1.Dry Cottonwood Creek Watershed Summary

Table xxx: Dry Cottonwood Creek Watershed Overview

Watershed Size	14,963 acres/23.4 sq miles/60.6 sq km
Elevation Range	2,619 feet [4,783-7,402]
Stream Miles	26.9
Land Ownership	Private: 40% /State: 9%/Federal: 51%
Road Miles	Local Road/City Street = 5.4 Total = 5.4

Source: Montana GIS Portal Data Layers

Description and Land Use

Dry Cottonwood Creek is a small tributary to the Clark Fork River and, as its name suggests, connects only seasonally (usually during spring runoff) depending on water availability (MFWP, 2010). The creek flows for nearly six miles from its headwaters in the foothills of the Boulder Mountains (MFWP, 2009). Land ownership is divided almost evenly between private and federal entities (Table xxx) and supports grazing, timber harvest and recreation. Several abandoned mines exist within the drainage as well (MFWP, 2009).

2. Impairments

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Table xxx: Temperature Measurements for Dry Cottonwood Creek

PIBO 2008	RM*	Start Date	End Date	Max T (°C)	Days>12°C	Days>18°C
	1.9	7/15	8/31	15.3	37	0
PIBO 2003	1.9	7/15	8/31	18.2	42	0
FWP 2008	RM*	Start Date	End Date	Max T (°C)	Days>15°C	Days>20°C
	5.1	7/9	10/13	16.9	27	0

*River Mile

Source: PIBO/USFS 2010; MFWP 2009

Temperature

Thermal impairments are often attributed to agricultural dewatering (and in this case, natural dewatering as well) and have been documented on Dry Cottonwood Creek

(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

Irrigation and Dewatering

Dry Cottonwood Creek is thought to be a naturally low-water stream. However, dewatering from agricultural irrigation within the lower portion of the basin most likely worsens flows. The lack of water has also signifies implications for water quality. 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).

3.Native/Sport Fishery

Table xxx: Fish Distribution in the Dry Cottonwood Creek Watershed

Waterbody	Begin RM*	End RM*	Species	Updated
Dry Cottonwood Creek	2.3	5.7	Westslope Cutthroat Trout	7/27/2009
Dry Cottonwood Creek	0.0	5.7	Brook Trout	1/5/2005
North Fork Dry Cottonwood Creek	0.0	4.1	Westslope Cutthroat Trout	1/5/2005
South Fork Dry Cottonwood Creek	0.0	4.8	Westslope Cutthroat Trout	1/5/2005

Source: MFWP, 2010

Current Condition

Dry Cottonwood Creek and North Fork Dry Cottonwood Creek were both sampled by Montana FWP in 2008, and were found to contain only westslope cutthroat trout (although a 2005 sample found a brook trout [Table xxx]). Montana FWP (2008) found Dry Cottonwood to have “good” fish habitat.

Fishery Potential

Table xxx: Tributary Rating Summary for Dry Cottonwood Creek (Unranked)

Stream	Reach(RM)	Trout Species	Impairments
Dry Cotton-wood Creek	All: 0.0-5.6	Westslope Cutthroat	Low summer flows due to irrigation with complete dewatering at certain reaches, livestock grazing in riparian areas; high temperatures
Current Recruitment/Restoration Fishery Value			Protection/Enhancement Value
Low			**Medium**
Current Tributary/Replacement Fishery Value			Protection/Enhancement Value
Low			**Low**
Current Native Fishery Value (westslope cutthroat)			Protection/Enhancement Value
Medium			**Medium**

Source: MFWP, 2010

Table xxx: Tributary Rating Summary for North Fork Dry Cottonwood Creek (Unranked)

Stream	Reach(RM)	Trout Species	Impairments
Dry Cotton-wood Creek	All: 0.0-4.1	Westslope Cutthroat	Low summer flows due to irrigation with complete dewatering at certain reaches, livestock grazing in riparian areas; high temperatures
Current Recruitment/Restoration Fishery Value			Protection/Enhancement Value
Low			**Medium**
Current Tributary/Replacement Fishery Value			Protection/Enhancement Value
Low			**Low**
Current Native Fishery Value (westslope cutthroat)			Protection/Enhancement Value
Medium			**Medium**

Source: MFWP, 2010

While Dry Cottonwood Creek and its tributary, North Fork Cottonwood Creek, experience several impairments, protection and enhancement possibilities for a viable trout fishery exist on several levels (Table xxx and xxx). Montana FWP has shown an interest in managing (in collaboration with state agencies and other organizations) Dry Cottonwood Creek and North Fork Cottonwood Creek, as stated 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

Dry Cottonwood 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, and stream channel and riparian habitat status.

Table xxx: Assessments on Dry Cottonwood Creek

Type	Agency	Year	Area
Riparian/Geomorphology/Flow	WRC	2009/2011	Throughout Dry Cottonwood Creek
Tributary Prioritization/Rating Summary	MFWP	2010	Dry Cottonwood and North Fork Dry Cottonwood
Fish Population/Riparian Habitat	MFWP	2009	Dry Cottonwood and North Fork Dry Cottonwood
Temperature Monitoring	PIBO/USFS	2010	River Mile 1.9

FWP Riparian Assessment

Montana FWP (2009) conducted riparian assessments along Dry Cottonwood Creek and found signs of bank erosion, noxious weeds and grazing pressure (MFWP, 2009). North Fork Dry Cottonwood Creek scored lower on the riparian assessment and was rated only as "fair". Grazing pressure was evident and the section lacked woody debris and deep pools (MFWP, 2009).

5.Restoration

Needs

- Work with landowners to address irrigation practices that contribute to dewatering
- Continue to monitor temperature
- Restrict livestock access to streams and riparian areas
- Continue to monitor and treat for noxious weeds
- Address lack of woody vegetation with riparian plantings

Activities: Projects being undertaken by the WRC

6.Watershed Map

7.Bibliography

Bureau of Land Management, Montana State Office. Montana Surface Management Ownership (poly)[vector digital data]. 2007.

Fischer, Jessie. Dry Cottonwood Creek watershed map. 1:120,000-500,000. [Printed/Computer Maps]. Fischer Geospatial Enterprises, LLC. Missoula, Montana. 2011.

KirK Environmental and Natural Resources, Inc. *Cottonwood Creek Flow Monitoring and Fish Barrier Study, Flow Monitoring and Water Rights Report.* Watershed Restoration Coalition. Deer Lodge, Montana. March 5, 2010.

Montana Bureau of Mines and Geology (MBMG). Montana Abandoned and Inactive Mines Database [vector digital data]. Montana State Library. Helena, Montana. January 9, 2006

Montana Department of Environmental Quality. *Upper Clark Fork River Tributaries Sediment, Metals, and Temperature TMDLs and Framework for Water Quality Restoration*. March 4, 2010
Montana Department of Natural Resources and Conservation Water Resources Division. Montana Water Rights [vector digital data]. Montana State Library. Helena, Montana. July 11, 2011

Montana Fish, Wildlife & Parks. Montana Fish Distribution – Streams[vector digital data]. Montana Fish, Wildlife & Parks. Helena, Montana. May 17, 2010.

Montana Fish Wildlife and Parks. *Rating Summaries for the Prioritization of Tributaries of the Upper Clark Fork River Basin for Fishery Enhancement Draft Final.* May, 2010.

Montana Fish Wildlife and Parks. *An Assessment of Fish Populations and Riparian Habitat in Tributaries of the Upper Clark Fork River Basin (*Phase II). March, 2009

Montana Fish, Wildlife & Parks. River Mile Locations (Tenth Mile Intervals) [vector digital data]. January 30, 2008.

Montana Natural Resources Conservation Service State Office. (6th-code) Hydrologic Units Montana Subwatershed [vector digital data]. Montana Natural Resources Conservation Service. Bozeman, Montana. 2007

U.S. Forest Service. PACFISH/INFISH Biological Opinion temperature and invasive weed datasets. U.S. Department of Agriculture. 2010

U.S. Census Bureau Geography Division. Montana Roads from TIGER/Line Files (Redistricting Census 2000)[vector digital data. Montana State Library. Helena, Montana. 2001.

U.S. Department of Commerce U.S. Census Bureau, Geography Division. Montana TIGER/Line Files, UA Census 2000 [vector digital data]. Montana State Library. Helena, Montana. 2002.

U.S. Geological Survey. National Elevation Dataset for Montana [raster digital data]. Montana State Library. Helena, MT. April 1, 2002.

Watershed Restoration Coalition. Upper Clark Fork Tributaries assessment data [Unpublished data for flow, geomorphology and riparian assessments]. Watershed Restoration Coalition. Deer Lodge, Montana. 2010-2011.