

1. Willow Creek (Fairmont) Watershed Summary

Description and Land Use

Table xxx: Willow Creek (Fairmont) Watershed Overview

Watershed Size	18,331 acres/28.7 sq miles/74.3 sq km
Elevation Range	2,615 feet [4,980-7,595]
Stream Miles	51.3
Land Ownership	Private: 39% /State: 61%
Road Miles	Driveway/Service Road= 0.1 Local Road/City Street = 12.5 Highway= 1.1 Total = 13.7

Source: Montana GIS Portal Data Layers

Willow Creek lies within the Silver Bow Creek Watershed, but no longer connects with Silver Bow Creek. The creek originates in the Continental Divide and flows for almost 13 miles before entering the Mill-Willow bypass and joining the Clark Fork River near the town of Opportunity (MFWP, 2009). The creek drains an area of almost 30 square miles and the basin is divided into private entities and state-managed property (including the Mount Haggin Wildlife Management Area). The Willow Creek watershed supports livestock grazing, irrigated agriculture and some timber harvest (MFWP, 2009).

2. Impairments

Table xxx: Listed and Suspected Impairments for Willow Creek

2010			
Reach	Impairment	Pollutant	Impaired Uses
Willow Creek River Mile 12.8 (Headwaters)-7.0	Arsenic	Metals	Drinking Water, Primary Contact Recreation
	Cadmium	Metals	Aquatic Life, Cold Water Fishery
	Copper	Metals	Aquatic Life, Cold Water Fishery
	Iron	Metals	Aquatic Life, Cold Water Fishery

	Lead	Metals	Aquatic Life, Cold Water Fishery
	Zinc	Metals	Aquatic Life, Cold Water Fishery
	Sedimentation / Siltation	Sediment	Aquatic Life, Cold Water Fishery
Willow Creek River Mile 7.0-0.0 (Silverbow Creek)	Arsenic	Metals	Aquatic Life, Cold Water Fishery, Drinking Water
	Cadmium	Metals	Aquatic Life, Cold Water Fishery, Drinking Water
	Copper	Metals	Aquatic Life, Cold Water Fishery, Drinking Water
	Iron	Metals	Aquatic Life, Cold Water Fishery, Drinking Water
	Lead	Metals	Aquatic Life, Cold Water Fishery
Willow Creek River Mile 7.0-0.0 (Silverbow Creek)	Zinc	Metals	Aquatic Life, Cold Water Fishery
	Sedimentation / Siltation	Sediment	Aquatic Life, Cold Water Fishery
2008			
Reach	Impairment	Pollutant	Impaired Uses
Willow Creek River Mile 12.8 (Headwaters)-7.0 Willow Creek River Mile 12.8 (Headwaters)-7.0	Arsenic	Metals	Drinking Water, Primary Contact Recreation
	Cadmium	Metals	Aquatic Life, Cold Water Fishery
	Copper	Metals	Aquatic Life, Cold Water Fishery
	Lead	Metals	Aquatic Life, Cold Water Fishery
	Phosphorus (Total)	Nutrients	Aquatic Life, Cold Water Fishery, Primary Contact Recreation
	Sedimentation / Siltation	Sediment	Aquatic Life, Cold Water Fishery
	Alteration in stream-side or littoral	<i>Not a Pollutant</i>	Aquatic Life, Cold Water Fishery
Willow Creek	Arsenic	Metals	Aquatic Life, Cold Water Fishery, Drinking Water
	Cadmium	Metals	Aquatic Life, Cold Water Fishery, Drinking Water

River Mile 7.0-0.0 (Silverbow Creek)	Copper	Metals	Aquatic Life, Cold Water Fishery, Drinking Water
	Lead	Metals	Aquatic Life, Cold Water Fishery, Drinking Water
	Low Flow Alterations	<i>Not a Pollutant</i>	Aquatic Life, Cold Water Fishery
	Alteration in stream-side or littoral	<i>Not a Pollutant</i>	Aquatic Life, Cold Water Fishery
Temperature Measurements (Suspected Impairment)			

FWP 2008	RM*	Start Date	End Date	Max T (°C)	Days>15°C	Days>20°C
	2.1	7/8	10/13	24.1	72	42
	7.7	7/8	10/13	17.5	37	0

*River Mile
Source: MDEQ, 2010; MFWP, 2008

Metals

The Willow Creek basin contains no recorded abandoned mines (DNRC, 2011). However, the entire watershed lies within the Anaconda Smelter Superfund Site (MDEQ, 2010) and has historically received contaminants from several different sources. The Yellow Ditch, which once brought water and tailings from Silver Bow Creek, multiple tile drains, railroad lines, polluted groundwater and atmospherically-contaminated eroding soil from the upper basin have all been cited as contributors, especially in the lower reaches (MDEQ, 2010). While several of the listed metals exceed target allowances during peak flows, lead, arsenic and copper still exceed at low flows (MDEQ, 2010). Willow Creek is also listed for cadmium, zinc and iron (Table xxx).

Irrigation and Dewatering

Chronic dewatering results from agricultural irrigation within the basin and has many implications for both water quantity and quality. Almost 90 water rights exist on Willow Creek (MDNRC, 2011) and contribute to low seasonal flows. Low flows result in unsuitable habitat for fish and macroinvertebrates due to increased temperatures and algal growth (Table xxx). In addition, irrigation structures can create barriers which impede fish passage and migration (MFWP, 2010).

Sediment/Siltation

Impairments from sediment and siltation often occur from over-grazing and in the riparian areas of Willow Creek. Because livestock frequently have access to natural water sources in this area, riparian vegetation is sparse. This, combined with livestock traffic, leads to accelerated bank erosion (MFWP, 2009). A road associated with Superfund remediation was also cited by the Watershed Restoration Coalition as a source of erosion and fine sediment (2011).

Sedimentation beyond that which is naturally occurring, damages fish and macroinvertebrate habitat by filling in redds, reducing available habitat (such as riffles and pools), and by altering stream channels (Kusnierz and Welch, 2011). Sediment levels in Willow Creek exceed those defined by Montana DEQ TMDL standards (MDEQ, 2010).

Temperature

Thermal impairments are attributed to agricultural dewatering and lack of stream cover, and have been documented throughout the basin (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

Current Condition

Montana FWP conducted fish sampling at River Mile 1.0, 5.1, and 8.4 on Willow Creek in 2008. The samples showed predominantly brook and brown trout at RM 1.0, while westslope cutthroat trout appeared at RM 5.1. Westslope cutthroat trout were the dominant species at RM 8.4 and some brook trout were present as well (MFWP, 2009).

Fish habitat was scored as “fair” at RM 1.0 and 5.1 and “good” at RM 8.4. All sites lacked suitable amounts of large woody debris and contained elevated amounts of fine sediment. RM 1.0 and 5.1 lacked vegetative stream cover and suffered from low flows as well (MFWP, 2009).

3. Native/Sport Fishery

Table xxx: Fish Distribution in Willow Creek

Waterbody	Begin RM*	End RM*	Species	Updated
Willow Creek	0.0	12.9	Brook Trout	8/10/2006
Willow Creek	0.0	3.6	Brown Trout	2/20/2009
Willow Creek	3.6	11.7	Brown Trout	2/20/2009
Willow Creek	0.0	7.0	Longnose Sucker	2/23/2009
Willow Creek	0.0	6.2	Redside Shiner	2/23/2009
Willow Creek	0.0	12.9	Slimy Sculpin	1/5/2005
Willow Creek	9.0	12.9	Westslope Cutthroat Trout	8/19/2009
Willow Creek	5.0	9.0	Westslope Cutthroat Trout	8/19/2009

Source: MFWP, 2010

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Fishery Potential

Table xxx: Tributary Rating Summary for Willow Creek (Priority 2)

Stream	Reach(RM)	Trout Species	Impairments
Willow Creek	All: 0.0-12.8	Brook, Brown and Westslope Cutthroat	Low summer flows due to irrigation; erosion and channel incisement; lack of vegetative cover; livestock grazing in riparian areas; high temperatures; metals contamination; competition to westslope cutthroat trout from brook and brown trout
Current Recruitment/Restoration Fishery Value			Protection/Enhancement Value
Medium			High
Current Tributary/Replacement Fishery Value			Protection/Enhancement Value
Medium			High
Current Native Fishery Value (westslope cutthroat)			Protection/Enhancement Value

Medium	Medium
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Source: MFWP, 2010

While Willow Creek experiences 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) Willow Creek as a recreational fishery, declaring it a “Priority 2” 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) with appropriate restoration projects.

4. Assessments

Willow 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: Willow Creek Assessments

Type	Agency	Year	Area
Riparian/Geomorphology/Flow Assessments	WRC	2011	Throughout Willow Creek
Tributary Prioritization /Rating Summary	MFWP	2010	All of Willow Creek
Fish Population/Riparian Habitat	MFWP	2009	River Mile 1.0, 5.1, and 8.4
Upper Clark Fork Tributaries TMDL	MDEQ	2010	All of Willow Creek

WRC and FWP Riparian Assessment

The Watershed Restoration Coalition (2011) conducted riparian assessments on 9.8 miles of Willow Creek in 2011. Of the 13 assessed reaches, the WRC classified four as “not sustainable”, four as “at-risk” and five as “sustainable”. WRC noted significant bank erosion and channel incisement throughout their survey area. Additionally, noxious weeds were prevalent and beneficial woody vegetation was lacking in riparian areas. The WRC noted hoofshear in several areas due to unrestricted livestock access. Assessed reaches within

and near the Mount Haggin Wildlife Management Area were rated as “sustainable” while the others were divided between “non-sustainable” and “at-risk” (WRC, 2011).

Montana FWP (2009) conducted riparian assessments as well (Table xxx). Each site received fairly low scores for riparian condition owing to the prevalent noxious weeds, bank erosion, channel incisement and lack of woody vegetation. In some areas, livestock had access to the channel and evidence of hoofshear was present.

5. Restoration

Needs

- Continued monitoring of metals contamination throughout the basin and appropriate remediation
- Address soil erosion issues with riparian plantings and limited livestock access in riparian areas
- Work with water users to address dewatering and low flows
- Continue to monitor temperature throughout the basin
- Address barriers to fish passage

Activities: Projects undertaken by the WRC

6. Watershed Map

7. Bibliography

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