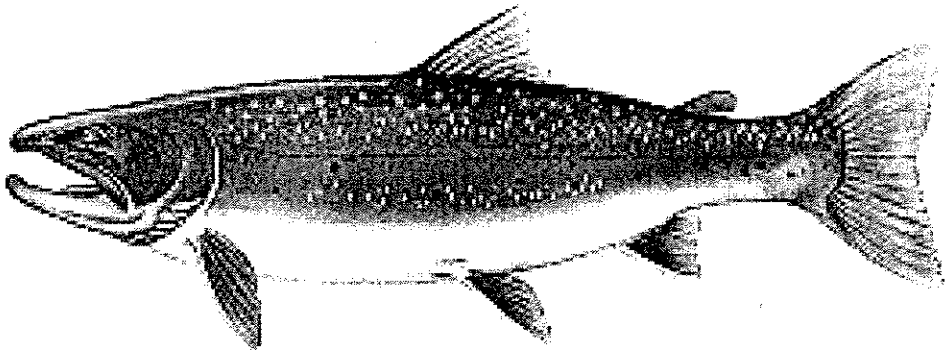
LOWER KOOTENAI RIVER DRAINAGE

BULL TROUT STATUS REPORT

(Below Kootenai Falls)



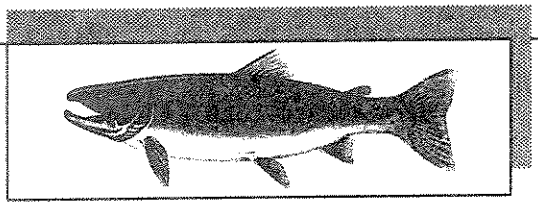
March 1996

Prepared for

The Montana Bull Trout Restoration Team

By

The Montana Bull Trout Scientific Group



Montana Bull Trout Restoration Team

Bonneville Power Administration

Confederated Salish & Kootenai Tribes

Department of State Lands

Montana Chapter American Fisheries Society

Montana Fish, Wildlife & Parks

National Wildlife Federation

Plum Creek Timber Co.

US Fish & Wildlife Service

US Forest Service

TO: Bull Trout Restoration Interested Parties

Bull trout, a native Montana fish, has been the subject of extensive study and broad discussion since Governor Racicot appointed the Bull Trout Restoration Team in early 1994.

The bull trout status reports reflect a portion of both the study and discussion which has occurred during the last two years. These status reports, prepared by the Bull Trout Scientific Group, are designed to provide information about bull trout populations, habitat needs, and threats.

Status Reports have been prepared for bull trout populations in 11 restoration/conservation areas:

- Bitterroot River
- Lower Clark Fork River, downstream of Thompson Falls
- Middle Clark Fork River from Thompson Falls to Milltown, including the lower Flathead River to Kerr Dam
- Upper Clark Fork River, including Rock Creek
- Blackfoot River
- Flathead Lake, including the North and Middle Forks of the Flathead River, Stillwater and Whitefish rivers
- South Fork Flathead River, upstream of Hungry Horse Dam
- Swan Lake/River
- Lower Kootenai River, below Kootenai Falls
- Middle Kootenai River, between Kootenai Falls and Libby Dam
- Upper Kootenai River/Lake Koocanusa, upstream of Libby Dam

Each of these 11 restoration/conservation areas consist of a number of critical populations. The areas have been delineated on the basis of natural barriers and dam-caused fragmentation of historically connected river systems.

These status reports are **working documents**; they are the result of a collaboration of biologists, hydrologists, and other scientists and have drawn on information and research done by people working within each management area.

These documents are intended to provide the most current and accurate information available to the Bull Trout Restoration Team (see Introduction, p. 1) and the local bull trout watershed groups, which will assist them in making informed decisions affecting

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the restoration and conservation of bull trout in Montana. It is hoped that the watershed groups will develop specific recovery actions to help restore bull trout in watersheds throughout western Montana.

The status reports describe risks to bull trout in each watershed. This description of threats and risks to the fish is the best scientific judgement of the Scientific Group and is based on information provided by the local biologists. New and additional information provided by the public, the watershed groups, and the field biologists will add to our understanding of these risks as recovery proceeds. A status review is a continuous process, hence the description of these reports as "working documents."

Likewise, the restoration goal described in each status report is based on the best science available. The goal describes what would be necessary to recover fully functioning bull trout populations in each watershed and may not reflect what is realistically practical in all watersheds, considering time, budget, local interest, and/or other overriding constraints. It is presented as a goal, not necessarily as an inflexible expected outcome.

It is the sincere hope of the Restoration Team and Scientific Group that these documents will assist the watershed groups in "going forth and doing good things" for bull trout.

As always, we welcome your comments regarding bull trout restoration. Please send your thoughts or call Glenn Marx, Governor's Office, Capitol Station, Helena, MT 50620 (444-5506) or Shelley Spalding, Montana Fish, Wildlife and Parks, P.O. Box 20071, Helena, MT 59620 (444-7409).

Sincerely,

Larry P. Peterman

Larry Peterman, Chairman
Bull Trout Restoration Team

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EXECUTIVE SUMMARY

This document addresses historic and current status and distribution of bull trout in the Lower Kootenai River drainage, identifies major threats, and describes core areas and nodal habitats. The area covered by this document includes the Kootenai River and its tributary drainages from Kootenai Falls downstream to the Montana-Idaho border.

Bull trout were one of five salmonids native to the Kootenai River drainage. It is believed bull trout were once widely distributed in the Kootenai River and tributary streams. The present distribution of bull trout is much reduced from historic levels in this drainage.

Risks

There are several risks to bull trout populations in the Lower Kootenai River restoration area. A primary concern is the need for a more formal working relationship with Idaho and Canada in addressing bull trout restoration in this drainage. The fact that the bull trout population in this drainage is comprised primarily of migratory fish, most of which originate in Idaho and/or Canada, makes restoration a difficult issue for Montana to address alone.

The second major risk is introduced species. Brook trout are present in the only core area (the O'Brien Creek watershed) and there is also a risk of lake trout introductions into Bull Lake and Kootenay Lake, BC. Dam operations and illegal harvest are also considered very high risks to bull trout in this drainage.

Core Areas

Core areas are drainages that historically and currently contain the strongest populations of bull trout. These habitats are key to the continued existence of bull trout in the Lower

Kootenai River drainage. These areas must be stringently protected.

The only core area for the Lower Kootenai restoration area is the O'Brien Creek watershed. Nodal habitats (those areas containing migratory corridors, overwintering areas, and critical rearing habitat) are the Kootenai River and Kootenay Lake, BC.

A disjunct bull trout population exists in Bull Lake and the Lake Creek drainage upstream of Troy Dam. The core areas for this population include the Keeler and Stanley creek watersheds. Nodal habitat for the Bull Lake population includes Bull Lake and Lake Creek.

Restoration Goal

The restoration goal for the Lower Kootenai drainage is to maintain existing self-sustaining populations with stable age structure and distribution; improve current habitat conditions in O'Brien Creek; protect the integrity of the population genetic structure; and establish a protocol for information exchange with Idaho and British Columbia. Specifically, a baseline of redd counts should be established in all drainages that presently support spawning migratory fish (O'Brien Creek and possibly Callahan Creek and the Yaak river below Yaak falls). If the total baseline exceeds 100 redds or 2000 individuals, an increasing trend should be the goal. If the baseline is below 100 redds or 2000 individuals, then an increase to the baseline level should be the immediate goal with an increasing trend thereafter.

The goal of bull trout restoration efforts for the Bull Lake population is to maintain the population genetic structure, improve habitat conditions in the core areas, and maintain the migratory component of the population. Specifically, a baseline of redd counts should be established in all drainages that presently support spawning migratory fish (Stanley and Keeler creeks). If the total baseline exceeds 100 redds or 2000 individuals, an increasing trend should be the goal. If the baseline is below 100 redds or 2000 individuals, then an increase to the baseline level should be the immediate goal with an increasing trend thereafter.

It should be recognized that these goals are based on the best information currently available. However, the level of uncertainty about the specific numbers of redds and individuals is high. These goals may require modification as more information becomes available.

LOWER KOOTENAI RIVER DRAINAGE
BULL TROUT STATUS REPORT

INTRODUCTION

In January, 1994, the Governor of Montana established a Bull Trout Restoration Team to develop a restoration plan for bull trout *(Salvelinus confluentus)* in Montana. The Restoration Team created a Scientific Group to provide guidance on technical issues related to the restoration of this fish.

The Scientific Group reviewed the status of bull trout and the risks to the survival of the species in Montana. In addition, the Scientific Group prepared reports on three of the most significant issues in bull trout restoration: (1) land use impacts, (2) removal and suppression of introduced species, and (3) the use of hatcheries and transplants in restoration. Because the threats facing bull trout vary widely in western Montana, separate reports were prepared for each of twelve major restoration/conservation areas, except Rock Creek which is included in the Upper Clark Fork report. Delineation of these areas was largely based on the fragmentation of historically connected systems (Figure 1). Loss of interconnectivity results from migration barriers or other habitat changes, such as dams, altered thermal regimes or stream dewatering. Each of the twelve restoration/conservation areas presently contains core and nodal habitats for bull trout.

This report is one of three bull trout status reports for the Kootenai River drainage. It addresses the historic and current status and distribution of bull trout, describes major risks to its continued existence, and identifies core areas and associated nodal habitats for bull trout in the Lower Kootenai River drainage from Kootenai Falls to the Montana/Idaho border (Figure 2).

Two other bull trout populations exist in the Kootenai River; one between Kootenai Falls and Libby Dam, and the other in Lake Koocanusa and the Kootenai drainage upstream from

Libby Dam. These two populations are addressed in separate reports. All three bull trout populations in the Kootenai drainage are presently isolated by physical barriers to upstream migration and only downstream genetic exchange can occur.

An extensive portion of the Lower Kootenai population's range is located in the state of Idaho and the province of British Columbia. In order for effective restoration planning to take place, representatives of these governments and other interested publics should be invited to participate in restoration planning efforts.

The Kootenai River drainage basin is an international watershed, with approximately two-thirds of the watershed within the province of British Columbia, Canada (Knudsen 1994). The Kootenai River is the second largest tributary to the Columbia River and has an average annual flow, measured near the Montana/Idaho border, of 14,150 cfs (USGS 1995). The total drainage area of the basin is 14,000 mi^2, with 3,750 mi^2 of that in the state of Montana (Knudsen 1994).

The river originates in Kootenay National Park in British Columbia, along the west slope of the Canadian Rockies. The river flows southward and enters Lake Kookanusa in the southeastern corner of British Columbia. Lake Kookanusa, created by Libby Dam, spans the US/Canadian border. Below the dam, the river turns northwest and crosses the Montana/Idaho border near Troy, Montana.

Approximately 90% of the Kootenai basin is coniferous forest; a small amount is agricultural land used mainly for pasture and forage production (Marotz et al. 1988). Land ownership within the Lower Kootenai Restoration Area in Montana (exclusive of the Yaak River drainage above Yaak Falls) is approximately 79% Forest Service, 10% Plum Creek Timber Corporation, 2% state, and 8% other private lands.

Figure 1. Bull Trout Restoration/Conservation Areas in Montana

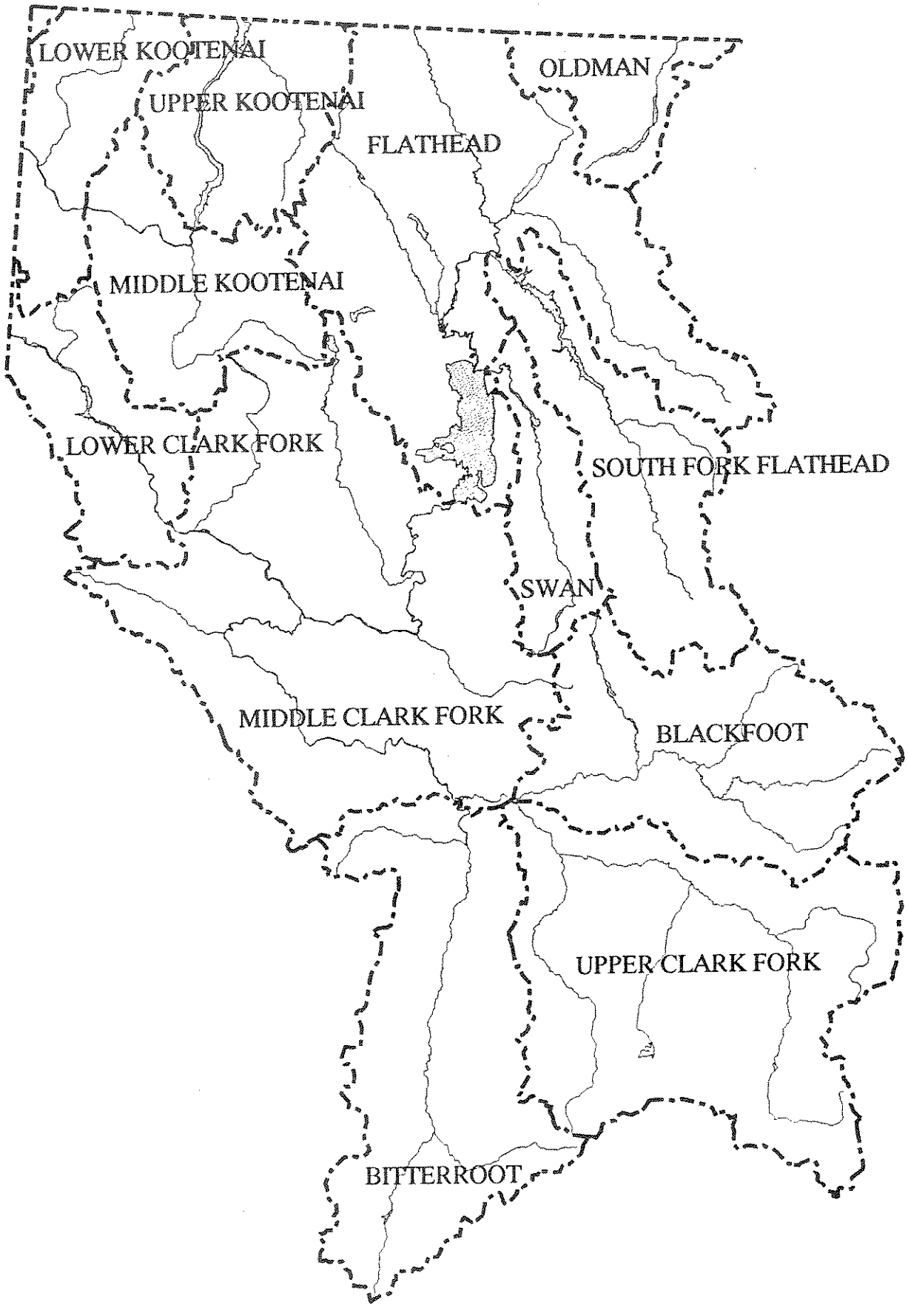
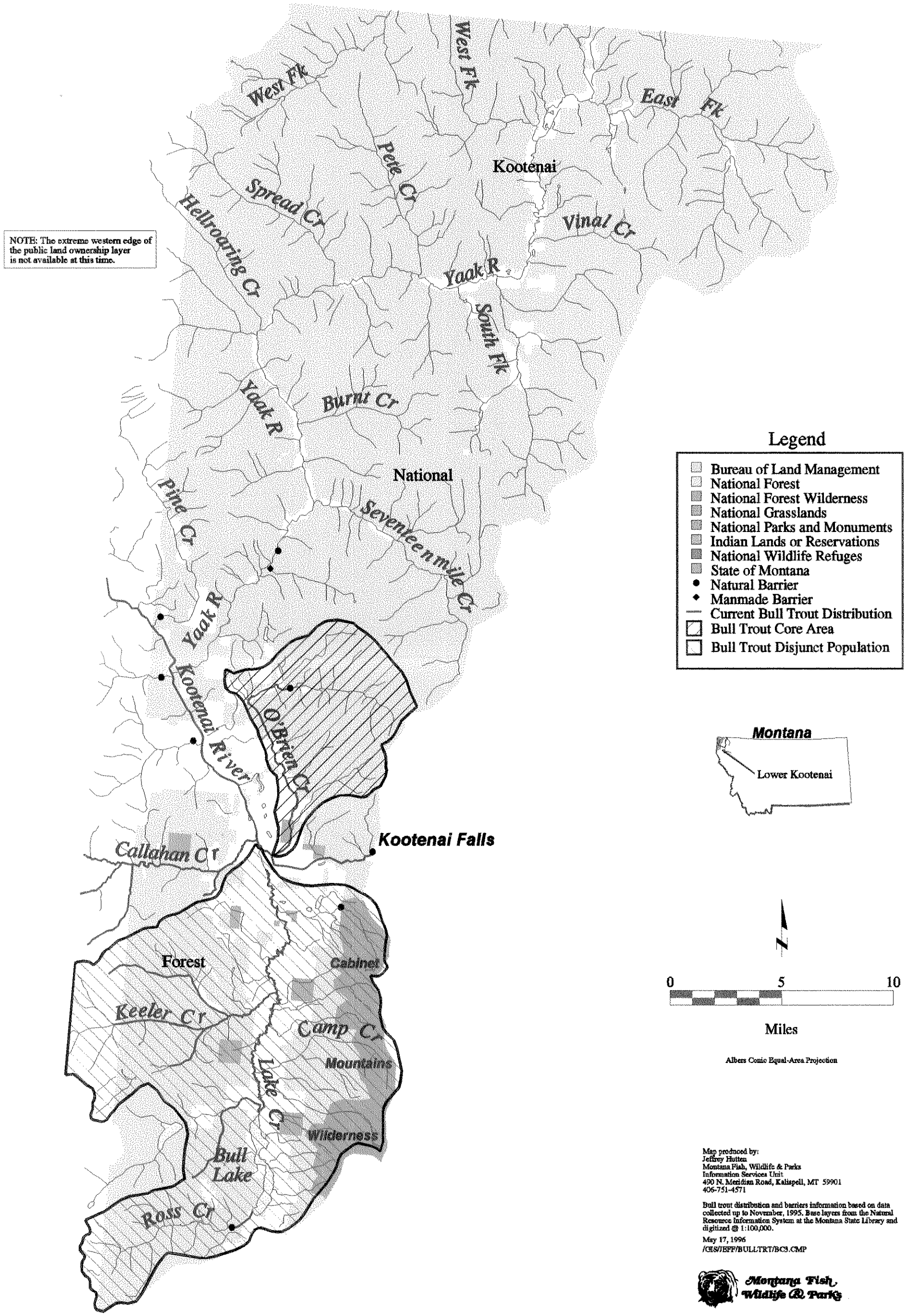


Figure 2. Bull trout distribution and core areas in the Lower Kootenai drainage.



The underlying bedrock of the Kootenai River drainage downstream from Kootenai Falls consists primarily of belt series rock. Intrusions of igneous rock are scattered throughout the area. Two large, younger intrusions of granite are located south of the Kootenai River in the Madge/Camp Creek and Callahan/Keeler Creek areas. The area has been highly influenced by glacial activity from both continental ice masses and alpine glaciation.

The climate is dominated by Pacific Maritime weather characteristic of much of the Northwest. Generally cloudy, cool, and wet weather occurs in the winter, often with steady soaking rains and wet snows. The area is often (every 6 to 10 years) influenced by fall and winter "rain on snow" events that result in higher stream flows than occur during spring runoff. Precipitation ranges from 25 inches in Troy, MT to over 100 inches in the Cabinet Mountains, with the average for the area being above 40 inches.

The Kootenai River basin remains remote and sparsely populated. Fewer than 100,000 people live within the basin upstream of Kootenay Lake. Forest products industry are the principal industries in the Kootenai basin. Other important industries are coal and hard rock mining and the production of hydroelectric energy (Knudsen 1994).

HISTORIC AND CURRENT STATUS OF BULL TROUT IN THE LOWER KOOTENAI RIVER DRAINAGE

Historic Distribution

Historically, bull trout were one of five native salmonid species distributed throughout the Kootenai River drainage. The other native salmonids were westslope cutthroat trout (*Oncorhynchus clarki lewisi*), redband rainbow trout (*Oncorhynchus mykiss gairdneri*), pygmy whitefish (*Prosopium coulteri*), and mountain whitefish (*Prosopium williamsoni*) (Brown 1971). The historic bull trout population in the river below Kootenai Falls likely included migratory fish from Kootenay Lake in British Columbia as well as fish which may have moved freely between Idaho and Montana. Resident bull trout may have been present but this life form is unconfirmed. Little quantitative information exists regarding historic bull trout abundance downstream from Kootenai Falls in Montana.

Suckley (1861) reported collecting a bull trout from the Kootenay River, but the exact location of this collection is unknown. Weisel and Dillon (1954) reported bull trout in Bull Lake. Spawning bull trout collected from O'Brien Creek in 1960, 1961, and 1962 were very likely migrants from the Kootenai River (Huston 1961; Huston 1963).

Schaeffer (1940) reported that char [bull trout], trout, and whitefish were the important fish to the Kutenai Indians, taken principally during the period of summer freshet. He mentions the Upper Kutenai using basket traps for fishing in the tributaries of the Kootenai and Elk rivers, where trout and char [bull trout] were taken as they were moving back into the main rivers in the autumn. Harpoons were used to catch bull trout during their downstream movement in September. Charr [bull trout] were caught in this way in the Kootenai drainage at the junctions of the Wigwam, or Lodgepole Creek, with the Elk River (Schaeffer 1940).

Current Distribution

Bull trout are distributed from Kootenai Falls downstream to Kootenay Lake in British Columbia. Spawning and rearing by migratory adults likely occurs in tributaries draining portions of British Columbia, Idaho and Montana (Figure 1). These migratory fish spend their adult lives in Kootenay Lake and/or the Kootenai River itself. Resident populations may exist, but we have no documentation. The Scientific Group has not attempted to collect current bull trout information for Idaho or British Columbia but recommends that this information be collected and incorporated as part of the restoration effort.

Historically, Kootenai Falls may not have been a barrier to upstream fish passage during periods of high stream flows (Chapman and May, 1986). The construction of Libby Dam changed flow regimes in the Kootenai River, reducing spring high flows, and likely eliminated the potential for upstream fish passage over Kootenai Falls. However, it is known that bull trout currently pass downstream over Kootenai Falls (May and Huston 1983). A bull trout tagged in Quartz Creek was recaptured in a tributary stream in Idaho, confirming downstream fish passage over Kootenai Falls (Marotz et al. 1988).

The most important spawning and rearing area in the Montana portion of this recovery area is O'Brien Creek. Montana Fish, Wildlife and Parks (FWP)operated an upstream trap in O'Brien Creek during from June to September, 1992. During this period, 20 adult bull trout were captured in the trap. Based on the relatively large size of adults captured (up to 30 inches), these fish were likely migrants from the Kootenai River(FWP unpublished file data). Spawning site inventories have been completed annually in O'Brien Creek since 1992. In 1992, a total of 24 redds were located and in 199334 redds were located. The presence of the trap in 1992 may have adversely affected the spawning migration. Field crews observed seven migratory bull trout redds in O'Brien Creek during 1994. The low count is attributed to extensive, new beaver activity and low stream flow (FWP unpublished file data). Field crews observed adult bull trout congregated at the mouth of O'Brien Creek during late August, 1994. A debris accumulation near

the old Troy Water Works may have partially blocked upstream passage (J. DeShazer, Montana Fish, Wildlife, and Parks, Libby, Montana, personal communication).

Resident bull trout may also occur in O'Brien Creek, but there is no data available to confirm their presence. Brook trout (*Salvelinus fontinalis*) are present in O'Brien Creek and 87 likely brook trout redds (species determination was based on size, timing and observation of fish on redds) were recorded in 1994 (FWP unpublished file data). Brook trout-bull trout hybridization is suspected in O'Brien Creek but has not been confirmed.

During 1992, Montana Fish, Wildlife and Parks conducted redd counts in several other tributaries to the Kootenai River below Kootenai Falls, including Callahan, Ruby, and Star creeks and the Yaak River. Field crews found no redds in the Yaak River from its junction with the Kootenai River to Yaak Falls, a barrier falls located approximately seven miles upstream. The channel through this area is high gradient and comprised of large substrate. The Yaak River is a large system with discharges of 100-200 cfs during July through October. Because of the substrate composition and the size of the stream, redds may be hard to detect. Low numbers of smaller sized bull trout were present during electrofishing surveys downstream from Yaak Falls. Additional survey work is required to determine bull trout utilization of the Yaak River below the falls. Extensive sampling conducted upstream from Yaak Falls has failed to document the presence of bull trout.

Field crews found no redds in the nine miles of Callahan Creek surveyed during 1992. This portion of Callahan Creek is also a high gradient stream with large substrate. Since only the lower nine miles have been surveyed for bull trout redds, and only during a single year, we cannot say conclusively that spawning by migratory bull trout does not occur. Anecdotal information suggests that historically adult bull trout were illegally harvested in weirs in Callahan Creek. Juvenile bull trout have been observed in low numbers during electro-fishing surveys so we recommend additional survey work prior to describing bull trout utilization of Callahan Creek. No redds have been located in Ruby and Star creeks. Plum Creek Timber Co.

surveyed Ruby Creek and did not find any bull trout present (G. Watson, Plum Creek Timber Co., Missoula, Montana, personal communication). However, one bull trout was observed in Ruby Creek during snorkel surveys in 1995 (Rob Spangler, Kootenai NF, personal communication). Bull trout spawning in the mainstem Kootenai River has not been documented at this time.

Bull Lake, a natural lake in the headwaters of the Lake Creek drainage, supports a disjunct bull trout population. The Troy Dam was constructed on Lake Creek in 1917 about 15 miles downstream from Bull Lake. It is not known whether migration was possible prior to this dam but it is currently an upstream passage barrier. The Bull Lake bull trout population is unusual in that the adult spawning run is downstream into Lake Creek, accessing spawning areas in Keeler and Stanley creeks. This pattern has been observed in the Flathead drainage (Upper Kintla Lake and Cyclone Lake) but is considered rare. Trapping in Keeler Creek in 1977 resulted in the collection of migrating bull trout during the June to October time period (Marotz et al. 1988).

CORE AREAS AND NODAL HABITATS

Core Areas are drainages that currently contain the strongest remaining populations of bull trout. They are usually less disturbed than surrounding areas. These watersheds need to have the most stringent levels of protection (Rieman and McIntyre 1993).

The only core area for the Lower Kootenai restoration area is the O'Brien Creek watershed. The Yaak River below Yaak Falls and Callahan Creek, are being considered as core areas and may be added to the list when more information becomes available. As previously discussed, additional survey work is required to better understand bull trout utilization of the Yaak River and Callahan Creek. It is possible that a large portion of the core areas for the Kootenay Lake and Kootenai River populations are located in Idaho and British Columbia. Long Creek and Fisher/Parker creeks, both in Idaho, were identified as "priority watersheds" for bull trout in the Forest Service's Inland Native Fish Strategy (USDA Forest Service 1995).

Nodal habitats are waters which provide migratory corridors, overwintering areas, and critical rearing habitat. Nodal habitats for this population include the Kootenai River, Yaak River below Yaak Falls, and Kootenay Lake.

Both Keeler and Stanley creeks are core areas for the disjunct Bull Lake bull trout population. Bull Lake and Lake Creek provide nodal habitat for this population.

RISKS TO BULL TROUT IN THE LOWER KOOTENAI RIVER DRAINAGE

The risks to bull trout in the Lower Kootenai River drainage are listed in Table 1. The risks were evaluated by the Scientific Group based on the degree to which each risk contributed to the past and current status of the species (designated as CURRENT/HISTORIC in the table) and the threat the risk factor poses to future restoration (RESTORATION in the table). Risks are rated relative to the goal of restoring Montana populations. Those risks which are of greatest concern are noted with a double asterisk.

All risks are discussed in the text, but only high risk factors have restoration strategies proposed to counteract them.

A large portion of this Lower Kootenai bull trout population's range is located outside of Montana. The Scientific Group did not assess risks outside the state. A primary concern is the need for a more formal working relationship with Idaho and Canada in addressing bull trout restoration in the Lower Kootenai drainage. Because the bull trout population in this drainage is comprised mostly of migratory fish originating in Idaho and/or Canada, coordination with these jurusdictions is critical to recovery.

There are several risks to bull trout populations in the Lower Kootenai River restoration area. A primary concern is the need for a more formal working relationship with Idaho and Canada in addressing bull trout restoration in this drainage. The fact that the bull trout population in this drainage is comprised mostly of migratory fish, most of which may originate in Idaho and/or Canada, makes restoration a difficult issue for Montana to address alone.

Another major risk is introduced species. Brook trout are present in the only core area (the O'Brien Creek watershed) and there is a risk of lake trout introductions into Bull Lake and Kootenay Lake, BC. Dam operations and illegal harvest are also considered very high risks to bull trout in this drainage. High risks include forestry, mining, and transportation.

Table 1. **Risks to bull trout.** ** = highest risk, * = high risk.

If risk is high in only some portions of the drainage, this portion is noted in ().

RISK	CURRENT/HISTORIC	RESTORATION
Environmental Instability		
Drought		
Landslide/Geology		
Flood/Rain on Snow		
Fire		
Introduced Species		
Private Ponds		
Legal Introductions	*	**
Illegal Introductions	*	*
Fisheries Management	*	*
Barriers		
Culverts	*	
Diversions	* (Flathead)	
Thermal		*?
Dams	*	*
Habitat		
Rural Residential Development		
Mining	*(Clark Fork)	*(Clark Fork)
Grazing		
Agriculture	*(Flathead)	**(Flathead)
Dam Operations	*(Flathead)	*(Flathead)
Forestry	*	**
Recreational Developments		
Transportation	* (St Regis)	* (St Regis)
Population		
Population Trend	*	*
Distribution/Fragmentation	*	*
Abundance	*	*
Biological Sampling		
Angling	*	*
Illegal Harvest	*	**

Environmental Instability

Drought(high risk), Landslide/Geology, Flood/Rain on Snow (high risk), Fire

There are two components to the risk from environmental instability. First, the likelihood of a catastrophic event occurring and, second, the risk to the bull trout population if such an event should occur.

In the Lower Kootenai River drainage, the risk from drought was rated high. Seasonal loss of surface flow is especially evident within aggraded reaches of the Callahan and Keeler creek watersheds. In most areas of the drainage, landslides are not a significant risk factor. However, in the headwaters portion of Callahan Creek there is landslide prone geology (Selkirk batholith and igneous intrusions).

The risk from flood and rain on snow events was rated as high. Risks due to fire were rated as low.

Introduced Species

Introduced fish species found in the Lower Kootenai River drainage include: coastal rainbow trout (*Oncorhynchus mykiss*) (the kamloops/inland rainbow are native), yellowstone cutthroat (*Oncorhynchus clarki bouvieri*), brook trout, kokanee salmon (*Oncorhynchus nerka*), lake trout (*Salvelinus namaycush*), northern pike (*Esox lucius*), yellow perch (*Perca flavescens*), largemouth bass (*Micropterus salmoides*), black bullheads (*Ameiurus melas*), and pumpkinseed sunfish (*Lepomis gibbosus*). *Mysis relicta* (opossum shrimp) have also been introduced into the drainage. Brown trout (*Salmo trutta*) were collected in Lake Creek in 1994, which is the first incidence of this species in the Lake Creek drainage.

Brook trout are believed to be the greatest risk to bull trout. Bull trout hybridize with brook trout and the offspring are generally sterile. Brook trout are present in O'Brien Creek, the only core area in Montana for the Lower Kootenai River drainage bull trout population. The available data indicate that hybridization between bull and brook trout can cause an unstable situation resulting in a dramatic decline or replacement of bull trout (Leary et al. 1983).

Lake trout are present in Spar Lake, which is a closed basin lake. Northern pike are present in some valley lakes and in backwater areas of the Kootenai River. Both lake trout and northern pike are potential predators on, and competitors with, juvenile bull trout. Although their distribution in the drainage is presently limited, if introduced into the Kootenay Lake/Kootenai River system lake trout could pose a major threat to the bull trout population. Interactions of bull trout with other introduced species are presently unknown.

Private Ponds

There are few private ponds in the Kootenai drainage below Kootenai Falls and stocking of private ponds with introduced fish has not been a problemto date. However, more people moving into the area may increase the demand for private ponds and increase the risk that these ponds may be a source of introduced fish. Although there is a requirement that private ponds be licensed with Montana Fish, Wildlife and Parks before they are stocked with fish, some people are unaware of, or circumvent this law. Fish stocking into private ponds creates a high potential for undesirable to spread from ponds into waters where they do not presently exist.

Legal Introductions (very high risk)

At the present time, FWP stocks Kamloops rainbow, introduced coastal rainbow, kokanee, and westslope cutthroat trout into waters within this drainage. There is no current evidence that this stocking program is detrimental to bull trout.

In the past FWP, other agencies, and individuals have stocked a variety of introduced species, including brook trout, coastal rainbow trout, and others. These fish have established reproducing populations in many Lower Kootenai River drainage waters. It is the legacy of these past stocking practices that poses a significant threat to the survival of bull trout today. One potential benefit to bull trout from a legal introduction is the food source provided by introduced kokanee.

Stocking programs in Canada and Idaho have the potential to impact Kootenai River bull trout if the introduced species emigrate into the Lower Kootenai River from the waters where they were stocked. Fisheries management programs in Canada and Idaho are outside the jurisdiction of the state of Montana. Communication and consultation between jurisdictions should be encouraged.

Illegal Introductions (high risk)

Some illegal introductions of fish have occurred in the drainage. Brown trout were found for the first time in the Lake Creek drainage in 1994. This occurence likely resulted from an illegal introduction, since there is no record of a legal introduction of brown trout in this drainage. It is likely that illegal introductions will continue. The greatest risk would be if lake trout were introduced into Bull Lake or Kootenay Lake, or additional unauthorized transplanting of brook trout were to occur.

Fisheries Management

Current angling regulations in the Lower Kootenai River are designed to protect large rainbow trout (regulations allow harvest of three rainbow under 13" and one larger than 18"). In addition, O'Brien, Libby, and Keeler creeks are closed to fishing until July 15 to protect spawning rainbows. Rainbow trout are not known to be detrimental to bull trout. However, the large kamloops strain of rainbow trout present in the Lower Kootenai may compete with bull trout, since both fish are top level predators.

Future sport fishery management goals directed at recreational fishing for introduced species may prove to conflict with the goal of restoring bull trout in this drainage. If bull trout are to persist over the long term, the goal of fisheries management may have to change to emphasize protection and restoration of imperiled native species.

Barriers

Culverts

There are several culverts in the drainage that are barriers to fish passage. However, in some areas, impassable culverts assist in keeping introduced fish out of a watershed. They are not considered to be a significant threat in this drainage and should be evaluated on a case by case basis.

Diversions

Currently, there is a diversion for the Troy municipal water supply on O'Brien Creek. This diversion is not a barrier, but it is not known if outmigrating juveniles are entrained in the diversion. Significant numbers of entrained juvenile bull trout have been documented in irrigation diversions in the Blackfoot River drainage(D. Peters, FWP, personal communication). There are also two active applications for micro-hydro development on O'Brien Creek which would pose a risk to bull trout, if developed.

Thermal

Rieman and McIntyre (1993) concluded that temperature is a critical habitat requirement for bull trout. Temperatures in excess of 15° C are thought to limit bull trout distribution in many systems (Bjornn 1961; Fraley and Shepard 1989; Brown 1992). The only known thermal problem in this drainage is in Lake Creek below the outlet of Bull Lake, where higher temperatures are a natural condition between the outlet and inflow from Stanley Creek. Adult bull trout from Bull Lake are known to migrate through this thermally influenced section of Lake Creek and into Stanley Creek for spawning.

Dams

Northern Lights Electric Company owns a dam, constructed in 1917, at the mouth of Lake Creek which is an upstream fish passage barrier. The dam is located at the site of a natural water fall. This falls was suspected to be at least a seasonal barrier to fish passage. The Bull Lake/Lake Creek bull trout population is considered disjunct and supported by core areas within the Lake Creek drainage.

Flow changes due to Libby Dam have altered Kootenai River fish migration. Historically,

Kootenai Falls may not have been a fish passage barrier during natural high spring flows. Today, the falls is a year around barrier, limiting genetic exchange between the middle Kootenai River and Lower Kootenai River. The implementation of white sturgeon restoration flows from Libby Dam will result in higher spring flows, and the possible re-establishment of seasonal fish passage at Kootenai Falls.

Habitat

Rural Residential Development

Human population growth in the Lower Kootenai drainage is currently slow, although this may change in the future. Onsite wastewater systems (septic tanks) have impaired water quality in Milnor, Savage, and Schoolhouse lakes (MT DHES 1994). There is a considerable amount of private land within core areas and adjacent habitats which could be at risk from development. The town of Troy does not have a municipal sewage treatment system. Waste water treatment relies on individual septic/drainfield systems.

Mining (high risk)

Historically, mining was much more active in the Lower Kootenai drainage than it is today. Some small private operations are still ongoing in the Lake Creek drainage and in Canada. Lake and Stanley creeks (a total of 15.4 stream miles) suffer from impaired water quality as a result of mining activities (MT DHES 1994). Water quality impairment in Lake Creek is the result of a copper/silver mine, mill, and tailings impoundment owned by ASARCO, Inc. This facility is not presently in operation, and operations are not likely to resume due to limited ore reserves at the site.

Grazing

There is very little grazing in the Lower Kootenai drainage. Grazing by livestock used for recreational purposes occurs mostly in the Yaak drainage and is not considered a risk to bull trout habitats.

Agriculture

There is a small amount of hay land in the Lake Creek drainage. Risks in the Lower Kootenai drainage due to agriculture are low.

Dam Operations (very high risk)

Impoundment of the Kootenai River by Libby Dam in 1972 altered the aquatic environment in the river downstream from the dam. Dam operations drastically alter down river discharge patterns on a seasonal and, sometimes, daily basis. Peak discharge rates of 64,000 cfs that formerly occurred during spring runoff at a two-year recurrence interval have been replaced with regulated releases ranging from 5,000 - 10,000 cfs during summer to 15,000 to 25,000 during winter. During many months, it is not uncommon for discharge rates to fluctuate widely between approximately 5,000 and 20,000 cfs (Knudsen 1994). Flow regimes, temperature patterns, sediment loads, and water quality were markedly changed downstream from Libby Dam. These changes resulted in alterations in periphyton, aquatic insect, and fish populations (FWP 1983). The effects of dam operations on juvenile bull trout rearing and food supply have not been quantified.

Recently, flow regimes from Libby Dam have been modified for a number of reasons. Water releases from Libby Dam were modified during 1994 and 1995 to benefit Upper Columbia River salmon and Kootenai River white sturgeon. These modified releases more closely reflected natural flow regimes. The effects of these flow modifications on bull trout are unknown at this

time.

The reservoir behind Lake Creek dam is dredged periodically to remove acummulated sediment. Lake Creek is affected by sedimentation during this process and the Kootenai River below the mouth of Lake Creek is generally turbid along one bank for a short period following the dredging.

Forestry (very high risk)

Past forestry practices (road construction, log skidding, riparian harvest, clearcutting, terracing) were often damaging to watershed conditions and were a major contributing cause of the decline of bull trout. The majority of the streams in the area were affected by splash dams for log drives. Splash dams are temporary structures constructed on small streams to impound and accumulate a large head of water. The water was released in one event, creating an artificial freshet to transport logs downstream. In addition to direct stream alterations from increased flow, stream channels were cleared of natural woody debris and often channelized. The effects of past forestry practices on habitat include increased sediment in streams, increased peak flows, thermal modifications, loss of instream woody debris, channel instability, and increased access for anglers and poachers.

Virtually all drainages currently supporting bull trout are managed timber lands. There are extensive corporate holdings, particularly in the Lake Creek and O'Brien Creek watersheds, as well as Kootenai National Forest lands. According to the Environmental Impact Statement for the Kootenai National Forest Plan, almost two-thirds of the Kootenai National Forest, particularly in the west half, is subject to watershed problems, including frequent flooding and concentrated high water yields, sedimentation, and small slumps below clearcuts and roads (KNF 1987).

According to Marotz et al. (1988), the Keeler Creek channel is in a destabilized condition

following extreme harvest activities and poorly constructed roads built primarily between 1941 and 1970. During that period, over 100 million board feet were clear-cut from 5,780 acres. Serious flooding occurred in 1974 and 1980. The Montana Department of Health and Environmental Sciences (MT DHES 1994) states that 6.8 miles of Keeler Creek suffers impaired water quality as a result of silvicultural activities.

Current forestry practices are less detrimental than past practices but the risk to bull trout is still high because of the existing road system, mixed land ownership, forestry practices on private land, and the lingering effects of past activities. Results of 1994 timber sale audits suggest impacts are still occurring from inconsistent application of best management practices (MT DSL 1994).

Recreational Developments

Little recreational development has occurred in the Lower Kootenai drainage and no large recreational development is anticipated in the near future. A large, developed Forest Service campsite is located at the mouth of the Yaak River and occupies most of the floodplain on either side of the Yaak River.

Transportation (high risk)

The Burlington Northern Railroad is located along the Kootenai River and is directly adjacent to the river for a considerable distance. US Highway 2 also parallels the river. Construction of the railroad and highway had direct impacts from channel alteration. There is potential for spills, weed suppression, fire suppression, maintenance and sanding to have significant impacts on bull trout. In the past, high levels of herbicides have been detected in the Kootenai River from weed suppression activities along the corridors (Joe Huston, FWP, personal communication).

Population

Life History

Migratory bull trout are the dominant life history form in the Lower Kootenai drainage. The resident life history form has not been documented.

Population Trend

There is relatively little trend data available. Additional survey work is required to adequately describe population trends in the Lower Kootenai drainage. Without information from Idaho and British Columbia, we cannot assess population trends for bull trout in this restoration area.

Distribution/Fragmentation

It appears that this bull trout population remains relatively unfragmented. The construction of Libby Dam may have precluded the population from accessing areas upstream from Kootenai Falls. In addition, the construction of the dam on Lake Creek may have eliminated two-way genetic exchange between the Lake Creek/Bull Lake population and the Kootenay Lake/Kootenai River population. Because a large portion of this population's range lies outside the state of Montana, we are unable to fully assess distribution and fragmentation.

Abundance (high risk)

If a population is small enough, variations in survival can cause a decline in the population long enough for the population to become extinct (Rieman and McIntyre 1993). The bull trout population in Bull Lake is estimated at several hundred fish or less and appears to be at high risk. Numbers of bull trout in O'Brien Creek also appear to be low. The migratory bull trout

utilizing O'Brien Creek may be a part of another larger population. Because most of the Lower Kootenai population's range lies outside the state of Montana, we are unable to fully assess population abundance.

Biological Sampling Loss

As a result of research on the impacts of electrofishing on fish, electrofishing techniques and equipment have been modified to minimize electrofishing risk. There is also a FWP policy limiting the use of electrofishing in waters containing Species of Special Concern. Overall, the loss of bull trout due to sampling by electrofishing was judged to be low. However, as a population declines, there is a tendency for increased research and the number and type of projects involving invasive sampling, such as electrofishing, must be evaluated.

Angling

Harvest of bull trout is no longer legal in this drainage. However, there is still some risk to bull trout from incidental hooking and handling mortality. Streams that receive high fishing pressure, such as the Kootenai River, are more likely to have hooking mortality problems, especially when anglers target larger fish. A fishery for large rainbow trout is becoming more popular in the Kootenai River. The Kootenai River received an estimated 29,854 angler days of fishing pressure in 1993, up from 25,213 angler days in 1991 (MDFWP 1992; MDFWP 1994). The fishing techniques employed on the Kootenai River (including large tackle and snagging for kokanee salmon) may also be effective for catching bull trout. More information is needed about angler catch of bull trout in this drainage. If data indicate that hooking mortality of bull trout is significant, there could be a need for additional gear restrictions and seasonal fishing closures.

Illegal Harvest (high risk)

Accurate information on illegal harvest is difficult to obtain. However, there is anecdotal

information that concentrations of large bull trout are targeted by poachers. It is known that, in the past, poachers have targeted large bull trout at the downstream end of Kootenai Falls. In areas where the population is small, the loss of even a few fish can be significant. Consequently, the risk to bull trout restoration was rated as high.

RESTORATION GOAL

A majority of this population's range is located in Idaho and British Columbia. A restoration goal is difficult to frame without information from these other jurisdictions. In light of this, the recovery goal presented here should be re-examined if and when more information becomes available.

The restoration goal for the Lower Kootenai drainage is to maintain existing self-sustaining populations with stable age structure and distribution; improve current habitat conditions in O'Brien Creek; protect the integrity of the population genetic structure; and establish a protocol for information exchange with Idaho and British Columbia. Specifically, a baseline of redd counts should be established in all drainages that presently support spawning migratory fish (O'Brien Creek and possibly Callahan Creek and the Yaak river downstream from Yaak Falls). If the total baseline exceeds 100 redds or 2000 individuals, an increasing trend should be the goal. If the baseline is below 100 redds or 2000 individuals, then an increase to the baseline level should be the immediate goal, with an increasing trend thereafter.

The goal of bull trout restoration efforts for the Bull Lake population is to maintain the population genetic structure, improve habitat conditions in the core areas (Stanley and Keeler Creeks)., and to maintain the migratory component of the population. Specifically, a baseline of redd counts should be established in all drainages that presently support spawning migratory fish. If the total baseline exceeds 100 redds or 2000 individuals, an increasing trend should be the goal. If the baseline is below 100 redds or 2000 individuals, then an increase to the baseline level should be the immediate goal with an increasing trend thereafter.

It should be recognized that these goals are based on the best information currently available. However, the level of uncertainty about the specific numbers of redds and individuals is high. These goals may require modification as more information becomes available.

SOURCES OF UNCERTAINTY AND DATA NEEDS

Migratory Population

There is a need for information on the genetic structure of the bull trout population. There may have been a historic connection between the upper Kootenai River (above the falls) and the Lower Kootenai (below the falls). There may still be genetic exchange between the Kootenay Lake/Kootenai River and the Bull Lake population segments. We also need more information about bull trout in the Idaho and British Columbia portions of the drainage.

Baseline redd counts need to be continued in O'Brien Creek, and established in Keeler and Stanley Creeks to monitor trends in spawner escapement.

The origin of the fish utilizing the O'Brien Creek watershed for spawning should be determined. Close coordination with Idaho and Canada is necessary.

We need to determine how significant the dam on Lake Creek is to fish passage and if it is preventing fish from the Kootenay Lake/Kootenai River system from accessing spawning areas in Lake Creek tributaries.

The potential for upstream movement over Kootenai Falls should be determined.

Distribution

Areas potentially utilized by spawning migratory fish in Callahan Creek and the Yaak River below Yaak Falls should be identified. If use is documented, baseline redd counts should be established.

The status of the resident life form in this drainage should be determined.

Species Interactions

Competitive and predator/prey interactions of bull trout and Kamloops rainbow trout need to be better understood.

The extent of bull trout x brook trout hybridization in spawning streams should be determined.

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APPENDIX A

ACRONYMS

FWP	Montana Fish, Wildlife, and Parks
MDHES	Montana Department of Health and Environmental Services
TMDL	Total Mean Daily Load
US EPA	United States Environmental Protection Agency
USGS	United States Geological Survey

GLOSSARY

aggrade:	raise the grade or level of a river valley or streambed by depositing streambed material or material or debris
core area:	a drainage that currently contains the strongest remaining populations of bull trout in a restoration area; usually relatively undisturbed habitat
cover:	anything that provides visual isolation or physical protection for a fish, including vegetation that overhangs the water, undercut banks, rocks, logs and other woody debris, turbulent water surfaces, and deep water
disjunct population:	a population found in a headwater lake, that appears to be self-reproducing, but is functionally isolated from the rest of the system
drainage:	an area (basin) mostly bounded upstream by ridges or other topographic features, encompassing part or all of a watershed
entrainment:	displacement of fish from a reservoir through an outlet from a dam or from a river into an irrigation ditch
escapement:	adult fish which return to spawn
fragmentation:	the breaking up of a larger population of fish into smaller disconnected subpopulations
fry:	first-year fish

migratory:	describes the life history pattern in which fish spawn and spend their early rearing years in specific tributaries, but migrate to larger rivers, lakes or reservoirs as adults during their non-spawning time
nodal habitat:	waters which provide migratory corridors, overwintering areas, or other critical life history requirements
redd:	a disturbed area in the gravel, or a nest, constructed by spawning fish in order to bury the fertilized eggs
resident:	fish, which are often found in tributary or small headwater streams, where the fish spend their entire lives
risk:	a factor which has contributed to the past or current decline of the species
restoration:	the process by which the decline of a species is stopped or reversed, and threats to its survival are removed or decreased so that its long-term survival in nature can be ensured
Restoration Team:	a policy-level group with representatives from state and federal agencies, conservation organizations and private industry; created by Governor Racicot to establish a Bull Trout Restoration Plan for Montana
population:	an interbreeding group of fish that spawn in a particular river system (or part of it) and are reproductively isolated
riparian area:	lands adjacent to water such as creeks, streams and rivers and, where vegetation is strongly influenced by the presence of water
Scientific Group:	composed of agency, private and university scientists appointed by the Restoration Team to conduct technical analysis
threat:	a factor which jeopardizes the future conservation of the species
watershed:	a drainage basin which contributes water, organic matter, dissolved nutrients, and sediments to a river, stream or lake (USDA 1995)
Watershed Group:	a group of agency representatives, landowners and recreational and commercial users of a watershed, plus a liaison from the Scientific Group; created by the Restoration Team and charged with developing recovery actions to help restore bull trout

APPENDIX B

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