FISHERIES SPECIALIST REPORT FOR THE BROADAXE PROJECT AREA

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MAY 4, 2005

Introduction

Regulatory Framework

There are six standards listed in the Idaho Panhandle National Forests (IPNF) Forest Plan (USDA Forest Service 1987) plus the additional standards described in the Inland Native Fish Strategy (USDA 1995 Inland Native Fish Strategy DN and FONSI) which, are applicable to the fisheries resource. The IPNF is proposing to change the Forest Plan by amending fisheries objectives, standards, and monitoring requirements that pertain to fry emergence success within streams across the forest. A decision on that proposal is expected in June 2005. Inland Native Fish Strategy (INFISH) requirements include but are not limited to meeting Riparian Habitat Conservation Area (RHCA) and Riparian Management Objective (RMO) requirements, initiating development and implementation of a Road/Transportation Management Plan for the area, and providing and maintaining fish passage in all existing and potential fish-bearing streams.

The National Forest Management Act (NFMA) (1976) requires that the Forest Service manage for a diversity of fish habitat to support viable fish populations. Regulations of NFMA (219.12g) state, "Fish and wildlife habitats will be managed... to maintain and improve habitat of management indicator species." Section 7 of the 1973 Endangered Species Act (ESA) includes direction that Federal agencies will not authorize, fund, or conduct actions that are likely to jeopardize the continued existence of any threatened or endangered species or result in the destruction or adverse modification of their critical habitat. Executive Order 12962 (June 7, 1995) states objectives "to improve the quantity, function, sustainable productivity, and distribution of U.S. aquatic resources for increased recreational fishing opportunities by: (h) evaluating the effects of Federally funded, permitted, or authorized actions on aquatic systems and recreational fisheries and document those effects relative to the purpose of this order." Additional regulatory requirements related to fisheries resources (*e.g.* Clean Water Act and Idaho Water Quality Standards, Idaho 303(d) list) are addressed in the Soil and Water Resources Review and are considered under this core topic for fish species and habitat.

Analysis Area

The Broadaxe Project Area, Township 45 N., Range 9 E (Boise Meridian), Shoshone County, Idaho, is located in the upper portion of the Gold Creek drainage that is a tributary to the St. Joe River. The St. Joe River feeds into the southern portion of Coeur d'Alene Lake. Coeur d'Alene Lake and its tributaries form the upper Spokane River Basin which, occurs within the interior Columbia River Basin.

The project area is identified as being within a "Priority watershed", all drainages upstream of Bird Creek on the north side of the St. Joe River and upstream of Mosquito Creek on the south side, as defined in INFISH (USDA, 1999, Internal Memo: Key and Priority Watershed Task Team Report). Priority watersheds are watersheds that have excellent habitat or strong populations of inland native fish (with a priority on bull trout), watersheds that could provide those, or degraded watersheds with high restoration potential.

Affected Environment

The affected environment describes the current condition of the fisheries resource within the project area. It is used to develop fisheries issues, which have the potential to be affected by the proposed action.

Analysis Methods

Determination of Project Issues:

The determination of the project issues is based on the deviation from the desired conditions. This deviation is called a limiting factor. A limiting factor is a factor, which limits or reduces the ability of an area to produce the desired product (Everest and Sedell, 1984). The identification of a limiting factor is developed by comparing the desired conditions to the current condition.

The USFWS (1998) developed a list of indicators and measurement parameters (Table 1), which were used to characterize the fish habitat and assist in the determination of limiting factors.

Table 1 - Indicators Considered in Limiting Factor Assessment

Indicator	**Measurement parameters**
Population Characteristics	Population size, growth and survival, diversity, isolation, persistence
Stream channel conditions	Width to depth ratio, streambank condition, floodplain connectivity
Flow/hydrology	Change in Peak/base flows
Watershed Condition	Sensitive landtype, road density, riparian harvest, elevation
Water Quality	Temperature, Sediment, Chemical Contaminants/nutrients
Habitat Access	Physical barriers
Habitat Elements	Substrate embeddedness, large woody debris, pool frequency, large pools, off channel habitat, refugia

Some of these indicators and measurement parameters are described in the description of the existing condition but are not selected for use as project issues used to analyze alternatives because either, they were not selected as limiting factors or they do not have the potential to be altered by timber management activity. For example, the amount of the watershed at a certain elevation would not be altered by any proposed activity.

The concluding paragraph of the Current Conditions section identifies those factors that are utilized as project issues.

The following paragraphs describe how the measurement parameters are used.

Population Characteristics:

Population size for Gold Creek is based on data collected by Idaho Department of Environmental Quality (DEQ); therefore DEQ's measure of density is used. DEQ considers between 0.1 and 0.5 fish/m^2/hr typical of the streams of the St. Joe (Idaho DEQ 2003 pg 29). Fish population size of streams not surveyed by Idaho DEQ are characterized by the following rates; < 3 fish/100 m^2 is considered low density and > 12 fish/100 m^2 is considered excellent (J. Dupont, personal communications project file doc F-1).

Fry emergence is the ability of eggs to survive and hatch to become fry and then survive to emerge from the gravels. The IPNF Forest Plan states, "*Sedimentation* [emphasis added] arising from land management activities will be managed so that in forest fisheries streams the objective is to maintain 80 percent of fry emergence success as measured from pristine condition" (IPNF Forest Plan II-7 1987). The 1989 Forest Plan monitoring report (page 14) documented that this was not a valid standard due to the variability of influences on fry emergence (not just sediment) and the inaccuracy of sampling methods to determine fry emergence. Therefore to meet the intent of this standard all factors influencing fry emergence are considered in a qualitative manner.

Fish assemblage diversity, presence and distribution were determined based on electro-fishing surveys, spawning surveys and incidental sightings during habitat surveys (project file, F-3 through F-14 and F-20).

Population isolation is based on a review of migration barriers.

Persistence will be addressed with the conclusion determined in the biological assessment and biological evaluation.

Current Habitat Characteristics:

Current habitat conditions are a result of the natural condition of a stream and the influences of past management activities on that stream. A description of past management activities and their potential influences are presented for each stream of the cumulative effects area.

Stream Channel Conditions

This parameter is based on information provided in the Broadaxe Project Watershed Specialist report.

Flow/Hydrology

This parameter is based on information provided in the Broadaxe Project Watershed Specialist report.

Watershed Condition

Sensitive landtype information is derived from a GIS layer based on soil surveys. (Watershed report)

Road density influence was determined based on miles of total road by acres within the drainage. The influence of road density to the fisheries resource was based on research conducted for the Interior Columbia Basin Ecosystem Management Project (ICBEMP) (Lee et al 1997). That research found that the "status of four non-anadromous salmonid species (which include bull trout and westslope cutthroat trout) are less likely to use moderate to highly roaded areas for spawning and rearing and if found are less likely to be at strong population levels" (Lee et al 1997 page 1347). Table 2 provides the ICBEMP definitions for road density ratings (Quigley et al 1996 page 67).

Table 2 - Total Road Density Ratings

Rating	Very low	Low	Moderate	High	Extremely High
Densities	0.02-0.1 mi/mi^2	0.1-0.7 mi/mi^2	0.7 – 1.7 mi/mi^2	1.7 – 4.7 mi/mi^2	4.7 + mi/mi^2

Encroaching road density and *RHCA road density* utilizes the same rating system as total road density (Table 2).

Riparian Harvest was determined by overlaying harvest history information with riparian habitat widths. Riparian habitat widths are based on INFISH categories; 300 feet perennial fish bearing, 150 feet perennial non-fish bearing and 100 feet intermittent.

Elevation is determined by GIS map layer.

Water Quality

Stream temperature data was collected using automated Onset temperature recorders. The criteria used for temperature is based on Idaho State criteria (Idaho DEQ 2005), Table 3. A stream is considered to be temperature impaired if the temperature standard is exceeded greater than 10% of the specified time period (Pettit, personal communication).

Table 3 - Temperature Criteria Standards

Metric	Spring Salmonid Spawning	Bull Trout	
Dates	April 15 – July 15	Juvenile 6/1-8/31	Spawning 9/1-10/31
Maximum Daily Maximum Temperature (MDMT)	13 °C		
Maximum Weekly (7- day average) Maximum Temperature (MWMT)		13 °C	
Maximum daily average Temperature (MDAT)	9°C		9°C

Habitat Access

Culvert accessibility was evaluated based on Region 1 Passage Through Crossings Assessment (project file F-23).

Habitat Elements:

The description of the current habitat elements is based on quantitative surveys conducted in 1998 and 2001 according to procedures outlined in the Region 1 Fisheries Habitat Evaluation Handbook (FSH2609.23) or the R1/R4 methodology (Overton et al 1997), woody debris inventory (project file document F-22), qualitative stream reviews (1996-2002), historical records, aerial photographs review, review of the watershed report, discussions with Idaho Department of Fish and Game (IDFG) and U.S. Fish and Wildlife Service (USFWS).

Desired Future Condition: The desired future condition for the fisheries resource is based on several sources: desired condition, as identified in the Idaho Panhandle National Forests Forest Plan, that the fisheries habitat will be improved (USDA 1987, Idaho Panhandle National Forests Forest Plan, pg II-22), reference conditions, the Quartz – Gold Environmental Analysis at the Watershed Scale, literature reviews and communication with Idaho Department of Fish and Game.

Cumulative Effects Determination*:* In order to determine the project's contribution to cumulative effects, a cumulative effects area was determined based on selecting an area, which contains all potential project activities and defines the largest watershed area that allows for the greatest level of resolution at various geographic and temporal scale. All past activities which occurred in the cumulative effects area are considered (Management History Report).

Reference Condition

The following summarizes the reference habitat conditions which, were known to exist or which, were expected in the Broadaxe Project Area before modern human management activities began in the early 1900s. No specific information is available for the project area, because detailed descriptions of the habitat prior to management were not completed. Reference conditions are therefore inferred based on the physical conditions, which could occur in areas with topography, geology, rainfall, etc., similar to the project area. Reference conditions are also based on the known habitat needs of the native fish species of the project area.

Biological communities, including native fish populations, evolved with extremely variable natural disturbances to develop functional ecosystems, which possessed an inherent resiliency to effects from natural disturbance regimes representing pulse-type disturbance (Reeves *et al.* 1995). Pulse disturbances influence the natural range of environmental conditions that are expected for ecosystems functioning at broad geographic scales but typically allow systems to begin recovering to pre-disturbance conditions in a timely manner.

Population Characteristics:

Bull trout and westslope cutthroat trout were historically documented in Gold Creek (Maclay, 1940; Fields, 1935). They were not historically documented in Broadaxe Creek, but it is assumed that they utilized Broadaxe Creek because there are no barriers between the two streams.

Habitat Characteristics:

Stream Channel Conditions:

The Broadaxe Project Watershed Specialist Report describes the reference condition of the project area.

Flow/Hydrology:

The Broadaxe Project Watershed Specialist Report describes the reference condition of the project area.

Watershed Condition:

The amount of sensitive landtypes and the amount of land within the rain on snow zone does not alter based on natural events or human activity, therefore the current condition is also the reference condition (Table 4).

Table 4 - Watershed Conditions

Stream Name	Drainage Area (Acres)	% Sensitive landtypes	% acres in Rain on Snow zone
Broadaxe Creek	3,366	1.4	13.7
Gold Creek	17,735	5.3	26.3

Road density and riparian harvest are both human-created parameters and therefore would not have existed in a reference condition.

Water Quality:

Water temperatures would have been conducive to fisheries production based on the known historic presence of fish in the project area.

Sediment conditions would have been such that they supplied the appropriate combination substrate sizes to provide spawning gravel and rearing habitat.

Chemical contamination and nutrient loading are parameters created by human activity therefore in a reference condition they would not have been an issue.

Habitat Access:

Fish populations utilizing Broadaxe Creek would have had access to approximately 2.5 miles of suitable habitat. Beyond this a waterfall prevents further upstream migration. Fish can utilize Gold Creek for approximately 8.5 miles at which point there is a natural migration barrier.

Habitat Elements:

Biologically preferred conditions of bull trout and westslope cutthroat trout provide insight into reference conditions for aquatic resources in the Broadaxe analysis area. The

preferred habitat of bull trout and westslope cutthroat trout can be generalized as cold, clear streams that possess rocky, silt-free riffles for spawning and slow, deep pools for feeding, resting, and over-wintering (Young 1995; Reel *et al.* 1989), therefore it is assumed because these fish were known to occur in this area that these conditions existed.

Based on topographic features, aquatic habitats would likely have included a diverse mix of fast and slow water habitats. It is expected that beavers would have had a minor influence on channel morphology and associated habitat conditions in the area.

Based on the forested nature of this area the reference conditions for instream cover would likely have consisted of a high percentage of undercut banks, over-hanging terrestrial vegetation, and accumulations of large woody debris.

Current Conditions:

Population Characteristics

Bull Trout: Bull trout population status reviews have found considerable reductions in the distribution and abundance throughout their historic range (USDA Forest Service 1996a, An assessment of the conservation needs of Bull Trout; Rieman and McIntyre 1993). The IPNF Forest Plan monitoring reports (1998, 2000 and 2002) indicate that bull trout populations appear to be stable throughout most of northern Idaho (USDA Idaho Panhandle Forest Plan Monitoring and Evaluation Reports 1998, 2000 and 2002).

Genetic analysis has shown bull trout populations in the St. Joe River system to be a unique stock though they are closely linked to the upper Columbia River clad - one of three major groupings of bull trout throughout the Columbia and Klamath River drainages (Williams, unpublished). Currently, bull trout are known to occupy habitat in the St. Joe River and many of its tributaries. However, in a status review of bull trout on the Idaho Panhandle National Forests, stocks from the St. Joe River system were considered to be at moderate risk of extinction (Cross 1992).

Bull trout historically occurred in Gold Creek (Fields 1935, Maclay 1941). Currently densities of bull trout are considered to be low based on surveys which have only located an occasional fish in Gold Creek (Idaho Fish and Game 1996, project file documents F-3 through F-11)

No bull trout were located during a survey of Broadaxe Creek, however because there are no migration barriers between Gold Creek and Broadaxe Creek there is the possibility of bull trout using Broadaxe Creek.

Westslope Cutthroat Trout: Population status reviews of the westslope cutthroat trout (WCT) within the United States, determined that currently WCT occupy an estimated 59% of the historically occupied habitat and in Idaho populations occupy almost 96% of the historical range (Shepard et al 2003). Idaho Fish and Game summarized 20 years of snorkeling data on four streams (including the St. Joe) in Idaho which indicates that "westslope cutthroat trout have maintained or increased their population abundance over a very large area within the state of Idaho during the past 15-34 years" (Idaho Fish and Game, 2003, pg 2). Idaho Fish and Game surveyed the St. Joe River from 1969 until

present, except for several years during the 1980s. These surveys indicated that current populations are lower than the peak years in 1977 and 1980, but higher than the earliest years of the survey (Idaho Fish and Game 2003 pg 43). The Northern Region of the Forest Service lists the westslope cutthroat trout as a sensitive species (project file document F-24). IPNF Forest Plan monitoring reports (1998, 2000 and 2002) indicate that westslope cutthroat trout populations appear to be stable throughout most of northern Idaho.

The westslope cutthroat trout densities found Broadaxe Creek are 10.9 fish/100 m^2, which is considered to be good (project file, F-12, F-13). The most recent density estimate for Gold Creek was 0.036 fish/m^2/hr, which is considered low (Idaho DEQ 2003 pg 30).

Non-native species: Rainbow trout were planted in the St. Joe within the segment of river adjacent to the project area in the 1960s. No recent surveys have located rainbow trout within any of the tributaries of the project area (project file documents F-3 through F-13).

Management Indicator Selection (MIS): Native bull trout and westslope cutthroat trout have been selected as appropriate MIS for the fisheries analysis of these watersheds, because of their historic presence in the project area and because they are either a threatened or sensitive species.

Habitat Characteristics

Broadaxe Creek

Broadaxe Creek drainage is approximately 19% of the Gold Creek drainage. Broadaxe Creek is approximately 3.5 miles long. The Forest Plan identified Broadaxe Creek as providing spawning and rearing habitat.

Historic Activity

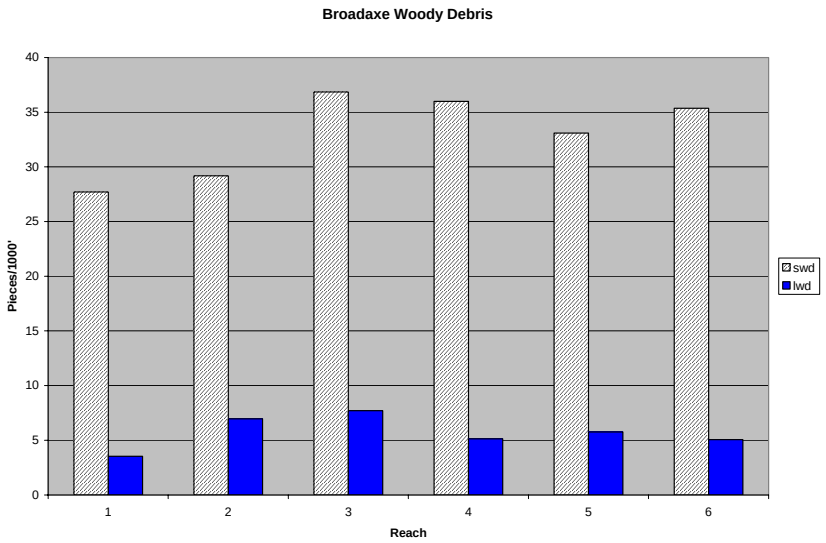
Timber harvest has occurred within approximately 0.7 miles of the Broadaxe Creek RHCA (Table 5). Of this length, approximately 0.4 miles (15% of the stream length) does not support a timber size class that would effectively provide shading to the stream. Within the entire Broadaxe Creek drainage, there are 14 units that partially occurred within the riparian habitat conservation areas (project file document #F-29). All of these units were harvested prior to 1988.

Table 5: Past Riparian Timber Harvest along Broadaxe Creek

Reach	Harvest Year	Harvest Method	Miles in RHCA	% harvest in RHCA	Current Size class
1	1972	Shelterwood Seed cut	0.2	6%	Mature
1	1988	Shelterwood final cut	0.3	9%	Seed/sap
3	1966	Clearcut	0.2	6%	Seed/sap

Riparian harvest that reduces stream shading, can cause increases in temperature, reduce the amount of potential woody debris recruitment and can cause streambank instability (Chamberlin et al, 1991, Lee et al 1997). Figure 1 displays the current amounts of all woody debris in the Broadaxe Creek. Reach 1 has the least amount of all types of woody debris and the least amount of large woody debris of all reaches, this is likely a result of timber harvest in the riparian zone.

Figure 1 Broadaxe Woody Debris



Stream Channel Conditions (Width to Depth ratio, streambank condition, floodplain connectivity)

Past activity has not caused a change from expected conditions in Broadaxe Creek, detailed information provided in Watershed specialist report.

Flow/hydrology

The Watershed Specialist report indicates that past activity has not had a negative affect to Broadaxe Creek.

Watershed Condition

Table 6 lists the measurement parameters for the watershed condition indicators which are created by human activity. Current total road density is considered in the high range, encroaching road density is considered in the moderate range and RHCA road density is considered in the high range (Quigley et al 1996, pg 67). The effects of past harvest in the RHCA has been described in the historic activity section above.

Table 6 - Broadaxe Creek Watershed Conditions

Stream Name	Drainage Area (Acres)	Total Road Density[1] (mi/mi^2)	Encroaching Road Density[2] (mi/mi^2)	RHCA Road Density[3] (mi/mi^2)	Past harvest in RHCA (% of RHCA)
Broadaxe	3,366	4.3	1.6	3.1	24%

- 1) density of road within drainage
- 2) density of road within 50'buffer
- 3) density of road within RHCA

Water Quality

Stream temperature was monitored in Broadaxe Creek in 2000 and 2001 (project file documents F-15 and F-16). Exceedance of Idaho State temperature standards were calculated based on that data (Table 7). High stream temperatures can have a negative effect on behavior, metabolism and survival of fish (Bjornn and Reiser 1991 pgs 106 and 112).

Table 7 - Exceedance of Idaho State Temperature Standards

Year	Idaho Salmonid Spawning Percentage Exceedance		Bull Trout Percentage Exceedance	
	MDMT (15 April -15 July)	MDAT (15 April – 15 July)	Juvenile (MWMT) (1 June – 31 Aug)	Spawning (daily average) (1 Sep – 31 Oct)
Standard	13 °C	9 °C	13 °C	9 °C
2000	0	N/A	17%	6%
2001	3%	16%	12%	5%

N/A indicates insufficient data was collected during the period of concern

Sediment has not been identified as a current issue of concern, see Watershed Specialist Report. Chemical contamination and nutrient levels are not expected to be above reference conditions because of the minimal number of road/stream intersections, the lack of agricultural activity and the lack of grazing.

Habitat Access

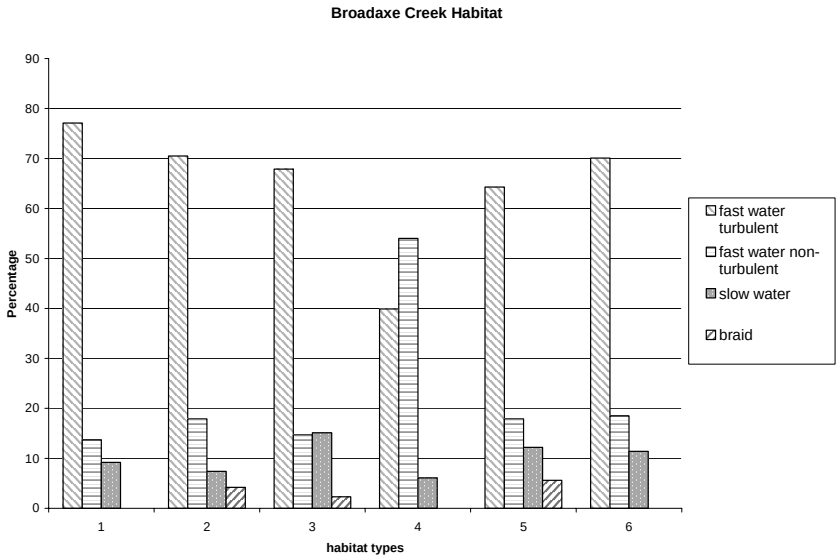
The only time roads encroach upon Broadaxe Creek is at stream crossings in the upper reaches, otherwise roads do not occur in riparian zones (Table 6). These crossings are not a migration barrier concern because they are located upstream of a natural migration barrier.

Habitat Elements

Spawning and rearing habitat is created by a diversity habitat characteristics (Baltz et al. 1991, Moore and Gregory 1988, Rieman and Apperson 1989, Campbell and Neuner 1985). Habitat diversity, is determined based on the percentages of the different habitats

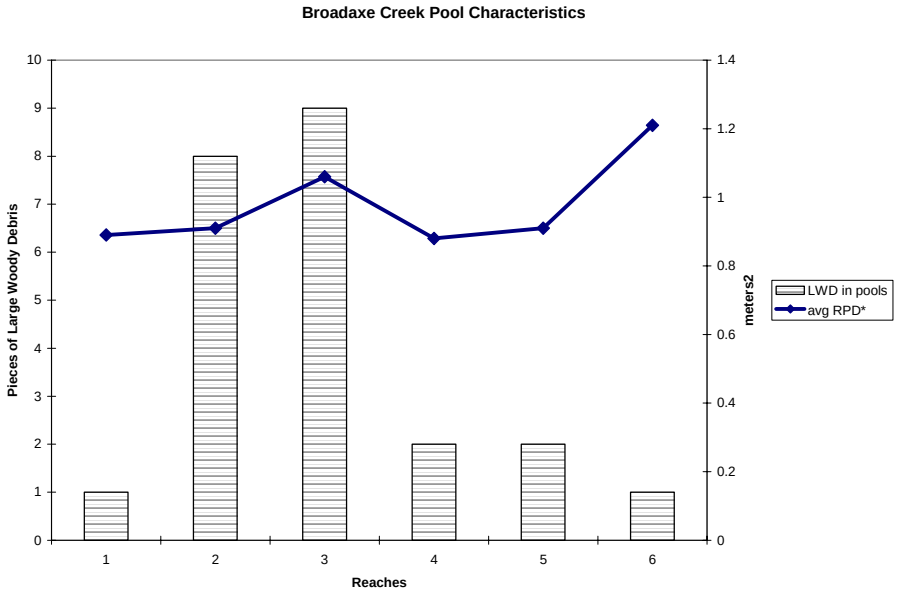
present in the stream. A very high percentage of one habitat reduces the amount of diversity in that reach. Habitat surveys were conducted in Broadaxe Creek in 2001 (project file document F-14). Figure 2 presents the percentages of habitats within the reaches surveyed in Broadaxe Creek. For all, but Reach 4, turbulent fast water habitats were most common, ranging from 40-77% of the reach (Figure 2). Pool habitat, slow water habitat, is always amongst the lowest habitat percentages (6.1 to 14.1%), and ranges in quantity from 23.5 to 44.4 pools/mile, the highest occurring in reach six.

Figure 2 - Broadaxe Creek Stream Habitat



Pool quality is determined by the residual pool depth and amount of large woody debris within the pool. Reach 3 has the highest amount of large woody debris and the deepest pools, and Reach 1 has the lowest amount of large woody debris and the shallowest pools (Figure 3).

Figure 3 - Broadaxe Pool Characteristics



The lowest reach has the least amount of large woody debris (4 pieces/1000'), but it does meet the INFISH objective of 4 pieces/1000'. The remaining reaches all exceed the INFISH woody debris objective, ranging from 5 – 8 pieces/1000'.

Summary

Based on the current condition compared to the desired condition there are three limiting factors: 1) high road densities 2) high stream temperature and 3) reduced woody debris in the Reach 1.

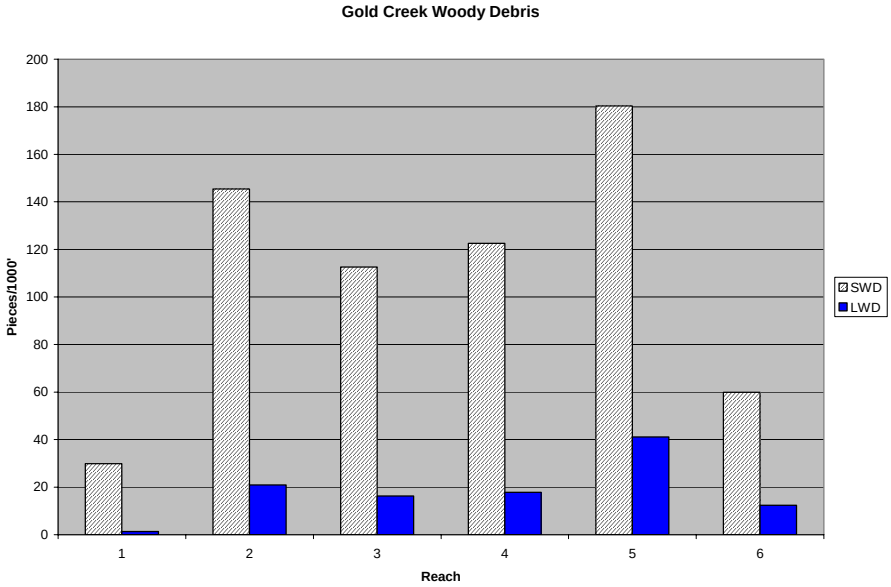
Gold Creek

Gold Creek drainage is approximately 2% of the St. Joe River drainage. Gold Creek is listed as a high value stream in the Forest Plan, and it is listed as providing spawning and rearing habitat. Gold Creek is approximately 9.5 miles long.

Historic Activity

Placer mining occurred in the lowest reaches of Gold Creek in the early 1900s (USDA 1998, Historical Overview of Mining on the St. Joe District, draft). This activity altered the instream habitat, woody debris was probably removed for the channel, stability of the stream channel was reduced, sediment would have been generated and riparian vegetation would have been removed. Figure 4 displays the reduction of woody debris in Reach 1 as compared to other surveyed reaches.

Figure 4: All Woody Debris



The lower six miles (approx.) of FH 50 were constructed prior to 1949. This section of road lies within the RHCA (300' of the stream) for approximately its entire length (project file document #28). The remainder of FH 50, approximately six miles, was constructed between 1958 and 1969. This section is primarily outside the Gold Creek 300' zone, except for at stream crossings. The construction of the lower portion of the road removed riparian vegetation which provided stream shading and assisted with temperature control of the stream, it destabilized the stream channel where the road is the stream bank, it increased in the amount of sediment generated, and it reduced the potential for woody debris recruitment to the stream thus reducing the potential for woody debris created pool habitat.

Riparian harvest occurred along Gold Creek between 1965 and 1979 (Table 8). Riparian harvest reduces the stream shading and can cause increases in temperature, reduces the amount of potential woody debris recruitment and can cause streambank instability.

Table 8 - Gold Creek Riparian Harvest

	1965	1966	1971	1972	1976	1977	1979
Miles of Riparian Harvest along Gold Creek	0.29	0.07	0.26	0.58	1.87	0.22	0.25
% of Gold Creek	3.5	0.8	3.2	7.1	22.8	2.7	3.0

Various habitat improvement structures have been installed in Gold Creek starting in 1989. The goal of these projects, in general was to increase the diversity of instream habitat. Success of those improvement projects was monitored in 2002 (project file F-21) (Table 9).

Table 9: Gold Creek Habitat Improvement Monitoring

Year of Construction	Total Sites constructed	Functioning as Planned	Not Functioning as Planned	Partially Functioning	Not Found*
1989	47	21%	17%	6%	55%
1994	5	40%	20%	40%	0

* many of the sites which were not found were boulder placement sites and therefore blended in with the natural appearance of the stream

Stream Channel Conditions

The St. Joe GA identified that Gold Creek was highly altered from the historic range of variability and that it was out of dynamic equilibrium (USDA 1996, Integration of forest planning into ecosystem management. Toward a forest ecosystem approach: an assessment for the St. Joe area, Appendix A pg 5). The Watershed Specialist Report further details the current channel problems.

Flow/Hydrology

Watershed Specialist Report identifies that water yield is not currently an issue in the Gold Creek drainage.

Watershed Condition

Table 10 lists the measurement parameters for the watershed condition indicators. Current total road density is considered to be in the extremely high range, encroaching road density is considered to be in high range and RHCA road density is considered to be in the extremely high range (Quigley et all 1996, pg 67). Forest Highway 50 continues to lie within the RHCA of Gold Creek, for approximately the lower six miles of stream. The riparian vegetation between the road and the stream is primarily brush (approximately 4 miles), the remainder is brush and timber (project file document #28). The effects of past riparian harvest directly associated to Gold Creek has been described in the historic section above. The effects of riparian harvest throughout the Gold Creek drainage has the potential to cause a variety of effects to Gold Creek including: increasing the amount of sediment to the channel, increasing stream temperatures, etc (Chamberlin et al 1991). Since the majority of this harvest occurred prior to 1990 the effects of these activities have been reduced as the vegetation recovers.

Table 10 - Watershed Conditions

Stream Name	Drainage Area (Acres)	Total Road Density[1] (mi/mi^2)	Encroaching Road Density[2] (mi/mi^2)	RHCA Road Density[3] (mi/mi^2)	Past harvest in RHCA (% of RHCA)
Gold*	17,735	7.4	4.3	6.6	45%

- 1) density of road within the drainage
- 2) density of road within the 50'buffer
- 3) density of road within the RHCA
- * includes acres from subdrainages.

Water Quality

Stream temperature was monitored in 2001, 2003 and 2004 (project files, F-17 through F-19). Exceedance of Idaho State temperature standards were calculated based on that data (Table 11). High stream temperatures can have a negative effect on behavior, metabolism and survival of fish (Bjornn and Reiser 1991 pgs 106 and 112).

Table 11 - Exceedance of Idaho Temperature Standards

Year	Idaho Salmonid Spawning Percent Exceedance		Bull Trout Percent Exceedance	
	MDMT (15 April -15 July)	MDAT (15 April – 15 July)	Juvenile (MWMT) (1 June – 31 Aug)	Spawning (daily average) (1 Sep – 31 Oct)
Standard	13 °C	9 °C	13 °C	9 °C
2001	N/A	N/A	N/A	31
2003	21	25	67	20
2004	23	26	70	24

N/A indicates insufficient data was collected during the period of concern

Idaho DEQ lists Gold Creek as temperature impaired (Idaho DEQ 2003, page 25, 44).

Sediment increases are described in the Broadaxe Project Watershed Specialist Report.

Chemical contamination and nutrient levels are not expected to be above reference conditions because of the minimal number of road/stream intersections, the lack of agricultural activity and the lack of grazing. Furthermore Idaho DEQ removed nutrients as a polluntant of concern from Gold Creek (IDEQ 2003, pp 23,44).

Habitat Access

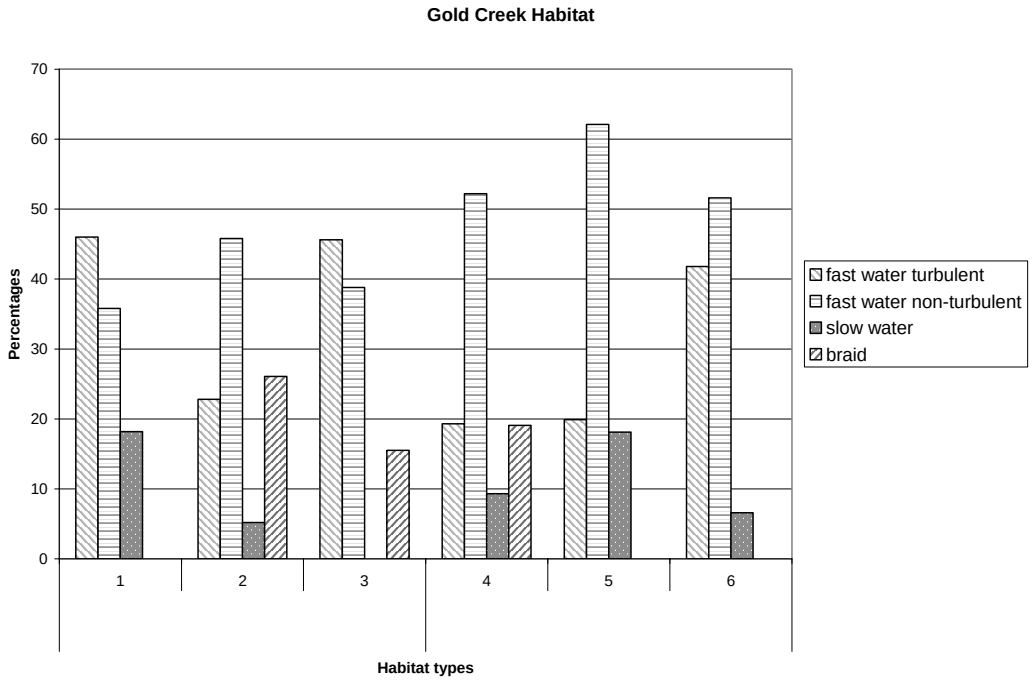
A human-created migration barrier occurs on Gold Creek at the crossing of Forest Highway 50, approximately 8.5 miles upstream for the mouth of the stream. A short distance upstream of this crossing is a natural migration barrier.

Habitat Elements

A habitat survey was conducted on the lower approximately 4 miles of Gold Creek in 1998 (project file document F-20). Watershed surveys conducted in 2004 were compared to 1993 surveys, no relevant changes were noted (Broadaxe Watershed Specialist Report). Based on that information it is assumed that the 1998 survey data continues to reflect current conditions. Spawning and rearing habitat is created by diverse habitat characteristics. Habitat diversity is determined based on the percentages of the different habitats present in the stream. A very high percentage of one habitat reduces the amount of diversity in that reach. Figure 5 presents the percentages of habitats within the reaches surveyed in Gold Creek. For all reaches, fast water habitats were most common, ranging from 45.8 – 62.1% of the reach (Figure 5). Of these fast water, non-turbulent habitats were the most common habitat in reaches 2, 4, 5, and 6 and fast water, turbulent habitats most common in Reaches 1 and 3. Pool habitat, slow water habitat, is always amongst

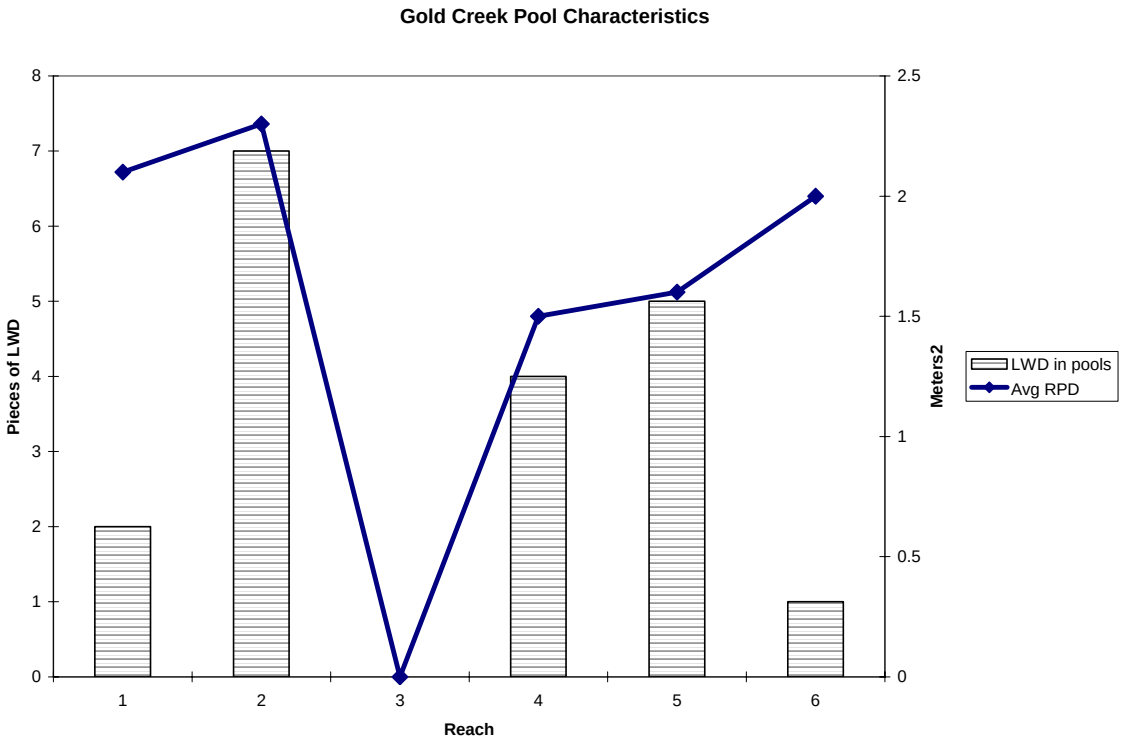
the lowest habitat percentages (0 to 18.2 %), and ranges in quantity from 0 to 12.1 pools/mile, the highest amount occurring in reach five.

Figure 5: Gold Creek Habitat Summary



Pool quality is determined by the residual pool depth and amount of large woody debris within the pool. Reach 2 has the highest amount of large woody debris and the deepest pools, and reach 3 has no pools. (Figure 6). In addition, Idaho DEQ measured residual pool volumes, another element that can be reviewed for pool quality, in several streams on the St. Joe including Gold Creek. Gold Creek, bankfull width of 35.7', has a residual pool volume of 79,910 cubic feet/mile, compared to 191,768 cubic feet/mile in the Upper St. Joe, an unmanaged area with a bankfull width of 39.7' (Idaho DEQ 2003, pp 32-33). This is another indicator that pool quality is below the desired condition.

Figure 6 Gold Creek Pool Characteristics



FH 50 lies almost entirely within the RHCA, and it lies within 50 feet of Gold Creek for approximately five percent of the total stream length.

Summary: Based on the above information the following are limiting factors: 1) riparian roads, 2) low habitat diversity, 3) high stream temperatures, 4) culvert migration barriers, 5) reduced pool quality, 6) reduced quantities of LWD, and 7) extremely high road densities.

Project Issue Indicator Determination

The project issue indicators were selected based on consideration of public comments, the determination of the limiting factors, the need to achieve the desired condition for fish habitat, and the potential for effects from the proposed project. The proposed activity, timber harvest and temporary road construction, have the potential to create various negative impacts. These activities can cause increases in water yields, peak flows, and sediment transport, among other effects (Chamberlin et al 1991). These factors when combined can cause an impact to the quality and quantity of fish habitat. The following table identifies those issues which were selected as project issue indicators.

Table 12- Selection of Project Issue Indicators

Indicator	Measurement Parameter	Potential effects from Proposed Project	Fisheries Project Issue Indicator
Population Characteristics	Population Size	Yes	Determination presented in BA/BE
	Growth and survival	Yes	Determination presented in BA/BE
	Diversity	No	No
	Isolation	No	No
	Persistence	Yes	Determination presented in BA/BE
Stream Channel conditions	Width to Depth Ratio	Yes	No, considered in Watershed Report
	Streambank condition	Yes	No, considered in Watershed Report
	Floodplain connectivity	No	
Flow/hydrology	Change in peak/base flows	Yes	No, considered in Watershed Report
Watershed Condition	Sensitive landtypes	No	
	Road density	Yes	Yes
	Riparian harvest	Yes	Yes
	Elevation	No	
Water Quality	Temperature	Yes	Yes
	Sediment	Yes	No, considered in Watershed Report
	Chemical Contamination/nutrients	No	
Habitat Access	Physical barriers	Yes	Yes
Habitat Elements	Substrate embeddedness	Yes	No, sediment concerns described in Watershed Report
	Large Woody Debris	Yes	Yes*
	Pool frequency	Yes	Yes*
	Large pools	Yes	Yes*
	Off channel habitat	No	
	Refugia	No	

* These factors are combined under the heading of Habitat Complexity. Habitat complexity includes two features: habitat diversity and structural complexity.

Habitat diversity is a measure of the range of different types of aquatic habitat and the frequency with which they occur. Stream segments possessing numerous habitats with a wide variety of stream velocities, water depths and configurations are considered more diverse and have a greater potential for meeting the physical habitat requirements of

naturally reproducing trout populations. Although all habitat types are valuable to maintain a healthy fisheries, pool habitat has a high value and is often the first habitat type to be lost due to management activity (Bjornn and Reiser 1991). INFISH establishes an interim goal of between 56-96 pools/mile in the streams of the project area.

Structural complexity is the degree of habitat partitioning by structural elements such as large woody debris, boulders, and undercut banks. This physical separation within habitat units can help maximize fish production by decreasing competition and aggression, reducing predation, increasing carrying capacity and producing micro-habitat conditions that minimize energy requirements and provide refuge for fish.

Cumulative Effects Area

For this project, Gold Creek was selected as the cumulative effects area.

Environmental Consequences

Analysis Methodology

Population Characteristics:

Effects to population characteristics will be displayed in the Biological Evaluation table and the Biological Assessment document.

Habitat Characteristics

Introduction: Direct and indirect effects analysis considers how the proposed action would affect the identified limiting factors. As previously stated, the limiting factors within this project area are: road density, riparian harvest, temperature, physical barriers, and habitat complexity.

Road Density: This analysis reviews the change to road density within the drainage. Road construction associated to this project and the presence of existing high road densities, have the potential of creating negative impacts to fish habitat. The determination of road density effects on fish is based on research conducted for the ICBEMP (Lee et al 1997). This research determined that high and moderate road densities (see Table 2) are considered to reduce the use of streams by non-anadromous fish. Streamside roads are likely to be the most impactive road segments (Dose and Roper 1994). Therefore the higher the amount of streamside road left in a drainage, the higher the risk for degrading instream habitat.

Riparian Harvest: The analysis is based on the location of harvest units.

Stream Temperature: The analysis is based on amount of proposed harvest within the riparian habitat conservation areas. Timber harvest can have negative effects to stream temperatures by reducing canopy and thus exposing channels to solar radiation (Chamberlin et al 1991).

Physical Barriers: Analysis determines if there is a change to the number of physical barriers.

Habitat Complexity: Effects to habitat complexity were determined based on information provided in the watershed section of this document (specifically relating to stream

channels and water quality), the location of harvest units and how this would affect the existing fish habitat.

The cumulative effects analysis takes into consideration; past activity, current conditions, future foreseeable actions, non-Forest Service managed activity, and proposed actions. Information for this analysis comes from several areas (Management History Report).

- Past activity is described under the heading historical influences, in the affected environment section of this document.
- Current conditions, which were described previously in this chapter.
- Future foreseeable actions utilized in this analysis are listed in the Broadaxe EA and the effects are described in Table 13.
- Non-Forest Service managed activity includes the presence of FH 50 which is managed by Shoshone County.
- Information about the proposed action comes from the descriptions provided in the Broadaxe EA and the descriptions of the Direct/Indirect effects of the individual drainages.
- Cumulative Effects are described for Gold Creek, which was selected as the cumulative effects area.

Effects Analysis

Effects Common to Alternatives

Table 13 lists the current and reasonably foreseeable activities, which are common to the No-Action Alternative and the Proposed Action Alternative. Some of these activities are Forest Service authorized activities others are general uses which do not require specific authorization. This table provides a summary of the direct and indirect effects from the individual activities. These activities and their effects were taken into consideration during the cumulative effects analysis.

Table 13 - Summary of Effects of Current and Reasonable Foreseeable Actions

Activity	Type of Potential Effect	Direct/Indirect Effects	Reference
Dispersed Camping	Alteration of streambanks and increased nutrient loading	Minimal	St. Joe River/NF Clearwater Basins BA, July 1998
Outfitter and Guides	Primarily associated to camping related effects and effects of stock use	Minimal	Outfitter Guide Programmatic BA, 2004, (project file)
Fire Suppression	Reduction of shading due to felling of hazard trees in RHCA, Chemical contamination	Minimal based on implementation of INFISH Guidelines.	St.Joe River/NF Clearwater Basins BA, July, 1998
Gathering of miscellaneous forest products	Primarily due to influence of roads	Minimal based on implementation of INFISH guidelines	Programmatic Road Maintenance BA, 2004 Determination: May affect, not likely to adversely affect.
Control of Noxious Weeds		No Effect	St. Joe Noxious Weeds EIS, Oct 1999
Road Maintenance	Increase sedimentation, temperature and chemical contamination, decrease in large woody debris	yes	Programmatic Road Maintenance BA, 2004 Bull Trout Determination: May affect, not likely to adversely affect.
Biotic Factors		No Effect	Currently there are no invasive fish species present in the project area
Data Gathering		No effect	No ground distrubing activity
Road Waste Disposal	Potential for increased sediment to Gold Creek	yes	Best management practices would be utilized if this area were used for road waste disposal, thus reducing potential risk.
Trail Maintenance	Increase sedimentation, temperature and chemical contamination, decrease in large woody debris	miminal	Programmatic Road Maintenance BA, 2004 Bull Trout Determination: May affect, not likely to adversely affect.
Helispot maintenance	Located on Berge Peak	No Effect	
Firewood cutting	Potential for reduction in LWD recruitment	Minimal	Firewood permit specifies no firewood cutting within 300' of a stream.
Fry Emergence Amendment to the IPNF Forest Plan	Change to analysis methods	No Effect	Fry Emergence Amendment EA, April 2005

No Action

Broadaxe Creek

Direct/Indirect Effects

Road densities: There would be no change to road density, it would remain in the high category.

Riparian Harvest: There would be no harvest, therefore conifers would begin to recover and grow in the long term.

Temperature: Temperature would improve slowly over time as conifers within the riparian zone grow and provide shading to the stream.

Physical Barriers: There are currently no human-created barriers, and this condition would not change.

Habitat Complexity: This would improve slowly over time as the conifers within the riparian zone grow and fall into the stream thus creating new pool habitat and greater complexity. The watershed report identifies that there is a potential for sediment and water yield increases due to the loss of crown closure which is due to the pine beetle infestation.

Gold Creek

Direct/Indirect Effects

Road Densities: There would be no change to road density, they would remain in the extremely high category.

Riparian Harvest: There would be no harvest and conifers would begin to recover and grow in the long term.

Temperature: This would improve slowly over time as conifers within the riparian zone grow and provide shading to the stream. However in Gold Creek temperatures are unlikely to return the pre management levels due to the continued presence of FH 50.

Physical Barriers: The existing human-created barriers would remain.

Habitat Complexity: The hydrologist reports that there would be no discernible increase in sediment or water yield to Gold Creek therefore there would be no alteration to the existing condition. Habitat complexity would improve slowly over time as the conifers within the riparian zone grow and fall into the stream thus creating new pool habitat and greater complexity, however due to the presence of FH 50 this increase is unlikely to return to pre-management levels.

Cumulative Effects: There would be no change from current conditions to the cumulative effects area of Gold Creek.

Proposed Action

Broadaxe Creek

Direct/Indirect Effects

Road Density: There would be a slight increase in road densities due to the construction of 0.9 miles of temporary road. This would keep the density within the high category. Following the sale the temporary roads would be decommissioned which would return road density to existing levels.

Riparian Harvest: INFISH buffer guidelines, 150 feet each side of the stream, would be utilized along the only Units 8, 10 and 11 which would lie adjacent to streams. Therefore there would be no riparian harvest, except for a potential stream crossing by the proposed temporary road. In addition to the buffers, the live canopy remaining in Units 10 and 11 are minor reductions from the current condition: 76 sq. ft. basal area down to 70 sq. ft. basal area for Unit 10 and 98 sq. ft. basal area down to 86 sq. ft. basal area for Unit 11. Unit 8 changes the greatest from 60 sq. ft. basal area currently down to 36 sq. ft. basal area if the project is implemented.

Temperature: INFISH buffer guidelines would be utilized, therefore there would be no riparian harvest, except for a potential stream crossing by the proposed temporary road. Broadcast burning and underburning of units would not be initiated in buffer zones (Appendix A). If, however, the fire backs down into those areas it may cause some reduction of riparian vegetation but would not cause an increase of stream temperatures. The retention of riparian vegetation, would allow for the slow recovery of the riparian zone, which would eventually provide shading to the stream. This shading would reduce stream temperatures.

Physical Barriers: There is the potential for the temporary road to intercept subsurface flow at one location. However the crossing is high in the drainage and the stream is not utilized by fish at this location.

Habitat Complexity: This would improve slowly over time as the conifers within the riparian zone grow and fall into the stream thus creating new pool habitat and greater complexity. There is the potential for slight sediment and water yield increases but the increases are not considered large enough to cause channel changes or changes to pool volume, (Watershed specialist report). The slight sediment increase would not cause a shift towards a uniform substrate composition or create negative impacts to fry emergence, because the reaches in Broadaxe Creek are transport reaches and the slight amount of additional sediment would be flushed through the system.

Gold Creek

Direct/Indirect Effects

Road Density: There would be a slight increase in road densities in the Gold Creek drainage due to the construction of 0.9 miles of temporary road within the Broadaxe Drainage. This would keep the road density within the extremely high category. Following the sale, the temporary roads would be decommissioned which would return road density to existing levels.

Riparian Harvest: There would be no riparian harvest along Gold Creek. Previous riparian will continue to slowly grow and eventually improve riparian conditions. However due to the presence of Forest Highway 50, there will continue to be a reduced amount of riparian vegetation along the sections of stream in which the road lies within the RHCA.

Temperature: The retention of riparian vegetation in both the Broadaxe Creek drainage where the project lies and Gold Creek, the cumulative effects area, would prevent any further increases in stream temperatures. The growth of conifers along the riparian zones in previously harvested areas would assist with the recovery to desired stream temperatures. However, the presence of Forest Highway 50 within the RHCA will continue to prevent the growth of riparian vegetation and thus prevent stream shading from the western side of the stream.

Physical Barriers: The implementation of this alternative would not create any migration barriers but neither would it correct the current migration barriers on Gold Creek.

Habitat Complexity: The activity proposed in the Broadaxe drainage is not expected to create relevant changes to water yield or sediment in Gold Creek (Watershed Specialist Report). The lack of change would keep Gold Creek in its current condition of reduced habitat complexity.

Cumulative Effects: The lack of negative impacts from activity within the Broadaxe Creek drainage, would prevent further decline of the cumulative conditions within Gold Creek. The current impaired condition of Gold Creek would remain, however in the long term there would be some improvement as riparian zone conditions improve.

Summary

Although the proposed action does not further degrade Broadaxe Creek or Gold Creek, neither does it improve conditions which were identified as limiting factors/issue indicators. The only factors which show some improvement in the long term are related to the riparian condition: riparian harvest, temperature and habitat complexity. These would improve only because no further riparian harvest would occur and the trees would continue to grow thus producing vegetation, which will create stream shading or future woody debris recruitment, which in turn would add greater complexity to the habitat.

Issue indicators	Broadaxe Creek			Gold Creek		
	Existing	**No Action**	**Proposed Action**	**Existing**	**No Action**	**Proposed Action**
Road Density	**High**	**No Change**	**No Change**	**Extremely High**	**No Change**	**No Change**
Riparian Harvest	**Present**	**Long-term improvement**	**Long-term improvement**	**Present**	**Long-term improvement**	**Long-term improvement**
Temperature	**High**	**Long-term improvement**	**Long-term improvement**	**High**	**Slight long-term improvement**	**Slight long-term improvement**
Physical barriers	**No culvert barriers**	**No Change**	**No Change**	**Culvert barriers**	**No Change**	**No Change**
Habitat Complexity	**Low in Reach 1**	**Long-term improvement**	**Long-term improvement**	**Low in all reaches surveyed**	**Some long-term improvement**	**Some long-term improvement**

Sensitive Species Biological Evaluation
Summary of Conclusion of Effects

Species	No Action	Proposed Action
1. Westslope Cutthroat Trout	No Impact	No Impact
2.		

Compliance with Standards and Laws

<u>Compliance with IPNF Forest Plan and INFISH Guidelines:</u>

Fry Emergence (Fish Standard 1 and 2):

The objectives for fisheries in the Forest Plan state that the forest "will be managed to maintain and improve fish habitat capacities in order to achieve cooperative goals with the State Fish and Game Department and to comply with state water quality standards. Sediment arising from land management activities will be managed so that in forest fisheries streams the objective is to maintain 80 percent fry emergence success as measured from pristine condition" (II-7). The first two standards for fish use similar language (II-29). The Fishery/Watershed Analysis to determine effects of land management activities on fry emergence is described in Appendix I (I-1, 2).

Appendix I requires that if, during the environmental assessment process, cumulative effects of the proposed and past activities on stream sedimentation are projected to result in greater than 20% reduction in fry emergence, then additional detailed analysis would be undertaken. The analysis, along with best professional judgment, is then used to

determine the significance of the project on water resources. This information is then presented to the line officer, who incorporates socio-economic and multi-resource considerations and makes a decision on the project. If the project is judged to have a "significantly negative effect" on water resources, it would be reviewed by the State for conformance with water quality standards prior to the final decision.

At the time the Forest Plan was written, models determining fry emergence (e.g., Stowell *et al.* 1983) were popular. These empirical models were later found to have limited application and were unreliable outside of where they were developed (J. Kershner, personal communication). In addition, the use of fry emergence survival (regardless of the threshold) as a surrogate for viability came into question, primarily for two reasons:

- First, fry emergence is highly variable. This can be due to changing natural conditions (e.g., floods, temperature regimes, geology) or human-induced causes (e.g., increased sediment input, chemical spills). Both agents are at work in most cases so it is difficult to determine what proportion of egg-to-fry mortality is due to each cause. As a result the underlying relationship between sediment in redds and survival is difficult to predict (Chapman 1988).
- Second, and more important, egg-to-fry mortality is usually density-independent (i.e., a percentage of fry will survive regardless of the number of eggs). This means that in most cases there are enough fry to inhabit all available habitat within a stream. Therefore fry-to-smolt (sub-adult) survival, where density dependent mortality plays a significant role, is a more effective and appropriate predictor of population viability than egg-to-fry survival (for a review of these concepts see Hilborn and Walters 1992). Currently the indicator used as a surrogate of fry-to-smolt survival is stream habitat characteristics.

The 1989 Forest Plan Evaluation and Monitoring Report documents the change away from use of the fry emergence standard (Item G-1, pages C-1 and C-2). After two years of monitoring by measuring and analyzing the intergravel fines of approximately 610 core samples from 25 streams across the forest, no determinations on fry emergence success or trends were possible due to high variability. As a result, the findings were that it was not a good monitoring tool to report stream health. G-1 was combined with item G-3, which includes a comprehensive array of fisheries and hydrology parameters.

Based on the above information, it is not possible to generate an accurate percent of fry emergence. Therefore, additional detailed analysis was undertaken and that information was used to determine the significance of the project on water resources, as required by the Forest Plan.

In conclusion, this project complies with Forest Plan direction because, although fry emergence was not computed, a detailed analysis of the effects to fish habitat and water resources was developed as required in Appendix I. This information has been presented to the line officer.

Standard 3 does not apply to this project because none of the streams identified in that standard are located in this project area.

Standard 4 would be met. There is no new road construction that would cross a fish bearing stream.

Standard 5 was met. The information contained in this report uses fisheries surveys to coordinate activities with other resources.

Standard 6 was met due to the extensive review of the stream systems and the implementation of standards described in INFISH.

Compliance with INFISH standards:

The implementation of the proposed action would comply with INFISH standards (Appendix A)

Compliance with NFMA regulations:

The proposed action would meet NFMA requirements by maintaining and improving habitat of management indicator species (MIS), bull trout and westslope cutthroat trout. Viability of MIS would be maintained under the action alternative (project file, Effects on Species Viability on the IPNF)

Compliance with ESA regulations:

The proposed action would not jeopardize the continued existence of bull trout, the listed species that historically was found in the project area. A biological assessment will be completed when an alternative is selected for implementation.

Compliance with Executive Orders 11988 and 11990:

The proposed action would not damage wetlands, and riparian dependent resources, such as the fishery, would be protected through the implementation of INFISH bufferstrips.

Compliance with Executive Order 12962:

The proposed action would maintain habitat and thus would not affect the fishery potential, which in turn would not reduce the potential for recreational fishing opportunities.

APPENDIX A: BROADAXE EA COMPLIANCE WITH THE INLAND NATIVE FISH STRATEGY

INFS Standards and Guidelines (USDA pages A7-13; 1995)

Only INFS standards and guidelines that apply to the alternatives for the Broadaxe Project are addressed here. These INFS standards and guidelines are presented followed by how the project addresses the standard and the expected effectiveness of the standard.

Timber Management (A-7)

TM-1. Prohibit timber harvest, including fuel wood cutting, in Riparian Habitat Conservation Areas, except as described below.

a. **Where catastrophic events such as fire, flooding, volcanic, wind, or insect damage result in degraded riparian conditions, allow salvage and fuel wood cutting in Riparian Habitat Conservation Areas (RHCA) only where present and future woody debris needs are met, where cutting would not retard or prevent attainment of other Riparian Management Objectives, and where adverse effects can be avoided to inland native fish. For priority watersheds, complete watershed analysis prior to salvage cutting in RHCAs.**

b. **Apply silvicultural practices for Riparian Habitat Conservation Areas to acquire desired vegetation characteristics where needed to attain Riparian Management Objectives. Apply silvicultural practices in a manner that does not retard attainment of Riparian Management Objectives and that avoid adverse effects on inland native fish.**

Project Proposal: This project will be using the "Standard Widths Defining Interim RHCAs," (InFish A-5, A-6). No timber harvest activities are proposed under the action alternative within RHCAs in the project area, therefore this standard would be met.

Effectiveness: The effectiveness of prohibiting timber harvest within the RHCA is *High* due to the following monitoring efforts. Documentation of bufferstrip widths would be located in the Tracks files for this project. This type of monitoring has been accomplished on past timber sale projects including Lower Marble T.S., Charlie Brown T.S. and Charlie Flight. This monitoring has corrected errors in marking thus preventing harvest from occurring in the RHCA (project file).

Roads Management (A-7-8)

RF-1. Cooperate with Federal, Tribal, State, and county agencies, and cost-share partners to achieve consistency in road design, operation, and maintenance necessary to attain Riparian Management Objectives.

Project Proposal: The project does not include any partnership activity.

Effectiveness: Not Applicable.

RF-2. For each existing or planned road, meet the Riparian Management objectives and avoid adverse effects to inland native fish by:

a. ***Completing watershed analyses prior to construction of new roads or landings in Riparian Habitat Conservation Areas (RHCAs) within priority watersheds.***

Project Proposal: This project area is within an INFISH priority watershed. Both an Ecosystem Analysis at the Watershed Scale (EAWS) and a Road Analysis has been completed. (see Quartz Gold project file).

Effectiveness: High, analyses have been completed.

b. ***Minimizing road and landing locations in Riparian Habitat Conservation Areas.***

Project Proposals: There are no new roads or landings proposed within RHCAs under the action alternative, except for a road crossing at a potential ephemeral stream.

Effectiveness: High. The project would not place landings in RHCAs and would minimize roads in the RHCAs.

c. Initiating development and implementation of a Road Management Plan or a Transportation Management Plan. At a minimum, address the following items in the plan:

1. Road design criteria, elements, and standards that govern construction and reconstruction.
2. Road management objectives for each road.
3. Criteria that govern road operation, maintenance, and management.
4. Requirements for pre-, during-, and post-storm inspections and maintenance
5. Regulation of traffic during wet periods to minimize erosion and sediment delivery and accomplish other objectives such as protection of the road surface.
6. Implementation and effectiveness monitoring plans for road stability, drainage, and erosion control.
7. Mitigation plans for road failures.

Project Proposal: A Road Analysis was developed for this project area (see Quartz Gold project file). Monitoring of the road system is in compliance with the National Deferred Maintenance Protocol.

Effectiveness: Moderate to High. The Road Analysis for Quartz Gold addresses the majority of these items and the National Deferred Maintenance Protocol addresses others.

d. Avoiding sediment delivery to streams from the road surface.

Project Proposal: There would be 0.9 miles of temporary road constructed near the ridge. The potential for sediment delivery for the road surface is very low because of the low probability of crossing water.

Effectiveness: High, Burroughs and King 1989.

1. Outsloping of the roadway surface is preferred, except in cases where outsloping would increase sediment delivery to streams or where outsloping is unfeasible or unsafe.

Project Proposal: This standard would be implemented during design of roads.

Effectiveness: Moderate. See BMP 15.02 (f), Broadaxe EA project file document SW41

2. Route road drainage away from potentially unstable stream channels and hillslopes.

Project Proposal: This standard would be implemented during design of roads.

Effectiveness: Moderate. See BMP 15.02 (c), Broadaxe EA project file document SW41

e. Avoiding disruption of natural hydrologic flow paths.

Project Proposal: Restoring slope hydrology would be accomplished through road decommissioning.

Effectiveness: Moderate. See BMP 15.02 (e), Broadaxe EA project file document SW41

f. ***avoid sidecasting of soils or snow. Sidecasting of road material is prohibited on road segments within or abutting RHCAs in priority watersheds.***

Project Proposal: Timber Sale Contract, road maintenance provisions, snow removal provisions, and erosion control provisions will be

implemented. Road Use permit contracts also contain specifications addressing this issue. The project area is within priority watersheds.

Effectiveness: Moderate to Good. Forest Service contracting officer representatives, contracting inspectors and sale administrators administer the contracts to ensure compliance. In addition see BMP 15.21 and 15.24 Broadaxe EA project file document SW41.

RF-3. Determine the influence of each road on the Riparian Management Objectives. Meet Riparian Management Objectives and avoid adverse effects on inland native fish by:

a. Reconstructing road and drainage features that do not meet design criteria or operation and maintenance standards, or that have been shown to be less effective than designed for controlling sediment delivery, or that retard attainment of Riparian Management Objectives, or do not protect priority watersheds from increased sedimentation.

b. Prioritizing reconstruction based on the current and potential damage to inland native fish and their priority watersheds, the ecological value of the riparian resources affected, and the feasibility of options such as helicopter logging and road relocation out of Riparian Habitat Conservation Areas.

c. Closing and stabilizing; or obliterating and stabilizing; roads not needed for future management activities. Prioritize these actions based on the current and potential damage to inland native fish in priority watersheds, and the ecological value of the riparian resources affected.

Project Proposal: The only road construction associated to this project is 0.9 miles of temporary road which would be decommissioned following the timber harvest.

Effectiveness: High.

RF-4. **Construct new, and improve existing, culverts, bridges, and other stream crossings to accommodate a 100-year flood, including associated bed load and debris, where those improvements would/do pose a substantial risk to riparian conditions. Substantial risk improvements include those that do not meet design and operation maintenance criteria, or that have been shown to be less effective than designed for controlling erosion, or that retard attainment of Riparian Management Objectives, or that do not protect priority watersheds from increased sedimentation. Base priority for upgrading on risks in priority watersheds and the ecological value of the riparian resources affected. Construct and maintain crossings to prevent diversion of streamflow out of the channel and down the road in the event of crossing failure.**

Project Proposal: The only potential for a stream crossing occurs on the temporary road. Currently there is no water at this location (Odegaard, personal communication) but construction of the road may intercept subsurface flow.

Effectiveness: High. Tracks reporting would monitor this standard.

RF-5. Provide and maintain fish passage at all road crossings of existing and potential fish-bearing streams.

Project Proposal: There are no proposals for stream crossings of potential or existing fish-bearing streams

Effectiveness: High.

Recreation Management (A-9)

RM-1 Design, construct, and operate recreation facilities, including trails and dispersed sites, in a manner that does not retard or prevent attainment of the Riparian Mangement Objectives and avoids adverse effects on inland native fish. Complete watershed analysis prior to construction of new recreation facilities in Riparian Habitat Conservation Areas within priority watersheds. For existing recreation facilities inside Riparian Habitat Conservation Areas, assure that the facilities or use of the facilities would not prevent attainment of Riparian Management Objectives or adversely affect inland native fish. Relocate or close recreation facilities where Riparian Management Objectives cannot be met or adverse effects on inland native fish can not be avoided.

Project Proposal: There are no proposals for recreational facilities or existing official recreation facilities within the project area.

Effectiveness: High

RM-2. Adjust dispersed and developed recreation practices that retard or prevent attainment of Riparian Management Objectives or adversely affect inland native fish. Where adjustment measures such as education, use limitations, traffic control devices, increased maintenance, relocation of facilities, and/or specific site closures are not effective in meeting Riparian Management Objectives and avoiding adverse effects on inland native fish, eliminate the practice or occupancy.

Project Proposal: There is a dispersed campsite in the RHCA of Gold Creek, the cumulative effects area, but it does not appear to currently be causing negative effects to RMOs.

Effectiveness: Periodic monitoring of site to ensure compliance with objective.

Fires/Fuels Management (A-11)

FM-1. Design fuel treatment and fire suppression strategies, practices, and actions so as not to prevent attainment of Riparian Management Objectives, and to minimize disturbance of riparian ground cover and vegetation. Strategies should recognize the role of fire in ecosystem function and identify those instances where fire suppression or fuel management actions could perpetuate detrimental conditions, or be damaging to, long-term ecosystem function or inland native fish.

Project Proposal: This project proposes a combination of broadcast burning, underburning and jackpot burning. Burning would not be initiated within the riparian buffer zones.

Effectiveness: Moderate. The St. Joe Ranger District has conducted monitoring of a fuel treatment burn in the North Fork of the St. Joe and a wildlife burn in the Big Creek drainage as regards to protection of riparian conditions. The monitoring of these projects has show that riparian conditions have been preserved.

FM-2. Locate incident bases, camps, helibases, staging areas, helispots, and other centers for incident activities outside of Riparian Habitat Conservation Areas. If the only suitable location for such activities is within the Riparian Habitat Conservation Area, an exemption may be granted following a review and recommendation by a resource advisor. The advisor would prescribe the location, use conditions, and rehabilitation requirements, with avoidance of adverse effects to inland native fish a primary goal. Use an interdisciplinary team, including a fishery biologist, to predetermine incident base and helibase locations during presuppression planning.

Project Proposal: The need to utilize incident bases, camps, helibases, etc is not planned for in this project, however in the unlikelihood of an occurrence the location of these activities would adhere to the InFish Standard.

Effectiveness: Not applicable

FM-3. Avoid delivery of chemical retardant, foam, or additives to surface waters. An exception may be warranted in situations where overriding immediate safety imperatives exist, or, following a review and recommendation by a resource advisor and a fishery biologist, when the action agency determines that an escape fire would cause more long-term damage to fish habitats than chemical delivery to surface waters.

Project Proposal: The need to utilize chemical retardant, foam or additives is not planned in this project, however in the unlikelihood of an occurrence the use of these substances would adhere to the InFish Standard.

Effectiveness: Not applicable

FM-4. Design prescribed burn projects and prescriptions to contribute to the attainment of the Riparian Management Objectives.
Project Proposal: This project proposes a combination of broadcast burning, underburning and jackpot burning.

Effectiveness: Moderate. The St. Joe Ranger District has conducted monitoring of a fuel treatment burn in the North Fork of the St. Joe and a wildlife burn in the Big Creek drainage as regards to protection of riparian conditions. The monitoring of these projects has show that riparian conditions have been preserved.

FM-5. Immediately establish an emergency team to develop a rehabilitation treatment plan to attain Riparian Management Objectives and avoid adverse effects on inland native fish whenever a wildfire or a prescribed fire burning out of prescription significantly damages Riparian Habitat Conservation Areas.

Project Proposal: This project would not influence the attainment of this standard.

Effectiveness: Not applicable

Lands (A-11-12)

LH-3. Issue leases, permits, rights-of-way, and easements to avoid effects that would retard or prevent attainment of the Riparian Management Objectives and avoid adverse effects on inland native fish. Where the authority to do so was retained, adjust existing leases, permits, rights-of-way, and easements to eliminate effects that would retard or prevent attainment of the Riparian Management Objectives or adversely affect inland native fish. If adjustments are not effective, eliminate the activity. Where the authority to adjust as not retained, negotiate to make changes in existing leases, permits, rights-of-way, and easements to eliminate effects that would prevent attainment of the Riparian Management Objectives or adversely affect inland native fish. Priority for modifying existing leases, permits, rights-of-way, and easements would be based on the current and potential adverse effects on inland native fish and the ecological value of the riparian resources affected.

Project Proposal: The proposed action would not influence the continuation of permits to Shoshone County for disposal sites.

Effectiveness: High. All agreements would comply with Forest Service standards on Forest Service administered lands.

General Riparian Area Management (A-12)

RA-1. Identify and cooperate with Federal, Tribal, State and local governments to secure instream flows needed to maintain riparian resources, channel conditions, and aquatic habitat.
Project Proposal:

This project would not adversely affect instream flows, therefore, this standard would be met.

RA-2. Trees may be felled in Riparian Habitat Conservation Areas when they pose a safety risk. Keep felled trees on site when needed to meet woody debris objectives.

Project Proposal: The only time trees may be felled in a potential RHCA is at the potential stream crossing.

Effectiveness: High.

RA-3. Apply herbicides, pesticides, and other toxicants, and other chemicals in a manner that does not retard or prevent attainment of Riparian Management Objectives and avoids adverse effects on inland native fish.

Project Proposal: The action alternative does not include the use of chemical treatments, however there is the potential for Noxious Weed herbicide treatment, authorized under the St. Joe Noxious Weed EIS, to occur within the cumulative effects area.

Effectiveness: High. Standards would be met as required by the chemical label directions, Biological Assessments and the St. Joe Noxious Weed EIS.

RA-4. Prohibit storage of fuels and other toxicants within Riparian Habitat Conservation Areas. Prohibit refueling with Riparian Habitat Conservation Areas unless there are no other alternatives. The Forest Service must approve refueling sites within a Riparian Habitat Conservation Area or Bureau of Land Management and have an approved spill containment plan.

Project Proposal: This is part of the standard timber sale contract.

Effectiveness: High.

RA-5. Locate water-drafting sites to avoid adverse effects to inland native fish and instream flows, and in a manner that does not retard or prevent attainment of Riparian Management Objectives.

Project Proposal: Water-drafting sites would likely be located at Forest Highway 50 and Gold Creek junction. The drafting nozzles have a very small sized mesh screen which would prevent entrainment of fish of any size. The prescribed burn plans would further specify the methods and means of drafting.

Effectiveness: Moderate. District fisheries biologist and hydrologist would review prescribed burn plans.

Watershed and Habitat Restoration (A-12)

WR-1. Design and implement watershed restoration projects in a manner that promotes the long-term ecological integrity of ecosystems, conserves the genetic integrity of native species, and contributes to attainment of Riparian Management Objectives.

Project Proposal: No restoration projects are included in this alternative

Effectiveness: Not applicable.

Fisheries and Wildlife Restoration (A-13)

FW-1. Design and implement fish and wildlife habitat restoration and enhancement actions in a manner that contributes to attainment of the Riparian Management Objectives.

Project Proposal: No restoration projects are included in this alternative

Effectiveness: Not applicable

FW-2. Design, construct, and operate fish, wildlife interpretive, and other user-enhancement facilities in a manner that does not retard or prevent attainment of the Riparian Management Objectives or adversely affect inland native fish. For existing fish and wildlife interpretive and other user-enhancement facilities inside Riparian Habitat Conservation Areas, assure that Riparian Management Objectives are met and adverse effects on inland native fish are avoided. Where Riparian Management Objectives cannot be met or adverse effects on inland native fish avoided, relocate or close such facilities.

Project Proposal: No projects are included in this alternative.

Effectiveness: Not applicable.

FW-3. Cooperate with Federal, Tribal, and State wildlife management agencies to identify and eliminate wild ungulate impacts that prevent attainment of the Riparian Management Objectives or adversely affect inland native fish.

Project Proposal: No projects proposed

Effectiveness: Not applicable

FW-4. Cooperate with Federal, Tribal, and State fish management agencies to identify and eliminate adverse effects on native fish associated with habitat manipulation, fish stocking, fish harvest, and poaching.

Project Proposal: *No projects proposed.*

Effectiveness: Not applicable.