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William F. Caton,

Acting Secretary.

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DEPARTMENT OF THE INTERIOR

Fish and Wildlife Service

50 CFR Part 17

RIN 1018—AE29

Endangered and Threatened Wildlife and Plants; Proposal to List the Klamath River Population Segment of Bull Trout as an Endangered Species and Columbia River Population Segment of Bull Trout as a Threatened Species

AGENCY: Fish and Wildlife Service, Interior.

ACTION: Proposed rule.

SUMMARY: The U.S. Fish and Wildlife Service (Service) proposes to list the Klamath River population segment of bull trout (*Salvelinus confluentus*) as endangered from south-central Oregon; and the Columbia River population segment of bull trout as threatened from the northwestern United States and British Columbia, Canada, with a special rule, pursuant to the Endangered Species Act of 1973, as amended (Act). The Klamath River population segment, comprised of seven bull trout populations from south-central Oregon, is threatened by habitat degradation, irrigation diversions, and the presence of non-native brook trout. The Columbia River population segment, comprised of 386 bull trout populations in Idaho, Montana, Oregon, and Washington with additional populations in British Columbia, is threatened by habitat degradation, passage restrictions at dams, and competition from non-native lake and brook trout. The special rule allows for take of bull trout within the Columbia River population segment if in accordance with applicable State fish and wildlife conservation laws and regulations. Pursuant to a court order, this rule is based on the 1994 administrative record. All available information, including current data, will be considered prior to promulgation of a final rule. If, after consideration of all available data, this proposal is made final, it would extend protection of the Act to these two fish population segments.

DATES: Comments from all interested parties must be received by August 12, 1997. Public hearings locations and dates are set forth in **SUPPLEMENTARY INFORMATION.**

ADDRESSES: Comments and material concerning this proposal should be sent to the U.S. Fish and Wildlife Service, Snake River Basin Field Office, 1387 S. Vinnell Way, Room 368, Boise, Idaho 83709. Comments and material received will be available for public inspection, by appointment, during normal business hours at the above address.

FOR FURTHER INFORMATION CONTACT: Robert Ruesink, Field Supervisor, Snake River Basin Field Office (see **ADDRESSES** section) (telephone 208/378–5243; facsimile 208/378–5262).

SUPPLEMENTARY INFORMATION: Public hearings locations and dates are:

1. Tuesday, July 1, 1997, from 2:00–4:00 p.m. and 6:00–8:00 p.m., Ramada Inn Portland Airport, 6221 N.E. 82nd Avenue, Portland Oregon.
2. Tuesday, July 8 1997, from 2:00–4:00 p.m. and 6:00–8:00 p.m., Shilo Inn, 923 East Third Avenue, Spokane, Washington.
3. Thursday, July 10, 1997, from 2:00–4:00 p.m. and 6:00–8:00 p.m., Doubletree Hotel Edgewater (formerly Village Red Lion Inn), 100 Madison Street, Missoula, Montana.
4. Tuesday, July 15, 1997, from 2:00–4:00 p.m. and 6:00–8:00 p.m., Shilo Inn, 2500 Almond Street, Klamath Falls, Oregon.
5. Thursday, July 17, 1997, from 2:00–4:00 p.m. and 6:00–8:00 p.m., Doubletree Hotel Riverside (formerly Red Lion Hotel), 2900 Chinden Blvd., Boise, Idaho.

Background

Bull trout (*Salvelinus confluentus*) were first described by Girard in 1856 from a specimen collected on the lower Columbia River. Cavender (1978) presented morphometric, meristic, osteological, and distributional evidence to document the separation between dolly varden (*Salvelinus malma*) and bull trout. Based on this work, taxonomists have recognized this separation since 1978 (Bond 1992). Bull trout and dolly varden were officially recognized as separate species by the American Fisheries Society in 1980 (Pratt 1992).

Although the bull trout is well accepted as a species among specialists in the evolution and classification of salmonid fishes (R. Behnke, *in litt.*, 1993), some uncertainty remains regarding the taxonomic status of bull trout among fisheries managers and industry (WDW 1992, Platts et al. 1993). When discriminate function values were used to separate populations of bull trout from dolly varden in the Puget Sound, a normal distribution resulted rather than a bimodal curve, which indicated that a clear separation of these species does not exist (C. Kraemer, *in litt.* 1993). In addition, Kraemer (*in litt.* 1992; undated U.S. Forest Service (USFS) survey) observed the two species spawning together, and suggested introgression may be occurring. In contrast, Phillips et al. (1992) and Pleyte et al. (1992) examined evolutionary relationships among six species of *Salvelinus* using ribosomal DNA analysis, and found clear distinctions among all six species. Their results suggested that dolly varden are more closely related to arctic char than bull trout, and that bull trout evolutionarily diverged from a line that gave rise to *S. leucomaenis* (a char indigenous to Japan) rather than the line that gave rise to dolly varden or arctic char. In addition, Cavender (1984) concluded that the evolutionary distance between bull trout and dolly varden is significant based on at least four separate chromosomal changes that separate the two taxa, and that the two species cannot be considered sister species based on those differences. As a result, the 1994 record supports the distinction between bull trout and dolly varden.

Bull trout populations are known to exhibit four distinct life history forms: resident, fluvial, adfluvial, and anadromous. Resident bull trout spend their entire life cycle in the same (or nearby) streams in which they were hatched. Fluvial and adfluvial populations spawn in tributary streams where the young rear from 1 to 4 years before migrating to either a lake (adfluvial) system or a river (fluvial) system, where they grow to maturity (Fraley and Shepard 1989). Anadromous fish spawn in tributary streams, with major growth and maturation occurring in salt water. Diverse life history strategies are important to the stability and viability of bull trout populations (Rieman and McIntyre 1993).

Bull trout display a high degree of sensitivity at all life stages to environmental disturbance and have more specific habitat requirements than many other salmonids (Fraley and Shepard 1989, Howell and Buchanan 1992, Rieman and McIntyre 1993). Bull trout growth, survival, and long-term population persistence appear to be particularly dependent upon five habitat characteristics: (1) cover, (2) channel stability, (3) substrate composition, (4) temperature, and (5) migratory corridors (Rieman and McIntyre 1993).

All life history stages of bull trout are closely associated with various forms of cover, including large woody debris, undercut banks, boulders, and pools

(Fraley and Shepard 1989; Goetz 1989; Hoelscher and Bjornn 1989; Oliver 1979; Pratt 1984, 1985, and 1992; Shepard et al. 1984b; Thomas 1992). Cover provides critical rearing, foraging, and resting habitat, and protection from predators (Bryant 1983, Meehan 1991, Salo and Cundy 1987, Sedell and Everest 1991).

Several bull trout life history features make them exceptionally sensitive to activities directly or indirectly affecting stream channel integrity and altering natural flow patterns. Juvenile and adult bull trout frequently inhabit areas of reduced water velocity, such as side channels, stream margins, and pools that are often eliminated or degraded by management activities (Rieman and McIntyre 1993). Length and timing of incubation to emergence (200 days or more during winter and early spring), the strong association of juvenile fish with stream channel substrates, and a fall spawning period, make bull trout particularly vulnerable to altered stream flow patterns and associated channel instability (Fraley and Shepard 1989, Pratt 1992, Pratt and Huston 1993, Rieman and McIntyre 1993).

Preferred spawning habitat consists of low gradient streams with loose, clean gravels (Fraley and Shepard 1989). Fine sediments fill spaces between the gravel that are needed by incubating eggs and fry. An extremely long period of residency in the gravel (200 or more days) makes bull trout especially vulnerable to fine sediments and water quality degradation (Fraley and Shepard 1989). Juveniles also live on or within the streambed cobble (Oliver 1979, Pratt 1984). High juvenile densities were observed in Swan River tributaries with a diverse cobble substrate and low percentage of fine sediments (Shepard et al. 1984a).

Successful bull trout spawning and development of embryos and juveniles requires very cold water temperatures (Bjornn and Reiser 1991, Goetz 1989, McPhail and Murray 1979, Pratt 1992). Additionally, water temperature influences the distribution of juveniles (Fraley and Shepard 1989, Pratt 1992). Such strict temperature tolerances predispose bull trout to declines from any activity occurring in a watershed that leads to increased stream temperatures.

Extensive migrations are characteristic of the species (Fraley and Shepard 1989, Oregon Department of Fish and Wildlife (ODFW) 1993). Migratory bull trout facilitate the interchange of genetic material between populations, ensuring sufficient variability within populations. Migratory forms also provide a mechanism for restoring local populations extirpated due to natural or human-caused events (Rieman and McIntyre 1993, citing others). Migratory forms are more fecund and larger than non-native brook trout, potentially reducing the risks associated with hybridization (Rieman and McIntyre 1993). The greater fecundity of these larger bull trout also enhances the ability of a population to persist in the presence of introduced fishes (Rieman and McIntyre 1993). Migratory bull trout have been restricted and/or eliminated due to stream habitat alterations, including seasonal or permanent obstructions, detrimental changes in water quality, increased temperatures, and the alteration of natural stream flow patterns. Migratory corridors tie seasonal habitat together for anadromous, adfluvial, and fluvial forms, and allow for dispersal of resident forms for recolonization of rebounding habitats. The disruption of migratory corridors, if severe enough, will result in the loss of migratory life history types and isolate resident forms from interacting with the metapopulation (U.S. Department of Agriculture (USDA) 1993).

Distinct Population Segments

Pursuant to a court order, the Service evaluated the distribution of bull trout throughout the species' range for the presence of distinct population segments in our reconsidered 12-month finding using the 1994 administrative record. This approach was undertaken because bull trout occur in widespread but fragmented habitats and have several life history patterns. In addition, the threats to the fish are diverse, and the quantity and quality of information regarding the population status and trends of bull trout varies greatly.

The Service has considered three elements when evaluating the status of potential distinct population segments—discreteness, significance, and conservation status. Discreteness refers to the separation of a population segment from other members of the species based on either (1) physical, physiological, ecological, or behavioral factors, or (2) international boundaries that result in significant differences in exploitation control, habitat management, conservation status, or regulatory mechanisms. Significance refers to the biological and ecological importance or contribution of a discrete population to the species throughout its range. Examples of significance include persistence of a discrete population segment in a unique or unusual ecological setting, evidence that loss of discrete segment would result in a significant gap in the range of the species, or evidence that the discrete segment differs markedly from other populations of the species in genetic characteristics.

Based on the 1994 administrative record and as discussed in the reconsidered 12-month finding, numerous bull trout populations are isolated from each other because of unsuitable habitat and/or impassable dams and diversions. Though these isolated populations could be considered discrete, few populations of bull trout are significant to the species as a whole. The 1994 record provided evidence of significance for five distinct population segments: (1) Coastal/Puget Sound; (2) Klamath River; (3) Columbia River; (4) Jarbidge River; and (5) Saskatchewan River. Based on the 1994 administrative record, the Service determined in the reconsidered 12-month finding that listing is not warranted for the Coastal/Puget Sound, Jarbidge River, and Saskatchewan River population segments. However, listing is warranted for the Klamath River and Columbia River population segments based on the 1994 administrative record.

Klamath River Population Segment

The Klamath River originates in south-central Oregon near Crater Lake National Park, and flows southwest into northern California where it meets the Trinity River and empties into the Pacific Ocean. Bull trout in this drainage are discrete because of physical isolation due to several small mountain ranges in central Oregon (separating this population from that of the Columbia River) and the Pacific Ocean. Leary and Allendorf (1991) determined the genetic structure of bull trout in the Klamath and Columbia River drainages with the use of protein electrophoresis. This study concludes that not only are these two groups of fish reproductively isolated, but also evolutionarily distinct. In addition, Williams et al. (abstract in: Friends of the Bull Trout Conference, 1994) separated the Klamath and Columbia River populations into different clades based on mtDNA diversity patterns. As a result, the Klamath River population segment is significant to the taxon because of substantial genetic differences from the Columbia River populations.

Columbia River Population Segment

The Columbia River population segment includes the entire Columbia River basin and all its tributaries, excluding the isolated bull trout populations found in the Jarbidge River

in Nevada which comprises the Jarbidge population segment. Though Williams et al. (abstract in: Friends of the Bull Trout Conference, 1994) identified two distinct clades (taxonomic groupings of descendants by common ancestors) in the Columbia Basin (Upper and Lower Columbia) based on mtDNA diversity patterns, a discrete geographical boundary between the two clades was not documented in the record. The Columbia River population segment is significant because the overall range of the species would be substantially reduced if this discrete population were lost.

Status and Distribution

The base of information contained in the 1994 administrative record regarding the status and trends of bull trout populations throughout the species' range varies in quantity and quality. The criteria for defining populations and estimating extinction risks were not standardized among individual states. Bull trout information from the state of Montana (primarily Thomas 1992) was the most organized and complete. In Idaho, with the exception of Lake Pend Oreille and its tributaries that support an important bull trout fishery, bull trout status information was incomplete. The status of a majority of Oregon bull trout populations is unknown. Similar patterns in quality of data were found for bull trout populations in Canada. Interpretation of ''status unknown'' was the primary problem in status information contained in the 1994 administrative record.

In 1993, the U.S. Department of Agriculture produced a working draft concerning the status and conservation needs for bull trout (USDA 1993). This publication, entitled ''An Assessment of the Conservation Needs for Bull Trout,'' surveyed biologists from State, Federal, and Tribal agencies, and private industry in the range of bull trout. Results from this survey represented the most thorough attempt to date at rangewide classification of bull trout. Survey participants were requested to fill out forms to provide information on life history, status, factors influencing status, and whether individual bull trout populations were considered remnant. The authors noted, that ''[a]lthough the quality of available data was not always consistent across sources, no attempt was made to account for that variability.'' Many of these data could be described as anecdotal, though a systematic attempt was made to address the entire species' range.

The appropriate interpretation of the ''remnant'' classification was the most difficult aspect of the survey to analyze. The 1993 publication classified a remnant population as one in which ''the fish are known to be present but in very low numbers.'' Additionally, a remnant classification included the caveat that ''[a]lthough long-term viability is questionable, the population may constitute a significant portion of the species gene pool.'' Lacking any population status data (i.e. declining, stable, secure, or increasing), the Service interpreted a remnant classification by itself as a ''gap'' in status information. When a remnant classification was accompanied by status information other than ''unknown'', the Service generally considered these data reliable and accurate.

Where population status or trends are known but only for a portion of a distinct population segment (i.e., there are informational gaps in 1994 record), the Service considered documented trends within a distinct population segment to be representative of the entire population segment.

Klamath River Population Segment

Historical accounts suggest that the bull trout was once widely distributed and exhibited diverse life history traits in the Klamath Basin. The earliest records of bull trout in the Klamath Basin were from the late 1800's (Oregon Chapter of the American Fisheries Society (OCAFS) 1993, citing Cope) and suggested that an adfluvial life history form occurred in Klamath Lake. Migratory fluvial bull trout evidently were present in some of the larger streams in the basin as recently as the early 1970's (Ziller *in litt.* 1992). Goetz (1989) suggested that bull trout occurred in 15 separate drainages between 1948 and 1979. By 1989, the distribution of the species had been restricted to 10 streams in the basin (author unknown, FWS notes, 1993). The most recent data provided in the 1994 record suggested that in 1991, only seven segregated resident populations still occurred in the basin and were confined to headwater streams in the Sprague, Sycan, and Upper Klamath Lake subbasins. The largest area occupied by any of the seven populations is 2.5 stream miles, and basinwide, only 12.5 miles of stream is inhabited by bull trout (Ziller *in litt.* 1992).

Bull trout occur in four tributaries to the Sprague River subbasin. Ziller (*in litt.* 1992) compared abundance estimates between samples taken in 1979 and 1989 at seven 30-meter sites on Deming, Boulder, Brownsworth, and Leonard creeks. Ziller found the abundance of bull trout was relatively unchanged at five sites, increased at one site, and decreased at one site. In 1991 and 1992, ODFW estimated a total population size of 3,310 individuals within the 4 segregated populations of the Sprague River subbasin (OCAFS 1993). The effective population size was estimated to be 140 to 462 mature fish, with 43 percent of these fish associated with Deming Creek. The remaining 57 percent were split unequally among Boulder, Brownsworth, and Leonard creeks. Although the Sprague River subbasin contains the healthiest remaining populations in the Klamath population segment, these populations are considered to be at a moderate to high risk of extinction (Ratliff and Howell 1992).

Long Creek may be supporting the only remaining bull trout population in the Sycan River subbasin. Ratliff and Howell (1992) suggested that the extinction risks of Long and Coyote creeks were moderate and high, respectively, based on sampling efforts in 1989. Sampling efforts in 1990 and 1991 suggest that populations previously identified in Coyote Creek and the Upper Sycan River are probably extinct (OCAFS 1993). The total population size in Long Creek was estimated at 842 individuals with an effective population size of 36 to 119.

Populations in the Upper Klamath Lake subbasin are at precarious abundance levels, and at a high risk of extinction (Ratliff and Howell 1992). Small populations remain in Sun and Threemile creeks. Populations in Cherry and Sevenmile creeks are likely to be extinct (OCAFS 1993). The Sun Creek population was estimated at 133 total individuals in 1991, with an effective population size of only 11 to 35 mature fish. No abundance estimates were reported for Threemile Creek, but only nine fish were sampled in the stream during recent surveys.

Because the resident life history trait prevails in the remaining Klamath River, bull trout populations, size at maturity and associated fecundity have been reduced in the population from historic conditions. Average fecundity in 1989 was only 170 eggs/female, and a predominance of males in the sample suggested a skewed sex ratio of 2.5 males/female (Rode 1990). These data suggest that the natural recovery potential of these populations is poor.

In summary, all seven of the remaining populations in the Klamath River Basin are currently disconnected from each other, and are considered to be isolated, remnant groups from a historically larger, more diverse metapopulation. Ratliff and Howell

(1992) determined each population to be at a moderate or high risk of extinction. Bull trout occur in three primary subbasins, with the fish residing in the Upper Klamath Lake subbasin the most precarious. The Sprague River and Sycan River subbasins each contain isolated populations within limited available habitat of 2.5 miles or less. Recent extinctions reportedly have occurred in Coyote Creek and the Upper Sycan River of the Sycan subbasin, and Cherry and Sevenmile creeks of the Upper Klamath Lake subbasin (Ratliff and Howell 1992).

Columbia River Population Segment

The Columbia River population segment encompasses a vast geographic area including portions of Idaho, Montana, Oregon, Washington and British Columbia. For discussion purposes, this segment was split into three areas: 1) the Columbia River upstream from the confluence with the Snake River, 2) the Snake River and its tributaries, and 3) the Columbia River downstream of the Snake River confluence.

Upper Columbia River

The upper Columbia River portion of the distinct population segment was separated into four subareas to aid in describing status and distribution: (1) Kootenai River basin, (2) Clark Fork/ Pend Oreille basin, (3) Spokane River Basin, and (4) Washington tributaries. The Kootenai River drains the southeastern portion of British Columbia west of the continental divide, and flows through the extreme northwestern section of Montana and northern Idaho, before flowing north back into Canada where it joins the Columbia River. The Clark Fork drains the majority of area west of the continental divide in Montana before flowing into Idaho and Lake Pend Oreille. The Pend Oreille River, including the Priest River and tributaries, flows north and joins the Columbia River just north of eastern Washington. The Spokane River drains both the Coeur d'Alene and St. Joe basins and flows west joining the Columbia River in western Washington. Major Washington tributaries in the upper Columbia River portion of the distinct population segment include the Entiat, Wenatchee, Methow, and Yakima rivers.

Kootenai River Basin

Historically, bull trout were likely distributed throughout the Kootenai River basin (Thomas 1992). Construction of Libby Dam and the formation of Lake Koocanusa functionally separated bull trout into different populations. The bull trout population in Lake Koocanusa is, generally, small in size and constitutes a minor portion of angler harvest (Thomas 1992). These fish have limited access to spawning tributaries putting this population at risk (Thomas 1992).

Below Libby Dam, bull trout populations are separated by Kootenai Falls. Kootenai Falls serves as a natural barrier to upstream migration (Thomas 1992). Bull trout between Libby Dam and Kootenai Falls rely on two remaining tributaries, Quartz and Pipe creeks, for spawning. Historically, bull trout were likely distributed throughout the Fisher River (tributary to the Kootenai below Libby Dam) since no physical barriers prevent dispersal. However, Thomas (1992) considered the status of fluvial bull trout in the Fisher River to be non-viable, or extinct. Information on bull trout populations in Montana below Kootenai Falls is incomplete. Several remnant populations are thought to occur in tributaries including the Yaak River. Of the 99 bull trout populations evaluated in the Kootenai River basin, all were at least at moderate risk of extinction, and 47 percent of these were considered to be at high risk of extinction (Thomas 1992).

Bull trout are considered uncommon in the Idaho portion of the lower Kootenai River (Esch and Hallock, citing others, 1993). Status is based on the relatively few individuals that contribute to the sport catch (1 percent). Based on limited surveys and harvest catch, the population trend in this portion of the Kootenai River appears to be declining. Bull trout populations in Kootenay Lake in British Columbia are considered stable with historic and current harvest rates remaining relatively high (Esch and Hallock, citing others, 1993).

Clark Fork/Pend Oreille River Basin

The Clark Fork/Pend Oreille River basin drains the largest area in the Columbia River population segment. Major tributaries of the Clark Fork are the Flathead, Bitterroot, and Blackfoot rivers. Historically, strong fluvial, adfluvial, and resident populations of bull trout were likely distributed throughout the system (Thomas 1992). The healthiest remaining bull trout populations are adfluvial because passage from stream to lake environments is unimpeded. Resident populations of bull trout are remnant and exist in the headwater reaches of tributaries (Thomas 1992, USDA 1993). Fluvial populations have shown the greatest decrease concurrent with the construction of mainstem impoundments. For discussion purposes, the Clark Fork/Pend Oreille Basin is separated into five areas: Upper Clark Fork (including the Bitterroot and Blackfoot rivers); Lower Clark Fork (from the Bitterroot confluence downstream to Lake Pend Oreille, including the Flathead River below Flathead Lake); Flathead Lake and its tributaries; Lake Pend Oreille and its tributaries; and Lower Pend Oreille River.

Upper Clark Fork

Historically, fluvial and resident populations of bull trout probably inhabited the entire upper mainstem Clark Fork (Thomas 1992). However, due to mining related stream degradation, these populations have become increasingly rare, or, in some cases, extirpated entirely from former habitats (Thomas 1992). Natural recolonization of these populations seems remote due to continued habitat problems and the absence of strong fluvial populations downstream. Bull trout are considered rare in many tributaries with most remaining populations at a high risk of extinction (Thomas 1992).

The healthiest remaining Clark Fork tributary population of bull trout is Rock Creek (Thomas 1992). Rock Creek generally has had relatively few impacts from humans, which undoubtedly has positively influenced this population. Conversely, Flint Creek has experienced a substantially higher degree of perturbation and consequently, this population is considered to be in perilous condition (Thomas 1992). However, the majority (86 percent) of bull trout in Flint and Rock creeks combined are considered to be at moderate risk of extinction.

The Blackfoot River is one of the largest tributaries to the upper Clark Fork River. Historically, the Blackfoot contained resident and fluvial populations of bull trout. The fluvial component is thought to have had connections with the mainstem Clark Fork. This connection was broken in the early 1900's by the construction of Milltown Dam, which effectively isolated bull trout in the Blackfoot from populations in the mainstem Clark Fork (Thomas 1992). Fluvial populations of bull trout still use the mainstem Blackfoot; however, their population status is unknown. Isolated populations of adfluvial and resident fish still exist within the basin. In the Blackfoot River, Peters (1990) found juvenile bull trout in only 40 percent of tributary streams surveyed in 1989, leading to a conclusion that Blackfoot bull trout

were in jeopardy. None of the remaining populations are classified as abundant, and only three populations within the system are considered common. Overall, 66 percent and 32 percent of bull trout populations in the Blackfoot River were considered at a moderate and high risk of extinction, respectively (Thomas 1992).

Bull trout were historically distributed throughout the mainstem Bitterroot River and its tributaries (Thomas 1992). Bull trout now appear to be extinct in the majority of the mainstem Bitterroot River. Though tributary streams contain small isolated populations of bull trout, many are sympatric with non-native brook trout. Bull trout are considered abundant or common in 30 percent of the surveyed Bitterroot stream reaches, and uncommon or rare in 70 percent (Thomas 1992). Ninety-six percent of the bull trout populations in the Bitterroot system are considered to be small, fragmented, and at a moderate to high risk of extinction (Thomas 1992).

Lower Clark Fork

The Lower, or mainstem, Clark Fork River is segmented by several impoundments that do not provide fish passage. Above Lake Pend Oreille, Cabinet Gorge, Noxon Rapids, and Thompson Falls facilities separate the mainstem river. Historically, a natural barrier existed at Thompson Falls that prevented upstream passage. Prior to mainstem impoundments, migrating bull trout from Lake Pend Oreille likely used the tributaries below Thompson Falls for spawning (Thomas 1992). In addition, this area probably supported fluvial and resident populations of bull trout. Currently, bull trout are uncommon in the mainstem Clark Fork River, and all remaining populations are considered at moderate risk of extinction (Thomas 1992).

Populations of fluvial bull trout probably occurred historically throughout the drainage above Thompson Falls (Thomas 1992). Adfluvial fish from Lake Pend Oreille probably did not use this area due to the natural barrier created by Thompson Falls. Thomas (1992) suggested that adfluvial bull trout from Flathead Lake may have migrated downstream. The construction of Kerr Dam blocked passage between Flathead Lake and the lower Flathead and Clark Fork rivers. Bull trout in the mainstem Clark Fork are considered rare or uncommon (Thomas 1992). Several important tributaries still serve as spawning grounds with many tributary populations existing at low numbers. Limited information exists on bull trout status in the lower Flathead River. Currently, bull trout are the least common salmonid found in the Flathead River below Kerr Dam. Of the 199 populations evaluated in the Lower Clark Fork and Flathead rivers, Thomas (1992) reported that 44 percent were at high risk of extinction and 56 percent were at moderate risk of extinction.

Flathead Lake

As in other areas in Montana, the actual historic distribution of bull trout in the Flathead Lake system is unknown. However, with few natural barriers and abundant interconnected habitat, bull trout likely were distributed throughout the system (Thomas 1992). Undoubtedly, resident and fluvial forms occupied areas within the drainage, but in the Flathead Lake system the adfluvial lifestage would most likely have had a distinct advantage. The larger adult size and increased reproductive potential would probably have made this the dominant life history form. Primary tributaries of Flathead Lake included the North, South, and Middle forks of the Flathead River, Swan River, and Stillwater River.

The interconnectedness of the Flathead system has been disrupted by the construction of several hydroelectric facilities that block historic migration corridors. Big Fork Dam on the Swan constructed in 1902 blocked bull trout passage into the Swan River drainage. Similarly, the completion of Hungry Horse Dam in 1953 on the South Fork Flathead River further isolated bull trout populations. As previously mentioned, Kerr Dam blocks passage from the lower Flathead River into Flathead Lake. The North and Middle forks of the Flathead River still have relatively unimpeded passage into Flathead Lake.

Thomas (1992) reported that the Flathead system contained one of the most viable populations of adfluvial bull trout left in the coterminous United States. The viability of bull trout in the Flathead system should be qualified given more recent monitoring data that suggest certain populations within the system are declining.

Spawning redd counts in the North Fork (1991) and Middle Fork (1990 and 1991) Flathead rivers have decreased. The 1991 redd count information in the North Fork was 34 percent below the annual average. Redd counts in the Middle Fork during 1990 and 1991 were 43 percent and 28 percent below the annual average, respectively (Thomas 1992). Trend analysis, including redd count surveys from 1992 and 1993, indicate a significant decline in redd counts over a 15-year monitoring period (Weaver 1994). Moreover, the recent estimated rate of decline (7-year period) is significantly greater than the 15-year rate of decline. Bull trout redd counts reached the lowest observed levels in 1992 and 1993. Annual rate of decline was estimated at 16 redds per year based on the 15-year observation period, and 60 redds per year using the recent 7-year period of record.

Analysis of redd count trend information for four North Fork Flathead tributaries found a moderate level of annual variability within the system (Rieman and McIntyre 1993). Using the same information, the authors calculated a probability of 100-year persistence for each population, based on an extinction threshold of 10 redds, alternate year spawning, and an instantaneous growth rate of zero. Of the four populations examined, all were below 50 percent probability of persistence. When actual estimates for instantaneous growth rate were used, all four populations were still below the 50 percent probability of persistence over the next 100 years.

Rieman and McIntyre (1993) conducted the same analysis of redd count trend information for four Middle Fork Flathead tributaries and found a low to moderate level of annual variability within the system. Of the four populations examined, two populations were below 50 percent probability of persistence (40 percent and 29 percent), while fish in two tributaries had moderate to high probabilities for persisting (60 percent and 71 percent). When actual estimates for instantaneous growth rate were used, all four populations were below the 50 percent probability of persistence over the next 100 years.

Despite this apparent decline, and uncertain probabilities for persistence in bull trout populations in the North and Middle forks of the Flathead, each tributary still contains areas of pristine habitat and healthy bull trout (Thomas 1992). Adfluvial populations of bull trout in Glacier National Park reside in high quality habitat with little or no exposure to non-native species. Similarly, the Middle Fork of the Flathead still contains viable populations of bull trout (Thomas 1992). Overall, while referred to as a bull trout stronghold, Thomas (1992) reported that 91 percent of the populations in the North and Middle Fork of the Flathead River are at a moderate risk of extinction. The remaining 9 percent are judged to be at low risk of extinction.

Little population information was available from the 1994 administrative record regarding bull trout population status in the South Fork of the Flathead River prior to the construction of

Hungry Horse Dam. As previously stated, Hungry Horse Dam was built without allowing for fish passage, and this functionally isolated adfluvial populations of bull trout which would have migrated to Flathead Lake. This blockage resulted in a net loss of 38 percent of the available bull trout spawning habitat (Thomas 1992). Fish that were trapped behind Hungry Horse Dam established a new adfluvial population using the newly formed reservoir. Remote spawning locations in the Bob Marshall Wilderness Area have hampered collection of redd count surveys. However, where information is available, 83 percent of the remaining bull trout populations in the South Fork of the Flathead River are considered to be at a moderate risk of extinction (Thomas 1992).

Historically, the Swan River supported an adfluvial population of bull trout that migrated to Flathead Lake (Thomas 1992). Construction of Bigfork Dam in 1902 effectively blocked passage and isolated this population. Subsequently, a new adfluvial population developed in Swan Lake. The Swan Lake drainage also supports isolated resident populations of bull trout (Thomas 1992). Thomas (1992) reported that adfluvial bull trout in Swan Lake represent the healthiest population in the Flathead system. Based on redd counts, Swan Lake bull trout spawner densities appear to be higher than those in Flathead Lake (Thomas citing others 1992). Trend analysis based on redd counts for the Swan River system indicates that adfluvial bull trout populations are increasing (Weaver 1994). In addition, the 1993 redd count was the highest recorded, and represented a 57 percent increase over an 11-year average. In spite of this, Thomas (1992) considered bull trout in Swan Lake and Swan River to be at moderate risk of extinction.

Rieman and McIntyre (1993) conducted the same analysis of redd count trend information for four Swan River tributaries and found a low to high level of annual variability within the system. Of the four populations examined using an instantaneous growth rate of zero, two populations were below 50 percent probability of persistence (43 percent and 49 percent), while fish in two tributaries had moderate to high probabilities for persisting (65 percent and 74 percent). When actual estimates for instantaneous growth rate were used, all three populations had high probabilities for persistence (two populations at greater than 95 percent and 80 percent respectively) over the next 100 years (Rieman and McIntyre 1993). Conversely, one tributary had a low probability of persistence (4 percent).

Bull trout populations in the Stillwater River are depressed and are considered at a high risk of extinction (Thomas 1992). Historically, bull trout were probably distributed throughout the Stillwater system. While several lakes still contain adfluvial populations of bull trout, poor habitat conditions and non-native species interactions have made the occurrence of bull trout uncommon.

Lake Pend Oreille

The Lake Pend Oreille system in the upper Columbia River is delineated upstream by Cabinet Gorge Dam on the Clark Fork River. Constructed in 1951, Cabinet Gorge Dam blocked upstream passage and functionally isolated adfluvial bull trout from numerous tributary spawning areas. Similarly, the Lake Pend Oreille system is isolated downstream by Albeni Falls Dam (1952) on the mainstem Pend Oreille River. The major tributary to the Pend Oreille system in this area is the Priest River, that enters the Pend Oreille River downstream of Lake Pend Oreille.

Historical accounts indicate that bull trout were common throughout the Pend Oreille system (Esch and Hallock, citing others). These accounts undoubtedly included resident, fluvial, and adfluvial lifecycles. As was the case with bull trout in the Flathead system, an adfluvial lifecycle in Lake Pend Oreille would have been advantageous, and annual spawner escapement may have reached 10,000 fish (Pratt and Houston 1993). Annual population estimates indicated that between 1,100 and 2,000 adfluvial bull trout may occur in Lake Pend Oreille (Pratt and Houston 1993).

Analysis of redd count trend information for six Lake Pend Oreille tributaries found a high degree of annual variability within the system (Rieman and McIntyre 1993). The authors calculated a probability of 100-year persistence for each population, based on an extinction threshold of 10 redds, alternate year spawning, and an instantaneous growth rate of zero. Of the six populations examined, four populations were below 50 percent probability of persistence, while fish in the remaining two tributaries had high probabilities for persisting (87 percent and greater than 95 percent). When actual estimates for instantaneous growth rate were used, five of the populations were below the 40 percent probability of persistence over the next 100 years. Only one Lake Pend Oreille tributary had a high probability of persistence (88 percent).

Since 1983, portions of 21 different tributaries to Lake Pend Oreille have been surveyed for bull trout redds (Idaho Bull Trout Survey, no date). Year to year consistency in sampling each site has varied. Of the 21 tributary locations, only 6 index streams were surveyed from 1983 through 1992. These tributaries are East Fork Lightning, Johnson, Trestle, Grouse, North Gold, and Gold creeks. This sampling represents some of the best trend information in the 1994 administrative record concerning Lake Pend Oreille. During this period, redd counts in index streams varied from a high of 671 in 1985, to a low of 290 in 1986. The 1992 stream index redd count of 344 is 31 percent below the 9-year average of 500.

Pend Oreille River

The Priest River is the only remaining tributary of the Pend Oreille River below Lake Pend Oreille still supporting bull trout (Pratt and Houston 1993). As recently as 1972, bull trout were documented in seven tributaries of the Priest River below Priest Lake. However, in 1987, only three of these tributaries were found to contain bull trout. The reduction in bull trout abundance in Priest Lake has been reflected in decreased annual harvest (Mauser 1985). Between 1956 and 1970, an annual average of 1,200 bull trout were harvested in Priest Lake. In 1978, a record harvest of 2,320 fish occurred, but by 1983 this number had decreased to only 159 fish. Interactions with lake trout and overharvest have nearly extirpated the Priest Lake bull trout population (Esch and Hallock, citing others). Bull trout are still found in Upper Priest Lake and are considered to be healthy and a possible source of bull trout for the lower lake. Evidence also exists for the decline in redd counts in tributaries of both lakes (Esch and Hallock, citing others). Overall, Priest Lake is considered to be at a high risk of extinction, while Upper Priest Lake is thought to be at a moderate risk.

Little information is available in the 1994 administrative record regarding bull trout status in the lower Pend Oreille River. Below Lake Pend Oreille and Albeni Falls Dam, mainstem impoundments have fragmented fluvial bull trout habitat. Historic records and accounts indicate that fluvial bull trout were numerous (C. Vail, WDW, undated USFS survey). The current bull trout population is considered remnant and at a high risk of extinction (WDW 1992).

Spokane River Basin

Little information is available in the 1994 record concerning bull trout status

in the Spokane River basin. It is assumed, however, that adfluvial, fluvial, and resident bull trout were distributed throughout the system including the Coeur d'Alene River, Lake Coeur d'Alene, and the St. Joe River drainage (Draft Conservation Plan, Idaho Department of Fish and Game (IDFG), Draft Bull Trout Conservation Plan for the Upper Spokane River Basin, no date). Restricted to Lake Coeur d'Alene and the St. Joe River, spawning appears to occur in only ten tributaries in headwater reaches of the system. The Coeur d'Alene subbasin is currently considered of special concern and at high risk of extinction (D. Cross, USFS, *in litt*. 1992). The St. Joe system is considered of special concern and at moderate risk of extinction.

In the Spokane River subbasin of the Columbia, stream surveys in 1935 and 1940 documented the presence of bull trout throughout the St. Joe River (USFS 1935; Maclay 1940). By 1992, the occupied range in the upper one-third of this river was reduced by 76 percent (Cross, pers. comm. 1993). Similar reductions have occurred in the Coeur d'Alene River drainage, where bull trout range may have been reduced 90 percent since surveys in 1940; presently bull trout may persist in only one isolated tributary in the entire drainage (Maclay 1940; Lider, USFS, pers. comm. 1994). Due to low numbers of fluvial spawners, bull trout in the Spokane River subbasin were estimated to have a moderate risk of extinction (Hoelscher, IDFG, *in litt*. 1992).

Washington State Tributaries

Historically, bull trout probably inhabited a majority of the tributaries to the upper Columbia River in Washington. In these tributaries, bull trout distribution has been significantly restricted and several populations, including the Okanogan River, Lake Chelan, and lower Yakima River, are extirpated (WDW 1992). Currently, 17 populations of bull trout occur in Washington above the Snake River confluence (WDW 1992). These populations include adfluvial, fluvial and resident components. Subbasins within the upper Columbia River still supporting bull trout are the Entiat, Methow, Naches, Wenatchee, and Upper Yakima drainages (WDW 1992). Of these populations, three are declining, seven are stable, and one population is considered secure. The status of the six remaining bull trout populations is unknown.

Within the upper Columbia River, risk of extinction was calculated for bull trout populations where the status was known (WDW 1992). Populations with unknown status were not classified by risk of extinction, but were given a priority ranking for information needs. Bull trout populations in Kachess and Keechelus Lakes (Upper Yakima River drainage), Roosevelt Lake, and the Pend Oreille River were considered to be at high risk of extinction (WDW 1992). Four bull trout populations in the Entiat, Methow, and Wenatchee River basins were classified as being at moderate risk of extinction (WDW 1992). Similarly, four other tributary populations in the Wenatchee, Methow, and Naches River basins were considered to be at low risk of extinction (WDW 1992). One tributary of the Methow River was considered to be at no immediate risk (WDW 1992). The remaining four bull trout populations in the upper Columbia River (Naches and Upper Yakima rivers) had an unknown status and were not classified.

Bull trout populations in the Entiat, Upper Yakima, Wenatchee, Methow and Naches occur in isolated segments and appear to be sparse in abundance (Brown 1992, WDW 1992). However, certain populations including the Chiwawa River and Rimrock Lake appear to be stable. In Rimrock Lake and Indian Creek (spawning tributary) redd counts increased from 29 in 1986, to 140 in 1993 (Yakima County Bull Trout Status 1994; E. Anderson, WDW, *in litt.* 1994). The Chiwawa River is recognized as having one of the stronger populations in the mid-Columbia River (Brown 1992). While long-term trend data on the Chiwawa River and tributaries were not available during 1991, 348 bull trout redds were counted in this system.

Snake River and Tributaries

Historically, bull trout were likely widely dispersed throughout the Snake River drainage, limited only by natural passage and thermal barriers (Esch and Hallock, citing others). Current distribution is primarily relegated to tributaries to the mainstem Snake River upstream to and including the Boise River (Esch and Hallock, citing others). Major tributaries of the Snake River in Oregon currently supporting bull trout populations include the Tucannon, Grande Ronde, Imnaha, and the Malheur. In Idaho, bull trout can be found in the Clearwater, Salmon, Weiser and Boise river drainages.

Ratliff and Howell (1992) compiled a status assessment of Oregon bull trout populations. Status was determined subjectively based on relative abundance, suppressing factors, and recovery potential of identified populations. In the 29 Oregon tributaries of the Snake River where bull trout are found, 7 percent are considered to be at high risk of extinction, while 14 percent are thought to be at low risk (Ratliff and Howell 1992). The majority of bull trout populations are either at moderate risk (38 percent) or are of special concern (34 percent). Seven percent of the examined populations are considered to be extinct. Of the 29 populations, 62 percent are classified as remnant, while 76 percent of the populations have a current status of unknown. Based on limited information, a few tributaries, including portions of the Grande Ronde, Minam River, and the North Fork of the Malheur, appear to have viable bull trout populations (Ratliff and Howell 1992, Bowers et al. 1993). Of the 10 identified Snake River bull trout populations occurring in Washington, the status of 40 percent are declining, 30 percent stable, and 30 percent unknown (WDW 1992).

The quality and quantity of bull trout information for Snake River tributaries in Idaho is poor. Limited spot surveys indicate that bull trout may be widespread throughout the Clearwater and Snake River drainages. However, the lack of identified populations and associated trend information complicates status evaluation. The Rapid River is one of the largest remaining bull trout populations for which long-term trend information is available. Bull trout counts from a fish weir on this Salmon River tributary averaged 206 fish between 1973–91 (Rieman and McIntyre 1993).

Analysis by Rieman and McIntyre (1993) calculated a probability of 100-year persistence for Rapid River bull trout. Using weir counts taken over a period of 19 years, the authors assumed a 1:1 sex ratio and one female per redd to approximate the mean number of redds per year in the spawning escapement. Based on this information, an extinction threshold of 10 redds, alternate year spawning, and an instantaneous growth rate of zero, the Rapid River population had a 58 percent probability of persistence. When the actual estimate for instantaneous growth rate was used, the probability for persistence increased to 74 percent.

Population trend data is also lacking for bull trout in the Weiser, Payette, and Boise rivers. IDFG (1993) suggested that bull trout were widely distributed in the Payette and Boise rivers, but restricted to only two tributaries in the Weiser River. Density estimates for Sheep and Anderson creeks of the Weiser drainage ranged from 2.8 to 5.2 bull trout/100 square meters in 1992 (IDFG 1993), but no earlier data was reported to establish

a trend. Neither historical nor current abundance data is available for the Payette or Boise rivers, but Renstrom (no affiliation, *in litt.* 1993) indicated that bull trout are quite common in the upper reaches of the North Fork Boise River and Johnson Creek; they often dominate the sport catch in these systems.

Lower Columbia River

The lower Columbia River encompasses a large geographic area including portions of Washington and Oregon. The lower Columbia River includes the mainstem Columbia River and all tributaries below the Snake River confluence. Major tributaries include the John Day, Deschutes, and Willamette rivers.

The 1994 administrative record on bull trout status in the lower Columbia River is largely incomplete. A significant portion of bull trout status information for Washington and Oregon is unknown (USDA 1993, WDW 1992). Where sufficient data existed to determine status, 40 percent were declining, 5 percent stable, and 15 percent secure. The status of the remaining 40 percent of lower Columbia River populations in Oregon was unknown. Of the six lower Columbia River bull trout populations identified in Washington all are considered remnant, with 17 percent classified as stable, and 83 percent as ''status unknown'' (WDW 1992).

Based on the 1994 administrative record, bull trout populations within the lower Columbia River have declined from historic levels. Remaining populations are generally considered to be isolated and remnant (Ratliff and Howell 1992, USDA 1992). Historic bull trout populations of the lower Columbia River consisted of adfluvial, fluvial, and resident components. While each lifecycle is still represented, the resident form is dominant, followed by the fluvial, and adfluvial (USDA 1992).

Within the Oregon portion of the lower Columbia River, 23 percent of bull trout populations are considered to be at a high risk of extinction, while 15 percent are thought to be at a moderate risk, 12 percent of special concern, 19 percent at low risk, and 31 percent are extinct (Ratliff and Howell 1992). In Washington, using a different risk assessment method (WDW 1992), only the bull trout population in Yale Reservoir was considered at risk (moderate). The remaining five bull trout populations were not evaluated with respect to risk of extinction due to a ''status unknown'' classification (WDW 1992).

The primary tributaries to the lower Columbia River still containing bull trout are the Walla Walla, Umatilla, John Day, Deschutes, Hood, Lewis, and Willamette rivers. With the exception of the Deschutes River basin, remaining populations are dominated by small, isolated, remnant populations. Long-term population trend information contained in the 1994 administrative record is incomplete or lacking for the remaining bull trout populations. Where information was available, the low abundance, and fragmented nature of these headwater populations is apparent.

An example of the variable and contradictory information found in the 1994 administrative record is illustrated by the John Day River basin. Based on bypass trap information from 1971–1992, bull trout counts on the Upper John Day River have been as high as 345 in 1973 to as low as 12 in 1988 (ODFW 1993). While the 1971–80 average of 152 was larger than the 1981–92 average of 95, the mean counts were not statistically different ($p \leq 0.05$), and the 1992 bull trout count (232) was the third highest on record. Ratliff and Howell (1992) consider the Upper John Day River to be at moderate risk of extinction. Similar trend information in the Middle Fork or the North Fork of the John Day was not available. These populations are isolated and occur at low numbers, and Ratliff and Howell (1992) considered Middle Fork to be at high risk and North Fork of special concern.

The quality of bull trout population status information varies in the Umatilla, Walla Walla, Hood, Willamette, and Lewis rivers. Populations in the Umatilla, Walla Walla, and Hood rivers are considered at low risk or of special concern (Ratliff and Howell 1992, WDW 1992). Other populations in the Hood and Willamette systems are considered to be at high risk of extinction. Based on direct counts and professional judgement these populations are isolated via impoundments or habitat degradation and are at low levels. Ratliff and Howell (1992) considered these populations to be at moderate to high risk of extinction.

The strongest remaining population of bull trout in the lower Columbia River is the adfluvial population located in the Deschutes River basin. Lake Billy Chinook and the Metolius River still support a viable population bull trout as documented by increasing redd counts from 1986–93 (Ratliff 1994). This population has benefitted from restrictions in harvest regulations and is considered at low risk of extinction (Ratliff and Howell 1992). Shitike Creek below lake Billy Chinook still supports a relatively good population of fluvial bull trout, which Ratliff and Howell (1992) considered to be at low risk of extinction. The remaining bull trout populations in the Deschutes system are not doing as well. Bull trout populations in the upper Deschutes are either extinct or considered to be at high risk of extinction in the future (Ratliff and Howell 1992).

Summary of Columbia River Population Segment

Based on the 1994 administrative record, bull trout populations within the upper Columbia River have declined from historic levels (Thomas 1992 and USDA 1993). Overall, remaining populations are generally considered to be isolated and remnant (Rieman and McIntyre 1993, Thomas 1992, USDA 1993). Fluvial bull trout populations in the upper Columbia River portion of the distinct population segment appear to be nearly extirpated. Resident populations existing in headwater tributary reaches are isolated and generally low in abundance (Thomas 1992). Based on information in the 1994 record, bull trout in Flathead Lake and Lake Pend Oreille appear to be declining. The adfluvial population in Swan Lake appears to be increasing and represents the healthiest remaining population.

The 1994 administrative record on bull trout populations within the Snake River and tributaries is largely incomplete. However, with the lack of passage barriers, historic distribution throughout the system was probable. Overall, the lack of specific trend information for the Snake River made the analysis of population status difficult. Certain populations appeared to be stable, while others were at a moderate to high risk of extinction (Ratliff and Howell 1992).

Historic distribution of bull trout within the lower Columbia River cannot be verified, but adfluvial, fluvial, and resident forms were likely widely distributed throughout the area (Ratliff and Howell 1992). Current distribution is fragmented with dispersed remnant populations of resident and fluvial bull trout inhabiting tributaries (Ratliff and Howell 1992, USDS 1993, WDW 1992). Certain populations appeared to be stable, while others were at high risk of extinction (Ratliff and Howell 1992, WDW 1992).

The general trend of bull trout populations in the Columbia River population segment where status is known is declining. An examination of 386 bull trout populations in the Columbia River population segment

indicated that 33 percent are declining, 15 percent stable, 3 percent secure, and 2 percent increasing (Ratliff and Howell 1992, USDA 1993, and WDW 1992). The population status of the remaining 47 percent is unknown. Of the 386 bull trout populations, 44 percent are considered remnant, 30 percent not remnant, and 26 percent unknown (Ratliff and Howell 1992, USDA 1993, WDW 1992).

Previous Federal Action

On September 18, 1985, the Service published an animal notice of review in the **Federal Register** (50 FR 37958) designating the bull trout a category 2 candidate for listing in the coterminous United States. Category 2 taxa were those for which conclusive data on biological vulnerability and threats were not currently available to support proposed rules. The Service published updated notices of review for animals on January 6, 1989 (54 FR 554), and November 21, 1991 (56 FR 58804), reconfirming the bull trout category 2 status. The Service elevated bull trout in the coterminous United States to category 1 for Federal listing on November 15, 1994 (59 FR 58982). Category 1 taxa were those for which the Service had on file substantial information on biological vulnerability and threats to support preparation of listing proposals. Upon publication of the February 28, 1996, notice of review (61 FR 7596), the Service ceased using category designations and included the bull trout as a candidate species. Candidate species are those for which the Service has on file sufficient information on biological vulnerability and threats to support proposals to list the species as threatened or endangered.

On October 30, 1992, the Service received a petition to list the bull trout as an endangered species throughout its range from the following conservation organizations in Montana: Alliance for the Wild Rockies, Inc., Friends of the Wild Swan, and Swan View Coalition (petitioners). The petitioners also requested an emergency listing and concurrent critical habitat designation for bull trout populations in select aquatic ecosystems where the biological information indicates that the species is in imminent threat of extinction. A 90-day finding, published on May 17, 1993 (58 FR 28849), determined that the petitioners had provided substantial information indicating that listing of the species may be warranted. The Service initiated a rangewide status review of the species concurrent with publication of the 90-day finding.

On June 6, 1994, the Service concluded in the original 12-month finding that listing of bull trout throughout its range was not warranted due to unavailable or insufficient data regarding threats to, and status and population trends of, the species within Canada and Alaska. However, the Service determined that sufficient information on the biological vulnerability and threats to the species was available to support a warranted finding to list bull trout within the coterminous United States. Because the Service concluded that the threats were imminent and moderate to this population segment, the Service gave the bull trout within the coterminous United States a listing priority number of 9. As a result, the Service found that listing a distinct vertebrate population segment of bull trout residing in the coterminous United States was warranted, but precluded due to higher priority listing actions.

On November 1, 1994, Friends of the Wild Swan, Inc. and Alliance for the Wild Rockies, Inc. (plaintiffs) filed suit in the Federal District Court of Oregon arguing that the warranted but precluded finding was arbitrary and capricious. After the Service issued a ''recycled'' 12-month finding for the coterminous population of bull trout on June 12, 1995, the district court issued an order declaring the plaintiffs' challenge to the original finding moot. The plaintiffs declined to amend their complaint and appealed to the Ninth Circuit Court of Appeals, which found that the plaintiffs' challenge fell ''within the exception to the mootness doctrine for claims that are capable of repetition yet evading review.'' On April 2, 1996, the circuit court remanded the case back to the district court. On November 13, 1996, the district court (Court) issued an order and opinion remanding the original finding to the Service for further consideration. Included in the instructions from the Court were requirements that the Service limit its review to the 1994 administrative record, and incorporate any emergency listings or high magnitude threat determinations into current listing priorities. In addition, reliance on other Federal agency plans and actions was precluded. The reconsidered 12-month finding was delivered to the Court on March 13, 1997. This finding determined that the Klamath River and Columbia River population segments warranted listing based on the 1994 administrative record.

On March 24, 1997, the plaintiffs filed a motion for mandatory injunction to compel the Service to issue a proposed rule to list the Klamath and Columbia bull trout populations within 30 days based solely on the 1994 administrative record. In response to this motion, the Service ''concluded that the law of this case requires the publication of a proposed rule'' to list the two warranted populations. On April 4, 1997, the Service requested 60 days to prepare and review the proposed rule. In a stipulation between the Service and plaintiffs filed with the Court on April 11, 1997, the Service agreed to issue a proposed rule in 60 days to list the Klamath River population of bull trout as endangered and the Columbia River population of bull trout as threatened based solely on the 1994 record. As a result, the Service did not consider any information received since the close of the 1994 record in the development of this proposal.

The processing of this proposed rule conforms with the Service's final listing priority guidance published in the **Federal Register** on December 6, 1996 (61 FR 64475). The guidance clarifies the order in which the Service will process rulemakings during fiscal year 1997. The guidance calls for giving highest priority to handling emergency situations (Tier 1), second highest priority (Tier 2) to resolving the listing status of the outstanding proposed listings, and third priority (Tier 3) to new proposals to add species to the list of threatened and endangered plants and animals. This proposed rule constitutes a Tier 3 action.

Summary of Factors Affecting These Species

Procedures found in section 4 of the Endangered Species Act (16 U.S.C. 1533) and regulations (50 CFR part 424) promulgated to implement the Act set forth the procedures for adding species to the Federal lists. A species may be determined to be an endangered or threatened species due to one or more of the five factors described in section 4(a)(1). These factors and their application to the Klamath River population segment and Columbia River population segment of bull trout (*Salvelinus confluentus*) are as follows:

A. *The present or threatened destruction, modification, or curtailment of its habitat or range.* According to the 1994 administrative record, many instream habitat features have been significantly impaired as a result of land management activities, including forest management and road building, hydropower and irrigation diversions, mining, and grazing (Chamberlain et al. 1991, Craig and Wissmar 1993, Frissell 1993, Furniss et al. 1991, Isaacson 1994, Meehan 1991, Nehlsen et al. 1991, Salo and Cundy 1987, Sedell and Everest 1991). Based on a survey of biologists, only 18

percent of all bull trout populations and stream segments rangewide are not threatened by degraded habitat conditions (USDA 1993). Adverse impacts to bull trout habitat and populations due to land management practices have been documented throughout the species' range in the conterminous United States (Brown 1992, Fraley and Shepard 1989, Goetz 1989, Howell and Buchanan 1992, Isaacson 1994, Meehan and Bjorn 1991, Platts et al. 1993, Pratt 1992, Pratt and Huston 1994, Rieman and McIntyre 1993, Shepard et al. 1984a, 1984b, Thomas 1992, USDA 1993, Weaver and Fraley 1991, WDW 1992). While some bull trout persist in ''managed'' drainages (Hicks, Plum Creek Timber Company, *in litt.*, 1993), it is likely that these populations are at risk of extinction (Rieman and McIntyre 1993).

Forest management has degraded bull trout habitat throughout the species' range. Logging and road building activities threaten bull trout populations within and downstream of managed areas through increased sediment production and delivery to streams, reduced streamside canopy closure, increased stream temperatures, and reduced woody debris recruitment (Chamberlain et al. 1991, Furniss et al. 1991, Weaver and Fraley 1991, Thomas 1992, Isaacson 1994). Thousands of miles of logging roads and vast acreage of recently logged watersheds will continue to impact hydrologic functions and habitat quality throughout the species' range for at least several decades (Isaacson 1994).

While forest management activity is cited as a contributor to bull trout population decline, the precise impact of a specific activity or accumulation of activities on the abundance, resilience or long-term persistence of a population is unknown (USDA 1993). Haugen (1991) estimated that salmonid habitat had been reduced in the Columbia Basin by about 24 percent in the past century as a result of these land management practices. On National Forests, most habitat alterations occurred during the period 1940–1970 when forest management focused on commodity resources.

Dam and reservoir construction and operation have significantly altered major portions of the riverine habitats of bull trout throughout the Columbia River Basin. Numerous dams without adequate fish passage have created barriers to fluvial and adfluvial bull trout, precluding access to former spawning, rearing, and migration habitats (Craig and Wissmar 1993, WDW 1992b, ODFW 1993). Altered hydrographs and water quality conditions may also degrade bull trout forage bases (Marotz 1993). Many migratory bull trout populations associated with mainstem river systems have been extirpated due to the construction of dams, particularly in the Columbia Basin (Brown 1992, Goetz 1991, WDW 1992a, ODFW 1993). The completion of McCloud Dam in 1965 has been cited as the primary cause of bull trout extirpation from California (Rode 1990).

Connectivity within and between watersheds is essential for maintaining aquatic ecosystem functions and healthy bull trout populations (Rieman and McIntyre 1993). Numerous hydroelectric and water storage dams currently isolate a large number of bull trout populations rangewide. The construction of hydropower dams on major river tributaries has isolated upper basin populations, and eliminated the downstream fluvial or adfluvial life history forms dependent on upstream spawning habitat. Irrigation and hydroelectric dams, large and small, have blocked bull trout migration in almost all drainages in the Pacific Northwest and converted riverine habitats into reservoir habitats (Platts et al. 1993). In many instances, natural recolonization of historically occupied bull trout sites has become impossible. But, movement of introduced species or undesirable species may also be controlled by a dam, thus, enabling bull trout to utilize historic habitats without competition from non-indigenous species.

Impacts associated with agriculture, including irrigation and water storage activities, have adversely impacted bull trout habitat. Agricultural activities reduce streamside cover, increase sedimentation, and introduce point and non-point source pollution. Unscreened irrigation diversions likely trap juvenile bull trout migrating downstream (Ratliff and Howell 1992).

Grazing impacts to salmonid habitat have been described by many authors (Platts 1991, Elmore and Beschta 1987, Meehan and Platts 1978). Improper livestock grazing negatively affects bull trout by reducing riparian vegetation, changing stream morphology and increasing soil erosion. These alterations degrade thermal and structural habitat conditions and water quality for bull trout, and compound the negative impacts of human activities.

Mining has adversely affected bull trout and their habitats in Idaho, Montana, Oregon, and Washington (Coeur d'Alene Tribe of Idaho et al. 1991, Johnson and Schmidt 1988, Martin and Platts 1981, Platts et al. 1993, USDA 1992, USDA 1993, WDW 1992b). Mining can degrade aquatic systems by producing sediment and toxic heavy metals, altering water acidity levels, and changing stream channels and flow (Esch and Hallock, citing others).

Klamath River Population Segment

The migratory life history forms (fluvial and adfluvial) of bull trout in the Klamath Basin have been lost because the habitat and migratory corridors that once supported these fish have been degraded to an unsuitable condition. This degradation appears to have been caused primarily by the loss of riparian vegetation and water withdrawals, but channelization of Sun Creek and a few other streams near Crater Lake has also been blamed for the loss of migratory fish. Land ownership and agricultural practices in the basin suggest that the loss of riparian vegetation is due to livestock grazing, timber harvest, and road construction. Ziller (*in litt.* 1992) noted that the removal of the riparian canopy increased stream temperatures. Water withdrawals at irrigation diversions are common in the basin, and occur on most streams where bull trout reside (OCAFS 1993). Because these diversions are unscreened and unregulated in regard to minimum flow and/or maximum withdrawal, direct loss of fish has been suggested and downstream areas have become entirely dewatered or unsuitable for bull trout due to low water flows and associated increasing temperatures (OCAFS 1993). These factors have rendered much of the basin unsuitable habitat for bull trout, and have isolated small resident populations in extreme headwater areas where suitable habitat still exists (Ziller 1992, Ratliff and Howell 1992). Irrigation, livestock grazing, timber harvest, and road construction is expected to continue in the basin along with the associated impacts to aquatic habitat. Based on the 1994 record, the present or threatened destruction, modification, or curtailment of bull trout habitat or range threatens the Klamath River distinct population segment of bull trout.

Columbia River Population Segment

Bull trout populations in the Columbia River population segment face a number of threats from habitat degradation and passage problems. Isaacson (1994) documented extensive habitat degradation of watersheds in Idaho and Montana. Suitable bull trout habitat on National Forest lands west of the Continental Divide have been impacted by land management practices including logging, road building, and grazing. Based on a survey of National

Forests reported by Isaacson (1994), a significant portion of watersheds on the Clearwater (71 percent), Nez Perce (67 percent), Kootenai (42 percent), Lolo (65 percent), Bitterroot (66 percent), Flathead (44 percent), and Idaho Panhandle National Forests (64 percent) have been moderately to severely degraded. Moreover, a large number of National Forests in Idaho and Montana do not meet existing Forest Plan standards for woody debris, pool/riffle ratios and other stream habitat parameters correlated with bull trout persistence (Isaacson 1994). Only 31 percent of streams in the Lake Pend Oreille basin meet Forest Plan standards for stream habitat attributes, and most of these streams (52 percent) are in the most degraded category. Such land management practices have deleterious effects on bull trout populations. In the Flathead River drainage, decreased survival of early life history stages was associated with increases in deposition of fine sediments in spawning gravel (Shepard 1984a, Weaver and Fraley 1991).

High water temperature is considered to be a factor limiting bull trout in certain Washington systems (Craig and Wissmer 1993). The negative impacts of grazing appear to be major factors in habitat degradation in Oregon and Idaho (USDA 1993). Grazing is identified as a major cause of habitat degradation in 15 of 34 streams/stream reaches supporting bull trout populations in the Clearwater River basin (USFS, *in litt.*, 1993). In Washington, for instance, agriculture was identified as being one of the greatest sources of non-point source pollution to rivers and streams (Edwards et al. 1992 *in* USDA 1994). Water quality in the Yakima River system has been degraded due to agricultural activities (WDE 1992).

Based on re-surveys of five rivers in the Lower Columbia, Sedell and Everest (1991) documented a loss of large pools during the past 50 years due to grazing, road construction, dredge mining, agricultural practices, and forest management. On the Middle Fork Salmon River in Idaho, large pool density has decreased 52 percent in some tributaries. On the Grande Ronde, Willamette, and Lewis and Clark rivers in Oregon the concentration of large pools has decreased by 67, 41, and 60 percent, respectively. Only tributaries in the Yakima River basin in Washington exhibited an increase (27 percent) in pool density.

Habitat degradation as the result of mining related activities in Montana has resulted in the extinction of some populations and the reduction of others (Thomas 1992). The upper Clark Fork above Milltown Dam in Montana has been contaminated by high levels of arsenic, cadmium, copper, lead, and zinc from large-scale copper mining and mineral processing. As a result, four Superfund sites have been designated in this area, and tests indicate that contamination has caused substantial reductions in the number, growth, and diversity of trout (RCG/Hagler, Bailly, Inc. 1993). Bull trout have likely been among the fish impacted, as only a few scattered headwater populations of bull trout currently exist. Entire drainages within the Clearwater and Salmon River basins have been severely degraded by past gold dredge mining practices (Esch and Hallock, no date). Mining continues in two streams with bull trout in the North Fork Clearwater River (C. Huntington, Clearwater Biostudies, pers. comm. 1993).

Irrigation practices restrict bull trout migrations and isolate populations from historical mainstem habitats in the Snake, Yakima, Walla Walla, Powder, Malheur, Grande Ronde, Umatilla, John Day, Clark Fork, and Bitterroot rivers (ODFW 1993, Thomas 1992, WDW 1992b). Dorratcaque (1986) documented chronic flow and passage problems on the Lemhi River of Idaho, where a complete lack of flow has occurred during the migration period. Over 80 percent of the annual stream flow in the Yakima subbasin is diverted for irrigation purposes and return flows account for 90 percent of the lower-river flow during the irrigation season (WDE 1992). Bull trout in this subbasin are now isolated in upper tributaries and are at high risk of extinction (WDW 1992b).

In addition to the negative effects associated with improper land management practices, habitat fragmentation due to hydroelectric impoundments have significantly impacted bull trout populations. Numerous impoundments throughout the Columbia Basin have isolated populations and altered mainstem habitat. Hydroelectric facilities such as Albeni Falls (1952), Noxon Rapids (1958), Cabinet Gorge (1951), and Milltown (1906) in the Clark Fork/Pend Oreille system have eliminated or reduced adfluvial and fluvial populations (Paragamian and Ellis 1993, Pratt and Houston 1993, and Thomas 1992). Similar consequences have occurred on the Flathead River where Kerr, Big Fork, and Hungry Horse Dams curtail population interchange (Fraley et al. 1989). Bull trout populations in Montana and northern Idaho are functionally isolated from lower Columbia River populations by a number of mainstem River impoundments including Chief Joseph and Grand Coulee Dams. The mainstem Columbia and Snake rivers are fragmented by 11 hydroelectric facilities. In addition, smaller impoundments are numerous throughout the system and have isolated bull trout populations in Montana, Idaho, Washington, and Oregon (USDA 1993). New hydropower development continues to occur, primarily for small hydropower facilities. For example, the Horseshoe Bend Project on the Payette River in Idaho, would involve a diversion dam and powerhouse that could cause bull trout migration problems and habitat losses from dewatering. Other examples of segregation due to hydropower include three dams along the Lewis River in southwest Washington, all built without passage facilities.

Although bull trout are widely distributed throughout the Columbia River population segment, individual populations are highly fragmented, and most populations are isolated and remnant. Of those populations where status is known and population data exist, the general trend in this distinct population segment is declining. A few populations, however, are considered stable or increasing, and are represented in parts of the Swan, Deschutes, Grande Ronde, Tucannon, and Malheur River basins. Documented habitat losses from timber harvest, grazing, mining, and hydropower are widespread and expected to continue throughout the distinct population segment. Based on the 1994 record, the present or threatened destruction, modification, or curtailment of bull trout habitat or range threatens the Columbia River distinct population segment of bull trout.

B. *Overutilization for commercial, recreational, scientific,* or *educational purposes.* According to the 1994 administrative record, bull trout historically have been targeted by anglers and government agencies who viewed the species as undesirable because of its piscivorous habits (Bond 1992). As recently as 1990, programs were conducted to remove bull trout through outright killing of fish, bounties, and poisoning of waterways (Simpson and Wallace 1978, Ratliff and Howell 1992, ODFW 1993, Newton and Pribyl 1994).

Many bull trout populations were intensely harvested prior to the implementation of restrictive angling regulations (Brown 1992, ODFW 1993, WDW 1992b). Overharvest (both legal and illegal) can seriously threaten populations already reduced by factors such as competition, degraded habitat, and isolation (Fraley et al. 1989, Brown

1992a, Craig and Wissmar 1993). Forty-two percent of all populations across the range were considered suppressed due to accessibility and overharvest (USDA 1993).

In recognition of the decline of bull trout populations rangewide, harvest regulations have become significantly restrictive in recent years. While certain introduced fish, such as small rainbow trout, may provide supplemental forage for large adult bull trout (Faler 1991, Pratt 1992, ODFW 1993), introductions have been shown to increase the risk of incidental and illegal harvest (Rode 1990, Bond 1992, WDW 1992b). Unfortunately, illegal poaching of bull trout continues and especially threatens small populations (WDW 1992b; Pratt and Huston 1993; USDA 1993; Goetz, pers. comm. 1994, Perkinson, Kootenai National Forest, *in litt.*, 1994).

Electrofishing-induced injury may pose a new threat to bull trout because of the dramatic rise in bull trout inventories using electrofishing techniques (Horton, pers. comm. 1993). If electrofishing is not conducted properly, bull trout may suffer mortality or injury (Fredenberg 1992; McMichael 1993; Sharber and Carothers 1988; Fredenberg, Fish and Wildlife Service, pers. comm. 1993).

Klamath River Population Segment

Though recreational harvest of adult bull trout likely contributed to the historical decline of the species, harvest has been curtailed since a regulatory ban was imposed in 1992. Because angling for other trout species continues, OCAFS (1993) suggested that incidental mortality may occur on bull trout in spite of their no-harvest regulation. This claim is speculative, however, and it is not supported in the 1994 record. As a result, the overutilization of bull trout for commercial, recreational, scientific, or educational purposes does not threaten the Klamath Basin population segment based on the 1994 record.

Columbia River Population Segment

Historic harvest in the range of the Columbia River population segment likely contributed to the observed decline of bull trout. In the past, harvest included legal recreational angling, poaching, and directed eradication programs (Thomas 1992). Statewide angling regulations have recently become more restrictive in an attempt to protect bull trout throughout Montana, Idaho, Oregon and Washington. Oregon, Idaho, and Montana have adopted much more restrictive statewide angling regulations for harvest fisheries associated with Lake Billy Chinook, Lake Pend Oreille, and Flathead Lake. Those areas of Oregon where bull trout are in the most precarious situations (including the Willamette, Hood, Malheur, Powder, and Pine rivers) are now closed to fishing (Ratliff and Howell 1992). In an effort to protect bull trout from recreational harvest, the Washington Department of Fish and Wildlife has prohibited take of bull trout in eastern Washington and in the lower Columbia River (Brown 1992). While undocumented, poaching may still be a problem in certain areas of the Columbia River population segment, especially for large adfluvial and fluvial adults. However, because angling restrictions are in place and legal harvest is limited to only a few large populations, the overutilization of bull trout for commercial, recreational, scientific, or educational purposes in the Columbia River population segment is not substantiated in the 1994 record.

C. *Disease and predation*. Disease is not believed to be a critical factor in the long-term health and survival of bull trout populations. Predation on juvenile bull trout by non-native fish species, such as lake, brown, and brook trout, is a recent and potentially serious threat to some populations (Pratt and Huston 1993, Rieman and McIntyre 1993).

Klamath River Population Segment

Exotic fish species have been introduced into Klamath Basin streams, and either brown or brook trout reside in conjunction with bull trout in all but one of the seven remaining populations (Ziller 1992, Ratliff and Howell 1992). The most significant threat by introduced species to bull trout is hybridization (see section E. *Other natural or manmade factors affecting its continued existence*). Although the potential for predation prevails, no evidence in the 1994 record suggests that predation occurs in this population segment. Neither Ratliff and Howell (1992) or OCAFS (1993) considered predation to be a threat to bull trout in the Klamath Basin. Based on the administrative 1994 record, disease or predation do not threaten the Klamath Basin population segment.

Columbia River Population Segment

Little information exists for the Columbia River population segment that implicates predation or disease as a significant factor for bull trout decline. Introductions of non-native fish present the most serious threat through hybridization (see section E. *Other natural or manmade factors affecting its continued existence*). However, lake trout populations have increased in Flathead Lake and resulted in the expansion of lake trout into the Flathead River system (Vashro et al. 1992), where they may prey on emigrating juvenile bull trout (Thomas 1992; Fredenberg, pers. comm. 1994). Similarly, bull trout population declines in Priest Lake, Idaho, appear to be correlated with the abundance of lake trout (Mauser 1985, Pratt and Houston 1993) and may be due to either competition or predation. Nonetheless, based on administrative 1994 record, disease does not threaten the Columbia River population segment and the threat posed by predation is limited and not substantiated for the entire population segment.

D. *The inadequacy of existing regulatory mechanisms*. Implementation of Federal and State laws designed to conserve fish resources or maintain water quality has been inadequate to prevent past and ongoing habitat degradation and population fragmentation. Deficient agency funding, competing implementation priorities and the large multi-state/international geographic area have contributed to this inadequacy. In addition, conservation measures provided for in many additional regulations are merely advisory to action agencies. Federal laws include the Fish and Wildlife Coordination Act; National Forest Management Act; Federal Land Policy and Management Act; Oregon and California Act; Clean Water Act; Rivers and Harbors Act; Federal Power Act; Pacific Northwest Electric Power Planning and Conservation Act; and Comprehensive Environmental Response, Compensation, and Liability Act. State laws include the Montana Stream Protection Act, Montana Natural Streambed and Land Preservation Act, and the Washington Forest Practices Act. In response to population declines, State fisheries agencies throughout the range have imposed increasingly restrictive harvest regulations for bull trout.

Klamath River Population Segment

Though historic harvest in the Klamath River basin likely contributed to the decline of bull trout, no information is provided in 1994 record to suggest that harvest, or the inadequacy of environmental rules and regulations now threaten bull trout. Given that legal harvest has been stopped since 1992, the 1994 record does not document inadequate existing regulatory mechanisms for the Klamath River population segment.

Columbia River Population Segment

Historic harvest in the Columbia River Basin likely contributed to the decline

of bull trout (Ratliff and Howell 1992, Thomas 1992). Harvest included legal recreational angling, poaching, and directed eradication programs (Thomas 1992). Idaho, Montana, and Oregon have since adopted much more restrictive harvest regulations for the stronghold fisheries of Lake Pend Oreille, Flathead Lake, and Lake Billy Chinook. Fishing seasons are closed to the harvest of bull trout in virtually all other waters of this distinct population segment outside of Canada. However, implementation of Federal and State laws designed to conserve fish resources or maintain water quality has been inadequate to prevent past and ongoing habitat degradation and population fragmentation. Deficient agency funding, competing implementation priorities and the large multi-state/ international geographic area have contributed to this inadequacy. Thus, given the above and that the general trend of bull trout populations in this distinct population segment is declining, the 1994 record suggests that existing regulatory mechanisms for the Columbia River distinct population segment are inadequate.

E. *Other natural or manmade factors affecting its continued existence.* Isolation, competition, and hybridization with introduced species adversely impact the persistence and viability of bull trout populations. Widespread introduction of non-native species across the range of bull trout has frequently resulted in serious population declines and extirpations (Bond 1992, Donald and Alger 1993, Howell and Buchanan 1992, Leary et al. 1993, Markle 1992, Platts et al. 1993, Pratt and Huston 1993, Rieman and McIntyre 1993, Isaacson 1994). Fish introductions significantly affect the persistence of populations, particularly when occurring in concert with habitat degradation and extirpated migratory life history forms (Rieman and McIntyre 1993).

Introduced brook trout have become established throughout much of the range of bull trout and hybridization seriously threatens the persistence of bull trout populations (Leary et al. 1993; Markle 1992; Rieman and McIntyre 1993; Thomas 1992, WDW 1992a and 1992b). Hybridization results in offspring that are nearly always sterile, eventually eliminating bull trout from a system (Leary et al. 1993). Life history differences between the two species (brook trout mature faster and have a higher reproductive rate) favor brook trout where ranges overlap (Thomas 1992). This threat is exacerbated when larger, migratory forms of bull trout have been eliminated and gene flow is prevented by the isolation of remnant bull trout populations.

Non-native lake trout are dominant and are able to displace bull trout where niche overlap and potential competition between the two species is substantial (Donald and Alger 1993). In two cases, introduced lake trout have replaced bull trout in less than 30 years (Donald and Alger 1993). In another case, lake trout appear to be in the process of replacing bull trout in Flathead Lake, which was considered a stronghold for bull trout (Thomas 1992, Weaver 1993).

Non-native brown trout and bull trout are likely to be in direct competition in numerous drainages (Platts et al. 1993, Pratt and Huston 1993, Ratliff and Howell 1992). Pratt and Huston (1993) note that brown trout and bull trout achieve similar sizes and have overlapping spawning seasons, which may result in disruption of bull trout redds and competition for resources.

A variety of mechanisms are responsible for isolating bull trout populations across their range. Isolation may occur directly, resulting from barrier structures (e.g., dams, weirs, culverts, stream diversions), or indirectly as a result of degraded habitat conditions (e.g., altered thermal regimes, dewatered stream reaches, channelization). Once isolated, bull trout populations face relatively high probabilities of extinction due to loss of gene flow and relatively low population size (Rieman and McIntyre 1993).

Klamath River Population Segment

Perhaps the most significant threat to the remaining bull trout populations in the Klamath Basin is hybridization with introduced brook trout. Where the two species reside together, bull trout abundance is alarmingly low, and hybrids are common; only four populations exist in the absence of brook trout and these populations are the most abundant populations in the basin (Ratliff and Howell 1992, Ziller, 1992). Bull trout have recently gone extinct in the Upper Sycan River and Sevenmile Creek, which now contain only brook trout and hybrids (Ratliff and Howell 1992). Because bull trout † brook trout hybrids are almost always sterile, the loss of the less numerous parental species (typically bull trout) inevitably occurs (Leary et al, 1992). Differences in life history and habitat tolerances between the species also tend to favor brook trout.

Competition with introduced brook and brown trout particularly may threaten bull trout in the Klamath Basin because only one of the seven remaining populations exist in the absence of these species (Ratliff and Howell 1992, Ziller 1992). Population declines, however, have not been attributed to competition in the basin like they have been to hybridization and habitat loss.

The seven remaining populations of bull trout in the Klamath Basin are isolated from one another by degraded, unsuitable habitat. In addition, four of these populations have a total population size of fewer than 500 individuals (all age classes represented) (B. Hooton, ODFW, *in litt.* 1993). Extinction risks increase dramatically when isolated populations decrease in size and/or metapopulations become further fragmented (Rieman and McIntyre 1993). In addition, the restriction of gene flow among isolated populations compounds these threats and reduces genetic diversity and the associated plasticity of populations to withstand extreme environmental conditions (Rieman and McIntyre 1993). These situations are prominent within the Klamath River population segment. Based on the documented hybridization and human-induced isolation described in the 1994 record, other natural or manmade factors pose a threat to the continued existence of the Klamath River population segment.

Columbia River Population Segment

In parts of the Columbia River Basin, non-native introductions seriously threaten bull trout populations. Where bull trout occur with brook trout, the threat of hybridization, loss of genetic integrity, and production of sterile offspring is a major concern (Ratliff and Howell 1992; Thomas 1992; Esch and Hallock, no date; USDA 1992). Forty-five percent of the bull trout populations in Oregon evaluated by Ratliff and Howell (1992) were considered at risk from brook trout. Populations that are at greatest risk are resident forms occurring predominantly in the headwater tributary reaches. Adfluvial and fluvial bull trout appear to be at less risk (Ratliff and Howell 1992). However, adfluvial and fluvial bull trout are in direct competition with non-native lake trout in certain areas such as Priest Lake, Idaho (Pratt and Houston 1993). Bull trout displacement by lake trout is of special concern in Flathead Lake, Montana and Lake Pend Oreille, Idaho, which have been considered strongholds for bull trout (Thomas 1992, Weaver 1993). Based on the documented hybridization and competition from introduced brook and lake trout described in the 1994 record, other natural and manmade factors pose a threat to the continued existence of the Columbia River population segment.

The Service has carefully assessed the best scientific and commercial

information available in the 1994 administrative record regarding the present and future threats facing the two distinct population segments of bull trout. Determinations by distinct population segment follow.

Klamath River Population Segment

The trend for this distinct population segment is declining based on the 1994 record. Only seven bull trout populations remain, which are isolated and remnant, and occupy only a fraction of the historically available habitat. Larger, more fecund migratory forms have essentially been lost from the entire distinct population segment, with only small, resident fish still existing. Imminent threats from habitat degradation, irrigation diversions, and the presence of non-native brook trout place this distinct population segment at a moderate to high risk of extinction.

Documented evidence for a drastic decline in bull trout in the Klamath River population segment was prominent in the 1994 record. None of the seven remaining populations occupy any more than 2.5 miles of available habitat, and no one population consists of more than 500 individuals (all year classes represented). Because the remaining populations consist of small resident forms with low fecundity, reproductive and natural recovery potential is extremely poor. As a result, their likelihood of persistence in the foreseeable future is uncertain in the absence of special protection and recovery efforts. Based on an evaluation of the 1994 administrative record, the Klamath River population segment is in danger of extinction throughout all or a significant portion of its range, and, thus, this population segment fits the definition of endangered as defined by the Act.

Columbia River Population Segment

Bull trout populations within the Columbia River population segment have declined from historic levels and are generally considered to be isolated and remnant (Rieman and McIntyre 1993, Thomas 1992, USDA 1993, WDW 1992). An examination of 386 bull trout populations in this population segment in the United States indicated that 33 percent were declining, 15 percent stable, 3 percent secure, and 2 percent increasing (Ratliff and Howell 1992, USDA 1993, WDW 1992). The population status of the remaining 47 percent in the United States was unknown, as were those populations in British Columbia in the 1994 record. Because the Service considered known documented trends within a distinct population segment to be representative of the entire population segment, an overall declining trend of bull trout populations in the Columbia River basin was evident based on the 1994 administrative record.

Decrease in bull trout abundance throughout the Columbia River population segment is evident with former stronghold populations in Flathead Lake and Lake Pend Oreille declining. However, examples of stable or increasing populations, such as Swan Lake and Lake Billy Chinook, were also found in this distinct population segment. Because of the species' wide range, scattered distribution, and diversity of life histories in the Columbia River basin, threats from habitat degradation, passage restriction, and non-native brook trout are moderate for bull trout populations in this distinct population segment. Based on the above evaluation of the 1994 administrative record, the Columbia River population segment is likely to become endangered within the foreseeable future throughout all or a significant portion of its range, and, thus, this population segment fits the definition of threatened as defined by the Act.

Critical habitat is not determinable for the two distinct population segments of bull trout included in this proposed rule, for reasons discussed in the ''Critical Habitat'' section of this rule.

Critical Habitat

Critical habitat is defined in section 3 of the Act as—(i) the specific area within the geographical area occupied by a species, at the time it is listed in accordance with the Act, on which are found those biological features (I) essential to the conservation of the species and (II) which may require special management considerations or protection; and (ii) specific areas outside the geographical area occupied by a species at the time it is listed, upon a determination that such areas are essential for the conservation of the species. ''Conservation'' means the use of all methods and procedures needed to bring the species to the point at which listing under the Act is no longer necessary.

Section 4(a)(3) of the Act, as amended, and implementing regulations (50 CFR 424.12) require that, to the maximum extent prudent and determinable, the Secretary designate critical habitat at the time the species is determined to be endangered or threatened. Service regulations (50 CFR 424.12(a)) state that critical habitat is not determinable if information sufficient to perform required analysis of impacts of the designation is lacking or if the biological needs of the species are not sufficiently well known to permit identification of an area as critical habitat. Section 4(b)(2) of the Act requires the Service to consider economic and other relevant impacts of designating a particular area as critical habitat on the basis of the best scientific data available. The Secretary may exclude any area from critical habitat if he determines that the benefits of such exclusion outweigh the conservation benefits, unless to do such would result in the extinction of the species.

The Service finds that the determination of critical habitat is not determinable for these distinct population segments based on the 1994 administrative record. When a ''not determinable'' finding is made, the Service must, within 2 years of the publication date of the original proposed rule, designate critical habitat, unless the designation is found to be not prudent. The Service reached this conclusion because the biological needs of the species in the two population segments are not sufficiently well known to permit identification of areas as critical habitat in the 1994 administrative record. Specifically, no information was available in the 1994 record on the number of individuals required for a viable population throughout the distinct population segment. In addition, the extent of habitat required for recovery of these fish had not been identified. This information is considered essential for determining critical habitat for these population segments. Therefore, the Service finds that designation of critical habitat for these species is not determinable at this time.

Available Conservation Measures

Conservation measures provided to species listed as endangered or threatened under the Endangered Species Act include recognition, recovery actions, requirements for Federal protection, and prohibitions against certain activities. Recognition through listing encourages and results in conservation actions by Federal, State, and private agencies, groups, and individuals. The Act provides for possible land acquisition and cooperation with the State and requires that recovery actions be carried out for all listed species. The protection required of Federal agencies and the prohibitions against taking and harm are discussed, in part, below.

Section 7(a) of the Act, as amended, requires Federal agencies to evaluate their actions with respect to any species that is proposed or listed as endangered or threatened and with respect to its critical habitat, if any is being

designated. Regulations implementing this interagency cooperation provision of the Act are codified at 50 CFR Part 402. Section 7(a)(4) requires Federal agencies to confer with the Service on any action that is likely to jeopardize the continued existence of a species proposed for listing or result in destruction or adverse modification of proposed critical habitat. If a species is listed subsequently, section 7(a)(2) requires Federal agencies to insure that activities they authorize, fund, or carry out are not likely to jeopardize the continued existence of a listed species or to destroy or adversely modify its critical habitat. If a Federal action may affect a listed species or its critical habitat, the responsible Federal agency must enter into formal consultation with the Service.

The Klamath River and Columbia River bull trout population segments occur on lands administered by the U.S. Forest Service and Bureau of Land Management (BLM); various State-owned properties in Oregon, Washington, Idaho and Montana; and private lands. Federal agency actions that may require conference and/or consultation as described in the preceding paragraph include Army Corps of Engineers (Corps) involvement in projects such as the construction of roads and bridges, and the permitting of wetland filling and dredging projects subject to section 404 of the Clean Water Act (33 U.S.C. 1344 *et seq.*); Federal Energy Regulatory Commission licensed hydropower projects authorized under the Federal Power Act; Forest Service and BLM timber and grazing management activities; Environmental Protection Agency authorized discharges under the National Pollutant Discharge System of the Clean Water Act; and U.S. Housing and Urban Development projects.

The Act and its implementing regulations found at 50 CFR 17.21 and 17.31 set forth a series of general trade prohibitions and exceptions that apply to all endangered and threatened wildlife, respectively. These prohibitions, in part, make it illegal for any person subject to the jurisdiction of the United States to take (includes harass, harm, pursue, hunt, shoot, wound, kill, trap, or collect; or attempt any of these), import or export, ship in interstate commerce in the course of commercial activity, or sell or offer for sale in interstate or foreign commerce any listed species. It is also illegal to possess, sell, deliver, carry, transport, or ship any such wildlife that has been taken illegally. Certain exceptions apply to agents of the Service and State conservation agencies.

Permits may be issued to carry out otherwise prohibited activities involving endangered and threatened wildlife under certain circumstances. Regulations governing permits are at 50 CFR 17.22, 17.23 and 17.32. Such permits are available for scientific purposes, to enhance the propagation or survival of the species, and/or for incidental take in connection with otherwise lawful activities. For threatened species, permits are also available for zoological exhibition, educational purposes, or special purposes consistent with the purpose of the Act.

It is the policy of the Service published in the **Federal Register** on July 1, 1994, (59 FR 34272) to identify to the maximum extent practicable at the time a species is listed those activities that would or would not constitute a violation of section 9 of the Act. The intent of this policy is to increase public awareness of the effect of this listing on proposed and ongoing activities within the species' range. The Service believes the following actions would not be likely to result in a violation of section 9:

(1) Actions that may affect bull trout in the Klamath and Columbia River basins and are authorized, funded or carried out by a Federal agency when the action is conducted in accordance with an incidental take statement issued by the Service pursuant to section 7 of the Act;

(2) Possession of Columbia River basin bull trout caught legally in accordance with state fishing regulations.

With respect to both the Klamath River and Columbia River bull trout population segments, the following actions likely would be considered a violation of section 9:

(1) Take of bull trout without a permit, which includes harassing, harming, pursuing, hunting, shooting, wounding, killing, trapping, capturing, or collecting, or attempting any of these actions, except in accordance with applicable State fish and wildlife conservation laws and regulations within the Columbia River bull trout population segment;

(2) Possess, sell, deliver, carry, transport, or ship illegally taken bull trout;

(3) Interstate and foreign commerce (commerce across state and international boundaries) and import/export (as discussed earlier in this section);

(4) Introduction of non-native fish species that compete or hybridize with, or prey on bull trout;

(5) Destruction or alteration of bull trout habitat by dredging, channelization, diversion, in-stream vehicle operation or rock removal, or other activities that result in the destruction or significant degradation of cover, channel stability, substrate composition, temperature, and migratory corridors used by the species for foraging, cover, migration, and spawning;

(6) Discharges or dumping of toxic chemicals, silt, or other pollutants into waters supporting bull trout that result in death or injury of the species; and

(7) Destruction or alteration of riparian or lakeshore habitat and adjoining uplands of waters supporting bull trout by timber harvest, grazing, mining, hydropower development, or other developmental activities that result in destruction or significant degradation of cover, channel stability, substrate composition, temperature, and migratory corridors used by the species for foraging, cover, migration, and spawning.

Questions regarding whether specific activities may constitute a violation of section 9 should be directed to the Field Supervisor of the Service's Snake River Basin Office (see **ADDRESSES** section). Requests for copies of the regulations concerning listed animals and inquiries regarding prohibitions and permits may be addressed to the U.S. Fish and Wildlife Service, Endangered Species Permits, 911 NE. 11th Avenue, Portland, Oregon 97232–4181 (telephone 503/231–6241; facsimile 503/231–6243).

Special Rule

Section 4(d) of the Act provides authority for the Service to promulgate special rules for threatened species that would relax the prohibition against taking. In this case, the Service proposes a special rule for the Columbia River bull trout distinct population segment (see Proposed Regulations Promulgation section). The Service recognizes that, based on the 1994 administrative record, statewide angling regulations have become more restrictive in an attempt to protect bull trout throughout Montana, Idaho, Oregon, and Washington. The Service intends to continue to work with the States in developing management plans and agreements with the objective of recovery and eventual delisting of the Columbia River bull trout distinct population segment. The Service is consequently proposing a special rule under section 4(d) that offers additional management flexibility for this population segment. The special rule would allow for take of bull trout within the Columbia River population segment

when it is in accordance with applicable State fish and wildlife conservation laws and regulations. The Service believes that a special rule of this nature will benefit the Columbia River distinct population segment of bull trout, and that the rule would satisfy the requirement under section 4(d) that regulation applied to threatened species embody those measures deemed necessary and advisable to provide for the conservation of the population segment in question.

Public Comments Solicited

The Service intends that any final action resulting from this proposal will be as accurate and as effective as possible. Therefore, comments or suggestions from the public, other concerned governmental agencies, the scientific community, industry, or any other interested party concerning this proposed rule are hereby solicited. Comments particularly are sought concerning:

(1) Biological, commercial trade, or other relevant data concerning threat (or lack thereof) to these two population segments;

(2) The location of any additional populations of the two segments and the reasons why any habitat should or should not be determined to be critical habitat as provided by section 4 of the Act;

(3) Additional and updated information concerning the range, distribution, and population size of the two segments;

(4) Current or planned activities in the subject area and their possible impacts on the two population segments; and

(5) Promulgation of the special rule.

The final decision on this proposal will take into consideration the comments and any additional information received by the Service, and such communications may lead to a final determination that differs from this proposal. In addition, the Service will consider significant new information on bull trout received since the close of the 1994 administrative record. A list of significant references concerning bull trout that have become available since the close of the 1994 record may be obtained upon request from the Snake River Basin Field Office (see **ADDRESSES** above).

The Endangered Species Act provides for at least one public hearing on this proposal, if requested. However, given the high likelihood of several requests throughout the range of both population segments, the Service has scheduled five hearings in advance of any request. The hearings are scheduled for Portland, Oregon, on July 1, 1997; Spokane, Washington, on July 8, 1997; Missoula, Montana, on July 10, 1997; Klamath Falls, Oregon, on July 15, 1997; and Boise, Idaho, on July 17, 1997. For additional information on public hearings, see the **DATES** section.

National Environmental Policy Act

The Fish and Wildlife Service has determined that Environmental Assessments and Environmental Impact Statements, as defined under the authority of the National Environmental Policy Act of 1969, need not be prepared in connection with regulations adopted pursuant to section 4(a) of the Endangered Species Act of 1973, as amended. A notice outlining the Service's reasons for this determination was published in the **Federal Register** on October 25, 1983 (48 FR 49244).

Required Determinations

The Service has examined this regulation under the Paperwork Reduction Act of 1995 and found it to contain no information collection requirements.

References Cited

A complete list of all references cited herein is available upon request from the Snake River Basin Field Office (see **ADDRESSES** above).

Author: The primary authors of this proposed rule are Don Sundeen and Jim Bartel, Regional Office, Portland, Oregon.

List of Subjects in 50 CFR Part 17

Endangered and threatened species, Exports, Imports, Reporting and recordkeeping requirements, and Transportation.

Proposed Regulations Promulgation

PART 17—[AMENDED]

Accordingly, part 17, subchapter B of Chapter I, Title 50 of the Code of Federal Regulations, is proposed to be amended as set forth below:

1. The authority citation for part 17 continues to read as follows:

Authority: 16 U.S.C. 1361–1407; 16 U.S.C. 1531–1544; 16 U.S.C. 4201–4245; Pub. L. 99–625, 100 Stat. 3500; unless otherwise noted.

2. Amend § 17.11(h) by adding the following, in alphabetical order under *Fishes*, to the List of Endangered and Threatened Wildlife:

§ 17.11 Endangered and threatened wildlife.

* * * * *

(h) * * *

Species		Historic range	Vertebrate population where endangered or threatened	Status	When listed	Critical habitat	Special rules
Common name	Scientific name						
*	*	*	*	*	*		*
FISHES							
*	*	*	*	*	*		*
Trout, bull	*Salvelinus confluentus.*	U.S.A. (OR)	Klamath River	E		NA	NA
Do	...do	U.S.A. (ID, MT, OR, WA) Canada.	Columbia River	T		NA	17.44(v)
*	*	*	*	*	*		*

3. Amend § 17.44 by adding paragraph (v) to read as follows:

§ 17.44 Special rule—fishes.

* * * * *

(v) Bull trout (*Salvelinus confluentus*), Columbia River population

(1) No person shall take this species, except in accordance with applicable State fish and wildlife conservation laws and regulations.

(2) Any violation of applicable State fish and wildlife conservation laws or regulations with respect to the taking of this species is also a violation of the Endangered Species Act.

(3) No person shall possess, sell, deliver, carry, transport, ship, import, or export, any means whatsoever, any such

species taken in violation of these regulations or in violation of applicable State fish and game laws and regulations.

(4) It is unlawful for any person to attempt to commit, solicit another to commit, or cause to be committed, any offense defined in paragraphs (v) (1) through (3) of this section.

Dated: June 9, 1997.

William Leary,

Acting Deputy Assistant Secretary for Fish and Wildlife and Parks.

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