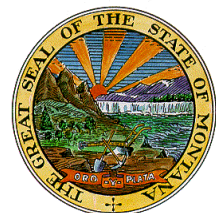


# Cramer Creek TMDL Implementation Evaluation



**March 2019**

*Steve Bullock, Governor*  
*Shaun McGrath, Director DEQ*



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**Prepared by:**

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## **ACRONYMS**

BCP – Bonita Clinton Potomac

BLM – United States Bureau of Land Management

DEQ – Montana Department of Environmental Quality

DNRC – Department of Natural Resources

EPA – United States Environmental Protection Agency

MSU – Montana State University

NRCS – Natural Resources Conservation Service

TIE – TMDL Implementation Evaluation

TMDL – Total Maximum Daily Load

TMDL Document – A document produced by DEQ to describe the total maximum daily load of a pollutant that a waterbody can receive and still maintain all its beneficial uses. The document typically also contains pollutant source assessment information and a restoration strategy.

## **1.0 – BACKGROUND ON TMDL IMPLEMENTATION EVALUATIONS (TIES)**

### **1.1 PURPOSE**

The Montana Department of Environmental Quality (DEQ) develops Total Maximum Daily Load (TMDL) documents to provide a framework for water quality restoration efforts. Then, DEQ works with local, state, federal, and private partners to provide assistance to local entities conducting water quality improvement activities. DEQ periodically reviews the progress of restoration efforts, and publishes the results as TMDL Implementation Evaluations (TIEs).

The Cramer Creek TMDL Implementation Evaluation (Cramer Creek TIE) accomplishes the following goals:

- Evaluate the success of on-the-ground efforts to address water quality impairments, and provide constructive feedback to local entities involved in these efforts.
- Suggest potential next steps for DEQ involvement in addressing water quality impairments.
- Provide a TMDL implementation evaluation consistent with the requirements of Montana State Law (75-5-703(9) MCA).

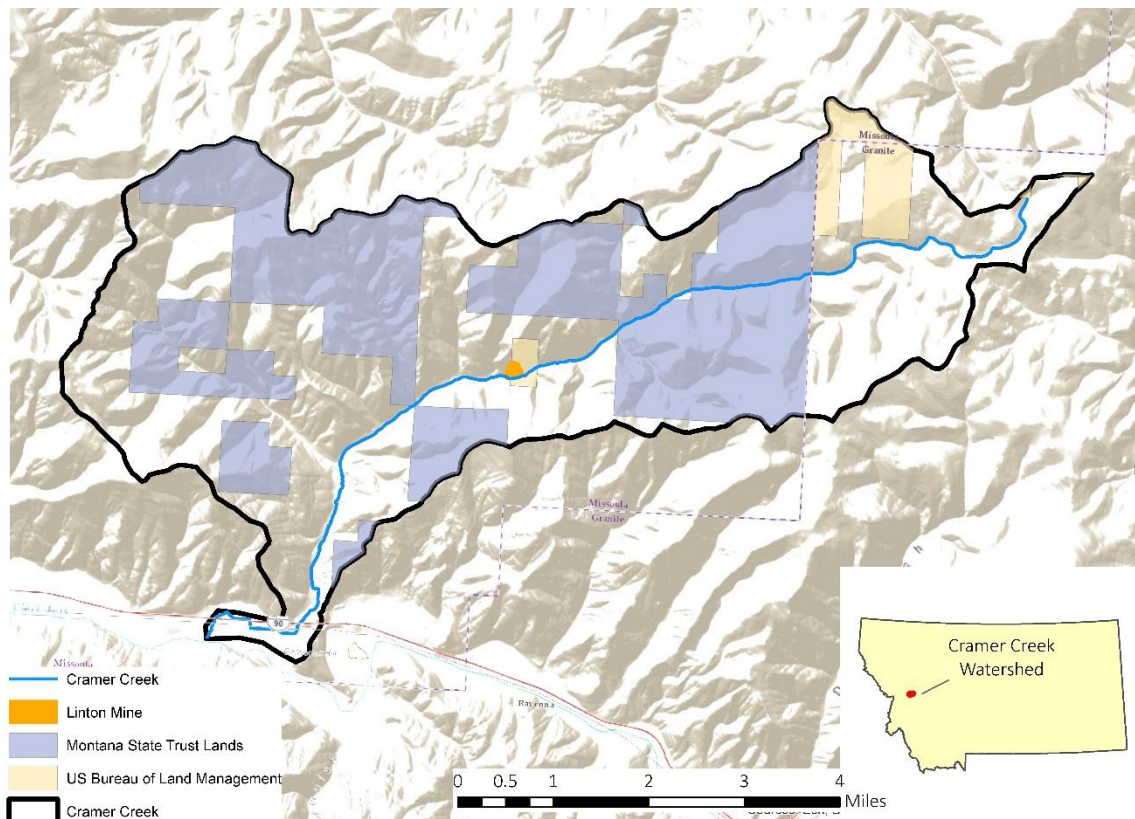
### **1.2 PROCESS**

Information in the Cramer Creek TIE was compiled primarily by speaking with key stakeholders (Section 6.0). DEQ reviewed details of BLM remediation efforts, including historical documents. Additionally, DEQ searched for and reviewed the most up-to-date assessment information, evaluated aerial imagery from 2005 to 2015, and briefly toured the watershed. The document was sent out for review from key stakeholders and revised based on their input.

## 2.0 – INTRODUCTION TO CRAMER CREEK

Cramer Creek is an impaired waterbody included within the boundaries of the Central Clark Fork Basin Tributaries TMDL Planning Area. The 12-mile tributary joins the Clark Fork River about 25 miles east of Missoula, Montana (Figure 1). Total Maximum Daily Loads for aluminum, lead (DEQ 2013) and sediment (DEQ 2014) have been developed for Cramer Creek. Non-pollutant impairments include physical substrate habitat alterations (DEQ 2014). The main pollutant sources within Cramer Creek are impacts from abandoned mine lands, timber harvest, grazing, and roadway run off. These impairments are addressed within two TMDL Documents:

- Bonita – Superior Metals TMDLs, May 2013
- Final – Central Clark Fork Basin Tributaries TMDLs and Water Quality Improvement Plan, September 2014



**Figure 1** Map of the Cramer Creek watershed and public land ownership.

Between 1947 and 1955, the Linton mine (formerly known as the Blacktail mine) produced silver, lead, zinc, and copper ores. DEQ identified this mine as a probable source of many impairments on the creek including sediment in 1988; arsenic, copper, lead, and mercury in 2000; physical substrate habitat alterations in 2006; and aluminum in 2014. These impairments cause the creek to not meet recreation, drinking water, or aquatic life uses. In addition to mining, this 26.5 square mile watershed has a history of timber harvest, wildfire, and is undergoing multiple landownership changes.

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## 3.0 – RECOMMENDED ACTIVITIES FROM TMDL DOCUMENTS

The Bonita-Superior Metals TMDL document (DEQ 2013) recommends specific restoration and monitoring activities for addressing pollutants within Cramer Creek. These recommendations are summarized below.

### Restoration

- Reduce lead loads from abandoned mines by 37-47% depending on flow conditions
- Reduce aluminum loads from abandoned mines by 82% at high flow conditions
- Develop a watershed restoration plan

### Monitoring

- Monitoring should track lead concentrations in Cramer Creek
- Monitoring should track aluminum concentrations in Cramer Creek, with attention to soil and land conservation BMPs that may be implemented to meet the sediment TMDL
- Track restoration projects as they are implemented and assess their effectiveness

The Central Clark Fork Tributaries TMDL document (DEQ 2014) recommends the following restoration and monitoring activities for addressing sediment pollution within Cramer Creek:

### Restoration

- Reduce sediment loads from roads by 80%, streambank erosion loads by 52%, and sources of upland sediment loading by 68%
- Apply BMPs within riparian zones and along roadways to address streambank erosion and sediment loading from roads
  - Divert water off roadways through healthy vegetation
  - Maintain and size culverts properly
- Promote wetland and riparian vegetation by improving grazing management (including timing and duration of grazing throughout multi-pasture systems that incorporate riparian grazing and off-stream watering areas)
- Apply timber harvest BMPs
- Develop a watershed restoration plan

### Monitoring

- Conduct field surveys of all roads and road crossing to identify specific contributing segments
- Review land-use practices to determine where the greatest potential improvements can occur
- Develop bank erosion rates specific to the Central Clark Fork Basin Tributaries TMDL Project Area
- Sample additional sites to better assess existing conditions
- Track restoration projects as they are implemented and assess their effectiveness

## **4.0 – INDICATORS OF PROGRESS**

Many of the TMDL Documents' recommendations (Section 3.0) have been or continue to be implemented. DEQ staff reached out to local, state, and federal entities believed to be involved in water quality improvement efforts. The activities compiled from these contacts provide a good indication of progress made towards reaching water quality standards for metals and sediment in the Cramer Creek watershed. It is important to note that this is not a comprehensive summary of all activities conducted in the watershed, and does not include any unknown efforts by watershed residents that help reduce nonpoint source pollution.

### **4.1 – RESTORATION ACTIVITIES**

#### **Mine Remediation**

DEQ included the Linton mine as a Priority Abandoned Mine and referred cleanup to the Bureau of Land Management (BLM), which manages the mine land. Between 2004 and 2005, BLM led reclamation activities that removed 130,000 cubic yards of mine waste from a 1,700-foot reach of floodplain and stream channel across public and private property (Figures 2). Additionally, BLM replaced a culvert with a bridge to aid in reducing road-related sediment inputs to Cramer Creek. In 2006, BLM installed approximately 7,500 willow, alder, and dogwood plants along the project reach, and used fascines to stabilize reconstructed banks. In 2007, large woody debris structures were added to the stream, and 350 potted trees and shrubs were planted along streambanks in the public portion of the project reach. Monitoring showed 80% survival of planted trees and shrubs after 2 years, and by 2009 vegetation covered 60 to 80% of streambanks along the reconstructed channel (RRG 2009). Effects of the reclamation should increase through time as vegetation matures, filters out pollutants, and stabilizes streambanks (Figure 3).



**Figure 2** Photos taken from approximately the same point pre-project (top left), after waste removal in 2004 (top right), during seeding and mulching in 2004 (bottom left), and post-project in 2006 (bottom right). Images provided by the Missoula Field Office, BLM.



**Figure 3** Cramer Creek reclamation reach in July 2013 on BLM property. Riparian habitat conditions continue to improve. Image provided by the Missoula Field Office, BLM.



## Wildfire and Timber Harvest Remediation

After wildfires in 2000 and 2007 burned significant portions of the drainage, private landowners, Plum Creek Timber Company, Stimson Lumber Company, DNRC, the Nature Conservancy, and BLM replanted trees, repaired road washouts, repaired or replaced stream crossings, reseeded, and mitigated weeds to reduce damages caused by the fire. Due to these fires, there is no longer a significant amount of timber harvest taking place in the Cramer Creek watershed because most areas have been previously harvested or burnt in 2000 or 2007 wildfires. Many former timber harvest roads are now blocked off to vehicular use.

In 2018, DNRC replaced two failed, undersized culverts on tributaries to Cramer Creek and required additional fencing of a sensitive spring-fed wetland. DNRC also repaired a 500 foot portion of Cramer Creek Road that washed out in two separate locations. Although these types of road maintenance activities are not typically required of DNRC, their actions ensured hauling efficiency and that timber harvest and hauling BMPs were met. In total, since 2013 DNRC maintained and implemented applicable BMPs on 14.7 miles of road within the Cramer Creek watershed, primarily associated with timber harvest sales.

## Grazing BMPs

Bonita Clinton Potomac (BCP) Grazing Association leases the lands owned by DNRC, The Nature Conservancy, Stimson Lumber Co., and BLM. The BCP follows the grazing BMPs outlined in their leases which run from June through September each year. Grazing BMPs include light to moderate stocking rates, changing turn-out locations, herding, salting, development of off-stream water sources, riparian fencing maintenance and installation, stream monitoring, and weed control. The BCP has reduced cattle numbers significantly in the Cramer Creek drainage from historic levels when leasing began in the 1930's. BLM initiated and installed multiple spring developments which are still operating and maintained by the BCP. Plum Creek initiated riparian fencing of multiple segments of Cramer Creek which continue to be maintained and expanded upon by BCP.

## 4.2—LAND USE

Much of the land in the Cramer Creek watershed was formerly owned by Plum Creek Timber Company and has since been purchased by a partnership between The Nature Conservancy and Montana State Trust Lands. The purchase was part of the Montana Legacy Project and includes Cramer Creek in a mosaic of more than 310,000 acres of land dedicated for preserving wildlife habitat and water resources and sustaining recreational and economic viability.

Resale of land is increasing the number of private parcels in the Granite County portion of Cramer Creek. The quality of land and water stewardship practices applied on these parcels vary widely. Conservation-minded landowners have fostered healthy riparian vegetation near the confluence of West Fork Cramer Creek. These actions have positive influences on water quality and hopefully will encourage land stewardship from additional landowners.

Beaver were observed during willow cutting collection for the Linton Mine project in 2006. Beaver ponds were observed in approximately the same location below the Linton Mine in 2018. Beaver ponds can mitigate impacts from streambank erosion, settle out fine sediment, and increase base flows to dilute metals concentrations.

## 4.3 – MONITORING ACTIVITIES

### DEQ Monitoring

DEQ last assessed Cramer Creek in 2013 with data collected from 2009 to 2011, just two to four years after revegetation efforts for the Linton Mine remediation project were completed. The results prompted MDEQ to remove arsenic, copper and mercury from the 2014 impairment list and link these achievements to Linton Mine reclamation activities (Table 1).

**Table 1** Results of the most recent assessment on Cramer Creek, conducted in 2013, removed arsenic, copper, and mercury as impairment causes on the impairment list.

Parameter	Most Stringent, Hardness-Adjusted Standard	Maximum Concentration Detected (Number of Samples)
Arsenic	10 µg/L	3 µg/L (21)
Copper	8.61 µg/L	2 µg/L (21)
Mercury	0.05 µg/L	0.0089 µg/L (15)

### DNRC Monitoring

DNRC regularly inventories trust lands roads for BMP compliance and effectiveness where the agency has primary maintenance responsibilities. According to most recent inventory data, 77% of road miles and 68% of culvert crossings have effective BMPs installed.

## 4.4 – PLANNING ACTIVITIES

In 2018, the Clark Fork Kootenai River Basins Council began planning for a restoration strategy including but not limited to Cramer Creek. Additionally, the passage of the Streamside Management Zone law in 1991 limited timber harvest within 50-100 feet of streams and within adjacent wetlands.

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## 5.0 – CONCLUSIONS

Significant land use changes and planning and restoration activities have occurred in the Cramer Creek watershed, and these have likely resulted in removing arsenic, copper, and mercury as metals pollutants. Additionally, it is possible that sufficient work has been done to allow attainment of aluminum and lead standards. Still, more work or time after implementation may be needed for this waterbody to achieve sediment water quality standards.

Based on available water quality data, documentation, conversations with stakeholders, the following conclusions may be drawn from this TMDL Implementation Evaluation:

- Mine remediation and timber, roadway, and grazing BMPs have significantly reduced pollutant loading to Cramer Creek. Stakeholders in the watershed should continue making progress with ongoing efforts.
- Metals water quality data was last collected between 2009 and 2011. New data may show further reductions in aluminum and lead pollution.
  - Lead pollution is likely linked to the mine. Therefore, lead concentrations in Cramer Creek may decrease as maturing vegetation continues to stabilize soil and intercept runoff.
  - Aluminum exceedances occur above and below the Linton mine and only occur during runoff conditions, which suggests that this impairment cause is not related to the mine (MDEQ 2013).
- Limited water quality monitoring has occurred on Cramer Creek since 2000. Collecting new data for reassessment is not necessary until improvements occur along the lower portion of Cramer Creek.

The following suggested recommendations address how to reduce pollution from the major sources in the Cramer Creek watershed. DEQ and other entities can help identify sources of financial and technical assistance to support efforts to develop a watershed restoration plan and implement restoration activities such as improving streambanks, channel form and function, and ranch management.

### 5.1 – RECOMMENDATIONS

Cramer Creek will be included in a Watershed Restoration Plan in development and led by the Clark Fork and Kootenai River Basins Council. Additional recommendations will likely be identified during local planning efforts. A priority area should be the lower reach of Cramer Creek where bank erosion, low flow, and channel modification are causing sediment loading. Other recommendations include additional roadway BMPs and encouraging beaver populations.

## 6.0 – INFORMATION SOURCES

**Table 2** Contacts

<b>Name</b>	<b>Title</b>	<b>Organization</b>
Steve Flood	Hydrologist	BLM, Missoula Field Office
Dave Williams	Geologist	BLM, Missoula Field Office
Betsy Hovda	Reclamation Specialist	DEQ, Hard Rock Mining Bureau
Tara Comfort	Former Resource Conservationist	BCP Grazing Association
Vicky Watson	Former Professor	University of Montana/Clark Fork and Kootenai River Basins Council
Andrea Stanley	Hydrologist/Soils Scientist	Montana DNRC

### Documents

Montana Department of Environmental Quality. 2013. Bonita-Superior Metals TMDLs. Helena, MT: Montana Dept. of Environmental Quality.

Montana Department of Environmental Quality. 2014a. Detailed Assessment Reports. Clean Water Act Information Center. Helena, MT: Montana Department of Environmental Quality.  
<http://cwaic.mt.gov>.

Montana Department of Environmental Quality. 2014b. Final Central Clark Fork Basin Tributaries TMDLs and Water Quality Improvement Plan. Helena, MT: Montana Dept. of Environmental Quality.

Reclamation Research Group, LLC. 2009. Linton Mine and Mill Site BLM Reclamation Evaluation Report.

## 7.0 – CONCLUSIONS SPREADSHEET

**Table 3** This table summarizes BMP implementation, data availability, and overall conclusions of the Cramer Creek TIE by each pollutant.

Waterbody	Pollutant	BMP Status	Data Summary	TIE Conclusion
Cramer Creek, MT76E004_020, from headwaters to mouth (Clark Fork River)	Aluminum	Some good BMPs implemented. More BMPs may still be needed.	Insufficient data for establishing water quality trends, estimating current conditions, or impairment reassessment.	More BMPs are needed. Reassessment to evaluate water quality standards attainment is not warranted at this time. Fine-scale source identification needed to determine extent that aluminum exceedances are related to sediment. On-the-ground projects should be promoted.
	Lead	BMPs have been implemented. Water quality standards may be achieved, or still need more time to be achieved.	Insufficient data for establishing water quality trends, estimating current conditions, or impairment reassessment.	BMPs have been applied. Future monitoring should determine if water quality standards have been achieved, if more time is needed to achieve water quality standards, or if there is an additional source of lead.
	Sediment	Some good BMPs implemented. Significantly more BMPs are still needed.	Insufficient data for establishing water quality trends, estimating current conditions, or impairment reassessment.	More BMPs are needed. Reassessment to evaluate water quality standards attainment is not warranted at this time. Fine-scale source identification and on-the-ground projects should be promoted.

## APPENDIX A – BCP COMMENTS



### Comments on Cramer Creek TMDL Implementation Evaluation (TIE)

December, 2018

Submitted by: Tara Comfort, For BCP Grazing Association  
(Former Resource Conservationist for Missoula Conservation District)

**Background:** I am familiar with the Cramer Creek drainage from having worked up there beginning in 1979 to present, for Missoula Conservation District and now for the Bonita Clinton Potomac (BCP) Grazing Association. After having read the MT DEQ Cramer Creek TMDL Implementation Evaluation, I offer the following comments on the upper, mid, and lower portion of the drainage above Interstate 90:

#### Major Changes in the Landscape:

**Wildfires:** Cramer Creek has been directly effected by 2 extensive wildfires, first the Ryan Gulch Fire (Year 2000) and then the Mile Marker 124 Fire (Year 2007). Significant portions of the drainage were burnt over and are still in varying stages of recovery. The cover photo of the DEQ TIE document shows the burnt-over slopes of Lower Cramer Creek. Individual private landowners, Plum Creek Timber Company, Stimson Lumber Company, MT DNRC State Lands, The Nature Conservancy, and BLM have replanted trees, repaired road washouts, repaired/replaced stream crossings, reseeded, and conducted weed control measures to mitigate the damages caused by the wildfires. The Cramer Creek drainage continues to recover from these fires. There is more bare soil, increased weed invasion, and much less tree cover than prior to the fires, which could all contribute to increased sediment runoff in the uplands.

**Land Ownership:** Cramer Creek is experiencing significant land ownership changes, with Montana DRNC State Lands, The Nature Conservancy, and Stimson Lumber Company purchasing former Plum Creek Timber Company lands, and Stimson reselling their Granite County portion of Cramer Creek to multiple private landowners. There are now many more individual private ownerships within the drainage. Lands historically managed for timber production are now being purchased for home sites and ranchettes. Land stewardship and water quality practices being applied to Cramer Creek and its tributaries on the private lands vary widely- some good, some not good.

#### Applied BMPs in Cramer Creek:

**Forestry BMPs:** MT DNRC, TNC, Stimson, and BLM are all applying Montana Forestry BMP's within Cramer Creek drainage on their respective land ownerships. There is no longer a significant amount of timber harvest taking place in the drainage, as most of the areas have been cut over previously, and/or burned in the recent wildfires. Beginning with Plum Creek Timber Company, many of the old road systems are now gated, and many old spur roads have been blocked off, limiting vehicle access and use. MT DNRC State Lands removed an undersized culvert on a tributary and required additional fencing of a sensitive spring-fed wetland area. The State has taken the lead in road maintenance and repair of the main Cramer Creek Road since the land ownership changes from Plum Creek ownership. Cramer Creek Road was repaired in 2 separate locations this fall 2018 by the State; where the main Cramer Road washed out this spring and an undersized, plugged culvert above causing flooding down the road from a side tributary of the creek. Both repairs have improved water quality and reduced direct sediment loading into Cramer Creek.

**Grazing BMPs:** Bonita Clinton Potomac (BCP) Grazing Association leases the lands owned by MT DNRC, TNC, Stimson, and BLM. The BCP follows the grazing BMPs outlined in their leases which run from June through September each year. Grazing BMPs include light to moderate stocking rates, changing turn-out locations, herding, salting, development of off-stream water sources, riparian fencing maintenance and installation, stream monitoring, and weed control. The BCP has reduced cattle numbers significantly in the Cramer Creek drainage from historic levels (the BCP has leased Cramer Creek since the 1930's). BLM initiated and installed multiple spring developments which are still operating and maintained by

the BCP. Plum Creek initiated riparian fencing of multiple segments of Cramer Creek which continue to be maintained on the State sections by BCP. Addition fencing of sensitive riparian areas has been installed and maintained by BCP.

**Mining BMPs:** The Linton Mine reclamation by BLM has definitely improved the water quality of Cramer Creek and the portion of the stream that was reconstructed following mine tailings removal is now healthy and recovering well. This is a definite success. Kennecott Mining (Rio Tinto) holds all the mineral rights in the Garnet Mountains. Their activities in Cramer Creek have not been significant other than road grading improvements when they are running equipment up to their mining activities at Copper Cliff on the Potomac side of the mountains through Cramer Creek.

#### **Personal Observations and Conclusions:**

From the early 1980's to the present, the riparian areas along Cramer Creek and its tributaries, within the leased lands (from Section 35, T12N, R16W to the headwaters of Cramer and West Cramer Creek), have improved with increased riparian vegetation and bank stability, due to less concentrated grazing use of the stream bottoms through grazing management and increased beaver activity. Beaver activity has increased in the last 10 years along Cramer Creek, raising the water table, acting as a water filter, and increasing the willow communities along sections of the stream. Cramer Creek is a steady good-flowing stream in wet as well as dry years, aiding in its ability to remain resilient and stable.

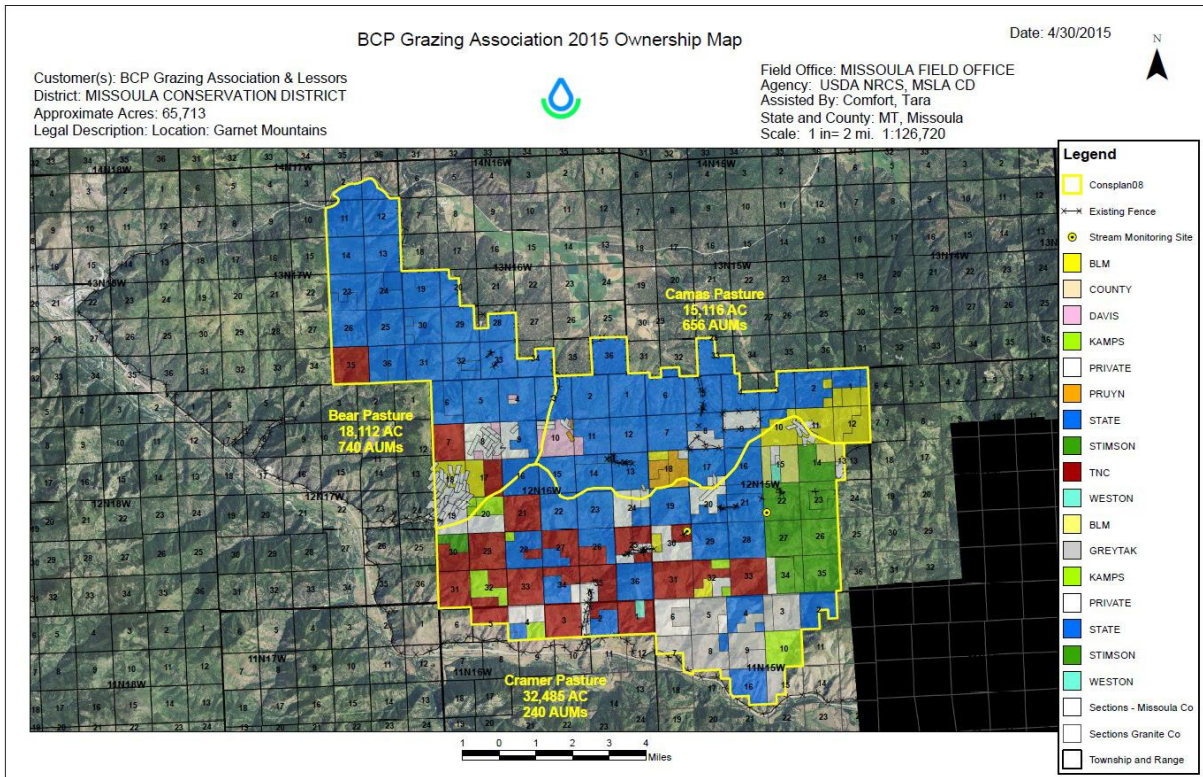
Wear and tear on the main roads, and weed spread have increased significantly with increased vehicle use on the remaining open roads in Cramer Creek. Off-setting this, there are now fewer roads that can be accessed by vehicles than there used to be due to gates, and many spur roads blocked off; which should aid in reduction of sediment loading from the old road systems.

There are less trees and canopy cover due to recent wildfires in the Cramer Drainage. Due to much of Cramer Drainage facing south, with hot, dry, aspects, and shallow droughty limestone soils; recovery from the fires, and reforestation of the area will take a long time.

There has been a definite increase in the amount and variety of weeds within the Cramer Creek drainage since the 1980's due to multiple reasons; wildfire, vehicle transport, the increased number of new invading weed species and amount throughout Western Montana, and drought being major factors. These weed species do not provide the ground cover and stability that the native vegetation provided to uplands.

In conclusion, within my 39 years of knowledge of Cramer Creek, the riparian areas leased by the BCP Grazing Association have improved and the uplands are currently in a lower ecological condition for the reasons stated above. See map of BCP Grazing Lease boundary below. The individual private land ownerships within the grazing lease boundaries are not leased to the BCP.

(Note: Ownerships have changed since 2015 when this map was made).





**APPENDIX B – DNRC STATE TRUST LANDS COMMENTS**  
**DEPARTMENT OF NATURAL RESOURCES**  
**AND CONSERVATION**

**Southwestern Land Office - Missoula Unit**



STEVE BULLOCK, GOVERNOR

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**Hannah Riedl**

Watershed Protection Section  
 Montana Department of Environmental Quality  
 1520 E Sixth Ave  
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RE: Cramer Creek TMDL Implementation Evaluation

Dear Hannah Riedl,

We appreciate the opportunity to contribute to the TMDL Implementation Evaluation (TIE) for the Cramer Creek watershed. The DNRC Trust Lands office currently owns and manages 42 percent of the watershed or 16,946 acres. Our management of these lands include timber sales, forest management, and grazing licenses. Management of these forested trust lands is described in Montana Code Annotated Title 77, Chapter 5, Part 3. In addition, DNRC has adopted administrative rules which outline the management of forested lands in Title 36.11.300 through 36.11.400. As a state agency, many of our activities are subject to the Montana Environmental Policy Act (MEPA). Many of these activities, including the use and maintenance of our road infrastructure, are relevant to water quality and the protection or improvement of beneficial uses.

We had a small land ownership presence in the watershed until 2010 when we purchased 32,192 acres in this area with the Potomac Land Purchase from The Nature Conservancy (TNC). Much of this new land is in the Cramer Creek watershed. Prior to being acquired by the TNC, the land was private industrial forest land.

Since the establishment of the Final Central Clark Fort Basin Tributaries TMDLS and Water Quality Improvement Plan in September 2014, the DNRC Trust Lands have completed the following projects and activities within the Cramer Creek watershed. Most of the maintenance, improvement, abandonment, and reclamation or roads on DNRC trust lands occurred in conjunction with timber sales and associated transportation planning.

- Wallace Cramer Timber Sale within Sections 16 and 21, T 12N, R 15 W.
  - Most of the harvest and road work associated with this project occurred within the Cramer Creek watershed.
  - Commercial harvest of approximately 314 acres within the Cramer Creek watershed (using cable and ground-based yarding).
  - Planned road management associated within the project included 12.2 miles of road maintenance and drainage improvements on existing access roads within the Cramer Creek watershed. Maintenance work included the replacement of two failed county culvert crossings along Cramer Creek Road. Maintenance and repair of county road infrastructure by the DNRC is not typical and occurred in this instance to ensure hauling efficiency and to ensure DNRC harvest and hauling activities met applicable BMPs. These two culvert replacements are located on unnamed tributaries to Cramer Creek (46.7643°N 113.5563°W and 46.7640°N 113.5505°W). Prior to replacement, these culvert crossings were identified as too short for the road prism and/or 100% blocked with all surface flow crossing the road surface. Road repair and CMP replacement work was completed in 2018. Final road grading and grass seeding of DNRC roads and landings will occur at the conclusion of harvest operations anticipated in 2021

- Unplanned road repairs also occurred on Cramer Creek Road in 2018 (near 46.7645°N 113.5428°W) due to the washout of approximately 500 feet of county road located immediately adjacent to Cramer Creek during high runoff in the spring of 2018. Road repairs included the improvement of road surface drainage, replacement of road fill, and fill and streambank armoring. Again, maintenance and repair of county road infrastructure by the DNRC is not typical and occurred in this instance to ensure hauling efficiency and to ensure DNRC harvest and hauling activities met applicable BMPs. We would like to caveat that this was a consequence of needing to complete repairs to ensure our purchasers were able to meet the timber sale timeline. We were informed by Missoula County roads staff that repairs would likely not occur within a timeframe that would suit our timber sale. We then made the decision to complete the road repair with the acknowledgment that potential project setbacks (cost and timeline) associated with waiting for the county to complete the repairs would be more costly than completing the repairs with our own resources.
- Beavertail Beetles Timber Sale within Section 2, T 11 N, R 16 W.
  - Most of the harvest and road work associated with this project occurred outside the Cramer Creek watershed.
  - Commercial harvest of approximately 17 acres (using cable and ground-based yarding) and pre-commercial thinning of 20 acres within the Cramer Creek watershed.
  - Road maintenance of 0.7 miles of road within the Cramer Creek watershed.
  - Work began in 2015 and was completed in 2016.
- Kamas Point Timber Sale within Section 16, T 12 N, R 16 W.
  - Most of the harvest and road work associated with this project occurred outside the Cramer Creek watershed.
  - Commercial harvest of approximately 17 acres within the Cramer Creek watershed (using cable and ground-based yarding).
  - Work within the watershed also included the construction of 1.0 miles of new road and the maintenance of 1.7 miles of existing road within the Cramer Creek watershed. All other road work and hauling occurred outside the Cramer Creek watershed.
  - Work began in 2013 and was completed in 2018.

The DNRC regularly inventories trust lands roads upon which the agency has primary maintenance responsibilities. Road and crossing monitoring includes BMP compliance and effectiveness assessment. Below is a summary of the DNRC trust lands road infrastructure and BMP assessment status for the Cramer Creek watershed from field data queried in January 2019. Road and crossing evaluations occur incrementally by DNRC trust lands staff, therefore this data may be representative of conditions observed as recently as last summer or from several years ago. Note that all DNRC trust lands roads within the Cramer Creek watershed have restricted access; this means these roads are closed to public vehicle access. All DNRC crossing structures within the Cramer Creek watershed are culvert crossings.

	BMP EFFECTIVE?	LENGTH OR ROAD (MILES) OR NUMBER OF INDIVIDUAL CROSSINGS
<b>ROADS</b>	No	6.9 miles
	Yes	50.6 miles
	Unknown	8.6 miles
<b>CULVERT CROSSINGS (INCLUDING STREAM AND DITCH RELIEF CROSSINGS)</b>	No	13 crossings
	Yes	28 crossings

The DNRC also allows grazing on state trust land in the watershed through grazing licenses. We are still assembling a summary of our activities in this watershed. Details will follow in the next week. Again, we appreciate the opportunity to contribute our knowledge of watershed conditions to the Cramer Creek TMDL. We welcome questions and discussion, so please don't hesitate to call me or email me.

Sincerely,

Andrea Stanley, PG  
Hydrologist/Soils Scientist  
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