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2003 ANNUAL REPORT & 2004 CONSERVATION PLAN

for

BULL TROUT

in

MONTANA

(January 1, 2003 - December 31, 2004)

prepared by:

MONTANA DEPARTMENT OF FISH, WILDLIFE AND PARKS

pursuant to:

SECTION 6(c)(1) of the ENDANGERED SPECIES ACT

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INTRODUCTION

Under Title 87 of the Statutes of the State of Montana, the Montana Department of Fish, Wildlife and Parks is directed to supervise the fish, wildlife, game, and nongame animals of the state. It is the policy of the Montana Legislature that species or subspecies of wildlife indigenous to this state, which may be found to be endangered within the state, should be protected in order to maintain, and to the extent possible, enhance their numbers (87-5-103). Further, it is the mission of the Department of Fish, Wildlife and Parks to provide for the stewardship of the fish and wildlife resources of Montana while contributing to the quality of life for present and future generations.

Under this direction, the Montana Department of Fish, Wildlife and Parks has implemented a large, diverse conservation program to manage, and where appropriate and possible, enhance populations of bull trout in Montana. This conservation program includes establishment of restrictive angling regulations, education of anglers about bull trout identification, population monitoring and assessment, habitat monitoring and assessment, habitat restoration, research into natural history, habitat needs, and life history requirements of bull trout, genetic analysis and monitoring of different bull trout populations, enforcement of protective bull trout regulations, education of the general public about bull trout and aquatic ecosystems, and restoration planning. Although the actions described above are directed towards enhancing the recovery of bull trout, and are part of an active conservation program for bull trout in Montana, some (e.g., population monitoring, habitat restoration) have potential to result in incidental or direct take of bull trout as described under Section 9 of the ESA. Therefore, the Department of Fish, Wildlife and Parks is seeking authorization for incidental take of bull trout under Section 6(c)(1) of the ESA, for purposes of conservation and recovery of bull trout in Montana.

Listed below are descriptions of activities for which the Department is seeking approval for take of bull trout in accordance with Section 6(c)(1) of the ESA. Included with the activity descriptions are the methods followed to conduct such activities, drainages where activities will occur, a description of the specific activities, approximate dates the activities will occur, personnel responsible for conducting such activities, and an estimate of take. Where applicable, specific research proposals and progress reports are also included.

The activities included can all be classified as monitoring or restoration actions, all of which contribute to the conservation and recovery of the species. Although monitoring actions such as gill netting and electroshocking may result in harm to individual bull trout, it is important they continue so that population trends can continually be assessed. Without these techniques, the current status of populations and bodies of water would not be possible. Because of the potential for take, efforts to minimize harm are maximized.

This plan will be updated annually, and by February 28 of each year, the Department will provide a report of actions accomplished during the previous calendar year, with an estimate of actual take. If the need arises, this plan will be amended to identify additional actions not already covered in this plan. Written notification of such additions will be made to the U.S. Fish and Wildlife Service prior to the action being implemented.

Listed below are the major actions that will be undertaken by the Montana Department of Fish, Wildlife and Parks as part of their bull trout recovery and conservation program. Specific methods are described in text. All activities that fit within each action category are then summarized in a table at the end of each section. Included in the table is an estimate of direct take (if known) or indirect take for all actions in that category (e.g., gillnetting). Finally, a complete summary table, arranged by drainages, is included to allow analysis of cumulative effects. Actions described herein are in addition to numerous other extensive efforts undertaken by the Department to conserve bull trout, but which do not result in take, including angling regulations, enforcement, education, restoration planning, project analysis, implementation monitoring of best management practices (BMPs), watershed planning, and database maintenance.

METHODS

Gillnetting

Gillnetting is an effective sampling tool to collect fisheries data for large and small lakes. The Montana Department of Fish, Wildlife & Parks has employed this method for many decades in numerous and diverse state waters to monitor populations of fish. The following paragraphs describe gillnetting in bull trout lakes in northwestern Montana.

Hungry Horse Reservoir

Justification

Gillnetting has been used to monitor fish population abundance, size- and age-structure, and community composition in Hungry Horse Reservoir since 1958. Consistent sampling during this period has provided data on long-term population trends and served as a baseline for current population assessments. We use this information primarily to track bull trout and westslope cutthroat populations. This is one of the most comprehensive data sets we have for any native species community and one of two indices used to assess the South Fork Flathead bull trout population. It is important that we continue with consistent methods for comparison of these time series data.

Methods

Standard, experimental floating and sinking nets are used to sample fish in near-shore areas. Nets are 38.1 m long and 1.8 m deep and consist of five equal length panels of 19, 25, 32, 38, and 51 mm square mesh. Floating nets sample fish from the surface down 1.8 m and sinking nets sample from the bottom up 1.8 m. A floating net set consists of 2 nets tied end-to-end and is fished perpendicular to shore. A sinking net set is a single net fished perpendicular to shore.

Sampling consists of a standard fall netting protocol. Gill nets are set during October in three reservoir areas: Emery (northern 1/3 of reservoir), Murray (middle 1/3), and Sullivan (southern 1/3). Four floating net sets and three sinking nets are set overnight during each sampling period in each area. This protocol is much reduced from previous efforts. Prior to 1995, sampling was conducted seasonally and many more nets were used.

Fish caught in nets are identified to species, weighed (g), and measured (mm). For bull trout and westslope cutthroat trout, we determine sex and state of maturity (immature, mature, ripe, spent). Scales and otoliths are also removed for age and growth information.

Bull Trout Mortality

Catch averages 69 bull trout per year (83 max) in this netting series. Any live bull trout are released immediately (average is 15% released), to reduce mortality.

Flathead Lake

Justification

The Confederated Salish & Kootenai Tribe (CSKT) and Montana Department of Fish, Wildlife & Parks annually conduct a relative fish abundance survey in Flathead Lake. This survey

allows managers to track changes and trends in fish populations over the long term. Nets fish designated areas and depths to provide comparable trend data between years.

In the late 1970s, concerns of potential adverse changes to the Flathead River Drainage associated with coal mining, timber harvest and other human development established the need for a series of studies to acquire baseline fisheries information and assess future changes in resource condition. A portion of this effort was focused on Flathead Lake, including seasonal gill-net surveys. From 1980 through 1983, MFWP conducted netting surveys in each of the four seasons. Following this collection period, investigators created a protocol for a standardized spring monitoring program to assess relative fish abundance in five areas of Flathead Lake. In 1981 and 1983, this spring survey was complete and provides a baseline of fisheries information prior to establishment and propagation of *Mysis relicta* (*Mysis*). Unfortunately, the spring monitoring program was discontinued until the early 1990s. From 1990 through 1994, MFWP and CSKT conducted only partial sinking net surveys and did not achieve completion of the standard monitoring protocol until 1995. However, for the floating net portion of the series, agencies have successfully completed the lake-wide surveys since 1992, only 1990 and 1991 surveys were incomplete. Complete surveys in 1995, 1996, 1997, and 1998 provide data for comparisons to the 1981 and 1983 surveys.

Methods

Agency personnel follow methodology established by investigators in the early 1980s. Netting occurs in spring (April/May) before spring runoff when lake temperatures are isothermal. Five areas of the lake are gill netted. In each area, three sets of floating and three sets of sinking nets are set. At sampling sites, both sinking and floating multi-strand nylon gill nets, 38 m long by 2 m deep, consisting of five panels of bar mesh sizes, 19, 25, 32, 38, and 51 mm are set. Each set consists of two ganged nets, one sinking net tied end to end to another sinking net, and likewise for floating nets. Nets are set perpendicular to the shoreline. Floaters are set with one end close to shore in roughly 2 meters of water, stretching the net out over deep water. Sinking nets are set at depths greater than 10 meters. Previous years' netting records are consulted to determine depths fished in each area. Sets fish overnight by setting nets in late afternoon and retrieving nets in mid-morning hours.

Sinking and floating net catches are reported separately. Percent composition of catch by species is also reported separately by net type. We enumerate, measure total length and weight, and collect age, growth, sexual maturity, and food habits data from captured fish.

All live bull trout, roughly half of catch, are released as nets are retrieved.

Koocanusa Reservoir

Methods

Gill nets have been used by MFWP since 1975 to assess annual trends in fish populations and species composition. Netting is done in both spring and fall, based on reservoir operation and surface water temperature criteria:

1) Spring (April - June): The reservoir is being refilled, surface water temperatures are increasing to 9 - 13° C.

2) Fall (September - October): Drafting of the reservoir begins, surface water temperature drops to 13 - 17° C.

Effort consists of 21 ganged floating nets in the fall and 28 single sinking nets in the spring.

Estimated Mortality

Average mortality of bull trout in spring gill nets (1992-1996) is 70 fish; average mortality in the fall is 6 fish.

Swan Lake

Annual spring gillnetting is conducted in Swan Lake for fish community assessment. Overnight sets are distributed throughout a range of habitat types. Six standard floating nets (5 mesh, 125' x 6'), 4 standard sinking nets (5 mesh, 125' x 6'), and 2 experimental floating nets of uniform mesh size are set in the pelagic zone, targeting kokanee.

In 2000 a late summer sinking gill net series was instituted to detect the presence of lake trout in Swan Lake. It is anticipated that this netting series will be conducted annually. Four ganged standard gill nets and three ganged ½" experimental nets will be utilized.

Small Lakes

There are 11 lakes containing bull trout in northwestern Montana that are gillnetted to monitor fish community status. These include Whitefish Lake, Noxon Reservoir, Glen Lake, Bull Lake, and Sophie Lake most of which are surveyed annually. There are also a number of lakes that are surveyed infrequently, every two to five years, such as Lower and Upper Stillwater, Tally, Duck, Doctor, Holland, and Lindbergh lakes. Netting methodology is similar to that previously described. Nets fish overnight, are distributed around the lake, and are the standard floating and sinking type consisting of 38 m long by 2 m deep nylon mesh in five sizes. The number of nets fished is related to the size of the lake, that is, smaller lakes get fewer nets. Live bull trout are immediately released to minimize mortality.

Holland, Lindbergh Lakes

Spring netting is done every 2-3 years for fish community assessment. Overnight sets are distributed in a range of habitat types. Three standard sinking nets and three standard floating nets are typically set.

Cabinet Gorge and Noxon Reservoirs

Netting consisted of 15 experimental sinking gill nets in Cabinet Gorge Reservoir and 30 nets in Noxon Reservoir. These nets were 38 m (125 ft) long and 1.8 m (6 ft) deep with five separate 7.6 m (25 ft) panels consisting of 1.9 cm (¾ inch), 2.5 cm (1 inch), 3.2 cm (1¼ inch), 3.8 cm (1½ inch), and 5.1 cm (2 inch) square mesh. Locations for nets are selected to be away from cold water refuges to avoid bull trout. Gill nets set at sites selected have captured one or no bull trout during the three years of netting between 2000 and 2002.

Whitefish Lake

In both spring and fall seasons, three areas of the lake are gill-netted following methodology established in early 1980s. This is done to track changes in the fish community following *Mysis* establishment. We set standard sinking (3) and floating (3) nets. Live bull trout are immediately released.

Thompson Falls Reservoir

Fall gillnetting will be used to determine species composition of reservoir. The study plan will be developed this year and will involve using 10 experimental sinking gill nets. These nets were 38 m (125 ft) long and 1.8 m (6 ft) deep with five separate 7.6 m (25 ft) panels consisting of 1.9 cm (¾ inch), 2.5 cm (1 inch), 3.2 cm (1¼ inch), 3.8 cm (1½ inch), and 5.1 cm (2 inch) square mesh. Locations for nets are selected to be away from cold water refuges to avoid bull trout.

Clearwater Chain of Lakes

Lakes that are gill-netted in the Clearwater River drainage include Salmon, Seeley, Placid, Lake Alva, Lake Inez, Rainy Lake, Marshall Lake, and Clearwater Lake. Ten to 15 6' x 125' floating or sinking experimental gill nets with graduated mesh size from 3/4" to 2" are set overnight throughout the lakes between August and October to determine population status, species composition, growth rates, habitat use, and overall condition. A description of the intensive survey efforts in the Clearwater River drainage is attached.

Table 1. Summary of gill-netting activities in bull trout habitat that will be undertaken by Montana Department of Fish, Wildlife and Parks.

Drainage	Water	Action (Provide detailed description)	Purpose	Length/ Area	Date of Action	Personnel	Est. Mort.	Comp-leted?	No. DV Handled	Actual Mort.	Do in 2004 ?
Clark Fork (Lower)	Thompson Falls Reservoir	Gillnetting	Fish Community Assessment	Res. Wide	Oct	Laura Katzman Brad Liermann	1	N	0	0	Y
Clark Fork (Lower)	Cabinet Gorge Reservoir	Gillnetting	Fish Community Assessment	Res. Wide	Sept-Oct	Laura Katzman Brad Liermann	0	Y	0	0	Y
Clark Fork (Lower)	Noxon Rapids Reservoir	Gillnetting	Fish Community Assessment	Res. Wide	Sept-Oct	Laura Katzman Brad Liermann	0	Y	0	0	Y
Clark Fork (Upper)	Milltown Reservoir	Gillnetting	Monitor Northern Pike	Res. Wide	May-Nov	Dave Schmetterling	1	Y	1	0	Y
Clearwater	Clearwater Lake	10-15 Experimental Gill Nets	Population Status, Growth Rates, Condition, Habitat Use	Entire Lake	Aug-Oct.	Rod Berg	1 Fish	N	0	0	Y
Clearwater	Lake Alva	10-15 Experimental Gill Nets	Population Status, Growth Rates, Condition, Habitat Use	Entire Lake	Sept-Oct.	Rod Berg	6 Fish	N	0	0	Y
Clearwater	Lake Inez	10-15 Experimental Gill Nets	Population Status, Growth Rates, Condition, Habitat Use	Entire Lake	Sept-Oct.	Rod Berg	4 Fish	Y	2	1	Y
Clearwater	Marshall Lake	10-15 Experimental Gill Nets	Population Status, Growth Rates, Condition, Habitat Use	Entire Lake	Aug-Oct.	Rod Berg	2 Fish	N	0	0	Y
Clearwater	Placid Lake	10-15 Experimental Gill Nets	Population Status, Growth Rates, Condition, Habitat Use	Entire Lake	Sept-Oct.	Rod Berg	4 Fish	Y	0	0	Y
Clearwater	Rainy Lake	10-15 Experimental Gill Nets	Population Status, Growth Rates, Condition, Habitat Use	Entire Lake	Aug-Oct.	Rod Berg	10 Fish	N	0	0	Y
Clearwater	Salmon Lake	10-15 Experimental Gill Nets	Population Status, Growth Rates, Condition, Habitat Use	Entire Lake	Sept-Oct.	Rod Berg	1 Fish	Y	0	0	Y

Drainage	Water	Action (Provide detailed description)	Purpose	Length/ Area	Date of Action	Personnel	Est. Mort.	Comp-leted?	No. DV -Handled	Actual Mort.	Do in 2004 ?
Clearwater	Seeley Lake	10-15 Experimental Gill Nets	Population Status, Growth Rates, Condition, Habitat Use	Entire Lake	Sept-Oct.	Rod Berg	10 Fish	Y	10	6	Y
Flathead	Flathead Lake	Gillnetting	Fish Community Assessment	Lakewide	Apr-Nov	Mark Deleray	20	Y	13	8	Y
Flathead (South Fk)	Hungry Horse Reservoir	Fall Gillnetting	Population Monitoring and Assessment	Lakewide	Oct	Grant Grisak	59 *see meth ods	Y	92	56	Y
Kootenai	Bull Lake	Gillnetting	Kokanee Assessment	Lake-wide	Oct	Mike Hensler	15	Y	11	8	Y
Kootenai	Glen Lake	Gillnetting	Kokanee Assessment	Lakewide	Oct	Mike Hensler	4	Y	8	4	Y
Kootenai	Lake Kookanusa	Gillnetting	Population Assessment	Lakewide	May-Sept	Mike Hensler	70	Y	76	76	Y
Rock Creek	East Fork Reservoir	Gillnetting	Fish Community Assessment	Lakewide	Aug.	Eric Reiland	1	N	0	0	N
Swan	Swan Lake	Gillnetting	Fish Community Assessment	Lakewide	spring/ late sum-mer	Scott Rumsey	14	Y	32	28	Y
Whitefish	Whitefish Lake	Gillnetting	Fish Community Assessment	Lakewide	May and Oct	Mark Deleray	5	Y	1	1	Y

Electrofishing

Justification

The determination of presence/absence, and estimation of fish population abundance is regularly conducted using electrofishing techniques. Electrofishing monitoring focuses on quantifying yearly variation of fish abundance in stream sections sampled consistently year after year. Electrofishing is a preferred technique in many areas and habitat types because:

1. The precision of electrofishing estimates can be estimated and reported, providing a measure of reliability;

2. There is less bias associated with changes in field personnel; and

3. Estimates derived using electrofishing techniques are presently better accepted by fisheries professionals.

Since 1989, MFWP has tested a variety of electrofishing systems on a number of fish species (Fredenberg 1992). Testing demonstrated a significant rate of injury to certain fish species with particular electrofishing gear. These results prompted a reevaluation of previously accepted electrofishing practices and the development of guidelines for acceptable equipment type and use.

Electrofishing may result in adverse consequences for affected fish of a variety of species and life history stages. The presence of injuries under some circumstances dictates a conservative policy until more specific data are available. Injury should be assumed to occur unless information indicates otherwise. It is therefore the determination of the Fisheries Division that all electrofishing by any entity operating in the waters of the State of Montana conform to the following policy. Modifications of this policy have been adopted as additional information became available.

METHODS

It is the policy of the MFWP that all electrofishing conducted in the waters of the State of Montana conform to the following standards to minimize injury to aquatic life. This policy shall apply to employees of MFWP, other state and federal agencies, and those entities operating under the authority of a collector's permit issued by MFWP. The only exceptions to this policy are for permanent collections where all fish sampled are killed, or for experimental purposes. Exceptions must be approved by the Fisheries Division Administrator and such requests must be submitted with written justification at least sixty (60) days in advance. No other electrofishing may be conducted. Any violation of this policy will be referred to the Administrator of the Fisheries Division for corrective action.
The standards are:

1. Each electrofishing effort should be preceded by an analysis weighing anticipated negative impacts on aquatic life against benefits to be gained from the data collected. Other methods of data collection should be considered in this analysis.

2. Electrofishing over spawning areas containing eggs or larvae will be conducted only when eggs are needed for government hatcheries or the data to be collected are critical to the well being of the fish population as determined by the regional fisheries manager.

3. The use of electrofishing gear in waters containing Species of Special Concern should be minimized. Prior approval must be given by the regional fisheries manager before electrofishing in these waters.

4. Electrofishing in areas where threatened or endangered aquatic species may be encountered is restricted to situations in which electrofishing gear and methodology have been shown to be of minimal impact to that species or a recovery team has determined that electrofishing will be in the best interest of the threatened or endangered species.

5. Electrofishing units which produce only 60 HZ pulsed DC waveforms are prohibited (e.g. Coffelt VVP2C, VVP2E, etc.). Setting on units that provide rectified sine, capacitor discharge or AC waveforms may not be used.

6. Settings on electrofishing units that produce pulse rates in excess of 30 HZ per second are not allowed in waters containing self-sustaining salmonid populations. The use of higher pulse rates for collection of warm/coolwater species should occur only after consideration has been given to the effect of this electrical form on these species and prior approval has been received by the regional fisheries manager.

MONTANA ELECTROFISHING GUIDELINES		
PARAMETER	RECOMMEND	AVOID
Pulse Rate	30 Hz or less	Over 30 Hz
Pulse Duration	5 milliseconds	10 milliseconds or >
Pulse Shape	Smooth DC - Best CPS - Second Choice Square - Third Choice	Rectified Sine Capacitor Discharge AC
Voltage	High Conductivity - use low voltage Low Conductivity - use high voltage	

MONTANA ELECTROFISHING GUIDELINES		
PARAMETER	RECOMMEND	AVOID
Generator	Low Conductivity (<200 umhos/cm) 2,500 W or > High Conductivity (>200 umhos/cm) 5,000 W or >)	Inadequate power supply/ generator
Electrode	Bigger is Better - Always use largest possible anode except in highest conductivity water (≥800 umhos/cm) Always maximize cathode size, in metal boats use the boat	Small point anodes such as a single dropper Never use small cathode
Method	Mobile Anode - Best	Never allow fish to lie in field
Intensity	Turn power down to the lowest effective level	Excessive current
Brands	Look for brands - If numerous, turn power down	Branded fish are an indicator of spinal injury
Fish Species	Most Susceptible to spinal injury - Rainbow Trout, Cutthroat Trout, Brown Trout Less Susceptible - Arctic Grayling Unknown Susceptibility - Warmwater Spp.	Never assume fish are not being injured based only on external appearance
Fish Size	Exercise caution with large fish	Do not assume small fish are immune to spinal injury
Environmental Variables	Record water temperature and conductivity and adjust methods accordingly	Do not ignore water conditions
Eggs	Assume eggs in redds have potential to be damaged	Avoid shocking spawning females and areas with redds
Crew	Use trained crews	Avoid multiple-dipping into the field and other factors that will stress fish

Electrofishing is done in a number of locations on a regular basis as part of established monitoring protocols. It is also done in other areas to monitor response of bull trout to restoration projects, to collect tissue for genetic analysis, to capture bull trout for tagging and telemetry purposes, and to asses presence/absence of bull trout and other species in specific streams. All electroshocking is done by qualified personnel according to FWP electroshocking guidelines. Electroshocking is done using backpack shockers in smaller streams, and boat or barge shockers in larger rivers.

River Electrofishing

Montana Fish, Wildlife & Parks conducts annual river surveys using electrofishing equipment mounted on boats. Across the state, equipment and methodologies vary to match water characteristics and target species. These surveys provide valuable information on species abundance, presence, size and age structure, movements, and status.

Kootenai River

This is the only method of establishing population parameters for trout in the Kootenai River. We are monitoring a restrictive regulation that was put in place in 1995 and expanded in 1998.

The standard section is from Flower Creek to below Bobtail Creek. Length of the section is 24,100 feet. Electrofishing in this section is generally accomplished between August 1 and October 1. Bull trout have migrated through this section by the end of July and do not return until after October 1. Two boom shockers are used with VVPs set on straight DC. Total mortality runs around 1%, although we have never killed a bull trout in the Kootenai while electrofishing. About 30 bull trout of various sizes have been x-rayed and no indication of electrofishing injury has been found.

Flathead River

Two sections of the Flathead River are sampled following standard protocols; the Kalispell section (2.95 km) near U.S. Highway 2 Bridge and the Columbia Falls section (2.0 km) near the Montana Highway 2 Bridge. Surveys are conducted at two-week intervals. Sampling begins after sunset and continues until two passes are completed on each bank (four passes in total) in the section per night. Electrofishing is done from a jet boat rigged with fixed boom anodes using straight DC at 3 to 5 amperes. Passes begin at the upstream boundary of the section and progress down one of the banks. All trout are netted, measured for total length and weight, and scales and genetic samples from cutthroat and rainbow trout are collected. On completion of the fourth pass, all captured trout are redistributed into the section.

Thompson River

One 3.2 km long section and one 1.6 km long section of river are electrofished from boat with a Smith Root electrofisher. Bull trout catch is expected to be about 20. Primary purpose is to monitor status of the recreational fishery.

Thompson Falls Reservoir

Fisheries species composition of Thompson Falls Reservoir will be determined using spring and fall. Electrofishing will occur during a two-night period along standardized transects. See attached *Thompson Falls Study Plan.*

Swan River

Two established electrofishing sections are on the Swan River above Swan Lake: Salmon Prairie to Piper Creek Bridge (3.7 mile length); and Fatty Creek Bridge to Point Pleasant Campground (6.3 mile length). These sections are sampled every 2-3 years for population estimates on all species except bull trout. Staging bull trout are avoided when encountered by shutdown of system.

Bitterroot River

Electrofishing in established monitoring reaches is conducted throughout the Bitterroot River drainage to monitor and assess fish population trends.

Clark Fork River

Electrofishing in established monitoring reaches is conducted throughout the Clark Fork River drainage to monitor and assess fish population trends.

Blackfoot River

Electrofishing in established monitoring reaches is conducted throughout the Blackfoot River drainage to monitor and assess fish population trends.

Rock Creek

Electrofishing in established monitoring reaches is conducted throughout the Rock Creek drainage to monitor and assess fish population trends.

Table 2. Summary of electrofishing activities in bull trout habitat that will be undertaken by Montana Department of Fish, Wildlife and Parks.

Drainage	Water	Action (Provide detailed description)	Purpose	Length/ Area	Date of Action	Personnel	Est. Mort.	Comp-leted?	No. DV handled	Actual Mort.	Do in 2004?
Bitterroot	Bitterroot	Electrofishing	Population Assessment/species composition	6 miles (two 3-mi. sections	September	Chris Clancy	<5%	Y	1	0	Y
Bitterroot	Bitterroot River between Stevensville and Victor	Electrofishing	Population Assessment/Species Comp.	8 miles (two 4-mi. Sections)	September	Chris Clancy	<5%	N	0	0	N
Bitterroot	Daly Creek	Electrofishing	Population assessment	1000'	July-Aug	Chris Clancy	<5%	Y	81	0	Y
Bitterroot	E. Fk. Bitterroot	Electrofishing	Population assessment	1000'	July-Aug	Chris Clancy	<5%	Y	3	0	Y
Bitterroot	Lolo Creek + tribs	Backpack Electroshocking	Fish population monitoring and bull trout and WCT genetics sampling	>1000'	July-Sep	Ladd Knotek	<5%	In Progress	~ 50	0	Y
Bitterroot	Meadow Creek	Electrofishing	Population assessment	1000'	July-Aug	Chris Clancy	<5%	Y	61	0	Y
Bitterroot	Miller Creek	Backpack Electroshocking	Fish population monitoring and wct genetics sampling	1000'	July-Sep	Ladd Knotek	<5%	N	0	0	Y
Bitterroot	Moose Creek	Electrofishing	Population assessment	1000'	July-Aug	Chris Clancy	<5%	Y	19	0	Y
Bitterroot	Nez Perce Creek	Electrofishing	Population assessment	1000'	July-Aug	Chris Clancy	<5%	Y	8	0	Y
Bitterroot	Skalkaho Creek	Electrofishing	Population assessment	Three 1000' reaches	July-Aug	Chris Clancy	<5%	Y	230	0	Y
Bitterroot	Sleeping Child Creek	Electrofishing	Population Assessment	1000'	July-Aug	Chris Clancy	<5%	Y	8	0	Y
Bitterroot	Swift Creek	Electrofishing	Population assessment	1000'	July-Aug	Chris Clancy	<5%	Y	48	0	Y
Bitterroot	Two Bear Creek	Electrofishing	Population assessment	1000'	July-Aug	Chris Clancy	<5%	Y	20	0	Y

Drainage	Water	Action (Provide detailed description)	Purpose	Length/ Area	Date of Action	Personnel	Est. Mort.	Comp-leted?	No. DV handled	Actual Mort.	Do in 2004?
Bitterroot	Upper E. Fk. Bitterroot	Electrofishing	Population assessment	1000'	July-Aug	Chris Clancy	<5%	Y	24	0	Y
Bitterroot	Warm Spring Creek	Electrofishing	Population assessment	1000'	July-Aug	Chris Clancy	<5%	Y	6	0	Y
Blackfoot	Bear Creek	Electrofishing	Monitoring habitat restoration responses	800'	August	Ron Pierce	≤1	Y	0	0	Y
Blackfoot	Blackfoot River tribs.	Electrofishing	Determine bull trout presence	1 mile	Aug, 2003	Laura Burns (USFS)	≤1	Y	0	0	N
Blackfoot	Blanchard Creek	Electrofishing	Monitoring water lease	400'	August	Ron Pierce	≤1	N	0	0	Y
Blackfoot	Chamberlain Creek	Backpack Electrofishing	Monitoring habitat restoration and water lease responses	1000' (4 sect.)	Sep	Ron Pierce	≤1	N	0	0	Y
Blackfoot	Cotter Creek	Electrofishing	Determine Presence of Bull Trout	up to 1 mile	Summer	Laura Burns (USFS)	0	N	0	0	N
Blackfoot	Cottonwood Creek	Backpack Electrofishing	Monitor water lease and habitat restoration; wct and bull trout genetic sampling	1000'	Sep	Ron Pierce	≤1	Y	6	0	Y
Blackfoot	Dick Creek	Backpack Electrofishing	Identify fish habitat restoration opportunities	800"	August	Ron Pierce	≤1	Y	0	0	N
Blackfoot	Dunham Creek	Backpack Electrofishing	Fish monitoring in habitat restoration project area; Wct genetic sample collection	400'	July-Sep	Ron Pierce	≤1	Y	28	0	Y
Blackfoot	E. Fk. Willow Creek trib.	Electrofishing	Determine bull trout presence	1 mile	Aug, 2003	Laura Burns (USFS)	≤1	Y	0	0	N
Blackfoot	Elk Creek	Backpack Electrofishing	Identify fish restoration opportunities	1200'	Sept	Ron Pierce	≤1	Y	0	0	N
Blackfoot	Gold Creek	Backpack Electrofishing	Fish monitoring in habitat restoration project area; wct and bull trout genetic sample collection	1000'	August	Ron Pierce	≤1	Y	0	0	Y
Blackfoot	Headwater Copper Creek	Electrofishing	Determine Presence of Bull Trout	up to 1 mile	Summer	Laura Burns (USFS)	0	Y	12	0	N

Drainage	Water	Action (Provide detailed description)	Purpose	Length/ Area	Date of Action	Personnel	Est. Mort.	Comp-leted?	No. DV handled	Actual Mort.	Do in 2004?
Blackfoot	Indian Creek Meadows	Electrofishing	Determine presence of bull trout and upstream distribution	Up to 1 mile	Fall	Laura Burns (USFS)	<1	N	0	0	N
Blackfoot	Kleinschmidt Creek	Electrofishing	Assess Fish Population	1000'	Jul-Sept	Ron Pierce	0	Y	0	0	Y
Blackfoot	Kleinschmidt Creek	Backpack Electrofishing	Fish population assessment prior to a habitat restoration project	800'	August	Ron Pierce	0	Y	0	0	Y
Blackfoot	Little Fish	Backpack Electrofishing	Inventory populations	800'	Aug	Ron Pierce	≤1	N	0	0	N
Blackfoot	McCabe Creek	Backpack Electrofishing	Fish monitoring in restoration project area	1500'	July	Ron Pierce	≤1	Y	0	0	Y
Blackfoot	McDermott Creek	Electrofishing	Population Survey	1500'	July	Ron Pierce	0	N	0	0	Y
Blackfoot	Monture Creek	Boom-mounted drift boat electrofishing	Fish Population Monitoring of Restoration Project	5437'	July	Ron Pierce	4%	Y	30	0	N
Blackfoot	Monture Creek	Backpack Electrofishing	Juvenile bull trout monitoring/fish monitoring in habitat restoration project areas; wct genetic sample collection	2200' (5 sections)	August	Ron Pierce	≤1	N	0	0	Y
Blackfoot	Nevada Spring Creek	Backpack Electrofishing	Pre habitat restoration fish populaltion monitoring	1500'	July	Ron Pierce	≤1	Y	0	0	Y
Blackfoot	North Fork	Boom-mounted drift boat electrofishing Fin Clips	Fish monitoring in habitat restoration project areas/fin clips for genetic analysis	20,430'	August	Ron Pierce	3	N	0	0	Y
Blackfoot	North Fork Blackfoot River	Backpack Electrofishing	Fish monitoring in habitat restoration project areas	2200' (4 Sections)	August	Ron Pierce	≤1	N	0	0	Y
Blackfoot	Pearson Creek	Backpack Electrofishing	Identify fish restoration opportunities	800'	August	Ron Pierce	≤1	Y	0	0	N
Blackfoot	Poorman Creek	Backpack Electrofishing	Monitor fish populations in response to habitat restoration	800'	Aug	Ron Pierce	≤1	N	0	0	N

Drainage	Water	Action (Provide detailed description)	Purpose	Length/ Area	Date of Action	Personnel	Est. Mort.	Comp- leted?	No. DV handled	Actual Mort.	Do in 2004?
Blackfoot	Ringeye Creek	Electrofishing	Determine presence of bull trout	Up to 1 mile	Summer 2002	Laura Burns (USFS)	0	N	0	0	N
Blackfoot	Rock Creek	Backpack Electrofishing	Fish population monitoring	800'	August	Ron Pierce	≤1	Y	0	0	Y
Blackfoot	Shanley Creek	Backpack Electrofishing	Identify fish restoration opportunities	800'	August	Ron Pierce	≤1	N	0	0	Y
Blackfoot	Snowbank Creek	Backpack Electrofishing	Inventory populations	800'	Aug	Ron Pierce	0	N	0	0	N
Blackfoot	Snowbank Creek (in Copper Creek drainage)	Electrofishing	Determine presence of bull trout and upstream distribution	Up to 1 mile	Fall	Laura Burns (USFS)	≤1	Y	0	0	N
Blackfoot	Spring Creek (Trib. to N. Fork)	Backpack Electrofishing	Monitor fish populations at culvertt project	500'	August	Ron Pierce	≤1	Y	0	0	N
Blackfoot	Warren Creek	Boom-mounted drift boat electrofishing	Fish Population Monitoring of Restoration Project	1000'	July	Ron Pierce	0	Y	0	0	Y
Blackfoot	Washington Creek	Electrofishing	Headwaters Evaluation for Bull Trout	2 miles	Summer	Laura Burns (USFS)	0	Y	0	0	N
Blackfoot	Washington gulch trib.	Electrofishing	Determine bull trout presence	1 mile	Aug, 2003	Laura Burns (USFS)	≤1	N	0	0	N
Clark Fork (Lower)	Below Thompson Falls Dam	Electrofishing	Mark fish to determine trap effectiveness	<1km	Mar-April	Brent Mabbot Chris Crane Jay Stuckey	≤1	Y	1	0	Y
Clark Fork (Lower)	Thompson Falls Reservoir	Electrofishing	Monitor/investigate N. Pike	Res.-wide	Mar & Oct	Brent Mabbott Chris Crane Jay Stuckey	≤1	Y	0	0	Y
Clark Fork (Lower)	Beaver Creek	Electrofishing	Disease sampling	<0.5 km	July-Aug	Laura Katzman Brad Liermann	≤1	N	0	0	Y
Clark Fork (Lower)	Crow Creek	Electrofishing	Fish Genetics/Population Estimate	2 km	Jul-Oct	Laura Katzman Brad Liermann	≤1	Y	67	1	Y

Drainage	Water	Action (Provide detailed description)	Purpose	Length/ Area	Date of Action	Personnel	Est. Mort.	Comp-leted?	No. DV handled	Actual Mort.	Do in 2004?
Clark Fork (Lower)	E, N &S. Fks. Bull River, Copper Cr.	Electrofishing	Population Estimate Disease sampling Monitor fish populatons and habitat restoration areas	<0.5 km each	Jul-Aug	Laura Katzman Brad Liermann	≤1	Y	41	0	Y
Clark Fork (Lower)	E. & W. Fks. Rock Creek	Electrofishing	Population Estimate Monitor fish populations and habitat restoration areas	<0.5 km each	Jul-Aug	Laura Katzman Brad Liermann	≤1	Y	68	0	Y
Clark Fork (Lower)	Graves Creek	Electrofishing	Population Estimate Disease sampling Monitor fish populations and habitat restoration areas	<0.5 km each	Jul-Aug	Laura Katzman Brad Liermann	≤1	N	0	0	N
Clark Fork (Lower)	Prospect Creek	Electrofishing	Monitor Fish Population, Disease sampling habitat restoration, and genetics	<2 km	Jul-Aug	Laura Katzman Brad Liermann	≤1	Y	62	1	Y
Clark Fork (Lower)	Thompson River	Electrofishing	Monitor Fish Population Disease sampling	6 km	June-Aug	Laura Katzman Brad Liermann	≤1	Y	19	0	Y
Clark Fork (Lower)	Vermillion River	Electrofishing	Monitor Fish Population and Fish Genetics Disease sampling	<0.5 km	Jul-Aug	Laura Katzman Brad Liermann	≤1	Y	185	19	Y
Clark Fork (Lower)	WF Thompson River, Fishtrap Cr.	Electrofishing	Monitor Fish Population and genetics Disease sampling	<0.5 km each	Jul-Aug	Laura Katzman Brad Liermann	≤1	Y	119	2	Y
Clark Fork (Lower)	White Pine Creek	Electrofishing	Monitor Fish Population, habitat restoration, and genetics	<0.5 km	Jul-Aug	Laura Katzman Brad Liermann	≤1	N	0	0	N
Clark Fork (Middle)	Albert Creek	Backpack Electroshocking	Species composition and cutthroat genetics sampling	1000'	July-Sep	Ladd Knotek	≤1	N	0	0	Y
Clark Fork (Middle)	Big Flat Irrigation Canal	Electrofishing & trapping	Salvage entrained fish and return to mainstem river "Operation Bull Trout Freedom"	1 mile	May-October	Ladd Knotek	0	In Progres s	0	0	Y

Drainage	Water	Action (Provide detailed description)	Purpose	Length/ Area	Date of Action	Personnel	Est. Mort.	Comp-leted?	No. DV handled	Actual Mort.	Do in 2004?
Clark Fork (Middle)	Cedar Creek + tribs	Backpack Electroshocking	Species composition and cutthroat genetics sampling	1000'	July-Sep	Ladd Knotek	≤1	N	0	0	Y
Clark Fork (Middle)	Clark Fork	Jet boat Electrofishing	Monitoring Clark Fork River fish populations	20,000'	April-June	David Schmetterling Ladd Knotek	≤1	N	0	0	Y
Clark Fork (Middle)	Clark Fork	Jet boat Electrofishing	Monitoring Clark Fork River fish populations	25,000'	Aug-Oct	Schmetterling Knotek	≤1	N	0	0	Y
Clark Fork (Middle)	Crystal Creek	Backpack Electroshocking	Species composition and cutthroat genetics sampling	1000'	July-Sep	Ladd Knotek	≤1	N	0	0	Y
Clark Fork (Middle)	Deep Creek	Backpack Electroshocking	Species composition and cutthroat genetics sampling	1000'	July-Sep	Ladd Knotek	≤1	N	0	0	Y
Clark Fork (Middle)	Deer Creek	Backpack Electroshocking	Species composition and cutthroat genetics sampling	1000'	July-Sep	Ladd Knotek	≤1	N	0	0	Y
Clark Fork (Middle)	Dry Creek	Backpack Electroshocking	Species composition and cutthroat genetics sampling	1000'	July-Sep	Ladd Knotek	≤1	N	0	0	Y
Clark Fork (Middle)	First Creek	Backpack Electroshocking	Species composition and cutthroat genetics sampling	1000'	July-Sep	Ladd Knotek	≤1	N	0	0	Y
Clark Fork (Middle)	Flat Creek	Backpack Electroshocking	Species composition and cutthroat genetics sampling	1000'	July-Sep	Ladd Knotek	≤1	N	0	0	Y
Clark Fork (Middle)	Frenchtown Grass Valley Irrigation Canal	Electrofishing & trapping	Salvage entrained fish and return to mainstem river "Operation Bull Trout Freedom"	1 mile	May-October	Ladd Knotek	0	N	0	0	Y
Clark Fork (Middle)	Frenchtown Irrigation Canal	Electrofishing & trapping	Salvage entrained fish and return to mainstem river "Operation Bull Trout Freedom"	1 mile	May-October	Ladd Knotek	0	In Progres s	0	0	Y

Drainage	Water	Action (Provide detailed description)	Purpose	Length/ Area	Date of Action	Personnel	Est. Mort.	Comp-leted?	No. DV handled	Actual Mort.	Do in 2004?
Clark Fork (Middle)	Grant Creek	Backpack Electroshocking	Species composition and cutthroat genetics sampling	1000'	July-Sep	Ladd Knotek	≤1	N	0	0	Y
Clark Fork (Middle)	Hellgate Irrigation Canal	Electrofishing & trapping	Salvage entrained fish and return to mainstem river "Operation Bull Trout Freedom"	1 mile	May-October	Ladd Knotek	0	N	0	0	Y
Clark Fork (Middle)	Johnson Creek	Backpack Electroshocking	Species composition and cutthroat genetics sampling	1000'	July-Sep	Ladd Knotek	≤1	N	0	0	Y
Clark Fork (Middle)	Marshall Creek	Backpack Electroshocking	Species composition and cutthroat genetics sampling	1000'	July-Sep	Ladd Knotek	≤1	N	0	0	Y
Clark Fork (Middle)	Mill Creek	Backpack Electroshocking	Species composition and cutthroat genetics sampling	1000'	July-Sep	Ladd Knotek	≤1	N	0	0	Y
Clark Fork (Middle)	Missoula Valley Irrigation Canal	Electrofishing & trapping	Salvage entrained fish and return to mainstem river "Operation Bull Trout Freedom"	1 mile	May-October	Ladd Knotek	0	N	0	0	Y
Clark Fork (Middle)	Nemote Creek	Backpack Electroshocking	Species composition and cutthroat genetics sampling	1000'	July-Sep	Ladd Knotek	≤1	N	0	0	Y
Clark Fork (Middle)	Ninemile Creek + Tributaries	Backpack Electroshocking	Species composition and cutthroat genetics sampling	1000'	July-Sep	Ladd Knotek	≤1	In Progres s	0	0	Y
Clark Fork (Middle)	O'Keefe Creek	Backpack Electroshocking	Species composition and cutthroat genetics sampling	1000'	July-Sep	Ladd Knotek	≤1	N	0	0	Y
Clark Fork (Middle)	Orchard Homes Irrigation Canal	Electrofishing & trapping	Salvage entrained fish and return to mainstem river "Operation Bull Trout Freedom"	1 mile	May-October	Ladd Knotek	0	N	0	0	Y
Clark Fork (Middle)	Petty Creek	Backpack Electroshocking	Species composition and cutthroat genetics sampling	1000'	July-Sep	Ladd Knotek	≤1	N	0	0	Y

Drainage	Water	Action (Provide detailed description)	Purpose	Length/ Area	Date of Action	Personnel	Est. Mort.	Comp-leted?	No. DV handled	Actual Mort.	Do in 2004?
Clark Fork (Middle)	Quartz Creek	Backpack Electroshocking	Species composition and cutthroat genetics sampling	1000'	July-Sep	Ladd Knotek	≤1	N	0	0	Y
Clark Fork (Middle)	Roman Creek	Backpack Electroshocking	Species composition and cutthroat genetics sampling	1000'	July-Sep	Ladd Knotek	≤1	N	0	0	Y
Clark Fork (Middle)	Second Creek	Backpack Electroshocking	Species composition and cutthroat genetics sampling	1000'	July-Sep	Ladd Knotek	≤1	N	0	0	Y
Clark Fork (Middle)	Siegel Creek	Backpack Electroshocking	Species composition and cutthroat genetics sampling	1000'	July-Sep	Ladd Knotek	≤1	Y	0	0	Y
Clark Fork (Middle)	Sixmile Creek	Backpack Electroshocking	Species composition and cutthroat genetics sampling	1000'	July-Sep	Ladd Knotek	≤1	N	0	0	Y
Clark Fork (Middle)	St. Regis River and Tributaries	Backpack Electroshocking	Species composition and cutthroat genetics sampling	>1000'	July-Sep	Ladd Knotek	≤1	N	0	0	Y
Clark Fork (Middle)	Tamarack Creek	Backpack Electroshocking	Species composition and cutthroat genetics sampling	1000'	July-Sep	Ladd Knotek	≤1	N	0	0	Y
Clark Fork (Middle)	Trout Creek + tribs	Backpack Electroshocking	Species composition and cutthroat genetics sampling	1000'	July-Sep	Ladd Knotek	≤1	N	0	0	Y
Clark Fork (Upper)	Browns Gulch	Backpack Electrofishing	Population estimate and Monitoring	150 meters 2 sections	July	Eric Reiland	≤1	N	0	0	N
Clark Fork (Upper)	Butler Creek	Backpack Electroshocking	Monitor fish populations in response to habitat restoration	1,000' (2 sections)	August	David Schmetterling Ladd Knotek	≤1	N	0	0	N
Clark Fork (Upper)	Clark Fork - Milltown Dam area	Backpack Electrofishing	Monitoring fish movements around Milltown Dam	Radial gate pool	3 days/wk 3/1-12/1	Schmetterling	0	Y	9	0	Y
Clark Fork (Upper)	Fish Creek	Backpack Electroshocking	Monitor fish populations in response to habitat restoration	2,000'	July	David Schmetterling Ladd Knotek	≤1	N	0	0	Y

Drainage	Water	Action (Provide detailed description)	Purpose	Length/ Area	Date of Action	Personnel	Est. Mort.	Comp-leted?	No. DV handled	Actual Mort.	Do in 2004?
Clark Fork (Upper)	German Gulch	Backpack Electrofishing	Population estimate and Monitoring	150 meters 2 sections	July	Eric Reiland	≤1	N	0	0	N
Clark Fork (Upper)	Harvey Creek	Fish population and mine tailings assessment. Data will be collected using backpack electrofishing units on 200 m reaches.	Assess aquatic ecosystem and gather baseline data for basin habitat improvement projects	Entire drainage	Summer	Eric Reiland	≤1 (partia l)	N	0	0	N
Clark Fork (Upper)	Harvey Creek (near mouth of Bearmouth)	Five 150-meter electroshocking transects-3 pass removal method	Population Assessment	750 m	July 1998	Eric Reiland	≤1	Y	?	0	Y
Clark Fork (Upper)	Lost Creek	Backpack Electrofishing	Population estimate and Monitoring	150 meters 4 sections	July	Eric Reiland	≤1	Y	0	0	Y
Clark Fork (Upper)	Lower Willow Creek	Backpack Electrofishing	Population estimate and Monitoring	150 meters 2 sections	July	Eric Reiland	≤1	N	0	0	N
Clark Fork (Upper)	Mill Creek	Backpack Electrofishing	Population estimate and Monitoring	150 meters 2 sections	July	Eric Reiland	≤1	Y	0	0	Y
Clark Fork (Upper)	Racetrack Creek	Backpack Electrofishing	Population estimate and Monitoring	150 meters 4 sections	July	Eric Reiland	≤1	Y	0	0	N
Clark Fork (Upper)	Rattlesnake Creek	Backpack Electroshocking	Monitor fish populations; collect wct genetic samples	2,000'	August	David Schmetterling Ladd Knotek	≤1	Y	10	0	Y
Clark Fork (Upper)	Rock Creek (Garrison)	Backpack Electrofishing	Population estimate and Monitoring	150 meters 2 sections	July	Eric Reiland	≤1	Y	0	0	N
Clark Fork (Upper)	Rock Creek	Boat Electrofishing	Population estimate and Monitoring	5000' 2 sections	Mar & Apr	Eric Reiland	≤1	N	0	0	N
Clark Fork (Upper)	Rock Creek	Backpack Electroshocking	Monitor fish populations Tribs	2,000'	July	Eric Reiland	≤1	N	0	0	N
Clark Fork (Upper)	Warm Springs Creek	Backpack Electrofishing	Population estimate and Monitoring	150 meters 2 sections	July	Eric Reiland	≤1	N	0	0	Y

Drainage	Water	Action (Provide detailed description)	Purpose	Length/ Area	Date of Action	Personnel	Est. Mort.	Comp-leted?	No. DV handled	Actual Mort.	Do in 2004?
Clark Fork (Upper)	Willow Creek Upper	Backpack Electrofishing	Population estimate and Monitoring	150 meters 2 sections	July	Eric Reiland	≤1	Y	0	0	Y
Flathead (Mid Fork)	Bear Creek	Electrofishing	Abundance Monitoring	150 m	Aug-Sept	Tom Weaver	≤1	N	0	0	Y
Flathead (Mid Fork)	Granite Creek	Electrofishing	Abundance Monitoring	150 m	Aug-Sept	Tom Weaver	≤1	Y	60	1	Y
Flathead (Mid Fork)	Morrison Creek	Electrofishing	Abundance Monitoring	150 m	Aug-Sept	Tom Weaver	≤1	Y	69	1	Y
Flathead (Mid Fork)	Ole Creek	Electrofishing	Abundance Monitoring	150 m	Aug-Sept	Tom Weaver	≤1	Y	25	0	Y
Flathead (Mid Fork)	Paola Creek	Electrofishing	Species Comp, Population Estimate/Assessment	150 m	Jul-Oct	Scott Rumsey	≤1	N	0	0	N
Flathead (North Fk)	South Coal Creek	Electrofishing	Abundance Monitoring	150 m	Aug-Sept	Tom Weaver	≤1	Y	56	0	Y
Flathead (North Fk)	Big Creek	Electrofishing	Abundance Monitoring	150 m	Aug-Sept	Tom Weaver	≤1	Y	100	1	Y
Flathead (North Fk)	Coal Creek	Electrofishing	Abundance Monitoring	150 m	Aug-Sept	Tom Weaver	≤1	Y	18	0	Y
Flathead (North Fk)	N. Coal Creek	Electrofishing	Abundance Monitoring	150 m	Aug-Sept	Tom Weaver	≤1	N	0	0	Y
Flathead (North Fk)	Red Meadow Creek	Electrofishing	Abundance Monitoring	150 m	Aug-Sept	Tom Weaver	≤1	Y	17	1	Y
Flathead (North Fk)	Whale Creek	Electrofishing	Abundance Monitoring	150 m	Aug-Sept	Tom Weaver	≤1	Y	48	0	Y
Flathead (South Fk)	Wounded Buck Creek	Electrofishing	Abundance Monitoring	150 m	Aug-Sept	Tom Weaver	≤1	Y	61	0	Y
Flathead Lake Trib.	Dayton Creek	Electrofishing	Species Comp, Population Estimate/Assessment	150 m	Jul-Oct	Grant Grisak	≤1	Y	0	0	Y
Flathead River (Main Stem)	Flathead River near Columbia Falls	Electrofishing	WCT Genetics Survey, Species Comp, Population Estimate/Assessment	3 km	Feb-Mar	Clint Muhlfeld	≤1	Y	15	0	Y

Drainage	Water	Action (Provide detailed description)	Purpose	Length/ Area	Date of Action	Personnel	Est. Mort.	Comp- leted?	No. DV handled	Actual Mort.	Do in 2004?
Flathead River (Main Stem)	Flathead River near Kalispell	Electrofishing	WCT Genetics Survey, Species Comp, Population Estimate/Assessment	3 km	Feb-Mar	Clint Muhlfeld	≤1	Y	12	0	Y
Flint Creek (Trib. To Upper Clark Fork)	Douglas Creek	Two electroshocking tansects-3- pass removal method	Population Assessment	150 m	July	Eric Reiland Darek Elverud	0	N	0	0	Y
Flint Creek (Trib. To Upper Clark Fork)	N.F. Lower Willow Creek	Two electroshocking tansects-3- pass removal method	Population Assessment	150 m	July	Eric Reiland Darek Elverud	0	N	0	0	Y
Flint Creek (Trib. To Upper Clark Fork)	S.F. Lower Willow Creek	Two electroshocking tansects-3- pass removal method	Population Assessment	150 m	July	Eric Reiland Darek Elverud	0	N	0	0	Y
Flint Creek (Trib. To Upper Clark Fork)	Sawmill Creek	Two electroshocking tansects-3- pass removal method	Population Assessment	150 m	July	Eric Reiland Darek Elverud	0	N	0	0	Y
Kootenai	Bear Creek	Electrofishing	Juvenile Population Assessment	150 m	Jul-Oct	Mike Hensler	≤1	Y	117	0	Y
Kootenai	Callahan Creek	Electrofishing	Juvenile Population Assessment	150 m	Jul-Oct	Mike Hensler	≤1	Y	17	1	Y
Kootenai	E.F. Fisher River	Electrofishing	Population Assessment	150 m	Jul-Oct	Mike Hensler	≤1	N	0	0	N
Kootenai	Glenn Lake Irrigation Canal	Electrofishing Trapping	Diversion Assessment	Beginning to Glen Lake	Jul-Oct	Mike Hensler	≤1	Y	335	0	Y
Kootenai	Grave Creek	Electrofishing	Juvenile Population Assessment to assess effectiveness of habitat restoration project.	150 m	Jul-Oct	Jim Dunnigan	≤1	Y	72	0	Y
Kootenai	Grave Creek	Electrofishing	Juvenile Population Assessment	150 m	Jul-Oct	Mike Hensler	≤1	Y	177	1	Y
Kootenai	Keeler Creek	Electrofishing	Juvenile Population Assessment	150 m	Jul-Oct	Mike Hensler	≤1	Y	84	0	Y
Kootenai	Kootenai River	Electrofishing, Radio Transmitter Insertion	Population Assessment and Radio Tracking	Dam to State Line	Jul-Oct	Mike Hensler	≤2	N	0	0	Y

Drainage	Water	Action (Provide detailed description)	Purpose	Length/ Area	Date of Action	Personnel	Est. Mort.	Comp- leted?	No. DV handled	Actual Mort.	Do in 2004?
Kootenai	Libby Creek	Electrofishing and Trapping	Juvenile Population Assessment	2 sections, 300 m each	Jul-Oct	Jim Dunnigan	≤1	Y	8	0	Y
Kootenai	O'Brien	Electrofishing	Juvenile Population Estimate	150 m	July-Oct	Mike Hensler	≤1	Y	71	0	Y
Kootenai	Parmenter Creek	Electrofishing	Juvenile Population Assessment to assess effectiveness of habitat restoration project.	150 m	Jul-Oct	Jim Dunnigan	≤1	Y	2	0	Y
Kootenai	Pipe Creek	Electrofishing	Juvenile Population Assessment	150 m	Jul-Oct	Mike Hensler	≤1	Y	56	0	Y
Kootenai	Therriault Creek	Electrofishing	Juvenile Population Assessment to assess effectiveness of habitat restoration project.	150 m	Jul-Oct	Jim Dunnigan	≤1	Y	25	0	Y
Kootenai	W.F. Quartz Creek	Electrofishing	Juvenile Population Assessment	150 m	Jul-Oct	Mike Hensler	≤1	Y	68	0	Y
Kootenai	West Fisher Creek	Electrofishing	Population Assessment	150 m	Jul-Oct	Mike Hensler	≤1	Y	9	0	Y
Little Blackfoot R.	Dog Creek	Electrofishing or snorkeling	Determine presence of bull trout and upstream distribution	Up to 1 mile	Summer	Archie Harper Len Walch (USFS)	≤ 1	N	0	0	Y
Little Blackfoot R.	Fred Burr Creek	Electrofishing	Determine presence of bull trout and upstream distribution	Up to 1 mile	Summer	Archie Harper Len Walch (USFS)	≤ 1	N	0	0	Y
Little Blackfoot R.	Hat Creek	Electrofishing	Determine presence of bull trout and upstream distribution	Up to 1 mile	Summer	Archie Harper Len Walch (USFS)	≤ 1	N	0	0	Y
Little Blackfoot R.	Hurd Creek	Electrofishing	Determine presence of bull trout and upstream distribution	Up to 1 mile	Summer	Archie Harper Len Walch (USFS)	≤ 1	Y	0	0	N

Drainage	Water	Action (Provide detailed description)	Purpose	Length/ Area	Date of Action	Personnel	Est. Mort.	Comp-leted?	No. DV handled	Actual Mort.	Do in 2004?
Little Blackfoot R.	Mid Fork Spotted Dog Creek	Electrofishing	Determine presence of bull trout and upstream distribution	Up to 1 mile	Summer	Archie Harper Len Walch (USFS)	≤ 1	Y	0	0	N
Little Blackfoot R.	S. Fork Spotted Dog Creek	Electrofishing	Determine presence of bull trout and upstream distribution	Up to 1 mile	Summer	Archie Harper Len Walch (USFS)	≤ 1	N	0	0	Y
Little Blackfoot R.	Uncle George Creek	Electrofishing	Determine presence of bull trout and upstream distribution	Up to 1 mile	Summer	Archie Harper Len Walch (USFS)	≤ 1	N	0	0	N
Little Blackfoot River	Dave Gulch	Electrofishing	Determine Presence of Bull Trout	up to 1 mile	Summer	Len Walch Archie Harper	0	N	0	0	N
Little Blackfoot River	Dog Creek Tribs	Electrofishing	Search for Bull Trout Sawmill Creek	up to 1 mile	Summer	Archie Harper	0	N	0	0	Y
Little Blackfoot River	Georgia Creek	Electrofish	Determine bull trout presence			Len Walch Archie Harper	0	N	0	0	N
Little Blackfoot River	Hat Creek	Electrofishing	Check Headwaters & Tribs for Bull Trout	up to 1 mile	Summer	Len Walch Archie Harper	0	N	0	0	N
Little Blackfoot River	Homestead Gulch	Electrofishing	Determine Presence of Bull Trout	up to 1 mile	Summer	Archie Harper (USFS)	0	N	0	0	N
Little Blackfoot River	Kinney Creek	Electrofishing	Determine Presence of Bull Trout	up to 1 mile	Summer	Archie Harper (USFS)	0	N	0	0	N
Little Blackfoot River	Little Blackfoot River below Avon	Electrofishing	Determine the downstream extent of bull trout in the mainstem reaches of the Little Blackfoot	Three 1000' reaches	Summer or Fall	Len Walch Archie Harper	≤1	N	0	0	N
Little Blackfoot River	McDonald Creek	Electrofishing	Determine Presence of Bull Trout	up to 1 mile	Summer	Archie Harper (USFS)	0	N	0	0	N
Little Blackfoot River	Meade Creek	Electrofishing	Determine Presence of Bull Trout	up to 1 mile	Summer	Archie Harper (USFS)	0	N	0	0	Y
Little Blackfoot River	North Trout	Electrofish	Determine bull trout presence			Len Walch Archie Harper	0	Y	0	0	N

Drainage	Water	Action (Provide detailed description)	Purpose	Length/ Area	Date of Action	Personnel	Est. Mort.	Comp-leted?	No. DV handled	Actual Mort.	Do in 2004?
Little Blackfoot River	Ontario Creek	Electrofish	Monitor fish recovery & Ontario Mine			Archie Harper	0	Y	0	0	Y
Little Blackfoot River	Threemile Creek	Electrofish	Determine bull trout presence			Len Walch Archie Harper	0	Y	0	0	N
Rock Creek	Rock Creek	Boom elctrofisher	Population monitoring	4 miles	April	Ron Pierce	<30	N	0	0	Y
Rock Creek	Rock Creek	Boom elctrofisher	Population monitoring	4 miles	April	Ron Pierce	<30	N	0	0	Y
Rock Creek (Trib. To Upper Clark Fork)	East Fork Rock Creek	Two 75-meter electroshocking tansects-3- pass removal method	Population Assessment	150 m	July	Eric Reiland	<5%	N	0	0	N
Rock Creek (Trib. To Upper Clark Fork)	Elk Creek	Two electroshocking tansects-3- pass removal method	Population Assessment	150 m	July	Eric Reiland Darek Elverud	0	N	0	0	Y
Rock Creek (Trib. To Upper Clark Fork)	Meadow Creek	Two electroshocking tansects-3- pass removal method	Population Assessment	150 m	July	Eric Reiland Darek Elverud	0	N	0	0	Y
Rock Creek (Trib. To Upper Clark Fork)	Moose Meadow Creek	Two electroshocking tansects-3- pass removal method	Population Assessment	150 m	July	Eric Reiland Darek Elverud	0	N	0	0	Y
Rock Creek (Trib. To Upper Clark Fork)	Upper Willow Creek	Two electroshocking tansects-3- pass removal method	Population Assessment	150 m	July	Eric Reiland Darek Elverud	0	N	0	0	Y
Stillwater	Fitzsimmons Creek	Electrofishing	Abundance Monitoring	150 m	Aug-Sept	Tom Weaver	≤1	N	0	0	N
Stillwater	Stillwater River	Electrofishing	Abundance Monitoring	150 m	Aug-Sept	Tom Weaver	≤1	Y	144	0	Y
Swan	Elk Creek	Electrofishing	Abundance Monitoring	150 m	Aug-Sept	Tom Weaver	≤1	Y	88	0	Y
Swan	Goat Creek	Electrofishing	Abundance Monitoring	150 m	Aug-Sept	Tom Weaver	≤1	Y	33	0	Y
Swan	Lion Creek	Electrofishing	Abundance Monitoring	150 m	Aug-Sept	Tom Weaver	≤1	Y	36	0	Y

Drainage	Water	Action (Provide detailed description)	Purpose	Length/ Area	Date of Action	Personnel	Est. Mort.	Comp-leted?	No. DV handled	Actual Mort.	Do in 2004?
Swan	Squeezer Creek	Electrofishing	Abundance Monitoring	150 m	Aug-Sept	Tom Weaver	≤1	Y	52	0	Y
Swan	Swan River	Electrofishing	Fish Community Assessment	5 mi.	Summer	Scott Rumsey	≤1	Y	20	0	Y
Swan	Woodward Creek	Electrofishing	Abundance Monitoring	150 m	Aug-Sept	Scott Rumsey	≤1	N	0	0	Y
Thompson River	Jungle Creek	Electrofishing	Monitor restoration/population estimate	<0..5km	July-Aug	Laura Katzman Brad Liermann	≤1	Y	9	0	Y
Warm Springs Creek (Trib. To Upper Clark Fork)	Foster Creek	Two electroshocking tansects-3- pass removal method	Population Assessment	150 m	July	Eric Reiland Darek Elverud	0	N	0	0	Y
Warm Springs Creek (Trib. To Upper Clark Fork)	Warm Springs Creek	Two electroshocking tansects-3- pass removal method	Population Assessment	150 m	July	Eric Reiland Darek Elverud	0	N	0	0	Y
Whitefish	Swift Creek (E. Fork)	Electrofishing	Abundance Monitoring	150 m	Aug-Sept	Tom Weaver	≤1	N	0	0	N
Whitefish	Swift Creek (W. Fork)	Electrofishing	Abundance Monitoring	150 m	Aug-Sept	Tom Weaver	≤1	Y	2	0	Y

Streambed Coring/Substrate Composition

Justification

Successful incubation and fry emergence are dependent on gravel composition, gravel permeability, water temperature, and surface flow conditions. Redds become less suitable for incubating embryos if fine sediments and organic materials are deposited in interstitial spaces of the gravel during the incubation period. Fine particles impede movement of water through the gravel, thereby reducing delivery of dissolved oxygen to, and flushing of metabolic wastes away from incubating embryos. This results in lower survival (Wickett 1958; McNeil and Ahnell 1964; Reiser and Wesche 1979). For successful emergence to occur, fry need to be able to move within the redd, but high levels of fine sediment can restrict their movements (Koski 1966; Bjornn 1969; Phillips et al. 1975). In some instances, embryos that incubate and develop successfully can become entombed (trapped by fine sediments). Sediment levels can alter timing of emergence (Alderdice et al. 1958; Shumway et al. 1964) and affect fry condition at emergence (Silver et al. 1963; Koski 1975).

Measurements of the size range of materials in the streambed are indicative of spawning and incubation habitat quality. In general, research has shown negative relationships between fine sediment and incubation success of redd constructing salmonids (Chapman 1988). A significant inverse relationship existed between the percentage of fine sediment in substrates and survival to emergence of westslope cutthroat and bull trout embryos in incubation tests (Weaver and White 1985; Weaver and Fraley 1991, 1993). Mean adjusted emergence success ranged from about 80% when no fine material was present, to less than 5% when half of the incubation gravel was smaller than 6.35 mm; about 30% survival occurs at 35% fines. Entombment was the major mortality factor. Median percentages of streambed materials smaller than 6.35 mm at fry emergence ranged from 24.8 to 50.3% in 29 separate bull trout spawning areas sampled during the Flathead Basin Forest Practice Water Quality and Fisheries Study (Weaver and Fraley 1991). Linear regression of results against output from models assessing ground disturbing activity and water yield increases in these 29 Flathead Basin tributary drainages showed significant positive relationships (Weaver and Fraley 1991). These results demonstrate a linkage between on-the-ground activity and spawning habitat quality. This testing allowed development of models which predict embryo survival to emergence, given the percentage of material smaller than 6.35 mm in the incubation environment. We determine the percent fines in a given spawning area by hollow core sampling.

Methods

Streambed Coring

Field crews use a standard 15.2-cm hollow core sampler (McNeil and Ahnell 1964) to collect four samples across each of three transects at each study area. We locate actual coring sites on the transects using a stratified random selection process. The total width of stream having suitable depth, velocity, and substrate for spawning was visually divided into four equal cells. We randomly take one core sample in each cell. In some study areas we deviate from this procedure due to limited or discontinuous areas of suitable spawning habitat. We select study areas based on observations of natural spawning. We only sample in spawning areas used by adfluvial westslope cutthroat and bull trout. These fish generally spawn in the same general areas, so sampling locations remain similar.

Sampling involves working the corer into the streambed to a depth of 15.2 cm. We remove all material inside the sampler and place it in heavy duty plastic bags. We label the bags and transport them to the Flathead National Forest Soils Laboratory in Kalispell, Montana, for gravimetric analysis. We sample the material in suspension in the water inside the corer using an Imhoff settling cone (Shepard and Graham 1982). We allow the cone to settle for 20 minutes before recording the amount of sediment per liter of water. After taking the Imhoff cone sample, we determine total volume of the turbid water inside the corer by measuring the depth and referring to a depth to volume conversion table (Shepard and Graham 1982).

The product of the cone reading (mg of sediment per liter) and the total volume of turbid water inside the corer (liters) yields an approximation of the amount of fine sediment suspended inside the corer after sample removal. We than applied a wet to dry conversion factor developed for Flathead tributaries by Shepard and Graham (1982), yielding an estimated dry weight (g) for the suspended material.

We oven dry the bagged samples and sieve separate them into 13 size classes ranging from >76.1 mm to >0.063 mm in diameter. We weigh the material retained on each sieve and calculate the percent dry weight in each size class. The estimated dry weight of the suspended fine material (Imhoff cone results) is added to the weight observed in the pan, to determine the percentage of material >0.063 mm. We sum these percentages, obtaining a cumulative particle size distribution for each sample (Tappel and Bjornn 1983).

Mesh size of sieves used to gravimetrically analyze hollow core (McNeil and Ahnell 1964) streambed substrate samples collected from the Flathead River Basin tributaries.

76.1 mm	(3.00 inch)
50.8 mm	(2.00 inch)
25.4 mm	(1.00 inch)
18.8 mm	(0.74 inch)
12.7 mm	(0.50 inch)
9.52 mm	(0.38 inch)
6.35 mm	(0.25 inch)
4.76 mm	(0.19 inch)
2.00 mm	(0.08 inch)
0.85 mm	(0.03 inch)
0.42 mm	(0.016 inch)
0.063 mm	(0.002 inch)
Pan	(<0.002 inch)

We refer to each set of samples by using the median percentage <6.35 mm in diameter. This size class is commonly used to describe spawning gravel quality, and it includes the size range typically generated during land management activities.

Substrate Scoring

A substrate score is an overall assessment of streambed particle size and embeddedness. Large particles which are not embedded in finer materials provide more interstitial space that juvenile bull trout favor. This situation generates a higher substrate score. Low substrate scores occur when smaller streambed particles and greater embeddedness limit the interstices within the streambed materials.

Substrate scoring involves visually assessing the dominant and subdominant streambed substrate particles, along with embeddedness in a series of cells across transects. Surveyors assign a rank to both the dominant and subdominant particle size classes in each cell. They also rank the degree to which the dominant particle size is embedded. The three ranks are summed, obtaining a single variable for each cell. All cells across each transect are averaged and a mean of all transects in a section results in the substrate score.

Characteristics and associated ranks for computing substrate score (modified by Leathe and Enk 1985 from Crouse et al. 1981).

Rank	Characteristic
	<u>Particle Size Class</u>[1]
1	Silt and/or detritus
2	Sand (<2.0 mm)
3	Small gravel (2.0 - 6.4 mm)
4	Large gravel (6.5 - 64.0 mm)
5	Cobble (64.1 - 256.0 mm)
6	Boulder and/or bedrock (>256.0 mm)
	<u>Embeddedness</u>
1	Completely embedded or nearly so
2	embedded
3	2 embedded
4	3 embedded
5	Unembedded

[1]Used for both dominant and subdominant particle ranking

We score 150 m sections using equally spaced transects. Cell width varies depending on wetted width, allowing a minimum of five evaluations for any transect. Maximum cell width is 1.0 m. Again, lower scores indicate poorer quality rearing habitat; higher values indicate good conditions.

Table 3. Summary of streambed coring and substrate scoring activities in bull trout habitat that will be undertaken by Montana Department of Fish, Wildlife and Parks.

Drainage	Water	Action (Provide detailed description)	Purpose	Length/ Area	Date of Action	Personnel	Est. Mort.	Comp-leted?	Actual Mort.	No. DV handled	Do in 2004?
Blackfoot River	Arrastra Creek	Substrate Core Sampling	Identify fine sediment levels in spawning gravels - Monitoring of timbersale effects	6-12 cores	Summer	Laura Burns (USFS)	0	Y	0	0	N
Blackfoot River	Blackfoot River	Substrate Core Sampling	Identify fine sediment levels in spawning gravels - Evaluation of all effects on sediments in watershed	6 - 9 cores	Summer	Laura Burns (USFS)	0	Y	0	0	Y
Blackfoot River	Copper Creek	Substrate Core Sampling	Identify fine sediment levels in spawning gravels - Evaluation of all effects on sediments in watershed	6 cores at four sites	Summer	Laura Burns (USFS)	0	Y	0	0	Y
Blackfoot River	Poorman Creek	Substrate Core Sampling	Identify fine sediment levels in spawning gravels - Monitor timbersale effects	6-12 cores	Summer	Laura Burns (USFS)	0	Y	0	0	Y
Blackfoot River	Snowbank Creek	Substrate Core Sampling	Identify fine sediment levels in spawning gravels - Evaluation of all effects on sediments in watershed	6 cores at two sites	Summer	Laura Burns (USFS)	0	Y	0	0	Y
Flathead (Mid Fork)	Granite Creek	Core Sampling/Sub Score	Habitat Quality Index	150 m	Mar-Apr/ Sept	Tom Weaver	0	Y	0	0	Y
Flathead (North Fk)	Big Creek	Core Sampling/ Substrate Score	Habitat Quality Index	150 m	Mar-Apr/ Sept	Tom Weaver	0	Y	0	0	Y
Flathead (North Fk)	Coal Creek	Core Sampling/ Substrate Score	Habitat Quality Index	150 m	Mar-Apr/ Sept	Tom Weaver	0	Y	0	0	Y
Flathead (North Fk)	Cyclone Creek	Core Sampling/ Substrate Score	Habitat Quality Index	150 m	Mar-Apr/ Sept	Tom Weaver	0	Y	0	0	Y
Flathead (North Fk)	Trail Creek	Core Sampling	Habitat Quality Index	150 m	Mar-Apr/ Sept	Tom Weaver	0	Y	0	0	Y
Flathead (North Fk)	Whale Creek	Core Sampling/ Substrate Score	Habitat Quality Index	150 m	Mar-Apr/ Sept	Tom Weaver	0	Y	0	0	Y
Flathead (South Fk)	Wounded Buck Creek	Core Sampling/ Substrate Score	Habitat Quality Index	150 m	Mar-Apr/Sept	Tom Weaver	0	Y	0	0	Y
Kootenai	Bear Creek	Core Sampling/ Substrate Score	Habitat Quality Index	150 m	Mar-Apr/ Sept	Mike Hensler	0	Y	0	0	Y
Kootenai	Grave Creek	Core Sampling/ Substrate Score	Habitat Quality Index	150 m	Mar-Apr/ Sept	Mike Hensler	0	Y	0	0	Y

Drainage	Water	Action (Provide detailed description)	Purpose	Length/ Area	Date of Action	Personnel	Est. Mort.	Comp-leted?	Actual Mort.	No. DV handled	Do in 2004?
Kootenai	Keeler Creek	Core Sampling/ Substrate Score	Habitat Quality Index	150 m	Mar-Apr/ Sept	Mike Hensler	0	Y	0	0	Y
Kootenai	O'Brien Creek	Core Sampling/ Substrate Score	Habitat Quality Index	150 m	Mar-Apr/ Sept	Mike Hensler	0	Y	0	0	Y
Kootenai	Pipe Creek	Core Sampling/ Substrate Score	Habitat Quality Index	150 m	Mar-Apr/ Sept	Mike Hensler	0	Y	0	0	Y
Kootenai	Quartz Creek	Core Sampling/ Substrate Score	Habitat Quality Index	150 m	Mar-Apr/ Sept	Mike Hensler	0	Y	0	0	Y
Kootenai	Wigwam River	Core Sampling/ Substrate Score	Habitat Quality Index	150 m	Mar-Apr/ Sept	Mike Hensler	0	Y	0	0	Y
Stillwater	Stillwater River	Core Sampling/ Substrate Score	Habitat Quality Index	150 m	Mar-Apr/ Sept	Tom Weaver	0	Y	0	0	Y
Swan	Elk Creek	Core Sampling/ Substrate Score	Habitat Quality Index	150 m	Mar-Apr/ Sept	Tom Weaver	0	Y	0	0	Y
Swan	Goat Creek	Core Sampling/ Substrate Score	Habitat Quality Index	150 m	Mar-Apr/ Sept	Tom Weaver	0	Y	0	0	Y
Swan	Jim Creek	Core Sampling/ Substrate Score	Habitat Quality Index	150 m	Mar-Apr/ Sept	Tom Weaver	0	Y	0	0	Y
Swan	Lion Creek	Core Sampling/ Substrate Score	Habitat Quality Index	150 m	Mar-Apr/ Sept	Tom Weaver	0	Y	0	0	Y
Swan	Lost Creek	Core Sampling/ Substrate Score	Habitat Quality Index	150 m	Mar-Apr/ Sept	Tom Weaver	0	Y	0	0	Y
Swan	S. Woodward Creek	Core Sampling/ Substrate Score	Habitat Quality Index	150 m	Mar-Apr/ Sept	Tom Weaver	0	Y	0	0	Y
Swan	Soup Creek	Core Sampling/ Substrate Score	Habitat Quality Index	150 m	Mar-Apr/ Sept	Tom Weaver	0	Y	0	0	Y
Swan	Squeezer Creek	Core Sampling/ Substrate Score	Habitat Quality Index	150 m	Mar-Apr/ Sept	Tom Weaver	0	Y	0	0	Y
Swan	Woodward Creek	Core Sampling/ Substrate Score	Habitat Quality Index	150 m	Mar-Apr/ Sept	Tom Weaver	0	Y	0	0	Y

Redd Counts

Justification

A reliable census of annual spawner escapement is a valuable element of any fisheries monitoring program. These data are frequently used as measures of anticipated production in succeeding generations. They also provide an index of success in regulating the fishery. Observations during past studies indicate that migratory fish populations in the Flathead consistently use the same stream sections for spawning. Flathead Lake bull trout spawned in 28% of the 750 km of available stream habitat surveyed in 1978-1982 (Fraley and Shepard 1989). In the Swan River drainage, 75% of all bull trout spawning during 1983 and 1984 took place in 8.5% of the available habitat (Leathe and Enk 1985). About 70% of spawning in the Swan drainage during 1995, 1996, and 1997 occurred in portions of four streams, which amounted to less than 10% of available stream habitat (Montana Fish, Wildlife & Parks, Kalispell, unpublished file data). Bull trout spawned in 13 of 37 streams surveyed in the South Fork of the Flathead River drainage upstream from Hungry Horse Dam during 1993. Portions of eight of these, totaling less than 10% of the total habitat, supported 80% of the spawning (MBTSG 1995b, 1995c). Similar findings resulted from spawning site surveys in the Kootenai and Clark Fork River drainages (Montana Fish, Wildlife & Parks, Kalispell, unpublished file data; MBTSG 1996b, 1996c). As a result of their specific spawning habitat requirements, the majority of bull trout spawning is clustered in a small portion of the available habitat, making these areas critical for bull trout production.

Field crews monitor the number of spawning sites annually. These counts provide information on trends in escapement into upper basin tributaries and allow us to choose sampling locations for other monitoring activities. Timing of salmonid spawning has likely evolved in response to seasonal changes in water temperature (Bjornn and Reiser 1991). Initiation of spawning by bull trout in the Flathead drainage appeared to be strongly related to water temperature, although photoperiod and stream flow may also have been factors (Shepard et al. 1984). Most bull trout spawn between late August and early November (McPhail and Murray 1979; Oliver 1979; Shepard et al. 1984; Pratt 1985; Brown 1992; Ratliff 1992). Spawning in the Flathead drainage (Fraley and Shepard 1989) and in Mackenzie Creek, British Columbia (McPhail and Murray 1979), began when daily maximum water temperatures declined to 9-10° C. Spawning takes place primarily at night (Heimer 1965; Weaver and White 1985), but has been observed during daylight hours (Needham and Vaughan 1952; T. Weaver, Montana Fish, Wildlife & Parks, personal communication; Russ Thurow, USFS Intermountain Research Station, personal communication).

Methods

We conduct preliminary surveys to determine appropriate timing for final counts. Final inventories begin after we observe numerous completed redds, few adult fish, and little evidence of active spawning during the preliminary surveys. Timing of final counts is critical, because as redds age, they lose the characteristic "cleaned" or "bright" appearance becoming more difficult to identify.

Experienced field crews conduct surveys by walking the channel within spawning areas. They visually identify redds by the presence of a pit or depression and associated tail area of disturbed gravel. If timing is proper, identification of redds presents little problem. We classify redds based on the following criteria:

1. Definite - no doubt. The area is definitely "cleaned" and or pit and tail area are recognizable. Not in an area typically cleaned by stream hydraulics.

2. Probable - an area cleaned that may be due to stream hydraulics but a pit and tail are recognizable, or an area that does not appear clean but has a definite pit and tail.

When the surveyors encounter a redd, they record its certainty class along with its location. Surveyors record distinct landmarks by noting the pace number at the location of each landmark. We include both classes of redds in final totals, which we compare annually as an index of spawner escapement.

Areas in which redds are counted on a routine basis are called "index areas". In some cases these index surveys continue to an upstream barrier. It is important to establish upper and lower limits of index areas. Through repeated annual index surveys we obtain valuable trend information to use in monitoring bull trout populations. Detection of trends will often require at least 10 years of monitoring index areas (Rieman and Meyers, in press).

During a basin-wide count all habitat which appears suitable for bull trout spawning (as described above) is surveyed. From this basin-wide survey index areas can be identified for annual surveys. Basin-wide counts can be done every 5-7 years.

A Montana Bull Trout Redd Survey Manual describing procedures for conducting redd surveys is attached (Spalding 1997)

Table 4. Summary of redd count activities in bull trout habitat that will be undertaken by Montana Department of Fish, Wildlife and Parks.

Drainage	Water	Action (Provide detailed description)	Purpose	Length/ Area	Date of Action	Personnel	Est. Mort	Comp - leted?	No. DV handled	Actual Mort.	Do in 2004 ?
Blackfoot River	Copper Creek	Redd Counts	Long-term Population Monitoring	6 miles	Fall	Laura Burns Len Walch (USFS)	0	Y	0	0	Y
Blackfoot River	Dunham Creek	Redd Counts	Long-term Population Monitoring	2 miles	Fall	Ron Pierce	0	Y	0	0	Y
Blackfoot River	Gold Creek	Redd Counts	Long-term Population Monitoring	2 miles	Fall	Ron Pierce	0	Y	0	0	Y
Blackfoot River	Monture Creek	Redd Counts	Long-term Population Monitoring	3 miles	Fall	Ron Pierce	0	Y	0	0	Y
Blackfoot River	Morrel Creek	Redd Counts	Long-term Population Monitoring	4 miles	Sept-Oct	Ladd Knotek	0	Y	0	0	Y
Blackfoot River	Nevada Creek	Redd Counts	Long-term Population Monitoring	3 miles	Fall	Laura Burns Len Walch (USFS)	0	Y	0	0	Y
Blackfoot River	North Fork	Redd Counts	Long-term Population Monitoring		Fall	David Schmetterli ng Ron Pierce	0	Y	0	0	Y
Clark Fork (Lower)	Bull River	Redd Counts	Long-term Population Monitoring	10 km	Aug-Nov	Laura Katzman B. Liermann	0	N	0	0	N
Clark Fork (Lower)	E. N. & S. Fks. Bull River. Copper Cr.	Redd Counts	Long-term Population Monitoring	20 km	Aug-Nov	Laura Katzman B. Liermann	0	Y	0	0	Y
Clark Fork (Lower)	EF & WF Rock Cr., Rock Cr.	Redd Counts	Long-term Population Monitoring	10 km	Aug-Nov	Laura Katzman Brad Liermann	0	N	0	0	N

Drainage	Water	Action (Provide detailed description)	Purpose	Length/ Area	Date of Action	Personnel	Est. Mort	Comp - leted?	No. DV handled	Actual Mort.	Do in 2004 ?
Clark Fork (Lower)	Fish Trap Creek drainage	Redd Counts	Long-term Population Monitoring	10 km	Aug-Nov	Brad Liermann	0	Y	0	0	Y
Clark Fork (Lower)	Graves Creek	Redd Counts	Long-term Population Monitoring	5 km	Aug-Nov	Brad Liermann	0	Y	0	0	Y
Clark Fork (Lower)	Prospect Creek	Redd Counts	Long-term Population Monitoring	20 km	Aug-Nov	Brad Liermann	0	Y	0	0	Y
Clark Fork (Lower)	Vermillion River	Redd Counts	Long-term Population Monitoring	20 km	Aug-Nov	Brad Liermann	0	Y	0	0	Y
Clark Fork (Lower)	W. Fk. Thompson Riv	Redd Counts	Long-term Population Monitoring	10 km	Aug-Nov	Brad Liermann	0	Y	0	0	Y
Clark Fork (Lower)	Whitepine Creek	Redd Counts	Long-term Population Monitoring	5 km	Aug-Nov	Brad Liermann	0	Y	0	0	Y
Clark Fork (Middle)	Cedar Creek	Redd Counts	Fluvial adult population estimates	2-4 miles	Sept-Nov	Ladd Knotek	0	Y	0	0	Y
Clark Fork (Middle)	Fish Creek	Redd Counts	Fluvial adult population estimates	6-10 miles	Sept-Nov	Ladd Knotek	0	Y	0	0	Y
Clark Fork (Middle)	Rattlesnake creek	Redd Counts	Fluvial adult population estimates	5-7 miles	Sept-Nov	Ladd Knotek	0	Y	0	0	Y
Clark Fork (Middle)	St. Regis River	Redd Counts	Fluvial adult population estimates	2-4 miles	Sept-Nov	Ladd Knotek	0	Y	0	0	Y
Clark Fork (Middle)	Trout Creek	Redd Counts	Fluvial adult population estimates	2-4 miles	Sept-Nov	Ladd Knotek	0	Y	0	0	Y
Flathead (Mid Fork)	Bear Creek	Redd Counts	Spawner Escapement	Mouth - Headwaters	Sept-Oct	Tom Weaver	0	Y	0	0	N
Flathead (Mid Fork)	Bowl Creek	Redd Counts	Spawner Escapement	Mouth - Headwaters	Sept-Oct	Tom Weaver	0	Y	0	0	N
Flathead (Mid Fork)	Clack Creek	Redd Counts	Spawner Escapement	Mouth - Headwaters	Sept-Oct	Tom Weaver	0	Y	0	0	N
Flathead (Mid Fork)	Dolly Varden Creek	Redd Counts	Spawner Escapement	Mouth - Headwaters	Sept-Oct	Tom Weaver	0	Y	0	0	N
Flathead (Mid Fork)	Granite Creek	Redd Counts	Spawner Escapement	Mouth - Headwaters	Sept-Oct	Tom Weaver	0	Y	0	0	Y

Drainage	Water	Action (Provide detailed description)	Purpose	Length/ Area	Date of Action	Personnel	Est. Mort	Comp - leted?	No. DV handled	Actual Mort.	Do in 2004 ?
Flathead (Mid Fork)	Lodgepole Creek	Redd Counts	Spawner Escapement	Mouth - Headwaters	Sept-Oct	Tom Weaver	0	Y	0	0	Y
Flathead (Mid Fork)	Long Creek	Redd Counts	Spawner Escapement	Mouth - Headwaters	Sept-Oct	Tom Weaver	0	Y	0	0	N
Flathead (Mid Fork)	Morrison Creek	Redd Counts	Spawner Escapement	Mouth - Headwaters	Sept-Oct	Tom Weaver	0	Y	0	0	Y
Flathead (Mid Fork)	Nyack Creek	Redd Counts	Spawner Escapement	Mouth - Headwaters	Sept-Oct	Tom Weaver	0	Y	0	0	N
Flathead (Mid Fork)	Ole Creek	Redd Counts	Spawner Escapement	Mouth - Headwaters	Sept-Oct	Tom Weaver	0	Y	0	0	Y
Flathead (Mid Fork)	Park creek	Redd Counts	Spawner Escapement	Mouth - Headwaters	Sept-Oct	Tom Weaver	0	Y	0	0	N
Flathead (Mid Fork)	Schafer Creek	Redd Counts	Spawner Escapement	Mouth - Headwaters	Sept-Oct	Tom Weaver	0	Y	0	0	N
Flathead (Mid Fork)	Strawberry Creek	Redd Counts	Spawner Escapement	Mouth - Headwaters	Sept-Oct	Tom Weaver	0	Y	0	0	N
Flathead (Mid Fork)	Trail Creek	Redd Counts	Spawner Escapement	Mouth - Headwaters	Sept-Oct	Tom Weaver	0	Y	0	0	N
Flathead (North Fk)	Big Creek	Redd Counts	Spawner Escapement	Mouth – Headwaters	Sept-Oct	Tom Weaver	0	Y	0	0	Y
Flathead (North Fk)	Coal Creek	Redd Counts	Spawner Escapement	Mouth – Headwaters	Sept-Oct	Tom Weaver	0	Y	0	0	Y
Flathead (North Fk)	Cyclone Creek	Redd Counts	Spawner Escapement	Mouth – Headwaters	Sept-Oct	Tom Weaver	0	N	0	0	Y
Flathead (North Fk)	Frozen Creek/Lake	Redd Counts	Monitoring Populations	1 mi.	Oct-Nov	Tom Weaver	0	N	0	0	Y
Flathead (North Fk)	Hallowat Creek	Redd Counts	Spawner Escapement	Mouth – Headwaters	Sept-Oct	Tom Weaver	0	Y	0	0	N
Flathead (North Fk)	Mathias Creek	Redd Counts	Spawner Escapement	Mouth – Headwaters	Sept-Oct	Tom Weaver	0	Y	0	0	N
Flathead (North Fk)	Red Meadow Creek	Redd Counts	Spawner Escapement	Mouth – Headwaters	Sept-Oct	Tom Weaver	0	Y	0	0	N

Drainage	Water	Action (Provide detailed description)	Purpose	Length/ Area	Date of Action	Personnel	Est. Mort	Comp - leted?	No. DV handled	Actual Mort.	Do in 2004 ?
Flathead (North Fk)	Shorty Creek	Redd Counts	Spawner Escapement	Mouth – Headwaters	Sept-Oct	Tom Weaver	0	Y	0	0	N
Flathead (North Fk)	South Coal Creek	Redd Counts	Spawner Escapement	Mouth – Headwaters	Sept-Oct	Tom Weaver	0	Y	0	0	N
Flathead (North Fk)	Trail Creek	Redd Counts	Spawner Escapement	Mouth – Headwaters	Sept-Oct	Tom Weaver	0	Y	0	0	Y
Flathead (North Fk)	Whale Creek	Redd Counts	Spawner Escapement	Mouth – Headwaters	Sept-Oct	Tom Weaver	0	Y	0	0	N
Flathead (South Fk)	Gordon Creek	Redd Counts	Spawner Enhancement	Headwaters-Confluence	Oct	Tom Weaver	0	N	0	0	Y
Flathead (South Fk)	Little Salmon Creek	Redd Counts	Spawner Enhancement	Headwaters-Confluence	Oct	Tom Weaver	0	N	0	0	Y
Flathead (South Fk)	Quintonkin Creek	Redd Counts	Spawner Escapement	Mouth - Headwaters	Sept-Oct	Tom Weaver	0	Y	0	0	Y
Flathead (South Fk)	Sullivan Creek	Redd Counts	Spawner Escapement	Mouth-Headwaters	Sept-Oct	Tom Weaver	0	Y	0	0	Y
Flathead (South Fk)	Wheeler Creek	Redd Counts	Spawner Escapement	Mouth - Headwaters	Sept-Oct	Tom Weaver	0	Y	0	0	Y
Flathead (South Fk)	White River	Redd Counts	Spawner Enhancement	Headwaters-Confluence	Oct	Tom Weaver	0	N	0	0	Y
Flathead (South Fk)	Wounded Buck Creek	Redd Counts	Spawner Escapement	Mouth - Headwaters	Sept-Oct	Tom Weaver	0	Y	0	0	Y
Flathead (South Fk)	Youngs Creek	Redd Counts	Spawner Escapement	Headwaters-Confluence	Oct	Tom Weaver	0	N	0	0	Y
Kootenai	Bear Creek	Redd Counts	Spawner Escapement	Headwaters-Confluence	Oct	Mike Hensler Jim Dunnigan	0	Y	0	0	Y
Kootenai	Blue Sky Creek	Redd Counts	Spawner Escapement	Headwaters-Confluence	Oct	Mike Hensler	0	Y	0	0	Y
Kootenai	Callahan Creek	Redd Counts	Spawner Escapement	Headwaters-Confluence	Oct	Mike Hensler	0	Y	0	0	Y
Kootenai	Clarence Creek	Redd Counts	Population Assessment	Headwaters-Confluence	Oct	Mike Hensler	0	Y	0	0	Y

Drainage	Water	Action (Provide detailed description)	Purpose	Length/ Area	Date of Action	Personnel	Est. Mort	Comp - leted?	No. DV handled	Actual Mort.	Do in 2004 ?
Kootenai	Grave Creek and associated tributaries	Redd Counts	Spawner Escapement	Headwaters-Confluence	Oct	Mike Hensler	0	Y	0	0	Y
Kootenai	Keeler Creek and associated tributaries	Redd Counts	Spawner Escapement	Headwaters-Confluence	Oct	Mike Hensler	0	Y	0	0	Y
Kootenai	Libby Creek	Redd Counts	Spawner Escapement	Headwaters-Confluence	Oct	Mike Hensler	0	Y	0	0	Y
Kootenai	Pipe Creek and associated tributaries	Redd Counts	Spawner Escapement	Headwaters-Confluence	Oct	Mike Hensler	0	Y	0	0	Y
Kootenai	Quartz Creek and associated tributaries	Redd Counts	Spawner Escapement	Headwaters-Confluence	Oct	Mike Hensler	0	Y	0	0	Y
Kootenai	W.F. Fisher Creek	Redd Counts	Population Assessment	Headwaters-Confluence	Oct	Mike Hensler	0	Y	0	0	Y
Kootenai	Wigwam River	Redd Counts	Population Assessment	Headwaters to British Columbia Border	Oct	Mike Hensler	0	Y	0	0	Y
Little Blackfoot	Little Blackfoot	Redd Counts	Locate spawning reach	20 miles	Sept 2003	Len Walch Arcjie Harper (USFS)	0	N	0	0	Y
Stillwater	Fitzsimmons Creek	Redd Counts	Spawner Escapement	Mouth - Headwaters	Sept-Oct	Tom Weaver	0	N	0	0	Y
Stillwater	Stillwater River	Redd Counts	Spawner Escapement	150 m	Aug-Sept	Tom Weaver	0	Y	0	0	Y
Swan	Cold Creek	Redd Counts	Spawner Escapement	Mouth - Headwaters	Sept-Oct	Scott Rumsey	0	Y	0	0	Y
Swan	Elk Creek	Redd Counts	Spawner Escapement	Mouth - Headwaters	Sept-Oct	Scott Rumsey	0	Y	0	0	Y

Drainage	Water	Action (Provide detailed description)	Purpose	Length/ Area	Date of Action	Personnel	Est. Mort	Comp - leted?	No. DV handled	Actual Mort.	Do in 2004 ?
Swan	Goat Creek	Redd Counts	Spawner Escapement	Mouth - Headwaters	Sept-Oct	Scott Rumsey	0	Y	0	0	Y
Swan	Holland Creek	Redd Counts	Spawner Escapement	Mouth – Headwaters	Sept-Oct	Scott Rumsey	0	Y	0	0	Y
Swan	Jim Creek	Redd Counts	Spawner Escapement	Mouth – Headwaters	Sept-Oct	Scott Rumsey	0	Y	0	0	Y
Swan	Lion Creek	Redd Counts	Spawner Escapement	Mouth – Headwaters	Sept-Oct	Scott Rumsey	0	Y	0	0	Y
Swan	Lost Creek	Redd Counts	Spawner Escapement	Mouth – Headwaters	Sept-Oct	Scott Rumsey	0	Y	0	0	Y
Swan	Piper Creek	Redd Counts	Spawner Escapement	Mouth – Headwaters	Sept-Oct	Scott Rumsey	0	Y	0	0	Y
Swan	Soup Creek	Redd Counts	Spawner Escapement	Mouth – Headwaters	Sept-Oct	Scott Rumsey	0	Y	0	0	Y
Swan	Squeezer Creek	Redd Counts	Spawner Escapement	Mouth – Headwaters	Sept-Oct	Scott Rumsey	0	Y	0	0	Y
Swan	Woodward Creek	Redd Counts	Spawner Escapement	Mouth – Headwaters	Sept-Oct	Scott Rumsey	0	Y	0	0	Y
Whitefish	E. Fk. Swift Creek	Redd Counts	Spawner Escapement	Mouth – Headwaters	Sept-Oct	Tom Weaver	0	Y	0	0	Y
Whitefish	Swift Creek	Redd Counts	Spawner Escapement	Mouth – Headwaters	Sept-Oct	Tom Weaver	0	Y	0	0	Y
Whitefish	W Fk. Swift Creek	Redd Counts	Spawner Escapement	Mouth – Headwaters	Sept-Oct	Tom Weaver	0	Y	0	0	Y

Genetic Sampling

Justification

With the decline in bull trout populations, there are concerns for the possible loss of unique genetic material, a loss which may be essential to bull trout preservation in Montana. In 1992 and 1993 a bull trout genetic survey of major spawning tributaries to the North, Middle, and South forks found substantial genetic divergence between tributaries in each drainage. These investigators also found indication of genetic differences between populations in the North Fork Flathead and Stillwater River drainages and those in the Middle and South forks and Swan River drainages with Aconsiderable overlap≅ genetic distribution among the latter three drainages. There is also preliminary evidence that samples from bull trout collected below Cabinet Gorge Dam are from upriver. Additional sampling needs to be done to infer that they did indeed come from upstream.

Montana Fish, Wildlife & Parks plans to collect genetic samples from representative populations throughout Montana. These populations are dispersed across northwestern Montana in the Kootenai, Flathead, Swan, and Clark Fork drainages. Thorough sampling will enable us to construct a dendogram of relatedness and uniqueness of populations in and between different drainages. This will assist managers to prioritize the most unique, and important populations. Sampling in the Clark Fork drainage will also be important in determining genetic relationships for conservation planning and passage decisions at Cabinet, Noxon, Thompson Falls, and Milltown dams. While conducting fish disease sampling for species other than bull trout, we may capture them incidentally. Bull trout will be returned immediately after obtaining a fin clip for genetic purposes. Disease sampling is to determine risks of transmitting disease if passage measures are implemented at Cabinet, Noxon, or Thompson Falls dams.

Sampling of disjunct populations will enable comparison with main stem populations. A disjunct population is a bull trout population with adults residing in a small mountain lake and spawning in an inlet or outlet stream, apparently reproductively isolated from mainstem river or lake populations. These populations may contain genetic material similar to the main stem populations and provide a partial genetic reserve for bull trout. The resulting information will provide resource managers a means of evaluating the disjunct populations and the present mainstem populations in the long-term preservation of genetic diversity for bull trout. For many of these populations there is very little information at this time. Not only will this survey provide a valuable genetic description but also will establish baseline data on habitat use, spawning streams, current status, abundance, and species composition indices and possible threats to population persistence, such as hybridization or coexistence with introduced fish species.

Methods

A small fin clip about 2 the size of a paper hole punch, ideally from a rayed fin, will be collected from approximately 30 juvenile fish of different sizes for genetic analysis. Nuclear and/or mitochondrial DNA will be used to determine the genetic structure and variability of populations. Laboratory analysis will be conducted at the University of Montana Wild Trout and Salmon Genetics Lab. Nuclear and/or mitochondrial DNA will provide more genetic information than electrophoretic allozyme analysis and allow us to use non-lethal collection methods to obtain genetic samples. Contingency table chi-square analysis will be used to determine if genetic difference between populations are statistically different.

Bull trout will be captured using variety of collection methods. We will fit a collection method or a number of methods to suit each sample site. Backpack electrofishing was a successful technique in previous surveys and will be relied upon for the majority of sampling. We will also employ seine netting, short period gill netting, and hook and line collection as needed.

To detect genetic differences between populations, 30-50 bull trout from each population will be analyzed. This sample size will allow investigators to distinguish statistically significant genetic differences from random genetic variation. In an effort to avoid collection of a sample with a high proportion of siblings, we will collect individuals from two or more age classes, and where possible, from multiple sampling locations. Age classes are easily separated based on length frequency. We will use a partial fin clip and then return fish to the collection site. Each fin clip will be stored in 95 percent solution of ethanol. We will record species, date, total length, and sampling location for each sample.

Table 5. Summary of genetic and micro-chemistry analysis activities in bull trout habitat that will be undertaken by Montana Department of Fish, Wildlife and Parks.

Drainage	Water	Action (Provide detailed description)	Purpose	Length/ Area	Date of Action	Personnel	Est. Mort.	Comp-leted?	No. DV handled	Actual Mort.	Do in 2004?
Clark Fork (Middle)	Albert Creek	Fin Clip (30-50 fish)	Genetic Survey		Jul-Sept	Ladd Knotek	0	N	0	0	Y
Clark Fork (Middle)	Cedar Creek	Fin Clip (30-50 fish)	Genetic Survey		Jul-Sept	Ladd Knotek	0	N	0	0	Y
Clark Fork (Middle)	Clark Fork below Milltown Dam	Fin Clip (30-50 fish)	Genetic Survey		Jul-Sept	David Schmetterling	0	N	0	0	Y
Clark Fork (Middle)	Fish Creek	Fin Clip (30-50 fish)	Genetic Survey		Jul-Sept	Ladd Knotek	0	N	0	0	Y
Clark Fork (Middle)	Grant Creek	Fin Clip (30-50 fish)	Genetic Survey		Jul-Sept	Ladd Knotek	0	N	0	0	Y
Clark Fork (Middle)	Rattlesnake Creek	Fin Clip (30-50 fish)	Genetic Survey		Jul-Sept	Ladd Knotek	0	N	0	0	Y
Clark Fork (Middle)	St. Regis River	Fin Clip (30-50 fish)	Genetic Survey		Jul-Sept	Ladd Knotek	0	N	0	0	Y
Clark Fork (Middle)	St. Regis River	Fin Clip (30-50 fish)	Genetic Survey		Jul-Sept	Ladd Knotek	0	N	0	0	Y
Clark Fork (Middle)	Trout Creek	Fin Clip (30-50 fish)	Genetic Survey		Jul-Sept	Ladd Knotek	0	N	0	0	Y
Flathead (South Fk.)	Doctor Lake	Fin Clip (30-50 fish)	Genetic Survey		Jul-Sept	Scott Rumsey	0	N	0	0	Y
Kootenai	Bear Creek	Juvenile sacrifice to obtain otoliths	Natal Tributary Assessment	Entire Stream	Jul-Sept	Jim Dunnigan	≤10	N	0	0	Y
Kootenai	Callahan Creek	Juvenile sacrifice to obtain otoliths	Natal Tributary Assessment	Entire Stream	Jul-Sept	Jim Dunnigan	≤10	N	0	0	Y
Kootenai	Callahan Creek	Fin Clip (30-50 fish)	Genetic Survey	Entire Stream	Jul-Sept	Mike Hensler	0	N	0	0	Y
Kootenai	Grave Creek	Juvenile sacrifice to obtain otoliths	Natal Tributary Assessment	Entire Stream	Jul-Sept	Jim Dunnigan	≤10	N	0	0	Y

Drainage	Water	Action (Provide detailed description)	Purpose	Length/ Area	Date of Action	Personnel	Est. Mort.	Comp-leted?	No. DV handled	Actual Mort.	Do in 2004?
Kootenai	O'Brien Creek	Juvenile sacrifice to obtain otoliths	Natal Tributary Assessment	Entire Stream	Jul-Sept	Jim Dunnigan	≤10	N	0	0	Y
Kootenai	Pipe Creek	Juvenile sacrifice to obtain otoliths	Natal Tributary Assessment	Entire Stream	Jul-Sept	Jim Dunnigan	≤10	N	0	0	Y
Kootenai	Quartz Creek	Juvenile sacrifice to obtain otoliths	Natal Tributary Assessment	Entire Stream	Jul-Sept	Jim Dunnigan	≤10	N	0	0	Y
Kootenai	West Fisher Creek	Juvenile sacrifice to obtain otoliths	Natal Tributary Assessment	Entire Stream	Jul-Sept	Jim Dunnigan	≤10	N	0	0	Y
Kootenai	West Fisher Creek	Fin Clip (30-50 fish)	Genetic Survey	Entire Stream	Jul-Sept	Mike Hensler	0	N	0	0	Y
Kootenai	Wigwam River	Juvenile sacrifice to obtain otoliths	Natal Tributary Assessment	Entire Stream	Jul-Sept	Jim Dunnigan	≤10	N	0	0	Y
Rock Creek (Trib. To Upper Clark Fork)	Rock Creek	Fin Clips for genetic analysis-fins clips will be collected from fish captured during scheduled monitoring and survey efforts described above	Genetic analysis	Entire basin		Eric Reiland	0	Y			N

Radio Telemetry

Justification

Radio-telemetry is being, and will be used to allow assessment of juvenile and sub-adult bull trout movements, distribution, and habitat use of bull trout in the Flathead River, Kootenai River, and Rock Creek (Upper Clark Fork) systems.

Methods

Radio-transmitters are surgically implanted into the body cavity of captured bull trout. The assumption is that tagged and non-tagged fish behave similarly. Transmitters used weigh 8.9 g and have a battery life of 400 days to 60 months. Transmitters are limited to two percent of the total body weight of each fish, therefore only fishing weighing >445 g are radio-tagged. Fish are obtained by angling and electrofishing. Only fish which appear to be in good condition are selected for implantation. A modified shielded needle method is used to implant radio-transmitters. Selected fish are anesthetized in a tub with a solution of MS-222. The fish are then placed ventral side up in a MFWP-designed cradle submerged in a MS-222 solution. The gills are continually flushed with a fresh MS-222 solution during the surgery process. An incision is made in the ventral side longitudinally from just anterior of the pelvic fins to 5 cm forward. A large-diameter hypodermic needle is inserted posteriorly through the skin into the body cavity anterior to the pelvic fins. The 30.5 cm long wire radio-antenna is inserted into the end of the needle while the needle is still in the body cavity. The needle is then withdrawn while simultaneously pulling the antenna posteriorly outside the body cavity. The transmitter is pressed into the body cavity, surgical staples are used to close the incision initially, sutures are used for full closure. A betadine solution is applied to cleanse the outside of the incision. The fish is then placed in fresh water to recover before release.

Radio implanted fish are monitored both from the ground and from the air.

Flathead

Radio telemetry will allow assessment of juvenile and sub-adult bull trout movements, distribution, and habitat use of bull trout in the Flathead River system. Approximately 25 sub-adult and adult bull trout (combined) will be continuously monitored during 2000. Twenty sub-adult bull trout were radio-tagged in summer 1998. Additional fish will be radio-tagged as old radio transmitters expire, so that 25 fish can be monitored at any one time. In addition to the main stem Flathead, the study area encompasses the North and Middle Forks of the Flathead River.

A state-of-the-art radio-telemetry system is used to monitor radio-tagged fish. Installation of this system began in 1996 with a radio-telemetry ground receiver station (PST) being installed in Section 1 on the Flathead River near the mouth of Flathead Lake. This location monitored fish movements to and from Flathead Lake. Two other radio-telemetry ground receiver stations were installed in 1997. One is located on the North Fork of the Flathead River which monitors movements of tagged fish moving between the North Fork and the main stem. Another is located on the Middle Fork of the Flathead River which monitors movements of tagged fish moving between the Middle Fork and the main stem. Each ground station consists of a Lotek data-logging receiver and antenna switch box inside a 2m x 1.5m x 2.5m plastic storage building, the unit is powered by a 12-volt deep-cycle marine battery. Transmitter signals are detected by a 6-element Yagi antenna mounted on a 5 cm diameter metal pole 3.5 m high. The battery is changed and the receivers are downloaded using an IBM PC compatible laptop computer and specialized software weekly or just prior to aerial surveys.

We will use radio telemetry to monitor micro- and macro-habitat use by bull trout and westslope cutthroat trout in the Flathead River from summer 1999-fall 2001. Juvenile and adult bull trout and westslope cutthroat trout will be captured by angling, passive traps, and electrofishing. They will be surgically implanted with radio transmitters and released in close proximity to their capture location. Fish will be tracked usually two times per week during the daytime from a jet boat or from the streambank. Fixed wing aerial telemetry will be used survery remote and inaccessible areas throughout the Flathead River when deemed necessary. We will monitor movement and habitat use at each location for approimately 15 minutes to ensure accurate habitat use measurements. At each fish location, microhabitat use variables of depth, velocity, cover and substrate will be measured. Habitat types will be classified as either pools, edge pools, eddy pools, backwaters, riffles, runs, riffle/runs, pocketwater, slackwater, and shoals based on channel characteristics and stream flow. Individual locations will be mapped using a boat-mounted GPS unit and visually displayed Arc View. In addition, 24-hour tracking surveys will be conducted intermittently on a sub-sample of fish to assess diel movement patters and habitat use during the summer fall, and winter periods.

Kootenai River

Justification

The Northwest Power and Conservation Council has directed the region's fish and wildlife managers to test, implement, and evaluate an interim summer operation, beginning in the summer 2004, that implements new drafting limits at Hungry Horse and Libby Dams. Summer drafting for flow augmentation would be limited to 10 feet from full pool by the end of September in all years except the lowest 20th percentile water supply (drought years) when the draft could be increased to 20 feet from full pool by the end of September. The Council's mainstem amendment strategy will likely increase productivity (e.g., survival and capacity) of native and threatened fish populations, aquatic and terrestrial invertebrates, and other aquatic biota in the reservoirs and downstream river systems. The operational changes will also stabilize discharge from Hungry Horse and Libby Dams from July through September, a period of critical biological productivity. The Council has also requested that additional research activities be conducted to quantify the biological effects of the modified hydro-system operations. Montana FWP designed a research project to address this request. Part of the scientific approach will require radio telemetry gear with bull trout and other resident salmonids. Additionally, Libby mitigation (BPA-funded project) researchers will use information gathered using radio telemetry to refine the IFIM model. This model will be used to modify hydro-system operations.

Rock Creek

A radio-telemetry study of bull trout in the Rock Creek drainage was initiated in 1998. Thirty-nine bull trout distributed throughout five stream reaches were captured by electroshocking, and were surgically implanted with radio transmitters. The purpose of the project is to determine habitat use, migration patters, timing of movements, and spawning area use. An additional 40 bull trout will be radio-tagged and monitored in 1999. Radio-implanted bull trout will be monitored from the ground and air at least twice/week from April through November, and once per week from December through March. A study proposal is attached.

Clark Fork River

Permission has recently been obtained to move bull trout over Milltown Dam in order to determine their movements, migration, and use of spawning areas. Bull trout blocked by Milltown Dam will be captured in a shallow plunge pool below the spillway. Fish congregate in the area of the pool, and can then be isolated in the pool by reducing flows from the dam. Fish in the pool are then captured using electroshockers. Up to 20 bull trout will be captured by this method, and will be implanted with radio transmitters. Bull trout will then be physically passed over the dam and monitored to determine if they continue moving upstream.

Table 6. Summary of radio telemetry activities in bull trout habitat that will be undertaken by Montana Department of Fish, Wildlife and Parks.

Drainage	Water	Action (Provide detailed description)	Purpose	Length/ Area	Date of Action	Personnel	Est. Mort.	Comp-leted?	No. DV handled	Actual Mort?	Do in 2004?
Blackfoot River	Mainstem Blackfoot River	Radio Telemetry	Assess Migration, Spawning, Habitat Use, Timing		Year round	Ron Pierce	0	Y	4	0	N
Clark Fork (Middle)	Mainstem	Radio Telemetry	Migration, movements & Habitat Use	--	Year-round	Ladd Knotek	0	In Progress	20	0	Y
Clark Fork (Lower)	Thompson Falls Dam (above and below)	Radio Telemetry	Determine migration, movements, and spawning area use	100 km	Year-round	Laura Katzman	≤2	Y	0	0	Y
Clark Fork (Middle)	Grant Creek	Radio Telemetry	Determine Migration, Spawning, Habitat Use, Timing		Year round	Ladd Knotek	0	N	0	0	Y
Clark Fork (Middle)	Rattkesnake Creek	Radio Telemetry	Determine Migration, Spawning, Habitat Use, Timing		Year round	Ladd Knotek	0	N	0	0	Y
Clark Fork (Upper)	Milltown Dam	Radio Telemetry	Determine migration, movements, and spawning area use		Spring-Fall 1999	David Schmetterling	0	Y	8	0	Y
Flathead	Flathead River	Radio Telemetry	Determine Habitat Use	85 km	Year-round	Clint Muhlfeld	≤3	N	0	0	Y
Flathead (Mid Fork)	Main Stem	Radio Telemetry	Determine Habitat Use	71 km	Year-round	Clint Muhlfeld	≤3	N	0	0	Y
Flathead (North Fk)	Main Stem	Radio Telemetry	Determine Habitat Use	93 km	Year-round	Clint Muhlfeld	≤3	N	0	0	Y
Kootenai	Kootenai River	Radio Telemetry	Determine habitat use, and effects of dam operations	Kootenai Falls to Libby Dam	Year-round	Mike Hensler Jim Dunnigan Brian Marotz	≤3	N	0	0	Y

Snorkeling

Justification

Snorkeling is done by personnel to determine presence/absence in small streams, and often is done in conjunction with electrofishing to refine population estimates. Snorkeling is also useful to determine presence or absence of bull trout, size/age class, and numbers, and will be used to complete IFIM studies in the Flathead River.

Methods

Snorkeling involves swimming on the surface with the current through pre-established transects. Species and size are recorded as the swimmer(s) descend a monitoring reach. It is the least stressful method of collection and provides for low to no mortality as compared to other methods of collection.

Flathead River IFIM

Instream Flow Incremental Methodology (IFIM) will be used to assess available physical habitat and fish habitat use relative to changes in river discharge at the micro- and macro-habitat spatial scales for bull trout and westslope cutthroat trout inhabiting the Flathead River. The mainstem Flathead River will be partioned into 250 meter river sections using a detailed GPS map of the Flathead River. The length of each section will be measured along the thalweg of the channel and section boundaries will be positioned perpendicular to the streambank and extend across the entire wetted plan view of the Flathead River. Two divers snorkeling two randomly chosen 250-m transects (1-6) parallel to the streambank (beginning at the upstream boundary of the randomly chosen section) will collect microhabitat use information in each section. Each diver will be assigned a randomly chosen cell to snorkel. Divers will enter the section from the upstream boundary and float downstream noting fish locations. At each fish location, numbered brightly colored rock (specific for each species and size class) will be placed at the focal point of each fish.

After the entire section is snorkeled the following microhabitat use data will be recored at each marked location: (1) total depth of the water column measured at the focal point of the fish; (2) mean water column velocity , measured at 0.6 o fthe total water depth (0.2 and 0.8 for depths > 3 feet); (3) focal point velocity measured at the focal point elevation; (4) substate composition estimated at the focal point; (5) cover types identified within a 1 m^2 radius of the focal point; and (6) substrate embeddedness within a 0.5m^2 radius of the focal point. Total depth and velocity measurements will be measured to the nearest 0.01m.

Substrate - the percentage of each substrate category (within 1 m^2 will be visually estimated and weighted at each focal point location using the following modified Wentworth scale: sand/silt/aquatic vegetation (<2mm; rank =1), small gravel (2-25 mm; rank=2); large gravel (26-75 mm; rand = 3); cobble (76-254 mm; rank = 4); boulder (>254 mm; rank = 5); and bedrock (rank =6). Substrate embeddedness will be visually estimated at each focal point location using the following ranking system: (1) completely embedded; (2) 3/4 embedded; (3) 2 embedded; (4) 1/4 embedded; and (5) unembedded.

Cover - Cover will be categorized into the following categories and sub-categories within a 2-meter radius of each fish location.
(1) Velocity Refuge - any instream structure that provides a velocity refuge. Sub-types will be classified as either boulders, large woody debris, or a complex bank structure or outcropping.
(2) Visual Isolation - any structure that provides visual isolation. Sub-types will be classified as large woody debris, turbulence, depth, undercut bank, or overhanging vegetation.
(3) Combination Cover - any cover that provides both velocity refuge and visual isolation.
(4) No Cover - absence of cover.

After microhabitat use information is gathered in each section, we will quantify the linear distance of habitat types occurring along each 250 meter sample cell. This information will be used to develop our own macro-habitat availability database for each reach. This will allow us to develop macro-habitat preference curves that relate habitat use to availability for each species and life stage.

Table 7. Summary of snorkeling activities in bull trout habitat that will be undertaken by Montana Department of Fish, Wildlife and Parks.

Drainage	Water	Action (Provide detailed description)	Purpose	Length/ Area	Date of Action	Personnel	Est. Mort.	Comp-leted?	Actual Mort.	Do in 2004?
Bitterroot	Kootenai Creek	Angling/snorkeling on monitoring reach	Population Assessment	1000'	July-Aug	Chris Clancy	0	Y	0	N
Clark Fork (Lower)	Bull River drainage	Snorkeling	Population Assessment	50 km	Jul-Nov	Laura Katzman	0	N	0	N
Clark Fork (Lower)	Fish Trap Creek	Snorkeling	Population Assessment	50 km	Jul-Sept	Laura Katzman	0	N	0	N
Clark Fork (Lower)	Graves Creek	Snorkeling	Population Assessment	10 km	Jul-Nov	Laura Katzman	0	N	0	N
Clark Fork (Lower)	Prospect Creek	Snorkeling	Population Assessment	50 km	Jul-Nov	Laura Katzman	0	N	0	N
Clark Fork (Lower)	Rock Creek drainage	Snorkeling	Population Assessment	20 km	Jul-Nov	Laura Katzman	0	N	0	N
Clark Fork (Lower)	Vermillion River	Snorkeling	Population Assessment	20 km	Jul-Nov	Laura Katzman	0	N	0	N
Clark Fork (Lower)	W.F. Thompson River	Snorkeling	Population Assessment	50 km	Jul-Sept	Laura Katzman	0	N	0	N
Clark Fork (Middle)	Fish Creek	Snorkeling	Population Assessment	40 km	Jul-Sept	Ladd Knotek	0	N	0	Y
Clark Fork (Middle)	Grant Creek	Snorkeling	Population Assessment	10 km	Jul-Sept	Ladd Knotek	0	N	0	Y
Clark Fork (Middle)	Main stem	Snorkeling	Population Assessment	100 km	Jul-Sept	Ladd Knotek	0	Y	0	Y
Clark Fork (Middle)	Rattlesnake Creek	Snorkeling	Population Assessment	10 km	Jul-Sept	Ladd Knotek	0	Y	0	Y
Clark Fork (Middle)	St. Regis River	Snorkeling	Population Assessment	30 km	Jul-Sept	Ladd Knotek	0	N	0	Y
Flathead	Flathead River	Snorkeling	Population Assessment	30 km	Jul-Sept	Clint Muhlfeld	0	Y	0	Y
Little Blackfoot River	Little Blackfoot	Snorkeling	Determine spawning reach	6 miles	Sept	Len Walch Archie Harper (USFS)	0	N	0	Y

Trapping and Tagging

Justification

Population information derived from trapping and tagging is used to determine the status of bull trout in the drainage, thus directing appropriate conservation measures. Trapping also occurs as part of whirling disease monitoring program, and bull trout may be incidentally captured. Captured bull trout are released, except in situations where they are specifically targeted as part of whirling disease studies on bull trout (see whirling disease section below). Trapping is also used as a method to remove introduced species such as brook trout from bull trout spawning areas. Bull trout are also trapped below dams for transportation around these migration barriers to reinstate upstream passage.

Clark Fork River

Upstream migrating bull trout will be trapped at the Thompson Falls Dam and transported above the dam

The trap will be operated when water temperature is less than or equal to 16° c. When water temperature reaches 16° c for less than 2 hours during the day and returns to less than or equal to 14° c at night, the trap will continue to operate around the clock. When water temperature remains above 14° c, the trap will only be operated periodically between 1800 and 0800 and checked hourly.

Trout transported above the dam will be released approximately 3.3 miles upstream at the Clark Fork Road Ramp off Cherry Creek Road or near the mouth of the Thompson River. Captured trout will be processed and transported in groups of 10 or less to reduce stress and promote survival.

Some bull trout will also be tagged and left below Thompson Falls Dam to help determine a future trap site there.

Whale Creek

Trapping at mouth of Whale Creek will be conducted to obtain juvenile bull trout for radio-telemetry as part of the Flathead River system telemetry study. A migrant trap will be constructed and installed at the mouth of Whale Creek to capture smolts ad they leave the tributary. The trap will be constructed in the winter of 1998, fish will be captured in the late spring of 1999 and 2000.

Rock Creek

Traps may be placed in East Fork Rock Creek above East Fork Reservoir in October/November (after bull trout have moved up to spawn) to capture and remove brook trout that can potentially move into the spawning ground and interbreed with brown trout.

Table 8. Summary of trapping/tagging activities in bull trout habitat that will be undertaken by Montana Department of Fish, Wildlife and Parks.

Drainage	Water	Action (Provide detailed description)	Purpose	Length/ Area	Date of Action	Personnel	Est. Mort.	Comp-leted?	No. DV handled	Actual Morf.	Do in 2004?
Clark Fork (Lower)	Cabinet Gorge Reservoir	Merwin Trapping	Fish abundance monitoring	One trap in Bull R Bay	Oct	Laura Katzman Brad.Lierman n	<1%	Y	0	0	N
Clark Fork (Lower)	Graves Creek	Trapping/Tagging	Adult estimate and Outmigrant Estimates	NA	June-Nov	Laura Katzman	<1%	N	0	0	N
Clark Fork (Lower)	Noxon Reservoir	Merwin Trapping	Fish abundance monitoring	One trap in each of Vermilio n and Marten Cr bays	Oct	Laura Katzman Brad Liermann	<1%	N	0	0	Y
Clark Fork (Lower)	Prospect Creek	Trapping/Tagging	Adult estimate and Outmigrant Estimates	NA	Mar-Nov	Laura Katzman B.rad Liermann	<1%	Y	2	0	N
Clark Fork (Lower)	Thompson Falls Dam	Trap and Provide Fish Passage Over Dam	Provide fish passage and determine migration movements and spawning areas	100km	Mar-Nov	Laura Katzman	≤1	Y	0	0	Y
Clark Fork (Lower)	W. Fork Thompson River	Trapping/Tagging	Adult estimate and Outmigrant Estimates	NA	June-Nov	Laura Katzman	<1%	N	0	0	N
Clark Fork (Middle)	Deer Creek	Trapping	Adult estimate and Outmigrant Estimates	NA	Spring/ Summer	Ladd Knotek	0	N	0	0	Y
Clark Fork (Middle)	Grant Creek	Trapping/Tagging	Adult estimate (return)	NA	Spring/ Summer	Ladd Knotek	<1%	N	0	0	Y
Clark Fork (Middle)	Marshall Creek	Trapping	Adult estimate and Outmigrant Estimates	NA	Spring/ Summer	Ladd Knotek	0	N	0	0	Y

Drainage	Water	Action (Provide detailed description)	Purpose	Length/ Area	Date of Action	Personnel	Est. Mort.	Comp-leted?	No. DV handled	Actual Mort.	Do in 2004?
Clark Fork (Middle)	Rattlesnake Creek	Trapping/Tagging	Adult estimate and Outmigrant Estimates	NA	All year	Ladd Knotek	<1%	Y	15	1	Y
Clark Fork (Upper)	Milltown Reservoir	Trapping	Monitor Northern Pike	Reservoi r-wide	March-May	David Schmetterling	0	Y	2	0	Y
Kootenai	Bear Creek	Trapping	Capture adults for radio telemetry	NA	April	Mike Hensler	1	N	0	0	Y
Kootenai	Glenn Lake Irrigation Canal (Grave Creek)	Trapping below (behind) juvenile fish screen within the irrigation canal to assess fish screen efficiency	Diversion Fish Screen Assessment	Beginni ng to Glen Lake	May-Aug	Jim Dunnigan	≤1	Y	355	0	Y
Kootenai	Grave Creek	Juvenile downstream weir	Obtain estimates of juvenile out migration and age structure.	Approxi mate RM 3	May-Nov.	Jim Dunnigan	3	N	0	0	Y
Kootenai	Young Creek	Trapping/Weir	Determine effectiveness of remote site incubators at increasing abundance of juvenile and adult WCT abundance	Approx. Rm1.0 (1000 ft)	4/1-7/30	Jim Dunnigan	0	Y	1	0	Y

Habitat Restoration

Habitat restoration projects being done by or in conjunction with Montana Department of Fish, Wildlife and Parks include a variety of activities including stream bank restoration, riparian improvement, riparian fencing, off-site water development, screening of water diversions, installation of instream structures, sediment source reductions, removal of culverts and other barriers, wetland improvements, and various other activities. Projects will be designed and implemented to minimize impacts to native fish and the aquatic environment. All will ultimately provide long-term benefits.

Habitat restoration projects occur throughout the range of bull trout in Montana throughout the year. Many of these projects are at least partially funded by the Department's Future Fisheries Improvement Program. This program solicits and funds habitat restoration projects on a twice/year basis, with applications accepted in January and July. All projects approved for funding must undergo MEPA analysis before commencing. Copies of all EAs will be provided to the USFWS for review as they are completed. Because of the funding cycle and contractual deadlines, it is expected that the list of proposed projects will need to be modified at least once during the year. In addition, other projects in which the Department is a cooperator will be included in future amendments as well.

Steps to minimize any take are included in the project designs. They include timing projects to during low flows and during periods when bull trout are least likely to be impacted; avoiding working in spawning grounds during spawning periods; installing silt screens to reduce sediment inputs; monitoring for bull trout during projects; and minimizing impacts to the riparian and stream channel zones.

Lower Grave Creek Restoration and Fish Habitat Enhancement Project

Channel stability, fish habitat and flood capacity has been harshly impaired throughout the lower 3 miles of Grave Creek. Improper land and riparian management through timber harvest, road construction, livestock grazing and stream manipulation has caused the channel to become unstable and over-widened. The over-widened channel has decrease the sediment transport capability, which has caused localized aggradation and intensified bank erosion and sediment supply. There are also a number of irrigation diversions within the lower 3 miles of Grave Creek. Nearly all of these diversions are simple ditches without control gates or fish screens and may account for fish losses and a large waste of in-stream water.

The purpose of this project is to construct a properly functioning stream channel that will meet these objectives:

1) Reduce sediment sources and bank erosion;
2) Re-establish proper channel cross-sectional, plan view, and longitudinal profile dimensions;

3) Improve fish and wildlife habitat within the stream channel and riparian area, with an emphasis on westslope cutthroat and rearing bulltrout;
4) Prevent waste of in-stream water to irrigation diversions by installing flow control gates at diversion sites; and
5) Prevent loss of out migrating fish to irrigation systems by installing fish screens.

The project is located on the lower 3 miles of Grave Creek approximately 8 miles Southeast of Eureka, MT within Section 12,14 and 15, Township 35N, Range 26W, Lincoln County, State of Montana

The project will be separated into 3 phases of approximately 1 mile each in length. Our plans are to restore one phase of stream per year starting in the fall of 2002 and ending in the fall of 2004. There will most likely be some minimal maintenance required following the completion of the project, so we anticipate construction to extend through 2005.

Table 9. Summary of habitat restoration activities in bull trout habitat that will be undertaken by Montana Department of Fish, Wildlife and Parks.

Drainage	Water	Action (Provide detailed description)	Purpose	Length/ Area	Date of Action	Personnel	Est. Mort.	Comp-leted?	Actual Mort.	Do in 2004?
Bitterroot River	Camp Creek	Restoration of approximately 11,000 feet of stream by returning the channel to its original channel and reconstructing the channel to simulate its natural stable state. This project will include reclocation of a 1,500' channelized reach of Camp Creek into a historic channel, and reconstruction of the historic channel to an appropriate dimension, pattern, meander, and profile of approximately 5,000'. The project will also involve construction of approximately acres of riparian wetland	Stream Restoration	11,000'	This project was originally scheduled for 1998-99, but due to logistical difficulties, will now likely commence in Spring/Summer 2001	Chris Clancy	20 bull trout	Y	_0	N
Bitterroot River	Kolb Spring Creek	Channel reconstruction	Improve spawning/rearing habitat, riparian condition and water quality	1 mile	2001-2002	Ladd Knotek	0	In Progress	0	Y
Bitterroot River	Laird Creek	Channel reconstruction, add woody debris, riparian revegetation.	Channel stabilization, habitat improvement, passage improvement	700'	Summer 2003	Chris Clancy Mark Lere	0	Y	0	N
Bitterroot River	Lolo Creek	Install Fish Screen	Reduce entrainment	1 mile	2003-2005	Ladd Knotek	0	N	0	Y
Bitterroot River	Mill Creek	Channel reconstruction, riparian revegetation, riparian fencing	Improve spawning and rearing habitat	7500'	Summer 2003	Chris Clancy Mark Lere	0	N	0	Y
Bitterroot River	Skalkaho Creek	Construct two siphons on Hedge & Republican ditches	Reduce entrainment into canal system.		Summer 2003	Chris Clancy Mark Lere	0	N	0	N
Blackfoot	Arrastra Creek	Culvert replacement	Improve fish passage for bull trout and WSCT	200'	Fall 2004	Ron Pierce Greg Neudecker	0	--	--	Y
Blackfoot	Beaver Creek	Fish-Friendly Irrigation	Upgrade Diversion	200'	July-September 2002	Ron Pierce Greg Neudecker (FWS)	0	N	0	Y

Drainage	Water	Action (Provide detailed description)	Purpose	Length/ Area	Date of Action	Personnel	Est. Mort.	Comp-leted?	Actual Mort.	Do in 2004?
Blackfoot	Blackfoot River	Bank Stabilization	Provide habitat-friendly option to riprap at county road crossing	200'	July-September 2002	Ron Pierce Greg Neudecker (FWS)	0	Y	0	N
Blackfoot	Cottonwood Creek	Ditch closure, off-stream water development (FFI-07-02)	Cattle exclusion	1 mile	2002	Mark Lere	0	Y	0	N
Blackfoot	Dunham Creek	Fish-Friendly Diversion	Improve Fish Passage	300'	July-September 2002	Ron Pierce Greg Neudecker (FWS)	0	Y	0	N
Blackfoot	Dunham Creek	Channel Reconstruction	Habitat Restoration	1 mile	2001	Ron Pierce	10	Y	0	N
Blackfoot	Kleinschmidt Creek	Reconstruct the full channel along 1 mile of stream where it is very degraded and overwidened. Will be funded by FWP, MDT, FWS. This project should result in immediate benefits to bull trout	Stream Restoration	6,000'	Spring/Summer 2001	Ron Pierce Greg Neudecker (FWS)	0	Y	0	N
Blackfoot	McCabe Creek	Channel Reconstruction	Habitat Restoration	0.5 miles	2001	Ron Pierce	0	Y	0	N
Blackfoot	McCabe Creek	Continuation of restoration work being done on McCabe Creek. Consolidation of five diversions into a single diversion located on the upper most ditch. A self-cleaning screen was recently added to this ditch. Provide additional instream flow by upgrading one sprinkler system and converting from flood to sprinkler irrigation in another field; and restoration of a channelized steam reach by returning flow back to the more stable historic channel and installing large woody debris.	Stream Restoration	3,960' directly affected; 3.5 miles will ultimately be improved.	Consolidation of diversions will occur in Fall 2000; Restoration work in Spring/ Summer 2001	Ron Pierce	0	Y	0	N

Drainage	Water	Action (Provide detailed description)	Purpose	Length/ Area	Date of Action	Personnel	Est. Mort.	Comp-leted?	Actual Mort.	Do in 2004?
Blackfoot	Monture Creek	Habitat Restoration	Improve Habitat, prevent an avulsion	500'	2002	Ron Pierce Greg Neudecker (FWS)	0	Y	0	N
Blackfoot	Nevada Creek	Fish-Friendly Diversion	Improve Fish Passage	300'	July-September 2002	Ron Pierce Green (NRCS)	0	Y	0	N
Blackfoot	Nevada Creek, Quigley Diversion	Irrigation diversion upgrade with fish ladder	Restore upstream passage for cutthroat trout	200'	Oct. 1998	Ron Pierce	0	Y	0	N
Blackfoot	Nevada Creek, Winegrass Ranch	Livestock fencing and irrigation diversion upgrade with fish ladder	Improve riparian condition and restore upstream passage for cutthroat trout	200'	Oct. 1998	Ron Pierce	0	Y	0	N
Blackfoot	Nevada Spring Creek	Channel Reconstruction	Restore Habitat	2 miles	2002	Ron Pierce Greg Neudecker (FWS)	0	Y	0	Y
Blackfoot	Nevada Spring Creek	Channel Reconstruction Fencing for 3 miles of stream	Habitat Restoration	3 miles	In Progress	Ron Pierce	0	Y	0	Y
Blackfoot	North Fork	Fish-Friendly Diversion	Move point of diversion – convert from flood to sprinkler irrigation	100'	July-September 2002	Ron Pierce Greg Neudecker (FWS)	0	Y	0	Y
Blackfoot	Poorman Creek	Replace 3 culverts	Provide spawning passage		Summer 2003	Ron Pierce	0	N	0	Y
Blackfoot	Rock Creek (Hoxworth)	Restore channel, install fencing and develop off-stream water	Improve fish habitat & riparian condition	1.1 miles	2001	Ron Pierce	0	Y	0	N
Blackfoot	Rock Creek	Floodplain construction	Improve riparian health and habitat	1.5 miles	Spring 2004	Ron Pierce Greg Neudecker	0	N	0	Y
Blackfoot	Rock Creek, south channel	Channel reconstruction	Improve habitat	2000'	April-June 2004	Ron Pierce	0	N	0	Y

Drainage	Water	Action (Provide detailed description)	Purpose	Length/ Area	Date of Action	Personnel	Est. Mort.	Comp-leted?	Actual Mort.	Do in 2004?
Blackfoot	Warren Creek	Stream channel restoration; riparian fencing; installation of new diversion fitted with a fish ladder	Improve stream channel and riparian condition, and restore upstream passage	1.5 miles	Summer 1999	Ron Pierce	0	N	0 -	Y
Blackfoot	Wasson Creek	Culvert removal; Bridge construction; and upgrade of irrigation diversions and install fish ladders	Restore upstream passage for trout, improve habitat	1125'	Sept. 1998	Ron Pierce	0	Y	0	N
Clark Fork (Lower)	Bull River	Restore riparian area, remove berms, plug existing ditches and revegetate riparian area and floodplain	Riparian/Wetland Restoration	2650'	Summer 2004	Laura Katzman B. Liermann	0	N	0	Y
Clark Fork (Lower)	E.Fk. Bull River	Maintain 1 mile of restored channel	Improve spawning and rearing habitat	1 mile	Summer 2004	Laura Katzman	0	Y	0	?
Clark Fork (Lower)	S. Fork Bull River	Restore ~ 1,000' channel affected by slide	Stream Restoration	~400'	Summer 2003	Laura Katzman	0	Y	0	N
Clark Fork (Lower)	White Pine Creek	Maintain stream channel restoration project	Improve fish habitat	3 reaches within lower 2.5 miles	Summer 2003	Laura Katzman B. Liermann	0	Y	0	?
Clark Fork (Middle)	Butler Creek	Correct 3 fish passage barriers	Provide fish passage	1 mile	2001-2002	Ladd Knotek	0	Y	0	N
Clark Fork (Middle)	Deer Creek	Upgrade & screen irrigation diversion, habitat improvement	Decrease fish losses, Improve instream habitat	1 mile	2001-2003	Ladd Knotek	0	N	0	Y
Clark Fork (Middle)	Dry Creek	Replace diversion dam with series of rock weirs	Enhance upstream fish passage	~50 m	July - Sept 2004	Ladd Knotek	0	--	--	Y
Clark Fork (Middle)	Marshall Creek	Install fish ladder, screen & upgrade irrigation diversion. Improve 3000' of channel habitat, fence riparian area.	Fish passage, habitat improvement, decrease fish losses	2 miles	2001-2003	Ladd Knotek	0	In Progress	0	Y

Drainage	Water	Action (Provide detailed description)	Purpose	Length/ Area	Date of Action	Personnel	Est. Mort.	Comp-leted?	Actual Mort.	Do in 2004?
Clark Fork (Middle)	Mill Creek	Correct 2 fish passage barriers	Provide fish passage	3 miles	2004-2006	Ladd Knotek	0	N	0	Y
Clark Fork (Middle)	Ninemile Creek	Stabilize eroding stream banks using soft stabilization techniques and planting native vegetation, and install 10,400 feet of riparian fencing along both sides of the stream within a 1.75 mile reach. Protection of the Cedar Creek Road bridge will involve placement of rip rap.	Stream restoration and stabilization	1.75 miles	Spring/Summer 2000	Ladd Knotek	0	Y	0	Y
Clark Fork (Middle)	Ninemile Creek	Riparian fencing (FFI-28-02)	Stream restoration and stabilization	1150 feet	2002	Ladd Knotek	0	Y	0	Y
Clark Fork (Middle)	Rattlesnake Creek	Install fish ladder, upgrade diversion & install screen (FFI-22-02) (FFI-21-02)	Provide fish passage & decrease entrainment losses	2 miles	2001-2003	Ladd Knotek	0	In Progress	0	Y
Clark Fork (Middle)	Rattlesnake Creek	Channel stabilization	Improve spawning and rearing habitat	2500'	2001	Ladd Knotek	0	N	0	Y
Clark Fork (Upper)	Antelope Creek	Riparian revegatation	Stream restoration	2.8 miles	June-Sep`t	Eric Reiland	0	Y	0	N
Clark Fork (Upper)	Flint Creek	Reconstruction of 2 fish-friendly headgates	Allow for fish passage and provide for natural bedload movement		Summer 2001	Eric Reiland Johnson	0	Y	0	N
Clark Fork (Upper)	Harvey Creek (Weaver Ranch)	Channel stabilization and riparian fencing (FFI-12-02)	Reduce erosion; increase spawning habitat; stabilize stream	3600'	Spring 1999	Eric Reiland	0	Y	0	N
Clark Fork (Upper)	Lost Creek (Heggelund)	Habitat improvement, off-site water, revegetation	Stream restoration	3 miles	June-Sept	Eric Reiland	0	Y	0	Y
Clark Fork (Upper)	Lost Creek (Lord)	Habitat improvement, off-site water, revegetation	Stream restoration	1.5 miles	June-Sept	Eric Reiland	0	Y	0	Y
Clark Fork (Upper)	Lost Creek (Ueland)	Habitat improvement, off-site water, revegetation	Stream restoration	6 miles	June-Sept	Eric Reiland	0	Y	0	Y
Clark Fork (Upper)	Lost Creek (Lampert Ranch)	Channel stabilization and riparian fencing	Reduce erosion; increase spawning habitat; prepare channel for increased flows	2.1 miles	Spring 1999	Eric Reiland	0	Y	0	Y

Drainage	Water	Action (Provide detailed description)	Purpose	Length/ Area	Date of Action	Personnel	Est. Mort.	Comp-leted?	Actual Mort.	Do in 2004?
Clark Fork (Upper)	Lost Creek (Mathews Ranch)	Headgate reconstruction; riparian fencing; bridge construction	Improved flows during fall spawning period; reduced sediment	1500'	Spring 1999	Eric Reiland	0	Y	0	Y
Clark Fork (Upper)	Trout Creek (Trib. To Flint Creek)-Dennis Ranch	Stream Channel relocation and stabilization; Livestock facility relocation	Reduce sediment and nutrient inputs; wetland improvements	4000'	Winter 1999	Eric Reiland	0	Y	0	Y
Clark Fork (Upper)	Trout Creek (Trib. To Flint Creek)-McClain Ranch	Channel stabilization, livestock watering site relocation; riparian fencing	Reduce sediment inputs, increase fisheries potential improve wetlands	2640'	Spring 2001	Eric Reiland	0	Y	0	Y
Clark Fork (Upper)	Trout Creek (Trib. To Flint Creek)-Yardley Ranch	Stream channel restoration and relocation; channel stabilization; off-site water development	Reduce sediment input; increase fisheries potential; improve wetlands	4000'	Winter 1999	Eric Reiland	0	Y	0	Y
Clark Fork (Upper)	Warm Springs Creek	Fish Passage	Meyers Dam Fish Passage	.1	2002	Eric Reiland	0	Y	0	N
Clark Fork (Upper)	Warm Springs Creek	Stream channel relocation and stabilization; habitat improvement; riparian management; removal of tailing deposits; screening of irrigation diversions	Stabilize eroding banks; reduce sediment inputs; increase spawning area, prevent loss of fish in diversions	17 miles	In progress	Eric Reiland	0	Y	0	Y
Clark Fork (Upper)	Wood Creek	Riparian revegatation	Stream restoration	1 mile	June-Sept	Eric Reiland	0	Y	0	N
Clark Fork River	Bert Creek	Riparian Fencing	Riparian Vegetation	2.5 miles	2003	Eric Reiland	0	N	0	N
Clark Fork River	Twin Lakes Creek	Fish Passage Screening	Fish Passage	0.1 miles	2003	Eric Reiland	0	Y	0	N
Flint Creek (CFR)	Flint Creek	Corral Relocate	Improve Water Quality	0.1 miles	2003	Eric Reiland	0	N	0	N
Flint Creek (CFR)	Sams Springs Creek	Wetland and stream restoration	Stream restoration	0.8 miles	2003	Eric Reiland	0	N	0	Y

Drainage	Water	Action (Provide detailed description)	Purpose	Length/ Area	Date of Action	Personnel	Est. Mort.	Comp-leted?	Actual Mort.	Do in 2004?
Kootenai River	Grave Creek	Screen Glen Lake Diversion Reconstruct channel at the diversion site to a more stable form and function	Exclude juvenile and adult bull trout from ditch Improve sediment transport through the reach, remove migration inhibiting diversion dam	1/4 mile	Aug-Nov. 1999	Jim Dunnigan	0	Y	0	N
Kootenai River	Grave Creek	Habitat enhancement in lower 3 miles		3 miles	Fall 2002-2005	Jim Dunnigan	0	N	0	Y
Kootenai	Libby Creek	Maintenance of bank stabilization projects completed in 2001 and 2002	To repair restoration work damaged by high water events	4000 ft. total	Year-round	Jim Dunnigan	0	Y	0	0
Kootenai	Pipe Creek	Bank stabilization and salmonid habitat enhancement	Increase stream channel stability and increase quantity and quality of salmonid habitat	4500 ft. total	Fall 2004	Jim Dunnigan	0	Y	0	Y
Kootenai	Therriault Creek	Install irrigation diversion and fish screen	Eliminate entrainment into irrigation diversion ditch	400 ft.	6/1-10/30	Jim Dunnigan	0	N	0	0
Kootenai River	Therriault Creek	Bank stabilization and salmonid habitat enhancement	Increase stream channel stability and increase quantity and quality of salmonid habitat, and restore historic wetland habitats.	4.500'	Spring 2004	Jim Dunnigan	0	N	0	Y
Rock Creek	Beaver Creek	Stream Restoration (FFI-03-02)	Restore Degraded Channel	1.5 miles	2002	Eric Reiland	2	N	0	Y
Rock Creek	East Fork Rock Creek	Stream Restoration	Restore Degraded Channel	.9 miles	2002	Eric Reiland	10	N	0	Y
Rock Creek	East Fork Rock Creek	Fish Screen	Fish Loss	.1 miles	2002	Eric Reiland	0	N	0	Y
Rock Creek	Hogback	Bridge Replacement	Fish Passage	.1 miles	2002	Eric Reiland	0	N	0	Y
Rock Creek	Mainstem Rock Creek	Riparian fencing (FFI-23-02)	Cattle exclusion	1 mile	2002	Eric Reiland	0	N	0	Y
Rock Creek	Middle Fork Rock Creek	Stream Restoration	Restore Degraded Channel	6.1 miles	2002	Eric Reiland	0	N	0	Y
Rock Creek	Ross Fork Rock Creek	Stream Restoration	Restore Degraded Channel	5.0 miles	2002	Eric Reiland	0	N	0	Y

Drainage	Water	Action (Provide detailed description)	Purpose	Length/ Area	Date of Action	Personnel	Est. Mort.	Comp-leted?	Actual Mort.	Do in 2004?
Rock Creek	Upper Willow Creek	Stream Restoration	Restore Degraded Channel	2.6 miles	2002	Eric Reiland	5	N	0	Y
Rock Creek (Trib. To Upper Clark Fork)	East Fork Rock Creek	Channel reconstruction and stabilization; fish weir construction	Improve and stabilize stream flow where it goes subsurface; prevent upstream migration of brook trout; increase bull trout spawning habitat	1.7 miles	Ongoing	Eric Reiland	10	N	0	Y
Rock Creek (Trib. To Upper Clark Fork)	East Fork Rock Creek	Stream restoration (design and data collection)	Stream restoration	2.2 miles	June-Sept	Eric Reiland	10	N	0	Y
Rock Creek (Trib. To Upper Clark Fork)	Main Stem Rock Creek (Strand Ranch/Rohrn sen Ranch/ Sanders Ranch/Gillie s Ranch Clark Ranch	Stream channel restoration and stabilization; riparian fencing; irrigation canal screening; grazing management	Reduce erosion and sediment input; improve stream integrity; reduce loss of fish in irrigation canals	17 miles	Feasibility Study in Spring 1998	Eric Reiland	15	N	0	Y

PERSONNEL

The following Montana Department of Fish, Wildlife and Parks personnel will be overseeing or conducting the activities described in previous sections.

Name	Education	Area	Prof. Exper. (Years)
Benner, Monty	B.S. University of Montana (Wildlife Biology - Aquatic)	Libby - Kootenai	8
Benson, Neil	B.S. University of Montana (Wildlife Biology - Aquatic)	Libby - Kootenai	14
Berg, Rodney	M.S. Montana State Univeristy (Fish & Wildlife Mgmt.)	Missoula-Clearwater	29
Cavigli, John	B.S. University of Idaho (Fisheries Biology)	Kalispell - Flathead	24
Clancy, Chris	M.S. Montana State University (Fish / Wildlife Mgmnt.)	Hamilton - Bitterroot	28
Daniels, Durae	B.A. Plattsburgh State (Environmental Science)	Flathead	8
Deleray, Mark	B.S. U.C. Berkeley (Biology) M.S. Montana State University (Fish/Wildlife Mgmnt)	Kalispell - Flathead	15
DeShazer, Jay	B.S. Montana State University (Fish/Wildlife Mgmnt.)	Libby - Kootenai	16
Dunnigan, Jim	B.S. University of Idaho M.S. University of Idaho	Libby, Kootenai	10
Garrow, Larry	B.S. University of Montana (Wildlife Biology - Aquatic)	Libby - Kootenai	18
Glutting, Stephen	B.S. University of Idaho (Fisheries Biology)	Kalispell - Flathead	23
Grisak, Grant	A.S. Northern Montana College (Biology) B.S. Northern Montana College (Biology) M.S. Montana State University (Fish/Wildlife Mgmnt.)	Kalispell	14
Hadley, Wayne	PhD Oklahoma State University	Missoula - Upper Clark Fork	43
Hensler, Mike	B.A. Whitman College (Biology) B.S. Montana State University (Fish/Wildlife Mgmnt.) M.S. Montana State University (Fish/Wildlife Mgmnt.)	Libby - Kootenai	21
Hunt, Rick	B.S. University of Michigan (Fisheries Science)	Kalispell - Flathead	13
Javorsky, Larry	M.S. Montana State University (Fish/ Wildlife Mgmnt)	Hamilton - Bitterroot	16
Katzman, Laura	B.S. University of Wisconsin-Stevens Point	Thompson Falls-	11

	(Biology/Resource Mgt. Envir. Ed. & Interp.) M.S. Montana State University (Fish & Wildlife Mgmt.)	Lower Clark Fork	11
Knotek, Ladd	B.S. University of North Dakota (Fish/Wildlife Biology) M.S. Virginia Tech. (Fisheries Science)	Missoula - Clark Fork	15
Liermann, Brad	B.S. University of Montana (Wildlife Biology – Aquatic emphasis) M.S. Montana State University (Fish/Wildlife Mgt)	Thompson Falls, - Lower Clark Fork	6
Marotz, Brian	B.S. Univ. of Wisconsin at Stevens Point M.S. Louisian State Universityat Baton Rouge	Flathead Kootenai	22
Michael, Gary	A.S. Penninsula College, WA (Fisheries)	Kalispell - Flathead	23
Muhlfeld, Clint	B.S. University of Montana (Aquatic Biology) M.S. University of Idaho (Fisheries Resources)	Kalispell - Flathead	13
Ostrowski. Tom	B.S. Michigan State University (Forest Resource Mgmnt.)	Libby - Kootenai	15
Pierce, Ron	B.S. University of Montana	Missoula - Blackfoot	17
Reiland, Eric	B.S. Colorado State University (Fish/Wildlife Mgmnt.) M.S. Montana State University (Fisheries Management)	Missoula - Rock Creek, Clark Fork	18
Rumsey, Scott	B.S. William Jewel College, MO (Wildlife Biology)	Kalispell - Swan	29
Saffel, Pat	B.S. South Dakota State (Fisheries Science) M.S. University of Idaho (Fishery Resources)	Thompson Falls - Lower Clark Fork	12
Schmetterling, Dave	B.S. University of Montana	Missoula - Blackfoot, Clark Fork	11
Vashro, Jim	B.S. University of Montana (Zoology - Aquatic Option) M.S. - Cornell University (Fishery Science)	Kalispell - Flathead	30
Wachsmuth, John	B.S. University of Montana (Parks and Recreation)	Kalispell - Flathead	22
Weaver, Tom	B.S. University of Montana (Wildlife Biology)	Kalispell - Flathead, Swan	27

Contacts:

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Montana Department of Fish, Wildlife and Parks - Libby Field Office
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Libby, MT 59923
406-293-4161

Montana Department of Fish, Wildlife and Parks - Region 2
Pat Saffel - Regional Fisheries Manager
3201 Spurgin Road
Missoula, MT 59804
406-542-5500

<u>Other Qualified Personnel</u>

In addition to the above listed individuals, the Department is seeking authority to sub-permit other qualified individuals engaged in bull trout recovery or conservation activities under the authority of this Section 6 authorization. These individuals include other agency biologists (Forest Service, BLM, U.S. Fish and Wildlife Service), university researchers, and biological consultants. Any individual seeking to collect fish in Montana must first obtain a Scientific Collectors Permit from the Department. Through this state permitting process, project proposals, personnel, and methodologies can be carefully scrutinized to ensure the proposed activities are necessary, in accordance with accepted protocols, and in compliance with ESA requirements. If a state collectors permit is issued, it will contain stipulations regarding types of activities authorized, timing of collection, collection methods, collection locations, and reporting requirements. Collection reports will be mandatory, and will be included with the Department's annual Section 6 report. Only activities that contribute to the conservation or recovery of bull trout will be permitted. If collection permits are issued for projects that may result in take, the Department will provide an amendment to the Service to ensure ESA requirements are met.

Qualified individuals also participate in other conservation and recovery actions beyond collection, such as habitat restoration, redd counts, and research. Such projects are often cooperative efforts involving numerous individuals and agencies. The Department seeks authorization to include such projects and individuals being done in cooperation with the Department under this Section 6 authorization.

REPORTING

Annual reports of project status and estimated take will be summarized in an annual report and submitted to the Service by February 28 of the following calendar year.

Up to five mortalities will be taxidermist mounted and used for educational purposes. All other mortalities will be preserved frozen and shipped to the U.S. Fish and Wildlife Service's Fish Health Laboratory in Bozeman, Montana by the end of each field season.

CONCLUSION

The above listed activities represent a very comprehensive summary of all activities being conducted directly or in cooperation with the Montana Department of Fish, Wildlife and Parks. Although some of the above listed activities may result in take of bull trout, all will ultimately result in the conservation and recovery of the species. Any additional activities that may result in take of bull trout will be amended to this plan. The actual take of bull trout associated with the bull trout conservation activities documented in this report as occurring in 2003 consisted of 3765 bull trout handled with a total of 218 mortalities.

ATTACHMENTS

The following were previously provided to the USFWS in support of this document. Additional copies are available by request.

Clearwater River Drainage Fishery Study

FWP Electrofishing Methods Policy

FWP Electrofishing Safety Policy and Guidelines

Montana Bull Trout Redd Survey Manual

Analysis of Bull Trout Population Genetic Structure in the Clark Fork River Drainage

Study Proposal - Bull Trout Movement and Habitat Use in Relation to Macro Habitat Parameters in the Rock Creek Drainage, Montana

Future Fisheries Improvement Program Fact Sheet and Information Brochures

The following are provided in support of this document:

Thompson Falls Dam Trap Protocol
Redd Count Report

THOMPSON FALLS DAM TRAP PROTOCOL
March 21, 2003

1. Record date, personnel, weather, water temperature and time taken, if spillgates were open or closed, condition of trap, gage height, and mark given.

2. Record fish species code (see code list).

    a) <u>If catch radio-tagged fish</u>: record tag frequency if possible and condition of fish and incision; take photos of incision wound if possible and release immediately. For all other fish, anesthetize fish with MS-222 or clove oil.
    b) <u>For all trout</u>: measure total length of fish in millimeters and weight in grams and sex if known (record how determined sex, that is if fish is ripe, etc.). Check for and record any fin clips or tag colors and numbers. If fish looks like it is hybridized record a description of the characteristics of the fish (i.e., throat slash yellow, spotting pattern like rainbow trout, dorsal fin has spots, worm tracks on back, body shape of brook trout) and take photos if possible. Photos should be of the feature showing potential hybridization (i.e., throat slash, dorsal fin); record photo numbers on data sheet.
    c) <u>For all other fish</u>: 1) check for and record any fin clips; 2) clip caudal fin (upper and lower on alternating week basis – see calendar in clipboard); and 3) measure total length of fish in millimeters and weight in grams and sex if known (record how determined sex, that is if fish is ripe, etc.) for 25 of each species per week.

3. <u>If trout</u> take scale sample. Scale envelopes should contain the following information: date, location, species, length, weight, collector, and scale sample number.

4. <u>If bull trout or westslope cutthroat trout or any bull trout or any hybridized bull trout or cutthroat trout</u>, take fin clip (from rayed fin) for genetic analysis. The clip should be at least half the size of a paper punch. Store fin clip in 95% ethanol in vial with label made of rite-in-the-rain paper written on with pencil. The label should contain the following information: date, location, species, and genetic sample number.

5. <u>If bull trout or westslope cutthroat trout >75 mm</u>, scan for PIT tag. If none and fish will not be radio-tagged, prepare to PIT tag. Attach needles to syringe(s). Place syringes with needles in sponge in tupperware container and fill with enough isopropyl alcohol to cover top of sponge. Soak needles in the alcohol at least 10 minutes before using. Scan fish with PIT tag reader and record PIT tag number. Note: After using, re-soak needles for at least 10 minutes before using on another fish. Clip adipose fin of each fish PIT tagged.

6. <u>If bull trout</u> take fin ray clip from pelvic fin for aging (see attached protocol). Store dry in scale envelope labeled with the date, location, species, and genetic sample number. Note: A scale sample is also needed from every bull trout captured.

7. <u>If westslope cutthroat trout or bull trout > 180 g</u> in weight and water temperature is no higher than 16° C, prepare to radio tag. Note: Up to 25 westslope cutthroat trout will be radio-tagged before May 1. The goal will be to radio tag about 5 per week. No westslope cutthroat trout will be radio-

tagged in
May or June (during spawning). Only those familiar with attached radio-tagging protocol should perform surgeries for radio-tagging. Fish need to be > 520 g to receive a 10.3 g tag, > 350 g to receive a 7 g tag, and > 180 g to receive a 3.6 g tag. Wide staples and Prolene monofilament sutures will be used in surgery depending on fish size. When fish have recovered from surgery, prepare to transport above dam and follow attached transport protocol.

NOTE: Only radio-tagged bull trout and westslope cutthroat trout will be passed above the Thompson Falls Dam and fish will only be transported if the water temperature is no higher than 16°C.

8. If dead fish, take total length, weight, genetic samples and scale samples if criteria described above met, and put in ziploc bag (labeled with location of capture, method of capture, date captured, total length, and weight) and freeze. Otoliths can later be removed from these fish and the sex of the fish can later be determined.

9. Clean trap box (especially entrance) well. Check for any holes at base of and around trap box. Check for any holes in trap box mesh. Perform any maintenance necessary.

NOTE: The trap will be operated when the water temperature is less than or equal to 16° C unless trap is closely supervised (i.e., checked every hour) at night.

TRANSPORT PROTOCOL FOR BULL TROUT AND WESTSLOPE CUTTHROAT TROUT

1) Bull trout and westslope cutthroat trout will be processed and transported in groups of five or less to reduce stress and promote survival.

2) Bull trout and westslope cutthroat trout will be transported only if aerator is working and water temperatures are no higher than 16 C. If aerator is not working or water temperatures are greater than 16 C then fish will be released at capture site.

3) Transport fish in covered and aerated container with fresh local water. Proceed with transport in an expeditious manner to reduce stress and promote survival of fish.

4) The release site above the dam is approximately 3.3 miles upstream at the Clark Fork Road Ramp off Cherry Creek Road. At the release site, holding water from the capture site will be tempered to within 3 C of the release site water temperature (and the fish held in this water for 10 minutes) before release.