

## 1. German Gulch Watershed Summary

### Description and Land Use

**Table xxx: German Gulch Watershed Overview**

<b>Watershed Size</b>	26,233 acres/40.9 sq miles/106.2 sq km
<b>Elevation Range</b>	3,629 feet [5,174-8,802]
<b>Stream Miles</b>	57.9
<b>Land Ownership</b>	Private: 8% /State: 18%/Federal:74%
<b>Road Miles</b>	Local Road/City Street = 23.1 Four Wheel Drive Trail = 6.1 Total = 29.2

Source: Montana GIS Portal Data Layers

The German Gulch watershed drains an area of approximately 41 square miles and along with German Gulch (which is a major tributary to Silver Bow Creek) includes the tributaries of Beefstraight Creek, Norton Creek, and several others (MFWP, 2009). German Gulch originates in the mountains of the Continental Divide southeast of Butte, and flows for about eight miles before its confluence with Silver Bow Creek, a direct tributary to the Clark Fork River.

The watershed lies mostly within the Anaconda Smelter Superfund and still contains high levels of contaminants in the soil and water. Land ownership is mainly federal, and the basin has a history of mining, timber harvest, livestock grazing and recreation.

## 2. Impairments

**Table xxx: Listed and Suspected Impairments for the German Gulch Watershed**

Impairment	River Mile	Pollutant	Impaired Beneficial Use			
Arsenic	0.0-8.4	Metals	Aquatic Life, Cold Water Fishery			
Cyanide	0.0-8.4	Metals	Aquatic Life, Cold Water Fishery			
Selenium	0.0-8.4	Metals	Aquatic Life, Cold Water Fishery			
Temperature Measurements (Suspected Impairment) for German Gulch Tributaries						
Stream	RM*	Start Date	End Date	Max T (°C)	Days>12°C	Days>18°C
Beefstraight Creek	0.5	7/15/03	8/31/03	17.4	42	0

Norton Creek	0.5	7/15/03	8/31/03	18.5	42	1
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\*River Mile

Source: MDEQ, 2010; PIBO/USFS 2010

*Metals*

As mentioned in the paragraph above, the German Gulch watershed suffers from severe metals contamination due to its proximity to the Anaconda Smelter Superfund Site. Cyanide, selenium and arsenic have been detected at critical levels and have, in some samples, exceeded human health and riparian health allowances (MDEQ, 2010). Much of the contamination stems from the Beal Mountain Mine and tailings piles associated with it (MDEQ, 2010). These pollutants pose health issues for humans, wildlife and fish in the area. Remediation efforts are currently underway that involve managing runoff, preventing soil erosion, and continued monitoring near listed point sources (MDEQ, 2010).

*Temperature*

German Gulch has not been monitored for thermal impairments in recent years. However, two of its tributaries, Beefstraight Creek and Norton Creek, were studied in 2003. The German Gulch basin does contain several irrigation diversions and therefore experiences some dewatering (which can raise stream temperatures). Beefstraight and Norton Creek show moderately high temperatures during the monitoring period but do not exceed 20 °C (Table xxx). Temperatures below 16°C are optimum for westslope cutthroat trout growth, while temperatures below 20 °C are critical for their survival (Kirk, 2010). High temperatures also encourage algae growth and reduce dissolved oxygen content, which can be detrimental to fish health.

**3.Native/Sport Fishery**

**Table xxx: Fish Distribution in the German Gulch Watershed**

<b>Waterbody</b>	<b>Begin RM*</b>	<b>End RM*</b>	<b>Species</b>	<b>Updated</b>
German Gulch	0.0	8.4	Westslope Cutthroat Trout	9/4/2009
German Gulch	2.7	8.4	Westslope Cutthroat Trout	11/18/2009

German Gulch	0.0	4.7	Brook Trout	2/20/2009
German Gulch	4.7	8.4	Brook Trout	2/20/2009
Beefstraight Ck	0.0	6.8	Westslope Cutthroat Trout	12/15/2005
Beefstraight Ck	0.0	1.8	Brook Trout	2/20/2009
Beefstraight Ck	1.8	5.1	Brook Trout	7/13/2009
Norton Creek	0.0	3.7	Brook Trout	9/14/2009
Norton Creek	0.0	5.4	Westslope Cutthroat Trout	12/15/2005
Beaver Creek	0.0	2.6	Westslope Cutthroat Trout	7/24/2009
Canyon Creek	0.0	1.8	Westslope Cutthroat Trout	1/5/2005
Canyon Creek	0.0	0.7	Brook Trout	7/13/2009
Clear Creek	0.0	2.6	Westslope Cutthroat Trout	1/5/2005
Coyote Gulch	0.0	1.1	Westslope Cutthroat Trout	1/5/2005
Edward Creek	0.0	2.1	Westslope Cutthroat Trout	7/24/2009
Greenland Gulch	0.0	3.1	Westslope Cutthroat Trout	1/5/2005
Minnesota Gulch	0.0	3.1	Westslope Cutthroat Trout	1/5/2005
Spring Creek	0.0	3.6	Westslope Cutthroat Trout	1/5/2005
American Gulch	0.0	1.5	Westslope Cutthroat Trout	9/24/2008

Source: MFWP, 2010

### *Current Condition*

Montana FWP conducted sampling on German Creek and its tributary, Beefstraight Creek, in 2008. Lower sections of German Gulch showed the effects of historic placer mining some bank erosion, and low flows, but support a fairly diverse community of woody vegetation. Fish habitat throughout the creek was rated as “good”, and several fish screens

had been installed on irrigation diversions (MFWP, 2009). Westslope cutthroat, rainbow and brook trout were found throughout the creek. Beefstraight Creek was also sampled and was found to contain brook and westslope cutthroat trout at both sample sites.

*Fishery Potential*

**Table xxx: Tributary Rating Summary for German Gulch (Priority 1)**

<b>Stream</b>	<b>Reach(RM)</b>	<b>Trout Species</b>	<b>Impairments</b>
German Gulch	Lower: 0.0-8.4	Rainbow, Brook and Westslope Cutthroat	Low summer flows due to irrigation, livestock grazing in riparian areas; high temperatures; competition to westslope cutthroat from brook/rainbow trout; mining waste and leachate contamination
Current Recruitment/Restoration Fishery Value			Protection/Enhancement Value
<b>High</b>			<b>Very High</b>
Current Tributary/Replacement Fishery Value			Protection/Enhancement Value
<b>Medium</b>			<b>High</b>
Current Native Fishery Value (westslope cutthroat)			Protection/Enhancement Value
<b>Medium</b>			<b>Medium</b>

Source: MFWP, 2010

**Table xxx: Tributary Rating Summary for Beefstraight Creek (Priority 3)**

<b>Stream</b>	<b>Reach(RM)</b>	<b>Trout Species</b>	<b>Impairments</b>
Beefstraight Creek	Lower: 0.0-6.7	Brook and Westslope Cutthroat	Low summer flows due to irrigation, livestock grazing in riparian areas; high temperatures; competition to westslope cutthroat from brook trout; mining waste and leachate contamination
Current Recruitment/Restoration Fishery Value			Protection/Enhancement Value
<b>High</b>			<b>High</b>
Current Tributary/Replacement Fishery Value			Protection/Enhancement Value
<b>Medium</b>			<b>Medium</b>
Current Native Fishery Value (westslope cutthroat)			Protection/Enhancement Value
<b>Medium</b>			<b>Medium</b>

Source: MFWP, 2010

While German Gulch and Beefstraight Creek experience several impairments, protection and enhancement possibilities for a viable trout fishery exist on several levels (Table xxx). Montana FWP has shown an interest in managing (in collaboration with state

agencies and other organizations) German Gulch and Beefstraight Creek as recreational fisheries, declaring German Gulch a “Priority 1” stream reach and Beefstraight Creek a “Priority 3” stream reach in the agency’s Final Tributary Rating Summary (2010). Improved management practices can increase the fishery viability by addressing documented impairments (Table xxx and xxx) with appropriate restoration projects.

**4. Assessments**

Gold Creek’s habitat and water quality status have been assessed several times in the last 10 years (Table xxx). Assessments have included fish habitat and fishery potential, temperature, noxious weeds, stream flow, and stream channel and riparian habitat status.

**Table xxx: German Gulch Assessments**

Type	Agency	Year	Area
Tributary Prioritization /Rating Summary	MFWP	2010	German Gulch/ Beefstraight Creek
Fish Population/Riparian Habitat	MFWP	2009	German Gulch/ Beefstraight Creek
PIBO Streams and Riparian Areas	USFS	2010	Beefstraight Creek/ Norton Creek
Upper Clark Fork Tributaries TMDL	MDEQ	2010	German Gulch/Tributaries

*FWP Riparian Assessment*

Montana FWP (2009) conducted riparian assessments at each fish survey site (Table xxx). The riparian habitat along German Gulch and Beefstraight Creek showed signs of livestock grazing, some bank erosion and disturbance-induced plants (mainly Canada thistle). However, woody vegetation was dense and continuous in most areas. The lower section of Beefstraight received a rating of “good” and the upper portion was rated “excellent” (MFWP, 2009).

**5. Restoration Needs**

- Continue monitoring for metals contamination from the Beal Mountain Mine and throughout the drainage
- Prevent soil erosion and runoff, especially in areas within the Anaconda Smelter Superfund Site
- Limit livestock access to streams and riparian areas
- Update temperature data for German Gulch and tributaries

#### *Activities*

- Reclamation activities associated with the Beal Mountain Mine and the Anaconda Smelter Superfund Site

*Activities: Projects being undertaken by the WRC*

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## **6.Watershed Map**

## **7.Bibliography**

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