Boise Regional Office
Idaho Department of
Environmental Quality

Subbasin Assessment for Upper Boise River Watersheds

Hydrologic Catalog Units: 17050111 and 17050113, Southwest Idaho

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Prepared By

Robert Steed

Robert Steed is an Analyst 3 at Boise Regional Office, Idaho Department of Environmental Quality, 1445 N. Orchard, Boise, ID 83706.

Chapter

1

Executive Summary

Upper Boise River Subbasin 303(d) Listed Waterbodies Not Impaired This Cycle.

This Subbasin Assessment has been developed to provide all necessary materials needed to comply with Idaho's TMDL development and program schedule. All 303(d) listed waterbodies within Upper Boise River subbasin are currently "Fully Supporting" each beneficial use, and no longer candidates for TMDL development. To assist DEQ and land management agencies in the appropriate focus and prioritization of water quality issues and solutions within the subbasin, the following comprehensive subbasin assessment has been developed. This subbasin assessment accomplishes the following:

- It justifies and documents the "Fully Supporting" status of waterbodies currently on the 303(d) list,
- It accounts for water quality limited streams that are "Not Fully Supporting" and should be considered for next 303(d) list and TMDL cycle,
- It identifies "Causes/Stressors" and "Sources" for within the subbasin, and
- It incorporates water quality and endangered bull trout objectives.

Located in Southwest Idaho, the Upper Boise River subbasin is about 2033 square miles of predominantly undeveloped forest land and open range with both managed and free flowing streams. The Upper Boise River subbasin is comprised of the two hydrologic cataloging units of the Boise River system upstream of Arrowrock Reservoir. All of the stream segments, that have been assessed in this document, are from within 1705011 and 17050113 cataloging units. The subbasin ranges in elevations from 3,200 feet (975 m) at Arrowrock Reservoir to above 10,000 feet (3,000 m) at some of it's mountain peaks. The waters of the subbasin join to form the Arrowrock Reservoir, which supplies Lucky Peak Reservoir, and the Lower Boise River.

Dynamic, high-energy processes have formed and continue to shape the subbasin. The uplift that formed the mountains accelerated surface erosion and exposed underlying rocks. Geology of the Upper Boise River watersheds is dominated by the Cretaceous Idaho Batholith and younger Tertiary granitic intrusions.

The subbasin is located on the western edge of the central mountain mass in Idaho, and has an upland continental climate. Gradual changes of seasons are occasionally marked by rapid changes in weather. The subbasin has long, cold winters with heavy snowfalls. Snow usually melts by mid-May. In summer, days are warm and nights are cool, and occasional light showers bring considerable thunderstorms and danger of forest fires. In the fall, the days are cooler and nighttime temperatures can drop below freezing.

The average annual precipitation in the Upper Boise River subbasin range from 20 to 50 inches per year with most precipitation associated with winter snow accumulation. Temperatures within the Upper Boise River watersheds can fluctuate dramatically from month to month. Weather stations record extremes as low as -32 degrees F (January) and as high as 109 degrees F (July, August).

The streams in the subbasin are home to redband trout, bull trout, mountain whitefish, brook trout, northern pike minnow and many nongame species.

Most of the land in the subbasin is public land managed by the US Department of Agriculture, Boise National Forest.

In 1994, and following in 1998, ten waterbodies within the Upper Boise River subbasin were classified as "water quality limited" under Section 303(d) of the Clean Water Act and placed on Idaho's 303(d) list. Waterbody identification numbers, stream segment numbers, size and listing year, may be found in Appendix T3 "303(d) Information for Idaho". Analysis conducted for this subbasin assessment has determined that each of these ten waterbodies are "Fully Supporting" their designated and existing beneficial uses.

In 1998, an additional waterbody was added to the §303(d) list. According to the 1998 303(d) List (DEQ, 1998) this added waterbody is scheduled for TMDL loading analysis in 2006. Analysis conducted for this subbasin assessment has also determined that this waterbody is in the "Fully Supporting but Threatened" assessment for cold water biota beneficial use. The recommendations of this subbasin assessment are:

- That during the next round of §303(d) development, the currently listed §303(d) waterbodies should be removed and those identified in this subbasin assessment as "Not Supporting" beneficial uses should be added.

- That management agency and landowner resources in the subbasin continue to be applied to projects to reduce legacy impacts. These activities can continue to enhance water quality in the subbasin.

This information was presented to the Southwest Basin Advisory Group on Thursday, November 2, 2000. The Southwest Basin Advisory Group voted to concur that TMDLs were not appropriate for 1998 303(d) listed streams within Upper Boise River Subbasin.

Chapter
2

Subbasin Assessment

Upper Boise River Subbasin (17050111 and 17050113)

The overall purpose of this subbasin assessment is to characterize and document water quality within the study area. This subbasin assessment is partitioned into four major sections; 1) characterization of watershed, 2) water quality concerns and status, 3) pollutant source inventory, and 4) summary of past and present pollution control efforts.

This subbasin assessment has been formatted to be published and distributed electronically, through Idaho Department of Environmental Quality's Internet site (www2.deq.state.id.us). An effort has been made to reduce the number of text embedded figures, and large tables. This information will be available to the electronic user through hypertext links. Hard copy users will find these materials appended at the end of the document.

Characterization of Watershed

The subbasin for this subbasin assessment is located in southwestern Idaho. It is comprised of the two hydrologic cataloging units of the Boise River system upstream of Lucky Peak Reservoir. The hydrologic cataloging units are identified on U.S. Geological Survey's Hydrologic Unit Map – 1974; State of Idaho (USGS, 1974) as follows:

- **17050111, North and Middle Fork Boise River** - This hydrologic cataloging unit includes the North and Middle Fork Boise River and all tributaries, upstream from the confluence of the North and Middle Forks of the Boise River.

- **17050113, South Fork Boise River** - This key watershed includes South Fork Boise River upstream from the slackwater of Arrowrock Reservoir, Anderson Ranch Reservoir and the South Fork Boise River and all tributaries upstream to the headwaters

The subbasin's area is approximately 2,033 square miles (5264 km^2) and its western terminus is situated about 36 miles (58 km) from Boise, Idaho. Except for 63 square miles (164 km^2) of private land and 23 square miles (59 km^2) of state land, the subbasin is primarily federally owned and administered. The Boise National Forest generally administers the federal lands. The subbasin is predominantly in Elmore and Boise Counties and extends into Camas County. The small settlements of Atlanta, Prairie, Pine, Featherville, Paradise Hot Springs, and Rocky Bar are in the subbasin see figure T9. State Highway 21 and U.S. Route 20 provide primary access to portions of the area. Extensive access is provided by many miles of national forest and state system roads and county owned or maintained roads (Image I1).

Physical and Biological Characteristics

Climate

The subbasin is located on the western edge of the central mountain mass in Idaho, and has an upland continental climate. These forested watersheds drain south southwesterly from elevations above 10,000 feet (3,000 m) to 3,200 feet (975 m) along the forks of the Boise River. Surrounding mountains rise about 4,000 feet (1,220 m) above the valley floors. Based on this broad range of elevations there is a high range of temperatures and precipitation. Gradual changes of seasons are occasionally marked by rapid changes in the weather. These long, cold winters have heavy snowfalls, which usually melt by mid-May. In summer, days are warm, nights are cool, and occasional light to moderate showers and thunderstorms bring considerable lightning and danger of forest fires. In the fall, the days are cooler and nighttime temperatures can drop below freezing. The first permanent snow generally occurs by mid-October.

The average annual precipitation in the Upper Boise River watersheds range from 20 to 50 inches per year. Based on Snotel (Snow Telemetry) stations around the basin, the highest snowfall would be over 40 SWE (Snow Water Equivalents) inches in the mountains, and the lowest would be under 15 inches in the western part of the basin. Temperatures within the Upper Boise River watersheds can fluctuate dramatically from month to month. Weather stations at Idaho City and Arrowrock Dam record similar extremes as low as -32 degrees F (January) and as high as 109 degrees F (July, August). The mean monthly temperature in Idaho City range from a low of 24.3 degrees F in January to a high of 64.3 degrees F in August. Sunshine days range from 40-50% in winter to about 80% in summer. (IDWR, 1992)

Hydrology

The Upper Boise River watersheds are located within the Idaho Batholith, which is a coarse-grained granitic intrusion. The geologic processes of uplifting, faulting, glaciation and fluvial action resulted in landscapes that are characterized by mixtures of steep canyon lands, steep slopes with strongly expressed drainages, gently rounded topography, and glacial and fluvial deposits such as river terraces. Typical drainage systems consist of steep headwater streams leading into steep to moderately steep main channels (Image I5). Stream energy is generally high in the upper stream reaches with sediment readily transported downstream. These channels have abundant boulders, cobbles, and rubble contained in their bed and banks. As the streams progress into the lower elevations with lesser gradients, energy is reduced and sediments settle into the channel bottoms (Image I2).

Stream hydrographs (runoff regimes) peak from late March to May because of snowmelt runoff. The runoff varies with south facing aspects at lower elevations [less than 4,500 feet (1,372 m)] warming early with resulting peak runoffs occurring as early as late March. High elevation lands with deeper snowpacks generate peak runoff beginning in late April and last until late May. Rain falling on snow in winter and spring cause rapid increases in stream flows. These rain on snow events usually occur in the elevation band between 4,500 feet (1,372 m) and 5,000 feet (1,524 m). The peak runoff periods are followed by warm, dry summers, which greatly decrease stream flows. Seeps and springs provide perennial flows to streams in higher elevations, smaller streams in the lower elevations tend to become dry before the end of summer. Periodic localized summer thunderstorms can result in flash floods within small drainages. The fall climate reduces transpiration in plants and additional ground water results in slight increases in stream flows.

The stream flow regimes in the Upper Boise River watersheds have been dramatically altered from historical conditions. Two dams (Anderson Ranch Reservoir Dam, and Arrowrock Reservoir Dam) have been built that isolate migrant fish populations in the basin. Downstream dams on the Snake and Columbia River systems have blocked anadromous fish. Remaining migrant fish species have adapted from a fluvial existence to an adfluvial and fluvial lifestyle, wintering in reservoirs. Only the South Fork Boise River below Anderson Ranch Reservoir has had major stream flow alteration. Upstream Anderson Ranch Dam controls the discharge in this stretch. In low water years (drought) the discharge from Anderson Ranch Dam is regulated to irrigation (1,700 cfs), intermediate (600 cfs), and base flow conditions (300 cfs).

Geology/Landform

The geology of the Upper Boise River watersheds is complex, particularly along some of the river canyons. The area is crossed by several major regional faults, which have crushed the rock and guided erosion to form river canyons.

Geology of the Upper Boise River watersheds is dominated by the Cretaceous Idaho Batholith and younger Tertiary granitic intrusions. Crosscutting the granitic rocks are numerous dikes (igneous rocks) mostly related to the Eocene intrusions. Miocene basalt cover the granites in places and are interbedded with sedimentary rocks of the Payette Formation, which are well mineralized and subject to commercial mining activity. The majority of the parent rock, Batholith, is principally composed of biotite granodiorite, a medium-grained igneous rock that disaggregates easily on the steep slopes of the subbasin.

The Upper Boise River subbasin is subject to rapid erosion and mass wasting. Both chemical and mechanical rock weathering provide material for stream channels. Geomorphologically speaking, the landforms within the Upper Boise River subbasin depict that the watershed is in an immature (relatively young) state. Most slopes are very steep, the rivers are controlled by many intermediate knickpoints, and meadows are limited in number and extent. This pared with an easily erodible granitic rock makes for naturally high erosion rates. In areas with intense land management activities, erosion rates are even higher. On the other hand, these chemical and mechanical rock weathering processes also provide well drained soils that make the Upper Boise River watersheds productive for forest, and forest production. Mass wasting in the Upper Boise River watersheds is also a naturally occurring phenomenon. The Upper Boise River watersheds have been subjected to both catastrophic fire and extreme weather conditions. Several streams in the subbasin have recently “blown out”. One extreme example of this is Trapper Creek on the North Fork of the Boise River. Trapper Creek was subject to a large wild fire in 1994. Trapper Creek suffered a debris flow in late summer 1995 that removed most of the streambed, all vegetation, and aquatic biota from the creek. The debris torrent made up of predominantly fine sediment, coarse rock, and plant material was deposited into the North Fork Boise River. Once Trapper Creek is given time to rebuild stream channel, riparian area, habitat, and aquatic communities the fish could pioneer back into this system. Mass wasting not associated with stream channels also occurs and provides pulses of material that streams must transport.

The parent rock of Upper Boise River watersheds like others with similar geology has limited water-holding capability. Water transfer through rock, and water holding capacity of weathered rock near the surface suggest that fractures play the dominant role. Intergranual porosity resulting from mineral grain weathering is very slow (Clayton, 1992). Most of the rock materials with water holding capacity are the sedimentary rocks, alluvial sand and gravels, located in the valley bottoms. This alluvium is critical in providing ground and surface water interaction which dictates selection of bull trout spawning habitat (Baxter, 1997).

Upper Boise River watersheds are susceptible to surface erosion and mass wasting. Both forms of erosion provide soils and rock material that the ecology of the streams need for nutrients, and structure. When excessive soil and rock materials are deposited in streams, it becomes difficult or impossible for the stream to assimilate them. This can cause impairment to the stream and impacts to bull trout. Of the two forms of erosion mass wasting, a naturally occurring event can be the most destructive to short term populations. Mass wasting rates in Upper Boise River watersheds can be accelerated by anthropogenic activities. Mass wasting usually occurs in over saturated soils on over steepened slopes. Mass wasting (debris torrents) frequently is highest in those areas that have had recent intense fires that result in hydrophobic soils.

Natural barriers in the form of waterfalls appear to be infrequent. Although the geology is complicated in the Boise River watersheds, most of the rocks are similar in composition. Rocks of similar composition erode at similar rates therefore minimizing knickpoints, and waterfalls. If falls are developed as a result of some catastrophic event it is soon (geologically timescale) eliminated.

Aquatic Fauna

The Upper Boise River Ecosystem is maintained through the continuous flow of energy and constant cycling and recycling of nutrients. The Upper Boise River watershed's aquatic fauna are characterized by algaes (producers), aquatic macroinvertebrates, juvenile amphibians (primary consumers), some fish, adult amphibians (secondary consumers) and other fish (tertiary consumers). Two species of fish, bull trout (Salvelinus confluentus) and rainbow/redband trout *(Oncorhynchus mykiss*) are of special concern in the Upper Boise River Watersheds. Both fish are native to the basin. The bull trout (*Salvelinus confluentus*) has been listed as a "threatened" species as per the Endangered Species Act. In mid-1996, Governor Batt and the State of Idaho issued an official conservation plan for bull trout (Batt 1996) and is now in the latter stages of executing this strategy across the state. The State of Idaho intends to restore this species by developing and implementing the necessary conservation measures.

Algae

Beneficial Algae is abundant and widely distributed throughout the subbasin. Although microscopic in size, their importance is immense, since they form the base of the aquatic food web. Periphyton alga assemblages have been sampled from 73 locations within the subbasin. These aquatic diatoms where identified and enumerated following procedures outlined by Bahls (1993). In the Upper Boise subbasin there are, on average, 36 different diatom species on each substrate particle in an quarter coin sized area (min 10, max 68). 274 separate diatom species have been identified. The five most common species are: *Achnanthes lanceolata, Fragilaria vaucheriae, Achnanthes minutissima, Cymbella minuta*, and *Rhoicosphenia curvata*. Algae assessment methodologies follow procedures outlined by Horsburgh and Steed (1998). Suspended algae in nuisance quantities have not been reported. Small isolated occurrences have been observed and are limited to stagnate water in small dredge ponds.

Aquatic Macroinvertebrates

From samples acquired through BURP monitoring, 362 different macroinvertebrate species were found in the Upper Boise River subbasin. These species were identified and enumerated in a laboratory setting.

Of these 362 different species, 34 were found to occur in between 85% and 25% of the sites sampled. These species have been categorized as “common”. Those in the common class have also been pared down to those that are either intolerant or moderately intolerant to fine sediment, according to *(cite in progress*) 2000. These taxon may assist as indicators of good water quality and may be found in the table below.

- Table 1. Top 11 Aquatic Macroinvertebrates found in Upper Boise River Subbasin

TAXON	ORDER	FAMILY	NAME
284	*Diptera*	*Tipulidae*	*Antocha*
622	*Ephemeroptera*	*Ephemerellidae*	*Drunella coloradensis/flavilinea*
43	*Ephemeroptera*	*Ephemerellidae*	*Drunella doddsi Needham*
35	*Ephemeroptera*	*Heptageniidae*	*Rhithrogena*
35	*Ephemeroptera*	*Heptageniidae*	*Rhithrogena*
32	*Ephemeroptera*	*Heptageniidae*	*Epeorus grandis*
31	*Ephemeroptera*	*Heptageniidae*	*Epeorus longimanus*
26	*Ephemeroptera*	*Heptageniidae*	*Cinygmula*
110	*Plecoptera*	*Perlidae*	*Doroneuria*
121	*Plecoptera*	*Perlodidae*	*Megarcys*
173	*Trichoptera*	*Glossosomatidae*	*Glossosoma*
229	*Trichoptera*	*Uenoidae*	*Neothremma*

Fish

In the Boise River Basin, headwater drainages tend to be populated by fish communities of low richness (i.e., few species). The rather “simple” headwater fish communities generally consist of bull trout, rainbow/redband trout, and sculpin (*Cottus bairdi, C. confusus*). Downstream fish communities (mainstem migration corridors, reservoir wintering areas) are more diverse and include native species such as mountain whitefish (*Prosopium williamsoni*), northern pike minnow (*Ptychocheilus oregonensis*), redside shiner (*Richardsonius balteatus*), several sucker species (*Catostomus spp*.), and daces (*Rhinichthys spp*.). A list of fish species documented to inhabit the Boise River subbasin from Arrowrock Reservoir upstream can be found in Appendix T2.

Bull Trout

The Boise River basin is dynamic in nature. Natural and human-induced factors can limit and influence the well being of bull trout populations by affecting the short- and long-term habitat conditions of streams inhabited by fish. Floods, debris torrents, landslides, and wildfires are examples of disturbance factors that profoundly influence habitat conditions for bull trout in the basin.

These sometimes catastrophic occurrences can render headwater streams uninhabitable for bull trout over a period of years while other previously impacted streams may be improving in condition (Rieman and Clayton, 1997). In such instances, channel recovery may take decades (Megahan 1991).

While bull trout are thought to be particularly sensitive to environmental change, their dispersal capabilities afford them the opportunity to potentially recolonize these disturbed

streams once conditions become suitable. However, stable bull trout populations require high quality habitat.

Large rivers or lakes supporting migratory populations have the highest potential for supporting large, flourishing populations (Rieman and McIntyre 1993).

Detailed discussions of general bull trout biology and life history can be found in Rieman and McIntyre (1993) and the State of Idaho's Conservation Plan (Batt 1996). Specific to the Boise River Basin, bull trout have been reported throughout the subbasin and exhibit both the migratory and resident life history forms. To date, there have been no published detailed life history studies on bull trout in the Boise River Basin. However, there is an ongoing project by the Idaho Department of Fish and Game and Bureau of Reclamation in the Middle Fork Boise River and North Fork Upper Boise River watersheds complex. Preliminary information is available regarding this study. Bull trout have had the capability to colonize all tributaries of the subbasin that do not contain impassable barriers.

In almost all situations, bull trout were sympatric (coexisted) with anadromous fish species and were the predominant species group. In the absence of anadromous fish, bull trout have adapted to a fluvial/adfluvial existence.

Findings of federal and state biologists indicate most local populations of bull trout are strongly influenced by the resident form but the migratory form is important. Migratory forms have been documented in two subbasin complexes. The first complex consists of Arrowrock Reservoir and the North Fork Boise River, Middle Fork Boise River, and lower South Fork Boise River. The second complex consists of Anderson Ranch Reservoir and the upper South Fork Boise River. It is notable that migratory forms were historically fluvial in nature but apparently have adapted to an adfluvial lifestyle following construction of both Arrowrock (1915) and Anderson Ranch (1950) dams. Adult bull trout captured in the early spring in Arrowrock Reservoir have attained 28 inches (700 mm) in length (Brian Flatter, IDFG, personal communication).

Based on the IDFG-BOR research, upstream migration by adult bull trout out of Arrowrock Reservoir begins in early April through early July. These fish enter spawning streams in the Middle and North Forks of the Boise River in late July or August. Spawning commences in September and October when water temperatures decrease below 10^{o} C. Following spawning, adults reenter the main stems and migrate downstream to winter in Arrowrock Reservoir.

Bull trout have patchy distribution within the watersheds of the Boise River Basin. While bull trout distributions are probably influenced by habitat loss, dams, diversions, and exotic species, juvenile bull trout also appear to be naturally restricted to cold stream temperature conditions (Rieman and McIntyre 1993).

Following the logic of Rieman and McIntyre (1995), suitable bull trout habitat was defined based on the observed relationship of fish distribution with elevation and watershed area. For discussion in this subbasin assessment, 5,000 feet (1,524 meters) elevation is used as those necessary criteria for the first three life-history stages. Criteria for life history stages four and five (sub-adult migration/post-spawning maintenance) have not yet been developed.

Amphibians

Amphibians known or suspected to inhabit this subbasin include the tailed frog (*Ascaphus truei*), northern leopard frog (*Rana pipiens*), western toad (*Bufo boreas*), pacific chorus frog (*Pseudacris regilla*), spotted frog (*Rana pretiosa*), and long-toed salamander (*Ambystoma macrodactylum*). Tailed frogs are present and abundant in many streams within the subbasin. Tadpoles of this species are an important food source for bull trout. Tailed frog tadpoles may grow several years in streams before transforming to adults. The young of other amphibian species may also be a food source for fish.

Sub-watershed and Stream Characteristics

Habitat condition and trend information is needed to assess aquatic life in Upper Boise River subbasin. Habitat variables include, a) channel and hydrologic stability, b) substrate size and relative composition, c) temperature and related variables, d) and barriers to migration. Two unpublished Forest Service reports contain habitat information from the upper Middle Fork Boise River and several tributaries (Burton 1996; Burton 1997). An analysis of the Upper South Fork Boise River was recently completed by the Mountain Home Ranger District (Corley, 1997)

Channel and Hydrologic Stability

Generally, many factors influence channel and hydrologic stability. Boise River Basin subbasin has experienced significant fine sediment inputs, hydrologic modification, and catastrophic wild fire at rates more than natural.

Land uses effecting channel and hydrologic stability include but are not limited to road building, mining, logging, livestock grazing, recreation, and urban development. When the rate of delivery of fine sediment is accelerated, the hydrologic system adjusts accordingly. Results include the filling of pools or other depositional zones, development of sand bars, braiding, and channel scour and simplification. An unstable stream channel is detrimental to aquatic life. Living spaces are filled, spawning areas may be moved or covered by fine sediments, or pool water depth declines.

Logging and road building can increase runoff to rivers and streams. Intensive logging, in certain instances, can affect water transpiration rates, and can change timing and total annual water yield. Roads and fire-hardened soils can result in more intensive runoff due to the abundance of impermeable road surfaces and hydrophobic soils. Large wildfires in high-density forest stands can result in severely unstable watershed conditions that affect water infiltration, soil stability, and vegetation communities.

Substrate Size and Relative Composition

Substrate, or the materials that make up the bed of a stream, is important to aquatic life. Sediment is categorized into different classes based on size, with the size class “fine sediment” being one of the smaller sizes. In the Upper Boise River subbasin fine sediment is described as particle sizes of less than or equal to 0.25 inches (6.4 millimeters) in diameter. Fine sediment is the most likely size to impair aquatic life. In the case of bull trout, preliminary assessment of data for sediment composition in focal and adjunct habitats of Upper Boise River subbasin, fine sediments comprise a greater proportion of substrate composition in adjunct (median value = 39%) versus focal (median value = 23%) habitats (Burton, 1997). The difference in fine sediment levels between focal and adjunct habitats was statistically significant (t-test, df = 120, P = 0.01). These

numbers are based on data provided by Boise National Forest aquatic surveys, and is limited to federally managed lands (Burton 1996a)

Although substrate composition is undoubtedly an important component of bull trout habitat, it remains difficult to predict how much particle changes in substrate will affect survival (Everest et al. 1987; Chapman 1988; Weaver and Fraley 1991). Some streams are more likely to accumulate fines than others, and some fish populations probably are more sensitive than others. In the absence of detailed local information on population and habitat dynamics, any increase in the proportion of fines in substrates should be considered a risk to the productivity of an environment and to the persistence of associated aquatic life.

High levels of fine sediment can reduce embryo survival by: 1) decreasing gravel permeability (therefore dissolved oxygen availability), 2) slowing rate of metabolic waste flushing, and 3) interfering with emergence by filling interstitial space through which the fry emerge (Weaver and Fraley 1991).

For this reason analysis was performed for this subbasin assessment to try to identify, those areas in appropriate bull trout habitat were fines were high. Thirteen waterbodies were found to have high average fines, and suppressed bull trout populations. The results from this additional investigation are reflected in water quality status calls and may be found in the water quality section.

Temperature and Related Variables

The one piece of habitat-related information that is sparse is temperature data. There are some temperature logger information available for main stems and incidental data collected during fisheries management activities. At the time of this sub-basin assessment, these temperature data have not been compared to Idaho Water Quality standards temperature criteria, or bull trout specific temperature criteria. DEQ intends to complete analysis of this temperature data by the end of March 2001, the subbasin assessment will be updated, if needed, to reflect these data.

Holistic subbasin analysis conclusions regarding this subbasin assessment may be misleading by the fact that existing competent temperature data has not been included.

Cultural Characteristics

Land Use and Ownership

The Boise River basin subbasin is of mixed ownership, see Figure T8. A majority of the land within the subbasin is managed by federal agencies. Percentage land ownership and acreage information is presented in the following table.

- Table 2. Land Management in Upper Boise River Subbasin

Managerial Responsibility	Acres	Percent of Total
Private	40,403	3.1
Forest Service	1,218,230	93.7

Managerial Responsibility	Acres	Percent of Total
Bureau of Land Mngt.	21,262	1.6
State	14,471	1.1
Tribal	0	0
Bureau of Reclamation	6,579	0.5
Total	1,300,945	100

There are 7 major land uses within the Upper Boise River subbasin. Each is described in the following sections.

Forestry

Ponderosa pine and Douglas fir stands occur over a large portion of the Upper Boise River Subbasin. Historically, Ponderosa pine stands were dominant and evolved with frequent, low intensity wildfires. Years of fire suppression and forest management have resulted in a higher density of stands containing Douglas fir and Ponderosa pine in portions of the Upper Boise River subbasin. With the lack of fire and high density stands, moderate to high intensity fires have occurred. Such fires have occurred extensively within the North Fork Boise River and Lower South Fork of the Boise River in the past decade.

> Risks associated with active management may out-weigh risks associated with large fires. Working strategically in certain watersheds, it is possible to establish mosaics of fuel and forest conditions that reduce the risk of extremely large fires without the intensive treatment of every watershed. (Reiman et al. 1997)

Because of the fires, insect attacks, and nearby timber markets, the Upper Boise River subbasin have had a high number of forest practices applied. Forest practices include reforestation, harvesting, road building and other practices associated with the harvest or improvement of forest tree species.

Pollutants such as sediment, dissolved chemicals and increased water temperature, which are associated with forest practices could threaten the persistence of aquatic life. These same pollutants also occur in any disruption of the natural ecosystem.

Roads

The development of road systems on the public and private lands of the Upper Boise River subbasin provide the transportation network that facilitated logging, mining, livestock grazing, other land management activities, and supported recreation access for the public. It is well documented that water quality may be affected by the number and location of forest roads in watersheds and the manner in which they are constructed and maintained (EPA et al. 1975). Sediment is typically identified as the most significant pollutant resulting from logging, specifically roads. Sediments are produced from forest lands by surface erosion, mass soil movement, and channel erosion. Logging road activities may influence all of these and accelerate the surface erosion and mass soil movement (EPA et al. 1975). Unfortunately, when most road prisms were pioneered in the Upper Boise River subbasin, little care or attention was given to potential environmental effects.

Based on available information, it appears that past road construction on timberlands of the Boise National Forest has negatively affected bull trout populations. Generally, those sub-watersheds with the highest road densities are areas where bull trout no longer exist

(existing adjunct habitats). Road densities in the Upper Boise River subbasin range from 0 to 4 miles/mi^2. Figure T7 depicts road location within the subbasin. Some sub-watersheds with high road densities include Crooked River, Beaver Creek, and the Feather River.

> Road construction causes the most severe disturbance to soils on slopes, far overshadowing fire and logging as a cause of accelerated erosion (Rieman and Clayton 1997).

> Roads contribute more sediment to streams than any other land management activity (Meehan 1991).

> Roads can affect water quality through applied road chemicals and toxic spills (from Lee et al. 1997 in Quigley and Arbelbide 1997; Furniss et al. 1991; Rhodes et al. 1994).

> Roads directly affect natural sediment and hydrologic regimes by altering stream flow, sediment loading, sediment transport and deposition, channel morphology, channel stability, substrate composition, stream temperatures, water quality, and riparian conditions within a watershed (Lee et al. 1997).

> Poor road location, concentration of surface and sub-surface water by cross slope roads, inadequate road maintenance, undersized culverts, and side cast materials can all lead to road-related mass movements (Lyons and Beschta 1983; Swanston 1971; Swanston and Swanson 1976; Wolf 1982; cited from Lee et al. 1997).

Unfortunately, roads have also allowed access for fishing with possible over exploitation of bull trout stocks, and has allowed access for introducing non-native fish species.

Mining

Historical mining has affected a significant portion of the habitat of the Upper Boise River subbasin. Dredge mining (commercial bucket) occurred on many sections of the Middle Fork Boise River, South Fork Boise River and North Fork Boise River. Much of the flood plain in these areas have been over-turned and remain as tall piles of cobbles, and dredge pools. In bucket dredge mining a barge carrying excavating and processing equipment is floated up the stream. The barge (dredge) works its way from bank to bank dislodging all the material that it can reach. The dredge processes the materials, then dumps the waste in piles behind it. These piles of waste, and stagnant pools resulting from dredging, can still be seen in some areas. Bucket dredge mining has not been performed in decades and will probably never be performed in Idaho again.

Lode and other forms of placer mining have also occurred. There are a few areas of older river gravels that form terraces high above the present river flood plain. Many of these high gravels, and the active river gravels, have been placer mined. Most of the historic mining occurred on the South Fork Boise River, in Atlanta, Idaho City, and the Featherville-Rocky Bar areas. Some mining activity occured along the North Fork Boise River and a few tributaries, but more occurred on the upper sections of the South Fork Boise River and Middle Fork Boise River.

Currently the largest mining district within the subbasin is the Atlanta District. Large dredge piles of cobbles downstream, large dumps and tailings areas identify Atlanta as a major producer. Historic production is estimated at approximately 400,000 ounces of gold. The Atlanta Lode consisted largely of quartz with arsenopyrite and gold, a common association, with pyrite. Arsenopyrite is an iron-arsenic-sulfide. Other old mines in the subbasin include an antimony mine near Swanholm Peak. There are also small gold and silver-base metal mines up Black Warrior Creek, Little Queens River and several other tributaries. The gold-bearing quartz veins at Rocky Bar are upstream of Anderson Ranch Dam, but the deposits generated large placer deposits which are evident near Featherville. Commercial mining is still viable in these areas with the Atlanta Lode the most likely to be re-activated.

Recreational mining is also occurring in the Upper Boise River subbasin. Small suction dredges still work claims along the upper sections of the Middle Fork Boise. Suction dredges are motorized aquatic vacuum cleaners that suck gravel from the riverbed, pass it over a sluice and then re-deposit it back into the river channel near where it was removed. Operators are regulated by permits and rules issued by Idaho Department of Water Resources. Mineralized material has been eroding into the streams of the subbasin for several million years and make this area prime for recreational mining. Recreational mining with a small suction dredge may damage fish redds and spawning areas.

“It would be speculative to evaluate the effects mining may have had on the aquatic species within the Upper Boise River Subbasin. No pre-mining conditions have been monitored, and actual account of management activities do not exist. We know that historic mining, unlike current mining practices, proceeded unchecked, and most likely caused major modifications to Upper Boise River Subbasin’s ecology. Most mining in the subbasin occurred prior to Idaho Water Quality Standards and the Clean Water Act. Idaho DEQ believes that the bioaccumulation of metals in fish tissues would be the primary indicator of widespread metals pollution and therefore warrant widespread metals monitoring. Bioaccumulation is what happens when organisms lower on the food chain incorporate metals into their systems, and when moving up the food chain, higher forms concentrate these metals, leaving top predators with the highest concentration. Recent fish tissue 1997/1998 monitoring in Middle Fork Boise River has not revealed metals bioaccumulation, and has not spurred DEQ into additional monitoring. Other mining related secondary pollutants have been evaluated within the BURP monitoring.”

Agriculture/Livestock

The three agricultural uses in the Upper Boise River subbasin are water storage, crop production and grazing. All of these agricultural uses are economically important.

Arrowrock Reservoir and Anderson Ranch Reservoir store water used for irrigation of agricultural lands in the lower Boise River watershed. These reservoirs are also currently being used for recreation, flood control, and habitat for aquatic species. As a result of blocking the river with these dams, some fish have adapted from a fluvial to adfluvial nature. The adult and sub-adult bull trout use these reservoirs as wintering areas. Threats involving the reservoirs and the preservation of bull trout could exist if a reservoir were permitted to completely drain.

There is also crop production agricultural use in Upper Boise River subbasin. Crop production (hay and grain) is limited to small areas in the South Fork Boise River watershed. Crop production also only occurs on private ground. Generally crop production has the potential to modify hydrologic systems, accelerate sedimentation, and introduce agriculture chemicals.

The final agricultural use in the Upper Boise River subbasin is grazing. There is grazing on private, state, and federal ownerships. Monitoring of grazing forage, and riparian habitat in Upper Boise River subbasin has been limited.

> Research has shown "generally streams in grazed areas contain more fine sediment, stream banks are more unstable, banks are less under-cut, and summer water temperatures are higher than those of un-grazed streams" (Armour 1997, Behnke and Zarn 1976).

> Grazing studies comparing sheep and cattle grazing have shown that cattle grazing frequently do more damage to the riparian area and fishery habitat than sheep grazing (May and Somes 1980).

Livestock grazing has occured in the South Fork Boise River drainage for more than 100 years with a wide range of both grazing intensities and impacts to the fishery resource. In the last 20 years the majority of the area has been grazed by sheep with only about 10 percent of the total area grazed by cattle (Image I5). Federal cattle allotments are located on the southwestern part of the drainage and sheep allotments generally on the remainder of the federal ownership. Some cattle are also grazed on private property with higher utilization in the Deer Creek and Grouse Creek areas. Generally, the impacts from sheep grazing have been moderate to light. Cattle are having some impacts to streams in the Fall Creek and Little Smokey drainages.

> The overall quality of aquatic habitat was visibly much better in sheep-grazed areas, than areas grazed by cattle. Riparian vegetation was more abundant and of higher quality in the sheep use area (Corley 1997).

Fire

Severe drought and fire occurred in the Upper Boise River subbasin during the past decade. High intensity wildfires, especially those in the North Fork Boise River and Lower South Fork Boise River, have burned to a greater extent than in the past. Approximately 30 percent of the sub-watersheds (5^{th} field HUCs) in the Upper Boise River subbasin have had a portion burned in the past five years. These large, high-intensity fires may have damaged the forest ecosystems, and possibly the condition of fisheries habitats for many years to come. Monitoring by the Boise National Forest suggest that in some areas, severe post-fire flooding had dramatic, short-term effects on critical fish habitat variables of both small and large streams. A general conclusion is that large fires can, in the short term, result in substantial mortality and even local extinctions (Rieman and Clayton 1997). Small streams were heavily scoured and had much lower habitat diversity and structural complexity. Large streams were heavily aggraded by sedimentation from the tributary

debris floods. This aggradation and deposition of sediments actually increased habitat complexity and diversity in the large rivers, but also increased the levels of substrate fines and embeddedness. Native fish abundance declined after the debris floods of 1995. Declines were proportional to the severity of habitat alterations, with post-flooding abundances near zero at heavily impacted stream segments.

Large fires can produce dramatic alterations in fish habitat and possibly even local extinctions (Rieman and Clayton 1997).

Obviously, healthy forests are important to aquatic ecosystems and there is a need to restore the natural structure and composition of degraded forests. However, researchers also admit that management to effect such restoration is largely experimental at this point in time (Rieman and Clayton, 1997). Of particular concern are the road systems typically associated with timber harvesting. The risk to native fishes from road effects may be greater than those from fire.

Intensive forest management to restore degraded conditions should be applied where watersheds are already developed and aquatic conditions are coincidentally degraded (Rieman and Clayton, 1997).

The forest conditions that made the basin more susceptible to increased fire sizes and intensities are a result of shifts in forest density and composition. After many years of fire suppression, fire-resistant ponderosa pine stands have gradually been replaced by far more dense stands of mixed ponderosa pine and Douglas fir. Unlike ponderosa pine, Douglas fir is not a fire-resistant species. The result is forest conditions that are unable to resist high fire intensities, especially during drought. The fuel loads and stand structures are such that flame lengths often carry into the crowns of the trees resulting in very large, stand-replacement fires.

Where forest ecosystems are most at risk of experiencing these intense wildfires, the threat to at-risk native fish (i.e. bull trout) at least in the near-term is very real. Threats are greatest in the Crooked River drainage (Beaver, Edna, Pikes, Upper Crooked River, and Lower Crooked River sub-watersheds), the South Fork Boise River drainage above Anderson Ranch Reservoir (Fall, Grouse, Dog, and Wagontown sub-watersheds), and portions of the Middle Fork Boise River drainage (Black Warrior and Lost Man sub-watersheds).

Trail Creek Fire, Summer 2000

During the development of this subbasin assessment a large wildfire was in progress in the Upper Middle Fork Boise River area. The Trail Creek Fire burned over 33,000 acres near Atlanta. The fire burned at moderate and high severity over approximately 13,300 acres and created an increased potential for debris flows/torrents into the town of Atlanta. All of the data used in this assessment was collected prior to the Trail Creek Fire. Assessments do not reflect Trail Creek Fire related threats.

Several abandoned mine sites with potentially hazardous tailing ponds could be at risk to flood events. Should these mine waste sites be impacted by a flood event, hazardous materials could be transported into the Middle Fork Boise River. There are two distinct areas of concern affected by this fire, the Yuba River and those tributaries draining into

Atlanta. The tributaries, Quartz Gulch and Montezuma Creek, encompass about four square miles.

Urban Encroachment

The Upper Boise River watersheds are predominantly uninhabited. There are several small communities (Pine, Atlanta, Rocky Bar, and Featherville) undergoing growth. Featherville and surrounding area is undergoing fastest growth, largely due to recreational development. Almost all of the private lands (99%) in the Upper Boise River watersheds are found in the Lower South Fork Boise River area (92%) and the Upper South Fork Boise River area (7%).

There have been no documented impacts to aquatic life as a result of urban encroachment in the Upper Boise River watersheds. Generally the major impacts to aquatic life would result from development (building) on the flood plain. Levees and channelized streams prevent streams from dissipating hydrologic energy and relocating sediment. Other concerns include the loss of vegetation, road construction and culverts, flow alteration, household chemical use, and very seldomly septic systems seepage. While there have been no documented impacts to date that would threaten aquatic life, there remains the potential for threats if increasing human development continues to encroach on important habitats

Recreation

North Fork Boise River Key Watershed

Recreation is a primary use of the North Fork Boise River drainage and includes hunting, fishing, camping, off-highway motorized vehicles, rafting, kayaking, and hiking. None of these uses is thought to have significant landscape level effects on habitat. There may be some minor localized effects of disbursed recreation on stream banks and riparian vegetation, primarily along the mainstem North Fork. Recreation impacts, especially fishing, may be a limiting factor for sensitive aquatic life. For example: noncompliance with the existing “no harvest” regulations for bull trout could be an issue.

Parts of the North Fork Boise River Basin are “State Protected Rivers” and recreational dredge mining is prohibited. The entire North Fork Boise River drainage is closed to recreational dredge mining under the Idaho Department of Water Resource’s “One Stop” Permit Program. Recently, state and federal resource agencies have worked with several individual mine claimants in the Crooked River and permitted recreational dredging with conditions to protect fish habitat.

Middle Fork Boise River (Including Lower South Fork Boise River)

There is a special regulation trout fishery on the Middle Fork Boise River from Atlanta Dam downstream to the confluence with the North Fork. This regulation was started in 1990. About 9,300 angler hours were estimated from a three month creel survey done in 1995 (Allen et al., in press). This is regarded as being relatively light fishing pressure and incidental catch (and release) of bull trout does occur. Bull trout accounted for an estimated 0.45 percentage (n »35) of the total fish caught in the 1995 survey.

The lower South Fork Boise River has been managed as a special regulation trout fishery since the late 1970's and has received national attention with anglers. It is a very popular fishery and receives significant angler pressure since it is now open to some species on a year-round basis. Creel surveys conducted by the IDFG on the lower South Fork since the early 1960's have consistently documented that bull trout always comprise a minor portion (< 1-2 %) of the total angler catch (published and unpublished IDFG reports and files). Total catch includes fish harvested and those caught and released.

Recreational suction dredge mining is not permitted in the lower South Fork Boise River drainage from Arrowrock Reservoir to Anderson Ranch Dam. Recreational dredge mining is permitted in the Middle Fork mainstem from the confluence with Roaring River upstream to the Sawtooth National Recreation Area boundary below Leggitt Creek. The season on the mainstem is open under the Department of Water Resource's One-Stop permit system from July 1 through October 31. However, because the entire river bottom is under mining claims upstream of Roaring River, there is little general public participation in this season unless permission is granted by claimants. There is one commercial dredge miner who has operated the past several seasons in the vicinity of Lost Man Creek and he has been very cooperative in working with agencies regarding protection of bull trout habitat.

All tributaries to the Middle Fork below the Sawtooth National Recreation Area (SNRA) boundary, except the Queens River, are open to recreational dredge mining from July 1 through October 31. Again, most are under claim so general public participation is estimated as minimal. While the entire Queens River drainage is closed under the One-Stop permit system, state and federal agencies have permitted prospecting to those individuals with mining claims. Conditions are placed on permits to protect fish habitat.

The Forest Service has documented dredge mining activities, and past-related adverse effects, in the Yuba River and Black Warrior Creek (USFS, unpublished report). Since the unpublished report Boise Regional Office DEQ has monitored Black Warrior Creek and Yuba River and has found their status to be in the "Full Support" assessment category.

South Fork Boise River (Above Anderson Ranch Reservoir)

Recreational development within the South Fork Boise River watershed is focused on Anderson Ranch Reservoir and the main river corridor upstream. Popularity of the area has lead to an influx of "weekend" residences within the Pine-Featherville area and development of numerous recreational sites, most of which are managed by the USFS. Residences have also flourished on small parcels of private property along Big Smokey Creek and on the upper South Fork Boise River within the platted Royal Elk Subdivision. Urban encroachment on wetlands, floodplains, and riparian areas are beginning to impact water quality and river hydrology. An overflow of recreationalists into non-developed sites has lead to impacts on riparian vegetation and streambank stability in isolated locations.

As previously stated, fishing is a popular recreational pursuit within the watershed. Incidental angler counts indicate fishing pressure is moderate during most of the summer with increased angling pressure on weekends and holidays. Special regulations apply from Beaver Creek to the mouth of Big Smokey Creek, which are designed to protect wild fish populations and provide a quality fishing experience for anglers. Terminal gear of artificial flies and lures only with one single barbless hook is designed to minimize hooking mortality on bull trout and fish less than 14" (355 mm) which are required to be released.

Recreational suction dredge activity is closed under Idaho Department of Water Resource's (IDWR) One-Stop Permit from Barker Gulch upstream within the South Fork Boise River watershed. This includes all tributaries. Currently, there are several pending applications to use suction dredges to mine parts of Little Smokey Creek (identified bull trout spawning and juvenile rearing habitat) on patented mining claims. USFS, Corps of Engineers, and IDWR are in the initial stages of permitting, at the present time.

Barriers to Migration

Barriers to migration affect many forms of aquatic life and influence beneficial uses status. The effect of barriers are partially known for bull trout which follows. The effects of barriers on other fishes needs additional research.

There are several types of barriers to migration of bull trout (adults and juvenile) in Upper Boise River subbasin including dams, culverts, severely degraded nodal habitats, and natural barriers like waterfalls. The Upper Boise River subbasin has two major dams that block upstream migration and isolate populations. These are Arrowrock Reservoir Dam on the lower Boise River and Anderson Ranch Dam on the South Fork Boise River. While the reservoirs provide substantial benefits to recreation and agriculture, they pose some definite problems for adfluvial species. Recently (August 1999) a minor dam, Kirby Dam (Image I6) on the upper Middle Fork Boise River near Atlanta, has been outfitted with a fish ladder (Image I7) to provide fish passage.

Culverts may be a less visible but very significant form of migration barrier in this subbasin (Image I8). Problem culverts typically pose velocity barriers to adult and juvenile fish movement but sometimes perched culverts provide an impassable jump. The Boise National Forest has developed a model for evaluating culverts for salmonids. This model may be a useful tool to assess the potential for individual culverts to be migration barriers for fish (adult and juvenile) movement.

Natural migration barriers also exist and include primarily waterfalls. An example is a recently documented waterfall on Fall Creek located in the lower South Fork Boise River (Image I9).

Water management, for irrigation, of lower Smith Creek has caused the Smith Creek watershed to become isolated from the South Fork Boise River. Although Smith Creek may been periodically isolated under natural conditions because of the abrupt gradient between lower Smith Creek and the South Fork Boise River, long term persistence of aquatic species rely on genetic interchange which is not occurring in Smith Creek.

Water Quality Concerns and Status

For the majority of the Upper Boise River subbasin water quality is very high. If compared to any of the country's other states' watersheds of this size, the upper Boise Rivers would be considered pristine, and have sought after conditions.

In few select areas aquatic populations have been reduced in strength by excess fine sediment. Elevated fine sediment deposition in streams can adversely affect native trout by filling pools and other depositional habitats. This reduces living space for fish including hiding, security, and winter cover. Sediment deposition can reduce egg survival in gravels through smothering of eggs due to lack of oxygen, or by entrapment of pre-emergent alevins (young fish with eggs sacks) in the substrate. Fine sediment can also affect the composition and production of the aquatic insect community, which is an important food source for juvenile bull trout and other fishes, which in turn are important prey items for adult fish.

In other limited areas of the basin, aquatic life may be threatened by elevated levels of metals or hydrologic modification associated with historic mining activities.

On those stream segments where a beneficial use is not fully supported and have been placed on the 303(d) list in accordance with the federal Clean Water Act, a Total Maximum Daily Load (TMDL) will be completed by the Department of Environmental Quality.

On those stream segments where problems other than water quality are identified, or on segments where water quality is a threat but the stream is not on the current §303(d) list,

solutions may be designed outside the TMDL process. Existing, or additional Watershed Advisory Groups, may be utilized, or formed as necessary for implementation of protection measures in these watersheds.

Water Quality Limited Segments Occurring in the Subbasin

In 1994, and following in 1998, ten waterbodies within the Upper Boise River Basin were classified as "water quality limited" under Section (§) 303(d) of the Clean Water Act. Waterbody identification numbers, stream segment numbers, size and listing year, may be found in Appendix T3 "303(d) Information for Idaho". Additional information can be found in Appendix T12 "General Report of 303(d) Waterbody Segment Data" regarding waterbody description, location, general assessment information, and use support calls. Analysis conducted for this subbasin assessment has determined that each of these ten waterbodies are "Fully Supporting" their designated and existing beneficial uses.

In 1998, an additional waterbody was added to the §303(d) list. According to the 1998 303(d) List (DEQ, 1998) this added waterbody is scheduled for TMDL loading analysis in 2006. Analysis conducted for this subbasin assessment has also determined that this waterbody is in the "Fully Supporting but Threatened" assessment for cold water biota beneficial use.

During the next round of §303(d) development, the currently listed §303(d) waterbodies should be replaced by those identified in this subbasin assessment as those "Not Supporting" beneficial uses.

It is DEQ's, and the new TMDL regulations, positions that habitat, flow alteration, and exotic species, while they may adversely affect beneficial uses, are not pollutants under Section 303(d) of the CWA, and therefore, TMDLs will not be developed to address habitat, flow alterations, and exotic species as pollutants.

Applicable Water Quality Standards

Beneficial Uses

Surface waters in Idaho are protected by a set of rules established in Water Quality Standards and Wastewater Treatment Requirements, which are part of the Administrative Rules of the Department of Department of Environmental Quality, Volume 58, Title 01, Chapter 02 (DEQ). These rules protect "beneficial uses" of the surface waters of the state. Beneficial uses are established in IDAPA 58.01.02.100 (DEQ) and described in the following sections.

For the purpose of this subbasin assessment; Cold Water Biota, Salmonid Spawning, Domestic Water Supply and both Primary and Secondary Contact beneficial uses were the only uses evaluated. Other uses, although important, lack criteria more stringent than above mentioned. In addition, other uses would reasonably not be expected to be impaired within this subbasin. Designated beneficial uses for many Idaho water bodies are listed in the Water Quality Standards. Existing beneficial uses are those uses that existed on or after November 28, 1975, the effective date of the CWA. Designated uses and/or existing uses have been assigned to each waterbody within the subbasin. This has been accomplished using information collected from Idaho Water Quality Standards, BURP monitoring, Boise National Forest monitoring, Boise National Forest recreational sites and their classification, and author's personal knowledge. The sources for each waterbodies uses can be found in appendix T5.

Water Supply

Waters which are suitable or intended to be made suitable for:

- Agricultural - crop irrigation and water for livestock,
- Domestic - drinking water,
- Industrial - water for industrial purposes.

Aquatic Life

Waters which are suitable or intended to be made suitable for the protection and maintenance of viable communities of aquatic organisms and populations of significant aquatic species as follows:

- Cold water biota - optimal growing temperatures below 18°C (64°F),
- Warm water biota - optimal growing temperatures above 18°C (64°F),
- Salmonid spawning - which provide or could provide habitat for active, self-propagating populations of salmonid fishes.

Recreation

Waters are those which are suitable or intended to be made suitable for:

- Primary contact recreation - prolonged and intimate contact by humans or for recreational activities when the ingestion of small quantities of water is likely to occur. Such activities include, but are not restricted to, those used for swimming, water skiing, or skin diving,
- Secondary contact recreation - recreational uses on or about the water and which are not included in the primary contact category. These activities may include fishing, boating, wading, infrequent swimming, and other activities where ingestion of raw water is not likely to occur

Other

- Wildlife Habitat; these include waters which are suitable or intended to be made suitable for wildlife habitats. This beneficial use is inadequately defined, lacks numeric or narrative criteria, and has not been applied to specific water bodies in Idaho.
- Aesthetics; This beneficial use is inadequately defined, lacks numeric or narrative criteria, and has been applied to all surface waters of the state.
- Special Resource Waters; Those specific segments or bodies of water which are recognized as needing intensive protection: to preserve outstanding or unique characteristics; or to maintain current beneficial use.

Criteria for Protecting Beneficial Uses

Beneficial uses are protected by criteria, for which the state of Idaho has two kinds, narrative and numeric. Narrative criteria is described as criteria which protects when amounts of pollutant, usually sediment or nutrients, are at levels that impair beneficial uses. Numeric criteria are those criteria which protects when specific, quantifiable amounts of pollutants (fecal coliform bacteria, chlorine, dissolved gas, ammonia, temperature or turbidity), and non pollutants (dissolved oxygen, pH) exceed numeric thresholds. Numeric criteria for those water quality parameters that would be applicable (potential violation of Standards) in the Upper Boise River subbasin are listed in the following table.

- Table 3. Selected Criteria Supportive of Designated Uses in Idaho Water Quality Standards (IDAPA 58.01.02.250) (DEQ) Prior to Year 2000.

Primary Contact Recreation	Secondary Contact Recreation	Cold Water Biota	Salmonid Spawning*
• 500 FC/100 ml any time; and • 200 FC/100 ml in 10% of • samples over 30 days; and • Geometric mean of • 50 FC/100 ml of five • samples over 30 days.	• 800 FC/100 ml any time; and • 400 FC/100 ml in 10% of • samples over 30 days; and • Geometric mean of • 200 FC/100 ml of five • samples over 30 days.	• pH between 6.5 and 9.5 • DO exceeds 6.0 mg/L • 22°C (72°F) or less daily maximum with a maximum daily average no greater than 19°C (66°F) • turbidity shall not exceed background by more than 50 NTU instantaneous or more than 25 NTU for more than 10 consecutive days.	• pH between 6.5 and 9.5. • DO exceeds 6.0 mg/L in water column • DO exceeds 5.0 mg/L intergravel • Bull trout: daily average of 12°C or less during June, July & August for rearing; and daily average of 9°C or less during September & October for spawning.

* during spawning and incubation period for inhabiting species

Some important year 2000 revisions, that may pertain to waters within the subbasin have been included in Table 4. Note that *E. coli* bacteria has been substituted for Fecal Coliform bacteria as an indicator for pathogens when determining support for primary or secondary contact recreation. There are also some changes in temperature criteria effecting cold water biota, salmonid spawning, and bull trout waters. Year 2000 changes includes a natural conditions temperature exemption clause, and there has been the addition of a "Seasonal Cold Water" aquatic life use designation

EPA has also established bull trout temperature criteria for some of the streams in the upper Boise River subbasin. EPA has listed specific streams for which the bull trout temperature criteria must apply (40 CFR Part 131). This EPA developed criteria is also shown in following table.

- Table 4. Selected Criteria Supportive of Designated Beneficial Uses in Idaho Water Quality Standards (IDAPA 58.02.01.250) (DEQ) Year 2000 Revisions

Primary Contact Recreation	Secondary Contact Recreation	Cold Water Biota	Salmonid Spawning*
• 406 E. Coli/100 ml any time; or Geometric mean of 126 E. Coli/100 ml of five samples over 30 days.	• 576 E. Coli/100 ml any time; or Geometric mean of 126 E. Coli/100 ml of five samples over 30 days.	• Seasonal Cold Water – IDAPA 58.01.02.250.03. Between summer solstice – autumn equinox: 27°C or less daily maximum, daily average of 24°C or less.	• 7 day moving average of 10°C or less maximum daily temperature for June, July, August, and September for bull trout rearing and spawning. **

Primary Contact Recreation	Secondary Contact Recreation	Cold Water Biota	Salmonid Spawning*
		• Temperature Exemption – IDAPA 58.01.02.80.04. Exceeding the temperature criteria in Section 250 will not be considered a water quality standard violation when the air temperature exceeds the ninetieth percentile of the seven day average daily maximum air temperature calculated in yearly series over the historic record measured at the nearest weather reporting station.	

* during spawning and incubation periods for inhabiting species.
** EPA Bull Trout Temperature Criteria: Water Quality Standards for Idaho, 40 CFR Part 131.

Narrative criteria for sediment (IDAPA 58.01.02.200.08) (DEQ) states that: "Sediment shall not exceed quantities specified in section 250 or, in the absence of specific sediment criteria, quantities which impair designated beneficial uses. Determinations of impairment shall be based on water quality monitoring and surveillance and the information utilized as described in Subsection 350.02.b."

The toxics criteria which the state has adopted to protect aquatic life that are relevant in Upper Boise River subbasin are Arsenic, Copper, Lead, Mercury, and Zinc. These criterion can be found in following table.

• Table 5. Aquatic Life Criteria for Toxic Substances (ìg/L)

Compound	CMC (Acute) – B1	CCC (Chronic) – B2	Human Health – D2
Arsenic †	(1.0)360	(1.0)190	6.2
Copper †	$(0.96)e^{(0.9422(\ln H)-1.464)}$	$(0.96)e^{(0.8545(\ln H)-1.465)}$	
Lead †	$(0.791‡)e^{(1.273(\ln H)-1.46)}$	$(0.791‡)e^{(1.273(\ln H)-4.705)}$	
Mercury †	(0.85)2.4	0.012	0.15
Zinc †	$(0.978)e^{(0.8473(\ln H)+0.8604)}$	$(0.986)e^{(0.8473(\ln H)+0.7614)}$	

Equivalent to 40 CFR 131.36(b)(1), Columns B1, B2 and D2 adopted December 22, 1992 as modified by Section 250.07 of then IDAPA 16.01.02 Water Quality Standards and Wastewater Treatment Requirements.
† Aquatic live metals criteria (columns B1 and B2) are expressed as dissolved concentrations. Conversion factors are in parentheses
‡ Conversion factors for lead are hardness dependent. Value shown represents a hardness of 100 mg/L as CaCo3. Hardness equations for conversion factors are as follows: Lead – Acute and Chronic: CF=1.46203-[(ln hardness)(0.145712)]

Although not considered an issue in the upper Boise River subbasin, narrative criteria for excess nutrients (IDAPA 58.01.02.200.06) (DEQ) states: "Surface waters of the state shall be free from excess nutrients that can cause visible slime growths or other aquatic growths impairing designated beneficial uses."

Summary and Analysis of Existing Water Quality Data

Because of several Clean Water Act requirements, the Idaho Department of Environmental Quality (DEQ) has developed a stream assessment program that:
Measures and incorporates physical, chemical, and biological data;
Addresses base water quality and beneficial use questions; and
Produces an accurate assessment of the status of the state's waters.
The two major components that accomplish these tasks are the Beneficial Use Reconnaissance Project (BURP) and the Water Body Assessment Guidance (WBAG) Process. The primary goal of the two programs is to provide consistency in information collection, monitoring, and the analysis of data throughout the state.

Because of several Clean Water Act requirements DEQ has developed a stream assessment program that:

- Measures and incorporates physical, chemical, and biological data;
- Addresses basic water quality and beneficial use questions; and
- Produces an accurate assessment of the status of the state's waters.

The two major components that accomplish these tasks are the Beneficial Use Reconnaissance Project (BURP) and the Water Body Assessment Guidance (WBAG) process. DEQ predominantly relies on monitoring data generated by BURP program. This program was initiated in 1993, and aimed at integrating biological monitoring, chemical monitoring, and physical habitat assessment as a way of characterizing stream integrity and the quality of water. In addition, this program was developed in order to meet the Clean Water Act requirements of monitoring and assessing biology as well as developing biocriteria. BURP relies heavily upon protocols for monitoring physical habitat and macroinvertebrates and closely follows the Rapid Bioassessment Protocols for Use In Streams and Rivers developed by EPA (Plafkin et al. 1989). DEQ hires and administers summer field crews to collect BURP approved parameters. These data are extensively reviewed and placed in a database for making assessments. WBAG was developed by DEQ to be a non-arbitrary, objective guidance document for making waterbody assessments. This tool was to be used in answering basic water quality and beneficial use policy type waterbody assessment questions.

In the Upper Boise River Subbasin, 245 sites have been monitored since 1993 following the BURP outlined methods. The information collected from these sites is the basis for beneficial use status assessment calls reported in this subbasin assessment. Other information was also used, including 539 Boise National Forest Aquatic Survey sites. See Figure T6 for monitoring station locations.

- Table 6. 305(b) Upper Boise River Subbasin Atlas

Topic	Value
Subbasin population	330
Subbasin surface area	2,033 $mi.^2$
• Total miles of rivers and streams • Miles of perennial rivers/streams (subset) • Miles of intermittent (non-perennial) streams (subset) • Miles of ditches and canals (subset) • Border miles of shared rivers/streams (subset)	2,849 mi. 2,634 mi. 215 mi. 0 0
Number of lakes/reservoirs/ponds • Number of significant publicly owned lakes/reservoirs/ponds (subset)	2 0
Total acres of lakes/reservoirs/ponds	5,570 acres
Square miles of estuaries/harbors/bays	0
Miles of ocean coast	0
Miles of Great Lakes shore	0
Acres of freshwater wetlands	0
Acres of tidal wetlands	0

* based on 1990 census (Alan Porter, Dept. of Commerce, personal communication)

Water quality assessments were predominantly performed following the assessment process outlined in DEQ's Waterbody Assessment Guidance Document (DEQ 1996). Assessments were performed for each designated or existing beneficial use on each waterbody segment. Each assessment (392) has been stored in EPA's Assessment

database. Assessments made following other process or using best professional judgement have been documented as such.

The Assessment Database (ADB) is a relational database application for tracking water quality assessment data, including use attainment, and causes and sources of impairment. Because of the size of the subbasin and the need to track this information ADB was chosen. ADB assists storing data for thousands of miles and hundreds of waterbodies, and has the ability to integrate it into meaningful reports. The ADB is designed to make this process accurate, straightforward and user-friendly for all interested parties. Appendix T6, Appendix T7, and Appendix T8 summarize waterbody specific assessment information for each waterbody type. Appendix T4 is a key to the above appendices that explains the codes and abbreviations used.

Figures have been prepared that graphically depict the information contained in the aforementioned appendices. Figure T1 shows the status of Cold Water Biota beneficial use for the subbasin. All waterbodies in the Upper Boise River subbasin are either designated or have been determined to have Cold Water Biota to be an existing use. The following table lists those waterbodies that have conditions that fall into the "Not Fully Support" assessment category of the Cold Water Biota beneficial use.

- Table 7. Impaired Cold Water Biota Waterbodies

WBID_segment	Waterbody Name	Cause/Stressor	Source
17050111014_01	Crooked River Tributaries	Sediment Exotic Species*	Silviculture Logging Road Const./Main. Natural Sources
17050111014_02	Beaver Creek	Sediment Exotic Species*	Source Unknown
17050111015_00	Rabbit Creek	Cause Unknown	Source Unknown
17050111016_00	Meadow Creek	Sediment	Source Unknown
17050111017_00	French Creek	Sediment	Source Unknown
17050113007L_00	Little Camas Reservoir	Nutrients Algal Growth/Chlorophyll a*	Agriculture Grazing related Sources Range Grazing Construction Natural Sources

*This cause/stressor should not be considered a pollutant, and should no be the basis for any 303(d) listing or future TMDL development.

Figure T5 shows the status of Salmonid Spawning beneficial use for the subbasin. Note that not all of the waterbodies have been designated. Nor have been determined to have Salmonid Spawning as an existing use. DEQ suspects that all of the non-intermittent streams within the subbasin have and will support salmonid spawning. The following table lists those waterbodies that have conditions that fall into the "Not Fully Support" assessment category for the Salmonid Spawning beneficial use.

- Table 8. Impaired Salmonid Spawning Waterbodies

WBID_segment	Waterbody Name	Cause/Stressor	Source
None	None	None	None

*This cause/stressor should not be considered a pollutant, and should no be the basis for any 303(d) listing or future TMDL development.

Figure T2 shows the status of Domestic Water Supply beneficial use for the subbasin. Similarly to Salmonid Spawning, not all of the waterbodies have been designated or have existing Domestic Water Supply Use. The only surface water public water supply system

in the subbasin is located near Atlanta. The intake for this public water supply system is on the East Fork of Montezuma. The following table lists those waterbodies that fall into the "Not Fully Support" assessment category for the Domestic Water Supply beneficial use.

- Table 9. Impaired Domestic Water Supply Waterbodies

WBID_segment	Waterbody Name	Cause/Stressor	Source
None	None	None	None

Figure T3 and Figure T4 are related and show Primary Contact Recreation and Secondary Contact Recreation. Since a stream is either primary or secondary contact recreation the union of the two represents all waterbodies within the subbasin. There were no waterbodies that fall into the "Not Fully Support" assessment category for the Secondary Contact Recreation beneficial use. The following table lists those waterbodies that have conditions that do "Not Fully Support" Primary Contact Recreation beneficial use.

- Table 10. Impaired Primary Contact Recreation Waterbodies.

WBID_segment	Waterbody Name	Cause/Stressor	Source
None	None	None	None

More detailed assessment information may be obtained by contacting Boise Regional Office, DEQ at (208) 373-0550.

The following three tables summarize the extent of impairment of designated or existing use support. There is a separate table for each waterbody type. Waterbodies have been distinguished between assessments based on monitoring and assessments based on other information. "Evaluated Waters" are those waterbodies for which the use support decision is based on information other than current site-specific ambient data. In addition, if an assessment is based on older ambient data (e.g., older than five years), the assessment should also be considered "evaluated". "Monitored Waters", are those waterbodies for which the use support decision is principally based on current, site-specific, ambient monitoring data believed to accurately portray water quality conditions. Waters with data from biosurveys are included in this category. Waterbodies have not been assumed to be fully supporting by default. Data from a single monitoring station has not been used to generate a monitored assessment for an entire watershed. Rather a monitoring station has been considered representative of a waterbody for that distance upstream and/or downstream in which there are no significant influences to the waterbody that might tend to change water quality.

For this Subbasin Assessment, a "Not Attainable" status category waterbody is one that has naturally occurring physical characteristics that prevent the attainment of beneficial uses. Discussion regarding each "Not Attainable" waterbodies can be found in Unattainable Status Category Discussions (Appendix T9 and Appendix T10).

For this Subbasin Assessment a "Fully supporting but threatened" status category waterbody is one that is found to be fully supporting beneficial uses following traditional evaluation and assessment methods but additional investigation shows a level of impairment. Discussion regarding "Fully supporting but threatened" waterbodies can be found in Appendix T11.

- Table 11. Summary of Fully Supporting, Fully supporting but threatened, and Impaired Waters for River Waterbodies (miles).

Degree of Use Support	Evaluated	Monitored	Total
Size Full Supporting All Assessed Uses:	1087.13	825.85	1912.98
Size Full Supporting All Assessed Uses but Fully supporting but threatened for at Least One Use:	143.98	211.69	355.67
Size Impaired for One or More Uses:	24.50	63.16	87.66
Size Not Attainable for Any Use and Not Included in the Line Items Above:	9.22	0.00	9.22
Total Assessed	1264.83	1100.70	2365.53

- Table 12. Summary of Fully Supporting, Fully supporting but threatened, and Impaired Waters for Intermittent Stream Waterbodies (miles).

Degree of Use Support	Evaluated	Monitored	Total
Size Full Supporting All Assessed Uses:	3.80	11.20	15.00
Size Full Supporting All Assessed Uses but Fully supporting but threatened for at Least One Use:	0.00	0.00	0.00
Size Impaired for One or More Uses:	0.00	0.00	0.00
Size Not Attainable for Any Use and Not Included in the Line Items Above:	0.00	61.10	61.10
Total Assessed	3.80	72.30	76.10

- Table 13. Summary of Fully Supporting, Fully supporting but threatened, and Impaired Waters for Freshwater Lake Waterbodies (acres).

Degree of Use Support	Evaluated	Monitored	Total
Size Full Supporting All Assessed Uses:	0.00	4605.00	4605.00
Size Full Supporting All Assessed Uses but Fully supporting but threatened for at Least One Use:	0.00	0.00	0.00
Size Impaired for One or More Uses:	0.00	965.00	965.00
Size Not Attainable for Any Use and Not Included in the Line Items Above:	0.00	0.00	0.00
Total Assessed	0.00	5570.00	5570.00

The following three tables summarize individual designated and existing use support within the Upper Boise River subbasin. These tables support this sections opening statement “For the majority of the upper Boise River subbasin water quality is very high”. The following tables show varying amounts of “size assessed” for each beneficial use. These varying amounts reflect the different combination of uses a waterbody may have, and the amount of information that is available from which to make an assessment

- Table 14. Individual Use Support Summary for River Waterbodies (miles)

Use	Size Assessed	Size Fully Supporting	Size Fully Supporting but Threatened	Size Not Supporting	Size Not Attainable
Primary Contact Recreation	1494.73	1494.73	0.00	0.00	0.00

Use	Size Assessed	Size Fully Supporting	Size Fully Supporting but Threatened	Size Not Supporting	Size Not Attainable
Secondary Contact Rec.	545.15	545.15	0.00	0.00	0.00
Cold Water Biota	2352.64	1900.09	355.67	87.66	9.22
Salmonid Spawning	2079.86	2070.64	0.00	0.00	9.22
Domestic Water Supply	723.70	723.70	0.00	0.00	0.00

- Table 15. Individual Use Support Summary for Intermittent Stream Waterbodies (miles).

Use	Size Assessed	Size Fully Supporting	Size Fully Supporting but Threatened	Size Not Supporting	Size Not Attainable
Primary Contact Recreation	15.00	15.00	0.00	0.00	0.00
Secondary Contact Rec.	61.10	0.00	0.00	0.00	61.10
Cold Water Biota	76.10	15.00	0.00	0.00	61.10
Salmonid Spawning	15.00	15.00	0.00	0.00	0.00
Domestic Water Supply	1.40	1.40	0.00	0.00	0.00

- Table 16. Individual Use Support Summary for Freshwater Lake Waterbodies (acres).

Use	Size Assessed	Size Fully Supporting	Size Fully Supporting but Threatened	Size Not Supporting	Size Not Attainable
Primary Contact Recreation	4605.00	4605.00	0.00	0.00	0.00
Secondary Contact Rec.	965.00	965.00	0.00	0.00	0.00
Cold Water Biota	5570.00	4605.00	0.00	965.00	0.00

Both DEQ and EPA agree that exotic species should not be considered a pollutant. DEQ and EPA also believe that the presence of exotic species should not be the basis for any 303(d) listing or future TMDL development.

Summary of Known Causes

Since none of the 303(d) listed streams are found to be "Not Fully Supporting" beneficial uses, a traditional pollutant source inventory is not warranted. During the assessment process, information has been generated that identify Causes/Stressors that need to be addressed.

The following table shows the amount of rivers and freshwater lakes, and identifies what pollutants are preventing "Full Support" of beneficial uses. The leading traditional pollutants in the subbasin are excess sediment and excess nutrients. Exotic species, in the form of brook trout infestation, has prevented a portion of the impaired streams from achieving "Full Support" status. Exotic species introduction, although a limiting factor, is not a traditional pollutant and would make an inappropriate TMDL pollutant. Exotic species may be symptomatic of habitat, access, or other ecological weakness. Metals related cause/stressors are isolated to a single waterbody. This waterbody's sources for metals are being addressed by the federal government (superfund), and are expected to achieve full support in the near future. The Causes/Stressors that have not been

addressed prior to the next TMDL cycle for this basin (2006), will need to have TMDLs established.

- Table 17. Summary of Cause/Stressors Impairing Waterbodies

Waterbody Type	Cause/Stressor Category	Total Size
River	Sediment	70.44 miles
	Exotic Species*	63.16 miles
Freshwater Lake	Nutrients	965.00 acres
	Algal Grwth/Chlorophyll a*	965.00 acres

*This cause/stressor should not be considered a pollutant, and should no be the basis for any 303(d) listing or future TMDL development.

The following table depicts the size of those waterbodies that are currently fully supporting their beneficial uses but are threatened and probably will not support uses in the future. These Causes/Stressors that have not been addressed prior to the next 303(d) listing cycle for this basin (2002), will be candidates for becoming 303(d) listed segments and will need to have TMDLs established (2008). Again, exotic species is not a traditional pollutant and would not be a TMDL pollutant/target.

- Table 18. Summary of Causes/Stressors that are not Impairing Waterbodies

Waterbody Type	Cause/Stressor Category	Total Size
River	Sediment	304.55 miles
	Exotic Species*	135.37 miles

*This cause/stressor should not be considered a pollutant, and should no be the basis for any 303(d) listing or future TMDL development.

Summary of Past and Present Pollution Control Efforts

The overall high water quality in the Upper Boise River subbasin is evidence to success in past and present pollution control efforts. The following sections summarize some of these pollution control efforts

Bull Trout (ESA)

The State of Idaho has stepped forward and developed a Bull Trout Conservation Plan This plan calls for the appointment of Watershed Advisory Groups (WAGs) to design and facilitate conservation plans for bull trout key watersheds. This group also may also facilitate improvement of water quality to protect the beneficial uses, including native fish (Idaho Code Title 39 Chapter 36). In order to accomplish this the Southwest Basin Advisory Group appointed one Native Fish WAG for the Southwest Basin. The mission statement adopted by that Native Fish Watershed Advisory Group (SBNFWAG) is as follows:

- ❖ To maintain and/or restore complex interacting groups of bull trout (and other native fishes) populations throughout their native range in Idaho.
- ❖ To serve as a forum of citizens, organizations and agencies to better understand the watershed resources and management options to improve water quality that relates to native fish.

- ❖ To involve the public in setting priorities for treatment programs and to maintain economic sustainability in program development.

The first task of the SBNFWAG was to complete problem assessments for each of the bull trout key watersheds. As a part of this effort the best available information was used to ascertain the range of the bull trout, status of any existing populations, population goals and threats to the population in a time frame that will allow all of the information to be compiled by the January 1, 1999 deadline. The SBNFWAG has developed the Boise River Key Watersheds Bull Trout Problem Assessment (Steed et al 1998). The SBNFWAG has included as a part of their recommendations to the BAG a listing of watersheds, or projects, that are priorities.

Conservation plans should be developed for key watersheds after problem assessments have been completed. The overall strategy for developing conservation plans will be determined after all problem assessments have been completed. Prior to determining this overall strategy, conservation plans may be developed on an as needs basis. One or two groups of key watersheds will have problem assessments developed at a time. Each problem assessment will be completed in approximately five months. All assessments for Southwest Basin Area have been completed.

INFISH

The INFISH (US Forest Service, Inland Native Fish Strategy) program dictates the way many land uses and practices occur in the Upper Boise River subbasin, where 95% of the land is managed by federal agencies. INFISH is a strategy currently used by the Forest Service to protect inland native fish habitat which involves the management of timber, roads, grazing, recreation, riparian areas, minerals, fire and fuels, and land uses such as leases, permits, right-of-way, and easements. This strategy will be in effect until completion of the Interior Columbia Basin Environmental Assessment and Decision which will provide longer-term direction. INFISH does not attempt to develop a restoration strategy given the short time-frame for implementation

Idaho Forest Practices Act

The Idaho Forest Practices Act (FPA) (IDL 1996) are included in the Idaho Water Quality Standards as approved best management practices for silvicultural activities. The FPA provides best management practices (BMP's) which when met or exceeded, would provide protection for Idaho's beneficial uses. BMP's are practices or a combination of practices which have been shown to be the most effective and practicable means of preventing or reducing the amount of non-point pollution generated by forest practices. The 1996 audit of Idaho Forest Practices Act (Zaroban et. al. 1996) found that the average rate of rule implementation was 97%, and that the forest practices act rules were effective 99% of the time. The audit also noted that road maintenance on multiple ownership roads was an issue.

Where forest health and native fish habitat are in moderate to poor conditions, some of the highest road densities can be found. Because these areas are productive forests and because areas of productive aquatic habitat and intact communities still exist, these may be logical basins for high priority restoration. There may be opportunities for intensive forest restoration and subsequent elimination of unnecessary or redundant roads. (Rieman et al. 1997)

One Stop Permit Program

The entire North Fork Boise River drainage is closed to recreational dredge mining under the Idaho Department of Water Resource's "One Stop" Permit Program. Recently, state and federal resource agencies have worked with several individual mine claimants in the Crooked River and permitted recreational dredging with conditions to protect fish habitat. Recreational suction dredge mining is not permitted in the lower South Fork Boise River drainage from Arrowrock Reservoir to Anderson Ranch Dam. Recreational dredge mining is permitted in the Middle Fork mainstem from the confluence with Roaring River upstream to the Sawtooth National Recreation Area boundary below Leggitt Creek. The season on the mainstem is open under the Department of Water Resource's One-Stop permit system from July 1 through October 31.

Recreational suction dredge activity is closed under Idaho Department of Water Resource's (IDWR) One-Stop Permit from Barker Gulch upstream within the South Fork Boise River watershed. This includes all tributaries. Currently, there are several pending applications to use suction dredges to mine parts of Little Smokey Creek (identified bull trout spawning and juvenile rearing habitat) on patented mining claims. USFS, Corps of Engineers, and IDWR are in the initial stages of permitting, at the present time.

Unified Federal Policy on Watershed Management

The Departments of Agriculture, Commerce, Defense, Energy and the Interior, the Environmental Protection Agency, the Tennessee Valley Authority, and the Army Corps of Engineers are adopting a unified Federal policy on watershed management. This policy, which provides a framework for a watershed approach to Federal land and resource management activities, is one of the action items in the President's Clean Water Action Plan: Restoring and Protecting America's Waters. The final policy has been revised in response to public comments on the proposed policy published in the Federal Register on February 22, 2000 (65 FR 8834). This policy is effective October 18, 2000.

Federal agencies manage large amounts of public lands throughout the country. To protect water quality and aquatic ecosystems on these public lands, Federal agencies have developed the following policy to reduce water pollution from Federal activities and foster a unified, watershed-based approach to Federal land and resource management. This policy is intended to accelerate Federal progress towards achieving the goals of the Clean Water Act (Federal Water Pollution Control Act of 1972, 33 U.S.C. 1251 et seq.). This policy applies only to Federal lands and resources and does not affect water rights laws, procedures, or regulations. This policy does not supersede or otherwise affect existing State or Tribal authority under the Clean Water Act. The Federal agencies also acknowledge that, in international waters, the watershed approach is subject to the international treaties and agreements affecting those waters.

Chapter

3

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Chapter

4

Glossary of Terms and Acronyms

Upper Boise River Subbasin Assessment

§ - symbol for section, usually referring to a section of the Clean Water Act.

303(d), or **§303(d)** – section 303 subsection "d" of the Clean Water Act. 303(d) generally describes a list of each state's waterbodies that are not fully supporting at least one beneficial use. This list is developed by each state and approved by EPA.

305(b) – or §305(b) – refers to section 305 subsection "b" of the Clean Water Act. 305(b) generally describes a report of each state's water quality, and is the principle means by which EPA, congress, and the public evaluate whether U.S. waters meet water quality standards, the progress made in maintaining and restoring water quality, and the extent of remaining problems.

ADB – Assessment Database, The Assessment Database (ADB) is a relational database application for tracking water quality assessment data, including use attainment, and causes and sources of impairment. States need to track this information and many other types of assessment data for thousands of waterbodies, and integrate it into meaningful reports. The ADB is designed to make this process accurate, straightforward and user-friendly for participating states, territories, tribes and basin commissions.

adfluvial - fish behavior term describing bull trout that migrate into lakes

adjunct – Areas directly adjacent to focal or refuge habitats that have been degraded by human or natural disturbances and do not presently support high diversity or abundance of native species.

alevins - newly hatched, incompletely developed fish (usually Salmonid) still in nest or inactive on bottom, living off stored yolk.

BAG – Basin Advisory Group

batholith – A large, generally discordant plutonic mass that has more than 40 square mile (100 km2) of surface exposure and no known floor. Its formation is believed by most investigators to involve magmatic processes.

biota - living organisms

BMP - Best Management Practices

BNF - U.S. Forest Service, Boise National Forest

BOR - U.S. Bureau of Reclamation

BURP – Beneficial Use Reconnaissance Project, Administered by DEQ.

C – Celsius

cfs - cubic feet per second

Clean Water Act – the Federal Water Pollution Control Act (PL92-500, commonly known as the Clean Water Act), as last reauthorize by the Water Quality Act of 1987 (PL100-4),establishes a process for State to use to develop information on the quality of the Nation's water resource's. The requirement for this process are found in Sections 106(e), 204(a), 303(d), 305(b), and 314(a) or the Clean Water Act.

Cretaceous – The final period of the Mesozoic era (after the Jurassic and before the Tertiary period of the Cenozoic era), thought to have covered the span of time between 135 and 65 million years ago.

debris torrent - The sudden movement down slope of the soil, rock, and vegetation on steep slopes, often caused by saturation from heavy rains.

DEQ - Idaho Department of Environmental Quality

E. coli. - Escherichia Coli or as it is best known, E. coli is a group of bacteria which are a subspecies of coliform bacteria. Most e. coli are essential to the healthy life of all warm blooded animals including humans.

Eocene – An epoch of the early Tertiary period, after the Paleocene and before the Oligocene.

EPA – U.S. Environmental Protection Agency

ESA – Endangered Species Act

F – Fahrenheit

fauna - animal life; especially : the animals characteristic of a region, period,or special environment

fluvial - fish behavior term describing bull trout that migrate to larger stream

focal – Critical areas supporting a mosaic of high quality habitats that sustain a diverse or unusually productive complement of native species.

FPA – Idaho Forest Practices Act.

"Fully Supporting" – An assessment category describing waterbodies that are not impaired. Compliance with those levels of water quality criteria listed in Sections 200, 210, 250, 251, 252, 253, and 275 (if applicable) or with the reference streams or conditions approved by DEQ in consultation with the appropriate basin advisory group.

"Fully Supporting but Threatened" – An intermediate assessment category describing waterbodies that Fully Supporting beneficial uses but have conditions which if not addressed are believed lead to Not Full Support.

GIS - Geographic Information System, a georeferenced data base.

Hydrologic Unit Code (HUC) - A watershed numbering system developed by US Geological Survey. All waters that flow to a common point have the same number. For example all of the waters that flow out of the Columbia river system begin with the number 17 (first field watershed), and all of those waters that flow the South Arm of Lucky Peak Reservoir 17050113 (fourth field watershed). Every two digits counts as a new field. For this problem assessment sixth field watersheds were used to drape the data.

IDFG - Idaho Department of Fish and Game

IDWR - Idaho Department of Water Resources

INFISH - The BLM-US Forest Service's Inland Native Fish Strategy

key watershed – Those watersheds that have been designated in Governor Batt's State of Idaho Bull Trout Conservation Plan as critical to the long-term persistence of regionally important trout populations.

knickpoint - Any interruption or break of slope.

km, km^2 – kilometer, square kilometer

macroinvertebrate - An invertebrate animal (animal without a backbone) large enough to be seen without magnification.

mass wasting - A general term for the down slope movement of soil and rock material under the direct influence of gravity.

mi, mi2 – mile, square mile

Miocene -of, relating to, or being an epoch of the Tertiary between the Pliocene and the Oligocene or the corresponding system of rocks.

nodal – Areas that are separated from focal and adjunct habitats by serve critical life history functions for individual native fish from other populations.

"Not Assessed" – A concept and an assessment category describing waterbodies that have been looked at but are missing critical information needed to complete assessment.

"Not Attainable" - A concept and an assessment category describing waterbodies that demonstrate characteristics that make it unlikely that a beneficial use can be attained (e.g. a stream that is dry but designated for salmonid spawning).

"Not Fully Supporting" - An assessment category describing waterbodies that are impaired. Non-compliance with those levels of water quality criteria listed in Sections 200, 210, 250, 251, 252, 253, and 275 (if applicable) or with the reference streams or conditions approved by DEQ in consultation with the appropriate basin advisory group.

periphyton – Algae organisms that live attached to surfaces projecting from the bottom of a freshwater aquatic environment

resident - fish behavior term describing bull trout that do not migrate

RHCA - Riparian Habitat Conservation Area. U.S. Forest Service description of land within the following number of feet up slope of each of the banks of streams.

- 300 feet from perennial fish bearing streams.

- 150 feet from perennial non-fish bearing streams.
- 100 feet from intermittent streams, wetlands, and ponds in priority watersheds.

SBA - Sub Basin Assessment, the precursor problem assessment which is the first step of developing a TMDL

SBNFWAG - Southwest Basin Native Fish Watershed Advisory Group

SNRA - Sawtooth National Recreation Area

subbasin - A grouping of Key Watersheds identified in the strategy paper for the Southwest Basin Native Fish Watershed Advisory Group. The grouping was intended to expedite the process and avoid duplication of efforts by both the public and agencies. The grouping is similar the to the grouping provided on the table (page 11) in the Governor's Bull Trout Plan.

Taxon – 1) plural TAXA, any unit used in the science of biological classification, or taxonomy. Taxa are arranged in a hierarchy from kingdom to subspecies, a given taxon ordinarily including several taxa of lower rank. In the classification of protists, plants, and animals, certain taxonomic categories are universally recognized; in descending order, these are kingdom, phylum (in plants, division), class, order, family, genus, species, and subspecies, or race. 2) Number DEQ uses to track taxon in macroinvertebrate database.

Tertiary - interval of geologic time lasting from 66.4 to 1.6 million years ago. It constitutes the first of two periods of the Cenozoic Era, the second being the Quaternary. The Tertiary has five subdivisions, which from oldest to youngest are the Paleocene, Eocene, Oligocene, Miocene, and Pliocene epochs. Some authorities prefer not to use the term Tertiary and instead divide the time interval encompassed by it into two periods, the Paleogene Period (66.4 to 23.7 million years ago) and the Neogene Period (23.7 to 1.6 million years ago).

TMDL - Total Maximum Daily Load.

TMDL Cycle – Schedule for development of TMDLs in Idaho. This schedule was developed collaboratively by DEQ and EPA. The schedule addresses specific concerns identified in September 1996 by US District Court for the Western District of Washington.

U.S. – United States

USFS – United States Forest Service

WAG – Watershed Advisory Group

Waterbody – A homogeneous classification that can be assigned to rivers, lakes, estuaries, coastlines, or other water features.

Water Quality Limited – A label that describes waterbodies for which one or more beneficial uses are not "fully supported". Water Quality Limited segment may or may not be on the 303(d) list.

WBAG – Waterbody Assessment Guidance (DEQ 1996).

WBID – Waterbody Identification Number. Number that identifies waterbody, and correlates to Idaho Water Quality Standards, and GIS information.

Chapter

5

Figures and Appendices

Upper Boise River Subbasin Assessment

Appendix T1

Upper Boise River Subbasin Assessment Segment Descriptions

17050111001_00 HUC: 17050111

Middle Fork Boise River

Size: 14.74 miles Year on 303(d):

Comments: Segment established Jan 2000, by R. Steed. Classified April 2000, Beneficial Uses have been designated in IDAPA 16.01.02.140.09.

Description: This mainstem segment is located downstream from the confluence of Roaring River to the Arrowrock Reservoir inflow.

17050111001_01 HUC: 17050111

Middle Fork Boise River Tributaries

Size: 45.5 miles Year on 303(d):

Comments: Segment established Jan 2000, by R. Steed. Classified April 2000, Beneficial Uses have been designated in IDAPA 16.01.02.140.09.

Description: This segment includes all the tributaries that flow into the Middle Fork Boise River from Roaring River to Arrowrock Reservoir. Nammed tributaries include Big Five, Road, Pete, Rough, Repeat, Dobson, Breadwinner, Vaughn, Loftus, Alexander, Plantat…

17050111001_03 HUC: 17050111

Buck Creek

Size: 14.1 miles Year on 303(d): 1994

Comments: Segment established Jan 2000, by R. Steed. Classified April 2000, Beneficial Uses have been designated in IDAPA 16.01.02.140.09.

Description: This segment includes Buck Creek and all of it's tributaries that flow into the Middle Fork Boise River.

17050111001_04 HUC: 17050111

Middle Fork Boise River

Size: 8.2 miles Year on 303(d):

Comments: Segment established Jan 2000, by R. Steed. Classified April 2000, Beneficial Uses have been designated in IDAPA 16.01.02.140.09.

Description: This mainstem segment of the Middle Fork Boise River is located between Hot Creek and Roaring River. This portion of the Middle Fork Boise River is fourth order.

17050111001_05 HUC: 17050111

Middle Fork Boise River Tributaries

Size: 54.97 miles Year on 303(d):

Comments: Segment established Jan 2000, by R. Steed.Classified April 2000, Beneficial Uses have been designated in IDAPA 16.01.02.140.09.

Description: This segment includes all the first and second order tributaries that flow into the Middle Fork Boise River from Hot Creek to Roaring River. Nammed tributaries include: Swanholm, Phifer, Dutch, Granite, Lost Man, Trail, Pitch, and Deadman Creeks.

17050111001_06 HUC: 17050111

Middle Fork Boise River Tributaries

Size: 4.37 miles Year on 303(d):

Comments: Segment established Jan 2000, by R. Steed. Classified April 2000, Beneficial Uses have been designated in IDAPA 16.01.02.140.09.

Description: This segment includes all the third order tributaries that flow into the Middle Fork Boise River from Hot Creek to Roaring River. Nammed tributaries include: lower portion of Swanholm and Lostman Creeks.

17050111001_09 HUC: 17050111

Middle Fork Boise River

Size: 11.27 miles Year on 303(d):

Comments: Segment established Jan 2000, by R. Steed. Classified April 2000, Beneficial Uses have been designated in IDAPA 16.01.02.140.09.

Description: This segment of the Middle Fork Boise River is made up of the mainstem between Yuba River and Hot Creek River. This portion of the Middle Fork Boise River is fourth order.

17050111001_10 HUC: 17050111

Middle Fork Boise River Tributaries

Size: 39.85 miles Year on 303(d):

Comments: Segment established Jan 2000, by R. Steed. Classified April 2000, Beneficial Uses have been designated in IDAPA 16.01.02.140.09.

Description: This segment includes all the first and second order tributaries that flow into the Middle Fork Boise River from Yuba River to Hot Creek. Nammed tributaries include: Snyder, Eagle, Lake, James, Steppe, Steek, Bald Mountain, Smith, and Fall Creeks.

17050111001_13 HUC: 17050111

Middle Fork Boise River

Size: 7.73 miles Year on 303(d):

Comments: Segment established Jan 2000, by R. Steed. Classified April 2000, Beneficial Uses have been designated in IDAPA 16.01.02.140.09.

Description: This segment of the Middle Fork Boise River is made up of the mainstem between Mattingly Creek and Yuba River. This portion of the Middle Fork Boise River is third order. Much of this segment is in roadless area.

17050111001_14 HUC: 17050111

Middle Fork Boise River Tributaries

Size: 64.45 miles Year on 303(d):

Comments: Segment established Jan 2000, by R. Steed.Classified April 2000, Beneficial Uses have been designated in IDAPA 16.01.02.140.09.

Description: This segment includes all the first and second order tributaries that flow into the Middle Fork Boise River upstream from Mattingly Creek. Nammed tributaries include: Middle Fork Boise River, Quartz, Leggit, Billy, Sawmill, Greylock, Joe Daley …

17050111001_15 HUC: 17050111

Montezuma Creek

Size: 1.62 miles Year on 303(d):

Comments: Segment established Jan 2000, by R. Steed. Classified April 2000, Beneficial Uses have been designated in IDAPA 16.01.02.140.09.

Description: This segment includes all of mainstem Montezuma Creek from headwaters to Middle Fork Boise River. It excludes East Fork Montezuma Creek.…

17050111001_16 HUC: 17050111

East Fork Montezuma Creek

Size: 1.89 miles Year on 303(d):

Comments: Montezuma Creek split into two segments on 9/19/2000 by R. Steed. This, East Fork, segment has an active water supply system, along with monitoring data associated with water supply systems.

Description: This segment includes all of East Fork Montezuma Creek from headwaters to Montezuma Creek.…

17050111002_00 HUC: 17050111

Lower East Fork Roaring River

Size: 8.12 miles Year on 303(d):

Comments: Segment Established January 2000 by R. Steed. This segment is unclassified, uses have been determined to be attainable at time of assessment.

Description: This segment is made up of the lower porting of Roaring River watershed. It includes the third order portion of Roaring River.

17050111002_01 HUC: 17050111

Upper East Fork Roaring River

Size: 30.95 miles Year on 303(d):

Comments: Segment was established by R. Steed on Jan 4, 2000. This segment is generally headwater, Rosgen type A and B and 1st and 2nd Order Streams. Includes Roaring River, East and Middle Fork Roaring River, and Scotch Creek.

Description: This segment is made up of the upper porting of Roaring River watershed. It includes the first and second order portions of the watershed.

17050111003_00 HUC: 17050111

Hot Creek

Size: 8.08 miles Year on 303(d):

Comments: Segement and waterbody established Jan, 2000 by R. Steed. This segment is unclassified, uses have been determined to be attainable at time of segment establishment.

Description: Hot Creek Waterbody is made up of one segment. The segment includes all waters from the headwaters to the Middle Fork Boise River. The segment is made up of first and second order streams.

17050111004_00 HUC: 17050111

Yuba River

Size: 4.55 miles Year on 303(d):

Comments: Segment established Jan, 2000 by R.Steed. This segment is unclassified, uses have been determined to be attainable at time of segment establishment.

Description: This segment of the Yuba River waterbody is located in the lower portion of the waterbody and is made up of the fourth and smaller segments of the third order portions of the mainstem.

17050111004_01 HUC: 17050111

Yuba River

Size: 34.7 miles Year on 303(d):

Comments: Segment established Jan, 2000 by R.Steed. This segment is unclassified, uses have been determined to be attainable at time of segment establishment.

Description: This segment of the Yuba River waterbody is located in the lower portion of the waterbody and is made up of the fourth and small segment of the third order portions of the mainstem. This segment flows into the Middle Fork Boise River.

17050111005_00 HUC: 17050111

Decker Creek

Size: 1.15 miles Year on 303(d):

Comments: Established January 7, 2000 by R. Steed. This segment is unclassified, uses have been determined to be attainable at time of segment establishment.

Description: This segment is from the Sawmill Creek tributary to the Yuba River.

17050111005_01 HUC: 17050111

Decker Creek Headwaters

Size: 24.27 miles Year on 303(d):

Comments: Established January 7, 2000 by R. Steed. This segment is unclassified, uses have been determined to be attainable at time of segment establishment.

Description: This segment is upstream from the Sawmill Creek tributary and includes Decker Creek, Flint Creek, Grouse Creek and Sawmill Creek.

17050111006_00 HUC: 17050111

Queens River mainstem

Size: 2.19 miles Year on 303(d):

Comments: Established Jan. 2000 by R. Steed. This segment is unclassified, uses have been determined to be attainable at time of segment establishment.

Description: This short segment is made up of the mainstem of Queens River from the confluence with Little Queens River to the Middle Fork Boise River. This segment is a third order stream.

17050111006_01 HUC: 17050111

Queens River Tributaries

Size: 33.7 miles Year on 303(d):

Comments: Established Jan. 2000 by R. Steed. This segment is unclassified, uses have been determined to be attainable at time of segment establishment.

Description: This segment includes the first and second order streams in the upper portion of the watershed. This segment include the following tributaries: Queens River, King Creek, Kid Creek, and China Fork.

17050111007_00 HUC: 17050111

Little Queens River

Size: 24.52 miles Year on 303(d):

Comments: Established Jan. 2000 by R.Steed

Description: Little Queens River flows into Queens River. Little Queens River segment includes Little Queens River, Scenic Creek, Tripod Cree, Scott Creek, Browns Creek and Mill Creek.

17050111008_00 HUC: 17050111

Black Warrior Creek

Size: 2.38 miles Year on 303(d):

Comments: Established Jan 2000 by R. Steed. This segment is unclassified, uses have been determined to be attainable at time of segment establishment.

Description: This segment of Black Warrior Creek waterbody is in the lower portion of the watershed. It is the third order portion of the stream. It flows from the confluence of West Warrior Creek and Black Warrior Creek.

17050111008_01 HUC: 17050111

Black Warrior Creek headwaters

Size: 20.32 miles Year on 303(d):

Comments: Established Jan 2000 by R. Steed. This segment is unclassified, uses have been determined to be attainable at time of segment establishment.

Description: This segment of Black Warrior Creek waterbody is in the upper portion of the watershed. It is the first and second order portions of the stream. It flows upstream of the confluence of West Warrior Creek and Black Warrior Creek.

17050111009_00 HUC: 17050111

Browns Creek

Size: 13.04 miles Year on 303(d): 1994

Comments: Est. Jan. 2000 by R. Steed. Classified April 2000, Beneficial Uses have been designated in IDAPA 16.01.02.140.09.

Description: This is the only segment for Browns Creek Waterbody. Includes several unnamed tributaries.

17050111010_00 HUC: 17050111

North Fork Boise River mainstem

Size: 9.15 miles Year on 303(d):

Comments: Established January 2000 by R. Steed. Classified April 2000, Beneficial Uses have been designated in IDAPA 16.01.02.140.09.

Description: This mainstem segment flows from Rabbit Creek to Middle Fork Boise River. It's predominate stream is North Fork Boise River.

17050111010_03 HUC: 17050111

North Fork Boise River mainstem

Size: 9.54 miles Year on 303(d):

Comments: Established January 2000 by R. Steed. Classified April 2000, Beneficial Uses have been designated in IDAPA 16.01.02.140.09.

Description: This mainstem segment flows from Crooked River to Rabbit Creek. It's predominate stream is North Fork Boise River

17050111010_04 HUC: 17050111

North Fork Boise River Tributaries

Size: 23.69 miles Year on 303(d):

Comments: Established January 2000 by R. Steed. Classified April 2000, Beneficial Uses have been designated in IDAPA 16.01.02.140.09.

Description: This segment is made of tributaries that flow into the North Fork Boise River in the section from Crooked River to Middle Fork Boise River. Named tributaries include: Beaver, Camp, Flicker, Hungarian, Sacrefice, Shonip and Tin Cup Creeks

17050111010_06 HUC: 17050111

North Fork Boise River

Size: 4.45 miles Year on 303(d):

Comments: Established January 2000 by R. Steed. Classified April 2000, Beneficial Uses have been designated in IDAPA 16.01.02.140.09.

Description: This mainstem segment flows from Bear River to Crooked River. It's predominate stream is North Fork Boise River

17050111010_07 HUC: 17050111

North Fork Boise River Tributaries

Size: 10.55 miles Year on 303(d):

Comments: Established January 2000 by R. Steed. Classified April 2000, Beneficial Uses have been designated in IDAPA 16.01.02.140.09.

Description: This segment is made of tributaries that flow into the North Fork Boise River in the section from Bear River to Crooked River. This segment excludes Wren Creek. Named tributaries include: Don Creek and Lost Creek.

17050111010_08 HUC: 17050111

Trapper Creek and Wren Creek

Size: 9.22 miles Year on 303(d):

Comments: Segment Established Jan 2000 by R. Steed. Classified April 2000, Beneficial Uses have been designated in IDAPA 16.01.02.140.09.

Description: These segments include all the streams in the Trapper Creek and Wren Creek Watersheds. These segments have been isolated from others because both stream have had catastophic land slides. This segment is unclassified, uses have been determined to be atta

17050111010_09 HUC: 17050111

North Fork Boise River

Size: 4.77 miles Year on 303(d):

Comments: Established January 2000 by R. Steed. Classified April 2000, Beneficial Uses have been designated in IDAPA 16.01.02.140.09.

Description: This mainstem segment flows from Trail Creek to Bear River.

17050111010_10 HUC: 17050111

North Fork Boise River Tributaries

Size: 7.15 miles Year on 303(d):

Comments: Established January 2000 by R. Steed. Classified April 2000, Beneficial Uses have been designated in IDAPA 16.01.02.140.09.

Description: This segment is made of tributaries that flow into the North Fork Boise River in the section from Trail Creek to Bear River. Named tributaries include: Robert Lee Creek.

17050111010_11 HUC: 17050111

Trail Creek Mainstem

Size: 1.7 miles Year on 303(d):

Comments: Established January 2000 by R. Steed. Classified April 2000, Beneficial Uses have been designated in IDAPA 16.01.02.140.09.

Description: This segment is in the lower portion of the Trail Creek watershed. It is the third order portion of the stream.

17050111010_12 HUC: 17050111

Trail Creek Headwaters

Size: 9.86 miles Year on 303(d):

Comments: Established January 2000 by R. Steed. Classified April 2000, Beneficial Uses have been designated in IDAPA 16.01.02.140.09.

Description: This segment is in the upper portion of the Trail Creek watershed. It is the first and second order portions of the streams. Named tributaries include: Horse Heaven Creek, Silver Creek, and Trail Creek.

17050111010_14 HUC: 17050111

North Fork Boise River

Size: 8.34 miles Year on 303(d):

Comments: Established January 2000 by R. Steed. Classified April 2000, Beneficial Uses have been designated in IDAPA 16.01.02.140.09.

Description: This mainstem segment flows from Johnson Creek to Trail Creek.

17050111010_15 HUC: 17050111

North Fork Boise River Tributaries

Size: 27.62 miles Year on 303(d):

Comments: Established January 2000 by R. Steed. Classified April 2000, Beneficial Uses have been designated in IDAPA 16.01.02.140.09.

Description: This segment is made of tributaries that flow into the North Fork Boise River in the section from Johnson Creek to Trail Creek. Named tributaries include: Horsefly Creek, Hunter Creek, Lodgepole Creek, McDonald Creek, NcNutt Creek and Taylor Creek.

17050111010_17 HUC: 17050111

North Fork Boise River

Size: 7.05 miles Year on 303(d):

Comments: Established January 2000 by R. Steed. Classified April 2000, Beneficial Uses have been designated in IDAPA 16.01.02.140.09.

Description: This mainstem segment flows from Ballentyne Creek to Johnson Creek.

17050111010_18 HUC: 17050111

North Fork Boise River Tributaries

Size: 25.86 miles Year on 303(d):

Comments: Established January 2000 by R. Steed. Classified April 2000, Beneficial Uses have been designated in IDAPA 16.01.02.140.09.

Description: This segment is made of tributaries that flow into the North Fork Boise River in the section from Ballentyne Creek to Johnson Creek. Named tributaries include: Bayhouse, Big Silver, Bow, Cow, Graham, Little Silver, and McKay Creeks.

17050111010_20 HUC: 17050111

North Fork Boise River Headwaters

Size: 34.46 miles Year on 303(d):

Comments: Established January 2000 by R. Steed. Classified April 2000, Beneficial Uses have been designated in IDAPA 16.01.02.140.09.

Description: This headwater segment includes tributaries and North Fork Boise River that flow into North Fork Boise River at the Ballentyne Creek confluence. Named Tributaries include: Ballentyne, Lightening, McLeod, McPherson, West Fork Creeks and North Fork Boise

17050111011_00 HUC: 17050111

Johnson Creek

Size: 4 miles Year on 303(d):

Comments: Established January 2000 by R. Steed. This segment is unclassified, uses have been determined to be attainable at time of segment establishment.

Description: This segment is the lower portion, third order, of Johnson Creek.

17050111011_01 HUC: 17050111

Johnson Creek

Size: 27.53 miles Year on 303(d):

Comments: Established January 2000 by R. Steed. This segment is unclassified, uses have been determined to be attainable at time of segment establishment.

Description: This segment is the lower portion, third order, of Johnson Creek.

17050111012_00 HUC: 17050111

Bear River

Size: 8.18 miles Year on 303(d):

Comments: Established January 2000 by R. Steed. This segment is unclassified, uses have been determined to be attainable at time of segment establishment.

Description: This lower segment includes the third order portion of Bear River.

17050111012_01 HUC: 17050111

Bear River Headwaters

Size: 39.27 miles Year on 303(d):

Comments: Established January 2000 by R. Steed. This segment is unclassified, uses have been determined to be attainable at time of segment establishment.

Description: This upper segment includes the first and second order portions of the Bear River watershed. It includes the following named tributaries: Steamboat, Louise, Cub, South Fork Cub, Rockey, and Bear Creeks.

17050111013_00 HUC: 17050111

Big Owl/Little Owl Creeks

Size: 12.7 miles Year on 303(d):

Comments: Est. Jan. 2000 by R. Steed. Classified April 2000, Beneficial Uses have been designated in IDAPA 16.01.02.140.09.

Description: This sement is the entire Big Owl/Little Owl Creeks watershed.

17050111014_00 HUC: 17050111

Crooked River

Size: 12.82 miles Year on 303(d):

Comments: Established January 2000 by R. Steed. Classified April 2000, Beneficial Uses have been designated in IDAPA 16.01.02.140.09.

Description: This mainstem segment includes Crooked River from Pike's Fork to the North Fork Boise River.

17050111014_01 HUC: 17050111

Crooked River Tributaries

Size: 40.39 miles Year on 303(d):

Comments: Established January 2000 by R. Steed. Classified April 2000, Beneficial Uses have been designated in IDAPA 16.01.02.140.09.

Description: This segment includes all the tributaries that flow into Crooked River in the segment that extends from watershed.

Pike's Fork to the North Fork Boise River. Named tributaries include: Ski, Sunset, Summit, Sandy, Steep, Wood, Edna, Lamar, and Woop Um Up Creeks.

17050111014_02 HUC: 17050111

Beaver Creek

Size: 22.77 miles Year on 303(d):

Comments: Established January 2000 by R. Steed. Classified April 2000, Beneficial Uses have been designated in IDAPA 16.01.02.140.09.

Description: This segment includes all the tributaries that flow into Crooked River from the Beaver Creek

Named tributaries include: Beaver Creek, West Fork, Little, Gold Fork, China Fork Beaver Creeks.

17050111014_04 HUC: 17050111

Crooked River

Size: 4.86 miles Year on 303(d):

Comments: Established January 2000 by R. Steed. Classified April 2000, Beneficial Uses have been designated in IDAPA 16.01.02.140.09.

Description: This segment includes the mainstem of Crooked River and The lower portion of Pikes Fork Creek. These have been combined because they are simular and third order.

17050111014_06 HUC: 17050111

Pikes Fork

Size: 26.12 miles Year on 303(d):

Comments: Established January 2000 by R. Steed. Classified April 2000, Beneficial Uses have been designated in IDAPA 16.01.02.140.09.

Description: This segment includes the Pikes Fork/Banner Creek watershed. Named tributaries include: Banner Creek, Pikes Fork, Sawmill Creek, Gotch Creek.

17050111014_07 HUC: 17050111

Crooked River Headwaters

Size: 34.9 miles Year on 303(d):

Comments: Established January 2000 by R. Steed. Classified April 2000, Beneficial Uses have been designated in IDAPA 16.01.02.140.09.

Description: This segment includes all the tributaries that flow into Crooked River in the segment that above Pikes Fork Creek. Named tributaries include: Crooked River, Abby Creek, Snow Creek, Cabin Creek, and Trapper Creek.

17050111015_00 HUC: 17050111

Rabbit Creek

Size: 6.39 miles Year on 303(d):

Comments: Established January 2000 by R.Steed. Classified April 2000, Beneficial Uses have been designated in IDAPA 16.01.02.140.09.

Description: This mainstem segment flows from the confluence of North Fork Rabbit Creek and Rabbit Creek. This segment is a third order stream.

17050111015_01 HUC: 17050111

Rabbit Creek Headwaters

Size: 34.33 miles Year on 303(d):

Comments: Established January 2000 by R.Steed. Classified April 2000, Beneficial Uses have been designated in IDAPA 16.01.02.140.09.

Description: This segment is made up of all the first and second order tributaries that flow into the third order portion of Rabbit Creek. Named tributaries include: German, North Fork Rabbit, Third, Second, First, South Fork, and Rabbit Creeks.

17050111016_00 HUC: 17050111

Meadow Creek

Size: 7.28 miles Year on 303(d):

Comments: Established January 2000 by R. Steed. This segment is unclassified, uses have been determined to be attainable at time of segment establishment.

Description: This segment represtents the entire Meadow Creek watershed.

17050111017_00 HUC: 17050111

French Creek

Size: 10.83 miles Year on 303(d):

Comments: Established in January 2000, by R. Steed. This segment is unclassified, uses have been determined to be attainable at time of segment establishment.

Description: From headwaters to North Fork Boise River.

17050113001_00 HUC: 17050113

Arrowrock Reservoir Tributaries

Size: 15.3 miles Year on 303(d):

Comments: Est. 2/9/00 by R. Steed. Classified April 2000, Beneficial Uses have been designated in IDAPA 16.01.02.140.11.

Description: All first and second order streams that flow from their headwaters to Arrowrock Reservoir or South Fork Boise River slack water in the South Fork Boise River Arm. Nammed streams include: South Fork Gulch, Soap Creek, Camp Creek, Crank Creek, and Dawes C

17050113002_00 HUC: 17050113

Willow Creek

Size: 2.4 miles Year on 303(d): 1994

Comments: Est. 5/4/00 by R. Steed. Unclassified, uses established at time of assessment.

Description: Fourth Order Portion of Willow Creek from Wood Creek to South Fork Boise River.

17050113002_01 HUC: 17050113

Willow Creek

Size: 11.2 miles Year on 303(d): 1994

Comments: Est. 2/9/00 by R. Steed. Unclassified, uses established at time of assessment.

Description: Third Order Portion of Willow Creek from Wood Creek to unnamed creek upstream of Case Creek.

17050113002_03 HUC: 17050113

Willow Creek Headwaters

Size: 61.1 miles Year on 303(d):

Comments: Est. 2/9/00 by R. Steed. Unclassified, uses established at time of assessment.

Description: First and second order streams in Willow Creek watershed. Includes: Hutton, Lambing, Fornham, Big Horse, Pine, Cottonwood, Salt, Long Gulch, Case and Beaver Creeks.

17050113003_00 HUC: 17050113

Wood Creek

Size: 2 miles Year on 303(d):

Comments: Est. 2/9/00 by R. Steed. . Classified April 2000, Beneficial Uses have been designated in IDAPA 16.01.02.140.11.

Description: Third order portion of wood creek from Deadman Creek to Willow Creek.

17050113003_03 HUC: 17050113

Wood Creek Headwaters

Size: 29.1 miles Year on 303(d):

Comments: Est. 2/9/00 by R. Steed. Classified April 2000, Beneficial Uses have been designated in IDAPA 16.01.02.140.11.

Description: First and second order streams flowing from headwaters into downstream segment. Named streams include Deadman Creek, Lime Creek, Wood Creek, Bender Creek, Jack Creek, and Flat Creek.

17050113004_00 HUC: 17050113

South Fork Boise River (1)

Size: 31.6 miles Year on 303(d): 1994

Comments: Est. 2/9/00 by A. Petersen. Classified April 2000, Beneficial Uses have been designated in IDAPA 16.01.02.140.11.

Description: Mainstem (5th order) South Fork Boise River from Anderson Ranch Res. to Arrowrock Res.

17050113004_03 HUC: 17050113

Lower Dry Buck Creek and Dixie Creek

Size: 9.8 miles Year on 303(d):

Comments: Est. 2/9/00 by A. Petersen. Classified April 2000, Beneficial Uses have been designated in IDAPA 16.01.02.140.11.

Description: Third order tributaries to South Fork Boise River in segment between Anderson Ranch Res. and Arrowrock Res. Dry Buck Creek from Williams Creek to South Fork Boise River and lower Dixie Creek.

17050113004_05 HUC: 17050113

Tributaries to South Fork Boise River (1)

Size: 152 miles Year on 303(d):

Comments: Est. 2/9/00 by A. Petersen. Classified April 2000, Beneficial Uses have been designated in IDAPA 16.01.02.140.11.

Description: Headwater (1st and 2nd order)to South Fork Boise River in segment from Anderson Ranch Res. to Arrowrock Res. Includes Granite, Cayuse, Mennecke, Pierce, Rock, Book, Trail, Dead Horse, Williams, Deer, Bounds, Devils Hole Buffalo, Pony, Big Fiddler, Long

17050113005_03 HUC: 17050113

Anderson Ranch Reservoir Tributaries

Size: 1.4 miles Year on 303(d):

Comments: Est. 2/10/00 by R. Steed. Classified April 2000, Beneficial Uses have been designated in IDAPA 16.01.02.140.11.

Description: Lower (third order) portion of Castle Creek.

17050113005_05 HUC: 17050113

Anderson Ranch Reservoir Tributaries

Size: 80.7 miles Year on 303(d):

Comments: Est. 2/10/00 by R. Steed. Classified April 2000, Beneficial Uses have been designated in IDAPA 16.01.02.140.11.

Description: Upper (first and second order) portion of Streams flowing into Anderson Ranch Reservoir and Castle Creek.

17050113005L_00 HUC: 17050113

Anderson Ranch Reservoir

Size: 4605 miles Year on 303(d):

Comments: Est. 2/10/00 by R. Steed. Unclassified, uses established at time of assessment. Size in acre feet.

Description: Entire Anderson Ranch Reservoir, from slackwaters of South Fork Boise River to Anderson Ranch Reservoir Dam.

17050113006_00 HUC: 17050113

Little Camas Creek

Size: 5.7 miles Year on 303(d):

Comments: Est. 2/10/00 by R. Steed. Unclassified, uses determinted at time of assessment.

Description: Little Camas Creek and Tributaries between Little Camas Reservoir and Anderson Ranch Reservoir.

17050113007_00 HUC: 17050113

Cat Creek

Size: 3.1 miles Year on 303(d):

Comments: Est. 2.10/00 by R. Steed. Unclassified, uses determined at time of assessement.

Description: Larger (third order) portion of Cat Creek from unnamed tributary to Little Camas Reservoir.

17050113007_03 HUC: 17050113

Little Camas Tributaries

Size: 24.8 miles Year on 303(d):

Comments: Est. 2.10/00 by R. Steed. Unclassified, uses determined at time of assessement.

Description: Larger (third order) portion of Cat Creek from unnamed tributary to Little Camas Reservoir.

17050113007L_00 HUC: 17050113

Little Camas Reservoir

Size: 965 miles Year on 303(d):

Comments: Est. 2/10/00 by R. Steed. Unclassified, uses determined at time of assessment.

Description: Entire Little Camas Reservoir.

17050113008_00 HUC: 17050113

Little Camas Creek

Size: 30 miles Year on 303(d):

Comments: Est. 2/10/00 by R. Steed. Unclassified, uses determined at time of assessment.

Description: Headwaters to Little Camas Reservoir. Many of the streams within this waterbody have been observed to go dry.

17050113009_00 HUC: 17050113

Wood Creek

Size: 17.4 miles Year on 303(d):

Comments: Est. 2/10/00 by R. Steed. Unclassified, uses determined at time of assessment.

Description: Headwaters to Anderson Ranch Reservoir. Named streams include: Wood Creek, and Little Wood Creek.

17050113010_00 HUC: 17050113

Lime Creek

Size: 11.2 miles Year on 303(d):

Comments: Est. 2/10/00 by R. Steed. Unclassified, uses determined at time of assessment.

Description: Lower portion of Lime Creek watershed. This segment includes the mainstem from the concluence of the North and Middle Forks of Lime Creek to the slackwater in Anderson Ranch Reservoir.

17050113010_03 HUC: 17050113

Lower Forks Lime Creek

Size: 13.6 miles Year on 303(d):

Comments: Est. 2/10/00 by R. Steed. Unclassified, uses determined at time of assessment.

Description: Lower portion (third order) of the North Fork Lime Creek, Middle Fork Lime Creek, Slickear Creek, and Big Springs Creek.

17050113010_05 HUC: 17050113

Lime Creek Headwaters

Size: 145.8 miles Year on 303(d):

Comments: Est. 2/10/00 by R. Steed. Unclassified, uses determined at time of assessment.

Description: headwaters of Lime Creek watershed to downstream segments. Named streams include: Honey, Trail, Slickear, Sprout, Buckhorn, Cold Spring, Monroe, North Fork Lime, Middle Fork Lime, and Stewart Creeks; also Bear, Fox , Lotah, Gem, and Sedum Gulches.

17050113011_00 HUC: 17050113

South Fork Lime Creek

Size: 9.3 miles Year on 303(d):

Comments: Est. 2/10/00 by R. Steed. Unclassified, uses determined at time of assessment.

Description: This segment starts from the confluence of South Fork Lime Creek and an unnamed tributary upstream from Salt Log Creek and flows to it's confluence with Main Lime Creek.

17050113011_03 HUC: 17050113

South Fork Lime Creek headwaters

Size: 70.7 miles Year on 303(d):

Comments: Est. 2/10/00 by R. Steed. Unclassified, uses determined at time of assessment.

Description: This segment includes all of the tributaries to South Fork Lime Creek. Named streams include Salt Log Creek, Upper South Fork Lime Creek, Ear Creek, Poison Creek, Hearn Creek, Thompson Creek, Maxfield Creek, Hunter Creek, and Salix Creek.

17050113012_00 HUC: 17050113

Deer Creek

Size: 26.1 miles Year on 303(d): 1994

Comments: Est. 2/23/2000 by R. Steed. Unclassified waterbody. Uses established at time of assessment.

Description: Deer Creek from headwaters to Anderson Ranch Reservoir. Named tributaries include: Deer Creek, North Fork Deer Creek, South Fork Deer Creek, Big Deer Creek and Little Deer Creek.

17050113013_00 HUC: 17050113

South Fork Boise River (2)

Size: 22.2 miles Year on 303(d):

Comments: Est. 2/25/00 by R. Steed. Classified. Classified April 2000, Beneficial Uses have been designated in IDAPA 16.01.02.140.11

Description: This segment only include the mainstem of South Fork Boise River, from where it flows from Willow Creek to Anderson Ranch Reservoir.

17050113013_03 HUC: 17050113

Tributaries to South Fork Boise River (2)

Size: 68.8 miles Year on 303(d):

Comments: Est. 2/25/00 by R. Steed. Classified April 2000, Beneficial Uses have been designated in IDAPA 16.01.02.140.11.

Description: This segment only include the face drainages into the South Fork Boise River, from where it flows from Willow Creek to Anderson Ranch Reservoir. Towne, Tollgate, Waggontown, Fairview, Warlbois, Bird, Marsh Creeks, and Barker, Swain, Virginia, Abbot, P

17050113014_00 HUC: 17050113

Grouse Creek

Size: 17.6 miles Year on 303(d):

Comments: Est. March 6, 2000 by R. Steed. Unclassified. Beneficial Uses determined at time of initial assessment.

Description: From Headwater to South Fork Boise River. Includes Grouse Creek, Yellow Pine Creek, and Burgy Creek.

17050113015_00 HUC: 17050113

South Fork Boise River (3)

Size: 16.1 miles Year on 303(d):

Comments: Est. March 6, 2000 by R. Steed. Classified April 2000, Beneficial Uses have been designated in IDAPA 16.01.02.140.11.

Description: The mainstem of South Fork Boise River in the section between Smoky Creek and Willow Creek.

17050113015_03 HUC: 17050113

South Fork Boise River Tributaries (3)

Size: 61.6 miles Year on 303(d):

Comments: Est. March 6, 2000 by R. Steed. Classified April 2000, Beneficial Uses have been designated in IDAPA 16.01.02.140.11.

Description: The smaller face drainages in the section of South Fork Boise River Smoky Creek and Willow Creek. Named streams include: Jumbo Creek, Deadwood Creek, East and West Forks of Kelley Creek, and Myrtle Creek. Named Gulches include: Sevens, Van, Big Water,

17050113016_00 HUC: 17050113

Beaver Creek

Size: 11 miles Year on 303(d):

Comments: Est. March 6, 2000 by R. Steed. Unclassified. Beneficial Uses determined at time of initial assessment.

Description: Headwaters to South Fork Boise River

17050113017_00 HUC: 17050113

Boardman Creek

Size: 5 miles Year on 303(d):

Comments: Est. March 6, 2000 by R. Steed. Unclassified. Beneficial Uses determined at time of initial assessment.

Description: Boardment Creek from Headwaters to South Fork Boise River, and including Smokey Dome Canyon.

17050113017_03 HUC: 17050113

Boardman Creek Tributaries

Size: 19.7 miles Year on 303(d):

Comments: Est. March 6, 2000 by R. Steed. Unclassified. Beneficial Uses determined at time of initial assessment.

Description: Boardment Creek from Headwaters to South Fork Boise River, and including Smokey Dome Canyon.

17050113018_00 HUC: 17050113

Little Smoky Creek

Size: 9.4 miles Year on 303(d):

Comments: Est. March 6, 2000 by R. Steed. Unclassified. Beneficial Uses determined at time of initial assessment.

Description: Lower mainstem (4th order) portion of Little Smoky Creek. From the Confluence with Big Smoky Creek to South Fork Boise River.

17050113018_03 HUC: 17050113

Little Smoky Creek

Size: 11.1 miles Year on 303(d):

Comments: Est. March 6, 2000 by R. Steed. Unclassified. Beneficial Uses determined at time of initial assessment.

Description: mainstem (3rd order) portion of Little Smoky Creek. From Grindstone Creek to the Confluence with Big Smoky Creek, Lower Salt Creek, and Lower Grindstone Creek.

17050113018_05 HUC: 17050113

Little Smoky Creek Tributaries

Size: 136.1 miles Year on 303(d): 1998

Comments: Est. March 6, 2000 by R. Steed. Unclassified. Beneficial Uses determined at time of initial assessment.

Description: Headwater sections (1st and 2nd order) of streams that flow into Little Smoky Creek, and Little Smoky Creek upstream fom Grindstone Creek. Includes: Lick, Placer, Worswick, Grindstone, Carrie, Tyrannis, Blackhorse, Pine, Sheep, Liberal, Cannonball, S

17050113019_00 HUC: 17050113

Big Smoky Creek

Size: 14.2 miles Year on 303(d):

Comments: Est. March 6, 2000 by R. Steed. Unclassified. Beneficial Uses determined at time of initial assessment.

Description: The lower (4th order) mainstem portion of Big Smoky Creek from West Fork Big Smoky Creek to Little Smoky Creek.

17050113019_03 HUC: 17050113

Big Peak Creek

Size: 4.6 miles Year on 303(d):

Comments: Est. March 6, 2000 by R. Steed. Unclassified. Beneficial Uses determined at time of initial assessment.

Description: The mid (3th order) mainstem portion of Big Peak Creek from West Fork Big Peak Creek to Smoky Creek.

17050113019_04 HUC: 17050113

Big Smoky Creek

Size: 4.9 miles Year on 303(d):

Comments: Est. March 6, 2000 by R. Steed. Unclassified. Beneficial Uses determined at time of initial assessment.

Description: The mid (3rd order) mainstem portion of West Fork Big Smoky Creek, and (3rd order) mainstem portion North Fork Big Smoky Creek.

17050113019_05 HUC: 17050113

Tributaries to Big Peak Creek

Size: 28.3 miles Year on 303(d):

Comments: Est. March 6, 2000 by R. Steed. Unclassified. Beneficial Uses determined at time of initial assessment.

Description: The upper portions (1st and 2nd order portions) of Big Peak Creek . Including: Calf, Long Tom, West Fork Big Peak, and East Fork Big Peak Creeks.

17050113019_06 HUC: 17050113

Big Smoky Creek

Size: 88.8 miles Year on 303(d):

Comments: Est. March 6, 2000 by R. Steed. Unclassified. Beneficial Uses determined at time of initial assessment.

Description: The upper portions (1st and 2nd order portions) of Big Smoky Creek Watershed. Including: Barlow, Poison, Skillen, North Fork Big Smoky, Snowslide, Loggy, Mule, West Fork Big Smoky, Helen, Big Smoky, Blind Canyon, Spring, Royal, and Bluff Creeks.

17050113020_00 HUC: 17050113

Paradise Creek

Size: 14.5 miles Year on 303(d):

Comments: Est. March 6, 2000 by R. Steed. Unclassified. Beneficial Uses determined at time of initial assessment.

Description: Paradise Creek from Headwaters to Big Smoky Creek.

17050113021_00 HUC: 17050113

South Fork Boise River (4)

Size: 14.8 miles Year on 303(d):

Comments: Est. March 6, 2000 by R. Steed. Classified April 2000, Beneficial Uses have been designated in IDAPA 16.01.02.140.11.

Description: Mainstem (4th order) of South Fork Boise River in section from Johnson Creek to Smoky Creek.

17050113021_03 HUC: 17050113

Lower Emma Creek

Size: 2.9 miles Year on 303(d):

Comments: Est. March 6, 2000 by R. Steed. Classified April 2000, Beneficial Uses have been designated in IDAPA 16.01.02.140.11. Domestic Water Supply removed 9/27/00 by R. Steed

Description: Mainstem (3rd order) of Emma Creek in section from Unnammed Tributary to South Fork Boise River.

17050113021_05 HUC: 17050113

South Fork Boise River Tributaries (4)

Size: 70.8 miles Year on 303(d):

Comments: Est. March 6, 2000 by R. Steed. Classified April 2000, Beneficial Uses have been designated in IDAPA 16.01.02.140.11.

Description: Tributaries to South Fork Boise River (1st and 2nd order) in section from Johnson Creek to Smoky Creek. Includes OP Creek, Skunk Creek, Bridge Creek, High Creek, Bear Creek, Upper Emma Creek, and Elk Creek.

17050113022_00 HUC: 17050113

Johnson Creek

Size: 5.6 miles Year on 303(d):

Comments: Est. March 6, 2000 by R. Steed. Unclassified. Beneficial Uses determined at time of initial assessment.

Description: Mainstem Portion of Johnson Creek, from unnamed tributary near headwaters to South Fork Boise River.

17050113022_03 HUC: 17050113

Johnson Creek

Size: 18 miles Year on 303(d):

Comments: Est. March 6, 2000 by R. Steed. Unclassified. Beneficial Uses determined at time of initial assessment.

Description: Upper Johnson Creek and tributaries to Johnson Creek.

17050113023_00 HUC: 17050113

Ross Fork

Size: 1.39 miles Year on 303(d):

Comments: Est. March 6, 2000 by R. Steed. Unclassified. Beneficial Uses determined at time of initial assessment.

Description: Lower (3rd order) portion of Ross Fork from unnamed tributary to Johnson Creek

17050113023_03 HUC: 17050113

Ross Fork

Size: 33.7 miles Year on 303(d):

Comments: Est. March 6, 2000 by R. Steed. Unclassified. Beneficial Uses determined at time of initial assessment.

Description: Upper (1st and 2nd order) portion of Ross Fork. Includes South Fork Ross Fork, North Fork of Ross Fork and Ross Fork.

17050113024_00 HUC: 17050113

Skeleton Creek

Size: 6 miles Year on 303(d):

Comments: Est. March 7, 2000 by R. Steed. Unclassified. Beneficial Uses determined at time of initial assessment.

Description: Mainstem segment (3rd order) of Skeleton Creek, from the confluence with West Fork of Skeleton Creek to South Fork Boise River.;

17050113024_03 HUC: 17050113

Skeleton Creek Tributaries

Size: 27.1 miles Year on 303(d):

Comments: Est. March 7, 2000 by R. Steed. Unclassified. Beneficial Uses determined at time of initial assessment.

Description: Upper segments (1st and 2nd order) of Skeleton Creek.

17050113025_00 HUC: 17050113

Willow Creek

Size: 5.8 miles Year on 303(d):

Comments: Est. March 7, 2000 by R. Steed. Classified April 2000, Beneficial Uses have been designated in IDAPA 16.01.02.140.11.

Description: Upper segments of Willow Creek (1st and 2nd order) including: Edna, Haypress, Badger, Fern, Gunsight, and Heather Creeks.

17050113025_03 HUC: 17050113

Willow Creek Tributaries

Size: 22.6 miles Year on 303(d):

Comments: Est. March 7, 2000 by R. Steed. Classified April 2000, Beneficial Uses have been designated in IDAPA 16.01.02.140.11.

Description: Mainstem Willow Creek from its confluence with Haypress Creek to South Fork Boise River.

17050113026_00 HUC: 17050113

Shake Creek

Size: 12.2 miles Year on 303(d):

Comments: Est. March 7, 2000 by R. Steed. Classified April 2000, Beneficial Uses have been designated in IDAPA 16.01.02.140.11.

Description: Headwaters to South Fork Boise River. Includes: Shake Creek, West Fork Shake Creek, and Regina Creek.

17050113027_00 HUC: 17050113

Feather River

Size: 6.19 miles Year on 303(d):

Comments: Est. March 7, 2000 by R. Steed. Classified April 2000, Beneficial Uses have been designated in IDAPA 16.01.02.140.11.

Description: Mainstem segment (4th order) portion that flows from the confluence with North Fork Feather River to South Fork Boise River.

17050113027_01 HUC: 17050113

Cayuse Creek

Size: 15.06 miles Year on 303(d): 1994

Comments: Est. March 7, 2000 by R. Steed. Classified April 2000, Beneficial Uses have been designated in IDAPA 16.01.02.140.11.

Description: Cayuse Creek from headwaters to Feather River. Includes: Little Cayuse Creek, Cayuse Creek, and Three Forks Creek.

17050113027_02 HUC: 17050113

North Fork Feather River

Size: 7.14 miles Year on 303(d): 1994

Comments: Est. March 7, 2000 by R. Steed. Classified April 2000, Beneficial Uses have been designated in IDAPA 16.01.02.140.11.

Description: Feather River from Headwaters to Feather River.

17050113027_03 HUC: 17050113

Feather River

Size: 1.46 miles Year on 303(d):

Comments: Est. March 7, 2000 by R. Steed. Classified April 2000, Beneficial Uses have been designated in IDAPA 16.01.02.140.11.

Description: Mainstem portion (3rd order) of Feather River from it's confluence with Steel Creek to North Fork Feather River.

17050113027_04 HUC: 17050113

Tributaries to Elk Creek

Size: 15.69 miles Year on 303(d):

Comments: Est. March 7, 2000 by R. Steed. Classified April 2000, Beneficial Uses have been designated in IDAPA 16.01.02.140.11.

Description: Upper Portions of Elk Creek. Includes: Elk Creek, Boiler grade Creek, East Fork Elk Creek, Alta Creek, and Sand Creek.

17050113027_05 HUC: 17050113

Feather River Tributaries

Size: 45.92 miles Year on 303(d):

Comments: Est. March 7, 2000 by R. Steed. Classified April 2000, Beneficial Uses have been designated in IDAPA 16.01.02.140.11.

Description: Upper Portions of Feather River. Includes Feather River, Steel Creek, Charcoal Creek, Bear Creek, Wide West Gulch, Red Warrior Creek, Lincoln Creek, and Cow Creek

17050113028_00 HUC: 17050113

Trinity Creek

Size: 5.6 miles Year on 303(d):

Comments: Est. March 7, 2000 by R. Steed. Unclassified. Beneficial Uses determined at time of initial assessment.

Description: Mainstem of Trinity Creek and Lower Portion of Parks Creek (3rd order).

17050113028_03 HUC: 17050113

Trinity Creek Tributaries

Size: 50.2 miles Year on 303(d):

Comments: Est. March 7, 2000 by R. Steed. Unclassified. Beneficial Uses determined at time of initial assessment.

Description: Upper Portions of Trinity Creek Watershed (1st and 2nd order) Incluedes: Trinity Creek, Parks, Middle Parks, West Parks, Rainbow, North Fork Trinity, Whiskey Jack, Johnson Fork and Spring Creeks.

17050113029_00 HUC: 17050113

Green Creek

Size: 7.3 miles Year on 303(d):

Comments: Est. March 7, 2000 by R. Steed. Unclassified. Beneficial Uses determined at time of initial assessment.

Description: Green Creek, from headwaters to South Fork Boise River.

17050113030_00 HUC: 17050113

Dog Creek

Size: 11.1 miles Year on 303(d):

Comments: Est. March 7, 2000 by R. Steed. Unclassified. Beneficial Uses determined at time of initial assessment.

Description: Dog Creek, from headwaters to South Fork Boise River.

17050113031_00 HUC: 17050113

Fall Creek

Size: 5 miles Year on 303(d):

Comments: Est. March 7, 2000 by R. Steed. Unclassified. Beneficial Uses determined at time of initial assessment.

Description: Lower Fall Creek (4th order) portion from Fall Creeks confluence with Tally Creek to South Fork Boise River.

17050113031_03 HUC: 17050113

Middle Fall Creek

Size: 4.7 miles Year on 303(d):

Comments: Est. March 7, 2000 by R. Steed. Unclassified. Beneficial Uses determined at time of initial assessment.

Description: Middle Fall Creek (3rd order) portion from Fall Creeks confluence with East Fork Fall Creek to Tally Creek.

17050113031_05 HUC: 17050113

Fall Creek Tributaries

Size: 84.1 miles Year on 303(d):

Comments: Est. March 7, 2000 by R. Steed. Unclassified. Beneficial Uses determined at time of initial assessment.

Description: Upper portions of Fall Creek Watershed (1st and 2nd order). Includes: Knox, Myrtle, Meadow, Stayley, Anderson, No Name, Burnt, West Fork Fall, East Fork
Fall, Vig Spring, Windy, Bear Hold, Sheldon, Guay, Baker, Tally, and Camp Creeks.

17050113032_00 HUC: 17050113

Smith Creek

Size: 16.4 miles Year on 303(d): 1994

Comments: Est. March 7, 2000 by R. Steed. Classified April 2000, Beneficial Uses have been designated in IDAPA 16.01.02.140.11.

Description: Lower Smith Creek, mainstem (3rd order) portions from Mule Gulch to South Fork Boise River.

17050113032_03 HUC: 17050113

Smith Creek Tributaries

Size: 47.3 miles Year on 303(d):

Comments: Est. March 7, 2000 by R. Steed. Classified April 2000, Beneficial Uses have been designated in IDAPA 16.01.02.140.11.

Description: Upper Smith Creek, tributaries (1st and 2nd order) portions including: Graves, Spring, Lava, Louse, Strawberry, Tiger, Mule, Smith, East Fork Smith, and Washboard Creeks.

17050113033_00 HUC: 17050113

Rattlesnake Creek

Size: 11.8 miles Year on 303(d): 1994

Comments: Est. March 7, 2000 by R. Steed. Unclassified. Beneficial Uses determined at time of initial assessment.

Description: Lower Rattlesnake Creek, Mainstem (3rd order) portion from Slater Creek to South Fork Boise River.

17050113033_03 HUC: 17050113

Rattlesnake Creek Tributaries

Size: 43.3 miles Year on 303(d):

Comments: Est. March 7, 2000 by R. Steed. Unclassified. Beneficial Uses determined at time of initial assessment.

Description: Upper Rattlesnake Creek, tributary (3rd order) portions, including: Grape, Elk, Corral, Little Rattlesnake, Tipton, Rattlesnake, Slater Creeks; Russel and Bear Gulchs.

Appendix T2. Fish species present in the Boise River basin from Arrowrock Dam upstream to the headwaters.

COMMON NAME	SCIENTIFIC NAME
Mottled Sculpin (n)	*Cottus bairdi*
Shorthead Sculpin (n)	*Cottus confusus*
Redband Trout (n)	*Oncorhynchus mykiss gairdneri*
Mountain Whitefish (n)	*Prosopium williamsoni*
Bull Trout (n)	*Salvelinus confluentus*
Chiselmouth Chub (n)	*Acroheilus alutaceus*
Northern Pike Minnow (n)	*Ptychocheilus oregonensis*
Redside Shiner (n)	*Richardsonius balteatus*
Longnose Dace (n)	*Rhinichthys cataractae*
Speckled Dace (n)	*Rhinichthys osculus*
Largescale Sucker (n)	*Catostomus macrocheilus*
Bridgelip Sucker (n)	*Catostomus columbianus*
Mountain Sucker (n)	*Catostomus platyrhynchus*
Fall Chinook Salmon (i)	*Oncorhynchus tshawytscha*
Westslope Cutthroat Trout (i)	*Oncorhynchus clarki lewisi*
Rainbow Trout-hatchery origin (i)	*Oncorhynchus mykiss*
Kokanee Salmon (i)	*Oncorhynchus nerka*
Brook trout (i)	*Salvelinus fontinalis*
Smallmouth Bass (i)	*Micropterus dolomieui*
Yellow Perch (i)	*Perca flavescens*
Brown Bullhead (i)	*Ictalurus nebulosus*

(n) = native species
(i) = introduced species

Adopted from a list developed by Dale Allen, IDFG, Southwest Region, on 5-13-97

Appendix T3 - 1998 303(d) Information for Idaho

Waterbody ID:	Segment ID:	Catalog Unit	Segment Name	Size	Size in	1st Year Listed	Designated Uses	Causes of Impairment	Sources of Impairment
17050111001	03	17050111	Buck Creek	14.1	Miles	1994	F42,F80,F82,F83		
17050111009	00	17050111	Browns Creek	13.04	Miles	1994	F42,F80,F82		
17050113002	00	17050113	Willow Creek	2.4	Miles	1994	F42,F80,F82		
17050113002	01	17050113	Willow Creek	11.2	Miles	1994	F42,F80,F82		
17050113004	00	17050113	South Fork Boise River	31.6	Miles	1994	F42,F80,F82,F83		
17050113012	00	17050113	Deer Creek	26.1	Miles	1994	F42,F80,F82		
17050113018	05	17050113	Little Smoky Creek	136.1	Miles	1998	F42,F82,T80	1101	
17050113027	01	17050113	Cayuse Creek	15.06	Miles	1994	F42,F80,F82		
17050113027	02	17050113	North Fork Feather	7.14	Miles	1994	F42,F80,F82		
17050113032	00	17050113	Smith Creek	16.4	Miles	1994	F42,F80,F82		
17050113033	00	17050113	Rattlesnake Creek	11.8	Miles	1994	F44,F80,F82		

Appendix T4 - Explanation for codes and abbreviations used in Appendices

Category	Code	Abbreviation For
Uses	42	Primary Contact Recreation
	44	Secondary Contact Recreation
	80	Cold Water Biota
	82	Salmonid Spawning
	83	Domestic Water Supply
Use Status	F	Fully Supporting
	N	Not Supporting
	X	Not Assessed
	T	Fully Supporting but Threatened
	A	Not Attainable
Caused of Impairment	0	Cause Unknown
	900	Nutrients
	2210	Algal Growth/Chlorophyll a
	500	Metals
	510	Arsenic
	530	Copper
	550	Lead
	560	Mercury
	580	Zinc
	1101	Sediment
	1500	Flow alteration
	1600	Other habitat alterations
	2600	Exotic species
Sources of Impairment	1000	Agriculture
	1350	Grazing related Sources
	1500	Range grazing - Riparian and/or Upland
	2000	Silviculture
	2300	Logging Road Construction/Maintenance
	3100	Construction
	5000	Resource Extraction
	5600	Mill Tailings
	8600	Natural Sources
	8910	Groundwater Loadings
	9000	Source Unknown
Assessment Types	M	Monitored
	E	Evaluated
Assessment Methods	120	Surveys of fish and game biologists/other professionals
	150	Monitoring data more than 5 years old
	170	Best professional judgement
	190	Biological/habitat data extrapolated from upstream or downstream waterbody
	210	Fixed station physical/chemical monitoring (conventional pollutants only)
	275	PWS chemical monitoring (finished water)
	310	Ecological/habitat surveys
	330	Fixed station physical/chemical (conventional plus toxic pollutants)
	365	Visual observation, usually at road crossings; professional not required
	375	Visual observation, may not quantify some parameters; single season; by prof.
	420	Water column surveys (e.g. fecal coliform)
	720	Biosurveys of multiple taxonomic groups (e.g. fish/invertebrates/algae)
	800	ASSESSMENTS BASED ON DATA FROM OTHER SOURCES
	860	Other Agencies/Organizations provided monitoring data
	941	Idaho Waterbody Assessment Guidance 1996
	942	Draft Idaho Lake and Reservoir Assessment Framework

Appendix T5. Upper Boise River, Sources for establishing beneficial uses by waterbody

Wednesday, February 14, 2001

WBIDSEGID	Domestic Water Supply	Cold Water Biota	Salmonid Spawning	Primary Contact Recreation	Secondary Contact Recreation
17050111001_00	D	D, M	D	D	
17050111001_01	D, S	D, M	D	D	
17050111001_03	D	D, F, M	D, F	D	
17050111001_04	D, S	D, M	D	D	
17050111001_05	D	D, F, M	D, F	D, O	
17050111001_06	D	D, M	D	D	
17050111001_09	D, S	D	D	D	
17050111001_10	D	D, F, M	D, F	D	
17050111001_13	D, S	D	D	D	
17050111001_14	D	D, F	D, F	D	
17050111001_15	D, P	D	D, L	D	
17050111002_00		A, F, M	F	O	
17050111002_01		A, F, M	F	O	
17050111003_00		A			A
17050111004_00		A, F, M	F		A
17050111004_01		A, F	F		A
17050111005_00		A, F	F		A
17050111005_01		A, F	F		A
17050111006_00		A			A
17050111006_01		A, F	F		A
17050111007_00		A, F	F		A
17050111008_00		A			A
17050111008_01		A, F	F		A
17050111009_00	D, S	D, B, M	D, B	D	
17050111010_00	D	D, F	D, F	D	
17050111010_03	D	D	D	D	
17050111010_04	D	D, F	D, F	D	
17050111010_06	D	D	D	D	
17050111010_07	D	D, F, B, M	D, F, B	D	
17050111010_08	D	D, F	D, F	D	
17050111010_09	D	D	D	D	
17050111010_10	D	D	D	D	
17050111010_11	D	D, F	D, F	D	
17050111010_12	D	D, F	D, F	D	

Appendix T5. Upper Boise River, Sources for establishing beneficial uses by waterbody

Wednesday, February 14, 2001

WBIDSEGID	Domestic Water Supply	Cold Water Biota	Salmonid Spawning	Primary Contact Recreation	Secondary Contact Recreation
17050111010_14	D	D	D	D	
17050111010_15	D	D, F	D, F	D	
17050111010_17	D	D	D	D	
17050111010_18	D	D, F, M	D, F	D	
17050111010_20	D	D, F	D, F	D	
17050111011_00		A, F	F		A
17050111011_01		A, F	F		A
17050111012_00		A, F	F		A
17050111012_01		A, F	F		A
17050111013_00		D, F, B, M	D, F, B	D	
17050111014_00		D, F, M	D, F	D	
17050111014_01		D, F	D, F	D	
17050111014_02		D, F, M	D, F	D	
17050111014_04		D, F, M	D, F	D, O	
17050111014_06		D, F, M, L	D, F, L	D, O	
17050111014_07		D, F, M	D, F	D, O	
17050111015_00		D, F, M	D, F	D	
17050111015_01		D, F, M	D, F	D	
17050111016_00		A, M			A
17050111017_00		A, F	F		A
17050113001_00*	D	D	D	D	
17050113002_00		A, F	F	O	
17050113002_03		A			A
17050113003_00		D, B	D, B	D	
17050113003_03		D, B, M	D, B	D	
17050113004_00	D	D	D	D, R	
17050113004_03	D	D	D	D, R	
17050113004_05	D	D, F, M	D, F	D, R	
17050113005_03	D	D, F	D, F	D, R	
17050113005_05	D	D	D	D, R	
17050113005L_00		A, L		R	
17050113006_00		A			A
17050113007_00		A			A
17050113007_03		A			A
17050113007L_00		A, L			A

Appendix T5. Upper Boise River, Sources for establishing beneficial uses by waterbody

Wednesday, February 14, 2001

WBIDSEGID	Domestic Water Supply	Cold Water Biota	Salmonid Spawning	Primary Contact Recreation	Secondary Contact Recreation
17050113008_00		A			A
17050113009_00		A			A
17050113010_00		A, F, M	F		A
17050113010_03		A, F	F		A
17050113010_05		A, F	F		A
17050113011_00		A			A
17050113011_03		A			A
17050113012_00		A, F	F	R	
17050113013_00	D	D, M	D	D, R	
17050113013_03	D, S	D, F, M	D, F	D, R, O	
17050113014_00		D, F, M	D, F	D	
17050113015_00	D	D	D	D	
17050113015_03	D	D, F	D, F	D	
17050113016_00		A, F	F		A
17050113017_00		A, M		O	
17050113017_03		A			A
17050113018_00		A, B, M	B		A
17050113018_03		A, F, B, M	F, B		A
17050113018_05		A, F, B, M	F, B	O	
17050113019_00		A, M		O	
17050113019_03		A			A
17050113019_04		A			A
17050113019_05		A, M		O	
17050113019_06		A, M		O	
17050113020_00		A, F, B, M	F, B	O	
17050113021_00	D	D, M	D	D	
17050113021_03	D	D, M	D	D, O	
17050113021_05	D	D, F, B, M	D, F, B	D, O	
17050113022_00		A			A
17050113022_03		A			A
17050113023_00		A, M		O	
17050113023_03		A, F, M	F		A
17050113024_00		A, F, M	F	O	
17050113024_03		A, F	F		A

Appendix T5. Upper Boise River, Sources for establishing beneficial uses by waterbody

Wednesday, February 14, 2001

WBIDSEGID	Domestic Water Supply	Cold Water Biota	Salmonid Spawning	Primary Contact Recreation	Secondary Contact Recreation
17050113025_00		D	D	D	
17050113025_03		D	D	D	
17050113026_00		D, F, B, M	D, F, B	D	
17050113027_00		D, B, M	D, B	D, O	
17050113027_01		D, F, M	D, F	D	
17050113027_02		D, M	D	D	
17050113027_03		D, M	D	D	
17050113027_04		D, F, M	D, F	D	
17050113027_05		D, F, M	D, F	D	
17050113028_00		A, F, M	F		A
17050113028_03		A, F, M	F	O	
17050113029_00		A, F, M	F		A
17050113030_00		A, F, M	F	R	
17050113031_00		A, F	F		A
17050113031_03		A, F	F		A
17050113031_05		A, F, B, M	F, B	O	
17050113032_00		D, F, B, M	D, F, B	D, L	
17050113032_03		D, F	D, F	D	
17050113033_00		A, F, M	F		A
17050113033_03		A, F	F		A

Explanation

A - Undesignated beneficial uses default use (IDAPA 16.01.02.101.01.a.) Because Idaho Division of Environmental Quality presumes most waters in the state will support cold water biota and primary or secondary contact recreation beneficial uses, the DEQ will apply cold water bioata and primary or secondary contact recreation criteria to undesignated waters.

B - Determined to be and existing use using fish, by finding juvenile salmonids shorter than 100mm long in Idaho DEQ Beneficial Use Reconnasance Project data.

D - Designated beneficial uses (IDAPA 16.01.02.140.09 and IDAPA 16.01.02.140.11.). Designated in Idaho Water Quality Standards, including 4-5-00 updates.

F - Determined to be and existing use using fish, by finding juvenile salmonids shorter than four inches long in Boise National Forest Aquatic Database

G - Determined to be an existing use through examination and distributation of grazing allotments, private, state, and BLM lands.

L - Authors personal knowledge

M - Determined to be an existing use using macroinvertebrate cold water indicators from Idaho DEQ Beneficial Use Reconnasance Project data.

O - Determined to be existing use through examination and distributation of BURP crew observation and documentation of existing use.

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Appendix T5. Upper Boise River, Sources for establishing beneficial uses by waterbody

Wednesday, February 14, 2001

P - Determined to be existing use through examination and distributation of Public Water Supply records at DEQ Boise Regional Office.

R - Determined to be existing use through examination and distributation of Boise National Forest recreational sites and their classification.

S – Determined to be existing use through examination and distribution of Recreational Dredge Mining use.

***** - This waterbody is a “River Waterbody”, and includes all of the river segments that flow into the slack waters of Arrowrock Reservoir. This waterbody includes a short portion of South Fork Boise River when Arrowrock reservoir is low and waters flow to it’s conservation pool. Designations for Arrowrock Reservoir the “Lake/Reservoir Waterbody” are in downstream cataloging unit (17050112).

Appendix T6 - Waterbody Specific Information for River

Waterbody ID:	Segment ID:	Catalog Unit	Segment Name	Size in Miles	Cycle Year	Key Sample Date	Assessment Type/Methods	Designated Uses	Causes of Impairment	Sources of Impairment
17050111001	00	17050111	Middle Fork Boise	14.74	1998		E / 941	F42,F80,F82,F83		
17050111001	01	17050111	Middle Fork Boise	45.5			M / 941	F42,F80,F83,X82		
17050111001	03	17050111	Buck Creek	14.1	2002		M / 375,941	F42,F80,F82,F83		
17050111001	04	17050111	Middle Fork Boise	8.2	1998		M / 941	F42,F80,F82,F83		
17050111001	05	17050111	Middle Fork Boise	54.97	2002		M / 941	F42,F80,F82,F83		
17050111001	06	17050111	Middle Fork Boise	4.37	2002		M / 941	F42,F80,F82,F83		
17050111001	09	17050111	Middle Fork Boise	11.27	1998		E / 941	F42,F80,F82,F83		
17050111001	10	17050111	Middle Fork Boise	39.85	2002		M / 941	F42,F80,F82,F83		
17050111001	13	17050111	Middle Fork Boise	7.73	1998		E / 941	F42,F80,F82,F83		
17050111001	14	17050111	Middle Fork Boise	64.45			E / 170,330, 860	F80,F82,X42,X83		
17050111001	15	17050111	Montezuma Creek	1.62	2002		E / 120,210, 310,800	F42,F80,F82,X83		
17050111001	16	17050111	East Fork Montezuma	1.89	2002		M / 275	F83,X42,X80,X82		
17050111002	00	17050111	Lower East Fork	8.12	1998		M / 941	F42,F80,F82		
17050111002	01	17050111	Upper East Fork	30.95	2002		M / 941	F42,F80,F82		
17050111003	00	17050111	Hot Creek	8.08	2002		M / 941	F44,F80		
17050111004	00	17050111	Yuba River	4.55	2002		M / 941	F44,F80,F82		
17050111004	01	17050111	Yuba River	34.7	2002		M / 941	F44,F80,F82		
17050111005	00	17050111	Decker Creek	1.15	2002		M / 941	F44,F80,F82		
17050111005	01	17050111	Decker Creek	24.27	2002		M / 941	F44,F80,F82		
17050111006	00	17050111	Queens River	2.19	2002		E / 170,190, 365	F44,F80		
17050111006	01	17050111	Queens River	33.7	2002		M / 941	F44,F80,F82		
17050111007	00	17050111	Little Queens River	24.52	2002		E / 150,170, 330,365	F44,F80,F82		
17050111008	00	17050111	Black Warrior Creek	2.38	2002		M / 150,941	F44,F80		
17050111009	00	17050111	Browns Creek	13.04	2002		M / 170,365, 941	F42,F80,F82		
17050111010	00	17050111	North Fork Boise River	9.15	2002		E /	X42,X80,X82,X83		
17050111010	03	17050111	North Fork Boise River	9.54	2002		E /	X42,X80,X82,X83		

Waterbody Specific Information for River

Waterbody ID:	Segment ID:	Catalog Unit	Segment Name	Size in Miles	Cycle Year	Key Sample Date	Assessment Type/Methods	Designated Uses	Causes of Impairment	Sources of Impairment
17050111010	04	17050111	North Fork Boise River	23.69	2002		M / 170,941, 942	F42,F82,F83,T80	1101	
17050111010	06	17050111	North Fork Boise River	4.45	2002		E /	X42,X80,X82,X83		
17050111010	07	17050111	North Fork Boise River	10.55	1998		M / 941	F42,F80,F82,F83		
17050111010	08	17050111	Trapper Creek and	9.22	2002		E / 120,170, 375	A80,A82,X42,X83		
17050111010	09	17050111	North Fork Boise River	4.77	2002		E /	X42,X80,X82,X83		
17050111010	10	17050111	North Fork Boise River	7.15	2002		E / 170	X42,X80,X82,X83		
17050111010	11	17050111	Trail Creek Mainstem	1.7	2002		M / 941	F42,F80,F82,F83		
17050111010	12	17050111	Trail Creek	9.86	2002		E / 170,941	F42,F82,F83,T80	1101	
17050111010	14	17050111	North Fork Boise River	8.34	2002		E / 170	X42,X80,X82,X83		
17050111010	15	17050111	North Fork Boise River	27.62	2002		M / 941	F42,F80,F82,F83		
17050111010	17	17050111	North Fork Boise River	7.05	2002		E / 170	X42,X80,X82,X83		
17050111010	18	17050111	North Fork Boise River	25.86	1998		M / 941	F42,F80,F82,F83		
17050111010	20	17050111	North Fork Boise River	34.46	2002		E / 170	F80,F82,X42,X83		
17050111011	00	17050111	Johnson Creek	4	2002		E / 170	F80,F82,X44		
17050111011	01	17050111	Johnson Creek	27.53	2002		E /	F80,F82,X44		
17050111012	00	17050111	Bear River	8.18	2002		M / 170,941	F44,F82,T80	2600	
17050111012	01	17050111	Bear River	39.27	2002		E / 170,330	F82,T80,X44	2600	
17050111013	00	17050111	Big Owl/Little Owl	12.7	1998		E / 170,941	F42,F82,T80	1101	
17050111014	00	17050111	Crooked River	12.82	1998		E / 175	F42,F82,T80	1101	2000,8600
17050111014	01	17050111	Crooked River	40.39	2002		M / 170,941	F82,N80,X42	1101,2600	2000,2300,8600
17050111014	02	17050111	Beaver Creek	22.77	2002		M / 170,941	F82,N80,X42	1101,2600	9000
17050111014	04	17050111	Crooked River	4.86	1998		M / 941	F42,F80,F82		
17050111014	06	17050111	Pikes Fork	26.12	2002		M / 170,941	F42,F82,T80	1101,2600	
17050111014	07	17050111	Crooked River	34.9	2002		M / 941	F42,F80,F82		
17050111015	00	17050111	Rabbit Creek	6.39	2002		E / 120,941	F82,N80,X42	0	9000
17050111015	01	17050111	Rabbit Creek	34.33	2002		E / 170,941	F42,F82,T80	1101	
17050111016	00	17050111	Meadow Creek	7.28	2002		E / 170,941	N80,X44	1101	9000
17050111017	00	17050111	French Creek	10.83	2002		E / 120,170, 941	F44,F82,N80	1101	9000
17050113001	00	17050113	Arrowrock Reservoir	15.3	2002		E / 170	X42,X80,X82,X83		

Waterbody Specific Information for River

Waterbody ID:	Segment ID:	Catalog Unit	Segment Name	Size in Miles	Cycle Year	Key Sample Date	Assessment Type/Methods	Designated Uses	Causes of Impairment	Sources of Impairment
17050113003	00	17050113	Wood Creek	2	2002		M / 941	F42,F80,F82		
17050113003	03	17050113	Wood Creek	29.1	2002		M / 170,941	F42,F80,X82		
17050113004	00	17050113	South Fork Boise River	31.6	2002		E / 110,170, 375	F42,F80,F82,F83		
17050113004	03	17050113	Lower Dry Buck Creek	9.8	2002		E / 170	X42,X80,X82,X83		
17050113004	05	17050113	Tributaries to South	152	2002		M / 170,941	F42,F80,F82,F83		
17050113006	00	17050113	Little Camas Creek	5.7	2002		E /	X44,X80		
17050113009	00	17050113	Wood Creek	17.4	2002		E / 170	X44,X80		
17050113010	00	17050113	Lime Creek	11.2	1998		E / 941	F44,F80,F82		
17050113010	03	17050113	Lower Forks Lime	13.6	2002		E / 941	F44,F80,F82		
17050113010	05	17050113	Lime Creek	145.8	2002		E / 170,941	F44,F80,F82		
17050113011	00	17050113	South Fork Lime Creek	9.3	2002		M / 170,941	X44,X80		
17050113011	03	17050113	South Fork Lime Creek	70.7	2002		E / 150,170, 190,941	F44,F80		
17050113012	00	17050113	Deer Creek	26.1	2002		E / 941	F42,F80,F82		
17050113013	00	17050113	South Fork Boise River	22.2	1998		E / 941	F42,F80,F82,F83		
17050113013	03	17050113	Tributaries to South	68.8	2002		E / 150,941	F42,F80,F82,F83		
17050113014	00	17050113	Grouse Creek	17.6	2002		M / 941	F42,F82,T80	1101	
17050113015	00	17050113	South Fork Boise River	16.1	2002		E / 170	X42,X80,X82,X83		
17050113015	03	17050113	South Fork Boise River	61.6	2002		E / 150,941	F42,F80,F82,F83		
17050113016	00	17050113	Beaver Creek	11	2002		E / 120,150, 170	F82,X44,X80		
17050113017	00	17050113	Boardman Creek	5	2002		M / 941	F42,F80		
17050113018	00	17050113	Little Smoky Creek	9.4	2002		E / 150,170, 190,941	F44,F82,T80	1101	
17050113018	03	17050113	Little Smoky Creek	11.1	2002		E / 120,150, 941	F44,F82,T80	1101	
17050113018	05	17050113	Little Smoky Creek	136.1	2002		M / 941	F42,F82,T80	1101	
17050113019	00	17050113	Big Smoky Creek	14.2	2002		M / 941	F42,F80		
17050113019	03	17050113	Big Peak Creek	4.6	2002		E / 170	X44,X80		
17050113019	04	17050113	Big Smoky Creek	4.9	2002		E / 170	X44,X80		
17050113019	05	17050113	Tributaries to Big Peak	28.3	2002		E /	X42,X80		
17050113019	06	17050113	Big Smoky Creek	88.8	2002		M / 941	F42,F80		

Waterbody Specific Information for River

Waterbody ID:	Segment ID:	Catalog Unit	Segment Name	Size in Miles	Cycle Year	Key Sample Date	Assessment Type/Methods	Designated Uses	Causes of Impairment	Sources of Impairment
17050113020	00	17050113	Paradise Creek	14.5	2002		E / 150,170, 941	F42,F82,T80	2600	
17050113021	00	17050113	South Fork Boise River	14.8	1998		E / 941	F42,F80,F82,F83		
17050113021	03	17050113	Lower Emma Creek	2.9	2002		M / 941	F42,F80,X82		
17050113021	05	17050113	South Fork Boise River	70.8	2002		E / 150,941	F42,F80,F82,F83		
17050113022	00	17050113	Johnson Creek	5.6	2002		E /	X44,X80		
17050113022	03	17050113	Johnson Creek	18	2002		E / 170	X44,X80		
17050113023	00	17050113	Ross Fork	1.39	2002		M / 120,150, 190,941	F42,F80,F82		
17050113023	03	17050113	Ross Fork	33.7	2002		M / 941	F44,F80,F82		
17050113024	00	17050113	Skeleton Creek	6	2002		M / 120,150, 941	F42,F80,F82		
17050113024	03	17050113	Skeleton Creek	27.1	2002		E / 120,150, 170	F44,F80,F82		
17050113025	00	17050113	Willow Creek	5.8	2002		E / 170	X42,X80,X82		
17050113025	03	17050113	Willow Creek	22.6	2002		E / 170	X42,X80,X82		
17050113026	00	17050113	Shake Creek	12.2	2002		M / 941	F42,F80,F82		
17050113027	00	17050113	Feather River	6.19	2002		M / 170,941	F42,F80,X82		
17050113027	01	17050113	Cayuse Creek	15.06	2002		M / 941	F42,F80,F82		
17050113027	02	17050113	North Fork Feather	7.14	2002		E / 150,941	F42,F80,F82		
17050113027	03	17050113	Feather River	1.46	2002		E / 941	F42,F80,X82		
17050113027	04	17050113	Tributaries to Elk Creek	15.69	2002		E / 170	X42,X80,X82		
17050113027	05	17050113	Feather River	45.92	2002		E / 941	F42,F80,F82		
17050113028	00	17050113	Trinity Creek	5.6	2002		M / 941	F44,F80,F82		
17050113028	03	17050113	Trinity Creek	50.2	2002		E / 941	F42,F80,F82		
17050113029	00	17050113	Green Creek	7.3	2002		E / 120,150, 941	F44,F80,F82		
17050113030	00	17050113	Dog Creek	11.1	2002		E / 941	F42,F80,F82		
17050113031	00	17050113	Fall Creek	5	2002		E / 120,150, 170	F80,F82,X44		
17050113031	03	17050113	Middle Fall Creek	4.7	2002		E / 120,150, 170,365	F80,F82,X44		
17050113031	05	17050113	Fall Creek Tributaries	84.1	2002		E / 941	F42,F80,F82		
17050113032	00	17050113	Smith Creek	16.4	2002		M / 941	F42,F80,F82		

Waterbody Specific Information for River

Waterbody ID:	Segment ID:	Catalog Unit	Segment Name	Size in Miles	Cycle Year	Key Sample Date	Assessment Type/Methods	Designated Uses	Causes of Impairment	Sources of Impairment
17050113032	03	17050113	Smith Creek	47.3	2002		E / 170	F80,F82,X42	2600	
17050113033	00	17050113	Rattlesnake Creek	11.8	2002		E / 120,150, 941	F44,F80,F82		
17050113033	03	17050113	Rattlesnake Creek	43.3	2002		E / 120,150, 170,190	F44,F80,F82		

Appendix T7 - Waterbody Specific Information for Intermittent Stream

Waterbody ID:	Segment ID:	Catalog Unit	Segment Name	Size in Miles	Cycle Year	Key Sample Date	Assessment Type/Methods	Designated Uses	Causes of Impairment	Sources of Impairment
17050113002	00	17050113	Willow Creek	2.4	2002		E / 170,190	F42,F80,F82		
17050113002	01	17050113	Willow Creek	11.2	2002		M / 170,941	F42,F80,F82		
17050113002	03	17050113	Willow Creek	61.1	2002		M / 170,375	A44,A80		
17050113005	03	17050113	Anderson Ranch	1.4	2002		E / 941	F42,F80,F82,F83		
17050113005	05	17050113	Anderson Ranch	80.7	2002		E / 170	X42,X80,X82,X83		
17050113007	00	17050113	Cat Creek	3.1	2002		E / 170	X44,X80		
17050113007	03	17050113	Little Camas	24.8	2002		E / 170	X44,X80		
17050113008	00	17050113	Little Camas Creek	30	2002		E / 170	X44,X80		

Appendix T8 - Waterbody Specific Information for Freshwater Lake

Waterbody ID:	Segment ID:	Catalog Unit	Segment Name	Size in Acre	Cycle Year	Key Sample Date	Assessment Type/Methods	Designated Uses	Causes of Impairment	Sources of Impairment
17050113005L	00	17050113	Anderson Ranch	4605	2002	07/09/1998	M / 310,720, 942	F42,F80,X82		
17050113007L	00	17050113	Little Camas Reservoir	965	2002	08/07/1998	M / 310,420, 720,942	F44,N80	900,2210	1000,1350,1500,3100 , 8600

November 1, 2000

Unattainable Status Category Discussion

Trapper Creek and Wren Creek

Trapper Creek and Wren Creek Waterbody (17050111010_08) have temporary naturally occurring physical characteristics that prevent the immediate attainment of Cold Water Biota beneficial use.

During the summer of 1994, approximately 184,500 acres of national Forest System lands were burned on the Boise National Forest in the Boise River Wildfire Complex (Rabbit Creek, Bannock Creek, and Star Gulch Fires) within Boise and Elmore Counties, Idaho (BNF 1997).

During the summer of 1995, several high intensity rain events, in areas burned at high intensities in the 1994 wildfires, caused debris flows which resulted in widespread flooding and damage within the North Fork Boise River basin. The events with the greatest effect occurred in late August 1995 and severely damaged several stream systems and blocked the primary transportation route in the burned area (BNF 1997).

Trapper Creek and Wren Creek were visited by DEQ in the Summer of 1996. Visual observation, during a single season, by professional staff was performed. It was determined not monitor these creeks following BURP methods. Observation at the mouths of both of these creeks were similar. All soils, live vegetation, and stable rock from the ridge tops on both sides of the channel had sloughed into the channel as part of the debris flow. Stream channel elevations had been changed significantly (2-10 meters). Large pieces of wood, large boulders, and bedrock controlled stream habitat complexity. Aquatic macroinvertebrates were not observed clinging to the fresh rock making up the substrate in the channel.

Riparian areas along streams heavily impacted by the 1995 flood events (i.e. Trapper Creek, Wren Creek, Lousie Creek) were severely degraded. Reestablishment of the riparian habitat will be part of the natural healing process and will be important to the speed of stream recovery. It is expected to take a number of years for recovery of this riparian habitat (BNF 1997).

Relative fish abundance has been monitored since 1994 at stations though out the burned areas. Trapper, Wren, and other streams were most heavily impacted by post-fire debris torrents and flooding. Monitoring stations on these streams have all shown dramatic fish abundance declines since the flood event of 1995. Fish densities in the severely degraded Trapper and Wren Creeks dropped to zero just after the summer of 1995. There is evidence of re-colonization by redband trout in Trapper Creek where a few were seen in 1996. Colonizers are likely moving upstream from the North Fork Boise River. Re-colonization has not been observed in Wren Creek, which is disconnected by a natural barrier upstream from the North Fork Boise River. Natural events may eventually remove the Wren Creek barrier (BNF 1997).

It is DEQ's position that Trapper Creek and Wren Creek can not attain, in the short term, a level of "full support" for cold water biota or other uses. This non attainment is not the result of excess pollutants introduced through human caused activities. Trapper Creek and Wren Creek should be given a decade of riparian soil and vegetation re-growth and aquatic assemblage re-colonization prior to determining beneficial use status.

Bob Steed
Analyst 3
Boise Regional Office, Idaho Department of Environmental Quality
1445 N. Orchard
Boise, Idaho 83706

Literature Cited

Boise National Forest. February 1997. Boise River Wildfire Recovery Project, Phase III – IV Resource Assessment 1994 – 1997. United State Department of Agriculture, Forest Service, Boise National Forest. Responsible Official: Dave D. Rittenhouse.

November 2, 2000

Unattainable Status Category Discussion

Willow Creek Tributaries

Willow Creek Tributaries Waterbody (17050113002_03) have naturally occurring physical characteristics that prevent the attainment of Cold Water Biota beneficial use.

Willow Creek is located in one of the southern most watersheds in the Upper Boise River Subbasin. The mainstem of Willow Creek (17050113002_00) flows from low gradient uplands into a short steep canyon (image to left of this text) and then into the headwaters of Arrowrock Reservoir. The waters that feed Willow Creek come from intermittent streams and under-land flow. Hard basalt lava rock forms a knick point at the poor point from the uplands. In dry months, water first visibly flows in the mainstem near the meadow/historic beaver complex that is at the base of the uplands. Willow Creek Tributaries Waterbody (17050113002_03) are intermittent and dry for a majority of each year. Idaho Department of Environmental Quality's Beneficial Use Reconnaissance Project summer field crew attempted to collect information from these tributaries twice in 1998. Both times these tributaries were dry. Image on left is typical draw considered Willow Creek Tributary.

The Willow Creek waterbody is made up of two segments. A mainstem segment (17050113002_00) and a tributary segment (17050113002_03) It is only the tributary segment, made up of approximately 21 draws, that should be accounted for as dry.

It is DEQ’s position that Willow Creek Tributaries can not attain a level of "full support" for cold water biota or other uses. This non-attainment is not the result of excess pollutants introduced through human caused activities. Willow Creek Tributaries should have the Cold Water Biota beneficial use disregarded, and this portion of Willow Creek waterbody be listed in Idaho Department of Environmental Quality's Water Quality Standards without aquatic life beneficial use.

Bob Steed, Analyst 3, Boise Regional Office, Idaho Department of Environmental Quality, 1445 N. Orchard, Boise, Idaho 83706.

May 3, 2000

Additional Cold Water Biota Status Investigation

Introduction

There are waterbodies in the Upper Boise River Basin that have native bull trout (Salvelinus confluentus) populations that are impaired by fine sediment (Steed et al. 1998). The BURP sampling and follow up analysis have not always shown to be sensitive enough to detect all situations. There are many factors that contribute to impairment of bull trout populations, including: prey base structure, meta-population structure, channel stability, hydrologic stability, cover complexity, stream temperature, barriers to migration, harvest, disease, exotic species, association with anadromous fish, and finally substrate size and it's relative composition. The purpose of this investigation is to identify waterbodies that are both high in "percent fines", and used by bull trout (focal or adjunct habitat) during life history phases (spawning, and juvenile rearing, ...) that have great need for high quality substrate composition. As intended, findings from this investigation have been used to make waterbody assessments for areas that lack BURP data or to modify "full support" calls.

Methods and Results

Waterbody segments and their bull trout habitat type (focal, adjunct, nodal) were identified through GIS manipulation. A waterbody is a State designated assembly of streams, designed to simplify beneficial use designation and beneficial use status reporting. The waterbody classification also provides uninterrupted coverage of all 1:100k scale streams. Segmenting these waterbodies is sometimes necessary, and provides for dissection of a waterbody based on stream order or land management differences. Again, using these GIS data each waterbody segment was tagged with all the three types of bull trout habitat using Boise National Forest's Bull Trout Habitat Types GIS data. Waterbody segments were also tagged with bull trout population strength (strong, depressed, migratory, unknown abundance, recoverable, and absent) using USDA's Inland West data.

Reference conditions used to set optimal percent fines (Wolman, 1957) are based on existing streams and conditions. Using the Boise National Forest (BNF) site data set, a query was performed that determined the average calculated percent fines (e.g. particles < 6 mm) for all of the sites on each waterbody.

The average percent fines for all waterbodies that included focal bull trout habitat and a strong bull trout population (n=5) was 18%. There were no Beneficial Use Reconnaissance Project (BURP) sites on water bodies that had both focal bull trout habitat, and a strong (according to USDA's Inland West) bull trout population. Since the BURP method for determining "percent fines" varied slightly from BNF, BURP percent fines was not used.

The 18% percent fines value was used as optimal, and as a reference condition. To determine the percent fines in which was to be treated as the threshold for impaired, the percentages between 18% and 100% were split into quartiles. An initial assumption was made that one quartile more sediment than optimal will be used as the cut-off for impairment. This value turns out to be 38.5%. This value seams reasonable compared to others observations. Weaver and Fraley (1991) found that there is little decline in emergence success in situation with fines up to 30%. Bull trout embryo survival correlates to percentage of fines in the stream bed. Survival of bull trout embryos was unaffected in Montana streams at levels up to 30% and dropped off sharply at 30% (Shepard et al. 1984). At 40% fines, survival fell below 20%. Average survival to emergence in Coal Creek, Montana, fell from over 60% in graves with 30% fines to 0% with 44% fines (Weaver and White).

Discussion

The following 13 waterbody segments where found to have percent fines in excess of 38.5%. Keep in mind that you will be able to find waterbodies within the upper Boise River watershed that has sites that exceed 38.5% percent fines. The following sites are also within suitable habitat.

waterbody segment	bt habitat	bt pop. status	average percent fines
17050111010_04	adjunct	recoverable	83.7%
17050111010_12	adjunct	depressed	41.4%
17050111013_00	adjunct	recoverable	45.4%
17050111014_01	adjunct	recoverable	49.4%
17050111014_02	adjunct	recoverable	51.0%
17050111014_06	adjunct	depressed	46.2%
17050111015_01	adjunct	recoverable	50.1%
17050111016_00	adjunct	recoverable	68.1%
17050111017_00	adjunct	recoverable	58.2%
17050113014_00	adjunct	recoverable	64.5%
17050113018_00	adjunct	recoverable	61.6%
17050113018_03	adjunct	recoverable	68.8%
17050113018_05	adjunct	recoverable	84.6%

Robert Steed
Analyst 3
Boise Regional Office, Idaho Department of Environmental Quality
1445 N. Orchard
Boise, Idaho 83706

Data Sources

Waterbodies, and Segments - the shape files h:\gis\sdata\hydrology\17050111 and h:\gis\sdata\hydrology\17050113 (Arc) were created by R. Steed 3/2000. These shape files were clipped from DEQ m:\sdata\water\surface\swstrm by 4th field HUC

boundaries. Three fields were added and populated (order, segment, and adb_segment). The field order (string) contains the order of the stream determined using swstrm shape file, which is supposed to be 1:100k hydrography. The field segment is the segmentation of any waterbody and typically looks like “00, 01, 02 ... nn”. The field adb_segment links the shape file to the Assessment Data Base (ADB) and is made up of the 4th field HUC, WBID, and segment fields. Adb_segment looks like “17050111001_00".

Bull Trout Habitat Types - the shape file bnf~\a itm\projects\upper boise misc\ bull trout\bull trout streams.shp (Arc) was created and distributed by Tim Burton, Boise National Forest on 4/17/2000.

Inland West Bull Trout Population Strength - the shape file bnf~\a itm\projects\upper boise misc\ bull trout\bull trout population (Polygon) was created and distributed by Tim Burton, Boise National Forest on 4/17/2000.

Boise National Forest Fish Inventory Data Set - the shape file h:\gis\sdata itm\projects\boise national forest data\boisfish.shp (Point) was created and distributed by Tim Burton, Boise National Forest 3/2000.

BURP Data Set - the shape file H:\gis\sdata\projects\upper boise misc\burp sites wbsegno 93_99 v2.shp (Point) was compiled by R. Steed 3/2000 from DEQ GIS coverages on the m: drive and data collected by 1999 BURP crews. The data set has been tagged with waterbody segment closest to site.

BURP site to waterbody segment - this table within access data base h:\HUCs\upper boise\ ... \upper boise work. This table is important because it contains verified BURP sites on each waterbody segment.

Literature Cited

Weaver, T., and J. Fraley. 1991. Fisheries Habitat and Fish Populations. Flathead basin forest practices water quality and fisheries cooperative program. Flathead basin commission.

Shepard, B. B., K. L. Pratt and P.J. Graham. 1984. Life histories of westslope cutthroat and bull trout in the upper Flathead River Basin, Montana. EPA R))8224-01-5, Denver Colorado.

Steed, R., and T. Burton, R. Danehy, D. Greegor, S. Grunder, T. Kennedy, D. Parrish. 1998. Boise River Key Watershed Bull Trout Problem Assessment. Southwest Basin Native Fish Watershed Advisory Group. Boise, Idaho.

Appendix T12 General Report of 303(d) Waterbody Segment Data

WBIDSEGID: 17050111001_03

WBNAME: Middle Fork Boise River

SEGNAME: Buck Creek

WBTYPE: River **SEGSIZE:** 14.1 Miles **Significant Lake?:** No

Waterbody Comments: This includes most of the Middle Fork Boise River Watershed, from the headwaters to Arrowrock Reservoir.

Segment Comments: Segment established Jan 2000, by R. Steed. Classified April 2000, Beneficial Uses have been designated in IDAPA 16.01.02.140.09.

Location

CU: 17050111

ST Watershed: North/Middle Fork Boise

ST Basin: Southwest Basin

NRCS11:

NRCS14:

1. County: ELMORE CO

2. County:

1. Ecoregion: Northern Rockies

2. Ecoregion:

Lat in DD: 43.7988

Lon in DD: -115.4046

Location Comments: This segment includes Buck Creek and all of it's tributaries that flow into the Middle Fork Boise River.

WBIDSEGID: 17050111001_03

WBNAME: Middle Fork Boise River

SEGNAME: Buck Creek

General Assessment Info.

Assess Date:	08/11/2000	**Start Sample:**	
Key Sample:		**End Sample:**	
YEAR303d:	1994		
Eval/Mon:	M		
Cycle:	2002		
Trends:			
Trophic Status:			
Bio Level:	Very Good		
Bio Sites:	3		
Assessor:	Robert	Steed	
Assessment Comments:	Buck Creek is intermittent at upper sites. Visual observation site visit by R. Steed		

Assessment Level Information

Assessment Method Information

CODE	METHODNAME
375	Visual observation, may not quantify some parameters; single season; by prof.
941	Idaho Waterbody Assessment Guidance 1996

WBIDSEGID: 17050111001_03

WBNAME: Middle Fork Boise River

SEGNAME: Buck Creek

Use Support

USECODE	USENAME	SUPDESC
42	Primary Contact Recreation	Fully
80	Cold Water Biota	Fully
82	Salmonid Spawning	Fully
83	Domestic Water Supply	Fully

Causes **Sources**

WBIDSEGID: 17050111009_00

WBNAME: Browns Creek

SEGNAME: Browns Creek

WBTYPE: River **SEGSIZE:** 13.04 Miles **Significant Lake?:** No

Waterbody Comments: This waterbody includes the entire Browns Creek watershed, from headwaters to the confluence with the Middle Fork Boise River. This waterbody is also known as "Upper Browns Creek"

Segment Comments: Est. Jan. 2000 by R. Steed. Classified April 2000, Beneficial Uses have been designated in IDAPA 16.01.02.140.09.

Location

CU: 17050111

ST Watershed: North/Middle Fork Boise

ST Basin: Southwest Basin

NRCS11:

NRCS14:

1. County: ELMORE CO

2. County:

1. Ecoregion: Northern Rockies

2. Ecoregion:

Lat in DD: 43.7791

Lon in DD: -115.4867

Location Comments: This is the only segment for Browns Creek Waterbody. Includes several unnamed tributaries.

WBIDSEGID: 17050111009_00

WBNAME: Browns Creek

SEGNAME: Browns Creek

General Assessment Info.

Key Sample: **End Sample:**

YEAR303d: 1994

Eval/Mon: M

Cycle: 2002

Trends:

Trophic Status:

Bio Level: Very Good

Bio Sites: 3

Assessor: Robert Steed

Assessment Comments: Assessment based on information available prior to assessment date.

Assessment Level Information

Assessment Method Information

CODE	METHODNAME
170	Best professional judgement
365	Visual observation, usually at road crossings; professional not required
941	Idaho Waterbody Assessment Guidance 1996

Assess Date: 08/23/2000 **Start Sample:**

WBIDSEGID: 17050111009_00

WBNAME: Browns Creek

SEGNAME: Browns Creek

Use Support

USECODE	USENAME	SUPDESC
42	Primary Contact Recreation	Fully
80	Cold Water Biota	Fully
82	Salmonid Spawning	Fully

Causes **Sources**

WBIDSEGID: 17050113002_00

WBNAME: Willow Creek

SEGNAME: Willow Creek

WBTYPE: Intermitten **SEGSIZE:** 2.4 Miles **Significant Lake?:** No

Waterbody Comments: Willow Creek watershed from headwaters to South Fork Boise River.

Segment Comments: Est. 5/4/00 by R. Steed. Unclassified, uses established at time of assessment.

Location

CU: 17050113

ST Watershed: South Fork Boise River

ST Basin: Southwest Basin

NRCS11:

NRCS14:

1. County: ELMORE CO

2. County:

1. Ecoregion: Snake River Basin/High Desert

2. Ecoregion:

Lat in DD:

Lon in DD:

Location Comments: Fourth Order Portion of Willow Creek from Wood Creek to South Fork Boise River.

WBIDSEGID: 17050113002_00

WBNAME: Willow Creek

SEGNAME: Willow Creek

General Assessment Info.

Assess Date: 09/06/2000 **Start Sample:**

Key Sample: **End Sample:**

YEAR303d: 1994

Eval/Mon: E

Cycle: 2002

Trends:

Trophic Status:

Bio Level:

Bio Sites: 0

Assessor: Robert Steed

Assessment Comments:

Assessment Level Information

Assessment Method Information

CODE	METHODNAME
170	Best professional judgement
190	Biological/habitat data extrapolated from upstream or downstream waterbody

WBIDSEGID: 17050113002_00

WBNAME: Willow Creek

SEGNAME: Willow Creek

Use Support

USECODE	USENAME	SUPDESC
42	Primary Contact Recreation	Fully
80	Cold Water Biota	Fully
82	Salmonid Spawning	Fully

Causes **Sources**

WBIDSEGID: 17050113002_01

WBNAME: Willow Creek

SEGNAME: Willow Creek

WBTYPE: Intermitten **SEGSIZE:** 11.2 Miles **Significant Lake?:** No

Waterbody Comments: Willow Creek watershed from headwaters to South Fork Boise River.

Segment Comments: Est. 2/9/00 by R. Steed. Unclassified, uses established at time of assessment.

Location

CU: 17050113

ST Watershed: South Fork Boise River

ST Basin: Southwest Basin

NRCS11:

NRCS14:

1. County: ELMORE CO

2. County:

1. Ecoregion: Snake River Basin/High Desert

2. Ecoregion:

Lat in DD:

Lon in DD:

Location Comments: Third Order Portion of Willow Creek from Wood Creek to unnamed creek upstream of Case Creek.

WBIDSEGID: 17050113002_01

WBNAME: Willow Creek

SEGNAME: Willow Creek

General Assessment Info.

Assess Date:	09/06/2000	**Start Sample:**	
Key Sample:		**End Sample:**	
YEAR303d:	1994		
Eval/Mon:	M		
Cycle:	2002		
Trends:			
Trophic Status:			
Bio Level:	Very Good		
Bio Sites:	3		
Assessor:	Robert	Steed	
Assessment Comments:	Assessment made with best available data at date indicated. Includes 3 BURP monitoring sites, in 1995 this segment was dry, drought conditions. Sites have been electrofished, and bateria samples were collected in 1999.		

Assessment Level Information

Assessment Method Information

CODE	METHODNAME
170	Best professional judgement
941	Idaho Waterbody Assessment Guidance 1996

WBIDSEGID: 17050113002_01

WBNAME: Willow Creek

SEGNAME: Willow Creek

Use Support

USECODE	USENAME	SUPDESC
42	Primary Contact Recreation	Fully
80	Cold Water Biota	Fully
82	Salmonid Spawning	Fully

Causes **Sources**

WBIDSEGID: 17050113004_00

WBNAME: South Fork Boise River (1)

SEGNAME: South Fork Boise River (1)

WBTYPE: River **SEGSIZE:** 31.6 Miles **Significant Lake?:** No

Waterbody Comments: South Fork Boise River and tributaries between Anderson Ranch Res. and Arrowrock Res.

Segment Comments: Est. 2/9/00 by A. Petersen. Classified April 2000, Beneficial Uses have been designated in IDAPA 16.01.02.140.11.

Location

CU: 17050113

ST Watershed: South Fork Boise River

ST Basin: Southwest Basin

NRCS11:

NRCS14:

1. County: ELMORE CO

2. County:

1. Ecoregion: Snake River Basin/High Desert

2. Ecoregion: Northern Rockies

Lat in DD:

Lon in DD:

Location Comments: Mainstem (5th order) South Fork Boise River from Anderson Ranch Res. to Arrowrock Res.

WBIDSEGID: 17050113004_00

WBNAME: South Fork Boise River (1)

SEGNAME: South Fork Boise River (1)

General Assessment Info.

Assess Date:	09/06/2000	**Start Sample:**	
Key Sample:		**End Sample:**	
YEAR303d:	1994		
Eval/Mon:	E		
Cycle:	2002		
Trends:			
Trophic Status:			
Bio Level:			
Bio Sites:	0		
Assessor:	Robert	Steed	
Assessment Comments:	This section of the South Fork Boise River is a world famous blue ribbon rainbow trout fishery. It was originally listed via SSOC process which is not an indicator of impairment. Upstream dam prevents fine sediment. Nominated in 2000 for ORW status.		

Assessment Level Information

Assessment Method Information

CODE	METHODNAME
110	Information from local residents
170	Best professional judgement
375	Visual observation, may not quantify some parameters; single season; by prof.

WBIDSEGID: 17050113004_00

WBNAME: South Fork Boise River (1)

SEGNAME: South Fork Boise River (1)

Use Support

USECODE	USENAME	SUPDESC
42	Primary Contact Recreation	Fully
80	Cold Water Biota	Fully
82	Salmonid Spawning	Fully
83	Domestic Water Supply	Fully

Causes **Sources**

WBIDSEGID: 17050113012_00

WBNAME: Deer Creek

SEGNAME: Deer Creek

WBTYPE: River **SEGSIZE:** 26.1 Miles **Significant Lake?:** No

Waterbody Comments: Entire Deer Creek watershed from headwaters to Anderson Ranch Reservoir.

Segment Comments: Est. 2/23/2000 by R. Steed. Unclassified waterbody. Uses established at time of assessment.

Location

CU: 17050113

ST Watershed: South Fork Boise River

ST Basin: Southwest Basin

NRCS11:

NRCS14:

1. County: ELMORE CO

2. County:

1. Ecoregion: Snake River Basin/High Desert

2. Ecoregion:

Lat in DD:

Lon in DD:

Location Comments: Deer Creek from headwaters to Anderson Ranch Reservoir. Named tributaries include: Deer Creek, North Fork Deer Creek, South Fork Deer Creek, Big Deer Creek and Little Deer Creek.

WBIDSEGID: 17050113012_00

WBNAME: Deer Creek

SEGNAME: Deer Creek

General Assessment Info.

Assess Date: 09/18/2000 **Start Sample:**

Key Sample: **End Sample:**

YEAR303d: 1994

Eval/Mon: E

Cycle: 2002

Trends:

Trophic Status:

Bio Level: Very Good

Bio Sites: 3

Assessor: Robert Steed

Assessment Comments: Assessment made with best avialable data on assessment date.

Assessment Level Information

Assessment Method Information

CODE	METHODNAME
941	Idaho Waterbody Assessment Guidance 1996

WBIDSEGID: 17050113012_00

WBNAME: Deer Creek

SEGNAME: Deer Creek

Use Support

USECODE	USENAME	SUPDESC
42	Primary Contact Recreation	Fully
80	Cold Water Biota	Fully
82	Salmonid Spawning	Fully

Causes

Sources

WBIDSEGID: 17050113018_05

WBNAME: Little Smoky Creek

SEGNAME: Little Smoky Creek Tributaries

WBTYPE: River **SEGSIZE:** 136.1 Miles **Significant Lake?:** No

Waterbody Comments: Entire Little Smoky Creek Watershed.

Segment Comments: Est. March 6, 2000 by R. Steed. Unclassified. Beneficial Uses determined at time of initial assessment.

Location

CU: 17050113

ST Watershed: South Fork Boise River

ST Basin: Southwest Basin

NRCS11:

NRCS14:

1. County: CAMAS CO

2. County:

1. Ecoregion: Northern Rockies

2. Ecoregion:

Lat in DD:

Lon in DD:

Location Comments: Headwater sections (1st and 2nd order) of streams that flow into Little Smoky Creek, and Little Smoky Creek upstream fom Grindstone Creek. Includes: Lick, Placer, Worswick, Grindstone, Carrie, Tyrannis, Blackhorse, Pine, Sheep, Liberal, Cannonball, S

WBIDSEGID: 17050113018_05

WBNAME: Little Smoky Creek

SEGNAME: Little Smoky Creek Tributaries

General Assessment Info.

Assess Date:	09/27/2000	**Start Sample:**	
Key Sample:		**End Sample:**	
YEAR303d:	1998		
Eval/Mon:	M		
Cycle:	2002		
Trends:			
Trophic Status:			
Bio Level:	Very Good		
Bio Sites:	9		
Assessor:	Robert	Steed	
Assessment Comments:	Assessment made with all available data on assessment date. Cold Water Biota found "Threatened" through addition investigation. Please see included document.		

Assessment Level Information

Assessment Method Information

CODE	METHODNAME
941	Idaho Waterbody Assessment Guidance 1996

WBIDSEGID: 17050113018_05

WBNAME: Little Smoky Creek

SEGNAME: Little Smoky Creek Tributaries

Use Support

USECODE	USENAME	SUPDESC
42	Primary Contact Recreation	Fully
80	Cold Water Biota	Threatened
82	Salmonid Spawning	Fully

Causes

CAUSECODE	MAGCODE	CAUSENAME
1101	T	Sediment

Sources

WBIDSEGID: 17050113027_01

WBNAME: Feather River

SEGNAME: Cayuse Creek

WBTYPE: River **SEGSIZE:** 15.06 Miles **Significant Lake?:** No

Waterbody Comments: Feather River watershed

Segment Comments: Est. March 7, 2000 by R. Steed. Classified April 2000, Beneficial Uses have been designated in IDAPA 16.01.02.140.11.

Location

CU: 17050113

ST Watershed: South Fork Boise River

ST Basin: Southwest Basin

NRCS11:

NRCS14:

1. County: ELMORE CO

2. County:

1. Ecoregion: Northern Rockies

2. Ecoregion:

Lat in DD:

Lon in DD:

Location Comments: Cayuse Creek from headwaters to Feather River. Includes: Little Cayuse Creek, Cayuse Creek, and Three Forks Creek.

WBIDSEGID: 17050113027_01

WBNAME: Feather River

SEGNAME: Cayuse Creek

General Assessment Info.

Assess Date: 09/29/2000 **Start Sample:**

Key Sample: **End Sample:**

YEAR303d: 1994

Eval/Mon: M

Cycle: 2002

Trends:

Trophic Status:

Bio Level: Very Good

Bio Sites: 4

Assessor: Robert Steed

Assessment Comments: Assessed with best available data on assessment date.

Assessment Level Information

Assessment Method Information

CODE	METHODNAME
941	Idaho Waterbody Assessment Guidance 1996

WBIDSEGID: 17050113027_01

WBNAME: Feather River

SEGNAME: Cayuse Creek

Use Support

USECODE	USENAME	SUPDESC
42	Primary Contact Recreation	Fully
80	Cold Water Biota	Fully
82	Salmonid Spawning	Fully

Causes **Sources**

WBIDSEGID: 17050113032_00

WBNAME: Smith Creek

SEGNAME: Smith Creek

WBTYPE: River **SEGSIZE:** 16.4 Miles **Significant Lake?:** No

Waterbody Comments: Smith Creek Watershed

Segment Comments: Est. March 7, 2000 by R. Steed. Classified April 2000, Beneficial Uses have been designated in IDAPA 16.01.02.140.11.

Location

CU: 17050113

ST Watershed: South Fork Boise River

ST Basin: Southwest Basin

NRCS11:

NRCS14:

1. County: ELMORE CO

2. County:

1. Ecoregion: Northern Rockies

2. Ecoregion: Snake River Basin/High Desert

Lat in DD:

Lon in DD:

Location Comments: Lower Smith Creek, mainstem (3rd order) portions from Mule Gulch to South Fork Boise River.

WBIDSEGID: 17050113032_00

WBNAME: Smith Creek

SEGNAME: Smith Creek

General Assessment Info.

Assess Date:	09/28/2000	**Start Sample:**	
Key Sample:		**End Sample:**	
YEAR303d:	1994		
Eval/Mon:	M		
Cycle:	2002		
Trends:			
Trophic Status:			
Bio Level:	Very Good		
Bio Sites:	2		
Assessor:	Robert	Steed	
Assessment Comments:	Assessment based on all available data on assessment date.		

Assessment Level Information

Assessment Method Information

CODE	METHODNAME
941	Idaho Waterbody Assessment Guidance 1996

WBIDSEGID: 17050113032_00

WBNAME: Smith Creek

SEGNAME: Smith Creek

Use Support

USECODE	USENAME	SUPDESC
42	Primary Contact Recreation	Fully
80	Cold Water Biota	Fully
82	Salmonid Spawning	Fully

Causes **Sources**

WBIDSEGID: 17050113033_00

WBNAME: Rattlesnake Creek

SEGNAME: Rattlesnake Creek

WBTYPE: River **SEGSIZE:** 11.8 Miles **Significant Lake?:** No

Waterbody Comments: Rattlesnake Creek watershed

Segment Comments: Est. March 7, 2000 by R. Steed. Unclassified. Beneficial Uses determined at time of initial assessment.

Location

CU: 17050113

ST Watershed: South Fork Boise River

ST Basin: Southwest Basin

NRCS11:

NRCS14:

1. County: ELMORE CO

2. County:

1. Ecoregion: Snake River Basin/High Desert

2. Ecoregion: Northern Rockies

Lat in DD:

Lon in DD:

Location Comments: Lower Rattlesnake Creek, Mainstem (3rd order) portion from Slater Creek to South Fork Boise River.

WBIDSEGID: 17050113033_00

WBNAME: Rattlesnake Creek

SEGNAME: Rattlesnake Creek

General Assessment Info.

Assess Date: 09/28/2000 **Start Sample:**

Key Sample: **End Sample:**

YEAR303d: 1994

Eval/Mon: E

Cycle: 2002

Trends:

Trophic Status:

Bio Level: Fair

Bio Sites: 6

Assessor: Robert Steed

Assessment Comments: Portions of Rattlesnake Creek watershed were burned in the Rabbit Creek Fire 1995. Assessment made with best available data on assessment date.

Assessment Level Information

Assessment Method Information

CODE	METHODNAME
120	Surveys of fish and game biologists/other professionals
150	Monitoring data more than 5 years old
941	Idaho Waterbody Assessment Guidance 1996

WBIDSEGID: 17050113033_00

WBNAME: Rattlesnake Creek

SEGNAME: Rattlesnake Creek

Use Support

USECODE	USENAME	SUPDESC
44	Secondary Contact Recreation	Fully
80	Cold Water Biota	Fully
82	Salmonid Spawning	Fully

Causes **Sources**

Appendix T13 General Report of Little Camas Reservoir Waterbody Data

WBIDSEGID: 17050113007L_00

WBNAME: Little Camas Reservoir

SEGNAME: Little Camas Reservoir

WBTYPE: Freshwater lake **SEGSIZE:** 965 Acre **Significant Lake?:** No

Waterbody Comments: Entire Little Camas Reservoir.

Segment Comments: Est. 2/10/00 by R. Steed. Unclassified, uses determined at time of assessment.

Location

CU: 17050113

ST Watershed: South Fork Boise River

ST Basin: Southwest Basin

NRCS11:

NRCS14:

1. County: ELMORE CO

2. County:

1. Ecoregion: Snake River Basin/High Desert

2. Ecoregion:

Lat in DD:

Lon in DD:

Location Comments: Entire Little Camas Reservoir.

WBIDSEGID: 17050113007L_00

WBNAME: Little Camas Reservoir

SEGNAME: Little Camas Reservoir

General Assessment Info.

Assess Date:	04/24/2000	**Start Sample:**	08/07/1998
Key Sample:	08/07/1998	**End Sample:**	08/07/1998
YEAR303d:			
Eval/Mon:	M		
Cycle:	2002		
Trends:	Unknown		
Trophic Status:			
Bio Level:			
Bio Sites:	1		
Assessor:	Brian	Hoelscher	
Assessment Comments:	Based on preliminary Lake and Reservoir BURP assessment using assessments concepts developed by 4/24/00. 1998BROQ015		

Assessment Level Information

Assessment Method Information

CODE	METHODNAME
310	Ecological/habitat surveys
420	Water column surveys (e.g. fecal coliform)
720	Biosurveys of multiple taxonomic groups (e.g. fish/invertebrates/algae)
942	Draft Idaho Lake and Reservoir Assessment Framework

WBIDSEGID: 17050113007L_00

WBNAME: Little Camas Reservoir

SEGNAME: Little Camas Reservoir

Use Support

USECODE	USENAME	SUPDESC
44	Secondary Contact Recreation	Fully
80	Cold Water Biota	Not supporting

Causes

CAUSECODE	MAGCODE	CAUSENAME
900	M	Nutrients
2210	M	Algal Grwth/Chlorophyll a

Sources

SRCCODE	MAGCODE	SRCNAME
1000	M	Agriculture
1350	M	Grazing related Sources
1500	H	Range grazing - Riparian and/or Upland
3100	S	Highway/Road/Bridge Construction
8600	S	Natural Sources

Appendix T14

Title: Public Comments and DEQ Reply for Subbasin Assessment for Upper Boise River Watersheds, Hydrologic Catalog Units; 17050111 and 17050113, Southwest Idaho.

Prepared by Robert Steed, Boise Regional Office, Idaho Department of Environmental Quality
Friday, February 16, 2001

Table of Contents

General Comments

Bull trout focus

Comments

Much of the discussion on these pages and the rest of the document focuses on bull trout and impacts to bull trout populations. For example, on page 10 an assessment of fine sediment in bull trout habitat, but not redband, is mentioned. We support your careful evaluation of this listed species, but are not clear if impacts on other sensitive species have been missed. The assessment would benefit from further discussion of redband trout populations and impairments. In particular, are there waterbodies with impairments to redband populations, e.g. those which occur below 5,000 feet, which would not be captured by evaluating impacts on bull trout, and which should be targeted for 303(d) listing and TMDL development? (EPA, Dec. 21, 2000)

Idaho Department of Environmental Quality Reply

The Upper Boise River Subbasin has been investigated by the South West Basin Native Fish Watershed Advisory Group (SWBNFWAG). This group was formed following Governor Philip E. Batt's State of Idaho Bull Trout Conservation Plan. The mission of the Governor's Bull Trout Conservation Plan is to "maintain and/or restore complex interacting groups of bull trout populations throughout their native range in Idaho." The SWBNFWAG prepared a problem assessment, (Steed et al., 1998) that assembled existing data, and determined bull trout distributions, habitat conditions, watershed characteristics, priority areas, and limiting factors. The reason that much of the discussion in the Upper Boise River Subbasin Assessment focuses on bull trout and impacts to bull trout populations is because bull trout are the most studied and the best understood native species remaining in the Upper Boise River Subbasin. There has not been any specific investigation of Columbia River redband trout (*Oncorhynchus mykiss gairdneri*) in the Upper Boise River Subbasin. Most redband trout investigations in Southwest Idaho focus on the more primitive form of arid lands redband trout (distinguished by the LDH-B2*100 allele) than the form inhabiting the Upper Boise River Subbasin. DEQ and Idaho Fish and Game agree, and I believe that it is generally understood, that in the meta-population context, redband trout are doing well in the Upper Boise River Subbasin. While bull trout has been the target species of recent studies in the Upper Boise River Subbasin, many other aquatic species (O. mykiss) will also likely benefit from bull trout conservation actions. It is our understanding, and based on our monitoring, that there are no additional waterbodies with impairments to redband populations that should be targeted for 303(d) listing and TMDL development.

Temperature data

Comments

We are concerned by the lack of temperature data evaluation. Subbasin assessments are to be comprehensive in nature and are intended to not only provide a basis for TMDL development, but also provide a basis for 303(d) listing and de-listing actions. The assessment suggests that temperature problems may exist in the subbasins, but available data have not been analyzed. As a result, conclusions regarding causes, stressors and sources within the basin may be misleading. We recommend that

temperature data analysis and finding be included in the SBA, or at a minimum that this gap be clearly identified along with an explanation of when the evaluation will be completed. (EPA, Dec. 21, 2000)

Currently there are no waterbodies 303(d) listed for temperature in the subbasin, but the assessment refers to seasonally elevated temperatures in mainstem migration corridors. USFS and other data is available but has not been analyzed, according to the assessment. In addition, EPA and USFS have published a report regarding a regional bull trout temperature database. Copies of the report and database may be obtained by contacting Bruce Rieman, USFS, at 373-4386. The State's guidance (IDEQ, 1999) on developing SBA's refers to identification and evaluation of all previously reported and new data, and that this data may identify additional waters not meeting water quality standards. (EPA, Dec. 21, 2000)

Idaho Department of Environmental Quality Reply

Good point. DEQ intends to perform and complete temperature data evaluation prior to the end of March 2001. This analysis will include comparing competent data against Idaho Water Quality Standards temperature criteria, and bull trout temperature criteria. We agree that this temperature evaluation gap needs to be clearly identified and propose that the following "Temperature and Related Variables" section has been modified to read:

> The one piece of habitat-related information that is sparse is temperature data. There are some temperature logger information available for main stems and incidental data collected during fisheries management activities. At the time of this sub-basin assessment, these temperature data have not been compared to Idaho Water Quality standards temperature criteria, or bull trout specific temperature criteria. DEQ intends to complete analysis of this temperature data by the end of March 2001, the subbasin assessment will be updated, if needed, to reflect these data.
>
> Holistic subbasin analysis conclusions regarding this subbasin assessment may be misleading by the fact that existing competent temperature data has not been included.

Mining impacts

Comments

Historic mining in the watershed has been extensive. If maps showing these areas are available it would be helpful to include them. Although mining has been extensive, there is little discussion of what effect on aquatic species it has caused. It would be particularly helpful to discuss the results of BURP or other monitoring in these areas, and any conclusions regarding support of beneficial uses and compliance with WQS. (EPA, Dec. 21, 2000)

Idaho Department of Environmental Quality Reply

DEQ is not aware of any maps that show all historic mining within the Upper Boise River Subbasin. In order to better describe mining impacts and current water quality we have added the following paragraph to the mining section:

> "It would be speculative to evaluate the effects mining may have had on the aquatic species within the Upper Boise River Subbasin. No pre-mining conditions have been monitored, and actual account of management activities do not exist. We know that historic mining, unlike current mining practices, proceeded unchecked, and most likely caused major modifications to Upper Boise River Subbasin's ecology. Most mining in the subbasin occurred prior to Idaho Water Quality Standards and the Clean Water Act. Idaho DEQ believes that the bioaccumulation of metals in fish tissues would be the primary indicator of widespread metals pollution and therefore warrant widespread metals monitoring. Bioaccumulation is what happens when organisms lower on the food chain incorporate metals into their systems, and when moving up the food chain, higher forms concentrate these metals, leaving top predators with the highest concentration.

Recent fish tissue 1997/1998 monitoring in Middle Fork Boise River has not revealed metals bioaccumulation, and has not spurred DEQ into additional monitoring. Other mining related secondary pollutants have been evaluated within the BURP monitoring."

Fully supporting but threatened waters

Comments

The text discusses threatened waterbodies as being addressed outside the 303(d) process. We support your efforts to work with land managers in a proactive way to address threats and restore water quality to avoid 303(d) listing and TMDL development. However, if waters are identified which are either impaired or "threatened" (expected to not meet WQS within 2 years [USEPA, 1997]), under current regulations these should be included in the State's next 303(d) list, and should be so identified in this assessment. Once listed, we believe there is still ample opportunity to continue to work with land managers to address and hopefully resolve these problems in advance of TMDL development. (EPA, Dec. 21, 2000)

The assessment also found that a number of unlisted waterbodies do not fully support their beneficial uses. A clearer picture of the future of these waters would be provided if the assessment described subsequent steps which IDEQ will take, such as 303(d) listing, revisiting the SBA and pollutant source inventory, TMDL development if necessary, etc. (EPA, Dec. 21, 2000)

Because of the SBA's format and the inclusion of those segments considered threatened, the Forest Service has the ability to be proactive in making sure segments are managed for improvement, therefore, preventing unnecessary scheduling or development of TMDLs. The Forest Service believes it is inappropriate to make any implication of required actions within an assessment document; it should be kept strictly to facts allowing landowners to get involved in determination of direction or further actions. (BNF, Dec 20, 2000)

There is some concern as to what will actually happen to a segment in the Threatened status. Does this mean these streams will not be included on the next 303(d) list? What assurance would we have that there is an opportunity to be proactive in trying to prevent listing of those segments? Another concern is competition for 319 money when segments are not on the 303(d) list. We would be interested in collaborative efforts to establish a basis for restoring or maintaining water quality in those watersheds that are threatened as well as truly attainable. These efforts may include competing for monies such as within the 319 programs, whether or not a segment is threatened or listed. These efforts would resemble the prevention of impairment within watersheds. (BNF, Dec 20, 2000)

Idaho Department of Environmental Quality Reply

DEQ will treat waterbodies, which have been identified to be in the "fully supporting but threatened" assessment category, as candidates for the State's next 303(d) list. All streams identified to be less than in the "full support" assessment category ("not full support") are also candidates for the upcoming 303(d) list. 303(d) listing includes assessment of new data, application of current assessment policy, and public review/appeals of proposed waterbodies. This subbasin assessment provides much of the information to be used, but does not replace 303(d) list development process.

This assessment has found that a number of unlisted waterbodies meet DEQ criteria and policy as being classified in the "fully supporting" assessment category. These unlisted waterbodies also have instream conditions that if not corrected will lead to the "not fully supporting" assessment category, hence the "fully supporting but threatened" assessment category.

Land managers have no assurances that proactive measures will prevent listing of "fully supporting but threatened" waterbodies. Land managers should provide new data that demonstrates that instream conditions have improved, provide implemented project results, or if make arguments regarding waterbody 303(d) status during public review/appeals process.

Water quality limited segments

Comments

It would help the reader if information in Appendix T3 were brought into the text, so that each currently listed waterbody, boundaries, and associated pollutants, were identified, e.g. in a table. (EPA, Dec. 21, 2000)

Idaho Department of Environmental Quality Reply

We agree that it would help the hard copy reader if information in Appendix T3 were brought into the text, but have chosen instead, to facilitate the electronic reader. DEQ prefers providing documents electronically whenever possible. The caveat explaining use in this document may be found on page 3:

> "This subbasin assessment has been formatted to be published and distributed electronically, through Idaho Department of Environmental Quality's Internet site (www2.deq.state.id.us). An effort has been made to reduce the number of text embedded figures, and large tables. This information will be available to the electronic user through hypertext links. Hard copy users will find these materials appended at the end of the document."

NFS waterbodies

Comments

It would help the reader if the waterbodies "Not Supporting" beneficial uses were specifically identified in a table in the text, along with boundaries and associated pollutants. (EPA, Dec. 21, 2000)

Idaho Department of Environmental Quality Reply

Tables 6, 7 and 8 list waterbodies that are impaired (not supporting) by beneficial use. These tables include cause/stressor (associated pollutants) identification. Waterbody boundaries have not been included but will be able to be found in additional appendix that we are going to provide in the final copy. Again, DEQ has chosen to better facilitate the electronic reader, and has purposely avoided the use of large text embedded tables

Applicable water quality standards

Comments

To be complete, I would suggest specifically identifying "other beneficial uses" and where they apply. I believe this would include at least Wildlife Habitat and Aesthetics. (EPA, Dec. 21, 2000)

Idaho Department of Environmental Quality Reply

DEQ has been complete in its incorporation of beneficial uses. While Wildlife Habitat, Aesthetics, Agricultural Water Supply, and Industrial Water Supply are indeed designated beneficial uses in Idaho Water Quality Standards, they are ubiquitously applied, they lack clear definition, and they lack criteria against which to judge. Incorporation of these uses on each waterbody segment would be a paper exercise, wasting the state's resources and the readers time.

Primary contact recreation

Comments

Due to the prolonged and intimate human contact, should primary contact recreation be an applicable beneficial use in waters with permitted or known suction dredging? (EPA, Dec. 21, 2000)

Idaho Department of Environmental Quality Reply

DEQ feels this is a valid concern and has investigated the waterbody segments where primary contact recreation should be included as an existing beneficial use due to suction dredge mining. Idaho Department of Water Resource's Recreational Dredging Programs Application (2000) was used to determine all areas within Upper Boise River Subbasin where recreational dredge mining is permitted. The following are segments that are open under IDWR permit:

- 17050111001_01*
- 17050111001_04*
- 17050111001_09*
- 17050111001_13*
- 17050111009_00*
- 17050113013_00*

** Indicates that stream is already designated for primary contact recreation.*

Changes to the Upper Boise River, Sources for establishing beneficial uses by waterbody (Appendix T5) has been modified to include Recreational Dredge Mining sources.

Special Resource Waters

Comments

Please indicate whether there are any Special Resource Waters in the subbasin, and if so, what such a designation means in terms of water quality standards compliance. (EPA, Dec. 21, 2000)

Idaho Department of Environmental Quality Reply

The main stems of all three forks of the Upper Boise River have "Special Resource Water" designations. While "Special Resource Waters" are indeed designated beneficial uses in Idaho Water Quality Standards, they lack definition, they lack criteria against which to judge, and DEQ has no clear policy on how to proceed with these designations. Comments of this sort bring up some good issues but would be better handled during EPAs review and approval of Idaho's Water Quality Standards.

Criteria

Comments

The table should also identify toxics criteria, e.g. metals, which the state has adopted to protect aquatic life, and have relevance in the subbasin, e.g. Montezuma Cr. Suggest formatting T. 3 to keep it on the same page. Table 2.8 reference on p. 21 should be Table 4. Recommend identifying all the relevant temperature criteria, i.e.. seasonal CWB, CWB, SS, federal bull trout criteria, and state bull trout criteria. (EPA, Dec. 21, 2000)

Idaho Department of Environmental Quality Reply

DEQ believes the relevant toxics criteria should be included in the subbasin assessment, but chooses to add a separate table rather than complicating an already complicated table. DEQ has added the following additional paragraph and table to the "Criteria for Protecting Beneficial Uses" section.

The toxics criteria which the state has adopted to protect aquatic life that are relevant in Upper Boise River subbasin are Arsenic, Copper, Lead, Mercury, Zinc. These criteria can be found in Table 1.

Table 1. Aquatic Life Criteria for Toxic Substances (ìg/L)

Compound	CMC (Acute) – B1	CCC (Chronic) – B2	Human Health – D2

Arsenic †	(1.0)360	(1.0)190	6.2
Copper †	$(0.96)e^{(0.9422(\ln H)-1.464)}$	$(0.96)e^{(0.8545(\ln H)-1.465)}$	
Lead †	$(0.791‡)e^{(1.273(\ln H)-1.46)}$	$(0.791‡)e^{(1.273(\ln H)-4.705)}$	
Mercury †	(0.85)2.4	0.012	0.15
Zinc †	$(0.978)e^{(0.8473(\ln H)+0.8604)}$	$(0.986)e^{(0.8473(\ln H)+0.7614)}$	

Equivalent to 40 CFR 131.36(b)(1), Columns B1, B2 and D2 adopted December 22, 1992 as modified by Section 250.07 of then IDAPA 16.01.02 Water Quality Standards and Wastewater Treatment Requirements.

† Aquatic live metals criteria (columns B1 and B2) are expressed as dissolved concentrations. Conversion factors are in parentheses

‡ Conversion factors for lead are hardness dependent. Value shown represents a hardness of 100 mg/L as CaCo3. Hardness equations for conversion factors are as follows: Lead – Acute and Chronic: CF=1.46203-[(ln hardness)(0.145712)]

DEQ has modified the reference to "Table 2.8" on p. 21 to "Table 4."

DEQ feels that all the relevant temperature criteria, i.e.. seasonal CWB, CWB, SS, federal bull trout criteria, and state bull trout criteria. (EPA, Dec. 21, 2000) can be found in Table 3. and Table 4. of the subbasin assessment.

WBAG process

Comments

It would help the reader to explain briefly the types of data collected by BURP and how the data are interpreted in the WBAG process. (EPA, Dec. 21, 2000)

Idaho Department of Environmental Quality Reply

DEQ has supplemented the "Summary and Analysis of Existing Water Quality Data" with the following paragraphs:

> Because of several Clean Water Act requirements DEQ has developed a stream assessment program that:
>
> - Measures and incorporates physical, chemical, and biological data;
> - Addresses basic water quality and beneficial use questions; and
> - Produces an accurate assessment of the status of the state's waters.
>
> The two major components that accomplish these tasks are the Beneficial Use Reconnaissance Project (BURP) and the Water Body Assessment Guidance (WBAG) process. DEQ predominantly relies on monitoring data generated by BURP program. This program was initiated in 1993, and aimed at integrating biological monitoring, chemical monitoring, and physical habitat assessment as a way of characterizing stream integrity and the quality of water. In addition, this program was developed in order to meet the Clean Water Act requirements of monitoring and assessing biology as well as developing biocriteria. BURP relies heavily upon protocols for monitoring physical habitat and macroinvertebrates and closely follows the Rapid Bioassessment Protocols for Use In Streams and Rivers developed by EPA (Plafkin et al. 1989). DEQ hires and administers summer field crews to collect BURP approved parameters. These data are extensively reviewed and placed in a database for making assessments. WBAG was developed by DEQ to be a non-arbitrary, objective guidance document for making waterbody assessments. This tool was to be used in answering basic water quality and beneficial use policy type waterbody assessment questions.

BNF data

Comments

Boise National Forest data is mentioned. What type of data did they collect, and was it evaluated using the WBAG, or some other process? (EPA, Dec. 21, 2000)

Idaho Department of Environmental Quality Reply

Fishery biologists working for the Forest Service are required to assess the direct, indirect, and cumulative effects of National Forest management activities on fish and fish habitat. Region 4, Forest Service biologist follow more or less a standardized inventory procedures for collecting fish habitat and salmonid fish species data for streams. BNF follows the R1/R4 (Northern/Intermountain Regions) Fish and Fish Habitat Standard Inventory Procedures Handbook by Overton, Wollrab, Roberts, and Radko, 1997. Boise National Forest's Fisheries Biologist, Tim Burton had assembled these data in a GIS linked data based referred to in this subbasin assessment as Boise National Forest Aquatic Survey Data Base. On March 15, 2000, I received from Tim Burton the edition of the Boise National Forest Aquatic Survey that I used for the remainder of the subbasin assessment development.

In all cases where Boise National Forest data was available for a waterbody, the data was incorporated into the WBAG process. Records of these transactions are available in Boise Regional Office DEQ, and have been reviewed by the appropriate regions of Idaho Department of Fish and Game.

Assessments

Comments

We strongly support the use of the Assessment Data Base (ADB) to since it is an efficient and detailed mechanism to track and document the assessment process with a link to GIS. Because the public generally does not have easy access to ADB, we recommend bringing results of specific assessments into this document in a table or series of tables in the text or appendices. In particular, details of the assessment results for the 10 currently listed segments, and any other segments identified as not fully supporting beneficial uses would be helpful to include in the document. (EPA, Dec. 21, 2000)

Idaho Department of Environmental Quality Reply

The water quality section of the SBA is a summary of water quality conditions. While, it is true that the public generally does not have easy access to ADB, we cannot overlook that fact that public involvement has been very limited for the Upper Boise River SBA. DEQ believes in this situation, in order to have stronger public involvement a study area must have controversial issues, local interest, and larger populations of affected publics. DEQ has not received any private public comment or contact regarding specifics of each assessment made on each segment. As stated in the SBA, "for more information please contact Boise Regional Office." DEQ has added an appendix that includes the results for the 10 currently listed segments, and will continue to be willing to go over the specifics of any assessment, or provide with additional information.

Exotic species

Comments

Identifying exotic species (brook trout) as a stressor to native species (bull trout) is an important finding, and we are pleased it is documented in the assessment. However, exotic species are not considered a pollutant under the Clean Water Act, and their presence would not be a basis for 303(d) listing or TMDL development. While we support moving forward with strategies to address exotic species problems, we recommend that the discussion on these pages be more clear that the CWA does not require listing or TMDL development for exotic species. (EPA, Dec. 21, 2000)

Idaho Department of Environmental Quality Reply

DEQ has added the following paragraph to the "Summary and Analysis of Existing Water Quality Data" section:

> Both DEQ and EPA agree that exotic species should not be considered a pollutant. DEQ and EPA also believe that the presence of exotic species should not be the basis for any 303(d) listing or future TMDL development.

Pollutant source inventory

Comments

A pollutant source inventory has not been conducted because currently listed waterbodies were all found to fully support their beneficial uses. (EPA, Dec. 21, 2000)

Idaho Department of Environmental Quality Reply

DEQ has changed the name of the section "Pollutant source inventory" to "Summary of known causes" to help alleviate any confusion regarding the content of this section.

Pollutants vs. pollution

Comments

Tables 6, 7, 8, 9, and 16 identify cause/stressor categories for impaired waterbodies. We suggest breaking this category into two columns to distinguish pollutants which would require listing and TMDL development (metals, sediment, etc.), vs. pollution, e.g. habitat, flow, exotic species, which would not require listing or TMDL development. (EPA, Dec. 21, 2000)

Idaho Department of Environmental Quality Reply

DEQ has added an special character to those items in Tables 6,7,8, 9, and 16 that are considered pollution, which do not require listing or TMDL development, with the explanation:

> This cause/stressor should not be considered a pollutant, and should not be the basis for any 303(d) listing or future TMDL development.

Idaho Forest Practices Act

Comments

The text suggests that EPA has certified and approved the IFPA. While we have approved Idaho water quality standards, we have not specifically reviewed or approved Idaho Forest Practices Rules or BMPs, and this sentence may be misleading. We suggest rewording the first sentence to read: "The Idaho Forest Practices Rules (IDL _____) are included in the Idaho Water Quality Standards as approved best management practices for silvicultural activities." (EPA, Dec. 21, 2000)

Idaho Department of Environmental Quality Reply

DEQ agrees that EPA has not directly certified or approved the Idaho Forest Practices Act, and has reworded first sentence as suggested. DEQ also understands that EPA has approved the *Forest Practices Water Quality Management Plan* in 1979 as the CWA section 208 plan for silvicultural activities. *The Forest Practices Water Quality Management Plan* identifies the Idaho Forest Practices Act, Rules and Regulations as the BMPs for silviculture.

Additional CWB Status Investigation

Comments

We support your efforts to further investigate fine sediment impairments not detected by BURP and other analysis. Regarding the Boise National Forest percent fine sediment data, please include a reference or source of the information, and indicate what type of measurements these represent, e.g. surface or depth, and/or the methods used. Regarding the percent fines cutoff of 38.5%, it would appear that further discussion is warranted to support the use of a 38.5% cutoff because the three references cited appear to suggest a cutoff closer to 30% to be protective of embryos. Thirteen waters are identified which exceed the 38.5 % cutoff. From the discussion in the introductory paragraph, we assume that the thirteen waters identified are those which IDEQ believes have bull trout populations impaired by fine sediment.

However, discussion preceding T. 17, p. 27, suggests that currently these waters fully support their beneficial uses. This should be clarified in the text, and if waters are impaired or fully supporting but threatened (see definition above) these should be proposed for 303(d) listing in the next list cycle. Finally, it would be helpful to explain why the segments with excessive fines are all in adjunct habitat, since the introductory paragraph suggested that focal habitat would be evaluated as well. (EPA, Dec. 21, 2000)

Idaho Department of Environmental Quality Reply

Regarding the Boise National Forest percent fine sediment data, the method of collection reference is (Wolman, 1957). The source of the information is the Boise National Forest site data set (BNF, 2000). These measurements represent surface fines. The BNF, 2000 refers Boise National Forest Aquatic Survey Data Base, March 15, 2000 version.

DEQ has stated that the purpose of the "Additional Cold Water Biota Status Investigation" is to identify waterbodies that are both high in "percent fines", and used by bull trout during life history phases that have great need for high quality substrate composition. Based on a preliminary assessment of Upper Boise River data for sediment composition in focal and adjunct habitats, Burton (1997) found that fine sediments comprise a greater proportion of substrate composition in adjunct (median value = 39%) versus focal (median value = 23%) habitats. In performing the Additional Cold Water Biota Status Investigation, DEQ was attempting to detect those segments where fine sediment was clearly the largest threat to bull trout survival. For this reason DEQ choose a cutoff that was statistically significant, related to Upper Boise River Subbasin, and related to literature values, but not necessarily optimal. Identification as fully supporting but threatened as a result of this Additional Cold Water Biota Status Investigation, likely leads to eventual 303(d) listing, and TMDL development.

Currently, Idaho Water Quality Standards are not species specific. The "Fully supporting but threatened" assessment category (short for) used in the Upper Boise River Subbasin Assessment refers to the "Fully Supporting but Threatened" category. The definition for the "Full Supporting but Threatened" assessment category follows: An intermediate assessment category describing waterbodies that "Fully Support" beneficial uses but have conditions which if not addressed are believe to lead to "Not Full Support". Following Idaho WBAG process, DEQ has, no reason, not to believe that the segments identified through Additional Cold Water Biota Status Investigation are any assessment category but "Full Support". DEQ believes that the manifestation of high percent fines is currently being observed in bull trout, and if not addressed will lead to "Not Full Support" for all species utilizing the segment. DEQ agrees that waterbodies and segments are candidates for 303(d) listing.

Both habitat types were analyzed, but there were no situations were segments with excessive fines (>38.5%) were in focal habitat. This issue supports Burton's (1997) observations that fine sediments comprise a greater proportion of substrate composition in adjunct (median value = 39%) versus focal (median value = 23%) habitats.

Use Attainability Analysis

Comments

We recognize the unique circumstances of these watersheds, but additional background information would help provide some context, such as whether they are 303(d) listed, whether there are anthropogenic pollutant sources in the watersheds and their relative significance. We are unclear what IDEQ plans to do next with these waters, and it would be helpful to explain what your thoughts are regarding the further development of these UAAs and the timing of completing them and submittal to EPA. (EPA, Dec. 21, 2000)

Idaho Department of Environmental Quality Reply

There are two Use Attainability Analysis Discussions in the Upper Boise River Subbasin Assessment. These discussions were provided to justify the "Not Attainable" assessment status category placed on these segments, and should not be confused as Use Attainability Analysis. For this reason, DEQ has changed the titles to "Unattainable Status Category Discussion".

These segments, which are sub-units of waterbodies, may not be at the correct scale for DEQ to submit UAAs. It is not clear what the effect of, and how DEQ would manage beneficial use designations, on segments. DEQ Regional Office has brought up these issues with our state office and standards coordinator.

303(d) listing

Comments

The Forest Service does not disagree with the stream segments recommended for 303(d) listing, however, we would like the chance to provide more accurate information prior to that listing. (BNF, Dec 20, 2000)

Idaho Department of Environmental Quality Reply

The Forest Service and any other interest are invited to participate in the 303(d) process, which includes submittal of new/non-accounted for data, inclusion of management efforts, and alternative analysis. Currently the schedule for the next 303(d) process is unknown and should be resolved by this spring or summer, 2001.

General SBA review and format

Comments

Generally, our (BNF) review of the Subbasin Assessment for Upper Boise River Watersheds is favorable, especially in this particular format. This assessment was particularly good at defining what the existing conditions looked like without indicating agency directions or biases. (BNF, Dec 20, 2000)

We generally agree with your findings, and appreciate your creativity in the use of the Assessment DataBase (ADB) as a tool for documenting assessment findings. We also appreciate your efforts to identify fine sediment impairments to bull trout, which are not necessarily detected through BURP monitoring. (EPA, Dec. 21, 2000)

Compliment Boise Regional Office IDEQ for a job very well done. (Moyer, Nov. 6, 2000)

Idaho Department of Environmental Quality Reply

No reply

Waterbody Specific Comments

Yuba River, Black Warrior Creek

Comments

Adverse effects of mining in the Yuba River and Black Warrior Creek are noted, followed by discussion of critical spawning and rearing habitat in such tributaries. We believe the assessment should contain a discussion of whether IDEQ will list these streams based on this information, or conduct further monitoring to confirm the nature and extent of the impacts. It would appear that impairments have occurred which may warrant 303(d) listing. (EPA, Dec. 21, 2000)

Idaho Department of Environmental Quality Reply

The USFS, unpublished report, referred, to in the Upper Boise River SBA does not substantiate current water quality conditions of Yuba River and Black Warrior Creek, and should not have been used. The unpublished report does record the occurrence of dredge mining that was generally implied to adverse effects. Since the unpublished report Boise Regional Office DEQ has monitored Black Warrior Creek and Yuba River and has found their status to be in the "Full Support" assessment category. DEQ has revised the paragraph in Recreation section to read:

The Forest Service has documented dredge mining activities, and past-related adverse effects, in the Yuba River and Black Warrior Creek (USFS, unpublished report). Since the unpublished report Boise Regional Office DEQ has monitored Black Warrior Creek and Yuba River and has found their status to be in the "Full Support" assessment category.

Montezuma Cr.

Comments

While this discussion appears to accurately represent the status and findings of the Superfund investigation near Montezuma Creek, additional discussion of the separate CWA obligations is needed. The assessment clearly concludes that all beneficial uses in Montezuma Creek are being impaired due to metals contamination. The document should clarify that in addition to the Superfund work, under the CWA these findings require 303(d) listing and TMDL development for this waterbody. We believe there is an opportunity to mesh the assessment and cleanup work under Superfund with TMDL development requirements under the CWA, in order to avoid duplication of effort, and it might help to explain these possibilities in the assessment. Such coordination has occurred in the Coeur d'Alene Basin, and other Superfund sites in Oregon and Alaska. Also, see attached editorial suggestions on this section from Dave Tomten. (EPA, Dec. 21, 2000)

The forest Service concurs with the finding that the main stem of Montezuma does not support the beneficial uses for Primary Contact Recreation and Salmonid Spawning. Sediment delivery from historic mining sites and existing road facilities continues to impact water quality within the Montezuma Creek Watershed. (BNF, Dec 20, 2000)

The determination for not supporting the Domestic Water Supply Beneficial Use should be moved to that segment consisting of only East Fork Montezuma Creek, and be removed from Montezuma Creek. The actual intake for the town of Atlanta's water system is on the East Fork of Montezuma Creek – Waterbody 17050111001_16. (BNF, Dec 20, 2000)

We understand that IDEQ may have examined a limited data set while formulating its recommendations to include Montezuma Creek on the Idaho 303(d) list. That data set characterizes conditions in Montezuma Creek in the first few months following the 1997 tailings release. The St. Joe Minerals Corporation and Monarch Greenback, LLC urge IDEQ to consider the additional data collected to characterize Montezuma

Creek in 1998 and 1999, as presented in the Final Site Characterization Report. These data indicate arsenic and metals levels that are below aquatic water quality criteria. (MFG, Dec. 5, 2000)

Additional information is available, but is not considered in the draft Subbasin Assessment, that indicates that Montezuma Creek supports the cold water biota, salmonid spawning, and primary contact recreation beneficial uses. This information is presented in a Final Baseline Ecological Risk Assessment (BERA) and a draft Baseline Human Health Risk Assessment (BHHRA) that have been prepared in connection with Superfund activities in the Montezuma Creek drainage. These documents assess potential risks in the "Depositional Area", the area to which mill tailings have been deposited following the 1997 tailings release. A portion of Montezuma Creek lies within the Depositional Area. Copies of the risk assessment documents have been provided to the Idaho Department of Environmental Quality. (MFG, Dec. 5, 2000)

Cold Water Biota and Salmonid Spawning Beneficial Uses. The BERA concluded that there are no unacceptable levels of risk to aquatic biota in Montezuma Creek due to the presence of arsenic and/or metals that exceed the State's water quality standards. Concentrations of arsenic, copper, lead, mercury, and zinc measured in Montezuma Creek in 1998 and 1999 are below the corresponding chronic aquatic water quality criteria. The following is an excerpt from section 9.1 (Summary, Conclusions, and Lines of Evidence) from the BERA:

> *"Fisheries habitat, fish population studies, and macroinvertebrate studies showed healthy populations of fish and aquatic macroinvertebrates within Montezuma Creek in both the Depositional Area and in reference areas. Habitat limitations, such as lack of wood loading, lack of channel diversity, and poor riparian conditions appear to be limiting redband rainbow trout populations in the lower portion of Montezuma Creek. Thus the lines-of-evidence point to physical habitat conditions as the primary limiting factor for aquatic life in Montezuma Creek; no evidence strongly points to ongoing effects from water quality parameters associated with the 1997 release."*

Please note that U.S. EPA Region 10 has approved the BERA and therefore concurs with this conclusion. On page 19 of the draft Subbasin Assessment, physical habitat is specifically identified as being inappropriate for regulation under Section 303(d) of the Clean Water Act, and thus inappropriate for consideration within the TMDL process. Therefore, inclusion of Montezuma Creek on the 303(d) list because physical habitat conditions may have affected cold water biota and/or salmonid spawning beneficial uses also is inappropriate. (MFG, Dec. 5, 2000)

Primary Contact Recreation Beneficial Use. The BHHRA presents a detailed evaluation of primary contact recreational use of Montezuma Creek. Scenarios investigated include the "Atlanta resident", the "visitor", and the "hypothetical future resident." In all cases, both adult and child receptors were evaluated with respect to incidental ingestion and dermal contact with surface water of Montezuma Creek. The evaluations were conducted using "reasonable maximum exposure" (RME) assumptions. These are very conservative assumptions regarding the amount of time each receptor may actually be exposed to the surface water. Note that the BHHRA has not yet been approved by U.S. EPA Region 10 because exposure to soil in the Depositional Area is being evaluated in further detail. However, at this time, the surface water exposure evaluations presented in the BHHRA are complete and are not subject to ongoing revision.

The BHHRA evaluated contact with surface water from both Montezuma Creek and Unnamed Creek as well as the Middle Fork of the Boise River (MFBR) . Unnamed Creek comprises a small stream that joins Montezuma Creek above its confluence with the MFBR. The BHHRA fount that potential exposure to surface waters in the Depositional Area do not pose unacceptable levels of risk to humans. Therefor, Montezuma Creek supports the primary contact recreation beneficial use. (MFG, Dec. 5, 2000)

Significant information has been collected to characterize Montezuma Creek. We request that IDEQ consider all available information for Montezuma Creek, surface water, including the evaluations presented in the BERA and BHHRA, while formulating the recommendations in the Subbasin Assessment. We believe that this additional information demonstrates that Montezuma Creek supports the cold water biota, salmonid spawning, and primary contact recreation beneficial uses. (MFG, Dec. 5, 2000)

Idaho Department of Environmental Quality Reply

DEQ has considered Montezuma Creek findings and additional data collected as presented in the Final Site Characterization Report. DEQ agrees with MFG that cold water biota, salmonid spawning, and primary contact recreation beneficial use's status should be changed from the "not fully supporting" to the "full support" assessment category. Data collection, and level of analysis performed for The Final Baseline Ecological Risk Assessment and draft Baseline Human Health Risk Assessment far exceed the reconnaissance efforts that the original assessment was based. The Final Baseline Ecological Risk Assessment and draft Baseline Human Health Risk Assessment provide recent stream concentrations that do not exceed Idaho Water Quality Standards criterion.

Forest Service comments depict "sediment delivery" as the cause impairing beneficial uses. Neither DEQ nor BNF monitoring data reflect excess in-channel sedimentation, perhaps because Montezuma Creek is high gradient and capable of transporting (assimilating) excess sediment delivered to channel. Further monitoring and assessment would be needed to demonstrate sediment as a cause for impairment.

Text and tables has been modified to reflect "full support" assessment category for of cold water biota, salmonid spawning, and primary contact recreation beneficial uses.

Domestic Water Supply beneficial use is designated in Idaho Water Quality Standards for HUC 17050111 WBID 001, which Montezuma Creek is part of (17050111001_15). Assessment for domestic water supply has been placed in "Not Assessed" assessment category. While DEQ agrees with MFG that Montezuma Creek is not used for domestic water supply, and East Fork of Montezuma Creek is, an Idaho Water Quality Standards rule change is necessary to depict as such.

Crooked River, Beaver Creek, and North Fork Boise River.

Comments

Boise River Wildfire Recovery monitoring data suggests that sediment fines are high within the Crooked River watershed, Trail Creek, Big Owl Creek, Little Owl Creek, Rabbit Creek, and the North Fork of the Boise River. The Forest Service recommend the additional Fully supporting but threatened listing of Crooked River and its tributaries (Including Banner Creek and all other unnamed tributaries), Beaver Creek and its tributaries, and the North Fork Boise River. (BNF, Dec 20, 2000)

Beaver Creek 17050111014_02. No rainbow trout in last sample. Brook Trout only. I would call impaired until more data. I cannot concur with assessment at this time. (Grunder Oct. 6, 2000)

Rabbit Creek Mainstem 17050111015_00. Age of data concerns me at We need post-fire data to make a call. I do not concur with "Not-Impaired" status call. (Grunder Oct. 6, 2000)

Idaho Department of Environmental Quality Reply

Conclusions based on Boise River Wildfire Recovery monitoring data may not be directly transferable to beneficial use status determinations. It is DEQ's understanding that direct measures of instream sediment are incorporated in the Boise National Forest Aquatic Survey Database, which was used for the Upper Boise River SBA. The Forest Service's recommendation for the additional "Fully supporting but threatened" listing of Crooked River is supported, since Boise Regional Office monitoring of Crooked River predated the Rabbit Creek Fire, and Boise River Wildfire Recovery monitoring. DEQ has:

1. Changed the status for the Crooked River mainstem segment 17050111014_00 (Crooked River from Pikes Fork to North Fork Boise River) from "Full Support" to the "Fully supporting but threatened" assessment status category,
2. Classified the assessment as "assessed" rather than "monitored", and
3. Modified the assessment method from "DEQ WBAG 1996" to "conditions observed judged to impair beneficial use."

DEQ has recent monitoring stations from upper Crooked River (Crooked River from headwaters to Pikes Fork) that meets all criteria for "Full Support". Crooked River's tributaries (Including Banner Creek, Gotch Creek, Pikes Fork, Sawmill Creek, and several other unnamed tributaries) Beaver Creek and its tributaries, are already in the "Fully supporting but threatened" assessment status category. More specific information, development of a DEQ large river monitoring, and development of a DEQ large river assessment protocol is required prior to modifying the status of North Fork Boise River.

Under original SBA Beaver Creek was found "Not Full Support" and is to remain the same. IDFG comments regard an index (RIBI) that following DEQ Waterbody Assessment Guidance, only can come up with a "Not Impaired" or a "Needs Verification" result. The decision to list as "Not Full Support" is a result of not being able with any index to get out of the "Needs Verification" category.

Rabbit Creek mainstem has been modified from "Full Support" to "Not Full Support" assessment status category. The determining index for assessment status assumed concurrence by a fisheries biologist with ecoregional experience.

Meadow Creek

Comments

The Forest Service concurs with the findings and recommendations of Meadow Creek. The District does not have any current monitoring data on the conditions of Meadow Creek; however, visual observations during the summer of 1997 and 1998 indicated that percent fines were potentially a problem within this stream channel. (BNF, Dec 20, 2000)

1750111016_00. Data needs to be updated or questionable call. Lack of rainbow trout concerns me. Look at habitat data. I do not concur with the "Needs Verification" status call. (Grunder Oct. 6, 2000)

Idaho Department of Environmental Quality Reply

Under original SBA Meadow Creek was found "Not Full Support" and is to remain the same. IDFG comments regard an index (RIBI) that following DEQ Waterbody Assessment Guidance, only can come up with a "Not Impaired" or a "Needs Verification" result. The decision to list as "Not Full Support" is a result of not being able with any index to get out of the "Needs Verification" category.

Quartz Gulch, Flint Creek, Decker Creek, and Yuba River

Comments

The Forest Service would also like to suggest that Quartz Gulch, Flint Creek, Decker Creek, and Yuba river be added to the list. Some of the information gathered for the Draft Atlanta Gold EIS during the 1980's indicated these streams channels have potentially high heavy metal concentrations from historic mining practices. The Forest Service would encourage DEQ to add these streams in a Fully supporting but threatened Status for further review. (BNF, Dec 20, 2000)

Idaho Department of Environmental Quality Reply

DEQ appreciates Forest Services nominations and will consider the above listed streams during the next 303(d) process, and prioritize future monitoring. DEQ feels, that without current data (<5yo), status of aquatic life, or status of habitat it would be best if DEQ does not modify assessment status. The Forest Service is encouraged to assist/coordinate monitoring efforts to more quickly re-evaluate stream status.

Little Camas Reservoir

Comments

The Forest Service would like the DEQ to provide a detailed rationale as to the listing of Little Camas Reservoir. It is interesting that Little Camas Creek and Little Camas do not illustrate the same or similar impairments. The purpose of this rationale would be twofold: to compare with Forest Service observations and conclusions and to aid in development of restorative actions, if necessary, prior to TMDL development. (BNF, Dec 20, 2000)

Idaho Department of Environmental Quality Reply

DEQ has added appendix T13 that includes the assessment results for Little Camas Reservoir. Little Camas Reservoir, according to DEQ Limnologist (Bryan Hoelscher), and based on recent monitoring is in the "Not Supporting" assessment status category. Excess algal growth (Chlorophyll a) was observed and excess nutrients were measured. Little Camas Creek and Little Camas Reservoir may illustrate the same or similar impairments. Little Camas Creek is in the "Not Assessed" assessment status category, because Little Camas Creek has not been monitored.

Little Smoky Creek, Paradise Creek, South Fork Boise River (Johnson Creek to Smoky Creek), and Middle Fall Creek.

Comments

There are several of the listed streams that we consider "borderline" as to whether they meet their beneficial use and warrant additional data collection. These are:

- Little Smoky Creek - 17050113018_03
- Paradise Creek - 17050113020_00
- South Fork Boise River (Johnson Creek to Smoky Creek)– 17050113021_05
- Middle Fall Creek – 17050113031_03

Our agency would like to work with your staff to continue monitoring habitat and populations of fish and macroinvertebrates in these systems as funding and resources allow. (IDFG, Dec. 8, 2000)

Idaho Department of Environmental Quality Reply

DEQ's reporting that a stream is in the "Full Support" assessment status category is different than saying a stream is fully supporting it's beneficial uses. There are many shades of gray in stream conditions between a pristine/optimal stream and a thoroughly degraded stream. Unfortunately, DEQ must make black or white, non-subjective call on each streams status. For the most part, DEQ reports that streams fall in either the "Full Support" assessment status category or the "Not Full Support" assessment category. Which category depends on monitoring results of aquatic life, physical, and chemical sampling. We agree that additional monitoring may better identify status and are willing to participate with IDFG.

South Fork Boise River Tribs (17050113004_05)

Comments

An error was make in calculating the density of salmonids for this stream. Rather than 0.97 salmonids/m^2, there should be 0.22 salmonids/m^2. (Grunder Oct. 6, 2000)

Idaho Department of Environmental Quality Reply

Good catch, although the results are not affected. While solving the IBI (using Fisher , 1983) one of the indices asks for the log of the density of salmonids. Both the log of 0.97 and the log of 0.22 score the same value of 5.

French Creek (17050111017_00)

Comments

Because of age of data, you are going to get questions. Needs updated data. I do not concur with "Not-Impaired" status call. (Grunder Oct. 6, 2000)

Idaho Department of Environmental Quality Reply

French Creek mainstem has been modified from "Full Support but Threatened" to "Not Full Support" assessment status category. The determining index for assessment status assumed concurrence by a fisheries biologist with ecoregional experience.

Section Specific Comments

Page 6 under heading "Algae," last sentence

Comments

"Small isolated occurrence have been observed and are **be** limited to stagnate water in small dredge ponds." Suggests that the word "be" be stricken. (Moyer, Nov. 6, 2000)

Idaho Department of Environmental Quality Reply

Comment noted and has been incorporated into final SBA.

Page 20 under heading "Criteria for Protecting Beneficial Uses"

Comments

In the sentence "Narrative criteria is described as criteria which protects with amounts of pollutant, usually sediment or nutrients are a levels that **do not** impair beneficial uses. Numeric criteria are those criteria which protects when specific, quantifiable amounts of pollutants like: fecal coliform bacteria, dissolved oxygen, pH, chlorine, dissolved gas, ammonia, temperature or turbidity, **do not** exceed numeric thresholds. Not sure that he "do nots" should be there. (Moyer, Nov. 6, 2000)

Idaho Department of Environmental Quality Reply

Comment noted and has been incorporated into final SBA.

Page 21

Comments

The first paragraph under the table the sentence reads. "There are also some changes in temperature criteria effecting**,** cold water biota, salmonid spawning, and bull trout waters. The first comma should be removed. (Moyer, Nov. 6, 2000)

Idaho Department of Environmental Quality Reply

Comment noted and has been incorporated into final SBA.

Superfund Section, page 29

Comments

Replace 1st sentence "Superfund is a EPA … from qualified sites." With "CERCLA is a federal law intended to address releases or threatened releases of hazardous substances. This law establish the Superfund Program, which is administered primarily by EPA." The 2nd sentence needs to be modified to read "Through analysis and compilation of the Upper Boise River SBA, one waterbody with a Superfund project stands out, the Talache Mine Tailings Superfund site." The 3rd sentence needs to be modified to read, "Montezuma Creek (17050111001_15), near the town of Atlanta is close to this site and has been impacted by it. DEQ has determined that if is impaired for all of it's beneficial uses from sources and pollutants that may not entirely addressed by Superfund." The 1st sentence of the 2nd paragraph needs to be modified to read, "On the Talache Mine Tailings Superfund Site, the potentially responsible parties are conducting a "removal action" to stabilize 2 historic mill tailings piles near Montezuma Creek and remove tailings from depositional areas to levels that are protective of human health and the environment." The 2nd sentence of the 2nd paragraph should be modified to read, "This work is being done by the PRPs as a…". The 4th and 5th paragraphs should be moved in front of the new 2nd sentence. The 1st sentence of the 6th paragraph needs to be modified to read, " The most significant of the problems…." Finally The 7th paragraph needs the word "Atlanta" inserted between the words "the" and "area" for the first sentence. (EPA, Dec. 21, 2000)

Idaho Department of Environmental Quality Reply

Superfund section has been removed from Upper Boise River SBA.

Appendix T3

Comments

I assume this table refers to the 1998 303(d) list, and it would be helpful to identify it as such. Also, all the streams except Little Smoky Cr. are listed for sediment, so I'm not clear why the sediment code doesn't appear for each of these waters. (EPA, Dec. 21, 2000)

Idaho Department of Environmental Quality Reply

The sediment code does not appear because status of waterbodies is in the "Full Support" assessment category. Table title comment is noted and has been incorporated into final SBA.

Appendix T5

Comments

It would help the reader to have names associated with the WBID, at least at some scale. (EPA, Dec. 21, 2000)

Idaho Department of Environmental Quality Reply

DEQ has added a new Appendix T-1 that includes a name, comments, and location of each waterbody identification and segment.

Appendix T6

Comments

Please clarify what the "cycle year" column refers to. (EPA, Dec. 21, 2000)

Idaho Department of Environmental Quality Reply

The field "cycle year" refers to the reporting cycle for assessments. Those assessments reported in 1998 were the same assessment submitted to and approved by EPA in the 1998 303(d) list. All other assessment dates in the Upper Boise River Subbasin Assessment should be the 2002 date. Currently, the schedule for the next 303(d) process is unknown and should be resolved this spring or summer, 2001. The SBA used 2002 and may need to modify.

Comment References

(EPA, Dec. 21, 2000)

Letter from United States Environmental Protection Agency, Region 10, Idaho Operations Office, 1435 N. Orchard St., Boise, Idaho 83706. Letter signed by Leigh Woodruff (Idaho TMDL Coordinator) on December 21, 2000. Letter received by Boise Regional Office DEQ on Dec. 22, 2000.

(BNF, Dec 20, 2000)

Letter from United States Department of Agriculture, Forest Service, Boise National Forest, 1249 South Vinnell Way, suite 200, Boise, Idaho 83709. Letter signed by David D. Rittenhouse (Forest Supervisor) on December 20, 2000. Letter received by Boise Regional Office DEQ on December 20, 2000.

(IDFG, Dec. 8, 2000)

Letter from Idaho Fish and Game, Magic Valley Region, 868 East Main Street, P.O. Box 428, Jerome, Idaho 83338. Letter signed by David Parrish (Acting Magic Valley Regional Manager) on December 8, 2000. Letter received by Boise Regional Office DEQ on December 11, 2000.

(MFG, December 5, 2000)

Letter from MFG Inc., 215 S. 3rd West (59801), P.O. Box 7158, Missoula, MT, 59807 in behalf of St. Joe Minerals Corporation and Monarch Greenback, LLC. Letter signed by Brian G. Hansen, P.E. (Senior Engineer/Hydrogeologist, MFG Inc.), and Roger E. Braun P.G. (Senior Hydrogeologist, Braun Consulting) on December 5, 2000. Fax of letter received by Boise Regional Office DEQ on December 5, 2000. Letter received by Boise Regional Office DEQ on December 11, 2000.

(Moyer, Nov. 6, 2000)

Phone message from Jim Moyer (South West Basin Advisory Group member). Message sent to and received by Boise Regional Office on Nov. 6, 2000.

(Grunder Oct. 6, 2000)

Memorandum from Scott Grunder, Idaho Department of Fish and Game dated 10/06/2000, regarding Index of Biotic Worksheets and Verification Calls. Memorandum received by Boise Regional Office DEQ on October 10, 2000. These changes had not been incorporated prior to release of public review draft.