In the Office of Endangered Species
Fish and Wildlife Service
United States Department of the Interior

Alliance for the Wild Rockies, Inc.
P.O. Box 8731
Missoula, MT 59807

Petition for a Rule to List the bull trout (Salvelinus confluentes) as Endangered

Friends of the Wild Swan
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Swan Lake, MT 59911

Swan View Coalition
P.O. Box 1901
Kalispell, Montana 59901

Petitioners

The Alliance for the Wild Rockies, et al. (Petitioners) hereby formally petition to list the bull trout (Salvelinus confluentes) as endangered pursuant to the Endangered Species Act, 16 U.S.C. Secs. 1531 et seq. (hereinafter referred to as "ESA"). This petition is filed under 5 U.S.C. Sec. 553(e) and 50 CFR Sec. 424.14 (1990), which grant interested parties the right to petition for issue of a rule from the Assistant Secretary of the Interior.

Petitioners also request that Critical Habitat be designated for the bull trout concurrently with the listing, pursuant to 50 CFR 424.12, and pursuant to the Administrative Procedures Act (5 U.S.C. 553).

Petitioners understand that this petition sets in motion a specific process placing definite response requirements on the U.S. Fish and Wildlife Service and very specific time constraints upon those responses.

Petitioners

The Alliance for the Wild Rockies is a tax-exempt, non-profit public interest organization dedicated to the protection and preservation of the native biodiversity of the Northern Rockies Bioregion (map attached), its native plant, fish, and animal life, and its naturally functioning ecosystems. Its registered office is located in Missoula, Montana. The Alliance has over 200 member organizations and businesses, and over 2700 individual members who are located throughout the range of the bull trout. Many of our members are employed as fishing guides, outfitters, and researchers who are directly affected by any change in status of native bull trout populations. Our members use the national forests and other public lands in the Northern Rockies for a variety of uses including fishing, hunting, hiking, skiing, photography, wildlife and fish viewing, backpacking and camping, horseback riding, berry picking, and many other uses.

The Friends of the Wild Swan is a non-profit Montana corporation, with its registered office at Swan Lake, Lake County, Montana. Friends of the Wild Swan is concerned with the national and global interest of maintaining biological diversity and integrity of all natural ecosystems. Its members use the national forests, state lands, rivers, and streams for outdoor recreation of all kinds, including fishing, hunting, hiking, cross country skiing and camping. Bull trout, and other native trout species are a special concern of the members of the Friends of the Wild Swan. Members have fished for bull trout since 1975 in Montana's Flathead River Basin, and have caught bull trout weighing over 13 pounds. Members have fished for bull trout in the Swan River drainage since 1976 and have caught bull trout weighing up to 10 pounds in that drainage. Members are very concerned about the rapid decline in bull trout populations, spawning and rearing habitat, and the overall inadequacy of federal, state, and local management regulations and standards to protect bull trout and its habitat. Friends of the Wild Swan brings this action on its own behalf and on behalf of its immediate and adversely affected members.

Swan View Coalition is a non-profit conservation organization that has been involved in water quality and fisheries, particularly bull trout, since 1984. Swan View Coalition and its members fish for bull

trout and engage in recreational activity that involves bull trout. Swan View Coalition has been involved in monitoring management actions and their effects on bull trout by state and federal managers in the Swan and Flathead drainages. Swan View Coalition has been involved in administrative appeals and litigation with bull trout and water quality issues and has taken numerous legal actions to protect bull trout and their habitat.

Executive Summary

The most up-to-date scientific information indicates that Salvelinus confluentes is critically imperiled in the United States. This abundant evidence from highly qualified scientific experts shows beyond a doubt that the bull trout has been and continues to be in a serious decline throughout its historic range. The bull trout is now extinct in roughly half of its known range. It is seriously threatened with extinction throughout vast stretches of its remaining habitat.

Very recent data from researchers in Montana and Idaho show that the two strongest bull trout populations in the U.S., the Flathead Basin population in Montana and the Lake Pend Oreille population in Idaho are in an extremely serious decline. Annual redd counts for 1992 in the Flathead Basin were 65% lower than the 13 year average (Weaver 1992). This is a basin-wide figure. Two major spawning streams, Coal Creek and Whale Creek, were down 83% and 89% from the 13 year average. Data from the Idaho Fish and Game Department (1992) show annual redd counts for 1992 are seriously down in the Pend Oreille aquatic ecosystem. The major spawning stream, Trestle Creek, dropped from 243 redds in 1991 to 128 in 1992, a 47% drop. This is also a 46% drop from the nine year average of 240 redds/yr. between 1983 and 1991. Grouse Creek redds were 65% below an eight year average between 1984-1991. Counts in tributaries to the Clark Fork River in Idaho were significantly lower than historical levels in the early to mid-1980's, ranging from 39% to 99% below the levels of the early to mid-1980's.

For 831 bull trout stream reaches in Montana where a risk of extinction could be calculated, over 90% are at moderate to high risks of extinction (Thomas 1992). In Oregon at least 54% of the bull trout populations are at moderate to high risks of extinction (Ratliff and Howell 1992). In north Idaho, 83% of the bull trout

populations are at moderate to high risks of extinction (Cross 1992). These calculations were made prior to unprecedented declines in redd counts in the two strongest bull trout populations remaining in the United States.

A review of the scientific literature on bull trout indicates a correlation between remaining healthy bull trout populations and undeveloped, substantially roadless areas. Swanson (1992) found healthy bull trout populations on the Bitterroot National Forest reside almost exclusively in roadless headwaters areas. Roberts (1987, 1991) found the same to be true in Alberta. In Montana the two strongest bull trout populations are the Flathead Basin (dominated by roadless headwaters in the Bob Marshall Wilderness Complex and adjacent roadless areas and Glacier National Park and roadless lands in the Whitefish Range) and in Rock Creek (surrounded by over 400,000 acres of roadless lands including all the major headwaters). In Oregon the strongest populations are found in the extreme northeast part of the state (Ratliff and Howell) which is remote and consists of large wilderness areas and adjacent roadless areas. With few exceptions, once streams leave predominately roadless areas, bull trout decline in numbers or disappear. In Washington remaining bull trout populations are concentrated in undeveloped headwaters areas (Brown 1992). The same is true in Idaho. Johnson (1992) noted that bull trout may do better inside Wilderness areas in Nevada. Sedell and Everest (1990) report that up to 75% of the pool habitat in the Columbia River Basin has been lost to salmonids. They found that the only areas where fish habitat quality remained stable or increased in quality were in wilderness areas.

This information suggests that bull trout are highly intolerant of any human-caused modification of their native habitat and therefore are in critical need of stringent habitat protection measures which do not curently exist. To protect this roadless-area dependent species, its remaining roadless habitat must be protected and aggressive efforts are needed to restore lower elevation habitat as well as removal of barriers to migrations and genetic interchange.

However, unchecked habitat degradation and destruction continue unabated. Adequate information now exists to support a Rule for the expedited listing of the bull trout as endangered under the federal Endangered Species Act. Petitioners urge the Service to expedite the listing and protection of Salvelinus confluentes. Petitioners also

request there be an emergency listing and concurrent critical habitat designation for bull trout populations in select aquatic ecosystems where the biological information indicates the species is in imminent threat of extinction.

These are (including tributaries): the Flathead Basin aquatic ecosystem (Flathead Lake, the North and Middle Forks of the Flathead River, and tributaries that contain or are used by bull trout; the Bitterroot River aquatic ecosystem; the Blackfoot River aquatic ecosystem; the Clark Fork River aquatic ecosystem; the Lake Pend Oreille aquatic ecosystem; the Priest Lake aquatic ecosystem; the Coeur d'Alene River aquatic ecosystem; the Kootenai River aquatic ecosystem; the Fisher River aquatic ecosystem; the Yaak River aquatic ecosystem; Flint Creek; the Middle Fork of the Willamette River; the Trailbridge Reservoir; the Clear Branch of the Hood River; the Boulder and Dixon Creek tributaries to the Klamath River; the Coyote Creek tributary to the Sycan River; the Cherry and Sun Creek tributaries to Upper Klamath Lake; Odell Lake; The Granite Boulder and Big Creek tributaries to the John Day River; the Middle Fork of the Malheur River; the Eagle Creek tributary to the Powder River; the Wenatchee River Basin; the Entiat River Basin; the Yakima River Basin; the Naches River Basin; the Jarbridge River Basin.

Classification and Nomenclature

Originally classified as the same species as the coastal Dolly Varden (Salvelinus malma) the bull trout was identified as a separate species and named Salvelinus confluentes by Cavender (1978). The bull trout is differentiated from the Dolly Varden on the basis of osteological, morphometric, and meristic characteristics that have proven to be consistent over the entire range of both species, even where they occur sympatrically (Rode 1990).

Common Name

The common name for Salvelinus confluentes is bull trout. It derives its name from its large broad head, its large mouth and prominent jaws, and its highly piscivorous diet (Cavender 1978).

Present Legal Status of <u>Salvelinus confluentes</u>

The bull trout is currently listed by the Fish and Wildlife Service as a Category 2 species, meaning that listing as threatened or endangered may be warranted, but that insufficient biological information has been available up to this time to accurately determine its status. It is listed as a sensitive species by U.S. Forest Service Regions 1, 6, and 4. The Forest Service (Cross 1992) defines sensitive species as those for which population viability is a concern as evidenced by:

a) Significant current or predicted downward trends in population numbers or density.

b) Significant current or predicted downward trends in habitat capability that would reduce a species existing distribution.

The bull trout is listed as a species of special concern by the Montana Department of Fish, Wildlife and Parks; as a sensitive/critical species by the Oregon Department of Fish and Game (Ratliff 1992); as a sensitive species by the Washington Department of Wildlife (Lea Knudsen, pers. comm. 8/1/92); as endangered by the California Department of Fish and Game; as a species of special concern by the Idaho Department of Fish and Game; bull trout are currently listed as a game fish in Nevada but are a candidate species for protective listing; as threatened by the Alberta Fish and Wildlife Division. Bull trout have no special designation in British Columbia. The American Fisheries Society lists the bull trout as a species of special concern. The bull trout is on the review list for the Oregon threatened and endangered species list compiled by the Oregon Natural Heritage Data Base (1987)(Buckman 1992).

Life History

Four life history patterns have been identified for the bull trout- resident, fluvial, adfluvial, and anadromous (Thomas 1992), the latter having only been reported for streams near Puget Sound in Washington state (Thomas 1992). Resident bull trout are non-migratory and spend their entire lives in the stream from which they were spawned.

More common are the inland migratory strategies. In these

strategies adults spawn in tributary streams where the young will remain for one to four years (Fraley and Shephard 1989). Juveniles will then migrate to either a lake (adfluvial) or river (fluvial) where they will grow to maturity (Thomas 1992). The majority of bull trout research has focused on one of these life history strategies.

Adult migration will begin in early spring and will extend through the summer; most fish will have arrived in the spawning stream by August (Pratt 1992). Spawning will occur in late summer to early fall (Pratt 1992, Thomas 1992). The initiation of spawning is correlated with water temperature. Researchers have identified a temperature threshold of 9 degrees Centigrade; spawning begins when the maximum daily temperature falls below this level (Fraley and Shepard 1989, McPhail and Murray 1979).

It is not uncommon for inland bull trout to spawn more than once in a lifetime, but they usually do not spawn every year (Pratt 1992, Thomas 1992). Bull trout in the Flathead River drainage have been observed spawning every year, every other year, and every third year (Weaver 1992 in Thomas 1992). Spawning sites are characterized by loose gravel substrates and a low gradient, with groundwater inflow and the proximity to cover also influencing site selection (Fraley and Shepard 1989).

Because members of resident stocks tend to mature at an earlier age, they are generally smaller in size and have a lower fecundity than migratory populations (Willamette National Forest 1989).

In the Flathead River drainage, bull trout leave Flathead Lake starting in April and move slowly up the main stem and forks to arrive at spawning sites in early July. Spawning occurs throughout September. After spawning, adults quickly return to Flathead Lake. The bull trout eggs incubate in the gravel over the winter and emerge in the spring. Juveniles then rear for one to three years in the upper drainage before they outmigrate to the lake. The subadults then rear for another 2-3 years before returning upstream to spawn (Montana Fish Wildlife and Parks 1992).

Habitat Requirements

The adult bull trout, as its young, is a bottom dweller with a preference for deep pools of cold water rivers, lakes, and reservoirs (Moyle 1976). Strict habitat requirements make spawning and incubation habitat for bull trout limited and valuable (Fraley, et

al. 1989).

In Montana bull trout spawn in September and October, selecting low-gradient mountain streams with cold, clean water, beds of clean gravel and areas of upwelling groundwater necessary for successful egg incubation (Fraley and Shephard 1989 in: Fraley, et al. 1989). Adult spawners require hiding cover such as logs and undercut banks. Juveniles require cold-water tributaries with good cover (rocks and woody debris) and relatively little streambed sediment. Thus, suitable rearing habitat is also scarce (Fraley, et al. 1989).

In the Sprague River Subbasin, Klamath Basin Oregon bull trout were the prevalent species in reaches at higher elevations and with cooler water temperatures and steeper gradients (Ziller 1992).

Bull trout are known to be highly susceptible to both man-caused and natural stream sedimentation (Weaver and Fraley 1991). On the Bitterroot National Forest in Montana, bull trout exist as isolated populations in mainly roadless headwaters areas (Clancy, pers. comm.).

Historical Distribution

The bull trout's needs for cold water lead researchers to believe that they originated during the last glacial period, hence their range is limited to the northern part of the Northwest United States and north into Canada and Alaska. The bull trout historically was found in most major river systems in the Pacific Northwest. The historical distribution extended from 41 degrees N lat. to 60 degrees N lat. The range extended from the McCloud River in California, where the bull trout is now extinct, northward to the headwaters of the Yukon (Bond 1992). The Bear River in Utah and several tributaries of the Bruneau River in Nevada are documented to be the southeastern limit of its historic range (Willamette National Forest 1989).

Current Distribution

The western distribution of the species currently extends in a discontinuous pattern from about 41 degrees N. Lat. to 60 N. Lat. Please see Appendix A for a map of bull trout distribution in the U.S. The range includes parts of the Cascade Range and Olympic Peninsula in Washington and in southeast and northeast Washington;

various coastal rivers of British Columbia and in extreme southeast British Columbia; parts of the Klamath and Willamette drainages and the Cascade Range in Oregon, and in northeast Oregon. In Idaho they still exist in and around the Lake Pend Oreille Basin; part of the Priest Lake Basin; Lake Coeur d'Alene; the St. Joe, Coeur d'Alene, Clearwater, and Salmon river systems. In Montana they are found in most major river systems west of the Continental Divide except for one population in the St. Mary's River east of the divide. In Alberta they are found only in headwaters streams on the east face of the Continental Divide. A remnant population still survives in extreme northeast Nevada in the Jarbridge River. (Bond 1992, Thomas 1992, Willamette National Forest 1989, Roberts 1991, Cross 1992, Horton 1992, Brown 1992, Johnson 1992, Ratliff and Howell 1992).

Documented Population Declines

Virtually all the recent scientific literature on bull trout shows that the species is in a definite decline throughout its range, even in the most viable populations in the Flathead Basin in Montana and in the Pend Oreille Basin in Idaho. The two most effective means of obtaining population estimates for bull trout are redd counts and electroshocking surveys. Direct counts are also made at weirs and snorkeling has been used for making density estimates (Schill 1992)(Smith pers. comm. 1992).

The North and Middle Forks of the Flathead River constitute the strongest remaining bull trout population in the U.S.. The redd counts in the North Fork and the Middle Fork were 65% below the thirteen year average in 1992 (Weaver 1992). The Pend Oreille Basin in Idaho is considered the next strongest bull trout population behind the Flathead Basin. Redd counts for 1992 show a dramatic decline throughout the Basin, particularly in Trestle Creek, the most important spawning tributary where there was a 46% decline below a nine-year average (Idaho Fish and Game 1992).

Schill (1992) reports a decrease in the mean density of bull trout/one hundred square meters from 0.13 to just under 0.05 in 43 Idaho streams between 1985 to 1990. In Lower Priest Lake, bull trout have gone extinct (Horner, pers. comm.) just since 1978, when 2,320 were harvested there.

Bull trout in the Bitterroot River system have undergone a rapid decline and are now thought to be extinct in the mainstem of the Bitterroot River (Thomas 1992). In the Clark Fork River system, bull trout have become rare (Thomas 1992). In the Blackfoot River system, Peters (1990) reports declining size and number of adult bull trout. Only 3 of 19 major sampled tributaries had significant densities of young of the year bull trout. In Monture Creek, the major spawning tributary to the Blackfoot, there was a 59% decline in redd counts between 1985-1989 (Peters 1990).

In Alberta bull trout are in a critical decline province wide (Roberts 1991). In California bull trout are extinct (Rode 1990). In Oregon, they are rapidly declining throughout most of the state (Ratliff and Howell 1992). In Washington they are declining (Willamette National Forest 1989).

Habitat Degradation

The ongoing decline and disappearance of the bull trout throughout its range has been the result of cumulative impacts to its habitat and population numbers. Serious impacts include, but are not limited to: roadbuilding and logging, cattle grazing, mining, poaching, overharvest, dam construction, dewatering of streams by irrigation, introduction of non-native fish species, pesticide use, and homesite subdivision.

The bull trout is very sensitive to changes in water quality, particularly increased sedimentation. All land use activities that increase the risk of sedimentation pose a direct threat to the remaining bull trout populations.

Sedimentation

There is a positive correlation between the amount of logging and roadbuilding in a drainage and the fine sediment levels found in the creeks (FBCP Hauer and Blum 1991)(Platts 1990). In 1981 the Montana Department of Fish Wildlife and Parks began a cooperative study in Coal Creek, a major bull trout spawning tributary in the North Fork of the Flathead River drainage. This drainage is heavily impacted by logging and roadbuilding. The study sought to determine the relationship between sediment levels and spawning success. The Coal

Creek Study established conclusively that sediment levels in spawning gravels have a measureable, negative effect on bull trout reproductive success (Enk, 1992).

In 1991 the Flathead Basin Forest Practices, Water Quality, and Fisheries Cooperative Program developed a stream rating system which defines "threatened streams" as those having greater than 35% fine materials in spawning gravels and "impaired streams" as having greater than 40% fine materials in spawning gravels (FBCP 1991).

The FBCP established a negative relationship between fry emergence and the percentage of substrate materials less than 6.35mm in diameter (Weaver and Fraley 1991). When 35% and 40% of the gravel is <6.35mm, embryo survival rates decline by 66% and 75% respectively.

FBCP found that the mean percentage (39%) of fine sediments in spawning areas in 17 watersheds subject to logging and roadbuilding exceeded the mean percentage of fine sediments (32%) found in 9 undisturbed watershed streams in the Flathead Basin (Enk, 1992 citing FBCP 1991).

Logging and Roadbuilding

Bull trout have very specific spawning habitat requirements which render them highly susceptible to increases in sedimentation. Much of the remaining bull trout range is in undeveloped headwaters areas which are overlapped by existing and planned logging programs which are highly intensive operations. A key example includes Rock Creek, which according to Thomas (1992) is the most healthy and productive bull trout fishery in Montana outside the Flathead Basin. The Lolo and Deerlodge National Forests have planned twenty-two timber sales over the next ten years, mostly in roadless area spawning tributaries to Rock Creek. Accompanying the timber sales would be at least 70 miles of new roads. Another example is Sleeping Child Creek, a major bull trout spawning tributary to the Bitterroot River. The Bitterroot National Forest has planned the White Stallion timber sale for the last roadless stretch of this stream. Many miles of new roads would be built and according to initial Forest Service reports, would increase sediment levels five to six times natural levels (Bitterroot National Forest 1992).

The Flathead National Forest has planned the Lost Silver timber sale in prime bull trout habitat near Hungry Horse Reservoir and has

several more planned in the Whitefish Range in prime spawning tributaries to the North Fork of the Flathead River. Other timber sales on the Lolo National Forest threaten bull trout habitat in the Monture and Blackfoot drainages, including the McCabe timber sale in the Monture Creek roadless area. Planned timber sales bordering spawning habitat on the Idaho Panhandle, Clearwater, and Nez Perce National Forests in Idaho are common. These include the massive Cove-Mallard timber sales in the Jersey Jack roadless area. These sales include 151 miles of new roads and 81 million board feet of clearcuts. Independent biologists have documented damage to Chinook salmon habitat as a result of roadbuilding, and these waters are inhabited by bull trout as well (Mitchell, pers. comm. 1992). The Colville National Forest in Washington and the Wallowa-Whitman in Oregon have plans for extensive timber harvests and new roads in bull trout habitat. Western Oregon and Washington bull trout habitat has been subjected to some of the most extensive timber harvest activity in the world. The Kootenai National Forest in Montana fits this category as well.

Private, corporate timber company lands throughout bull trout range have been completely liquidated of timber and road densities are extremely high.

Other known timber sale impacts include the Harvey-Eight Mile sale on the Deerlodge National Forest which will clearcut over 800 acres and includes nearly 20 miles of new roads. Both Harvey and Eight Mile Creeks support bull trout.

An analysis of Bitterroot River system streams found that virtually all the remaining bull trout exist in headwaters streams that are remote and primarily roadless (Swanson 1992).

In many documented instances, roadbuilding and clearcutting of stream side areas and headwaters tributaries has degraded or destroyed prime bull trout habitat, including the Overwhich Creek Disaster on the Bitterroot National Forest, where an entire bull trout population of about 600 fish was wiped out by massive landslides in 1992.

Both geologists and hydrologists have noted that the most intensive roadbuilding and clearcutting programs took place during the past ten years, eight of which have comprised a severe drought. When normal precipitation levels return, these scarred mountainsides are likely to suffer more frequent slope falures and road blowouts, increasing sedimentation to many times current levels (Campbell,

pers. comm.).

Cattle Grazing

Cattle grazing can destroy bull trout habitat by trampling headwaters spawning tributaries; removing streamside vegetation and shade, resulting in increased water temperatures too high to support spawning activity and resident fish; trampling of stream banks causing collapse which results in increased sedimentation and widening and shallowing of streams. Peters (1990) reported that cattle grazing had impacted or destroyed key bull trout spawning tributaries in the Blackfoot River system.

Mining

Mining operations have had very serious effects on bull trout populations. Both the Clark Fork and Blackfoot River systems have very high levels of toxic mine tailings in certain stretches of the river resulting from improper operations and failure of tailings ponds. These toxic discharges have resulted in large fish kills on several occasions and continue to result in fish kills following heavy rains. The toxic metals are passed through the food chain and bull trout undoubtedly prey on fish that are contaminated with heavy metals.

Mining operations also frequently divert streams for operations and disturb streambeds during mining.

Many new mines have been proposed throughout bull trout habitat including the Phelps-Dodge gold mine near the headwaters of the Blackfoot River. These mines will use a cyanide heap leaching process. Many of these proposals include plans to divert entire streams.

Dams

The construction of several large dams within the heart of bull trout range has had similar effects on bull trout as dams in the Columbia River system have had on anadromous fisheries. Dams have had several serious effects. They: 1) cut off natural spwaning runs (for example, the construction of the Hungry Horse Dam and the Bigfork dam

in Montana cut off up to 40% of the total bull trout spawning habitat in the Flathead River Basin). 2) they isolate remaining bull trout populations, putting them at increased risk of genetic isolation and extinction 3) they flood out prime spawning and rearing habitat 4) dam operations have effects on downstream bull trout populations (Stanford 1990).

As mentioned above, the Hungry Horse and Bigfork dams cut off 40% of the spawning habitat in the Flathead Basin and broke the Flathead bull trout populations into several discreet populations. The Milltown Dam split the Clark Fork and Blackfoot River bull trout populations. The Libby Dam split up the Kootenai River population. Several irrigation dams in the Bitterroot River system have isolated several bull trout populations.

Artificial barriers, such as dams, can block or substantially delay upstream migration of adults to spawning areas (Ratliff and Howell 1992). Barriers isolate populations and prevent genetic interchange that may contribute to the genetic diversity within the population (Ratliff and Howell 1992).

Brown (1992) reported that dams on the Columbia and Wenatchee Rivers have had serious impacts on bull trout populations in Washington.

Irrigation

It is not uncommon for streams in the Northern Rockies to be completely dewatered by irrigation. In drought years, this can be a very serious impact on bull trout populations. Streams already at below normal flow can be dewatered, exposing spawning sites and eggs. Lower flows are also susceptible to warming above natural levels.

Overharvest

The bull trout is an aggressive fish that is susceptible to angling (Ratliff and Howell 1992). Bull trout are particularly vulnerable to poaching during spawning (Pratt 1985, Smith 1992).

Overharvest of bull trout has been a problem for several decades. Due to their aggressive nature, bull trout are very easily caught on lures, plugs, and flies (Rhude 1989). In addition, they are an easy target for poachers during spawning season. The large spawners are

readily visible in small spawning streams and are frequently the victims of netting, spearing, and shooting by poachers. Liberal fishing bag limits have reduced bull trout populations in Alberta (Rhude 1989). Overharvest is suspected of being the major cause of bull trout decline in Alberta (Roberts 1987).

Population Fragmentation and Genetic Isolation

Fragmentation and isolation can exacerbate problems of declining populations (Ratliff and Howell 1992). Lack of genetic interchange between populations coupled with low population levels result in little genetic variation within the population. This can lead to an inbreeding depression, further lowering productivity of the population (Ratliff and Howell 1992).

A study of 5 bull trout populations in the Upper Columbia River drainage shows a substantial percentage (26.4) of the total amount of genetic variation detected was due to genetic differences between populations while the rate of intrapopulation variability was low (Rode 1991). This underscores the importance of maintaining many diverse populations to preserve the genetic resource represented by the bull trout (Rode 1990).

Introduction of Non-Native Species

In most of the bull trout range there have been extensive introductions of non-native fish including rainbow trout, brown trout, and brook trout. In most areas, the introduced species are more tolerant of human impacts and able to outcompete the bull trout to the extent that much of the remaining bull trout are found only in isolated headwaters streams in pristine condition. In the case of the brook trout there is a serious problem of interbreeding, which often produces sterile hybrids.

Introduced brook trout pose a serious threat to bull trout populations through hybridization (Ratliff and Howell 1992). Frequent production of sterile hybrids creates an unstable situation leading to displacement of the bull trout, (Ratliff and Howell 1992) especially when combined with habitat alterations, such as increased temperatures (Ratliff and Howell 1992) and sedimentation (Peters 1991). According to Peters (1991) the brook trout's tolerance for high sediment levels in stream channels probably also gives it a

competetive advantage over bull trout in the growing number of heavily impacted stream reaches.

Possible Introduction of Artificial Hatchery Strains

As part of the Northwest Power Planning Act, mitigation funds to repair habitat damage from the construction of Hungry Horse Dam are to be used. However, agencies including the U.S. Fish and Wildlife Service are planning a project to use funds not for habitat improvement but for introduction of up to 250,000 juvenile bull trout into Flathead Lake. This raises several problems for the native bull trout. According to Weaver (pers. comm. 1992) hatchery-raised bull trout could dominate the wild trout and spread inferior genes throughout the river system's population. Artificially boosting the bull trout population also would increase fishing pressure, further reducing wild stocks. Weaver cites increased siltation due to logging and faulty road construction over the past 20 years as a primary cause of declining bull trout populations. Using Hay Creek in the North Fork of the Flathead as an example, Weaver said that removing sediment through the use of sediment traps, then reopening the passage to allow spawners could result in the production of 15,000 wild young bull trout in Hay Creek (Weaver pers. comm. 1992). Hatchery plantings are experimental and should be carried out on a small scale in isolated areas.

Predicted Downward Trend in Habitat

As discussed above, there are massive plans for future development of the remaining bull trout range. These plans include statewide wilderness release bills pursued by Congress. These could open up 80% of the roadless areas in Montana for development, including more than 98% of the timber base and 100% of mining claims (Baucus and Burns 1992). A similar bill is planned for Idaho roadless areas. These actions could have catastrophic impacts on the bull trout. The cumulative effects of all the development threats to bull trout habitat will spell doom for the bull trout unless emergency habitat protection plans are developed and implemented.

Summary of Status of *Salvelinus confluentes*

Over the last few decades, the bull trout's abundance and distribution in the Northwest have steadily declined as non-native fish species have been introduced and pristine habitats are altered by development.

Montana

Bull trout currently are found in 42% of the river and lake reaches in Montana (Thomas 1992). Thomas estimates that bull trout could be extirpated from 58% of its historic range in Montana (1992).

Flathead River Basin (Montana, British Columbia)

Although the Flathead Basin is believed to comprise the most viable population of bull trout remaining in the 48 states (Thomas 1992), it is clearly in a serious decline (Enk 1992). Bull trout in Flathead Lake have lost half of their historic spawning area to dams and are now known to spawn in only 28 tributaries. Of those 28 tributaries, more than half are threatened by habitat degradation (Northwest Power Planning Council 1992).

The construction of Kerr Dam and Hungry Horse Dam have created remnant bull trout populations that are at risk because genetic interchange with the Flathead Lake population is virtually nonexistent (Thomas 1992). Bigfork Dam, built in 1902, blocked fish migration from Flathead Lake into Swan River. The construction of Hungry Horse Dam, which resulted in the loss of 2,000 spawners in 1954, blocked passage into the South Fork of the Flathead River (Northwest Power Planning Council 1992). Thus, genetically or behaviorally discreet populations of bull trout may now exist in both the Swan River drainage and the South Fork of the Flathead River (Stanford 1990). Kerr Dam blocks fish passage from the lower Flathead into Flathead Lake.

Hungry Horse Dam blocks approximately 38% of the total drainage area available for bull trout spawners migrating from Flathead Lake (Thomas 1992).

In addition to the effects of the dam, bull trout residing in Hungry Horse Reservoir must attempt to spawn in creeks that are

heavily impacted by sedimentation from extensive road networks and clearcutting activity. Quintonkon Creek is believed to support spawning activity even though no redds have been sighted, because juveniles have been seen there (Wittenger 1992). Thomas (1992) listed Quintonkon Creek as an important spawning tributary. August 1992 was the first time core samples were taken in Quintonkon Creek. The median percent fines <6.35mm was 39.6% (Wittenger 1992). That places this stream in the "impaired" category defined by the Flathead Basin Commission. An ever increasing number of bull trout spawning streams are entering the "impaired" category.

The North and Middle Forks of the Flathead River contain some of the best remaining bull trout habitat in the United States and more data has been collected there than in any other drainage in Montana (Thomas 1992). On-going population studies demonstrate that the North and Middle Fork bull trout populations continue to decline at a precipitous rate.

The redd count in the North Fork of the Flathead River was 36% below the twelve year average in 1991 (Enk 1992). Redd counts in the Middle Fork averaged 46 and 31 percent below the 12 year average in 1990 and 1991, respectively (Thomas 1992). The near record-low total redd count coupled with below-average counts in seven of eight monitoring streams in 1991 is unprecedented. However, the declines for 1992 are even greater. There was a 65.5% decline in redds basin-wide, below the 13 year average (Weaver 1992). Every surveyed spawning stream showed a dramatic downward count. Coal and Whale Creeks were 83% and 89% below the thirteen year average.

In the Middle Fork, 1992 redd counts ranged from 43.5% to 68.6% below the thirteen year average (Weaver 1992).

Juvenile abundance in Coal and Big Creeks has also declined. The monitoring record for Big Creek suggests that juvenile abundance is directly related to egg survival from prior years (Enk 1992). Since 1986, sediment levels have increased steadily in Big Creek and spawning gravels and estimated egg survival rates have fallen accordingly. Correspondingly, juvenile bull trout abundance has been declining since 1989 (Enk 1992). Drought and low stream flows in 1987 and 1989 have also contributed to the decline of juveniles. (Enk 1992).

Several major spawning streams in the North Fork have sediment levels that exceed threshold levels for bull trout. The rating system

developed by the Flathead Basin Forest Practices, Water Quality, Fisheries Cooperative Program in 1991 defines "threatened streams" as those having greater than 35% fine materials in spawning gravels and "impaired streams" as having greater than 40% fine materials in spawning gravels (FBCP 1991). Fish habitat monitoring results through 1990 indicate that Big and Coal Creeks in the North Fork drainage, where bull trout redd counts have recently shown declines, are "impaired." The highest sediment levels of record for Coal Creek and Big Creek were measured in 1990: 42 percent and 52 percent respectively. These two drainages have extensive road networks and a history of timber harvest. Coal Creek also has been subjected to Placer mining activity, and the Big Mountain Ski Area encompasses part of Big Creek's headwater zone (Enk 1992).

The situation in Big Creek is particularly alarming (Enk 1992). Spawning gravel sediment has risen steadily from 29% in 1987 to 52% in 1990. In 1991 Big Creek remained "threatened" with a 33% fine sediment level and the Lakalaho Timber Sale in progress (1992-1993) which is predicted to cause sediment increases. Causes appear to be release of stored sediment from decaying log debris jams, slumping of abandoned logging roads, mass wasting of streambanks, and inadequate flushing flows in 1988 and 1989. Soil and channel disturbances associated with expansion of the Big Mountain Ski Area have contributed to Big Creek's sediment load.

Twelve streams are closed to fishing because they provide critical spawning and rearing habitat for bull trout and cutthroat trout and are essential to maintenance of these sport fisheries in Swan Lake and Flathead Lake (Amendment No.3, Flathead N.F. LRMP 2/27/90).

Swan River

The Swan River fishery is essentially isolated from the remainder of the Flathead drainage by the Bigfork dam (Leathe and Enk 1985 cited in Thomas 1992). Prior to construction of the Bigfork Dam, large runs of bull trout were observed each spring as adults moved from Flathead Lake into the tributaries of the Swan River to spawn (J. Whitney, Bigfork, Montana pers. comm. 1992).

Elk Creek, which reports more bull spawners than any other stream in the Swan drainage, qualifies for "threatened" status (Enk 1992). The significance of the bull trout habitat in Elk Creek precludes

most development activities. The Forest Service has tried unsuccessfully to purchase sections of Elk Creek currently owned by Plum Creek Timber Co. Unless the Forest Service can acquire the headwaters of Elk Creek, logging and roadbuilding by Plum Creek will seriously degrade the most important stream in the Swan River bull trout fishery.

The Swan drainage contains some isolated resident populations. The North Fork of Lost Creek contains one such population upstream of a barrier falls (Thomas 1992).

Monitoring done at Jim Creek (Platts 1990), a known bull trout spawning stream found that fine sediments <6.35mm increased significantly below the Jim Creek Timber Sale. Before the sale fines <6.35mm were 40.9%; after the sale they were 50%. This stream was already in the "impaired" category before the sale, and its condition worsened to the point that bull trout fry were predicted to suffer 100% mortality (Platts 1990). The study concluded that there were violations of voluntary "Best Management Practices."

The Swan population appears relatively stable but it remains threatened by habitat degradation and possible upriver migration by lake trout, which may be eating juvenile bull trout.

Clark Fork River and tributaries between Milltown Dam and the confluence with the Flathead River

In the mainstem of the Clark Fork, bull trout are considered either rare or uncommon (Thomas 1992). Important spawning tributaries include Cache Creek and Montana Creek, which are tributaries to Fish Creek, the St. Regis River, and Trout Creek. Other important bull trout streams are Cedar Creek, Cement Gulch Creek, Lost Creek, and Ward Creek (Thomas 1992). Many of these streams are heavily impacted by roads and logging. The petitioners have documented extensive sedimentation and road damage to the South Fork of Little Joe Creek (see attached photos). An official notice of a Water Quality Violation was sent to the Montana Water Quality Bureau. Furthermore, improperly installed road culverts block spawning movements in the South Fork of Little Joe. Timber harvests have been heavy throughout this drainage. The few pristine segments are located in roadless areas. Large timber sales are planned for all of these roadless areas.

Thomas (1992) states that several other streams in this drainage

support only a handful of bull trout but likely once supported healthy bull trout populations. Dams have blocked spawning migrations at Milltown Dam and at the Montana Power dam on Rattlesnake Creek.

The entire drainage has been plagued by toxic mine tailings from the huge mine at Butte. The Milltown Dam is the nation's largest EPA Superfund Site.

Thomas (1992) reports that 85% of all the bull trout stream reaches in this drainage also contain brook trout. She calculated that 36% of the streams in this drainage had the highest risk of extinction. Forty-one percent of the streams have a high risk of extinction.

Clark Fork River and tributaries downstream from the Flathead River

Thomas (1992) reports bull trout as rare in the mainstem of the river. A moderate risk of extinction was calculated for 80% of the streams in this part of the drainage (Thomas 1992). Historically, this part of the river and its tributaries were used by spawning bull trout from Lake Pend Oreille, but dams now block these migrations.

Clark Fork River upstream from Milltown Dam

Bull trout were once abundant throughout the entire drainage but are now considered rare in the main stem of the river (Thomas 1992). Harvey Creek contains a resident population that is considered the healthiest population in the drainage but it is now threatened with the Harvey-Eight Mile timber sale. This drainage has been battered by mining impacts and toxic heavy metals. Trout kills still occur after heavy rains.

Blackfoot River and tributaries

The bull trout is clearly in decline in the Blackfoot River. The Blackfoot population is separated from the Clark Fork population by the Milltown Dam. Peters (1990) found that only 3 of 19 sampled major tributaries to the Blackfoot had significant densities of young of year bull trout. He reported that the lack of young of year bull trout in several streams with known spawning runs in the past could

mean populations have been lost. He noted that Monture Creek had a 59% decline in redd counts between 1985-1989. Another monitored spawning run also had a 59% decline in redds. Overall, the density of adult bull trout in the Blackfoot River is only 0.05 fish/1,000 feet. He found that fish sampling observations during the 1989 spring population estimates in the Blackfoot River indicate declining numbers and size of adult bull trout. He identified the lack of more and better spawning opportunities for large fluvial bull trout as putting the bull trout in jeopardy. He called for the immediate curtailment of harvest of the few remaining adult and juvenile bull trout still in the system and called for special land, water and fish management considerations for spawning streams.

This entire drainage has been heavily impacted by extensive mining and toxic metals pollution, extensive roadbuilding and clearcutting of forestlands on both private and public ownerships, excessive cattle grazing and removal of riparian vegetation cover, and heavy recreational use. The Blackfoot River has deteriorated to the point that American Rivers, a private conservation organization, recently identified the Blackfoot as one of the ten most endangered rivers in North America.

Peters (1990) found significantly deteriorated trout habitat in the tributary streams of the Blackfoot. He cited private land development and livestock grazing as major impacts as well as extensive logging of private corporate lands in the drainage. In general the entire drainage has suffered major habitat damage from toxic mine tailings. The Mike Horse Mine tailings pond suffered a major breach in 1975 sending toxic metals throughout the river.

Bitterroot River and tributaries

The bull trout is critically endangered in the Bitterroot River system. They are now believed to be extinct within the main stem of the Bitterroot River (Thomas 1992). They now exist as isolated, separate populations within the headwaters of mostly pristine, unroaded drainages (Bitterroot National Forest Monitoring Report 1992, Swanson 1992). In these areas hybridization with brook trout is a major threat. Existence of bull trout is closely correlated with unroaded drainages that were rated as in good condition (Decker 1992).

Clancy (Bull trout meeting notes, 1992) reports that managers on

the Bitterroot are seriously concerned about viability of bull trout on the Bitterroot. According to several local sportsmen, who have fished the Bitterroot River system since the 1930's, bull trout were common in the Bitterroot with very large fish also being common (pers. comm. Brandborg 1992, Craighead 1992). Craighead (pers. comm. 1992) reports that there was a dramatic decline in fish populations in the Bitterroot following widespread use of DDT in the Bitterroot Valley. He observed a marked decline in aquatic insects, which in turn is believed to have caused a decline in fish populations. As prey for the bull trout decreased, the bull trout population also decreased. Combined with extensive roadbuilding and logging, agricultural pollution, extensive alteration of the original stream courses and stream banks, removal of riparian vegetation, and other impacts, the cumulative effects have apparently driven the mainstem river population into extinction. Emergency measures are urgently needed to protect the remaining bull trout habitat and restore large areas of historic habitat in the Bitterroot System.

Kootenai River and tributaries

The Kootenai River bull trout population is at risk because it depends upon a few key tributaries to support the population (Thomas 1992). Three distinct populations exist in the main stem of the Kootenai River. One upstream group has been isolated historically by Kootenai Falls. The construction of Libby Dam further blocked migration, creating two more distinct populations; one below the dam, and another above the dam and below the Falls (Thomas 1992).

The most important spawning stream above the dam and below the falls is Quartz Creek. While numerous spawners have been identified, there has also been genetic testing that shows a 25% hybridization rate with brook trout (cited in Thomas 1992 at 31). Skaar (1992) noted that timber harvests have been very heavy in recent years in the Quartz Creek drainage. That could pose serious sediments problems in the future.

Thomas' (1992) review of the risk of extinction for these populations indicates that the majority of the populations are at a moderate or high risk. Streams with the greatest risk of extinction are Camp, Keeler, Meadow, Murphy, and Pipe Creek.

Fisher River

Perkinson (1992 cited in Thomas 1992) reports that bull trout are probably extinct here and certainly not viable, although the drainage historically supported bull trout. The area has been heavily roaded and logged.

Yaak River

Bull trout are considered rare here with a relatively high risk of extinction (Thomas 1992). This drainage has also been very heavily roaded and logged.

Rock Creek

Thomas (1992) rates this stream as being the healthiest bull trout population outside the Flathead Basin. The habitat is rated as A: best value habitat. Thomas (1992) stated it is prudent to assume that this is the most important spawning tributary for large Clark Fork River bull trout. Local residents with long experience at Rock Creek report seeing congregations of very large bull trout spawners resting along the streambanks of Rock Creek.

However, the Lolo and Deerlodge National Forests have planned 22 timber sales and at least 70 miles of new roads into roadless headwater areas in this drainage, posing a very serious risk of sediment increases to what may now be one of the last stable population of bull trout in the Northern Rockies.

Flint Creek

Human impacts have been heavy here and Thomas (1992) reports that bull trout are in perilous condition in Flint Creek.

Idaho

The bull trout is the least studied salmonid in Idaho (Schill 1992). Bull trout were present in 26% of 1440 separate sampling events. The average densities in 112 sites in 43 streams monitored continuously since 1985 have declined 3-fold (Schill 1992). The bull trout is virtually extinct in the Coeur d'Alene river system (Horner

pers. comm. 1992). Few fish remain in the St. Joe River and Lake Coeur d'Alene , where fishing has been prohibited since 1988 (Horner pers. comm. 1992). Recent reports (Idaho Fish and Game 1992) show a serious decline in redd counts in the Pend Oreille aquatic ecosystem, which is the largest and strongest remaining bull trout population in Idaho.

Coeur d'Alene

The bull trout is virtually extinct in the Coeur d'Alene River system (Horner pers. comm. 1992). Few fish remain in the St. Joe River and Lake Coeur d'Alene, where fishing has been prohibited since 1988 (Horner pers. comm. 1992). Cross (1992) rated this population as having a high risk of extinction.

Pend Oreille Basin

Recent reports from the Idaho Fish and Game Department (1992) show a serious decline in redd counts. The most important spwaning tributary, Trestle Creek, showed a 46% decline below the nine-year average between 1983-1991. Redd counts in Grouse Creek were 65% below an eight-year average between 1983-1991. The spawning tributaries to the Clark Fork River had redd counts in 1992 that are way below the levels of the early to mid-1980's. Twin Creek was 81% below early to mid-1980's levels. Johnson Creek, 39% below; Rattle Creek, 65% below; Wellington Creek, 41% below; Porcupine Creek, 87% below; Savage Creek, 99% below; Lightning Creek, 55% below.

The construction of Cabinet Gorge Dam in 1951 reduced the available spawning and rearing habitat for bull trout to 16 km of the Clark Fork (Pratt 1985). Redd counts conducted in 1983 and 1984 established that bull trout spawning was limited to 23% of available habitat. Pratt found that the annual mortality of spawning bull trout was high partially due to the illegal harvest of spawners.

In the Pend Oreille spawning sites sampled, the percent fines < 6.35mm in diameter averaged 34-37%, and estimated egg survival was less than 50% (Pratt 1985). Bull trout egg-to-fry survival declines rapidly as fines <6.35 mm in diameter exceed 30% (Weaver 1985). Pratt recommended prevention of further sedimentation in South Gold Creek, an important spawning stream that exceeded the 30% sediment threshold

(Pratt 1985). Trestle Creek, which had the highest redd count in the Pend Oreille drainage in 1983-1984 (Pratt 1985), is closed to fishing, but the Forest Service has plans log the area's steep slopes (Smith pers. comm. 1992). Bull trout streams were often characterized by large substrate, closed or partial canopy, and high gradients (Pratt 1985).

Cross (1992) rated the Pend Oreille basin bull trout population as having a low risk of extinction. However, this was prior to the 1992 redd counts. He also qualified that rating by stating that distinct sub-populations may have a higher extinction risk. For example he listed the downward trend in spawning activity in Lightning Creek as an indication that this population faces a moderate risk of extinction.

Priest Lake Basin

The bull trout population in Lower Priest Lake is extinct (Horner pers. comm. 1992). Priest Lake supported a good bull trout fishery prior to 1978 (Mauser 1988). Fishing has been closed since 1984 due to an abrupt decline in the population first apparent in the late 1970s (Mauser 1988). Creel survey showed a decrease in catch from a record 2,320 in 1978 to 159 in 1983 (Mauser 1985). The bull trout population did not respond to fishing closures (Mauser 1986) and the bull trout has been replaced by an expanded lake trout population (Mauser 1988).

The declining bull trout population in Upper Priest Lake has resulted in catch and release fishing in the Lake with fishing prohibited in the tributaries (Horner pers. comm. 1992). Cross (1992) rates this population as having a moderate risk of extinction.

Wood River

There is conflicting information regarding the Wood River. According to Ratliff and Howell (1992), an isolated bull trout population exists in the Wood River. According to Bill Horton (pers. comm) falls presented a natural barrier and the Wood river is outside the bull trout's historic range.

Clearwater River

The Little North Fork of the Clearwater River in Idaho still supports a viable population of bull trout although little research has been done (Horner pers. comm. 1992). Fishing is permitted but limited to 2 fish. Much of the currently unroaded Little North Fork drainage is owned by Plum Creek Timber Co. Future logging and roadbuilding by Plum Creek is likely to have significant detrimental impacts on bull trout habitat in the Little Fork of the Clearwater (Horner pers. comm. 1992). Cross (1992) listed this stream as one of special concern and estimates a moderate risk of extinction for this population.

Salmon River

Little is known about bull trout in this area except that they are present. Schill (1992) reports a strong spawning run up the Rapid River and reports that bull trout are successfully negotiating the dam obstruction there. He reports similar timing for the run up the East Fork of the Salmon River.

St. Joe River

Cross (1992) rates this population as having a moderate risk of extinction. Logging activity is common in this area. The headwaters are still roadless but threatened by future roadbuilding and clearcutting. Redd counts by the Idaho Fish and Game Department (1992) identified redds in the mainstem Upper St. Joe River as well as in eight tributary streams. A total of 58 redds were confirmed and 13 possible redds were sighted. The total of 71 assumes 142 spawners.

Kootenai River

Bull trout fishing is permitted in the main stem of the Kootenai River, but the tributaries are closed (Horner pers. comm. 1991). Cross (1992) estimated a moderate risk of extinction for this population.

Oregon

The range of the bull trout in Oregon has been reduced to primarily the upper reaches of tributaries to the Columbia, Snake, and Klamath rivers (Ratliff and Howell 1992). Sixty-five populations in 13 basins were classified into five categories of population viability based on an evaluation of information on abundance and limiting factors: 9 populations have a "low risk" of extinction; 13 are "of special concern"; 19 face a "moderate risk" of extinction; 12 face a "high risk" of extinction; 12 are "probably extinct." The basins that have the most precarious populations are the Willamette, Hood, Klamath, and Powder rivers. Most of the healthiest populations are in northeastern Oregon (Ratliff and Howell 1992), where extensive undeveloped roadless areas exist. However, recent Forest Service salvage/forest health harvesting in eastern Oregon threatens these populations (Bull Trout Coordination Meeting 1992).

Klamath

Bull trout populations in the Klamath River Basin face "moderate" to "high" risks of extinction (Ratliff and Howell 1992). Two populations in the Scyan River subbasin are "probably extinct." (Ratliff and Howell 1992). In the Sprague River subbasin bull trout populations appear to be primarily resident and vulnerable to extirpation (Ziller 1992).

The limited range, diminished status, and resident nature of these populations makes them vulnerable to even small environmental or biological changes (Ziller, 1992).

Willamette River Basin

The Middle Fork of the Willamette was listed as having a high risk of extinction (Ratliff and Howell 1992). Major tributaries include the McKenzie, Santiam and Clackamas Rivers. Ratliff and Howell (1992) report bull trout as extinct in the Santiam and Clackamas Rivers. Major forks and tributaries of the McKenzie range from moderate to high risk to probably extinct.

Deschutes River Basin

The Metolius River and Shitike Creek are at low risk of extinction. However, bull trout are now extinct in the upper Deschutes River and Crescent Lake. There is a moderate risk of extinction in the Warm Springs River and high risk in Odell Lake (Ratliff and Howell 1992).

John Day River Basin

Bull trout are at moderate to high risk throughout this drainage and are probably extinct in the Upper North Fork (Ratliff and Howell 1992).

Hood River

Ratliff and Howell (1992) report a high risk of extinction for the Clear Branch and rate bull trout as extinct in the West Fork. This area was specifically identified by Tucker (1992) as one of the most heavily logged areas in the world with up to 90% of the forest logged off.

Umatilla River

Ratliff and Howell (1992) report bull trout in the North Fork at low risk of extinction but of special concern in the South Fork.

Walla Walla River

Ratliff and Howell (1992) report bull trout at low risk of extinction in the South Fork and Mill Creek, but of special concern in the North Fork.

Malheur River

This area has suffered habitat degradation from overgrazing and dewatering for irrigation. Ratliff and Howell (1992) rate bull trout as at high risk of extinction in the Middle Fork and of special concern in the North Fork.

Powder River

Ratliff and Howell (1992) report that bull trout are at moderate to high risk of exinction throughout the entire drainage.

Pine Creek

Rated by Ratliff and Howell (1992) as moderate risk of extinction to special concern.

Grande Ronde River

Ratliff and Howell (1992) rate this drainage as a moderate risk of extinction for bull trout.

Imnaha River

The main river population of bull trout are at low risk of extinction but three tributaries of of special concern (Ratliff and Howell 1992). This population is still healthy because the Imnaha drains a large wilderness area and several adjacent roadless areas.

Wallowa River

The Lostine River bull trout are at moderate risk of extinction and Bear and Hurricane Creeks are of special concern. Bull trout are probably extinct in Wallowa Lake. The Wenaha River population is at low risk (Ratliff and Howell 1992).

Washington

Washington populations in many east slope Cascade streams and rivers have shown accelerated declines in abundance and distribution in recent years. The bull trout is considered to be extinct in Lake Chelan and the Okanogan River (Willamette National Forest 1989). Populations in many east slope Cascade streams and rivers have shown accelerated declines in abundance and distribution in recent years. Spawning runs in some streams are meager enough to suggest stock endangerment (Brown 1984 cited in Willamette National Forest 1989).

This entire region has been subject to some of the most extensive roadbuilding and logging activity in the world (Tucker 1992).

The Washington Department of Fish and Game published a map (1992) which shows that bull trout have gone extinct in large sections of the Columbia River; are extinct in the Yakima River; extinct in the lower half of the Asotin River and the lower reaches of the Tucannon River; extinct in the lower Walla Walla River and the lower Touchet River; extinct in much of the Wenatchee River; extinct in the upper Spokane River; extinct in part of the Methow River; extinct in part of Skykomish River.

Bull trout are reported to be in many streams throughout the Wenatchee National Forest although sighting data are considered barely adequate to confirm the presence of the species in many streams (Brown 1992). Brown (1992) reports bull trout as sparse in the Entiat River basin. He reports the bull trout population is low in the Wenatchee River basin. He listed the White River and the Chiwawa Rivers as strongholds for spawning bull trout. He reports bull trout as nearly gone from the Upper Yakima River basin and gone from the Lower Yakima. He also reports bull trout as very rare in the mainstem Naches River and several tributaries. He states that with few exceptions, bull trout on the Wenatchee Forest are found only in typically near-pristine waters (Brown at 37). He wrote (at 37) that: "Spawning aggregations (and most early rearing juveniles) are mostly restricted to streams unaltered by land-use management activities, often in association with Wilderness." He also listed dams as a major detriment to bull trout.

A draft report on a bull trout migration study in Swift Reservoir, and the North Fork Lewis River and its tributaries was prepared by the Gifford Pinchot National Forest in response to increased demands for timber harvest in this drainage (Gifford Pinchot National Forest 1992). Twenty-seven bull trout were fitted with radio-telemetry gear. They conclude that this population of bull trout is small and vulnerable to man-caused disturbances and overharvest.

California

The bull trout is extinct in the McCloud river system in Califonia (Rode 1990). Bull trout historically existed in California from the mouth of the McCloud River upstream to Big Springs but had declined drastically by the early 1970's (Rode 1990). The last adult bull

trout documented in the McCloud was in 1975. Extensive and varied surveys conducted by the California Department of Fish and Game over the past 12 years have examined thousands of trout to assess the status of the bull trout. Only one possible sighting (in 1978) has been made by persons trained to identify bull trout.

Several factors contributed to the extinction of the bull trout. The dramatic decline of the bull trout soon after the completion of McCloud Dam implicates the project as the primary cause of extirpation. The construction of Shasta Dam, the diversion of a major portion of the river flow to the Pit River drainage in 1965, the introduction of brook trout *S. fontinalis* and brown trout *Salmo troutta*, and overharvest by anglers also contributed to the McCloud River bull trout's demise (Rode 1990).

The California Department of Fish and Game is currently at work on a reintroduction plan. It may be possible to re-establish a bull trout population in the McCloud River using introduced stock, but the gene pool of the original bull trout population has been lost forever (Rode 1990).

Note (Angling regulations since 1976 required the release of all bull trout).

Nevada

A remnant population of bull trout still exists in the Jarbridge River drainage in extreme northeast Nevada. Willard (pers. comm. 1992) reports that dewatering by irrigation and drought is a concern.

One bull trout was captured in 1992 in Jack Creek and Pine Creek (Johnson 1992). Johnson (1992) noted that only two bull trout stream reaches (Jack and Dave Creeks) lie outside the Jarbridge Wilderness Area. He wrote that "Wilderness status presumably lessens the impacts man can have on the bull trout." Sixteen tributaries were surveyed in 1992. The East Fork Jarbridge River tributaries will be surveyed in 1993 (Johnson 1992).

Due to its extremely isolated status, this population probably faces a risk of extinction.

Alberta

Every biologist contacted in Alberta reports that bull trout are

in a steady, serious decline throughout the province. The Alberta Fish and Wildlife Division plans to restrict the fishing season on bull trout to catch and release only (pers. comm. with Jim Stelfox and Larry Rhude, Alberta Fish and Wildlife 1992). Bull trout were reportedly in abundance across the entire province but are now found only in the foothills of the Rockies. One three-part study shows that bull trout density in one Alberta river declined from 100/km to 17/km to 1/km (pers. comm. Rhude 1992). Stelfox (pers. comm. 1992) reported that a study of Lower Kananaskis Lake bull trout detected only 78 adult spawners up Smith-Dorrien Creek, the major spawning tributary. Anglers harvested 46% of the adults during the winter season alone and probably 70% were harvested for the year. Wayne Roberts with the Provincial Museum at the University of Edmonton has several deacdes of experience fishing bull trout in Alberta and is widely recognized at the leading expert on the bull trout in Alberta. He reports (pers. comm. 1992) that the bull trout is in a serious decline and have disappeared from many streams altogether.

British Columbia

Brown (1985) reports that bull trout populations have been declining in British Columbia. He listed overharvesting, poaching, and dam construction that blocked spawning runs as the major causes. Still, the bull trout has no special status in British Columbia, and is managed as one of many game fish, although some spawning streams are closed to fishing. There have been few specific studies done on the bull trout in British Columbia.

The major drainage with bull trout that British Columbia shares with the U.S. is the North Fork of the Flathead River. Up to 25% of all spawning bull trout in the North Fork of the Flathead drainage spawn in the British Columbia part of the drainage (Weaver 1992).

Appendix B includes a map of increased road density in southeast British Columbia in the North Fork area. Road sediments could be impacting bull trout habitat there. There is also still the threat of the gigantic Cabin Creek Mine proposal, which could have major effects on the entire North Fork of the Flathead, which now represents the most viable bull trout population left in the U.S.

Thomas (1992) reports that a few spawning bull trout leave Lake Koocanusa in Montana and migrate to headwaters creeks in British Columbia.

Risk of Extinction

Risk of extinction calculations done by researchers in several different areas of bull trout range shows that bull trout face a moderate to high risk of extinction in a majority of the stream reaches they still occupy. In Montana, 96% of all bull trout populations are at a moderate to high risk of extinction (Thomas 1992). In Oregon, about 54% are at moderate to high risk of extinction (Ratliff and Howell 1992). In Idaho, a rough calculation shows 83% are at moderate to high risk of extinction. These are results from the heart of the remaining bull trout range and were made prior to unprecedented declines in redd counts in the Flathead Basin and the Lake Pend Oreille basin.

Official Actions That Show the Situation is Critical

The Montana Fish, Wildlife, and Parks Department and the Confederated Salish and Kootenai Tribes recently imposed emergency regulations that prohibit harvest of bull trout in the Flathead River Basin between July 6 and November 30 and in Flathead Lake between January 1 and May 14. These restrictions were imposed in the middle of the fishing season, an unprecedented action. State biologists report these regulations will be expanded and extended. The state of Montana contracted to have a statewide status report on bull trout completed by Thomas (1992).

The Salish and Kootenai Tribes have begun an intensive study of bull trout on the Reservation and are considering a listing action.

The Idaho Panhandle National Forests have put together a bull trout action plan.

The province of Alberta has recommended a new bull trout management plan that will allow catch and release fishing only.

The Washington Department of Wildlife recently prohibited recreational harvest of bull trout throughout all of eastern Washington and the lower Columbia River drainage (Brown 1992).

Oregon streams now closed to bull trout harvest are the Willamette, Hood, Klamath, Malheur, Powder, and Pine Creek basins and the Metolius River. The daily limit on bull trout was recently reduced to 1 fish in Lake Billy Chinook and to 2 fish in the John

Day, Umatilla, Walla Walla, Grande Ronde , and Imnaha basins (Ratliff and Howell 1992).

The Oregon Chapter of the American Fisheries Society voted to begin a status review of the bull trout and will likely petition the U.S. Fish and Wildlife Service to conduct a status review.

The state of California listed the bull trout as endangered although they are believed to be extinct there now. A draft recovery plan for bull trout in the McCloud River is being worked on and it is now illegal to harvest a bull trout in California.

The Flathead Basin Commission developed a new rating system for bull trout streams that scores their habitat quality based on an index of fine sediments.

Inadequacy of Existing Regulations

While emergency fishing regulations may help, most of the threats to the bull trout continue unabated. In particular, habitat degradation from roadbuilding and timber harvest show no signs of lessening. Even though the Forest Service has listed the bull trout as a species of special concern, massive plans for roadbuilding and timber harvest within roadless areas that are the last stronghold of the bull trout remain in place. Mining operations are an increasing threat on Forest Service lands. Actions on private lands including grazing, irrigation, logging, and mining remain at all time highs.

Poaching remains a big problem since there is a very serious lack of enforcement personnel to stop it.

The Idaho Panhandle National Forests have developed a habitat action plan for bull trout yet it states that bull trout habitat will be managed in only four of the six aquatic ecosystems on the Panhandle National Forests. The Little North Fork of the Clearwater River and the Upper St. Joe River aquatic ecosystems were omitted from the habitat action plan. Redd counts for 1992 indicated 71 redds in the Upper St. Joe drainage and the Little North Fork of the Clearwater may still support a viable population of bull trout. Furthermore, the habitat action plan does not preclude the large scale logging plans which are ongoing in the last stretches of bull trout range.

The Flathead National Forest also has a bull trout habitat

management plan. However, moratoriums on harmful developments are only put in place once a stream has reached "threatened" or "impaired" status. By that time bull trout fry mortality reaches upwards of 75%.

There is a draft management guide for bull trout habitat on the Wenatchee National Forest (Brown 1992). Unfortunately, it concludes that current management under the Forest Plan is adequate, while the Forest Plan does not provide enough protection for bull trout habitat.

Many of the streams containing bull trout in Montana are listed as protected streams under the Northwest Power Planning Council list of protected fish and wildlife areas. Yet this designation has not halted any development practices that degrade water quality and fish habitat.

Critical Habitat Designation Recommended

Petitioners strongly recommend the designation of critical habitat for Salvelinus confluentes coincident with the listing of the species. The habitat of the bull trout continues to be degraded and destroyed and now even the highest quality remaining habitats are imminently threatened with continued degradation. Critical habitat should be designated in all areas where it is currently extant; if it is rediscovered in additional areas, those areas should also be included as critical habitat. Critical habitat designation for Salvelinus confluentes is clearly determinable and prudent.

Respectfully submitted this 27th of October, 1992.

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