APPENDIX B
BLACKBIRD MINE
BIOLOGICAL RESTORATION AND COMPENSATION PLAN

INTRODUCTION

This Biological Restoration and Compensation Plan is Appendix B to the "Blackbird Mine Site" Consent Decree (see Section X). This plan contains three main components I) Hatchery Operations Plan, II) Smolt Survival Plan, and III) Performance Monitoring Plan.

This Plan is based on a 100 year project life, but at the request of the Settling Defendants, the Trustees may approve a fifty year option. A fifty year option was discussed in detail during the process of agreeing on this Biological Restoration Plan. The only difference between the two options is that the 50 year option requires an additional 3 miles of out-of-basin cattle exclusion within the livestock exclusion element (see Smolt Survival Plan). The 50 year option will be available until such time that the areas for livestock exclusion are determined.

I. HATCHERY OPERATIONS PLAN

The Hatchery Operation Plan has three elements: 1) a hatchery facility, 2) an adult fish barrier and trap, and 3) acclimation ponds.

ELEMENT 1 -- HATCHERY FACILITY

Element Description

This element is based on the use of an existing hatchery off-site to produce salmon smolts for reintroduction into Panther Creek. At this time, the proposed hatchery is the Sawtooth Hatchery. This element includes funding of capital costs to modify (if necessary) the existing facility, provide water used in incubation and rearing, and provide for discharge of that water (if necessary). The hatchery will begin using appropriate donor stock as approved by the Trustees. Additional brood stock will be collected from Panther Creek as chinook salmon populations increase. It is anticipated that hatchery operation and maintenance will be done by the State of Idaho. Table B-1 provides a summary of those costs as estimated by Idaho Department of Fish and Game.

Operation and Maintenance Summary

- Operation and maintenance will last for up to 30 years.

TABLE 6-1 HATCHERY OPERATION COSTS SUMMARY

Item Description	Capital Costs	PDV O&M Costs[1] (10 Seed Adult, 30 yrs of operation)	PDV O&M Costs (30 Seed Adult, 20 yrs of operation)	PDV O&M Costs (50 Seed Adult, 16 yrs of operation)
Expansion of existing hatchery	$ 161,234			
Permitting, Engineering, Design & Administration @ 15%	$ 24,185			
Contingency @ 30%	$ 55,626			
Sub - Total	$ 241,045	$ 688,302	$ 771,078	$ 835,374
Total Costs		$ 929,347	$1,012,123	$1,076,419

[1] Annual hatchery O&M includes:
- $2,775 adult transportation cost [(6 trips X 350 mi round trip X $0.75/mi) + (6 days labor X $200/day);
- monitoring based on $150/1000 smolt tagging cost + $7,500 evaluation;
- hatchery production cost based on $12.50/lb X (# smolts/20 per lb);
- smolt transportation cost based on [(juvenile production / 6,000 juveniles per trip) X 350 mi round trip X $0.75/mi] + [(juvenile production / 6000 juveniles per trip) X $200 labor];
- 30% contingency.
- discount rate of 3.63%

- Operation and maintenance will include production costs, adult and juvenile transportation costs, and tagging and evaluation of returns.

- The fate of hatchery fish will be monitored by implanting coded wires in all juvenile fish prior to release from the hatchery. Information will be used to provide an annual index of anadromous and resident fish populations and compare habitat quality or habitat change to changes in fish production or survival.

ELEMENT 2 -- ADULT TRAP FACILITY ON PANTHER CREEK

Element Description

The following element description is presented according to each major component of the adult trap facility. General criteria to be designed into the facility are as follows.

- The facility will be located within a maximum of 5 miles upstream of the mouth of Panther Creek to prevent directing adults into Clear Creek.

- The facility will be designed to withstand a 100-yr. flood event during the trapping season.

- The design will allow placement and removal of weir sections and trash removal during trapping operations under normal operational conditions during mid-May through mid-September.

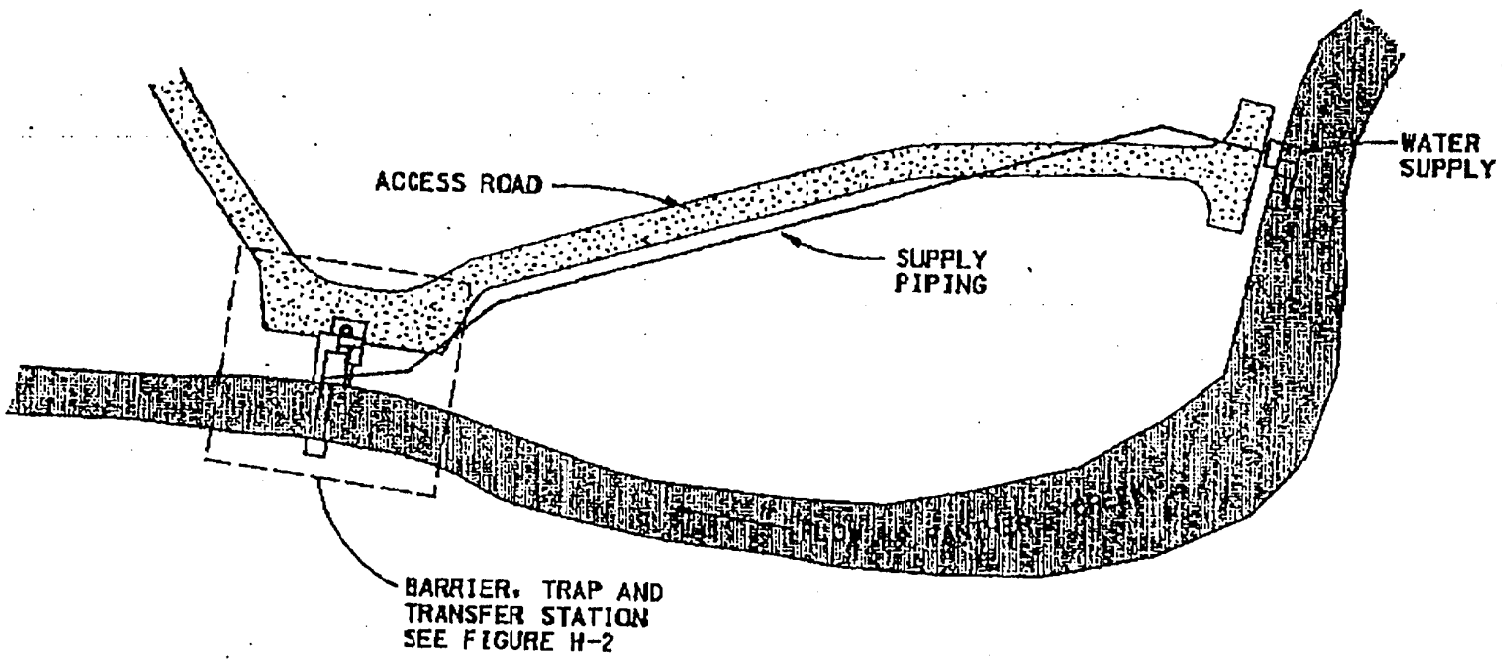
- The facility will allow collection of broodstock that represents the spectrum of the chinook salmon run in terms of run timing and population demographics.

- The facility will minimize turn-backs, rejection by fish, and injury to fish.

- The facility will provide safe transfer of fish from trap to vehicle for transport to the hatchery.

Barrier

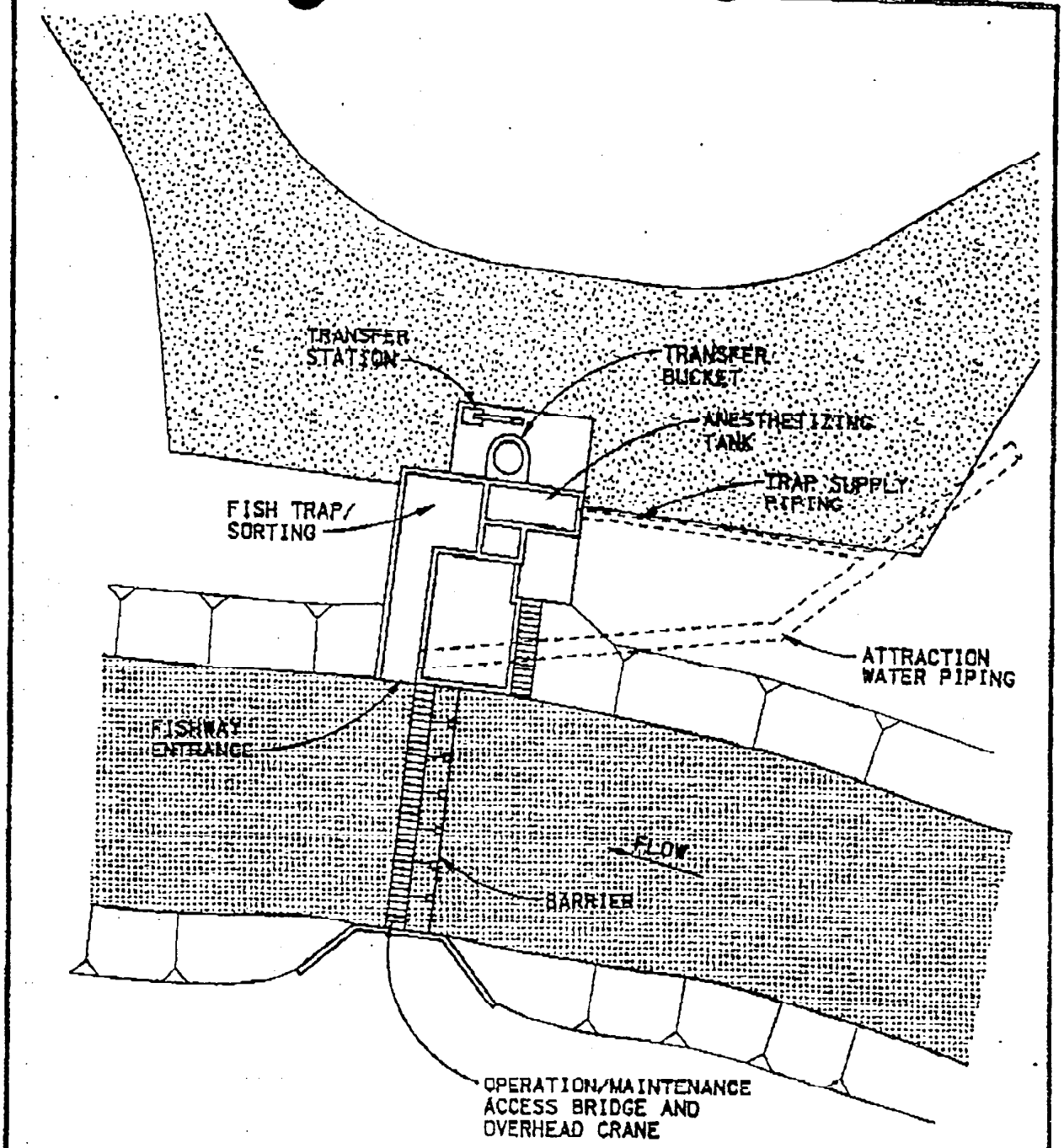
To direct the fish to the trapping and transfer facility, it will be necessary to construct an in-river barrier (see Figures B-1 and B-2). The barrier must pass water, but inhibit upstream migration of the fish targeted. If design river flows allow, a barrier similar to the Crooked River barrier will likely be used. The Crooked River barrier consists of an access bridge that



FISHPRO

PANTHER CREEK FISH TRAP

FIGURE 8-1



FISHPRO

PANTHER CREEK
FISH TRAP

FIGURE B-2

partially supports steel frames and steel screen panels. During flood events with high debris loads, the screens and supporting frames can be removed with an overhead crane.

Should design river flows prove to be more than can be accommodated by the Crooked River type barrier, alternative barrier designs will be considered:

1. Hydraulic/pneumatic operated picket barrier.
2. Pneumatic rubber dam supporting pickets.

Water Supply

The trap should be supplied with sufficient water to maintain fish health and provide proper flow-through velocity. Trap flow velocities above 1 to 2 cubic feet per second will begin to tire adult chinook salmon, leading to increased stress and eventual impingement on the trap screens.

The trap entrance will have sufficient flow to attract fish. Characteristically, around 3 to 5 percent of the river flow is required as attraction water. Typically, most of this water is provided at the trap entrance.

Should site conditions permit, the Panther Creek trap water supply will be similar in construction and operation to the Crooked River facility. The Crooked River facility utilizes an in-river flat screen to supply attraction and trap flow. The water supply intake should be located upstream to take advantage of the fall through the facility. Settling Defendants and the Trustees anticipate a reinforced concrete structure will be built to contain the screens and direct the flow to the trap. See Figure B-1 for a typical layout of a water supply structure. If there is insufficient fall to supply water to the trap and attraction, it may be necessary to pump flow from Panther Creek or an alternate supply.

Trap

Handling of fish by trap operators should be minimized. Fish to be transported off station would be directly transferred to a tanker truck, or to a holding area for future transport. Fish that are to be sent back to the river will be placed in a recovery tank and then may be loaded into a transfer pipe connected to the river upstream of the barrier.

The fish will be trapped and sorted in the same portion of the facility. The trap will likely consist of a standard fyke or a finger weir. The trap will be constructed of reinforced concrete walls and bottom, with a lockable grating or lockable timber lid (see Figure B-2).

Anesthetizing Tank

The fish are to be anesthetized prior to handling. An anesthetizing tank will be included in the design. Prior to transportation, the fish will be crowded into the anesthetizing tank, then anesthetized using carbon dioxide (see Figure B-2).

Transfer Station

After anesthetizing, the fish will be transported to a suitable transfer truck. Fish will be manually removed from the anesthetizing tank using "water-to-water" transfer. See Figure B - 2 for the location of the transfer station. Fish that are to be sent back to the river will be placed in a recovery tank and then may be loaded into a transfer pipe connected to the river upstream of the barrier.

Objective and Scope-of-Work

Objective: To place an adult salmon trap in the lower reach of Panther Creek capable of passing and intercepting broodstock that represent the run timing and stock demographics for the run. The trap should minimize fish rejection and fish injury, and survive a 100 year design flood.

The scope-of-work will consist of the following 4 tasks.

Task 1. Site Assessment

This task consists of a field trip in April of 1995 to assess site conditions and to ascertain probable locations for a barrier and trap that are mutually agreeable to the Trustees and Settling Defendants. This trip will consist of one day for investigating two potential sites. In addition, a visit to the Crooked River site should take place at this time. In addition, detailed hydrologic and hydraulic conditions particular to the chosen site will be studied to ascertain the design flow parameters.

Task 2. Conceptual Design

Working closely, the Settling Defendants and the Trustees will establish design parameters and define a mutually agreeable conceptual design and site location for the in-river barrier, water supply, trap, anesthetizing system and transfer station. Deliverable items for this task include preliminary drawings and a formal documentation of design criteria.

Task 3. Agency Meetings

It is anticipated that one meeting on site is required, and three additional meetings will involve the design process. Meetings will establish initial design criteria and provide a forum to comment on the design as the design progresses.

Task 4. Preliminary and Final Design

After review and Trustee approval of the conceptual design and site location, the Settling Defendants will begin the preliminary and final design process. The final design documents will consist of bid ready drawings, and technical specifications, stamped and signed by a professional engineer, registered in the state of Idaho. One interim submittal will be provided for review and approval by the Settling Defendants and Trustees (preliminary design). One set of final design documents will be provided for bid and construction purposes as ink on mylar drawings, and camera ready technical specifications.

Operation and Maintenance Summary

Adult Trap Facility

- Operation and maintenance will last for up to 28 years.

Barrier

- Maintenance of the barrier will consist of regular cleaning during the trapping season.
- Assuming the barrier is of the Crooked River type, cleaning will consist of raking trash and miscellaneous debris over the screens.
- After the fish run, when the trap will no longer be used, the barrier screens will be removed and stored off site.

Water Supply

- In-river screens for the trap water supply should require little maintenance during operation. The screens will require a periodic inspection to assure that debris has not lodged in the intakes and prohibited flow through the screens. If pumping is required, fish screens will be designed as appropriate to prevent entrainment or entrapment of juvenile fish.

- During operation, the trap will require daily maintenance to assure that all portions are operating properly. Operational maintenance will consist of visual inspection of fish trapping, holding and transfer areas to verify there are no obstructions to flow or other hindrances to fish health. When the trap is not operating, no periodic maintenance will be required.

Anesthetizing Tank

- Maintenance of the anesthetizing tank will consist of regular inspections of the carbon dioxide cylinders. No periodic maintenance of the anesthetizing tank is required when the trap is not in operation.

Transfer Station

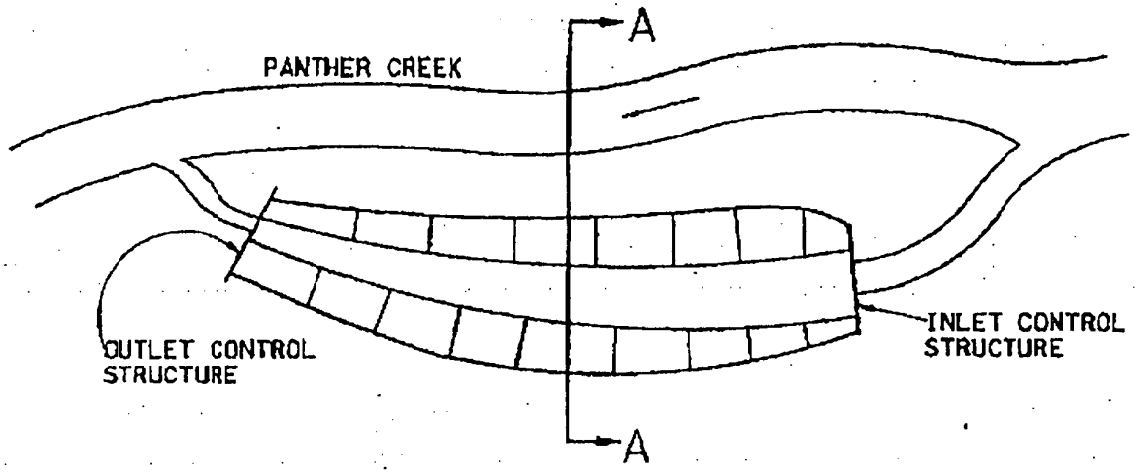
- The transfer station will require periodic maintenance. The operators may remove the entire transfer system for off site storage when the trap is not in operation.

ELEMENT 3 -- ACCLIMATION PONDS

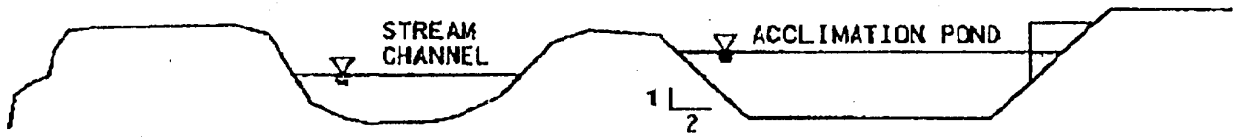
Element Description

Two ponds are planned, each with the capability to accommodate 60,000 smolts. One pond will be located high in the drainage basin (above Moyer Creek), and the other will be located low in the basin (possibly incorporated into the adult trapping facility). These ponds will be fed by water from the stream into which the fish will eventually be released, allowing the fish to become accustomed to the water in the release stream. A conceptual pond configuration is shown in Figure B-3. Preliminary calculations indicate an individual pond volume of approximately 5,300 cubic feet and a flow of approximately 670 gpm per pond. Natural rearing materials will be used in construction such as cobbles to line the bottom. An impervious liner may be required if the site soils do not adequately retain water.

The ponds will have a high length to width ratio to reduce the potential for stagnant areas with poor water quality within the pond. Horizontal wires will be provided to control predation. Each pond will include inlet and outlet channels with flow controls to manage water supplied from, and returned to, the stream. Inlet and outlet control structures will be constructed from timber, with removable stoplogs and braces (see Figure B-4).



ACCLIMATION POND
NO SCALE

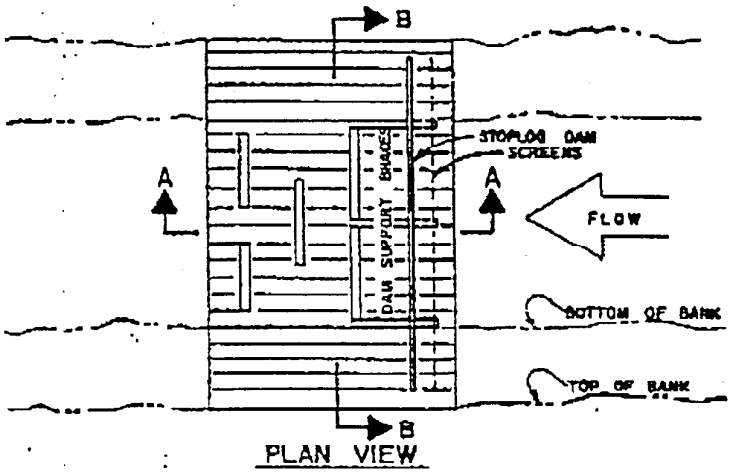


SECTION A-A
NO SCALE

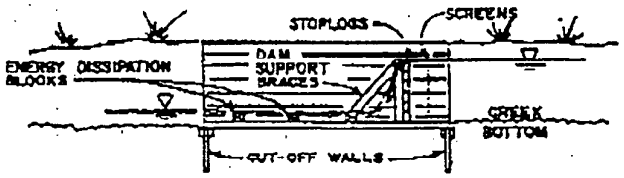
PANTHER CREEK
ACCLIMATION POND

FISHPRO

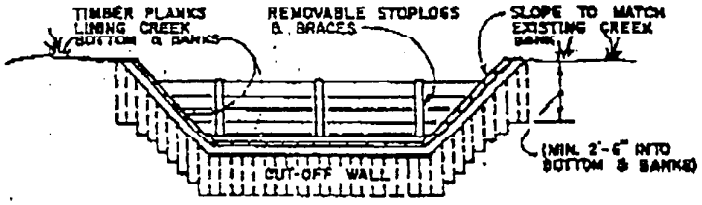
FIGURE B-3



PLAN VIEW



SECTION A-A



SECTION B-B

ACCLIMATION POND
CONTROL STRUCTURE

FISHPRO

FIGURE B-4

The pond level will be controlled by adding or removing stoplogs at the outlet structure. The flow of water into the pond will be controlled by adjusting valves in the inlet pipe lines. The quantity of flow will be estimated by measuring the depth of flow over the stoplogs at the outlet structure. Water may be allowed to flow freely through the pond when not in use by removing stoplogs at the inlet structure. Alternatively, water supply to the pond may be shut off completely when the pond is not in use. Drying the pond out during the summer will help control potential disease pathogens.

Objective and Scope-of-Work

Objective: Construct two ponds to acclimate the smolts to the water that they will return to as migrating adults.

The scope-of-work will consist of three tasks as described below.

Task 1. Site Assessment

This task consists of a field trip to assess site conditions and ascertain probable locations for the two ponds that are mutually agreeable to the Trustees and Settling Defendants. This will consist of one day for investigating potential pond sites.

Task 2. Conceptual Design

Working closely, the Settling Defendants and the Trustees will establish design parameters and define a mutually agreeable conceptual design and site locations . Deliverable items for this task include preliminary drawings and a formal documentation of the design criteria.

Task 3. Agency Meetings

It is anticipated that one meeting on site is required, and three additional meetings will involve the design process. Meetings will establish initial design criteria and provide a forum to comment on the design as the design progresses.

Task 4. Preliminary and Final Design

After review and Trustee approval of the conceptual design and site locations, the Settling Defendants will begin the preliminary and final design process. The final design documents will consist of bid ready drawings, and technical specifications, stamped and signed by a professional engineer, registered in the State of Idaho. One interim submittal will be provided for review and approval by the Settling Defendants and Trustees (preliminary design). One set

of final design documents will be provided for bid and construction purposes as ink on mylar drawings, and camera ready technical specifications.

Operation and Maintenance Summary

- Operation and maintenance will last for up to 30 years.
- The fish will be fed on the hatchery induced schedule upon placement into the ponds, and then intermittent and irregular feeding schedules will be implemented as much as possible in order to mimic natural conditions.
- Ongoing maintenance will consist of removing and replacing stoplogs, operating valves and removing accumulated debris and gravel as required during operation.
- The facility will require no maintenance after the acclimation season.
- Since transportation to the upstream acclimation pond will occur near the end of March and operation will extend into April, provisions will include access for at least a one ton truck during inclement weather (e.g. accumulations of snow).
- Since the acclimation ponds will likely be constructed and operated remotely from a power source, the water intake screens (located on Panther Creek) will be designed for easy debris removal.

II. SMOLT SURVIVAL PLAN

The Smolt Survival Plan has three elements: 1) channel re-alignment, 2) livestock exclusion from streamsides, and 3) off-channel rearing habitat.

ELEMENT 1 -- CHANNEL RE-ALIGNMENT

Element Description

The element involves reconstructing approximately 1.2 miles of the Panther Creek channel to approximate its natural sinuosity. The new channel should have approximately the same average width and depth as the old channel, with the thalweg following natural patterns (i.e., running along the outside third of stream bends).

Panther Creek is a sinuous point-bar type channel (Chang 1988) with alternating riffle pool sequences. The channel appears to be in a state of dynamic equilibrium geomorphologically, with active channel changes consistent with its stream power and sediment transport conditions. The sinuosity of the river is estimated to be 2.0 or less (channel length divided by valley length) based on a review of topographic maps for the creek. The valley slope is between 1.5 and 2 percent, the valley width ranges between 200 and 500 feet, and the bankfull channel width is estimated to range between 50 and 100 feet. Channel depths have not been estimated. The creek has a well developed point bar system, some braiding and relatively minor meander development due to the relatively steep channel and valley gradient. The bed and bank material has not been fully characterized but consists of sand/gravel and cobble. Information for the reaches, including the channelized sections, is based on topographic maps and detailed habitat mapping conducted in 1984 by Bechtel.

Objectives and Scope-of-Work

The goal of the restoration is to reconstruct a channel in the disturbed reaches that will approximate pre-disturbance channel conditions and reflect aquatic habitat similar to Panther Creek above and below the disturbed reaches. To accomplish the above goal, the following objectives will be met:

- Channel conditions will be similar to the pre-disturbance channel. They will be hydraulically and geomorphologically compatible with upstream and downstream reaches.

- Channel conditions to be restored include width, depth, sinuosity, meander pattern, riffle/pool and gravel bar characteristics.

- The channel will be capable of receiving and transporting sediment from upstream and will not aggrade or erode inconsistent with upstream and downstream reaches.

- The channel will be part of the natural channel dynamics of the creek.

- Channel banks and overbank areas will be capable of supporting riparian vegetation and will act as a floodplain for the creek similar to upstream and downstream areas.

Meeting the above objectives will be done by providing a compatible substrate and constructing an initial channel pattern that will allow the natural hydraulic and sediment transport characteristics of the creek to re-establish themselves in the disturbed sections. The

following engineering guidelines and tasks should be used to design and construct the channel sections.

- Review pre-disturbance aerial photographs of the reaches (if possible) to establish pre-disturbance channel characteristics (width, sinuosity, channel pattern, etc.), and identify old abandoned channel scars.

- Determine the upstream and downstream channel characteristics, and the channel bed and bank substrate materials in the field (to the extent necessary).

- Determine bed and bank substrate gradation (i.e. sand/gravel/cobble proportions) and use similar material as necessary for reconstruction.

- Based on field inspection of the channelized reaches, determine where reconstruction of channelized portions is required, and where existing conditions are currently compatible with the objectives of the design.

- Use bio-degradable bank stabilization materials (e.g. jute matting and native LWD) as temporary measures to allow for establishment of riparian vegetation, armored bed and banks and thalweg development without creating a long term obstruction to natural channel migration.

The reconstruction will require diversion of Panther Creek to allow for the removal and excavation of previously disturbed channel sections followed by placement of new bed and bank substrate and channel alignment. Where possible, old abandoned channels will be re-established.

The following describes the locations for the rechannelization:

Panther Creek - Sections 9, 10 (Reach 1) and 3 (Reach 2); T19N, R18E.

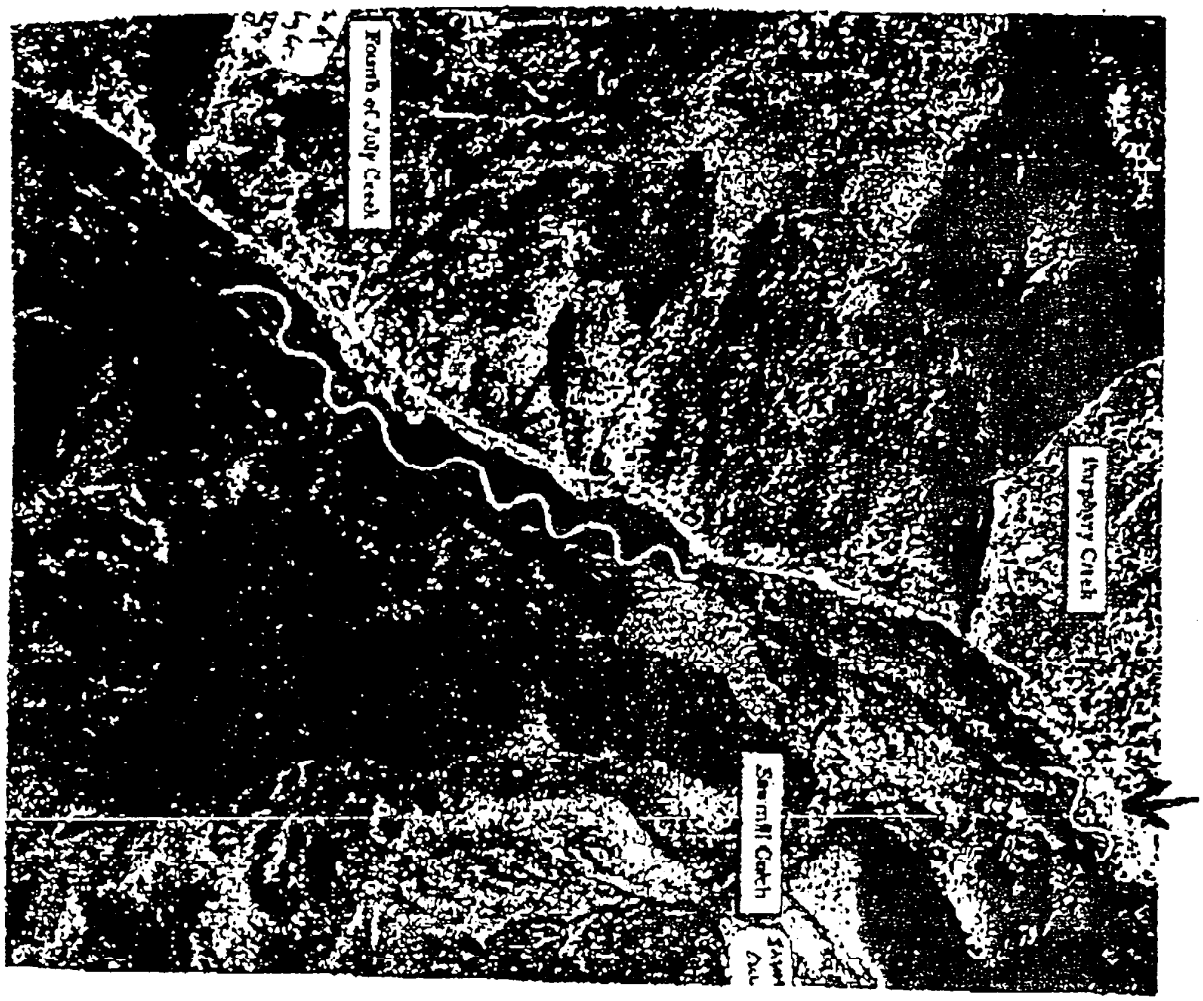
Reach 1

Reach 1 begins downstream of Fourth of July Creek and extends approximately 1 mile (almost to Sawmill Gulch) (Figures B-5 & B-6).

Reach 2

Reach 2 begins downstream of Porphyry Creek and extends approximately 0.2 mile (Figures B -5 & B-6).

FIGURE 3-5 AERIAL PHOTOGRAPH SHOWING THE TWO AREAS WHERE CHANNEL RE-ALIGNMENT WILL TAKE PLACE

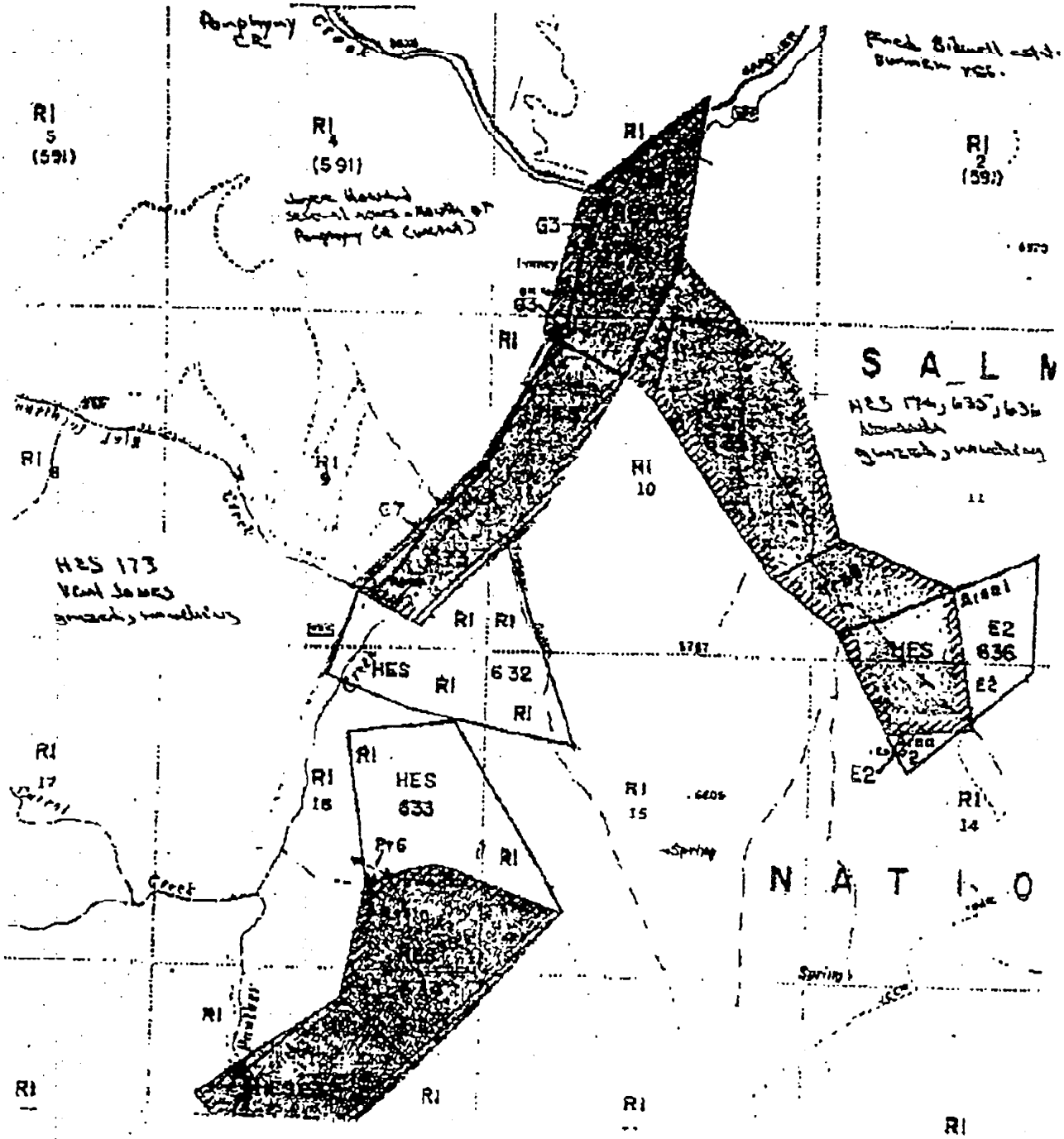


CUMBRANCE MAP

Lembi	Salmon
STATE	RANGER DIST
Idaho	Cobalt - I

n Diag 51 - 7-8-1966.

FIGURE B-6 PLAT SHOWING THE TWO AREAS WHERE CHANNEL RE-ALIGNMENT WILL TAKE PLACE



A temporary diversion will be placed on Panther Creek and a diversion channel excavated to bypass flows around the construction area. The diversion channel will be lined with sufficient gravel to minimize scour and sediment introduction into Panther Creek. Panther Creek water will be diverted into the diversion channel and the upstream and downstream ends of the section to be reconstructed will then be diked. All construction activities will be conducted in a manner to minimize turbidity and sediment introduction into Panther Creek.

There will be two stages of excavation in the new channel. The following describes expected channel reconstruction criteria. These data will require refinement and adjustment as part of the final design. The course of the channel will be excavated at a gross level, with a mean excavation depth approximately 4 feet below the flood plain elevation, bottom width about 50 feet, and 2H:1V side slopes. The second stage of excavation will be directed at developing a riffle/pool/channel-bend morphology. Pools will be located on the outside portion of each bend. Fill will be placed on the inside portion of each bend to provide raw material for point bar development. The outside portion of the bends will be excavated to approximately 1.5H:1V side slope; the inside to approximately a 3H:1V side slope. The channel sinuosity will be 1.5 following the centerline of the valley as a starting point between unexcavated reaches. Meander bends will be constructed at approximately 250 foot intervals, matching conditions upstream, downstream and in unexcavated sections.

Bank stabilization will entail a combination of jute matting, LWD placement, willow cuttings, and hydroseeding. Banks will be graded, seeded, and a hay cover placed prior to fabric placement. The matting on the outside bends will be keyed into the soil to a minimum depth of 18 inches at both the head and toe of the slope and staked. It will run down to the toe of the slope where it will be keyed into the soil and held down by a cobble/gravel mixture. This is expected to minimize erosion as the riparian vegetation becomes established. Rooted willow cuttings will be planted at appropriate intervals.

Waste material from the new channel will be used to fill the abandoned portions of the existing channelized reach. Remaining waste material will be spread in the project area in a manner that minimizes the potential for introduction of sediment into the stream. Upon completion of the new channel the diversion will be removed and the diversion ditch backfilled with its original material and seeded. All disturbed ground will be seeded with native grasses.

Operation and Maintenance Summary

- Annual monitoring and maintenance will be performed to assess the constructed channel for 10 years. Since the design will be based on site conditions, minimum maintenance is expected after the first 10 years of operation. Any

unexpected degradation in the habitat during the 100 year project (50 for the 50 year project) will be corrected.

- Monitoring, as part of the normal monitoring for the project, will assess whether the reconstructed channel is compatible with natural dynamics.

- Appropriate maintenance measures will be employed to ensure the constructed channel is protected and revegetation is adequate. Protection of the constructed channel will also include livestock exclusion for the life of the project (separate from the livestock exclusion element described below).

ELEMENT 2 -- LIVESTOCK EXCLUSION ON PRIVATE LANDS

Element Description

This measure is intended to exclude domestic livestock from the riparian corridor of selected reaches on private lands in cooperation with landowners. Livestock will be excluded from segments of streams containing chinook salmon habitat to re-establish a riparian vegetation community, maintain streambank structure, and develop and maintain channel form. Livestock will be excluded from 2 miles within the Panther Creek Basin and 5 miles outside the Panther Creek Basin at sites which are agreeable to both the Trustees and Settling Defendants. The miles outside of the Panther Creek basin would be increased to 8 miles if the 50 year option is chosen.

Definition of Area from which Livestock are to be Excluded

The riparian area which will be selected for exclusion management is site-dependent. The width and length of the potential exclusion zone is difficult to generalize; however, basic assumptions regarding these variables are presented. Recommendations for riparian width range from the edge of the 100-year floodplain to the extent of functioning woody species (willows). Recommendations for the length include the area where grazing has physically damaged the streambank and riparian area and a length that provides overall ecological benefit and prevents upstream and downstream incursions after closure of the damaged area.

In the spring of 1994, a multi-agency stream habitat review team evaluated streams in the Lemhi, Pahsimeroi and East Fork watersheds and judged that woody species generally occupied an area from 25-50 feet away from the streambank. For low gradient streams, an exclosure extending 50 feet from each streambank was suggested as a rule of thumb. This criteria is based on the perpendicular distance from the midpoint of the stream channel. However, in many instances it may be more efficient to include the meander width of the

channel with a minimum distance of 25 to 50 feet from the outer meander bend. This allows fencing to be placed in a straight line rather than following the channel meanders.

Although the width of the corridor will depend on site conditions, the Trustees have recommended that exclosures extend a minimum distance of 50 feet from the edge of the meander width. This will translate to 75 to 100 foot widths in most cases along the stream valley. If site-specific conditions indicate that the area in which woody vegetation will recover is narrower or wider, the distance may be adjusted. Adjustments to the enclosed areas will also consider active channel meandering and braiding characteristics so that channel shifting will remain within the excluded area.

Criteria for Site Selection

Basic criteria for site selection are: 1) private land; 2) the stream reach considered must contain chinook salmon spawning or rearing habitat; and 3) the ecological condition of the stream reach must be generally rated as containing poor or degraded conditions which can be improved by excluding livestock grazing. Stream habitats in the Lemhi, Pahsimeroi, and East Fork watersheds have been inventoried for the Model Watershed Fisheries Habitat Report. Private lands were included in this inventory and an analysis of this information should assist in selecting candidate areas for livestock exclusion. The following approach will serve as a starting point for developing a final agreed upon approach to selecting the reaches where cattle exclusion will be beneficial to the overall health of the aquatic habitat. The approach will be applied in a site specific manner so as to accommodate diverse geographic conditions.

One approach for selecting areas is based on ecological conditions. The reaches with highest priority for livestock exclusion would be those reaches that include sections rated "poor" with respect to ecological condition.

I. Ecological Condition

Ecological condition in a community reflects a combination of two components: 1) vegetation condition and 2) stream bank/channel condition. Ratings of poor, fair, and good ecological condition can be made using a combination of these two components.

A. Vegetation Condition

In Clary and Webster (1989), ecological status was defined as a measure of the degree of similarity between current vegetation and potential vegetation for a given riparian area. The comparison makes use of a "similarity index" which compares percentages of different species

in the current vegetation community to percentages of those species in a potential natural community (PNC) for that location. The resulting categories of similarity are:

1) 0-25% similar to PNC is termed "early seral;"
2) 26-50% similar to PNC is termed "mid seral;"
3) 51-75% similar to PNC is termed "late seral;"
4) 76-100% similar to PNC is termed "PNC."

B. Stream Bank/Channel Condition

Stream bank and channel features are also important aspects of stream and riparian function. The following key is used.

1) Stream Bank Sub-Rating

a. Meets or exceeds the expected bank stability (based on Riparian Capability Group, Figure B-7). (3 points).
b. Is below expected bank stability by 5% or less. (2 points).
c. Is below expected bank stability by more than 5%. (1 point).

NOTE: Where channel type information is lacking, the following stream bank sub-rating may be applied as an alternative.

a. Meets or exceeds PACFISH standards for bank stability and lower bank angle. (3 points)
b. Meets or exceeds PACFISH standards for bank stability or lower bank angle. (2 points)
c. Does not meet PACFISH standards for bank stability or lower bank angle. (1 point)

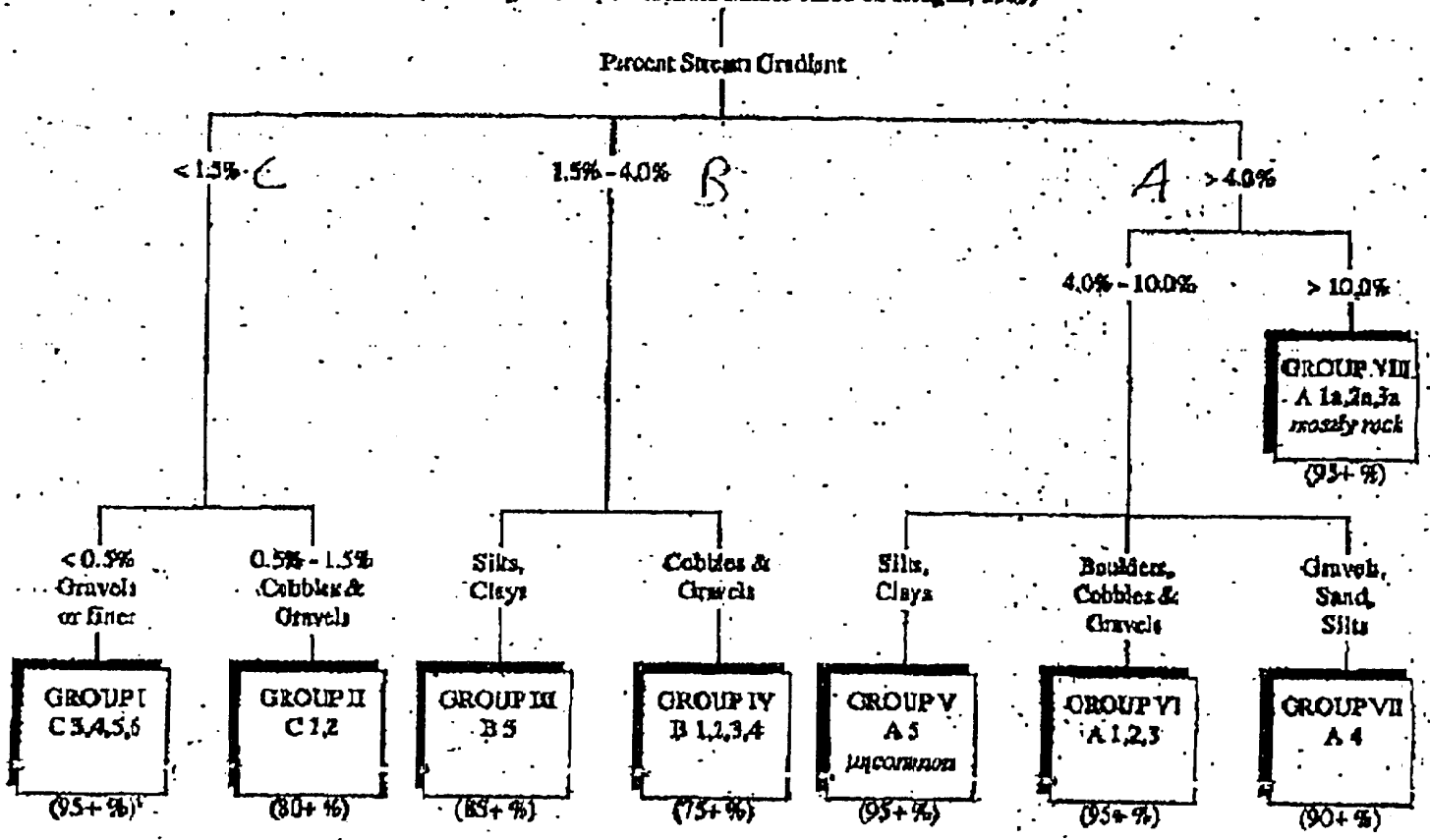
2) Stream Channel Sub-Rating:

a. Meets or exceeds PACFISH standards for temperature, pool frequency, and width/depth ratio (3 points)
b. Meets or exceeds PACFISH standards for temperature and pool frequency, or width/depth ratio. (2 points)
c. Does not meet PACFISH standards for temperature, pool frequency, or width/depth ratio. (1 point)

FIGURE B-7

KEY TO RIPARIAN CAPABILITY GROUPS (Winward, 1992)

(Percent gradient and substrate classes based on Rosgen, 1985)



[1]These values refer to percent of the streambank that should be stable when riparian areas fitting this capability group are in good health and functioning properly.

For the stream channel sub-ratings, temperature is considered only where livestock grazing is likely to be a contributing factor to maximize stream temperatures.

3) **Summary Stream Bank/Channel Ratings:**

≥ 5 = Functional
4 = Partially Functional
≤ 3 = Non-functional

C. Ecological Condition Ratings

The combination of vegetation and stream bank/channel criteria defines good, fair, and poor ecological condition for the purpose of implementing range management alternatives. Table B-2 reflects how the two factors may be combined to arrive at ecological condition ratings.

Table B-2. Ecological condition ratings based on vegetation condition and streambank/channel condition.

ECOLOGICAL CONDITION

	Streambank/Channel Condition		
Vegetation Condition	Functional	Partially Functional	Non-functional
late seral	Good	Fair	Poor
mid-seral	Fair	Fair	Poor
early seral	Poor	Poor	Poor

D. Exclusion Reaches

Once a stream reach or segment has been determined to be an appropriate candidate for exclusion, the appropriate stream length containing this reach will be determined. The stream length may include fair or even good habitat; however, by extending the length of the exclusion zone, long term ecological benefit to the stream will be achieved. As noted above, priority will be given to stream reaches that consist of poor ecological condition segments. A priority will also be given to segments that would minimize, to the extent possible, collateral degradation by livestock to adjacent stream reaches. If poor ecological conditions are not found in a particular drainage (e.g. Panther Creek), alternative reaches will be considered.

By excluding cattle over longer reach lengths, greater benefit is likely achieved compared to many smaller exclusion lengths because it prevents adjacent reaches from being used by cattle over the long term, and allows continuity in riparian habitat to develop without interruption. A desired length of exclusion may be on the order of 0.25 miles to 1 mile or more; however, a minimum length should be developed and agreed upon in order to obtain maximum benefit for lowest cost. Reach selection should then be made by including those areas that contain the largest number of shorter segments that are rated in poor condition.

Operation and Maintenance Summary

- Maintenance will be performed for 100 years (50 years for the 50 year option).
- Maintenance will include regularly scheduled visual observation to confirm effective cattle exclusion and fence repair on a regular basis. A brief annual report would be provided to the Trustees concerning the maintenance operations.

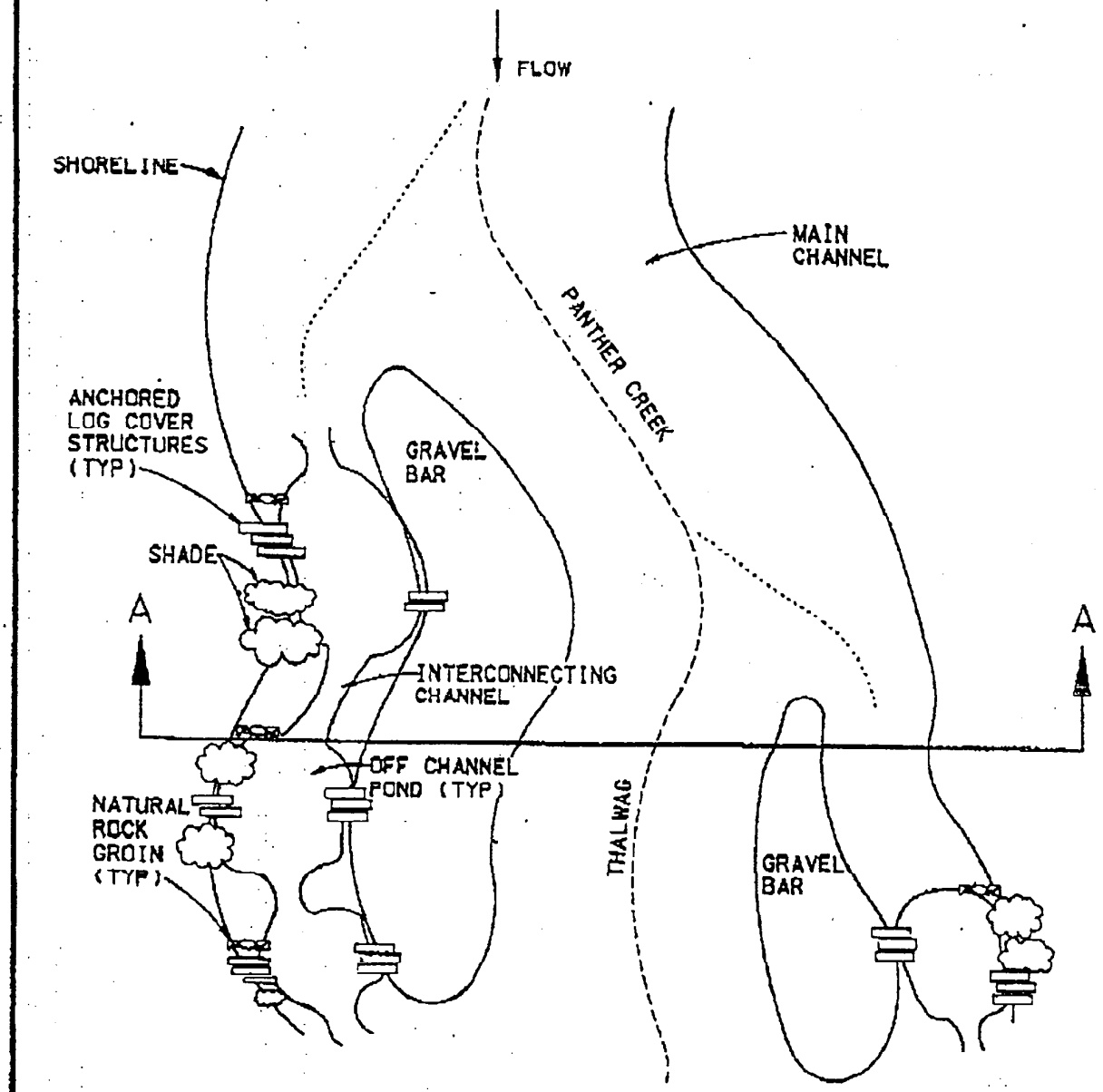
ELEMENT 3 -- OFF CHANNEL REARING PONDS

Element Description

This element includes the construction of ponds with a total surface area of approximately 1.0 acre that enhance the naturally occurring rearing habitat in the flood plain in a manner that mimics the setting in which they naturally occur. Variable depths are to be incorporated into the ponds to enhance over wintering protection. Side channels and appropriate naturally occurring braids may be developed into ponds that mimic the naturally occurring conditions. Shading and cover will be provided with natural material and plantings. Revegetation with proper brush and ground surface material will enhance the adjacent riparian habitat during fluctuating water surface elevations (see Figures B-8 and B-9).

Natural rock groins will be utilized to scour deeper areas within the ponds in a manner that reflects natural conditions and occurrences. The log type covering structure could also be configured to help maintain the described configurations.

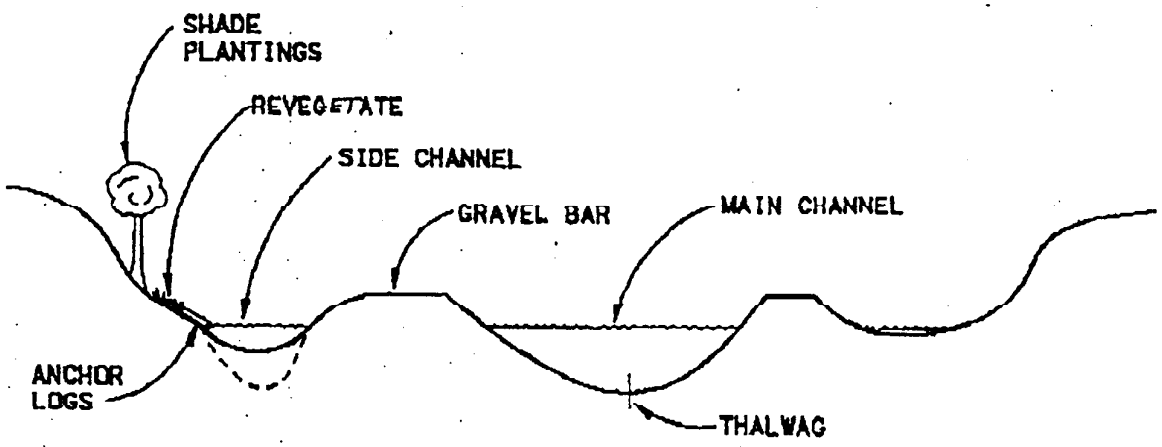
Bedload movement will be considered in the planning, along with debris movement and ice-out flow conditions. These considerations, along with peak floods, will require seasonal maintenance that will include resetting or relocating some of the control groins and shade structures.



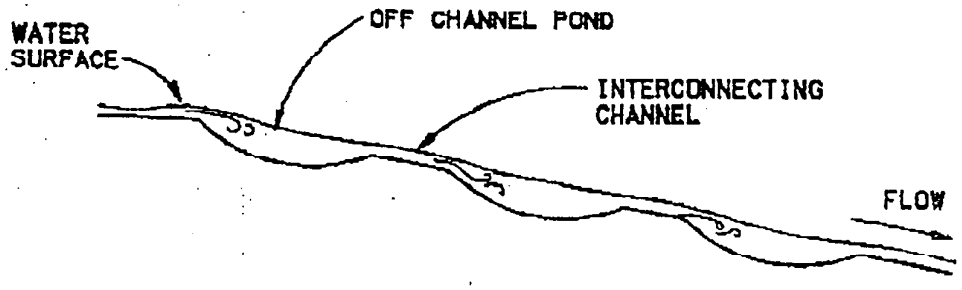
PANTHER CREEK
OFF CHANNEL PONDS

FISHPRO

FIGURE 3-8



OFF CHANNEL PONDS
TYPICAL SECTION A-A



OFF CHANNEL PONDS
TYPICAL PROFILE

FISHPRO

PANTHER CREEK
OFF CHANNEL PONDS

FIGURE B-9

Objective and Scope-of-Work

Objective:

- Construct ponds with a total surface area of approximately 1.0 acre that enhance the naturally occurring rearing habitat in the flood plain in a manner that mimics the setting in which they naturally occur. Variable depths are to be incorporated into the ponds to enhance over wintering protection.

The scope-of-work is described in the four tasks described below.

Task 1. Site Assessment

This task consists of a field trip to assess site conditions and ascertain possible locations for the rearing ponds that are mutually agreeable to the Trustees and Settling Defendants. This will consist of one day investigating potential sites. Hydrologic, hydraulic, channel morphology, plant and other habitat conditions particular to the chosen site will be studied to ascertain the design parameters. These site specific conditions will then be incorporated into habitat criteria and preferences for chinook salmon to design an appropriate rearing area.

Task 2. Conceptual Design

Working closely, the Settling Defendants and the Trustees will establish design parameters and define a mutually agreeable conceptual design and site location for off-channel rearing ponds. Deliverable items for this task include preliminary drawings and a formal documentation of design criteria.

Task 3. Agency Meetings

It is anticipated that one meeting on site is required, and three additional meetings will involve the design process. Meetings will establish initial design criteria and provide a forum to comment on the design as the design progresses.

Task 4. Preliminary and Final Design

After review and Trustee approval of the conceptual design and site location, the Settling Defendants will begin the preliminary and final design process. The final design documents will consist of bid ready drawings, and technical specifications, stamped and signed by a professional engineer, registered in the state of Idaho. One interim submittal will be provided for review and approval by the Settling Defendants and Trustees (preliminary design). One set

of final design documents will be provided as ink on mylar drawings, and camera ready technical specifications.

Operation and Maintenance Summary

- Maintenance will be performed for 100 years (50 years for the 50 year option).
- Annual monitoring and maintenance will be performed to assess the constructed rearing areas for 10 years. Since the design will be based on site conditions, minimum maintenance is expected after the first 10 years of operation. Any unexpected degradation in the habitat during the 100 year project (50 for the 50 year option) will be corrected.
- Monitoring, as part of the normal monitoring for the project, will assess whether the off-channel rearing areas are compatible with natural dynamics.
- Appropriate maintenance measures will be employed to ensure the constructed channel is protected and revegetation is adequate.

III. PLANNING AND MONITORING

ELEMENT 1 -- PERFORMANCE MONITORING PLAN

Introduction

This section describes the Performance Monitoring Plan for the Blackbird Mine Restoration Project. This plan includes water and sediment quality surveys, macroinvertebrate surveys and physical and biological observations. The intent of this plan is to provide information to determine if water quality will sustain the reintroduction and maintenance of salmonids through all life stages of both anadromous and resident species. Additional monitoring at a reduced level will be conducted after the release of chinook salmon to confirm continued suitability.

The Performance Monitoring plan is not intended to duplicate any monitoring conducted pursuant to other activities including monitoring that will be carried out during the remedial action process. If overlap or duplication occurs, portions of this plan can be eliminated after concurrence by the Trustees. Detailed information on the components of the Performance Monitoring Plan will be provided in a Sampling and Analysis Plan (SAP) and a Quality Assurance Project Plan (QAPP) under separate covers. The SAP and QAPP will be prepared in accordance with EPA protocol and submitted to the Trustees for review and approval at

least 90 days before beginning the first sampling effort under each of the four tasks. Settling Defendants will perform a regular review of the data and will submit any needed revisions to the SAP and QAPP to the Trustees for review and approval.

Objectives and Scope-of-Work

The following four tasks will serve as the basis for performance monitoring:

- Task 1: Water Quality Monitoring
- Task 2: Sediment Quality Monitoring
- Task 3: Macroinvertebrate Surveys
- Task 4: Physical and Biological Monitoring

The objective and work components for each task are described below.

TASK 1: WATER QUALITY MONITORING

Objective:

- Obtain data to confirm water quality after remediation and prior to re-introduction of salmonids. Water quality will continue to be monitored at a reduced level after reintroduction of salmonids to ensure continued suitability of the water quality.

Six sampling stations will be established for water quality monitoring and will include:

- Panther Creek upstream of Blackbird Creek
- Panther Creek downstream of the mouth of Blackbird Creek
- Panther Creek upstream of Big Deer Creek
- Panther Creek downstream of the mouth of Big Deer Creek
- Big Deer Creek upstream of South Fork of Big Deer Creek
- Big Deer Creek downstream of the mouth of South Fork of Big Deer Creek

The upstream or "background" and downstream stations that will be monitored during each sampling event are intended to provide a statistical basis for evaluating surface water quality upstream and downstream of influences from the Blackbird mine. The upstream stations will be used to characterize the naturally occurring concentrations of target constituents; the downstream stations, or points of compliance, will be used to characterize the influence of the Blackbird Mine Site on water quality after remediation.

The three points of compliance are: (1) Panther Creek downstream of the mouth of Blackbird Creek; (2) Panther Creek downstream of the mouth of Big Deer Creek; and (3) Big Deer Creek downstream of the mouth of South Fork of Big Deer. Each compliance point has a paired upstream station.

Sample Size Determination and Power Analysis

The sampling objectives are to: (1) Test for downstream increases in dissolved copper concentrations over a four-day sampling event -- representing an influence of the Blackbird Mine Site and (2) Determine whether the EPA chronic criterion for copper is exceeded by downstream dissolved copper concentrations over the four-day period.

The sampling program should allow these tests to be conducted using accepted statistical methods according to the following parameters: Type I Error level of 0.10 or better; and Type II Error level of 0.05 at an actual difference in dissolved copper concentrations of 2 ug/l.

A statistical power analysis will be performed prior to initiating the water quality monitoring program. The intent of the power analysis is to determine the number of samples required to meet the sampling and analysis objectives listed above. The power analysis will be based on water quality data from the paired upstream and downstream stations identified above that will be collected specifically for the purposes of performing a power analysis. In conducting the power analysis, consideration of statistical tests shall include, but not necessarily be limited to: tests using confidence limits about the mean; parametric tests such as t-tests for differences in two samples; and nonparametric tests including Wilcoxan and Quantile tests. The power analysis will consider the distribution of the data (normal versus other) and evaluate differences in variance between upstream and downstream stations. In addition, the power analysis will include an evaluation of the number of samples needed to adequately characterize the set of chronic criteria calculated from hardness data over a 4-day sampling event for the purpose of comparing the population of criteria to the set of dissolved copper measurements in the same samples. A Power Analysis Sampling Plan that specifies the statistical methods and sampling and analysis program will be submitted to the Trustees for review and approval at least 90 days prior to initiating the power analysis evaluation.

The number of upstream samples collected should be sufficient to accept or reject the null hypothesis with a previously determined and agreed upon likelihood of error. The null hypothesis for the water quality monitoring program assumes that the downstream concentrations do not exceed the upstream concentrations. In statistical hypothesis testing there are two types of error. Rejection of the null hypothesis when it is true is customarily called a Type I error. Failing to reject the null hypothesis when it is false is customarily called a Type II error. In customary notations, "α", denotes the probability that a Type I error will occur,

and "ß" denotes the probability that a Type II error will occur. Most statistical comparisons refer to "α" as the level of significance of the test. In the case where $\alpha = 0.10$, there is a 10% (i.e. 2 in 20) chance that the conclusion will be made that concentrations of contaminants are higher downstream than upstream when they actually are not.

Equally critical considerations in determining the number of samples to be collected for a given statistical procedure are ß and "power". The power of a statistical test has the value 1 - ß and is defined as the probability that a given statistical test will detect significant results. Power curves are a function of ß, sample size (i.e. the number of upstream and downstream samples) and the amount of variability in the data. Thus, if a maximum 5% likelihood of failing to detect a false null hypothesis is desired (i.e. ß = 0.05), the number of upstream samples can be calculated such that the power of the test is at least 0.95. Values of $\alpha = 0.10$ and ß = 0.05, for an actual concentration difference of +/- 2 ug/l, will be used as the basis for the power analysis.

The site-specific sampling program for the power analysis will include the collection of at least three water samples per day over four consecutive days at each of the paired designated upstream and downstream stations. The sampling schedules will be coordinated at respective points of compliance and upstream or background sampling sites for the collection of paired samples. The paired samples will approximate the same "parcel" of water as it moves downstream. The samples will be submitted for laboratory analysis of dissolved metals (cobalt, copper, calcium, and magnesium), dissolved carbon, dissolved sulfate and alkalinity. The detection limit for copper will be 1 ug/l using an appropriate analytical method.

Even if the power analysis indicates that less than twelve samples are required at each station, the collection of a minimum of three grab samples will still be required at randomly selected times on each of the four consecutive days for a total of twelve samples per station. A minimum number of three samples per day is necessary to calculate daily mean concentrations for evaluating compliance with the acute ambient water quality criteria for dissolved copper concentrations as described below.

If the power analysis indicates that a large number of samples is required per station that would require difficult logistics and substantially increase costs without additional added benefits, alternative(s) for selecting the sample size will be provided to the Trustees for review and approval.

A Sample Size and Power Analysis Report will be prepared and submitted to the Trustees within 45 days of the sampling event and will summarize the site-specific data collected and the results of the power analysis, present alternatives and recommend statistical tests for determining sample size, if necessary. The report will discuss how statistical applications will

address reported concentrations below the detection limit. Before development of the SAP for the water quality monitoring program, Trustee approval of the sample size and the recommendations in the report must be obtained.

Water Quality Monitoring Program

A SAP will be prepared and provided to the Trustees for review, comment, and concurrence prior to initiating the water quality monitoring program. The SAP will include, but not be limited to, identification of monitoring stations, sample size, sampling frequency, and statistical methods, underlying assumptions, and plans for testing if underlying assumptions are not met.

Surface water field measurements and grab samples will be collected four times annually from the six stations. Each sampling event will be conducted over a consecutive four-day period. The Trustees will consider flow conditions in establishing the schedule for sampling. Flow conditions will be determined based on the hydrograph for Panther Creek. Three sampling events will be conducted during high flow and one sampling event will be conducted during a low flow period. The specific schedule for the four sampling events per year will be determined by the Trustees with appropriate notice to Settling Defendants.

Four stream gauging stations will be established for the hydrograph for Panther Creek and for correlating stream flow with the chemical data. The gauging stations will include:

- Panther Creek upstream of Blackbird Creek
- Panther Creek downstream of Blackbird Creek
- Panther Creek downstream of Big Deer Creek
- Mouth of Panther Creek (reestablish USGS gauging station)

Panther Creek will be gauged during each sampling event at all the gauging locations.

The requisite number of samples for the water quality monitoring program will be determined as described above, but, in any case, a minimum of three grab samples will be collected at each station on each of four consecutive days. The sampling schedules will be coordinated at respective points of compliance and upstream or background sampling sites for the collection of paired samples. The paired samples will approximate the same "parcel" of water as it moves downstream. The samples will be submitted for laboratory analysis of dissolved metals (cobalt, copper, calcium, and magnesium), dissolved carbon, dissolved sulfate and alkalinity. The detection limit for copper will be 1 ug/l using an appropriate analytical method. This sampling and analysis regime will be used to evaluate both acute and chronic dissolved copper concentrations.

The chronic dissolved copper concentrations at upstream and downstream stations will be determined using samples collected over four consecutive days. The acute dissolved copper concentrations at upstream and downstream stations will be determined using samples collected on a daily basis.

Water Quality Data Evaluation

Evaluation of the water quality data will be performed for each sampling event using the statistical methods specified in the SAP to assess compliance with the chronic and acute water quality criteria. Statistical analysis will be performed on both upstream and downstream stations. In cases where the measured hardness is less than 25 mg/l expressed as $CaCO_3$, a hardness of 25 will be used to calculate the copper water quality criterion. Upon request by the Settling Defendants, the Trustees and Settling Defendants may establish a site-specific water quality standard for dissolved copper by developing and applying a water effects ratio for Panther Creek and laboratory waters to the foregoing Ambient Water Quality criteria for dissolved copper.

Testing for Chronic Water Quality Exceedance

Statistical analysis will be performed on the upstream and downstream data collected from each paired station as described in the SAP. The evaluation of compliance will be conducted using the following two step decision process to compare the data for each paired station.

1. Where:

   Downstream Concentration < or = Upstream Concentration

   then, further comparison of the downstream data to the Chronic Water Quality Criteria is not required.

2. Where:

   Downstream Concentration > Upstream Concentration

   then, the downstream concentration will be compared to the chronic water quality criteria for dissolved copper. The chronic water quality criteria for dissolved copper will be calculated using the following equation (40 CFR Part 131.36(b)(2)):

   Copper (ug/l) = WER exp{0.8545[ln(hardness)]-1.465}

where: Water Effects Ratio (WER) = 1.0; hardness = mg/l of $CaCO_3$

The chronic water quality criterion for copper will be determined for each sample taken at a point of compliance using the hardness calculated from calcium and magnesium concentrations (or 25 mg/l, whichever is greater) for that sample. The set of sampling results for chronic copper criteria calculated over the four-day sampling period will then be compared to the measured copper concentrations using an appropriate statistical test.

(i) Where:

Downstream Concentration < or = Chronic Water Quality Criteria

then, the downstream copper concentration will not be considered an exceedance.

(ii) Where:

Downstream Concentration > Chronic Water Quality Criteria

then, the downstream copper concentration will be considered an exceedance. This initial exceedance will not by itself constitute a violation of the water quality provisions of Subparagraph 5(c) of the Consent Decree. In the event that the monitoring program detects an exceedance at a point of compliance, if the results of each of the 4 regularly scheduled subsequent sampling events indicate that the water meets the water quality standards at that point of compliance, the initial exceedance shall not constitute a violation of the water quality provisions of Subparagraph 5(c) of the Consent Decree. If, however, the results of any of the 4 regularly scheduled subsequent sampling events indicate that the water quality does not meet the water quality standards at that point of compliance, the initial exceedance shall constitute a violation of the water quality provisions of Subparagraph 5(c) of the Consent Decree.

Testing for Acute Water Quality Exceedance

The evaluation of compliance will be conducted using the following two step decision process to compare the data for each paired station.

1. Where:

   Daily Numeric Mean Downstream Concentration < or = Daily Numeric Mean Upstream Concentration

   then, further comparison of the downstream data to the Acute Water Quality Criteria is not required.

2. Where:

   Daily Numeric Mean Downstream Concentration > Daily Numeric Mean Upstream Concentration

   then, the downstream concentration will be compared to the acute water quality criterion for dissolved copper. The acute water quality criterion for dissolved copper will be calculated using the following equation (40 CFR Part 131.36(b)(2)):

   Copper (ug/l) = WER exp{0.9422[ln(hardness)]-1.464}

   where: Water Effects Ratio (WER) = 1.0; hardness = mg/l of $CaCO_3$. The following conditions shall constitute an exceedance of the acute criterion: the arithmetic mean of dissolved copper concentrations for samples taken in any 24-hour period at a point of compliance exceeds by a factor of 2 or more the arithmetic mean of acute criteria calculated using the concurrent sample-specific hardness measurements for that point of compliance or 25 mg/l $CaCO_3$, whichever is greater. Direct numerical comparison of the arithmetic mean dissolved copper concentration with two times the arithmetic mean of the acute criteria for the same point of compliance will be used to determine which value is greater.

An exceedance of the acute criterion, as defined above, shall constitute a violation of the water quality provisions of Subparagraph 5(c) of the Consent Decree unless a determination can be made that the exceedance is not biologically significant or was caused by background copper concentrations, laboratory performance, or some other factor unrelated to the Blackbird Mine Site.

If an exceedance occurs, Settling Defendants shall include in the sampling report to the Trustees (within 45 days after the sampling date) an explanation as to whether the exceedance is caused by Blackbird Mine sources or other factors. The Trustees will accept or reject the Settling Defendants' determination based on the rationale and supporting data included in the report, and any other pertinent information. The Trustees' determination is subject to the dispute resolution procedures of the Consent Decree. If the exceedance constitutes a violation

of the acute criterion, the Settling Defendants shall proceed with reporting requirements for a violation as described above, but shall not be required to conduct any work to prevent future exceedances until any pending dispute resolution is resolved.

Quality Assurance

The QAPP will include a discussion of data quality objectives and how they influence the statistical testing. The detection limit for dissolved copper shall be 1 ug/l or less. The same laboratory shall analyze both upstream and downstream samples. Samples shall be numbered so that the laboratory cannot discern whether a sample is from an upstream site or point of compliance (downstream) site and so that samples are distributed among analyses without prejudice as to the site of collection. Laboratory data shall be reviewed and qualified by an independent and qualified expert.

Upon request, the Settling Defendants shall provide split or duplicate samples to the Trustees. Settling Defendants agree to fund up to one field audit and one laboratory audit per year, if requested by the Trustees.

Reporting

Within 45 days after each sampling event, a report will be provided to the Trustees on the results of the monitoring. These reports will contain a summary of all primary data including any data qualifiers assigned, distribution of data, power analysis assumptions, calculated hardness levels and water quality criteria, full descriptions of statistical tests, and conclusions.

If, for any sampling event, the Data Quality Objectives presented in the QAPP are not met, the Settling Defendants shall provide to the Trustees within 45 days of the sampling event an explanation for the failure and a description of actions that will be taken to prevent future data quality problems.

In the event that a water quality exceedance occurs, a second report will be submitted to the Trustees which describes the exceedance, explains probable causes, and provides a schedule for development of additional proposals to prevent future exceedances. The second report will be submitted to the Trustees within 75 days of the sampling event.

After three consecutive years of suitable water quality has been confirmed during the intensive sampling schedule discussed above, a reduced sampling frequency (two sampling events per year) will be performed for the rest of the project duration. Monitoring parameters may be reduced overtime based on concurrence by the Trustees.

TASK 2: SEDIMENT QUALITY MONITORING

Objective:

- Obtain data to determine whether contaminated sediments associated with the Blackbird Mine site have been stabilized and ensure that sediment-related impacts are addressed prior to reintroduction of chinook salmon.

Suspended sediment samples (spring) and depositional area samples (fall) will be collected in Panther Creek and Big Deer Creek to monitor the recovery of each stream and potential inputs of contaminated sediments from Blackbird and Bucktail drainages. Suspended sediment sampling stations will be established close to the water quality sampling points. Two suspended sediment sampling events will occur at different flow periods (at the beginning of the high flow period and at the end of the high flow period). Depositional area stations will be established in representative areas close to the areas sampled during high flow. One sampling event for deposit sampling will occur at low flow. A total of three samples will be taken at random spots at each sampling point in order to obtain a statistically valid picture of suspended and depositional sediment quality.

Physical and chemical (arsenic, cobalt, copper, and nickel) analysis of suspended and depositional samples will be performed. Sediment toxicity testing of deposit samples will be performed using site water to assess the potential for contaminant release.

A report will be issued to the Trustees within 45 days of receipt of the results of each sampling event summarizing the results of analyses, along with explanations of statistical analyses and conclusions.

TASK 3: MACROINVERTEBRATE SURVEYS

Objective:

- Obtain data to assist in monitoring the rate of overall system recovery and provide biological confirmation that toxic conditions in Panther Creek have been eliminated.

Benthic macroinvertebrate and periphyton samples will be collected at representative habitats in Panther Creek and Big Deer Creek to assist in characterizing the nature and magnitude of populations and to assess contamination. Sampling will be conducted once during the low flow period. Sampling locations will be selected that represent Panther Creek upstream and downstream of Blackbird Creek; upstream and downstream of Big Deer Creek; Panther Creek

near its mouth; Big Deer Creek upstream and downstream of South Fork of Big Deer Creek; and Big Deer Creek near its mouth.

Five replicate benthic macroinvertebrate samples will be collected at each station for population analysis (taxonomic identification, enumeration, and biomass measurement). Three replicate benthic macroinvertebrate and three replicate periphyton samples will be collected at each station for metals bioaccumulation analysis (arsenic, cobalt, and copper). Macroinvertebrate and periphyton will be analyzed for metals according to the U.S. Environmental Protection Agency's (EPA) or other approved methods appropriate for the measurement.

A summary report will be provided to the Trustees summarizing the results of the macroinvertebrate surveys after each survey is completed.

TASK 4. PHYSICAL AND BIOLOGICAL MONITORING

Objective:

- Obtain data for evaluation of the effectiveness of habitat improvements in Panther Creek. Obtain data to evaluate juvenile and returning adult salmonids.

Monitoring sections in Panther Creek and selected tributaries will be established, ensuring that segments where habitat modifications have occurred are included. Parr density and parr standing stock evaluations will be conducted. Carcass surveys will be conducted after completion of chinook salmon spawning.

During the initial survey, detailed measurements of physical habitat variables will be made of all monitoring sections. These variables will include % pool; run; riffle; pocket water and backwater; % substrate surface sand, gravel, rubble, boulder, and bedrock; section length, flow, average width and depth; gradient; channel type, bank condition, riparian cover, etc.. In following years, intensive physical measurement each year will be focused only on modified habitat areas and any upstream or downstream sections that may be influenced by the modifications. Less intensive measurements of physical variables will be conducted in other sections. A detailed survey of all sections will be done at least every 5 years to assess overall habitat conditions and changes. Snorkel surveys of sections will be conducted to identify and enumerate steelhead and chinook parr and resident fishes.

A report will be prepared documenting the results of the monitoring and provided to the Trustees for review.

TIMING AND DURATION

The water quality and sediment monitoring program described above will commence in approximately 2002 and continue yearly through 2010. Monitoring at a reduced level of effort (sampling at all six stations at high and low flow only) will be continued yearly thereafter for the remainder of the life of the project (30 years project life).

The macroinvertebrate monitoring program described will commence in 2002 and continue yearly through 2006. After 2006, macroinvertebrate monitoring will be conducted every three years for the remainder of the life of the project (30 year project life).

Physical habitat and biological monitoring will commence in 2002 and continue yearly for the remainder of the life of the project (30 year project life).

ELEMENT 2 -- ENVIRONMENTAL COMPLIANCE

Introduction

The environmental compliance element includes obtaining permits necessary to comply with all applicable laws pertaining to actions undertaken pursuant to the Biological Restoration and Compensation Plan. This will be done with cooperation from the Trustees.

Objectives and Scope-of-Work

The first task will be to determine the type and scope of the NEPA documentation that may be required. Formal scoping with the public and the involved agencies to develop the issues of concern may be needed. If so, an interdisciplinary team would be assembled to guide the technical studies and alternatives development for the NEPA document.

Following the scoping process, the purpose and need and proposed actions would be developed. A technical study of all of the alternatives would be conducted and an impact assessment completed. Mitigation planning would occur simultaneously with the impact assessment to determine how to reduce or eliminate significant impacts.

The Preliminary Environmental Assessment (EA) would then be completed for review by the involved agencies and the interdisciplinary team. Comments would be incorporated into the document. An EA draft would be subject to an informal review by the appropriate agencies. An EA would then be produced for review. A decision notice would be issued following the mandated review period. If the EA concluded that an Environmental Impact Statement (EIS) was necessary, the EIS would be prepared consistent with NEPA requirements.

In addition to NEPA compliance, permits for enhancement/propagation of endangered species may be needed. The exact number and types of permits are not known at this time. Appropriate applications for such permits will be timely submitted. Cooperation of Trustees in obtaining any necessary permits is expected and required.

REFERENCES

Clary, W.P. and B.F. Webster. 1989. Managing Grazing of Riparian Areas in the Intermountain Region. USDA Forest Service, Intermountain Research Station, General Technical Report INT-263.

Chang, Howard, 1988. Fluvial Processes in River Engineering, John Wiley and Sons, New York.

Bechtel 1986. Habitat Rehabilitation - Panther Creek, Idaho. Final Report. BPA contract no. DE-AC79-84BP1749; Project No. 84-29.

Conover, W.J. 1980. Practical Nonparametric Statistics. Second Edition.

EPA 1989. Risk Assessment Guidance for Superfund, Volume 1, Human Health Evaluation Manual (Part A), Interim Final, EPA/540/1-89/002.

EPA 1992. Methods for Evaluating The Attainment of Cleanup Standards, Volume 2: Ground Water, EPA 230-R-92-014, July.