Biological Assessment for the Potential Effects of Managing the Payette National Forest

in

the Middle Fork Salmon River NW Tributaries (Big Creek)

on

Snake River Spring Chinook Salmon

and Snake River Summer Steelhead Trout

Volume 3: Cabin Creek Airstrip Repair

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Biological Assessment for the Potential Effects of Managing the Payette National Forest in the Middle Fork Salmon River NW Tributaries (Big Creek) on Snake River Spring Chinook Salmon and Snake River Steelhead Trout

Volume 3: Cabin Creek Airstrip Repair

This Biological Assessment (BA) determines the effects of repairing the Cabin Creek airstrip and rehabilitating Cow Creek on Snake River spring chinook salmon, *Oncorhyncus tshawytscha*, its critical habitat, and Snake River steelhead trout, *Oncorhyncus mykiss*. Hereinafter, all references to chinook salmon are to the listed species, all references to steelhead are to the proposed species, and all references to habitat are to critical habitat for chinook salmon.

The Cabin Creek airstrip was damaged to an unusable condition by a high flow event in Cow Creek during the summer of 1996 (Figure 1) . This BA addresses the proposed repair of the airstrip and rehabilitation of Cow Creek (Appendix 1: Environmental Assessment [EA] for Repair of Cabin Creek Airstrip), and is tiered to the following BAs for Big Creek (Middle Fork Salmon River NW Tributaries):

Figure 1 Gullied Cabin Creek airstrip.

Lund, John. 1996. Biological Assessment for the Potential Effects of Managing the Payette National Forest in the Middle Fork Salmon River (NW) on Snake River Spring/Summer Chinook Salmon. Volume 2: Sunday Mine Access and Timber Removal Project.

Faurot, Mary. 1994. Biological Assessment for Spring/Summer Chinook Salmon, Middle Fork Salmon River Tributaries (NW) and Main Salmon River Tributaries (SE), Payette National Forest. Ongoing and Proposed Forest Service Activities.

I. General Description of Section 7 Watershed

Most land within the analysis area is classified Wilderness within the Frank Church-River of No Return Wilderness (FC-RNRW), managed under an approved plan (USDA Forest Service, FC-RNRW Management Plan, 1985). The area is managed for a broad range of land uses and recreational opportunities in a manner that will leave it unimpaired for future use and enjoyment as Wilderness. The main recreational activities are hunting, horse camping, backpacking, rafting, and fishing. Exceptions to Wilderness management occur in upper Big Creek and upper Monumental Creek, which have a history of mining activity, roaded recreation, and in Big Creek, residential development. Forest Plan (USDA Forest Service 1988) direction for mining "ensures that exploration, development, and production of mineral and energy resources are conducted in an environmentally sound manner and that these activities are integrated with the planning and management of other National Forest resources". The Forest Plan directs "no degradation of fish habitat" for Wilderness streams in the analysis area, and "management of watersheds containing habitat for anadromous fish to improve upon overall existing habitat capability of the Forest".

II. Specific Description of Section 7 Watershed

A. Location of watersheds

U. S. Geological Survey hydrologic units are: 17060206-13 (Cabin Creek), 17060206-14 (Rush Creek), and 17060206-15 (Lower Big Creek).

B. Natural physical and biological characteristics

Cabin Creek enters Big Creek (Figure 2) approximately 15 miles upstream of the mouth of Big Creek . Habitat quality is near pristine throughout lower Big Creek below Cabin Creek with the exception of some historically altered streambanks in the vicinity of Cabin Creek and Taylor Ranch. Cabin Creek has a watershed area of 61,232 acres.

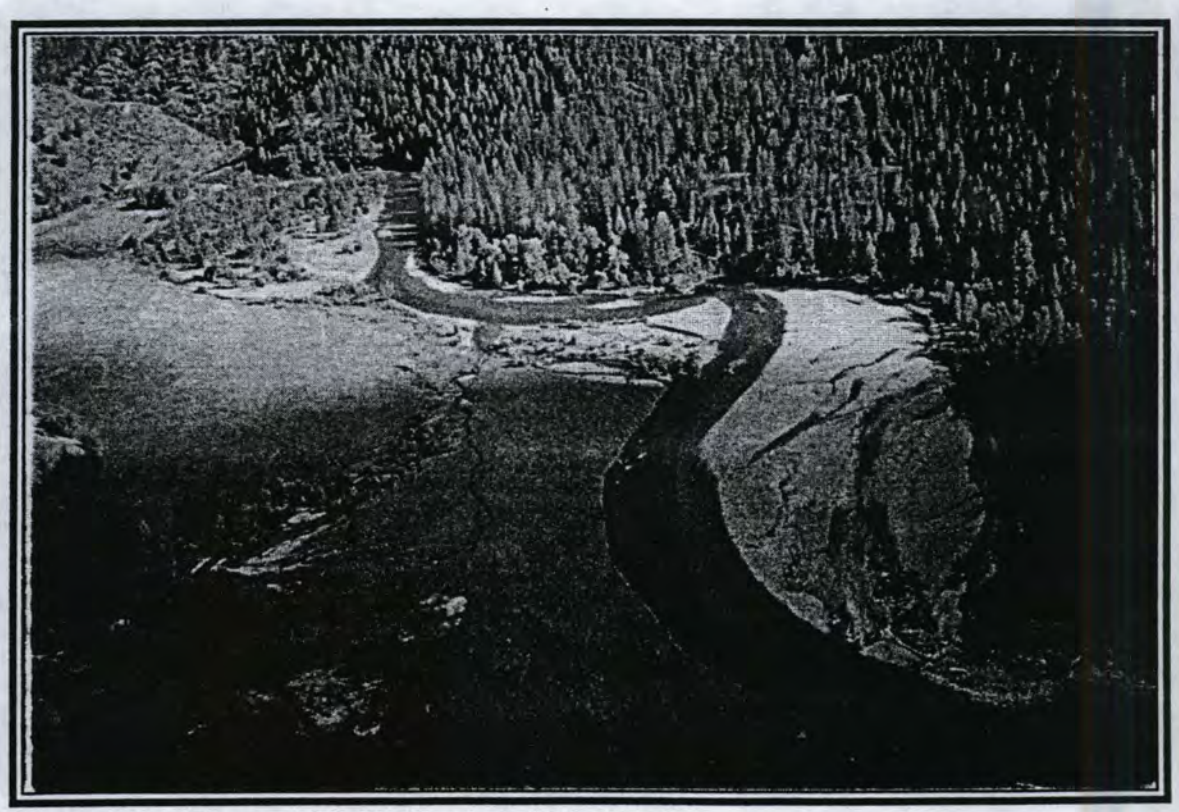
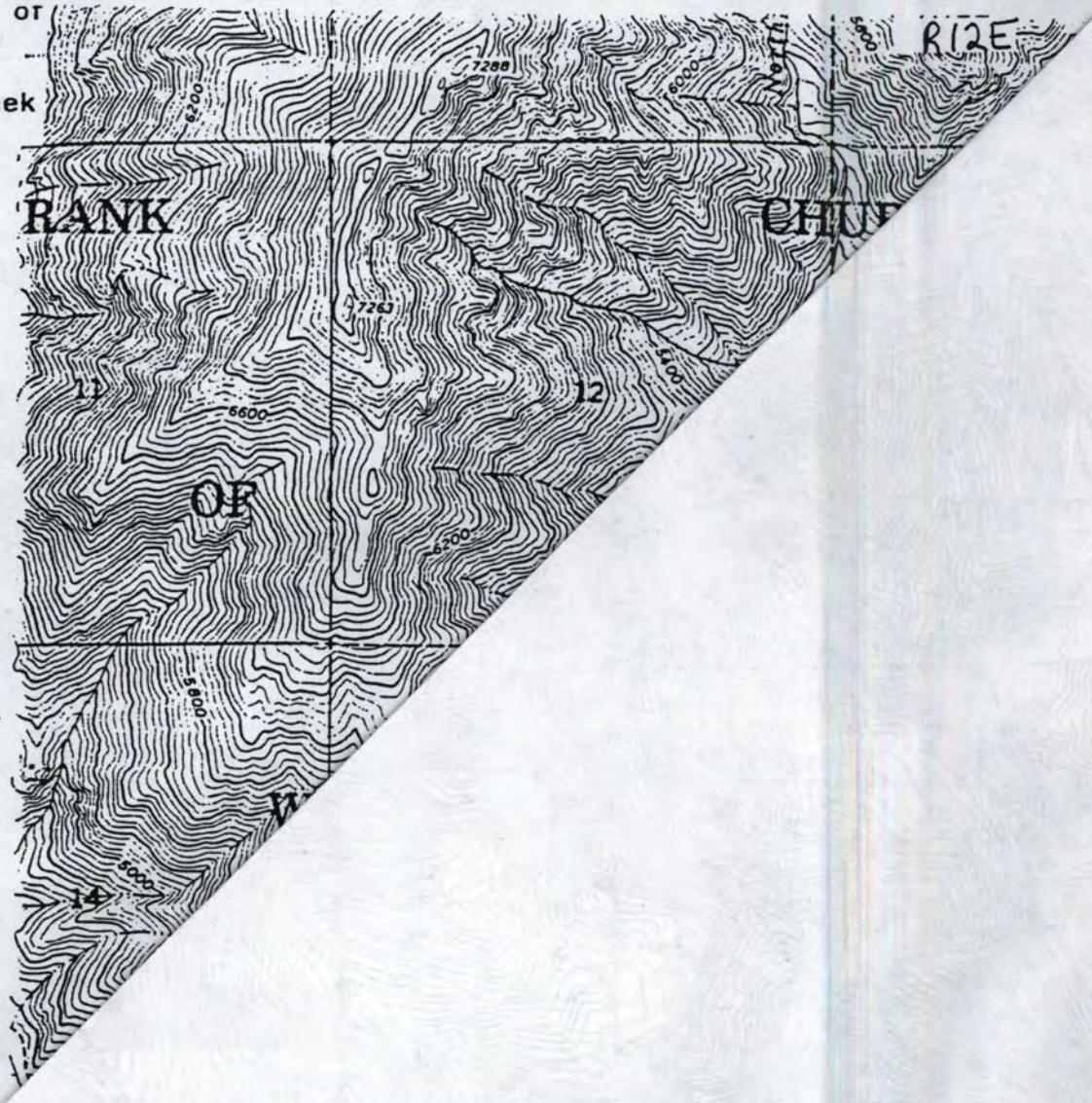


Figure 2 Confluence of Cabin Creek and Big Creek.

Figure 3. Location map of Cabin Creek and Cow Creek drainage.



Cow Creek enters Cabin Creek approximately a mile above the mouth of Cabin Creek, and has a watershed area of approximately six square miles (Figure 3).

C. Human-caused physical characteristics

Big Creek. The Big Creek watershed includes about 340,000 acres of Wilderness, historical and present mining activities, private summer residences, two guest outfitter lodges, water diversions, hydropower sites, 5 airstrips, a Forest Service guard station, about 6,000 acres of State/private land, 50 miles of USDA Forest Service system roads, 400 miles of system trails, and 2 inactive fire lookouts.

Grazing by livestock on private land and by pack/saddle stock throughout the watershed has occurred and is currently occurring in localized areas.

Scattered mining disturbance in the Big Creek area from activities dating almost a century are described in Cater et al. (1973). Numerous placer and lode deposits were prospected and worked in the area, but most are abandoned now.

Cabin Creek. Cabin Creek was historically diverted for irrigation and power production by a dam located about a mile upstream of the mouth. This diversion was a barrier to anadromous fish migration, and was removed in the early 1980's. The stream remains somewhat impacted in the vicinity of the airstrip from the historical diversion, airstrip construction, and other alterations. Existing dam footings constrict the channel, the streamcourse has been narrowed and channelized, and devegetated streambanks provide little shade, riparian diversity, or source of woody debris (Figure 4).

Figure 4. Altered streambanks in Cabin Creek, below confluence with Cow Creek.

Many users of the airstrip hike down Cabin Creek to Big Creek to fish. The number of aircraft landings before 1996 was about 600 per year (Krassel District, Payette National Forest files). Increased fishing pressure has been recently identified as potentially increasing mortality of cutthroat and other species in Big Creek in the Cabin Creek vicinity (Dave Burns, Fisheries Biologist, Payette National Forest, personal communication). The Idaho Department Fish and Game is managing fishing by implementing closures or catch and release regulations for all sport fish species (except for brook trout and whitefish) in Big Creek and its tributaries (Don Anderson, Fisheries Manager, Idaho Department of Fish and Game, McCall, Idaho).

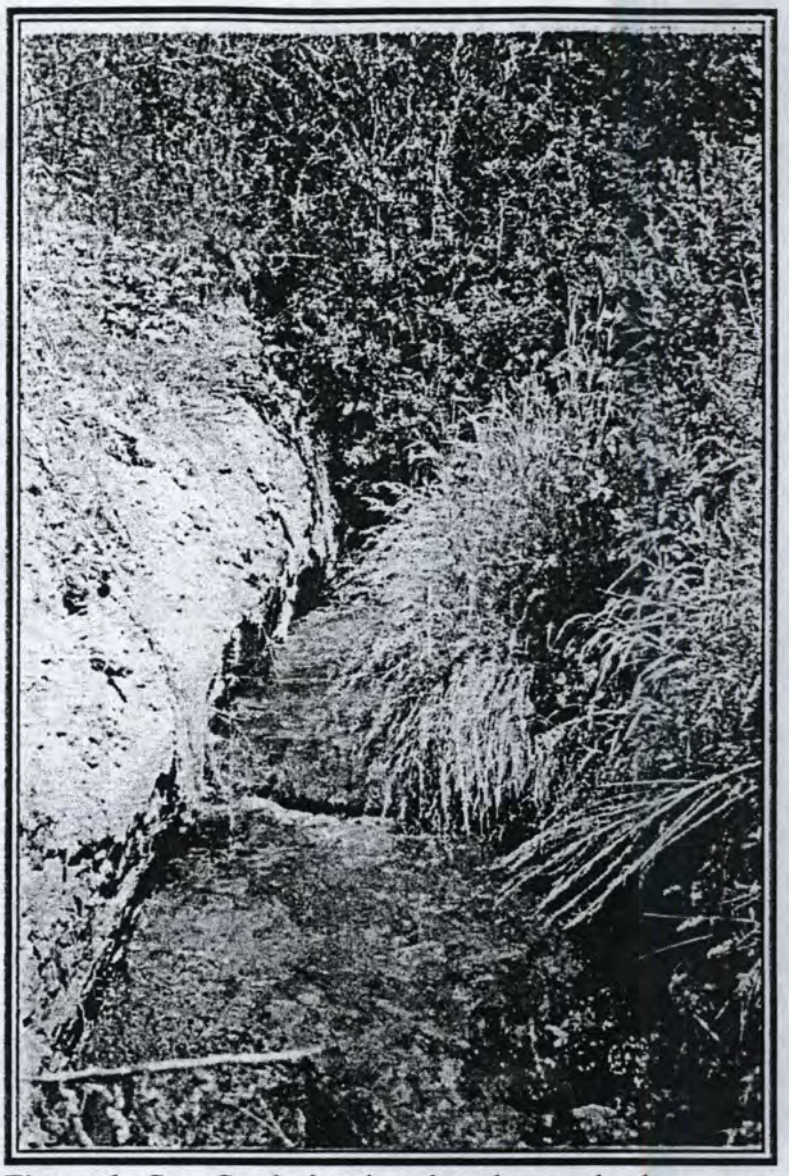


Figure 6. Cow Creek showing altered streambanks.

Cow Creek. Airstrip construction and other development prior to Forest Service ownership resulted in alteration to the lower ½ mile of Cow Creek. When the airstrip was constructed, a borrow source was developed on the north side of Cow Creek and a temporary crossing was installed. Logs were placed which still remain along the streambanks, and the creek was channelized to accommodate the airstrip (Figures 5 and 6). These alterations have resulted in an unnaturally incised channel with near-vertical banks, channel confinement, active bank erosion, bank collapse, undercutting, and blockage of natural high-flow channels. This type of channel is typically very unstable due to the high sediment supply available from the banks and channel, and eventually develops into a more stable A4 channel (Rosgen 1996). A chronic, unstable erosion/sediment production situation now exists in the airstrip area. The erosion is causing meanders to migrate at a faster rate than if the stream were in a more natural, stable state. Depending on seasonal flows and climatic events, an estimated 10-20 cubic yards of sediment per year is routed downstream that is associated with the unstable, eroding banks (Dennis Gordon, Soil Scientist, Payette National Forest). The sediment production could exist for

Figure 7. Deposition of sediment in abandoned reservoir as a result of the overland flow of Cow Creek.

another 50-75 years (Dennis Gordon, soil scientist, Payette National Forest, personal communication) until an A4 channel condition is achieved, which is the typical progression of stabilization.

The added sediment load is being deposited in the stream channels of Cow, Cabin, and lower Big Creeks . This is contributing to wider and shallower channels (higher width/depth ratio), filled pools, fewer "clean" gravels for spawning and food production, and less diverse fish habitat.

The blocked overflow channels and confined mainstem channel cause unnatural effects from periodic high flow events in Cow Creek. In 1996, Cow Creek exceeded its capacity, scoured out the airstrip fill, created a gully several feet deep and about 1500 feet long, and deposited the fill in a small, abandoned reservoir adjacent to Cabin Creek (Figure 7) (Appendix 1).

Several hundred feet upstream of the airstrip, the channel is in near-natural condition (Figure 8). The banks and floodplain are heavily vegetated. There, during high flows and/or when the channel becomes naturally restricted with debris, the channel capacity can be exceeded and the water can be naturally dispersed onto floodplain channels and riparian vegetation.

D. Cumulative watershed effects

The McCammon (1993) risk assessment procedure yielded a overall condition rating for the Big Creek watershed of "good" (Faurot 1994, Lund 1996).

E., F., and G. Description and distribution of species, descriptions of habitat trends

Middle Fork Salmon River. The Middle Fork Salmon River and its tributaries formerly supported 32% of the annual statewide chinook salmon redd counts (Mallett 1970). The Middle

Fork run of chinook salmon has been declining since at least 1941 (Gebhards 1959, Corley 1972, Pollard 1983, Thurow 1985). Refer to previously mentioned documents for further information on chinook salmon.

Steelhead trout are found along the Pacific Coast from the Alaska Peninsula and eastern Asia, south to California and inland to the Rocky Mountains via the Columbia River (Snake and Salmon Rivers) (USDA Forest Service 1991). Steelhead occur in the Salmon River system in the Little Salmon River, and Main, South, and Middle Fork Salmon River tributaries on the Payette National Forest.

The steelhead trout in the upper Columbia River basin (which includes the Snake, Salmon, and Middle Fork Salmon River watersheds) is an anadromous form of redband trout (*Oncorhynchus mykiss*). Part of the life history is spent in the ocean, and spawning occurs in freshwater streams (Behnke 1992). Wild and naturally reproducing steelhead runs in the Columbia River basin have declined mainly due to construction of several major dams along their migration routes (USDA Forest Service 1991). Survival rates from smolt to adult for fish that must surmount dams and travel long riverine distances to natal streams may be less than 2 percent (Meehan and Bjornn 1991). Loss and degradation of spawning and rearing habitats have contributed to declines as well (USDA Forest Service 1991).

Steelhead trout may spawn in the upper Columbia Basin from March-July, and may enter streams several months before spawning. Young steelhead have a variety of migration patterns that vary with local conditions; control mechanisms range from mostly genetic to mostly environmental (Behnke 1992). In some populations, fish may remain in natal streams before migrating to the ocean, but in others they may migrate upstream or downstream soon after emergence to enter other rearing areas.

Figure 8. Cow Creek upstream of the airstrip, showing natural channel condition.

The Middle Fork Salmon River and its tributaries contain extensive areas of high quality steelhead spawning habitat, though spawning escapements were insufficient to occupy available habitat in the mid 1980's (Thurow 1985). Densities of juvenile steelhead ranged from 0.2 to 10.0 fish per $100m^2$, and averaged 4.0 fish per $100m^2$ (Thurow 1985). This is a fraction of the potential carrying capacity of fully-seeded streams (up to 20 fish per $100m^2$).

Big Creek. Chinook salmon and steelhead spawn, migrate, overwinter, and/or rear throughout lower Big Creek and its tributaries (Mallet 1974, Thurow 1985). Though Middle Fork Salmon River chinook salmon runs were in extremely low abundance in the mid-1980's, viable populations of spring chinook remained in Big Creek (Pollard 1983, Thurow 1985). Since the mid-1980's, Big Creek runs have declined even further (Idaho Department of Fish and Game redd count files). Optimal steelhead spawning areas exist just below Cabin Creek in Big Creek (Thurow 1985). Populations of chinook salmon and steelhead in Big Creek are depressed, following the same trend as those throughout Idaho (Faurot 1994). The Idaho Department of Fish and Game maintains parr monitoring stations in lower Big Creek that are periodically snorkelled (Table 1).

Cabin Creek. Cabin Creek provides anadromous habitat for the lower two miles (Mallett 1974). Rearing chinook salmon and steelhead have recently been documented in the lower 1/4 mile (Krassel Ranger District, Payette National Forest files). Above the lower two miles, Cabin Creek is probably too steep to support anadromous species. Cow Creek does not contain anadromous fish populations.

Table 1: Steelhead and chinook salmon densities in lower Big Creek. Snorkel data from Idaho Department of Fish and Game 1988-1992, McCall, Idaho.

Big Creek location	year	age 0 chinook density #/$100m^2$	age 1 chinook density #/$100m^2$	age 0 steelhead density #/$100m^2$	age 1 and 2 steelhead density #/$100m^2$
Mouth at lowest bridge	1989	0.00	0.00	0.00	0.63
200 yds above lowest bridge	1988	0.98	0.00	0.00	6.56
200 yds above lowest bridge	1989	3.61	0.00	1.31	1.97
200 yds above lowest bridge	1990	0.00	0.48	1.45	11.63
200 yds above lowest bridge	1992	0.10	0.00	0.41	1.43
Taylor Ranch	1988	1.92	0.05	3.21	0.18
Taylor Ranch	1989	1.40	0.00	2.79	0.30
Taylor Ranch	1990	0.21	0.00	1.95	0.48
Taylor Ranch	1991	1.13	0.00	1.22	0.82
Taylor Ranch	1992	1.39	0.00	2.34	2.25
Cabin Creek	1992	1.23	0.00	0.67	0.51

III. Description of Ongoing or Proposed Actions

The federal action is to repair and restore prior operational capability of Cabin Creek airstrip, and to rehabilitate Cow Creek to more natural condition.

A. Purpose and Need

The purpose of the proposed airstrip repair action is to restore the level of aircraft access to the lower Big Creek watershed that existed prior to the damage and closure of the Cabin Creek airstrip in a timely, effective manner, while protecting and improving resource conditions related to soils, water quality, fish, wildlife, and wilderness. The purpose of the channel repair action is to rebuild a stable and functional stream channel which will be able to handle flood events and sediment input from upstream events without impacting fish habitat downstream beyond natural disturbance levels.

The need for the proposed action was triggered by the damage from a high flow event to the Cabin Creek airstrip, a Forest Service-maintained facility within the Frank Church-River of No Return Wilderness. This event occurred during June 7-10, 1996. The airstrip was subsequently closed to use due to the safety hazard.

B. Site specific activities

Approximately 1000 cubic yards would be required to repair the airstrip to a useable condition. About half (400-450 cubic yards) of the required fill to repair the airstrip would come from rehabilitating Cow Creek to a near-natural, functional channel (Borrow site 1 in Figure 5). This would entail pulling the streambanks back where they have been artificially oversteepened due to airstrip construction and maintenance, and widening the flow path to a more natural configuration (Figure 9). The work would include constructing a floodplain capable of handling baseflow, bankfull, and flood flows. (The floodplain is now non-existent in the confined channel area, resulting in bank erosion, undercutting, sediment production, and "overflow" events like the one that destroyed the airstrip in 1996.) The southern bank would be excavated back 6-8 feet to create a much wider floodplain, and bankfull and baseflow channels would be designed within the floodplain, away from the existing, eroding banks (Figure 5). All excavated material would be used as fill on the airstrip. Approximately four vortex rock weirs (appropriate for minimizing shear stress on banks of A4 channels - Rosgen 1996) would be incorporated into the channel design to maintain the integrity of the new channel. Native riparian plant species would be planted along the banks, and other disturbed areas would be seeded with native seed and mulched. The integrity of the channel upstream of the airstrip would be restored by re-establishing the connection of "overflow" flood channels at the northern and eastern sides of the airstrip. About 400-500 cubic yards of fill would be removed from three locations adjacent to the airstrip (Borrow sites 2, 3 and 4 in Figure 5) to complete the work. This removal would aid in the function of an overflow channel by routing high flows away from the airstrip and into the remnant overflow channel.

Borrow site 1 is approximately 250 feet long (Figure 5). The floodplain in this area would be widened by approximately 8 feet . In the lower, confined 100 feet, the slope from the edge of the floodplain to the existing ground level of the airstrip would be sloped 2:1. In the next 75 feet upstream, the slope from the edge of the floodplain to the ground level would range from 4:1 to 6:1 (this is the area where Cow Creek overflowed its banks in 1996). In the next 75 feet upstream, the banks will be sloped at 2:1. The resultant channel geometry for this 250-foot reach is being designed to approximate a stable channel reach below the airstrip and above the beaver

dams (Figure 5). Sinuosity should change slightly from 1.01 to 1.10, and width to depth ratios should change from 2.6 to 4.6.
A very high level of erosion control and sediment mitigation would be implemented including silt fence, slash windrows, straw application, direct removal of sediment (Appendix 2), use of low-impact, non-motorized techniques, and timing of work during the lowest-flow, dry season.

The rehabilitation of all borrow sites will include shaping to blend with the natural landscape, seeding with native seed, soil amendments, mulching, and planting of shrubs. The shrubs will be propagated from seed and cuttings collected locally. Follow-up seeding and planting in further years beyond the year of the action may be necessary to achieve soil coverage.

Horse-drawn equipment (slips, fresnos, and/or wheeled wagons, dumps, and graders) and handwork would be used to conduct the repair work. The 1200 cubic yards of material required to repair the airstrip would be moved and compacted as necessary. Campsites would be pre-approved by the Forest Service, grazing areas would be rotated and within 30% utilization, and all equipment and material would be removed from the site following completion of the work.

IV. Effects

A. Evaluation criteria

The following criteria were used to evaluate the effects of the proposed action:

- Sediment production
- Fishing pressure
- PACFISH

B. Direct and indirect effects

Local sediment can be transported downstream and influence habitat quality where chinook salmon and steelhead occur. Sediment is a potential source of density-independent mortality. Increased suspended and bedload sediment decreases rearing and spawning habitat by decreasing pool volumes and by filling in interstitial spaces critical for food production and cover (Cordone and Kelly 1961, Martin and Platts 1981, Sigler et al. 1984, Bell 1986, Chapman and McLeod 1987, Everest et al. 1987). Settled sediment decreases interstitial flow which in turn decreases dissolved oxygen, smothering eggs and fry, which can become trapped in the gravel. Suspended sediment can alter fish behavior and feeding efficiency (Hicks et al. 1991).

Sediment production. Chronic erosion and sediment production in Cow Creek (estimated 10-20 cubic yards per year) would continue for an estimated 20-50 years until naturally stabilizing into a new channel, without some form of stream rehabilitation (Dennis Gordon, soil scientist, Payette National Forest, personal communication). The federal action would reconstruct the unstable channel into a more stable A4 channel. This would create a much wider floodplain, remove fill sediment from banks, and restore natural baseflow, stream velocity, sinuosity, and riffle/pool ratio. Instream structures and riparian plantings would help maintain the integrity of the newer, more stable channel. Quantitative measurements (listed in section III.B.) used to design restoration activities, and stabilizing techniques such as those described above, even with their associated short-term sediment increases, have been shown to be successful in reducing long-term sedimentation in other areas (Rosgen 1996). These techniques have been used successfully in Cabin Creek on the South Fork Salmon River, with a goal of reducing sediment production (Krassel District files, Payette National Forest; Dennis Gordon, Soil Scientist, Payette National Forest, personal communication; Appendix 2). The level of long-term sediment

production in Cow Creek (and deposition into Cabin and Big Creeks) which is now occurring would be decreased by use of these techniques.

Without treatment, the scoured airstrip will produce high amounts of long-term sediment during flood events and from overland flow. With the federal action, the airstrip gully would be filled and stabilized, and potential overflow from Cow Creek would be diverted away from the airstrip into reconstructed overflow channels. This would decrease long-term sediment production from the immediate vicinity of the airstrip, compared to doing nothing.

Short-term sediment production. Stream diversion, bank excavation, installation of in-channel structures, bank stabilization, and construction of a temporary stream crossing would result in an overall decrease in sediment production and erosion in Cow Creek. The chronic production (estimated 10-20 cubic yards per year) would cease immediately following this action. Some short-term production would result from this action in the 250 feet where in channel work would occur: an estimated 3-8 cubic yards in the first year, 2-3 cubic yards in the second year, 1 cubic yard in the third year, and less than 1 cubic yard in subsequent years (which is what would be expected under natural conditions). The net sediment production during the first year would decrease from an estimated 10-20 cubic yards to 3-8 cubic yards; for the second year would decrease from 10-20 cubic yards to 2-3 cubic yards; for the third year would decrease from 10-20 cubic yards to 1 cubic yard; and in the subsequent 50-75 years would decrease from 10-20 cubic yards to less than 1 cubic yard. The very high level of erosion control and sediment mitigation (silt fence, slash windrows, straw, timing of work during the lowest-flow, driest season) associated with this alternative would minimize any short-term production (Dennis Gordon, Soil Scientist, Payette National Forest, personal communication). The short-term sediment production should cease within three years, when the new channel stabilizes and new riparian vegetation is established.

The current unnaturally incised channel with near-vertical banks, channel confinement, active bank erosion, bank collapse, undercutting, and blockage of natural high-flow channels would be converted into a more stable A4 channel. The erosion that is causing meanders to migrate at a faster rate than if the stream were in a more natural, stable state would decrease. The chronic, unstable erosion/sediment production situation that now exists in the airstrip area would be eliminated. The existing sediment load that is being deposited in the stream channels of Cow, Cabin, and lower Big Creeks as a result of the unstable nature of Cow Creek would decrease. This would contribute to lower width/depth ratios, deeper pools, cleaner gravels for spawning and food production, and more diverse fish habitat.

The floodplain is now non-existent in the confined channel area, resulting in bank erosion, undercutting, sediment production, and "overflow" events like the one that destroyed the airstrip in 1996. A reconstructed, functioning floodplain would provide sediment and water storage, energy dissipation, a belt width for natural stream meanders, diversity of fish habitat, and an overflow area for increased flows.

There is a 100% probability that sometime in the future Cow Creek will again overflow its banks and threaten the airstrip to some degree. The time frame is unknown. It is also unknown how the proposed channel alterations would function during a 100 or 500-year event. There is a high level of confidence that the proposed stream design would function as intended to prevent erosion of streambanks and airstrip fill during lesser magnitude events (Dennis Gordon, Soil Scientist, Payette National Forest, personal communication).

The proposed actions would remove material where there is currently a 99% probability that it will be delivered to fish habitat downstream as banks continue to erode. The excavated material would be placed where there is a very low probability that it would enter a stream system (in the airstrip). Due to the reconstruction of overflow channels adjacent to the airstrip, the new airstrip would be less susceptible to a scouring event like that in 1996 (Dennis Gordon, Soil Scientist, Payette National Forest, personal communication).

Fishing pressure. Increased fishing pressure has been recently identified as potentially increasing mortality of cutthroat and other species in Big Creek in the Cabin Creek vicinity (Dave Burns, Fisheries Biologist, Payette National Forest, personal communication). The Idaho Department Fish and Game is managing fishing by implementing closures or catch and release regulations for all sport fish species (except for brook trout and whitefish) in Big Creek and its tributaries (Don Anderson, Fisheries Manager, Idaho Department of Fish and Game, McCall, Idaho).

Fishing pressure could result in effects to steelhead and chinook salmon such as 1) a fish being accidentally or intentionally caught, then suffering instant or delayed mortality or hooking stress; 2) harassment (accidental or intentional) of fish by wading, camping, fishing, or other streamside recreational activities; or 3) trampling of redds. Anglers are expected to follow state and federal laws, requiring that federally listed and proposed fish species are not targeted while angling, and if accidentally caught, are released.

The airstrip would be repaired to its previous level of condition and aircraft landing capability. The annual number of aircraft landings before the airstrip was closed (600 in 1995) would be predicted as a reasonable assumption of use once the airstrip was repaired (Clem Pope, Wilderness Manager, Payette National Forest, personal communication). The return in number of aircraft landings to pre-1996 levels would have a corresponding return in fishing pressure in the Cabin Creek/Big Creek confluence area. Idaho Department of Fish and Game closures and catch-and-release regulations would continue to enforce regulations which govern angling and its associated effects to fish species (Don Anderson, Fisheries Manager, Idaho Department of Fish and Game, McCall, Idaho).

PACFISH. PACFISH Riparian Habitat Conservation Area (RHCA) widths would be contain activities in Cow and Cabin Creeks with the proposed federal actions. The net effects of temporarily manipulating the RHCAs would be an overall decrease in long-term sediment production, and an increase in quality of the riparian area, both which would avoid chronic effects to chinook salmon and steelhead trout. Several PACFISH Riparian Management Objectives (RMOs) would be improved by activities that would occur within the PACFISH RHCAS: pool frequency would increase (the currently incised, narrow channel would become "meandered" into a pool-riffle sequence), bank stability would increase (bank structure is currently very unstable), lower bank angle would increase (current bank structure lends itself to collapse without developing stable undercuts), and width to depth ratio would increase (existing channel is uncomplex, narrow, and deep; widening the channel and floodplain would provide for channel complexity).

C. Cumulative and combined effects

State-regulated aircraft landings and fishing permits and restrictions would continue at the levels observed before the airstrip closure.

The McCammon (1993) risk assessment procedure yielded a overall condition rating for the Big Creek watershed of "good" (Faurot 1994, Lund 1996). The addition of the proposed federal action to the original analysis does not change this overall rating, but would actually improve the ability of the watershed to "absorb" human effects.

V. Mitigation Measures

Many mitigation measures have been incorporated as part of the proposed project.

No absolute certainty exists with regard to effectiveness of mitigation measures, although all measures have been tested on other projects and have been found to work well. Short of total avoidance of an activity, mitigation measures can not guarantee that some effects will not occur at some level. Mitigation measures developed for this project are to designed to avoid and limit the extent of any potential impact.

Cow Creek, Cabin Creek, and Big Creek (immediately below the mouth of Cabin Creek) will be surveyed one week before the project initiation date for the presence of spawning chinook salmon or redds. If spawning fish are observed, the NMFS will be contacted and a delay of contract will occur. If a redd is observed, the NMFS will be contacted and a delay of contract will be considered. These mitigation measures will be outlined in contract specifications. If monitoring of this activity shows that the mitigation is not having the desired effect of protecting the chinook salmon, their habitat, and steelhead, then the activity will be suspended by District Ranger until corrections can be made. Consultation with NMFS will be reinitiated if unforeseen impacts are occurring. Reinitiation of consultation would then result in what additional mitigation measures are needed for correction of the problem.

VI. Monitoring and Evaluation

The following parameters would be measured to assure that project goals have been met:

- width to depth ratios
- sinuosity (includes meander width, belt width, meander radius)
- gradient
- channel cross section and longitudinal profile
- riffle to pool ratio
- substrate
- average bankfull width
- annual monitoring evaluation and reports by a fisheries biologist during construction, immediately following construction, and annually for 1-2 years following project completion.

VII. Determination

The repair of the Cabin Creek airstrip and associated rehabilitation of Cow Creek are not likely to adversely affect Snake River spring/summer chinook salmon or their critical habitat in the Middle Fork Salmon NW Tributaries. The repair of the Cabin Creek airstrip and associated rehabilitation of Cow Creek are not likely to jeopardize the continued existence of Snake River steelhead trout in the Middle Fork Salmon NW Tributaries. The federal actions would result in irreversible or irretrievable commitments of resources which could preclude the National Marine Fisheries Service from defining reasonable and prudent alternatives should they be carried out before conclusion of consultation.

VIII. Rationale

These conclusions are based on the long-term sediment reduction that would result from the federal actions. The long-term reduction would greatly outweigh the short-term sediment increase associated with the instream work, which would be mitigated to the highest level to reduce downstream effects. The ultimate condition of the Cow Creek channel, riparian areas, and downstream channels would be restored by creating more natural channels and decreasing chronic erosion and sedimentation. The stabilizing techniques proposed for this project, even with their associated short-term sediment increases, have been shown to be successful in reducing long-term sedimentation and improving fish habitat in other areas (Rosgen 1996). Site-specific information on the altered, unstable nature of the Cow Creek channel supports the management of PACFISH RHCAs to improve sediment production conditions (section IIC). Management modification of PACFISH RHCAs would not prevent attainment of PACFISH RMOS, and would provide progress toward attaining impaired RMOs.

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