Coal Creek Channel Survey
Preliminary Overview 2003

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Introduction and Methods

In the winter of 2002-2003 an interagency group convened to discuss stream habitat conditions in Coal Creek, a tributary to the North Fork of the Flathead River. The group consisted of representatives, mostly hydrologists or fisheries biologists, from the U.S. Forest Service, U.S. Fish and Wildlife Service, Montana Department of Natural Resources and Conservation, and Montana Fish Wildlife and Parks (MFWP). The group convened for a number of reasons, including declines in bull trout spawning, TMDL planning, and observed in-channel erosion and sedimentation. The group met a number of times including a fieldtrip to Coal Creek where we looked at active bank erosion. The outcome of these meetings was concurrence that the group needed to work towards improving habitat conditions in the stream. To do this, it was decided that we needed better information of existing channel conditions to take a holistic approach to restoration. Prior to working on isolated locations within the drainage, the group decided to do preliminary surveys of the forest road system, in-channel conditions, and water yields within the drainage. We felt this baseline information was important in order to proceed with a better likelihood of success. This report addresses the in-channel stream habitat conditions in Coal Creek and its tributaries upstream of the confluence with Dead Horse Creek.

From the information collected during this survey, we were able to produce an overview of channel conditions in the drainage and provide information in a format that allows others to view channel conditions and assess the current status. This will allow members of the interagency working group and others to direct future restoration efforts. This report consists of six parts. The first is this document summarizing the preliminary channel survey and containing a brief introduction, methodology, and summaries of general channel conditions for four stream reaches. Also included are four GIS maps (one for each reach) with GPS locations and photographs of channel features. Some digital photographs are embedded in the maps. The maps were built by MFWP (Jeff Hutten) in the Information Services Unit located in the MFWP Region 1 headquarters. The third part of this report is a copy of our field notes with an appendix that contains a table relating numbered locations on the maps to field observations and photographs. The fourth portion is an Access database, which provides this information in a format that may be useful in future assessments. The fifth part is a file containing all photographs taken during the survey. The last part of this report is a copy of the narrative summary from the 1988 survey (see below). By referring to the maps, field notes, appendix table, or the Access database a reader can electronically view the information collected in this survey.

Prior to this survey, a very similar survey was conducted in 1988 (Weaver, Tom. 1989. Coal Creek Fisheries Monitoring Study NO. VII and Forest-Wide Fisheries Monitoring-1988. Montana Fish, Wildlife and Parks, Kalispell, MT). The Flathead National Forest and Montana Fish Wildlife and Parks conducted this earlier study through a cooperative effort. This report provided a narrative description of stream features beginning in the headwaters and working downstream identifying sediment sources, bank instability

concerns, and restoration measures. This report stated that there were highly unstable channel areas in each of the three major forks in the Coal Creek drainage. The vast majority of the problems were related to land-management, logging and road building activities of the 1950's and 1960's. It noted that sediment generated decades ago continued to cause channel instability and erosion in the late 1980's. Since the 1980's, there had been a number of road improvement projects on federal and state lands to improve stream crossings and road drainage. However, a number of the problems observed in the 1988 report had not been addressed. The 2003 survey aimed to repeat the 1988 survey and determine current status of and if there were major changes in channel condition.

MFWP personnel (Jon Cavigli, Tom Weaver, and Mark Deleray) split the roughly 28 miles of stream between the three recorders, which took 15 person-days. For reporting purposes, we broke the river miles into four reaches. One reach was Mathias Creek and its tributaries down to its confluence with the South Fork of Coal Creek. The second was the South Fork of Coal Creek from the headwaters down to the confluence with main Coal Creek. The third was the upper two forks of main Coal Creek. And the forth reach was main Coal Creek from the confluence of the upper two forks down to the confluence with Dead Horse Creek. Starting at the headwaters or upstream end of a reach, observers walked downstream noting in-channel sediment deposits, eroding banks or other sediment sources. Major features were noted in narrative field notes, digital photographs, and GPS coordinates. Digital photos and GPS coordinates may not be available for some reaches due to availability of equipment. This survey provides a qualitative overview of channel conditions that can be compared to similar information from the 1988 report and provide a holistic view of the drainage to direct future surveys and restoration needs.

Summaries of Stream Habitat Conditions in Four Reaches

Mathias Creek – Map 1

The headwaters reach of Mathias Creek is steep with step pools formed by bedrock slabs and large woody debris (LWD). Upstream from the Road 317 crossing the channel appears relatively stable with the exception of a reach through the old cutting unit near the upper fork. No Streamside Management Zone (SMZ) was provided here and the channel has migrated through areas of deposition on large woody debris. Several low cut banks are present. Frequent avalanches from the steep slopes north of the channel compound the erosion problem. Surveyors noted 20 sites where large woody debris held gravels and fine sediments, two depositional plugs where the channel braided (This feature is a plug of sediment often associated with large woody debris that will be referred to as Plug Deposition Braiding (PDB)) and eleven wind-thrown trees in the channel area between the old cutting unit and the 317 crossing.

Most of the fill has been removed from the upper crossing of Road 317; the pipe is still in place. Downstream from this crossing extensive deposition is evident on old logging debris. Several old machine crossings are present and wind-thrown trees are common

along the channel throughout an old logging unit. Bull trout spawning occurred throughout this general area during past years.

Approximately 1.3 km below the crossing of Road 317 a small tributary flows into Mathias Creek from the South. This drainage has been highly impacted by past land management activities. The survey team accessed this area by continuing past the upper Mathias Creek crossing on Road 317 approximately 1.2 km to where this drainage is crossed by Road 317 in Section 4. This drainage has been a major sediment contributing area. Portions of Sections 4 and 5 above Road 317 north of the Mathias-Hallowatt saddle were logged approximately 45 years ago. Poor skid trail location and equipment operation in the channel area resulted in an estimated 6100 m^3 of material delivered and transported downstream. Water yield and transport has been enhanced by a "new" channel system and channel stability problems are evident throughout the drainage downstream. The culverts where these channels cross Road 317 were removed in 1999, but banks were left too steep and erosion of road fill is ongoing. Downstream from these crossings, channels are very steep and sediment traps are full of stored fine material. This small tributary to Mathias should be evaluated for future restoration potential.

Lower Mathias Creek remains relatively steep downstream from the confluence with this small tributary. The large woody debris storing major deposits of fine sediment is old and some of it is failing, allowing sediment movement that created new channels. As the gradient decreases, this situation becomes more common. Lower Mathias Creek passes through logging units and potential for new recruitment of large woody debris is generally limited or nonexistent. In some areas, lateral deposition is being colonized by vegetation and appears to be stabilizing. Surveyors noted approximately six major plugs of deposition causing braiding (PDB) through this reach.

Main Coal Creek Headwaters – Map 2

The fork of main Coal Creek flowing out of Haines Pass covers a distance of 4.8 km from the headwaters (Section 36) to the junction with the north fork of Coal Creek in Section 19. The upper 1.0 km drains an undeveloped area; however, slopes north of the pass appear highly erosive and natural slumping has occurred in several areas. The channel here is steep but stable. Deposited materials are generally larger than 2.0 mm. The area in the vicinity of the trailhead (#26) has contributed a substantial amount of fine sediment, largely from management-related activities. Deposition on stable channel debris is evident and streambed substrate in low gradient areas is highly embedded. Large woody debris is generally lacking throughout this reach but where jams occur a large amount of sediment is stored. Surveyors noted four PDBs in the reach. Bull trout spawning has been documented just upstream from the junction with the north fork of Coal during past surveys.

The fork flowing out of the unnamed lake in Section 23 is characterized as steep and stable. We call this headwater reach the north fork of Coal Creek. Bedrock step pools with large amounts of large woody debris are common. As the gradient decreases debris jams cause deposition and gradient checks. Cut stumps and logging debris are present in the channel through old cutting units and a short reach (300 m) appears to have been

straightened and channelized by machinery. A gradient break is present as the channel flows out into the Haines Fork valley. Active cutting and depositional areas occur approaching the junction with Haines Fork. The survey team identified four large depositional areas, six PDBs and 22 lateral deposits all associated with large woody debris in the north fork of Coal Creek. This reach should be evaluated for future restoration potential.

South Fork Coal Creek – Map 3

The headwaters of South Coal Creek are undeveloped from the Whitefish Divide down to just above the 1686 crossing in Section 31. Sediment sources are natural and materials deposited are generally >2.0 mm. The fill has been removed from the tops of each end of the 72" open arch culvert where 1686 crosses; the pipe is still in place. Below this crossing the channel is steep with bedrock and boulders forming cascades and falls. Large old debris, both natural and logging related is storing sediment. Old cutting units occur on both sides. A 2.5 m falls is formed by large woody debris on bedrock 1.4 km downstream from the 1686 crossing. This barrier is located at the upstream end of the bull trout redd count section. Stream gradient lessens from here down. Many depositional areas due to old debris accumulations create braiding (PDBs). Cutting units exist on both banks with inadequate SMZs. Cut stumps occur in the channel and there is evidence of logging debris being cut out of the channel during past years (≈15 years ago). Proceeding downstream, these debris accumulations causing deposition and braiding become more common as gradient decreases. Wind-thrown trees are common along old cutting units with inadequate SMZs on South Coal Creek and adjacent wetlands. Intercepted groundwater forms small channels, which are full of fine sediments. South Coal joins with Mathias Creek approximately 3.8 km downstream from the 1686 crossing.

The lower portion of South Coal Creek runs through old cutting units with no SMZs. Cut stumps are visible in the channel area, which has been artificially straightened. Large woody debris is lacking through these old units and the potential for recruitment is limited or non-existent. This reach should be evaluated for future restoration potential. Several slumping banks occur on the north side of the channel through these old units. Once the stream leaves the logged area, gradient increases and it becomes more confined. Five large logjams have caused major deposition and braiding (PDBs). Two large slumps are present just upstream from the junction with main Coal Creek.

Main Coal Creek – Map 4

Downstream from the confluence of the upper two forks of main Coal Creek, the channel ran through old cutting units where inadequate SMZs and machine operation in the channel area and adjacent wetlands caused instability. Logging debris and cut stumps in the channel were common. Seven PDBs were noted along with several slumping banks upstream from the campsite crossing at the edge of Section 17. Bull trout spawning has been documented throughout this reach. Below the crossing in Section 17 the channel is similar. We noted several additional PDBs in the mile below this crossing. The bull trout redd count section ends approximately 1.4 km below the Section 17 crossing. From here downstream to the junction of South Coal Creek, main Coal Creek passes through a

canyon-like area with large substrate, bedrock, and higher gradient. Surveyors noted 15 PDBs and a lack of debris in the upstream section of this reach. Several large slumping banks are present downstream from the 317 Bridge.

Downstream from the Coal-South Coal confluence deposition is extensive and generally finer material; PDBs are practically continuous. Sand deposits occur in channel and on gravel bars. Substrate is highly embedded with sand "wind rows" obvious behind mid-channel obstructions. Downstream from Dead Horse Bridge large woody debris resulting from the Moose Fire became more evident. Many logs across the channel and in jams have burned. Beaver activity became more common and is causing braiding in several areas. All large debris jams have extensive deposits of sand and gravel and low velocity areas have a thin layer of organic sediment. We ended this survey in the willow meadow area at the mouth of Dead Horse Creek.