APPENDIX F Matrix Pathways/Indicators and Critical Habitat Crosswalk

Designated critical habitat occurs throughout the range of bull trout in western Montana. Activities on private or federal lands authorized, funded, or carried out by the NRCS require consultation, to ensure that they are not likely to destroy or adversely modify bull trout critical habitat. The FWS supports the use of **A Framework to Assist in Making Endangered Species Act Determinations of Effect for Individual or Grouped Actions at the Bull Trout Subpopulation Watershed Scale** (USDI 1998a) for bull trout to evaluate and document baseline conditions of critical habitat and to determine the likelihood of "take" of the species. Matrix analysis incorporates four biological indicators and 19 physical habitat indicators. The majority of the matrix analysis consists of specific consideration of the 19 habitat indicators. Analysis of the matrix habitat indicators provides a thorough analysis of the existing baseline condition and potential impacts to bull trout habitat. Therefore, by assessing potential effects to bull trout as a species through use of the matrix, NRCS biologists concurrently provide an analysis of effects to the primary constituent elements (PCE) for bull trout critical habitat. Table F -1 describes the nine PCE (USDI 2010) and the related matrix indicators.

Table F-1 Provides a crosswalk of Principle Critical Elements (PCE) for bull trout critical habitat, the associated matrix habitat indicators, and goals of the NRCS aquatic-riparian conservation strategy.

PCE	PCE Description	Matrix Indicators	Conservation Strategy
1	Springs, seeps, ground water sources, and subsurface water connectivity (hyporehic flows) to contribute to water quality and quantity and provide thermal refugia.	- Floodplain connectivity - Change in peak/base flows - Increase in drainage network - Riparian area condition - Chemical contamination/nutrients	1 2 3 4 5 6 7 8 9 10
2	Migratory habitats with minimal physical, biological, or water quality impediments between spawning, rearing, over-wintering, and freshwater and marine foraging habitats, including but not limited to permanent, partial, intermittent, or seasonal barriers.	- Life history diversity and isolation - Persistence and genetic integrity - Temperature - Chemical contamination/nutrients - Physical barriers - Average wetted width/maximum depth ratio in scour pools in a reach - Change in peak/base flows - Refugia	2 3 8 10

PCE	PCE Description	Matrix Indicators	Conservation Strategy
3	An abundant food base, including terrestrial organisms of riparian origin, aquatic macro-invertebrates, and forage fish.	- Growth and survival - Life history diversity and isolation - Riparian area condition - Floodplain connectivity	6 7 8 9 10
4	Complex river, stream, lake, reservoir, and marine shoreline aquatic environments and processes with features such as large wood, side channels, pools, undercut banks and substrates, to provide a variety of depths, gradients, velocities, and structure.	- Large woody debris - Pool frequency and quality - Large pools - Off channel habitat - Refugia - Average wetted width/maximum depth ratio in scour pools in a reach - Streambank condition - Floodplain connectivity - Riparian area condition	3 5 7 8 10
5	Water temperatures ranging from 2° to 15°C (36° to 59°F), with adequate thermal refugia available for temperatures at the upper end of this range. Specific temperatures within this range will vary depending on bull trout life-history stage and form; geography; elevation; diurnal and seasonal variation; shade, such as that provided by riparian habitat; and local groundwater influence.	- Temperature - Refugia - Average wetted width/maximum depth ratio in scour pools in a reach - Streambank condition - Change in peak/base flows - Riparian area condition - Floodplain connectivity	1 7 8 10
6	Substrates of sufficient amount, size, and composition to ensure success of egg and embryo overwinter survival, fry emergence, and young-of-the-year and juvenile survival. A minimal amount (e.g., less than 12 percent) of fine substrate less than 0.85 mm (0.03 in.) in diameter and minimal embeddedness of these fines in larger substrates are characteristic of these conditions.	- Sediment - Substrate embeddedness - Large woody debris - Pool frequency and quality	2 3 5 8 10
7	A natural hydrograph, including peak, high, low, and base flows within historic and seasonal ranges or, if flows are controlled, they minimize departures from a natural hydrograph.	- Change in peak/base flows - Increase in drainage network - Disturbance history - Disturbance regime	3 4 7 8 9 10

PCE	PCE Description	Matrix Indicators	Conservation Strategy
8	Sufficient water quality and quantity such that normal reproduction, growth, and survival are not inhibited.	- Sediment - Chemical contamination/nutrients - Change in peak/base flows	2 3 4 10
9	Few or no non-native predatory (e.g., lake trout, walleye, northern pike, smallmouth bass; interbreeding (e.g., brook trout); or competitive (e.g., brown trout) species present.	- Subpopulation size - Growth and survival - Life history diversity and isolation - Persistence and genetic integrity	1 2 5 7 8 10

The crosswalk provides rationale that supports the PCE for bull trout critical habitat, addresses the NRCS matrix analysis, as well as the goals in the NRCS aquatic-conservation strategy for bull trout in Montana. Thus, the environmental baseline and determination of effects to the species consists of both biological and habitat components, addressing in total the PCE listed in the final rule for Critical Habitat (USDI 2010). Following are the nine PCE and the supporting rationale.

1. Springs, seeps, ground water sources, and subsurface water connectivity (hyporehic flows) to contribute to water quality and quantity and provide thermal refugia.

This PCE is addressed by analysis of *floodplain connectivity* and *riparian area condition*. *Floodplain connectivity* considers hydrologic linkage of off-channel areas with the main channel and overbank flow maintenance of wetland function and riparian vegetation and succession. Floodplain and riparian areas provide hydrologic connectivity for springs, seeps, ground water upwelling and wetlands and contribute to the maintenance of the water table (USDI 1998b). The analysis of *changes in peak/base flows* would address subsurface water connectivity. I*ncrease in drainage network* would address potential changes to ground water sources and subsurface water connectivity. C*hemical contamination/nutrients* would address concerns regarding ground water water quality.

2. Migratory habitats with minimal physical, biological, or water quality impediments between spawning, rearing, over-wintering, and freshwater and marine foraging habitats, including but not limited to permanent, partial, intermittent, or seasonal barriers.

The biological indicator *life history diversity and isolation* addresses the function of migration and/or subsequent isolation with respect to the population. The biological indicator *persistence and genetic integrity* indirectly reflects the status of migratory corridors. Physical, biological or chemical barriers to migration are addressed directly through water quality habitat indicators, including *temperature* and *chemical contamination/nutrients*, as well as habitat connectivity through *physical barriers*. The analysis of these indicators would assess if barriers have been created due to impacts such as high temperatures, high concentrations of contaminants or physical barriers. Analysis of *change in peak/base flows* and *average wetted width/maximum depth ratio in scour pools in a reach* would assess whether changes in flow might create a

seasonal barrier to migration. An analysis of *refugia*, which considers the habitat's ability to support strong, well distributed, and connected populations for all life stages and forms of bull trout, would also be pertinent to this PCE.

3. An abundant food base, including terrestrial organisms of riparian origin, aquatic macroinvertebrates, and forage fish.

An analysis of *floodplain connectivity* and *riparian area condition* would assess these contributions to the food base. Floodplain and riparian areas provide habitat to aquatic invertebrates, which in turn provides a forage base to bull trout (USDI 1998c). This PCE is indirectly addressed through the biological indicator of *growth and survival* and *life history diversity and isolation*. Both of these indicators look at habitat quality and subpopulation condition, which provides information on food base. It is addressed through the analysis of biological and habitat indicators in that, if a bull trout population either exists or could exist in a watershed, then there is an adequate forage base. A healthy habitat provides a forage base for the target species. Any potential impairment to the forage base has been addressed by way of summarizing the biological and habitat indicators.

4. Complex river, stream, lake, reservoir, and marine shoreline aquatic environments and processes with features such as large wood, side channels, pools, undercut banks and substrates, to provide a variety of depths, gradients, velocities, and structure.

The analysis of *large woody debris*, such as current values and sources available for recruitment, directly addresses this PCE. Large woody debris increases channel complexity, is a formative feature for pools, and creates or stabilizes undercut banks. *Pool frequency and quality* would also directly address this PCE, showing the number of pools per mile as well as the amount of cover and temperature of water in the pools. *Average wetted width/maximum depth ratio in scour pools in a reach* is an indicator of channel shape and pool quality. Low ratios suggest deeper, higher quality pools. *Large pools*, consisting of a wide range of water depths, velocities, substrates and cover, are typical of high quality habitat and are a key component of channel complexity (USFWS 1998). An analysis of *off-channel habitat* would describe side-channels and other off-channel areas. *Streambank condition* would analyze the stability of the banks, including such features as undercut banks. The analysis of both *riparian area condition* and *floodplain connectivity* would directly address this PCE. Floodplain and riparian functions include the maintenance of habitat and channel complexity, the recruitment of large woody debris and the connectivity to off-channel habitats or side channels (USDI 1998b). Complex habitats provide refugia for bull trout and in turn, *refugia* analysis would assess complex stream channels. All of these habitat indicators consider the numerous characteristics of in-stream bull trout habitat and quantify critical components that are fundamental to creating and maintaining complex in-stream habitat over time.

5. Water temperatures ranging from 2° to 15°C (36° to 59°F), with adequate thermal refugia available for temperatures at the upper end of this range. Specific temperatures within this range will vary depending on bull trout life-history stage and form; geography; elevation; diurnal and seasonal variation; shade, such as that provided by riparian habitat; and local ground water influence.

This PCE is addressed directly by the analysis of *temperature*. It is addressed indirectly through consideration of *refugia*, which by definition is accessible high quality habitat of appropriate temperature. Important components of refugia include pool frequency and quality and large pools. *Average wetted width/maximum depth ratio in scour pools* is an indication of water volume, which indirectly indicates water temperature, (i.e., low ratios indicate deeper water, which in turn indicates possible refugia). This indicator in conjunction with *change in peak/base flows* is an indicator of potential temperature and refugia concerns particularly during low flow periods. *Streambank condition*, *floodplain connectivity* and *riparian area condition* address the components of shade and ground water influence, both of which are important factors of water temperature. Stable streambanks and intact riparian areas, which include part of the floodplain, typically support adequate vegetation to maintain thermal cover to streams during low flow periods.

6. Substrates of sufficient amount, size, and composition to ensure success of egg and embryo over-winter survival, fry emergence, and young-of-the-year and juvenile survival. A minimal amount (e.g., less than 12 percent) of fine substrate less than 0.85 mm (0.03 in) in diameter and minimal embeddedness of these fines in larger substrates are characteristic of these conditions.

This PCE is addressed directly by analysis of *sediment* in areas of spawning and incubation and considers directly the size class composition of in-stream sediments, particularly fine sediments $\leq$6.3 mm. This PCE is also addressed directly by analysis of *substrate embeddedness* in rearing areas, which is a function of sediment size class and bedload transport. Both of these indicators would assess substrate composition and stability in relation to the various life stages of the bull trout as well as the sediment transportation and deposition. *Large woody debris*, *pool frequency and quality*, and s*treambank condition* affect sediment transport and redistribution within a stream and would indirectly assess substrate composition and amounts.

7. A natural hydrograph, including peak, high, low, and base flows within historic and seasonal ranges or, if flows are controlled, they minimize departures from a natural hydrograph.

This PCE is addressed by analysis of *change in peak/base flows*, which considers changes in hydrograph amplitude or timing with respect to watershed size, geology, and geography. Considering *increase in drainage network* and *disturbance history* provides further information. Roads and vegetation management both have effects strongly linked to a stream's hydrograph. *Disturbance regime* ties this information together to consider how a watershed reacts to disturbance as well as the recovery time required for pre-disturbance discharge regime.

8. Sufficient water quality and quantity such that normal reproduction, growth, and survival are not inhibited.

Flow conditions, such as perennial or ephemeral would be analyzed through *changes in peak/base flows*, and addressed in consideration of current base flows. Changes in hydrograph amplitude or timing with respect to watershed size, geology, and geography would be considered. The level of contaminants is addressed directly by the analysis of *chemical contamination/nutrients* and *sediment*. Current listing under 303(d) status should be considered,

as well as the causes for that listing. *Sediment* is considered a contaminant especially in spawning and rearing habitat and would apply to this PCE.

9. Few or no non-native predatory (e.g., lake trout, walleye, northern pike, smallmouth bass), hybridizing (e.g., brook trout), or competitive (e.g., brown trout) species present.

This PCE is addressed by analysis of the four subpopulation indicators. Introductions of non-native species affects bull trout populations by predation, declines in abundance, local extirpations, and hybridization. Non-native species exacerbate stresses on bull trout from habitat degredation, fragmentation, isolation, and species interactions. Predation by non-native fishes directly affects *subpopulation size* and *growth and survival*, and indirectly through *life history diversity and isolation* and *persistence and genetic integrity*. Hybridization and competition directly affect *persistence and genetic integrity* and *growth and survival*, and can indirectly lead to declines in *subpopulation size* as well as loss of *life history diversity*. The NRCS would not be directly involved in a non-native species introduction, but must remain cognizant of how a project could benefit introduced species if present in the area.

Applying the Environmental Baseline to Designated Critical Habitat

Following are three scenarios with an associated narrative to summarize the results of using the baseline environmental condition. This process will be applied at the project level within the 6th HUC where the project is located, and included in the project file as documentation for the environmental baseline and effects determination only for those practices identified as Likely to Adversely Affect designated bull trout critical habitat.

Example 1 – In-channel disturbance from stream habitat improvement and road culvert barrier removal: Based on the results of the crosswalk (Table F-1) for the Principle Critical Elements of bull trout critical habitat/habitat indicators/NRCS aquatic conservation strategy, one or more habitat indicators for each of six PCE's were "functioning at risk" or "functioning at unacceptable risk". The project is on a 3rd order spawning and rearing stream, and the habitat indicators listed for PCE 1, 3 and 7 were identified as "functioning appropriately".

Narrative 1: Based on the environmental baseline of bull trout habitat conditions in the proposed project 6th HUC, one or more habitat indicators for PCE 5, 6 and 9 (Table F-1) are "functioning at risk", and one or more habitat indicators for PCE 2, 4 and 8 are "functioning at unacceptable risk". The project as proposed would result in moderate to substantial improvement in the baseline condition for PCE 5 and 6 by restoring the stream channel and riparian vegetation; improved habitat conditions should benefit bull trout, but may remain neutral for PCE 9. Restoring habitat connectivity and increasing habitat complexity would substantially improve the baseline condition for PCE 2 and 4. The project is on a 3rd order spawning and rearing stream, and the habitat indicators listed for PCE 1, 3 and 7 are "functioning appropriately". The project complies fully with the NRCS aquatic conservation strategy.

Example 2 – Riparian disturbance due to establishing a riparian pasture and vegetation restoration: Based on the results of the crosswalk (Table F-1) for the Principle Critical Elements of bull trout critical habitat/habitat indicators/NRCS aquatic conservation strategy, at least one habitat indicator listed for eight PCEs is identified as "functioning at risk" or

"functioning at unacceptable risk". The project is on a 3rd order spawning and rearing stream, and PCE 9 is "functioning appropriately".

Narrative 2: Based on the environmental baseline of bull trout habitat conditions in the proposed project 6th HUC, one or more habitat indicators for PCE 1 through 4 (Table F-1) are "functioning at risk", and one or more habitat indicators for PCE 5 through 8 are "functioning at unacceptable risk". The project as proposed would moderately improve the baseline condition for PCE's 1 through 4 by establishing a riparian pasture, restoring native riparian plant species, reducing bank shearing, and relocating a stock watering system to an upland site. Restoration of native riparian vegetation, reduced grazing utilization and bank shearing, and 1.0 cfs water right retained in-stream would substantially improve the baseline condition for PCE's 5 through 8. The project is located on a 3rd order spawning and rearing stream, and PCE 9 is "functioning appropriately". The project complies fully with the NRCS aquatic conservation strategy.

Example 3 – Restoration of an oxbow wetland: Based on the results of the crosswalk (Table F-1) for the Principle Critical Elements of bull trout critical habitat/habitat indicators/NRCS aquatic conservation strategy, at least one habitat indicator listed for PCE 1, 3, 5, 7, 8 and 9 are identified as "functioning at risk" or "functioning at unacceptable risk." The project is on a 5th order stream that provides foraging, migrating, and over-wintering habitat for bull trout, and PCE's 2, 4 and 6 are "functioning appropriately".

Narrative 3: Based on the environmental baseline of bull trout habitat conditions in the proposed project 6th HUC, at least one habitat indicator listed for PCE 1, 7 and 8 are "functioning at risk", and one or more habitat indicators for PCE 3, 5 and 9 are "functioning at unacceptable risk". The project as proposed would provide a slight to moderate improvement in the baseline condition for PCE's 1, 3, 5, 7 and 8 by restoring the ground water hydrology and vegetation of the previously drained wetland; the project will be neutral for PCE 9. The project is on a 5th order stream that provides foraging, migrating, and over-wintering habitat for bull trout, and PCE's 2, 4 and 6 are "functioning appropriately". The project complies fully with the NRCS aquatic conservation strategy.

Effects Determination – Habitat Indicator Relationship to Principle Critical Elements

The Natural Resources Conservation Service is required to determine if actions are likely to adversely modify critical habitat. Following are three examples linking site specific adverse impacts from a project to bull trout habitat indicators, and therefore to the PCE's of designated critical habitat. Principle critical element determinations must address those habitat indicators described in Table F-1, and any other factors pertinent to the project analysis.

Example 1 – In-channel disturbance from stream habitat improvement and road culvert barrier removal: Effects determination is May Affect, Likely to Adversely Affect bull trout or critical habitat on a project to restore in-stream habitat and fish passage at a road crossing, with actions occurring entirely between July 1 and August 31.

Narrative 1: Affects analysis for the proposed conservation practices 322, 395, 396, and 582 found that activities associated with this project were likely to impact habitat indicators for one or more habitat indicators for each of six PCE's. Potential adverse impacts anticipated from

practices 322 and 396 to habitat indicators and subsequently PCEs 6 and 8 (Table F-1) include **sediment, embeddedness, streambank condition**. For practice 582 potential adverse impacts anticipated to habitat indicators and subsequently PCEs 2, 4, 5, 6 and 8 include **sediment, embeddedness, large wood, pool frequency and quantity, large pools, off-channel, refugia, width:depth, streambank condition, floodplain connectivity,** and **riparian area condition**. The impacts associated with the proposed action are not discountable or insignificant but are expected to be entirely beneficial long-term. As such, the proposed conservation practices 322, 396, and 582 are likely to adversely affect bull trout or proposed critical habitat for bull trout in Big Creek; the project will be neutral for PCE 9. Practice 395 will have no effect.

Example 2 – Riparian disturbance due to establishing a riparian pasture and vegetation restoration: Effects determination is May Affect, Likely to Adversely Affect bull trout on a project establishing a riparian pasture, restoring native riparian plant and tree species, reducing bank shearing, and relocating a stock watering tank to an upland site.

Narrative 2: Affects analysis for the proposed conservation practices 322, 382, 390, 391 and 528 found that activities associated with this project may affect at least one habitat indicator listed for eight PCE's. Mechanical site preparation is required for practice 322, and potential adverse impacts anticipated to habitat indicators and subsequently PCEs 6 and 8 (Table F-1) include **sediment, embeddedness, streambank condition**. For practices 382, 390, 391 and 528 potential adverse impacts anticipated to habitat indicators and subsequently PCEs 1, 2, 3, 4, 5 and 7 include **temperature, sediment, embeddedness, pool frequency and quality, off-channel, width:depth, streambank condition, change in peak or base flow, riparian area condition, disturbance regimes**. The impact associated with the proposed action is not expected to be discountable or insignificant as a result of mechanical site preparation for practice 322, but are expected to be entirely beneficial long-term. As such, the proposed conservation practice 322 is likely to adversely affect designated critical habitat for bull trout in Trout Creek. Practices 382, 390, 391 and 528 are not likely to adversely affect bull trout or designated critical habitat.

Example 3 – Restoration of an oxbow wetland: Effects determination is May Affect, Likely to Adversely Affect bull trout by restoring the ground water hydrology and vegetation of a previously drained floodplain wetland; "other factors" must be considered that relate adverse impacts to PCE 3.

Narrative 3: Affects analysis for the proposed conservation practices 595, 644, 657 and 797* found that activities associated with this project may affect at least one habitat indicator listed for six PCE's. Potential adverse impacts anticipated from practice 657 to habitat indicators and subsequently PCE 2, 4, 5, 6, and 7 (Table F-1) include **temperature, sediment, embeddedness, change in peak or base flow,** and **riparian area condition**. For the proposed conservation practice 797*, adverse impacts (from noxious weed treatment) anticipated to habitat indicators and subsequently PCEs 1, 3 and 8 were likely to impact the habitat indicator **chemical contamination, riparian area condition**. However, analysis indicates that noxious weed treatment has the potential to deliver herbicides to flowing water, and consequently could adversely impact the macroinvertebrate community (forage base). As such, PCE 3 may be

*See Appendix H

impacted by implementation of the proposed action. The impacts associated with the proposed action are not discountable or insignificant but are entirely beneficial. Consequently, the proposed conservation practices 657 and 797* are likely to adversely affect bull trout and critical habitat for bull trout in the Big Weed River; the project will be neutral for PCE 9. Practices 595 and 644 will have no effect.

*See Appendix H

APPENDIX G Quantities for Conservation Practices Implemented within the Range of Bull Trout in Montana 2004-2009

Table G-1. Summaries of the number of projects and the annual average for each conservation practice, 2004 to 2009. Practices are organized by impact category, and grouped by their similarities for affects analysis. Years displayed varies by practice, given a practices' application frequency throughout the range of bull trout in Montana.

Code	Impact Category, Practice Group, and Practice Name	Units	Number of Projects	Average	Year
	Impact Category I – No Disturbance/habitat modification				
	Group – No Effect				
366	Anaerobic Digestor, Controlled Temperature	no	1	1.0	2008
511	Forage Harvest Management	ac	36	49.3	2004
			66	91.9	2005
			87	44.0	2006
			58	54.7	2007
			105	65.1	2008
			13	51.3	2009
449	Irrigation Water Management	ac	30	42.5	2004
			75	59.7	2005
			153	44.6	2006
			45	38.9	2007
			49	18.5	2008
			80	78.7	2009
595	Pest Management	ac	42	129.1	2004
			119	118.9	2005
			305	90.6	2006
			225	82.3	2007
			287	70.5	2008
			84	26.7	2009
646	Shallow Water Development and Management	ac	1	39.7	2004
			1	2.0	2006
			1	0.2	2007
395	Stream Habitat Improvement and Management	ac	10	8.7	2004
			4	1.0	2006
			7	14.2	2007
			1	0.2	2008
			1	1.0	2009

Code	Impact Category, Practice Group, and Practice Name	Units	Number of Projects	Average	Year
645	Upland Wildlife Habitat Management	ac	56	93.6	2004
			119	222.4	2005
			301	215.7	2006
			218	233.7	2007
			188	171.0	2008
			70	56.9	2009
644	Wetland Wildlife Habitat Management	ac	8	42.9	2004
			27	52.9	2005
			80	51.8	2006
			25	24.3	2007
			11	31.9	2008
			18	43.8	2009
	Impact Category II – Disturbance				
	Group – Access Control				
472	Access Control	ac	6	11.8	2004
			6	40.8	2005
			20	28.5	2006
			15	17.1	2007
			13	91.3	2008
561	Heavy Use Area Protection	ac	2	2.4	2006
382	Fence	ft	43	3652.3	2004
			86	3515.3	2005
			163	2927.3	2006
			83	2147.7	2007
			71	2344.5	2008
			39	2310.9	2009
	Group – Erosion Control				
327	Conservation Cover	ac	1	1.3	2005
			1	72.9	2007
342	Critical Area Planting	ac	7	20.4	2005
			29	47.7	2006
			5	2.9	2007
			7	16.3	2008
			1	6.0	2009
362	Diversion	ft	1	560.0	2004

Code	Impact Category, Practice Group, and Practice Name	Units	Number of Projects	Average	Year
			1	170.0	2007
			2	1196.5	2008
393	Filter Strip	ac	2	5.4	2004
			2	5.7	2006
			6	8.6	2007
			1	1.0	2008
410	Grade Stabilization Structure	no	2	1.0	2008
	Group – Riparian				
322	Channel Bank Vegetation	ac	1	1.0	2004
			2	6.5	2006
			1	140.0	2007
391	Riparian Forest Buffer	ac	11	6.3	2004
			9	6.7	2005
			18	6.3	2006
			15	3.3	2007
			15	2.6	2008
			2	1.5	2009
390	Riparian Herbaceous Cover	ac	1	2.0	2006
580	Streambank and Shoreline Protection	ft	2	192.5	2004
			6	1692.0	2005
			5	218.2	2006
			2	612.5	2007
			2	95.0	2008
	Group – Upland and Wildlife Habitat				
643	Restoration and Management of Rare and Declining Habitats	ac	23	204.5	2005
			78	51.2	2006
			25	21.1	2007
			10	67.5	2008
612	Tree/Shrub Establishment	ac	9	13.7	2004
			11	8.5	2005
			32	21.6	2006
			16	6.2	2007
			28	6.8	2008
			12	18.7	2009

Code	Impact Category, Practice Group, and Practice Name	Units	Number of Projects	Average	Year
490	Tree/Shrub Site Preparation	ac	2	10.0	2004
			5	35.6	2006
			1	56.0	2007
			1	1.0	2008
380	Windbreak/Shelterbelt Establishment	ft	9	1354.3	2005
			3	752.0	2008
			1	1092.0	2009
	Impact Category III – Disturbance/Habitat Modification				
	Group - Agriculture				
328	Conservation Crop Rotation	ac	16	51.8	2004
			37	58.7	2005
			23	51.2	2006
			40	73.0	2007
			26	31.5	2008
			17	47.1	2009
340	Cover Crop	ac	5	35.3	2006
			1	28.0	2008
512*	Pasture and Hay Planting	ac	6	26.5	2004
			7	22.1	2005
			21	34.8	2006
			15	55.1	2007
			13	32.2	2008
			10	30.9	2009
345	Residue and Tillage Management, Mulch Till	ac	2	32.4	2005
			2	32.4	2006
			2	32.4	2007
329	Residue and Tillage Management, No-Till/Strip Till/Direct Seed	ac	11	28.5	2005
			18	35.3	2006
			8	27.0	2007
			13	33.2	2008
344	Residue Management, Seasonal	ac	2	30.0	2004
			8	50.5	2005
			9	47.7	2006
			43	98.9	2007

Code	Impact Category, Practice Group, and Practice Name	Units	Number of Projects	Average	Year
			12	21.5	2009
	Group – Chemical or Organic Applications				
450*	Anionic Polyacrylamide (PAM) Erosion Control	ac	1	1.0	2005
797*	Herbaceous Weed Control and Management	ac	9	27.2	2009
590	Nutrient Management	ac	19	28.8	2004
			16	52.1	2005
			68	27.5	2006
			50	46.2	2007
			61	24.5	2008
			30	23.9	2009
633	Waste Utilization	ac	2	16.6	2004
			4	34.0	2005
			2	42.5	2006
			13	24.2	2007
			6	49.9	2008
			1	29.0	2009
	Group – Forestry and Fire				
314	Brush Management	ac	1	91.0	2004
384*	Forest Slash Treatment	ac	25	11.1	2006
			44	10.2	2007
			120	24.9	2008
			60	8.6	2009
666	Forest Stand Improvement	ac	37	17.2	2004
			43	12.7	2005
			131	13.1	2006
			160	21.0	2007
			193	17.4	2008
			124	9.2	2009
655	Forest Trails and Landings	ac	9	5.3	2007
			7	10.0	2008
			1	4.5	2009
394	Firebreak	ft	3	1266.7	2004

Code	Impact Category, Practice Group, and Practice Name	Units	Number of Projects	Average	Year
			4	375.8	2006
			1	300.0	2007
			4	322.9	2008
383	Fuel Break	ac	2	140.5	2006
			6	2.7	2007
			5	3.4	2008
			2	2.2	2009
338	Prescribed Burning	ac	1	91.0	2004
	Group – Grazing and Rangeland				
550	Range Planting	ac	2	40.4	2005
			6	5.1	2006
			4	34.0	2007
			4	4.3	2008
			3	21.3	2009
528	Prescribed Grazing	ac	180	228.2	2004
			202	711.5	2005
			285	324.9	2006
			156	275.0	2007
			117	112.5	2008
			85	374.2	2009
614	Watering Facility	no	25	1.2	2004
			44	1.4	2005
			66	1.2	2006
			61	1.2	2007
			66	1.3	2008
			34	1.4	2009
	Group – Ground Disturbance				
560	Access Road	ft	2	125.0	2005
575	Animal Trails and Walkways	ft	4	33.2	2004
			4	363.4	2005
			13	183.5	2006
			3	492.0	2007
			2	79.0	2008
			1	40.0	2009
464	Irrigation Land Leveling	ac	1	11.8	2004
			1	2.0	2007

Code	Impact Category, Practice Group, and Practice Name	Units	Number of Projects	Average	Year
466	Land Smoothing	ac	2	18.3	2006
500	Obstruction Removal	ac	3	11.7	2005
			2	73.6	2006
572*	Spoil Spreading	ac	2	8.0	2005
			8	357.1	2006
			1	1.2	2007
351*	Well Decommissioning	no	1	1.0	2009
	Group – Irrigation				
388	Irrigation Field Ditch	ft	2	425.0	2008
441	Irrigation System, Microirrigation	ac	10	2.4	2006
			3	1.6	2007
			4	5.0	2008
			3	1.5	2009
442	Irrigation System, Sprinkler	ac	22	5.9	2004
			41	50.8	2005
			67	74.6	2006
			20	54.7	2007
			18	54.9	2008
			8	75.7	2009
	Waste Treatment				
313	Waste Storage Facility	no	1	1.0	2005
			2	1.0	2006
			1	1.0	2007
			5	1.2	2008
634	Waste Transfer	no	1	1.0	2009
	Impact Category IV – Disturbance/habitat modification/ long-term beneficial				
	Group – In-channel Disturbance				
584*	Channel Stabilization	ft	1	100.0	2006
396	Fish Passage	mi	1	1.0	2006
			5	0.2	2008

Code	Impact Category, Practice Group, and Practice Name	Units	Number of Projects	Average	Year
582	Open Channel	ft	5	998.0	2004
			4	10543.9	2005
			7	2855.0	2006
			5	4378.0	2007
			3	2478.7	2008
578	Stream Crossing	no	2	1.0	2007
			2	1.0	2008
			1	1.0	2009
	Group – Wetland				
658*	Wetland Creation	ac	2	10.5	2004
			1	0.2	2005
			3	5.6	2006
			13	1.0	2007
			1	4.7	2008
659	Wetland Enhancement	ac	9	11.4	2004
			2	1.6	2005
			10	38.3	2006
			4	37.6	2007
			3	25.6	2008
657	Wetland Restoration	ac	10	46.6	2004
			10	160.9	2005
			37	39.9	2006
			5	81.4	2007
			4	43.2	2008
			1	77.3	2009
	Impact Category V – Disturbance/habitat modification/ detrimental				
	Group – Water Conveyence				
320	Irrigation Canal or Lateral	ft	2	682.0	2006
428B	Irrigation Water Conveyance, Ditch and Canal Lining, Flexible Membrane	ft	7	1198.6	2007
430DD*	Irrigation Water Conveyance, Pipeline, High-	ft	15	1540.8	2004

Code	Impact Category, Practice Group, and Practice Name	Units	Number of Projects	Average	Year
	Pressure, Underground, Plastic				
			43	1556.2	2005
			45	1800.0	2006
			17	1467.6	2007
			20	1707.2	2008
			10	1989.2	2009
430EE*	Irrigation Water Conveyance, Pipeline, Low-Pressure, Underground, Plastic	ft	4	1130.0	2006
			1	20.0	2008
430FF*	Irrigation Water Conveyance, Pipeline, Steel	ft	1	60.0	2005
			1	363.0	2006
516	Pipeline	ft	20	2402.1	2004
			40	1672.1	2005
			52	1861.0	2006
			49	1522.8	2007
			54	1714.4	2008
			21	3490.8	2009
	Group – Water Development				
348	Dam, Diversion	no	1	1.0	2005
			1	1.0	2007
356	Dike	ft	7	176.6	2006
			5	224.0	2007
436*	Irrigation Storage Reservoir	ac-ft	1	1.0	2007
378	Pond	no	4	1.5	2004
			1	1.0	2005
			13	1.5	2006
			10	1.2	2007
			4	2.5	2008
521A	Pond Sealing or Lining, Flexible Membrane	no	2	1.0	2006
533	Pumping Plant	no	11	1.1	2004
			26	1.0	2005
			18	1.0	2006
			11	1.1	2007
			20	1.0	2008
			12	1.1	2009

Code	Impact Category, Practice Group, and Practice Name	Units	Number of Projects	Average	Year
574	Spring Development	no	6	1.0	2004
			18	1.2	2005
			22	1.1	2006
			11	1.0	2007
			23	1.1	2008
			11	1.0	2009
587	Structure for Water Control	no	12	1.8	2004
			8	1.0	2005
			41	1.1	2006
			10	1.6	2007
			18	1.1	2008
			9	1.0	2009
642	Water Well	no	2	1.0	2004
			8	9.6	2005
			11	1.0	2006
			11	1.0	2007
			11	1.0	2008
			9	1.0	2009

Table G-2. Summaries of the number of projects and the project average, minimum, and maximum, for each conservation practice throughout the range of bull trout in Montana, 2004 to 2009. Practices were grouped by their similarities for affects analysis. Values are for each 4th level hydrologic unit code (HUC) where bull trout are listed as threatened and critical habitat is designated.

Code	Impact Category, Practice Group, and Practice Name	Units	4th HUC	HUC Name	Number of Projects	Average	Minimum	Maximum
	Impact Category I - No Disturbance/habitat modification							
	Group - No Effect							
366	Anaerobic Digestor, Controlled Temperature	no	17010205	Bitterroot	1	1.0		
511	Forage Harvest Management	ac	17010101	Upper Kootenai	2	50.1	44.4	55.8
			17010102	Fisher	1	930.0		
			17010201	Upper Clark Fork	27	56.3	4.0	198.9
			17010202	Flint-Rock	91	85.2	2.0	417.0
			17010203	Blackfoot	20	46.8	4.0	129.4
			17010204	Middle Clark Fork	14	17.3	2.0	45.0
			17010205	Bitterroot	53	33.5	2.9	262.0
			17010208	Flathead Lake	48	47.0	3.6	168.0
			17010212	Lower Flathead	106	63.4	2.2	1245.0
			17010213	Lower Clark Fork	3	34.3	6.0	52.0
449	Irrigation Water Management	ac	17010101	Upper Kootenai	11	22.1	1.6	59.0
			17010201	Upper Clark Fork	13	71.1	6.3	198.9
			17010202	Flint-Rock	109	85.6	2.0	417.0
			17010203	Blackfoot	24	60.9	7.6	129.0
			17010204	Middle Clark Fork	10	8.4	2.0	27.4
			17010205	Bitterroot	85	28.4	1.3	127.2
			17010208	Flathead Lake	61	23.9	0.2	161.0
			17010212	Lower Flathead	115	46.3	1.5	407.0
			17010213	Lower Clark Fork	4	71.9	44.8	120.4

Code	Impact Category, Practice Group, and Practice Name	Units	4th HUC	HUC Name	Number of Projects	Average	Minimum	Maximum
595	Pest Management	ac	10010002	St. Mary	2	35.0	20.0	50.0
			17010101	Upper Kootenai	35	2.4	0.1	10.0
			17010102	Fisher	2	1.5	1.0	2.0
			17010201	Upper Clark Fork	191	145.9	1.0	3460.0
			17010202	Flint-Rock	49	42.9	1.0	280.0
			17010203	Blackfoot	182	82.0	0.0	1046.0
			17010204	Middle Clark Fork	114	14.8	0.1	233.0
			17010205	Bitterroot	125	33.5	0.4	384.0
			17010206	North Fork Flathead	4	1.5	1.0	2.0
			17010208	Flathead Lake	100	49.5	0.1	1200.0
			17010211	Swan	1	15.5		
			17010212	Lower Flathead	190	149.0	0.5	1740.0
			17010213	Lower Clark Fork	67	59.3	0.9	370.4
646	Shallow Water Development and Management	ac	17010211	Swan	1	2.0		
			17010212	Lower Flathead	2	20.0	0.2	39.7
395	Stream Habitat Improvement and Management	ac	17010201	Upper Clark Fork	1	1.0		
			17010202	Flint-Rock	1	52.0		
			17010204	Middle Clark Fork	2	1.0	1.0	1.0
			17010205	Bitterroot	18	7.5	0.2	27.2
			17010208	Flathead Lake	1	1.2		
645	Upland Wildlife Habitat Management	ac	17010101	Upper Kootenai	49	49.3	1.0	656.0
			17010102	Fisher	11	334.6	22.0	1202.0
			17010201	Upper Clark Fork	52	559.5	4.0	6166.0
			17010202	Flint-Rock	15	1103.6	1.8	6218.0
			17010203	Blackfoot	163	506.3	0.7	15491.9
			17010204	Middle Clark Fork	42	44.0	0.1	290.0
			17010205	Bitterroot	151	63.3	0.3	625.0
			17010206	North Fork Flathead	30	14.7	0.9	45.0

Code	Impact Category, Practice Group, and Practice Name	Units	4th HUC	HUC Name	Number of Projects	Average	Minimum	Maximum
			17010207	Middle Fork Flathead	3	60.4	3.0	159.2
			17010208	Flathead Lake	147	38.1	0.4	608.1
			17010211	Swan	4	14.4	2.0	40.8
			17010212	Lower Flathead	254	118.3	0.3	1789.0
			17010213	Lower Clark Fork	31	54.7	1.4	412.2
644	Wetland Wildlife Habitat Management	ac	17010101	Upper Kootenai	1	40.0		
			17010102	Fisher	9	373.6	65.8	1,067.0
			17010201	Upper Clark Fork	10	59.2	1.0	129.0
			17010202	Flint-Rock	5	80.5	13.7	151.6
			17010203	Blackfoot	39	20.6	0.2	69.2
			17010204	Middle Clark Fork	6	5.4	0.1	20.0
			17010205	Bitterroot	12	17.6	1.0	84.0
			17010206	North Fork Flathead	1	9.2		
			17010208	Flathead Lake	19	25.8	2.0	122.0
			17010212	Lower Flathead	64	25.3	0.2	185.0
			17010213	Lower Clark Fork	3	33.4	3.8	84.0
	Impact Category II - Disturbance							
	Group – Access Control							
472	Access Control	ac	17010101	Upper Kootenai	1	52.0		
			17010102	Fisher	2	415.0	30.0	800.0
			17010202	Flint-Rock	4	125.7	81.0	239.6
			17010203	Blackfoot	16	10.1	3.0	32.0
			17010204	Middle Clark Fork	2	1.3	1.0	1.5
			17010205	Bitterroot	6	12.0	1.0	50.0
			17010208	Flathead Lake	10	20.3	1.4	72.9
			17010212	Lower Flathead	19	26.7	0.1	160.0

Code	Impact Category, Practice Group, and Practice Name	Units	4th HUC	HUC Name	Number of Projects	Average	Minimum	Maximum
561	Heavy Use Area Protection	ac	17010212	Lower Flathead	2	2.4	0.2	4.5
382	Fence	ft	10010002	St. Mary	16	4,360.8	575.0	6,525.0
			17010101	Upper Kootenai	5	2,353.0	840.0	4,810.0
			17010102	Fisher	20	8,455.6	100.0	35,732.0
			17010201	Upper Clark Fork	53	3,198.5	104.0	12,874.0
			17010202	Flint-Rock	37	3,150.9	42.0	17,720.0
			17010203	Blackfoot	104	2,631.5	180.2	9,150.0
			17010204	Middle Clark Fork	19	1,404.5	200.0	3,822.0
			17010205	Bitterroot	88	1,807.4	84.0	7,958.0
			17010208	Flathead Lake	21	2,333.6	156.7	9,240.0
			17010212	Lower Flathead	101	2,712.7	78.0	11,016.0
			17010213	Lower Clark Fork	21	2,486.0	242.0	7,512.0
	Group – Erosion Control							
327	Conservation Cover	ac	17010208	Flathead Lake	2	37.1	1.3	72.9
342	Critical Area Planting	ac	10010002	St. Mary	1	3.0		
			17010101	Upper Kootenai	2	7.6	2.1	13.0
			17010201	Upper Clark Fork	3	1.3	1.0	2.0
			17010203	Blackfoot	3	2.7	1.0	6.0
			17010204	Middle Clark Fork	1	4.0		
			17010205	Bitterroot	20	16.5	0.2	60.0
			17010208	Flathead Lake	2	3.1	1.2	5.0
			17010213	Lower Clark Fork	17	76.0	7.0	336.0
362	Diversion	ft	17010202	Flint-Rock	1	170.0		
			17010205	Bitterroot	3	984.3	560.0	1,800.0
393	Filter Strip	ac	17010202	Flint-Rock	1	1.0		
			17010205	Bitterroot	2	4.8	4.5	5.0
			17010212	Lower Flathead	8	8.0	0.3	38.9

Code	Impact Category, Practice Group, and Practice Name	Units	4th HUC	HUC Name	Number of Projects	Average	Minimum	Maximum
410	Grade Stabilization Structure	no	17010212	Lower Flathead	2	1.0	1.0	1.0
	Group – Riparian							
322	Channel Bank Vegetation	ac	17010102	Fisher	1	1.0		
			17010205	Bitterroot	1	12.0		
			17010208	Flathead Lake	1	1.0		
			17010213	Lower Clark Fork	1	140.0		
391	Riparian Forest Buffer	ac	17010201	Upper Clark Fork	8	4.3	1.0	10.3
			17010202	Flint-Rock	2	1.5	1.0	2.0
			17010203	Blackfoot	23	5.2	0.5	18.1
			17010204	Middle Clark Fork	7	1.8	1.0	5.0
			17010205	Bitterroot	13	10.0	0.3	41.0
			17010208	Flathead Lake	15	2.2	0.3	5.4
			17010213	Lower Clark Fork	2	1.0	1.0	1.0
390	Riparian Herbaceous Cover	ac	17010208	Flathead Lake	1	2.0		
580	Streambank and Shoreline Protection	ft	17010201	Upper Clark Fork	2	315.5	310.0	321.0
			17010203	Blackfoot	3	3,257.3	310.0	5,862.0
			17010204	Middle Clark Fork	7	140.0	25.0	265.0
			17010205	Bitterroot	2	180.0	75.0	285.0
			17010208	Flathead Lake	2	612.5	325.0	900.0
			17010213	Lower Clark Fork	1	75.0		

Code	Impact Category, Practice Group, and Practice Name	Units	4th HUC	HUC Name	Number of Projects	Average	Minimum	Maximum
	Group – Upland and Wildlife Habitat							
643	Restoration and Management of Rare and Declining Habitats	ac	17010101	Upper Kootenai	3	23.2	3.7	60.0
			17010102	Fisher	2	129.3	87.0	171.6
			17010201	Upper Clark Fork	1	1.0		
			17010203	Blackfoot	11	19.7	0.8	69.2
			17010204	Middle Clark Fork	9	27.8	1.0	214.6
			17010205	Bitterroot	15	49.4	0.5	625.0
			17010208	Flathead Lake	11	27.1	1.0	160.0
			17010211	Swan	3	15.9	1.0	40.8
			17010212	Lower Flathead	76	98.6	0.2	848.0
			17010213	Lower Clark Fork	5	104.7	10.8	400.0
612	Tree/Shrub Establishment	ac	17010101	Upper Kootenai	8	7.1	2.0	19.0
			17010201	Upper Clark Fork	1	2.5		
			17010202	Flint-Rock	8	18.1	6.4	37.0
			17010203	Blackfoot	8	4.4	0.5	7.0
			17010204	Middle Clark Fork	3	4.7	0.1	10.9
			17010205	Bitterroot	19	36.2	0.1	180.0
			17010206	North Fork Flathead	5	16.3	3.0	26.4
			17010208	Flathead Lake	24	4.1	0.4	20.0
			17010212	Lower Flathead	26	9.9	0.4	63.0
			17010213	Lower Clark Fork	6	7.1	1.0	15.7
490	Tree/Shrub Site Preparation	ac	17010205	Bitterroot	2	10.0	10.0	10.0
			17010212	Lower Flathead	7	33.6	1.0	91.0

Code	Impact Category, Practice Group, and Practice Name	Units	4th HUC	HUC Name	Number of Projects	Average	Minimum	Maximum
380	Windbreak/Shelterbelt Establishment	ft	17010101	Upper Kootenai	3	725.3	656.0	864.0
			17010202	Flint-Rock	2	2,018.5	2,018.0	2,019.0
			17010208	Flathead Lake	4	956.5	660.0	1,274.0
			17010212	Lower Flathead	2	1,521.5	843.0	2,200.0
			17010213	Lower Clark Fork	2	1,227.5	139.0	2,316.0
	Impact Category III – Disturbance/Habitat Modification							
	Group – Agriculture							
328	Conservation Crop Rotation	ac	17010201	Upper Clark Fork	1	198.9		
			17010202	Flint-Rock	12	78.2	2.0	150.0
			17010203	Blackfoot	2	30.0	30.0	30.0
			17010208	Flathead Lake	97	43.3	2.2	608.1
			17010212	Lower Flathead	45	65.2	2.2	574.5
			17010213	Lower Clark Fork	2	193.3	104.0	282.6
340	Cover Crop	ac	17010201	Upper Clark Fork	3	41.2	23.0	72.5
			17010202	Flint-Rock	1	78.0		
			17010205	Bitterroot	2	1.6	1.5	1.6
512*	Pasture and Hay Planting	ac	17010201	Upper Clark Fork	3	38.0	18.0	73.0
			17010202	Flint-Rock	3	21.3	15.0	25.0
			17010203	Blackfoot	4	34.0	30.0	40.0
			17010204	Middle Clark Fork	2	20.4	5.7	35.0
			17010205	Bitterroot	10	37.2	2.0	101.1
			17010208	Flathead Lake	7	56.8	4.6	161.0
			17010212	Lower Flathead	35	32.6	1.5	148.0
			17010213	Lower Clark Fork	8	42.0	11.6	109.0

Code	Impact Category, Practice Group, and Practice Name	Units	4th HUC	HUC Name	Number of Projects	Average	Minimum	Maximum
345	Residue and Tillage Management, Mulch Till	ac	17010208	Flathead Lake	6	32.4	5.3	59.5
329	Residue and Tillage Management, No-Till/Strip Till/Direct Seed	ac	17010208	Flathead Lake	50	31.9	6.8	130.8
344	Residue Management, Seasonal	ac	17010201	Upper Clark Fork	1	198.9	198.9	198.9
			17010203	Blackfoot	2	30.0	30.0	30.0
			17010208	Flathead Lake	58	51.5	2.2	608.1
			17010212	Lower Flathead	12	176.7	8.0	574.5
			17010213	Lower Clark Fork	1	40.0	40.0	40.0
	Group – Chemical or Organic Applications							
450*	Anionic Polyacrylamide (PAM) Erosion Control	ac	17010201	Upper Clark Fork	1	1.0		
797*	Herbaceous Weed Control and Management	ac	17010202	Flint-Rock	4	26.0	9.0	40.0
			17010205	Bitterroot	1	90.0		
			17010208	Flathead Lake	4	12.7	4.0	32.0
590	Nutrient Management	ac	17010101	Upper Kootenai	1	40.0		
			17010201	Upper Clark Fork	13	13.5	1.0	44.0
			17010202	Flint-Rock	7	98.8	2.0	170.0
			17010203	Blackfoot	10	71.6	11.7	210.0
			17010205	Bitterroot	45	18.4	0.2	70.8
			17010208	Flathead Lake	130	26.3	0.2	157.1
633	Waste Utilization	ac	10010002	St. Mary	1	3.0		
			17010201	Upper Clark Fork	9	44.3	33.0	56.0
			17010202	Flint-Rock	4	47.4	25.0	75.0
			17010203	Blackfoot	1	11.7		

Code	Impact Category, Practice Group, and Practice Name	Units	4th HUC	HUC Name	Number of Projects	Average	Minimum	Maximum
			17010205	Bitterroot	4	23.9	0.2	62.1
			17010208	Flathead Lake	9	22.0	4.6	44.9
	Group – Forestry and Fire							
314	Brush Management	ac	17010212	Lower Flathead	1	91.0		
384*	Forest Slash Treatment	ac	17010101	Upper Kootenai	87	4.9	0.4	29.5
			17010201	Upper Clark Fork	5	6.6	4.0	10.7
			17010202	Flint-Rock	3	20.8	10.0	40.0
			17010203	Blackfoot	49	14.5	1.0	66.4
			17010204	Middle Clark Fork	12	7.0	0.7	43.0
			17010205	Bitterroot	14	9.6	0.5	27.0
			17010206	North Fork Flathead	4	1.5	0.5	4.0
			17010208	Flathead Lake	37	26.4	1.6	608.1
			17010212	Lower Flathead	14	104.6	7.0	574.5
			17010213	Lower Clark Fork	24	13.6	3.0	46.0
666	Forest Stand Improvement	ac	17010101	Upper Kootenai	181	4.7	0.3	29.5
			17010102	Fisher	7	3.6	0.8	5.0
			17010201	Upper Clark Fork	25	18.3	1.0	82.0
			17010202	Flint-Rock	18	37.5	3.4	118.0
			17010203	Blackfoot	120	16.7	0.4	215.0
			17010204	Middle Clark Fork	34	16.9	0.3	169.3
			17010205	Bitterroot	68	16.2	0.1	391.0
			17010206	North Fork Flathead	32	10.6	0.5	45.2
			17010207	Middle Fork Flathead	5	11.5	3.0	19.0
			17010208	Flathead Lake	64	19.8	0.7	608.1
			17010211	Swan	8	12.3	1.7	40.8
			17010212	Lower Flathead	43	42.6	1.0	574.5
			17010213	Lower Clark Fork	83	18.0	1.2	275.8

Code	Impact Category, Practice Group, and Practice Name	Units	4th HUC	HUC Name	Number of Projects	Average	Minimum	Maximum
655	Forest Trails and Landings	ac	17010202	Flint-Rock	1	6.0		
			17010203	Blackfoot	14	5.1	4.0	10.0
			17010212	Lower Flathead	1	5.0		
			17010213	Lower Clark Fork	1	40.0		
394	Firebreak	ft	17010101	Upper Kootenai	1	1.5		
			17010202	Flint-Rock	2	1,400.0	1,200.0	1,600.0
			17010205	Bitterroot	7	511.4	250.0	1,000.0
			17010206	North Fork Flathead	1	510.0		
			17010208	Flathead Lake	1	3.0		
383	Fuel Break	ac	17010101	Upper Kootenai	1	2.8		
			17010203	Blackfoot	5	2.0	0.7	3.0
			17010205	Bitterroot	7	42.8	0.6	280.0
338	Prescribed Burning	ac	17010212	Lower Flathead	1	91.0		
	Group – Grazing and Rangeland							
550	Range Planting	ac	17010201	Upper Clark Fork	1	1.0		
			17010203	Blackfoot	3	20.3	0.8	55.0
			17010205	Bitterroot	4	47.1	16.4	80.0
			17010208	Flathead Lake	6	3.5	2.0	4.9
			17010212	Lower Flathead	5	11.4	4.0	40.0
528	Prescribed Grazing	ac	10010002	St. Mary	2	2,252.6	2,005.1	2,500.0
			17010101	Upper Kootenai	7	250.2	23.6	656.0
			17010102	Fisher	4	216.3	118.0	335.0
			17010201	Upper Clark Fork	85	308.4	6.0	2,080.0
			17010202	Flint-Rock	66	1,326.8	5.6	36,500.0
			17010203	Blackfoot	222	545.2	1.3	25,500.0
			17010204	Middle Clark Fork	14	45.1	1.0	290.0
			17010205	Bitterroot	177	207.9	0.9	7,854.0

Code	Impact Category, Practice Group, and Practice Name	Units	4th HUC	HUC Name	Number of Projects	Average	Minimum	Maximum
			17010208	Flathead Lake	56	84.9	1.4	604.0
			17010212	Lower Flathead	337	225.1	1.4	4,940.0
			17010213	Lower Clark Fork	55	96.3	7.0	469.0
614	Watering Facility	no	10010002	St. Mary	3	1.3	1.0	2.0
			17010101	Upper Kootenai	1	1.0		
			17010201	Upper Clark Fork	72	1.3	1.0	4.0
			17010202	Flint-Rock	43	1.2	1.0	5.0
			17010203	Blackfoot	68	1.2	1.0	5.0
			17010204	Middle Clark Fork	10	1.0	1.0	1.0
			17010205	Bitterroot	20	1.3	1.0	2.0
			17010208	Flathead Lake	7	1.3	1.0	3.0
			17010212	Lower Flathead	68	1.4	1.0	5.0
			17010213	Lower Clark Fork	4	1.0	1.0	1.0
	Group – Ground Disturbance							
560	Access Road	ft	17010204	Middle Clark Fork	2	125.0	100.0	150.0
575	Animal Trails and Walkways	ft	17010201	Upper Clark Fork	2	722.5	695.0	750.0
			17010203	Blackfoot	5	44.2	20.0	79.0
			17010204	Middle Clark Fork	1	100.0		
			17010205	Bitterroot	8	45.8	1.0	200.0
			17010208	Flathead Lake	4	33.9	1.4	91.3
			17010212	Lower Flathead	7	482.6	1.0	1,452.0
464	Irrigation Land Leveling	ac	17010202	Flint-Rock	1	2.0		
			17010205	Bitterroot	1	11.8		
466	Land Smoothing	ac	17010212	Lower Flathead	2	18.3	7.5	29.0
500	Obstruction Removal	ac	17010102	Fisher	4	42.0	1.0	133.0
			17010205	Bitterroot	1	14.2		

Code	Impact Category, Practice Group, and Practice Name	Units	4th HUC	HUC Name	Number of Projects	Average	Minimum	Maximum
572*	Spoil Spreading	ac	17010102	Fisher	2	8.0	1.0	15.0
			17010205	Bitterroot	8	357.1	55.0	800.0
			17010208	Flathead Lake	1	1.2		
351*	Well Decommissioning	no	17010212	Lower Flathead	1	1.0		
	Group – Irrigation							
388	Irrigation Field Ditch	ft	17010205	Bitterroot	2	425.0	150.0	700.0
441	Irrigation System, Microirrigation	ac	17010205	Bitterroot	1	1.0		
			17010208	Flathead Lake	19	2.7	0.9	9.6
442	Irrigation System, Sprinkler	ac	17010101	Upper Kootenai	8	22.2	1.0	58.0
			17010201	Upper Clark Fork	18	81.9	10.0	148.0
			17010202	Flint-Rock	26	89.3	1.0	175.0
			17010203	Blackfoot	7	23.3	1.0	87.0
			17010204	Middle Clark Fork	10	7.8	2.0	28.2
			17010205	Bitterroot	41	26.9	1.0	130.0
			17010208	Flathead Lake	15	56.5	1.0	156.0
			17010212	Lower Flathead	46	73.9	1.0	1,600.0
			17010213	Lower Clark Fork	5	65.7	35.4	120.0
	Group – Waste Treatment							
313	Waste Storage Facility	no	17010201	Upper Clark Fork	1	1.0		
			17010205	Bitterroot	6	1.2	1.0	2.0
			17010208	Flathead Lake	1	1.0		
			17010212	Lower Flathead	1	1.0		
634	Waste Transfer	no	17010205	Bitterroot	1	1.0		

Code	Impact Category, Practice Group, and Practice Name	Units	4th HUC	HUC Name	Number of Projects	Average	Minimum	Maximum
	Impact Category IV - Disturbance/ habitat modification/long-term beneficial							
	Group – In-channel Disturbance							
584*	Channel Stabilization	ft	17010205	Bitterroot	1	100.0		
396	Fish Passage	mi	17010203	Blackfoot	1	1.0		
			17010205	Bitterroot	5	0.2	0.2	0.2
582	Open Channel	ft	17010102	Fisher	2	16,356.8	8,141.5	24,572.1
			17010203	Blackfoot	15	3,577.2	1,000.0	7,027.0
			17010205	Bitterroot	6	1,148.3	393.0	2,157.0
			17010212	Lower Flathead	1	3,214.8		
578	Stream Crossing	no	17010101	Upper Kootenai	1	1.0		
			17010201	Upper Clark Fork	1	1.0		
			17010205	Bitterroot	1	1.0		
			17010212	Lower Flathead	2	1.0	1.0	1.0
	Wetlands							
658*	Wetland Creation	ac	17010204	Middle Clark Fork	1	0.2		
			17010205	Bitterroot	1	2.4		
			17010212	Lower Flathead	18	2.9	0.3	14.0

Code	Impact Category, Practice Group, and Practice Name	Units	4th HUC	HUC Name	Number of Projects	Average	Minimum	Maximum
659	Wetland Enhancement	ac	17010101	Upper Kootenai	1	0.6		
			17010102	Fisher	2	103.1	1.2	205.0
			17010203	Blackfoot	1	2.0		
			17010204	Middle Clark Fork	2	1.5	1.0	2.0
			17010205	Bitterroot	8	7.7	0.3	25.4
			17010212	Lower Flathead	11	25.6	3.0	107.7
			17010213	Lower Clark Fork	3	53.5	20.4	110.0
657	Wetland Restoration	ac	17010101	Upper Kootenai	3	15.8	2.5	40.0
			17010102	Fisher	11	219.4	15.0	1,017.0
			17010201	Upper Clark Fork	3	109.0	96.0	116.0
			17010202	Flint-Rock	1	151.6		
			17010203	Blackfoot	12	29.9	0.8	119.0
			17010205	Bitterroot	2	14.2	14.2	14.2
			17010208	Flathead Lake	7	15.2	2.9	64.0
			17010212	Lower Flathead	24	28.6	3.0	185.0
			17010213	Lower Clark Fork	4	22.2	12.3	30.0
	Impact Category V - Disturbance/ habitat modification/detrimental							
	Group – Water Conveyance							
320	Irrigation Canal or Lateral	ft	17010205	Bitterroot	2	682.0	564.0	800.0
428B	Irrigation Water Conveyance, Ditch and Canal Lining, Flexible Membrane	ft	17010202	Flint-Rock	1	1,520.0		
			17010205	Bitterroot	6	1,145.0	371.0	1,511.0
430DD*	Irrigation Water Conveyance, Pipeline, High-Pressure, Underground, Plastic	ft	17010101	Upper Kootenai	2	1,900.0	750.0	3,050.0
			17010201	Upper Clark Fork	16	1,574.3	800.0	3,070.0

Code	Impact Category, Practice Group, and Practice Name	Units	4th HUC	HUC Name	Number of Projects	Average	Minimum	Maximum
			17010202	Flint-Rock	18	1,463.4	20.0	4,300.0
			17010203	Blackfoot	4	1,931.3	1,380.0	2,410.0
			17010204	Middle Clark Fork	8	4,077.4	1,197.7	15,500.0
			17010205	Bitterroot	44	1,188.5	123.1	3,180.0
			17010208	Flathead Lake	11	1,279.9	300.0	3,770.0
			17010212	Lower Flathead	42	1,836.9	500.0	4,330.0
			17010213	Lower Clark Fork	5	2,163.8	112.0	7,140.0
430EE*	Irrigation Water Conveyance, Pipeline, Low-Pressure, Underground, Plastic	ft	17010208	Flathead Lake	3	600.0	600.0	600.0
			17010212	Lower Flathead	2	1,370.0	20.0	2,720.0
430FF*	Irrigation Water Conveyance, Pipeline, Steel	ft	17010204	Middle Clark Fork	1	363.0		
			17010205	Bitterroot	1	60.0		
516	Pipeline	ft	10010002	St. Mary	3	727.7	260.0	1,608.0
			17010101	Upper Kootenai	1	2,400.0		
			17010201	Upper Clark Fork	63	2,377.9	43.0	16,872.0
			17010202	Flint-Rock	35	1,223.0	95.0	8,900.0
			17010203	Blackfoot	54	1,693.7	52.0	8,300.0
			17010204	Middle Clark Fork	10	1,024.0	200.0	4,000.0
			17010205	Bitterroot	19	465.3	75.0	2,450.0
			17010208	Flathead Lake	5	371.0	130.0	600.0
			17010212	Lower Flathead	43	3,218.1	100.0	44,975.0
			17010213	Lower Clark Fork	3	1,411.7	75.0	2,700.0
	Group – Water Development							
348	Dam, Diversion	no	17010202	Flint-Rock	2	1.0	1.0	1.0

Code	Impact Category, Practice Group, and Practice Name	Units	4th HUC	HUC Name	Number of Projects	Average	Minimum	Maximum
356	Dike	ft	17010205	Bitterroot	7	176.6	25.0	421.0
			17010212	Lower Flathead	5	224.0	100.0	600.0
378	Pond	no	10010002	St. Mary	2	1.0	1.0	1.0
			17010202	Flint-Rock	1	1.0		
			17010204	Middle Clark Fork	1	1.0		
			17010205	Bitterroot	5	1.4	1.0	3.0
			17010211	Swan	1	1.0		
			17010212	Lower Flathead	22	1.6	1.0	7.0
521A	Pond Sealing or Lining, Flexible Membrane	no	17010202	Flint-Rock	2	1.0	1.0	1.0
533	Pumping Plant	no	17010101	Upper Kootenai	2	1.0	1.0	1.0
			17010201	Upper Clark Fork	18	1.1	1.0	2.0
			17010202	Flint-Rock	9	1.0	1.0	1.0
			17010203	Blackfoot	8	1.1	1.0	2.0
			17010204	Middle Clark Fork	3	1.0	1.0	1.0
			17010205	Bitterroot	20	1.1	1.0	2.0
			17010208	Flathead Lake	10	1.0	1.0	1.0
			17010212	Lower Flathead	25	1.0	1.0	1.0
			17010213	Lower Clark Fork	3	1.0	1.0	1.0
574	Spring Development	no	10010002	St. Mary	2	1.0	1.0	1.0
			17010201	Upper Clark Fork	18	1.1	1.0	2.0
			17010202	Flint-Rock	19	1.1	1.0	2.0
			17010203	Blackfoot	15	1.0	1.0	1.0
			17010204	Middle Clark Fork	4	1.0	1.0	1.0
			17010205	Bitterroot	12	1.2	1.0	2.0
			17010208	Flathead Lake	2	1.5	1.0	2.0
			17010212	Lower Flathead	17	1.2	1.0	3.0
			17010213	Lower Clark Fork	2	1.0	1.0	1.0

Code	Impact Category, Practice Group, and Practice Name	Units	4th HUC	HUC Name	Number of Projects	Average	Minimum	Maximum
587	Structure for Water Control	no	17010101	Upper Kootenai	4	1.0	1.0	1.0
			17010201	Upper Clark Fork	11	1.0	1.0	1.0
			17010202	Flint-Rock	3	1.0	1.0	1.0
			17010203	Blackfoot	18	1.3	1.0	7.0
			17010204	Middle Clark Fork	4	1.0	1.0	1.0
			17010205	Bitterroot	42	1.4	1.0	8.0
			17010208	Flathead Lake	6	1.0	1.0	1.0
			17010211	Swan	1	1.0		
			17010212	Lower Flathead	7	1.1	1.0	2.0
			17010213	Lower Clark Fork	2	1.0	1.0	1.0
642	Water Well	no	17010201	Upper Clark Fork	13	1.0	1.0	1.0
			17010202	Flint-Rock	8	1.0	1.0	1.0
			17010203	Blackfoot	14	5.9	1.0	70.0
			17010205	Bitterroot	1	1.0		
			17010208	Flathead Lake	1	1.0		
			17010212	Lower Flathead	15	1.0	1.0	1.0
614	Watering Facility	no	10010002	St. Mary	3	1.3	1.0	2.0
			17010101	Upper Kootenai	1	1.0		
			17010201	Upper Clark Fork	72	1.3	1.0	4.0
			17010202	Flint-Rock	43	1.2	1.0	5.0
			17010203	Blackfoot	68	1.2	1.0	5.0
			17010204	Middle Clark Fork	10	1.0	1.0	1.0
			17010205	Bitterroot	20	1.3	1.0	2.0
			17010208	Flathead Lake	7	1.3	1.0	3.0
			17010212	Lower Flathead	68	1.4	1.0	5.0
			17010213	Lower Clark Fork	4	1.0	1.0	1.0

*See Appendix H

APPENDIX H Montana Conservation Practice Revisions

Table H-1. This table lists the Conservation Practices that have had been re-named, or have been combined with other conservation practices and also re-named. These changes were effective March, 2012.

Conservation Practice Name Changes/Code	
Previous Name/Code	**New Name/Code**
Above Ground, Multi Outlet Pipe (431)	Above Ground, Multi Outlet Pipeline (431)
Forest Slash Treatment (384)	Woody Residue Treatment (384)
Herbaceous Weed Control and Management (797)	Herbaceous Weed Control (797)
Irrigation Water Conveyance, Pipeline, Aluminum Tubing (430AA)	Irrigation Pipeline (430)
Irrigation Water Conveyance, Pipeline, High Pressure, Underground, Plastic (430DD)	Irrigation Pipeline (430)
Irrigation Water Conveyance, Pipeline, Low Pressure, Underground, Plastic (430EE)	Irrigation Pipeline (430)
Irrigation Water Conveyance, Pipeline, Steel (430FF)	Irrigation Pipeline (430)
Pasture and Hayland (512)	Forage and Biomass Planting (512)
Runoff Management System (570)	Stormwater Runoff Control (570)
Well Decommissioning (351)	Water Well Decommissioning (351)

Table H-2. This table lists the Conservation Practices that have been removed from use in Montana; effective March, 2012.

Deleted Conservation Practices
Anionic Polyacrylamide (PAM) Erosion Control (450)
Channel Stabilization (584)
Irrigation Storage Reservoir (436)
Lined Waterway (468)
Spoil Spreading (572)
Wetlands Creation (658)

3.7 MAPS

Map 1 - Montana bull trout (*Salvelinus confluentus*) distribution map.

This map was created July, 2008, by the U.S. Fish and Wildlife Service Montana Ecological Services Field Office. It is intended to serve as a guide to inform users of the known and suspected current distribution of bull trout for the State of Montana. The map is titled as a DRAFT, only to indicate that distribution of bull trout is dynamic and may change. Mapped stream segments represent approximate distribution, based on best available information, and should not be interpreted as providing an absolute indicator of bull trout presence or absence at a specific site. This map should not be used as a substitute for more comprehensive on-site field surveys. Streams color coded as "Unspecified Occupancy" indicate a historical record of bull trout presence, but lacks recent survey for confirmation. Streams color coded as "Unspecified or Unsurveyed" indicate either no historical record of bull trout, or no recent survey.

Map 2 - Montana bull trout (*Salvelinus confluentus*) local population map.

This map was created June, 2009, by the U.S. Fish and Wildlife Service Montana Ecological Services Field Office. It is intended to serve as a guide to inform users of the 6th code hydrologic units (HUC) with known bull trout spawning and rearing habitat in the State of Montana. Dominant land ownership is indicated for the 6th HUC's with spawning and rearing habitat. Streams color coded as "Unspecified Occupancy" indicate a historical record of bull trout presence, but lacks recent confirmation. Streams color coded as "Unspecified or Unsurveyed" indicate either no historical record of bull trout, or no recent survey.

Maps 3-12 - Montana bull trout (*Salvelinus confluentus*) federally designated critical habitat maps.

Map 3 - Swan River - Designated Critical Habitat
Map 4 - Bitterroot River - Designated Critical Habitat
Map 5 - Clark Fork River - Designated Critical Habitat
Map 6 - Clearwater River - Designated Critical Habitat
Map 7 - Kootenai River - Designated Critical Habitat
Map 8 - Middle Fork Flathead River - Designated Critical Habitat
Map 9 - North Fork Flathead River - Designated Critical Habitat
Map 10 - South Fork Flathead River - Designated Critical Habitat
Map 11 - Rock Creek - Designated Critical Habitat
Map 12 - Saint Mary River - Designated Critical Habitat

These maps were posted in the federal register (75) #200, October 18, 2010 and were officially adopted on November 17, 2010 by the U.S. Fish and Wildlife Service. The data layers were created using U.S. Geological Survey (USGS) Hydrologic Unit Code maps (HUCs) at a scale of 1:250,000 down to the 4th level cataloging unit. In some cases, 5th and 6th level HUCs were also used and some finer scale watersheds developed using USGS 10-meter Digital Elevation Model and 1:24,000 scale hydrographic layers. Lakes and streams that are color coded in red are bull trout designated critical habitat areas.

In developing the final designation that will be managed as critical habitat throughout the range of the bull trout, the Service excluded 1,707 miles of streams (9.0 percent), 19,396 acres of lakes and reservoirs (4.0 percent) and 216 miles of marine shoreline (28.7 percent) of suitable critical habitat from the 2010 proposed designation because they are areas where key partners of the Service, including tribes, military and some state agencies and landowners with Habitat Conservation Plans, have formally committed to protect bull trout habitat; these waters are considered Essentially Excluded Critical Habitat. Essentially Excluded Critical Habitat is color coded in green on the attached critical habitat maps. The agency is required to determined effects of our practice(s) on only the individuals of bull trout within these reaches.