APPENDIX H -- MONTANA'S EPA APPROVED TMDLs

Waterbody Name	Parameter/ Pollutant	Water Quality Goal/Endpoint	TMDL	Approval Date
Deep Creek*	**Sediment** **Flow** **Temperature**	**Sediment:** 30% substrate fines(<6.35mm) **TSS:** 0.26 slope of TSS v. Q plot **Temperature**: >73 degrees F. in only 10 days annually **Biotic:** 3,000 female trout captured/year	TSS load same as ref reach 50% reduction in erosive bands 2275' increase in channel length 3-9 cfs min. flow	Oct. 15, 1996
Clark Fork River* HUC 17010204 4 segments: MT76G001-1, MT76G001-2, MT76G001-3, MT76G001-4, HUC 17010201 3 segments: MT76M001-1, MT76M001-2, MT76M001-3	**Total nitrogen (7)** **Total phosphorus (7)**	**Algae:** 100 mg/m2 (summer mean) **chlorophyll a:** 150 mg/m2 (peak) chlorophyll a **Phosphorus**: 30 ug/l total P upstream of Reserve St. **Nitrogen**: 300 ug/l total N **Nutrient ratio:** 15:1 N:P	(kg/day) **Clark Fork below Deer Lodge** Total N: 52 Total P: 0.84 **Clark Fork above Missoula** Total N: 689 Total P: 59 **Clark Fork Below Stone Container** Total N: 801 Total P: 77	Oct. 10, 1998
Elk Creek* (Lower Clark Fork R.)	**Sediment**	Restoration of native trout	50% reduction in annual sediment load at the mouth of Elk Creek	Dec. 7, 1998
Teton River* (near Chouteau)	**Salinity**	Specific Conductance of 1000 micromhos/cm (at 25 deg C) total dissolved solids (TDS) of 700 mg/l (TMDL endpoints measured at Teton River at State Highway 221 Bridge)	TMDL = Qdown Cdown = Cup + $Q_{PB}C_{PB}$ **where:** Qdown = flow in Teton River below Priest Butte outlet Cdown = TMDL endpoint (i.e. 1000 umhos/cm or 400 mg/l TDS) Qup = upstream flow in Teton River Cup =upstream concentration of either specific conductivity or TDS $Q_{PB=}$ flow in Priest Butte outlet C_{PB}= concentration of either specific conductivity of TDS in Priest Butte outlet	Mar. 23, 1999

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Teton River* (near Chouteau)	**Sediment**	Narrative Standard: "No increases are allowed above naturally occurring concentrations of sediment, settleable solids, oils or floating solids, which will or are likely to create a nuisance or render the waters harmful, detrimental, or injurious to public health, recreation, safety, welfare, livestock, wild animals, birds, fish, or other wildlife"(ARM 17.30.629(f)) # Beneficial Use Standard: "...suitable for bathing, swimming and recreation, growth and propogation of non-salmonid fishes and associated aquatic life, waterfowl and furbearers." (ARM 17.30.6529(l)) [The success of meeting these standards will be guaged by monitoring physical and biological parameters such as: flow, total suspended solids, temperature, conductivity, pH. amount of bank erosion, stream cross sections, pebble counts, photoplots, macroinvertebrates and fish . A goal of approximately 155 mg/1 sediment concentration (suspended and bedload combined) during a stable flow of 150 cfs has been suggested as a reasonable target for ambient sediment levels.]	25% reduction in long term sediment yield TMDL partially implemented by: restoration of 54% of eroding banks increase in stream length by 4 percent (i.e., increase in channel sinuosity) maximum flow target of 100 cfs at Careless Canal diversion and 80 cfs at mouth of Careless Creek	Sept. 20, 2001
Lone Tree Creek	**Nitrogen**	- 1 mg/l total Kjeldahl nitrogen - periphyton pollution index of 2.00 or greater	* 80 percent reduction in long term nitrogen load * TMDL partially implemented by: * restoration of riparian areas along 37% of the stream miles to a proper function condition (PFC) * re-activation of 0.25 mile of abandoned channel	Sept. 20, 2001
Flathead Lake*	**Nitrogen Phosphorus**	- 80 g Carbon/m2/yr - no declining trend in hypolimnionic dissolved oxygen - no measurable blooms of Anabaena or other pollution algae - 1.0 ug/l chlorophyll a maintaining or decreasing near-shore algal growth on rocks - 5.0 ug/l total phosphorus - <0.5 ug/l soluble reactive phosphorus - 95 ug/l total nitrogen - 30 ug/l nitrate+nitrate - <1.0 ug/l ammonia	25% reduction in long term nitrogen and phosphorus loads	Mar. 30, 2002

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Sage Creek*	**Salinity**	**Narrative Standard:** "State surface waters must be free from substances attributable to municipal, industrial, agricultural practices or other discharges tha will create concentrations or combinations of materials which are toxic or harmful to human, animal, plant or aquatic life")ARM 17.30.637 (l) (d).) **Beneficial Use Standard:** "...suitable for culinary and food process purposes, after conventional treatment, and for bathing, swimming and recreation, propagation of non-salmonid fishes and associated aquatic life, waterfowl and furbearers, and agricultural and industrial water supply." (ARM 17.30.625). A **goal** of approximately 1250 mg/l total dissolved solids (TDS) or 1600 mhos/cm specific conductance (SC). (These metrics reflect about the same amount of salinity in Sage Creek.)	The Sage Creek TMDL is expressed in pounds per day of TDS using the following formula based on flow: TMDL = 1250 mg/l x flow x 5.39 where, flow = stream flow in cfs 5.39 = conversion factor TMDL partially implemented by reducing groundwater levels in saline seep recharge areas.	Apr. 22, 2002
Big Sandy Creek*	**Salinity**	**Narrative Standard:** "State surface waters must be free from substances attributable to municipal, industrial, agricultural practices or other discharges tha will create concentrations or combinations of materials which are toxic or harmful to human, animal, plant or aquatic life" (ARM 17.30.637 (l) (d)) **Beneficial Use Standard:** "...suitable for culinary and food process purposes, after conventional treatment, and for bathing, swimming and recreation, growth and propagation of non-salmonid fishes and association aquatic life, waterfowl and furbearers, and agricultural and industrial water supply." (ARM 17.30.625). **A goal** of approximately 1250 mg/l total dissolved solids (TDS) or 1600 mhos/cm specific conductance (SC). (These metrics reflect about the same amount of salinity in Sage Creek.)	The Big Sandy Creek TMDL is expressed in pounds per day of TDS using the following formula based on flow: TMDL = 1000 mg/l x flow x 5.39 where, flow = stream flow in cfs 5.39 = conversion factor TMDL partially implemented by applying agricultural BMPS	Apr. 22, 2002

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Cooke City TMDL Planning Area: **Daisy Creek** (metals, pH, sediment), **Stillwater River** (metals, sediment) **Fisher Creek** (metals, pH, sediment), **Clarks Fork of the Yellowstone River** (metals, pH), **Miller Creek** (metals), **Soda Butte Creek** (metals)	**Metals (6) pH (3) Sediment (3)**	New World Mining District restoration efforts currently underway for mine disturbances from sources within the Daisy , Fisher, and Miller Creek drainages. *Additional Nation Forest Service erosion control practices and mine restoration efforts where needed (all waterbodies) *Further characterization and possible restoration of mine disturbances on private lands (for some water bodies; key strategy component for Soda Butte Creek drainage). *Significant water quality and related monitoring including additional source characterization (all water bodies). *Adaptive management approach to identify any necessary changes to targets, TMDLs or load allocations (all waterbodies). *Numeric values for aquatic life support. *Numeric values for drinking water/domestic use support. Elimination of objectionable deposits and turbidity from metal precipitates. Non-toxic levels in stream sediments. Biota at greater than or equal to 75% of reference conditions. Stream habitat conditions within 25% of reference stream.	Based on numeric concentration targets multiplied by stream flow. Metals TMDLs used as surrogates for pH. Based on yearly loads and percent reductions in loading (metals load reductions of 97 to 38 %, and 27% fine sediment load reduction to not more than 25 % above reference).	Jan. 6, 2003
Big Creek (N.Fk. Flathead R)	**Sediment -** (Watershed Restoration Plan also restores 'other habitat alterations, bank erosion and fish habitat degradation)	Full support of a cold water fishery is the primary goal of this watershed restoration plan, with a target of attainment of reference conditions in Big Creek -This translates to the first target of less than 30 percent fines less than 6.4 mm. -The second objective would be to reduce the amount of streambank erosion occurring in the most sensitive impaired reaches of Big Creek, to not significantly greater than 125% of the erosion rate of the monitored reference reaches, based on a statistically valid comparison. -The third objective is to reduce the sediment input from upland and stream channel sources, through the successful revegetation and/or armoring of at least 75% of the identified sediment sources.	The load allocation is a performance based approach addressing virtually all of the identified impairment sources -The soil erosion from cutslopes, ditches and road surface on 75 miles of reclaimed roads, is a WEPP-modeled reduction of approximately 26 tons annually. - Applying revegetation, drainage, and stabilization treatments to streambank slumps in Big Creek, reducing streambank erosion by 75 to 95 %. - Improve road surface/stream crossings to current Montana BMP's by upsizing approximately 77 culverts (reducing road/stream crossing sedimentation by 60 to 90 %) and adding approximately 35 stream crossing crossdrains (resulting in a WEPP modeled sediment reduction of approximately 9 tons annually).	May 9, 2003
Upper Lolo Creek TMDL Planning Area - West Fork Lolo Cr., East Fork Lolo Cr., Granite Cr., Lee Cr. & Lost Park Cr.	**Sediment (5)** (Plan also restores 'Thermal modifications' for Granite Creek)	Full support of aquatic life/cold water fishery is the primary goal of this watershed restoration plan, through reduction in silviculture/roads and highway sedimentation sources. -This translates to the first set of target of less than 21 to 31 percent fines less than 6 mm depending on Rosgen stream type. -The second set of targets (pool frequency, V*, entrenchment ratio, width/depth ratio and sinuosity) will be set through the plan's monitoring program.	The load allocations are based on stream specific reductions in sediment loads from roads and the highway. These load reductions range from 33 to 56% reductions in human-caused loads. Implementation strategies include: recalim forest roads to meet Montana BMPs; recalim surplus forest roads; improve and upgrade existing culverts; improve Highway 12 use and maitenance of sediment traps, plowing techniques and guardrail cleaning, and reduce fish passage barriers.	June 24, 2003

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Blackfoot Headwaters - Blackfoot R.-abv. Landers Fk. (cadmium, copper, iron, lead, manganese, zinc); **Blackfoot R. -blw. Landers Fk.** (aluminum, cadmium, iron, zinc); **Beartrap Cr.** (cadmium, copper, iron, lead, manganese, zinc); **Mike Horse Cr.** (aluminum, cadmium, copper, iron, lead, manganese, zinc), **Sandbar Cr.** (aluminum, copper, iron, manganese) & **Poorman Cr**. (cadmium, copper, lead)	**Metals: (30)** (Waterbody / pollutant combinations from mining disturbances)	Blackfoot waters achieve numeric metals concentrations in the water column for aquatic life/fishery and for domestic water use support, *Metals in stream sediments may not impede beneficial uses. *Biota (periphyton, macroinvertebrates) equal to or better than reference conditions. *Elimination of objectionable deposits from metal precipatates.	Based on numeric metals concentration targets multiplied by stream flow. UBMC restoration efforts for mine distrubances in Mike Horse Cr., Beartrap Cr. and Blcackfoot R.. Adaptive mangement approach using future monitoring, application of most protective numeric standard, sediment chemistry targets and use of biota targets equal or better than reference condition.	Oct. 10, 2003
Teton River TMDL Planning Area -11 Sediment, TDS/SC, Nutrients, Thermal Modification TMDLs: **Priest Butte Lake** (TDS/SC, selenium), **Teton River** (TDS/SC, sediment, thermal modification), **Willow Creek** (sediment), **Deep Creek** (sediment, nutrients), **Teton Spring Cr,** (sediment, thermal modification, nutrients)	**TDS/SC: (2) Selenium: (1) Sediment: (4) Thermal modification: (2) Nutrients: (2)**	Teton waters achieve water quality standards for nutrients, thermal modification, sediment and TDS/SC through application of BMPs for effects of the 1964 flood and/or for agricultural land uses and associated practices.	TDS/SC reductions of 14% to 23% in maximum SC, and 0% to 34% reductions in average SC concentrations. Daily selenium discharge target for largest selinium seep area. 80% of the stream's linear distance have the appropriate channel pattern, form, function, and riparian conditions for sediment reduction. Thermal modification targets for stream channel morphology, instream flow regimes, and shade-providing riparian vegetative community. Measued nutrient reductions of 0 to 57% and Chl **a** reductions of 4% to 168%.	Nov. 26, 2003