APPENDIX F
UNPAVED ROAD SEDIMENT ASSESSMENT, UPPER JEFFERSON RIVER TMDL PLANNING AREA

1.0 INTRODUCTION

This report presents a sediment assessment of the unpaved road network within the Upper Jefferson River TMDL Planning Area (TPA). This assessment was performed as part of the development of sediment TMDLs for 303(d) Listed stream segments with sediment as a documented impairment. Through a combination of GIS analysis, field assessment, and modeling, estimated sediment loads were developed for both road crossings and parallel road segments. Existing road conditions were modeled, as well as estimated future road conditions after the application of sediment reducing Best Management Practices (BMPs).

The 1996 303(d) List included a total of 10 impaired streams within the Upper Jefferson River TPA: Big Pipestone Creek, Cherry Creek, Dry Boulder Creek, Fish Creek, Fritz Creek, Halfway Creek, Hells Canyon Creek, Little Pipestone Creek, Whitetail Creek, and the Jefferson River (**Figure 1**). All streams were listed for siltation on the 1996 303(d) List with the exception of Cherry Creek, which was listed for flow alterations. The 2006 303(d) List includes Big Pipestone Creek, Hells Canyon Creek, Little Pipestone Creek, Whitetail Creek, Jefferson River, Cherry Creek, Fish Creek and Fitz Creek for sediment related impairments.

2.0 DATA COLLECTION

The Upper Jefferson Road Sediment assessment consisted of three primary tasks: 1.) GIS Layer development, 2.) field assessment and sediment modeling, and 3.) sediment load calculations and allocations for listed watersheds and the entire Upper Jefferson River TPA. Additional information on assessment techniques is available in prior reporting for this project: *Task 1. Road GIS Layers and Summary Statistics* (MDEQ 2006), and *Task 2. Sampling and Analysis Plan* (MDEQ 2006).

2.1 Spatial Analysis

Unpaved crossings and parallel segments in the road network were identified and classified relative to landscape type, land ownership, and 6th code subwatershed. These classifications captured a statistically representative sample of roads within the entire watershed, based on a number of road conditions (subwatershed, road design, soil type, maintenance level, etc). A total of 1441 unpaved road crossings were identified based on the GIS analysis; forty seven percent (675 crossings) in the mountain landscape, forty four percent (641 crossings) in the foothill landscape, and nine percent (125 crossings) in the valley landscape. A random subset of unpaved crossing sites were generated for field assessment based on the proportion of total crossings within each landscape type, with approximately 4 percent of the total unpaved crossings assessed. Parallel road segments were identified as areas where roads encroach upon the stream channel, and total road lengths within 150-foot and 300-foot buffer zones were generated. There was a total of 439 miles of unpaved parallel road segments within 300 feet of stream channels and 262 miles within 150 feet.

2.2 Field Data Collection

A total of 60 unpaved crossings and 23 unpaved parallel segments were evaluated in the field (**Figure 2**). Twenty six crossings were assessed in the mountain landscape, 29 crossings were assessed in the foothill landscape, and 5 crossings were assessed in the valley landscape type. In the field, near stream segments were selected based on best professional judgment while traveling roads on which specific crossings were selected for evaluation. Parallel segments were selected in a manner where road segments would not be duplicated in both the crossing and parallel sediment load calculations. Seventeen parallel segments were assessed in the mountain landscape type and 6 segments were assessed in the foothill landscape type. No parallel segments were assessed in the valley landscape type due to the small overall area of the valley landscape, and the observation that the majority of the roads were paved and/or did not parallel a stream channel. Field data spreadsheets with detailed information on each road crossing and parallel segment are included in **Attachment A** and **Attachment B**.

2.3 Sediment Assessment Methodology

The road sediment assessment was conducted using the WEPP:Road forest road erosion prediction model (http://forest.moscowfsl.wsu.edu/fswepp/). WEPP:Road is an interface to the Water Erosion Prediction Project (WEPP) model (Flanagan and Livingston, 1995), developed by the USDA Forest Service and other agencies, and is used to predict runoff, erosion, and sediment

delivery from forest roads. The model predicts sediment yields based on specific soil, climate, ground cover, and topographic conditions. Specifically, the following model input data was collected in the field: soil type, percent rock, road surface, road design, traffic level, and specific road topographic values (road grade, road length, road width, fill grade, fill length, buffer grade, and buffer length). Site specific climate profiles were developed for each landscape type using data from the Western Regional Climate Center (http://www.wrcc.dri.edu). Fifty year simulations were run for each unpaved road crossing and parallel road segment.

2.4 Error Reduction

Field conditions required that a number of sites be moved to different locations due to lack of access (landowner permission or road condition), lack of an existing stream channel, or inaccuracies in the road or stream GIS layers, which showed crossings that weren't present. It was also noted during field activities that some roads showed up as paved on the GIS layers, when, in fact, they were improved gravel roads. Records were kept in the field and edits were made to the GIS layers. Revised road network statistics were generated, which resulted in unpaved road crossings increasing from 1441 to 1549 crossings.

A visual assessment of the road system was also conducted using 2005 color aerial infrared photography to identify and remove incorrect road crossings. Most errors were noted along boundary edges where different road layers overlapped each other, or along confined valley bottoms where a road and stream paralleled each other. Incorrect road crossings were marked as such in the GIS data file, and removed from the final sediment loading calculations. The presence of heavy foliage in narrow valleys made identification of incorrect crossings difficult in some areas. Crossings were only removed if they could be positively identified as incorrect. The entire road system within all 303(d) Listed watersheds were evaluated using aerial photography, and average error percentages were calculated for each landscape type. Mountain landscape types had an average error of 8.5 percent, foothill landscape types had an average error of 6.3 percent, and valley landscape types had an average error of 5 percent. These average error percentages were then applied to the remainder of the Upper Jefferson River watershed to determine a final unpaved road crossing tally of 1419 crossings, 660 mountain crossings, 626 foothill crossings, and 133 valley crossings (**Table 2-1**). The ability to generate completely accurate road and stream crossing layers is not feasible; however, this revised tally represents a more accurate representation of existing conditions.

Table 2-1. Total Revised Number of Unpaved Crossings

Landscape Type	Unpaved Road Crossings using GIS Only	Revised Unpaved Crossings After Field Adjustments	Final Number of Unpaved Crossings After Aerial Photo Adjustments
Mountain	675	721	660
Foothill	641	688	626
Valley	125	140	133
Total	**1441**	**1549**	**1419**

Parallel road segments within 150-foot and 300-foot buffer distances from all identified stream channels were identified using GIS; however, field conditions demonstrated that roads more than 150-feet from a stream channel did not appear to be a sediment source. A total of 439 miles of

parallel road is present within 300-feet of stream channels and 262 miles of parallel road is within 150-feet. This distance was further reduced to 100-feet based on modeling results showing low sediment load from three assessed segments outside this distance. A total of 189 miles of parallel road are present in the watershed within a 100 foot buffer distance, and all parallel road sediment load calculations were based on this value (**Table 2-2**).

Table 2-2. Total Revised Parallel Road Distance

Landscape Type	Parallel Distance Within 300-ft of Streams (miles)	Parallel Distance Within 150-ft of Streams (miles)	Parallel Distance Within 100-ft of Streams (miles)
Mountain	203.2	130.5	95.8
Foothill	198.3	111.9	79.3
Valley	37.8	20.0	13.9
Total	**439.3**	**262.4**	**189.0**

2.5 Mean Sediment Loads

Field assessment data and modeling results were used to calculate mean sediment loads from the unpaved road network by landscape type. Mean sediment loads from unpaved road crossings were estimated at 0.07 tons/year for mountain crossings, 0.62 tons/year for foothill crossings, and 0.11 tons/year for valley crossings. Mean sediment loads were calculated for parallel road segments, and loads were then normalized to 1000-feet to account for differences in contributing road length. Mean sediment loads from unpaved parallel road segments were estimated at 0.32 tons/year/1000-feet in mountain landscapes and 0.39 tons/year/1000-feet in foothill landscapes. No valley parallel segments were assessed in the field due to the small overall area of the valley landscape and the majority presence of paved roads or roads that did not parallel streams. As a result, the mean sediment loads from the mountain and foothill parallel segments were averaged together to obtain an estimated sediment load of 0.36 tons/year/1000-feet for valley parallel segments (**Table 2-3**).

Table 2-3. Mean Sediment Load from Field Assessed Sites

Road Feature	Landscape Type	Number of Sites Assessed	Mean Contributing Length (ft)	Mean Sediment Load (tons/yr)
Crossing	Mountain	26	330	0.07
Crossing	Foothill	29	409	0.62
Crossing	Valley	5	665	0.11
Total:		**60**		
Road Feature	**Landscape Type**	**Number of Sites Assessed**	**Mean Contributing Length (ft)**	**Mean Sediment Load Per 1000 feet (tons/yr)**
Parallel	Mountain	15	587	0.32
Parallel	Foothill	5	457	0.39
Parallel	Valley	0	no data	no data
Total:		**20***		

***** = Three sites with buffer distances greater than 100-feet were removed from the load calculations.

2.6 Extrapolation to Watershed Scale

Total road crossings and parallel road distances were further defined by land ownership and subwatershed. USGS 6th code subwatersheds (HUC_12) were used as a basis for road sediment categorization in order to provide means for identifying the most impacted areas, and opportunities, for potential restoration planning. Some listed watersheds did not correlate with the HUC_12 boundaries; in these instances, the listed watersheds were digitized separately and included as a standalone unit in the load summary analyses. If a listed watershed existed within the boundary of another HUC_12, results were reported separately to avoid duplication. All streams with sediment as a listed impairment on either the 1996 or 2004 303(d) List were reported separately (**Table 2-4** and **Table 2-5**).

The road network was also classified by major landowner within the watershed, as various entities are responsible for operation and maintenance of the system. Four major landowner classifications were developed: United States Forest Service (USFS), United States Bureau of Land Management (BLM) & U.S. Fish & Wildlife Service (USFWS), State of Montana (School Trust and Fish Wildlife, and Parks(FWP)), and private landowners. Due to the insignificant road network impact from USFWS and Montana FWP lands, they were combined with other applicable land classifications. USFWS land was combined with BLM land into a BLM_USFWS category, and FWP land was combined with Montana State Trust land into a State category. Road features and sediment load results are reported by these major land categories.

3.0 ROAD SEDIMENT ANALYSIS

Mean sediment loads from field assessed sites were used to extrapolate loads throughout the entire watershed. Mean loads for unpaved crossings were applied to the total number of crossings within each landscape type, and normalized mean parallel segment loads were applied to the entire parallel distance within 100-feet of streams. For valley parallel road segments, mean results for the mountain and foothill landscape types were averaged to obtain a load value of 0.36 tons/year/1000-feet. Sediment loads were extrapolated to the entire watershed and were sorted by landscape type.

The total Upper Jefferson River Watershed sediment load from unpaved road crossings was estimated to be 449 tons/year, and the total sediment load from unpaved parallel segments within 100-feet of streams was estimated to be 351 tons/year (**Table 3-1**).

Table 3-1. Sediment Load Summary from Unpaved Road Network – Existing Conditions

Road Feature	Landscape Type	Total Number of Sites	Mean Sediment Load (Tons/year)	Total Sediment Load (Tons/year)
Crossing	Mountain	660	0.07	46.2
Crossing	Foothill	626	0.62	388.1
Crossing	Valley	133	0.11	14.6
Total:				**448.9**
Road Feature	**Landscape Type**	**Total Parallel Distance Within 100-feet (Miles)**	**Mean Sediment Load (Tons/year/1000 ft)**	**Total Sediment Load (Tons/year)**
Parallel	Mountain	95.81	0.32	161.9
Parallel	Foothill	79.29	0.39	163.3
Parallel	Valley	13.86	0.36	26.0
Total:		**188.96**		**351.2**
Total Upper Jefferson TPA:				**800.1**

3.1 Sediment Load from Road Crossings

Road crossing results showed that Whitetail Creek (62.6 tons/year), Big Pipestone Creek (61.4 tons/year), and Little Whitetail Creek (49.4 tons/year) contained the three highest sediment loads from unpaved road crossings (**Table 3-2**). The total sediment load from unpaved crossings was 449 tons/year from a total of 1419 crossings, or an average of 0.32 tons/year/crossing across all landscape types. The majority of sediment load is generated from crossings on private land (311.1 tons/year), followed by BLM/USFWS land (64.2 tons/year), and USFS land (48.4 tons/year).

3.2 Sediment Load from Parallel Road Segments

Parallel road segment results showed that the Big Pipestone Creek (40.6 tons/year), Little Whitetail Creek (37 tons/year), and Jefferson River-Mill Creek (33.8 tons/year) watersheds contained the three highest sediment loads from parallel road segments (**Table 3-3**). The total

sediment load from parallel road segments was 351 tons/year from a total of 189 miles of road within 100-feet of streams, or an average of 1.86 tons/year/mile across all landscape types. The majority of sediment load is generated from parallel road segments on private land (176.3 tons/year), followed by USFS land (123.6 tons/year), and BLM/USFWS land (42.5 tons/year).

3.3 Total Sediment Loading

Results from unpaved road crossings and parallel road segments were combined to determine the total sediment load breakdown for the watershed. Combined total sediment loads showed that Big Pipestone Creek (102 tons/year), Whitetail Creek (94.3 tons/year), and Little Whitetail Creek (86.4 tons/year) contained the three highest sediment loads from the unpaved road network (**Table 3-4**).

4.0 APPLICATION OF BEST MANAGEMENT PRACTICES

Sediment impacts are widespread throughout the Upper Jefferson River TMDL Planning Area, and sediment loading from the unpaved road network is one of several sources within the watershed. Application of Best Management Practices (BMPs) on the unpaved road network will result in a decrease in sediment loading to streams. Estimated load reductions were calculated by assuming a uniform reduction in contributing road length for each unpaved crossing and parallel road segment assessed in the field. For crossing locations, the reduced contributing length assumes that the crossing is located in the center of the total length. For parallel segments, the reduced contributing length corresponds with the parallel road segment. Due to the extent of the unpaved road network and the resulting inability to assess it in its entirety, generalized assumptions are necessary for modeling the affects of BMPs. Restoration efforts would need to consider site specific BMPs that, on average, would likely be represented by the modeling assumptions.

4.1 Contributing Road Length Reduction Scenarios

Two contributing road length reduction scenarios were evaluated: the first assumes a length reduction to 200 feet (100-feet on each side of a crossing) and the second assumes a length reduction to 500 feet (250-feet on each side of a crossing). On crossing locations in excess of each length reduction scenario, road lengths were reduced to the corresponding post-BMP scenario (200-feet or 500-feet). No changes were made to crossing locations where the contributing road length was less than the BMP reduction scenario. For parallel road segments in excess of each length reduction scenario, road and fillslope lengths were reduced to the corresponding post-BMP scenario (200-feet or 500-feet). No changes were made to parallel locations where the contributing road length was less than the BMP reduction scenario. Each BMP scenario (200-feet and 500-feet) was evaluated using the WEPP: Road forest road erosion prediction model, so potential sediment load reductions could be estimated. Reduced mean sediment loads were extrapolated to the watershed scale using the total refined number of unpaved road crossings, and the total parallel road length within 100-feet of streams.

For the 200-foot BMP scenario, mean sediment loads would be reduced from 0.07 tons/year to 0.03 tons/year for mountain crossings, from 0.62 tons/year to 0.07 tons/year for foothill crossings, and from 0.11 tons/year to 0.05 tons/year for valley crossings (**Table 4-1**). Sediment load from road crossings would be reduced from 448.9 tons/year to 68.5 tons/year (84.8 percent), and sediment load from parallel road segments would be reduced from 351.1 tons/year to 257.6 tons/year (26.6 percent). The significant reduction in road crossing load results occurs primarily within the foothill landscape type, where a small number of field sites had extended road lengths and contributed a majority of the sediment load. Reduction in the contributing road length had a major impact on these sites, resulting in a decreased average sediment load.

Table 4-1. Estimated Sediment Load Summary – Reduce Road Length to 200-feet

Road Feature	Landscape Type	Total Number of Sites	Mean Sediment Load (Tons/year)	Total Sediment Load (Tons/year)	Load Reduction %
Crossing	Mountain	660	0.03	21.8	52.9%
Crossing	Foothill	626	0.07	40.7	89.5%
Crossing	Valley	133	0.05	6.0	59.1%
Total				**68.5**	**84.8%**
Road Feature	**Landscape Type**	**Total Parallel Distance Within 100-feet (Miles)**	**Mean Sediment Load (Tons/year/1000 ft)**	**Total Sediment Load (Tons/year)**	**Load Reduction %**
Parallel	Mountain	95.81	0.24	121.4	25.0%
Parallel	Foothill	79.29	0.28	117.2	28.2%
Parallel	Valley	13.86	0.26	19.0	26.8%
Total		**188.96**		**257.6**	**26.6%**
Total Upper Jefferson TPA:				**326.1**	**59.2%**

For the 500-foot BMP scenario, mean sediment loads would be reduced from 0.07 tons/year to 0.06 tons/year for mountain crossings, from 0.62 tons/year to 0.27 tons/year for foothill crossings, and from 0.11 tons/year to 0.08 tons/year for valley crossings (**Table 4-2**). Sediment load from road crossings would be reduced from 448.9 tons/year to 220.6 tons/year (50.9 percent), and sediment load from parallel road segments would be reduced from 351.1 tons/year to 316.6 tons/year (9.8 percent).

Table 4-2. Estimated Sediment Load Summary – Reduce Road Length to 500-feet

Road Feature	Landscape Type	Total Number of Sites	Mean Sediment Load (Tons/year)	Total Sediment Load (Tons/year)	Load Reduction %
Crossing	Mountain	660	0.06	41.6	10.0%
Crossing	Foothill	626	0.27	169.0	56.5%
Crossing	Valley	133	0.08	10.0	31.8%
Total				**220.6**	**50.9%**
Road Feature	**Landscape Type**	**Total Parallel Distance Within 100-feet (Miles)**	**Mean Sediment Load (Tons/year/1000 ft)**	**Total Sediment Load (Tons/year)**	**Load Reduction %**
Parallel	Mountain	95.81	0.29	146.7	9.4%
Parallel	Foothill	79.29	0.35	146.5	10.3%
Parallel	Valley	13.86	0.32	23.4	9.9%
Total		**188.96**		**316.6**	**9.8%**
Total Upper Jefferson TPA:				**537.2**	**32.9%**

4.2 Total Estimated Sediment Load Reductions

Total estimated sediment load would be reduced from 800.1 tons/year to 326.1 tons/year (59.2 percent) for the 200-foot BMP scenario, and total sediment load would be reduced from 800.1

tons/year to 537.2 tons/year (32.9 percent) for the 500-foot BMP scenario. Unpaved road crossings, parallel road segments, and total estimated sediment load reductions for the 200-foot and 500-foot BMP scenarios were further classified by each listed watershed or 6th code HUC, landscape type, and land ownership. (**Table 4-3** through **Table 4-8**). Total estimated sediment loads and percent reductions for the 200-foot and 500-feet BMP scenarios by subwatershed are shown in **Table 4-9**.

Table 4-9. Total Estimated Sediment Load Reductions after Application of BMPs

Watershed	Total Sediment Load Existing Conditions (tons/year)	Total Sediment Load After 200 ft Road Length BMP (tons/year)	Percent Reduction in Sediment Load after 200-foot BMP Reduction	Total Sediment Load After 500 ft Road Length BMP (tons/year)	Percent Reduction in Sediment Load after 500-foot BMP Reduction
Big Pipestone Creek	102.0	39.2	61.6%	67.0	34.3%
Cherry Creek	19.0	5.6	70.4%	11.1	41.8%
Dry Boulder Creek	5.3	2.9	44.9%	4.2	21.1%
Little Pipestone Creek	36.5	21.9	39.8%	30.2	17.2%
Whitetail Creek	94.3	31.7	66.4%	58.3	38.2%
Fish Creek	51.9	25.0	51.9%	37.9	27.1%
Fritz Creek	9.2	3.9	57.2%	6.3	31.9%
Halfway Creek	8.0	5.6	30.7%	7.3	9.5%
Hells Canyon Creek	20.8	12.9	38.2%	17.3	16.6%
Homestake Creek	23.5	16.1	31.4%	21.3	9.5%
Dry Creek	38.1	9.8	74.2%	21.0	44.8%
Little Whitetail Creek	86.4	36.0	58.3%	59.2	31.5%
Jefferson River-Cardwell	71.5	25.1	64.9%	44.4	37.9%
Jefferson River-Cottonwood Creek	29.8	9.0	70.0%	17.4	41.7%
Jefferson River-Dry Boulder Creek	30.4	12.1	60.2%	20.1	33.8%
Jefferson River-Mill Creek	57.8	28.8	50.3%	42.7	26.2%
Jefferson River-Silver Star	25.4	10.0	60.8%	16.6	34.6%
Jefferson Slough	57.7	19.7	65.9%	35.4	38.6%
Piedmont Swamp	32.5	10.9	66.5%	19.8	39.1%
Total Upper Jefferson TPA:	**800.1**	**326.1**	**59.2%**	**537.2**	**32.9%**

4.3 Additional BMPs

As an alternative to or in combination with reductions in contributing road length, other potential BMPs are available that would reduce sediment loading from the unpaved road network. Road sediment reduction strategies such as road surface improvement, reduction in road traffic levels (seasonal or permanent road closures), timely road maintenance to reduce surface rutting, and

installation of culverts at ford crossings are all BMPs that would lead to reduced sediment loading from the road network. These alternative BMPs have not been evaluated as part of this report, but could be addressed at a later time, if necessary.

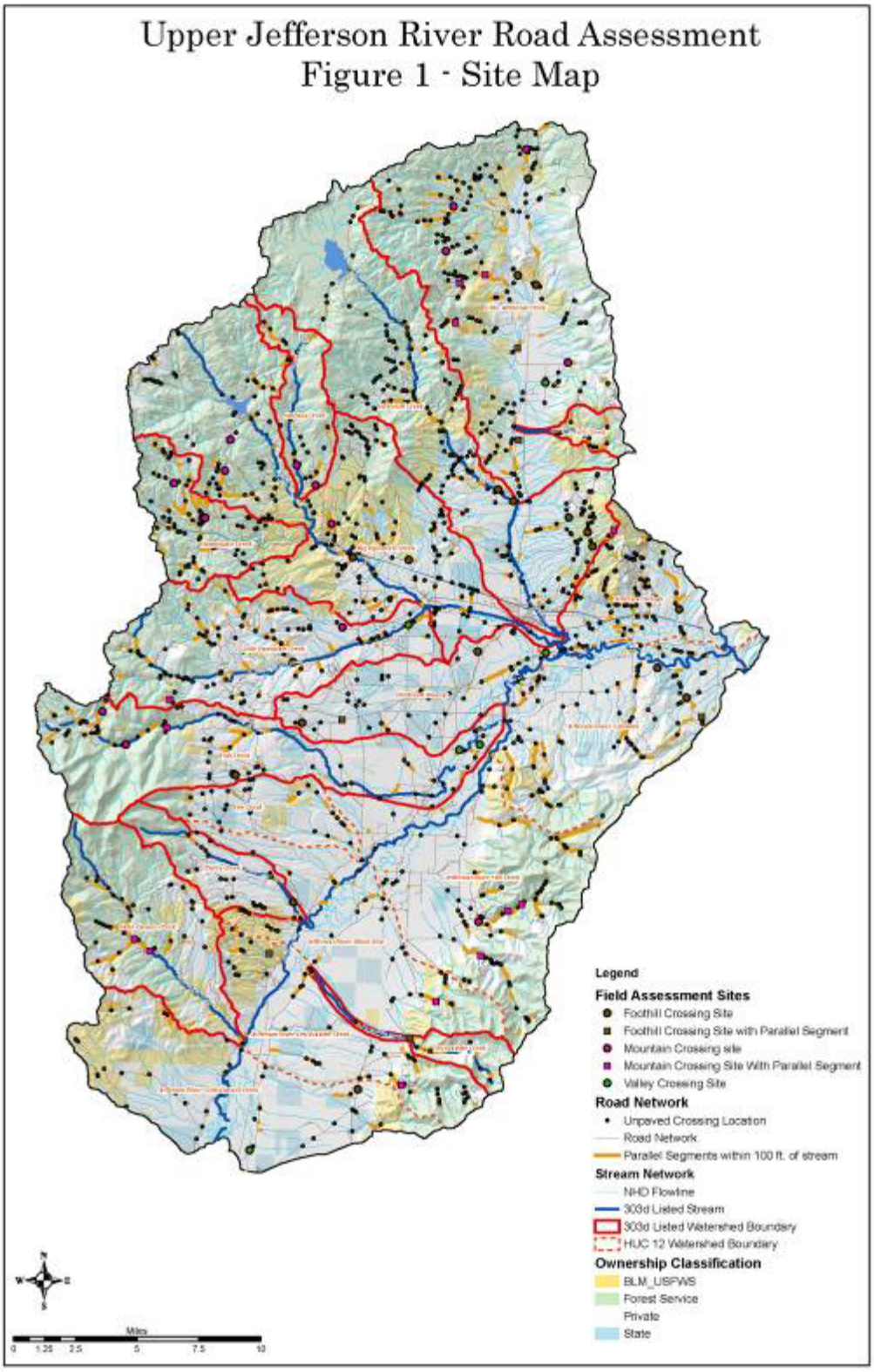
5.0 REFERENCES

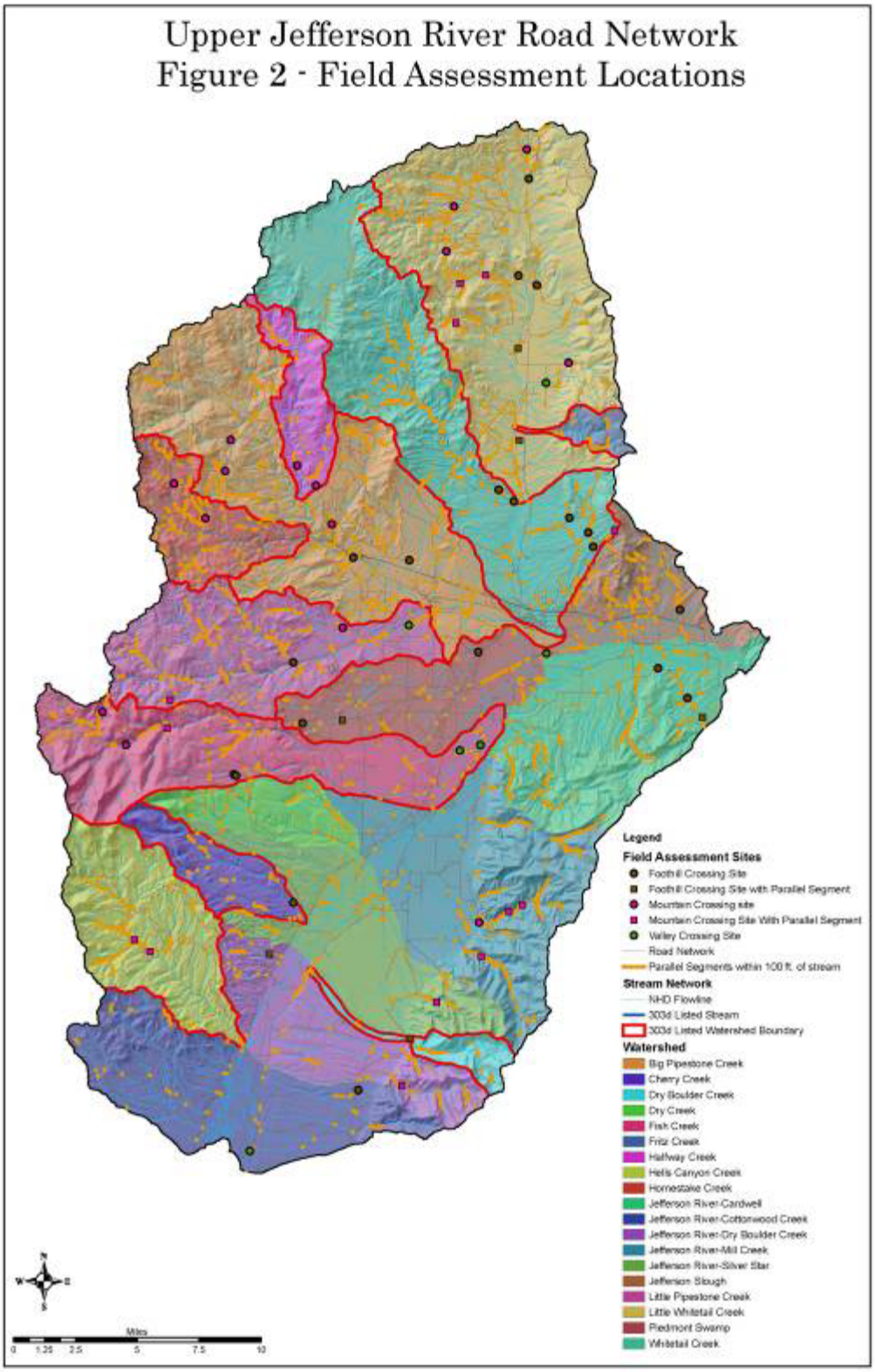
MDEQ 2006. Task 1. Road GIS & Summary Statistics, Upper Jefferson River Watershed. Prepared by Water & Environmental Technologies, PC. Prepared for Montana Department of Environmental Quality, Water Quality Planning Bureau, Helena, Montana.

MDEQ 2006. Task 2. Sampling and Analysis Plan, Upper Jefferson River Watershed. Prepared by Water & Environmental Technologies, PC. Prepared for Montana Department of Environmental Quality, Water Quality Planning Bureau, Helena, Montana.

MDEQ 2007. Unpaved Road Runoff Sediment Assessment. Prepared by PBS&J, Helena, Montana. Prepared for Montana Department of Environmental Quality, Water Quality Planning Bureau, Helena, Montana.

LIST OF FIGURES


Upper Jefferson River Road Assessment
Figure 1 - Site Map
Legend
Field Assessment Sites
Foothill Crossing Site
Foothill Crossing Site with Parallel Segment
Mountain Crossing site
Mountain Crossing Site With Parallel Segment
Valley Crossing Site
Road Network
Unpaved Crossing Location
Road Network
Parallel Segments within 100 ft. of stream
Stream Network
NHD Flowline
303d Listed Stream
303d Listed Watershed Boundary
HUC 12 Watershed Boundary
Ownership Classification
BLM_USFWS
Forest Service
Private
State
Miles
0 1.25 2.5 5 7.5 10


Upper Jefferson River Road Network
Figure 2 - Field Assessment Locations
Legend
Field Assessment Sites
Foothill Crossing Site
Foothill Crossing Site with Parallel Segment
Mountain Crossing site
Mountain Crossing Site With Parallel Segment
Valley Crossing Site
Road Network
Parallel Segments within 100 ft. of stream
Stream Network
NHD Flowline
303d Listed Stream
303d Listed Watershed Boundary
Watershed
Big Pipestone Creek
Cherry Creek
Dry Boulder Creek
Dry Creek
Fish Creek
Fritz Creek
Halfway Creek
Hells Canyon Creek
Homestake Creek
Jefferson River-Cardwell
Jefferson River-Cottonwood Creek
Jefferson River-Dry Boulder Creek
Jefferson River-Mill Creek
Jefferson River-Silver Star
Jefferson Slough
Little Pipestone Creek
Little Whitetail Creek
Piedmont Swamp
Whitetail Creek
Miles
0 1.25 2.5 5 7.5 10

LIST OF TABLES

Table 2-4. Detailed Revised Number of Unpaved Road Crossings

Ownership	1996/ 2004 303(d)	Private			State			BLM_USFWS			Forest Service			Total Crossings
Watershed		Valley	Foothill	Mountain	Valley	Foothill	Mountain	Valley	Foothill	Mountain	Valley	Foothill	Mountain	
Big Pipestone Creek	Yes	6	65	17	0	7	0	0	14	28	0	0	61	198
Cherry Creek	Yes	0	18	5	0	0	0	0	3	0	0	0	0	26
Dry Boulder Creek	Yes	1	1	2	0	1	0	0	0	2	0	0	6	13
Little Pipestone Creek	Yes	7	9	42	0	0	0	0	0	4	0	0	27	89
Whitetail Creek	Yes	5	53	14	1	10	0	0	24	6	0	5	50	168
Fish Creek	Yes	13	30	27	0	0	0	0	0	0	0	0	33	103
Fritz Creek	Yes	0	4	0	0	0	0	0	1	0	0	2	4	11
Halfway Creek	Yes	0	0	0	0	0	0	0	0	1	0	0	22	23
Hells Canyon Creek	Yes	0	4	7	0	0	0	0	0	0	0	1	26	38
Homestake Creek	No	0	0	14	0	0	0	0	0	1	0	0	62	77
Dry Creek	No	1	39	2	0	6	0	0	1	1	0	0	0	50
Little Whitetail Creek	No	11	43	12	0	0	0	0	16	16	0	5	93	196
Jefferson River-Cardwell	No	11	56	0	1	5	0	0	3	0	0	4	0	80
Jefferson River-Cottonwood Creek	No	8	17	0	1	5	0	0	10	1	0	0	0	42
Jefferson River-Dry Boulder Creek	No	1	15	2	0	1	0	0	9	6	0	0	12	46
Jefferson River-Mill Creek	No	8	18	10	1	0	0	0	2	0	0	12	36	87
Jefferson River-Silver Star	No	9	17	4	0	1	0	0	3	1	0	0	3	38
Jefferson Slough	No	26	44	0	0	1	0	0	10	0	0	0	0	81
Piedmont Swamp	No	22	28	0	0	3	0	0	0	0	0	0	0	53
Total Upper Jefferson:		***129***	***461***	***158***	***4***	***40***	***0***	***0***	***96***	***67***	***0***	***29***	***435***	***1419***

Table 2-5. Detailed Revised Parallel Road Distance

Ownership	1996 / 2004 303(d)	Private			State			BLM_USFWS			Forest Service			Total Miles
Watershed		Valley	Foothill	Mountain	Valley	Foothill	Mountain	Valley	Foothill	Mountain	Valley	Foothill	Mountain	
Big Pipestone Creek	Yes	0.66	6.37	1.88	0.00	0.72	0.08	0.00	1.64	2.44	0.00	0.00	8.24	22.03
Cherry Creek	Yes	0.00	1.76	0.84	0.00	0.00	0.00	0.00	0.29	0.00	0.00	0.00	0.00	2.89
Dry Boulder Creek	Yes	0.05	0.20	0.26	0.00	0.09	0.00	0.00	0.00	0.42	0.00	0.00	0.84	1.86
Little Pipestone Creek	Yes	0.99	1.43	6.80	0.08	0.00	0.00	0.00	0.00	0.89	0.00	0.00	4.18	14.37
Whitetail Creek	Yes	0.28	4.31	0.91	0.20	0.99	0.00	0.00	2.69	0.32	0.00	1.26	5.75	16.70
Fish Creek	Yes	1.22	4.19	5.77	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.16	15.34
Fritz Creek	Yes	0.00	0.51	0.00	0.00	0.00	0.00	0.00	0.07	0.00	0.00	0.70	1.14	2.42
Halfway Creek	Yes	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.00	3.75	3.79
Hells Canyon Creek	Yes	0.00	1.12	0.87	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.33	6.46	8.78
Homestake Creek	No	0.00	0.00	1.81	0.00	0.00	0.00	0.00	0.00	0.08	0.00	0.00	8.83	10.72
Dry Creek	No	0.08	3.43	0.22	0.00	0.25	0.00	0.00	0.35	0.22	0.00	0.00	0.05	4.61
Little Whitetail Creek	No	0.63	3.95	1.63	0.00	0.00	0.00	0.00	1.03	1.97	0.00	0.48	10.97	20.66
Jefferson River-Cardwell	No	1.06	9.23	0.00	0.03	0.53	0.00	0.00	2.25	0.00	0.00	0.58	0.00	13.69
Jefferson River-Cottonwood Creek	No	0.43	1.61	0.00	0.04	0.43	0.17	0.00	1.47	0.31	0.00	0.00	0.00	4.46
Jefferson River-Dry Boulder Creek	No	0.45	2.08	0.40	0.00	0.12	0.00	0.00	1.46	0.75	0.00	0.00	1.79	7.05
Jefferson River-Mill Creek	No	0.81	3.00	2.44	0.04	0.00	0.00	0.00	0.78	0.00	0.00	4.73	6.25	18.04
Jefferson River-Silver Star	No	1.71	1.43	0.70	0.00	0.14	0.00	0.00	0.60	0.34	0.00	0.00	0.85	5.76
Jefferson Slough	No	1.90	6.40	0.00	0.00	0.27	0.00	0.00	1.66	0.00	0.00	0.00	0.00	10.23
Piedmont Swamp	No	3.21	2.19	0.00	0.00	0.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.56
Total Upper Jefferson:		***13.48***	***53.23***	***24.52***	***0.38***	***3.70***	***0.25***	***0.00***	***14.27***	***7.78***	***0.00***	***8.09***	***63.27***	***188.96***

Table 3-2. Sediment Load From Unpaved Road Crossings - Existing Conditions

Ownership	1996 / 2004 303(d)	Private			State			BLM_USFWS			Forest Service			Total Load Tons/ Year
Watershed		Load (tons/year)			Load (tons/year)			Load (tons/year)			Load (tons/year)			
		Valley	Foothill	Mountain	Valley	Foothill	Mountain	Valley	Foothill	Mountain	Valley	Foothill	Mountain	
Big Pipestone Creek	Yes	0.66	40.3	1.19	0	4.34	0	0	8.68	1.96	0	0	4.27	61.4
Cherry Creek	Yes	0	11.16	0.35	0	0	0	0	1.86	0	0	0	0	13.37
Dry Boulder Creek	Yes	0.11	0.62	0.14	0	0.62	0	0	0	0.14	0	0	0.42	2.05
Little Pipestone Creek	Yes	0.77	5.58	2.94	0	0	0	0	0	0.28	0	0	1.89	11.46
Whitetail Creek	Yes	0.55	32.86	0.98	0.11	6.2	0	0	14.88	0.42	0	3.1	3.5	62.6
Fish Creek	Yes	1.43	18.6	1.89	0	0	0	0	0	0	0	0	2.31	24.23
Fritz Creek	Yes	0	2.48	0	0	0	0	0	0.62	0	0	1.24	0.28	4.62
Halfway Creek	Yes	0	0	0	0	0	0	0	0	0.07	0	0	1.54	1.61
Hells Canyon Creek	Yes	0	2.48	0.49	0	0	0	0	0	0	0	0.62	1.82	5.41
Homestake Creek	No	0	0	0.98	0	0	0	0	0	0.07	0	0	4.34	5.39
Dry Creek	No	0.11	24.18	0.14	0	3.72	0	0	0.62	0.07	0	0	0	28.84
Little Whitetail Creek	No	1.21	26.66	0.84	0	0	0	0	9.92	1.12	0	3.1	6.51	49.36
Jefferson River-Cardwell	No	1.21	34.72	0	0.11	3.1	0	0	1.86	0	0	2.48	0	43.48
Jefferson River-Cottonwood Creek	No	0.88	10.54	0	0.11	3.1	0	0	6.2	0.07	0	0	0	20.9
Jefferson River-Dry Boulder Creek	No	0.11	9.3	0.14	0	0.62	0	0	5.58	0.42	0	0	0.84	17.01
Jefferson River-Mill Creek	No	0.88	11.16	0.7	0.11	0	0	0	1.24	0	0	7.44	2.52	24.05
Jefferson River-Silver Star	No	0.99	10.54	0.28	0	0.62	0	0	1.86	0.07	0	0	0.21	14.57
Jefferson Slough	No	2.86	27.28	0	0	0.62	0	0	6.2	0	0	0	0	36.96
Piedmont Swamp	No	2.42	17.36	0	0	1.86	0	0	0	0	0	0	0	21.64
Total Upper Jefferson:		***14.19***	***285.82***	***11.06***	***0.44***	***24.8***	***0***	***0***	***59.52***	***4.69***	***0***	***17.98***	***30.45***	***448.95***

Table 3-3. Sediment Load From Parallel Road Segments - Existing Conditions

Ownership		Private			State			BLM_USFWS			Forest Service			Total Load Tons/Year
Watershed	1996 / 303(d)	Load (tons/year)			Load (tons/year)			Load (tons/year)			Load (tons/year)			
		Valley	Foothill	Mountain	Valley	Foothill	Mountain	Valley	Foothill	Mountain	Valley	Foothill	Mountain	
Big Pipestone Creek	Yes	1.23	13.12	3.18	0.00	1.49	0.13	0.00	3.37	4.13	0.00	0.00	13.93	40.57
Cherry Creek	Yes	0.00	3.63	1.42	0.00	0.00	0.00	0.00	0.60	0.00	0.00	0.00	0.00	5.65
Dry Boulder Creek	Yes	0.10	0.42	0.43	0.00	0.18	0.00	0.00	0.00	0.71	0.00	0.00	1.42	3.27
Little Pipestone Creek	Yes	1.86	2.94	11.48	0.15	0.00	0.00	0.00	0.00	1.51	0.00	0.00	7.06	25.01
Whitetail Creek	Yes	0.52	8.88	1.53	0.37	2.04	0.00	0.00	5.53	0.53	0.00	2.60	9.71	31.72
Fish Creek	Yes	2.29	8.64	9.74	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.02	27.70
Fritz Creek	Yes	0.00	1.05	0.00	0.00	0.00	0.00	0.00	0.15	0.00	0.00	1.45	1.93	4.57
Halfway Creek	Yes	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.00	0.00	6.34	6.41
Hells Canyon Creek	Yes	0.00	2.30	1.47	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.68	10.92	15.37
Homestake Creek	No	0.00	0.00	3.06	0.00	0.00	0.00	0.00	0.00	0.14	0.00	0.00	14.91	18.11
Dry Creek	No	0.16	7.07	0.38	0.00	0.52	0.00	0.00	0.72	0.36	0.00	0.00	0.09	9.30
Little Whitetail Creek	No	1.17	8.13	2.76	0.00	0.00	0.00	0.00	2.12	3.32	0.00	0.99	18.54	37.03
Jefferson River-Cardwell	No	2.00	19.01	0.00	0.05	1.10	0.00	0.00	4.62	0.00	0.00	1.20	0.00	27.98
Jefferson River-Cottonwood Creek	No	0.81	3.32	0.00	0.07	0.88	0.29	0.00	3.03	0.52	0.00	0.00	0.00	8.92
Jefferson River-Dry Boulder Creek	No	0.84	4.29	0.67	0.00	0.25	0.00	0.00	3.00	1.27	0.00	0.00	3.02	13.34
Jefferson River-Mill Creek	No	1.51	6.17	4.12	0.07	0.00	0.00	0.00	1.60	0.00	0.00	9.74	10.57	33.79
Jefferson River-Silver Star	No	3.20	2.95	1.18	0.00	0.28	0.00	0.00	1.24	0.57	0.00	0.00	1.44	10.86
Jefferson Slough	No	3.57	13.18	0.00	0.00	0.55	0.00	0.00	3.41	0.00	0.00	0.00	0.00	20.71
Piedmont Swamp	No	6.01	4.51	0.00	0.00	0.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	10.86
Total Upper Jefferson:		***25.27***	***109.61***	***41.42***	***0.71***	***7.62***	***0.42***	***0.00***	***29.39***	***13.14***	***0.00***	***16.67***	***106.90***	***351.14***

Table 3-4. Total Sediment Load From Unpaved Road Network - Existing Conditions

Ownership	1996 / 2004 303(d)	Private			State			BLM_USFWS			Forest Service			Total Load Tons/ Year
Watershed		Load (tons/year)			Load (tons/year)			Load (tons/year)			Load (tons/year)			
		Valley	Foothill	Mountain	Valley	Foothill	Mountain	Valley	Foothill	Mountain	Valley	Foothill	Mountain	
Big Pipestone Creek	Yes	1.89	53.42	4.37	0.00	5.83	0.13	0.00	12.05	6.09	0.00	0.00	18.20	101.97
Cherry Creek	Yes	0.00	14.79	1.77	0.00	0.00	0.00	0.00	2.46	0.00	0.00	0.00	0.00	19.02
Dry Boulder Creek	Yes	0.21	1.04	0.57	0.00	0.80	0.00	0.00	0.00	0.85	0.00	0.00	1.84	5.32
Little Pipestone Creek	Yes	2.63	8.52	14.42	0.15	0.00	0.00	0.00	0.00	1.79	0.00	0.00	8.95	36.47
Whitetail Creek	Yes	1.07	41.74	2.51	0.48	8.24	0.00	0.00	20.41	0.95	0.00	5.70	13.21	94.32
Fish Creek	Yes	3.72	27.24	11.63	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.33	51.93
Fritz Creek	Yes	0.00	3.53	0.00	0.00	0.00	0.00	0.00	0.77	0.00	0.00	2.69	2.21	9.19
Halfway Creek	Yes	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.14	0.00	0.00	7.88	8.02
Hells Canyon Creek	Yes	0.00	4.78	1.96	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.30	12.74	20.78
Homestake Creek	No	0.00	0.00	4.04	0.00	0.00	0.00	0.00	0.00	0.21	0.00	0.00	19.25	23.50
Dry Creek	No	0.27	31.25	0.52	0.00	4.24	0.00	0.00	1.34	0.43	0.00	0.00	0.09	38.14
Little Whitetail Creek	No	2.38	34.79	3.60	0.00	0.00	0.00	0.00	12.04	4.44	0.00	4.09	25.05	86.39
Jefferson River-Cardwell	No	3.21	53.73	0.00	0.16	4.20	0.00	0.00	6.48	0.00	0.00	3.68	0.00	71.46
Jefferson River-Cottonwood Creek	No	1.69	13.86	0.00	0.18	3.98	0.29	0.00	9.23	0.59	0.00	0.00	0.00	29.82
Jefferson River-Dry Boulder Creek	No	0.95	13.59	0.81	0.00	0.87	0.00	0.00	8.58	1.69	0.00	0.00	3.86	30.35
Jefferson River-Mill Creek	No	2.39	17.33	4.82	0.18	0.00	0.00	0.00	2.84	0.00	0.00	17.18	13.09	57.84
Jefferson River-Silver Star	No	4.19	13.49	1.46	0.00	0.90	0.00	0.00	3.10	0.64	0.00	0.00	1.65	25.43
Jefferson Slough	No	6.43	40.46	0.00	0.00	1.17	0.00	0.00	9.61	0.00	0.00	0.00	0.00	57.67
Piedmont Swamp	No	8.43	21.87	0.00	0.00	2.19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	32.50
Total Upper Jefferson:		***39.46***	***395.43***	***52.48***	***1.15***	***32.42***	***0.42***	***0.00***	***88.91***	***17.83***	***0.00***	***34.65***	***137.35***	***800.09***

Table 4-3. Estimated Sediment Load From Unpaved Road Crossings - Reduce Length to 200 Feet

Ownership	1996 / 2004 303(d)	Private			State			BLM_USFWS			Forest Service			Total Load Tons/ Year
Watershed		Load (tons/year)			Load (tons/year)			Load (tons/year)			Load (tons/year)			
		Valley	Foothill	Mountain	Valley	Foothill	Mountain	Valley	Foothill	Mountain	Valley	Foothill	Mountain	
Big Pipestone Creek	Yes	0.27	4.23	0.56	0.00	0.46	0.00	0.00	0.91	0.92	0.00	0.00	2.01	9.36
Cherry Creek	Yes	0.00	1.17	0.17	0.00	0.00	0.00	0.00	0.20	0.00	0.00	0.00	0.00	1.53
Dry Boulder Creek	Yes	0.05	0.07	0.07	0.00	0.07	0.00	0.00	0.00	0.07	0.00	0.00	0.20	0.51
Little Pipestone Creek	Yes	0.32	0.59	1.39	0.00	0.00	0.00	0.00	0.00	0.13	0.00	0.00	0.89	3.31
Whitetail Creek	Yes	0.23	3.45	0.46	0.05	0.65	0.00	0.00	1.56	0.20	0.00	0.33	1.65	8.56
Fish Creek	Yes	0.59	1.95	0.89	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.09	4.52
Fritz Creek	Yes	0.00	0.26	0.00	0.00	0.00	0.00	0.00	0.07	0.00	0.00	0.13	0.13	0.59
Halfway Creek	Yes	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.73	0.76
Hells Canyon Creek	Yes	0.00	0.26	0.23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.86	1.41
Homestake Creek	No	0.00	0.00	0.46	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	2.05	2.54
Dry Creek	No	0.05	2.54	0.07	0.00	0.39	0.00	0.00	0.07	0.03	0.00	0.00	0.00	3.13
Little Whitetail Creek	No	0.50	2.80	0.40	0.00	0.00	0.00	0.00	1.04	0.53	0.00	0.33	3.07	8.65
Jefferson River-Cardwell	No	0.50	3.64	0.00	0.05	0.33	0.00	0.00	0.20	0.00	0.00	0.26	0.00	4.96
Jefferson River-Cottonwood Creek	No	0.36	1.11	0.00	0.05	0.33	0.00	0.00	0.65	0.03	0.00	0.00	0.00	2.52
Jefferson River-Dry Boulder Creek	No	0.05	0.98	0.07	0.00	0.07	0.00	0.00	0.59	0.20	0.00	0.00	0.40	2.33
Jefferson River-Mill Creek	No	0.36	1.17	0.33	0.05	0.00	0.00	0.00	0.13	0.00	0.00	0.78	1.19	4.00
Jefferson River-Silver Star	No	0.41	1.11	0.13	0.00	0.07	0.00	0.00	0.20	0.03	0.00	0.00	0.10	2.03
Jefferson Slough	No	1.17	2.86	0.00	0.00	0.07	0.00	0.00	0.65	0.00	0.00	0.00	0.00	4.75
Piedmont Swamp	No	0.99	1.82	0.00	0.00	0.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.01
Total Upper Jefferson:		***5.81***	***29.97***	***5.21***	***0.18***	***2.60***	***0.00***	***0.00***	***6.24***	***2.21***	***0.00***	***1.89***	***14.36***	***68.46***

Table 4-4. Estimated Sediment Load From Unpaved Crossings - Reduce Length to 500 Feet

Ownership	1996 / 2004 303(d)	Private			State			BLM_USFWS			Forest Service			Total Load Tons/Year
Watershed		Load (tons/year)			Load (tons/year)			Load (tons/year)						
		Valley	Foothill	Mountain	Valley	Foothill	Mountain	Valley	Foothill	Mountain	Valley	Foothill	Mountain	
Big Pipestone Creek	Yes	0.45	17.55	1.07	0.00	1.89	0.00	0.00	3.78	1.76	0.00	0.00	3.84	30.35
Cherry Creek	Yes	0.00	4.86	0.32	0.00	0.00	0.00	0.00	0.81	0.00	0.00	0.00	0.00	5.99
Dry Boulder Creek	Yes	0.08	0.27	0.13	0.00	0.27	0.00	0.00	0.00	0.13	0.00	0.00	0.38	1.25
Little Pipestone Creek	Yes	0.53	2.43	2.65	0.00	0.00	0.00	0.00	0.00	0.25	0.00	0.00	1.70	7.55
Whitetail Creek	Yes	0.38	14.31	0.88	0.08	2.70	0.00	0.00	6.48	0.38	0.00	1.35	3.15	29.70
Fish Creek	Yes	0.98	8.10	1.70	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.08	12.86
Fritz Creek	Yes	0.00	1.08	0.00	0.00	0.00	0.00	0.00	0.27	0.00	0.00	0.54	0.25	2.14
Halfway Creek	Yes	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.00	0.00	1.39	1.45
Hells Canyon Creek	Yes	0.00	1.08	0.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.27	1.64	3.43
Homestake Creek	No	0.00	0.00	0.88	0.00	0.00	0.00	0.00	0.00	0.06	0.00	0.00	3.91	4.85
Dry Creek	No	0.08	10.53	0.13	0.00	1.62	0.00	0.00	0.27	0.06	0.00	0.00	0.00	12.68
Little Whitetail Creek	No	0.83	11.61	0.76	0.00	0.00	0.00	0.00	4.32	1.01	0.00	1.35	5.86	25.73
Jefferson River-Cardwell	No	0.83	15.12	0.00	0.08	1.35	0.00	0.00	0.81	0.00	0.00	1.08	0.00	19.26
Jefferson River-Cottonwood Creek	No	0.60	4.59	0.00	0.08	1.35	0.00	0.00	2.70	0.06	0.00	0.00	0.00	9.38
Jefferson River-Dry Boulder Creek	No	0.08	4.05	0.13	0.00	0.27	0.00	0.00	2.43	0.38	0.00	0.00	0.76	8.09
Jefferson River-Mill Creek	No	0.60	4.86	0.63	0.08	0.00	0.00	0.00	0.54	0.00	0.00	3.24	2.27	12.21
Jefferson River-Silver Star	No	0.68	4.59	0.25	0.00	0.27	0.00	0.00	0.81	0.06	0.00	0.00	0.19	6.85
Jefferson Slough	No	1.95	11.88	0.00	0.00	0.27	0.00	0.00	2.70	0.00	0.00	0.00	0.00	16.80
Piedmont Swamp	No	1.65	7.56	0.00	0.00	0.81	0.00	0.00	0.00	0.00	0.00	0.00	0.00	10.02
Total Upper Jefferson:		***9.68***	***124.47***	***9.95***	***0.30***	***10.80***	***0.00***	***0.00***	***25.92***	***4.22***	***0.00***	***7.83***	***27.41***	***220.58***

Table 4-5. Estimated Sediment Load From Parallel Segments - Reduce to 200 foot Length

Ownership / Watershed	1996 / 2004 303(d)	Private Load (tons/year)			State Load (tons/year)			BLM_USFWS Load (tons/year)			Forest Service Load (tons/year)			Total Load Tons/ Year
		Valley	Foothill	Mountain	Valley	Foothill	Mountain	Valley	Foothill	Mountain	Valley	Foothill	Mountain	
Big Pipestone Creek	Yes	0.90	9.42	2.38	0.00	1.07	0.10	0.00	2.42	3.10	0.00	0.00	10.45	29.83
Cherry Creek	Yes	0.00	2.61	1.06	0.00	0.00	0.00	0.00	0.43	0.00	0.00	0.00	0.00	4.10
Dry Boulder Creek	Yes	0.07	0.30	0.33	0.00	0.13	0.00	0.00	0.00	0.54	0.00	0.00	1.06	2.43
Little Pipestone Creek	Yes	1.37	2.11	8.61	0.11	0.00	0.00	0.00	0.00	1.13	0.00	0.00	5.30	18.63
Whitetail Creek	Yes	0.38	6.38	1.15	0.27	1.46	0.00	0.00	3.97	0.40	0.00	1.87	7.28	23.16
Fish Creek	Yes	1.68	6.20	7.31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.27	20.45
Fritz Creek	Yes	0.00	0.75	0.00	0.00	0.00	0.00	0.00	0.11	0.00	0.00	1.04	1.45	3.34
Halfway Creek	Yes	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.00	4.76	4.81
Hells Canyon Creek	Yes	0.00	1.65	1.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.49	8.19	11.43
Homestake Creek	No	0.00	0.00	2.30	0.00	0.00	0.00	0.00	0.00	0.10	0.00	0.00	11.18	13.59
Dry Creek	No	0.12	5.07	0.28	0.00	0.38	0.00	0.00	0.51	0.27	0.00	0.00	0.07	6.70
Little Whitetail Creek	No	0.86	5.84	2.07	0.00	0.00	0.00	0.00	1.52	2.49	0.00	0.71	13.90	27.39
Jefferson River-Cardwell	No	1.46	13.65	0.00	0.04	0.79	0.00	0.00	3.32	0.00	0.00	0.86	0.00	20.12
Jefferson River-Cottonwood Creek	No	0.59	2.38	0.00	0.05	0.63	0.22	0.00	2.18	0.39	0.00	0.00	0.00	6.44
Jefferson River-Dry Boulder Creek	No	0.62	3.08	0.50	0.00	0.18	0.00	0.00	2.15	0.96	0.00	0.00	2.27	9.75
Jefferson River-Mill Creek	No	1.11	4.43	3.09	0.05	0.00	0.00	0.00	1.15	0.00	0.00	7.00	7.93	24.75
Jefferson River-Silver Star	No	2.34	2.11	0.89	0.00	0.20	0.00	0.00	0.89	0.43	0.00	0.00	1.08	7.94
Jefferson Slough	No	2.61	9.46	0.00	0.00	0.39	0.00	0.00	2.45	0.00	0.00	0.00	0.00	14.92
Piedmont Swamp	No	4.40	3.24	0.00	0.00	0.24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.88
Total Upper Jefferson:		***18.51***	***78.69***	***31.07***	***0.52***	***5.47***	***0.31***	***0.00***	***21.10***	***9.86***	***0.00***	***11.97***	***80.18***	***257.67***

Table 4-6. Estimated Sediment Load From Parallel Segments - Reduce to 500 foot Length

Ownership	1996 / 2004 303(d)	Private			State			BLM_USFWS			Forest Service			Total Load Tons/Year
Watershed		Load (tons/year)			Load (tons/year)			Load (tons/year)			Load (tons/year)			
		Valley	Foothill	Mountain	Valley	Foothill	Mountain	Valley	Foothill	Mountain	Valley	Foothill	Mountain	
Big Pipestone Creek	Yes	1.11	11.77	2.88	0.00	1.33	0.12	0.00	3.03	3.74	0.00	0.00	12.62	36.60
Cherry Creek	Yes	0.00	3.26	1.29	0.00	0.00	0.00	0.00	0.54	0.00	0.00	0.00	0.00	5.08
Dry Boulder Creek	Yes	0.09	0.38	0.39	0.00	0.16	0.00	0.00	0.00	0.65	0.00	0.00	1.29	2.95
Little Pipestone Creek	Yes	1.68	2.64	10.41	0.14	0.00	0.00	0.00	0.00	1.37	0.00	0.00	6.40	22.63
Whitetail Creek	Yes	0.47	7.97	1.39	0.33	1.83	0.00	0.00	4.97	0.48	0.00	2.34	8.80	28.57
Fish Creek	Yes	2.06	7.75	8.83	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.37	25.01
Fritz Creek	Yes	0.00	0.94	0.00	0.00	0.00	0.00	0.00	0.13	0.00	0.00	1.30	1.75	4.12
Halfway Creek	Yes	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.00	0.00	5.75	5.81
Hells Canyon Creek	Yes	0.00	2.06	1.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.61	9.89	13.90
Homestake Creek	No	0.00	0.00	2.78	0.00	0.00	0.00	0.00	0.00	0.13	0.00	0.00	13.51	16.42
Dry Creek	No	0.14	6.34	0.34	0.00	0.47	0.00	0.00	0.64	0.33	0.00	0.00	0.08	8.35
Little Whitetail Creek	No	1.06	7.30	2.50	0.00	0.00	0.00	0.00	1.90	3.01	0.00	0.89	16.80	33.46
Jefferson River-Cardwell	No	1.80	17.06	0.00	0.05	0.98	0.00	0.00	4.15	0.00	0.00	1.08	0.00	25.12
Jefferson River-Cottonwood Creek	No	0.73	2.98	0.00	0.06	0.79	0.26	0.00	2.72	0.47	0.00	0.00	0.00	8.01
Jefferson River-Dry Boulder Creek	No	0.76	3.85	0.61	0.00	0.22	0.00	0.00	2.69	1.15	0.00	0.00	2.74	12.02
Jefferson River-Mill Creek	No	1.36	5.54	3.73	0.06	0.00	0.00	0.00	1.44	0.00	0.00	8.74	9.58	30.46
Jefferson River-Silver Star	No	2.88	2.64	1.07	0.00	0.25	0.00	0.00	1.11	0.52	0.00	0.00	1.30	9.78
Jefferson Slough	No	3.22	11.82	0.00	0.00	0.49	0.00	0.00	3.06	0.00	0.00	0.00	0.00	18.60
Piedmont Swamp	No	5.42	4.05	0.00	0.00	0.30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.77
Total Upper Jefferson:		***22.78***	***98.37***	***37.54***	***0.64***	***6.83***	***0.38***	***0.00***	***26.37***	***11.91***	***0.00***	***14.96***	***96.88***	***316.66***

Table 4-7. Total Sediment Load From Unpaved Road Network - Reduce Length to 200-feet

Ownership	1996 / 2004 303(d)	Private			State			BLM_USFWS			Forest Service			Total Load (Tons/Year)
Watershed		Load (tons/year)			Load (tons/year)			Load (tons/year)			Load (tons/year)			
		Valley	Foothill	Mountain	Valley	Foothill	Mountain	Valley	Foothill	Mountain	Valley	Foothill	Mountain	
Big Pipestone Creek	Yes	1.17	13.64	2.95	0.00	1.52	0.10	0.00	3.33	4.02	0.00	0.00	12.46	39.19
Cherry Creek	Yes	0.00	3.78	1.23	0.00	0.00	0.00	0.00	0.62	0.00	0.00	0.00	0.00	5.63
Dry Boulder Creek	Yes	0.12	0.37	0.39	0.00	0.20	0.00	0.00	0.00	0.60	0.00	0.00	1.26	2.93
Little Pipestone Creek	Yes	1.68	2.70	10.00	0.11	0.00	0.00	0.00	0.00	1.26	0.00	0.00	6.19	21.94
Whitetail Creek	Yes	0.60	9.82	1.61	0.31	2.11	0.00	0.00	5.53	0.60	0.00	2.19	8.93	31.72
Fish Creek	Yes	2.26	8.15	8.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.36	24.97
Fritz Creek	Yes	0.00	1.01	0.00	0.00	0.00	0.00	0.00	0.17	0.00	0.00	1.17	1.58	3.93
Halfway Creek	Yes	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.08	0.00	0.00	5.48	5.56
Hells Canyon Creek	Yes	0.00	1.91	1.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.56	9.05	12.85
Homestake Creek	No	0.00	0.00	2.76	0.00	0.00	0.00	0.00	0.00	0.14	0.00	0.00	13.23	16.13
Dry Creek	No	0.16	7.61	0.35	0.00	0.77	0.00	0.00	0.58	0.31	0.00	0.00	0.07	9.84
Little Whitetail Creek	No	1.36	8.64	2.46	0.00	0.00	0.00	0.00	2.56	3.02	0.00	1.03	16.97	36.04
Jefferson River-Cardwell	No	1.96	17.29	0.00	0.08	1.11	0.00	0.00	3.52	0.00	0.00	1.12	0.00	25.08
Jefferson River-Cottonwood Creek	No	0.95	3.49	0.00	0.09	0.96	0.22	0.00	2.83	0.42	0.00	0.00	0.00	8.96
Jefferson River-Dry Boulder Creek	No	0.66	4.05	0.57	0.00	0.24	0.00	0.00	2.74	1.15	0.00	0.00	2.66	12.08
Jefferson River-Mill Creek	No	1.47	5.60	3.42	0.10	0.00	0.00	0.00	1.28	0.00	0.00	7.78	9.11	28.75
Jefferson River-Silver Star	No	2.75	3.22	1.02	0.00	0.27	0.00	0.00	1.08	0.46	0.00	0.00	1.18	9.98
Jefferson Slough	No	3.78	12.32	0.00	0.00	0.46	0.00	0.00	3.10	0.00	0.00	0.00	0.00	19.66
Piedmont Swamp	No	5.39	5.06	0.00	0.00	0.43	0.00	0.00	0.00	0.00	0.00	0.00	0.00	10.89
Total Upper Jefferson:		***24.31***	***108.66***	***36.28***	***0.70***	***8.07***	***0.31***	***0.00***	***27.34***	***12.07***	***0.00***	***13.85***	***94.53***	***326.12***

Table 4-8. Total Sediment Load From Unpaved Road Network - Reduce Length to 500-feet

Ownership	1996 / 2004 303(d)	Private			State			BLM_USFWS			Forest Service			Total Load (Tons/ Year)
Watershed		Load (tons/year)			Load (tons/year)			Load (tons/year)			Load (tons/year)			
		Valley	Foothill	Mountain	Valley	Foothill	Mountain	Valley	Foothill	Mountain	Valley	Foothill	Mountain	
Big Pipestone Creek	Yes	1.56	29.32	3.95	0.00	3.22	0.12	0.00	6.81	5.51	0.00	0.00	16.47	66.95
Cherry Creek	Yes	0.00	8.12	1.60	0.00	0.00	0.00	0.00	1.35	0.00	0.00	0.00	0.00	11.07
Dry Boulder Creek	Yes	0.16	0.65	0.52	0.00	0.43	0.00	0.00	0.00	0.77	0.00	0.00	1.66	4.20
Little Pipestone Creek	Yes	2.21	5.07	13.05	0.14	0.00	0.00	0.00	0.00	1.62	0.00	0.00	8.10	30.18
Whitetail Creek	Yes	0.84	22.28	2.27	0.41	4.53	0.00	0.00	11.45	0.86	0.00	3.69	11.95	58.27
Fish Creek	Yes	3.04	15.85	10.53	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.45	37.87
Fritz Creek	Yes	0.00	2.02	0.00	0.00	0.00	0.00	0.00	0.40	0.00	0.00	1.84	2.00	6.26
Halfway Creek	Yes	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.12	0.00	0.00	7.13	7.26
Hells Canyon Creek	Yes	0.00	3.14	1.77	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.88	11.53	17.33
Homestake Creek	No	0.00	0.00	3.66	0.00	0.00	0.00	0.00	0.00	0.19	0.00	0.00	17.42	21.27
Dry Creek	No	0.22	16.87	0.47	0.00	2.09	0.00	0.00	0.91	0.39	0.00	0.00	0.08	21.04
Little Whitetail Creek	No	1.88	18.91	3.25	0.00	0.00	0.00	0.00	6.22	4.02	0.00	2.24	22.66	59.18
Jefferson River-Cardwell	No	2.62	32.18	0.00	0.12	2.33	0.00	0.00	4.96	0.00	0.00	2.16	0.00	44.38
Jefferson River-Cottonwood Creek	No	1.33	7.57	0.00	0.13	2.14	0.26	0.00	5.42	0.53	0.00	0.00	0.00	17.39
Jefferson River-Dry Boulder Creek	No	0.84	7.90	0.73	0.00	0.49	0.00	0.00	5.12	1.53	0.00	0.00	3.50	20.10
Jefferson River-Mill Creek	No	1.96	10.40	4.36	0.14	0.00	0.00	0.00	1.98	0.00	0.00	11.98	11.84	42.67
Jefferson River-Silver Star	No	3.56	7.23	1.32	0.00	0.52	0.00	0.00	1.92	0.58	0.00	0.00	1.49	16.63
Jefferson Slough	No	5.17	23.70	0.00	0.00	0.76	0.00	0.00	5.76	0.00	0.00	0.00	0.00	35.40
Piedmont Swamp	No	7.07	11.61	0.00	0.00	1.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	19.79
Total Upper Jefferson:		***32.45***	***222.84***	***47.49***	***0.94***	***17.63***	***0.38***	***0.00***	***52.29***	***16.13***	***0.00***	***22.79***	***124.29***	***537.23***

ATTACHMENT A.
WEPP: ROAD MODELING RESULTS FOR FIELD ASSESSED ROAD CROSSINGS

ID	Yrs	Climate	Soil	Rock	Surface, traffic	Design	Road grad	Road length	Road width	Fill grad	Fill len	Buff grad	Buff len	Precip	Rain runoff	Snow runoff	Sediment Road	Road	Sediment Profile	Profile	Comment	
				%			%	ft	ft	%	ft	%	ft	in	in	in	lb/yr	ton/yr	lb/yr	ton/yr		
1	50	ALDER 17 S MT +	sandy loam	0	native high	insloped bare	11%	138	16	90%	1	3%	1	14.55	0.1	0	163.81	0.082	43.42	0.022	F1-WTC	
2	50	ALDER 17 S MT +	silt loam	0%	native low	outsloped rutted	1%	32	10	35%	1	0.30%	1	14.55	0.24	0.01	3.08	0.002	1.16	0.001	F2-WTC	
3	50	ALDER 17 S MT +	sandy loam	10%	native low	outsloped unrutted	6%	135	9	0.30%	1	0.30%	1	14.55	0.1	0	11.44	0.006	3.32	0.002	F3-WTC	
4	50	ALDER 17 S MT +	sandy loam	40%	native none	outsloped unrutted	9%	380	8	50%	1	0.30%	1	14.55	0.28	0.01	52.98	0.026	24.99	0.012	F4-MWTC	
5	50	ALDER 17 S, MT +	loam	40%	graveled high	outsloped unrutted	9%	295	13	63%	1	0.30%	1	14.55	0.33	0	577.02	0.289	521.46	0.261	F5-MLWTC	
6	50	ALDER 17 S MT +	silt loam	5%	native high	outsloped rutted	5%	540	20	65%	1	0.30%	1	14.55	0.99	0.18	2474.6	1.237	2300.94	1.150	F6-MLWTC	
7	50	ALDER 17 S MT +	loam	40%	native low	outsloped rutted	2%	100	9	0.30%	1	0.30%	1	14.55	0.75	0.18	10.13	0.005	4.67	0.002	F7-MLWTC	
8	50	ALDER 17 S, MT +	silt loam	50%	graveled high	outsloped unrutted	3%	50	11	40%	1	0.30%	1	14.55	0.15	0	15.43	0.008	6.75	0.003	F8-MLWTC	
9	50	PONY MT +	sandy loam	0%	native low	insloped bare	2.50%	285	8	40%	1	3%	1	19.05	0.03	0	20.92	0.010	12.88	0.006	M9-ULWTC	
10	50	ALDER 17 S MT +	sandy loam	0%	native high	insloped bare	2%	1068	24	80%	1	0.30%	1	14.55	0.2	0	415	0.208	417.10	0.209	F10-ULWTC	MULTIPLIED SED. LOADS *2 TO ACCOUNT FOR HALF LENGTH
11	50	PONY MT +	sandy loam	0%	native none	outsloped rutted	4%	123	8	0.30%	1	0.30%	1	19.05	0.18	0.02	9.68	0.005	6.77	0.003	M11-ULWTC	
12	50	PONY, MT +	silt loam	30%	graveled high	outsloped unrutted	5%	330	12	40%	1	5%	1	19.05	0.04	0	195.62	0.098	32.27	0.016	M12-ULWTC	
13	50	PONY MT +	loam	10%	native low	outsloped rutted	5%	153	8	20%	1	0.30%	1	19.05	0.33	0.06	40.62	0.020	30.29	0.015	M13-MLWTC	
14	50	PONY MT +	silt loam	5%	native low	outsloped rutted	3%	375	8	0.30%	1	0.30%	1	19.05	1.29	0.37	77.47	0.039	60.43	0.030	M14-MLWTC	
15	50	PONY, MT +	silt loam	50%	graveled high	outsloped unrutted	3%	150	10	40%	1	0.30%	1	19.05	0.09	0	38.74	0.019	34.96	0.017	M15-MLWTC	

ID	Yrs	Climate	Soil	Rock	Surface, traffic	Design	Road grad	Road length	Road width	Fill grad	Fill len	Buff grad	Buff len	Precip	Rain runoff	Snow runoff	Sediment Road	Road	Sediment Profile	Profile	Comment	
				%			%	ft	ft	%	ft	%	ft	in	in	in	lb/yr	ton/yr	lb/yr	ton/yr		
16	50	ALDER 17 S MT +	sandy loam	20%	native low	outsloped rutted	7%	228	9	62%	1	0.30%	1	14.55	0.39	0.02	48.89	0.024	44.62	0.022	F16-JS	
17	50	ALDER 17 S, MT +	silt loam	30%	graveled high	outsloped unrutted	2%	210	18	90%	1	2%	1	14.55	0.01	0	151.12	0.076	6.06	0.003	F17-JRC	
18	50	ALDER 17 S MT +	silt loam	5%	native high	insloped bare	10%	807	22	60%	1	0.30%	1	14.55	1.15	0.22	12359.16	6.180	10533.33	5.267	F18-JRC	
19	50	TWIN BRIDGES MT +	silt loam	50%	native high	insloped vegetated	1%	237	22	75%	1	0.30%	1	11.5	1.41	0.45	280.6	0.140	206.46	0.103	V19-JS	
20	50	ALDER 17 S, MT +	sandy loam	30%	graveled high	outsloped rutted	4%	366	10	0.30%	1	0.30%	1	14.55	0.55	0.02	220.54	0.110	193.74	0.097	F20-PS	
21	50	TWIN BRIDGES MT +	silt loam	15%	native high	outsloped rutted	0.50%	840	21	50%	1	0.30%	1	11.5	0.85	0.23	439.19	0.220	380.36	0.190	V21-LPC	CHANGED TO OUTSLOPED RUTTED TO ACCOUNT FOR HIGH TRAFFIC, NO CHANGE TO WIDTH
22	50	ALDER 17 S, MT +	sandy loam	0%	native low	outsloped rutted	5%	128	8	0.30%	1	0.30%	1	14.55	0.26	0.01	11.33	0.006	8.82	0.004	F22-LBPC	
23	50	PONY MT +	sandy loam	0%	native low	outsloped rutted	25%	180	10	0.30%	1	0.30%	1	19.05	0.28	0.03	91.11	0.046	68.71	0.034	M23-LBPC	
24	50	PONY MT +	sandy loam	0%	native low	outsloped rutted	5%	90	7	0.30%	1	0.30%	1	19.05	0.18	0.02	5.8	0.003	3.98	0.002	M24-UBPC	
25	50	PONY, MT +	sandy loam	40%	graveled high	insloped bare	4%	735	16	70%	1	10%	1	19.05	0.2	0.01	602.55	0.301	533.58	0.267	M25-UBPC	
26	50	PONY MT +	sandy loam	0%	native none	insloped vegetated	1.50%	321	7	30%	1	0.30%	1	19.05	0.16	0.02	10.11	0.005	7.63	0.004	M26-HC	
27	50	PONY MT +	sandy loam	0%	native low	outsloped rutted	1%	450	8	44%	1	0.30%	1	19.05	0.15	0.02	9.59	0.005	11.26	0.006	M27-UBPC	
28	50	PONY, MT +	sandy loam	30%	graveled high	insloped vegetated	1%	456	24	64%	1	0.30%	1	19.05	0.38	0.02	100.93	0.050	118.10	0.059	M28-UBPC	
29	50	PONY MT +	sandy loam	0%	native low	outsloped rutted	2%	492	12	110%	1	0.30%	1	19.05	0.17	0.03	40.74	0.020	37.82	0.019	M29-HC	
30	50	ALDER 17 S, MT +	silt loam	30%	graveled high	outsloped unrutted	4%	475	17.5	114%	1	0.30%	1	14.55	0.25	0	408.42	0.204	199.97	0.100	F30-LBPC	

ID	Yrs	Climate	Soil	Rock	Surface, traffic	Design	Road grad	Road length	Road width	Fill grad	Fill len	Buff grad	Buff len	Precip	Rain runoff	Snow runoff	Sediment Road	Road	Sediment Profile	Profile	Comment	
				%			%	ft	ft	%	ft	%	ft	in	in	in	lb/yr	ton/yr	lb/yr	ton/yr		
31	50	PONY, MT +	sandy loam	80%	graveled high	outsloped unrutted	2.50%	466	22	80%	1	0.30%	1	19.05	0.15	0	241.55	0.121	190.39	0.095	M31-LPC	
32	50	ALDER 17 S MT +	silt loam	10%	native low	outsloped rutted	2%	297	12	10%	1	0.30%	1	14.55	0.96	0.19	51.86	0.026	41.60	0.021	F32-LPC	
33	50	ALDER 17 S MT +	loam	0%	native none	outsloped rutted	4%	315	8	5%	1	0.30%	1	14.55	1.44	0.3	97.09	0.049	76.62	0.038	F33-FC	
34	50	ALDER 17 S MT +	loam	0%	native none	outsloped rutted	2%	189	8	32%	1	0.30%	1	14.55	0.96	0.19	24.48	0.012	15.97	0.008	F34-FC	
35	50	PONY MT +	sandy loam	15%	native low	outsloped rutted	7%	130	6	0.30%	1	0.30%	1	19.05	0.25	0.03	12.31	0.006	9.07	0.005	M35-HCC	
36	50	PONY, MT +	sandy loam	50%	graveled high	insloped vegetated	9%	201	17	0.30%	1	0.30%	1	19.05	0.4	0.02	180.49	0.090	148.77	0.074	M36-HCC	
37	50	TWIN BRIDGES MT +	silt loam	20%	graveled high	insloped bare	0.50%	593.7	11.5	35%	1	1%	1	11.5	0.29	0.01	379.92	0.190	350.24	0.175	V37-JRCC_1/2L,1/2W	MULTIPLIED SED. LOADS *4 TO ACCOUNT FOR HALF LENGTH + CHANGED WIDTH FROM 22.5 TO 11.25 TO ACCOUNT FOR INSLOPE BARE DITCH FROM CROWNED BARE.

ID	Yrs	Climate	Soil	Rock	Surface, traffic	Design	Road grad	Road length	Road width	Fill grad	Fill len	Buff grad	Buff len	Precip	Rain runoff	Snow runoff	Sediment Road	Road	Sediment Profile	Profile	Comment	
				%			%	ft	ft	%	ft	%	ft	in	in	in	lb/yr	ton/yr	lb/yr	ton/yr		
38	50	ALDER 17 S MT +	silt loam	25%	native high	insloped bare	3%	960	14	12%	1	10%	1	14.55	1.29	0.28	12276.48	6.138	11344.12	5.672	F38-JRCC_ 1/2 W_1/2 L	MULTIPLIED SED. LOADS *4 TO ACCOUNT FOR HALF LENGTH + CHANGED WIDTH FROM 28 TO 14 TO ACCOUNT FOR INSLOPE BARE DITCH FROM CROWNED UNRUTTED.
39	50	PONY MT +	silt loam	30%	native low	outsloped unrutted	9%	478	20	110%	1	0.30%	1	19.05	0.44	0.08	301.14	0.151	169.97	0.085	M39-JRDBC	
40	50	PONY MT +	sandy loam	10%	native low	outsloped rutted	11%	547	18	38%	1	10%	1	19.05	0.32	0.04	447.99	0.224	426.25	0.213	M40-JRMC	CHANGED TO OUTSLOPED RUTTED - CATEGORY INCLUDES INSLOPE RUTTED, NO CHANGE TO WIDTH
41	50	PONY MT +	sandy loam	5%	native none	outsloped rutted	6.50%	183	7.5	0.30%	1	0.30%	1	19.05	0.25	0.03	23.94	0.012	18.64	0.009	M41-JRMC	
42	50	ALDER 17 S MT +	loam	0%	native none	outsloped unrutted	6%	117	7	0.30%	1	0.30%	1	14.55	0.2	0.02	15.57	0.008	1.26	0.001	F42-JRMC	
43	50	PONY MT +	loam	0%	native none	outsloped rutted	8%	150	8	105%	1	0.30%	1	19.05	0.84	0.23	67.58	0.034	40.96	0.020	M43-JRMC	
44	50	PONY MT +	silt loam	70%	native low	outsloped rutted	14%	264	8	110%	1	0.30%	1	19.05	2.82	1.12	586.2	0.293	462.09	0.231	M44-JRSS	
45	50	PONY MT +	sandy loam	25%	native low	outsloped rutted	12%	453	14	0.30%	1	0.30%	1	19.05	0.42	0.05	354.83	0.177	309.71	0.155	M45-JRDBC	
46	50	ALDER 17 S MT +	sandy loam	0%	native low	outsloped unrutted	2%	405	11	115%	1	50%	1	14.55	0.13	0	30.12	0.015	19.72	0.010	F46-JRSS	
47	50	ALDER 17 S MT +	sandy loam	30%	native low	outsloped rutted	5%	519	9	0.30%	1	0.30%	1	14.55	0.4	0.02	115.62	0.058	104.94	0.052	F47-JRDBC	

ID	Yrs	Climate	Soil	Rock	Surface, traffic	Design	Road grad	Road length	Road width	Fill grad	Fill len	Buff grad	Buff len	Precip	Rain runoff	Snow runoff	Sediment Road	Road	Sediment Profile	Profile	Comment	
				%			%	ft	ft	%	ft	%	ft	in	in	in	lb/yr	ton/yr	lb/yr	ton/yr		
48	50	TWIN BRIDGES MT +	silt loam	5%	native high	outsloped rutted	1%	579	18.5	0.30%	1	10%	1	11.5	0.67	0.19	221.63	0.111	191.98	0.096	V48-FC	
49	50	TWIN BRIDGES MT +	silt loam	5%	native high	outsloped rutted	1.50%	480	15	90%	1	2%	1	11.5	0.64	0.17	196.59	0.098	171.65	0.086	V49-FC	
50	50	ALDER 17 S MT +	silt loam	0%	native high	insloped vegetated	2%	470	6	65%	1	0.30%	1	14.55	1.09	0.21	191.18	0.096	157.92	0.079	F50-MWTC, 1/2W,VEG	MULTIPLIED SED. LOADS *2 - CHANGED WIDTH FROM 12 TO 6 TO ACCOUNT FOR INSLOPE VEG DITCH FROM CROWNED UNRUTTED.
51	50	ALDER 17 S MT +	silt loam	0%	native low	outsloped unrutted	1%	29	10.5	72%	1	3%	1	14.55	0.03	0	3.87	0.002	0.34	0.000	F51-MWTC	
52	50	ALDER 17 S MT +	loam	0%	native low	outsloped rutted	3%	60	8.5	0.30%	1	0.30%	1	14.55	0.73	0.14	6.68	0.003	2.72	0.001	F52-MLWTC	
53	50	ALDER 17 S MT +	silt loam	25%	native none	outsloped rutted	13%	447	7	25%	1	3%	1	14.55	0.45	0.06	655.8	0.328	187.46	0.094	F53-MLWTC	
54	50	ALDER 17 S MT +	silt loam	0%	native high	outsloped rutted	6%	598	24	52%	1	0.30%	1	14.55	1.02	0.19	4117.98	2.059	3804.25	1.902	F54-JRC	UNRUTTED CHANGED TO RUTTED TO ACCOUNT FOR HIGH TRAFFIC, NO CHANGE TO WIDTH

ID	Yrs	Climate	Soil	Rock	Surface, traffic	Design	Road grad	Road length	Road width	Fill grad	Fill len	Buff grad	Buff len	Precip	Rain runoff	Snow runoff	Sediment Road	Road	Sediment Profile	Profile	Comment	
				%			%	ft	ft	%	ft	%	ft	in	in	in	lb/yr	ton/yr	lb/yr	ton/yr		
55	50	ALDER 17 S MT +	sandy loam	20%	native high	outsloped unrutted	7%	554	30	78%	1	0.30%	1	14.55	0.34	0.02	3048.68	1.524	2979.26	1.490	F55-PS_1/2L	CROWNED ROAD MODELED AS OUTSLOPE RUTTED. SPLIT ROAD LENGTH IN 1/2 AND DOUBLED SEDIMENT LOAD.
56	50	ALDER 17 S MT +	sandy loam	5%	native low	outsloped rutted	2%	448	10	45%	1	0.30%	1	14.55	0.24	0.01	27.54	0.014	28.25	0.014	F56-PS	
57	50	PONY MT +	sandy loam	10%	native high	outsloped rutted	10%	235	20	116%	1	0.30%	1	19.05	0.33	0.04	426.74	0.213	379.24	0.190	M57-FC	
58	50	PONY MT +	sandy loam	0%	native low	outsloped rutted	10%	507	11	60%	1	35%	1	19.05	0.19	0.02	219.08	0.110	189.31	0.095	M58-FC	
59	50	PONY MT +	sandy loam	25%	native low	outsloped rutted	4%	153	9	80%	1	5%	1	19.05	0.31	0.03	20.16	0.010	18.51	0.009	M59-FC	
60	50	PONY MT +	sandy loam	10%	native low	outsloped rutted	2%	664	8.5	57%	1	20%	1	19.05	0.17	0.03	38.54	0.019	38.48	0.019	M60-FC	

ATTACHMENT B
WEPP: ROAD MODELING RESULTS FOR FIELD ASSESSED PARALLEL ROAD SEGMENTS

ID	Yrs	Climate	Soil	Rock	Surface, traffic	Design	Road grad	Road len	Road width	Fill grad	Fill len	Buff grad	Buff len	Sed road	Road	Normalized Load-Road	Sed profile	Profile	Normalized Load-Profile	Comment	
				%				ft						lb/yr	ton/yr	t/y/1000 ft	lb/yr	ton/yr	load/1000 ft		
2	50	ALDER 17 S MT +	silt loam	0%	native low	outsloped rutted	14%	265	10	40%	265	26%	150	396.3	0.198	0.748	34.14	0.017	0.064	F2P-WTC	Buffer Length >150 ft
5	50	ALDER 17 S, MT +	loam	40%	graveled high	insloped vegetated	9%	723	13	63%	600	30%	13	2173.88	1.087	1.503	1630.02	0.815	1.127	F5P-MLWTC	Modeled as 300ft x 2, 123ft x 1
13	50	PONY MT +	loam	10%	native low	outsloped rutted	5%	705	8	0.30%	1	15%	8	638.05	0.319	0.453	529.48	0.265	0.376	M13P-MLWTC	
14	50	PONY MT +	sandy loam	0%	native low	outsloped rutted	8%	162	8	0.30%	1	16%	41	23.91	0.012	0.074	3.87	0.002	0.012	M14P-MLWTC	
15	50	PONY, MT +	silt loam	50%	graveled high	outsloped rutted	6%	615.5	10	0.30%	1	16%	30	860.3	0.430	0.699	560.44	0.280	0.455	M15P-MLWTC	MULTIPLIED SED. LOADS *2 - HALF LENGTH
17	50	ALDER 17 S, MT +	silt loam	20%	graveled high	outsloped unrutted	3%	594	18	90%	594	9%	55	519.18	0.260	0.437	766.72	0.383	0.645	F17P-JRC	MODEL AS OUTSLOPE RUTTED; 297ft x 2
35	50	PONY MT +	sandy loam	5%	native low	outsloped rutted	7%	1300	6	60%	1300	5%	120	286.6	0.143	0.110	31	0.016	0.012	M35P1-HCC_300 FT LENGTH	Modeled as 300ft x 4, 100ft x 1, Buffer >150ft
35	50	PONY MT +	sandy loam	5%	native low	outsloped rutted	3%	1300	6	0.30%	1	30%	40	75.01	0.038	0.029	64.64	0.032	0.025	M35P2-HCC_300 FT LENGTH	ADD 1000 FT AND 300 FT TO EQUAL TOTAL LENGTH
36	50	PONY MT +	sandy loam	0%	native high	outsloped rutted	12%	162	10	22%	30	2%	87	154.06	0.077	0.475	1.02	0.001	0.003	M36P-HCC	
39	50	PONY MT +	silt loam	30%	native low	outsloped rutted	10%	508	18	55%	508	2%	10	1233.62	0.617	1.214	534.22	0.267	0.526	M39P-JRDBC	Modeled 254ft x 2
40	50	PONY MT +	sandy loam	10%	native low	outsloped rutted	11%	547	18	100%	547	0.30%	1	556.14	0.278	0.508	810.62	0.405	0.741	M40P-JRMC	INSLOPE RUTTED MODELED AS OUTSLOPED RUTTED; Modeled 273.5ft x 2
41	50	PONY MT +	loam	5%	native none	outsloped rutted	3%	108	7.5	0.30%	1	15%	12	15.46	0.008	0.072	5.75	0.003	0.027	M41P-JRMC	
43	50	PONY MT +	sandy loam	10%	native none	outsloped rutted	7%	792	8.5	90%	300	5%	10	363.9	0.182	0.230	599.66	0.300	0.379	M43P-JRMC_HALF LENGTH	Modeled as 792ft x 2
43	50	PONY MT +	sandy loam	50%	native none	outsloped rutted	7%	450	8.5	100%	450	0.30%	1	651.6	0.326	0.724	616.4	0.308	0.685	M43P2-JRMC	Modeled as 300 ft and 150ft

ID	Yrs	Climate	Soil	Rock	Surface, traffic	Design	Road grad	Road len	Road width	Fill grad	Fill len	Buff grad	Buff len	Sed road	Road	Normalized Load-Road	Sed profile	Profile	Normalized Load-Profile	Comment	
44	50	PONY MT +	silt loam	70%	native low	outsloped rutted	16%	490	8	70%	490	20%	1	1357.4	0.679	1.385	1117.6	0.559	1.140	M44P-JRSS	Modeled as 245ft x 2
45	50	PONY MT +	silt loam	25%	native low	outsloped rutted	10%	372	14	0.30%	1	15%	125	240.17	0.120	0.323	16.5	0.008	0.022	M45P-JRDBC	Buffer >150ft
47	50	ALDER 17 S MT +	loam	30%	native low	outsloped rutted	8%	342	9	0.30%	1	15%	40	109.56	0.055	0.160	76.37	0.038	0.112	F47P-JRDBC	
52	50	ALDER 17 S MT +	loam	0%	native low	outsloped rutted	1%	416	9	30%	150	2%	2	36	0.018	0.043	70.89	0.035	0.085	F52P-MLWTC	
56	50	ALDER 17 S MT +	sandy loam	5%	native low	outsloped rutted	1.50%	210	10	0.30%	1	9%	91	8.18	0.004	0.019	0.56	0.000	0.001	F56P-PS	
57	50	PONY MT +	silt loam	10%	native high	outsloped rutted	3%	120	13	92%	120	60%	52	97.42	0.049	0.406	46.37	0.023	0.193	M57P-FC	
57	50	PONY MT +	silt loam	50%	native low	outsloped rutted	12%	507	8	0.30%	1	40%	28	671.65	0.336	0.662	449.96	0.225	0.444	M57P2-FC_HALF LENGTH	MULTIPLIED SED. LOADS *2 - HALF LENGTH
58	50	PONY MT +	sandy loam	5%	native low	insloped vegetated	10%	243	11	74%	243	25%	30	266.43	0.133	0.548	107.24	0.054	0.221	M58P-FC	
58	50	PONY MT +	sandy loam	0%	native low	outsloped rutted	8%	177	8.5	0.30%	1	18%	42	28.65	0.014	0.081	5.67	0.003	0.016	M58P2-FC	

ATTACHMENT C.
FIELD ASSESSMENT SITE GPS DATA

ID	Location ID	Lat	Long	PAR SEG
1	F1-WTC	45.91518208	-112.0490644	0
2	F2-WTC	45.92527633	-112.0315288	1
3	F3-WTC	45.92343164	-112.0536221	0
4	F4-MWTC	45.93153957	-112.0698719	0
5	F5-MLWTC	45.97619298	-112.1141439	1
6	F6-MLWTC	46.0098147	-112.0931726	0
7	F7-MLWTC	46.06674983	-112.1036875	0
8	F8-MLWTC	46.07180285	-112.119477	0
9	M9-ULWTC	46.14575062	-112.1158243	0
10	F10-ULWTC	46.12858461	-112.1131832	0
11	M11-ULWTC	46.08477255	-112.1806855	0
12	M12-ULWTC	46.11091874	-112.175547	0
13	M13-MLWTC	46.04332373	-112.1703007	1
14	M14-MLWTC	46.0664517	-112.167887	1
15	M15-MLWTC	46.07187747	-112.1467756	1
16	F16-JS	45.88011763	-111.9748632	0
17	F17-JRC	45.81786943	-111.9531169	1
18	F18-JRC	45.8453279	-111.9915522	0
19	V19-JS	45.85202048	-112.085201	0
20	F20-PS	45.85156193	-112.142368	0
21	V21-LPC	45.86591241	-112.201216	0
22	F22-LBPC	45.90373052	-112.2027788	0
23	M23-LBPC	45.92310999	-112.268611	0
24	M24-UBPC	45.94527259	-112.2830018	0
25	M25-UBPC	45.95676958	-112.2995419	0
26	M26-HC	45.92383175	-112.3747946	0
27	M27-UBPC	45.95187382	-112.3598012	0
28	M28-UBPC	45.97009126	-112.3560697	0
29	M29-HC	45.94364593	-112.4018914	0
30	F30-LBPC	45.90409753	-112.249963	0
31	M31-LPC	45.8415764	-112.2967477	0
32	F32-LPC	45.86289187	-112.2565829	0
33	F33-FC	45.7745069	-112.3412254	0
34	F34-FC	45.77514114	-112.3430427	0
35	M35-HCC	45.67675894	-112.4211978	2
36	M36-HCC	45.67015188	-112.4077905	1
37	V37-JRCC	45.55598281	-112.3184597	0
38	F38-JRCC	45.59348344	-112.2301355	0
39	M39-JRDBC	45.59714844	-112.1940569	1
40	M40-JRMC	45.70066373	-112.1097823	1

ID	Location ID	Lat	Long	PAR SEG
41	M41-JRMC	45.70494878	-112.0982178	1
42	F42-JRMC	45.69374537	-112.1341411	0
43	M43-JRMC	45.67439851	-112.1316509	2
44	M44-JRSS	45.64655789	-112.1675304	1
45	M45-JRDBC	45.62484573	-112.1885682	1
46	F46-JRSS	45.70145495	-112.2896022	0
47	F47-JRDBC	45.67133469	-112.3079148	1
48	V48-FC	45.79738997	-112.13799	0
49	V49-FC	45.79367607	-112.1551931	0
50	F50-MWTC	45.94658275	-112.1297515	0
51	F51-MWTC	45.9399132	-112.117011	0
52	F52-MLWTC	46.02954732	-112.1177104	1
53	F53-MLWTC	46.02191426	-112.0749703	0
54	F54-JRC	45.82852724	-111.9663031	0
55	F55-PS	45.80635219	-112.2873123	0
56	F56-PS	45.80924211	-112.2540311	1
57	M57-FC	45.81722149	-112.3988044	2
58	M58-FC	45.80075512	-112.400333	2
59	M59-FC	45.78990488	-112.4340641	0
60	M60-FC	45.80882658	-112.454945	0