek is likely a relatively important spawning tributary for brown trout from the Clark Fork River. Electrofishing surveys completed in September 2008 yielded several large adults (>20") in the lower electrofishing section and these fish appeared to be pre-spawn brown trout preparing to spawn in Trout Creek. A portion of these fish may be spawning adult brown trout from the Clark Fork River. Connectivity between Trout Creek and the Upper Clark Fork appears to be good other than potential seasonal fish passage issues at some diversion dams in lower mainstem Flint Creek. The results of a recent radio telemetry study indicate that the diversion dams in lower Flint Creek are at least seasonally passable by migrating adult salmonids.

*Current Value: High*

*Protection and Enhancement Value: High*

### **Value as a Tributary/Replacement Fishery:**

**Recreational Species Present:** Brown trout

**Fish Density:** Two electrofishing sections were completed on Trout Creek in 2008 and brown trout densities were high in both sections sampled.

**Fish Size:** Brown trout captured in the upper section averaged 7" and reached a maximum length of 13.5" while brown trout in the lower reach averaged 8.5" and reached a maximum length of 24".

**Recruitment to non Clark Fork River Fishery:** Trout Creek appears to be a key spawning tributary for adult brown trout from Flint Creek. Electrofishing surveys completed in September 2008 yielded several large adults (>20") in the lower electrofishing section and these fish appeared to be pre-spawn brown trout preparing to spawn in Trout Creek. It is suspected that a majority of these fish are likely spawning adults from Flint Creek.

*Current Value: High*

*Protection and Enhancement Value: High*

### **Value as a Native Fishery:**

**Native Species Present:** N/A- No native salmonids were captured in Trout Creek.

**Competitor and/or Hybridizing Species Present:** N/A

**Demographics and Connectivity:** N/A

***Current Value:*** Very Low

***Protection and Enhancement Value:*** Very Low

### **Habitat Description:**

**Habitat Quality:** Habitat degradation was observed at the upper survey site caused primarily by riparian grazing impacts and its impact on woody riparian vegetation. Similar impacts were observed lower in the drainage, although woody riparian vegetation was completely absent from the lower reach. Fish habitat was still considered good in the lower reach due to its low width to depth ratio and abundant deep pools. Trout Creek acts as a conduit for an unusually large trans-basin diversion of water from East Fork Rock Creek into the Flint Creek valley. This project commonly diverts up to 150 cfs from East Fork Rock Creek and conveys this flow through Trout Creek to downstream water users throughout the irrigation season. This altered hydrograph during the irrigation season appears to destabilize portions of Trout Creek, particularly reaches impacted by other land uses.

**Habitat Security:** Nearly the entire Trout Creek drainage is located within privately owned land and thus is quite susceptible to future changes in the land and water use that could significantly degrade fish habitat.

**DRAINAGE:** Rock Creek  
**STREAM:** Welcome Creek  
**REACH:** Entire stream

### **Value as a Recruitment/Restoration Fishery for the Clark Fork River:**

**Species Present:** Westslope Cutthroat Trout, Brown Trout, Rainbow Trout

**Fish Density/Number of Fish Produced:** Westslope cutthroat trout were captured in moderate to low densities in both the upper and lower electrofishing sections sampled in 2008. Both brown and rainbow trout were only captured in the lower electrofishing section and both species maintained relatively low densities.

**Recruitment to and Connectivity with the Clark Fork River:** Welcome Creek is a large tributary that flows directly into lower Rock Creek and potentially serves as a significant source of recruitment to the Clark Fork River. Welcome Creek maintains moderate densities of westslope cutthroat trout and brown trout and low densities of rainbow trout, a portion of which likely outmigrate and recruit into the mainstem Clark Fork River fishery. Connectivity between Welcome Creek and the Clark Fork River via Rock Creek is excellent for both up- and downstream migrants.

**Current Value:** High

**Protection and Enhancement Value:** High (nearly all the Welcome Creek drainage is within the Welcome Creek Wilderness)

### **Value as a Tributary/Replacement Fishery:**

**Recreational Species Present:** Westslope Cutthroat Trout, Brown Trout, Rainbow Trout

**Fish Density:** Westslope cutthroat trout were captured in moderate to low densities in both the upper and lower electrofishing sections sampled in 2008. Both brown and rainbow trout were only captured in the lower electrofishing section and both species maintained relatively low densities.

**Fish Size:** Westslope cutthroat trout captured in the lower electrofishing section averaged 5.5" and reached a maximum length of 9" while westslope cutthroat trout in the upper reach averaged 6" and also reached a maximum length of 9". Brown trout captured in Welcome Creek averaged 6" and reached a maximum length of 9" while rainbow trout averaged 8" and reached a maximum length of 9".

**Recruitment to non Clark Fork River Fishery:** Welcome Creek is a larger tributary that flows directly into lower Rock Creek and likely serves as a significant source of westslope cutthroat trout, brown trout, and rainbow trout recruitment to Rock Creek. Welcome Creek maintains moderate densities of westslope cutthroat trout and brown trout and low densities of rainbow trout, a portion of which likely outmigrate and recruit into the mainstem Rock Creek fishery.

**Current Value:** High

**Protection and Enhancement Value:** High (nearly all the Welcome Creek drainage is within the Welcome Creek Wilderness)

### **Value as a Native Fishery:**

**Native Species Present:** Both bull and westslope cutthroat trout are present in Welcome Creek. No genetic analyses have been completed for westslope cutthroat trout in Welcome Creek but it is likely that some hybridization has occurred due to the presence of rainbow trout in the drainage.

**Competitor and/or Hybridizing Species Present:** Both brown and rainbow trout are present in the Welcome Creek drainage, although both species were captured only in the lower portion of the drainage and densities of both species are relatively low.

Nonetheless, rainbow trout are a hybridization threat for westslope cutthroat trout and juvenile brown trout are a competition threat for both bull and westslope cutthroat trout.

**Demographics and Connectivity:** Bull trout in the Welcome Creek drainage appear to maintain moderate to low densities and occupy a good portion of the drainage. Bull trout redd counts are conducted annually in Welcome Creek and in recent years (2006 to 2008) four to six redds have been observed in the index reaches. Thus, there is some question as to the long-term viability of this population but the population currently appears to be stable. The presence of several other bull trout populations in the middle and lower Rock Creek drainage provide possible sources of fish to maintain genetic variation within the Welcome Creek population or to re-found the population should it be lost. The connectivity between this population and other neighboring bull trout populations (i.e. Ranch Creek, Butte Cabin Creek, etc...) via Rock Creek is excellent.

Westslope cutthroat trout densities are moderate to low in the Welcome Creek drainage but appear to be present throughout the drainage, suggesting that this population is relatively strong. Connectivity between Welcome Creek and other westslope cutthroat trout populations in the lower Rock Creek drainage is excellent.

**Current Value:** Very High

**Protection and Enhancement Value:** Very High (nearly all of Welcome Creek is within the Welcome Creek Wilderness)

### **Habitat Description:**

**Habitat Quality:** Habitat quality in the Welcome Creek drainage was found to be excellent at the two sites surveyed with minimal habitat degradation being observed. The only degradation observed between the two sites was due to fire damage in the lower portion of the drainage.

**Habitat Security:** The Welcome Creek drainage is located almost entirely within lands administered by the Lolo National Forest with a majority of the drainage being located within the Welcome Creek Wilderness. Based on its location within designated wilderness, this drainage is very secure from future land use changes.

**DRAINAGE:** Rock Creek

**STREAM:** West Fork Rock Creek

**REACH:** Entire stream

### **Value as a Recruitment/Restoration Fishery for the Clark Fork River:**

**Species Present:** Westslope Cutthroat Trout, Brown Trout

**Fish Density/Number of Fish Produced:** Westslope cutthroat trout were captured in low densities in the lowest electrofishing section sampled in the drainage and relatively low densities in the upper electrofishing section sampled. Westslope cutthroat trout densities were moderate in the two middle reaches sampled. Brown trout were captured only in the two lowest electrofishing sections sampled and their densities were low.

**Recruitment to and Connectivity with the Clark Fork River:** West Fork Rock Creek is connected to the Upper Clark Fork River via mainstem Rock Creek, however the large distance from the mouth of West Fork Rock Creek and the Clark Fork River likely reduces outmigration of fish to the Clark Fork River. Nonetheless, West Fork Rock Creek is a large tributary that likely maintains migratory populations of brown and westslope cutthroat trout that likely also provide some recruitment to the Clark Fork River. Fish passage from the Clark Fork River to the mouth of West Fork Rock Creek via Rock Creek is excellent.

**Current Value:** Medium

**Protection and Enhancement Value:** Medium

### **Value as a Tributary/Replacement Fishery:**

**Recreational Species Present:** Westslope Cutthroat Trout, Brown Trout

**Fish Density:** Westslope cutthroat trout were captured in low densities in the lowest electrofishing section sampled in the drainage and relatively low densities in the upper electrofishing section sampled. Westslope cutthroat trout densities were moderate in the two middle reaches sampled. Brown trout were captured only in the two lowest electrofishing sections sampled and their densities were low.

**Fish Size:** Westslope cutthroat trout captured in the two lowest electrofishing sections averaged 7" and reached a maximum length of 10". Westslope cutthroat trout in the upper electrofishing sections averaged 5.5" and reached maximum lengths of 9.5". Brown trout in the lower two electrofishing sections averaged 9" and reached a maximum length of 10".

**Recruitment to non Clark Fork River Fishery:** West Fork Rock Creek likely provides significant recruitment of native and non-native sport fish to mainstem Rock Creek. West Fork Rock Creek is a large tributary that flows directly into upper Rock Creek and maintains moderate densities of westslope cutthroat trout and low densities of brown

trout. A portion of these westslope cutthroat and brown trout likely outmigrate and recruit into the mainstem Rock Creek fishery.

***Current Value:*** *High*

***Protection and Enhancement Value:*** *High*

**Value as a Native Fishery:**

**Native Species Present:** Both bull and westslope cutthroat trout are present in West Fork Rock Creek. Genetic analyses were completed for westslope cutthroat trout in lower West Fork Rock Creek in 1991 and alleles characteristic of only westslope cutthroat trout were detected (100% westslope cutthroat trout).

**Competitor and/or Hybridizing Species Present:** Brown trout are found in low densities in the lower portion of the West Fork Rock Creek drainage and pose a competition and predation threat to native bull trout and westslope cutthroat trout. No other non-native trout are present in the drainage.

**Demographics and Connectivity:** Electrofishing surveys in West Fork Rock Creek indicate that bull trout are present throughout most of the drainage and maintain moderate densities. Based on these data, it appears that the West Fork Rock Creek population is still relatively stable. The presence of several other bull trout populations in the upper Rock Creek drainage provide possible sources of fish to maintain genetic variation within the West Fork Rock Creek population or to re-found the population should it be lost. The connectivity between this population and other neighboring bull trout populations (i.e. Stony Creek, Middle Fork Rock Creek, etc...) via Rock Creek is excellent.

Westslope cutthroat trout maintain moderate densities in the West Fork Rock Creek drainage and are found throughout the drainage, suggesting that this population is relatively strong. Connectivity between West Fork Rock Creek and other westslope cutthroat trout populations in the upper Rock Creek drainage is quite good which allows for genetic exchange with other populations and potentially re-founding of the population should it be lost.

***Current Value:*** *Very High*

***Protection and Enhancement Value:*** *Very High*

**Habitat Description:**

**Habitat Quality:** Habitat quality in West Fork Rock Creek was slightly degraded in the upper two survey sites (RM 16.2 and 21.1) due to past riparian grazing impacts and its effect on riparian vegetation. Habitat quality at the lower middle site (RM 6.4) was considered excellent with minimal habitat degradation observed at the site. Habitat quality was rated the lowest (still rated “fair”) at the lowest survey site (RM 1.7) due to significant grazing impacts affecting the riparian vegetation and overall channel characteristics of the reach. Highway 38 (Skalkaho Highway) does encroach on portions

of West Fork Rock Creek eliminating floodplain adjacent to the channel and also reducing natural channel migration in affected reaches.

**Habitat Security:** A majority of the West Fork Rock Creek drainage is located within lands administered by the Beaverhead-Deerlodge National Forest and thus is quite secure. A small portion of the lower drainage is comprised of privately owned parcels, which could be subject to future changes in land and water uses.

## PRIORITY – 4

**DRAINAGE:** Warm Springs Creek

**STREAM:** Barker Creek

**REACH:** All

### **Value as a Recruitment/Restoration Fishery for the Clark Fork River:**

**Species Present:** Westslope Cutthroat Trout, Brook Trout, and Rainbow Trout

**Fish Density/Number of Fish Produced:** Based on electrofishing conducted in 2007, westslope cutthroat trout comprise the bulk of the recreational fishery in Barker Creek. However, the species only occurs in low densities throughout much of the stream. Brook trout and rainbow trout are also present but appear to be fairly uncommon and do not likely represent significant components of the fishery at this time.

**Recruitment to and Connectivity with the Clark Fork River:** Barker Creek is a direct tributary to upper Warm Springs Creek. The stream likely provides at least some recruitment of westslope cutthroat trout to the mainstem as well as the Clark Fork River. However, the overall contribution may be low given the low densities of fish in the stream. Additionally, much of the recreational fish community is comprised of westslope cutthroat trout, which tend to be rather incidental in the upper Clark Fork River. The rarity of these fish in downstream reaches suggests that the dispersal or survival of migratory individuals may be limited. Additionally, the presence of Myers Dam, may also limit the recruitment potential of Barker Creek. This diversion structure, which is located on Warm Springs Creek at river mile 16.6, appears to be at least a partial barrier restricting upstream fish movement (e.g. fish returning to Barker Creek to spawn).

**Current Value:** Low

**Protection and Enhancement Value:** Low

### **Value as a Tributary/Replacement Fishery:**

**Recreational Species Present:** Westslope Cutthroat Trout, Brook Trout, and Rainbow Trout

**Fish Density:** Based on electrofishing conducted in 2007, westslope cutthroat trout comprise the bulk of the recreational fishery in Barker Creek. However, the species only occurs in low densities throughout much of the stream. Brook trout and rainbow trout are also present but appear to be fairly uncommon and do not likely represent significant components of the fishery at this time.

**Fish Size:** Westslope cutthroat trout in Barker Creek do not typically attain extremely large size, although fish of catchable length are present. At the three sites sampled in 2007, westslope cutthroat trout had an average length between about 6 and 8 inches. The

largest fish captured during our sampling was about 10 inches in total length. As mentioned above, brook trout and rainbow trout are relatively uncommon in Barker Creek, and do not likely represent significant components of the fishery at this time. Representatives of each species handled in 2007 were larger fish of approximately 10 inches in length.

**Recruitment to non Clark Fork River Fishery:** Barker Creek is a direct tributary to upper Warm Springs Creek. The stream likely provides at least some recruitment of westslope cutthroat trout to the mainstem. However, the overall contribution may be low given the low densities of fish in the stream.

***Current Value: Low***

***Protection and Enhancement Value: Low***

### **Value as a Native Fishery:**

**Native Species Present:** Bull Trout and Westslope Cutthroat Trout

No genetic testing has been conducted on westslope cutthroat trout in Barker Creek. However, given the presence of what appear to be rainbow trout in the stream, it is possible that genetic purity is compromised.

**Competitor and/or Hybridizing Species Present:** Rainbow Trout and Brook Trout

Rainbow trout and brook trout were both found in very low densities in Barker Creek during 2007 electrofishing. Since both species appear to be fairly uncommon, neither likely exerts any measurable competitive pressure on native trout in the stream. However, the simple presence of brook trout and rainbow trout in Barker Creek does pose hybridization risks to both bull trout (w/ brook trout) and westslope cutthroat trout (w/ rainbow trout).

**Demographics and Connectivity:** Based on electrofishing conducted in 2007, bull trout comprise much of the fish community in Barker Creek. The species occurs in low to moderate densities throughout much of stream, and the observation of multiple age classes suggests the population is viable with successful recruitment being a relatively regular occurrence. One finding of interest during our 2007 electrofishing was the capture of a 20-inch bull trout in the upper reaches of the stream. It is unlikely a fish could attain this large size in Barker Creek, and thus was probably a migratory adult from Warm Springs Creek. Westslope cutthroat trout are also present in Barker Creek, but densities tend to be relatively low throughout the stream. While several age classes were observed during 2007 sampling, the relative scarcity of younger juvenile size classes at all of the sample sites suggests that survival and recruitment may be marginal. The largest westslope cutthroat trout measured in Barker Creek in 2007 was approximately 10 inches in length.

Barker Creek is a direct tributary to upper Warm Springs Creek. The stream appears to have fair connectivity with the mainstem, and it likely supports populations of both bull trout and westslope cutthroat trout with resident as well as migratory life histories. However, it is likely that the migratory component is largely limited to fish utilizing upper Warm Springs Creek. The presence of Myers Dam on Warm Springs Creek at river mile 16.6 appears to limit the connectivity of the stream with lower Warm Springs Creek and the Clark Fork River. This structure appears to be at least a partial barrier restricting upstream fish movement (e.g. migratory fish returning to Barker Creek to spawn).

***Current Value:*** Very High

***Protection and Enhancement Value:*** Very High

### **Habitat Description:**

**Habitat Quality:** Habitat quality and riparian condition along Barker Creek is fairly good. However, much of the watershed has undergone recent widespread timber harvest, and logging activity has affected stream and riparian habitat (mostly from reductions in canopy cover and road construction) in various locations in the drainage. Past mining activity is also evident in several areas along the channel, and impacts to stream habitat are present in these locations. Additionally, the lower reaches of Barker Creek flow through a small subdivision where residential development has impacted stream and riparian habitat to some degree. In this area, the stream is divided into two channels. The split appears to be related to past mining activity that has likely been perpetuated to maximize the amount of stream length within the subdivision.

**Habitat Security:** Historically, the entire Barker Creek watershed was in private ownership where commercial timber harvest was the primary land use. However, the bulk of the watershed is now part of the National Forest where long-term habitat security is considered to be fairly good. This relatively recent land transfer was part of the Watershed Land Acquisition that occurred in 2000 and 2001. Private ownership is now limited to the lower 0.5 miles of Barker Creek where the stream flows through a small residential subdivision. Although limited in its extent, the nature of the land use in this area (residential development) does pose some risks to habitat security in this portion of the drainage.

**DRAINAGE:** Rock Creek

**STREAM:** Butte Cabin Creek

**REACH:** Entire stream

### **Value as a Recruitment/Restoration Fishery for the Clark Fork River:**

**Species Present:** Westslope Cutthroat Trout, Brown Trout, Rainbow Trout

**Fish Density/Number of Fish Produced:** Westslope cutthroat trout appear to maintain low densities in the Butte Cabin Creek drainage with only three captured in both of the two electrofishing sections sampled. Brown trout were only captured in the lower electrofishing section and their densities were moderate. Similarly, rainbow trout were only captured in the lowest electrofishing section, but their densities were relatively low.

**Recruitment to and Connectivity with the Clark Fork River:** Butte Cabin Creek is a relatively large tributary that flows directly into lower Rock Creek and potentially serves as a significant source of recruitment to the Clark Fork River. Butte Cabin Creek maintains moderate densities of brown trout and low densities of westslope cutthroat trout and rainbow trout, a portion of which likely outmigrate and recruit into the mainstem Clark Fork River fishery. Connectivity between Butte Cabin Creek and the Clark Fork River via Rock Creek is excellent for both up- and downstream migrants.

**Current Value:** Medium

**Protection and Enhancement Value:** Medium (*entire drainage in Forest Service ownership*)

### **Value as a Tributary/Replacement Fishery:**

**Recreational Species Present:** Westslope Cutthroat Trout, Brown Trout, Rainbow Trout

**Fish Density:** Westslope cutthroat trout appear to maintain low densities in the Butte Cabin Creek drainage with only three captured in both the upper and lower electrofishing sections. Brown trout were only captured in the lower electrofishing section and their densities were moderate. Similarly, rainbow trout were only captured in the lowest electrofishing section, but their densities were relatively low.

**Fish Size:** Westslope cutthroat trout averaged 6" in Butte Cabin Creek and reached a maximum length of 7". Both brown and rainbow trout averaged 3.5" and reached maximum lengths of 5".

**Recruitment to non Clark Fork River Fishery:** Butte Cabin Creek is fairly large tributary that flows directly into lower Rock Creek and likely serves as a significant source of westslope cutthroat trout, brown trout, and rainbow trout recruitment to Rock Creek. Butte Cabin Creek maintains moderate densities of brown trout and low densities of westslope cutthroat trout and rainbow trout, a portion of which likely outmigrate and recruit into the mainstem Rock Creek fishery.

**Current Value:** High

**Protection and Enhancement Value:** High (entire drainage in Forest Service ownership)

### **Value as a Native Fishery:**

**Native Species Present:** Both bull and westslope cutthroat trout are present in Butte Cabin Creek. No genetic analyses have been completed for westslope cutthroat trout in Butte Cabin Creek but it is likely that some hybridization has occurred due to the presence of rainbow trout in the drainage.

**Competitor and/or Hybridizing Species Present:** Both brown and rainbow trout are present in the Butte Cabin Creek drainage, although both species were captured only in the lower portion of the drainage and densities of both species were moderate to low. Nonetheless, rainbow trout are a hybridization threat for westslope cutthroat trout and juvenile brown trout are a competition threat for both bull and westslope cutthroat trout.

**Demographics and Connectivity:** Bull trout in the Butte Cabin Creek drainage maintain relatively low densities and appear to occupy only a portion of the drainage. Thus, there is some question as to the long-term viability of this population. Bull trout redd counts are conducted in Butte Cabin Creek in most years and in recent years (2007 and 2008) three to four redds have been observed. The presence of several other bull trout populations in the middle and lower Rock Creek drainage provide possible sources of fish to maintain genetic variation within the Butte Cabin Creek population or to re-found the population should it be lost. The connectivity between this population and other neighboring bull trout populations (i.e. Ranch Creek, Welcome Creek, etc...) via Rock Creek is excellent.

Westslope cutthroat trout densities are low in the Butte Cabin Creek drainage however they do occupy much of the drainage. This population appears to be stable but the long-term viability of this population is questionable due to the low densities of fish observed. Connectivity between Butte Cabin Creek and other westslope cutthroat trout populations in the lower Rock Creek drainage is excellent.

**Current Value:** High

**Protection and Enhancement Value:** High (entire drainage in Forest Service ownership)

### **Habitat Description:**

**Habitat Quality:** Habitat quality in the Butte Cabin Creek drainage was found to be excellent at the two sites surveyed with minimal habitat degradation being observed.

**Habitat Security:** The entire Butte Cabin Creek drainage is located within lands administered by the Lolo National Forest and thus is quite secure from future land use changes.

**DRAINAGE:** Rock Creek

**STREAM:** Carpp Creek

**REACH:** Entire stream

### **Value as a Recruitment/Restoration Fishery for the Clark Fork River:**

**Species Present:** Westslope Cutthroat Trout, brook trout

**Fish Density/Number of Fish Produced:** Westslope cutthroat trout densities were low in both electrofishing sections sampled in Carpp Creek. Brook trout were only captured in the lower electrofishing section and their densities were also low.

**Recruitment to and Connectivity with the Clark Fork River:** Carpp Creek is a relatively large tributary, however westslope cutthroat trout densities are quite low in the drainage and it is located high in the Rock Creek drainage. Thus, it is unlikely that Carpp Creek provides a significant number of westslope cutthroat out-migrant to the Clark Fork River.

***Current Value:*** Low

***Protection and Enhancement Value:*** Low

### **Value as a Tributary/Replacement Fishery:**

**Recreational Species Present:** Westslope Cutthroat Trout, brook trout

**Fish Density:** Westslope cutthroat trout densities were low in both electrofishing sections sampled in Carpp Creek. Brook trout were only captured in the lower electrofishing section and their densities were also low.

**Fish Size:** Westslope cutthroat trout in the lower electrofishing section averaged 4.5" (only two fish captured) and reached a maximum length of 7", while westslope cutthroat trout in the upper reach averaged 5.5" and reached a maximum length of 7.5".

**Recruitment to non Clark Fork River Fishery:** Carpp Creek is a relatively large tributary; however it maintains relatively low densities of westslope cutthroat trout and thus is likely not a major source of recruitment to Rock Creek.

***Current Value:*** Medium

***Protection and Enhancement Value:*** Medium

### **Value as a Native Fishery:**

**Native Species Present:** Both bull and westslope cutthroat trout are present in the Carpp Creek drainage. No genetic analyses have been completed for westslope cutthroat trout in Carpp Creek although some hybridization may have occurred in the drainage due to its connectivity with Middle Fork Rock Creek and mainstem Rock Creek.

**Competitor and/or Hybridizing Species Present:** Brook trout are the only non-native trout found in the Carpp Creek drainage and they were found in low densities. Brook trout represent a competition threat to both bull and westslope cutthroat trout and a hybridization threat to bull trout.

**Demographics and Connectivity:** Bull trout in the Carpp Creek drainage maintain moderate to low densities, although bull trout appear to be well distributed throughout the drainage. Redd counts are conducted annually in Carpp Creek and these counts have varied from 8 to 11 redds per year between 2006 and 2008 in the index reaches. Based on these data, it appears that the Carpp Creek population is relatively stable. The presence of several other bull trout populations in the upper Rock Creek drainage provide possible sources of fish to maintain genetic variation within the Carpp Creek population or to re-found the population should it be lost. This includes connection with Middle Fork Rock Creek and Copper Creek bull trout populations. .

Westslope cutthroat trout densities are relatively low in the Carpp Creek drainage although they appear to be found throughout the drainage. Thus, the population appears to be stable, however the long- term viability of this population may be uncertain based on their low densities. Connectivity between Carpp Creek and other westslope cutthroat trout populations in the upper Rock Creek drainage is quite good.

**Current Value:** Very High

**Protection and Enhancement Value:** Very High (*entire drainage in Forest Service ownership*)

### **Habitat Description:**

**Habitat Quality:** Habitat quality in the Carpp Creek drainage was found to be excellent at the two sites surveyed with minimal habitat degradation being observed.

**Habitat Security:** The entire Carpp Creek drainage is located within lands administered by the Beaverhead-Deerlodge National Forest with the south side of the creek delineating the boundary for the Anaconda Pintler Wilderness. Thus, this drainage is quite secure from future land and water use changes.

**DRAINAGE:** Rock Creek

**STREAM:** Copper Creek

**REACH:** Entire stream

### **Value as a Recruitment/Restoration Fishery for the Clark Fork River:**

**Species Present:** Westslope Cutthroat Trout, brook trout

**Fish Density/Number of Fish Produced:** Three electrofishing sections were completed in Copper Creek in 2008. Westslope cutthroat trout are moderately abundant throughout the Copper Creek drainage. Brook trout densities were very high in the lowest electrofishing section and moderate in the upper two electrofishing sections. Brown trout densities were low with only one captured in the lowest electrofishing section.

**Recruitment to and Connectivity with the Clark Fork River:** Copper Creek is a relatively large tributary capable of producing a relatively large number of out-migrant; however it is located quite high in the Rock Creek drainage. It is likely that Copper Creek does provide some westslope cutthroat out-migrant to the Clark Fork River however it is uncertain whether it is a significant number of out-migrant. Brown trout densities in Copper Creek are too low to provide significant recruitment of this species to the Clark Fork River.

**Current Value:** Medium

**Protection and Enhancement Value:** Medium

### **Value as a Tributary/Replacement Fishery:**

**Recreational Species Present:** Westslope Cutthroat Trout, brook trout

**Fish Density:** Three electrofishing sections were completed in Copper Creek in 2008. Westslope cutthroat trout are moderately abundant throughout the Copper Creek drainage. Brook trout densities were very high in the lowest electrofishing section and moderate in the upper two electrofishing sections. Brown trout densities were low with only one captured in the lowest electrofishing section.

**Fish Size:** Westslope cutthroat trout averaged 6" in all electrofishing sections in Copper Creek and reached maximum lengths of 11". Brook trout in the lower and upper electrofishing sections averaged 5" and reached a maximum length of 10" in the lower section and 8" in the upper section. Brook trout in the middle section averaged 4" and reached a maximum length of 9". The one brown trout caught in the lower section was 6" in length.

**Recruitment to non Clark Fork River Fishery:** Copper Creek is a relatively large tributary that likely serves as a source of westslope cutthroat trout recruitment to Rock Creek. Copper Creek provides a moderate number of westslope cutthroat trout and low

densities of brown trout, a portion of which likely out-migrate and recruit into the mainstem Rock Creek fishery.

***Current Value: High***

***Protection and Enhancement Value: High (entire drainage in Forest Service ownership)***

**Value as a Native Fishery:**

**Native Species Present:** Both bull and westslope cutthroat trout are present in the Copper Creek drainage. No genetic analyses have been completed for westslope cutthroat trout in Copper Creek although some hybridization may have occurred in the drainage due to its connectivity with Middle Fork Rock Creek and mainstem Rock Creek.

**Competitor and/or Hybridizing Species Present:** Both brown and brook trout are present in the Copper Creek drainage, although densities of brown trout are very low. Brook trout represent a competition threat to both bull and westslope cutthroat trout and a hybridization threat to bull trout. Brown trout pose a competition threat for both bull and westslope cutthroat trout.

**Demographics and Connectivity:** Bull trout in the Copper Creek drainage appear to maintain moderate to high densities (depending on location in drainage) and are well distributed throughout the drainage. Redd counts are conducted annually in Copper Creek and these counts have varied from 7 to 9 redds per year between 2006 and 2008 in the index reaches. Based on these data, it appears that the Copper Creek population is relatively stable. The presence of several other bull trout populations in the upper Rock Creek drainage provide possible sources of fish to maintain genetic variation within the Copper Creek population or to re-found the population should it be lost. This includes connection with Middle Fork Rock Creek and Carpp Creek bull trout populations. .

Westslope cutthroat trout are moderately abundant in the Copper Creek drainage and are found throughout the drainage, suggesting that this population is relatively strong. Connectivity between Copper Creek and other westslope cutthroat trout populations in the upper Rock Creek drainage is quite good.

***Current Value: Very High***

***Protection and Enhancement Value: Very High (entire drainage in Forest Service ownership)***

**Habitat Description:**

**Habitat Quality:** Habitat quality in the Cooper Creek drainage was found to be excellent at the three sites surveyed with minimal habitat degradation being observed. Only slight habitat degradation was observed in the middle portion of the reach including some bank erosion and slightly reduced densities of willows; however the causes of this degradation were not evident.

**Habitat Security:** The entire Copper Creek drainage is located within lands administered by the Beaverhead-Deerlodge National Forest and thus is quite secure from future land use changes.

**DRAINAGE:** Clark Fork

**STREAM:** Cramer Creek

**REACH:** Entire stream

### **Value as a Recruitment/Restoration Fishery for the Clark Fork River:**

**Species Present:** Westslope Cutthroat Trout, brook trout

**Fish Density/Number of Fish Produced:** Nine single-pass electrofishing sections (total) were completed on Cramer Creek in 1999 and 2009. Westslope cutthroat trout densities were low in lower reaches of the stream upstream of Interstate-90 (~ RM 1.5 – 4.5) and generally transitioned to high density in upper reaches (RM 7.5 – 8.5) and in the West Fork. Brook trout densities were moderate to high throughout the drainage, with the highest densities occurring in lower and middle reaches (~ RM 1.5 - 6.5). There was no substantial difference in relative density or species composition between samples collected in 1999 and 2009. However, brook trout densities in upper reaches increased between the early 1980s (Spoon 1980) and 1999-2009. Cramer Creek is a relatively large, productive tributary system (~ 23 mi<sup>2</sup>) with approximately 7 miles of fish-bearing stream reaches. Fish densities and species composition are unknown between the mouth and Interstate-90, but anecdotal observations suggest brown trout and rainbow trout spawning and rearing in portions of this reach.

**Recruitment to and Connectivity with the Clark Fork River:** Although most Cramer Creek surface flows eventually reach the Clark Fork River (Workman 2009), the stream is effectively isolated from the river by a series of complex tunnels and culverts that transport the stream under and around the transportation system near the mouth (Interstate-90 and frontage roads; see Workman 2009). Although some trout may out-migrate to the river from the upper drainage, it is unlikely that Cramer Creek is currently a significant source of westslope cutthroat trout recruitment. However, the lower reach (mouth to Interstate-90) offers some spawning and rearing habitat that is likely used by brown trout and other salmonids, but habitat is degraded and the extent of spawning is unknown. This reach is likely an opportunity for enhanced recruitment to the Clark Fork River.

**Current Value:** Medium

**Protection and Enhancement Value:** Medium

### **Value as a Tributary/Replacement Fishery:**

**Recreational Species Present:** Westslope Cutthroat Trout, brook trout

**Fish Density:** Nine single-pass electrofishing sections (total) were completed by MFWP on Cramer Creek in 1999 and 2009 upstream of Interstate-90. No sampling sections were completed in the ~1.5 mile section between the mouth and Interstate-90. Westslope cutthroat trout densities were low in lower reaches of the stream upstream of Interstate-90 (~ RM 1.5 – 4.5) and generally transitioned to high density in upper reaches (RM 7.5 –

8.5) and in the West Fork. Brook trout densities were moderate to high throughout the drainage, with the highest densities occurring in lower and middle reaches (~ RM 1.5–6.5). There was no substantial difference in relative density or species composition between samples collected in 1999 and 2009. However, brook trout densities in upper reaches increased between the early 1980s (Spoon 1980) and 1999–2009. Fish densities and species composition are unknown between the mouth and Interstate-90, but anecdotal observations suggest brown trout and rainbow trout spawning and rearing in portions of this reach.

**Fish Size:** The size distribution of westslope cutthroat trout and brook trout in Cramer Creek was similar throughout the drainage and typical of stream-resident populations. Westslope cutthroat trout averaged 4–5 inches and reached a maximum of 8–9 inches total length. Brook trout also averaged 4–5 inches and reached a maximum of 8–9 inches total length. No fish population information is available for the ~ 1.5 mile reach between the mouth and Interstate-90.

**Recruitment to non Clark Fork River Fishery:** Cramer Creek flows directly into the Clark Fork River and thus does not provide recruitment to a non Clark Fork River fishery.

*Current Value: Medium*

*Protection and Enhancement Value: Medium*

### **Value as a Native Fishery:**

**Native Species Present:** Stream-resident westslope cutthroat trout are present throughout Cramer Creek upstream of Interstate-90, with higher densities found in the upper watershed. Genetic samples were collected in 2009 and analyses were completed for fish from three sites (~ RM 4.5 – 8.5). Alleles characteristic of only westslope cutthroat trout were detected, suggesting that this isolated population is genetically non-introgressed (> 95% certainty). Westslope cutthroat trout are likely also found in the reach downstream of Interstate-90, but it is unlikely that they are non-introgressed. Bull trout may have occupied this drainage historically, but there are no records documenting their presence in Cramer Creek.

**Competitor and/or Hybridizing Species Present:** Brook trout are prevalent throughout Cramer Creek and likely compete directly with westslope cutthroat trout. The distribution of brook trout has spread upstream since 1980 (Spoon 1980). Brown trout and rainbow trout x westslope cutthroat trout hybrids likely occupy the 1.5 mile reach downstream of Interstate-90 (anecdotal observations; Workman 2009), but these species have not been documented upstream of the fish passage barriers at Interstate-90.

**Demographics and Connectivity:** Westslope cutthroat trout are found throughout Cramer Creek, with higher densities occurring in upper reaches. Overall, the population size is likely adequate for long-term resilience and persistence as Cramer Creek is a relatively large tributary drainage. However, the population upstream of Interstate-90 is

effectively isolated from other populations in the Clark Fork Basin and experiences a high level of competition with brook trout.

***Current Value: High***

***Protection and Enhancement Value: High***

### **Habitat Description:**

**Habitat Quality:** Habitat quality in Cramer Creek is poor overall. Land ownership in the drainage has consisted primarily of “checkerboard” ownership made up of Plum Creek Timber Company (PCTC), State School Trust (DNRC), and private parcels, with some small Bureau of Land Management (BLM) tracts. Most of the drainage has been heavily impacted by overgrazing, placer mining, industrial logging and high road densities. On the main stem of Cramer Creek, roads encroach on the stream and many crossings create fish passage impediments and unnatural obstructions. The stream crossing structures at Interstate-90 create a complete barrier to upstream fish passage. Riparian areas and instream habitat have been degraded throughout much of the watershed. Irrigation diversions divert fish and water in lower portions of the drainage (below the West Fork). Recent improvements to stream habitat include reclamation of a mining site by the BLM and reduction in grazing pressure on PCTC leases.

Workman (2009) surveyed the ~ 1.5 mile reach from Interstate-90 to the mouth and found similar problems, including a series of straightened, man-made channel sections. His recommendations for improvements in this reach include: removal of a partial fish passage barrier at the mouth, restoration of selected channel reaches, enhancement of riparian buffers, and acquisition water rights to increase instream flows.

**Habitat Security:** As part of the Montana Legacy Project, most PCTC lands in the watershed have been purchased by The Nature Conservancy (2010). The eventual owner of these properties has not been determined. Current public land holdings and Montana Legacy Project transactions will likely leave ~ 25% of the main stem in other private ownership. Stream reaches on these private lands are generally heavily impacted and offer many opportunities for restoration. Habitat conditions and security will likely improve on public lands and those recently acquired by The Nature Conservancy.

**DRAINAGE:** Rock Creek

**STREAM:** East Fork Rock Creek

**REACH:** East Fork Dam to Mouth

### **Value as a Recruitment/Restoration Fishery for the Clark Fork River:**

**Species Present:** Westslope Cutthroat Trout, Brown Trout, and brook trout

**Fish Density/Number of Fish Produced:** Fish densities are very high for both brown and brook trout in East Fork Rock Creek below the dam. Westslope cutthroat trout densities, on the other hand, were relatively low in lower East Fork Rock Creek.

**Recruitment to and Connectivity with the Clark Fork River:** Lower East Fork Rock Creek is a potential source of brown trout recruitment to the Clark Fork River. During informal surveys, many brown trout redds have been observed in East Fork Rock Creek. Some of these brown trout may out-migrate to the Clark Fork River, but due to the large geographic distance, it is uncertain whether the East Fork is a major source of recruitment. Westslope cutthroat trout densities in East Fork Rock Creek are too low to provide significant recruitment to the Clark Fork River

**Current Value:** Medium

**Protection and Enhancement Value:** Medium

### **Value as a Tributary/Replacement Fishery:**

**Recreational Species Present:** Westslope Cutthroat Trout, Brown Trout, and brook trout

**Fish Density:** Fish densities are very high for both brown and brook trout in East Fork Rock Creek below the dam. Westslope cutthroat trout densities, on the other hand, were relatively low in lower East Fork Rock Creek.

**Fish Size:** Brown trout in East Fork Rock Creek average 6-7" and commonly attain lengths of 13" while brook trout similarly average 6-7" and generally attain a maximum length of 10-12". Westslope cutthroat trout averaged 8" and reached a maximum length of 13", although only 4 westslope cutthroat trout were sampled in lower East Fork Rock Creek.

**Recruitment to non Clark Fork River Fishery:** Lower East Fork Rock Creek is likely an important source of brown trout recruitment to Rock Creek. During informal surveys, many brown trout redds have been observed in East Fork Rock Creek (near river mile 4.5). Westslope cutthroat trout densities in East Fork Rock Creek are too low to provide significant recruitment to Rock Creek and brook trout generally make up only a minor portion of the Rock Creek fishery.

**Current Value:** High

**Protection and Enhancement Value:** High

### **Value as a Native Fishery:**

**Native Species Present:** Both bull trout and westslope cutthroat trout are present in the lower East Fork Rock Creek drainage, although both species are found in relatively low abundance. No genetic analyses are available for westslope cutthroat trout in East Fork Rock Creek, but it is suspected that due to its connectivity with Rock Creek that some hybridization with rainbow trout has occurred.

**Competitor and/or Hybridizing Species Present:** Both brown and brook trout are highly abundant in the lower East Fork Rock Creek drainage and both species serve as significant competitors to native bull and westslope cutthroat trout. Brook trout also serve as a hybridization threat to bull trout in the drainage.

**Demographics and Connectivity:** Both bull and westslope cutthroat trout maintain relatively low densities in the lower East Fork Rock Creek drainage, suggesting that these populations are likely not entirely stable. The presence of East Fork Dam in the drainage impedes the spawning migrations of many of these fish, making it impossible for a good portion of these fish to complete their life histories. However, the presence of several other bull and westslope cutthroat trout populations in the upper Rock Creek drainage provide possible sources of fish to maintain genetic variation within these populations or to re-found these populations should either be lost.

***Current Value:*** Medium

***Protection and Enhancement Value:*** High

### **Habitat Description:**

**Habitat Quality:** Habitat quality in lower East Fork Rock Creek is classified as “fair” to “poor”. Most sites observed along lower East Fork Rock Creek have been actively grazed within the riparian area, causing a reduction in woody riparian vegetation and channel over-widening. A majority of the stream flows in East Fork Rock Creek are stored in East Fork Reservoir and later diverted into the Flint Creek Canal during irrigation season, leading to significantly reduced in-stream flows. Additional diversion of water for flood irrigation further depletes in-stream flows in the lower East Fork drainage. Management of East Fork Reservoir as an irrigation reservoir also eliminates spring “flushing flows” in many years, which degrades the habitat by reducing pool scouring, deposition and other natural hydrologic processes. The presence of the dam and the elimination of spring flushing flows also appear to favor non-native brown and brook trout in the drainage by creating an un-naturally productive and stable environment.

**Habitat Security:** Habitat security in the lower East Fork Rock Creek drainage is relatively low due to a large portion of the drainage being held in private land ownership. However, one large parcel surrounding approximately one mile of East Fork Rock Creek is under a permanent conservation easement preventing any future residential development on the property.

**DRAINAGE:** Rock Creek

**STREAM:** East Fork Rock Creek

**REACH:** East Fork Rock Creek Reservoir to headwaters

### **Value as a Recruitment/Restoration Fishery for the Clark Fork River:**

**Species Present:** Westslope Cutthroat Trout

**Fish Density/Number of Fish Produced:** Westslope cutthroat trout were the only recreational fish species captured in East Fork Rock Creek above the reservoir. Westslope cutthroat trout were only captured in the lower electrofishing section on East Fork Rock Creek above the reservoir and their densities were relatively low.

**Recruitment to and Connectivity with the Clark Fork River:** Upper East Fork Rock Creek may provide some recruitment of westslope cutthroat trout to the Clark Fork River via entrainment through East Fork Dam. However, East Fork Dam provides no upstream passage, preventing adults from accessing their natal streams for spawning. Due to these fish not being able to spawn in their natal tributaries, these fish likely do not represent meaningful recruitment to the Clark Fork River.

**Current Value:** Low

**Protection and Enhancement Value:** Low

### **Value as a Tributary/Replacement Fishery:**

**Recreational Species Present:** Westslope Cutthroat Trout

**Fish Density:** Westslope cutthroat trout were the only recreational fish species captured in East Fork Rock Creek above the reservoir. Westslope cutthroat trout were only captured in the lower electrofishing section on East Fork Rock Creek above the reservoir and their densities were relatively low.

**Fish Size:** Westslope cutthroat trout in the lower electrofishing section averaged 6" and reached a maximum length of 15".

**Recruitment to non Clark Fork River Fishery:** Upper East Fork Rock Creek likely provides some recruitment of westslope cutthroat trout to Rock Creek via entrainment through East Fork Dam. However, East Fork Dam provides no upstream passage, preventing adults from accessing their natal streams for spawning. Due to these fish not being able to spawn in their natal tributaries, these fish likely do not represent meaningful recruitment to Rock Creek.

**Current Value:** Medium

**Protection and Enhancement Value:** Medium

### **Value as a Native Fishery:**

**Native Species Present:** Both bull and westslope cutthroat trout are present in East Fork Rock Creek above the reservoir. No genetic analyses have been completed for westslope cutthroat trout in Upper East Fork Rock Creek although it is possible that some hybridization may have occurred in the drainage due to its connectivity with East Fork Reservoir. Rainbow trout have been captured in East Fork Reservoir during gill netting surveys.

**Competitor and/or Hybridizing Species Present:** No competitor or hybridizing species were captured during electrofishing surveys completed in upper East Fork Rock Creek, however rainbow and brook trout are commonly sampled in East Fork Reservoir during gill net surveys. While these species were not captured in upper East Fork Rock Creek, rainbow and brook trout still serve as potential hybridization threats to westslope cutthroat and bull trout.

**Demographics and Connectivity:** Bull trout in upper East Fork Rock Creek maintain moderate to low densities and appear to occupy a large portion of the drainage based on their presence in both electrofishing sections completed. Redd counts are conducted annually in East Fork Rock Creek and these counts have varied from 11 to 49 redds per year between 2006 and 2008 in the index reach. Based on these data, upper East Fork Rock Creek appears to be one of the strongest bull trout populations in the Rock Creek drainage and is likely quite stable. However, the presence of East Fork Dam prevents all connectivity with other bull trout populations in the Rock Creek drainage. This lack of connectivity does not allow for genetic exchange with other populations or for other populations to re-found this population should it be lost to a stochastic event. Fortunately, this population is likely large enough to maintain a stable genetic structure and hopefully survive potential environmental disturbances.

Westslope cutthroat trout currently maintain low densities in upper East Fork Rock Creek. However, it is unknown whether westslope cutthroat trout were historically present in the upper East Fork Rock Creek watershed. East Fork Reservoir was initially stocked with westslope cutthroat trout in 2004 to provide a recreational fishery in the reservoir and continues to be stocked to maintain this recreationally fishery. However, surveys completed by the Beaverhead-Deerlodge National Forest in upper East Fork Rock Creek before 2004 found no westslope cutthroat trout in the drainage (Steve Gerdes, pers. comm.). Thus, it is suspected that the current westslope cutthroat trout captured in the lower electrofishing section likely represent either westslope cutthroat trout stocked into East Fork Reservoir or natural reproduction by these stocked fish.

**Current Value:** Very High

**Protection and Enhancement Value:** Very High (*most of the upper watershed is located within the Anaconda Pintler Wilderness*)

### **Habitat Description:**

**Habitat Quality:** Habitat quality in Upper East Fork Rock Creek was found to be excellent at the two sites surveyed with minimal habitat degradation being observed. A majority of upper East Fork Rock Creek flows through the Anaconda-Pintler Wilderness and the excellent habitat conditions observed are due to the pristine condition of the wilderness.

**Habitat Security:** A majority of upper East Fork Rock Creek flows through the Anaconda-Pintler Wilderness and the portion that is not located in the wilderness flows through lands administered by the Beaverhead-Deerlodge National Forest. Thus, this portion of the watershed is quite secure from future changes in land and water use.

**DRAINAGE:** Flint Creek  
**STREAM:** Fred Burr Creek  
**REACH:** Entire stream

### **Value as a Recruitment/Restoration Fishery for the Clark Fork River:**

**Species Present:** Westslope Cutthroat Trout, Brown Trout, and Rainbow Trout

**Fish Density/Number of Fish Produced:** Westslope cutthroat trout were captured in moderate densities in the upper portion of the Fred Burr Creek drainage, but were absent from the electrofishing section located lower in the drainage. Brown trout were captured throughout the drainage and were captured in moderate to low densities at all sample sites while rainbow trout were only captured in the lower portion of the drainage and were found in low densities.

**Recruitment to and Connectivity with the Clark Fork River:** Fred Burr Creek is potentially a significant source of brown trout recruitment to Flint Creek. Electrofishing surveys in Fred Burr Creek indicate that brown trout are relatively abundant throughout the drainage and Fred Burr Creek is a relatively large tributary capable of producing a fairly large number of juvenile out-migrant. The rainbow and westslope cutthroat trout in Fred Burr Creek may also provide some recruitment to the Clark Fork River. Connectivity between Fred Burr Creek and the Upper Clark Fork appears to be good other than potential seasonal fish passage issues at some diversion dams in mainstem Flint Creek. The results of a recent radio telemetry study indicate that the diversion dams in lower Flint Creek are at least seasonally passable by migrating adult salmonids.

**Current Value:** Medium

**Protection and Enhancement Value:** Medium

### **Value as a Tributary/Replacement Fishery:**

**Recreational Species Present:** Westslope Cutthroat Trout, Brown Trout, and Rainbow Trout

**Fish Density:** Westslope cutthroat trout were captured in moderate densities in the upper portion of the Fred Burr Creek drainage, but were absent from the electrofishing section located lower in the drainage. Brown trout were captured throughout the drainage and were captured in moderate to low densities at all sample sites while rainbow trout were only captured in the lower portion of the drainage and were found in low densities.

**Fish Size:** Westslope cutthroat trout in Fred Burr Creek averaged 6" in length and reached a maximum length of 8.5". Brown trout averaged 6" and reached a maximum length of 10" while rainbow trout in the lower portion of the drainage averaged 6.5" and reached maximum lengths of 9".

**Recruitment to non Clark Fork River Fishery:** Fred Burr Creek is likely a significant source of brown trout recruitment to Flint Creek. Electrofishing surveys in Fred Burr Creek indicate that brown trout are relatively abundant throughout the drainage and Fred Burr Creek is a relatively large tributary that flows direct into Flint Creek. The rainbow and westslope cutthroat trout in Fred Burr Creek may also provide some recruitment to Flint Creek; however neither of these species makes up a significant portion of the Flint Creek fishery based on electrofishing surveys.

***Current Value: High***

***Protection and Enhancement Value: High***

**Value as a Native Fishery:**

**Native Species Present:** Westslope cutthroat trout are the only native trout present in the Fred Burr Creek drainage. No genetic analyses have been completed in the Fred Burr drainage, but it is suspected that hybridization between rainbow and westslope cutthroat trout has occurred due to rainbow trout being present in the lower portion of the drainage.

**Competitor and/or Hybridizing Species Present:** Both rainbow and brown trout are present in the drainage with rainbow trout serving as a hybridization threat to westslope cutthroat trout in the drainage. Brown trout serve as a threat to westslope cutthroat trout in the drainage via competition and potentially predation.

**Demographics and Connectivity:** Westslope cutthroat trout maintain moderate densities in the upper portion of the drainage but are not present in the lower portion of the drainage, suggesting this population has a limited range within the drainage. Based on the presence of rainbow trout in the drainage, it is likely that the westslope cutthroat trout in the drainage are hybridized. Connectivity between Fred Burr Creek and other westslope cutthroat trout populations in the Flint Creek drainage is considered moderate to poor, as some migratory individuals appear to still exist in Flint Creek, but are not abundant.

***Current Value: Low***

***Protection and Enhancement Value: Low***

**Habitat Description:**

**Habitat Quality:** Habitat surveys completed in the Fred Burr drainage indicate that overall, habitat quality at the survey sites was relatively good. However, a large portion of the drainage was not surveyed or visible from roadways and could not be assessed. Fred Burr Creek was historically mined and logged very heavily but the habitat quality in the drainage appears to have improved over time.

**Habitat Security:** Less than half of the Fred Burr Creek drainage is located within National Forest lands, but this portion of the drainage is quite secure. The lower portion

of the drainage flows through old mining claims, private sub-divided parcels and private cattle ranching land and thus could potentially undergo future changes in land and water use that could significantly degrade habitat in this reach.

**DRAINAGE:** Clark Fork River

**STREAM:** Harvey Creek

**REACH:** Entire stream

### **Value as a Recruitment/Restoration Fishery for the Clark Fork River:**

**Species Present:** Westslope Cutthroat Trout

**Fish Density/Number of Fish Produced:** Five electrofishing sections were sampled in 2008 and westslope cutthroat trout densities were moderate to high in all of the sampled reaches.

**Recruitment to and Connectivity with the Clark Fork River:** Harvey Creek maintains moderate to high densities of westslope cutthroat trout, a portion of which likely out-migrate to the Clark Fork River. However, a fish passage barrier is present just upstream of the mouth of Harvey Creek which limits all upstream fish passage, preventing out-migrant from returning to spawn as adults.

**Current Value:** Medium

**Protection and Enhancement Value:** Medium

### **Value as a Tributary/Replacement Fishery:**

**Recreational Species Present:** Westslope Cutthroat Trout

**Fish Density:** Five electrofishing sections were sampled in 2008 and westslope cutthroat trout densities were moderate to high in all of the sampled reaches.

**Fish Size:** Westslope cutthroat trout in the lowest electrofishing section averaged 4" and reached a maximum length of 11.5" while westslope cutthroat trout in the lower middle section averaged 5.5" and reached a maximum length of 14". Westslope cutthroat trout in the middle reach averaged 3" and reached a maximum length of 11.5" while westslope cutthroat trout in the upper two electrofishing sections averaged 6.5" and reach maximum lengths of 12".

**Recruitment to non Clark Fork River Fishery:** N/A. Harvey Creek flows directly into the Clark Fork River and thus cannot provide recruitment to a non Clark Fork River fishery.

**Current Value:** Medium

**Protection and Enhancement Value:** Medium

### **Value as a Native Fishery:**

**Native Species Present:** Both bull and westslope cutthroat trout are present in Harvey Creek. Genetic analyses were completed in both 1986 and 2009 for samples taken from

Harvey Creek and alleles characteristic of only westslope cutthroat trout were detected, suggesting that this population is genetically pure.

**Competitor and/or Hybridizing Species Present:** No non-native fish were captured in the Harvey Creek drainage and its lack of connectivity with the Clark Fork River currently protects the drainage from potential invasion by non-native species.

**Demographics and Connectivity:** Bull trout in Harvey Creek maintain moderate to low densities but appear to occupy a large portion of the drainage based on their presence in most electrofishing sections, suggesting that the population is relatively stable. Bull trout in Harvey Creek are not connected to other populations and this lack of connectivity does not allow for genetic exchange with other populations or for other populations to re-found this population should it be lost. While this population is protected from other invasive trout species (i.e. brook and brown trout), this lack of connectivity does create demographic risks to the population. Fortunately, the Harvey Creek drainage is quite large which likely reduces the risk of a stochastic event eliminating this population.

Westslope cutthroat trout densities are moderate to high throughout the Harvey Creek drainage, which suggests the population is quite stable. Westslope cutthroat trout in Harvey Creek are not connected to other populations and this lack of connectivity does not allow for genetic exchange with other populations or for other populations to re-found this population should it be lost. While this genetically pure population is protected from future invasion by rainbow trout or westslope cutthroat/rainbow trout hybrids, this lack of connectivity does create demographic risks to the population. The Harvey Creek drainage is quite large which likely reduces the risk of a stochastic event eliminating this population.

**Current Value:** Very High

**Protection and Enhancement Value:** Very High

### **Habitat Description:**

**Habitat Quality:** Habitat quality varied significantly in the Harvey Creek drainage. Habitat quality in the upper Harvey Creek drainage was found to be excellent with only minimal habitat degradation observed at the upper two survey sites. At the middle survey site (RM 3.3), significant habitat degradation was observed primarily due to riparian grazing while at the lower-middle survey site (RM 2.0), minimal habitat degradation was observed. Significant habitat degradation was again observed in the lowest survey site due to riparian grazing impacts. A significant irrigation diversion is operated near the mouth of Harvey Creek (below the barrier) that diverts a majority of the stream flow for flood irrigation.

**Habitat Security:** A majority of the Harvey Creek drainage is located within the Lolo National Forest and thus is quite secure. A portion of the drainage is located within private lands including parcels owned by a private timber company, which could undergo

future changes in land and water use that could significantly degrade habitat in the drainage.

**DRAINAGE:** Rock Creek  
**STREAM:** Hogback Creek  
**REACH:** Entire stream

### **Value as a Recruitment/Restoration Fishery for the Clark Fork River:**

**Species Present:** Westslope Cutthroat Trout, Brown Trout, and brook trout

**Fish Density/Number of Fish Produced:** Westslope cutthroat trout maintained moderate to low densities in the two electrofishing sections completed in Hogback Creek. Brown trout and brook trout both maintained low densities with brook trout being captured in both electrofishing sections and brown trout only being captured in the lower electrofishing section.

**Recruitment to and Connectivity with the Clark Fork River:** Hogback Creek is a relatively large tributary that flows directly into Rock Creek and may serve as a source of recruitment to the Clark Fork River. Hogback Creek maintains moderate densities of westslope cutthroat trout and low densities of brown trout, a portion of which may out-migrate and recruit into the mainstem Clark Fork River fishery. Hogback Creek is located relatively high in the Rock Creek drainage, which may diminish its ability to provide recruitment to the Clark Fork River. Connectivity between Hogback Creek and the Clark Fork River via Rock Creek is excellent for both up- and downstream migrants.

**Current Value:** Medium

**Protection and Enhancement Value:** Medium (nearly the entire drainage within Forest Service ownership)

### **Value as a Tributary/Replacement Fishery:**

**Recreational Species Present:** Westslope Cutthroat Trout, Brown Trout, and brook trout

**Fish Density:** Westslope cutthroat trout maintained moderate to low densities in the two electrofishing sections completed in Hogback Creek. Brown trout and brook trout both maintained low densities with brook trout being captured in both electrofishing sections and brown trout only being captured in the lower electrofishing section.

**Fish Size:** Westslope cutthroat trout in the lower electrofishing section averaged 5.5" while westslope cutthroat trout in the upper electrofishing section averaged 6.5". The maximum size of westslope cutthroat trout captured in Hogback Creek was 12". Two brown trout were captured in the lowest electrofishing section and averaged 5" with the largest fish measuring 5.5". The two brook trout captured in the lowest electrofishing section averaged 6" with the largest fish measuring 8". The one brook trout captured in the upper electrofishing section was 9.5" in length.

**Recruitment to non Clark Fork River Fishery:** Hogback Creek is fairly large tributary that flows directly into middle Rock Creek and likely serves as a significant source of

westslope cutthroat trout and potentially brown trout recruitment to Rock Creek. Hogback Creek maintains moderate densities of westslope cutthroat trout and low densities of brown trout, a portion of which likely out-migrate and recruit into the mainstem Rock Creek fishery.

**Current Value:** High

**Protection and Enhancement Value:** High (nearly the entire drainage within Forest Service ownership)

**Value as a Native Fishery:**

**Native Species Present:** Both bull and westslope cutthroat trout are present in Hogback Creek. Genetic analyses were completed for westslope cutthroat trout in Hogback Creek in 1999 and alleles characteristic of both westslope cutthroat trout and rainbow trout were observed.

**Competitor and/or Hybridizing Species Present:** Both brown and brook trout are present in the Hogback Creek drainage, although densities of both species are quite low. Despite these low densities, brook trout represent a threat for competition with both bull and westslope cutthroat trout and a hybridization threat to bull trout. Brown trout pose a competition threat for both bull and westslope cutthroat trout. Genetic analyses indicate that rainbow trout have hybridized with westslope cutthroat trout in Hogback Creek.

**Demographics and Connectivity:** Bull trout in the Hogback Creek drainage maintain relatively low densities but do appear to occupy the entire drainage below the dry reach (approximately 1 to 1.5 miles above the mouth). Bull trout redd counts are conducted in Hogback Creek in most years and in recent years (2006-2008) two to four redds have been observed. Thus, there is some question as to the long-term viability of this population. The presence of several other bull trout populations in the middle and upper Rock Creek drainage provide possible sources of fish to maintain genetic variation within the Hogback Creek population or to re-found the population should it be lost. The connectivity between this population and other neighboring bull trout populations (i.e. Stony Creek, Welcome Creek, etc...) via Rock Creek is excellent.

Westslope cutthroat trout densities are moderate to low in the Hogback Creek drainage and they are distributed throughout the lower portion of the drainage below the dry reach (approximately 1 to 1.5 miles above the mouth), suggesting that this population is relatively stable. Connectivity between Hogback Creek and other westslope cutthroat trout populations in the middle Rock Creek drainage is quite good which allows for genetic exchange with other populations and potentially re-founding of the population should it be lost.

**Current Value:** High

**Protection and Enhancement Value:** High (nearly the entire drainage within Forest Service ownership)

**Habitat Description:**

**Habitat Quality:** Habitat quality in the Hogback Creek drainage was found to be excellent at the two sites surveyed with minimal habitat degradation being observed.

**Habitat Security:** Nearly the entire Hogback Creek drainage is located within lands administered by the Lolo National Forest and thus is quite secure from future land use changes.

**DRAINAGE:** Flint Creek

**STREAM:** North Fork Flint Creek

**REACH:** Entire stream

### **Value as a Recruitment/Restoration Fishery for the Clark Fork River:**

**Species Present:** Westslope Cutthroat Trout, Brook Trout, and Rainbow Trout

**Fish Density/Number of Fish Produced:** Two electrofishing sections were completed on North Fork Flint Creek in 2008. Brook trout were captured in moderate densities in the lower electrofishing section and low densities in the upper section. Westslope cutthroat trout were captured in low densities in both sections sampled with only one fish captured at each section. Only one rainbow trout was captured and it was captured in the lower electrofishing section.

**Recruitment to and Connectivity with the Clark Fork River:** North Fork Flint Creek does maintain very low densities of westslope cutthroat trout and rainbow trout that could potentially out-migrate to the Clark Fork River. Due to the significant distance between North Fork Flint Creek and the Clark Fork River and the presence of Flint Creek Dam, this recruitment is likely minimal.

**Current Value:** Very Low

**Protection and Enhancement Value:** Very Low

### **Value as a Tributary/Replacement Fishery:**

**Recreational Species Present:** Westslope Cutthroat Trout, brook trout, and Rainbow Trout

**Fish Density:** Two electrofishing sections were completed on North Fork Flint Creek in 2008. Brook trout were captured in moderate densities in the lower electrofishing section and low densities in the upper section. Westslope cutthroat trout were captured in low densities in both sections sampled with only one fish captured in each section. Only one rainbow trout was captured and it was captured in the lower electrofishing section.

**Fish Size:** Brook trout captured in the lower electrofishing section averaged 4.5" and reached a maximum length of 7.5" while brook trout in the upper section averaged 6" and reached a maximum length of 7.5". The two westslope cutthroat trout captured measured 5" and 6" while the one rainbow trout captured measured 7.5".

**Recruitment to non Clark Fork River Fishery:** North Fork Flint Creek is the largest tributary to Georgetown Lake. Georgetown Lake is a world-class fishery for rainbow trout and trophy brook trout that receives a tremendous amount of fishing pressure annually. The Georgetown Lake rainbow trout fishery is dependent on annual stocking as natural recruitment into the system is not adequate to provide the number of fish necessary to maintain this quality fishery. Historically, brook trout in Georgetown Lake

were a self-sustaining population that required no supplementation to provide the fishery. More recently, brook trout densities have declined in Georgetown Lake requiring hatchery supplementation to maintain a quality fishery.

North Fork Flint Creek is a known spawning tributary for hatchery rainbow trout and wild brook trout from Georgetown Lake. The amount of recruitment that North Fork Flint Creek provides for both rainbow trout and brook trout has not been quantified, although it is suspected that significant recruitment of brook trout from North Fork Flint Creek historically occurred to maintain that self-sustaining fishery. It is more difficult to assess the role that North Fork Flint Creek plays in recruitment of rainbow trout into Georgetown Lake, although adult rainbow trout annually spawn in North Fork Flint Creek and natural reproduction from this spawning may be an important component of the Georgetown Lake fishery. Electrofishing surveys completed in 2008 in North Fork Flint Creek found relatively few juvenile rainbow trout are present in the drainage suggesting that recruitment may be low from spawning hatchery rainbow trout. Nonetheless, North Fork Flint Creek is an important source of recruitment of brook trout and potentially rainbow trout into the Georgetown Lake system.

***Current Value: High***

***Protection and Enhancement Value: High***

#### **Value as a Recruitment/Restoration Fishery for the Clark Fork River:**

**Species Present:** Westslope Cutthroat Trout, Brook Trout, and Rainbow Trout

**Fish Density/Number of Fish Produced:** Two electrofishing sections were completed on North Fork Flint Creek in 2008. Brook trout were captured in moderate densities in the lower electrofishing section and low densities in the upper section. Westslope cutthroat trout were captured in low densities in both sections sampled with only one fish captured at each section. Only one rainbow trout was captured and it was captured in the lower electrofishing section.

**Recruitment to and Connectivity with the Clark Fork River:** North Fork Flint Creek does maintain very low densities of westslope cutthroat trout and rainbow trout that could potentially out-migrate to the Clark Fork River. Due to the significant distance between North Fork Flint Creek and the Clark Fork River and the presence of Flint Creek Dam, this recruitment is likely minimal.

***Current Value: Very Low***

***Protection and Enhancement Value: Very Low***

#### **Value as a Native Fishery:**

**Native Species Present:** Westslope cutthroat trout are the only native salmonid present in North Fork Flint Creek. No genetic analyses have been completed for westslope cutthroat trout in North Fork Flint Creek, but due to the extensive stocking of rainbow

trout that has occurred in Georgetown Lake over many years, it is suspected that this population is extensively hybridized with rainbow trout.

**Competitor and/or Hybridizing Species Present:** Both brook and rainbow trout are present in North Fork Flint Creek, with brook trout maintaining moderate to low densities. Both brook and rainbow trout likely compete with juvenile westslope cutthroat trout in North Fork Flint Creek.

**Demographics and Connectivity:** Westslope cutthroat trout appear to maintain very low densities in the North Fork Flint Creek drainage, despite occupying a good portion of the drainage. Based on these low densities, the North Fork Flint Creek population does not appear to be a stable population. Connectivity between westslope cutthroat trout in North Fork Flint Creek and other westslope cutthroat trout populations is poor with the only known connected population found in Discovery Creek, which is only seasonally connected to North Fork Flint Creek.

***Current Value: Low***

***Protection and Enhancement Value: Low***

### **Habitat Description:**

**Habitat Quality:** Habitat quality in North Fork Flint Creek was excellent at the two sites surveyed with minimal habitat degradation being observed.

**Habitat Security:** A majority of North Fork Flint Creek flows through lands administered by the Beaverhead-Deerlodge National Forest and these lands are quite secure. Several mining claims do exist in the upper watershed and the lower portion of the drainage flows through private lands. Future changes in land and water use could occur on these parcels that could significantly degrade the habitat in the drainage.

**DRAINAGE:** Rock Creek

**STREAM:** North Fork Rock Creek

**REACH:** Entire stream

### **Value as a Recruitment/Restoration Fishery for the Clark Fork River:**

**Species Present:** Westslope Cutthroat Trout

**Fish Density/Number of Fish Produced:** Westslope cutthroat trout densities were moderate to high in the two electrofishing sections completed in the North Fork Rock Creek drainage.

**Recruitment to and Connectivity with the Clark Fork River:** Due to the moderate size of North Fork Rock Creek and the location of the drainage near the headwaters of Rock Creek, many river miles from the Clark Fork River, it is unlikely that this stream serves as a major source of recruitment to the Clark Fork River. It is possible however that North Fork Rock Creek does provide some westslope cutthroat out-migrant to the Clark Fork River.

**Current Value:** Medium

**Protection and Enhancement Value:** Medium

### **Value as a Tributary/Replacement Fishery:**

**Recreational Species Present:** Westslope Cutthroat Trout

**Fish Density:** Westslope cutthroat trout densities were moderate to high in the two electrofishing sections completed in the North Fork Rock Creek drainage.

**Fish Size:** Westslope cutthroat trout averaged 5" in the lower electrofishing section and reached a maximum size of 9" while westslope cutthroat trout in the upper section averaged 4" and reached a maximum size of 8".

**Recruitment to non Clark Fork River Fishery:** North Fork Rock Creek does provide a moderate number of westslope cutthroat trout that could out-migrate and be recruited into the mainstem Rock Creek fishery. North Fork Rock Creek is a fair sized tributary that likely provides moderate amount of westslope cutthroat trout recruitment to Rock Creek.

**Current Value:** Medium

**Protection and Enhancement Value:** Medium

### **Value as a Native Fishery:**

**Native Species Present:** Both bull and westslope cutthroat trout are present in North Fork Rock Creek. No genetic analyses have been completed for westslope cutthroat trout in North Fork Rock Creek although genetic analyses were completed for westslope

cutthroat trout in lower West Fork Rock Creek in 1991 and these fish were found to be genetically pure. Thus, it is assumed that North Fork Rock Creek westslope cutthroat trout are pure, although these analyses are quite dated.

**Competitor and/or Hybridizing Species Present:** No non-native fish were captured in North Fork Rock Creek, although non-native brown, rainbow, and brook trout are present in mainstem Rock Creek and could potentially invade the North Fork Rock Creek drainage.

**Demographics and Connectivity:** Electrofishing surveys in North Fork Rock Creek indicate that bull trout maintain moderate to high densities and are found throughout most of the drainage. Based on these data, it appears that the North Fork Rock Creek population is still viable. The presence of several other bull trout populations in the upper Rock Creek drainage provide possible sources of fish to maintain genetic variation within the North Fork Rock Creek population or to re-found the population should it be lost. The connectivity between this population and other neighboring bull trout populations (i.e. West Fork Rock Creek, Middle Fork Rock Creek, etc...) via Rock Creek is excellent.

Westslope cutthroat trout maintain moderate to high densities in the North Fork Rock Creek drainage and are found throughout the drainage, suggesting that this population is relatively strong. Connectivity between North Fork Rock Creek and other westslope cutthroat trout populations in the upper Rock Creek drainage is quite good which allows for genetic exchange with other populations and potentially re-founding of the population should it be lost.

**Current Value:** Very High

**Protection and Enhancement Value:** Very High (*entire drainage in Forest Service ownership*)

### **Habitat Description:**

**Habitat Quality:** Habitat quality in the North Fork Rock Creek drainage was found to be excellent at the two sites surveyed with minimal habitat degradation being observed.

**Habitat Security:** The entire North Fork Rock Creek drainage is located within lands administered by the Beaverhead-Deerlodge National Forest and thus is quite secure from future land use changes.

**DRAINAGE:** Flint Creek

**STREAM:** South Fork Lower Willow Creek

**REACH:** All

### **Value as a Recruitment/Restoration Fishery for the Clark Fork River:**

**Species Present:** Westslope Cutthroat Trout

**Fish Density/Number of Fish Produced:** Four electrofishing surveys were completed on South Fork Lower Willow in 2007. Westslope cutthroat trout occur in very high densities throughout most of South Fork Lower Willow Creek drainage except for the lowest section sampled (RM 0.7), which maintained relatively high densities. Westslope cutthroat trout are the only salmonid species that are present in the drainage.

**Recruitment to and Connectivity with the Clark Fork River:** South Fork Lower Willow Creek likely provides some recruitment of westslope cutthroat trout to the Clark Fork River. However, this stream is located above Lower Willow Creek Dam, which prevents all fish passage upstream for returning adults and thus it is unknown whether this recruitment is substantial.

*Current Value: Low*

**Protection and Enhancement Value:** Low

### **Value as a Tributary/Replacement Fishery:**

**Recreational Species Present:** Westslope Cutthroat Trout

**Fish Density:** Four electrofishing surveys were completed on South Fork Lower Willow in 2007. Westslope cutthroat trout occur in very high densities throughout most of South Fork Lower Willow Creek drainage except for the lowest section sampled (RM 0.7), which maintained relatively high densities. Westslope cutthroat trout are the only salmonid species that are present in the drainage.

**Fish Size:** Fish size in South Fork Lower Willow Creek are relatively small with mean lengths varying from 4 to 5" in four sections sampled in the drainage. However, for the size of the stream (>5 cfs base flows), some relatively large westslope cutthroat trout were sampled with maximum lengths varying from 7.5" to 11" in the four sections sampled.

**Recruitment to non Clark Fork River Fisheries:** South Fork Lower Willow Creek likely provides some recruitment to mainstem Lower Willow Creek. Westslope cutthroat trout are relatively abundant in Lower Willow Creek just below Lower Willow Dam and are likely due to entrainment of fish through the dam. However, Lower Willow Dam provides no upstream passage, which prevents adults from accessing their natal streams for spawning.

**Current Value:** Medium

**Protection and Enhancement Value:** Medium

**Value as a Native Fishery:**

**Native Species Present:** Westslope cutthroat trout is the only species found in the South Fork Lower Willow Creek drainage. Extensive sampling in the drainage found no evidence of other native or non-native salmonids being present in the drainage. South Fork Lower Willow was likely historically occupied by bull trout due to the size of the drainage, but none were sampled during the 2007 sampling efforts. Tissue samples for 25 westslope cutthroat trout captured in two sections of South Fork Lower Willow Creek drainage were analyzed in 2008 and only alleles characteristic of westslope cutthroat trout were detected.

**Competitor and/or Hybridizing Species Present:** There are no competing or hybridizing species currently present in South Fork Lower Willow Creek. Brook trout were captured in both West Fork Lower Willow Creek and North Fork Lower Willow Creek (one brook trout captured), however none were observed in surveys of South Fork Lower Willow Creek. The invasion of brook trout into the South Fork Lower Willow Creek drainage is possible via Lower Willow Creek Reservoir, but it appears that this has not occurred yet.

**Demographics and Connectivity:** Westslope cutthroat trout densities are quite high in the South Fork Lower Willow drainages and multiple age classes of westslope cutthroat trout were observed including age 0 fish. Westslope cutthroat trout were also captured throughout the drainage, indicating that population is quite stable. The lack of connectivity between South Fork Lower Willow Creek and mainstem Lower Willow Creek could pose a potential threat to viability due to the possible effects of small population size. However, North Fork Lower Willow Creek and multiple tributaries to North Fork Lower Willow Creek maintain westslope cutthroat trout populations and are currently connected to South Fork Lower Willow Creek via Lower Willow Creek Reservoir. Also, several tributaries to South Fork Lower Willow Creek also maintain viable westslope cutthroat trout populations providing possible sources of genetic exchange and populations to re-found of this population should it be lost. Thus, the impact of lost connectivity due to the presence of Lower Willow Dam appear to be minimized by the relatively large contiguous habitat that is occupied by westslope cutthroat trout in tributaries above the dam.

**Current Value:** High

**Protection and Enhancement Value:** Very High

**Habitat Description:**

**Habitat Quality:** Habitat quality in the South Fork Willow Creek drainage is considered fair. A good portion of the drainage is located within private cattle ranching properties

and most of these reaches do not maintain riparian fencing, so grazing impacts are evident in this portion of the drainage. Only one major irrigation diversion was observed in the drainage, however a significant portion of the water from South Fork Lower Willow was being diverted at this site. In the upper drainage, on lands administered by the Beaverhead-Deerlodge National Forest, grazing impacts were not observed although historic impacts of mining were evident.

**Habitat Security:** A good portion of the South Fork Lower Willow Creek drainage flows through private lands. While the upper portion of the drainage flows through lands administered by the U.S. Forest Service, this comprises only roughly half of the land ownership in the drainage. The lower portion of the drainage flows primarily through private lands and could potentially undergo future changes in land and water use that could significantly degrade habitat in this reach.

**DRAINAGE:** Warm Springs Creek

**STREAM:** Storm Lake Creek

**REACH:** All

### **Value as a Recruitment/Restoration Fishery for the Clark Fork River:**

**Species Present:** Westslope Cutthroat Trout and Brook Trout

**Fish Density/Number of Fish Produced:** Based on electrofishing conducted in 2007, fish densities are moderate throughout much of Storm Lake Creek. In the upper reaches of the stream, westslope cutthroat trout comprise the bulk of the recreational fishery. However, as you move downstream, brook trout also begin to comprise a considerable component of the fish community. The species appears to be present in roughly equal densities as westslope cutthroat trout in the lower reaches of the stream.

**Recruitment to and Connectivity with the Clark Fork River:** Storm Lake Creek is unlikely to be a significant source of fish for the Clark Fork River. The stream was historically a tributary to Warm Springs Creek, but has since been completely diverted into Silver Lake to provide water for reservoir management. Subsequently, the stream is relatively disconnected from downstream waters. However, it is possible that fish in Storm Lake Creek could reach downstream waters via the Silver Lake aqueduct.

**Current Value:** Low

**Protection and Enhancement Value:** Low

### **Value as a Tributary/Replacement Fishery:**

**Recreational Species Present:** Westslope Cutthroat Trout and Brook Trout

**Fish Density:** Based on electrofishing conducted in 2007, fish densities are moderate throughout much of Storm Lake Creek. In the upper reaches of the stream, westslope cutthroat trout comprise the bulk of the recreational fishery. However, as you move downstream, brook trout also begin to comprise a considerable component of the fish community. The species appears to be present in roughly equal densities as westslope cutthroat trout in the lower reaches of the stream.

**Fish Size:** Fish in Storm Lake Creek do not typically attain very large size, although fish of catchable length are present in fairly good numbers. At most of the sites sampled in the drainage in 2007, both westslope cutthroat trout and brook trout had an average length of about 6 inches. The largest fish of each species was about 9 inches in total length.

**Recruitment to non Clark Fork River Fishery:** Storm Lake Creek is a tributary to Silver Lake that drains into the east end of the reservoir. Storm Lake Creek was historically a tributary to Warm Springs Creek, but the stream has been completely diverted into Silver Lake to provide water for reservoir management. The stream appears to be a primary source of fish for the Silver Lake fishery.

**Current Value:** Medium

**Protection and Enhancement Value:** Medium

**Value as a Native Fishery:**

**Native Species Present:** Bull Trout and Westslope Cutthroat Trout

Genetic testing conducted in 2007 suggests that the westslope cutthroat trout population in Storm Lake Creek is slightly hybridized with rainbow trout. The genetic purity was assigned at approximately 99%. Nevertheless, with bull trout present in the stream, the score receives full points.

**Competitor and/or Hybridizing Species Present:** Brook Trout

Brook trout are sympatric with bull trout and westslope cutthroat trout throughout Storm Lake Creek. Brook trout likely exert a competitive pressure on native trout, especially in the lower reaches of the stream where the species tends to be more abundant. Brook trout also pose a hybridization concern for bull trout in Storm Lake Creek.

**Demographics and Connectivity:** Based on electrofishing conducted in 2007, westslope cutthroat trout comprise much of the fish community in Storm Lake Creek. The species occurs in low to moderate densities throughout much of stream, and the observation of multiple age classes suggests the population is viable with successful recruitment being a relatively regular occurrence. The largest westslope cutthroat trout measured in the stream in 2007 was about 9 inches in total length. Bull trout are also present in Storm Lake Creek, but densities tend to be relatively low throughout the stream. While a couple of age classes were observed during 2007 sampling, all of the fish were younger juveniles. No fish large enough to be considered a resident adult were observed during our sampling. The largest bull trout measured in Storm Lake Creek in 2007 was approximately 6.5 inches in length. The U.S. Fish and Wildlife Service conducted some additional electrofishing in Storm Lake Creek in 2008. Bull trout captured during this sampling were once again mostly juveniles. The relatively low population density as well as the rarity of spawning adults is a significant concern for the long-term viability of bull trout in Storm Lake Creek. This is likely exacerbated by the lack of connectivity with other populations.

Storm Lake Creek is a tributary to Silver Lake that drains into the east end of the reservoir. Storm Lake Creek was historically a tributary to Warm Springs Creek, but the stream has since been completely diverted into Silver Lake to provide water for reservoir management. A water control structure just above of the mouth of the stream is likely a barrier to upstream fish movement. This structure appears to have isolated the fish in Storm Lake Creek, and has largely made Silver Lake a reproductive sink (especially for bull trout). The risks of isolation (i.e. inbreeding, local extinction, etc.) are of serious concern for native trout in the stream.

***Current Value: High***

***Protection and Enhancement Value: Very High***

**Habitat Description:**

**Habitat Quality:** Habitat quality and riparian condition along Storm Lake Creek is fairly good. However, much of the watershed has undergone recent widespread timber harvest, and logging activity has affected stream and riparian habitat (mostly from reductions in canopy cover and road construction) in various locations in the drainage. Additionally, the lower mile of the stream has been channelized and diverted away from its historic channel. Storm Lake Creek is used as a delivery mechanism for getting water stored in Storm Lake downstream into Silver Lake.

**Habitat Security:** Historically, much of the Storm Lake Creek watershed was owned/managed by a private timber company who heavily harvested much of its land. However, between 2000 and 2001, the U.S. Forest Service acquired the majority of these parcels. Land ownership along Storm Lake Creek now consists primarily of lands administered by the U.S. Forest Service where habitat security if considered to be relatively good. However, privately owned lands still exist in the lower 0.5 miles of the drainage near Silver Lake, as well as in the upper end of the drainage near Storm Lake. Thus far, development on these parcels has been relatively light. Nevertheless, given the nature of the ownership and potential land use, habitat security is somewhat of a concern in these areas.

**DRAINAGE:** Clark Fork

**STREAM:** Swartz Creek

**REACH:** Entire stream

### **Value as a Recruitment/Restoration Fishery for the Clark Fork River:**

**Species Present:** Westslope Cutthroat Trout, Westslope Cutthroat Trout x Rainbow Trout hybrids, Brown Trout, Brook Trout.

**Fish Density/Number of Fish Produced:** Nine single-pass electrofishing sections have been completed on Swartz Creek from 1999-2008. Westslope cutthroat trout (including hybrids) densities were moderate or high throughout the drainage, except for the lowest reach within ~ 2 miles of the mouth. Brown trout and brook trout densities were high from the mouth to ~ RM 2.0. In middle portions of the drainage (RM 2.0 to 4.5), westslope cutthroat trout and brook trout were roughly equal in abundance (moderate) and were the only species present. Although brook trout were found in low densities in upper portion of the watershed (above RM 4.5), westslope cutthroat trout were the predominant species and density was high. This stream currently supports runs of fluvial brown trout, westslope cutthroat trout, and westslope cutthroat trout x rainbow trout hybrids. Swartz Creek is a relatively large tributary system (~ 24 mi<sup>2</sup>) that appears to have moderate productivity.

**Recruitment to and Connectivity with the Clark Fork River:** Swartz Creek is directly connected to the Clark Fork River and currently supports runs of fluvial brown trout, westslope cutthroat trout, and westslope cutthroat trout x rainbow trout hybrids. With the exception of 2-3 undersized road crossings and seasonal dewatering by a single irrigation diversion near the mouth, connectivity within the drainage and with the Clark Fork River is intact. A diversion at ~ RM 1.5 deters the lower reach from July-Sept. Fish passage for fluvial trout is largely unobstructed, except for early migrations of brown trout. However, the current irrigation schedule may hamper the potential recovery of bull trout in the drainage.

**Current Value:** High

**Protection and Enhancement Value:** High

### **Value as a Tributary/Replacement Fishery:**

**Recreational Species Present:** Westslope Cutthroat Trout, westslope cutthroat trout x Rainbow Trout hybrids, Brown Trout, brook trout

**Fish Density:** Nine single-pass electrofishing sections have been completed on Swartz Creek from 1999-2008. Westslope cutthroat trout (including hybrids) densities were moderate or high throughout the drainage, except for the lowest reach within ~ 2 miles of the mouth. Brown trout and brook trout densities were high from the mouth to ~ RM 2.0. In middle portions of the drainage (RM 2.0 to 4.5), westslope cutthroat trout and brook trout were roughly equal in abundance (moderate) and were the only species present.

Although brook trout were found in low densities in upper portion of the watershed (above RM 4.5), westslope cutthroat trout were the predominant species and density was high.

**Fish Size:** Westslope cutthroat trout and brook trout in middle and upper electrofishing sections on Swartz Creek (above RM 2.0) averaged ~ 5 inches and reached a maximum length of ~ 9 inches. In the lower section (RM 0 to 2.0), brown, brook and cutthroat trout averaged 5-6 inches and reached a maximum size of 9-12 inches. All electrofishing sections were completed in July-August and did not include adult river migrants that move into the stream and spawn in spring and fall.

**Recruitment to non Clark Fork River Fishery:** Swartz Creek flows directly into the Clark Fork River and thus cannot provide recruitment to a non Clark Fork River fishery.

*Current Value: Medium*

*Protection and Enhancement Value: High*

### **Value as a Native Fishery:**

**Native Species Present:** Westslope cutthroat trout are present throughout Swartz Creek. Both stream-resident and migratory life forms are present. Westslope cutthroat trout throughout the drainage were tested for introgression in 2000 and hybridization with rainbow trout was detected throughout the drainage. The contribution of alleles tested was 80-95% westslope cutthroat trout and 5-20% rainbow trout, with results varying among sites (longitudinal gradient with higher sites having less rainbow trout contribution). Sculpins were observed at several sites on Swartz Creek. Bull trout likely historically occupied this stream, but have not been documented in recent history.

**Competitor and/or Hybridizing Species Present:** Both brown and brook trout are present in the Swartz Creek drainage, although densities of brown trout are only found in lower reaches and brook trout densities dissipate quickly higher in the watershed. Both species likely compete with cutthroat trout populations and likely preclude recovery of bull trout at current densities. Westslope cutthroat trout in the drainage are significantly hybridized.

**Demographics and Connectivity:** Westslope cutthroat trout are abundant in most of middle and upper Swartz Creek and are found throughout the drainage, suggesting that this population is relatively robust. Connectivity between cutthroat trout sub-populations within Swartz Creek and connectivity with other populations in the area via the Clark Fork River are good. Fluvial and stream-resident forms are both present.

*Current Value: Medium*

*Protection and Enhancement Value: Medium*

## **Habitat Description:**

**Habitat Quality:** Habitat quality in Swartz Creek is good overall. A survey of road crossings in 1999-2001 revealed several undersized culverts that may act as partial upstream fish passage obstructions during high flows, but no complete fish passage barriers were observed. Instream habitat and riparian areas are generally intact. However, overall forest road densities are high in the drainage. Until 2009, land ownership in the drainage was made up of lands administered by the Lolo National Forest (USFS) in the headwaters, a combination or “checkerboard” ownership of USFS and Plum Creek Timber Company (PCTC) holdings in middle portions, and private ownership in the lowest 1.5 miles of the drainage. As part of the Montana Legacy Project – Phase II, all PCTC lands in the watershed will be permanently transferred to the USFS, leaving only the lowest 1.5 miles of the main stem in private ownership. No mining or significant grazing impacts have been observed. Surface water diversions and seasonal dewatering are a problem in the ~ 1.5 mi immediately upstream of the mouth.

**Habitat Security:** After transfer of all PCTC lands to the USFS, the entire drainage will be in public ownership within the Lolo National Forest, with the exception of the 1.5 miles immediately upstream of the mouth. The majority of these private lands are owned by a single landowner (ranch). These private lands could potentially undergo future changes in land and water use that could significantly degrade habitat in this reach.

**DRAINAGE:** Warm Springs Creek (near Garrison)

**STREAM:** Warm Springs Creek (near Garrison)

**REACH:** Lower – Mouth to Waterfall

### **Value as a Recruitment/Restoration Fishery for the Clark Fork River:**

**Species Present:** Brown Trout and Westslope Cutthroat Trout

**Fish Density/Number of Fish Produced:** Based on 2008 electrofishing in one sample reach, brown trout density is very high in lower Warm Spring Creek. Most of the brown trout sampled were smaller, juvenile fish indicating that the stream may be an important spawning tributary for brown trout in the Clark Fork River. Westslope cutthroat trout are present, but appear to occur only rarely and do not represent a significant component of the fishery.

**Recruitment to and Connectivity with the Clark Fork River:** Warm Springs Creek is a direct tributary to the Clark Fork River, and may be an important spawning and early rearing tributary for brown trout in the Clark Fork River. Warm Springs Creek appears to be one of the few upper Clark Fork River tributaries flowing out of the Garnet Range that has good connection to the main-stem river.

***Current Value:*** Medium

***Protection and Enhancement Value:*** High

### **Value as a Tributary/Replacement Fishery:**

**Recreational Species Present:** Brown Trout and Westslope Cutthroat Trout

**Fish Density:** Based on 2008 electrofishing in one sample reach, brown trout density is very high in lower Warm Spring Creek. Westslope cutthroat trout are present, but appear to occur only rarely and do not represent a significant component of the fishery.

**Fish Size:** Most of the brown trout sampled in 2008 were smaller, juvenile fish that were not of catchable size. The average total length of brown trout in the reach was just under 5 inches, although fish as large as 13 inches were observed. The single westslope cutthroat trout captured in the reach was approximately 11.5 inches in length.

**Recruitment to non Clark Fork River Fishery:** N/A – Warm Springs Creek is a direct tributary to the Clark Fork River.

***Current Value:*** Medium

***Protection and Enhancement Value:*** Medium

### **Value as a Native Fishery:**

**Native Species Present:** Westslope Cutthroat Trout.

Fish from this reach have not been genetically tested, but westslope cutthroat trout found upstream the waterfall at the top of the reach were tested in 1992 and where shown to be 100% pure. The phenotypic characteristics of the one fish handled in 2008 suggested that the fish was at least 95% pure.

**Competitor and/or Hybridizing Species Present:** Brown Trout.

Brown trout are extremely abundant in lower Warm Springs Creek and likely exert heavy competition and predation on the few westslope cutthroat trout present in the reach. This issue is likely to be persistent and would make managing for westslope cutthroat trout very difficult in this reach.

**Demographics and Connectivity:** Based on limited sampling in 2008, westslope cutthroat trout appear to occur only rarely and do not likely represent a viable population in lower Warm Springs Creek. The one fish captured in the survey reach was large enough to be an adult, and no young-of-the-year or other juveniles were observed.

Lower Warm Springs Creek is well connected to the Clark Fork River, and westslope cutthroat (in the Clark Fork River) have access to the lower 5.3 miles of the stream. A sizeable waterfall at river mile 5.3 appears to preclude any upstream passage beyond this point. Based on limited surveys and reconnaissance conducted in 2008, spawning habitat suitable for westslope cutthroat trout may be rather limited and site specific in lower Warm Springs Creek.

**Current Value:** Low

**Protection and Enhancement Value:** Low

### **Habitat Description:**

**Habitat Quality:** Overall, habitat quality and riparian condition throughout much of lower Warm Springs Creek is fair. Within the 2008 survey segment there was a general lack of woody riparian vegetation along much of the channel. Bank erosion was evident in several locations, and stream substrate was generally comprised of fine sediments. Sites suitable for trout spawning (clean gravel substrates) appeared limited and site specific. Deep-water habitat was abundant however, and aquatic vegetation provided a fair amount of overhead cover.

**Habitat Security:** The entirety of this reach lies on private lands used primarily for agricultural purposes including grazing and irrigated hay production. The nature of the ownership and land use makes habitat security a concern. Additionally, an abandoned phosphate mine is located in the middle of the watershed, posing a potential threat to water quality.

**DRAINAGE:** Warm Springs Creek

**STREAM:** West Fork Warm Springs Creek

**REACH:** All

### **Value as a Recruitment/Restoration Fishery for the Clark Fork River:**

**Species Present:** Westslope Cutthroat Trout

**Fish Density/Number of Fish Produced:** Based on limited electrofishing in 2007, westslope cutthroat trout are present in moderate densities in West Fork Warm Springs Creek.

**Recruitment to and Connectivity with the Clark Fork River:** West Fork Warm Springs Creek is not likely to be a significant source of westslope cutthroat trout recruitment for the Clark Fork River. Although the stream is a tributary to Warm Springs Creek, marginal connectivity between the upper extent of Warm Springs Creek and the lower portion of the drainage reduces the overall recruitment value of the stream. The uppermost extent of Warm Springs Creek is somewhat isolated from the lower portion of the drainage by a segment of ephemeral channel that separates the two parts of the watershed. Flow through this section of the stream appears to be fairly irregular, although in high flow years it is likely that fish from West Fork Warm Springs Creek can migrate downstream to the lower reaches of Warm Springs Creek and potentially the Clark Fork River.

**Current Value:** Low

**Protection and Enhancement Value:** Low

### **Value as a Tributary/Replacement Fishery:**

**Recreational Species Present:** Westslope Cutthroat Trout

**Fish Density:** Based on limited electrofishing in 2007, westslope cutthroat trout are present in moderate densities in West Fork Warm Springs Creek.

**Fish Size:** Westslope cutthroat trout in West Fork Warm Springs Creek tend to be small, although fish of catchable size are present. The average length of westslope cutthroat trout in the one section sampled in 2007 was a little less than 5 inches. The largest fish observed was about 8 inches.

**Recruitment to non Clark Fork River Fishery:** West Fork Warm Springs Creek is a tributary to Warm Springs Creek. While there is potential for the stream to be a fair source of westslope cutthroat trout recruitment for downstream reaches of Warm Springs Creek, marginal connectivity between the upper extent of Warm Springs Creek and the lower portion of the drainage may reduce the overall recruitment value of the stream. The uppermost extent of Warm Springs Creek is somewhat isolated from the lower portion of the drainage by a segment of ephemeral channel that separates the two parts of

the watershed. Flow through this section of the stream appears to be fairly irregular, although in high flow years it is likely that fish from West Fork Warm Springs Creek can migrate downstream to the lower reaches of Warm Springs Creek.

***Current Value: Low***

***Protection and Enhancement Value: Low***

### **Value as a Native Fishery:**

**Native Species Present:** Bull Trout and Westslope Cutthroat Trout

No genetic testing has been conducted on westslope cutthroat trout in West Fork Warm Springs Creek. However, genetic testing conducted in the upper extent of Warm Springs Creek near the mouth of the stream in 1986 suggests that the westslope cutthroat trout population may be genetically pure.

**Competitor and/or Hybridizing Species Present:** None detected.

**Demographics and Connectivity:** Based on limited electrofishing conducted in 2007, both bull trout and westslope cutthroat trout maintain fairly good populations in West Fork Warm Springs Creek. Both species appear to be present in moderate densities, and the observation of multiple age classes of each species suggests that the populations are viable. The largest westslope cutthroat trout measured during 2007 sampling was 8 inches in total length, while the largest bull trout was about 10 inches. Fish of this size are large enough to be adults with a resident life history.

Westslope cutthroat trout and bull trout in West Fork Warm Springs Creek appear to have limited connectivity with other populations. A segment of ephemeral channel that separates the upper extent of Warm Springs Creek from the lower portion of the drainage likely reduces fish movement between the two areas. While this relative isolation may limit the invasion of non-native species, it also likely limits the ability of native trout in West Fork Warm Springs Creek to express a migratory life history. Therefore it is likely the both the bull trout and westslope cutthroat populations in the stream are maintained largely by resident fish.

***Current Value: Very High***

***Protection and Enhancement Value: Very High***

### **Habitat Description:**

**Habitat Quality:** Habitat quality and riparian condition along West Fork Warm Springs Creek is relatively good. Much of the stream flows through a forested canopy where past timber harvest is evident along portions of the channel. Despite the evidence of past riparian logging, woody debris is fairly common along the stream and contributes a fair amount of habitat complexity to the channel. Summer base flows appear to be good throughout the entire length of the stream.

**Habitat Security:** Landownership along West Fork Warm Springs Creek is comprised entirely of public lands administered by the U.S. Forest Service. Habitat security is likely to be good throughout the drainage.

## **UNRANKED**

**DRAINAGE:** Rock Creek

**STREAM:** Alder Creek

**REACH:** Entire stream

### **Value as a Recruitment/Restoration Fishery for the Clark Fork River:**

**Species Present:** Westslope Cutthroat Trout

**Fish Density/Number of Fish Produced:** Westslope cutthroat trout densities were moderate in the two electrofishing sections sampled in Alder Creek.

**Recruitment to and Connectivity with the Clark Fork River:** Alder Creek is a moderate sized tributary that flows directly into middle Rock Creek and potentially serves as a source of recruitment to the Clark Fork River. Alder Creek maintains moderate densities of westslope cutthroat trout, a portion of which may out-migrate and recruit into the mainstem Clark Fork River fishery. Connectivity between Alder Creek and the Clark Fork River via Rock Creek is excellent for both up- and downstream migrants.

**Current Value:** Medium

**Protection and Enhancement Value:** Medium

### **Value as a Tributary/Replacement Fishery:**

**Recreational Species Present:** Westslope Cutthroat Trout

**Fish Density:** Westslope cutthroat trout densities were moderate in the two electrofishing sections sampled in Alder Creek.

**Fish Size:** Westslope cutthroat trout in Alder Creek averaged 5.5" and reached a maximum length of 9.5".

**Recruitment to non Clark Fork River Fishery:** Alder Creek is moderate sized tributary that flows directly into middle Rock Creek and likely serves as a source of westslope cutthroat trout recruitment to Rock Creek. Alder Creek maintains moderate densities of westslope cutthroat trout, a portion of which likely out-migrate and recruit into the mainstem Rock Creek fishery.

**Current Value:** medium

**Protection and Enhancement Value:** medium

### **Value as a Native Fishery:**

**Native Species Present:** Both bull and westslope cutthroat trout are present in Alder Creek. No genetic analyses have been completed for westslope cutthroat trout in Alder Creek although it is possible that some hybridization may have occurred in the drainage due to its connectivity with mainstem Rock Creek.

**Competitor and/or Hybridizing Species Present:** No non-native fish were captured in Alder Creek, although non-native brown, rainbow, and brook trout are present in mainstem Rock Creek and could potentially invade the Alder Creek drainage.

**Demographics and Connectivity:** Bull trout in the Alder Creek drainage maintain relatively low densities but do appear to occupy a large portion of the drainage based on their presence in both electrofishing sections. Nonetheless, there is some question as to the long-term viability of this population based on their low densities. The presence of several other bull trout populations in the middle and upper Rock Creek drainage provide possible sources of fish to maintain genetic variation within the Alder Creek population or to re-found the population should it be lost. The connectivity between this population and other neighboring bull trout populations (i.e. Hogback Creek, Welcome Creek, etc...) via Rock Creek is excellent.

Westslope cutthroat trout are moderately abundant in the Alder Creek drainage and are found throughout the drainage, suggesting that this population is relatively strong. Connectivity between Alder Creek and other westslope cutthroat trout populations in the middle Rock Creek drainage is quite good which allows for genetic exchange with other populations and potentially re-founding of the population should it be lost.

***Current Value: High***

***Protection and Enhancement Value: High (entire drainage in Forest Service ownership)***

### **Habitat Description:**

**Habitat Quality:** Habitat quality in the Alder Creek drainage was found to be excellent at the two sites surveyed with minimal habitat degradation being observed.

**Habitat Security:** The entire Alder Creek drainage is located within lands administered by the Lolo National Forest and thus is quite secure from future land use changes.

**DRAINAGE:** Clark Fork River

**STREAM:** Allen Creek

**REACH:** Entire stream

### **Value as a Recruitment/Restoration Fishery for the Clark Fork River:**

**Species Present:** Westslope Cutthroat Trout

**Fish Density/Number of Fish Produced:** Two single-pass electrofishing sections were completed in Allen Creek in 2002. Westslope cutthroat trout densities were moderate at the lower site (~ RM 0.5) and high at the upper site (~ RM 1.5). Although not confirmed, it is likely that these fish are predominantly stream-resident, with a smaller, intact migratory component.

**Recruitment to and Connectivity with the Clark Fork River:** Allen Creek flows directly into the Clark Fork River and no fish passage obstructions have been observed within the watershed. Given its relatively small size (~ 6 mi<sup>2</sup>, < 4 mi fish-bearing stream), trout recruitment to the Clark Fork River may be limited. However, westslope cutthroat trout densities are moderate to high and little is known about their life-history.

**Current Value:** Medium

**Protection and Enhancement Value:** Medium

### **Value as a Tributary/Replacement Fishery:**

**Recreational Species Present:** Westslope Cutthroat Trout

**Fish Density:** Two single-pass electrofishing sections were completed in Allen Creek in 2002. Westslope cutthroat trout densities were moderate at the lower site (~ RM 0.5) and high at the upper site (~ RM 1.5).

**Fish Size:** Westslope cutthroat trout averaged ~ 4 inches and reached maximum lengths of 6-7 inches at both sampling sites in 2002.

**Recruitment to non Clark Fork River Fishery:** N/A. Allen Creek flows directly into the Clark Fork River and thus does not provide recruitment to a non Clark Fork River fishery.

**Current Value:** Low

**Protection and Enhancement Value:** Low

### **Value as a Native Fishery:**

**Native Species Present:** Westslope cutthroat trout are the only native trout present in the drainage. Genetic samples were collected in 2002 and analyses were completed for fish from both sites on Allen Creek. Alleles characteristic of only westslope cutthroat trout

were detected, suggesting that this population is genetically non-introgressed (> 95% certainty).

**Competitor and/or Hybridizing Species Present:** No non-native fish were detected in electrofishing surveys on Allen Creek. However, this is an open system with apparent unobstructed connectivity with the Clark Fork River, which could lead to invasion by non-native species in the future.

**Demographics and Connectivity:** Westslope cutthroat trout abundance was moderate to high in the Allen Creek drainage, which provides 3.5 - 4 miles of fish-bearing habitat. Although the overall population size is limited, this westslope cutthroat trout population is accessible to genetic exchange with other populations in the Clark Fork Basin. Connectivity could also allow migratory adults or fish from other populations to re-found this population should it be lost in a catastrophic event.

***Current Value:*** High

***Protection and Enhancement Value:*** High

### **Habitat Description:**

**Habitat Quality:** Habitat quality in Allen Creek is good or excellent throughout the drainage. Instream habitat and water quality appear to be unimpaired and riparian corridors are intact. There are forest road networks in the upper watershed, but overall density is moderate. No surface water diversions, dewatering, or mining impacts have been observed.

**Habitat Security:** Until 2009, approximately 30% of the Allen Creek watershed was owned by Plum Creek Timber Company (PCTC), with the remainder administered by the Lolo National Forest (USFS; RM 1.0-2.0). Through the recent purchase of PCTC lands by The Nature Conservancy (TNC) under the Montana Legacy Project, all PCTC lands within Crystal Creek will be transferred to the USFS in 2010. This will provide a high level of habitat security throughout most of the drainage and will likely lead to long-term enhancement.

**DRAINAGE:** Ross Fork Rock Creek

**STREAM:** Angelico Creek

**REACH:** Entire stream

### **Value as a Recruitment/Restoration Fishery for the Clark Fork River:**

**Species Present:** Westslope Cutthroat Trout and brook trout

**Fish Density/Number of Fish Produced:** Two electrofishing sections were completed in Angelico Creek in 2007. Westslope cutthroat trout densities were moderately high in the Angelico Creek drainage and were relatively consistent between the sections. Brook trout were only found in the lower portion of the drainage and their densities were low.

**Recruitment to and Connectivity with the Clark Fork River:** Due to the small size of Angelico Creek and the location of the drainage near the headwaters of Rock Creek, many river miles from the Clark Fork River, it is unlikely that Angelico Creek serves as a major source of recruitment to the Clark Fork River. It is possible however that Angelico Creek does provide some westslope cutthroat trout out-migrant to the Clark Fork River.

**Current Value:** Low

**Protection and Enhancement Value:** Low

### **Value as a Tributary/Replacement Fishery:**

**Recreational Species Present:** Westslope Cutthroat Trout, brook trout

**Fish Density:** Two electrofishing sections were completed in Angelico Creek in 2007. Westslope cutthroat trout densities were moderately high in the Angelico Creek drainage and were relatively consistent between the sections. Brook trout densities were low and were only found in the lower portion of the drainage.

**Fish Size:** Westslope cutthroat trout in Angelico Creek were relatively small with the average size being approximately 5" in the lower sample section (RM 1.1) and 4" in the upper sample section (RM 1.9). Westslope cutthroat trout reached a maximum length of 7.5" in the lower section and 6" in the upper section. Only two brook trout were captured in lower Angelico Creek and these fish were 2.5" and 8" in length.

**Recruitment to non Clark Fork River Fishery:** Angelico Creek does provide a moderate number of westslope cutthroat trout that could out-migrate and be recruited into the mainstem Rock Creek fishery. However, due to the relatively small size of the drainage, it is unlikely that Angelico Creek is a major source of recruitment to Rock Creek.

**Current Value:** Medium

**Protection and Enhancement Value:** Medium

### **Value as a Native Fishery:**

**Native Species Present:** Both bull and westslope cutthroat trout are present in the Angelico Creek drainage, although bull trout densities are quite low in the drainage with only two captured. No genetic analyses have been completed on Angelico Creek although it is possible that some hybridization has occurred in the drainage due to its connectivity with mainstem Rock Creek.

**Competitor and/or Hybridizing Species Present:** Brook trout are the only potential competitor or hybridizing species captured in the drainage and their densities were found to be quite low with only two captured.

**Demographics and Connectivity:** The viability of the Angelico Creek bull trout population is somewhat questionable based to the small number of fish captured and their relatively small distribution within the drainage. However, the presence of several other bull trout populations in the upper Rock Creek drainage (i.e. West Fork, Middle Fork, etc...) provide possible sources of fish to maintain genetic variation within this population or to re-found the population should it be lost.

Westslope cutthroat trout are moderately abundant in the Angelico Creek drainage and are found throughout the drainage, suggesting that this population is relatively strong. Connectivity between Angelico Creek and other westslope cutthroat trout populations in the upper Rock Creek drainage is quite good which allows for genetic exchange with other populations and potentially re-founding of the population should it be lost.

***Current Value: High***

***Protection and Enhancement Value: High***

### **Habitat Description:**

**Habitat Quality:** Habitat surveys completed in the Angelico Creek drainage indicate that habitat degradation has occurred in several portions of the drainage. This degradation was due primarily to riparian grazing by cattle and the associated loss of woody riparian vegetation. This degradation was observed on both private lands and National Forest lands.

**Habitat Security:** Approximately half of the Angelico Creek drainage is located within National Forest lands and thus are quite secure. The lower portion of the drainage flows through private cattle ranching land and thus could potentially undergo future changes in land and water use that could significantly degrade habitat in this reach.

**DRAINAGE:** Cottonwood Creek

**STREAM:** Baggs Creek

**REACH:** All

### **Value as a Recruitment/Restoration Fishery for the Clark Fork River:**

**Species Present:** Westslope Cutthroat Trout and Brook Trout

**Fish Density/Number of Fish Produced:** Based on electrofishing conducted in 2007 and 2008, fish density is moderate to high in much of Baggs Creek. However, species composition is somewhat variable. In the lower portion of the drainage, westslope cutthroat trout are present in relatively low densities, but become quite common (and brook trout becoming less so) as you move upstream. While brook trout are present in relatively high densities in the lower extent of the drainage, many of the fish handled during our sampling were relatively small juveniles. Additionally, the species seems to become less common as you move upstream. A natural waterfall is located at river mile 5.3, and appears to be a definite upstream fish barrier. Above this location, westslope cutthroat trout comprise the entire fish community and appear to be present in relatively high densities.

**Recruitment to and Connectivity with the Clark Fork River:** It is unlikely that Baggs Creek provides a significant source of trout recruitment for the Clark Fork River. Currently the recruitment value of the stream appears to be limited by marginal connectivity with downstream waters. A sizeable diversion ditch off of Cottonwood Creek captures all of Baggs Creek near its mouth. While fish in Baggs Creek have access to Cottonwood Creek, the pathways are somewhat complex. One way fish can reach Cottonwood Creek is to swim up the ditch to the diversion point, while another is to move down a steep, rocky spill channel located just upstream of the headgate on the ditch. It is also likely that many fish are being entrained down the ditch when it is flowing. If fish do make it to Cottonwood Creek, they may be unable to make it downstream to the Clark Fork River. Cottonwood Creek is a rather significant tributary to the Clark Fork River, but annual irrigation withdrawal and a number of fish movement impediments (e.g. Kohrs-Manning Diversion, Interstate 90 culverts, etc.) in the lower part of the drainage likely limit the recruitment value of the lower reaches of the stream. Additionally, despite trout densities being relatively good throughout much of Baggs Creek, portions of these fish are brook trout. Brook trout do not typically exhibit significant migratory tendencies and therefore reduce the overall recruitment value of the stream to some degree.

***Current Value:*** Low

Protection and Enhancement Value: Medium

### **Value as a Tributary/Replacement Fishery:**

**Recreational Species Present:** Westslope Cutthroat Trout and Brook Trout

**Fish Density:** Based on electrofishing conducted in 2007 and 2008, fish density is moderate to high in much of Baggs Creek. However, species composition is somewhat variable. In the lower portion of the drainage, westslope cutthroat trout are present in relatively low densities, but become quite common (and brook trout becoming less so) as you move upstream. While brook trout are present in relatively high densities in the lower extent of the drainage, many of the fish handled during our sampling were relatively small juveniles. Additionally, the species seems to become less common as you move upstream. A natural waterfall is located at river mile 5.3, and appears to be a definite upstream fish barrier. Above this location, westslope cutthroat trout comprise the entire fish community and appear to be present in relatively high densities.

**Fish Size:** Fish in Baggs Creek do not typically attain very large size, although fish of catchable length are present in fair numbers throughout much of the stream (especially westslope cutthroat trout). At the several sites sampled in the drainage in 2007 and 2008, westslope cutthroat trout averaged about 5 to 6 inches in total length, with maximum fish size being approximately 10 inches. Many of the brook trout captured in the stream were rather small, and relatively few were of catchable size. However, brook trout as large as 10 inches in total length were observed.

**Recruitment to non Clark Fork River Fishery:** Baggs Creek is a tributary to Cottonwood Creek, and is likely a source of trout recruitment for the stream. However, the current recruitment value may be limited by marginal connectivity between the two streams. A sizeable diversion ditch off of Cottonwood Creek captures all of Baggs Creek near its mouth. While fish in Baggs Creek have access to Cottonwood Creek, the pathways are somewhat complex. One way fish can reach Cottonwood Creek is to swim up the ditch to the diversion point, while another is to move down a steep, rocky spill channel located just upstream of the headgate on the ditch. It is also likely that many fish are being entrained down the ditch when it is flowing.

**Current Value:** Medium

**Protection and Enhancement Value:** Medium

### **Value as a Native Fishery:**

**Native Species Present:** Westslope Cutthroat Trout

Genetic testing conducted in 1988 suggests that the westslope cutthroat trout population in Baggs Creek is genetically pure.

**Competitor and/or Hybridizing Species Present:** Brook Trout

Brook trout are fairly common in Baggs Creek downstream of the natural barrier (waterfall) at river mile 5.3. Brook trout likely exert a fair competitive pressure on westslope cutthroat trout in this reach. Upstream of the barrier, brook trout are absent, and are not likely to pose a threat to the isolated westslope cutthroat trout population located above it.

**Demographics and Connectivity:** Based on 2007 and 2008 electrofishing, westslope cutthroat trout comprise a fair portion of the fish community in Baggs Creek. The species is present in moderate to high densities, and observations of multiple size classes of fish suggest that the population is relatively strong both upstream and downstream of a natural fish barrier (waterfall) located at river mile 5.3. However, due to the limited amount of occupied habitat above this barrier (~ 2 miles), the viability of the population in this portion of the drainage could be threatened by associated risks of isolation (i.e. inbreeding depression, local extinction, etc.). The largest westslope cutthroat trout captured during our sampling in 2007 was about 10 inches in total length.

Baggs Creek is a rather significant tributary to Cottonwood Creek. However, a large irrigation diversion near the mouth appears to have reduced connectivity between the two streams. Additionally, irrigation withdrawal and a number of fish movement impediments (e.g. Kohrs-Manning Diversion, Interstate 90 culverts, etc.) in lower Cottonwood Creek has also limited connectivity of Baggs Creek with the Clark Fork River. Due to these reductions in connectivity, it is likely that resident fish maintain the westslope cutthroat trout population in Baggs Creek. However, the presence of a small migratory component of the population cannot be ruled out.

***Current Value: Medium***

***Protection and Enhancement Value: High***

### **Habitat Description:**

**Habitat Quality:** Overall, habitat quality in Baggs Creek is only fair, although habitat quality tends to increase gradually in an upstream direction. Habitat quality has been affected by a number of factors including widespread livestock grazing in the riparian zone, timber harvest, and past mining activity. In some areas, woody riparian vegetation along the channel tends to be somewhat patchy, and the lack of woody vegetation has reduced stream shading and habitat complexity, as well as increased sedimentation by making the streambanks more susceptible to erosion. A road/trail runs through much of the drainage and fords the stream in several locations contributing sediment at each site. Additionally, irrigation withdrawal in the lower reaches of the stream can leave flow in Baggs Creek rather low during the irrigation season.

**Habitat Security:** Landownership along Baggs Creek is comprised of both private and public (National Forest) lands. Approximately the lower two miles of the drainage lies on private lands used primarily for livestock grazing. Additionally there are several irrigation diversions located within this reach that have the potential to divert much of the flow in Baggs Creek. The nature of the ownership and land use makes habitat security a concern in this portion of the drainage. In the upper extent of the watershed, the stream flows entirely through lands administered by the U.S. Forest Service where habitat security is fairly good. However, the entirety of the watershed lies within several livestock grazing allotments. Livestock grazing along upper Baggs Creek could make habitat security a concern if not closely managed.

**DRAINAGE:** Rock Creek

**STREAM:** Beaver Creek

**REACH:** Entire stream

### **Value as a Recruitment/Restoration Fishery for the Clark Fork River:**

**Species Present:** Westslope Cutthroat Trout

**Fish Density/Number of Fish Produced:** Westslope cutthroat trout in Beaver Creek maintained low densities in the lower electrofishing section and were not captured in the upper section (upper section was fishless).

**Recruitment to and Connectivity with the Clark Fork River:** Due to the small size of Beaver Creek and the location of the drainage near the headwaters of Rock Creek, many river miles from the Clark Fork River, it is unlikely that Beaver Creek serves as a major source of recruitment to the Clark Fork River.

**Current Value:** Low

**Protection and Enhancement Value:** Low

### **Value as a Tributary/Replacement Fishery:**

**Recreational Species Present:** Westslope Cutthroat Trout

**Fish Density:** Westslope cutthroat trout in Beaver Creek maintained low densities in the lower electrofishing section and were not captured in the upper section (upper section was fishless).

**Fish Size:** Westslope cutthroat trout in Beaver Creek averaged 4" and reached a maximum length of 6".

**Recruitment to non Clark Fork River Fishery:** Beaver Creek does maintain a small number of westslope cutthroat trout that could out-migrate and be recruited into the mainstem Rock Creek fishery. However, due to the relatively small size of the drainage, it is unlikely that Beaver Creek is a major source of recruitment to Rock Creek.

**Current Value:** Low

**Protection and Enhancement Value:** Low

### **Value as a Native Fishery:**

**Native Species Present:** Westslope cutthroat trout was the only native salmonid that was captured in the Beaver Creek drainage. No genetic analyses have been completed for

westslope cutthroat trout in Beaver Creek although it is possible that some hybridization may have occurred in the drainage due to its connectivity with mainstem Rock Creek.

**Competitor and/or Hybridizing Species Present:** No non-native fish were captured in Beaver Creek, although non-native brown trout are present in West Fork Rock Creek and could potentially invade the Beaver Creek drainage.

**Demographics and Connectivity:** Westslope cutthroat trout were captured in low densities in the lower section of Beaver Creek with no fish being captured in the upper section. This data suggests that the population is currently stable, but the long-term viability may still be questionable. Connectivity between Beaver Creek and other westslope cutthroat trout populations in the upper Rock Creek drainage is quite good which allows for genetic exchange with other populations and potentially re-founding of the population should it be lost.

***Current Value:*** Medium

***Protection and Enhancement Value:*** Medium

### **Habitat Description:**

**Habitat Quality:** Habitat quality at the upper site on Beaver Creek drainage was found to be excellent with minimal habitat degradation being observed. At the lower site, the habitat was still rated quite high, but some degradation to the riparian vegetation was observed due to riparian grazing. This reach was still rated as excellent in terms of fish habitat.

**Habitat Security:** A majority of the Beaver Creek drainage is located within Beaverhead-Deerlodge National Forest lands and thus is quite secure. The lower portion of the drainage flows through private lands and thus could potentially undergo future changes in land and water use that could significantly degrade habitat in this reach.

**DRAINAGE:** Rock Creek

**STREAM:** Brewster Creek

**REACH:** Entire stream

### **Value as a Recruitment/Restoration Fishery for the Clark Fork River:**

**Species Present:** Westslope Cutthroat Trout, brook trout, and Brown Trout

**Fish Density/Number of Fish Produced:** Westslope cutthroat trout densities were moderate in the two electrofishing sections sampled in Brewster Creek. Brown and brook trout were only captured in the lowest electrofishing section in Brewster Creek with moderate densities of brook trout sampled and only one brown trout captured in this section.

**Recruitment to and Connectivity with the Clark Fork River:** Brewster Creek provides a moderate number of westslope cutthroat trout that could out-migrate and be recruited into the Clark Fork River fishery, although Brewster Creek is likely not a major source of recruitment to the Clark Fork River. Connectivity between Brewster Creek and the Clark Fork River via Rock Creek is excellent for both up- and downstream migrants.

**Current Value:** Medium

**Protection and Enhancement Value:** Medium

### **Value as a Tributary/Replacement Fishery:**

**Recreational Species Present:** Westslope Cutthroat Trout, brook trout, and Brown Trout

**Fish Density:** Westslope cutthroat trout densities were moderate in the two electrofishing sections sampled in Brewster Creek. Brown and brook trout were only captured in the lowest electrofishing section in Brewster Creek with moderate densities of brook trout sampled and only one brown trout captured in this section.

**Fish Size:** Westslope cutthroat trout in Brewster Creek in the lower section averaged 6" and reached a maximum length of 11.5" while westslope cutthroat trout in the upper section averaged 4" and reached a maximum length of 8". Brook trout captured in the lowest section averaged 5" and reached a maximum length of 8.5" and the one brown trout sampled was 6" in length.

**Recruitment to non Clark Fork River Fishery:** Brewster Creek does provide a moderate number of westslope cutthroat trout that could out-migrate and be recruited into the mainstem Rock Creek fishery. Brewster Creek is also a larger than average tributary that flows directly into Rock Creek and could serve as a significant source of westslope cutthroat trout recruitment to Rock Creek.

**Current Value:** Medium

**Protection and Enhancement Value:** Medium

**Value as a Native Fishery:**

**Native Species Present:** Westslope cutthroat trout are the only native trout present in the Brewster Creek drainage. Bull trout may have been historically present in Brewster Creek, but were not captured during electrofishing surveys. No genetic analyses have been completed for westslope cutthroat trout in Brewster Creek although it is possible that some hybridization has occurred in the drainage due to its connectivity with mainstem Rock Creek.

**Competitor and/or Hybridizing Species Present:** Both brown and brook trout are present in the lower portion of the Brewster Creek drainage, although brown trout densities are very low. Brook trout densities are moderately high in the lower portion of the drainage and likely represent a threat for competition with westslope cutthroat trout.

**Demographics and Connectivity:** Westslope cutthroat trout are moderately abundant in the Brewster Creek drainage and are found throughout the drainage, suggesting that this population is relatively strong. Connectivity between Brewster Creek and other westslope cutthroat trout populations in the lower Rock Creek drainage is quite good which allows for genetic exchange with other populations and potentially re-founding of the population should it be lost.

**Current Value:** Medium

**Protection and Enhancement Value:** Medium

**Habitat Description:**

**Habitat Quality:** Habitat quality in the Brewster Creek drainage was found to be excellent at the two sites surveyed with minimal habitat degradation being observed at either site.

**Habitat Security:** Nearly all of the Brewster Creek drainage is located within lands administered by the Lolo National Forest and thus is quite secure from future land use changes. The only private lands present in the Brewster Creek drainage are small mining claims located in the headwaters and near the mouth. Residential development has occurred on private lands located near the mouth.

**DRAINAGE:** Brock Creek

**STREAM:** Brock Creek

**REACH:** All

### **Value as a Recruitment/Restoration Fishery for the Clark Fork River:**

**Species Present:** Westslope Cutthroat Trout

**Fish Density/Number of Fish Produced:** Based on 2008 electrofishing, westslope cutthroat trout comprise the entire recreational fish community in Brock Creek. The species is present in relatively high densities in the upper reaches of the stream, but abundance decreases notably in the middle-to-lower portion of the drainage.

**Recruitment to and Connectivity with the Clark Fork River:** Brock Creek is a direct tributary to the Clark Fork River. However, the mouth of the stream is the outlet of an approximately 300-foot culvert underneath Interstate 90 at the Phosphate interchange. It is unknown whether fish (i.e. spawning adults in the Clark Fork River) are capable of moving upstream through this rather long pipe. While it is likely that the stream contributes some westslope cutthroat trout to the Clark Fork River, the overall input is unknown. However, it is likely that it is not at its potential given the relatively low densities of fish and somewhat marginal habitat throughout much of the lower portion of the stream.

**Current Value:** Low

**Protection and Enhancement Value:** Medium

### **Value as a Tributary/Replacement Fishery:**

**Recreational Species Present:** Westslope Cutthroat Trout

**Fish Density:** Based on 2008 electrofishing, westslope cutthroat trout comprise the entire recreational fish community in Brock Creek. The species is present in relatively high densities in the upper reaches of the stream, but abundance decreases notably in the middle-to-lower portion of the drainage.

**Fish Size:** Based on 2008 electrofishing at two sample sites, westslope cutthroat trout in Brock Creek do not typically attain very large size. However, fish of catchable length are present. The average length of westslope cutthroat trout sampled at the lowest sample site was about 5.5 inches, whereas at the uppermost sample location, fish averaged a little over 4 inches. The largest fish handled in Brock Creek during 2008 sampling was a little less than 9 inches in total length.

**Recruitment to non Clark Fork River Fishery:** N/A – Brock Creek is a direct tributary to the Clark Fork River.

**Current Value:** Low

**Protection and Enhancement Value:** Medium

**Value as a Native Fishery:**

**Native Species Present:** Westslope Cutthroat Trout

Genetic testing conducted in 2008 suggests that westslope cutthroat trout in Brock Creek are genetically pure.

**Competitor and/or Hybridizing Species Present:** None detected.

**Demographics and Connectivity:** Based on 2008 electrofishing, Brock Creek appears to support a viable resident westslope cutthroat trout population. The species is present in relatively high densities in the upper reaches of the stream, but abundance decreases notably in the middle-to-lower portion of the drainage where young juveniles appear to be less common. Fish do not typically attain very large size, with the largest fish handled during 2008 sampling being a little less than 9 inches in total length.

Brock Creek is a direct tributary with good surface connection to the Clark Fork River. However, the mouth of the stream is the outlet of an approximately 300-foot culvert underneath Interstate 90 at the Phosphate interchange. It is unknown whether fish are capable of moving upstream through this rather long pipe. If the structure inhibits upstream fish movement, it somewhat reduces the potential for westslope cutthroat trout to be threatened by invasion from downstream nonnative species (i.e. brown trout and rainbow trout). However, it also reduces the potential for Brock Creek to be a spawning and rearing tributary for migratory westslope cutthroat trout in the Clark Fork River.

**Current Value:** High

**Protection and Enhancement Value:** High

**Habitat Description:**

**Habitat Quality:** Habitat quality and riparian condition along Brock Creek ranges from fair to comparatively good, with habitat tending to increase in quality as you move upstream. In the lower portion of the drainage, the stream flows through private as well as state owned land used primarily for livestock grazing. Portions of the stream show impacts from unrestricted livestock presence in the riparian zone. A lack of woody vegetation in these areas has reduced stream shading and habitat complexity, as well as increased sedimentation by making the streambanks more susceptible to erosion. There is also evidence of past mining impacts in the lower portion of Brock Creek, including some severe channelization in at least one location. Water temperatures are of a concern in this reach and can reach upwards of 20° C (68° F) during the summer season. In the upper reaches of Brock Creek, the riparian corridor is in fairly good condition. However, encroachment from the main forest access road, as well as impacts from past timber harvest have negatively affected habitat quality in some locations. Additionally, flow tends to be ephemeral in the most upstream portions of the reach.

**Habitat Security:** Land ownership along Brock Creek consists mostly of undeveloped private lands. Primary land uses in the drainage are livestock grazing, timber harvest (upper portion of drainage), and forest recreation. There is also evidence of past mining activity throughout the lower portion of the watershed. The only irrigation diversion known on Brock Creek is located about one mile above the mouth. This diversion can significantly impact flows in the lower mile of the stream during the irrigation season. The nature of the ownership and land use makes habitat security somewhat of a concern.

**DRAINAGE:** Warm Springs Creek

**STREAM:** Cable Creek

**REACH:** All

### **Value as a Recruitment/Restoration Fishery for the Clark Fork River:**

**Species Present:** Brook Trout, Rainbow Trout, and Westslope Cutthroat Trout

**Fish Density/Number of Fish Produced:** Based on electrofishing conducted in 2007, trout density is relatively high throughout much of Cable Creek. Upstream of the confluence with the Silver Lake aqueduct, brook trout appear to comprise the entire fish community. Past fish sampling conducted by the U.S. Forest Service also supports this observation. Downstream of the confluence with the aqueduct, brook trout are also present, but sampling in 2007 showed much of the fish community in this reach was comprised of rainbow trout. Only one westslope cutthroat trout was identified in the sample section. The presence and fair density of rainbow trout in this segment of the stream/aqueduct is not well understood. Past fish sampling conducted by the U.S. Forest Service within this portion of the stream did not produce similar results. During these sample events (conducted in the 1990's), brook trout and westslope cutthroat trout were present, but rainbow trout were absent or rare.

**Recruitment to and Connectivity with the Clark Fork River:** Cable Creek was historically a tributary to Storm Lake Creek, but Storm Lake Creek has since been diverted to Silver Lake, and the old channel is now part of the Silver Lake aqueduct. Nevertheless, Cable Creek is still connected to Warm Springs Creek via the aqueduct channel. While it is probable that Cable Creek contributes some fish to downstream reaches, the overall amount may be rather limited given that much of the fish community in the stream is comprised of brook trout. Brook trout generally do not exhibit significant migratory tendencies, and thus they have a rather low recruitment value. Additionally, the presence of Myers Dam, may also limit the recruitment potential of Cable Creek. This diversion structure, which is located on Warm Springs Creek at river mile 16.6, appears to be at least a partial barrier restricting upstream fish movement (e.g. fish returning to Cable Creek to spawn).

**Current Value:** Low

**Protection and Enhancement Value:** Low

### **Value as a Tributary/Replacement Fishery:**

**Recreational Species Present:** Brook Trout, Rainbow Trout, and Westslope Cutthroat Trout

**Fish Density:** Based on electrofishing conducted in 2007, trout density is relatively high throughout much of Cable Creek. Upstream of the confluence with the Silver Lake aqueduct, brook trout appear to comprise the entire fish community. Past fish sampling

conducted by the U.S. Forest Service also supports this observation. Downstream of the confluence with the aqueduct, brook trout are also present, but sampling in 2007 showed much of the fish community in this reach was comprised of rainbow trout. Only one westslope cutthroat trout was identified in the sample section. The presence and fair density of rainbow trout in this segment of the stream/aqueduct is not well understood. Past fish sampling conducted by the U.S. Forest Service within this portion of the stream did not produce similar results. During these sample events (conducted in the 1990's), brook trout and westslope cutthroat trout were present, but rainbow trout were absent or rare.

**Fish Size:** Fish in Cable Creek do not typically attain very large size, although fish of catchable length are present in fairly good numbers in at least the lower half of the drainage. Between the two sites sampled in the stream in 2007, brook trout had an average length of a little over 5 inches. Rainbow trout in the lowest reaches of the stream had an average length of about 6 inches. The largest brook trout captured during our sampling was about 11 inches in total length, while the biggest rainbow trout was about 10 inches.

**Recruitment to non Clark Fork River Fishery:** Cable Creek was historically a tributary to Storm Lake Creek, but Storm Lake Creek has since been diverted to Silver Lake, and the old channel is now part of the Silver Lake aqueduct. Nevertheless, Cable Creek is still connected to Warm Springs Creek via the aqueduct channel. While it is probable that Cable Creek contributes some fish to downstream reaches, the overall amount may be rather limited given that much of the fish community in the stream is comprised of brook trout. Brook trout generally do not exhibit significant migratory tendencies, and thus they have a rather low recruitment value.

***Current Value: Medium***

***Protection and Enhancement Value: Medium***

### **Value as a Native Fishery:**

**Native Species Present:** Westslope Cutthroat Trout

No genetic testing has been conducted on westslope cutthroat trout in Cable Creek. However, given the presence of rainbow trout in the stream, it is reasonable to believe that genetic purity may be less than 90%.

Electrofishing conducted by the U.S. Forest Service in 1993 documented the presence of bull trout in the lower reaches of Cable Creek (in the Silver Lake aqueduct). However, our electrofishing in 2007 failed to detect any. Given the absence of the species in 2007 sampling, as well as the rarity of the species in the U.S. Forest Service sample from 1993, it is unlikely that Cable Creek presently supports a viable bull trout population. It is possible however, that bull trout from Warm Springs Creek (or Silver Lake) occasionally stray into the lower reaches of the stream.

**Competitor and/or Hybridizing Species Present:** Brook Trout and Rainbow Trout

Brook trout are common throughout Cable Creek, and likely exert a heavy competitive pressure on native trout in the stream. Additionally, the presence of fair densities of rainbow trout in the lower reaches of the stream pose a competitive and hybridization threat to westslope cutthroat trout.

**Demographics and Connectivity:** Based on electrofishing conducted in 2007, native trout are very rare in Cable Creek. Only one westslope cutthroat trout was observed during our sampling, and this fish was found in the segment of Cable Creek that is part of the Silver Lake aqueduct. It does not appear that Cable Creek supports a viable population of westslope cutthroat trout (or bull trout) at this time.

Cable Creek was historically a tributary to Storm Lake Creek, but Storm Lake Creek has since been diverted to Silver Lake, and the old channel is now part of the Silver Lake aqueduct. Nevertheless, Cable Creek is still connected to Warm Springs Creek via the aqueduct channel. While this allows some connectivity with downstream waters, the presence of Myers Dam on Warm Springs Creek at river mile 16.6 appears to limit the connectivity of the stream with lower Warm Springs Creek and the Clark Fork River. This structure appears to be at least a partial barrier restricting upstream fish movement (e.g. migratory fish returning to Cable Creek to spawn).

**Current Value:** Low

**Protection and Enhancement Value:** Low

**Habitat Description:**

**Habitat Quality:** Habitat quality and riparian condition along Cable Creek is somewhat variable and ranges from marginal to relatively good. Although the drainage is fairly small, stream and riparian habitat has been affected by a number of factors. In the upper reaches of the stream, rather abundant mining and timber harvest activity is evident throughout the area. In the middle portion of the drainage, the stream flows through a rural subdivision where limited development has taken place, but future land use and development is likely. In the lower reaches of the stream, roads, recreational areas, and use of the channel as a delivery system for stored water in Silver Lake have all impacted stream and/or riparian habitat to some extent.

**Habitat Security:** Land ownership along Cable Creek is variable and consists of a mixture of public and private lands. The U.S. Forest Service manages much of the lower half of the drainage, and habitat security is relatively good in this area. However, in the upper portion of the drainage, much of the land along Cable Creek is in private ownership. The Cable Mountain Mine is located at the headwaters of the stream, and a subdivision is present along a good portion of the channel downstream of this location. The nature of the ownership and land use does pose some risks to habitat security in this portion of the drainage.

**DRAINAGE:** Little Blackfoot River

**STREAM:** Carpenter Creek

**REACH:** Lower – Mouth to Cascade near BLM Boundary

### **Value as a Recruitment/Restoration Fishery for the Clark Fork River:**

**Species Present:** Brown Trout

**Fish Density/Number of Fish Produced:** Based on electrofishing conducted in 2007, brown trout comprise the entire fish community in lower Carpenter Creek. The species is present in fairly high densities throughout much of the stream, which is noteworthy given the relatively small size of the channel. Many of the fish observed in 2007 in the lower portion of the reach were young juveniles.

**Recruitment to and Connectivity with the Clark Fork River:** Carpenter Creek is a small tributary to the Little Blackfoot River that appears to be an important spawning and early rearing tributary for brown trout given the high density of juveniles in the lower portion of the stream. Assuming that there is connectivity between the two streams (which has not been thoroughly evaluated), Carpenter Creek may provide a relatively good source of brown trout recruitment to the Little Blackfoot River and possibly the Clark Fork River.

**Current Value:** Medium

**Protection and Enhancement Value:** Medium

### **Value as a Tributary/Replacement Fishery:**

**Recreational Species Present:** Brown Trout

**Fish Density:** Based on electrofishing conducted in 2007, brown trout comprise the entire fish community in lower Carpenter Creek. The species is present in fairly high densities throughout much of the stream, which is noteworthy given the relatively small size of the channel.

**Fish Size:** Electrofishing was conducted at two sample sites in lower Carpenter Creek in 2007. At the lowest site, a majority of the brown trout sampled were smaller, juvenile fish (most were young-of-the-year) that were not of catchable size. However, there were catchable sized fish in the reach, with several approximately 13 inches in length. The average total length of brown trout in this reach was a little less than 4 inches. Farther upstream, below the mouth of Ophir Creek, brown trout continued to maintain a relatively small overall size. However, catchable sized fish up to about 12 inches in length were rather abundant. The average total length of brown trout in this reach was a little greater than 6 inches.

**Recruitment to non Clark Fork River Fishery:** Carpenter Creek is a small tributary to the Little Blackfoot River that appears to be an important spawning and early rearing

tributary for brown trout given the high density of juveniles in the lower portion of the stream. Assuming that there is connectivity between the two streams (which has not been thoroughly evaluated), Carpenter Creek likely provides a relatively good source of brown trout recruitment to the Little Blackfoot River.

***Current Value: Medium***

***Protection and Enhancement Value: Medium***

**Value as a Native Fishery:**

**Native Species Present:** None detected.

**Competitor and/or Hybridizing Species Present:** Brown Trout

Brown trout are very abundant in lower Carpenter Creek and likely exert heavy competition and predation on any native species (i.e. westslope cutthroat trout) that may be present in the reach. This issue will likely remain persistent.

**Demographics and Connectivity:** No native trout were observed in lower Carpenter Creek during 2007 electrofishing. However, there is the possibility that native fish could access the reach since there is an upstream source of westslope cutthroat trout in upper Carpenter Creek as well as Ophir Creek (a connected tributary). Additionally, the stream appears to be at least seasonally connected with the lower Little Black Foot River, where westslope cutthroat trout are also present in low densities.

***Current Value: Very Low***

***Protection and Enhancement Value: Low***

**Habitat Description:**

**Habitat Quality:** Overall, habitat quality and riparian condition along lower Carpenter Creek is fair. Habitat quality throughout the stream is affected by multiple factors including livestock use of the riparian zone, hay production in the lower extent of the drainage, and irrigation withdrawal. Additionally, the historic impacts of intensive placer mining are evident throughout much of the lower watershed. In some portions of the reach, woody riparian vegetation along the channel tends to be patchy, and the lack of woody plants in these areas has reduced stream shading and habitat complexity.

**Habitat Security:** All of lower Carpenter Creek flows through private lands used primarily for agricultural purposes. The primary land use in the drainage is livestock grazing, although some flood irrigated hay production is also present in the lower extent of the watershed. An irrigation diversion near river mile 0.8 appears to significantly impact flows in lower Carpenter Creek during the irrigation season. This diversion has the ability to divert virtually the entire flow of the stream. The nature of the ownership and land use makes habitat security a concern throughout lower Carpenter Creek.

**DRAINAGE:** Little Blackfoot River

**STREAM:** Carpenter Creek

**REACH:** Upper –Cascade near BLM Boundary to Headwaters

### **Value as a Recruitment/Restoration Fishery for the Clark Fork River:**

**Species Present:** Westslope Cutthroat Trout

**Fish Density/Number of Fish Produced:** Based on electrofishing conducted in 2007, westslope cutthroat trout comprise the entire fish community in upper Carpenter Creek. However, the species appears to be present in very low densities.

**Recruitment to and Connectivity with the Clark Fork River:** Carpenter Creek is a small tributary to the Little Blackfoot River. Assuming that there is connectivity between the two streams (which has not been thoroughly evaluated), it remains unlikely that upper Carpenter Creek provides much, if any, westslope cutthroat trout recruitment to the Little Blackfoot or Clark Fork Rivers. This judgment is based on several factors including that the species is only present in low densities in upper Carpenter Creek, and that high levels of brown trout competition/predation in lower Carpenter Creek likely limit westslope cutthroat trout survival in this portion of the stream.

**Current Value:** Low

**Protection and Enhancement Value:** Low

### **Value as a Tributary/Replacement Fishery:**

**Recreational Species Present:** Westslope Cutthroat Trout

**Fish Density:** Based on electrofishing conducted in 2007, westslope cutthroat trout comprise the entire fish community in upper Carpenter Creek. However, the species appears to be present in very low densities.

**Fish Size:** Electrofishing was conducted at one sample site in upper Carpenter Creek in 2007. At this site, only one fish was captured that was considered to be of catchable size, and this fish was relatively small at just less than 7 inches in length. Many of the westslope cutthroat trout observed were smaller, juvenile fish. The average length of fish collected in the reach was about 4 inches. We did observe a fair number of extremely small young-of-the-year (~25) at the sample site, but these fish were not captured or measured for fear of high mortality.

**Recruitment to non Clark Fork River Fishery:** Carpenter Creek is a small tributary to the Little Blackfoot River. Assuming that there is connectivity between the two streams (which has not been thoroughly evaluated), it remains unlikely that upper Carpenter Creek provides much, if any, westslope cutthroat trout recruitment to the Little Blackfoot River. This judgment is based on several factors including that the species is only present in low densities in upper Carpenter Creek, and that high levels of brown trout

competition/predation in lower Carpenter Creek likely limit westslope cutthroat trout survival in this portion of the stream.

***Current Value: Low***

***Protection and Enhancement Value: Low***

**Value as a Native Fishery:**

**Native Species Present:** Westslope Cutthroat Trout

Limited genetic sampling conducted in 1990 suggests that westslope cutthroat trout in upper Carpenter Creek are genetically pure.

**Competitor and/or Hybridizing Species Present:** None detected.

**Demographics and Connectivity:** Based on electrofishing conducted in 2007, westslope cutthroat trout comprise the entire fish community in upper Carpenter Creek. However, the species appears to be present in very low densities, and most of the fish appear to be juveniles. Only one fish was captured that was large enough to be a resident adult (>6 inches in total length). While, we did observe a fair number of young-of-the-year (~25) in the sample site in 2007, gaps in the size classes of measured fish suggests that successful reproduction and recruitment may be limited in upper Carpenter Creek.

Upper Carpenter Creek appears to be isolated from the lower portion of the drainage by a cascade that limits upstream fish movement. The total length of stream capable of supporting fish above this barrier appears to be less than 2 miles. While the lack of connectivity may have benefited the existing westslope cutthroat trout population in upper Carpenter Creek by limiting the invasion of non-native species such as brown trout, risks of isolation (i.e. inbreeding depression, local extinction, etc.) are of serious concern. The long-term viability of this population may be in question.

***Current Value: Medium***

***Protection and Enhancement Value: Medium***

**Habitat Description:**

**Habitat Quality:** Riparian condition along upper Carpenter Creek is fair, but fish habitat quality tends to be rather poor. The stream is small and shallow, and appears to be possibly aggrading due to poor sediment transport capacity. The sparse pools present in the reach are mostly filled with sediment providing little in the way of adult fish habitat. Livestock have access to upper Carpenter Creek, and there is evidence of hoofs hear and grazing pressure (primarily on grasses) along portions of the stream. Additionally, past timber harvest and placer mining impacts are evident throughout the reach as well.

**Habitat Security:** Much of upper Carpenter Creek flows through lands managed by the U.S. Bureau of Land Management and the U.S. Forest Service. However, there are also

parcels of private land developed with cabins present in the area. While habitat security is fair in this reach, the presence of livestock along the stream within the federal allotments poses some risk to habitat security. This concern is heightened since the total length of stream capable of supporting fish appears to be relatively limited (< 2 miles).

**DRAINAGE:** Carten Creek

**STREAM:** Carten Creek

**REACH:** All

### **Value as a Recruitment/Restoration Fishery for the Clark Fork River:**

**Species Present:** Westslope Cutthroat Trout

**Fish Density/Number of Fish Produced:** Based on 2008 electrofishing, westslope cutthroat trout comprise the entire fish community in Carten Creek. The species appears to occur in moderate densities throughout much of the stream.

**Recruitment to and Connectivity with the Clark Fork River:** Historic activities including the construction of Interstate 90 have significantly impacted Carten Creek near its terminus. The mouth of the stream is a perched culvert, which is over 250 feet in length. Additionally, a 12-acre impoundment is situated on Carten Creek near Interstate 90 at RM 0.4. These impacts likely limit both upstream and downstream movement of fish. While Carten Creek may provide some recruitment to the Clark Fork River, the overall level is likely fairly low.

**Current Value:** Low

**Protection and Enhancement Value:** Medium

### **Value as a Tributary/Replacement Fishery:**

**Recreational Species Present:** Westslope Cutthroat Trout

**Fish Density:** Based on 2008 electrofishing, westslope cutthroat trout comprise the entire fish community in Carten Creek. The species appears to occur in moderate densities throughout much of the stream.

**Fish Size:** Westslope cutthroat trout in Carten Creek tend to be fairly small and rarely occur at a catchable size. Average fish length at the two sites sampled in 2008 was less than 5 inches. The largest fish captured was approximately 7 inches.

**Recruitment to non Clark Fork River Fishery:** N/A – Carten Creek is a direct tributary to the Clark Fork River.

**Current Value:** Low

**Protection and Enhancement Value:** Low

### **Value as a Native Fishery:**

**Native Species Present:** Westslope Cutthroat Trout.

Genetic testing conducted on samples collected in 1986 and 2008 show that Carten Creek contains a pure population of westslope cutthroat trout.

**Competitor and/or Hybridizing Species Present:** None detected.

**Demographics and Connectivity:** Based on 2008 electrofishing, westslope cutthroat trout are present in moderate densities in Carten Creek. Multiple size classes were present with fish ranging up to approximately 7 inches in total length. Based on the relative density and size of fish collected, it suggests a viable population of resident westslope cutthroat trout is in the stream. No large, migratory sized fish were detected during 2008 sampling.

Historic activities including the construction of Interstate 90 have significantly impacted Carten Creek near its terminus. The mouth of the stream is a perched culvert, which is over 250 feet in length. Additionally, a 12-acre impoundment is situated on Carten Creek near Interstate 90 at RM 0.4. These impacts likely limit both upstream and downstream movement of fish. These factors reduce the potential for westslope cutthroat trout to be threatened by downstream nonnative species invasion, but also limit the ability of the population to re-found should a catastrophic event take place in the upper watershed that would extirpate the population. Additionally, the presence of the pond at RM 0.4 does pose a potential threat to the population through the possible introduction of non-native species into the pond.

***Current Value:*** High

***Protection and Enhancement Value:*** High

### **Habitat Description:**

**Habitat Quality:** Habitat quality in Carten Creek ranges from fair to good. Much of the riparian zone maintains healthy woody riparian vegetation, although some areas do show impacts from unrestricted livestock presence. In these areas, a lack of woody riparian vegetation has reduced stream shading and habitat complexity, and increased sedimentation by making the streambanks more susceptible to erosion. Fish habitat in Carten Creek is most affected by high fine sediment accumulation and low streamflow. Several hay meadows are located in the lower-middle portion of the drainage, and stream flow downstream of this location is clearly affected by irrigation withdrawal.

**Habitat Security:** Land ownership along Carten Creek is comprised entirely of private agricultural lands used primarily for livestock grazing and irrigated hay production. Factors that could affect habitat security in the drainage include unrestricted livestock grazing in the riparian zone, and irrigation withdrawals that could dewater the lower portion of the drainage. The nature of the ownership and land use makes habitat security a concern.

**DRAINAGE:** Boulder Creek

**STREAM:** Copper Creek

**REACH:** Entire stream

### **Value as a Recruitment/Restoration Fishery for the Clark Fork River:**

**Species Present:** Westslope Cutthroat Trout, brook trout

**Fish Density/Number of Fish Produced:** Westslope cutthroat trout densities are relatively low throughout the Copper Creek drainage and several of the westslope cutthroat trout captured showed clear signs of hybridization. Brook trout densities are very high in the upper portion of Copper Creek and moderate in the lower portion of the drainage.

**Recruitment to and Connectivity with the Clark Fork River:** Some westslope cutthroat trout potentially out-migrate from Copper Creek to the Upper Clark Fork River, however Copper Creek is likely not a major source of recruitment to the Clark Fork River due to the low densities of westslope cutthroat trout in the drainage. Connectivity between Copper Creek and the Upper Clark Fork appears to be good other than potential seasonal fish passage issues at some diversion dams in lower mainstem Flint Creek. The results of a recent radio telemetry study indicate that these dams are at least seasonally passable by migrating adult salmonids.

**Current Value:** Low

**Protection and Enhancement Value:** Low

### **Value as a Tributary/Replacement Fishery:**

**Recreational Species Present:** Westslope Cutthroat Trout, brook trout

**Fish Density:** Westslope cutthroat trout densities are relatively low throughout the Copper Creek drainage and several of the westslope cutthroat trout captured showed clear signs of hybridization. Brook trout densities were very high in the upper portion of Copper Creek and moderate in the lower portion of the drainage.

**Fish Size:** Westslope cutthroat trout and westslope cutthroat trout/rainbow trout hybrids in Copper Creek averaged 5" in the lower portion of the drainage and 7" in the upper portion of the drainage, with individuals up to 10" captured. Brook trout averaged 5.5" throughout the drainage and reached a maximum length of 8.5".

**Recruitment to non Clark Fork River Fishery:** Copper Creek does provide a small number of westslope cutthroat trout that could out-migrate and be recruited into the mainstem Flint Creek fishery. However, electrofishing surveys in Flint Creek indicate that westslope cutthroat trout do not represent a significant portion of the recreational fishery. Westslope cutthroat trout from Copper Creek may provide recruitment to the mainstem Boulder Creek fishery which does receive some angling pressure.

**Current Value:** Low

**Protection and Enhancement Value:** Low

### **Value as a Native Fishery:**

**Native Species Present:** Westslope cutthroat trout are the only native trout present in the Copper Creek drainage. Several individuals that were clearly westslope cutthroat trout/rainbow trout hybrids were sampled in the drainage. Sidney Lake is located in the headwaters of the Copper Creek drainage was sampled by MFWP crews in 2008. Rainbow trout were the only species captured in Sidney Lake and are likely the source of hybridization in the Copper Creek drainage.

**Competitor and/or Hybridizing Species Present:** Brook trout and rainbow trout are the two non-native species captured in the drainage. Brook trout densities were found to be very high and likely represent a threat in terms of competition to westslope cutthroat trout. Rainbow trout are present in a headwater lake and appear to have hybridized with westslope cutthroat trout in the drainage.

**Demographics and Connectivity:** Westslope cutthroat trout are found in low densities throughout the Copper Creek drainage, suggesting that this population is relatively unstable. Connectivity between Copper Creek and other tributaries to Boulder Creek is good and allows for genetic exchange with other populations and potentially re-founding of the population should it be lost. Connectivity between Copper Creek and other westslope cutthroat trout populations in the Flint Creek drainage is fair as some migratory individuals appear to still exist, but are not abundant.

**Current Value:** Low

**Protection and Enhancement Value:** Low

### **Habitat Description:**

**Habitat Quality:** Habitat quality in the Copper Creek drainage was found to be excellent at the two sites surveyed with minimal habitat degradation being observed.

**Habitat Security:** Nearly all of the Copper Creek drainage is located within lands administered by the Beaverhead-Deerlodge National Forest and thus is quite secure from future land use changes. The only private land present in the Copper Creek drainage is one small mining claim.

**DRAINAGE:** Lower Willow Creek

**STREAM:** Copper Creek

**REACH:** Entire stream

### **Value as a Recruitment/Restoration Fishery for the Clark Fork River:**

**Species Present:** Westslope Cutthroat Trout

**Fish Density/Number of Fish Produced:** Two electrofishing surveys were completed on Copper Creek in 2007. Westslope cutthroat trout densities were high in the upper section and moderate in the lower section. No other trout species were captured.

**Recruitment to and Connectivity with the Clark Fork River:** Copper Creek may provide some recruitment of westslope cutthroat trout to the Clark Fork River, although due to the small size of the drainage, it is likely not significant. The lack of upstream passage at Lower Willow Creek Dam would not allow fish recruited into the Clark Fork River fishery to return to Copper Creek to spawn.

***Current Value:*** Low

***Protection and Enhancement Value:*** Low

### **Value as a Tributary/Replacement Fishery:**

**Recreational Species Present:** Westslope Cutthroat Trout

**Fish Density:** Two electrofishing surveys were completed on Copper Creek in 2007. Westslope cutthroat trout densities were high in the upper section and moderate in the lower section. No other trout species were captured.

**Fish Size:** Westslope cutthroat trout averaged 4.5" in length in Copper Creek and reached a maximum length of 8".

**Recruitment to non Clark Fork River Fishery:** Copper Creek likely provides some recruitment to mainstem Lower Willow Creek. Westslope cutthroat trout are relatively abundant in Lower Willow Creek just below Lower Willow Dam and are likely present due to entrainment of fish through the dam. However, Lower Willow Dam provides no upstream passage, which prevents adults from accessing their natal streams for spawning.

***Current Value:*** Low

***Protection and Enhancement Value:*** Low

### **Value as a Native Fishery:**

**Native Species Present:** Westslope cutthroat trout are the only native trout present in the Copper Creek drainage. Genetic analyses of westslope cutthroat trout from Copper completed in 2009 indicate that these fish are genetically pure.

**Competitor and/or Hybridizing Species Present:** No non-native fish are present in the Copper Creek drainage.

**Demographics and Connectivity:** The viability of westslope cutthroat trout appears to be quite good in the Copper Creek drainage. Genetic sampling from within the drainage indicates that this population is genetically pure and all other connected streams also only maintain pure westslope cutthroat trout. Lower Willow Creek Dam serves as a barrier for invasion of rainbow trout minimizing the potential threat of hybridization. Westslope cutthroat trout densities are high in the Copper Creek drainage and multiple age classes of westslope cutthroat trout were observed including age 0 fish.

The lack of connectivity between Copper Creek and mainstem Lower Willow Creek could pose a potential threat to viability due to the possible effects of small population size. However, North Fork Lower Willow Creek and multiple other tributaries to North Fork Lower Willow maintain westslope cutthroat trout populations and are currently connected to Copper Creek via Lower Willow Creek Reservoir. Also, several other tributaries to South Fork Lower Willow Creek also maintain viable westslope cutthroat trout populations providing additional protection against small population size. Thus, the impact of lost connectivity due to the presence of Lower Willow Dam appears to be minimized by the relatively large contiguous habitat that is occupied by westslope cutthroat trout in tributaries above the dam.

***Current Value:*** High

***Protection and Enhancement Value:*** High

### **Habitat Description:**

**Habitat Quality:** Habitat quality in the Copper Creek drainage was generally considered fair. In both the upper and lower portions of the drainage, riparian grazing impacts were evident including reduced densities of woody riparian vegetation and its associated effects on stream bank stability and fish habitat.

**Habitat Security:** A good portion of the Copper Creek drainage flows through public lands including lands owned by the Forest Service and Bureau of Land Management and thus is relatively secure. The lower portion of Copper Creek does flow through private lands and could potentially undergo future changes in land and water use that could significantly degrade habitat in this drainage.

**DRAINAGE:** Lower Willow Creek

**STREAM:** Cottonwood Creek

**REACH:** Entire stream

### **Value as a Recruitment/Restoration Fishery for the Clark Fork River:**

**Species Present:** Westslope Cutthroat Trout

**Fish Density/Number of Fish Produced:** Two electrofishing surveys were completed on Cottonwood Creek in 2007. Westslope cutthroat trout densities were very high in both sections. No other trout species were captured.

**Recruitment to and Connectivity with the Clark Fork River:** Cottonwood Creek may provide some recruitment of westslope cutthroat trout to the Clark Fork River, although due to the small size of the drainage, it is likely not significant. The lack of upstream passage at Lower Willow Creek Dam would not allow fish recruited into the Clark Fork River fishery to return to Cottonwood Creek to spawn.

***Current Value:*** Low

***Protection and Enhancement Value:*** Low

### **Value as a Tributary/Replacement Fishery:**

**Recreational Species Present:** Westslope Cutthroat Trout

**Fish Density:** Two electrofishing surveys were completed on Cottonwood Creek in 2007. Westslope cutthroat trout densities were very high in both sections. No other trout species were captured.

**Fish Size:** Westslope cutthroat trout averaged 3.5" in length in Cottonwood Creek and reached a maximum length of 8".

**Recruitment to non Clark Fork River Fishery:** Cottonwood Creek likely provides some recruitment to mainstem Lower Willow Creek. Westslope cutthroat trout are relatively abundant in Lower Willow Creek just below Lower Willow Dam and are likely present due to entrainment of fish through the dam. However, Lower Willow Dam provides no upstream passage, which prevents adults from accessing their natal streams for spawning.

***Current Value:*** Low

***Protection and Enhancement Value:*** Low

### **Value as a Native Fishery:**

**Native Species Present:** Westslope cutthroat trout are the only native trout present in the Cottonwood Creek drainage. Genetic analyses of westslope cutthroat trout from Cottonwood completed in 2008 indicate that these fish are genetically pure.

**Competitor and/or Hybridizing Species Present:** No non-native fish are present in the Cottonwood Creek drainage.

**Demographics and Connectivity:** The viability of westslope cutthroat trout appears to be quite good in the Cottonwood Creek drainage. Genetic sampling from within the drainage indicates that this population is genetically pure and all other connected streams also only maintain pure westslope cutthroat trout. Lower Willow Creek Dam serves as a barrier for invasion of rainbow trout minimizing the potential threat of hybridization. Westslope cutthroat trout densities are high in the Cottonwood Creek drainage and multiple age classes of westslope cutthroat trout were observed including age 0 fish.

The lack of connectivity between Cottonwood Creek and mainstem Lower Willow Creek could pose a potential threat to viability due to the possible effects of small population size. However, North Fork Lower Willow Creek and multiple other tributaries to North Fork Lower Willow maintain westslope cutthroat trout populations and are currently connected to Cottonwood Creek via Lower Willow Creek Reservoir. Also, several other tributaries to South Fork Lower Willow Creek also maintain viable westslope cutthroat trout populations providing additional protection against small population size. Thus, the impact of lost connectivity due to the presence of Lower Willow Dam appears to be minimized by the relatively large contiguous habitat that is occupied by westslope cutthroat trout in tributaries above the dam.

***Current Value:*** High

***Protection and Enhancement Value:*** High

### **Habitat Description:**

**Habitat Quality:** Habitat quality in the Cottonwood Creek drainage was generally rated as fair to poor. In both the upper and lower portions of the drainage, riparian grazing impacts were evident including reduced densities of woody riparian vegetation and its associated effects on stream bank stability and fish habitat.

**Habitat Security:** A majority of the Cottonwood Creek drainage flows through public lands including lands owned by Forest Service, Bureau of Land Management, and Montana Department of Natural Resource Conservation and thus is relatively secure. Approximately one mile of Cottonwood Creek does flow through private lands and could potentially undergo future changes in land and water use that could significantly degrade habitat in this drainage.

**DRAINAGE:** Cottonwood Creek

**STREAM:** Cottonwood Creek

**REACH:** Upper – Confluence with Baggs Creek to Headwater Forks

### **Value as a Recruitment/Restoration Fishery for the Clark Fork River:**

**Species Present:** Westslope Cutthroat Trout and Brook Trout

**Fish Density/Number of Fish Produced:** Based on 2007 electrofishing, fish density is relatively high in upper Cottonwood Creek. Both westslope cutthroat trout and brook trout are present in good densities, although brook trout appear to be a little more common.

**Recruitment to and Connectivity with the Clark Fork River:** Cottonwood Creek is a rather significant tributary to the Clark Fork River. However, annual irrigation withdrawal and a number of fish movement impediments (e.g. Kohrs-Manning Diversion, Interstate 90 culverts, etc.) in the lower part of the drainage have likely limited the recruitment value of the upper reaches of the stream. Nevertheless, there is the potential for upper Cottonwood Creek to be a fair source of westslope cutthroat trout recruitment for the Clark Fork River. While brook trout are also present in good densities in this reach, the species does not generally exhibit significant migratory behavior, and thus has a relatively low recruitment value.

**Current Value:** Low

**Protection and Enhancement Value:** Medium

### **Value as a Tributary/Replacement Fishery:**

**Recreational Species Present:** Westslope Cutthroat Trout and Brook Trout

**Fish Density:** Based on 2007 electrofishing, fish density is relatively high in upper Cottonwood Creek. Both westslope cutthroat trout and brook trout are present in good densities, although brook trout appear to be a little more common.

**Fish Size:** Fish in upper Cottonwood Creek do not typically attain very large size, although fish of catchable length are present in fairly good numbers (especially westslope cutthroat trout). At the one site sampled in this portion of the drainage in 2007, brook trout and westslope cutthroat trout had an average length of approximately 4 and 5 inches, respectively. The largest westslope cutthroat trout captured during our sampling was about 11 inches in total length, while the biggest brook trout was only about 8 inches.

**Recruitment to non Clark Fork River Fishery:** N/A – Cottonwood Creek is a direct tributary to the Clark Fork River.

**Current Value:** Medium

**Protection and Enhancement Value:** Medium

**Value as a Native Fishery:**

**Native Species Present:** Westslope Cutthroat Trout

Genetic testing conducted in 2007 suggests that the westslope cutthroat trout population in the upper Cottonwood Creek drainage is genetically pure.

**Competitor and/or Hybridizing Species Present:** Brook Trout

Brook trout are relatively common in upper Cottonwood Creek, and are sympatric with westslope cutthroat trout throughout the stream. Brook trout likely exert a fair competitive pressure on westslope cutthroat trout in upper Cottonwood Creek.

**Demographics and Connectivity:** Based on 2007 electrofishing, westslope cutthroat trout comprise a fair portion of the fish community in upper Cottonwood Creek. The species is present in moderate densities, and observations of multiple different size classes of fish suggest that the population is relatively strong. The largest westslope cutthroat trout captured during our sampling in 2007 was about 11 inches in total length.

Cottonwood Creek is a rather significant tributary to the Clark Fork River. However, annual irrigation withdrawal and a number of fish movement impediments (e.g. Kohrs-Manning Diversion, Interstate 90 culverts, etc.) in the lower part of the drainage have limited the connectivity between the two streams. Because of this, it is likely that the westslope cutthroat trout population in upper Cottonwood Creek is maintained by fish with a resident life history. However, the presence of a small migratory component of the population cannot be ruled out.

**Current Value:** Medium

**Protection and Enhancement Value:** High

**Habitat Description:**

**Habitat Quality:** Habitat quality and riparian condition in upper Cottonwood Creek is fairly good. This segment of the stream flows primarily through a forested canopy where livestock grazing is the primary land use. Livestock appear to have access to the channel throughout the section, and impacts to habitat quality are evident (i.e. bank trampling, browse on woody shrubs, etc), but not overly severe. Summer base flow is relatively good in this reach of Cottonwood Creek, and does not appear to be a limiting factor like in the lower reaches of the stream.

**Habitat Security:** Almost the entirety of upper Cottonwood Creek flows through private land. The primary land use in this portion of the drainage is livestock grazing, although there is at least one irrigation diversion present in the reach as well. Additionally, there is

some limited residential development at a couple locations along the stream. The nature of the ownership and land use makes habitat security somewhat of a concern in upper Cottonwood Creek.

**DRAINAGE:** Cottonwood Creek

**STREAM:** Middle Fork Cottonwood Creek

**REACH:** All

### **Value as a Recruitment/Restoration Fishery for the Clark Fork River:**

**Species Present:** Westslope Cutthroat Trout and Brook Trout

**Fish Density/Number of Fish Produced:** Based on limited electrofishing conducted in 2007 and 2008, westslope cutthroat trout are present in moderate densities in Middle Fork Cottonwood Creek. Brook trout are also present in the stream (found in 2008, but not in 2007), but appear to occur in rather low densities.

**Recruitment to and Connectivity with the Clark Fork River:** Middle Fork

Cottonwood Creek is a direct tributary to Cottonwood Creek, and is the largest of the three forks. The stream provides abundant spawning and rearing habitat, and likely is a good source of recruitment for the mainstem of the stream. However, Middle Fork Cottonwood Creek is unlikely to be a key source of fish for the Clark Fork River.

Although Cottonwood Creek is a rather significant tributary to the Clark Fork River, annual irrigation withdrawal and a number of fish movement impediments (e.g. Kohrs-Manning Diversion, Interstate 90 culverts, etc.) in the lower part of the drainage limit the recruitment potential of the stream and its tributaries (i.e. Middle Fork Cottonwood Creek).

**Current Value:** Low

**Protection and Enhancement Value:** Medium

### **Value as a Tributary/Replacement Fishery:**

**Recreational Species Present:** Westslope Cutthroat Trout and Brook Trout

**Fish Density:** Based on limited electrofishing conducted in 2007 and 2008, westslope cutthroat trout are present in moderate densities in Middle Fork Cottonwood Creek.

Brook trout are also present in the stream (found in 2008, but not in 2007), but appear to occur in rather low densities.

**Fish Size:** Fish in Middle Fork Cottonwood Creek tend to be small, although fish of catchable size are rather common in the stream. The average length of westslope cutthroat trout in the sections sampled in 2007 and 2008 was about 5 inches. The largest fish observed was slightly less than 9 inches in total length.

**Recruitment to non Clark Fork River Fishery:** Middle Fork Cottonwood Creek is a direct tributary to Cottonwood Creek, and is the largest of the three forks. The stream provides abundant spawning and rearing habitat, and likely is a good source of recruitment for the mainstem of the stream.

***Current Value: Medium***

***Protection and Enhancement Value: Medium***

**Value as a Native Fishery:**

**Native Species Present:** Westslope Cutthroat Trout

Genetic testing conducted in 2007 suggests that the westslope cutthroat trout population in the upper Cottonwood Creek drainage is genetically pure.

**Competitor and/or Hybridizing Species Present:** Brook Trout

Brook trout appear to be relatively uncommon in Middle Fork Cottonwood Creek, and are unlikely to exert a strong competitive pressure on westslope cutthroat trout at this time. However, expansion of the population could pose some risks to the viability of westslope cutthroat trout in Middle Fork Cottonwood Creek in the future.

**Demographics and Connectivity:** Based on limited electrofishing conducted in 2007 and 2008, westslope cutthroat trout comprise much of the fishery in Middle Fork Cottonwood Creek. The species is present in moderate densities, and observations of multiple size classes of fish suggest that the population is relatively strong. Larger fish capable of being resident adults (i.e. >6 inches) are rather common. The largest fish measured in the sections sampled in 2007 and 2008 was slightly less than 9 inches in total length.

Middle Fork Cottonwood Creek is a direct tributary to Cottonwood Creek, and is the largest of the three forks. The stream provides abundant spawning and rearing habitat, and likely is a good source of recruitment for the mainstem of the stream. However, Cottonwood Creek is only marginally connected with the Clark Fork River. Annual irrigation withdrawal and a number of fish movement impediments (e.g. Kohrs-Manning Diversion, Interstate 90 culverts, etc.) in the lower part of the drainage limit the recruitment potential of the stream and its tributaries (i.e. Middle Fork Cottonwood Creek). Due to this reduction in connectivity, it is likely that resident fish or fish with limited migrant behavior (i.e. fish in upper Cottonwood Creek) maintain the westslope cutthroat trout population in Middle Fork Cottonwood Creek. However, the presence of a small migratory component of the population (i.e. fish utilizing the Clark Fork River) cannot be ruled out.

***Current Value: High***

***Protection and Enhancement Value: High***

**Habitat Description:**

**Habitat Quality:** Habitat quality and riparian condition along Middle Fork Cottonwood Creek is relatively good. The channel flows primarily through a forested canopy with a

decent understory of woody shrubs present along much of its length. Livestock have access to the stream throughout the drainage, although impacts to habitat quality (i.e. bank trampling, browse on woody shrubs, etc) appear to be light.

**Habitat Security:** Landownership along Middle Fork Cottonwood Creek is comprised entirely of public lands administered by the U.S. Forest Service. Habitat security is likely to be good throughout the drainage.

**DRAINAGE:** Cottonwood Creek  
**STREAM:** North Fork Cottonwood Creek  
**REACH:** All

### **Value as a Recruitment/Restoration Fishery for the Clark Fork River:**

**Species Present:** Westslope Cutthroat Trout and Brook Trout

**Fish Density/Number of Fish Produced:** Based on limited electrofishing conducted in 2007 and 2008, westslope cutthroat trout are present in moderate densities in North Fork Cottonwood Creek. Brook trout are also present in the stream but appear to occur in rather low densities.

**Recruitment to and Connectivity with the Clark Fork River:** North Fork Cottonwood Creek is a direct tributary to Cottonwood Creek. The stream provides abundant spawning and rearing habitat, and likely is a good source of recruitment for the mainstem of the stream. However, North Fork Cottonwood Creek is unlikely to be a key source of fish for the Clark Fork River. Although Cottonwood Creek is a rather significant tributary to the Clark Fork River, annual irrigation withdrawal and a number of fish movement impediments (e.g. Kohrs-Manning Diversion, Interstate 90 culverts, etc.) in the lower part of the drainage limit the recruitment potential of the stream and its tributaries (i.e. North Fork Cottonwood Creek).

**Current Value:** Low

**Protection and Enhancement Value:** Medium

### **Value as a Tributary/Replacement Fishery:**

**Recreational Species Present:** Westslope Cutthroat Trout and Brook Trout

**Fish Density:** Based on limited electrofishing conducted in 2007 and 2008, westslope cutthroat trout are present in moderate densities in North Fork Cottonwood Creek. Brook trout are also present in the stream but appear to occur in rather low densities.

**Fish Size:** Fish in North Fork Cottonwood Creek tend to be small, although fish of catchable size are present in the stream. The average length of westslope cutthroat trout in the sections sampled in 2007 and 2008 was about 4 to 5 inches. The largest fish observed was about 9 inches in total length. Brook trout in North Fork Cottonwood Creek range in size from young-of-the-year to fish about 7 inches in length.

**Recruitment to non Clark Fork River Fishery:** North Fork Cottonwood Creek is a direct tributary to Cottonwood Creek. The stream provides abundant spawning and rearing habitat, and likely is a good source of recruitment for the mainstem of the stream.

**Current Value:** Medium

**Protection and Enhancement Value:** Medium

**Enhancement Priority:** Medium

**Value as a Native Fishery:**

**Native Species Present:** Westslope Cutthroat Trout

Genetic testing conducted in 2007 suggests that the westslope cutthroat trout population in the upper Cottonwood Creek drainage is genetically pure.

**Competitor and/or Hybridizing Species Present:** Brook Trout

Brook trout appear to be fairly uncommon in North Fork Cottonwood Creek, and are unlikely to exert a strong competitive pressure on westslope cutthroat trout at this time. However, expansion of the population could pose some risks to the viability of westslope cutthroat trout in North Fork Cottonwood Creek in the future.

**Demographics and Connectivity:** Based on limited electrofishing conducted in 2007 and 2008, westslope cutthroat trout comprise much of the fishery in North Fork Cottonwood Creek. The species is present in moderate densities, although the bulk of this density appears to be comprised of younger fish. Larger fish capable of being resident adults (i.e. >6 inches) are present, but are not overly common. The largest fish measured in the sections sampled in 2007 and 2008 was about 9 inches total length.

North Fork Cottonwood Creek is a direct tributary to Cottonwood Creek. The stream provides abundant spawning and rearing habitat, and likely is a good source of recruitment for the mainstem of the stream. However, Cottonwood Creek is only marginally connected with the Clark Fork River. Annual irrigation withdrawal and a number of fish movement impediments (e.g. Kohrs-Manning Diversion, Interstate 90 culverts, etc.) in the lower part of the drainage limit the recruitment potential of the stream and its tributaries (i.e. North Fork Cottonwood Creek). Due to this reduction in connectivity, it is likely that resident fish or fish with limited migrant behavior (i.e. fish in upper Cottonwood Creek) maintain the westslope cutthroat trout population in North Fork Cottonwood Creek. However, the presence of a small migratory component of the population (i.e. fish utilizing the Clark Fork River) cannot be ruled out.

**Current Value:** High

**Protection and Enhancement Value:** High

**Habitat Description:**

**Habitat Quality:** Habitat quality and riparian condition along North Fork Cottonwood Creek is relatively good. The channel flows primarily through a forested canopy with a good understory of woody shrubs present along much of its length. Livestock have access to the stream throughout the drainage, although impacts to habitat quality (i.e. bank

trampling, browse on woody shrubs, etc) appear to be relatively modest. Pools and large woody debris are abundant throughout much of the stream, which provides for excellent fish habitat.

**Habitat Security:** Landownership along North Fork Cottonwood Creek is comprised entirely of public lands administered by the U.S. Forest Service. Habitat security is likely to be good throughout the drainage.

**DRAINAGE:** Cottonwood Creek  
**STREAM:** South Fork Cottonwood Creek  
**REACH:** All

### **Value as a Recruitment/Restoration Fishery for the Clark Fork River:**

**Species Present:** Westslope Cutthroat Trout

**Fish Density/Number of Fish Produced:** Based on limited electrofishing conducted in 2007 and 2008, westslope cutthroat trout are present in relatively low to moderate densities in South Fork Cottonwood Creek. The species appears to comprise the entire fish community in the stream.

**Recruitment to and Connectivity with the Clark Fork River:** South Fork Cottonwood Creek is a direct tributary to Cottonwood Creek. The stream provides some spawning and rearing habitat, and likely is a fair source of recruitment for the mainstem of the stream. However, South Fork Cottonwood Creek is not likely to be a major source of fish for the Clark Fork River. Although Cottonwood Creek is a rather significant tributary to the Clark Fork River, annual irrigation withdrawal and a number of fish movement impediments (e.g. Kohrs-Manning Diversion, Interstate 90 culverts, etc.) in the lower part of the drainage limit the recruitment potential of the stream and its tributaries (i.e. South Fork Cottonwood Creek).

**Current Value:** Low

**Protection and Enhancement Value:** Medium

### **Value as a Tributary/Replacement Fishery:**

**Recreational Species Present:** Westslope Cutthroat Trout

**Fish Density:** Based on limited electrofishing conducted in 2007 and 2008, westslope cutthroat trout are present in relatively low to moderate densities in South Fork Cottonwood Creek. The species appears to comprise the entire fish community in the stream.

**Fish Size:** Westslope cutthroat trout in South Fork Cottonwood Creek tend to be small, with relatively few being of catchable size. The average length of westslope cutthroat trout in the sections sampled in 2007 and 2008 was 4 inches. Larger fish (i.e. > 6" total length) were rare. The largest fish observed was slightly less than 7 inches in total length.

**Recruitment to non Clark Fork River Fishery:** South Fork Cottonwood Creek is a direct tributary to Cottonwood Creek. The stream provides some spawning and rearing habitat, and likely is a fair source of recruitment for the mainstem of the stream.

**Current Value:** Low

**Protection and Enhancement Value:** Medium

**Value as a Native Fishery:**

**Native Species Present:** Westslope Cutthroat Trout

Genetic testing conducted in 2007 suggests that the westslope cutthroat trout population in the upper Cottonwood Creek drainage is genetically pure.

**Competitor and/or Hybridizing Species Present:** None detected.

**Demographics and Connectivity:** Based on limited electrofishing conducted in 2007 and 2008, westslope cutthroat trout comprise the entire fish community in South Fork Cottonwood Creek. At the sites sampled, fish were present in relatively low to moderate densities. While there were multiple age classes present, most fish tended to be younger, smaller individuals. Fish capable of being resident adults (i.e. >6 inches) appeared to be relatively uncommon. The largest fish measured was slightly less than 7 inches in total length.

South Fork Cottonwood Creek is a direct tributary to Cottonwood Creek. The stream provides some spawning and rearing habitat, and likely is a fair source of recruitment for the mainstem of the stream. However, Cottonwood Creek is only marginally connected with the Clark Fork River. Annual irrigation withdrawal and a number of fish movement impediments (e.g. Kohrs-Manning Diversion, Interstate 90 culverts, etc.) in the lower part of the drainage limit the recruitment potential of the stream and its tributaries (i.e. South Fork Cottonwood Creek). Due to this reduction in connectivity, it is likely that resident fish or fish with limited migrant behavior (i.e. fish in upper Cottonwood Creek) maintain the westslope cutthroat trout population in South Fork Cottonwood Creek. However, the presence of a small migratory component of the population (i.e. fish utilizing the Clark Fork River) cannot be ruled out.

**Current Value:** High

**Protection and Enhancement Value:** High

**Habitat Description:**

**Habitat Quality:** Habitat quality and riparian condition along South Fork Cottonwood Creek appears fair. The channel flows primarily through a forested canopy where woody shrubs tend to be rather sparse. The primary factors affecting habitat quality in the stream are low summer flows (natural and from irrigation withdrawal), bank trampling related to livestock grazing in the riparian area, and past timber harvest.

**Habitat Security:** Landownership along South Fork Cottonwood Creek is comprised of both private and public lands. The lower portion of the drainage flows exclusively through private land. The nature of the ownership and potential land uses, (i.e. livestock

grazing, timber harvest, residential development, etc.), makes habitat security somewhat of a concern in this area. In the upper extent of the watershed, the stream flows entirely through lands administered by the U.S. Forest Service where habitat security is fairly good. However, the area is within a livestock grazing allotment, and this activity could make habitat security a concern if not closely managed. Additionally, an irrigation diversion is located in the upper extent of the watershed, which appears to have the capacity to divert a fair amount of flow from South Fork Cottonwood Creek during the irrigation season.

**DRAINAGE:** Rock Creek

**STREAM:** Cougar Creek

**REACH:** Entire stream

**Value as a Recruitment/Restoration Fishery for the Clark Fork River:**

**Species Present:** N/A

**Fish Density/Number of Fish Produced:** N/A

**Recruitment to and Connectivity with the Clark Fork River:** N/A

*Current Value: Very Low*

*Protection and Enhancement Value: Very Low*

**Value as a Tributary/Replacement Fishery:**

**Recreational Species Present:** None. Bull trout were the only salmonid captured in the Cougar Creek drainage.

**Fish Density:** N/A

**Fish Size:** N/A

**Recruitment to non Clark Fork River Fishery:** N/A

*Current Value: Very Low*

*Protection and Enhancement Value: Very Low*

**Value as a Native Fishery:**

**Native Species Present:** Bull trout were the only trout species captured in the Cougar Creek drainage. Interestingly, only one bull trout was captured in the two electrofishing sections completed and no other fish species were captured.

**Competitor and/or Hybridizing Species Present:** No non-native fish were captured in Cougar Creek, although non-native brown, rainbow, and brook trout are present in mainstem Rock Creek and could potentially invade the Alder Creek drainage.

**Demographics and Connectivity:** Bull trout in the Alder Creek drainage maintain very low densities (only one fish captured) and were only captured in one electrofishing section. Thus, there is significant concern about the long-term viability of this population based on their extremely low densities. The presence of several other bull trout populations in the middle and upper Rock Creek drainage provide possible sources of fish to maintain genetic variation within the Cougar Creek population or to re-found the population should it be lost. The connectivity between this population and other

neighboring bull trout populations (i.e. Hogback Creek, Welcome Creek, etc...) via Rock Creek is excellent.

***Current Value: Low***

***Protection and Enhancement Value: Medium***

**Habitat Description:**

**Habitat Quality:** Habitat quality in the Cougar Creek drainage was found to be excellent at the two sites surveyed with minimal habitat degradation being observed.

**Habitat Security:** The entire Cougar Creek drainage is located within lands administered by the Lolo National Forest and thus is quite secure from future land use changes.

**DRAINAGE:** Gold Creek

**STREAM:** Crevice Creek

**REACH:** All

### **Value as a Recruitment/Restoration Fishery for the Clark Fork River:**

**Species Present:** Westslope Cutthroat Trout

**Fish Density/Number of Fish Produced:** Based on 2007 electrofishing, westslope cutthroat trout comprise the entire fish community in Crevice Creek. The species is present in relatively high densities throughout much of this small stream, and many of the fish sampled in 2007 were young juveniles.

**Recruitment to and Connectivity with the Clark Fork River:** Crevice Creek is a direct tributary to Gold Creek, and appears to be an important spawning and early rearing tributary for westslope cutthroat trout given the high density of juveniles in the stream. The stream appears to have good connectivity with Gold Creek, and may be a fair recruitment source of westslope cutthroat trout for Gold Creek and possibly the Clark Fork River as well.

***Current Value:*** Medium

***Protection and Enhancement Value:*** Medium

### **Value as a Tributary/Replacement Fishery:**

**Recreational Species Present:** Westslope Cutthroat Trout

**Fish Density:** Based on 2007 electrofishing, westslope cutthroat trout comprise the entire fish community in Crevice Creek. The species is present in relatively high densities throughout much of the stream, although the bulk of this density appears to be comprised of relatively young juveniles.

**Fish Size:** Based on 2007 electrofishing at two sample sites, many of the westslope cutthroat trout present in Crevice Creek are young juveniles. Catchable sized fish are present, but are not overly common. The average length of westslope cutthroat trout at both sample sites was about 3 inches. The largest fish handled during 2007 sampling was about 9 inches in total length.

**Recruitment to non Clark Fork River Fishery:** Crevice Creek is a direct tributary to Gold Creek, and appears to be an important spawning and early rearing tributary for westslope cutthroat trout given the high density of juveniles in the stream. The stream appears to have good connectivity with Gold Creek, and may be a fair recruitment source of westslope cutthroat trout.

***Current Value:*** Medium

**Protection and Enhancement Value:** Medium

**Value as a Native Fishery:**

**Native Species Present:** Westslope Cutthroat Trout

Genetic tests conducted on small sample of fish in 1996 suggest that westslope cutthroat trout in Crevice Creek are genetically pure.

**Competitor and/or Hybridizing Species Present:** None detected.

**Demographics and Connectivity:** Based on 2007 electrofishing, westslope cutthroat trout comprise the entire fish community in Crevice Creek. The species is present in relatively high densities throughout much of the stream, although the bulk of this density appears to be comprised of young juveniles. While several age classes of fish were apparent during 2007 sampling, the bulk of the fish collected were likely one year of age or less (i.e. young-of-the-year). Larger fish capable of being resident sized adults (i.e. >6 inches total length) were present, but were not nearly as common. The average length of westslope cutthroat trout handled during 2007 sampling was about 3 inches. The largest fish measured was about 9 inches. It is unknown if there is any migratory life history component among the westslope cutthroat trout in Crevice Creek. However, it may be likely considering the demographic makeup of the population (e.g. a lot of young fish, but relatively few adults), as well as the apparent connectivity with Gold Creek (and the Clark Fork River).

Crevice Creek appears to have good connectivity with Gold Creek, and may be a key recruitment source of westslope cutthroat trout. However, connectivity does pose some risk as it could provide an avenue for invasion by non-native species such as brown and rainbow trout. The presence of these species could affect the long-term sustainability of westslope cutthroat trout in Crevice Creek.

**Current Value:** High

**Protection and Enhancement Value:** High

**Habitat Description:**

**Habitat Quality:** Habitat quality and riparian condition along Crevice Creek is relatively good, although it would not be considered optimal. The primary factors affecting fish habitat in the stream are a lack of deep pools, and notable fine sediment accumulation. Riparian vegetation shows signs of use by livestock, and hoof shear and trampling of the banks is also evident in some areas of the channel.

**Habitat Security:** Habitat security in Crevice Creek is relatively good. Land ownership along Crevice Creek is comprised mostly of lands administered by the U.S. Forest Service, although the lower mile of the channel does flow through several parcels of

private land. These parcels of private land currently remain relatively undeveloped. The primary land use in the Crevice Creek drainage is livestock grazing, although forest recreation and timber harvest are also apparent. Livestock use of the riparian area is obvious throughout the drainage, and this activity could make habitat security a concern if not closely managed. Additionally, Goldberg Reservoir is a small 8-acre impoundment at the head of the drainage, which poses some risk to Crevice Creek. Although the primary direction of flow out of this reservoir is into the Dunkelberg Creek watershed, the dam face is in the Crevice Creek drainage. The dam is in poor condition and could be a threat to habitat in Crevice Creek if it were to fail. Reportedly, the U.S. Forest Service is addressing the situation.

**DRAINAGE:** Clark Fork River

**STREAM:** Crystal Creek

**REACH:** Entire stream

### **Value as a Recruitment/Restoration Fishery for the Clark Fork River:**

**Species Present:** Westslope Cutthroat Trout, brook trout

**Fish Density/Number of Fish Produced:** Three single-pass electrofishing sections were completed in Crystal Creek in 2000-2002. Westslope cutthroat trout densities were moderate at lower sites (RM 0.25-0.75), and high at the upper site (~ RM 2.0). Brook trout densities were also moderate at lower sites and low at the upper site. It is likely that these fish are predominantly stream-resident. Crystal Creek is a relatively small tributary drainage (~ 5 mi<sup>2</sup>).

**Recruitment to and Connectivity with the Clark Fork River:** Crystal Creek currently flows through an undersized, perched culvert near the mouth. This crossing likely prevents upstream movement of trout from the Clark Fork River. In addition, Crystal Creek enters a series of backwaters and wetlands before reaching the Clark Fork River, so direct connectivity is questionable at some flow levels. Thus, Crystal Creek appears to provide limited trout recruitment the Clark Fork River

**Current Value:** Low

**Protection and Enhancement Value:** Medium

### **Value as a Tributary/Replacement Fishery:**

**Recreational Species Present:** Westslope Cutthroat Trout, brook trout

**Fish Density:** Three single-pass electrofishing sections were completed in Crystal Creek in 2000-2002. Westslope cutthroat trout densities were moderate at lower sites (RM 0.25-0.75), and high at the upper site (~ RM 2.0). Brook trout densities were also moderate at lower sites and low at the upper site.

**Fish Size:** Westslope cutthroat trout and brook trout in all electrofishing sections averaged 4–5 inches and reached maximum lengths of 6-8 inches.

**Recruitment to non Clark Fork River Fishery:** N/A. Crystal Creek flows directly into a backwater of the Clark Fork River and thus cannot provide recruitment to a non Clark Fork River fishery.

**Current Value:** Low

**Protection and Enhancement Value:** Low

### **Value as a Native Fishery:**

**Native Species Present:** Westslope cutthroat trout are the only native trout present in the drainage. Genetic samples were collected in 2002 and analyses were completed for 3 sites in Crystal Creek. Alleles characteristic of only westslope cutthroat trout were detected, suggesting that this population is genetically non-introgressed (> 95% certainty).

**Competitor and/or Hybridizing Species Present:** Although densities were low at upper sites, brook trout were present at all electrofishing sites in Crystal Creek. Upstream fish passage obstructions near the mouth likely protect the drainage from potential invasion by other non-native species.

**Demographics and Connectivity:** Westslope cutthroat trout abundance was moderate to high in the Crystal Creek drainage, which provides 3-4 miles of fish-bearing habitat. The westslope cutthroat trout population in Crystal Creek is likely isolated from other populations in the Clark Fork Basin, limiting genetic exchange and the ability of other populations to re-found this population should it be lost. While this genetically pure population is likely protected from future invasion by rainbow trout or westslope cutthroat/rainbow trout hybrids, this lack of connectivity does create demographic risks to the population.

***Current Value:*** High

***Protection and Enhancement Value:*** High

### **Habitat Description:**

**Habitat Quality:** Habitat quality in Crystal Creek is good in the upper ~ 95% of the drainage. In the lowest reach (RM 0-0.25), located on private land, the stream has been channelized and has a limited riparian corridor. The county road also encroaches on the stream in this reach and a perched, undersized culvert likely limits fish passage. The stream and riparian corridor are in good condition in the remainder of the watershed. However, forest road densities in the upper watershed are high and likely cumulatively impact the streams hydrology and water quality. No surface water diversions, riparian grazing impacts, or mining have been observed and all middle and lower reaches appear to maintain perennial flow.

**Habitat Security:** Until 2009, the majority of the Crystal Creek watershed was owned by Plum Creek Timber Company (PCTC), with one section of lands administered by the Lolo National Forest (USFS; RM 1.0-2.0) and a small portion of private land near the mouth. Through the recent purchase of PCTC lands by The Nature Conservancy (TNC) under the Montana Legacy Project, all PCTC lands within Crystal Creek will be transferred to the USFS by 2010. This will provide a high level of habitat security throughout most of the drainage and will likely lead to long-term enhancement. Habitat

quality in the remaining private parcels could be degraded in the future, but this is unlikely give the topography and current infrastructure layout.

**DRAINAGE:** Dempsey Creek

**STREAM:** Dempsey Creek

**REACH:** Upper – Confluence with North Fork Dempsey Creek to Headwaters

### **Value as a Recruitment/Restoration Fishery for the Clark Fork River:**

**Species Present:** Brook Trout and Westslope Cutthroat Trout

**Fish Density/Number of Fish Produced:** Based on limited electrofishing in 2008, trout density is moderately high in upper Dempsey Creek. Much of the fish community is comprised of brook trout, with westslope cutthroat trout also present but in noticeably lower densities.

**Recruitment to and Connectivity with the Clark Fork River:** Dempsey Creek is a tributary to the Clark Fork River. However, connectivity between the two streams is not fully understood. Near its mouth, the stream flows into an unscreened irrigation ditch that originates off the river near Sager Lane. Downstream of the confluence with this ditch, Dempsey Creek seems to enter a rather marshy area. While there does appear to be surface connection to the river, this area may pose movement impediments to fish moving into and out of Dempsey Creek (this area has not been fully evaluated in the field). In addition to the marginal connectivity at the mouth, annual irrigation withdrawal and marginal habitat quality in the lower reaches of the stream limit the recruitment potential of the stream as a whole. Additionally, brook trout are the most prevalent species in upper Dempsey Creek, and this species generally does not exhibit significant migratory behavior, and thus has a relatively low recruitment value.

**Current Value:** Low

**Protection and Enhancement Value:** Low

### **Value as a Tributary/Replacement Fishery:**

**Recreational Species Present:** Brook Trout and Westslope Cutthroat Trout

**Fish Density:** Based on limited electrofishing in 2008, trout density is moderately high in upper Dempsey Creek. Much of the fish community is comprised of brook trout, with westslope cutthroat trout also present but in noticeably lower densities.

**Fish Size:** Fish in upper Dempsey Creek do not typically attain very large size, although fish of catchable length are present in fairly good numbers. At the one site sampled in this portion of the drainage in 2008, brook trout and westslope cutthroat trout had an average length of approximately 4 inches. The largest westslope cutthroat trout captured during our sampling was about 8 inches in total length, while the biggest brook trout was about 9 inches.

**Recruitment to non Clark Fork River Fishery:** N/A – Dempsey Creek is a tributary to the Clark Fork River

**Current Value:** Medium

**Protection and Enhancement Value:** Medium

### **Value as a Native Fishery:**

**Native Species Present:** Westslope Cutthroat Trout

Genetic testing conducted in 1986 suggests that the westslope cutthroat trout population in upper Dempsey Creek is genetically pure.

**Competitor and/or Hybridizing Species Present:** Brook Trout

Brook trout are relatively common in upper Dempsey Creek. The species likely exerts a rather significant competitive pressure on westslope cutthroat trout in the reach.

**Demographics and Connectivity:** Based on limited electrofishing in 2008, westslope cutthroat trout are present in rather modest densities in upper Dempsey Creek. While multiple age classes of fish were observed at the one site sampled in the reach, the majority were young juveniles of approximately one year of age. Larger fish capable of being resident adults (i.e. > 6 inches total length) were relatively uncommon. The largest fish measured during 2008 sampling was about 8 inches in total length.

Dempsey Creek is a tributary to the Clark Fork River. However, connectivity between the two streams is not fully understood. Near its mouth, the stream flows into an unscreened irrigation ditch that originates off the river near Sager Lane. Downstream of the confluence with this ditch, Dempsey Creek seems to enter a rather marshy area. While there does appear to be surface connection to the river, this area may pose movement impediments to fish moving into and out of Dempsey Creek (this area has not been fully evaluated in the field). In addition to the marginal connectivity at the mouth, annual irrigation withdrawal and marginal habitat quality in the lower reaches of the stream further limit the connectedness of upper Dempsey Creek with the Clark Fork River. Because of this, it is likely that the westslope cutthroat trout population in upper Dempsey Creek is somewhat isolated, and is maintained by fish with a resident life history.

**Current Value:** Medium

**Protection and Enhancement Value:** Medium

### **Habitat Description:**

**Habitat Quality:** Habitat quality and riparian condition in upper Dempsey Creek is relatively good. This reach is largely situated in a fairly high gradient, forested canyon where livestock grazing, timber harvest, and forest recreation are the primary land uses. Livestock have access to much of the channel throughout the section, but impacts (i.e.

bank trampling, browse on woody shrubs, etc) appear to be relatively light. Summer base flows are good in this reach of Dempsey Creek, and do not appear to be a limiting factor like in the lower reaches of the stream. Flow appears to be augmented by upstream irrigation storage in high mountain lakes.

**Habitat Security:** Landownership in upper Dempsey Creek is a combination of private and National Forest lands. The lower two miles of the reach is situated on private lands used primarily for livestock grazing and timber harvest. The nature of the ownership and land use makes habitat security somewhat of a concern along this portion of the stream. In the upper extent of the watershed, the stream flows entirely through lands administered by the U.S. Forest Service. Habitat security is likely to be relatively good throughout this portion of the drainage.

**DRAINAGE:** Dry Cottonwood Creek

**STREAM:** Dry Cottonwood Creek

**REACH:** All

### **Value as a Recruitment/Restoration Fishery for the Clark Fork River:**

**Species Present:** Westslope Cutthroat Trout

**Fish Density/Number of Fish Produced:** Based on 2008 electrofishing, westslope cutthroat trout comprise the entire fish community in Dry Cottonwood Creek. The species is present in moderate densities throughout much of the stream.

**Recruitment to and Connectivity with the Clark Fork River:** Dry Cottonwood Creek is a direct tributary to the Clark Fork River. However, the stream only appears to connect to the river during spring runoff. The remainder of the year the lower reach of the stream is dry. While Dry Cottonwood Creek likely provides some limited recruitment of westslope cutthroat trout to the Clark Fork River (during spring runoff), the overall contribution is likely to be low.

**Current Value:** Low

**Protection and Enhancement Value:** Medium

### **Value as a Tributary/Replacement Fishery:**

**Recreational Species Present:** Westslope Cutthroat Trout

**Fish Density:** Based on 2008 electrofishing, westslope cutthroat trout comprise the entire fish community in Dry Cottonwood Creek. The species is present in moderate densities throughout much of the stream.

**Fish Size:** Fish in Dry Cottonwood Creek do not typically attain very large size, although fish of catchable length are present in the stream. At the two sites sampled in the drainage in 2008, westslope cutthroat trout had an average length of about 5 inches. Maximum fish size was about 8 inches.

**Recruitment to non Clark Fork River Fishery:** N/A – Dry Cottonwood Creek is a direct tributary to the Clark Fork River.

**Current Value:** Low

**Protection and Enhancement Value:** Low

### **Value as a Native Fishery:**

**Native Species Present:** Westslope Cutthroat Trout

Genetic testing conducted in the Dry Cottonwood Creek drainage in 1988 and 1995 suggests that the westslope cutthroat trout population is slightly hybridized with Yellowstone cutthroat trout. The genetic purity was reported as approximately 93% (1988 – Dry Cottonwood Creek) and 97% (1995 – South Fork Dry Cottonwood Creek).

**Competitor and/or Hybridizing Species Present:** None detected.

**Demographics and Connectivity:** Based on 2008 electrofishing, westslope cutthroat trout comprise the entire fish community in Dry Cottonwood Creek. The species is present in moderate densities throughout much of the stream, and there appears to be a good distribution of age classes including young juveniles and fish capable of being resident sized adults (i.e. >6 inches total length). The largest westslope cutthroat trout observed in Dry Cottonwood Creek during 2008 sampling was 8 inches in total length.

Dry Cottonwood Creek is a direct tributary to the Clark Fork River. However, the stream only appears to connect to the river during spring runoff. The remainder of the year the lower reach of the stream is dry. Due to this reduction in connectivity, it is likely that resident fish maintain the westslope cutthroat trout population in Dry Cottonwood Creek. However, the presence of a small migratory component of the population cannot be ruled out, since it may be possible for migratory adults to return the stream to spawn during spring runoff.

**Current Value:** Medium

**Protection and Enhancement Value:** Medium

### **Habitat Description:**

**Habitat Quality:** Habitat quality and riparian condition along Dry Cottonwood Creek is mostly fair. The primary land use along the stream is livestock grazing, although impacts from forest roads and past mining activity have also affected habitat quality to some extent. Cattle have access to almost the entire length the channel, and impacts to stream bank stability and woody riparian vegetation are evident in some locations. In these areas, woody riparian vegetation along the channel tends to be patchy, and the lack of woody plants has reduced stream shading and habitat complexity, as well as increased sedimentation by making the streambanks more susceptible to erosion. The lower reaches of Dry Cottonwood Creek go dry on an annual basis. This event may be natural, although irrigation withdrawal in the lower part of the drainage likely exacerbates the issue.

**Habitat Security:** Land ownership along Dry Cottonwood Creek is comprised mostly of privately owned grazing lands, although some State and U.S. Forest Service lands are also present in the middle and upper portions of the watershed, respectively. There are several irrigation diversions located in the lower reaches of the stream, which have the capacity to divert a fair amount of flow from the stream during the irrigation season. The nature of the ownership as well as the current and potential land uses makes habitat security a concern in much of Dry Cottonwood Creek.

**DRAINAGE:** Dry Cottonwood Creek

**STREAM:** North Fork Dry Cottonwood Creek

**REACH:** All

### **Value as a Recruitment/Restoration Fishery for the Clark Fork River:**

**Species Present:** Westslope Cutthroat Trout

**Fish Density/Number of Fish Produced:** Based on limited electrofishing in 2008, westslope cutthroat trout comprise the entire fish community in North Fork Dry Cottonwood Creek. The species appears to occur in moderate densities.

**Recruitment to and Connectivity with the Clark Fork River:** North Fork Dry Cottonwood Creek is a direct tributary to Dry Cottonwood Creek. The stream provides fairly good spawning and rearing habitat, and likely is a good source of recruitment for the mainstem of the stream. However, North Fork Dry Cottonwood Creek is unlikely to be a key source of fish for the Clark Fork River. Dry Cottonwood Creek is a direct tributary to the Clark Fork River, but the stream only appears to connect to the river during spring runoff. The remainder of the year the lower reach is dry. The reduced connectivity likely limits the recruitment potential of the stream and its tributaries (i.e. North Fork Dry Cottonwood Creek). Additionally, a perched culvert at the mouth of North Fork Dry Cottonwood Creek may further limit the overall recruitment potential of the stream by making it difficult for migratory fish to return to spawn.

**Current Value:** Low

**Protection and Enhancement Value:** Medium

### **Value as a Tributary/Replacement Fishery:**

**Recreational Species Present:** Westslope Cutthroat Trout

**Fish Density:** Based on limited electrofishing in 2008, westslope cutthroat trout comprise the entire fish community in North Fork Dry Cottonwood Creek. The species appears to occur in moderate densities.

**Fish Size:** Fish in North Fork Dry Cottonwood Creek do not typically attain very large size, and catchable sized fish appear to be relatively uncommon. At the one site sampled in the drainage in 2008, westslope cutthroat trout had an average length of about 3.5 inches. Maximum fish size was about 5 inches.

**Recruitment to non Clark Fork River Fishery:** North Fork Dry Cottonwood Creek is a direct tributary to Dry Cottonwood Creek. The stream provides fairly good spawning and rearing habitat, and likely is a good source of recruitment for the mainstem of the stream. However, a perched culvert at the mouth of the stream may limit the overall recruitment potential since fish may have a difficult time returning to spawn.

**Current Value:** Low

**Protection and Enhancement Value:** Low

**Value as a Native Fishery:**

**Native Species Present:** Westslope Cutthroat Trout

No genetic testing has been conducted on westslope cutthroat trout in North Fork Dry Cottonwood Creek. However, genetic testing conducted in Dry Cottonwood Creek near the mouth of the stream in 1988 suggests that the westslope cutthroat trout population is slightly hybridized with Yellowstone cutthroat trout. The genetic purity was reported as approximately 93%.

**Competitor and/or Hybridizing Species Present:** None detected.

**Demographics and Connectivity:** Based on limited electrofishing in 2008, westslope cutthroat trout comprise the entire fish community in North Fork Dry Cottonwood Creek. The species appears to occur in moderate densities, although many of the fish appear to be relatively young juveniles. Fish capable of being resident sized adults (i.e. >6 inches total length) appear to be fairly uncommon. The largest westslope cutthroat trout observed in North Fork Dry Cottonwood Creek during 2008 sampling was about 5 inches in total length.

North Fork Dry Cottonwood Creek is a direct tributary to Dry Cottonwood Creek. However, the stream appears to be at least partially isolated from downstream waters. A perched culvert near the mouth likely limits fish movement into the stream. If this culvert is a complete upstream barrier (which is unlikely), then the long-term viability of this population could be of concern given the associated risks of isolation (i.e. inbreeding depression, local extinction, etc.).

**Current Value:** Medium

**Protection and Enhancement Value:** Medium

**Habitat Description:**

**Habitat Quality:** Habitat quality and riparian condition along North Fork Dry Cottonwood Creek is fair. The primary land use along the stream is livestock grazing, although impacts from forest roads and past mining activity have also affected habitat quality to some extent. Cattle have access to the entire length the channel, and impacts to stream bank stability and woody riparian vegetation are evident in some locations. In these areas, woody riparian vegetation along the channel tends to be patchy, and the lack of woody plants has reduced stream shading and habitat complexity, as well as increased sedimentation by making the streambanks more susceptible to erosion.

**Habitat Security:** Landownership along North Fork Dry Cottonwood Creek is comprised entirely of public lands administered by the U.S. Forest Service. The stream is within a grazing allotment, and livestock use of the riparian area is apparent throughout much of the drainage. This activity could make habitat security a concern if not closely managed. Additionally, there are abandoned mines along the stream in the middle portion of the drainage that could pose a risk to water quality.

**DRAINAGE:** Clark Fork River

**STREAM:** Dunkleberg Creek

**REACH:** Entire stream

### **Value as a Recruitment/Restoration Fishery for the Clark Fork River:**

**Species Present:** Westslope Cutthroat Trout, Brown Trout

**Fish Density/Number of Fish Produced:** Two electrofishing sections were completed on Dunkleberg Creek in 2008. Westslope cutthroat trout were captured in low densities in the lower electrofishing section and moderate densities in the upper electrofishing section. One brown trout was captured in the lower electrofishing section.

**Recruitment to and Connectivity with the Clark Fork River:** Dunkleberg Creek maintains moderate to low densities of westslope cutthroat trout and low densities of brown. A portion of these fish likely out-migrate to the Clark Fork River. Dunkleberg Creek is a relatively large drainage that flows directly into the Clark Fork River and is potentially a significant source of recruitment to the system. There appears to be connectivity between Dunkleberg Creek and the Clark Fork River although lower Dunkleberg Creek was not adequately investigated to fully assess connectivity and habitat conditions.

**Current Value:** Medium

**Protection and Enhancement Value:** Medium

### **Value as a Tributary/Replacement Fishery:**

**Recreational Species Present:** Westslope Cutthroat Trout, Brown Trout

**Fish Density:** Two electrofishing sections were completed on Dunkleberg Creek in 2008. Westslope cutthroat trout were captured in low densities in the lower electrofishing section and moderate densities in the upper electrofishing section. One brown trout was captured in the lower electrofishing section. Unfortunately, the lowest reach of Dunkleberg Creek was not sampled and may reflect a different fish community than those observed in the two electrofishing sections completed.

**Fish Size:** Westslope cutthroat trout in the lower electrofishing section averaged 7" and reached a maximum length of 10" while westslope cutthroat trout in the upper section averaged 5" and reached a maximum length of 8.5". The one brown trout captured in the lower section was 8" in length.

**Recruitment to non Clark Fork River Fishery:** N/A. Dunkleberg Creek flows directly into the Clark Fork River and thus cannot provide recruitment to a non Clark Fork River fishery.

**Current Value:** Low

**Protection and Enhancement Value: Low**

**Value as a Native Fishery:**

**Native Species Present:** Westslope cutthroat trout are the only native trout present in the Dunkleberg Creek drainage. Genetic analyses were completed for westslope cutthroat trout in the drainage in 1992, although the sample size was relatively small (n=10). Nonetheless, alleles characteristic of only westslope cutthroat trout were detected, suggesting that this population is genetically pure.

**Competitor and/or Hybridizing Species Present:** Brown trout were the only non-native trout species captured in Dunkleberg Creek. Brown trout potentially pose a competition threat to westslope cutthroat trout although very low densities of brown trout were sampled.

**Demographics and Connectivity:** Westslope cutthroat trout densities are moderate to low in the Dunkleberg drainage and they appear to be found throughout most of the drainage, suggesting that this population is relatively stable. Connectivity between Dunkleberg Creek and other westslope cutthroat trout populations in the Clark Fork River appears to be good which allows for genetic exchange with other populations and potentially re-founding of the population should it be lost.

**Current Value: High**

**Protection and Enhancement Value: High**

**Habitat Description:**

**Habitat Quality:** Habitat quality at the upper survey site on Dunkleberg Creek was good with only minor habitat degradation observed. Habitat degradation was observed in the lower section due to riparian grazing impacts.

**Habitat Security:** A majority of the Dunkleberg Creek drainage flows through private lands, which could undergo future changes in land and water use that could significantly degrade habitat in the drainage. The Beaverhead-Deerlodge National Forest administers the upper portion of the drainage, which is relatively secure from future changes in land and water use.

**DRAINAGE:** Ross Fork Rock Creek

**STREAM:** Elk Creek

**REACH:** Entire stream

### **Value as a Recruitment/Restoration Fishery for the Clark Fork River:**

**Species Present:** Westslope Cutthroat Trout, brook trout

**Fish Density/Number of Fish Produced:** Three electrofishing sections were completed in the Elk Creek drainage in 2007. Based on these surveys, westslope cutthroat trout densities were found to be moderate in the upper portion of the Elk Creek drainage (upper two sections) and low in the lower portion of the drainage. Brook trout were only captured in the lower two electrofishing sections and were found to maintain low densities.

**Recruitment to and Connectivity with the Clark Fork River:** Due to the small size of Elk Creek and the location of the drainage near the headwaters of Rock Creek, many river miles from the Clark Fork River, it is unlikely that this stream serves as a major source of recruitment to the Clark Fork River. It is possible however that Elk Creek does provide some westslope cutthroat out-migrant to the Clark Fork River.

**Current Value:** Low

**Protection and Enhancement Value:** Low

### **Value as a Tributary/Replacement Fishery:**

**Recreational Species Present:** Westslope Cutthroat Trout, brook trout

**Fish Density:** Three electrofishing sections were completed in the Elk Creek drainage in 2007. Based on these surveys, westslope cutthroat trout densities were found to be moderate in the upper portion of the Elk Creek drainage (upper two sections) and low in the lower portion of the drainage. Brook trout were only captured in the lower two electrofishing sections and were found to maintain low densities.

**Fish Size:** Westslope cutthroat trout generally maintained an average length of 3.5-4" and were captured as large as 7". Brook trout, on the other hand, averaged approximately 6" in length and reached a maximum length of 8".

**Recruitment to non Clark Fork River Fishery:** Elk Creek does provide a moderate number of westslope cutthroat trout that could out-migrate and be recruited into the mainstem Rock Creek fishery. However, due to the relatively small size of the drainage, it is unlikely that Elk Creek is a major source of recruitment to Rock Creek.

**Current Value:** Medium

**Protection and Enhancement Value:** Medium

### **Value as a Native Fishery:**

**Native Species Present:** Westslope cutthroat trout are the only native species present in the Elk Creek drainage. Westslope cutthroat trout densities in Elk Creek are moderate in the upper portion of the drainage and low in the lower portion of the drainage. No genetic analyses have been completed in the drainage, but it is possible that some hybridization has occurred between westslope cutthroat trout and rainbow trout due to its connectivity with Rock Creek.

**Competitor and/or Hybridizing Species Present:** Brook trout are the only potential non-native species captured in the drainage and they were captured only in the lowest two electrofishing sections. Their abundance was quite low at both sites suggesting that they are not a major threat to westslope cutthroat trout in the drainage.

**Demographics and Connectivity:** Westslope cutthroat trout are moderately abundant throughout most of the Elk Creek drainage and are well distributed in the drainage, suggesting that this population is relatively strong. Connectivity between Elk Creek and other westslope cutthroat trout populations in the upper Rock Creek drainage is quite good which allows for genetic exchange with other populations and potentially re-founding of the population should it be lost.

***Current Value:*** High

***Protection and Enhancement Value:*** High

### **Habitat Description:**

**Habitat Quality:** Habitat quality is considered good in the Elk Creek drainage. A large portion of the Elk Creek drainage is located within National Forest lands. Some riparian grazing was observed in the lower portion of the drainage, which appeared to be causing minor habitat degradation, but these impacts were not severe enough to substantially degrade the fish habitat.

**Habitat Security:** A majority of the Elk Creek drainage is located within the Beaverhead/Deerlodge National Forest and thus habitat security is generally quite good. A small private in-holding surrounds approximately one mile of lower Elk Creek and future changes in land and water uses at this parcel could be a concern for long term habitat security in this portion of the drainage.

**DRAINAGE:** Little Blackfoot River

**STREAM:** Elliston Creek

**REACH:** All

### **Value as a Recruitment/Restoration Fishery for the Clark Fork River:**

**Species Present:** Westslope Cutthroat Trout

*U.S. Forest Service electrofishing in the past had documented the presence of westslope cutthroat trout, brook trout and a few brown trout in the lower reaches of Elliston Creek. However, during our sampling in 2008, we did not observe either brook trout or brown trout in our sample sections.*

**Fish Density/Number of Fish Produced:** Based on 2008 electrofishing, westslope cutthroat trout comprise the entire fish community in Elliston Creek. The species is present in moderate to fairly high densities throughout much of the stream.

**Recruitment to and Connectivity with the Clark Fork River:** Elliston Creek is a small tributary to the Little Blackfoot River. Provided there is physical connectivity between the two streams (which has not been thoroughly evaluated), it is likely that Elliston Creek offers at least some recruitment of westslope cutthroat trout to the Little Blackfoot and Clark Fork Rivers based on the fair densities of fish produced in the stream.

**Current Value:** Low

**Protection and Enhancement Value:** Medium

### **Value as a Tributary/Replacement Fishery:**

**Recreational Species Present:** Westslope Cutthroat Trout

*U.S. Forest Service electrofishing in the past had documented the presence of westslope cutthroat trout, brook trout and a few brown trout in the lower reaches of Elliston Creek. However, during our sampling in 2008, we did not observe either brook trout or brown trout in our sample sections.*

**Fish Density:** Based on 2008 electrofishing, westslope cutthroat trout comprise the entire fish community in Elliston Creek. The species is present in moderate to fairly high densities throughout much of the stream.

**Fish Size:** Based on 2008 electrofishing, westslope cutthroat trout in Elliston Creek tend to be small, with very few being of catchable size. The average length of westslope cutthroat trout in the sections sampled was a little less than 4 inches. The largest fish observed was slightly over 6 inches in total length.

**Recruitment to non Clark Fork River Fishery:** Elliston Creek is a small tributary to the Little Blackfoot River. Provided there is physical connectivity between the two

streams (which has not been thoroughly evaluated), it is likely that Elliston Creek offers at least some recruitment of westslope cutthroat trout to the Little Blackfoot River based on the fair densities of fish produced in the stream.

***Current Value: Low***

***Protection and Enhancement Value: Medium***

**Value as a Native Fishery:**

**Native Species Present:** Westslope Cutthroat Trout

Genetic testing conducted in 1989 and 2008 suggests that westslope cutthroat trout in Elliston Creek are genetically pure.

**Competitor and/or Hybridizing Species Present:** None detected.

*U.S. Forest Service electrofishing in the past had documented the presence of westslope cutthroat trout, brook trout and a few brown trout in the lower reaches of Elliston Creek. However, during our sampling in 2008, we did not observe either brook trout or brown trout in our sample sections. Nevertheless, these species may be present in low densities.*

**Demographics and Connectivity:** Based on 2008 electrofishing, westslope cutthroat trout comprise the entire fish community in Elliston Creek. The species is present in moderate to fairly high densities throughout much of the stream, and there appears to be a fair distribution of age classes present including young-of-the-year, and larger fish capable of being resident adults (i.e. >6 inches). However, fish in Elliston Creek tend to be relatively small, with the largest fish observed in 2008 being slightly over 6 inches in total length.

Elliston Creek is a small tributary to the Little Blackfoot River. While there appears to be downstream connectivity between the two streams, upstream connectedness is not as certain. At its intersection with Highway 12, the stream is routed through a 125-foot (approximately) culvert with a fairly steep grade. It is unknown to what extent fish are capable of passing upstream through this pipe. If the structure inhibits upstream fish movement, it somewhat reduces the potential for westslope cutthroat trout to be threatened by invasion from downstream nonnative species (i.e. brown trout and rainbow trout). However, it also reduces the potential for Elliston Creek to be a spawning and rearing tributary for migratory westslope cutthroat trout. In addition to the Highway 12 culvert, a small private reservoir is located on Elliston Creek at approximately river mile 2.7. The dam of this impoundment is reportedly a barrier to upstream fish movement. If so, the westslope cutthroat trout population in the headwaters of Elliston Creek is relatively isolated. This raises concerns of the long-term viability of this segment of the population given the relatively small amount of stream it occupies.

***Current Value: High***

***Protection and Enhancement Value: High***

**Habitat Description:**

**Habitat Quality:** Habitat quality and riparian condition along much of Elliston Creek is considered fair. The primary land use in the watershed is livestock grazing, although impacts from forest roads and residential development (close to the mouth) have also affected habitat quality to some extent. In the lower reaches of the stream, a fenced livestock enclosure has been installed on about one mile of channel on U.S. Forest Service land. In this area, riparian and stream habitat conditions appear to be improving. However, woody riparian vegetation along the channel still tends to be patchy, and the lack of woody plants in some areas has reduced stream shading and habitat complexity, as well as increased sedimentation by making the streambanks more susceptible to erosion. Farther upstream near the headwaters, portions of Elliston Creek appear to be in a state of degradation (active headcuts present). Additionally, water appears to be naturally limited in this part of the drainage, and some channel segments receive only seasonal (spring) flow.

**Habitat Security:** Land ownership along Elliston Creek is variable, as is habitat security. Residential development is common along the lower 0.75 miles of the stream where it flows through the community of Elliston. Encroachment on the riparian zone is highly variable in this area, and potential changes in ownership and/or land use could affect habitat security on some parcels where the riparian zone remains relatively intact. In the upper reaches of Elliston Creek, much of the channel lies on National Forest lands where habitat security is considered to be fairly good. A fenced livestock enclosure has added to habitat security in this area. A rather large, undeveloped private in-holding is present in the middle portion of the drainage, and the uncertain nature of future land use and ownership poses some concerns.

**DRAINAGE:** Warm Springs Creek

**STREAM:** Foster Creek

**REACH:** All

### **Value as a Recruitment/Restoration Fishery for the Clark Fork River:**

**Species Present:** Westslope Cutthroat Trout and Brook Trout

**Fish Density/Number of Fish Produced:** Based on 2007 electrofishing, total trout density is relatively high throughout much of Foster Creek. Both westslope cutthroat trout and brook trout comprise the recreational fishery, although westslope cutthroat trout tend to be most common.

**Recruitment to and Connectivity with the Clark Fork River:** Foster Creek is a direct tributary to upper Warm Springs Creek. The stream likely provides a good source of recruitment of westslope cutthroat trout to the mainstem based on the densities of fish present in the stream. However, the overall contribution to the Clark Fork River may be low. Westslope cutthroat trout tend to be rather incidental in the upper Clark Fork River, and the rarity of these fish in downstream reaches suggests that the dispersal or survival of migratory individuals may be limited. Additionally, the presence of Myers Dam, may also limit the recruitment potential of Foster Creek. This diversion structure, which is located on Warm Springs Creek at river mile 16.6, appears to be at least a partial barrier restricting upstream fish movement (e.g. fish returning to Foster Creek to spawn). While brook trout are also present in Foster Creek, this species generally does not exhibit significant migratory tendencies, and thus has a rather low recruitment value.

**Current Value:** Medium

**Protection and Enhancement Value:** Medium

### **Value as a Tributary/Replacement Fishery:**

**Recreational Species Present:** Westslope Cutthroat Trout and Brook Trout

**Fish Density:** Based on 2007 electrofishing, total trout density is relatively high throughout much of Foster Creek. Both westslope cutthroat trout and brook trout comprise the recreational fishery, although westslope cutthroat trout tend to be most common.

**Fish Size:** Fish in Foster Creek do not typically attain very large size, although fish of catchable length are present in fairly good numbers. At the three sites sampled in the drainage in 2007, westslope cutthroat trout had an average length between about 4 and 6 inches. Brook trout had an average length of a little over 5 inches. The largest westslope cutthroat trout captured during our sampling was about 10 inches in total length, while the biggest brook trout was about 9 inches.

**Recruitment to non Clark Fork River Fishery:** Foster Creek is a direct tributary to upper Warm Springs Creek. The stream likely provides a good source of recruitment of westslope cutthroat trout to the mainstem based on the densities of fish present in the stream. While brook trout are also present in Foster Creek, this species generally does not exhibit significant migratory tendencies, and thus has a rather low recruitment value.

***Current Value:*** Medium

***Protection and Enhancement Value:*** Medium

**Value as a Native Fishery:**

**Native Species Present:** Bull Trout and Westslope Cutthroat Trout

No genetic testing has been conducted on westslope cutthroat trout in Foster Creek. However, given the connection of the stream to Warm Springs Creek, where rainbow trout are relatively common, it is possible that genetic purity is compromised.

**Competitor and/or Hybridizing Species Present:** Brook Trout

Brook trout appear to be present in fair densities throughout much of Foster Creek. The species likely competes with both westslope cutthroat trout and bull trout, especially in the lower reaches of the stream where they appear to be more common. In addition to the competitive threat, brook trout are also a significant hybridization concern for bull trout. Genetic sampling conducted in 2008 by the U.S. Fish and Wildlife Service documented the presence of first generation hybrids in Foster Creek.

**Demographics and Connectivity:** Based on fish sampling conducted in 2007, westslope cutthroat trout comprise the bulk of the fish community throughout much of Foster Creek. The species occurs in fairly good numbers throughout much of the stream, and the presence of multiple age classes indicates that the population is relatively healthy. The largest westslope cutthroat trout measured in Foster Creek in 2007 was about 10 inches in total length. Bull trout also occur in Foster Creek, but are present in very low densities. Additionally, the species appears to be limited to the lower reaches of the stream. During 2007 electrofishing, only one bull trout and one phenotypic bull-brook hybrid were captured in lower Foster Creek. However, the hybrid was very large (approximately 20 inches in length), and likely represented a fish with a migratory life history. Given the low population density and the presence of competing/hybridizing species (brook trout), the viability of the bull trout population in Foster Creek is of significant concern.

Foster Creek is a direct tributary to upper Warm Springs Creek. The stream appears to have good connectivity with the mainstem, and it likely supports populations of both bull trout and westslope cutthroat trout with resident as well as migratory life histories. However, it is likely that the migratory component is largely limited to fish utilizing upper Warm Springs Creek. The presence of Myers Dam on Warm Springs Creek at river mile 16.6 appears to limit the connectivity of the stream with lower Warm Springs Creek and the Clark Fork River. This structure appears to be at least a partial barrier

restricting upstream fish movement (e.g. migratory fish returning to Foster Creek to spawn).

***Current Value: High***

***Protection and Enhancement Value: High***

**Habitat Description:**

**Habitat Quality:** Habitat quality and riparian condition is relatively good throughout much of Foster Creek. While impacts from historic timber harvest, road construction, and residential development (close to mouth) are evident in portions of the drainage, the overall effects on habitat quality are not overly severe.

**Habitat Security:** The bulk of the Foster Creek watershed lies within the National Forest where long-term habitat security is considered to be fairly good. However, private ownership is present in the lower 0.6 miles of the stream where it flows through a residential subdivision. Although limited in its extent, the nature of the land use in this area (residential development) does pose some risks to habitat security in this portion of the drainage.

**DRAINAGE:** Clark Fork River

**STREAM:** Gillespie Creek

**REACH:** Entire stream

### **Value as a Recruitment/Restoration Fishery for the Clark Fork River:**

**Species Present:** Westslope Cutthroat Trout

**Fish Density/Number of Fish Produced:** Three electrofishing sections were completed on Gillespie Creek in 2008. Westslope cutthroat trout densities were high in the lowest section and moderate in the middle section. No fish were captured in the upper section.

**Recruitment to and Connectivity with the Clark Fork River:** Gillespie Creek is a small but direct tributary to the Clark Fork River. Gillespie Creek maintains moderate to high densities of westslope cutthroat trout, a portion of which could out-migrate to the Clark Fork River. A perched culvert is present in the Gillespie Creek drainage at approximately river mile 1.5 which is an upstream fish passage barrier. This barrier may limit returning adult fish from reaching necessary spawning habitat and may limit the recruitment potential of the stream.

***Current Value:*** Low

***Protection and Enhancement Value:*** Low

### **Value as a Tributary/Replacement Fishery:**

**Recreational Species Present:** Westslope Cutthroat Trout

**Fish Density:** Three electrofishing sections were completed on Gillespie Creek in 2008. Westslope cutthroat trout densities were high in the lowest section and moderate in the middle section. No fish were captured in the upper section.

**Fish Size:** Westslope cutthroat trout in the lower section averaged 4.5" and reached a maximum length of 9.5" while westslope cutthroat trout in the middle section averaged 4" and reached a maximum length of 9".

**Recruitment to non Clark Fork River Fishery:** Gillespie Creek flows directly into the Clark Fork River and thus cannot provide recruitment to a non Clark Fork River fishery.

***Current Value:*** Low

***Protection and Enhancement Value:*** Low

### **Value as a Native Fishery:**

**Native Species Present:** Westslope cutthroat trout are the only native trout species found in the Gillespie Creek drainage. Genetic analyses were completed in 2009 for samples taken from both above and below the perched culvert barrier and alleles characteristic of

only westslope cutthroat trout were detected, suggesting that westslope cutthroat trout both above and below the barrier are genetically pure.

**Competitor and/or Hybridizing Species Present:** No non-native trout were captured in the Gillespie Creek drainage.

**Demographics and Connectivity:** Westslope cutthroat trout were found in moderate to high abundance throughout most of the Gillespie Creek drainage, which suggests the population is quite stable. Westslope cutthroat trout in the lower portion of the drainage (below river mile 1.5) may be connected to other westslope cutthroat trout populations in the Clark Fork River, although the lower reach of Gillespie Creek is likely only passable during high flows due to intermittency (Workman 2009). Westslope cutthroat trout residing above the culvert barrier are not connected to other populations and this lack of connectivity does not allow for genetic exchange with other populations or for other populations to re-found this population should it be lost. These demographic risks are quite substantial in upper Gillespie Creek drainage due to small amount of habitat available between the culvert and the fishless portion of the drainage. While a genetically pure population does exist above the culvert that is protected from future invasion by rainbow trout or westslope cutthroat/rainbow trout hybrids, this lack of connectivity does create demographic risks to this population.

*Current Value: High*

*Protection and Enhancement Value: High*

### **Habitat Description:**

**Habitat Quality:** Habitat quality varied in the Gillespie Creek drainage with some grazing impacts observed at the upper survey site due to riparian grazing. Habitat was excellent in the middle reach and somewhat degraded in the lower reach due to past logging impacts that affected woody riparian vegetation and may have caused slight down-cutting in the reach. Overall, habitat quality in Gillespie Creek is considered fair to good.

**Habitat Security:** A majority of the Gillespie Creek drainage is owned by private landowners with a significant portion of the drainage being owned by a private timber company. Parcels owned by private landowners could potentially undergo future changes in land and water use that could significantly degrade habitat. The Lolo National Forest administers the remainder of the drainage.

**DRAINAGE:** Gold Creek

**STREAM:** North Fork Gold Creek

**REACH:** All

### **Value as a Recruitment/Restoration Fishery for the Clark Fork River:**

**Species Present:** Westslope Cutthroat Trout

**Fish Density/Number of Fish Produced:** Based on 2007 electrofishing, westslope cutthroat trout comprise the entire fish community in North Fork Gold Creek. Two sites were sampled in the drainage in 2007. At the lowest site, the species was present at relatively high density, but at the uppermost site, no fish were found.

**Recruitment to and Connectivity with the Clark Fork River:** North Fork Gold Creek is a direct tributary to Gold Creek, and likely is a good source of westslope cutthroat trout recruitment for mainstem Gold Creek and possibly the Clark Fork River.

***Current Value:*** Medium

***Protection and Enhancement Value:*** Medium

### **Value as a Tributary/Replacement Fishery:**

**Recreational Species Present:** Westslope Cutthroat Trout

**Fish Density:** Based on 2007 electrofishing, westslope cutthroat trout comprise the entire fish community in North Fork Gold Creek. Two sites were sampled in the drainage in 2007. At the lowest site, the species was present at relatively high density, but at the uppermost site, no fish were found.

**Fish Size:** Westslope cutthroat trout in North Fork Gold Creek do not typically attain very large size, although fish of catchable size are present. At the lowest site sampled in the drainage in 2007 (the only site where fish were found), fish averaged about 4.5 inches in length, with the largest fish being a little over 7 inches.

**Recruitment to non Clark Fork River Fishery:** North Fork Gold Creek is a direct tributary to Gold Creek, and likely is a good source of westslope cutthroat trout recruitment for mainstem Gold Creek.

***Current Value:*** Medium

***Protection and Enhancement Value:*** Medium

***Enhancement Priority:*** Medium

### **Value as a Native Fishery:**

**Native Species Present:** Westslope Cutthroat Trout

Genetic testing conducted in 1992 suggests that westslope cutthroat trout in North Fork Gold Creek are genetically pure.

**Competitor and/or Hybridizing Species Present:** None detected.

**Demographics and Connectivity:** Westslope cutthroat trout appear to comprise the entire fish community in North Fork Gold Creek. Two sites were sampled in the stream in 2007. At the uppermost sample site, no fish were found; however, at the lowest site, the species was present at relatively high density. There was a fairly good distribution of age classes including young-of-the-year, and larger fish capable of being resident sized adults (i.e. >6 inches).

North Fork Gold Creek appears to have good connectivity with Gold Creek, and may be an important source of westslope cutthroat trout recruitment. However, connectivity does pose some risk as it could provide an avenue for invasion by non-native species such as brown and rainbow trout. The presence of these species could affect the long-term viability of westslope cutthroat trout in North Fork Gold Creek.

***Current Value:*** High

***Protection and Enhancement Value:*** High

### **Habitat Description:**

**Habitat Quality:** Habitat quality and riparian condition along North Fork Gold Creek is relatively good. The primary factor currently affecting habitat quality is livestock grazing in the riparian zone. However, the impacts of this appear to be relatively site-specific and light based on the limited riparian evaluations that were completed in the drainage in 2007. Past timber harvest is also widespread throughout the drainage, and lasting effects of this activity are evident along several segments of the stream.

**Habitat Security:** Habitat security in North Fork Gold Creek is relatively good. Land ownership along the stream is comprised almost entirely of lands administered by the U.S. Forest Service. The primary land uses in the drainage are livestock grazing and timber harvest. Livestock use of the riparian area is apparent throughout much of the drainage, and this activity could make habitat security a concern if not closely managed. Additionally, at least one irrigation diversion is present in the upper reaches of the stream. It is unknown to what extent this diversion affects summer base flows in North Fork Gold Creek.

**DRAINAGE:** Gold Creek

**STREAM:** South Fork Gold Creek

**REACH:** All

### **Value as a Recruitment/Restoration Fishery for the Clark Fork River:**

**Species Present:** Westslope Cutthroat Trout

**Fish Density/Number of Fish Produced:** Based on 2007 electrofishing, westslope cutthroat trout comprise the entire fish community in South Fork Gold Creek. At the one site sampled, fish were present at relatively high density.

**Recruitment to and Connectivity with the Clark Fork River:** South Fork Gold Creek is a direct tributary to Gold Creek, and likely is a good source of westslope cutthroat trout recruitment for mainstem Gold Creek and possibly the Clark Fork River.

***Current Value:*** Medium

***Protection and Enhancement Value:*** Medium

### **Value as a Tributary/Replacement Fishery:**

**Recreational Species Present:** Westslope Cutthroat Trout

**Fish Density:** Based on 2007 electrofishing, westslope cutthroat trout comprise the entire fish community in South Fork Gold Creek. At the one site sampled, fish were present at relatively high density.

**Fish Size:** Westslope cutthroat trout in South Fork Gold Creek do not typically attain very large size, although fish of catchable size are present. At the one site sampled in the drainage in 2007, fish averaged about 5 inches in length, with the largest being a little over 8 inches.

**Recruitment to non Clark Fork River Fishery:** South Fork Gold Creek is a direct tributary to Gold Creek, and likely is a good source of westslope cutthroat trout recruitment for mainstem Gold Creek.

***Current Value:*** Medium

***Protection and Enhancement Value:*** Medium

### **Value as a Native Fishery:**

**Native Species Present:** Westslope Cutthroat Trout

No genetic testing has been conducted on westslope cutthroat trout from South Fork Gold Creek. However, fish tested from mainstem Gold Creek in 2007 not far from the confluence with South Fork Gold Creek indicate there is slight hybridization with

rainbow trout (99.8% pure). Provided there are no barriers to movement between the two streams, it is possible that westslope cutthroat trout in South Fork Gold Creek share a similar genetic makeup.

**Competitor and/or Hybridizing Species Present:** None detected.

**Demographics and Connectivity:** Based on 2007 electrofishing, westslope cutthroat trout comprise the entire fish community in South Fork Gold Creek. At the one site sampled, fish were present at relatively high density. There was a fairly good distribution of age classes including young-of-the-year, and larger fish capable of being resident sized adults (i.e. >6 inches). The largest fish handled was a little over 8 inches in total length.

South Fork Gold Creek appears to have good connectivity with Gold Creek, and may be an important source of westslope cutthroat trout recruitment. However, connectivity does pose some risk as it could provide an avenue for invasion by non-native species such as brown and rainbow trout. The presence of these species could affect the long-term viability of westslope cutthroat trout in South Fork Gold Creek.

***Current Value:*** Medium

***Protection and Enhancement Value:*** Medium

### **Habitat Description:**

**Habitat Quality:** Habitat quality and riparian condition along South Fork Gold Creek is relatively good. However, past timber harvest, mining, and roads are all evident throughout the drainage, and the lasting effects of these activities have had some measurable effect on habitat quality in portions of the reach.

**Habitat Security:** A good portion of South Fork Gold Creek lies on public lands administered by the U.S. Forest Service. In these areas, habitat security is rather good. However, there are also a number of private mining claims present in the drainage, and habitat security is of more concern in these areas given the uncertainties of land use and potential changes in future ownership. Factors present in the drainage that could affect habitat security include forest recreation, roads, mining, and timber harvest.

**DRAINAGE:** Gold Creek

**STREAM:** Gold Creek

**REACH:** Upper – Confluence with North Fork Gold Creek to Headwaters

### **Value as a Recruitment/Restoration Fishery for the Clark Fork River:**

**Species Present:** Westslope Cutthroat Trout

**Fish Density/Number of Fish Produced:** Based on 2007 electrofishing, westslope cutthroat trout comprise the entire fish community in upper Gold Creek. The species is present in moderate densities throughout much of the reach, although abundance decreases closer to the headwaters where habitat is more limited.

**Recruitment to and Connectivity with the Clark Fork River:** Gold Creek is well connected to the Clark Fork River and is one of the largest tributaries entering the river between the confluences of Flint Creek and the Little Blackfoot River. Upper Gold Creek is likely an important recruitment source of westslope cutthroat trout for lower Gold Creek and the Clark Fork River.

***Current Value:*** Medium

***Protection and Enhancement Value:*** Medium

### **Value as a Tributary/Replacement Fishery:**

**Recreational Species Present:** Westslope Cutthroat Trout

**Fish Density:** Based on 2007 electrofishing, westslope cutthroat trout comprise the entire fish community in upper Gold Creek. The species is present in moderate densities throughout much of the reach, although abundance decreases closer to the headwaters where habitat is more limited.

**Fish Size:** Based on 2007 electrofishing at two sample sites, catchable sized fish are present in fair densities in upper Gold Creek. However, fish do not typically attain very large size. The average length of westslope cutthroat trout sampled at the lowest sample site was about 7 inches, whereas at the uppermost sample location, fish averaged a little less than 4 inches. The largest fish handled in upper Gold Creek during 2007 sampling was 10 inches in total length.

**Recruitment to non Clark Fork River Fishery:** N/A

***Current Value:*** Medium

***Protection and Enhancement Value:*** Medium

### **Value as a Native Fishery:**

**Native Species Present:** Westslope Cutthroat Trout

Genetic testing conducted in 2007 suggests that the westslope cutthroat trout population in upper Gold Creek is hybridized with rainbow trout, although the predominant genetic contribution (99.8%) was found to be from westslope cutthroat trout.

**Competitor and/or Hybridizing Species Present:** None detected.

**Demographics and Connectivity:** Based on 2007 electrofishing, westslope cutthroat trout comprise the entire fish community in upper Gold Creek. The species is present in moderate densities throughout much of the reach, although abundance decreases closer to the headwaters where habitat is more limited. Several age classes of fish were found at each of the sample locations including young-of-the-year, and fish large enough to be resident adults (>6 inches). The largest fish handled in upper Gold Creek during 2007 sampling was 10 inches in total length.

Gold Creek is well connected to the Clark Fork River and is one of the largest tributaries entering the river between the confluences of Flint Creek and the Little Blackfoot River. Upper Gold Creek is likely an important spawning location and recruitment source for westslope cutthroat trout in lower Gold Creek and the Clark Fork River. However, the fact that upper Gold Creek is connected to downstream fisheries does put the westslope cutthroat trout population in the reach at some risk of invasion from non-native species.

**Current Value:** Medium

**Protection and Enhancement Value:** Medium

### **Habitat Description:**

**Habitat Quality:** Habitat quality in upper Gold Creek ranges from good to fair with habitat appearing to decline in quality closer to the headwaters where the channel is small and flow more limited. Overall, riparian condition tends to be fairly good throughout much of the reach, although there is evidence of past mining and timber harvest impacts in portions of it.

**Habitat Security:** Much of upper Gold Creek lies on public lands administered by the U.S. Forest Service. In these areas, habitat security is rather good. However, there are also private mining claims present in the drainage, and habitat security is of more concern in these areas given the uncertainties of land use and potential changes in future ownership. Factors present in the reach that could affect habitat security include forest recreation, roads, livestock grazing, timber harvest, and mining.

**DRAINAGE:** Gough Creek

**STREAM:** Gough Creek

**REACH:** All

### **Value as a Recruitment/Restoration Fishery for the Clark Fork River:**

**Species Present:** Westslope Cutthroat Trout

**Fish Density/Number of Fish Produced:** Based on 2008 electrofishing, westslope cutthroat trout comprise the entire fish community in Gough Creek. The species appears to occur in rather low densities throughout most of the stream.

**Recruitment to and Connectivity with the Clark Fork River:** Gough Creek is no longer well connected to the Clark Fork River. The stream appears to be captured by an irrigation ditch prior to reaching the river. Additionally, a 3-acre private reservoir is situated on Gough Creek at RM 0.6. While the dam of this structure was not closely examined during 2008 sampling, it is likely a migration barrier to fish. It is unlikely that Gough Creek provides any significant recruitment to the Clark Fork River (if any at all).

**Current Value:** Low

**Protection and Enhancement Value:** Low

### **Value as a Tributary/Replacement Fishery:**

**Recreational Species Present:** Westslope Cutthroat Trout

**Fish Density:** Based on 2008 electrofishing, westslope cutthroat trout comprise the entire fish community in Gough Creek. The species appears to occur in rather low densities throughout most of the stream.

**Fish Size:** Westslope cutthroat trout in Gough Creek tend to be small, with very few being of a catchable size. It appears that the majority of the population is comprised of juvenile fish. The average size of westslope cutthroat trout in the sections sampled in 2008 ranged between about 3 and 4 inches in total length. Larger fish (i.e. >6 inches total length) were rare. The largest fish observed in 2008 was slightly over 7.5 inches in total length.

**Recruitment to non Clark Fork River Fishery:** N/A – Gough Creek is a tributary to the Clark Fork River.

**Current Value:** Low

**Protection and Enhancement Value:** Low

### **Value as a Native Fishery:**

**Native Species Present:** Westslope Cutthroat Trout.

Genetic tests conducted in 2008 indicate that the westslope cutthroat trout population in Gough Creek is comprised mostly of fish that are genetically pure. However, one fish from the lowest sample site was determined to be a hybrid with rainbow trout.

**Competitor and/or Hybridizing Species Present:** None detected.

**Demographics and Connectivity:** Based on 2008 electrofishing, westslope cutthroat trout comprise the entire fish community in Gough Creek. The species appears to occur in rather low densities throughout most of the stream, and fish tend to be small. It appears that the majority of the population is comprised of juvenile fish. Larger fish of resident adult size (i.e. >6 inches total length) are rare. The small population size and limited number of spawning adults could pose a potential threat to viability due to possible effects of inbreeding depression, etc. This could be exacerbated by the lack of connectivity with other populations.

Gough Creek is no longer well connected to the Clark Fork River. The stream appears to be captured by an irrigation ditch prior to reaching the river. Additionally, a 3-acre private reservoir is situated on the stream at RM 0.6. While the dam of this structure was not closely examined during 2008 sampling, it is likely a migration barrier to fish. This somewhat reduces the potential for westslope cutthroat trout to be threatened by invasion from downstream nonnative species, but it also limits the ability of the population to re-found should a catastrophic event extirpate it from the upper watershed. Additionally, the presence of the pond does pose some risk to the westslope cutthroat trout population of Gough Creek by providing a potential location for the introduction of non-native fish.

***Current Value:*** Medium

***Protection and Enhancement Value:*** Medium

### **Habitat Description:**

**Habitat Quality:** Habitat quality in Gough Creek is fair. Much of the stream flows through private agricultural lands used primarily for livestock grazing. Portions of the stream show impacts from unrestricted livestock presence in the riparian zone. Woody riparian vegetation along the channel tends to be somewhat patchy, and the lack of woody vegetation in some areas of the stream has reduced stream shading and habitat complexity, as well as increased sedimentation by making the streambanks more susceptible to erosion. A primitive, private road follows the stream throughout much of the drainage, encroaching on the channel and contributing sediment in narrower portions of the canyon. Fish habitat in Gough Creek is most limited by high fine sediment accumulation and a lack of deep pools.

**Habitat Security:** Land ownership along Gough Creek consists primarily of private agricultural lands, with one mile of stream flowing through State owned land in the upper portion of the watershed. The main land uses in the drainage are livestock grazing and

timber harvest. The nature of the ownership and land use makes habitat security a concern in Gough Creek.

**DRAINAGE:** Boulder Creek

**STREAM:** Granite Creek

**REACH:** Entire stream

### **Value as a Recruitment/Restoration Fishery for the Clark Fork River:**

**Species Present:** Westslope Cutthroat Trout

**Fish Density/Number of Fish Produced:** Westslope cutthroat trout densities are quite low in the Granite Creek drainage with westslope cutthroat trout only being captured near the mouth at RM 0.1. Another electrofishing section was completed just 0.2 miles upstream of this section (RM 0.3) and no fish were captured. Electrofishing surveys were not completed higher in the Granite Creek drainage, but past Forest Service data indicate that the upper portion of the drainage is fishless (Steve Gerdes, pers. comm.).

**Recruitment to and Connectivity with the Clark Fork River:** Westslope cutthroat trout recruitment from Granite Creek to the Clark Fork River is likely very low based on the small number of fish present in the drainage.

**Current Value:** Very Low

**Protection and Enhancement Value:** Very Low

### **Value as a Tributary/Replacement Fishery:**

**Recreational Species Present:** Westslope Cutthroat Trout

**Fish Density:** Westslope cutthroat trout densities are quite low in the Granite Creek drainage with westslope cutthroat trout only being captured near the mouth at RM 0.1. Another electrofishing section was completed just 0.2 miles upstream of this section (RM 0.3) and no fish were captured. Electrofishing surveys were not completed higher in the Granite Creek drainage, but past Forest Service data indicate that the upper portion of the drainage is fishless (Steve Gerdes, pers. comm.).

**Fish Size:** Westslope cutthroat trout sampled in Granite Creek averaged 8" and reached a maximum length of 12".

**Recruitment to non Clark Fork River Fishery:** Westslope cutthroat trout recruitment from Granite Creek to either Boulder Creek or Flint Creek is likely very low based on the small number of fish present in the drainage.

**Current Value:** Very Low

**Protection and Enhancement Value:** Very Low

### **Value as a Native Fishery:**

**Native Species Present:** Westslope cutthroat trout are the only native trout present in Granite Creek and densities are very low in the drainage. No genetic analyses have been completed for westslope cutthroat trout in Granite Creek.

**Competitor and/or Hybridizing Species Present:** No non-native fish were captured in Granite Creek, although non-native brook and brown trout are present in the Boulder Creek drainage and could potentially invade Granite Creek.

**Demographics and Connectivity:** Westslope cutthroat trout densities are very low in Granite Creek with a majority of the drainage having no fish present. Based on these low densities, the viability of this population is very low. The fish sampled near the mouth likely represent fish from Boulder Creek that are utilizing lower Granite Creek rather than an established population within Granite Creek.

***Current Value: Low***

***Protection and Enhancement Value: Low***

### **Habitat Description:**

**Habitat Quality:** Habitat quality in the Granite Creek drainage was found to be excellent at the one site surveyed with minimal habitat degradation being observed.

**Habitat Security:** All of the Granite Creek drainage is located within lands administered by the Beaverhead-Deerlodge National Forest and thus is quite secure from future land use changes.

**DRAINAGE:** Clark Fork River

**STREAM:** Greenough Creek

**REACH:** Entire stream

### **Value as a Recruitment/Restoration Fishery for the Clark Fork River:**

**Species Present:** Westslope Cutthroat Trout, brook trout

**Fish Density/Number of Fish Produced:** Five single-pass electrofishing sections (~RM 0.5 – 4.0) were completed on Greenough Creek in 2000-2008. Westslope cutthroat trout densities were high at all sites. Brook trout were only found at the lowest two sites (RM 0 - 1.5) and densities were very low. Although not confirmed, it is likely that westslope cutthroat trout are predominantly stream-resident, with a smaller, intact migratory component.

**Recruitment to and Connectivity with the Clark Fork River:** Greenough Creek flows directly into the Clark Fork River and upstream fish passage within the stream is largely intact. One undersized culvert exists (~ RM 2) that likely acts as a selective obstruction to trout at high flows. Given its moderate size (~ 9 mi<sup>2</sup>, ~6 miles of fish-bearing stream) and high juvenile fish densities, trout recruitment to the Clark Fork River may be significant. However, little is known about the life-history of cutthroat trout in the drainage.

**Current Value:** Medium

**Protection and Enhancement Value:** Medium

### **Value as a Tributary/Replacement Fishery:**

**Recreational Species Present:** Westslope cutthroat trout, brook trout

**Fish Density:** Five single-pass electrofishing sections (~RM 0.5 – 4.0) were completed on Greenough Creek in 2000-2008. Westslope cutthroat trout densities were high at all sites. Brook trout were only found at the lowest two sites (RM 0 - 1.5) and densities were very low.

**Fish Size:** Westslope cutthroat trout and brook trout in all electrofishing sections averaged 5-6 inches. Maximum lengths were ~10 inches for brook trout and ~8 inches for westslope cutthroat trout.

**Recruitment to non Clark Fork River Fishery:** N/A. Greenough Creek flows directly into the Clark Fork River and thus cannot provide recruitment to a non Clark Fork River fishery.

**Current Value:** Low

**Protection and Enhancement Value:** Low

### **Value as a Native Fishery:**

**Native Species Present:** Westslope cutthroat trout are the only native trout present in the drainage. Genetic samples were collected in 2000 and analyses were completed for fish from two sites (~RM 2.0 & 4.0) on Greenough Creek. Alleles characteristic of only westslope cutthroat trout were detected, suggesting that this population is genetically non-introgressed (> 95% certainty).

**Competitor and/or Hybridizing Species Present:** Brook trout were detected at lower sites in Greenough Creek, but at low abundance. This is an open system with apparent unobstructed connectivity with the Clark Fork River, which could lead to invasion by other non-native species in the future.

**Demographics and Connectivity:** Westslope cutthroat trout abundance was high at sampling sites in the Greenough Creek drainage, which provides ~ 6 miles of fish-bearing habitat. This suggests a fairly robust population that is accessible for genetic exchange with other populations in the Clark Fork Basin. Connectivity could also allow migratory adults or fish from other populations to re-found this population should it be lost in a catastrophic event.

***Current Value: High***

***Protection and Enhancement Value: High***

### **Habitat Description:**

**Habitat Quality:** Habitat quality in Greenough Creek is good or excellent throughout the drainage. Instream habitat and water quality appear to be unimpaired and riparian corridors are intact. There are forest road networks in the upper watershed, but overall density is moderate. No mining, grazing impacts, surface water diversions or dewatering have been observed. One undersized culvert exists (~ RM 2) that likely acts as a selective obstruction to trout at high flows.

**Habitat Security:** Approximately 90% of the Greenough Creek watershed is managed by the Lolo National Forest. Small portions are also managed by Plum Creek Timber Company (PCTC) and the Bureau of Land Management. Through the recent purchase of PCTC lands by The Nature Conservancy (TNC) under the Montana Legacy Project, the one section of PCTC land within Greenough Creek will be transferred to the USFS in 2010. This will only enhance the high level of habitat security throughout the drainage as the entire watershed will be in public ownership.

**DRAINAGE:** Rock Creek

**STREAM:** Grizzly Creek

**REACH:** Entire stream

### **Value as a Recruitment/Restoration Fishery for the Clark Fork River:**

**Species Present:** Westslope Cutthroat Trout

**Fish Density/Number of Fish Produced:** Westslope cutthroat trout densities were moderate to low in the one electrofishing section completed in Grizzly Creek in 2008.

**Recruitment to and Connectivity with the Clark Fork River:** Grizzly Creek provides a moderate to low number of westslope cutthroat trout that could out-migrate and be recruited into the Clark Fork River fishery. However, Grizzly Creek is a relatively small drainage and is likely not a major source of recruitment to the Clark Fork River. Connectivity between Grizzly Creek and the Clark Fork River via Rock Creek is excellent for both up- and downstream migrants.

**Current Value:** Medium

**Protection and Enhancement Value:** Medium

### **Value as a Tributary/Replacement Fishery:**

**Recreational Species Present:** Westslope Cutthroat Trout

**Fish Density:** Westslope cutthroat trout densities were moderate to low in the one electrofishing section completed in Grizzly Creek in 2008.

**Fish Size:** Westslope cutthroat trout in Grizzly Creek averaged 4" in length and reached a maximum length of 6".

**Recruitment to non Clark Fork River Fishery:** Grizzly Creek does provide low to moderate numbers of westslope cutthroat trout that could out-migrate and be recruited into the mainstem Rock Creek fishery. However, due to the relatively small size of the drainage, it is unlikely that Grizzly Creek is a major source of recruitment to Rock Creek.

**Current Value:** Medium

**Protection and Enhancement Value:** Medium

### **Value as a Native Fishery:**

**Native Species Present:** Westslope cutthroat trout is the only native salmonid captured in the Grizzly Creek drainage. No genetic analyses have been completed for westslope cutthroat trout in Grizzly Creek although it is possible that some hybridization may have occurred in the drainage due to its connectivity with mainstem Rock Creek.

**Competitor and/or Hybridizing Species Present:** No non-native fish were captured in Grizzly Creek, although non-native brook and brown trout are present in the Ranch Creek drainage and could potentially invade the Grizzly Creek drainage.

**Demographics and Connectivity:** Westslope cutthroat trout were captured in moderate to low densities in the one section of Grizzly Creek that was sampled, suggesting that this population is stable. Connectivity between Grizzly Creek and other westslope cutthroat trout populations in the lower Rock Creek drainage is quite good which allows for genetic exchange with other populations and potentially re-founding of the population should it be lost.

*Current Value: High*

**Protection and Enhancement Value:** *High (entire drainage in Forest Service ownership)*

### **Habitat Description**

**Habitat Quality:** Habitat quality in Grizzly Creek was found to be excellent at the one site surveyed with minimal habitat degradation being observed.

**Habitat Security:** The Grizzly Creek drainage is located entirely within lands administered by the Lolo National Forest and thus is quite secure from future land use changes.

**DRAINAGE:** Ross Fork Rock Creek

**STREAM:** Helm Creek

**REACH:** Entire stream

### **Value as a Recruitment/Restoration Fishery for the Clark Fork River:**

**Species Present:** Westslope Cutthroat Trout

**Fish Density/Number of Fish Produced:** Two electrofishing sections were completed on Helm Creek in 2007 and westslope cutthroat trout densities were moderate in the lower electrofishing section while surveys completed in the upper section yielded no fish.

**Recruitment to and Connectivity with the Clark Fork River:** Due to the small size of Helm Creek and its location near the headwaters of Rock Creek, it is unlikely that Helm Creek serves as a major source of recruitment to the Clark Fork River. It is possible however that Helm Creek does provide some westslope cutthroat trout out-migrant to the Clark Fork River.

***Current Value:*** Low

***Protection and Enhancement Value:*** Low

### **Value as a Tributary/Replacement Fishery:**

**Recreational Species Present:** Westslope Cutthroat Trout

**Fish Density:** Two electrofishing sections were completed on Helm Creek in 2007 and westslope cutthroat trout densities were moderate in the lower electrofishing section while surveys completed in the upper section yielded no fish.

**Fish Size:** Westslope cutthroat trout in Helm Creek are quite small with the largest fish sampled being approximately 5" in length.

**Recruitment to non Clark Fork River Fishery:** Due to the small size of Helm Creek and the relatively low densities of fish in the drainage, it is unlikely that Helm Creek serves as a major source of recruitment to other systems. It is likely that Helm Creek provides some westslope cutthroat trout out-migrant to Rock Creek.

***Current Value:*** Low

***Protection and Enhancement Value:*** Low

### **Value as a Native Fishery:**

**Native Species Present:** Westslope cutthroat trout are the only species present in the Helm Creek drainage. No genetic analyses have been completed in the drainage, but it is possible that some hybridization has occurred between westslope cutthroat trout and rainbow trout due to its connectivity with Rock Creek.

**Competitor and/or Hybridizing Species Present:** No other competing or hybridizing species were detected in the Helm Creek drainage. It is possible that some hybridization between westslope cutthroat trout and rainbow trout has occurred in the drainage due to connectivity with Rock Creek, but the actual genetic status is unknown.

**Demographics and Connectivity:** Westslope cutthroat trout are moderately abundant in the lower portion of Helm Creek drainage and were not captured in the upper portion of the drainage. Based on the number of fish captured in the lower portion of the drainage, the population appears relatively stable, but it does not maintain a distribution within the drainage that many other westslope cutthroat trout populations' exhibit in the Upper Clark Fork drainage. Connectivity between Helm Creek and other westslope cutthroat trout populations in the upper Rock Creek drainage is quite good which allows for genetic exchange with other populations and potentially re-founding of the population should it be lost.

*Current Value: Medium*

*Protection and Enhancement Value: Medium*

### **Habitat Description:**

**Habitat Quality:** The upper portion of Helm Creek is located within National Forest lands and the habitat quality in this reach was found to be excellent. The lower portion of the drainage is located on a private cattle ranch and fish habitat in the reach was observed to be fair to poor. The impacts observed in this reach were primarily due to cattle grazing which had led to reduced woody riparian vegetation, channel over-widening, and a loss of pool habitat.

**Habitat Security:** The upper portion of Helm Creek is located within National Forest lands and thus habitat security in this portion of the drainage is good, however the lower portion of the drainage is located on a private cattle ranch. Habitat security is lower in this portion of the drainage due to the potential for further habitat degradation and the possibility of future changes in land use.

**DRAINAGE:** Flint Creek  
**STREAM:** Henderson Creek  
**REACH:** Entire stream

### **Value as a Recruitment/Restoration Fishery for the Clark Fork River:**

**Species Present:** Westslope Cutthroat Trout

**Fish Density/Number of Fish Produced:** Two electrofishing sections were completed in Henderson Creek in 2008. Westslope cutthroat trout were found in moderate densities in the lower electrofishing section and low densities in the upper section.

**Recruitment to and Connectivity with the Clark Fork River:** Due to extensive placer mining in the lower portion of Henderson Creek, a majority of Henderson Creek is not connected to Flint Creek and cannot provide westslope cutthroat trout recruitment to the Clark Fork River.

**Current Value:** Very Low

**Protection and Enhancement Value:** Very Low

### **Value as a Tributary/Replacement Fishery:**

**Recreational Species Present:** Westslope Cutthroat Trout

**Fish Density:** Two electrofishing sections were completed in Henderson Creek in 2008. Westslope cutthroat trout were found in moderate densities in the lower electrofishing section and low densities in the upper section.

**Fish Size:** Westslope cutthroat trout in both sections of Henderson Creek averaged 3.5" and reached a maximum length of 5.5" in the lower section and 7" in the upper section.

**Recruitment to non Clark Fork River Fishery:** Due to extensive placer mining in the lower portion of Henderson Creek, a majority of Henderson Creek is not connected to Flint Creek and cannot provide westslope cutthroat trout recruitment to Flint Creek. A small section of lower Henderson Creek below the placer mining reach does regain surface flow, but this portion of the drainage was not sampled.

**Current Value:** Very Low

**Protection and Enhancement Value:** Very Low

### **Value as a Native Fishery:**

**Native Species Present:** Westslope cutthroat trout are the only native salmonid present in Henderson Creek. Genetic analyses were completed for westslope cutthroat trout in Henderson Creek in 2009 and alleles characteristic of only westslope cutthroat trout were detected, suggesting that this population is genetically pure.

**Competitor and/or Hybridizing Species Present:** No non-native fish were captured in the Henderson Creek drainage and its lack of connectivity with Flint Creek currently protects the drainage from potential invasion by non-native species.

**Demographics and Connectivity:** Westslope cutthroat trout densities are moderate to low in the Henderson Creek drainage although they appear to be fairly well distributed in the drainage (within the range available), which suggests the population is stable. Westslope cutthroat trout in Henderson Creek are not connected to other populations and this lack of connectivity does not allow for genetic exchange with other populations or for other populations to re-found this population should it be lost. While this genetically pure population is protected from future invasion by rainbow trout or westslope cutthroat/rainbow trout hybrids, this lack of connectivity does create demographic risks to the population.

***Current Value: Medium***

***Protection and Enhancement Value: Medium***

**Habitat Description:**

**Habitat Quality:** Habitat conditions in the upper portion of Henderson Creek (upper survey site) were quite degraded due to riparian grazing impacts and its impact on fish habitat. Habitat conditions improved lower in the drainage (lower survey site), as riparian grazing had ceased and habitat conditions, including the density of woody riparian vegetation, improved considerably. Below this site, Henderson Creek flows through a considerable length of placer mining piles and stream flow is completely lost through a majority of this reach.

**Habitat Security:** Approximately half of the Henderson Creek drainage flows through federal lands administered by either the Bureau of Land Management or the Beaverhead-Deerlodge National Forest. Due to the federal ownership of these lands, they are quite secure from future changes in land and water uses. The remainder of the drainage flows through privately owned parcels and future changes in land and water uses could occur on these parcels, however a good portion of this reach has already been severely impacted by historic placer mining.

**DRAINAGE:** Hoover Creek

**STREAM:** Hoover Creek

**REACH:** Lower – Mouth to Miller Lake Dam

### **Value as a Recruitment/Restoration Fishery for the Clark Fork River:**

**Species Present:** Brook Trout and Brown Trout

**Fish Density/Number of Fish Produced:** Based on 2008 electrofishing in several segments of lower Hoover Creek, brook trout occur in relatively low numbers in the lower portion of this reach, but can be found in higher densities below Miller Lake. Brown trout occur only rarely, and appear to be limited to the lowest reaches of the stream downstream of Interstate 90.

**Recruitment to and Connectivity with the Clark Fork River:** Brook trout are the most common species in lower Hoover Creek. This species most often resides in small tributary streams, and generally does not exhibit migratory tendencies. Therefore, lower Hoover Creek poses little recruitment value to the Clark Fork River. Furthermore, this segment of stream is poorly connected to the Clark Fork River. Several physical barriers are present in the lower part of the reach that prevents any notable upstream migration of fish from the Clark Fork River. At least one of the barriers (railroad grade near Interstate 90) would be very difficult to rectify.

***Current Value:*** Low

***Protection and Enhancement Value:*** Low

### **Value as a Tributary/Replacement Fishery:**

**Recreational Species Present:** Brook Trout and Brown Trout

**Fish Density:** Based on 2008 electrofishing in several segments of lower Hoover Creek, brook trout occur in relatively low numbers in the lower portion of this reach, but can be found in higher densities below Miller Lake. Brown trout occur only rarely, and appear to be limited to the lowest reaches of the stream downstream of Interstate 90.

**Fish Size:** Most of the brook trout captured in lower Hoover Creek during 2008 were small, juvenile fish that were not of catchable size. Catchable size fish (>6 inches) appeared relatively uncommon. The mean length of brook trout handled in the sections surveyed was approximately 3 inches. The largest brook trout handled was about 10 inches. The only brown trout captured in this reach in 2008 was 9.5 inches long.

**Recruitment to non Clark Fork River Fishery:** N/A - Hoover Creek is a direct tributary to the Clark Fork River.

***Current Value:*** Low

Protection and Enhancement Value: Low

**Value as a Native Fishery:**

**Native Species Present:** None detected.

**Competitor and/or Hybridizing Species Present:** Brook Trout and Brown Trout

Brook trout are common in lower Hoover Creek and likely exert a heavy competitive pressure on any native trout that may be present in the reach. Brown trout occur only rarely and appear to be isolated to the lower portion of the reach downstream of Interstate 90.

**Demographics and Connectivity:** No native trout were observed in lower Hoover Creek during 2008 electrofishing. Furthermore, this segment of stream is poorly connected to the Clark Fork River. Several physical barriers are present in the lower part of the reach that prevents any notable upstream migration of fish from the Clark Fork River. At least one of the barriers (railroad grade near Interstate 90) would be very difficult to rectify.

**Current Value:** Very Low

**Protection and Enhancement Value:** Low

**Habitat Description:**

**Habitat Quality:** Fish habitat was evaluated at several locations in lower Hoover Creek during 2008. At all sites, habitat quality was rated only fair, and was most limited by a lack of pool habitat and woody debris in the channel. Fine sediment accumulation tended to be rather high, but was most evident in the lower segments of the reach where notable channel incision and lateral erosion was observed. Water temperatures are of a concern in this reach and can reach upwards of 20° C (68° F) during the summer season.

**Habitat Security:** Landownership in lower Hoover Creek is comprised almost entirely of private lands. The primary land uses in the area are timber harvest and livestock grazing. Additionally, the lower portion of the reach flows through a large irrigated pasture/hay meadow. The nature of the ownership and land use makes habitat security a concern in lower Hoover Creek.

**DRAINAGE:** Hoover Creek

**STREAM:** Hoover Creek

**REACH:** Upper – Miller Lake Dam to Headwaters

### **Value as a Recruitment/Restoration Fishery for the Clark Fork River:**

**Species Present:** Westslope Cutthroat Trout and Brook Trout

**Fish Density/Number of Fish Produced:** Based on 2008 electrofishing in two segments of upper Hoover Creek, westslope cutthroat trout persist at relatively low density, but are most common in the upper reaches. Brook trout are fairly common in the lower part of the section above Miller Lake, but the species occurs only rarely in the upper reaches.

**Recruitment to and Connectivity with the Clark Fork River:** Upper Hoover Creek is poorly connected to the Clark Fork River. Several physical barriers including the Miller Lake dam are present below the reach that prevents any notable upstream migration of fish from the Clark Fork River. This reach likely provides little to no recruitment to the Clark Fork River.

**Current Value:** Low

**Protection and Enhancement Value:** Low

### **Value as a Tributary/Replacement Fishery:**

**Recreational Species Present:** Westslope Cutthroat Trout and Brook Trout

**Fish Density:** Based on 2008 electrofishing in two segments of upper Hoover Creek, westslope cutthroat trout persist at relatively low density, but are most common in the upper reaches. Brook trout are fairly common in the lower part of the section above Miller Lake, but the species occurs only rarely in the upper reaches.

**Fish Size:** Fish tend to be relatively small in this reach of Hoover Creek, with few fish being of catchable size. Westslope cutthroat trout and brook trout averaged just under 4 and 5 inches in total length, respectively. The largest cutthroat trout handled during 2008 electrofishing was a little over 6 inches in total length, while the largest brook trout measured was approximately 9 inches.

**Recruitment to non Clark Fork River Fishery:** N/A - Hoover Creek is a direct tributary to the Clark Fork River.

**Current Value:** Low

**Protection and Enhancement Value:** Low

### **Value as a Native Fishery:**

**Native Species Present:** Westslope Cutthroat Trout.

Genetic tests conducted in 1990 indicate that this population is hybridized with rainbow trout. Genetic purity was reported at 88.2%.

**Competitor and/or Hybridizing Species Present:** Brook Trout.

Brook trout are relatively common in upper Hoover Creek, and are sympatric with westslope cutthroat trout throughout the stream segment. Brook trout likely compete with westslope cutthroat trout, especially in the lower portion of the reach where they tend to be more abundant.

**Demographics and Connectivity:** Based on 2008 sampling, westslope cutthroat trout density is relatively low in upper Hoover Creek. Despite several different age classes being observed, there is some concern that this population may not have long-term viability. The small population size and limited number of spawning adults could pose a potential threat to viability due to possible effects of inbreeding depression, etc. This could be exacerbated by the apparent lack of connectivity with other populations.

Upper Hoover Creek appears to be relatively isolated from the Clark Fork River as well as lower Hoover Creek. The dam at Miller Lake appears to be a probable migration obstacle, as are numerous other man-made barriers downstream (see discussion from Lower Hoover Creek for more information).

***Current Value:*** Low

***Protection and Enhancement Value:*** Low

**Habitat Description:**

**Habitat Quality:** Fish habitat was evaluated at two locations in upper Hoover Creek during 2008. Habitat quality was rated from fair to good within the survey segments. Assessment scores were most affected by a general lack of woody debris and rootwads in the channel above Miller Lake, while in the upper extent of the reach, a lack of pools and notable fine sediment accumulation was evident.

**Habitat Security:** Landownership along upper Hoover Creek is comprised entirely of private lands. The primary land uses in the area are timber harvest and livestock grazing. The nature of the ownership and land use makes habitat security somewhat of a concern in upper Hoover Creek.

**DRAINAGE:** Little Blackfoot River

**STREAM:** Hurd Creek

**REACH:** All

### **Value as a Recruitment/Restoration Fishery for the Clark Fork River:**

**Species Present:** Westslope Cutthroat Trout and Brook Trout

**Fish Density/Number of Fish Produced:** Based on 2008 sampling, trout density is low throughout Hurd Creek. Both westslope cutthroat trout and brook trout are present in the stream, though brook trout only occur in the lower reaches.

**Recruitment to and Connectivity with the Clark Fork River:** Hurd Creek is a small tributary to the Little Blackfoot River. However, the stream is not likely a significant source of recruitment for either westslope cutthroat trout or brook trout based on the low densities of fish in the stream. Additionally, surface flow connection to downstream waters (i.e. the Little Blackfoot and Clark Fork Rivers) appears poor (at least during summer), as the stream is captured by an irrigation diversion located near its mouth along Highway 12. Furthermore, a small 1.5-acre in-stream pond is present near river mile 0.2. Although the dam of this impoundment has not been thoroughly evaluated, it likely limits upstream, and possibly downstream, fish movement.

**Current Value:** Low

**Protection and Enhancement Value:** Low

### **Value as a Tributary/Replacement Fishery:**

**Recreational Species Present:** Westslope Cutthroat Trout and Brook Trout

**Fish Density:** Based on 2008 sampling, trout density is low throughout Hurd Creek. Both westslope cutthroat trout and brook trout are present in the stream, though brook trout only occur in the lower reaches.

**Fish Size:** Based on 2008 electrofishing at two sample sites, trout in Hurd Creek do not typically attain very large size. While fish of catchable size are present, they tend to be rather uncommon. Most of the fish (both species) captured in Hurd Creek in 2008 were small juveniles under 4 inches in length. The largest fish observed was a westslope cutthroat trout that was a little less than 8 inches in total length.

**Recruitment to non Clark Fork River Fishery:** Hurd Creek is a small tributary to the Little Blackfoot River. However, the stream is not likely a significant source of recruitment for either westslope cutthroat trout or brook trout based on the low densities of fish in the stream. Additionally, surface flow connection to the Little Blackfoot River appears poor (at least during summer) as the stream is captured by an irrigation diversion located near its mouth along Highway 12. Furthermore, a small 1.5-acre in-stream pond

is present near river mile 0.2. Although the dam of this impoundment has not been thoroughly evaluated, it likely limits upstream, and possibly downstream, fish movement.

***Current Value: Low***

***Protection and Enhancement Value: Low***

**Value as a Native Fishery:**

**Native Species Present:** Westslope Cutthroat Trout

Genetic tests of westslope cutthroat trout collected from Hurd Creek in 2008 suggest that the population is genetically pure.

**Competitor and/or Hybridizing Species Present:** Brook Trout

Brook trout are present in Hurd Creek, but appear to be in relatively low densities and primarily in the lower extent of the drainage. Nevertheless, brook trout likely compete with westslope cutthroat trout in Hurd Creek, and the species poses a risk to the long-term viability of the westslope cutthroat trout population in the stream.

**Demographics and Connectivity:** Based on 2008 electrofishing, westslope cutthroat trout are present in rather low densities throughout most of Hurd Creek. Additionally, most of the fish tend to be small. It appears that the majority of the population is comprised of immature, juvenile fish. Larger fish of resident adult size (i.e. > 6 inches total length) are rare. The small population size and limited number of spawning adults could pose a potential threat to viability due to possible effects of inbreeding depression, etc. This could be exacerbated by the limited connectivity with other populations.

Hurd Creek is a small tributary to the Little Blackfoot River. However, the stream no longer appears to be well connected. Surface flow is captured by an irrigation diversion located near its mouth, and a small 1.5-acre in-stream pond is present near river mile 0.2. Although the dam of the impoundment has not been thoroughly evaluated, it likely limits upstream, and possibly downstream, fish movement. It is likely that fish with a resident life history maintain the westslope cutthroat trout population in Hurd Creek.

***Current Value: Medium***

***Protection and Enhancement Value: High***

**Habitat Description:**

**Habitat Quality:** Habitat quality and riparian condition along most of Hurd Creek is considered fair. Much of the stream flows through private lands used primarily for livestock grazing and timber harvest. Portions of the stream show impacts from unrestricted livestock presence in the riparian zone. Woody riparian vegetation along the channel is somewhat patchy, and the lack of woody vegetation in some areas of the

stream has reduced stream shading and habitat complexity, as well as increased sedimentation by making the streambanks more susceptible to erosion. Fish habitat in Hurd Creek is most limited by a lack of deep pools, and notable fine sediment accumulation in the lower reaches of the stream.

**Habitat Security:** Land ownership along Hurd Creek consists primarily of lands in private ownership, with only one mile of the channel flowing though public land (National Forest) in the upper extent of the watershed. The primary land uses in the drainage are widespread livestock grazing and timber harvest. The nature of the ownership and land use makes habitat security in Hurd Creek a concern.

**DRAINAGE:** Boulder Creek

**STREAM:** Little Gold Creek

**REACH:** Entire stream

### **Value as a Recruitment/Restoration Fishery for the Clark Fork River:**

**Species Present:** Westslope Cutthroat Trout

**Fish Density/Number of Fish Produced:** Westslope cutthroat trout densities were moderate in the lower portion of the drainage (RM 0.8), but no westslope cutthroat trout were captured in the upper portion of the drainage.

**Recruitment to and Connectivity with the Clark Fork River:** Some westslope cutthroat trout potentially out-migrate from Little Gold Creek to the Upper Clark Fork River, although Little Gold Creek is likely not a major source of recruitment to the Clark Fork River. Connectivity between Little Gold Creek and the Upper Clark Fork is questionable due to periods of dewatering during hydropower generation (see habitat description).

*Current Value: Low*

*Protection and Enhancement Value: Low*

### **Value as a Tributary/Replacement Fishery:**

**Recreational Species Present:** Westslope Cutthroat Trout

**Fish Density:** Westslope cutthroat trout densities were moderate in the lower portion of the drainage (RM 0.8), but no westslope cutthroat trout were captured in the upper portion of the drainage.

**Fish Size:** Westslope cutthroat trout in the Little Gold Creek drainage averaged 6" in length and reached a maximum length of 8".

**Recruitment to non Clark Fork River Fishery:** Little Gold Creek does provide a small number of westslope cutthroat trout that could out-migrate and be recruited into the mainstem Flint Creek fishery. However, electrofishing surveys in Flint Creek indicate that westslope cutthroat trout do not represent a significant portion of the recreational fishery. Westslope cutthroat trout from Little Gold Creek likely do provide recruitment to the mainstem Boulder Creek fishery which does receive some angling pressure.

*Current Value: Low*

*Protection and Enhancement Value: Low*

### **Value as a Native Fishery:**

**Native Species Present:** Westslope cutthroat trout are the only trout species present in the Little Gold Creek drainage. Genetic analyses were completed on this population to assess its genetic purity in 2007 and the results indicated that Little Gold Creek maintains a pure westslope cutthroat trout population.

**Competitor and/or Hybridizing Species Present:** No non-native fish were captured in Little Gold Creek, although non-native brook and brown trout are present in the Boulder Creek drainage and could potentially invade Little Gold Creek.

**Demographics and Connectivity:** Westslope cutthroat trout are moderately abundant in the lower portion of the Little Gold Creek drainage but are not present in the upper portion of the drainage, suggesting that this population is relatively small. Connectivity between Little Gold Creek and other tributaries is fair to poor due to dewatering in the lower portion of the drainage caused by the small hydropower project operated in the drainage (see habitat description). This dewatering would allow for minimal genetic exchange with other populations and overall brings into question the viability of this population.

***Current Value: Medium***

***Protection and Enhancement Value: Medium***

### **Habitat Description:**

**Habitat Quality:** Habitat quality was found to be excellent at all sites surveyed in 2007. In the lower portion of the drainage, a significant amount of Little Gold Creek is diverted into a penstock that delivers the water to a small hydroelectric project located adjacent to Boulder Creek downstream of the mouth of Little Gold Creek. During 2007 (the year these surveys were completed) the hydroelectric plant was not in operation, so the extent of the dewatering is not known, but is likely significant.

**Habitat Security:** The entire Little Gold Creek drainage is located within National Forest lands, other than a few small mining claims. Thus, security in the drainage is relatively high. The presence of the small hydropower project in the drainage is a significant threat, particularly to the westslope cutthroat trout in the lower portion of the drainage.

**DRAINAGE:** Rock Creek  
**STREAM:** Little Stony Creek  
**REACH:** Entire stream

### **Value as a Recruitment/Restoration Fishery for the Clark Fork River:**

**Species Present:** Westslope Cutthroat Trout

**Fish Density/Number of Fish Produced:** Westslope cutthroat trout densities were low in the one electrofishing section sampled on Little Stony Creek.

**Recruitment to and Connectivity with the Clark Fork River:** Little Stony Creek provides only low densities of westslope cutthroat trout that could out-migrate and be recruited into the Clark Fork River fishery and thus is likely not a major source of recruitment to the Clark Fork River. Connectivity between Little Stony Creek and the Clark Fork River via Rock Creek is excellent for both up- and downstream migrants.

**Current Value:** Low

**Protection and Enhancement Value:** Low

### **Value as a Tributary/Replacement Fishery:**

**Recreational Species Present:** Westslope Cutthroat Trout

**Fish Density:** Westslope cutthroat trout densities were low in the one electrofishing section sampled on Little Stony Creek.

**Fish Size:** Westslope cutthroat trout averaged 3" in Little Stony Creek and reached a maximum length of 4".

**Recruitment to non Clark Fork River Fishery:** Little Stony Creek does provide low numbers of westslope cutthroat trout that could out-migrate and be recruited into the mainstem Rock Creek fishery. However, due to the relatively small size of the drainage, it is unlikely that Little Stony Creek is a major source of recruitment to Rock Creek.

**Current Value:** Medium

**Protection and Enhancement Value:** Medium

### **Value as a Native Fishery:**

**Native Species Present:** Both bull and westslope cutthroat trout are present in Little Stony Creek. No genetic analyses have been completed for westslope cutthroat trout in Little Stony Creek although some hybridization may have occurred in the drainage due to its connectivity with Stony Creek and mainstem Rock Creek.

**Competitor and/or Hybridizing Species Present:** No non-native fish were captured in Little Stony Creek, although non-native brown trout are present in the Stony Creek drainage and could potentially invade Little Stony Creek.

**Demographics and Connectivity:** Electrofishing surveys in Little Stony Creek found that bull trout maintain moderate densities in the lower portion of the drainage. Bull trout redd counts in Little Stony Creek indicate that minimal spawning is occurring in the drainage with 0-1 redds observed each year from 2006-2008, although more redds were observed in prior years. While redd counts are only completed in index reaches and do not reflect all spawning that is occurring in a drainage, these results still bring into question the long-term viability of this population. The presence of several other bull trout populations in the middle and upper Rock Creek drainage provide possible sources of fish to maintain genetic variation within the Little Stony Creek population or to re-found the population should it be lost. The connectivity between this population and other neighboring bull trout populations (i.e. Stony Creek, Middle Fork Rock Creek, etc...) via Rock Creek is excellent.

Westslope cutthroat trout maintain low densities in the Little Stony Creek drainage although only one electrofishing section was completed. Thus, the overall health of the Little Stony Creek westslope cutthroat trout population is difficult to discern with the current data set. Connectivity between Stony Creek and other westslope cutthroat trout populations in the middle and upper Rock Creek drainage is quite good which allows for genetic exchange with other populations and potentially re-founding of the population should it be lost.

**Current Value:** High

**Protection and Enhancement Value:** High (*entire drainage in Forest Service ownership*)

### **Habitat Description:**

**Habitat Quality:** Habitat quality in the Little Stony Creek drainage was found to be excellent at the one site surveyed with minimal habitat degradation being observed.

**Habitat Security:** The Little Stony Creek drainage is located entirely within lands administered by the Beaverhead-Deerlodge National Forest and thus is quite secure from future land use changes.

**DRAINAGE:** Lost Creek

**STREAM:** Lost Creek

**REACH:** Middle – Gardiner Ditch Intersection to Waterfall in Lost Creek State Park

### **Value as a Recruitment/Restoration Fishery for the Clark Fork River:**

**Species Present:** Brook Trout, Westslope Cutthroat Trout, and Brown Trout

**Fish Density/Number of Fish Produced:** Based on limited electrofishing conducted in 2008, trout density is moderately low in middle Lost Creek. Brook trout appear to comprise the bulk of the fish community, with westslope cutthroat trout and brown trout also present, but in lesser densities.

**Recruitment to and Connectivity with the Clark Fork River:** Lost Creek is a direct tributary to the Clark Fork River. However, middle Lost Creek is unlikely to be a major source of trout for the Clark Fork. First of all, fish density is moderately low throughout reach. Secondly, much of the fish density appears to be comprised of brook trout, a species that typically does not exhibit significant migratory tendencies. And finally, numerous irrigation diversions (e.g. Gardiner Ditch, Dutchman Pond, etc.) diminish the connectivity of the reach with the Clark Fork River.

**Current Value:** Low

**Protection and Enhancement Value:** Medium

### **Value as a Tributary/Replacement Fishery:**

**Recreational Species Present:** Brook Trout, Westslope Cutthroat Trout, and Brown Trout

**Fish Density:** Based on limited electrofishing conducted in 2008, trout density is moderately low in middle Lost Creek. Brook trout appear to comprise the bulk of the fish community, with westslope cutthroat trout and brown trout also present, but in lesser densities.

**Fish Size:** Based on electrofishing conducted in 2008, fish of catchable size make up a fair proportion of the fish present in middle Lost Creek. At the one site that was sampled in the reach, both brook trout and westslope cutthroat trout had an average length of about 5 inches. The largest brook trout captured during our sampling was 9 inches in total length, whereas the largest westslope cutthroat trout was about 8 inches in total length. Brown trout in the reach had an average length of a little less than 9 inches, with the largest fish measured being a little over 15 inches.

**Recruitment to non Clark Fork River Fishery:** N/A – Lost Creek is a direct tributary to the Clark Fork River.

**Current Value:** Medium

**Protection and Enhancement Value:** Medium

**Value as a Native Fishery:**

**Native Species Present:** Westslope Cutthroat Trout

Genetic testing conducted in 1991 suggests that the westslope cutthroat trout population in middle Lost Creek is slightly hybridized with rainbow trout. The genetic purity was assigned at 99%.

**Competitor and/or Hybridizing Species Present:** Brook Trout and Brown Trout

Both brook trout and brown trout are relatively common in middle Lost Creek. Each of these species likely exerts a fairly significant competitive pressure on westslope cutthroat trout in the reach.

**Demographics and Connectivity:** Based on limited electrofishing conducted in 2008, westslope cutthroat trout are present in relatively low densities in middle Lost Creek. While several different age classes of fish were observed during our sampling, gaps in the size structure of the population may be indicative of marginal or variable recruitment. The largest westslope cutthroat trout handled during our sampling was about 8 inches in total length.

Middle Lost Creek appears to be fairly isolated from the lower reaches of Lost Creek as well as the Clark Fork River. The Gardiner diversion at the bottom of the reach (as well as other downstream diversions) is a barrier that prevents potential migratory fish from returning to the reach to spawn. Therefore, it is likely that fish with a resident life history maintain the westslope cutthroat trout population in middle Lost Creek. However, it is also possible that fish from neighboring Warm Springs Creek that are entrained in the Gardiner Ditch could supplement the population. Nevertheless, the long-term viability of this population could be of concern given the relatively low densities of fish and associated risks of isolation (i.e. inbreeding depression, local extinction, etc.).

**Current Value:** Medium

**Protection and Enhancement Value:** Medium

**Habitat Description:**

**Habitat Quality:** Habitat quality in middle Lost Creek is considered fair, despite much of the riparian area being in relatively good condition. The primary land use in this part of the drainage is rural residential development, although irrigated hay/pasture production and livestock grazing are also present in the reach. While residential development and livestock grazing have affected stream and riparian health in a few locations, the primary impact to habitat quality in this reach is summer irrigation withdrawal. Several irrigation diversions throughout the reach capture much of the flow during late summer, severely

dewatering the lower portion of the channel. The upper portion of middle Lost Creek flows through Lost Creek State Park managed by Montana Fish, Wildlife, and Parks. Habitat quality and riparian condition tends to be fairly good throughout this area.

**Habitat Security:** Much of middle Lost Creek flows through private lands used for residential and agricultural purposes. Factors present in the reach that could affect habitat security are irrigation withdrawal, residential development, and livestock grazing in the riparian zone. The nature of the ownership and land use makes habitat security a concern throughout much of the reach.

**DRAINAGE:** Lost Creek

**STREAM:** Lost Creek

**REACH:** Upper –Waterfall in Lost Creek State Park to Headwaters

### **Value as a Recruitment/Restoration Fishery for the Clark Fork River:**

**Species Present:** Brook Trout and Westslope Cutthroat Trout

**Fish Density/Number of Fish Produced:** Based on limited electrofishing conducted in 2008, trout density is relatively low in upper Lost Creek. Brook trout appear to comprise all of the fish community in the lower portion of the reach, while westslope cutthroat trout appear to make up all of the species composition in the upper portion of the reach. A steep cascade near river mile 18.9 appears to divide the two species.

**Recruitment to and Connectivity with the Clark Fork River:** Lost Creek is a direct tributary to the Clark Fork River. However, upper Lost Creek is unlikely to be a significant source of trout for the Clark Fork. First of all, fish density is fairly low throughout reach. Secondly, much of the fish density is comprised of brook trout, a species that typically does not exhibit significant migratory tendencies. And finally, numerous irrigation diversions as well as a natural waterfall diminish the connectivity of the reach with the Clark Fork River.

**Current Value:** Low

**Protection and Enhancement Value:** Low

### **Value as a Tributary/Replacement Fishery:**

**Recreational Species Present:** Brook Trout and Westslope Cutthroat Trout

**Fish Density:** Based on limited electrofishing conducted in 2008, trout density is relatively low in upper Lost Creek. Brook trout appear to comprise all of the fish community in the lower portion of the reach, while westslope cutthroat trout appear to make up all of the species composition in the upper portion of the reach. A steep cascade near river mile 18.9 appears to divide the two species.

**Fish Size:** Fish in upper Lost Creek do not typically attain very large size, although fish of catchable length are present. At the sites electrofished in the drainage in 2008, brook averaged about 5 inches in length, with the largest fish being about 9 inches. Westslope cutthroat trout had an average length of approximately 6.5 inches, with the largest measured during our sampling being about 10 inches.

**Recruitment to non Clark Fork River Fishery:** N/A – Lost Creek is a direct tributary to the Clark Fork River.

**Current Value:** Low

**Protection and Enhancement Value: Low**

**Value as a Native Fishery:**

**Native Species Present:** Westslope Cutthroat Trout

Limited genetic testing conducted in 2008 suggests that the westslope cutthroat trout population in upper Lost Creek is significantly hybridized with Yellowstone cutthroat trout. The genetic purity was assigned at 51%.

**Competitor and/or Hybridizing Species Present:** Brook Trout

Brook trout are fairly common in the lower extent upper Lost Creek, but do not appear to occur above a cascade located near river mile 18.9. However, where the species is present, it likely exerts a fairly heavy competitive pressure on westslope cutthroat trout.

**Demographics and Connectivity:** Based on limited electrofishing conducted in 2008, westslope cutthroat trout are present in low densities in upper Lost Creek. Furthermore, the species appears to be relatively isolated to the upper extent of the reach (above a steep cascade near river mile 18.9). The size distribution of the fish measured during our sampling was relatively concerning as the majority of the fish appeared to be large enough to be resident adults (i.e. > 6 inches total length). Juveniles were relatively uncommon, suggesting that reproductive success and recruitment may be limited.

Upper Lost Creek is effectively isolated from downstream waters. A natural waterfall that limits any upstream fish passage is present near river mile 17.6. Therefore, fish with a resident life history maintain the westslope cutthroat trout population in upper Lost Creek. The long-term viability of this population could be of concern given the low population size and associated risks of isolation (i.e. inbreeding depression, local extinction, etc.).

**Current Value:** Low

**Protection and Enhancement Value:** Low

**Habitat Description:**

**Habitat Quality:** Habitat quality and riparian condition in upper Lost Creek is good. The primary land use in this portion of the watershed is non-motorized recreation on public land. Summer base flows are good throughout this portion of the drainage.

**Habitat Security:** Landownership along upper Lost Creek is comprised entirely of public lands administered by Montana Fish, Wildlife and Parks and the U.S. Forest Service. Habitat security is likely to be good throughout the reach.

**DRAINAGE:** Flint Creek

**STREAM:** Lower Willow Creek

**REACH:** Entire stream

### **Value as a Recruitment/Restoration Fishery for the Clark Fork River:**

**Species Present:** Westslope cutthroat trout, Brown Trout, and brook trout

**Fish Density/Number of Fish Produced:** Electrofishing data was collected in two sections of Lower Willow Creek in 2007 and each showed relatively different results in terms of fish densities. The upper section (located at RM 8.1) maintained very high densities of westslope cutthroat trout and low densities of brown trout. This section was located above the first major irrigation diversion, which appears to significantly impact in-stream flows. In contrast, the lower section (RM 3.2) maintained very low densities of both westslope cutthroat trout and brook trout with a total of only one of each species captured.

**Recruitment to and Connectivity with the Clark Fork River:** Lower Willow Creek is a direct tributary to lower Flint Creek and is a relatively large stream. Thus, it has the potential to provide significant recruitment to the Clark Fork River, however due to the low densities of fish in the drainage; it is likely not a major source of recruitment. Brown trout and brook trout maintain very low densities in the drainage and westslope cutthroat trout densities are low throughout most of the drainage. The reach in the upper portion of the drainage that maintains high westslope cutthroat trout densities may provide some recruitment to the Clark Fork River.

**Current Value:** Low

**Protection and Enhancement Value:** Low

### **Value as a Tributary/Replacement Fishery:**

**Recreational Species Present:** Westslope cutthroat trout, Brown Trout, and brook trout

**Fish Density:** Electrofishing data was collected in two sections of Lower Willow Creek in 2007 and each showed relatively different results in terms of fish densities. The upper section (located at RM 8.1) maintained very high densities of westslope cutthroat trout and low densities of brown trout. This section was located above the first major irrigation diversion, which appears to significantly impact in-stream flows. In contrast, the lower section (RM 3.2) maintained very low densities of both westslope cutthroat trout and brook trout with a total of only one of each species captured.

**Fish Size:** Westslope cutthroat trout in the upper reach averaged approximately. 5" with individuals captured up to 12" in length. Brown trout in the upper reach were relatively large with the two fish captured measuring 13" and 15". The one westslope cutthroat trout captured in the lower section was 10" in length while the one brook trout captured was 12".

**Recruitment to non Clark Fork River Fishery:** Lower Willow Creek is a direct tributary to Flint Creek and is a relatively large stream. Thus, it has the potential to provide significant recruitment, however due to the low densities of fish in the drainage, it is unlikely a source of recruitment to Flint Creek. Brown trout and brook trout maintain very low densities in the drainage and westslope cutthroat densities are only high in the upper portion of the drainage (directly below the dam). Electrofishing surveys completed in mainstem Flint Creek indicate that it maintains very low densities of westslope cutthroat trout and thus the high densities of westslope cutthroat trout found in the upper portion of Lower Willow Creek likely do not represent a significant recruitment source for Flint Creek.

***Current Value:*** Low

***Protection and Enhancement Value:*** Medium

**Value as a Native Fishery:**

**Native Species Present:** Westslope cutthroat trout are the only native trout present in the Lower Willow Creek drainage and it is suspected that at least a portion of this population is hybridized due to its connectivity with Flint Creek and the upper Clark Fork River.

**Competitor and/or Hybridizing Species Present:** Brown and brook trout are present in the drainage although these species maintain very low densities. Thus, they do not appear to be a significant source of competition for native westslope cutthroat trout.

**Demographics and Connectivity:** The presence of large numbers of westslope cutthroat trout in the upper portion of Lower Willow Creek suggests that at least this portion of the drainage may maintain a viable population of westslope cutthroat trout. However, a significant number of these westslope cutthroat trout may also be fish that were entrained through Lower Willow Dam that are simply occupying the best habitat in the drainage. An excellent population of westslope cutthroat trout is present in Lower Willow Reservoir and its tributaries (i.e. South Fork Lower Willow Creek, North Fork Lower Willow Creek, etc...). The dam represents a complete barrier to upstream migration and no other reaches (other than the reach directly below the dam) or tributaries to the Lower Willow Creek provide adequate spawning habitat for westslope cutthroat trout. Thus, the viability of this population is questionable.

***Current Value:*** Low

***Protection and Enhancement Value:*** Low

**Habitat Description:**

**Habitat Quality:** Habitat quality in the Lower Willow drainage rates quite low due to extensive land use in the drainage. Dewatering due to irrigation withdrawal is chronic in Lower Willow Creek and significantly impacts fish habitat in the drainage. Riparian grazing was also observed throughout the drainage, which caused a significant reduction

in woody riparian vegetation, channel over-widening and reduced stream shading. The upper electrofishing section maintained relatively high densities of fish, but this reach was located above the upstream most diversion and thus did not suffer from the dewatering observed downstream.

**Habitat Security:** Lower Willow Creek flows nearly entirely through private agricultural land and could potentially undergo future changes in land and water use that could further degrade habitat in this drainage. Thus, habitat security is rated low for Lower Willow Creek.

**DRAINAGE:** Flint Creek  
**STREAM:** Marshall Creek  
**REACH:** Entire stream

### **Value as a Recruitment/Restoration Fishery for the Clark Fork River:**

**Species Present:** Westslope Cutthroat Trout, brook trout

**Fish Density/Number of Fish Produced:** Two electrofishing sections were completed on Marshall Creek in 2008. Westslope cutthroat trout densities were relatively low in the lower section and moderate in the upper section. Brook trout were only captured in the lower section and their densities were very high.

**Recruitment to and Connectivity with the Clark Fork River:** Marshall Creek maintains moderate to low densities of westslope cutthroat trout and some of these fish may out-migrate to the Clark Fork River. Marshall Creek is a relatively small drainage however and is likely not a significant source of recruitment to the Clark Fork River.

**Current Value:** Low

**Protection and Enhancement Value:** Low

### **Value as a Tributary/Replacement Fishery:**

**Recreational Species Present:** Westslope cutthroat trout, brook trout

**Fish Density:** Two electrofishing sections were completed on Marshall Creek in 2008. Westslope cutthroat trout densities were relatively low in the lower section and moderate in the upper section. Brook trout were only captured in the lower section and their densities were very high.

**Fish Size:** Westslope cutthroat trout captured in the lower section averaged 5" and reached a maximum length of 8.5" while westslope cutthroat trout in the upper section averaged 3.5" and reached a maximum length of 6.5". Brook trout captured in the lower section averaged 3.5" and reached a maximum length of 8.5".

**Recruitment to non Clark Fork River Fishery:** Marshall Creek maintains moderate to low densities of westslope cutthroat trout and some of these fish may out-migrate to Flint Creek. Marshall Creek is a relatively small drainage and is likely not a significant source of recruitment to Flint Creek. Electrofishing surveys in Flint Creek indicate that westslope cutthroat trout do not represent a significant portion of that recreational fishery, thus recruitment of westslope cutthroat trout from tributaries such as Marshall Creek is not essential to maintaining the Flint Creek fishery.

**Current Value:** Low

**Protection and Enhancement Value:** Low

### **Value as a Native Fishery:**

**Native Species Present:** Westslope cutthroat trout are the only native salmonid present in Marshall Creek. No genetic analyses have been completed in the Marshall Creek drainage, but it is expected that this population is at least slightly introgressed with rainbow trout based genetic testing completed in South Fork Marshall Creek.

**Competitor and/or Hybridizing Species Present:** Brook trout are the only non-native salmonid sampled in the Marshall Creek drainage. Brook trout maintain very high densities in the lower portion of Marshall Creek and are likely a competitor with westslope cutthroat trout.

**Demographics and Connectivity:** Westslope cutthroat trout maintain moderate to low densities in Marshall Creek and appear to be distributed throughout much of the drainage, suggesting that this population is relatively stable. Connectivity between Marshall Creek and other westslope cutthroat trout populations in the Flint Creek drainage is fair as some migratory individuals appear to still exist in Flint Creek, but are not abundant. This connectivity may allow for genetic exchange with other populations and potentially re-founding of the Marshall Creek population should it be lost.

***Current Value:*** Medium

***Protection and Enhancement Value:*** Medium

### **Habitat Description:**

**Habitat Quality:** Significant habitat degradation was observed at the lower survey site on Marshall Creek and this degradation appeared to be caused by riparian grazing in the reach and its affect on woody riparian vegetation. Similar grazing impacts were observed at the upper survey site although the impacts were not as severe as observed at the lower site. Lower Marshall Creek was not surveyed, but it appears that several irrigation diversions exist in the lower portion of the drainage to flood irrigate pastureland and hay crops. Habitat quality is considered fair in the Marshall Creek drainage.

**Habitat Security:** A majority of Marshall Creek flows through private lands and is susceptible to future changes in land and water uses that could significantly degrade habitat in this drainage. The upper portion of the drainage flows through lands administered by the Beaverhead-Deerlodge National Forest and is quite secure.

**DRAINAGE:** East Fork Rock Creek

**STREAM:** Meadow Creek

**REACH:** Entire stream

### **Value as a Recruitment/Restoration Fishery for the Clark Fork River:**

**Species Present:** Westslope Cutthroat Trout, Brown Trout, and brook trout

**Fish Density/Number of Fish Produced:** Three electrofishing sections were completed in Meadow Creek in 2007 and 2008. Westslope cutthroat trout densities were moderate in the upper two electrofishing sections; however no westslope cutthroat trout were captured in the lower electrofishing section (RM 0.3). Brook trout were captured in all three electrofishing sections and maintained moderate densities in the lower two sections and low densities in the upper section. Brown trout were only captured in the lower two electrofishing sections and maintained low densities in both sections.

**Recruitment to and Connectivity with the Clark Fork River:** Due to the small size of Meadow Creek and the location of the drainage near the headwaters of Rock Creek, many river miles from the Clark Fork River, it is unlikely that this stream serves as a major source of recruitment to the Clark Fork River. It is possible however that Meadow Creek does provide some westslope cutthroat and brown trout out-migrant to the Clark Fork River.

**Current Value:** Low

**Protection and Enhancement Value:** Low

### **Value as a Tributary/Replacement Fishery:**

**Recreational Species Present:** Westslope Cutthroat Trout, Brown Trout, and brook trout

**Fish Density:** Three electrofishing sections were completed in Meadow Creek in 2007 and 2008. Westslope cutthroat trout densities were moderate in the upper two electrofishing sections; however no westslope cutthroat trout were captured in the lower electrofishing section (RM 0.3). Brook trout were captured in all three electrofishing sections and maintained moderate densities in the lower two sections and low densities in the upper section. Brown trout were only captured in the lower two electrofishing sections and maintained low densities in both sections.

**Fish Size:** Westslope cutthroat trout in the upper electrofishing section averaged 5" and reached a maximum length of 11" while westslope cutthroat trout in the middle reach averaged 9.5" and reached lengths of nearly 12". Brook trout sizes generally increased from upstream to downstream with brook trout in the upper section averaging approximately 4" and reaching a max length of 7.5" while brook trout at the lower section (RM0.3) averaging 6" and reaching a maximum length of 11". Brown trout generally averaged 5.5" and reached a maximum length of 10".

**Recruitment to non Clark Fork River Fishery:** Meadow Creek does provide a moderate number of westslope cutthroat trout and small number of brown trout that could out-migrate and be recruited into the mainstem Rock Creek fishery. However, due to the relatively small size of the drainage, it is unlikely that Meadow Creek is a major source of recruitment to Rock Creek.

***Current Value: Medium***

***Protection and Enhancement Value: Medium***

**Value as a Native Fishery:**

**Native Species Present:** Both bull and westslope cutthroat trout are present in the Meadow Creek drainage, although bull trout densities are quite low in the drainage with only three captured. No genetic analyses have been completed for westslope cutthroat trout in Meadow Creek although it is possible that some hybridization has occurred in the drainage due to its connectivity with mainstem Rock Creek.

**Competitor and/or Hybridizing Species Present:** Both brown and brook trout are present in the Meadow Creek drainage, although brown trout densities are relatively low and pose a threat primarily in the lower portion of the drainage. Brook trout densities are quite high throughout the drainage and likely represent a threat for competition with both bull and westslope cutthroat trout and a hybridization threat to bull trout. Two suspected bull/brook trout hybrids were sampled in 2008 and genetic analysis of these fish indicate that they were indeed hybrids.

**Demographics and Connectivity:** The viability of the Meadow Creek bull trout population is somewhat questionable based to the small number of fish captured and the presence of bull/brook trout hybrids. However, the presence of several other bull trout populations in the upper Rock Creek drainage (i.e. West Fork, Middle Fork, etc...) provide possible sources of fish to maintain genetic variation within this population or to re-found the population should it be lost.

Westslope cutthroat trout are moderately abundant in the Meadow Creek drainage and are found throughout most of the drainage (except for the lowest portion of the drainage), suggesting that this population is relatively strong. Connectivity between Meadow Creek and other westslope cutthroat trout populations in the upper Rock Creek drainage is quite good which allows for genetic exchange with other populations and potentially re-founding of the population should it be lost.

***Current Value: High***

***Protection and Enhancement Value: High***

**Habitat Description:**

**Habitat Quality:** Fish habitat in both the upper and lower reaches of Meadow Creek were somewhat degraded due riparian grazing. This degradation was more prevalent in the lower reach, likely due to the channel type being more sensitive to grazing impacts (E vs. B channel type). Habitat quality in the middle reach (RM 2.0) was found to be excellent and appeared to be experiencing minimal riparian grazing.

**Habitat Security:** A majority of the Meadow Creek drainage is located within the Beaverhead-Deerlodge National Forest lands, thus long-term security of this drainage is quite good. The lower one-mile of the drainage is located on private lands and thus could be subject to future changes in land and water use.

**DRAINAGE:** Rock Creek

**STREAM:** Meyers Creek

**REACH:** Entire stream

### **Value as a Recruitment/Restoration Fishery for the Clark Fork River:**

**Species Present:** Westslope Cutthroat Trout, brook trout

**Fish Density/Number of Fish Produced:** Westslope cutthroat trout densities were low in both electrofishing section sampled. Brook trout densities were moderate in the upper electrofishing section and low in the lower electrofishing section.

**Recruitment to and Connectivity with the Clark Fork River:** Due to the small size of Meyers Creek and the location of the drainage near the headwaters of Rock Creek, many river miles from the Clark Fork River, it is unlikely that this stream serves as a major source of recruitment to the Clark Fork River. It is possible however that Meyers Creek does provide some westslope cutthroat trout out-migrant to the Clark Fork River.

***Current Value:*** Low

***Protection and Enhancement Value:*** Low

### **Value as a Tributary/Replacement Fishery:**

**Recreational Species Present:** Westslope Cutthroat Trout, brook trout

**Fish Density:** Westslope cutthroat trout densities were low in both electrofishing section sampled. Brook trout densities were moderate in the upper electrofishing section and low in the lower electrofishing section.

**Fish Size:** Westslope cutthroat trout in the lower electrofishing section averaged 4" and reached a maximum length of 6" while westslope cutthroat trout in the upper section averaged 5" and reached a maximum length of 7". Brook trout in both electrofishing sections averaged 4" and reached a maximum length of 7".

**Recruitment to non Clark Fork River Fishery:** Meyers Creek does provide a small number of westslope cutthroat trout that could out-migrate and be recruited into the mainstem Rock Creek fishery. However, due to the relatively small size of the drainage and low densities of westslope cutthroat trout, it is unlikely that Meyers Creek is a major source of recruitment to Rock Creek.

***Current Value:*** Medium

***Protection and Enhancement Value:*** Medium

### **Value as a Native Fishery:**

**Native Species Present:** Both bull and westslope cutthroat trout are present in Meyers Creek. No genetic analyses have been completed for westslope cutthroat trout in Meyers Creek although it is possible that some hybridization may have occurred in the drainage due to its connectivity with mainstem Rock Creek.

**Competitor and/or Hybridizing Species Present:** Brook trout were the only non-native trout that were captured in the Meyers Creek drainage, but they were relatively abundant particularly in the upper portion of the drainage. Brook trout represent a competition threat for both bull and westslope cutthroat trout and a hybridization threat to bull trout.

**Demographics and Connectivity:** Electrofishing surveys in Meyers Creek indicate that bull trout maintain moderate to low densities in the drainage, although bull trout appear to be present throughout a good portion of the drainage. Based on these data, it appears that the Meyers Creek population is stable, although the long-term viability may be questionable. The presence of several other bull trout populations in the upper Rock Creek drainage provide possible sources of fish to maintain genetic variation within the Meyers Creek population or to re-found the population should it be lost. The connectivity between this population and other neighboring bull trout populations (i.e. West Fork Rock Creek, Middle Fork Rock Creek, etc...) via Rock Creek is excellent.

Westslope cutthroat trout densities are relatively low in the Meyers Creek drainage although they appear to be distributed throughout a large portion the drainage. This suggests that the population is stable, but the long-term viability may be questionable. Connectivity between Meyers Creek and other westslope cutthroat trout populations in the upper Rock Creek drainage is quite good which allows for genetic exchange with other populations and potentially re-founding of the population should it be lost.

***Current Value:*** High

***Protection and Enhancement Value:*** High (entire drainage in Forest Service ownership)

### **Habitat Description:**

**Habitat Quality:** Habitat quality in the Meyers Creek drainage was found to be excellent at the two sites surveyed with minimal habitat degradation being observed.

**Habitat Security:** The entire Meyers Creek drainage is located within lands administered by the Beaverhead-Deerlodge National Forest and thus is quite secure from future land use changes.

**DRAINAGE:** Flint Creek

**STREAM:** Middle Fork Douglas Creek

**REACH:** Entire stream

### **Value as a Recruitment/Restoration Fishery for the Clark Fork River:**

**Species Present:** Westslope Cutthroat Trout

**Fish Density/Number of Fish Produced:** One electrofishing section was completed in Middle Fork Douglas Creek in 2008. Westslope cutthroat trout densities were moderate to low in this section.

**Recruitment to and Connectivity with the Clark Fork River:** Middle Fork Douglas Creek maintains moderate to low densities of westslope cutthroat trout, a portion of which may out-migrate to the Clark Fork River. However, the historic dam on upper Douglas Creek prevents upstream fish passage, which would not allow out-migrant to return to upper Douglas Creek to spawn. Due to the small size of the drainage and presence of the dam, Middle Fork Douglas Creek is likely not a significant source of recruitment to the Clark Fork River.

***Current Value:*** Low

***Protection and Enhancement Value:*** Low

### **Value as a Tributary/Replacement Fishery:**

**Recreational Species Present:** Westslope Cutthroat Trout

**Fish Density:** One electrofishing section was completed in Middle Fork Douglas Creek in 2008. Westslope cutthroat trout densities were moderate to low in this section.

**Fish Size:** Westslope cutthroat trout captured in Middle Fork Douglas Creek averaged 5.5" and reached a maximum length of 7".

**Recruitment to non Clark Fork River Fishery:** Middle Fork Douglas Creek maintains moderate densities of westslope cutthroat trout, a portion of which may out-migrate to Flint Creek. However, the historic dam on upper Douglas Creek prevents upstream fish passage, which would not allow out-migrant to return to upper Douglas Creek to spawn.

***Current Value:*** Low

***Protection and Enhancement Value:*** Low

### **Value as a Native Fishery:**

**Native Species Present:** Westslope cutthroat trout are the only native trout present in Middle Fork Douglas Creek. Genetic analyses were completed for westslope cutthroat

trout in Middle Fork Douglas Creek in 1986 and alleles characteristic of only westslope cutthroat trout were detected, suggesting that this population is genetically pure.

**Competitor and/or Hybridizing Species Present:** No non-native fish were captured in Middle Fork Douglas Creek, although non-native brook trout are present in the Douglas Creek drainage and could potentially invade the Middle Fork Douglas Creek drainage.

**Demographics and Connectivity:** Westslope cutthroat trout densities are moderate to low in the Middle Fork Douglas Creek drainage, which suggests the population is stable. The only other westslope cutthroat trout population that this population is connected to is the upper Douglas Creek population. This lack of connectivity does not allow for genetic exchange with other populations or for other populations to re-found this population should it be lost. While this genetically pure population is protected from future invasion by rainbow trout or westslope cutthroat/rainbow trout hybrids, this lack of connectivity does create demographic risks to the population.

*Current Value: High*

*Protection and Enhancement Value: High*

### **Habitat Description:**

**Habitat Quality:** Habitat quality of Middle Fork Douglas Creek was assessed at one site in 2008 and some habitat degradation was observed due to riparian grazing, however habitat conditions at this site were still considered good.

**Habitat Security:** A majority of the Middle Fork Douglas Creek drainage is located within lands administered by the Beaverhead-Deerlodge National Forest and is quite secure. The middle portion of the drainage flows through a private parcel that could be subject to future changes in land and water use.

**DRAINAGE:** Little Blackfoot River

**STREAM:** Mike Renig Gulch

**REACH:** All

### **Value as a Recruitment/Restoration Fishery for the Clark Fork River:**

**Species Present:** Brook Trout and Westslope Cutthroat Trout

**Fish Density/Number of Fish Produced:** Based on 2008 electrofishing, brook trout occur in rather high densities throughout much of Mike Renig Gulch. While westslope cutthroat trout are also present throughout the drainage, the species tends to be at fairly low densities.

**Recruitment to and Connectivity with the Clark Fork River:** Mike Renig Gulch is a small tributary to the Little Blackfoot River. Surface connection to the river is poor and appears to be seasonal at best. While it is likely that the stream provides some limited recruitment of westslope cutthroat trout and brook trout to downstream waters, the overall contribution is likely to be low. Additionally, many of the fish in the stream are brook trout, which typically do not display significant migratory behavior. Therefore, the overall value of Mike Renig Gulch as a recruitment source for the Clark Fork River is questionable.

**Current Value:** Low

**Protection and Enhancement Value:** Low

### **Value as a Tributary/Replacement Fishery:**

**Recreational Species Present:** Brook Trout and Westslope Cutthroat Trout

**Fish Density:** Based on 2008 electrofishing, brook trout occur in rather high densities throughout much of Mike Renig Gulch. While westslope cutthroat trout are also present throughout the drainage, the species tends to be at fairly low densities.

**Fish Size:** Fish tend to be relatively small in Mike Renig Gulch, although fish of catchable size are present in fair numbers in portions of the drainage. Based on 2008 electrofishing at several sites, brook trout average about 4 inches in total length, while westslope cutthroat trout average between 5 to 6 inches in total length. Both species appear to reach a similar maximum size of about 9 inches.

**Recruitment to non Clark Fork River Fishery:** Mike Renig Gulch is a small tributary to the Little Blackfoot River. Surface connection to the river is poor and appears to be seasonal at best. While it is likely that the stream provides some limited recruitment of westslope cutthroat trout and brook trout to the Little Blackfoot River, the overall contribution is likely to be low. Additionally, many of the fish in the stream are brook trout, which typically do not display significant migratory behavior.

**Current Value:** Low

**Protection and Enhancement Value:** Low

**Value as a Native Fishery:**

**Native Species Present:** Westslope Cutthroat Trout

Limited genetic testing conducted in 1990 suggests that the westslope cutthroat trout population in Mike Renig Gulch is genetically pure.

**Competitor and/or Hybridizing Species Present:** Brook Trout

Brook trout are relatively common in Mike Renig Gulch, and are sympatric with westslope cutthroat trout throughout the stream. Brook trout likely exert a fairly heavy competitive pressure on the westslope cutthroat trout population in Mike Renig Gulch.

**Demographics and Connectivity:** Based on 2008 electrofishing, westslope cutthroat trout density is relatively low in Mike Renig Gulch. While multiple size classes of fish were observed at all of the sample sites, noticeable gaps in fish size at each location suggest that recruitment may be somewhat limited. Limited recruitment could affect the long-term viability of this population. This is especially of concern since Mike Renig Gulch appears to be fairly isolated from other populations.

Mike Renig Gulch is a small tributary to the Little Blackfoot River. However, surface connection to the river is poor and appears to be seasonal at best. It is likely that primarily fish with a resident life history maintain the westslope cutthroat trout population in the stream.

**Current Value:** Medium

**Protection and Enhancement Value:** Medium

**Enhancement Priority:** Medium

**Habitat Description:**

**Habitat Quality:** Habitat quality and riparian condition along Mike Renig Gulch is fair to good. A relatively healthy woody riparian community is present along much of the channel, and fish habitat is generally in decent condition. However, habitat quality is limited by low stream flow (natural and from irrigation withdrawal) and fine sediment accumulation in pools and gravels. Livestock grazing in the riparian area is evident throughout most of the drainage, but the impacts of this activity on habitat quality appear to be relatively light and site specific. Additional factors that have affected habitat quality to some extent in Mike Renig Gulch are widespread historic placer mining throughout the drainage, and past and recent timber harvest activities.

**Habitat Security:** Land ownership along Mike Renig Gulch is a mixture of private, State, and U.S. Forest Service controlled lands. The primary land uses in the drainage are widespread livestock grazing, timber harvest, and limited Forest recreation in the upper reaches of the stream. Several irrigation diversions are also present in the lower reaches of the stream, with each having the capacity to divert a fair amount of flow out of Mike Renig Gulch at certain times of the year. Additionally, historic mining activity is apparent throughout the drainage, and a privately owned mining claim encompasses the upper mile of the channel. The mixed nature of the ownership and rather diverse land use makes habitat security somewhat of a concern in much of Mike Renig Gulch. Habitat security is of greatest concern on private lands where changes in future ownership and/or land use could result in unforeseen impacts to stream and riparian habitat.

**DRAINAGE:** Mill Creek

**STREAM:** Mill Creek

**REACH:** Upper – Waterfall (River Mile 11.0) to Headwaters

### **Value as a Recruitment/Restoration Fishery for the Clark Fork River:**

**Species Present:** Westslope Cutthroat Trout

**Fish Density/Number of Fish Produced:** Based on limited electrofishing conducted in 2008, westslope cutthroat trout comprise the entire fish community in upper Mill Creek. At the one site sampled, fish were present in high density.

**Recruitment to and Connectivity with the Clark Fork River:** Mill Creek is a direct tributary to the Clark Fork River via the Mill-Willow Bypass. While it is likely that upper Mill Creek provides some westslope cutthroat trout recruitment to the Clark Fork River, the overall contribution may be low. Westslope cutthroat trout tend to be rather incidental in the upper Clark Fork River, and the rarity of these fish in downstream reaches suggests that the dispersal or survival of migratory individuals may be limited. Additionally, the presence of a waterfall at the bottom of the reach may also limit the recruitment potential of upper Mill Creek. This small waterfall, which is located near river mile 11.0, appears to be a barrier restricting upstream fish movement (e.g. fish returning to upper Mill Creek to spawn).

**Current Value:** Low

**Protection and Enhancement Value:** Low

### **Value as a Tributary/Replacement Fishery:**

**Recreational Species Present:** Westslope Cutthroat Trout

**Fish Density:** Based on limited electrofishing conducted in 2008, westslope cutthroat trout comprise the entire fish community in upper Mill Creek. At the one site sampled, fish were present in high density.

**Fish Size:** Westslope cutthroat trout in upper Mill Creek do not typically attain very large size, although fish of catchable length are present in fairly good numbers. At the one site sampled in the reach in 2008, westslope cutthroat trout had an average length of just over 5 inches, and ranged up to about 10 inches in total length.

**Recruitment to non Clark Fork River Fishery:** N/A – Mill Creek is a direct tributary to the Clark Fork River via the Mill-Willow Bypass.

**Current Value:** Medium

**Protection and Enhancement Value:** Medium

### **Value as a Native Fishery:**

**Native Species Present:** Westslope Cutthroat Trout

Genetic testing conducted in 2008 suggests that the westslope cutthroat trout population in upper Mill Creek is genetically pure.

**Competitor and/or Hybridizing Species Present:** None detected.

**Demographics and Connectivity:** Based on limited electrofishing conducted in 2008, westslope cutthroat trout comprise the entire fish community in upper Mill Creek. The high densities of fish as well as the multiple age classes that were observed in the one site sampled suggest the population is relatively strong. The largest westslope cutthroat trout measured in upper Mill Creek during 2008 sampling was about 10 inches in total length.

Upper Mill Creek is effectively isolated from downstream waters. A natural waterfall that limits any upstream fish passage is present near river mile 11.0. Therefore, fish with a resident life history maintain the westslope cutthroat trout population in upper Mill Creek. Despite relatively high densities of fish, the long-term viability of this population could be of concern given the associated risks of isolation (mostly from the risk of local extinction caused by a catastrophic event). The total amount of occupied habitat is currently unknown, but is likely between 4 and 9 miles of stream.

***Current Value:*** High

***Protection and Enhancement Value:*** High

### **Habitat Description:**

**Habitat Quality:** Habitat quality and riparian condition along upper Mill Creek is relatively good. The stream is situated in a rather picturesque canyon where habitat degradation is rather limited. That which is present is mostly from timber harvest activities, road construction, and livestock grazing in the riparian zone. There is also some limited residential development in the lower extent of the reach.

**Habitat Security:** Virtually the entire length of upper Mill Creek is in private ownership. While much of this land is fairly undeveloped, the risk of future development and land use is of concern.

**DRAINAGE:** Ross Fork Rock Creek

**STREAM:** Moose Meadow Creek

**REACH:** Entire stream

### **Value as a Recruitment/Restoration Fishery for the Clark Fork River:**

**Species Present:** Bull trout, westslope cutthroat trout, brook trout, and Brown Trout

**Fish Density/Number of Fish Produced:** Three electrofishing sections were completed in Moose Meadow Creek in 2007. Westslope cutthroat trout densities were moderate and were relatively consistent throughout the drainage. Brook trout densities were quite high at the lowest section surveyed in the drainage (RM 0.2), moderate in the middle section (RM 1.9) and low at the upper section (RM 2.8). Brown trout were only captured in the lowest section sampled and their densities were low (three captured).

**Recruitment to and Connectivity with the Clark Fork River:** Due to the small size of Moose Meadow Creek and the location of the drainage near the headwaters of Rock Creek, many river miles from the Clark Fork River, it is unlikely that this stream serves as a major source of recruitment to the Clark Fork River. It is possible however that Moose Meadow Creek does provide some westslope cutthroat and brown trout out-migrant to the Clark Fork River.

**Current Value:** Low

**Protection and Enhancement Value:** Low

### **Value as a Tributary/Replacement Fishery:**

**Recreational Species Present:** Westslope Cutthroat Trout, brook trout, and Brown Trout

**Fish Density:** Three electrofishing sections were completed in Moose Meadow Creek in 2007. Westslope cutthroat trout densities were moderate and were relatively consistent throughout the drainage. Brook trout densities were quite high at the lowest section surveyed in the drainage (RM 0.2), moderate in the middle section (RM 1.9) and low at the upper section (RM 2.8). Brown trout were only captured in the lowest section sampled and their densities were low (three captured).

**Fish Size:** Westslope cutthroat trout in the lowest electrofishing section averaged 4.5" and reached a maximum length of 8" while westslope cutthroat trout in the middle section averaged 5" and reached a maximum length of 10.5". Westslope cutthroat trout in the upper section averaged 3.5" and reached a maximum length of 5.5". Brook trout captured in the lower section averaged 4.5" and reached a maximum length of 8", while brook trout captured in the middle section averaged 5" and reached a maximum length of 6". The one brook trout captured in the upper electrofishing section was 6" in length. Only three brown trout were captured and they averaged 6" and reached a maximum length of 7". .

**Recruitment to non Clark Fork River Fishery:** Moose Meadow Creek does provide a moderate number of westslope cutthroat trout and a small number brown trout that could out-migrate and be recruited into the mainstem Rock Creek fishery. However, due to the relatively small size of the drainage, it is unlikely that Moose Meadow Creek is a major source of recruitment to Rock Creek.

*Current Value: Medium*

*Protection and Enhancement Value: Medium*

**Value as a Native Fishery:**

**Native Species Present:** Both bull and westslope cutthroat trout are present in the Moose Meadow Creek drainage, although bull trout densities are quite low in the drainage with only two captured. No genetic analyses have been completed for westslope cutthroat trout in Moose Meadow Creek although it is possible that some hybridization has occurred in the drainage due to its connectivity with mainstem Rock Creek.

**Competitor and/or Hybridizing Species Present:** Both brown and brook trout are present in the Moose Meadow Creek drainage, although brown trout densities are quite low and only occur in the lower portion of the drainage. Brook trout densities are quite high in the lower portion of the drainage and likely represent a threat for competition with both bull and westslope cutthroat trout and a hybridization threat to bull trout. One suspected rainbow/westslope cutthroat trout hybrid was sampled in the lowest electrofishing section, thus it is suspected that some westslope cutthroat trout hybridization has occurred in the lower portion of Moose Meadow Creek, although no genetic analysis has been completed.

**Demographics and Connectivity:** The viability of the Moose Meadow Creek bull trout population is somewhat questionable based to the small number of fish captured and their relatively small distribution within the drainage. However, the presence of several other bull trout populations in the upper Rock Creek drainage (i.e. West Fork, Middle Fork, etc...) provide possible sources of fish to maintain genetic variation within this population or to re-found the population should it be lost.

Westslope cutthroat trout are moderately abundant in the Moose Meadow Creek drainage and are found throughout the drainage, suggesting that this population is relatively strong. Connectivity between Moose Meadow Creek and other westslope cutthroat trout populations in the upper Rock Creek drainage is quite good which allows for genetic exchange with other populations and potentially re-founding of the population should it be lost.

*Current Value: High*

*Protection and Enhancement Value: High*

**Habitat Description:**

**Habitat Quality:** Habitat quality is considered good in the Moose Meadow Creek drainage. A large portion of the Moose Meadow Creek drainage is located within National Forest lands. Several grazing Forest Service grazing allotments are active along Moose Meadow Creek and some habitat degradation was observed due to cattle grazing in the riparian area in these reaches, but these grazing impacts did not appear to be severe at the time of the survey.

**Habitat Security:** A majority of the Moose Meadow Creek drainage is located within the Beaverhead/Deerlodge National Forest and thus habitat security is generally quite good. The only land use impacts that risk the security of fish habitat is riparian grazing via Forest Service grazing allotments, however the impacts of these allotments appeared to only be moderate during the time of the habitat surveys.

**DRAINAGE:** Lower Willow Creek

**STREAM:** North Fork Lower Willow Creek

**REACH:** Entire stream

### **Value as a Recruitment/Restoration Fishery for the Clark Fork River:**

**Species Present:** Westslope Cutthroat Trout, brook trout

**Fish Density/Number of Fish Produced:** Westslope cutthroat trout densities were very high in the North Fork Lower Willow drainage. Two electrofishing sections were completed in the drainage in 2007 and both maintained some of the highest westslope cutthroat trout densities observed in the Upper Clark Fork drainage. Brook trout were found in very low densities with only one captured in the upper electrofishing section (RM 4.8).

**Recruitment to and Connectivity with the Clark Fork River:** North Fork Lower Willow may provide some recruitment of westslope cutthroat trout to the Clark Fork River, however the lack of upstream passage at Lower Willow Creek Dam would not allow these fish to return to North Fork Lower Willow Creek to spawn.

***Current Value:*** Low

***Protection and Enhancement Value:*** Low

### **Value as a Tributary/Replacement Fishery:**

**Recreational Species Present:** Westslope Cutthroat Trout, brook trout

**Fish Density:** Westslope cutthroat trout densities were very high in the North Fork Lower Willow drainage. Two electrofishing sections were completed in the drainage in 2007 and both maintained some of the highest westslope cutthroat trout densities observed in the Upper Clark Fork drainage. Brook trout were found in very low densities with only one captured in the upper electrofishing section (RM 4.8).

**Fish Size:** The average size of westslope cutthroat trout in North Fork Lower Willow was somewhat small at 3.5", however fish up to 8" and 9" were captured in the upper section and lower sections, respectively. The small average size was due to abundant age 0 westslope cutthroat trout in the sample. The one brook trout captured measured 8" in length.

**Recruitment to non Clark Fork River Fishery:** North Fork Lower Willow Creek likely provides some recruitment to mainstem Lower Willow Creek. Westslope cutthroat trout are relatively abundant in Lower Willow Creek just below Lower Willow Dam and are likely present due to entrainment of fish through the dam. However, Lower Willow Dam provides no upstream passage, which prevents adults from accessing their natal streams for spawning.

**Current Value:** Low

**Protection and Enhancement Value:** Medium

**Value as a Native Fishery:**

**Native Species Present:** Westslope cutthroat trout are the only native trout present in the North Fork Willow Creek drainage. Genetic analyses of westslope cutthroat trout from North Fork Willow Creek completed in 2007 indicate that these fish are genetically pure.

**Competitor and/or Hybridizing Species Present:** Brook trout are the only competitor species present in the drainage and they currently maintain very low densities. Lower Willow Creek Dam appears to have prevented any rainbow trout or westslope cutthroat/rainbow trout hybrids from accessing the upper portion of the Lower Willow drainage, preserving the genetic purity of the westslope cutthroat trout populations above the dam.

**Demographics and Connectivity:** The viability of westslope cutthroat trout appears to be quite good in North Fork Lower Willow Creek. Genetic sampling from within the drainage indicates that this population is genetically pure and all other connected streams also only maintain pure westslope cutthroat trout. Lower Willow Creek Dam serves as a barrier for invasion of rainbow trout minimizing the potential threat of hybridization. Westslope cutthroat trout densities are quite high in the North Fork Lower Willow drainages and multiple age classes of westslope cutthroat trout were observed including age 0 fish.

The lack of connectivity between North Fork Lower Willow Creek and mainstem Lower Willow Creek could pose a potential threat to viability due to the possible effects of small population size (i.e. inbreeding depression, etc...). However, South Fork Lower Willow Creek and multiple tributaries to South Fork Lower Willow maintain westslope cutthroat trout populations and are currently connected to North Fork Lower Willow Creek via Lower Willow Creek Reservoir. Also, several tributaries to North Fork Lower Willow Creek also maintain viable westslope cutthroat trout populations providing additional protection against small population size. Thus, the impact of lost connectivity due to the presence of Lower Willow Dam appears to be minimized by the relatively large contiguous habitat that is occupied by westslope cutthroat trout in tributaries above the dam.

**Current Value:** High

**Protection and Enhancement Value:** High

**Habitat Description:**

**Habitat Quality:** Habitat quality in the North Fork Willow Creek drainage is considered fair to poor. A good portion of the drainage is located within private cattle ranching properties and most of these reaches do not maintain riparian fencing, so grazing impacts

are evident in this portion of the drainage. In the upper drainage where Forest Service land ownership begins, grazing impacts were still evident including reduced densities of woody riparian vegetation and its associated effects on stream bank stability and fish habitat.

**Habitat Security:** Approximately half of the North Fork Lower Willow Creek drainage is located within National Forest lands and thus is quite secure. The lower portion of the drainage flows through private cattle ranching land and could potentially undergo future changes in land and water use that could significantly degrade habitat in this reach.

**DRAINAGE:** Little Blackfoot River

**STREAM:** North Trout Creek

**REACH:** Lower – Mouth to Top of Surface Flow

### **Value as a Recruitment/Restoration Fishery for the Clark Fork River:**

**Species Present:** Brook Trout

**Fish Density/Number of Fish Produced:** Based on 2008 electrofishing, trout density is very low in lower North Trout Creek. Only one brook trout was captured during our sampling, and this fish was captured outside the chosen electrofishing section.

**Recruitment to and Connectivity with the Clark Fork River:** Lower North Trout Creek is unlikely to be an important source of trout recruitment for the Little Blackfoot or Clark Fork Rivers. Brook trout appear to be the only species present, and fish occur at extremely low densities. Additionally, brook trout typically do not exhibit significant migratory tendencies, and thus the species has a rather low recruitment value.

**Current Value:** Very Low

**Protection and Enhancement Value:** Low

### **Value as a Tributary/Replacement Fishery:**

**Recreational Species Present:** Brook Trout

**Fish Density:** Based on 2008 electrofishing, trout density is very low in lower North Trout Creek. Only one brook trout was captured during our sampling, and this fish was captured outside the chosen electrofishing section.

**Fish Size:** The one brook trout captured in lower North Trout Creek in 2008 was an adult fish of about 9 inches in length.

**Recruitment to non Clark Fork River Fishery:** Lower North Trout Creek is unlikely to be an important source of trout recruitment for the Little Blackfoot River. Brook trout appear to be the only species present, and fish occur at extremely low densities. Additionally, brook trout typically do not exhibit significant migratory tendencies, and thus the species has a rather low recruitment value.

**Current Value:** Very Low

**Protection and Enhancement Value:** Low

### **Value as a Native Fishery:**

**Native Species Present:** None detected.

**Competitor and/or Hybridizing Species Present:** Brook Trout

Brook trout are present in lower North Trout Creek. However, overall density appears to be extremely low.

**Demographics and Connectivity:** No native trout were detected in lower North Trout Creek during 2008 electrofishing. However, the stream appears to be well connected to the lower Little Blackfoot River where native westslope cutthroat trout are present in low densities.

***Current Value:*** *Very Low*

***Protection and Enhancement Value:*** *Low*

### **Habitat Description:**

**Habitat Quality:** Habitat quality and riparian condition in lower North Trout Creek is relatively poor. The channel shows signs of past downcutting throughout much of the reach, although there is evidence that the channel is stabilizing and developing a new inset floodplain. Woody riparian vegetation along the channel is relatively sparse, and the lack of woody plants has reduced stream shading and habitat complexity, as well as increased sedimentation by making the streambanks more susceptible to erosion. Fish habitat (for trout) is poor, and is limited by high fine sediment accumulation and low stream flow.

**Habitat Security:** The entirety of this reach lies on private lands used primarily for livestock grazing. The nature of the ownership and land use makes habitat security a concern in lower North Trout Creek.

**DRAINAGE:** Little Blackfoot River

**STREAM:** North Trout Creek

**REACH:** Upper – End of Surface Flow to Headwaters

### **Value as a Recruitment/Restoration Fishery for the Clark Fork River:**

**Species Present:** Brook Trout and Westslope Cutthroat (which are visibly hybridized with rainbow trout).

**Fish Density/Number of Fish Produced:** Based on 2008 electrofishing, trout density is high in upper North Trout Creek. However, the bulk of the fish are young brook trout. Hybridized westslope cutthroat trout are also present in the stream, but appear to occur at very low densities.

**Recruitment to and Connectivity with the Clark Fork River:** Upper North Trout Creek appears to be isolated from the Little Blackfoot River, and therefore does not likely provide a source of trout recruitment for the Little Blackfoot or Clark Fork Rivers. No surface connection appears to exist between the upper and lower portions of the drainage, as no defined stream channel can be observed at the county road crossing located near river mile 3.3. Additionally, brook trout appear to be the dominant species present. Brook trout typically do not exhibit significant migratory tendencies, and thus the species has a rather low recruitment value.

**Current Value:** Very Low

**Protection and Enhancement Value:** Very Low

### **Value as a Tributary/Replacement Fishery:**

**Recreational Species Present:** Brook Trout and Westslope Cutthroat (which are visibly hybridized with rainbow trout).

**Fish Density:** Based on 2008 electrofishing, trout density is high in upper North Trout Creek. However, the bulk of the fish are young brook trout. Hybridized westslope cutthroat trout are also present in the stream, but appear to occur at very low densities.

**Fish Size:** Based on 2008 electrofishing, catchable sized brook trout are present in fair densities in upper North Trout Creek. However, fish tend to be small, with maximum fish size being around 9 inches in total length. The average length of brook trout captured in the stream in 2008 was about 3.5 inches. Hybridized westslope cutthroat trout are also present in upper North Trout Creek, but these fish tend to be rare and relatively small (average length is about 4 inches), and do not represent a significant component of the recreational fishery.

**Recruitment to non Clark Fork River Fishery:** Upper North Trout Creek appears to be isolated from the Little Blackfoot River, and therefore does not likely provide a source of trout recruitment for the Little Blackfoot. No surface connection appears to exist between

the upper and lower portions of the drainage, as no defined stream channel can be observed at the county road crossing located near river mile 3.3. Additionally, brook trout appear to be the dominant species present. Brook trout typically do not exhibit significant migratory tendencies, and thus the species has a rather low recruitment value.

***Current Value: Low***

***Protection and Enhancement Value: Low***

### **Value as a Native Fishery:**

**Native Species Present:** Westslope Cutthroat Trout

Genetic samples collected from westslope cutthroat trout in upper North Trout Creek in 1989 supported our 2008 field observations of hybridization. The westslope cutthroat trout tested at that time were found to be only 53% pure.

**Competitor and/or Hybridizing Species Present:** Brook Trout

Brook trout are present in high densities in upper North Trout Creek. The species likely imposes a heavy competitive pressure on the westslope cutthroat trout present in the stream.

**Demographics and Connectivity:** Based on 2008 electrofishing, westslope cutthroat trout occur in very low densities in upper North Trout Creek. Additionally, the few fish present are heavily hybridized with rainbow trout, and most appear to be juveniles of a similar size/age. No fish of resident adult size (i.e. >6 inches total length) were observed during our sampling in 2008.

No surface connection appears to exist between the upper and lower portions of the North Trout Creek drainage. This apparent lack of connectivity has effectively isolated the westslope cutthroat population of upper North Trout Creek. The risks of isolation (i.e. inbreeding depression, local extinction, etc.) are of concern, as is the long-term viability of this population. However, given the degree of hybridization present in this population, its conservation value is relatively low.

***Current Value: Low***

***Protection and Enhancement Value: Low***

### **Habitat Description:**

**Habitat Quality:** Habitat quality and riparian condition in upper North Trout Creek is fair. Habitat quality throughout the reach is affected primarily by livestock use of the riparian zone. Woody riparian vegetation along the channel tends to be patchy, and the lack of woody plants in some areas of the stream has reduced stream shading and habitat complexity. Fish habitat tends to be most limited by a lack of deep pools as well as sparse

overhead cover. Spawning habitat however appears to be plentiful, and stream flow is not likely a limiting factor.

**Habitat Security:** Much of upper North Trout Creek lies on U.S. Forest Service lands where habitat security is considered fair. However, the area is within a grazing allotment and livestock use of the riparian area is apparent throughout much of the drainage. This activity could make habitat security a concern if not closely managed.

**DRAINAGE:** Little Blackfoot River

**STREAM:** Ontario Creek

**REACH:** All

### **Value as a Recruitment/Restoration Fishery for the Clark Fork River:**

**Species Present:** Westslope Cutthroat Trout and Brook Trout

**Fish Density/Number of Fish Produced:** Based on 2007 electrofishing, total trout density in Ontario Creek is variable, and ranges from moderate to relatively high. Westslope cutthroat trout comprise most of the fish community, although brook trout are also present in fair numbers, especially in the more upstream reaches of the drainage.

**Recruitment to and Connectivity with the Clark Fork River:** Ontario Creek is a direct tributary to the upper Little Blackfoot River. The stream appears to have good connection to downstream waters, and trout densities in the drainage are fairly good as well. Additionally, westslope cutthroat trout comprise much of the fish community, which increases the recruitment value of the stream given the propensity of the species to exhibit migratory tendencies (unlike brook trout, which tend not to display significant migratory behavior). However, the physical distance between Ontario Creek and the Clark Fork River is relatively great, which may limit the value of the stream as a source of recruitment for the Clark Fork fishery.

**Current Value:** Medium

**Protection and Enhancement Value:** Medium

### **Value as a Tributary/Replacement Fishery:**

**Recreational Species Present:** Westslope Cutthroat Trout and Brook Trout

**Fish Density:** Based on 2007 electrofishing, total trout density in Ontario Creek is variable, and ranges from moderate to relatively high. Westslope cutthroat trout comprise most of the fish community, although brook trout are also present in fair numbers, especially in the more upstream reaches of the drainage.

**Fish Size:** Fish in Ontario Creek do not typically attain very large size, although fish of catchable length are present in fairly good numbers throughout much of the stream. At the sites sampled in the drainage in 2007, both westslope cutthroat trout and brook trout had an average length of about 5 inches. The largest westslope cutthroat trout captured during our sampling was about 10 inches in total length, while the biggest brook trout was only about 8 inches.

**Recruitment to non Clark Fork River Fishery:** Ontario Creek is a direct tributary to the upper Little Blackfoot River. The stream appears to have good connection to the Little Blackfoot, and trout densities in the drainage are fairly good as well. Additionally, westslope cutthroat trout comprise much of the fish community in Ontario Creek, which

increases the recruitment value of the stream given the propensity of the species to exhibit migratory tendencies (unlike brook trout, which tend not to display significant migratory behavior).

***Current Value: Medium***

***Protection and Enhancement Value: Medium***

### **Value as a Native Fishery:**

**Native Species Present:** Westslope Cutthroat Trout

Limited genetic testing conducted in 1988 suggests that the westslope cutthroat trout population in Ontario Creek is genetically pure.

**Competitor and/or Hybridizing Species Present:** Brook Trout

Brook trout appear to be relatively common throughout much of Ontario Creek, and are sympatric with westslope cutthroat trout throughout the stream. Brook trout likely compete with westslope cutthroat trout, especially in the upper portions of the stream where they tend to be more common. However, since brook trout tend to be less abundant than westslope cutthroat trout throughout much of Ontario Creek, the effects of their presence are likely reduced.

**Demographics and Connectivity:** Based on 2007 electrofishing, westslope cutthroat trout comprise much of the fish community in Ontario Creek. The species is present in moderate densities throughout the stream, and observations of multiple different size classes of fish suggest that the population is relatively strong. The largest westslope cutthroat trout captured during our sampling in 2007 was about 10 inches in total length.

Ontario Creek is a direct tributary to the upper Little Blackfoot River. The stream appears to have good connection to downstream waters, and it likely provides important spawning and rearing habitat for westslope cutthroat trout with both resident and migratory life history patterns.

***Current Value: High***

***Protection and Enhancement Value: High***

### **Habitat Description:**

**Habitat Quality:** Habitat quality and riparian condition throughout much of Ontario Creek is good. The primary land uses evident in the drainage are timber harvest, forest recreation, and historic mining. There is also some limited residential development located on private mining claims near the mouth of the stream. While there are some observable site-specific impacts of these land uses, overall impacts to habitat quality are relatively light.

**Habitat Security:** Land ownership in the Ontario Creek drainage is dominated by publicly owned lands administered by the U.S. Forest Service. However, there are several small privately owned mining claims near the mouth of the stream that support residences. While localized habitat security is of some concern in this area, overall habitat security in the drainage is relatively good.

**DRAINAGE:** Little Blackfoot River

**STREAM:** Ophir Creek

**REACH:** All

### **Value as a Recruitment/Restoration Fishery for the Clark Fork River:**

**Species Present:** Westslope Cutthroat Trout, Brown Trout, and Brook Trout.

**Fish Density/Number of Fish Produced:** Based on 2007 electrofishing, total trout density is relatively high throughout much of Ophir Creek. However, species composition varies longitudinally along the stream. In the lower part of the drainage brown trout provide the primary fishery, with brook trout also present, but very rare. In the upper portion of the drainage brown trout are absent. Instead, brook trout become rather common, although many of the fish handled during 2007 sampling tended to be young-of-the-year. Westslope cutthroat trout are also present in upper Ophir Creek, and occur in moderate densities.

**Recruitment to and Connectivity with the Clark Fork River:** Ophir Creek is a direct tributary to Carpenter Creek, and the stream is actually the larger of the two at their confluence. There appears to be at least marginal connectivity with the Clark Fork River, and it is possible that the lower reaches of Ophir Creek provide at least some brown trout recruitment to the Clark Fork. However, the overall contribution may be low given current habitat and distance limitations. It is doubtful if the upper portion of the stream provides any significant recruitment of westslope cutthroat trout or brook trout. No westslope cutthroat trout were sampled in lower Ophir Creek or Carpenter Creek, which suggests that the species has limited dispersal or survival in downstream reaches. Additionally, brook trout typically do not exhibit significant migratory tendencies, and thus the species has a rather low recruitment value.

**Current Value:** Low

**Protection and Enhancement Value:** Medium

### **Value as a Tributary/Replacement Fishery:**

**Recreational Species Present:** Westslope Cutthroat Trout, Brown Trout, and Brook Trout.

**Fish Density:** Based on 2007 electrofishing, total trout density is relatively high throughout much of Ophir Creek. However, species composition varies longitudinally along the stream. In the lower part of the drainage brown trout provide the primary fishery, with brook trout also present, but very rare. In the upper portion of the drainage brown trout are absent. Instead, brook trout become rather common, although many of the fish handled during 2007 sampling tended to be young-of-the-year. Westslope cutthroat trout are also present in upper Ophir Creek, and occur in moderate densities.

**Fish Size:** Based on 2007 electrofishing, fish tend to be relatively small in Ophir Creek. However, fish of catchable size are present in fair numbers, especially in the lower portion of the stream where brown trout dominate the fishery. The average length of brown trout in this portion of the drainage is about 6 inches, with fish reaching sizes of up to 12 inches. Farther upstream where brook trout and westslope cutthroat trout comprise the fishery, fish size tends to be smaller. Brook trout and westslope cutthroat trout collected in 2007 averaged just over 3 and 4 inches, respectively. The small overall size is indicative of the high numbers of young, juvenile fish that were captured in the sample reach. Both species appear to reach a maximum size of about 8 inches in total length in Ophir Creek.

**Recruitment to non Clark Fork River Fishery:** Ophir Creek is a direct tributary to Carpenter Creek, and the stream is actually the larger of the two at their confluence. It is likely that the lower reaches of Ophir Creek provide a fair amount of brown trout recruitment to Carpenter Creek and possibly the Little Blackfoot River. In contrast, it is doubtful if the upper portion of the stream provides any significant recruitment of westslope cutthroat trout or brook trout. No westslope cutthroat trout were sampled in lower Ophir Creek or Carpenter Creek, which suggests that the species has limited dispersal or survival in downstream reaches. Additionally, brook trout typically do not exhibit significant migratory tendencies, and thus the species has a rather low recruitment value.

**Current Value:** Medium

**Protection and Enhancement Value:** Medium

**Value as a Native Fishery:**

**Native Species Present:** Westslope Cutthroat Trout

Genetic tests of westslope cutthroat trout collected from Ophir Creek in 1992 suggest that the population is genetically pure.

**Competitor and/or Hybridizing Species Present:** Brown Trout and Brook Trout

Brown trout are relatively common throughout much of lower Ophir Creek, and likely compete with, and prey on, any westslope cutthroat trout present in the reach. Additionally, brook trout are also relatively common in the upper portions of the stream, and likely compete with westslope cutthroat trout as well.

**Demographics and Connectivity:** Based on 2007 electrofishing, westslope cutthroat trout are present in moderate densities in Ophir Creek. However, the species appears to be restricted to the upper reaches of the stream. During 2007 sampling, several age classes were observed including juveniles of about one year of age and fish large enough to be resident adults (>6 inches). The largest fish handled in Ophir Creek during 2007 sampling was about 8 inches in total length.

Ophir Creek is a direct tributary to Carpenter Creek. However, it is doubtful if the upper portion of the stream provides any significant recruitment of westslope cutthroat trout to downstream reaches. No westslope cutthroat trout were sampled in lower Ophir Creek or Carpenter Creek, which suggests that the species has limited dispersal or survival in downstream reaches. It is likely that fish with a resident life history support the westslope cutthroat trout population that is present in upper Ophir Creek.

***Current Value: Medium***

***Protection and Enhancement Value: Medium***

**Habitat Description:**

**Habitat Quality:** Overall, habitat quality and riparian condition along Ophir Creek is fair. Habitat quality throughout the stream is affected by several factors including livestock grazing in the riparian zone, hay production in the middle portion of the drainage, and irrigation withdrawal. Woody riparian vegetation along much of the channel tends to be patchy, and the lack of woody plants has reduced stream shading and habitat complexity, as well as increased sedimentation by making the streambanks more susceptible to erosion. Additionally, the impacts of intensive placer mining are evident throughout much of the watershed, especially in the upper portion of the drainage where large placer piles divide Ophir Creek into multiple channels in some areas.

**Habitat Security:** Land ownership along Ophir Creek consists mainly of privately owned agricultural lands, with public lands managed by the Bureau of Land Management and the U.S. Forest Service limited to the upper portion of the watershed. However, within the general area of public ownership, a number of privately owned mining claims exist where some limited development (recreational cabins) has occurred. The main land uses in the Ophir Creek drainage are livestock grazing, irrigated hay production, historic and current placer mining, timber harvest, and recreation. The diverse nature of the land use and ownership makes habitat security a concern throughout much of Ophir Creek.

**DRAINAGE:** Clark Fork River

**STREAM:** Perkins Creek

**REACH:** All

### **Value as a Recruitment/Restoration Fishery for the Clark Fork River:**

**Species Present:** Fish sampling was completed at two sections of Perkins Creek in 2008. No fish were observed at either of the sampled sections. Additional spot electrofishing in the most likely habitats between the two sections also yielded no fish. It is unknown if Perkins Creek historically supported fish, although it is probable.

**Fish Density/Number of Fish Produced:** N/A

**Recruitment to and Connectivity with the Clark Fork River:** Perkins Creek does not currently provide a recruitment source for fish to the Clark Fork River as no fish were found in the stream. Furthermore, this stream is likely poorly connected to the Clark Fork River. A large irrigation ditch appears to capture the stream in its entirety near its mouth.

**Current Value:** Very Low

**Protection and Enhancement Value:** Very Low

### **Value as a Tributary/Replacement Fishery:**

**Recreational Species Present:** None detected.

**Fish Density:** Fish sampling was completed at two sections of Perkins Creek in 2008. No fish were observed at either of the sampled sections. Additional spot electrofishing in the most likely habitats between the two sections also yielded no fish. It is unknown if Perkins Creek historically supported fish, although it is probable.

**Fish Size:** N/A

**Recruitment to non Clark Fork River Fishery:** N/A – Perkins Creek is a tributary to the Clark Fork River.

**Current Value:** Very Low

**Protection and Enhancement Value:** Very Low

### **Value as a Native Fishery:**

**Native Species Present:** Fish sampling was completed at two sections of Perkins Creek in 2008. No fish were observed at either of the sampled sections. Additional spot electrofishing in the most likely habitats between the two sections also yielded no fish. It is unknown if Perkins Creek historically supported fish, although it is probable.

**Competitor and/or Hybridizing Species Present:** None detected.

**Demographics and Connectivity:** No native trout were observed in Perkins Creek during 2008 electrofishing. Furthermore, this stream is likely poorly connected to the Clark Fork River. A large irrigation ditch appears to capture the stream in its entirety near its mouth.

***Current Value:*** Very Low

***Protection and Enhancement Value:*** Very Low

**Habitat Description:**

**Habitat Quality:** Fish habitat was assessed in over a mile of Perkins Creek in 2008, and was rated as poor. Notable fine sediment accumulation, a lack of pools, and marginal stream flow were all factors in the low rating. Additionally, some rather significant channel instability was noted in the upper reaches of the stream.

**Habitat Security:** Land ownership along Perkins Creek is comprised primarily of privately owned lands, with limited U.S. Forest Service ownership in the upper extent of the watershed. The primary land uses in the drainage are livestock grazing and timber harvest. The nature of the ownership and land use makes habitat security somewhat of a concern, although much of the private land in the drainage is in a conservation easement.

**DRAINAGE:** Perkins Gulch

**STREAM:** Perkins Gulch

**REACH:** All

### **Value as a Recruitment/Restoration Fishery for the Clark Fork River:**

**Species Present:** Westslope Cutthroat Trout

**Fish Density/Number of Fish Produced:** Based on 2008 electrofishing, westslope cutthroat trout comprise the entire fish community in Perkins Gulch. However, the species is present in very low densities throughout much of the stream.

**Recruitment to and Connectivity with the Clark Fork River:** Perkins Gulch is a tributary to the Clark Fork River. However, the stream only appears to connect to the river during spring runoff. The remainder of the year the lower reach of the stream is dry. Given this and very low fish densities, it is likely that the overall recruitment value of Perkins Gulch is fairly limited.

***Current Value:*** Low

***Protection and Enhancement Value:*** Low

### **Value as a Tributary/Replacement Fishery:**

**Recreational Species Present:** Westslope Cutthroat Trout

**Fish Density:** Based on 2008 electrofishing, westslope cutthroat trout comprise the entire fish community in Perkins Gulch. However, the species is present in very low densities throughout much of the stream.

**Fish Size:** Fish in Perkins Gulch do not typically attain very large size, and catchable sized fish appear to be relatively uncommon. At the two sites sampled in the drainage in 2008, westslope cutthroat trout had an average length between about 4 and 5 inches. Maximum fish size was about 8 inches.

**Recruitment to non Clark Fork River Fishery:** N/A – Perkins Gulch is a direct tributary to the Clark Fork River.

***Current Value:*** Low

***Protection and Enhancement Value:*** Low

### **Value as a Native Fishery:**

**Native Species Present:** Westslope Cutthroat Trout

Limited genetic testing conducted in Perkins Gulch in 1998 suggests that the westslope cutthroat trout population is genetically pure.

**Competitor and/or Hybridizing Species Present:** None detected.

**Demographics and Connectivity:** Based on 2008 electrofishing, westslope cutthroat trout comprise the entire fish community in Perkins Gulch. However, the species is present in very low densities throughout much of the stream. While a couple different age classes of fish were observed during our sampling, gaps in the size structure of the population may be indicative of poor or variable recruitment. Additionally, fish capable of being resident sized adults (i.e. >6 inches total length) appear to be fairly uncommon. The largest westslope cutthroat trout observed in Perkins Gulch during 2008 sampling was about 8 inches in total length.

Perkins Gulch is a tributary to the Clark Fork River. However, the stream only appears to connect to the river during spring runoff. The remainder of the year the lower reach of the stream is dry. Given the relatively poor connectivity, it is likely that fish movement between the two streams may be extremely limited. If this is the case, then fish with a resident life history likely maintain the westslope cutthroat trout population in Perkins Gulch. The long-term viability of this population could be of concern given the low population size and associated risks of isolation (i.e. inbreeding depression, local extinction, etc.).

***Current Value: Medium***

***Protection and Enhancement Value: High***

## **Habitat Description:**

**Habitat Quality:** Habitat quality and riparian condition along Perkins Gulch is mostly fair, although some the lower reaches of the stream are in a rather poor state. The primary land use along the stream is livestock grazing, although roads have also affected habitat quality to some extent throughout the drainage. Cattle have access to almost the entire length the channel, and impacts to stream bank stability and woody riparian vegetation are evident in many locations. In these areas, woody riparian vegetation along the channel tends to be patchy, and the lack of woody plants has reduced stream shading and habitat complexity, as well as increased sedimentation by making the streambanks more susceptible to erosion. The lower reaches of Perkins Gulch go dry on an annual basis, but this event appears to be natural, though irrigation withdrawal in the lower part of the drainage likely exacerbates the issue.

**Habitat Security:** Land ownership along Perkins Gulch is varied, with private and State owned lands in the lower half of the drainage, and U.S. Forest Service managed lands in the upper portion of the watershed. All of these lands are used primarily for livestock grazing, which poses some concern for habitat security given the widespread use of the riparian zone by cattle.

**DRAINAGE:** Peterson Creek

**STREAM:** Peterson Creek

**REACH:** All

### **Value as a Recruitment/Restoration Fishery for the Clark Fork River:**

**Species Present:** Brown Trout, Brook Trout, and Westslope Cutthroat Trout

**Fish Density/Number of Fish Produced:** Based on electrofishing conducted in 2008, fish density and species composition is variable throughout Peterson Creek. In general however, total trout density ranges from low to moderate. In the lower extent of the stream, brown trout appear to comprise the entire trout community, but fish tend to be rather uncommon. In the middle reaches of the stream, brook trout occur in moderate densities, and represent the primary fishery. In the upper reaches of the stream, westslope cutthroat trout are present, and occur with brook trout in relatively low densities.

However, near the headwaters of Peterson Creek, westslope cutthroat trout comprise the entire fish community and occur in more moderate numbers.

**Recruitment to and Connectivity with the Clark Fork River:** Peterson Creek is a direct tributary to the Clark Fork River. However, annual irrigation withdrawal, marginal habitat quality, and a number of fish movement impediments (i.e. diversions) have likely limited the recruitment value of the drainage. While it is likely that the very lower extent of the stream (downstream of Interstate 90) provides a small source of brown trout recruitment to the Clark Fork River, the stream overall is not likely at its potential. It is doubtful if the upper portion of the stream provides any significant recruitment of westslope cutthroat trout or brook trout to the Clark Fork River. No westslope cutthroat trout were sampled in lower Peterson Creek, which suggests that the species has limited dispersal or survival in downstream reaches. Additionally, brook trout typically do not exhibit significant migratory tendencies, and thus the species has a rather low recruitment value.

**Current Value:** Low

**Protection and Enhancement Value:** Medium

### **Value as a Tributary/Replacement Fishery:**

**Recreational Species Present:** Brown Trout, Brook Trout, and Westslope Cutthroat Trout

**Fish Density:** Based on electrofishing conducted in 2008, fish density and species composition is variable throughout Peterson Creek. In general however, total trout density ranges from low to moderate. In the lower extent of the stream, brown trout appear to comprise the entire trout community, but fish tend to be rather uncommon. In the middle reaches of the stream, brook trout occur in moderate densities, and represent the primary fishery. In the upper reaches of the stream, westslope cutthroat trout are present, and occur with brook trout in relatively low densities. However, near the

headwaters of Peterson Creek, westslope cutthroat trout comprise the entire fish community and occur in more moderate numbers.

**Fish Size:** In general, trout in Peterson Creek tend to be relatively small, although fish of catchable size were observed throughout the entire stream during 2008 electrofishing. In the lower reaches of the stream, where brown trout are the primary species present, most of the fish measured during our sampling were younger, smaller fish. Downstream of Interstate 90, the majority of the fish captured were young-of-the-year. The largest brown trout measured in Peterson Creek in 2008 was only about 8 inches in total length. In the middle reaches of the stream, where brook trout are most common, average fish length was about 4 inches, with maximum fish size appearing to be around 11 inches. Westslope cutthroat trout in the upper reaches of the drainage had an average length approximately 4 inches, with the largest fish measured being about 8 inches.

**Recruitment to non Clark Fork River Fishery:** N/A – Peterson Creek is a direct tributary to the Clark Fork River.

***Current Value:*** Low

***Protection and Enhancement Value:*** Medium

### **Value as a Native Fishery:**

**Native Species Present:** Westslope Cutthroat Trout

Genetic testing conducted in 2008 suggests that the westslope cutthroat trout population in upper Peterson Creek is genetically pure.

**Competitor and/or Hybridizing Species Present:** Brook Trout and Brown Trout

Brook trout are relatively common in the middle and upper reaches of Peterson Creek. Where the species is sympatric with westslope cutthroat trout, fair competitive pressure likely exists. Brown trout also occur in low densities in Peterson Creek, but are primarily restricted to the lower reaches of the stream close to the mouth. However, this is likely related to marginal habitat conditions throughout much of lower Peterson Creek, and upstream expansion by this species would be likely given improvements to habitat quality and connectivity to the Clark Fork River. An increase in distribution and abundance of this species could be a concern for westslope cutthroat trout in Peterson Creek.

**Demographics and Connectivity:** Based on electrofishing conducted in 2008, westslope cutthroat trout are primarily restricted to the upper reaches of Peterson Creek. Population density appears to range from low to moderate, with fish tending to be more common closer to the headwaters of the stream. Although size distribution was somewhat variable in the locations electrofished in 2008, the presence of several different age classes of fish suggests that successful reproduction and recruitment is occurring in most years. The largest westslope cutthroat trout observed during our sampling was about 8 inches in total length.

Peterson Creek is a direct tributary to the Clark Fork River. However, annual irrigation withdrawal, marginal habitat quality in the lower reaches, and a number of fish movement impediments (i.e. diversions) have limited the connectivity between the two streams. Because of this, it is likely that the westslope cutthroat trout population in upper Peterson Creek is maintained by fish with a resident life history. However, the presence of a small migratory component of the population cannot be ruled out.

***Current Value: Medium***

***Protection and Enhancement Value: High***

### **Habitat Description:**

**Habitat Quality:** Habitat quality and riparian condition along Peterson Creek tends to be fair at best. In the middle and lower portions of the drainage, the stream flows extensively through irrigated hay meadows, livestock pastures, and residential areas where stream and riparian habitat has been fairly altered. Woody riparian vegetation along the channel tends to be somewhat patchy, and the lack of woody vegetation in some areas has reduced stream shading and habitat complexity, as well as increased sedimentation by making the streambanks more susceptible to erosion. Additionally, there are a number of irrigation diversions present in this reach that can severely impact summer base flows during the irrigation season. Water temperatures near the mouth of the stream can reach upwards of 20° C (68° F) during this period. In the upper portion of the drainage, the primary land use is livestock grazing. Cattle appear to have access to all of the channel length throughout this reach, and impacts of riparian grazing (i.e. bank trampling, browse on woody shrubs, etc) are clearly evident in many locations. Additionally, evidence of past placer mining activity is widespread throughout this portion of the drainage. Similar to lower Peterson Creek, the upper reaches of the stream often suffer from low summer flow, which is related to both natural as well irrigation related causes.

**Habitat Security:** Predominately, Peterson Creek flows through private lands used primarily for agricultural purposes. Although portions of the stream are located on State and Federally (National Forest) owned lands, public ownership makes up only a small amount of the land base along Peterson Creek. Factors present in the drainage that could affect habitat security are irrigation withdrawal, hay production, livestock grazing in the riparian zone, urbanization near the mouth, and additional residential development. The nature of the ownership and land use makes habitat security a concern throughout most of Peterson Creek.

**DRAINAGE:** Gold Creek  
**STREAM:** Pikes Peak Creek  
**REACH:** All

### **Value as a Recruitment/Restoration Fishery for the Clark Fork River:**

**Species Present:** Westslope Cutthroat Trout

**Fish Density/Number of Fish Produced:** Based on electrofishing completed in 2007 and 2008, westslope cutthroat trout comprise the entire fish community in Pikes Peak Creek. However, sampling has been limited to the upper portion of the drainage since the lower extent of the stream is typically dry or very dewatered for much of the year. The species occurs in relatively good numbers throughout the upper portion of the stream, with densities appearing highest above the Crater, a natural feature that captures most of the surface flow of upper Pikes Peak Creek in normal flow conditions.

**Recruitment to and Connectivity with the Clark Fork River:** Pikes Peak Creek is a direct tributary to Gold Creek. But as mentioned above, the lower portion of the drainage is typically dewatered for most of the year. While this limits the ability of fish to move in this stream, it is possible that westslope cutthroat trout from the upper portion of the drainage do move downstream into Gold Creek and the Clark Fork River during periods of connected flow. The overall contribution of Pikes Peak Creek as a recruitment source to the Clark Fork River is unknown, but is likely fairly low.

**Current Value:** Low

**Protection and Enhancement Value:** Low

### **Value as a Tributary/Replacement Fishery:**

**Recreational Species Present:** Westslope Cutthroat Trout

**Fish Density:** Based on electrofishing completed in 2007 and 2008, westslope cutthroat trout comprise the entire fish community in Pikes Peak Creek. However, sampling has been limited to the upper portion of the drainage since the lower extent of the stream is typically dry or very dewatered for much of the year. The species occurs in relatively good numbers throughout the upper portion of the stream, with densities appearing highest above the Crater, a natural feature that captures most of the surface flow of upper Pikes Peak Creek in normal flow conditions.

**Fish Size:** Westslope cutthroat trout in Pikes Peak Creek do not typically attain very large size, although fish of catchable size are present in fair numbers. Two sites were sampled in the upper portion of the drainage (above and below the Crater) between 2007 and 2008. At the lowest site, fish averaged a little less than 5 inches in length, with the largest fish being a little less than 7 inches. At the uppermost site, fish averaged about 6 inches in length, with the largest being about 10 inches.

**Recruitment to non Clark Fork River Fishery:** Pikes Peak Creek is a direct tributary to Gold Creek. But as mentioned above, the lower portion of the drainage is typically dewatered for most of the year. While this limits the ability of fish to move in this stream, it is possible that westslope cutthroat trout from the upper portion of the drainage do move downstream into Gold Creek during periods of connected flow. The overall contribution of Pikes Peak Creek as a recruitment source to Gold Creek is unknown, but is likely fairly low.

***Current Value:*** Medium

***Protection and Enhancement Value:*** Medium

**Value as a Native Fishery:**

**Native Species Present:** Westslope Cutthroat Trout

Genetic tests conducted in 1996 from fish collected in the upper portion of the drainage indicate that this population is 100% pure.

**Competitor and/or Hybridizing Species Present:** None detected.

**Demographics and Connectivity:** Based on electrofishing completed in 2007 and 2008, westslope cutthroat trout comprise the entire fish community in Pikes Peak Creek. However, sampling has been limited to the upper portion of the drainage since the lower extent of the stream is typically dry or very dewatered for much of the year. The species occurs in relatively good numbers throughout the upper portion of the stream, with densities appearing highest above the Crater, a natural feature that captures most of the surface flow of upper Pikes Peak Creek in normal flow conditions. Multiple age classes of fish were captured during 2007 and 2008 sampling, including young-of-the-year and fish large enough to be resident adults (>6 inches). All of this suggests that the westslope cutthroat trout population in Pikes Peak Creek is viable.

Pikes Peak Creek is a direct tributary to Gold Creek. But as mentioned above, the lower portion of the drainage is typically dewatered for most of the year. While this limits the ability of fish to move freely in this stream, it appears possible that fish (including non-native species present downstream in Gold Creek and the Clark Fork River) could move through this portion of the drainage during periods of connected flow. It is unknown to what extent this may be true, or if there is any migratory life history component among the westslope cutthroat trout population in upper Pikes Peak Creek. While no non-native species have been detected in upper Pikes Peak Creek, it appears possible for them to invade given the right conditions. If non-native species were to invade, it is unlikely they would make it above the Crater area, which appears to be an upstream fish barrier.

***Current Value:*** High

***Protection and Enhancement Value:*** High

### **Habitat Description:**

**Habitat Quality:** Habitat quality and riparian condition along much of Pikes Peak Creek is considered fair, although habitat quality tends to improve as you move upstream. Rather extensive historic mining impacts are prevalent throughout the drainage, and livestock have unrestricted access to much of the stream on both private as well as U.S. Forest Service lands. Additionally, there is also evidence of past timber harvest in and near the riparian area in the drainage. These factors, as well as current roads and recreational use, have all contributed to some level of habitat degradation in portions of Pikes Peak Creek. The Crater, a natural feature present in the upper portion of the stream, captures much of the surface flow of Pikes Peak Creek during normal flow conditions. This creates a significantly dewatered or dry reach throughout much of the lower portion of the drainage.

**Habitat Security:** Land ownership along the lower six miles of Pikes Peak Creek is comprised largely of private lands used primarily for livestock grazing. While the nature of the ownership and land use generally makes habitat security a concern, this reach tends to be significantly dewatered (naturally) for much of the year, and likely provides little year-round fish habitat. However, it may provide an important fish movement corridor during periods of high flow, although this is not well understood. In contrast to the lower reach, the upper six miles of Pikes Peak Creek flows exclusively through U.S. Forest Service lands. Habitat security in this reach is fairly good, although there are land uses present that are known to affect habitat quality if not managed properly. The primary land uses of concern are unregulated livestock grazing in riparian areas, and forest roads and recreation. The lasting effects of historic mining and past timber harvest in the watershed are also likely to continue to affect habitat security to some extent.

**DRAINAGE:** Racetrack Creek

**STREAM:** Racetrack Creek

**REACH:** Upper – Falls Above Forest Service Campground to Headwaters

### **Value as a Recruitment/Restoration Fishery for the Clark Fork River:**

**Species Present:** Westslope Cutthroat Trout and Rainbow Trout

**Fish Density/Number of Fish Produced:** Based on electrofishing conducted in 2007, trout density is relatively high in upper Racetrack Creek. The entire fish community is comprised of westslope cutthroat trout, rainbow trout, and their hybrids (*Oncorhynchus* species).

**Recruitment to and Connectivity with the Clark Fork River:** Racetrack Creek is a direct tributary to the Clark Fork River. A high gradient cascade/waterfall is present near river mile 13.0. This feature is a fish barrier that inhibits upstream fish movement, but does not likely prevent downstream migration. Therefore, upper Racetrack Creek likely provides some recruitment of westslope cutthroat trout, rainbow trout, and their hybrids to the Clark Fork River. However, summer irrigation withdrawal that typically dewatered a large portion of lower Racetrack Creek, as well as a number of fish movement impediments (i.e. diversions), likely limits the recruitment potential of upper Racetrack Creek.

**Current Value:** Low

**Protection and Enhancement Value:** Medium

### **Value as a Tributary/Replacement Fishery:**

**Recreational Species Present:** Westslope Cutthroat Trout and Rainbow Trout

**Fish Density:** Based on electrofishing conducted in 2007, trout density is relatively high in upper Racetrack Creek. The entire fish community is comprised of westslope cutthroat trout, rainbow trout, and their hybrids (*Oncorhynchus* species).

**Fish Size:** Fish in upper Racetrack Creek do not typically attain very large size, although fish of catchable length are present in fairly good numbers throughout the stream. At both sites sampled in the reach in 2007, *Oncorhynchus* species had an average length of approximately 5 inches. The largest fish measured during our sampling was 10 inches in total length.

**Recruitment to non Clark Fork River Fishery:** N/A – Racetrack Creek is a direct tributary to the Clark Fork River.

**Current Value:** Medium

**Protection and Enhancement Value:** Medium

### **Value as a Native Fishery:**

**Native Species Present:** Westslope Cutthroat Trout

No genetic testing has been conducted on westslope cutthroat trout in upper Racetrack Creek. However, given the densities of rainbow trout in the stream, and the presence of obvious hybrids, it is reasonable to believe that genetic purity may be less than 90%.

**Competitor and/or Hybridizing Species Present:** Rainbow Trout

Rainbow trout are common in upper Racetrack Creek and their presence has resulted in obvious hybridization among the westslope cutthroat trout population.

**Demographics and Connectivity:** Based on electrofishing conducted in 2007, westslope cutthroat trout are present in relatively high densities in upper Racetrack Creek. However, many of the fish appear to be obvious hybrids with rainbow trout. The high numbers of fish, as well as the presence of several distinct age classes, indicates that the population is relatively robust. The largest fish measured in upper Racetrack Creek in 2007 was 10 inches in total length.

Racetrack Creek is a direct tributary to the Clark Fork River. However, a high-gradient cascade/waterfall is present near river mile 13.0. This feature appears to be a natural barrier that prevents any migratory fish from returning to the upper portion of the drainage to spawn. Therefore, it is likely that fish with a resident life history maintain the westslope cutthroat trout population in upper Racetrack Creek.

***Current Value:*** Low

***Protection and Enhancement Value:*** Low

### **Habitat Description:**

**Habitat Quality:** Habitat quality and riparian condition in upper Racetrack Creek is good. The primary land use in this portion of the watershed is motorized and non-motorized recreation on public land. Summer base flows are good in this reach of Racetrack Creek, and are not a limiting factor like in the lower reaches of the stream. Flow is augmented by upstream irrigation storage in high mountain lakes.

**Habitat Security:** Landownership along upper Racetrack Creek is comprised entirely of public lands administered by the U.S. Forest Service. Habitat security is likely to be good throughout the drainage.

**DRAINAGE:** Boulder Creek

**STREAM:** Royal Gold Creek

**REACH:** Entire stream

**Value as a Recruitment/Restoration Fishery for the Clark Fork River:**

**Species Present:** Westslope Cutthroat Trout, Brook Trout

**Fish Density/Number of Fish Produced:** Westslope cutthroat trout are found in low densities throughout the Royal Gold Creek drainage. Brook trout are found only in the lower portion of the drainage at low densities.

**Recruitment to and Connectivity with the Clark Fork River:** Some westslope cutthroat trout potentially outmigrate from Royal Gold Creek to the Upper Clark Fork River, although Royal Gold Creek is likely not a major source of recruitment to the Clark Fork River. Connectivity between Royal Gold Creek and the Upper Clark Fork appears to be good other than potential seasonal fish passage issues at some diversion dams in lower mainstem Flint Creek. The results of a recent radio telemetry study indicate that these dams are at least seasonally passable by migrating adult salmonids.

**Current Value:** Low

**Protection and Enhancement Value:** Low

**Value as a Tributary/Replacement Fishery:**

**Recreational Species Present:** Westslope cutthroat trout, Brook Trout

**Fish Density:** Westslope cutthroat trout are found in low densities throughout the Royal Gold Creek drainage. Brook trout are found only in the lower portion of the drainage at low densities.

**Fish Size:** Westslope cutthroat trout in the Royal Gold Creek drainage averaged 6" and reached a maximum size of 7". The two brook trout captured were both approximately 6" in length.

**Recruitment to non Clark Fork River Fishery:** Royal Gold Creek does provide a small number of westslope cutthroat trout that could outmigrate and be recruited into the mainstem Flint Creek fishery. However, electrofishing surveys in Flint Creek indicate that westslope cutthroat trout do not represent a significant portion of the recreational fishery. Westslope cutthroat trout from Royal Gold Creek may provide some recruitment to the mainstem Boulder Creek fishery which does receive some angling pressure.

**Current Value:** Low

**Protection and Enhancement Value:** Low

### **Value as a Native Fishery:**

**Native Species Present:** Westslope cutthroat trout are the only native trout present in Royal Gold Creek and densities are relatively low in the drainage. No genetic analyses have been completed for westslope cutthroat trout in Royal Gold Creek.

**Competitor and/or Hybridizing Species Present:** Brook trout are the only competitor in the drainage and their densities are quite low with only two captured in the lower electrofishing section.

**Demographics and Connectivity:** Westslope cutthroat trout are found in low densities throughout the Royal Gold Creek drainage, suggesting that this population is moderately stable. Connectivity between Royal Gold Creek and other tributaries to Boulder Creek is good and allows for genetic exchange with other populations and potentially re-founding of the population should it be lost. Connectivity between Royal Gold Creek and other westslope cutthroat trout populations in the Flint Creek drainage is fair as some migratory individuals appear to still exist in Flint Creek, but are not abundant.

***Current Value:*** Medium

***Protection and Enhancement Value:*** Medium

### **Habitat Description:**

**Habitat Quality:** Habitat quality in the Royal Gold Creek drainage was found to be excellent at the two sites surveyed with minimal habitat degradation being observed.

**Habitat Security:** Nearly all of the Royal Gold Creek drainage is located within lands administered by the Beaverhead-Deerlodge National Forest and thus is quite secure from future land use changes. The only private lands present in the Royal Gold Creek drainage are small mining claims.

**DRAINAGE:** Clark Fork River

**STREAM:** Ryan Creek

**REACH:** Entire stream

### **Value as a Recruitment/Restoration Fishery for the Clark Fork River:**

**Species Present:** Westslope Cutthroat Trout

**Fish Density/Number of Fish Produced:** Two single-pass electrofishing sections were completed in middle and lower Ryan Creek in 2006. Westslope cutthroat trout (WCT) densities were moderate at the lower site (~RM 0.25) and high at the site in the middle portion of the drainage (~RM 0.75). Ryan Creek is a small tributary drainage (~ 4 mi<sup>2</sup>), with a relatively short reach that is known to be fish-bearing (~1.25 miles). Therefore, the total number of fish produced in this drainage is low.

**Recruitment to and Connectivity with the Clark Fork River:** Ryan Creek currently enters a pond and irrigation system when it reaches the valley floor and is functionally disconnected from the Clark Fork River. Thus, Ryan Creek appears to provide little or no trout recruitment to the Clark Fork River

**Current Value:** Low

**Protection and Enhancement Value:** Low

### **Value as a Tributary/Replacement Fishery:**

**Recreational Species Present:** Westslope Cutthroat Trout

**Fish Density:** Two single-pass electrofishing sections were completed in middle and lower Ryan Creek in 2006. Westslope cutthroat trout (WCT) densities were moderate at the lower site (~RM 0.25) and high at the site in the middle portion of the drainage (~RM 0.75).

**Fish Size:** The size distribution of WCT in Ryan Creek was typical of stream-resident populations in the upper Clark Fork Basin. WCT in both electrofishing sections averaged 4 –5 inches and reached maximum lengths of 7-9 inches.

**Recruitment to non Clark Fork River Fishery:** N/A. Ryan Creek flows directly into a ditch and pond system adjacent to the Clark Fork River (historic channel of the Clark Fork River prior to relocation south of I-90) and thus cannot provide recruitment to a non Clark Fork River fishery.

**Current Value:** Low

**Protection and Enhancement Value:** Low

### **Value as a Native Fishery:**

**Native Species Present:** Westslope cutthroat trout were the only fish species observed at sampling locations on Ryan Creek. Genetic samples were collected in 2006 and analyses were completed for fish at both sites. Alleles characteristic of only westslope cutthroat trout were detected, suggesting that this population is genetically non-introgressed (> 95% certainty).

**Competitor and/or Hybridizing Species Present:** No non-native fish species were observed in the Ryan Creek drainage. Given the physical isolation from the rest of the Clark Fork river system, this will likely continue unless an unauthorized introduction occurs.

**Demographics and Connectivity:** Although westslope cutthroat trout abundance was moderate to high at sample sites in the Ryan Creek drainage, the length of fish-bearing habitat and overall fish abundance are relatively low. Small population size combined with no apparent connectivity to other Clark Fork Basin populations *theoretically* increases the risk of inbreeding depression and catastrophic loss in Ryan Creek in the long term. Size structure of westslope cutthroat trout in the stream indicated multiple year classes and consistent reproduction. While this genetically pure population is likely protected from future invasion by rainbow trout or westslope cutthroat/rainbow trout hybrids, this lack of connectivity does create demographic risks to the population.

**Current Value:** High

**Protection and Enhancement Value:** medium

### **Habitat Description:**

**Habitat Quality:** Habitat quality in Ryan Creek is good in the ~1.25 mile canyon reach from ~ RM 0.1 – 1.35 (known fish-bearing reach). Although this reach contains two undersized stream crossings, the riparian area and instream habitat are still intact. Below this reach, the stream enters an irrigation ditch and pond system that serves the valley ranch land in the vicinity. The ponds are portions of the historic Clark Fork River channel (moved south of I-90 in the mid-1900s). It is unlikely that surface water from Ryan Creek reaches the Clark Fork River. Upstream of the fish-bearing, canyon section, the stream is intermittent for an unknown distance (~ RM 1.35 – 1.75). The upper watershed is quite steep and has been managed for timber production by Plum Creek Timber Company (PCTC). An old instream reservoir (likely to enhance irrigation) still exists at ~ RM 2.25. It is not known if the reservoir or stream segments upstream support fish. No mining or riparian grazing impacts have been observed in the middle and lower portions of the drainage, but impacts are unknown in the upper watershed. Impacts related to the road system in the upper basin are also unknown.

**Habitat Security:** Until 2009, the majority (~70%) of the Ryan Creek watershed was owned by PCTC, with the remaining ~30% owned by various other private landowners.

Portions of the upper watershed (upstream of the reservoir) were purchased by The Nature Conservancy (TNC) as part of the Montana Legacy Project. Other private and PCTC lands in the watershed will likely remain in private ownership. Protection of these lands (particularly through the known fish-bearing reach) is likely given the steep and difficult (canyon) terrain.

**DRAINAGE:** Rock Creek  
**STREAM:** Sand Basin Creek  
**REACH:** Entire stream

### **Value as a Recruitment/Restoration Fishery for the Clark Fork River:**

**Species Present:** Westslope Cutthroat Trout

**Fish Density/Number of Fish Produced:** Westslope cutthroat trout densities were moderate at both the upper and lower electrofishing sections completed in Sand Basin Creek.

**Recruitment to and Connectivity with the Clark Fork River:** Due to the moderate to small size of Sand Basin Creek and the location of the drainage near the headwaters of Rock Creek, many river miles from the Clark Fork River, it is unlikely that this stream serves as a major source of recruitment to the Clark Fork River. It is possible however that Sand Basin Rock Creek does provide some westslope cutthroat outmigrants to the Clark Fork River.

**Current Value:** Low

**Protection and Enhancement Value:** Low

### **Value as a Tributary/Replacement Fishery:**

**Recreational Species Present:** Westslope Cutthroat Trout

**Fish Density:** Westslope cutthroat trout densities were moderate at both the upper and lower electrofishing sections completed in Sand Basin Creek.

**Fish Size:** Westslope cutthroat trout in the lower electrofishing section averaged 4.5" and reached a maximum length of 9" while westslope cutthroat trout in the upper section averaged 4" and reached a maximum length of 7.5".

**Recruitment to non Clark Fork River Fishery:** Sand Basin Creek does provide a moderate number of westslope cutthroat trout that could outmigrate and be recruited into the mainstem Rock Creek fishery. However, due to the relatively small size of the drainage, it is unlikely that Sand Basin Creek is a major source of recruitment to Rock Creek.

**Current Value:** Low

**Protection and Enhancement Value:** Low

### **Value as a Native Fishery:**

**Native Species Present:** Both bull and westslope cutthroat trout are present in Sand Basin Creek. No genetic analyses have been completed for westslope cutthroat trout in

Sand Basin Creek although genetic analyses were completed for westslope cutthroat trout in lower West Fork Rock Creek in 1991 and these fish were found to be 100% pure. Thus, it is assumed that Sand Basin Creek westslope cutthroat trout are pure although these analyses are quite dated.

**Competitor and/or Hybridizing Species Present:** No non-native fish were captured in Sand Basin Rock Creek, although non-native brown, rainbow, and brook trout are present in mainstem Rock Creek and could potentially invade the Sand Basin Creek drainage.

**Demographics and Connectivity:** Bull trout in the Sand Basin Creek drainage maintain relatively low densities and appear to occupy only a portion of the drainage (only captured in the upper electrofishing section). Thus, there is some question as to the long-term viability of this population. The presence of several other bull trout populations in the upper Rock Creek drainage provide possible sources of fish to maintain genetic variation within the Sand Basin Creek population or to re-found the population should it be lost. The connectivity between this population and other neighboring bull trout populations (i.e. West Fork Rock Creek, Middle Fork Rock Creek, etc...) via Rock Creek is excellent.

Westslope cutthroat trout maintain moderate to high densities in the Sand Basin Creek drainage and are found throughout the drainage, suggesting that this population is relatively strong. Connectivity between Sand Basin Creek and other westslope cutthroat trout populations in the upper Rock Creek drainage is quite good which allows for genetic exchange with other populations and potentially re-founding of the population should it be lost.

**Current Value:** High

**Protection and Enhancement Value:** High (*entire drainage in Forest Service ownership*)

### **Habitat Description:**

**Habitat Quality:** Habitat quality in the Sand Basin Creek drainage was quite good overall with only minor degradation observed in the lower portion of the drainage, likely due to past riparian grazing.

**Habitat Security:** The entire Sand Basin Creek drainage is located within lands administered by the Beaverhead- Deerlodge National Forest and thus is quite secure from future land use changes.

**DRAINAGE:** Lower Willow Creek

**STREAM:** Senia Creek

**REACH:** Entire stream

### **Value as a Recruitment/Restoration Fishery for the Clark Fork River:**

**Species Present:** Westslope Cutthroat Trout

**Fish Density/Number of Fish Produced:** Westslope cutthroat trout densities were quite low in the Senia Creek drainage although only one reach was sampled and it was located in the upper portion of the drainage.

**Recruitment to and Connectivity with the Clark Fork River:** Due to its small size and low densities of fish, it is unlikely that Senia Creek provides significant recruitment to the Clark Fork River.

*Current Value: Low*

*Protection and Enhancement Value: Low*

### **Value as a Tributary/Replacement Fishery:**

**Recreational Species Present:** Westslope Cutthroat Trout

**Fish Density:** Westslope cutthroat trout densities were quite low in the Senia Creek drainage although only one reach was sampled and it was located in the upper portion of the drainage.

**Fish Size:** Westslope cutthroat trout in Senia Creek averaged 5" in length and reached a maximum length of 6".

**Recruitment to non Clark Fork River Fishery:** Due to its small size and low densities of fish, it is unlikely that Senia Creek provides significant recruitment to any other fisheries.

*Current Value: Low*

*Protection and Enhancement Value: Low*

### **Value as a Native Fishery:**

**Native Species Present:** Westslope cutthroat trout are the only native trout present in Senia Creek and it is assumed that these fish are genetically pure based on genetic analyses from adjacent drainages (i.e. North and West Forks Lower Willow Creek).

**Competitor and/or Hybridizing Species Present:** No other species were captured in the one electrofishing section completed on Senia Creek.

**Demographics and Connectivity:** The demographics of Senia Creek is a concern due to the relatively low densities of fish in the drainage, however only one electrofishing section was completed in the drainage and this section was located high in the drainage (higher fish densities expected lower in the drainage). Genetic sampling from adjacent drainages suggest that this population is genetically pure and all other connected streams also maintain only pure westslope cutthroat trout. Similar to other tributaries to Lower Willow Creek, Senia Creek is relatively isolated due to the presence of Lower Willow Dam, however several other pure westslope cutthroat trout populations exist in the North and South Fork Willow Creek drainages to provide for genetic exchange and potentially re-founding of the population should it be lost.

***Current Value: High***

***Protection and Enhancement Value: High***

**Habitat Description:**

**Habitat Quality:** Habitat quality in the upper portion of Senia Creek was considered to be poor. Riparian grazing in this reach appears to limit recruitment and growth of woody riparian vegetation leading to bank instability, poor stream shading, and a lack of quality pools.

**Habitat Security:** Upper Senia Creek flows through lands administered by the Beaverhead Deerlodge National Forest and thus maintain good habitat security. The remainder of the drainage (greater than half the drainage area) is owned by either a commercial timber company or other private landowners and could potentially undergo future changes in land and water use that could significantly degrade habitat in this drainage.

**DRAINAGE:** Little Blackfoot River

**STREAM:** Slate Creek

**REACH:** All

### **Value as a Recruitment/Restoration Fishery for the Clark Fork River:**

**Species Present:** Westslope Cutthroat Trout, Brook Trout, and Brown Trout

**Fish Density/Number of Fish Produced:** Based on 2008 electrofishing, westslope cutthroat trout are present in moderate densities throughout much of Slate Creek. While brook trout and brown trout also occur in the stream, both species are rare and appear to be limited to the lowest extent of the drainage.

**Recruitment to and Connectivity with the Clark Fork River:** Slate Creek is a very small tributary to the Little Blackfoot River. A large human constructed rock dam spans the stream and the floodplain near its mouth. This dam likely restricts both upstream and downstream fish movement, although it may not be a complete barrier as was originally believed. Nevertheless, the small size of the stream and the presence of this potential barrier limit the recruitment potential of Slate Creek.

**Current Value:** Low

**Protection and Enhancement Value:** Low

### **Value as a Tributary/Replacement Fishery:**

**Recreational Species Present:** Westslope Cutthroat Trout, Brook Trout, and Brown Trout

**Fish Density:** Based on 2008 electrofishing, westslope cutthroat trout are present in moderate densities throughout much of Slate Creek. While brook trout and brown trout also occur in the stream, both species are rare and appear to be limited to the lowest extent of the drainage.

**Fish Size:** Fish in Slate Creek do not typically attain very large size, although fish of catchable length are present in the stream. At the several sites sampled in the drainage in 2008, westslope cutthroat trout had an average length of about 5 inches. Maximum fish size was about 8 inches. As mentioned above, brook trout and brown trout do not comprise a significant component of the fishery in Slate Creek.

**Recruitment to non Clark Fork River Fishery:** Slate Creek is a very small tributary to the Little Blackfoot River. A large human constructed rock dam spans the stream and the floodplain near its mouth. This dam likely restricts both upstream and downstream fish movement, although it may not be a complete barrier as was originally believed. Nevertheless, the small size of the stream and the presence of this potential barrier limit the recruitment potential of Slate Creek.

**Current Value:** Low

**Protection and Enhancement Value:** Low

**Value as a Native Fishery:**

**Native Species Present:** Westslope Cutthroat Trout

Genetic testing conducted in 2008 suggests that westslope cutthroat trout in Slate Creek are genetically pure.

**Competitor and/or Hybridizing Species Present:** Brook Trout and Brown Trout

Brook trout and brown trout were observed in lower Slate Creek during 2008 sampling. Currently however, neither species appears to be very abundant, and their effect on westslope cutthroat trout is likely limited.

**Demographics and Connectivity:** Based on 2008 electrofishing, westslope cutthroat trout comprise most of the fish community in Slate Creek. The species is present in moderate densities throughout much of stream, and the presence of several age classes of fish (including young-of-the-year and fish large enough to be resident adults) suggests there is successful recruitment. The largest fish handled in Slate Creek during 2008 sampling was about 8" in total length. Fish of this size likely represent adults with a resident life history.

Slate Creek is a very small tributary to the Little Blackfoot River. A large human constructed rock dam spans the stream and the floodplain near its mouth. This dam likely restricts both upstream and downstream fish movement, although it may not be a complete barrier as was originally believed. Nevertheless, the westslope cutthroat trout population in Slate Creek appears to be fairly isolated. The total length of stream capable of supporting fish above the rock dam appears to be less than 2 miles. While the limited connectivity may have benefited the existing westslope cutthroat trout population in Slate Creek by limiting the invasion of non-native species such as brook trout and brown trout, risks of isolation (i.e. inbreeding depression, local extinction, etc.) are of some concern.

**Current Value:** Medium

**Protection and Enhancement Value:** High

**Habitat Description:**

**Habitat Quality:** Habitat quality and riparian condition along Slate Creek is fair at best. The drainage is small and streamflow is quite low, especially in the upper and lower reaches of the stream. The middle segment of the drainage appears to provide the bulk of the better habitat present. In addition to low flow, much of Slate Creek flows through a U.S. Forest Service grazing allotment, and livestock use of the riparian zone is evident. Woody riparian vegetation along the channel tends to be patchy, and the lack of woody

plants in some areas of the stream has reduced stream shading and habitat complexity, as well as increased sedimentation by making the streambanks more susceptible to erosion. Closer to the mouth, the stream flows through a flood irrigated pasture, and habitat is relatively simple throughout this area.

**Habitat Security:** Landownership along Slate Creek is comprised largely of National Forest lands. However, the lower 0.7 miles of the stream does flow primarily across private land. The primary land uses in the watershed are livestock grazing and timber harvest. Livestock use of the riparian area is apparent throughout much of the drainage, and this activity could make habitat security a concern if not closely managed. Additionally, at least two small irrigation diversions are present in the lower reaches of the stream. It is unknown to what extent these diversions affect summer base flows in lower Slate Creek.

**DRAINAGE:** Flint Creek

**STREAM:** Smart Creek

**REACH:** Entire stream

### **Value as a Recruitment/Restoration Fishery for the Clark Fork River:**

**Species Present:** Westslope Cutthroat Trout

**Fish Density/Number of Fish Produced:** Two electrofishing sections were completed in Smart Creek in 2008. Westslope cutthroat trout densities in the lower section were moderate while westslope cutthroat trout densities were very high in the upper section.

**Recruitment to and Connectivity with the Clark Fork River:** Smart Creek is a tributary to Henderson Creek and it is suspected (conversations with a local landowner) that lower Henderson Creek (near the mouth) is intermittent. Thus, it is also suspected that Smart Creek is only connected to Flint Creek during high flow periods and that outmigrants from Smart Creek can only reach Flint Creek during this time of year. Based on this limited connectivity, it is assumed that Smart Creek provides a relatively small amount of recruitment to the Clark Fork River.

*Current Value: Low*

*Protection and Enhancement Value: Low*

### **Value as a Tributary/Replacement Fishery:**

**Recreational Species Present:** Westslope Cutthroat Trout

**Fish Density:** Two electrofishing sections were completed in Smart Creek in 2008. Westslope cutthroat trout densities in the lower section were moderate while westslope cutthroat trout densities were very high in the upper section.

**Fish Size:** Westslope cutthroat trout in both electrofishing sections averaged 4.5". Westslope cutthroat trout captured in the lower section reached a maximum length of 7" while westslope cutthroat trout captured in the upper section reached a maximum length of 8.5".

**Recruitment to non Clark Fork River Fishery:** Smart Creek is a tributary to Henderson Creek and it is suspected (conversations with a local landowner) that lower Henderson Creek (near the mouth) is intermittent. Thus, it is also suspected that Smart Creek is only connected to Flint Creek during high flow periods and that outmigrants from Smart Creek can only reach Flint Creek during this time of year. Based on this limited connectivity, it is assumed that Smart Creek provides a relatively small amount of recruitment to Flint Creek.

*Current Value: Low*

*Protection and Enhancement Value: Low*

### **Value as a Native Fishery:**

**Native Species Present:** Westslope cutthroat trout are the only native trout present in Smart Creek. Westslope cutthroat trout from Smart Creek were genetically tested in 1992 and alleles characteristic of both westslope cutthroat trout and Yellowstone cutthroat trout were detected (98.7% westslope cutthroat trout, 1.3% Yellowstone cutthroat trout). Interestingly, Smart Creek westslope cutthroat trout were genetically tested again in 2009 and alleles characteristic of both westslope cutthroat trout and rainbow trout were detected (99.5% westslope cutthroat trout, 0.5% rainbow trout) with no alleles characteristic of Yellowstone cutthroat trout being detected.

**Competitor and/or Hybridizing Species Present:** No non-native fish were captured in Smart Creek.

**Demographics and Connectivity:** Westslope cutthroat trout maintain moderate to high densities in Smart Creek and appear to be distributed throughout the drainage, suggesting the population is stable. Connectivity and its affect on demographics is difficult to determine as Smart Creek appears to only be connected to Flint Creek seasonally, based on a conversation with a local landowner. While seasonal connectivity is assumed for this prioritization exercise, further investigation is necessary to truly assess connectivity of Smart Creek.

*Current Value: High*

*Protection and Enhancement Value: High*

### **Habitat Description:**

**Habitat Quality:** Habitat conditions in the upper portion of Smart Creek (upper survey site) were quite degraded due to riparian grazing impacts and its associated impact on fish habitat. Similar habitat degradation was also observed at the lower survey site due to riparian grazing, although the impacts were not severe as observed upstream. Overall, habitat conditions in Smart Creek were considered fair.

**Habitat Security:** A majority of the Smart Creek drainage flows through federal lands administered by either the Beaverhead-Deerlodge National Forest or the Bureau of Land Management and are quite secure. A small portion of the lower drainage is in private ownership and future changes in land and water uses could occur on these parcels.

**DRAINAGE:** Little Blackfoot River

**STREAM:** Snowshoe Creek

**REACH:** Upper – Lois Lake Dam to Headwaters

### **Value as a Recruitment/Restoration Fishery for the Clark Fork River:**

**Species Present:** Brown Trout and Westslope Cutthroat Trout

**Fish Density/Number of Fish Produced:** Based on limited electrofishing conducted in 2007, total trout densities are rather moderate in upper Snowshoe Creek. Westslope cutthroat trout are present in similar densities to brown trout, with neither species being overly abundant.

**Recruitment to and Connectivity with the Clark Fork River:** Snowshoe Creek is a fair sized tributary to the Little Blackfoot River. While the lower reaches of the stream are likely an important source of brown trout recruitment for the Little Blackfoot and Clark Fork Rivers, the value of the upper reaches of the stream as a recruitment source of westslope cutthroat trout is more uncertain. Although sampling was limited to only one site in lower Snowshoe Creek in 2007, the lack of westslope cutthroat trout in this section suggests that the species may have limited dispersal and/or survival in downstream reaches. Additionally, Lois Lake, a 25-acre private reservoir, is located on Snowshoe Creek at RM 6.3. The dam and outlet appear to restrict fish movement, and subsequently may affect the recruitment potential of upper Snowshoe Creek.

**Current Value:** Low

**Protection and Enhancement Value:** Low

### **Value as a Tributary/Replacement Fishery:**

**Recreational Species Present:** Brown Trout and Westslope Cutthroat Trout

**Fish Density:** Based on limited electrofishing conducted in 2007, total trout densities are rather moderate in upper Snowshoe Creek. Westslope cutthroat trout are present in similar densities to brown trout, with neither species being overly abundant.

**Fish Size:** Based on 2007 electrofishing, fish tend to be relatively small in upper Snowshoe Creek, although catchable size fish are present. At the one site sampled in this part of the stream, both westslope cutthroat trout and brown trout had an average length of about 5 inches, with each species appearing to reach a maximum size of about 8 inches.

**Recruitment to non Clark Fork River Fishery:** Snowshoe Creek is a fair sized tributary to the Little Blackfoot River. While the lower reaches of the stream are likely an important source of brown trout recruitment for the Little Blackfoot River, the value of the upper reaches of the stream as a recruitment source of westslope cutthroat trout is more uncertain. Although sampling was limited to only one site in lower Snowshoe

Creek in 2007, the lack of westslope cutthroat trout in this section suggests that the species may have limited dispersal and/or survival in downstream reaches. Additionally, Lois Lake, a 25-acre private reservoir, is located on Snowshoe Creek at RM 6.3. The dam and outlet appear to restrict fish movement, and subsequently may affect the recruitment potential of upper Snowshoe Creek.

***Current Value: Low***

***Protection and Enhancement Value: Low***

**Value as a Native Fishery:**

**Native Species Present:** Westslope Cutthroat Trout

Genetic tests of westslope cutthroat trout collected from upper Snowshoe Creek in 1988 and 1992 suggest that the population is genetically pure.

**Competitor and/or Hybridizing Species Present:** Brown Trout

Brown trout appear to be relatively common throughout much of upper Snowshoe Creek, and the species likely competes with, and preys on, westslope cutthroat trout. Brown trout are likely the primary threat to the long-term viability of westslope cutthroat trout in upper Snowshoe Creek.

**Demographics and Connectivity:** Based on 2007 electrofishing, westslope cutthroat trout are present in relatively low densities in upper Snowshoe Creek. Despite this, the population appears to be somewhat viable as several age classes were observed during 2007 sampling. The largest fish handled in upper Snowshoe Creek in 2007 was about 8 inches in total length.

Snowshoe Creek is a direct tributary to the Little Blackfoot River. However, it is doubtful if the upper portion of the stream provides any significant recruitment of westslope cutthroat trout. Lois Lake (a 25-acre reservoir) is located on Snowshoe Creek at RM 6.3. The outlet of the dam appears to restrict upstream fish movement, and has likely isolated the westslope cutthroat trout population in upper Snowshoe Creek. No westslope cutthroat trout were observed in lower Snowshoe Creek during 2007 sampling, which suggests that the species has limited dispersal or survival in downstream reaches. It is likely that fish with a resident life history maintain the westslope cutthroat trout population in upper Snowshoe Creek. The risks of being isolated (i.e. inbreeding depression, local extinction, etc.), as well as persistent competition with brown trout, makes the long-term viability of this population a concern.

***Current Value: Medium***

***Protection and Enhancement Value: Medium***

### **Habitat Description:**

**Habitat Quality:** Habitat quality and riparian condition is mostly fair in upper Snowshoe Creek. Throughout much of this reach, historic placer mining activity in the channel has notably affected habitat quality. Additionally, impacts from past timber harvest as well as continued livestock grazing in the riparian area has also affected habitat quality and riparian condition in portions of upper Snowshoe Creek. Woody riparian vegetation along the channel tends to be patchy, and the lack of woody plants in some areas of the stream has reduced stream shading and habitat complexity.

**Habitat Security:** Landownership in upper Snowshoe Creek is a mixture of private and public lands (National Forest). The primary land uses in the drainage are livestock grazing and timber harvest. Additionally, there are also lasting affects of past mining activity in the upper portion of the watershed. The mixed nature of the ownership and current land uses make habitat security a somewhat of a concern throughout much of upper Snowshoe Creek.

**DRAINAGE:** Boulder Creek

**STREAM:** South Boulder Creek

**REACH:** Entire stream

### **Value as a Recruitment/Restoration Fishery for the Clark Fork River:**

**Species Present:** Westslope Cutthroat Trout

**Fish Density/Number of Fish Produced:** Two electrofishing sections were completed in South Boulder Creek in 2007. Westslope cutthroat trout densities were moderate throughout the sampled portion of the South Boulder drainage.

**Recruitment to and Connectivity with the Clark Fork River:** Some westslope cutthroat trout potentially outmigrate from South Boulder Creek to the Upper Clark Fork River. Connectivity between South Boulder Creek and the Upper Clark Fork appears to be good other than potential seasonal fish passage issues at some diversion dams in lower mainstem Flint Creek. The results of a recent radio telemetry study indicate that these dams are at least seasonally passable by migrating adult salmonids.

**Current Value:** Medium

**Protection and Enhancement Value:** Medium

### **Value as a Tributary/Replacement Fishery:**

**Recreational Species Present:** Westslope Cutthroat Trout

**Fish Density:** Two electrofishing sections were completed in South Boulder Creek in 2007. Westslope cutthroat trout densities were moderate throughout the sampled portion of the South Boulder drainage.

**Fish Size:** Westslope cutthroat trout in South Boulder Creek averaged 5" in length and reached maximum lengths of 10".

**Recruitment to non Clark Fork River Fishery:** South Boulder Creek does provide a moderate number of westslope cutthroat trout that could outmigrate and be recruited into the mainstem Flint Creek fishery. However, electrofishing surveys in Flint Creek indicate that westslope cutthroat trout do not represent a significant portion of the recreational fishery. Westslope cutthroat trout from South Boulder Creek likely do provide recruitment to the mainstem Boulder Creek fishery which does receive some angling pressure.

**Current Value:** Medium

**Protection and Enhancement Value:** Medium

### **Value as a Native Fishery:**

**Native Species Present:** Both bull and westslope cutthroat trout are present in the South Boulder Creek drainage, although bull trout densities are relatively low in the drainage. No genetic analyses have been completed for westslope cutthroat trout in South Boulder Creek.

**Competitor and/or Hybridizing Species Present:** No non-native fish were captured in South Boulder Creek, although non-native brook and brown trout are present in the Boulder Creek drainage and could potentially invade the South Boulder Creek drainage.

**Demographics and Connectivity:** The viability of bull trout in South Boulder Creek is questionable due to low number of fish present in the drainage. South Boulder Creek is connected with the Boulder Creek population, which provides a source of genetic exchange and the potential to re-found the population should it be lost. However, the Boulder Creek population is the only bull trout population left in the Flint Creek drainage and thus has the inherent demographic risk of no local populations to re-found it, should it be lost.

Westslope cutthroat trout are moderately abundant in the South Boulder Creek drainage and are found throughout the drainage, suggesting that this population is relatively strong. Connectivity between South Boulder Creek and other tributaries to Boulder Creek is excellent and allows for genetic exchange with other populations and potentially re-founding of the population should it be lost. Connectivity between South Boulder Creek and other westslope cutthroat trout populations in the Flint Creek drainage is fair as some migratory individuals appear to still exist in Flint Creek, but are not abundant.

***Current Value: High***

***Protection and Enhancement Value: High***

### **Habitat Description:**

**Habitat Quality:** Habitat quality in the South Boulder Creek drainage was found to be excellent at the two sites surveyed with minimal habitat degradation being observed.

**Habitat Security:** Nearly all of the South Boulder Creek drainage is located within lands administered by the Beaverhead-Deerlodge National Forest and thus is quite secure from future land use changes. The only private lands present in the South Boulder drainage are small mining claims.

**DRAINAGE:** Flint Creek

**STREAM:** South Fork Marshall Creek (un-named tributary to Marshall Creek)

**REACH:** Entire stream

### **Value as a Recruitment/Restoration Fishery for the Clark Fork River:**

**Species Present:** Westslope Cutthroat Trout

**Fish Density/Number of Fish Produced:** Westslope cutthroat trout densities were very high in the one electrofishing section sampled on South Fork Marshall Creek in 2008.

**Recruitment to and Connectivity with the Clark Fork River:** South Fork Marshall Creek maintains very high densities of westslope cutthroat trout in the lower portion of the drainage and some of these fish may outmigrate to the Clark Fork River. Due to the small size of the drainage however it is unlikely that South Fork Marshall Creek is a significant source of recruitment to the Clark Fork River.

*Current Value: Low*

*Protection and Enhancement Value: Low*

### **Value as a Tributary/Replacement Fishery:**

**Recreational Species Present:** Westslope cutthroat trout

**Fish Density:** Westslope cutthroat trout densities were very high in the one electrofishing section sampled on South Fork Marshall Creek in 2008.

**Fish Size:** Westslope cutthroat trout in South Fork Marshall Creek averaged 3" and reached a maximum length of 7.5".

**Recruitment to non Clark Fork River Fishery:** South Fork Marshall Creek maintains very high densities of westslope cutthroat trout in the lower portion of the drainage and some of these fish may outmigrate to Flint Creek. Due to the small size of the drainage however it is unlikely that South Fork Marshall Creek is a significant source of recruitment to Flint Creek.

*Current Value: Low*

*Protection and Enhancement Value: Low*

### **Value as a Native Fishery:**

**Native Species Present:** Westslope cutthroat trout are the only native trout present in South Fork Marshall Creek. Westslope cutthroat trout from South Fork Marshall Creek were genetically tested in 2009 and alleles characteristic of both westslope cutthroat trout and rainbow trout were detected (98.7% westslope cutthroat trout, 1.8% rainbow trout).

**Competitor and/or Hybridizing Species Present:** No non-native fish were captured in South Fork Marshall Creek, although non-native brook are present in the Marshall Creek drainage and could potentially invade the South Fork Marshall Creek drainage.

**Demographics and Connectivity:** Westslope cutthroat trout are highly abundant in the South Fork Marshall Creek drainage, suggesting that this population is relatively strong. Connectivity between South Fork Marshall Creek and Marshall Creek appears adequate which allows for genetic exchange with the Marshall Creek population and potentially re-founding of the South Fork Marshall Creek population should it be lost. Connectivity between South Fork Marshall Creek and other westslope cutthroat trout populations in the Flint Creek drainage is fair as some migratory individuals appear to still exist in Flint Creek, but are not abundant.

*Current Value: Medium*

*Protection and Enhancement Value: Medium*

**Habitat Description:**

**Habitat Quality:** Significant habitat degradation was observed at the one survey site on South Fork Marshall Creek and this degradation appeared to be caused by riparian grazing in the reach.

**Habitat Security:** A majority of South Fork Marshall Creek flows through private lands and is susceptible to future changes in land and water uses that could significantly degrade habitat in this drainage.

**DRAINAGE:** Ross Fork Rock Creek

**STREAM:** South Fork Rock Creek

**REACH:** Entire stream

### **Value as a Recruitment/Restoration Fishery for the Clark Fork River:**

**Species Present:** Westslope Cutthroat Trout

**Fish Density/Number of Fish Produced:** Westslope cutthroat trout densities were found to be moderate in the South Fork Rock Creek drainage. Only one section was completed in the lower portion of the drainage due to the remoteness of the stream, thus fish densities higher in the drainage are unknown.

**Recruitment to and Connectivity with the Clark Fork River:** Due to the small size of South Fork Rock Creek and the location of the drainage near the headwaters of Rock Creek, many river miles from the Clark Fork River, it is unlikely that this stream serves as a major source of recruitment to the Clark Fork River. It is possible however that South Fork Rock Creek does provide some westslope cutthroat outmigrants to the Clark Fork River.

*Current Value: Low*

**Protection and Enhancement Value:** Low

### **Value as a Tributary/Replacement Fishery:**

**Recreational Species Present:** Westslope Cutthroat Trout

**Fish Density:** Westslope cutthroat trout densities were found to be moderate in the South Fork Rock Creek drainage. Only one section was completed in the lower portion of the drainage due to the remoteness of the stream, thus fish densities higher in the drainage are unknown.

**Fish Size:** Westslope cutthroat trout averaged 4" and were captured as large as 6.5" in South Fork Rock Creek.

**Recruitment to non Clark Fork River Fishery:** South Fork Rock Creek does provide a moderate number of westslope cutthroat trout that could outmigrate and be recruited into the mainstem Rock Creek fishery. However, due to the relatively small size of the drainage, it is unlikely that South Fork Rock Creek is a major source of recruitment to Rock Creek.

*Current Value: Medium*

**Protection and Enhancement Value:** Medium

### **Value as a Native Fishery:**

**Native Species Present:** Both bull and westslope cutthroat trout are present in the South Fork Rock Creek drainage, although bull trout densities may be relatively low as only two were captured. Fish densities are based on only one section of South Fork Rock Creek due to the remoteness of the stream. No genetic analyses have been completed for westslope cutthroat trout in South Fork Rock Creek although it is suspected that no hybridization has occurred due to the remoteness of the drainage and its location within the upper portion of Ross Fork Rock Creek.

**Competitor and/or Hybridizing Species Present:** No competing or hybridizing species were captured in the drainage, although this is based on only one electrofishing section.

**Demographics and Connectivity:** The viability of the South Fork Rock Creek bull trout population is somewhat questionable based to the small number of fish captured, although only one electrofishing section was sampled. However, the presence of several other bull trout populations in the upper Rock Creek drainage (i.e. Ross Fork, West Fork, Middle Fork, etc...) provide possible sources of fish to maintain genetic variation within this population or to re-found the population should it be lost.

Westslope cutthroat trout are moderately abundant in the South Fork Rock Creek drainage, suggesting that this population is stable. Connectivity between South Fork Rock Creek and other westslope cutthroat trout populations in the upper Rock Creek drainage is quite good which allows for genetic exchange with other populations and potentially re-founding of the population should it be lost.

***Current Value: High***

***Protection and Enhancement Value: High (entire drainage in Forest Service ownership)***

### **Habitat Description:**

**Habitat Quality:** South Fork Rock Creek flows entirely through a road-less portion of the Beaverhead Deerlodge National Forest and thus exhibits minimal habitat degradation

**Habitat Security:** South Fork Rock Creek flows entirely through a road-less portion of the Beaverhead Deerlodge National Forest and thus security for this stream is quite good.

**DRAINAGE:** Little Blackfoot River  
**STREAM:** Spotted Dog Creek  
**REACH:** Upper –Reservoir to Headwaters

### **Value as a Recruitment/Restoration Fishery for the Clark Fork River:**

**Species Present:** Westslope Cutthroat Trout, Brown Trout, and Brook Trout

**Fish Density/Number of Fish Produced:** Based on 2007 electrofishing, westslope cutthroat trout comprise much of the fishery in upper Spotted Dog Creek, and fish occur at fairly high densities. While brook trout are also present in the reach, their abundance appears to be low. However, because we were denied access to a significant portion of the stream that was on private land, our sampling was limited to just one site on U.S. Forest Service land located in the upper portion of the drainage.

**Recruitment to and Connectivity with the Clark Fork River:** Spotted Dog Creek is a direct tributary to the Little Blackfoot River. However, a sizeable reservoir is located on the stream at river mile 5.5. The outlet/spillway of this reservoir appears to preclude any upstream fish passage. Nevertheless, downstream movement appears possible, and it is likely that upper Spotted Dog Creek provides at least some westslope cutthroat trout recruitment for the Little Blackfoot and Clark Fork Rivers. However, the overall contribution to the Clark Fork may currently be rather low. While brook trout are also present in upper Spotted Dog Creek, this species generally does not exhibit significant migratory tendencies, and thus has a rather low recruitment value.

**Current Value:** Low

**Protection and Enhancement Value:** Medium

### **Value as a Tributary/Replacement Fishery:**

**Recreational Species Present:** Westslope Cutthroat Trout and Brook Trout

**Fish Density:** Based on 2007 electrofishing, westslope cutthroat trout comprise much of the fishery in upper Spotted Dog Creek, and fish occur at fairly high densities. While brook trout are also present in the reach, their abundance appears to be low. However, because we were denied access to a significant portion of the stream that was on private land, our sampling was limited to just one site on U.S. Forest Service land located in the upper portion of the drainage.

**Fish Size:** Catchable sized fish are relatively uncommon in upper Spotted Dog Creek. However, this is based on 2007 electrofishing at one sample site that was located in the upper extent of the drainage where the stream is fairly small. At this site, westslope cutthroat trout averaged a little less than 4 inches in length, with the largest fish handled being just under 7 inches. Only a handful of brook trout were captured during 2007 sampling, and all ranged between about 4 and 6 inches in total length. While it is likely that larger fish of more catchable size exist lower in the reach (where the stream is larger

and has more available habitat), this was unable to be confirmed since we were denied sampling access.

**Recruitment to non Clark Fork River Fishery:** Spotted Dog Creek is a direct tributary to the Little Blackfoot River. However, a sizeable reservoir is located on the stream at river mile 5.5. The outlet/spillway of this reservoir appears to preclude any upstream fish passage. Nevertheless, downstream movement appears possible, and it is likely that upper Spotted Dog Creek provides at least some westslope cutthroat trout recruitment for the Little Blackfoot River. While brook trout are also present in upper Spotted Dog Creek, this species generally does not exhibit significant migratory tendencies, and thus has a rather low recruitment value.

***Current Value: Medium***

***Protection and Enhancement Value: Medium***

**Value as a Native Fishery:**

**Native Species Present:** Westslope Cutthroat Trout

Limited genetic sampling conducted in 1989 (fish were collected on U.S. Forest Service land), suggests that westslope cutthroat trout in upper Spotted Dog Creek are genetically pure.

**Competitor and/or Hybridizing Species Present:** Brook Trout

Brook trout are present in upper Spotted Dog Creek. However, their densities seem relatively low based on limited electrofishing that was conducted in the reach in 2007. Due to their apparent low abundance, it is likely that brook trout are not currently exerting a heavy competitive pressure on westslope cutthroat trout in upper Spotted Dog Creek. However, there is some concern that the population could expand in the future, and thus threaten the long-term viability of westslope cutthroat trout.

**Demographics and Connectivity:** Based on limited electrofishing conducted in 2007 (one site on U.S. Forest Service land in the upper portion of the drainage), westslope cutthroat trout comprise much of the fishery in upper Spotted Dog Creek. The species is present in relatively high densities, although the bulk of this density appears to be comprised of young juveniles. While several age classes of fish were apparent during 2007 sampling, the bulk of the fish collected were likely about one year of age. Larger fish capable of being resident sized adults (i.e. >6 inches) were present, but were not nearly as common. The average length of westslope cutthroat trout handled during 2007 sampling was a little less than 4 inches. The largest fish measured was just under 7 inches. It is likely that fish with a resident life history maintain the westslope cutthroat trout population in upper Spotted Dog Creek.

Spotted Dog Creek is a direct tributary to the Little Blackfoot River. However, a sizeable reservoir is located on the stream at river mile 5.5. The outlet/spillway of this reservoir

appears to preclude any upstream fish passage (including migratory fish trying to return to the reach to spawn). While the lack of connectivity may have benefited the existing westslope cutthroat trout population in upper Spotted Dog Creek by limiting the invasion of non-native species such as brown trout and rainbow trout, risks of isolation (i.e. inbreeding depression, local extinction, etc.) remain. However, these risks are somewhat reduced by the presence of several connected fish bearing tributaries (i.e. Middle and South Forks of Spotted Dog Creek).

***Current Value: High***

***Protection and Enhancement Value: High***

### **Habitat Description:**

**Habitat Quality:** Habitat quality and riparian condition along upper Spotted Dog Creek is variable, but ranges from fair to good. Habitat condition in the reach has been affected by several factors including livestock grazing in the riparian zone, irrigation withdrawal, timber harvest, and roads. In the lower portion of the reach (downstream of the U.S. Forest Service boundary), habitat is considered to be in fair condition. Woody riparian vegetation along the channel tends to be patchy, and the lack of woody plants in some areas of the reach has reduced stream shading and habitat complexity, as well as increased sedimentation by making the streambanks susceptible to erosion. In the upper portion of the reach (upstream of the U.S. Forest Service boundary), habitat appears to be in relatively good condition, although impacts from past timber harvest and present livestock grazing are evident along segments of the channel.

**Habitat Security:** Landownership and habitat security along upper Spotted Dog Creek is divided. The upper portion of the reach lies exclusively on lands managed by the U.S. Forest Service. Habitat security is fairly good in this segment, although impacts of past timber harvest and current livestock grazing do pose some risk. In the lower reaches of upper Spotted Dog Creek, land ownership is comprised mostly of private land used primarily for livestock grazing and hay production. There is a sizeable diversion located near the U.S. Forest Service boundary that has the potential to affect streamflow during marginal flow years. Additionally, the land along this segment of upper Spotted Dog Creek is relatively developable, and subdivision should not be ignored as a potential future land use. The nature of the ownership and land use in this portion of the stream does make habitat security a concern.

**DRAINAGE:** Lower Willow Creek

**STREAM:** Spring Creek

**REACH:** Entire stream

### **Value as a Recruitment/Restoration Fishery for the Clark Fork River:**

**Species Present:** Westslope Cutthroat Trout

**Fish Density/Number of Fish Produced:** Westslope cutthroat trout densities are relatively low in the Spring Creek drainage. The small size of the drainage and minimal flow in Spring Creek appears to limit fish densities in the drainage.

**Recruitment to and Connectivity with the Clark Fork River:** Due to its small size and low densities of fish, it is unlikely that this drainage provides significant recruitment to the Clark Fork River.

**Current Value:** Very Low

**Protection and Enhancement Value:** Very Low

### **Value as a Tributary/Replacement Fishery:**

**Recreational Species Present:** Westslope Cutthroat Trout

**Fish Density:** Westslope cutthroat trout densities are relatively low in the Spring Creek drainage. The small size of the drainage and minimal flow in Spring Creek appears to limit fish densities in the drainage.

**Fish Size:** Westslope cutthroat trout in Spring Creek averaged 3.5" and reached a maximum length of 6".

**Recruitment to non Clark Fork River Fishery:** Due to its small size and low densities of fish, it is unlikely that this drainage provides significant recruitment to any other fisheries.

**Current Value:** Very Low

**Protection and Enhancement Value:** Very Low

### **Value as a Native Fishery:**

**Native Species Present:** Westslope cutthroat trout are the only native trout present in Spring Creek and it is assumed that these fish are genetically pure based on genetic analyses from adjacent drainages (i.e. North and West Forks Lower Willow Creek).

**Competitor and/or Hybridizing Species Present:** No other species were captured in Spring Creek.

**Demographics and Connectivity:** The demographics of Spring Creek are a concern due to the small size of the drainage and the relatively low densities of fish in the drainage, both of which bring into question the viability of the population. However, genetic sampling from adjacent drainages suggest that this population is genetically pure and all other connected streams also maintain only pure westslope cutthroat trout. Similar to other tributaries to Lower Willow Creek, Spring Creek is relatively isolated due to the presence of Lower Willow Dam, however several other pure westslope cutthroat trout populations exist in the North and South Fork Willow Creek drainages to provide for genetic exchange and potentially re-founding of the population should it be lost.

***Current Value:*** Medium

***Protection and Enhancement Value:*** Medium

**Habitat Description:**

**Habitat Quality:** Habitat quality in the Spring Creek drainage is considered poor. Heavy riparian grazing has caused significant damage to the woody riparian vegetation and extensive hoof shear along the channel. This has led to significant channel overwidening, loss of pool habitat, and a substantial reduction in stream shading.

**Habitat Security:** Spring Creek flows entirely through private ranch lands and thus could potentially undergo future changes in land and water use that could significantly degrade habitat in this drainage.

**DRAINAGE:** Little Blackfoot River

**STREAM:** Telegraph Creek

**REACH:** All

### **Value as a Recruitment/Restoration Fishery for the Clark Fork River:**

**Species Present:** Brook Trout, Westslope Cutthroat Trout, and Brown Trout

**Fish Density/Number of Fish Produced:** Based on 2007 electrofishing, total trout density is moderate to high throughout much of Telegraph Creek, with brook trout comprising much of the fish community. Westslope cutthroat trout also occur in Telegraph Creek, but tend to be in low to moderate densities. Brown trout are relatively rare in the stream, and are limited to the lower reaches near the mouth.

**Recruitment to and Connectivity with the Clark Fork River:** Telegraph Creek is a direct tributary to the Little Blackfoot River. The stream appears to have fair connection to the Little Blackfoot, although numerous beaver ponds near the mouth may affect fish movement into and out of this tributary to some extent. Nevertheless, trout density in Telegraph Creek is relatively good, and the stream likely provides at least some trout recruitment to downstream waters. However, many of the fish in the stream are brook trout, which typically do not display significant migratory behavior. Therefore, the overall value of Telegraph Creek as a recruitment source for the Clark Fork River is likely to be low.

**Current Value:** Low

**Protection and Enhancement Value:** Low

### **Value as a Tributary/Replacement Fishery:**

**Recreational Species Present:** Brook Trout, Westslope Cutthroat Trout, and Brown Trout

**Fish Density:** Based on 2007 electrofishing, total trout density is moderate to high throughout much of Telegraph Creek, with brook trout comprising much of the fish community. Westslope cutthroat trout also occur in Telegraph Creek, but tend to be in low to moderate densities. Brown trout are relatively rare in the stream, and are limited to the lower reaches near the mouth.

**Fish Size:** Fish in Telegraph Creek do not typically attain very large size, although fish of catchable length are present in fair numbers throughout much of the stream. At the several sites sampled in the drainage in 2007, both brook trout and westslope cutthroat trout had a similar average size of about 4 to 5 inches in total length. Maximum size for both species was around 9 inches. As mentioned above, brown trout did not comprise a significant component of the fishery in Telegraph Creek, and the few present were relatively small juveniles.

**Recruitment to non Clark Fork River Fishery:** Telegraph Creek is a direct tributary to the Little Blackfoot River. The stream appears to have fair connection to the Little Blackfoot, although numerous beaver ponds near the mouth may affect fish moment into and out of this tributary to some extent. Nevertheless, trout density in Telegraph Creek is relatively good, and the stream likely provides at least some trout recruitment for the Little Blackfoot River. However, many of the fish in the stream are brook trout, which typically do not display significant migratory behavior.

***Current Value: Low***

***Protection and Enhancement Value: Low***

**Value as a Native Fishery:**

**Native Species Present:** Westslope Cutthroat Trout

Genetic testing conducted in 2007 suggests that the westslope cutthroat trout population in Telegraph Creek is genetically pure.

**Competitor and/or Hybridizing Species Present:** Brook Trout and Brown Trout

Brook trout are relatively common in Telegraph Creek, and are sympatric with westslope cutthroat trout throughout the stream. Brook trout likely exert a fairly strong competitive pressure on westslope cutthroat trout in Telegraph Creek. While brown trout are also present, their abundance and distribution is currently limited, and their effect on westslope cutthroat trout is likely low.

**Demographics and Connectivity:** Based on 2007 electrofishing, westslope cutthroat trout occur in low to moderate densities in Telegraph Creek. The species appears to be most common in the upper reaches of the stream on the National Forest. In this area of the drainage we observed multiple age classes of fish at several sample locations. This suggests that westslope cutthroat trout recruitment is at least fair in much of the stream. The largest fish we noted in Telegraph Creek in 2007 was about 9 inches in total length. This fish was likely a resident adult.

Telegraph Creek is a direct tributary to the Little Blackfoot River. The stream appears to have fair connection to the Little Blackfoot, although numerous beaver ponds near the mouth may affect fish moment into and out of this tributary to some extent. While it is likely that westslope cutthroat trout in Telegraph Creek are supported primarily by the reproduction of resident fish, fish with a migratory life history do appear to have access to the stream.

***Current Value: Medium***

***Protection and Enhancement Value: Medium***

### **Habitat Description:**

**Habitat Quality:** Habitat quality and riparian condition is relatively good throughout much of Telegraph Creek. However, isolated areas in the lower extent of the drainage do show impacts from residential development, livestock grazing, and irrigated hay production. Additionally, water temperatures in this portion of the drainage are also of concern, reaching upwards of 20° C (68° F) during the summer season. In the upper reaches of the stream, the channel flows through a narrow timbered canyon that shows significant evidence of past timber harvest and placer mining activity. Despite this, the channel is stable and provides relatively good fish habitat.

**Habitat Security:** Land ownership along Telegraph Creek is a fairly even mixture of privately owned lands and lands administered by the U.S. Forest Service. The lower three miles of stream flows exclusively through private lands used for residential development, livestock grazing, and irrigated hay production. There are several irrigation diversions located in this reach, which have the capacity to divert a fair amount of flow from lower Telegraph Creek during the irrigation season. The nature of the ownership and land use in this segment of the stream makes habitat security somewhat of a concern. In the upper portion of the watershed, much of the drainage lies within the National Forest. Habitat security appears to be relatively good throughout much of this area.

**DRAINAGE:** Warm Springs Creek

**STREAM:** Twin Lakes Creek

**REACH:** All

### **Value as a Recruitment/Restoration Fishery for the Clark Fork River:**

**Species Present:** Westslope Cutthroat Trout and Brook Trout

**Fish Density/Number of Fish Produced:** Based on 2007 electrofishing (all sites were downstream of lower Twin Lake), trout density is low to moderate throughout much of Twin Lakes Creek. Both westslope cutthroat trout and brook trout are present in relatively low densities, although westslope cutthroat trout appear to be a little more common.

**Recruitment to and Connectivity with the Clark Fork River:** Twin Lakes Creek is a direct tributary to upper Warm Springs Creek. The stream likely provides at least some recruitment of westslope cutthroat trout to the mainstem as well as the Clark Fork River. However, the overall contribution may be rather modest given the relatively low densities of fish in the stream. Additionally, westslope cutthroat trout tend to be rather incidental in the upper Clark Fork River. The rarity of these fish in downstream reaches suggests that the dispersal or survival of migratory individuals may be limited. The presence of the Silver Lake Diversion (river mile 2.2) and Myers Dam (on mainstem Warm Springs Creek near river mile 16.6) may also limit the recruitment potential of Twin Lakes Creek. Both structures appear to be at least partial barriers restricting upstream fish movement (e.g. fish returning to Twin Lakes Creek to spawn). While brook trout are also present in Twin Lakes Creek, this species generally does not exhibit significant migratory tendencies, and thus has a rather low recruitment value.

**Current Value:** Low

**Protection and Enhancement Value:** Medium

### **Value as a Tributary/Replacement Fishery:**

**Recreational Species Present:** Westslope Cutthroat Trout and Brook Trout

**Fish Density:** Based on 2007 electrofishing (all sites were downstream of lower Twin Lake), trout density is low to moderate throughout much of Twin Lakes Creek. Both westslope cutthroat trout and brook trout are present in relatively low densities, although westslope cutthroat trout appear to be a little more common.

**Fish Size:** Fish in Twin Lakes Creek do not typically attain very large size, although fish of catchable length are present. At the four sites sampled in the drainage in 2007, westslope cutthroat trout and brook trout had similar average lengths at most of the sample locations. Average size ranged between about 4 and 7 inches. The largest westslope cutthroat trout and brook trout captured during our sampling were each about 9 inches in total length.

**Recruitment to non Clark Fork River Fishery:** Twin Lakes Creek is a direct tributary to upper Warm Springs Creek. The stream likely provides at least some recruitment of westslope cutthroat trout to the mainstem. However, the overall contribution may be rather modest given the relatively low densities of fish in the stream. While brook trout are also present in Twin Lakes Creek, this species generally does not exhibit significant migratory tendencies, and thus has a rather low recruitment value.

***Current Value: Medium***

***Protection and Enhancement Value: Medium***

**Value as a Native Fishery:**

**Native Species Present:** Bull Trout and Westslope Cutthroat Trout

Genetic testing conducted in 2007 suggests that the westslope cutthroat trout population in Twin Lakes Creek (above the Silver Lake Diversion at river mile 2.2) is genetically pure.

**Competitor and/or Hybridizing Species Present:** Brook Trout

Brook trout appear to be present in fair densities throughout much of Twin Lakes Creek. The species likely competes with both westslope cutthroat trout and bull trout. In addition to the competitive threat, brook trout are also a significant hybridization concern for bull trout.

**Demographics and Connectivity:** Based on fish sampling conducted in 2007, westslope cutthroat trout occur in fairly low densities throughout much of Twin Lakes Creek. Multiple age classes were observed at several sample sites, but at others, the size structure was rather restricted. While small sample size could have had something to do with this, the overall low densities of fish suggest that survival and recruitment may be marginal in much of Twin Lakes Creek. The largest westslope cutthroat trout measured in the stream in 2007 was about 9 inches in total length. Bull trout also occur in Twin Lakes Creek, but appear to be primarily restricted to the segments of stream above Lower and Upper Twin Lake. Downstream of the lakes, the species is present in very low densities. During 2007 electrofishing, only four bull trout were captured in this portion of the stream. All of these fish were of a similar age and size, and all were captured downstream of the Silver Lake Diversion (located near river mile 2.2). Genetic sampling conducted by the U.S. Fish and Wildlife Service in 2008 suggests that the fish in this segment of the stream (i.e. downstream of the Silver Lake Diversion) are actually from the Warm Springs Creek population. Upstream of the Twin Lakes, electrofishing conducted by the U.S. Fish and Wildlife Service in 2008 shows bull trout to be more common. All of the fish captured during this sampling appeared to be juveniles, but of multiple different age classes. Bull trout are present in both Upper and Lower Twin Lakes, and annual redd counts in conjunction with the 2008 electrofishing data, suggests

that the lakes support viable adfluvial bull trout populations. However, genetic samples also collected in 2008 suggest that hybridization with brook trout may be a concern.

Twin Lakes Creek is a direct tributary to upper Warm Springs Creek. However, the presence of the Silver Lake Diversion (river mile 2.2) and Myers Dam (on mainstem Warm Springs Creek near river mile 16.6) limit the connectivity of the stream with downstream waters. Both structures appear to be at least partial barriers restricting upstream fish movement (e.g. fish returning to Twin Lakes Creek to spawn).

***Current Value: High***

***Protection and Enhancement Value: High***

### **Habitat Description:**

**Habitat Quality:** Habitat quality and riparian condition is relatively good throughout much of Twin Lakes Creek. However, much of the watershed has undergone recent widespread timber harvest, and logging activity has affected stream and riparian habitat (mostly from reductions in canopy cover and road construction) in various locations in the drainage. Additionally, the lower portion of Twin Lakes Creek flows through a small rural subdivision where residential development has impacted stream and riparian habitat to some degree.

**Habitat Security:** Historically, much of the Twin Lakes Creek watershed was in private ownership where commercial timber harvest was the primary land use. However, the bulk of the drainage is now part of the National Forest where long-term habitat security is considered to be fairly good. This relatively recent land transfer was part of the Watershed Land Acquisition that occurred in 2000 and 2001. Private ownership is now limited to the lower 1.2 miles of Twin Lakes Creek where the stream flows through a rural residential subdivision. Although rather limited in its extent, the nature of the land use in this area (residential development) does pose some risks to habitat security in this portion of the drainage. Additionally, a large, trans-basin diversion operated by the county of Butte-Silver Bow exists on Twin Lakes Creek at river mile 2.2. The purpose of the diversion is to deliver water to Silver Lake. The conveyance structure is very old and in poor condition, but the site is still operable and continues to be used annually. This diversion has the ability to divert a significant amount of flow from Twin Lakes Creek.

**DRAINAGE:** Clark Fork River

**STREAM:** Tyler Creek

**REACH:** Entire stream

### **Value as a Recruitment/Restoration Fishery for the Clark Fork River:**

**Species Present:** Westslope Cutthroat Trout

**Fish Density/Number of Fish Produced:** Two electrofishing sections were completed in Tyler Creek in 2008. Westslope cutthroat trout densities were very high in the lower electrofishing section and high in the upper electrofishing section.

**Recruitment to and Connectivity with the Clark Fork River:** Lower Tyler Creek is currently entirely diverted into an irrigation ditch in the lower portion of the drainage and generally dries up before reaching the Clark Fork River. If flow does continue through the entire diversion ditch, the remaining flow drains into a pond created by the Old Milwaukee railroad line and appears to seep though the railroad fill which acts as a barrier to any up- or downstream passage of fish (Workman 2009). Thus, Tyler Creek appears to provide no recruitment to the Clark Fork River

**Current Value:** Low

**Protection and Enhancement Value:** Low

### **Value as a Tributary/Replacement Fishery:**

**Recreational Species Present:** Westslope Cutthroat Trout

**Fish Density:** Two electrofishing sections were completed in Tyler Creek in 2008. Westslope cutthroat trout densities were very high in the lower electrofishing section and high in the upper electrofishing section.

**Fish Size:** Westslope cutthroat trout in both electrofishing sections averaged 4.5" and reached maximum lengths of 9" in the lower section and 8" in the upper section

**Recruitment to non Clark Fork River Fishery:** N/A. Tyler Creek flows directly into the Clark Fork River and thus cannot provide recruitment to a non Clark Fork River fishery.

**Current Value:** Low

**Protection and Enhancement Value:** Low

### **Value as a Native Fishery:**

**Native Species Present:** Westslope cutthroat trout are the only native trout present in the drainage. Genetic analyses were completed in 2009 for samples taken from Tyler Creek

and alleles characteristic of only westslope cutthroat trout were detected, suggesting that this population is genetically pure.

**Competitor and/or Hybridizing Species Present:** No non-native fish were captured in the Tyler Creek drainage and its lack of connectivity with the Clark Fork River likely protects the drainage from potential invasion by non-native species.

**Demographics and Connectivity:** Westslope cutthroat trout were highly abundant throughout the Tyler Creek drainage, which suggests the population is quite stable. Westslope cutthroat trout in Tyler Creek are not connected to other populations and this lack of connectivity does not allow for genetic exchange with other populations or for other populations to re-found this population should it be lost. While this genetically pure population is protected from future invasion by rainbow trout or westslope cutthroat/rainbow trout hybrids, this lack of connectivity does create demographic risks to the population. The Tyler Creek drainage is relatively large which likely reduces the risk of a stochastic event eliminating this population.

***Current Value: High***

***Protection and Enhancement Value: High***

### **Habitat Description:**

**Habitat Quality:** Habitat quality in the Tyler Creek drainage was quite good at the two sites that were surveyed in 2008. Extensive logging was observed adjacent to the stream at the lower electrofishing section however the streamside management zone was not harvested leaving the riparian habitat in relatively good condition.

**Habitat Security:** A majority of the Tyler Creek drainage is located within lands administered by the Lolo National Forest and thus are quite secure. A portion of the drainage is located within private lands including parcels owned by a private timber company, which could undergo future changes in land and water use that could significantly degrade habitat.

**DRAINAGE:** Flint Creek

**STREAM:** Douglas Creek- lower Flint Creek Drainage

**REACH:** Dam to confluence of Middle Fork Douglas Creek and North Fork Douglas Creek

### **Value as a Recruitment/Restoration Fishery for the Clark Fork River:**

**Species Present:** Westslope Cutthroat Trout, Brook Trout

**Fish Density/Number of Fish Produced:** Two electrofishing sections were completed on upper Douglas Creek in 2008. Westslope cutthroat trout densities were low in the lower electrofishing section and moderate in the upper section. Brook trout densities were moderate in both sections.

**Recruitment to and Connectivity with the Clark Fork River:** Upper Douglas Creek maintains moderate densities of westslope cutthroat trout, a portion of which may outmigrate to the Clark Fork River. However, the historic dam on upper Douglas Creek prevents upstream fish passage, which would not allow outmigrants to return to upper Douglas Creek to spawn.

***Current Value:*** Low

***Protection and Enhancement Value:*** Low

### **Value as a Tributary/Replacement Fishery:**

**Recreational Species Present:** Westslope Cutthroat Trout, Brook Trout

**Fish Density:** Two electrofishing sections were completed on upper Douglas Creek in 2008. Westslope cutthroat trout densities were low in the lower electrofishing section and moderate in the upper section. Brook trout densities were moderate in both sections.

**Fish Size:** Westslope cutthroat trout in the lower electrofishing section averaged 6" and reached a maximum length of 7" while westslope cutthroat trout in the upper section 5.5" and reached a maximum length of 9". Brook trout in both electrofishing sections averaged 4.5" and reached maximum lengths of 11".

**Recruitment to non Clark Fork River Fishery:** Upper Douglas Creek maintains moderate densities of westslope cutthroat trout, a portion of which likely outmigrate to Flint Creek. However, the historic dam on upper Douglas Creek prevents upstream fish passage, which would not allow outmigrants to return to upper Douglas Creek to spawn.

***Current Value:*** Low

***Protection and Enhancement Value:*** Low

### **Value as a Native Fishery:**

**Native Species Present:** Westslope cutthroat trout are the only native trout present in upper Douglas Creek. Genetic analyses were completed for westslope cutthroat trout in upper Douglas Creek in 2001 and alleles characteristic of only westslope cutthroat trout were detected, suggesting that this population is genetically pure.

**Competitor and/or Hybridizing Species Present:** Brook trout are the only non-native salmonid present in the upper Douglas Creek drainage. Brook trout maintain moderate densities in Douglas Creek and are likely a competitor with resident westslope cutthroat trout.

**Demographics and Connectivity:** Westslope cutthroat trout densities are low to moderate in the upper Douglas Creek drainage although they appear to be well distributed in the drainage, which suggests the population is stable. Westslope cutthroat trout in upper Douglas Creek are not connected to other populations and this lack of connectivity does not allow for genetic exchange with other populations or for other populations to re-found this population should it be lost. While this genetically pure population is protected from future invasion by rainbow trout or westslope cutthroat/rainbow trout hybrids, this lack of connectivity does create demographic risks to the population.

***Current Value:*** High

***Protection and Enhancement Value:*** High

### **Habitat Description:**

**Habitat Quality:** Habitat degradation was observed throughout the upper Douglas Creek drainage. The upper survey site was degraded due to riparian grazing impacts including reduced densities of woody riparian vegetation, cattle hoof shear and associated channel instability. The lower survey site was located in a channelized portion of the creek adjacent to the old Douglas Creek Reservoir. Habitat degradation in this reach was severe and the habitat was considered “poor”. This habitat degradation was due primarily to channelization of the reach and also riparian grazing impacts.

**Habitat Security:** A majority of the upper Douglas Creek drainage flows through private lands and thus is susceptible to future changes in land and water uses that could significantly degrade habitat in this reach.

**DRAINAGE:** Rock Creek

**STREAM:** Wahlquist Creek

**REACH:** Entire stream

### **Value as a Recruitment/Restoration Fishery for the Clark Fork River:**

**Species Present:** Westslope Cutthroat Trout

**Fish Density/Number of Fish Produced:** Westslope cutthroat trout densities were low in the Wahlquist Creek drainage during 2008 electrofishing surveys. Westslope cutthroat trout were only captured in the lowest electrofishing section sampled and it appeared that a high gradient reach of Wahlquist just above the lowest electrofishing section was likely the upper end of westslope cutthroat distribution in the drainage.

**Recruitment to and Connectivity with the Clark Fork River:** Wahlquist Creek maintains low densities of westslope cutthroat trout that could outmigrate and be recruited into the Clark Fork River fishery but is likely not a major source of recruitment to the Clark Fork River. Connectivity between Wahlquist Creek and the Clark Fork River via Rock Creek is excellent for both up- and downstream migrants.

***Current Value:*** Low

***Protection and Enhancement Value:*** Low

### **Value as a Tributary/Replacement Fishery:**

**Recreational Species Present:** Westslope Cutthroat Trout

**Fish Density:** Westslope cutthroat trout densities were low in the Wahlquist Creek drainage during 2008 electrofishing surveys. Westslope cutthroat trout were only captured in the lowest electrofishing section sampled and it appeared that a high gradient reach of Wahlquist just above the lowest electrofishing section was likely the upper end of westslope cutthroat distribution in the drainage.

**Fish Size:** Westslope cutthroat trout captured in Wahlquist Creek averaged 6" and reached a maximum length of 7".

**Recruitment to non Clark Fork River Fishery:** Wahlquist Creek provides a small number of westslope cutthroat trout that could outmigrate and be recruited into the mainstem Rock Creek fishery. However, due to the relatively small size of the drainage and the small length of stream inhabited by westslope cutthroat trout, it is unlikely that Wahlquist Creek is a major source of recruitment to Rock Creek.

***Current Value:*** Low

***Protection and Enhancement Value:*** Low

### **Value as a Native Fishery:**

**Native Species Present:** Westslope cutthroat trout are the only native trout present in Wahlquist Creek. No genetic analyses have been completed for westslope cutthroat trout in Grizzly Creek although it is possible that some hybridization may have occurred in the drainage due to its connectivity with mainstem Rock Creek.

**Competitor and/or Hybridizing Species Present:** No non-native fish were captured in Wahlquist Creek, although non-native brown trout, rainbow, and brook trout are present in mainstem Rock Creek and could potentially invade the Wahlquist Creek drainage.

**Demographics and Connectivity:** Westslope cutthroat trout were captured in low densities in Wahlquist Creek and occupy a limited portion of the drainage (appx. 0.6 miles). Thus, there is some question as to the long-term viability of this population. Connectivity between Wahlquist Creek and other westslope cutthroat trout populations in the lower Rock Creek drainage is quite good which allows for genetic exchange with other populations and potentially re-founding of the population should it be lost.

***Current Value:*** Medium

***Protection and Enhancement Value:*** Medium

### **Habitat Description:**

**Habitat Quality:** Habitat quality in the Wahlquist Creek drainage was found to be excellent at the two sites surveyed with minimal habitat degradation being observed.

**Habitat Security:** A majority of the Wahlquist Creek drainage is located within lands administered by the Lolo National Forest and thus is quite secure from future land use changes. A small portion of the lower Wahlquist drainage (near the mouth) is held in private ownership.

**DRAINAGE:** Warm Springs Creek (near Garrison)

**STREAM:** Warm Springs Creek (near Garrison)

**REACH:** Upper – Waterfall to Headwaters

### **Value as a Recruitment/Restoration Fishery for the Clark Fork River:**

**Species Present:** Westslope Cutthroat Trout

**Fish Density/Number of Fish Produced:** Based on 2008 electrofishing at one sample reach, westslope cutthroat trout density is very high in upper Warm Springs Creek.

**Recruitment to and Connectivity with the Clark Fork River:** A large waterfall is located on Warm Springs Creek at river mile 5.3. This feature appears to preclude upstream fish passage, and likely poses hazards for downstream movement as well. Additionally, a notable length of stream goes dry upstream of the waterfall during the summer. These factors likely reduce the potential for upper Warm Springs Creek to be a viable source of fish for the Clark Fork River.

***Current Value:*** Low

***Protection and Enhancement Value:*** Low

### **Value as a Tributary/Replacement Fishery:**

**Recreational Species Present:** Westslope Cutthroat Trout

**Fish Density:** Based on 2008 electrofishing at one sample reach, westslope cutthroat trout density is very high in upper Warm Springs Creek. No other species appear to be present.

**Fish Size:** The average length of westslope cutthroat trout sampled in upper Warm Springs Creek in 2008 was rather small at slightly less than 5 inches. Fish of catchable size were not overly common. The largest fish handled in the sample reach was a little over 8 inches in total length.

**Recruitment to non Clark Fork River Fishery:** N/A – Warm Springs Creek is a direct tributary to the Clark Fork River.

***Current Value:*** Medium

***Protection and Enhancement Value:*** Medium

### **Value as a Native Fishery:**

**Native Species Present:** Westslope Cutthroat Trout.

Genetic tests conducted in 1992 indicate that this population is 100% pure.

**Competitor and/or Hybridizing Species Present:** None detected.

**Demographics and Connectivity:** Westslope cutthroat trout density was very high in the one section sampled in upper Warm Springs Creek in 2008. Multiple age classes were present, including young-of-the-year. The largest fish handled in the sample reach was a little over 8 inches in total length. This all suggests a viable population of resident westslope cutthroat trout in the reach.

A large waterfall is located on Warm Springs Creek at river mile 5.3. This feature appears to preclude upstream fish passage, and likely poses hazards for downstream movement as well. Additionally, a notable length of stream goes dry upstream of the waterfall during the summer. These factors reduce the potential for westslope cutthroat trout to be threatened by nonnative species invasion, but also limit the ability of the population to re-found should a catastrophic event take place in the upper watershed that would extirpate the population. The total amount of occupied habitat is currently unknown, but is likely around 6 miles of stream.

**Current Value:** High

**Protection and Enhancement Value:** High

### **Habitat Description:**

**Habitat Quality:** Limited access prevented a complete assessment of habitat quality in upper Warm Springs Creek. However, fish habitat at the one section sampled in 2008 was rated fairly good, but was likely less than its potential. While there were several quality pools and undercut banks in the survey section, the sparse woody shrubs and trees along the streambanks provided relatively little overhead cover and shade. Additionally, woody debris in the channel was mostly absent, and an old roadbed occupied a good portion of the riparian area throughout the survey section. Livestock use adjacent to the stream was notable, and extensive timber harvest was observed upstream of the survey site in much of the watershed. The stream channel was dry just upstream of the waterfall at river mile 5.3.

**Habitat Security:** Landownership in upper Warm Springs Creek is comprised largely of private timberlands, although some U.S. Bureau of Land Management and State lands are also present. Livestock grazing is prevalent throughout the upper watershed as is timber harvest. The nature of the ownership and land use makes habitat security a concern in upper Warm Springs Creek. Additionally, an abandoned phosphate mine is located in the watershed, posing a potential threat to water quality.

**DRAINAGE:** Warm Springs Creek  
**STREAM:** East Fork Warm Springs Creek  
**REACH:** All

**Value as a Recruitment/Restoration Fishery for the Clark Fork River:**

**Species Present:** None detected.

**Fish Density/Number of Fish Produced:** Fish sampling was completed at several sections of East Fork Warm Springs Creek in 2007. No fish were observed in the sampled sections.

**Recruitment to and Connectivity with the Clark Fork River:** East Fork Warm Springs Creek is a tributary to Warm Springs Creek. However, the stream does not likely provide any recruitment to the mainstem or the Clark Fork River as no fish were found during 2007 electrofishing. Additionally, the stream is only marginally connected to downstream waters. The uppermost extent of Warm Springs Creek is somewhat isolated from the lower portion of the drainage by a segment of ephemeral channel that separates the two parts of the watershed. Flow through this section of the stream appears to be fairly irregular.

**Current Value:** Very Low

**Protection and Enhancement Value:** Very Low

**Value as a Tributary/Replacement Fishery:**

**Recreational Species Present:** None detected.

**Fish Density:** Fish sampling was completed at several sections of East Fork Warm Springs Creek in 2007. No fish were observed in the sampled sections.

**Fish Size:** N/A

**Recruitment to non Clark Fork River Fishery:** East Fork Warm Springs Creek is a tributary to Warm Springs Creek. However, the stream does not likely provide any recruitment to the mainstem as no fish were found during 2007 sampling.

**Current Value:** Very Low

**Protection and Enhancement Value:** Very Low

**Value as a Native Fishery:**

**Native Species Present:** None detected.

**Competitor and/or Hybridizing Species Present:** None detected.

**Demographics and Connectivity:** No native trout were observed in East Fork Warm Springs Creek during 2007 electrofishing. Limited available habitat and marginal connectivity with downstream waters likely limits the potential of the stream to support fish.

***Current Value:*** Very Low

***Protection and Enhancement Value:*** Very Low

**Habitat Description:**

**Habitat Quality:** Habitat quality and riparian condition along East Fork Warm Springs Creek is relatively good. However, fish habitat value appears to be fairly limited as flow appears low, and deep-water habitats (i.e. pools) are scarce.

**Habitat Security:** Landownership along East Fork Warm Springs Creek is comprised mostly of public lands administered by the U.S. Forest Service. Habitat security is likely to be good throughout most of the drainage.

**DRAINAGE:** Warm Springs Creek

**STREAM:** Middle Fork Warm Springs Creek

**REACH:** All

### **Value as a Recruitment/Restoration Fishery for the Clark Fork River:**

**Species Present:** Westslope Cutthroat Trout

**Fish Density/Number of Fish Produced:** Based on limited electrofishing in 2007, westslope cutthroat trout comprise the entire fish community in Middle Fork Warm Springs Creek. The species is present in moderate densities, and many of the fish appear to be relatively young juveniles.

**Recruitment to and Connectivity with the Clark Fork River:** Middle Fork Warm Springs Creek is not likely to be a significant source of westslope cutthroat trout recruitment for the Clark Fork River. Although the stream is a tributary to Warm Springs Creek, marginal connectivity between the upper extent of Warm Springs Creek and the lower portion of the drainage reduces the overall recruitment value of the stream. The uppermost extent of Warm Springs Creek is somewhat isolated from the lower portion of the drainage by a segment of ephemeral channel that separates the two parts of the watershed. Flow through this section of the stream appears to be fairly irregular, although in high flow years it is likely that fish from Middle Fork Warm Springs Creek can migrate downstream to the lower reaches of Warm Springs Creek and potentially the Clark Fork River.

**Current Value:** Low

**Protection and Enhancement Value:** Low

### **Value as a Tributary/Replacement Fishery:**

**Recreational Species Present:** Westslope Cutthroat Trout

**Fish Density:** Based on limited electrofishing in 2007, westslope cutthroat trout comprise the entire fish community in Middle Fork Warm Springs Creek. The species is present in moderate densities, although many of the fish appear to be relatively young juveniles.

**Fish Size:** Westslope cutthroat trout in Middle Fork Warm Springs Creek tend to be small, although fish of catchable size are present. The average length of westslope cutthroat trout in the one section sampled in 2007 was about 3 inches. The largest fish observed was about 7.5 inches.

**Recruitment to non Clark Fork River Fishery:** Middle Fork Warm Springs Creek is a tributary to Warm Springs Creek. While there is potential for the stream to be a fair source of westslope cutthroat trout recruitment for downstream reaches of Warm Springs Creek, marginal connectivity between the upper extent of Warm Springs Creek and the lower portion of the drainage may reduce the overall recruitment value of the stream.

The uppermost extent of Warm Springs Creek is somewhat isolated from the lower portion of the drainage by a segment of ephemeral channel that separates the two parts of the watershed. Flow through this section of the stream appears to be fairly irregular, although in high flow years it is likely that fish from Middle Fork Warm Springs Creek can migrate downstream to the lower reaches of Warm Springs Creek.

***Current Value: Low***

***Protection and Enhancement Value: Low***

**Value as a Native Fishery:**

**Native Species Present:** Westslope Cutthroat Trout

No genetic testing has been conducted on westslope cutthroat trout in Middle Fork Warm Springs Creek. However, genetic testing conducted in the upper extent of Warm Springs Creek near the mouth of the stream in 1986 suggests that the westslope cutthroat trout population may be genetically pure.

**Competitor and/or Hybridizing Species Present:** None detected.

**Demographics and Connectivity:** Based on limited electrofishing conducted in 2007, westslope cutthroat trout comprise all of the fish community in Middle Fork Warm Springs Creek. The species appears to be present in moderate densities, although many of the fish handled during 2007 sampling appeared to be young juveniles of approximately one year of age. Nevertheless, the observation of multiple age classes including young-of-the-year and fish large enough to be resident adults (i.e. >6 inches total length) suggests that the population is viable. The largest westslope cutthroat trout measured during 2007 sampling was 7.5 inches in total length.

Westslope cutthroat trout in Middle Fork Warm Springs Creek appear to have marginal connectivity with other populations. A segment of ephemeral channel that separates the upper extent of Warm Springs Creek from the lower portion of the drainage likely reduces fish movement between the two areas. While this relative isolation may limit the invasion of non-native species, it also likely limits the ability of westslope cutthroat trout in Middle Fork Warm Springs Creek to express a migratory life history. Therefore it is probably that resident fish maintain much of the population.

***Current Value: High***

***Protection and Enhancement Value: High***

**Habitat Description:**

**Habitat Quality:** Habitat quality and riparian condition along Middle Fork Warm Springs Creek is relatively good. However, much of the stream flows through a forested canopy where past timber harvest is evident along portions of the channel. Riparian

logging practices may have limited the recruitment of large woody debris to the channel, as this habitat component was relatively uncommon in the survey reach. However, the potential for future recruitment is good.

**Habitat Security:** Landownership along Middle Fork Warm Springs Creek is comprised entirely of public lands administered by the U.S. Forest Service. Habitat security is likely to be good throughout the drainage.

**DRAINAGE:** Lower Willow Creek

**STREAM:** West Fork Lower Willow Creek and Mohave Creek

**REACH:** Entire drainage

### **Value as a Recruitment/Restoration Fishery for the Clark Fork River:**

**Species Present:** Westslope Cutthroat Trout, Brook Trout

**Fish Density/Number of Fish Produced:** Two electrofishing sections were completed in West Fork Lower Willow Creek in 2007. Trout densities were high in the lower portion of West Fork Lower Willow Creek (RM 1.6) and were comprised of moderate densities of both westslope cutthroat trout and brook trout. Trout densities in the upper portion of the drainage (RM 3.1) were moderate and were comprised of low densities of brook trout and moderate densities of westslope cutthroat trout. Westslope cutthroat trout densities were moderate in Mohave Creek and no brook trout were sampled in this drainage.

**Recruitment to and Connectivity with the Clark Fork River:** The West Fork Lower Willow drainage (including Mohave Creek) may provide some recruitment of westslope cutthroat trout to the Clark Fork River, however the lack of upstream passage at Lower Willow Creek Dam would not allow these fish to return to the West Fork Lower Willow drainage to spawn.

**Current Value:** Low

**Protection and Enhancement Value:** Low

### **Value as a Tributary/Replacement Fishery:**

**Recreational Species Present:** Westslope Cutthroat Trout, Brook Trout

**Fish Density:** Two electrofishing sections were completed in West Fork Lower Willow Creek in 2007. Trout densities were high in the lower portion of West Fork Lower Willow Creek (RM 1.6) and were comprised of moderate densities of both westslope cutthroat trout and brook trout. Trout densities in the upper portion of the drainage (RM 3.1) were moderate and were comprised of low densities of brook trout and moderate densities of westslope cutthroat trout. Westslope cutthroat trout densities were moderate in Mohave Creek and no brook trout were sampled in this drainage.

**Fish Size:** Westslope cutthroat trout averaged 3.5-4" in the West Fork Lower Willow Creek and Mohave Creek drainages and reached maximum lengths of 9". Brook trout averaged 4" in the lower portion of the drainage and 6" in the upper portion of the drainage and reach maximum lengths of 8".

**Recruitment to non Clark Fork River Fishery:** The West Fork Lower Willow Creek drainage (including Mohave Creek) likely provides some recruitment to mainstem Lower Willow Creek. Westslope cutthroat trout are relatively abundant in Lower Willow Creek just below Lower Willow Dam and are likely present due to entrainment of fish through

the dam. However, Lower Willow Dam provides no upstream passage, which prevents adults from accessing their natal streams for spawning.

***Current Value: Low***

***Protection and Enhancement Value: Low***

**Value as a Native Fishery:**

**Native Species Present:** Westslope cutthroat trout are the only native trout present in the West Fork Willow Creek drainage (including Mohave Creek). Genetic analyses of westslope cutthroat trout from West Fork Willow Creek completed in 2007 indicate that these fish are genetically pure.

**Competitor and/or Hybridizing Species Present:** Brook trout are the only competitor species present in the drainage and they currently maintain moderate to low densities in the drainage. Lower Willow Creek Dam appears to have prevented any rainbow trout or westslope cutthroat/rainbow trout hybrids from accessing the upper portion of the Lower Willow drainage, preserving the genetic purity of the westslope cutthroat trout populations above the dam.

**Demographics and Connectivity:** The viability of westslope cutthroat trout appears to be quite good in the West Fork Lower Willow Creek drainage (including Mohave Creek). Genetic sampling from within the drainage indicates that this population is genetically pure and all other connected streams also only maintain pure westslope cutthroat trout. Lower Willow Creek Dam serves as a barrier for invasion of rainbow trout minimizing the potential threat of hybridization. Westslope cutthroat trout densities are moderate in the West Fork Lower Willow drainage and multiple age classes of westslope cutthroat trout were observed including age 0 fish.

The lack of connectivity between West Fork Lower Willow Creek and mainstem Lower Willow Creek could pose a potential threat to viability due to the possible effects of small population size (i.e. inbreeding depression, etc...). However, South Fork Lower Willow Creek and multiple tributaries to South Fork Lower Willow maintain westslope cutthroat trout populations and are currently connected to West Fork Lower Willow Creek via Lower Willow Creek Reservoir. Also, several other tributaries to North Fork Lower Willow Creek also maintain viable westslope cutthroat trout populations providing additional protection against small population size. Thus, the impact of lost connectivity due to the presence of Lower Willow Dam appears to be minimized by the relatively large contiguous habitat that is occupied by westslope cutthroat trout in tributaries above the dam.

***Current Value: High***

***Protection and Enhancement Value: High***

**Habitat Description:**

**Habitat Quality:** Habitat quality in the West Fork Lower Willow Creek drainage was generally rated as fair to poor. In the upper portion of the drainage and in the Mohave Creek drainage, riparian grazing impacts were evident including reduced densities of woody riparian vegetation and its associated effects on stream bank stability and fish habitat. In the lower portion of the West Fork Lower Willow drainage, similar grazing impacts were evident as well as impacts of recent logging efforts.

**Habitat Security:** Significantly less than half of the West Fork Lower Willow drainage (including Mohave Creek) is within Beaverhead-Deerlodge National Forest administered lands. The remainder of the drainage is owned by either a commercial timber company or other private landowners and could potentially undergo future changes in land and water use that could significantly degrade habitat in this drainage.

**DRAINAGE:** Boulder Creek

**STREAM:** Wyman Gulch

**REACH:** Entire stream

### **Value as a Recruitment/Restoration Fishery for the Clark Fork River:**

**Species Present:** Bull trout, westslope cutthroat trout

**Fish Density/Number of Fish Produced:** Three electrofishing sections were completed in Wyman Gulch in 2007. Westslope cutthroat trout densities were moderate in the lower two electrofishing sections sampled and low in the upper electrofishing section sampled.

**Recruitment to and Connectivity with the Clark Fork River:** Some westslope cutthroat trout potentially outmigrate from Wyman Gulch to the Upper Clark Fork River, although Wyman Gulch is likely not a major source of recruitment to the Clark Fork River. Connectivity between Wyman Gulch and the Upper Clark Fork appears to be good other than potential seasonal fish passage issues at some diversion dams in lower mainstem Flint Creek. The results of a recent radio telemetry study indicate that these dams are at least seasonally passable by migrating adult salmonids.

**Current Value:** Low

**Protection and Enhancement Value:** Low

### **Value as a Tributary/Replacement Fishery:**

**Recreational Species Present:** Westslope Cutthroat Trout

**Fish Density:** Three electrofishing sections were completed in Wyman Gulch in 2007. Westslope cutthroat trout densities were moderate in the lower two electrofishing sections sampled and low in the upper electrofishing section sampled.

**Fish Size:** Westslope cutthroat trout throughout Wyman Gulch average approximately 5" and in the lowest electrofishing section reached a maximum length 11". Westslope cutthroat trout in the middle and upper electrofishing sections reached maximum lengths of 8" and 6", respectively.

**Recruitment to non Clark Fork River Fishery:** Wyman Gulch does provide a moderate number of westslope cutthroat trout that could outmigrate and be recruited into the mainstem Flint Creek fishery. However, electrofishing surveys in Flint Creek indicate that westslope cutthroat trout do not represent a significant portion of the recreational fishery. Westslope cutthroat trout from Wyman Gulch likely do provide recruitment to the mainstem Boulder Creek fishery which does receive some angling pressure.

**Current Value:** Medium

**Protection and Enhancement Value:** Medium

### **Value as a Native Fishery:**

**Native Species Present:** Both bull and westslope cutthroat trout are present in the Wyman Gulch drainage, although bull trout densities are quite low in the drainage with only two being captured. Genetic analysis was completed on the Wyman Gulch westslope cutthroat trout population in 1986 and it was found to be genetically pure.

**Competitor and/or Hybridizing Species Present:** No non-native fish were captured in Wyman Gulch, although non-native brook and brown trout are present in the Boulder Creek drainage and could potentially invade Wyman Gulch.

**Demographics and Connectivity:** The viability of bull trout in Wyman Gulch is relatively low due to low number of fish present in the drainage. Wyman Gulch is connected with the Boulder Creek population, which provides a source of genetic exchange and the potential to re-found the population should it be lost. However, the Boulder Creek population is the only bull trout population left in the Flint Creek drainage and thus has the inherent demographic risk of no local populations to re-found it, should it be lost.

Westslope cutthroat trout are moderately abundant in the Wyman Gulch drainage and are found throughout the drainage, suggesting that this population is relatively strong. Connectivity between Wyman Gulch and other tributaries to Boulder Creek is good and allows for genetic exchange with other populations and potentially re-founding of the population should it be lost. Connectivity between Wyman Gulch and other westslope cutthroat trout populations in the Flint Creek drainage is fair as some migratory individuals appear to still exist in Flint Creek, but are not abundant.

***Current Value: High***

***Protection and Enhancement Value: High***

### **Habitat Description:**

**Habitat Quality:** Habitat quality in the Wyman Gulch drainage was found to be excellent at the upper and lower sites surveyed with minimal habitat degradation being observed. The middle site was slightly degraded primarily due to channel down-cutting in the reach.

**Habitat Security:** Nearly all of the Wyman Gulch drainage is located within lands administered by the Beaverhead-Deerlodge National Forest and thus is quite secure from future land use changes. The only private lands present in the Wyman Gulch drainage are small mining claims.

**DRAINAGE:** Rock Creek  
**STREAM:** Wyman Gulch  
**REACH:** Entire stream

### **Value as a Recruitment/Restoration Fishery for the Clark Fork River:**

**Species Present:** Westslope Cutthroat Trout, Brown Trout, Brook Trout

**Fish Density/Number of Fish Produced:** Westslope cutthroat trout were captured in both electrofishing sections completed in the drainage and densities of westslope cutthroat trout were moderate to low in both sections. Both brown and brook trout were only captured in the lowest section and their densities were low with only one of each species captured.

**Recruitment to and Connectivity with the Clark Fork River:** Wyman Gulch is a moderate sized tributary that flows directly into middle Rock Creek and potentially serves as a source of recruitment to the Clark Fork River. Wyman Gulch maintains moderate densities of westslope cutthroat trout and low densities of brown trout, a portion of which may outmigrate and recruit into the mainstem Clark Fork River fishery. Wyman Gulch is located relatively high in the Rock Creek drainage and this long distance may limit the amount of recruitment that Wyman Gulch provides to the Clark Fork River. Connectivity between Wyman Gulch and the Clark Fork River via Rock Creek is excellent for both up- and downstream migrants.

**Current Value:** Medium

**Protection and Enhancement Value:** Medium

### **Value as a Tributary/Replacement Fishery:**

**Recreational Species Present:** Westslope Cutthroat Trout, Brown Trout, Brook Trout

**Fish Density:** Westslope cutthroat trout were captured in both electrofishing sections completed in the drainage and densities of westslope cutthroat trout were moderate to low in both sections. Both brown and brook trout were only captured in the lowest section and their densities were low with only one of each species captured.

**Fish Size:** Westslope cutthroat trout in the lower section averaged 4" in length and reached a maximum length of 10" while westslope cutthroat trout in the upper section averaged 7" and reached a maximum length of 8". The one brown and brook trout captured in the lower reach were each 10" in length.

**Recruitment to non Clark Fork River Fishery:** Wyman Gulch is moderate sized tributary that flows directly into middle Rock Creek and likely serves as a source of westslope cutthroat trout recruitment to Rock Creek. Wyman Gulch maintains moderate to low densities of westslope cutthroat trout and low densities of brown trout, a portion of which likely outmigrate and recruit into the mainstem Rock Creek fishery.

**Current Value:** Medium

**Protection and Enhancement Value:** Medium

### **Value as a Recruitment/Restoration Fishery for the Clark Fork River:**

**Species Present:** Westslope Cutthroat Trout, Brown Trout, Brook Trout

**Fish Density/Number of Fish Produced:** Westslope cutthroat trout were captured in both electrofishing sections completed in the drainage and densities of westslope cutthroat trout were moderate to low in both sections. Both brown and brook trout were only captured in the lowest section and their densities were low with only one of each species captured.

**Recruitment to and Connectivity with the Clark Fork River:** Wyman Gulch is a moderate sized tributary that flows directly into middle Rock Creek and potentially serves as a source of recruitment to the Clark Fork River. Wyman Gulch maintains moderate densities of westslope cutthroat trout and low densities of brown trout, a portion of which may outmigrate and recruit into the mainstem Clark Fork River fishery. Wyman Gulch is located relatively high in the Rock Creek drainage and this long distance may limit the amount of recruitment that Wyman Gulch provides to the Clark Fork River. Connectivity between Wyman Gulch and the Clark Fork River via Rock Creek is excellent for both up- and downstream migrants.

**Current Value:** Medium

**Protection and Enhancement Value:** Medium

### **Value as a Native Fishery:**

**Native Species Present:** Both bull and westslope cutthroat trout are present in Wyman Gulch. No genetic analyses have been completed for westslope cutthroat trout in Wyman Gulch, although it is possible that some hybridization may have occurred in the drainage due to its connectivity with mainstem Rock Creek.

**Competitor and/or Hybridizing Species Present:** Both brown and brook trout are present in the Wyman Gulch drainage, although densities of both species are quite low. Despite these low densities, brook trout represent a threat for competition with both bull and westslope cutthroat trout and a hybridization threat to bull trout. Brown trout pose a competition threat for both bull and westslope cutthroat trout.

**Demographics and Connectivity:** Bull trout in the Wyman Gulch drainage maintain relatively low densities although their densities were slightly higher than adjacent drainages (i.e. Hogback Creek and Alder Creek). Nonetheless, there is some question as to the long- term viability of this population based on their low densities. The presence of several other bull trout populations in the middle and upper Rock Creek drainage provide possible sources of fish to maintain genetic variation within the Wyman Gulch

population or to re-found the population should it be lost. The connectivity between this population and other neighboring bull trout populations (i.e. Hogback Creek, Stony Creek, etc...) via Rock Creek is excellent.

Westslope cutthroat trout maintain moderate to low densities in the Wyman Gulch drainage and are found throughout the drainage, suggesting that this population is relatively stable. Connectivity between Wyman Gulch and other westslope cutthroat trout populations in the middle Rock Creek drainage is quite good which allows for genetic exchange with other populations and potentially re-founding of the population should it be lost.

***Current Value:*** High

***Protection and Enhancement Value:*** High (entire drainage in Forest Service ownership)

### **Habitat Description:**

**Habitat Quality:** Habitat quality in the Wyman Gulch drainage was good at the upper survey site and excellent at the lower survey site. Some habitat degradation was observed at both sites due to wildfires that burned the drainage in 2007. This degradation was more notable at the upper site primarily due to the channel type (C channel type) being more sensitive to disturbance.

**Habitat Security:** The entire Wyman Gulch drainage is located within lands administered by the Lolo National Forest and thus is quite secure from future land use changes.

## **ASSESSED, PRIORITY PENDING**

Alaska Gulch  
American Gulch  
Antelope Creek  
Barnes Creek  
Basin Creek  
Bear Creek  
Bear Creek (Upper Willow Cr.)  
Beaver Creek  
Big Spring Creek  
Blum Creek  
Browns Gulch  
Camp Creek  
Cinnamon Bear Creek  
Corduroy Creek  
Dirty Ike Creek  
Donovan Creek  
Eightmile Creek  
Flume Gulch  
Gaskill Creek  
Gilbert Creek  
Gird Creek  
Hail Columbia Gulch  
Hutsinpilar Creek  
Kendall Creek  
Lutz Creek  
Meadow Gulch  
O'Neill Creek  
Page Creek  
Rock Creek (Garrison)  
Sawmill Creek  
Solomon Creek  
Shylo Creek  
Taylor Creek  
Telegraph Gulch  
Tenmile Creek  
Tin Cup Joe Creek  
Turah Creek  
Upper Willow Creek  
Wallace Creek  
Williams Gulch  
Willow Creek (Garrison)

## **ASSESSED, NO FISH FOUND**

Moose Gulch (Stony Creek)

Princeton Gulch

South Fork Douglas Creek

Starvation Creek