Biological Evaluation
Environmental Analyses of Mining Activities
Silver Strand Site
Coeur d'Alene River Ranger District

Prepared for:

USDA Forest Service
Coeur d'Alene River Ranger District
Idaho Panhandle National Forests
3815 Schreiber Way
Coeur d'Alene, ID 83815

Prepared by:

Garcia and Associates
7550 Shedhorn Drive
Bozeman, MT

Table of Contents

Tables and Figures

1.0 Introduction

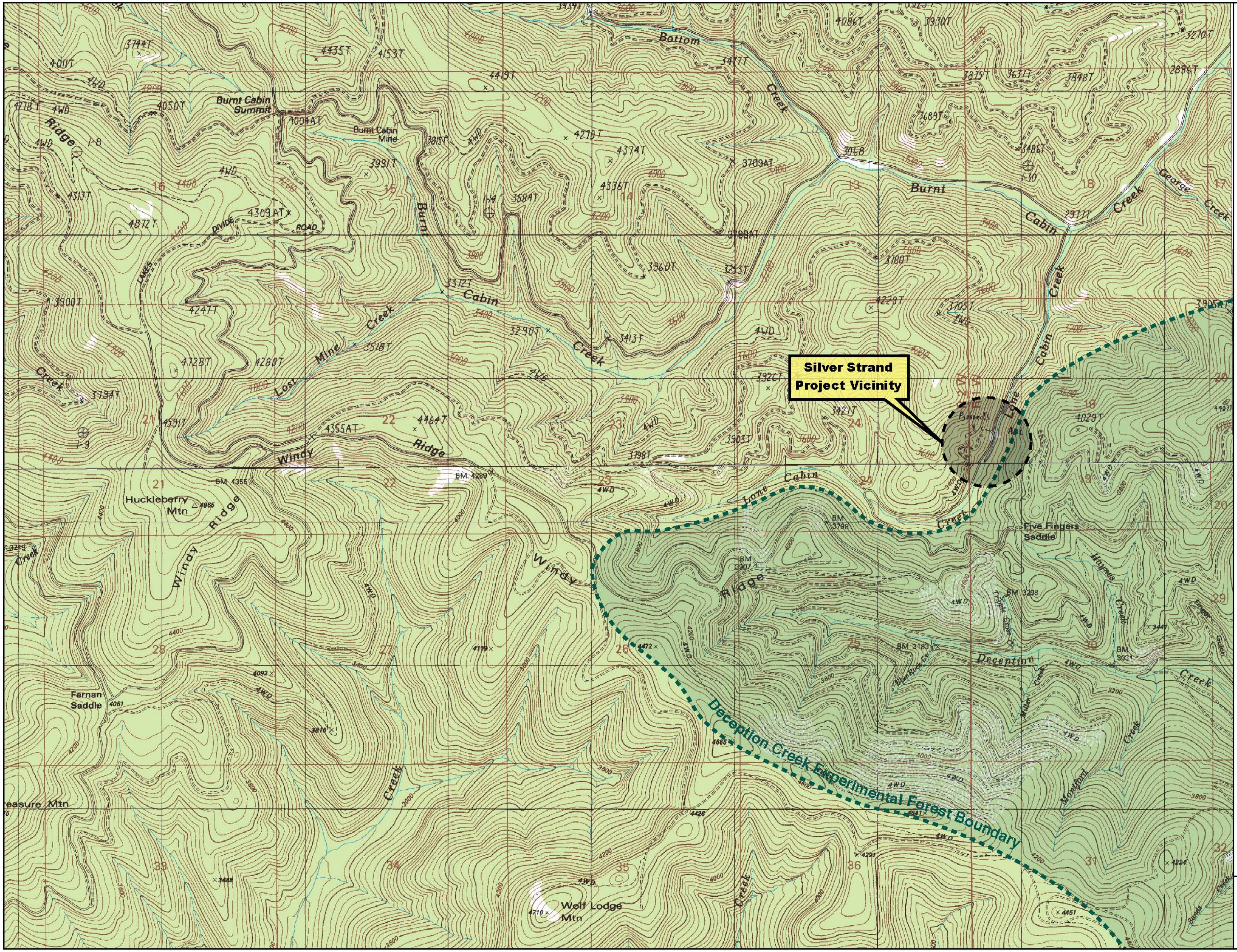
Garcia and Associates (GANDA) prepared this Biological Evaluation (BE), in compliance with Forest Service Manual 2672.4 to evaluate the possible impacts on habitat of species listed by the US Forest Service Idaho Panhandle Region (IPNF) and the State of Idaho Department of Fish and Game (IDF&G) within the Silver Strand Underground Mine project area. Table 1 lists all species currently listed by the IPNF and/or IDF&G as sensitive that are known to occur within the IPNF. It should be noted that not all of these species occur within the Coeur d'Alene River Ranger District or within the project area.

Table 1. USFS and IDF&G listed sensitive species on the Idaho Panhandle National Forests (IPNF).

Common Name	Scientific Name	USFS Status
Plants (See Table 2)		
Fish		
Westslope cutthroat trout	*Oncorhynchus clarki lewisi*	Sensitive, MIS
Torrent sculpin	*Cottus rhotheus*	Sensitive
Redband trout	*Oncorhynchus mykiss*	Sensitive
Burbot	*Lota lota*	Sensitive
Amphibians		
Coeur d'Alene salamander	*Plethodon idahoensis*	Sensitive
Boreal toad	*Bufo boreas boreas*	Sensitive
Northern leopard frog	*Rana pipiens*	Sensitive
Birds		
Common loon	*Gavia immer*	Sensitive
Harlequin duck	*Histrionicus histrionicus*	Sensitive
Northern goshawk	*Accipiter gentilis*	Sensitive
Flammulated owl	*Otus flammeolus*	Sensitive
Black-backed woodpecker	*Picoides arcticus*	Sensitive
Mammals		
Townsend's big-eared bat	*Corynorhinus townsendi*	Sensitive
Fisher	*Martes pennanti*	Sensitive
Wolverine	*Gulo gulo*	Sensitive

2.0 Description of Proposed Project

On April 4, 2003, the Coeur d'Alene River Ranger District, IDPNF received a Plan of Operations (POO) dated April 3, 2003 from New Jersey Mining Company (NJMC) for development of the Silver Strand lode deposit located adjacent to Lone Cabin Creek (Figure 1). The proposed mine development plan includes underground mine ramp and heading development, access trail rehabilitation and construction, portal excavation, waste rock dump construction, construction of a temporary pole building for maintenance and tool storage, drilling



Approximate Boundary for Deception Creek Experimental Forest

NORTH

0 1/2

Miles

Base Map: USGS 7.5 Minute-series Spades Mountain and Wolf Lodge, Idaho, quadrangles

Figure 1. Silver Strand Project Vicinity.

GARCIA and ASSOCIATES
NATURAL & CULTURAL RESOURCE CONSULTANTS
GANDA

and completion of a waste water injection well system, various storm water and erosion control barriers and installation of other mine-related structures. Ore will be stored in a steel bin located approximately 30 meters (98 feet) from Lone Cabin Creek. Stockpiling of ore on the ground near the creek as was done in the previous operation will not be necessary. The bin will significantly reduce the risk of ore entering the creek. Ore is to be processed via a flotation circuit at an offsite mill with spent tailings returned to the underground mine site and utilized as paste backfill. Additional information on the New Jersey Mill site is provided in Appendix A.

Based on favorable results from past exploration efforts, the company proposes to develop an underground mining operation to develop a precious metal (Au, Ag) mineral resource defined by previous exploration work on the property located on lands under U.S. Forest Service (USFS) jurisdiction, in the NW ¼, SE ¼, Section 19, T51N, R1W, Boise Meridian, in the Spades Mountain 7.5' Quadrangle, Kootenai County, Idaho. The proposed mine site is located along the north side of an existing mine access road approximately 0.64 km (0.4 mile) northeast from the access roads intersection with FS Route 411, approximately 73 vertical meters (240 feet) and 29 to 121 horizontal meters (96 to 400 feet) from Lone Cabin Creek (Figure 1). Mining is expected to be conducted on a seasonal basis over a 5-year period with ore hauled offsite to a mill on private property in Kellogg, Idaho for processing.

Seven management alternatives have been identified in consultation with the Coeur d'Alene River District Ranger for the Silver Strand project (01/05/2004) and in collaboration with state and federal agency staff, New Jersey Mining Company, and in response to comments from the public. (See the EA for a description of alternatives that were considered but eliminated from detailed study.)

2.1 Alternative 1: No Action Alternative

Development of this alternative is required by Forest Service Handbook 1909.15 (23.1) and the Council on Environmental Quality Regulations (40 CFR 1502.14(d)). In this alternative, the District Ranger would not approve the submitted Plan of Operations. No mining would occur, and thus, no trees would be harvested, as there would be no need to stockpile the waste rock or construct the temporary access roads. There would be no hauling of ore, thus road and trail maintenance and upgrading would not be necessary. No additional new portal would be opened, the wastewater injection well or wastewater land application infiltration gallery would not be installed. This alternative would result in no additional impacts to forest resources. However, the Forest Service has no legal right to deny exploration and mining proposals, so the no action alternative provides a means to describe the baseline environmental conditions and how the environment would persist in the absence of the proposed actions and for evaluating the effects of the various alternatives under consideration.

2.2 Alternative 2: Permit Operation as Proposed April 3, 2003

The proposed mine development plan includes an underground mine ramp and heading development, access trail rehabilitation and construction, portal excavation, waste rock dump construction, construction of a temporary pole building for maintenance and tool storage, drilling and completion of a waste water injection well system, various storm water and erosion control barriers and installation of other mine-related structures (NJMC, 2003a, 2003b).

NJMC proposes to access the site via an existing mine access trail spurring off of FR 411. The underground workings are accessed from three levels, although the upper level is significantly caved. All entry portals are currently locked and gated. Primary equipment presently proposed for use on site includes: a diesel powered load-haul-dump 'LHD' (for underground haulage), a front end loader (for mucking and truck loading), a 30-cubic yard haul truck and pup trailer (for haulage), an air compressor (underground ventilation), diesel generator (lights and power), and an underground drill rig (for blasting and underground development drilling). A plan view of the proposed mine development is presented in Figure 2.

The company intends to mine approximately 500-1000 tons of ore per month utilizing standard cut and fill mining procedures. Development rock from excavation of the ramp used to reach the ore body will be removed to a rock storage site (RSS) with 20,000 tonnes (22,000 tons) of capacity. Ore will not be processed on site, but will be trucked to a crushing, grinding and flotation mill on private property near Kellogg. The flotation tails will be backhauled to the site and used as paste backfill in the underground operation. NJMC proposes to store any tailings that cannot be used for backfill at the mill site (NJMC, 2003e).

The old open stopes left by historic mining operations will be filled with paste when time and materials permit. When groundwater is encountered underground, grouting may be used to reduce the inflows. These practices should reduce the volume of water flowing into the mine from the surface and subsequently, the volume leaving the No. 3 portal (adit). Approximately 142 cubic meters (185 cubic yards) of tailings will be stockpiled on the No. 2 Level each month to accommodate the paste backfill operation. These will be stored adjacent to the backslope of the No. 2 Level bench, and retained using a two-sided timber crib wall.

About 0.3 hectare (0.7 acre) will need to be cleared for the RSS. Approximately an additional 0.7 hectare (1.7 acre) will be cleared for the right-of-way of the roads to the RSS and ore bin/paste backfill plant. Another 0.15 hectare (0.3 acre) will be cleared for the injection well site. Clearing will be accomplished by falling merchantable trees. Merchantable trees standing on NJMC lode claims will be retained for use as mine timbers as permitted by law. Some of the trees will be hauled off the site to a small mobile-sawmill setup to be sawn into the proper dimensions for various mine timbers. Brush and unmerchantable trees will be cleared by a dozer or excavator. Some of this material will be piled at the toe of the RSS to provide a slash filter windrow while the rest will be piled for burning at an appropriate time.

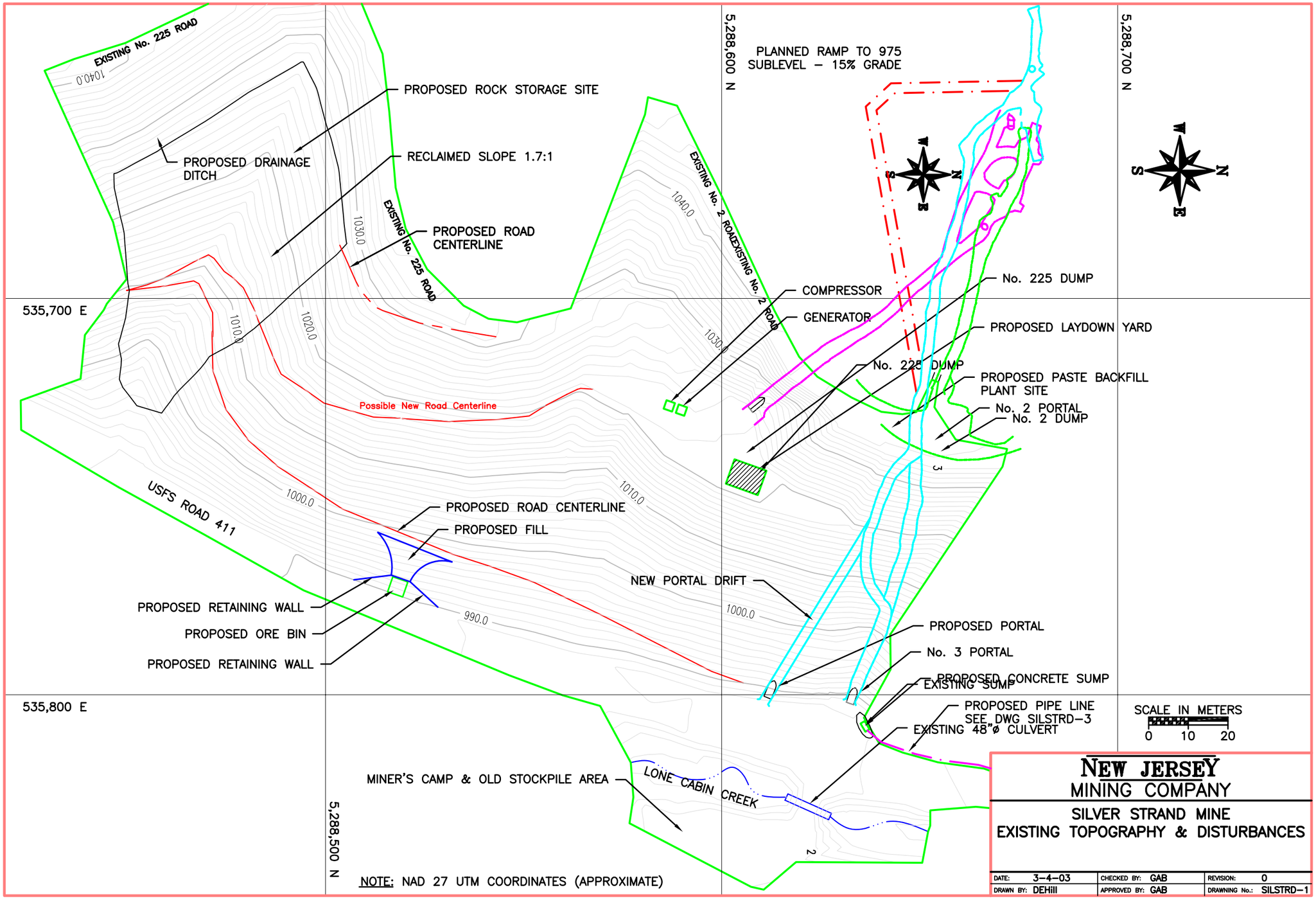
Topsoil will be inventoried prior to clearing for volume and reclamation suitability. Topsoil found suitable for reclamation will be stockpiled at the RSS. If present at the site, a quantity of topsoil to cover the disturbed area at the RSS with 30 centimeters (12 inches) of soil will be stripped and stockpiled. The use of other growth media may be required if sufficient topsoil is not available at the site. Topsoil stockpiles will be sheltered from wind and water erosion and seeded with an approved grass seed mixture for a temporary vegetative cover.

The operation will require several small surface structures including an air compressor site, temporary ore stockpile storage and loading facility, a small sediment settling pond/sump site for mine waste water storage and possible treatment, and a dump for mine waste rock. Fuel and associated oil products will be stored either underground or at the No. 225 pole building. One

2000-liter (528 gallon) diesel fuel tank is reported to be sufficient for the entire operation. Either diesel fuel location will have secondary containment equal to 110% of the tank volume. Explosives magazines will be located in the mine and regulated by Mine Safety and Health Administration (MSHA) and Bureau of Alcohol Tobacco and Firearms (ATF) rules. A concrete sump is planned to be constructed near the current No. 3 portal (adit) to collect a portion of the solids from the mine water discharge pipes. The sump will be covered with a steel grate to prevent persons, vehicles or animals from falling into it. The sump will be approximately 1.2 meter x 1.2 meter x 2.4 meters (width x depth x length) (4 feet x 4 feet x 8 feet). The capacity will be about 1.7 cubic meter (450 gallons) or 60 minutes of capacity at a flow rate of 0.44 liter/second.

Overflow from the No. 3 portal (adit) sump will be gravity fed down Lone Cabin Creek via a buried 50 millimeter (2 inch) diameter HDPE pipe to a Lamella inclined-plate clarifier at the location indicated on Figure 2. At the expected peak flow rate of 190 liters (50 gallons) per minute, the water velocity is 1.46 meter per second (0.45 feet/second). The pipeline will be buried in the Lone Cabin Creek Road ditch for a distance of about 520 meters (568 yards). Overflow from the Lamella clarifier will be injected into the groundwater by a well. The proposed location of the injection well can be found on Figure 3. It is planned to locate the injection well in a fracture zone capable of consuming up to 190 liters (50 gallons) per minute. In 1997, a previous operator drilled surface core holes at the Silver Strand site and the loss of drilling fluid return occurred in each of the four drill holes, thus indicating the concept of an injection well is possible at the Silver Strand site. At least 40 to 60 liters (10.5 to 16 gallons) per minute were consumed by these drill holes. These core holes were drilled to the north of the Silver Strand ore body but did not intercept the ore body. A second drilling program was completed in 2002, which did intercept a significant silicified and fractured zone of rock.

A new road would be constructed from the No. 3 Level portal (adit) to the proposed RSS and continue up the hill to the No. 225 Level. From the existing No. 225 Level road, the new road will traverse to the top of the proposed RSS (Figure 2). This road will be primarily used as a haul road by the underground mine trucks and/or trailers. This road will also provide access to the top of the ore storage bin. The road will be constructed using a combination of cuts and fills. The grade of the road will be 10% with a width of 4 meters (13 feet). Rolling dips will be placed about every 50 meters (164 feet). Additionally, a new road about 90 meters (295 feet) long will be constructed to access the proposed injection well site. Design parameters are identical to the RSS road except that the road will be constructed at a grade of about 2.0% (Figure 2). Erosion and sediment control best management practices (BMPs) proposed for the roads also include the placement of brush windrows at the base of fill slopes.


EXISTING No. 225 ROAD
1040.0
PROPOSED ROCK STORAGE SITE
PROPOSED DRAINAGE DITCH
RECLAIMED SLOPE 1.7:1
EXISTING No. 225 ROAD
PROPOSED ROAD CENTERLINE
1030.0
1020.0
1010.0
535,700 E
Possible New Road Centerline
5,288,600 N
PLANNED RAMP TO 975 SUBLEVEL – 15% GRADE
EXISTING No. 2 ROAD
1040.0
1030.0
COMPRESSOR
GENERATOR
No. 225 DUMP
PROPOSED LAYDOWN YARD
No. 228 DUMP
PROPOSED PASTE BACKFILL PLANT SITE
No. 2 PORTAL
No. 2 DUMP
5,288,700 N
USFS ROAD 411
1000.0
1010.0
PROPOSED ROAD CENTERLINE
PROPOSED FILL
PROPOSED RETAINING WALL
PROPOSED ORE BIN
PROPOSED RETAINING WALL
990.0
NEW PORTAL DRIFT
1000.0
PROPOSED PORTAL
No. 3 PORTAL
PROPOSED CONCRETE SUMP
EXISTING SUMP
PROPOSED PIPE LINE SEE DWG SILSTRD–3
EXISTING 48"ø CULVERT
535,800 E
MINER'S CAMP & OLD STOCKPILE AREA
LONE CABIN CREEK
5,288,500 N
SCALE IN METERS
0 10 20
NOTE: NAD 27 UTM COORDINATES (APPROXIMATE)
NEW JERSEY
MINING COMPANY
SILVER STRAND MINE
EXISTING TOPOGRAPHY & DISTURBANCES
DATE: 3–4–03
CHECKED BY: GAB
REVISION: 0
DRAWN BY: DEHill
APPROVED BY: GAB
DRAWNING No.: SILSTRD–1

There would be no permanent structures constructed on the site besides a waste rock dump. The current plan is to conduct underground mining on a seasonal basis from April to November. Expected mine life of the presently defined resources is 4-5 years at the proposed production rate. Reclamation of the site after permanent closure will include:

- Re-contour the RSS to the final slope (1.7 horizontal (H) to 1.0 vertical (V)). Stockpiled topsoil will be applied to cover the disturbed area at the RSS. If the quantity of topsoil necessary to cover the disturbed area with 30 centimeters (12 inches) of stockpiled soil is not present, the use of other growth media may be required.
- Dismantle the ore bin, injection well plant and No. 225 pole building and remove materials from the site. Concrete foundations will be covered with soil at the site.
- Re-contour the old waste dumps by pulling material up slope to achieve a flatter slope.
- Seed the RSS and old waste dumps with a USFS approved grass seed mixture. NJMC also plans to plant native conifers throughout the reclaimed slopes.
- Plug the No. 225 and No. 3 portals (adits) with a cemented paste backfill plug 3 meters (10 feet) in length. Remove portal ground supports, re-contour portal areas and seed with grass and trees.
- Remove steel grate from No. 3 sump and fill sump with rock and cover with soil.
- Fill the No. 1 Level "glory hole" with non-acid generating rock to fill the existing depression.
- Plug the injection well pipeline on both ends.
- Remove the 1.2-meter (48 inch) culvert in Lone Cabin Creek, which provides access to the staging area. Widen the channel by pulling fill material from the creek bed back up onto the western slope. Place any riprap if necessary.
- Re-contour the first 100 meters (330 feet) of the existing and proposed mine roads to match surrounding topography. Scarify the remaining road lengths with a bulldozer and plant with grass and conifers. Remove any road culverts and pull fill material from those draws back onto the roadbed.

2.3 Alternative 3: Additional Onsite Mine Discharge Water Storage

The POO currently states that discharge water from the mine will be used for drilling and in the paste backfill process. During times when there are insufficient waters supplies, the POO details extracting waters from Lone Cabin Creek. This would most likely occur during the late summer and fall when water levels in the creek are near base line levels. During the fall 2003 site visit; streamflow in Lone Cabin Creek was measured at 0.03 meter^3/second (cms; 1.2 cubic feet per second [cfs]). This is equivalent to approximately 2,040 liters per minute (lpm) or 540 gallons per minute (gpm). Peak flows necessary for mine operations are anticipated to be 8 lpm (2 gpm). This would cause a slight decrease in flow in Lone Cabin Creek.

Alternative 3 recommends placing a water storage tank at the Number 2 level, the same level as the paste backfill system. The tank would need to be sufficiently sized to accommodate a minimum of two days of paste backfill and other mine-related water needs at the maximum rate of use (tank size needed is estimated at approximately 90,900 liters (20,000 gallons). This tank

would be initially filled in the spring, which would reduce the amount of water that needed to be disposed of during the annual mine opening activities in the spring. The tank would be kept full during the summer months by flow exiting the mine. Consumption rates could be monitored such that the cessation of tank filling could be timed to match the anticipated needs of water that season. Thus, the tank would be emptied at the end of mine operations each season.

2.4 Alternative 4: Land Disposal of Mine Discharged Water

The proposed water treatment and discharge system includes a Lamella inclined-plate clarifier and injection well. Mine discharge waters would passively flow through the filter and into injection wells located approximately 520 meters (1,706 feet) north of the No. 3 portal. The potential for the injection wells to handle the peak discharge rate of 200 lpm (53 gpm) is based on previous drilling experience in the area. Previous exploration drilling programs noted significant water loss to the formation during drilling (40 to 60 lpm or 11 to 22 gpm) and a highly fracture bedrock system.

The potential for the injection well to handle the proposed flows has not been demonstrated at this time and groundwater conditions in the vicinity of the proposed injection well are unknown. In addition, the proposed filtration system may not be effective at removing the contaminants of potential concern (COPC) to sufficiently low concentrations needed to meet applicable water quality criteria. Injected waters that have not been appropriately filtered will receive limited amounts of natural filtration once discharged to the bedrock due to the inert nature of the bedrock. This could lead to discharges of mine waters to Lone Cabin Creek.

An alternative to, or to be used in addition to, the injection well disposal is land application of the mine waters. Mine discharge waters would still be settled in the proposed concrete sump, but would then be distributed using a series of garden hoses and passive discharge of mine waters via soaker hoses. The placement and linear dimensions could be varied such that steep slopes were avoided and the area of discharge was great enough to avoid creating saturated conditions along the slope. As with the injection well proposed in Alternative 2, the land application of the mine discharge would need to be state certified by the IDEQ and a monitoring plan would need to be developed and approved by the State and USFS prior to commencement of either mine discharge disposal system. In the event that a shallow subsurface system is installed, an IDEQ Underground Injection Control registration must be submitted.

2.5 Alternative 5: Modified Development Rock Storage

The proposed development rock storage area would have a final face grade of 1.7 units of horizontal run to 1 unit vertical rise. Alternative 5 would reduce the final grade slightly (e.g. 1.65:1), crown the face of the rock storage area to disperse precipitation toward the margins, and add a dike rock drain at the base. Upon completion of filling activities, the development rock storage would be regraded to produce a convex shape to the face and a crown on the top. This would improve drainage away from the surface of the development rock to the contacts with the native soils to either side. Infiltration and the potential for generating acidified waters would be reduced with this regrading plan.

The original design includes using the dike rock to buffer the quartz rock and prevent the development of ARD. However, the dike rock will not be extracted until after most of the

development rock (primarily from the ramp) has been extracted and placed in the RSS area. Consequently, the dike rock will not be located at the base of the RSS. Alternative 5 includes the addition of a drain at the base that would be backfilled with dike rock. Water that infiltrated through the development rock would flow through this drain. If these waters have been acidified by the development rock, the drain rock would neutralize these waters.

If alternative 5 is selected, it will require a geotechnical investigation to confirm the stability of this configuration. The investigation should include an analysis to confirm that there is sufficient dike rock in the drain to buffer the RSS over time.

2.6 Alternative 6: Alternative Site Access

This alternate alignment for the main access road deviates slightly from the proposed action (Alternative 2) by extending the switchback location into the RSS, thereby increasing the length and decreasing the average slope of the road from 10% to 9%. No additional net land disturbance would occur with alternative 6, however, because the additional length would be accommodated within the footprint of the proposed RSS. This alternative was evaluated because it eliminates some of the steeper portions of the access route and still allows access to the RSS during all phases of its development.

2.7 Alternative 7: Maintain FR411 Open

Alternative seven would leave FR411 open to public use during the mine activity. This Alternative would eliminate the need for signage, gates and detours for National Forest land users if FR411 were closed during the mining season. No other aspect of Alternative 2 would be altered.

Watershed Restoration: Removal of the 1.2-meter (48-inch) culvert in Lone Cabin Creek, which provides access to the staging area. Widen the channel by pulling fill material from the creek bed back up onto the western slope. Place any riprap if necessary. Construct grade control so site will have proper dimension and profile for existing channel type

Activities in allocated old growth: No allocated old growth exists in the project area.

Activities in roadless areas: No roadless areas exist within the project area.

Wildlife security: A short section of road will be constructed for hauling waste rock to the dumpsite above the active adit. This will not be open to public use, and will not experience high-speed traffic. Some trees will be removed from the project area, thereby reducing potential cover for wildlife, but the affected area will be minimal in size and surrounded by contiguous forest. The road section will be closed at the end of operations, and the waste rock dump will be covered with organic material, thereby returning it to a functional state for wildlife passage.

Aquatic features: Based on the proposed actions their will be a number of ground disturbing activities in the RHCAs. The reclamation of the streambed and removal of the culvert will occur after the project is completed, but the burying of the injection well feeder pipe will fall within the RHCA and will occur prior to operation start up. The sump pump used to divert water from Lone

Cabin Creek will be removed during the winter season and will be located outside of the riparian zone along the creek. Removal of the existing culvert at the closure of the mine will enhance fish passage.

3.0 Botanical Resources

3.1 Existing Condition and Inventory

Garcia and Associates (GANDA) conducted a habitat assessment on September 16, 2003. Forest Service botanists conducted surveys for early summer flowering species on June 2nd, 2004. No occurrences of forest-listed sensitive plant species were located within the project area. The site is located on an east-southeast-facing hillside of 30 to 40% slope. The vegetation is predominantly a mid-seral, mixed-conifer forest with an understory composed of small shrub stands and herb communities. The canopy has few openings and the understory is patchy and depauperate. Dominant tree species are western hemlock (*Tsuga heterophylla*), grand fir (*Abies grandis*), western redcedar (*Thuja plicata*), white pine (*Pinus monticola*), and Douglas-fir (*Psuedotsuga menziesii*). Shrub stands are composed of chokecherry (*Prunus virgininana*), oval-leaved huckleberry (*Vaccinium ovalifolium*), and fool's huckleberry (*Menziesia ferruginea*). Understory contains sweet-scented bedstraw (*Galium triflorum*), pathfinder (*Adenocaulon bicolor*), queen's cup (*Clintonia uniflora*), and twinflower (*Linnaea borealis*). The area contains a deep layer of forest duff. Habitats consist of moist forest guilds.

Activities in allocated old growth: No allocated old growth exists in the project area

Activities in roadless areas: No roadless areas exist with in the project area

3.2 Analysis of Impacts

There are 31 forest-listed sensitive species that were considered for this impact analysis (Table 2). No occurrences of sensitive plant species were located in the project area.

Table 2. Determination of impacts for IPNF -listed sensitive plant species.

Common Name	*Scientific Name*	Impacts Determination			
		No Impact	MIIH[1]	WIIH[2]	BI[3]
Canadian St. John's wort	***Hypericum majus***	X			
Chickweed monkeyflower	***Mimulus alsinoides***	X			
Clear moss	***Hookeria lucens***	X			
Clustered lady's-slipper	***Cypripedium fasciculatum***	X			
Constance's bittercress	***Cardamine constancei***	X			
Creeping sedge	***Carex chordorrhiza***	X			
Deer fern	***Blechnum spicant***	X			
Dryland sedge	***Carex xerantica***	X			
Green bug on a stick	***Buxbaumia viridis***	X			
Henderson's sedge	***Carex hendersonii***	X			
Howell's gumweed	***Grindelia howellii***	X			
Iceland moss lichen	***Cetraria subalpina***	X			
Idaho barren strawberry	***Waldsteinia idahoensis***	X			
Lance-leaved sedum	***Sedum rupicolum***	X			

Common Name	*Scientific Name*	Impacts Determination			
		No Impact	MIIH[1]	WIIH[2]	BI[3]
Leafless bug on a stick	***Buxbaumia aphylla***	X			
Least moonwort	***Botrychium simplex***	X			
Maidenhair spleenwort	***Asplenium trichomanes***	X			
Mingan moonwort	***Botrychium minganense***	X			
Mountain moonwort	***Botrychium montanum***	X			
Northwestern moonwort	***Botrychium pinnatum***	X			
Pale sedge	***Carex livida***	X			
Peculiar moonwort	***Botrychium paradoxum***	X			
Pod grass	***Scheuchzeria palustris***	X			
Short spored jelly lichen	***Collema curtisporum***	X			
Sierra woodfern	***Thelypteris nevadensis***	X			
Stalked moonwort	***Botrychium pedunculosum***	X			
Triangle moonwort	***Botrychium lanceolatum***	X			
Upward-lobed moonwort	***Botrychium ascendens***	X			
Water club rush	***Scirpus subterminalis***	X			
Wavy moonwort	***Botrychium crenulatum***	X			
White beakrush	***Rhynchospora alba***	X			

Notes
1 MIIH=May impact individuals or habitat but will not likely contribute to a trend toward federal listing or cause a loss of viability to the population or species.
2 WIIH=Will impact individuals or habitats with consequences that the action may contribute to a trend towards federal listing or cause a loss of viability to the population or species.
3 BI=Beneficial impact.

The project area contains few old trees and is relatively disturbed. It does contain some low quality habitat for rare species, however. Of the 31 species discussed above, 10 occur in moist forest guilds, like those present within the project area. Deer fern, an evergreen species, was not observed to occur within the project area though habitat is present. Rock seeps and perennial pristine streams are microhabitats within the moist forest guild providing habitat for maidenhair spleenwort, and Henderson's sedge. However, these microhabitats do not occur within the project area and no individuals were encountered during field surveys. Peculiar moonwort occupies a variety of forested habitat though tends to occur at higher elevations than occur within the project area. No individuals were located during field surveys. The microhabitat for least moonwort and northwestern moonwort, grassy slopes and meadows, is also not present in the project area. Habitat for clustered lady's slipper, Idaho barren strawberry, mingan moonwort, and triangle moonwort occurs within the project area.

3.3 Determination of Impacts

Disturbance from soil removal, road building, and other mining activities will have **no impact** on any forest-listed sensitive plant species.

3.3.1 Direct And Indirect Effects

Alternative 1-No-Action Alternative

No sensitive plant species or Forest species of concern occur within the project boundaries. Implementation of Alternative 1 will not have direct or indirect effects on sensitive plant species. Alternative 1, the 'no action alternative' would allow the forest within the project area to continue maturing. Mature and old growth forests provide significant habitat for most forest-listed species. Mature forests may provide additional habitat for rare species occurring within 8

kilometers (5 miles) of the project area thereby increasing population size and possibly population viability. Preventing or limiting ground disturbing activities could help slow the spread of noxious weeds that are a significant threat to populations of rare species. Implementation of Alternative 1 may have positive indirect effects for forest- and district-listed sensitive species.

Alternative 2-Permit Operation as Proposed April 3, 2003

Alternative 2 involves construction of new roads through the project area, removal of trees and topsoil in drainage, and construction of temporary buildings at the upper adit. Construction activities will likely affect air quality and produce dust and airborne particulates. Impacts from dust and particulates will not impact adjacent vegetation communities. There are no known occurrences of rare plants in this drainage. Implementation of Alternative 2, as proposed, will not have direct impacts on any forest-listed threatened, sensitive, or species of concern. No rare species were found within the project area.

Significant noxious weed infestations occur in disturbed areas within the project area. Yellow toadflax, spotted knapweed, meadow hawkweed, Canada thistle, and goatweed occur on all roads and existing dump areas. Additional ground disturbing activities will likely contribute to an expansion of these infestations. Implementation of mitigation measures and monitoring (described below) could reduce the density of the infestations but will not prevent their expansion. Noxious weeds are a significant threat to populations of rare species (Shelley and Petroff 1999). Implementation of the proposed action would likely increase the size of existing weed infestations and lead to new infestations. This would increase the likelihood of adverse indirect effects on sensitive plant populations occurring outside the boundaries of the project area.

Alternative 3-Additional Onsite Mine Discharge Water Storage

No sensitive species or species of concern occur within the project boundaries, therefore implementation of Alternative 3 will not impact sensitive plant species. Other direct and indirect effects are similar to those described for Alternative 2.

Alternative 4-Land Disposal of Mine Discharged Water

Direct and indirect effects are similar to those described for Alternative 2.

Alternative 5-Modified Development Rock Storage

Direct and indirect effects are similar to those described for Alternative 2.

Alternative 6-Alternative Site Access

Direct and indirect effects are similar to those described for Alternative 2.

Alternative 7-Maintain FR411 Open

Direct and indirect effects are similar to those described for Alternative 2.

3.3.2 Cumulative Effect Analysis

A determination of cumulative effects is based on population viability for forest-listed sensitive, and species of concern. The area of consideration for the cumulative effects analysis is the area

covered by the proposed action. No sensitive species or species of concern occur within the project boundaries.

3.4 Mitigation Measures

Extensive noxious weed populations are present at the site. Preventing or limiting ground disturbing activities could help slow the spread of noxious weeds that are a significant threat to community structure and rare species. It is likely that the existing noxious weed populations will continue to expand regardless of present and future activities. Noxious weed spread and new invading weed species are significant threats to native species and habitats (Seevers and Lang 1998). Noxious weeds are present on the site and the following measures will address potential problems. One of the most important methods of weed control is prevention of weed spread.

1. All areas that currently contain noxious weeds that will be disturbed during mining activity, including but not limited to roads, building sites, excavated areas, and drill pads, will be sprayed with appropriate herbicides **as required**. Spraying of existing weed populations may be necessary before operation begins.
2. All existing roads and new roads utilized during mining operations will be monitored in spring and fall for weed infestations. Developing infestations will be sprayed regularly if determined appropriate by a qualified botanist.
3. Heavy equipment will be cleaned prior to entering the site and before leaving the project area.
4. Operating equipment in weed free areas before working in weed-infested areas may prevent or decrease the risk of weed seed spread on equipment.
5. Disturbed areas will be immediately reclaimed, upon completion of specific activity in each area, with an appropriate native seed mixture, approved by District Botanist. To increase spatial and temporal competition with the weedy species, the reclamation mix should include a diversity of grass, forb, and shrub species that grow at varying times of year (spring, summer, and fall).
6. Certified weed-free mulch and seed will be used in reclamation activities.
7. Erosion control methods and stockpiling excavated soils away from current weed populations and out of the stream run-off pathway in contaminated areas will reduce the migration of weed seeds throughout the project area.

3.5 Botanical References

Sheley, R.L. and J. K. Petroff. 1999. The Biology and Management of Noxious Rangeland Weeds. Oregon State University Press, Corvallis, OR.

Seevers J., and F Lang. 1998. Management Recommendations for Clustered Lady Slipper (*Cypripedium fasciculatum* Kellogg ex. S. Watson) v. 2.0. Available online at http://www.or.blm.gov/surveyandmanage/mr/vascularplants. Accessed August 2002.

4.0 Fisheries Resources

Currently the USFS (USFS 2002) lists four species as sensitive for the IPNF, westslope cutthroat trout (*Oncorhynchus clarki lewisi*), torrent sculpin (*Cottus rhotheus*), redband trout (*O. mykiss*

gairdneri), and burbot (*Lota lota*) (Table 3). For this evaluation, GANDA defined the cumulative impacts area as Lone Cabin Creek from the headwaters to the confluence with Burnt Cabin Creek and extending an additional 0.8 kilometer (0.5 mile) downstream. A determination of the cumulative effects analysis area is based on each fish species' ability and likelihood to migrate seasonally within a drainage area in relation to available habitat, and life stage, and boundaries that represent the point of diminishing potential effects. Because we are focused on waterborne sediments and potential pollutants, the extent of the effects area is determined by how far downstream these constituents are likely to travel and have an effect on habitat or aquatic species. Sediment travel distance was based on the hydrologist's professional opinion and review of the results of FS-WEPP modeling (MacDonald and Schick 2004).

GANDA reviewed current distribution maps for the four sensitive species and determined that redband trout are only found within the Kootenai River in Idaho, and burbot are limited to large rivers and deep, cold lakes and reservoirs (Bradley et al. 2002, AFS 2003a). The distribution of redband trout falls outside of the cumulative impacts area for this project, and there is no suitable habitat for burbot in the cumulative impacts area; therefore, the proposed project will have no impact on either of these two species.

Table 3. Fish species presence and level of analysis for the Silver Strand Project

Species		Species or Habitat Present on District?	Species or Habitat Present in Project Area?	Species or Habitat Measurably Affected?	Species Further Analyzed?
Common Name	**Scientific Name**				
Sensitive					
Westslope cutthroat trout	*Oncorhynchus clarki lewisi*	Yes	Yes	Yes	Yes
Redband trout	*Oncorhynchus mykiss gairdneri*	No	No	No	No
Burbot	*Lota lota*	No	No	No	No
Torrent sculpin*	*Cottus rhotheus*	Yes	No	No	No

*Torrent sculpin are listed as sensitive by the USFS, but not by the State of Idaho.

4.1 Existing Conditions and Inventory

Overview: Lone Cabin Creek is a tributary to Burnt Cabin Creek which then flows into the Little North Fork Coeur d'Alene River. Valley side slopes are steep (30 to 40 percent) and vegetated predominately with conifers. Channels of Lone Cabin Creek and Burnt Cabin Creek are severely restricted by roads on the western and northern sides, respectively. The lower mile of Lone Cabin Creek is characterized by a narrow channel with maximum widths ranging from 6- 9 meters (20 to 30 feet). The total length of streamside road that parallels Lone Cabin Creek is approximately 7 kilometers (4.3 miles), and only the uppermost headwaters of the creek is unconfined. Previous activities in the drainage include historic mining and associated road building and timber harvest. Field observations suggest that the main channel and a majority of the flood plain have been altered by the streamside road and disturbance of riparian influenced areas.

The concerns in Lone Cabin Creek include:

1. Potential delivery of sediments and mine-contaminated waters to the creek, and transport of these materials downstream.
2. The delivery of sediment to the main channel from potential failures of the streamside roads, and confinement of the lower channel by infringement of the road in the riparian area.

Stream Flow Regime: The majority of the Lone Cabin/Burnt Cabin watershed is in the rain-on-snow elevation range of 1,000 to 1,370 meters (3,300 to 4,500 feet). Below 1,000 meters, the snow pack is transitory, while above 1,370 meters, the snow pack is sufficiently cool that warming by a maritime front is insufficient to cause a significant thaw. In the rain-on-snow elevation range, a warm and heavy snow pack accumulates each winter. A warm maritime front can sufficiently warm the snow pack making it isothermal and capable of yielding large volumes of water to a runoff event. This aspect of the climate translates into a hydrograph that peaks in the mid-winter to early spring season (January-March).

Stream Channel Stability: A streamside road is the dominant feature of the riparian areas in Lone Cabin Creek and the lower portion of Burnt Cabin Creek. Streams that have been constricted by roads cannot access the natural floodplain and are less able to dissipate the increased energy associated with large flow or sediment inputs. Channel pattern changes resulting from streamside road placement may result in drastic and long-term changes to the streamflow and sediment routing regime. Additionally, streamside roads are subject to frequent or continual stress of flow against the roadfill, particularly during peak discharges. These roads can be a chronic source of sediment to the stream. The riparian area along Lone Cabin Creek is well vegetated and banks appear stable despite the road's encroachment. The riparian plant community is comprised of conifers and alder (*Alnus rubra*).

Water Quality: Based on the Coeur d'Alene Geographic Assessment the Lone Cabin Creek watershed has 14.3 kilometers (8.9 miles) of road per square mile and the drainage is 622 hectares (2.4 square miles) which equates to 34.75 kilometers (21.6 miles) of road (USFS 1998). The Coeur d'Alene Geographic Assessment also states that the Lone Cabin Creek watershed has 1.4 crossing per mile, which calculates out to 30 stream crossings. Approximately 7 kilometers (4.3 miles) of USFS road and 2 road channel crossings exist in the Lone Cabin Creek drainage in the area surrounding the proposed action. The upstream road crossing is a small culvert and is well above the project area. The second crossing is a large culvert that allows access to a staging/camping area across from adit #3. The road fill surrounding the culvert and potential failures of the streamside road are the primary potential sediment contributors to the lower to mid elevation areas of the watershed. The existing culvert on Lone Cabin Creek that creates the road access to the staging area is a fish migration barrier. Restoration work is planned as part of the project clean up with the removal of this culvert and obliteration of the current crossing/access to the staging area across Lone Cabin Creek.

Water quality samples have been taken in Lone Cabin Creek by the operator and by the Bureau of Mines (BOM). Ambient water quality data has been collected by the operator for Lone Cabin Creek since January 2003 (MacDonald and Schick 2004). The creek was sampled upstream of proposed activities, immediately downstream from the No. 3 portal, and at the mouth of Lone Cabin Creek. All samples were filtered and therefore represent dissolved constituents. The water is alkaline but very soft. With the exception of the first sample collected for zinc that was

detected at 0.0053 mg/l (5.3 μg/l), heavy metals were below detection limits in all samples at all locations.

The applicant has also monitored water quality and flow volumes from flow discharging from the No. 3 portal since January, 2003 (Mac Donald et al. 2004). Both filtered and unfiltered samples were collected and analyzed. In addition, the BOM collected water samples from the portal between November, 1991 and September, 1995 (USBM 1996). As with surface water in Lone Cabin Creek, the portal discharge is soft with low total dissolved solids and conductivity, and is weakly acidic to alkaline. This water has violated ambient water quality criteria (AWQC; usually chronic values) for several constituents:

- pH below 6.5 in 2 of 25 samples;
- Arsenic above ground water standards in 8 of 25 samples;
- Cadmium above AWQC in 4 of 27 samples (with several detection limits above hardness-corrected criteria);
- Copper above AWQC in 14 of 27 samples;
- Iron above secondary drinking water criteria in 1 of 21 samples;
- Manganese above secondary drinking water criteria in 5 of 21 samples;
- Antimony above ground water standards in 1 of 6 samples (2003 sampling only); and
- Lead above AWQC in 5 of 27 samples (with several detection limits above hardness-corrected criteria).

Though this water does not consistently exceed criteria for any single constituent, both arsenic and copper standards have been consistently exceeded in the 2003 sampling. Detection limits for cadmium, lead, and mercury are above relevant standards, so compliance with undetected results cannot be demonstrated.

Burnt Cabin and Lone Cabin creeks are on the 303(d) list for sediment and thermal modifications.

In-Stream Habitat: GANDA surveyed Lone Cabin Creek on September 16-18, 2003. All data sheets and field notes are included in Appendix A of the Silver Strand Fisheries Specialist Report (GANDA 2004). Habitat in Lone Cabin Creek is varied, but dominated by fast water. Riffles accounted for over 53% and run habitat an additional 15%. However, pools (27%) and other slow-water resting areas are interspersed within Lone Cabin Creek, providing a good level of habitat diversity. Scour pools were created by boulders, large wood and rootwads. Cover within the creek is diverse and plentiful with lots of woody debris aggregates, boulders and undercut banks. The woody debris was often in the form of "spanners" or logs that span the entire width of the stream with some portion submerged in the water. GANDA measured the streamflow at 1.2 cfs (0.034 m^3/s) on September 17. Although this probably represents late season base flow, it does provide some context to evaluate the fish community survey results.

Lone Cabin Creek is a first order stream and habitat is probably limited mainly by water flow and availability. Mean depths across all habitat units were less than 13 centimeters (5 inches) and maximum pool depths were less than 30 centimeters (12 inches). Trout specialize in foraging in moving water, but require slow moving and pooled areas to rest, to provide protection from predators, and to provide overwintering habitat. The size and number of pools found in Lone Cabin Creek would limit resident fish size and population density.

Substrate in Lone Cabin Creek was evaluated using a Wolman pebble count (Wolman 1954). Per USFS Region 1 guidelines the substrate sample was taken in the first habitat unit surveyed (Overton et al. 1997). GANDA found that substrate in Lone Cabin Creek is dominated by gravel (8-64 millimeters) (~0.5 inch to 2.75 inches) with lesser amounts of small cobble (65-128 millimeters) (3 inches to 5.25 inches) and cobble (129-256 millimeters) (5.25 inches to 10.25 inches). There is an abundance of spawning quality gravels in the stream, and fines were uncommon except in pools and eddies.

4.2 Sensitive Fish Species

4.2.1 Westslope Cutthroat Trout

Habitat Requirements

Westslope cutthroat trout are listed as "Sensitive" by Region 1 of the USFS and listed as a "Species of Special Concern" by the State of Idaho. Westslope cutthroat trout are also considered a Management Indicator Species (MIS) by the USFS. In addition, the USFWS has evaluated westslope cutthroat trout for listing under Section 7(c) of the 1973 Endangered Species Act, but has found them to be “not warranted” (US Federal Register, August 7, 2003). Westslope cutthroat trout are native to many of the watersheds surrounding the project area. Their preferred habitat is cold, clear streams that possess rocky, silt-free riffles for spawning and slow, deep pools for feeding, resting, and over-wintering (Liknes and Graham 1988). Pools are a particularly important habitat component as adult cutthroat trout occupy pool habitat most of the time and dominance hierarchies are demonstrated by pool position if more than one adult occupies a pool (Shepard et al. 1984). Other key features of cutthroat habitat are large woody debris for persistent cover and habitat diversity as well as small headwater streams for spawning and early rearing.

Life History

Westslope cutthroat trout have three possible life forms, adfluvial (migrates to lakes), fluvial (migrates to rivers) or resident (stays in streams). All three life forms spawn in tributary streams in the springtime when water temperature is about 10° C (50° F) and flows are high (Liknes and Graham 1988). Cutthroat trout spawn when they are about 4 or 5 years old and only a few survive to spawn again (McIntyre and Rieman 1995). Fry emerge in late June to mid July and then may spend one to four years in their natal streams. While resident fish spend their entire life in tributary streams, migratory life forms can travel several hundred kilometers as they move between adult and spawning habitat.

Spawning and rearing streams tend to be cold and nutrient poor. Westslope cutthroat trout primarily eat insects and zooplankton and do not grow very large, usually averaging between 148-300 millimeters (6-12 inches). Their small size makes them less of a recreational trophy fish, but also makes them well suited to small headwater streams such as Lone Cabin Creek that have small pools and limited low velocity habitat.

Westslope cutthroat trout seek out gravel substrate in riffles and pool crests for spawning habitat. Cutthroat trout have long been regarded as sensitive to fine sediment (generally defined as 6.3 millimeters (0.25 inch) or less). However, stream habitats are complex and fish have shown themselves capable of adapting somewhat to changes in microhabitat conditions

Westslope cutthroat trout require cold water and streams with more pool habitat and cover than uniform, simple habitat (Shepard et al. 1984). Juvenile cutthroat trout overwinter in the interstitial spaces of large stream substrate. Adult cutthroat trout need deep, slow moving pools that do not fill with anchor ice in order to survive the winter (Jakober 1997). Where the species range overlaps, westslope cutthroat trout are often found in the same streams as bull trout and mountain whitefish. Cutthroat trout do not compete well with aggressive introduced species such as brook trout (*Salvelinus fontinalis*) and recent reintroduction efforts for westslope cutthroat trout have included brook trout eradication as a preliminary step to ensure better success.

Reference and Existing Conditions

A 1989 population status review of westslope cutthroat trout in Idaho determined that populations in northern Idaho are declining, with viable populations existing in only 36% of the original Idaho range (Rieman and Apperson 1989). However, a more recent review found WCT currently occupy over 29,000 kilometers (18,000 miles) in Idaho (95% of historical) (Shepard et al 2003). Shepard (2003) explained the discrepancy between the two studies in three ways. First, more populations of westslope cutthroat trout have been documented in the four-year period between 1998 and 2002. Second, Shepard's assessment provided more detailed information that was gathered and the data were summarized more consistently than that available to the USFWS when they conducted their earlier status review. Third, the scale at which Shepard collected and summarized information was finer than the scale at which some data were provided to the USFWS.

There has been much discussion about the genetic purity of trout stocks because of the role of local adaptation in maintaining the size of populations and in preserving the attributes that make native species inherent pieces in the ecological puzzle of habitats. Essentially, the argument is that native species have evolved to be best adapted to local conditions (water temperature/climate, spawning period, habitat, etc.) and that diluting their genetic make up can cause a loss of fitness for an area. Shepard et al.(2003) analyzed the results from genetic testing of trout collected from 84 kilometers (52.1 miles) of the Little North Fork Coeur d'Alene river watershed (HUC 17010301 3485). Results showed that 61.5% of those miles held populations of "unaltered" fish and that the remaining tested fish were <10% introgressed, or contained less than 10% of genes from non-westslope cutthroat trout species (e.g. rainbow trout *Oncorhynchus mykiss*). The study went on to estimate that, given habitat conditions and presence of rainbow trout in the drainage, that 92.7% of the remaining miles were "potentially altered", or would have substantially genetically introgressed fish. IDFG has recently collected genetic samples from tributaries near the Silver Strand project area, but these had not been analyzed at the time of the completion of this report (R. Hennekey pers. comm. 2003). Therefore, GANDA cannot make a

determination on the purity of the westslope cutthroat trout that use Lone Cabin or Burnt Cabin Creek, but given it is likely that at least some portion of the population is non-introgressed westslope cutthroat trout, and that the usual vector for genetic introgression is introduced species colonizing their way upstream in a watershed, it is reasonable to assume that fish occupying the headwaters of watersheds such as Burnt Cabin and Lone Cabin creeks are less likely to be introgressed.

Other causes and ongoing concerns for the decline of westslope cutthroat trout include land management activities that are potentially disruptive to fish habitat such as timber harvest, mining, livestock grazing, road building and non-angling recreation (Shepard et al. 2003). A post-flood survey of resident westslope cutthroat population levels in the Coeur d'Alene drainage in 1996 showed that the relative trout density had decreased, though not to the point of local extinction in any of the subdrainages. Rieman (1996) tentatively concluded that catastrophic events, such as major floods, have less impact on trout populations than continued habitat degradation. This is particularly true when populations are comprised of fluvial and resident groups. Sediment is often the main concern with land use activities, and Burnt Cabin Creek is listed as a 303(d) stream by the Idaho Department of Environmental Quality (IDEQ 2000) for sediment as is the Little North Fork Coeur d'Alene River.

Non-native species have also taken a toll on westslope cutthroat trout via competition and hybridization. Westslope cutthroat trout hybridize with rainbow trout and other cutthroat trout subspecies such as Yellowstone cutthroat trout (*Oncorhynchus clarki bouvieri*). This is difficult to ascertain since it takes extensive genetic testing to verify the problem. Many remnant genetically pure cutthroat trout populations are located above barriers that protected them from non-native species. Thus, ironically, barriers that disrupted historical migration routes for westslope cutthroat trout have sometimes served to protect them from non-native species.

Existing Westslope Cutthroat Trout Population Status

GANDA found westslope cutthroat trout in Lone Cabin Creek during our electroshocking survey on September 18, 2003. Because fluvial fish are known to outmigrate soon after spawning, these fish are almost certainly year-round residents, possibly rearing in Lone Cabin Creek until they reach large enough size to outmigrate to larger waters (Liknes and Graham 1988). Although it is impossible to determine the genetic purity of the fish sampled in the field, the appearance of the fish coupled with the upper headwaters location of Lone Cabin Creek would support the assumption that these fish are less likely to be introgressed. However, as stated above, IDFG has recently taken genetic samples from the Burnt Cabin Creek area (R. Hennekey pers. comm. 2003). When the results of these samples are known, the status of the resident fish in Lone Cabin Creek will be more certain. GANDA also found evidence of westslope cutthroat trout using Lone Cabin Creek as a spawning stream. Out of 23 fish captured, 20 were young-of-the-year/fry. Since westslope cutthroat trout fry often remain in their natal tributaries, particularly if they express the resident life history, these fish were undoubtedly spawned in Lone Cabin Creek. Previous electroshocking surveys in Lone Cabin Creek found similar size classes and population levels, although the surveys from 1994 (pre-1996 flood event) showed a larger population density (Lider 2003a, 2003b).

Lone Cabin Creek Sampling Results: The three-pass electrofishing survey yielded westslope cutthroat trout and sculpin (*Cottus* spp.). GANDA used Microfish 3.0 to calculate a population estimate for the area surveyed (Van Deventer and Platts 1985) (See Roulson 2004 for data printout). However, since the westslope cutthroat trout captured were largely comprised of this year's fry, it is likely that the resulting population estimate is inflated. GANDA captured a total of 23 westslope cutthroat trout; three of these fish were age 1-2 adults (Total Length (TL) 135-195 millimeters) (5.5 - 7.75 inches) and 20 were young of the year (TL 40-61 millimeters) (1.75 -3 inches). Microfish returned a population estimate of 38 fish. All of the adult westslope cutthroat trout were captured in larger pools with dense cover (rootwads and boulders). GANDA captured a total of 131 sculpin; the vast majority of these fish were adults (TL 50-93 mm) (2-3.75 inches).

Although a quantitative survey was not completed, GANDA biologists collected several samples of macroinvertebrates during the habitat surveys in order to qualitatively assess the macroinvertebrate community. We found members of the Ephemeroptera (mayflies), Plecoptera (stoneflies), Dipterans (flies) and Tricoptera (caddisflies). Dipteran larvae observed included members of the crane fly family (Tipulidae) and the midge family (Chironomidae).

Modeling Results: A habitat suitability index (HSI) model is available for cutthroat trout (*Oncorhynchus clarki*) (Hickman and Raleigh 1982). Hickman and Raleigh's model is generalized for all species of cutthroat trout and uses seventeen variables to assess suitability for each life stage. Variables assess temperature, substrate, flow, and cover and are allocated to applicable life stages in the index calculations. Each variable can be scored from 0 to 1.0. To obtain a score for a variable, the site data is plotted on a curve derived from suitable habitat ranges for that variable. For example, the percent of pools during the late/low water period was found to be approximately 15-20%. The curve for this variable rates 15-25% as 0.7. The final index calculates a score using applicable variables for each life stage (adult, juvenile, fry, embryo, and other) and ranges from 0 (unsuitable) to 1.0 (highly suitable). GANDA ran the model using data from our field work and existing data concerning streamflow regime and temperatures. Because some of the parameters related to the embryo component could not be directly measured during the time frame for this assessment (e.g. stream velocity over spawning substrate during incubation period), GANDA calculated the HSI for the adult, juvenile, and fry life stages only. The "other" component evaluates variables affecting all life stages and is factored in to all model output. Based on the data collected in September 2003 and existing sources of historic data, the HSI score for Lone Cabin Creek was 0.78 using the equal component value method for the riverine model (Hickman and Raleigh 1982). Complete model data input is provided in the Silver Strand Fisheries Specialist Report (GANDA 2004).

4.2.2 Torrent Sculpin

Habitat Requirements

Torrent sculpin have been added to the IPNF sensitive species list (dated March 12, 1999). This species has been found within the mainstem Coeur d'Alene River and larger tributary streams. Their preferred habitat is riffle habitat in medium to wide streams and rivers (AFS 2003b). Large adults (>150 millimeters or 5.9 inches) are found in pools. The range of torrent sculpin, a cold water species, overlaps with both westslope cutthroat and historic bull trout. Because this species

primarily inhabits large streams, it would only be affected by proposed activities if the magnitude of the impacts altered habitat conditions in the larger streams.

Life History

Life history information on torrent sculpin is limited, a common situation for most sculpin species. Little information exists on home range size and dispersal. The Montana Natural Heritage Information System has reviewed literature on the species and has posted their review on the web (Hendricks 1997). Much of the following information is derived from that review.

Pre-spawning upstream movements (January-March), and post-spawning downstream movements (April-June) have been reported in Washington; distances of these movements were not determined, and may be relatively small (Hendricks 1997).

Sexual maturity is reached at two years of age at about 5.5 centimeters (2.2 inches) standard length. Adults can live at least six years and reach 15.2 centimeters (6.1 inches). Spawning has been reported to occur in April and May, and eggs are laid on the undersides of rocks (Hendricks 1997). In Montana, fry have been reported to emerge in August (Hendricks 1997).

Torrent sculpins eat a large variety of prey; larger organisms can be consumed because torrent sculpins have large mouths. Several species of salmonids and other game fishes feed on this sculpin species (Hendricks 1997).

Existing Torrent Sculpin Population Status

As noted above, there is not a great deal of information on torrent sculpin distribution or the numbers of torrent sculpin in Idaho streams. Data provided by Ed Lider (Lider 2003a, 2003b) documents the presence of torrent sculpin in the North Fork Coeur d'Alene River above Cascade Creek.

Impacts Determination

The possible impacts on this species are similar to those analyzed for the cold-water MIS such as westslope cutthroat trout. This species may periodically be present downstream of the cumulative impacts area, but is likely absent from the project area. Torrent sculpin have been documented in the Little North Fork Coeur d'Alene River downstream of the cumulative impacts area (E. Lider, USFS, pers. com 2003). There is the potential for small amounts of sediment to be introduced to Lone Cabin Creek and possibly transported downstream into Burnt Cabin Creek. However, the amount of sediment expected given the POO as written is minimal and these sediments should not have measurable impact on the stream system. Because torrent sculpin are unlikely to use Burnt Cabin Creek for any appreciable period, and the impacts of the proposed project will be limited to small amounts of fine sediment being introduced into Lone Cabin Creek near the active project area the impacts determination for this species is:

The action alternatives would have no measurable impact on torrent sculpin or their habitat.

4.3 Analysis of Impacts

In making our determinations of impacts on USFS sensitive species GANDA fisheries biologist consulted with the IDFG and the USFS fisheries biologist on species presence, habitat quality, and potential level of impacts (Table 4.) Although several action alternatives have been developed as modifications of the proposed action, no alternative results in elimination of potential impacts to westslope cutthroat trout; therefore, all alternatives result in the same "impact determination" even though the type and level of impact may differ slightly.

Table 4. Determination of impacts of the Silver Strand underground mine project on Forest Service sensitive fish species.

Species	No Impact	May impact individuals or habitat, but will not likely result in a trend toward federal listing or reduced viability for the population or species.	Likely to impact individuals or habitat, with a consequence that the action may contribute towards federal listing or result in reduced viability for the population or species.*	Beneficial Impact
Westslope cutthroat trout		X		
Redband trout	X			
Burbot	X			
Torrent sculpin	X			

*Considered a trigger for significant action

There are documented occurrences of westslope cutthroat trout within the project area and the cumulative impacts area (Lone Cabin Creek from the headwaters to Burnt Cabin Creek). In addition, the area connects to potential westslope cutthroat trout habitat downstream. Therefore, this discussion will focus on potential impacts to resident fish and habitat that are currently occupied, as well as downstream impacts on habitat.

Mining and associated road building can lead to increased sediment loads and potential pollutant inputs from mine drainage if the water leaving the mine is not treated appropriately. Increased sediment loads fill the interstitial spaces in stream gravels and can smother incubating fish eggs, and alter sediment transport patterns within a stream. Rearing habitat can also be affected, as cover such as boulders, cobble, deep pools, and woody debris fill in with fine sediments over time.

Other pollutants such as metals and acidified mine drainage can negatively affect water quality and can displace fish from habitats at higher concentrations. Woodward et al. (1997) found that cutthroat trout (*Oncorhynchus clarki*) avoided waters with metals concentrations similar to those in the South Fork Coeur d'Alene River, an area heavily impacted by surface (placer) and lode mining. Although the Silver Strand POO has taken steps to contain and filter the mine outflow, it is important to keep in mind the potential harm that can be done by accidental introductions due to spills and filtering/settling equipment failure.

4.3.1 Direct Impacts

4.3.1.1 Sediment

Methodology

Analysis of changes in sediment input is based on assessment of stream conditions and potential sediment sources from the alternatives, as well as knowledge of proposed mining techniques.

Alternative 1- No Action

In the absence of new mine development, the project area would continue to exist as a road-confined stream with the potential for sediment input from the current mine drainage, road failures, traffic, and livestock.

Alternative 2- Permit as Proposed

Direct impacts due to the Silver Strand Project as proposed would include a potential for increased sediment input via runoff to Lone Cabin Creek due to surface disturbance, spills of mined material during loading and unloading of trucks, potential road failures due to increased heavy truck traffic, and mine drainage sediments that may be introduced during the unattended periods (December to March). Since the mine will be unattended during the period that coincides with the most likely occurrences of rain-on-snow events, the potential for the proposed sump and settling tank to be overwhelmed is a concern.

Sediment is also a concern because of the potential impact on westslope cutthroat trout eggs and fry in Lone Cabin and Burnt Cabin Creeks. IDFG communicated a concern that "no increase is acceptable for sediment in either creek" (R. Hennekey, IDFG pers. comm. 2003). The URS hydrologists report found that the new main access road would be problematic in terms of sediment delivery and the various Water Erosion Prediction Project (WEPP) models run found that the main access road, as proposed, would increase sediment delivery substantially (MacDonald et al. 2004). However, the sediment increase would be mitigated by proper and consistent application of BMPs as described in the Hydrologists report (MacDonald and Schick 2004).

Alternative 3

Alternative 3 would potentially decrease the amount of sediment that could reach Lone Cabin Creek by redirecting the mine discharge and reincorporating it into the mine shaft system as part of the backfill. Other sediment-related impacts due to truck traffic and ground disturbance would be the same as those described in Alternative 2.

Alternative 4

Alternative 4 would have a similar potential reduction in sediment impacts due to the redirection of the mine discharge; however, because the water will be distributed on the ground surface, the soil would act as a filter rather than the rocky material within the mine shafts. The dispersal area should be periodically moved so that sediment build up, if any, on the surface does not become prone to runoff erosion. Other sediment-related impacts due to truck traffic and ground disturbance would be the same as those described in Alternative 2.

Alternative 5
Alternative 5 would not change the amount of sediment that could potentially reach Lone Cabin Creek, providing that the geotechnical investigation proved the proposed configuration stable. If the configuration is unstable, this alternative would create a significant risk of slope failure and sediment input.

Alternative 6
Alternative 6 would not appreciably change the sediment related impacts of the POO as written because it does not change the overall area of disturbance. There may be a slight decrease in sediments generated by the truck traffic because of the decrease in overall slope of the access route.

Alternative 7
Alternative 7 basically combines the amount of traffic generated sediments under the no-action alternative, with the additional traffic due to the POO as proposed (Alternative 2).

Consistency with IPNF Forests Plan and Other Regulations and Impacts Determination
Sediment input to the creeks in the project area is one of the most likely impacts from this proposed project. Diligence and strict adherence to BMPs will be necessary to minimize the potential for impacts during the active mining season. Any sediment input to Lone Cabin Creek is likely to impact westslope cutthroat trout because of their documented use of the stream for spawning and rearing up to 2 years of age. Westslope cutthroat trout are in Lone Cabin Creek year–round; therefore, sediment inputs are likely to impact individuals of the species. Sediment would most likely settle out of the water column before traveling downstream beyond the confluence with Burnt Cabin Creek; therefore, it is unlikely that sediments would impact torrent sculpin.

4.3.1.2 Water Quality
Methodology
Analysis of changes in water quality is based on assessment of stream conditions and potential pollutant sources under the alternatives, as well as knowledge of proposed mining techniques.

Alternative 1- No Action
In the absence of mining activity, the existing mine drainage would continue to drain into the roadside ditch and percolate into the stream because of the close proximity of the drainage pathway to the creek. Little monitoring has been done on Lone Cabin Creek regarding the amount of sediment or mine contaminants that enter the creek. Any impacts that currently exist would be expected to continue under this alternative.

Alternative 2
Potential impacts of water quality changes on aquatic communities and their habitat(s) may result from mine operations, including point and non-point source discharges, and changes in

flow regimes due to disturbance of underground hydrology. Parameters of concern may include heavy metals, pH, and total dissolved solids. The Silver Strand POO (4/03/2003) addresses the geologic content of the rocks and their buffering potential and suggests that acid mine drainage should not be a problem. GANDA measured the pH of the mine drainage at 7.1 on September 17, 2003, but the character and/or quantity of the mine drainage may change once active mining begins because the excavation may disturb deposits that will generate more groundwater or that m ay have different compositions that the current exposed rocks. Other common pollutants of concern such as cyanide and cyanide breakdown products (e.g., ammonia, nitrogen compounds), are not planned for use for the off-site ore processing in the POO. If cyanidization is considered in any future revisions to the POO, its use would have to be evaluated closely because of the proximity of the waste dump to Lone Cabin Creek. Other components of the mine drainage such as Arsenic (As) appear to be generated at low enough levels to meet IDEQ and U.S. Environmental Protection Agency (EPA) guidelines (190 ppb) (IDEQ 2003a). Flotation reagents are purported to be removed from the mine tailings prior to transport back to the mine site for dumping, and the tailings will be covered to prevent surface runoff prior to the tailings being used as paste backfill.

Although NJMC would may require a NPDES permit for seepage and wastewater because of a possible exemption for locatable minerals activities, the operator has the responsibility to ensure that no potentially contaminated (e.g. sediments, metals) mine drainage water reaches Lone Cabin Creek either via surface flow or infiltration into an underground aquifer connected to the creek under the State's anti-degradation clause (G. Harvey, IDEQ pers. comm. 2003). It is also the operator's responsibility to consult with the EPA regarding the necessity of an NPDES permit when they are applying for the other required permits for the proposed mining activities.

The injection well proposed to handle excess mine drainage during the active mine season (April to December) would direct water into a zone of fractured quartz downstream from the Silver Strand mine site. The well will have an un-perforated case to a depth of 5.5 meters (18 feet). In order to meet the state anti-degradation clause for water quality, NJMC will need to demonstrate that the well site is hydrologically separate from any aquifers feeding Lone Cabin Creek (G. Harvey, pers. comm. 2003). IDEQ suggested that at a minimum the well will need to be tested using biodegradable fluorescent dye or another acceptable water tracing method prior to active mining and at least once a year during each active season (G. Harvey, pers. comm. 2003). In addition to testing for hydrologic isolation, the receiving water in the well will need to be tested to demonstrate that the mine drainage pumped into the ground water will not degrade existing ground water quality. Mr. Harvey of IDEQ, in consultation with an IDEQ hydrologist, was of the opinion that much of the groundwater in the area carries iron (Fe) and zinc (Zn), but NJMC would need to conduct their own water test to confirm this for the proposed well site. Any mine discharge disposal action would require a monitoring program and would need to be permitted by IDEQ.

NJMC proposes to disconnect the sump settling tank and injection well during the inactive season (January to March) and allow the mine drainage to drain as it currently does, along the drainage ditch on the west side of FR 411. However, NJMC's mining activities may affect both the quantity and quality of the mine drainage. The extent and direction of these impacts cannot be determined with total certainty a priori. If the mining activities do change either the quantity

or constituents of the mine drainage, allowing it to drain as it does now may constitute a degradation of the surface water quality in Lone Cabin Creek as the mine drainage soaks into the roadside sediments, and at least a small portion was observed to drain via a small culvert under FR 411 onto the banks of Lone Cabin Creek (GANDA 2004). The culvert is in a dip in the road that will be filled as part of the POO, but the buried culvert will need to be removed to prevent the direct conveyance of the mine drainage into the creek.

As with any activity involving vehicles and machinery in close proximity to a stream, there is the potential for spills of stored fuel and other toxic chemicals that could adversely affect aquatic communities and their habitat. NJMC has provided for secondary containment of fuel and the explosives will be stored within the mine, which should minimize the risk of on-site spills. In addition, NJMC has filed a spill response plan as part of their POO.

If there is a need for the placement of fill material associated with the culvert removal a Section 404 permit would be required under the Clean Water Act. The 404 permit is issued by the US Army Corps of Engineers (USACE). Although similar activities such as culvert replacements are typically considered as maintenance activities which are permitted under nationwide permit 3, since Lone Cabin Creek is on the 303(d) list for impaired waters, IDEQ may need to certify the culvert work (G. Rayner, USACE, pers. comm. 2003).

Alternative 3

Alternative 3 would potentially decrease the amount of contaminants that could reach Lone Cabin Creek by redirecting the mine discharge and reincorporating it into the mine shaft system as part of the backfill. Other water quality-related impacts due to truck traffic and ground disturbance would be the same as those described in Alternative 2. Alternative 3 would also decrease the need for water diversion from Lone Cabin Creek, potentially to zero. Any reduction in the amount of water diverted from the creek would be considered a beneficial impact to fisheries.

Alternative 4

Alternative 4 would have a similar potential reduction in water quality impacts due to the redirection of the mine discharge; however, because the water will be distributed on the ground surface, the soil would act as a filter rather than the rocky material within the mine shafts. If the mine discharge waters or sediments contain heavy metals or other pollutants the soils and vegetation would become contaminated as well. The dispersal area should be periodically moved so that sediment build-up, if any, on the surface does not become prone to runoff erosion which could introduce contaminants into surface waters. Other water quality-related impacts due to truck traffic and ground disturbance would be the same as those described in Alternative 2.

Alternative 5

Alternative 5 was designed to reduce the potential for acidified mine drainage to reach Lone Cabin Creek. However, this assertion is based on the geotechnical investigation proving the proposed configuration stable. If the configuration is unstable, then this alternative would create

a significant risk of slope failure and potentially catastrophic mine waste input to Lone Cabin Creek.

Alternative 6

Alternative 6 would not appreciably change the water quality related impacts of the POO as written because it does not change the overall area of disturbance. There may be a slight decrease in sediments generated by the truck traffic because of the decrease in overall slope of the access route.

Alternative 7

Alternative 7 basically combines the amount of traffic generated sediments under the no-action alternative, with the additional traffic due to the POO as proposed (Alternative 2). There would be no additional impacts to water quality under this alternative.

Consistency with IPNF Forests Plan and Other Regulations and Impacts Determination

It is difficult to determine the extent of impacts from any of the action alternatives because of the uncertainty surrounding the amount and content of the mine drainage after active mining is resumed. However, if NJMC complies with all state and federal water quality standards and the recommendations/requirements of IDEQ, there will be no impact to sensitive fish species. Complying with these standards should necessitate a water quality monitoring program on a frequency acceptable to all permitting agencies including the USFS. If Alternative 4 was able to reduce the need for water diversion from Lone Cabin Creek it would have a beneficial impact on sensitive fish species.

4.3.1.3 Stream and Riparian Disturbance

Methodology

Analysis of changes in riparian disturbance is based on assessment of stream conditions and potential ongoing sources of disturbance under the alternatives, as well as knowledge of proposed mining techniques.

Alternative 1- No Action

In the absence of new mine development, the project area would continue to exist as a road-confined stream with the potential for sediment input from road failures, traffic, and livestock. Potential riparian disturbances would be limited to road maintenance, impacts from the on-going grazing allotment, and off-road recreational activities.

Alternative 2

NJMC's POO does not include plans to place any structures in or to change the channel of Lone Cabin Creek in any way during the mining operation. After mining is terminated, the culvert in Lone Cabin Creek will be removed and the dimension and profile of the streambed will be stabilized, which will have a positive impact on the channel. The sump pump that will be used to divert water from the creek will only require a screened intake hose to be placed in the creek. Therefore, potential impacts of physical disturbance or removal of aquatic habitat and associated riparian area should be minimal. However, NJMC does propose to remove water from the creek when mine drainage is insufficient to meet their water needs for operation. Therefore, there is a

potential impact due to stream flow changes on aquatic habitat and biota resulting from water withdrawals. The amount of water needed as stated in the POO is small, but because withdrawals will occur during base flow periods the diversion could be a significant portion of the flow at times. Therefore these withdrawals could adversely affect habitat for sensitive fish species and macroinvertebrate communities. Because of the 303(d) listing of Lone Cabin and Burnt Cabin creeks for thermal impacts, any water withdrawal during low-flow periods becomes problematic. A water right would be required for withdrawal from the creek (IDEQ 2000).

Alternative 3

Alternative 3 would not change any of the aspect of the proposed action related to stream and riparian disturbance. If the tank were filled with mine discharge water exclusively, this alternative would eliminate the need for the sump pump in Lone Cabin Creek which could alleviate the potential of minor riparian vegetation and bank disruption from its placement.

Alternative 4

Alternative 4 would have a similar potential reduction in stream and riparian disturbance impacts due to the redirection of the mine discharge; and the possible elimination of the sump pump from Lone Cabin Creek.

Alternative 5

Alternative 5 would not have any impact on the amount of riparian and stream disturbance associated with the proposed action (Alternative 2). However, this assertion is based on the geotechnical investigation proving the proposed configuration stable. If the configuration is unstable, then this alternative would create a significant risk of slope failure and potentially catastrophic mine waste input to Lone Cabin Creek.

Alternative 6

Alternative 6 would not change the riparian and stream disturbance related impacts the proposed action (Alternative 2) because it does not affect an area near or within the riparian area of Lone Cabin Creek.

Alternative 7

Alternative 7 would not have any riparian or stream disturbance related impacts in addition to those under the proposed action (Alternative 2).

Consistency with IPNF forests Plan and Other Regulations and Impacts Determination

Alternative 1 would result in no change to riparian habitat or the stream channel. Within the project area, westslope cutthroat trout would probably maintain their populations over time. Any of the Action Alternatives that potentially require water withdrawals (Alternative 2, 3, & 4) would result in short-term impacts to the stream and riparian area due to reduction in water availability. Consequently, there is the potential for a negative impact to westslope cutthroat trout.

Spills: Other potential direct impacts to aquatic biota could occur from spills during the transport or storage of fuel, other petroleum products, explosives, and other hazardous materials.

4.3.1.4 Fish Passage and Habitat

Methodology

Analysis of changes in passage and habitat is based on assessment of stream conditions and potential fish barriers under the alternatives, as well as knowledge of proposed mining techniques.

Alternative 1 –No Action

The existing culvert on Lone Cabin Creek is a fish barrier (S. DeKome USFS, pers. comm. 2003). Under the no-action alternative this barrier would continue to potentially block migrating westslope cutthroat trout.

Alternative 2

The 1.2 meter (48 inch) culvert that exists on Lone Cabin Creek is a barrier to fish movement during high and low flows. NJMC proposes to remove this culvert after closing the mine, thus removing the barrier and potentially restoring passage.

There is the potential for direct disturbance to habitat used by sensitive fish species during life history events such as spawning, rearing, and adult movements due to increase human presence. However, no activities are planned that will directly impact the stream banks or channel except for the culvert removal.

Access: NJMC proposes to close FR 411 to public use during the mining season as a safety precaution. This would limit access to Lone Cabin Creek for fishing and recreational use. However, given the size of the creek, Lone Cabin Creek is probably not often fished by recreational anglers. In addition, the public could still access the creek from the north via FR 206.

Alternative 3

Alternative 3 would not change any of the aspect of the proposed action related to fish passage If, as stated above, the tank were filled with mine discharge water exclusively, this alternative would eliminate the need for water withdrawals from Lone Cabin Creek which could alleviate the potential of short-term water level fluctuations on fish movement.

Alternative 4

Alternative 4 would have no impacts related to fish passage in Lone Cabin Creek.

Alternative 5

Alternative 5 would have no impacts related to fish passage in Lone Cabin Creek.

Alternative 6

Alternative 6 would have no impacts related to fish passage in Lone Cabin Creek.

Alternative 7

Alternative 7 would have no impacts related to fish passage in Lone Cabin Creek.

Consistency with IPNF forests Plan and Other Regulations and Determination of Impacts

IPNF forests Plan guidelines (USFS 1987) state that habitat for sensitive species should be managed to prevent further declines in populations that could lead to Federal listing under the Endangered Species Act. Without management (i.e., Alternative 1), Lone Cabin Creek would continue to provide good quality, complex habitat for westslope cutthroat trout. However, the culvert would also continue to exist as a passage barrier. **However, this small impact on passage under Alternative 1 would not contribute to a trend toward Federal listing or loss of viability to the population or species.**

The reclamation plan associated with all of the Action Alternatives would improve westslope cutthroat trout habitat by increasing habitat by providing access above the existing culvert. **Consequently, Alternative 2 would have a small beneficial impact on westslope cutthroat trout passage. Torrent sculpin are most likely absent from Lone Cabin Creek; therefore, no alternative would have any impact on torrent sculpin.**

Access: NJMC proposes to close FR 411 to public use during the mining season as a safety precaution. This would limit access to Lone Cabin Creek for fishing and recreational use. However, given the size of the creek, Lone Cabin Creek s probably not actively fished. In addition, the public could still access the creek from the north via FR 206. The direct impacts on access would be the same for all action alternatives except for Alternative 7 which would leave the road open as it is now.

4.3.2 Indirect Impacts

Methodology

Analysis of indirect impacts was based on assessments project-related activities likely to occur outside of the project area and evaluation of potential long-term impacts due to alterations in habitat caused by proposed project actions, as well as knowledge of existing and past projects that have used similar mining techniques.

Alternative 1

Under the No Action Alternative there would be no indirect impacts to the stream or the fisheries resources.

Alternative 2

Indirect impacts due to the Silver Strand POO as proposed will include potential for spills of mined materials, petroleum products, and explosives during transport along USFS and other public roads. In addition, because the haul route crosses at least three 303(d) listed streams (Burnt Cabin Creek, Little North Fork Coeur D'Alene River, and South Fork Coeur D'Alene River) there is additional concern for contamination of streams listed by the state as already in need of restoration (B. Schuld 1/28/03 e-mails).Water withdrawals from Lone Cabin Creek could reduce water levels and cause reduced recruitment of westslope cutthroat trout due to stress and increases in water temperature.

Alternative 3

Alternative 3 would not change any of the aspect of the proposed action related to indirect impacts. If, as stated above, the tank were filled with mine discharge water exclusively, this alternative would eliminate the need for water withdrawals from Lone Cabin Creek which could alleviate the potential of indirect impacts on westslope cutthroat trout recruitment under the proposed action (Alternative 2).

Alternative 4

Alternative 4 has the potential to introduce small amounts of heavy metals into the soils and vegetation in the discharge areas if the water is not properly filtered and treated to remove such materials. These may work their way into Lone Cabin Creek via runoff over time and cause water quality degradation in the future.

Alternative 5

If the RSS in its new configuration is proven stable, then Alternative 5 would have no fisheries resource related indirect impacts beyond those stated for the proposed action (Alternative 2).

Alternative 6

Alternative 6 would have no fisheries resource related indirect impacts beyond those stated for the proposed action (Alternative 2).

Alternative 7

Alternative 7 would have no fisheries resource related indirect impacts beyond those stated for the proposed action (Alternative 2).

4.3.3 Cumulative Impacts

Methodology

A determination of the cumulative impacts analysis area is based on each fish species' ability and likelihood to migrate seasonally within a drainage area in relation to available habitat, and life stage, and boundaries that represent the point of diminishing potential impacts. Because we are focused on waterborne sediments and potential pollutants, the extent of the impacts area is determined by how far downstream these constituents are likely to travel and have an impact on habitat or aquatic species. For the Silver Strand Project, the cumulative impacts analysis area was determined to be Lone Cabin Creek from the headwaters to its confluence with Burnt Cabin Creek and continuing downstream 0.8 kilometers (0.5 miles). Note that this area is different from the cumulative impacts area analyzed for some of the other resources, such as botany and wildlife.

In addition to the specific activities identified for each alternative, there are other activities are ongoing or reasonably foreseeable to occur. These activities have the potential to alter various aspects of watershed conditions. Protective measures will be recommended and incorporated into

the designs for future projects as part of their environmental review allowing watershed resources to be maintained. Impacts to fisheries resources can be expected from these activities, and any action alternative under this analysis is considered to have additive impacts when combined with the No-Action Alternative. All projects identified as reasonably foreseeable will need to complete consultation with the USFWS prior to the decision, unless consultation has already occurred. There are currently no private lands within the analysis area; therefore activities and actions on private lands were not considered.

To determine any future activities on National Forest lands, the Forest Service's Schedule of Proposed Actions (SOPA) was reviewed. The Forest Service has one planned future action, a road construction and obliteration project that will affect approximately 1.6 kilometer (1 mile) of riparian area along Burnt Cabin Creek downstream from its confluence with Lone Cabin Creek (T. Syverson and E. Lider pers. comm. 2003), in the Silver Strand cumulative impacts analysis area. The road reconstruction project is still in the very early planning stages and a location for the new road alignment was not available at the time of this report (T. Syverson, pers. comm. 2003).

Ongoing actions include a grazing allotment for 45 cow-calf pairs that includes the area north of Cascade Creek along the Little North Fork Coeur d'Alene River (Iron Mokins). These livestock could be in the Lone Cabin/Burnt Cabin area from June to September and are rounded up near the mouth of Burnt Cabin at the end of the season. GANDA observed evidence of cattle use along the FR 411 and in the stream channel upstream of the project area during our site visit in September, but not within the project area where the stream channel is incised and probably not easily accessed by cattle. Water is available and grazing forage is much more attractive near the Burnt Cabin confluence downstream of the project area. In addition, NJMC intends to close access to FR 411 during the allotment period, which would prevent most cattle from accessing the area.

The foreseeable future actions in the cumulative impacts analysis area (other than the proposed Silver Strand project) related to the road project along Burnt Cabin Creek cannot be evaluated at this time because of a lack of specifics. The ongoing impacts from the grazing allotment appeared to be minimal in the project area based on our field observations which would have coincided with the end of the grazing season. However, livestock grazing is a common contributor of sediment due to cattle congregating within riparian areas, and livestock presence has a definite potential to degrade in-stream habitat.

Alternative 1- No Action

There will be no cumulative impacts under Alternative 1.

Alternative 2

If the Silver Strand Project succeeds in excluding the cattle from the Lone Cabin drainage, there could be a beneficial impact to the creek. However, contributions to cumulative impacts on native fish populations from some biotic factors will be largely unaffected by the alternative selected. Rieman and McIntyre (1993) report that the elimination or isolation of different life history forms, predation, competition, or hybridization with exotic species, and increased variation of population dynamics are critical mechanisms leading to population declines or

extinction. Some of these mechanisms, particularly isolation of life history forms and competition and hybridization with exotic fish species, may be contributing to cumulative impacts for native trout populations within the analysis area. Removing the passage barrier in Lone Cabin Creek will open the upper reaches of the creek all fish, including potential colonization by rainbow trout. Therefore, there may be a small cumulative impact on westslope cutthroat trout given that other passage barriers are being removed in the Little North Fork Coeur d'Alene River watershed. Impacts from predation, competition, and variation of population dynamics are not expected to be affected by this alternative.

Alternative 3
Alternative 3 would not change any of the aspect of the proposed action related to cumulative impacts on fisheries resources. This is assuming that the mine discharge is fully incorporated into the backfill and does not enter the groundwater system. If the waters enter the groundwater, the cumulative impacts would be similar to those described below under Alternative 4.

Alternative 4
Alternative 4 has the potential to introduce small amounts of heavy metals into the soils and vegetation in the discharge areas if the water is not properly filtered and treated to remove such materials. These may work their way into Lone Cabin Creek via runoff over time and cause water quality degradation in the future. Because of the past mining history in the area and the current water quality impairment of Lone Cabin and Burnt Cabin creeks even small amounts of contaminants would constitute a negative cumulative impact.

Alternative 5
Alternative 5 would not change any of the aspect of the proposed action related to cumulative impacts on fisheries resources.

Alternative 6
Alternative 6 would not change any of the aspect of the proposed action related to cumulative impacts on fisheries resources.

Alternative 7
Alternative 7 would not change any of the aspect of the proposed action related to cumulative impacts on fisheries resources.

4.3.4 Determination of Impacts on Westslope Cutthroat Trout
There is the potential for small amounts of sediment to be introduced to Lone Cabin Creek and possibly transported downstream into Burnt Cabin Creek. However, the amount of sediment expected given the POO as written is minimal and these sediments should not have measurable impact on the stream system. All recent surveys indicate that westslope cutthroat trout use the Lone Cabin and Burnt Cabin Creek watersheds year round both as resident and as spawning habitat. The Silver Strand POO as written has the potential to affect individuals and populations, but the level of potential impacts on the stream appears to be minimal and the operator has taken steps to reduce the potential. Therefore, the determination of impacts on sensitive species is

"May impact individuals or habitat, but will not likely result in a trend toward federal listing or reduced viability for the population or species."

Analysis area: Lone Cabin Creek from headwaters to confluence with Burnt Cabin Creek

Biological Determination: May impact westslope cutthroat trout individuals or habitat, but will not likely result in a trend toward federal listing or reduced viability for the population or species.

4.3.5 Determination of Impacts on Torrent Sculpin

The possible impacts on torrent sculpin are similar to those analyzed for westslope cutthroat trout. Torrent sculpin may periodically be present downstream of the cumulative impacts area in the mouth of Burnt Cabin Creek, but are likely absent from the project area. Because torrent sculpin are unlikely to use Burnt Cabin Creek for any appreciable period, and the impacts of the proposed project will be limited to small amounts of fine sediment being introduced into Lone Cabin Creek near the active project area it is unlikely that the project as proposed would have any impact on torrent sculpin.

Analysis area: Lone Cabin Creek from headwaters to confluence with Burnt Cabin Creek

Biological Determination: The proposed action would have no measurable impact on torrent sculpin or their habitat.

4.4 Mandatory Conservation Requirements

Conditions of this Biological Evaluation must be met in order to preserve the determination stated in this document unless otherwise agreed to and documented by the appropriate personnel. They include:

1. The sump pump used to divert water from Lone Cabin Creek will be situated inside a spill containment device such as a stock tank to minimize potential fuel contamination of the riparian area in the event of a spill. The device should be situated as far from the riparian zone as practicable to minimize foot traffic/disturbance of riparian vegetation and stream banks and reduce the potential for fuel spills to enter the creek. The pump intake will be screened with material sized to exclude aquatic organisms (~ 8 millimeter (3/8 inch) mesh).

2. As stated above, the NJMC proposes to remove the existing 1.2 meter (48 inch) culvert from Lone Cabin Creek when the mine is permanently closed. However, the material used to fill in and set the culvert was derived from mine wastes on site (C. Dail per. Comm. 2003). Therefore, care should be taken when the culvert is removed to minimally disturb this material while removing it, and ensure that all of the mine waste material is removed from the creek area and disposed of as part of the mine backfill or transported off site. The streambank and channel will need to be reconstructed to a stable profile and dimension typical of the undisturbed portion of the stream. After completion, the area along the stream will be reseeded and stabilized.

3. Large equipment work in the stream channel during culvert removal or stream reconstruction will be limited to crossing the channel when absolutely necessary to access the far side and putting in grade controls. Lone Cabin Creek is a fairly narrow stream and much of the reconstruction work should be able to be accomplished from the FR411 side of the channel.

4. Removal of the culvert will take place during base flow periods (late summer-early fall) to avoid spawning and embryo development season for resident fish (westslope cutthroat trout) and to minimize channel disturbance and sediment transport. No stream-disturbing work will occur before July 15.

5. Best Management Practices for watershed resources (Section III, IV, & V) will be used to minimize introductions of sediment into Lone Cabin Creek (ID Department of State Lands 1992).

6. During surface disturbing work such as road reconstruction, road construction, other facility construction (injection well drilling, pole building construction, etc.) sediment retention devices will be installed and inspected frequently to ensure proper function. If straw bales are used, they must be certified weed-free. When activities are complete, these devices will be removed and sediments will be stabilized and reseeded with a certified weed-free mix approved by the District Botanist.

7. The injection well proposed for the disposal of mine wastewater must be located in an area that is demonstrated to be hydrologically separate from the aquifer feeding Lone Cabin Creek (i.e. bedrock of sufficient depth and integrity). The injection well and any other mine discharge disposal actions will be certified and permitted by the IDEQ.

8. The sump and settling container will be monitored during the inactive season periodically on a schedule agreed upon by the District Ranger and the operator to ensure that mine drainage is not generating sediments or contaminants that could enter Lone Cabin Creek. Monitoring will include visual inspection of the sump and drainage ditch for sediment accumulation and capacity, water quality testing similar to that conducted by NJMC and submitted with the POO, and visual road inspection to ensure that the mine drainage is not being conveyed directly into the creek due to a road failure.

9. All sediments collected in the sump will be need to be tested to determine the level of metals and periodically removed and disposed of as part of the paste backfill. Under no circumstances will this sludge be stored outside of the sump or dumped on the surface on-site.

10. No trees or down logs will be removed or introduced into the riparian area in association with this activity without review and acceptance by an aquatic biologist.

11. If NJMC crew members elect to camp on-site, they will have self-contained shower facilities and grey water systems for all cooking or cleaning necessary. Under no

circumstances will any camp waste water be introduced into Lone Cabin Creek or dumped on the ground in the project area or the "staging area" on the southeast side of Lone Cabin Creek. Portable bathroom facilities will be provided at the camp site AND at the 225 dump (as proposed in the POO) if campers are dispersed beyond the No. 225 site.

Additional mitigation applicable to Alternative 2 only:

1. A water storage tank(s) will be used to collect water for use in mining activities to reduce the peak demand for diversion from the creek in low flow periods. The tank(s) will have a capacity sufficient to meet the water needs of the mine for two days at actual peak consumption for the mining activities as stated in the POO. The rate of water diversion will be at or below the minimal withdrawal stated in the POO, and excess diverted will be used to fill the tank over the period of little or no mine-related water use.

Additional mitigation applicable to Alternative 4 only:

1. Hoses will be placed over areas covered with dense groundcover. Under no circumstances will hoses be placed on bare ground.
2. Hoses will be inspected on a weekly basis to determine if they need to be moved to prevent soil saturation and potential isolated erosion. Hoses will be moved immediately if any exposed soil is noted during an inspection.

4.5 Fisheries References

Personal Communications:

Dail, C. 2003. USFS Geologist Coeur d'Alene River Ranger District. Personal communication, September 16, 2003.

DeKome, S. 2003. USFS, Fisheries Resources. Coeur d'Alene River Ranger District. E-mail correspondence with Christopher Dail, October 21, 2003.

Harvey, G. 2003. Idaho Department of Environmental Quality. Personal communication, October 1, 2003.

Hennekey, R. 2003. Project Environmental Biologist. Idaho Department of Fish and Game. Personal communication, October 3, 2003.

Lider, E. 2003. USFS Fisheries Biologist. Coeur d'Alene River Ranger District. Personal communication, September 23, 2003.

Rayner, G. Regulatory Project Manager, U.S. Army Corps of Engineers, Walla Walla District e-mail dated November 21, 2003

Schuld, B. Idaho Department of Environmental Quality. E-mail correspondence with C. Dail USFS. January 28, 2003.

Syverson, T. 2003. USFS Central Zone Engineer. Idaho Panhandle National Forests. E-mail to Sherri Lionberger, USFS Ecosystems Team Leader, in an e-mail sent to Chris Dail, USFS Geologist. September 25, 2003.

References:

American Fisheries Society Idaho Chapter (ID AFS) 2003a. Fishes of Idaho website. Burbot. Accessed on January 9, 2004. Available on-line at http://www.fisheries.org/idaho/butbot.htm .

American Fisheries Society Idaho Chapter (ID AFS) 2003b. Fishes of Idaho website. Torrent sculpin. Accessed on October 7, 2003. Available on-line at http://www.fisheries.org/idaho/torrent_sculpin.htm .

Bradley, C., J. Rhodes, J. Kessler, and C. Frissel. 2002. An analysis of trout and salmon status and conservation values of potential wilderness candidates in Idaho and eastern Washington; a report by the western native trout campaign.

GANDA. 2004. Silver Strand Fisheries Specialist Report. Garcia and Associates. Bozeman, MT.

Hendricks, P. 1997. Status, Distribution, and Biology of Sculpins, (Cottidae) in Montana: A review. Montana Natural Heritage Program. Available on-line at: http://nhp.nris.state.mt.us/animal/reports/fish/sculpin.html. Accessed on November 21, 2003.

Hickman, T. and R. F. Raleigh. 1982. Habitat suitability index models: cutthroat trout. FWS/OBS-82/10.5. WELUT, Fort Collins, Co. 38 pp.

-------- 2000. North Fork Coeur d'Alene Total Maximum Daily Load (TMDL) – November 2000. Idaho Department of Environmental Quality, Boise, Idaho.

-------- 2003. Waterbody Use Report. http://inside3.uidaho.edu/WebMapping/IDEQ/. Idaho Department of Environmental Quality, Boise, Idaho.

-------- 2003a .Water quality standards and wastewater treatment requirements for the State of Idaho, IDAPA58, Title 03, Chapter 02. http://www2.state.id.us/adm/adminrules/rules/idapa58/0102.pdf. Idaho Department of Environmental Quality, Boise, Idaho.

Idaho Department of State Lands. 1992. Best management practices for mining in Idaho. Idaho Department of State Lands, Boise.

Idaho Department of Fish and Game, Streamnet. (IDFG) 2004. Streamnet data request for information on Lone Cabin and Trail Creeks (HUC 17010301, Upper Coeur d'Alene). Fish species documented or suspected present. January 9, 2004.

Jakober, M.J., and T.E. McMahon 1997. Role of Stream Ice on Fall and Winter Movements and Habitat Use by Bull Trout and Cutthroat Trout in Montana Headwater Streams. Transactions of the American Fisheries Society. 127:2 223-235.

Lider, E. 2003a. Electrofishing/sampling data query for Burnt Cabin and Lone Cabin Creek from USFS database for 1994 and 1995. USFS Coeur d'Alene River Ranger District. 17 pgs.

-------- 2003b. Electrofishing report for Lone Cabin Creek 1997. USFS Coeur d'Alene River Ranger District. 19 pgs.

Liknes, G.A. and P.J. Graham. 1988. Westslope Cutthroat Trout in Montana: Life History, Status and Management. Status and Management of Interior Stocks of Cutthroat Trout. American Fisheries Society Symposium 4:53-60.

Mac Donald, A., Schick, J. and L. Roulson. 2004. Hydrology, Soils, Geology, & Geotechnical Specialist Report: Silver Strand Underground Mine Project Draft Report. Prepared for Idaho Panhandle National Forests. Coeur d'Alene, Idaho. Prepared by URS Corporation. Portland, Oregon, and Garcia and Associates. Bozeman, MT.

McIntyre, J.D. and B.E. Rieman. 1995. Westslope Cutthroat Trout IN Conservation Assessment for Inland Cutthroat Trout. General Technical Report RM-256. US Department of

Agriculture, Forest Service, Rocky Mountain Forest and Range Experiment Station, Fort Collins, Colorado. M.K. Young, tech. Ed. Pages 1-15.

Overton, C.K., S.P. Wollrab, B.C. Roberts, M. A. Radko. 1997. R1/R4 (Northern/Intermountain Regions) fish and fish habitat standard inventory procedures handbook. INT-GTR-346.Ogden, Utah: USDA Forest Service: 1-72.

Rieman, B. and K. Apperson. 1989. Status and analysis of salmonid fisheries: Westslope cutthroat trout synopsis and analysis of fishery information. Idaho Department of Fish and Game. Project F-73-R-11, Subproject No. 11, Job No. 1., 112 pp.

Rieman , B.E. and J.D. McIntyre. 1996. Spatial and temporal variability in bull trout redd counts. North American Journal of Fisheries Management. 16:132-141.

Shepard, B.B., B.E. May and W. Urie. 2003. Status of westslope cutthroat trout (*Oncorhynchus clarki lewisi*) in the United States: 2002. westslope cutthroat trout interagency team, Bozeman, Montana.

Shepard, B., K. Pratt and J. Graham. 1984. Life Histories of Westslope Cutthroat and Bull Trout in the Upper Flathead River Basin, Montana. Montana Dept. of Fish, Wildlife and Parks, Kalispell, MT.

U.S. Bureau of Mines. 1996. Analytical results for water quality from the Silver Strand Mine from 1991-1995. Included in a letter to Fred Brackebusch, Mine Systems Design. June 21.

U.S. Fish and Wildlife Service. 2002. Biannual Forest-wide species list. Reference Number 1-9-02-SP-213. Upper Columbia Basin Field Office, Spokane, WA.

-------- 2003. Proposed Rules. Endangered and Threatened Wildlife and Plants: Reconsidered Finding for an Amended Petition To List the Westslope Cutthroat Trout as Threatened Throughout Its Range. Federal Register.Vol. 68, No. 152 . August 7.

U.S. Forest Service. 1998. Geographic Assessment of the Coeur d'Alene River Basin. Idaho Panhandle National Forests.

Van Deventer J.S. and W.S. Platts. 1985.Microfish: A computer software system for entering, managing, and analyzing fish capture data from streams. USDA Forest Service Research Note INT-352. Intermountain Research Station, Ogden, Utah.

Wolman, M.G. 1954. A method for sampling coarse river-bed material. Transactions of the American Geophysical Union 35:951-956.

Woodward, D.F., J.N. Goldstein, A.M. Farag, and W.M. Brumbach. 1997. Cutthroat trout avoidance of metals and conditions characteristic of a mining waste site: Coeur d'Alene River, Idaho. Transactions of the American Fisheries Society 126:699-706.

5.0 Wildlife Resources

Currently the USFS Region 1 lists twelve species as sensitive on the IPNF: Coeur d'Alene salamander (*Plethodon idahoensis*); boreal toad (*Bufo boreas boreas*); northern leopard frog (*Rana pipiens*); common loon (*Gavia immer*); harlequin duck (*Histrionicus histrionicus*); northern goshawk (*Accipiter gentilis*); peregrine falcon (*Falco peregrinus*); flammulated owl (*Otus flammeolus*); black-backed woodpecker (*Picoides arcticus*); Townsend's big-eared bat (*Corynorhinus townsendi*); fisher (*Martes pennanti*); and wolverine (*Gulo gulo*). Table 4 identifies relevant species, their status in the project area, and level of analysis. Species that received further alternatives analysis were selected based on habitat presence in the project area, and the expected measurable effect of project operations on that species' habitat.

Table 5. Wildlife species, presence and habitat status in project area, and level of analysis

Common Name	Scientific Name	Species or Habitat Present on District?	Species or Habitat Present in Project Area?	Species or Habitat Measurably Affected?	Species Further Analyzed?
Sensitive Species					
Coeur d'Alene salamander	*Plethodon idahoensis*	Yes	Yes	Yes	Yes
Boreal toad	*Bufo boreas boreas*	Yes	No	No	No
Northern leopard frog	*Rana pipiens*	Yes	No	No	No
Common loon	*Gavia immer*	Yes	No	No	No
Harlequin duck	*Histrionicus histrionicus*	Yes	No	No	No
Northern goshawk	*Accipiter gentilis*	Yes	Capable habitat present	Yes	Yes
Peregrine falcon	*Falco peregrinus*	Yes	No	No	No
Flammulated owl	*Otus flammeolus*	Yes	No	No	No
Black-backed woodpecker	*Picoides arcticus*	Yes	No	No	No
Townsend's big-eared bat	*Corynorhinus townsendi*	Yes	Potential habitat present	No	Yes
Fisher	*Martes pennanti*	Yes	No	No	No
Wolverine	*Gulo gulo*	Yes	No	No	No

GANDA biologists conducted a site visit on September 16-17, 2003. We performed an informal survey to evaluate habitat characteristics, and a protocol survey for Coeur d'Alene salamanders (USFS 1991). Two sites were identified for the protocol surveys during the daytime evaluation; the mine wastewater runoff ditch, and 400 meters (1,312 feet) of Lone Cabin Creek centered on the culvert opposite Adit No. 3.

5.1 Existing Conditions and Inventory

Wildlife distribution and abundance is primarily a function of habitat conditions specific to a given species. These conditions include variable attributes such as vegetation type, structure, and successional stage, and fixed attributes such as soils, elevation, slope and aspect. This

combination of attributes is dynamically modified over time by disturbances such as fire, disease, and climatic events. Anthropogenic impacts can also alter the habitats either directly (timber harvest, prescribed burning, mining activities) or indirectly (fire suppression, climate change). These impacts can result in changes to vegetation composition and structure, and can interact with natural disturbance regimes.

The Silver Strand project site is located on an east southeast-facing hillside of 30-40 percent slope. The site contains an active Forest Service road with a pullout and an undeveloped campsite, and gated mine adit access roads. The roads are passable but not currently open to public access. There have been no recent timber harvesting activities or fires in the project area, but past mining efforts have left visible ground disturbances and facilitated invasion of noxious weeds. The elevation at the top of the uppermost adit is approximately 1,100 meters (3,600 feet), and the bed of Lone Cabin Creek lies at approximately 915 meters (3,000 feet). Lone Cabin Creek is a first order stream approximately 98 meters (320 feet) horizontally from the ground-level adit, and forms the southeast border of the project area.

The vegetation is predominantly a mid-seral, mixed-conifer forest with an understory composed of small shrub stands and herbs. The canopy has few openings, averaging approximately 70% canopy closure, and the understory is patchy and sparse. The site contains no open meadows or fields. Dominant tree species are western hemlock (*Tsuga heterophylla*), grand fir (*Abies grandis*), western redcedar (*Thuja plicata*), white pine (*Pinus monticola*), and Douglas-fir (*Pseudotsuga menziesii*). Shrub stands are composed of chokecherry (*Prunus virgininana*), oval-leaved huckleberry (*Vaccinium ovalifolium*), and fool's huckleberry (*Menziesia ferruginea*). Herbs of the understory include sweet-scented bedstraw (*Galium triflorum*), pathfinder (*Adenocaulon bicolor*), queen's cup (*Clintonia uniflora*), and twinflower (*Linnaea borealis*). The ground is covered by a deep layer of forest duff. Habitats consist of moist forest guilds.

5.2 Sensitive Wildlife Species

In this section we characterize available habitats in the project area and describe the habitat requirements, reference, and existing conditions for each species. Through this process we identify which species will or will not occur in the project area based on available habitat and/or seasonal habitat requirements, and recommend further surveys where needed. The information presented here is based on site visits, interviews with knowledgeable state and federal agency personnel, database searches, and literature review.

The IPNF has developed habitat models for several species. For our analysis, we defined a one-mile radius around the project area as a unit of analysis in order to equivalently evaluate habitat model data for each species relative to the project area. The size of this area is 1,122 hectares, or 2772 acres.

The habitat model results define habitat for all species as "capable" and "suitable". Capable habitat is defined as: the inherent future or potential of a site to provide essential habitat requirements for a given species. The site vegetation may not be currently suitable for a given species due to variable stand attributes (such as cover type, unsuitable seral stage, or stand density) but the site has the fixed attributes (elevation, slope, aspect, soil, and habitat type) that

would enable it to provide those variables under appropriate conditions. This designation is also useful for identifying areas suitable for restoration efforts. Suitable habitat is defined as: the current ability of a site to provide essential habitat requirements for a given species. Suitable habitat currently exists and has both fixed and variable attributes required by a given species.

5.2.1 Coeur d'Alene Salamander

Habitat Requirements

Coeur d'Alene salamanders have very small home ranges and seldom migrate from their adult habitats (Nussbaum et al. 1983). They are found in moist environments such as established seeps and year-round springs, waterfall splash zones, and streamsides of small cascading creeks between sea level and 1524 meters (5,000 feet) (Stebbins 1985). The species' habitat requirements also include fractured bedrock, talus, or gravel required for winter and dry-season aestivation, and a dense forest canopy to moderate surface water temperatures (Cassirer et al. 1994).

Reference and Existing Conditions

Fifty-nine occurrences of this species have been documented in the Central Zone (USFS 2002a).. Two additional sightings are documented by the Idaho Conservation Data Center query (ICDC 2003) and occur 7.2 kilometers (4.5 miles) south and 8 kilometers (5 miles) south-southeast of the project area. These are the closest sightings to the project area.

Lone Cabin Creek lies at approximately 4,800 meters (3,000 feet), putting it well within this species' elevation range. Some attributes of Coeur d'Alene salamander habitat, such as waterfall splash zones, streamsides, and fractured rock formations, are present year-round, but identifying seeps can be difficult. Seeps and surface water features can depend on spring runoff and surface water conditions; therefore suitable habitat may exist in spring but be unidentifiable at other times of the year (Worden, pers. comm. 2003). Optimum survey periods are May, June and September when temperatures are above 9°C (48°F) with high relative humidity. September rains facilitate surface feeding, and can create suitable habitat until temperatures drop below 8.8°C (48°F).

No seeps or vegetation indicative of perennial surface water, were located on exploratory survey transects through the project site above Lone Cabin Creek. The mine itself is releasing water and may be draining surface water from the site, and the forest floor is highly disturbed with signs of past mineral diggings common throughout the project area. Historical activities of surface and subsurface disturbance may have caused groundwater to drop subsurface on the slope above Lone Cabin Creek, thus eliminating suitable habitat for this species.

Following the initial exploratory survey we conducted protocol surveys at the site on September 17, 2003 in the mine discharge ditch and Lone Cabin Creek. Rainfall occurred two days prior to and on the day of the surveys. We surveyed 200 meters (656 feet) upstream and downstream (total of 400 m.; 1,312 ft.) from the culvert outside of the lower adit. No salamanders were documented during the surveys.

5.2.2 Boreal Toad

Habitat Requirements

The boreal toad (*Bufo boreas boreas*) breeds in marshes, small lakes and slow-moving streams. The discharge ditch and Lone Cabin Creek are too small and fast moving to be suitable habitat (Leonard 1993). There is potential for suitable habitat near the site because this species does not require standing water all season, and can travel a mile from where eggs are laid. Boreal toads will not lay eggs in main creek channels, but may lay them in marshy or boggy areas. Suitable breeding habitat availability is likely the limiting factor for this species. During the non-breeding season the adults live underground adjacent to their breeding habitat or in upland habitats, particularly near seeps (Corkran and Thoms 1996).

Reference and Existing Conditions

Boreal toads appear to be in decline throughout most of their historical range. There are records for this species in the Central Zone (USFS 2002a). No boreal toad habitat exists in or near the project area.

5.2.3 Northern Leopard Frog

Habitat Requirements

The northern leopard frog inhabits a variety of habitats ranging from grassland, brushland, woodland, and forest, and can range into high elevations. It breeds from mid-March to early June, and utilizes springs, slow moving streams, marshes, bogs, ponds, canals, and reservoirs (Stebbins 1985).

Reference and Existing Conditions

There are no leopard frog sightings in the Central Zone (USFS 2002a). No northern leopard frog habitat exists in or near the project area.

5.2.4 Common Loon

Habitat Requirements

Common loons are closely tied with large bodies of water. They generally nest in clear, fish bearing, oligotrophic lakes surrounded by forests. They nest on islands, floating grass mats, or other areas protected from wind and waves. They tend to be sensitive to human disturbance.

Reference and Existing Conditions

One sighting has been recorded in the Central Zone (USFS 2002a). There is no loon habitat on or near the project area.

5.2.5 Harlequin Duck

Habitat Requirements

Harlequin ducks occur in mountain stream environments during the breeding season (Sibley 2000). Their breeding habitat consists of clean, clear, fast-flowing, low gradient mountain streams (2nd order or larger) with rocky substrates and riparian bank vegetation.

Reference and Existing Conditions

There are 8 sightings recorded in the Central Zone (USFS 2002a). Trends in harlequin duck abundance in northern Idaho are unknown. There is no harlequin duck habitat in or near the project area; therefore the project will have **no impact** on the harlequin duck.

5.2.6 Northern Goshawk

Habitat Requirements

Northern goshawks are associated with a variety of forest types that include aspen, coniferous, and mixed hardwood-conifer stands (Squires and Reynolds 1997). Limiting factors for goshawks include availability of nesting habitat, which generally includes mature and old growth forests with high canopy closure, open understories, and slopes less than 40% (Squires and Reynolds 1997). Nest trees can range from 23 centimeters (9 inches) diameter at breast height (dbh) or larger, but are usually among the larger trees in the stand, and are usually located near drainages. Forest stands that contain nests are often small, approximately 10 to 101 hectares (25 to 250 acres). Foraging habitat includes a wide range of forest age structures with relatively open understories. Disturbances such as timber harvest, mining activities, or human activity near nests have been shown to cause nest failures (Squires and Reynolds 1997).

Reference and Existing Conditions

The USFWS concluded that, despite changes in forest vegetation due to timber harvest, goshawk populations in the western U.S. continue to be well distributed throughout their historic range (USFS 1998). This report also states there is no indication that goshawk populations are declining overall, although they may be declining in certain parts of their range.

There have been 87 goshawk sightings in the Central Zone (USFS 2002a), with the closest located approximately eight kilometers (five miles) to the east of the project site (USFS 2002). The Forest goshawk habitat suitability and habitat capability model results indicate 91.3 hectares (225.7 acres) of capable habitat within a one-mile radius of the project site, with all but 10 acres located on the eastern side of Lone Cabin Creek. No suitable habitat exists within this buffer, and no nests are documented within the project area. This indicates that the project area is located in relatively poor goshawk habitat when compared to other parts of the IPNF. The capable areas are currently marginal due to insufficient density of large (>30.5 centimeters (12 inches) dbh) trees.

5.2.7 Peregrine Falcon

Habitat Requirements

Peregrine falcons occur in a variety of habitats. They primarily hunt birds that range in size from songbirds up to ducks, geese, and even herons (Sibley 2001). Peregrines usually nest on high cliffs near water bodies where avian prey species are most common. Hunting territories range from 10 to 20 miles from their nest sites (Sibley 2001).

Reference and Existing Conditions

There have been five peregrine falcon sightings in the Central Zone (USFS 2002a). There is no peregrine falcon habitat in the project area.

5.2.8 Flammulated Owl

Habitat Requirements

Flammulated owls are Neotropical migrants, and occur in the northern Rocky Mountains during breeding season in spring. Nesting habitat consists of mid-elevation mature and old growth conifer forests dominated by ponderosa pine (Hayward and Verner 1994). On the IPNF the species occurs in low density, mature and old growth ponderosa pine and Douglas-fir stands with moderately open canopies (USFS 1992).

Reference and Existing Conditions

The species has declined in the past century due to habitat loss from logging, fire, and stand conversions. One sighting record exists in the Central Zone (USFS 2002a). Only 0.1 hectare (2.4 acres) of capable habitat, and no suitable habitat, exists in the project area. The capable habitat unit is approximately 1.6 kilometers (one mile) from the project site.

5.2.9 Black-backed Woodpecker

Habitat Requirements

The black-backed woodpecker occurs primarily in burned areas in montane and pine forests (USFS 1992; Dixon and Saab 2000). Recently burned or diseased trees provide outbreaks of bark beetles, a major prey item for the woodpecker. Most studies indicate that the species prefer to forage on dead trees rather than live trees (Dixon and Saab 2000). Nesting cavities are excavated in rotten or rotting dead or live trees generally 20.3 to 30.5 centimeters (8 to 12 inches) dbh and near water (USFS 1992). However, Saab and Dudley (1998) found they preferred trees that averaged about 40.6 centimeters (6 inches) dbh. They seem to select for ponderosa pine (*Pinus ponderosa*) in fragmented habitats (Dixon and Saab 2000).

Reference and Existing Conditions

Twenty-eight sightings have been recorded in the Central Zone (USFS 2002a), but none have occurred on the District (USFS 2002). Fire suppression and timber harvest have resulted in fewer burned areas and availability of snags throughout their range, greatly reducing suitable habitat for this species. No large patches of burned or diseased trees occur near the project area. The project area does not currently provide suitable habitat for this species.

5.2.10 Townsend's Big-eared Bat

Habitat Requirements

Townsend's big-eared bats are medium-sized bats with a wingspan of 30 centimeters (11.8 inches). This species is insectivorous, and preys mainly on small moths. Most foraging activity occurs late at night. They occur in a variety of habitat types where caves or cave-like structures (including mines) are present. In general, they prefer to roost alone or in small clusters in cold caves and mine shafts. One of only 3 bat species known to overwinter in the northern Rockies, it hangs exposed from the cave or mine shaft ceiling rather than hiding in cracks or crevices. This behavior makes it more susceptible to human disturbance (Foresman 2001).

Reference and Existing Conditions

No information exists on Townsend's big-eared bat populations in northern Idaho. Caves are rare due to the geological character of the region, so the species was likely historically rare. Artificial habitats such as mines may attract bats. The project area contains two adits that may attract this species, especially during the winter when mining activities cease. In neighboring Montana, it is one of the rarest species in the state.

No sighting records exist in the Central Zone (USFS 2002a), although they have been documented to the north on the adjacent Bonners Ferry Ranger District at the Bethlehem Mine and American Girl Mine, approximately 120 kilometers (75 miles) due north in Boundary County. No information exists on Townsend's big-eared bat populations in northern Idaho. Caves are rare due to the geological character of the region, so the species was likely historically rare. In neighboring Montana, it is one of the rarest species in the state. Artificial habitats such as mine adits and features may attract bats. Exterior examination of the adits did not reveal any sign of Townsend's big-eared bats. However, additional protocol surveys are recommended prior to initiating the project to evaluate potential habitat and presence or absence of the species before project impacts can be assessed.

5.2.11 Fisher

Habitat Requirements

Fisher habitat in the northern Rocky Mountains is characterized by old growth coniferous forests in summer months, and young, mature, and old growth stands in winter. Large diameter downed and woody debris is used for denning and foraging during winter months. Forests near riparian areas seem to be selected for (Heinemeyer and Jones 1994). Study results in north-central Idaho indicated that fishers generally preferred grand fir and spruce forests, and avoided dry ponderosa pin and Douglas-fir habitats (Heinemeyer and Jones 1994).

Reference and Existing Conditions

The IPNF wildlife sightings database contains four sightings in the Central Zone (USFS 2002a). Fishers historically occupied much of the forested habitats in the northern Rockies (Heinemeyer and Jones 1991). Trapping, habitat loss, and human encroachment contributed to their decline in the early 1900s. The habitat model analysis results for the Silver Strand site indicate 826 hectares

(2,040 acres) of capable habitat, and 108 hectares (267 acres) of suitable habitat within 1.6 kilometer (one mile). The proposed mine site is located in the currently non-productive capable habitat, but is not within suitable habitat polygons. The project area, however, lacks the large diameter downed and woody debris used for denning and foraging in winter.

5.2.12 Wolverine

Habitat Requirements

Wolverines inhabit mid-aged and mature forests near natural openings such as meadows, talus, and cliffs (USFS 1998). They prefer higher elevations, especially subalpine fir forests, in summer and move to lower elevations near ungulate winter ranges in the fall. Wolverines feed on a variety of meat and non-meat items, and in winter often scavenge on carcasses of ungulates. Denning habitat usually includes high elevation cirques, alpine basins, and avalanche chutes. Limiting factors are human exploitation (usually at lower elevations in winter), denning sites, and food availability (usually consisting of carcasses).

Reference and Existing Conditions

There are 12 sightings in the Central Zone (USFS 2002a), the closest occurring 6.4 kilometers (four miles) to the southeast of the project site (USFS 2002). The project site is too low in elevation for denning or summer habitat, and does not contain large groups of wintering ungulates. Human activities and access will be limited in winter between October and April when mine operations cease.

5.4 Analysis and Determination of Impacts

This section analyzes potential direct, indirect, and cumulative impacts of the proposed mining project on the wildlife species addressed in the previous section. Two primary direct impacts are habitat modification and an increase in human activity related to the mine. Indirect impacts include an increase in potential human access. Project activities could have negative, positive, or no measurable impact on these species. Species that received further alternatives analysis were selected based on habitat presence in the project area, and the expected measurable effect of project operations on that species' habitat. Of the six species considered in this document to potentially occur in the project area, our analysis results determined that three, Coeur d'Alene salamander, northern goshawk, and Townsend's big-eared bat, may be affected by Alternative 2.

5.4.1 Analysis Criteria for Selected Species

Table 6 summarizes the criteria for analysis used to determine the measurable impacts for each alternative for each species. The criteria are unique to each species, and based on those factors that could result in either favorable or unfavorable measurable impact for each proposed action.

Table 6. Species and criteria for evaluating measurable impacts of the Silver Strand project.

Species	Criteria
Coeur d'Alene salamander	Trends in surface water breeding habitat
Boreal toad	Availability of breeding habitat
Northern leopard frog	Availability of breeding habitat
Common loon	Availability of breeding and foraging habitat

Species	Criteria
Harlequin duck	Changes in downstream water quality
Northern goshawk	Trends in suitable nesting habitat
Peregrine falcon	Availability of nesting habitat
Flammulated owl	Availability of breeding and foraging habitat
Black-backed woodpecker	Trends in foraging and nesting habitat
Townsend's big-eared bat	Changes in underground roosting habitat
Fisher	Trends in winter foraging habitat
Wolverine	Trends in winter foraging habitat and security

5.4.2 Alternative Action Analyses

The purpose of Section 5.3.2 is to describe the components of the alternative actions in the Silver Strand project area and the impacts that could occur under each alternative analyzed, including the No-Action Alternative. For each resource, direct, indirect and cumulative impacts are predicted, providing a comparison of alternatives.

Direct impacts are caused by the action and occur at the same time and place.

Indirect impacts are caused by the action and occur later than the action or are farther removed geographically (40 CFR 1508.8).

Cumulative impacts are those affecting the environment as a result of the incremental impact of the action, when considered with other past, present and reasonably foreseeable actions (40 CFR 1508.7).

The estimated impacts described in this section are based on current knowledge of the environmental conditions, the ongoing and reasonably foreseeable activities, and the impacts of management actions. Table 7 outlines the determination of impacts on FS Sensitive wildlife species that could occur in the project area.

5.4.2.1 Coeur d'Alene Salamander

Alternative 1: No Action

Alternative 1 will not change the existing conditions at the site. Under the no action alternative it is expected that the stand will continue to mature and recover from past extraction activities. Considering that the existing conditions will remain unchanged, Alternative 1 will have no direct, indirect, or cumulative impact, and therefore will have **no impact** on the Coeur d'Alene salamander or northern goshawk or their habitats.

Alternative 2: Permit Operations as Proposed April 3, 2003

Direct Impacts

Although no salamanders were found during the survey, nearby sightings and the existence of suitable habitat at the project site indicate they could inhabit the area during mining activities.

Coeur d'Alene salamanders have very small home ranges closely associated with their surface water habitat. The proposed action states that the mine will operate during summer months when salamanders are above ground, and close during winter when they are aestivating below ground. Coeur d'Alene salamanders present on the project site may be killed or displaced during mining activities.

Indirect and Cumulative Impacts

The proposed haul road cut into the hillside will bisect the slope between the upper adit and the forest road. This action could indirectly affect the species by reducing spring surface water runoff and thereby the presence or development of seeps over time. Coeur d'Alene salamanders are Plethodons, and absorb oxygen and moisture through their skin. This physiological trait makes them extremely susceptible to toxins in their environment. Indirect and/or cumulative affects could occur if pollutants such as metals and acidified mine drainage were increased or released during operations. This will negatively affect water quality, and displace salamanders from habitats at higher concentrations.

Determination

Alternative 2 **may impact** individuals or habitat, but will not likely result in a trend toward federal listing or reduced viability for the population or species.

Alternative 3: Additional Onsite Mine Discharge Water Storage

Direct, Indirect and Cumulative Impacts

The water storage tank would have no direct impact on the Coeur d'Alene salamander since its contents would not be available to the animal. However, the proposed action states that the mine will operate during summer months when salamanders are above ground, and close during winter when they are aestivating below ground. Coeur d'Alene salamanders present on the project site may be killed or displaced during mining activities.

Determination

Mine operations will be similar to Alternative 2. Therefore, Alternative 3 **may impact** this species or its habitat.

Alternative 4: Land Disposal of Mine Discharged Water

Direct, Indirect and Cumulative Impacts

Alternative 4 introduces the option of combining or substituting land application of mine discharge water with the injection well option. There are several unknown factors which this technique introduces: quantity of discharge water, quality of discharge water (i.e. metals, pH.), and the timing of the discharge. The placement and linear dimensions could be varied such that steep slopes were avoided and the area of discharge was great enough to avoid creating saturated conditions along the slope. If enough water of tolerable quality were discharged during the periods when the species was above ground, salamanders could potentially be drawn to the water source. Long-term application could begin to affect vegetation and further create suitable seep-like habitats. The mine will operate during summer months when salamanders are above ground,

and close during winter when they are aestivating below ground. Coeur d'Alene salamanders present on the project site may be killed or displaced during mining activities.

Determination
In addition to the impacts outlined above, mine operations will be similar to Alternative 2. Therefore, Alternative 4 **may impact** this species or its habitat.

Alternative 5: Modified Development Rock Storage

Direct Indirect, and Cumulative Impacts
This alternative will reduce the final face grade of the rock storage area. It will not change any habitat attributes or create different conditions than proposed in the action alternative. The mine will operate during summer months when salamanders are above ground, and close during winter when they are aestivating below ground. Coeur d'Alene salamanders present on the project site may be killed or displaced during mining activities.

Determination
Mine operations will be similar to Alternative 2. Therefore, Alternative 5 **may impact** this species or its habitat.

Alternative 6: Alternative Site Access

Direct, Indirect, and Cumulative Impacts
This alternate alignment for the main access road deviates slightly from the proposal by extending the switchback location into the RSS. No additional net land disturbance would occur with alternative 6. It will not change any habitat attributes or create different conditions than proposed in the action alternative. The mine will operate during summer months when salamanders are above ground, and close during winter when they are aestivating below ground. Coeur d'Alene salamanders present on the project site may be killed or displaced during mining activities.

Determination
Mine operations will be similar to Alternative 2. Therefore, Alternative 6 **may impact** this species or its habitat.

Alternative 7: Maintain FR411 Open

Direct, Indirect, and Cumulative Impacts

Alternative 7 would leave FR411 open to public use during the mine activity. No other aspect of Alternative 2 would be altered, and no additional land disturbance would occur. It will not change any habitat attributes or create different conditions than proposed in the action alternative. The mine will operate during summer months when salamanders are above ground, and close during winter when they are aestivating below ground. Coeur d'Alene salamanders present on the project site may be killed or displaced during mining activities.

Determination
Mine operations will be similar to Alternative 2. Therefore, Alternative 6 **may impact** this species or its habitat.

5.4.2.2 Northern Goshawk

Alternative 1: No Action

Alternative 1 will not change the existing conditions at the site. Under the no action alternative it is expected that the stand will continue to mature and recover from past extraction activities. Considering that the existing conditions will remain unchanged, Alternative 1 will have no direct, indirect, or cumulative impact, and therefore will have **no impact** on the Coeur d'Alene salamander or northern goshawk or their habitats.

Alternative 2: Permit Operations as Proposed April 3, 2003

Direct Impacts, Indirect, and Cumulative Impacts
Under Alternative 2, trees will be removed along the proposed haul road and in the ravine in which the waste rock is dumped. The areas cleared of trees will comprise approximately 1.2 hectares (3 acres). Tree removal will reduce the amount of capable nesting habitat for goshawks in the project area.

Determination
Alternative 2 **may impact** individuals or habitat, but will not likely result in a trend toward federal listing or reduced viability for the population or species.

Alternative 3: Additional Onsite Mine Discharge Water Storage

Direct Impact
This alternative will place an above ground water storage tank at the mine site to facilitate the paste backfill operation. This action will have no direct impact on the species or suitable habitat.

Indirect or Cumulative Impact
Alternative 3 will not reduce the amount of timber removed in the project area. Removing trees from the project area will have indirect and cumulative impacts by eliminating capable habitat from that area, and reducing the overall availability and future potential for capable or suitable habitat in the project area.

Determination
Alternative 3 **may impact** individuals or habitat, but will not likely result in a trend toward federal listing or reduced viability for the population or species.

Alternative 4: Land Disposal of Mine Discharged Water

Direct Impact
Alternative 4 introduces the option of combining or substituting land application of mine discharge water with the injection well option. This action will have no direct impact on the species.

Indirect or Cumulative Impact
Alternative 4 will not reduce the amount of timber removed in the project area. Removing trees from the project area will have indirect and cumulative impacts by eliminating capable habitat from that area, and reducing the overall availability and future potential for capable or suitable habitat in the project area.

Determination
Alternative 4 **may impact** individuals or habitat, but will not likely result in a trend toward federal listing or reduced viability for the population or species.

Alternative 5: Modified Development Rock Storage

Direct Impacts
This alternative will reduce the final face grade of the rock storage area. It will not change any habitat attributes or create different conditions than proposed in the action alternative.

Indirect or Cumulative Impact
Alternative 5 will not reduce the amount of timber removed in the project area. Removing trees from the project area will have indirect and cumulative impacts by eliminating capable habitat from that area, and reducing the overall availability and future potential for capable or suitable habitat in the project area.

Determination
Alternative 5 **may impact** individuals or habitat, but will not likely result in a trend toward federal listing or reduced viability for the population or species.

Alternative 6: Alternative Site Access

Direct Impacts
This alternative designates an alternate alignment for the main access road, which deviates slightly from the POO by extending the switchback location into the RSS. No additional net land disturbance would occur with Alternative 6. It will not change any habitat attributes or create different conditions than proposed in the action alternative.

Indirect or Cumulative Impact
Alternative 6 will not reduce the amount of timber removed in the project area. Removing trees from the project area will have indirect and cumulative impacts by eliminating capable habitat

from that area, and reducing the overall availability and future potential for capable or suitable habitat in the project area.

Determination
Alternative 6 **may impact** individuals or habitat, but will not likely result in a trend toward federal listing or reduced viability for the population or species.

Alternative 7: Maintain FR411 Open

Direct Impact

Alternative 7 would leave FR411 open to public use during mining operations. No other aspect of Alternative 2 would be altered. No additional land disturbance would occur. It will not change any habitat attributes or create different conditions than proposed in the action alternative.

Indirect or Cumulative Impact
Alternative 7 will not reduce the amount of timber removed in the project area. Removing trees from the project area will have indirect and cumulative impacts by eliminating capable habitat from that area, and reducing the overall availability and future potential for capable or suitable habitat in the project area.

Determination
Alternative 7 **may impact** individuals or habitat, but will not likely result in a trend toward federal listing or reduced viability for the population or species.

5.4.2.3 Townsend's Big-eared Bat

Alternative 2: Permit Operations as Proposed April 3, 2003

Direct Impacts
Under Alternative 2, the existing adits and tunnels would be reopened, and the access shafts extended underground. Any bats utilizing the existing habitat could be killed or displaced.

Indirect and Cumulative Impacts
As exploration and mining is finished in each vein, paste backfill will be injected into the shafts, effectively removing any potential bat habitat.

Determination
Alternative 2 **may impact** individuals or habitat, but will not likely result in a trend toward federal listing or reduced viability for the population or species.

Alternative 3: Additional Onsite Mine Discharge Water Storage

Alternative 3 operations are similar to Alternative 2, and **may impact** individuals or habitat, but will not likely result in a trend toward federal listing or reduced viability for the population or species.

Alternative 4: Land Disposal of Mine Discharged Water

Alternative 4 operations are similar to Alternative 2, and **may impact** individuals or habitat, but will not likely result in a trend toward federal listing or reduced viability for the population or species.

Alternative 5: Modified Development Rock Storage

Alternative 5 operations are similar to Alternative 2, and **may impact** individuals or habitat, but will not likely result in a trend toward federal listing or reduced viability for the population or species.

Alternative 6: Alternative Site Access

Alternative 6 operations are similar to Alternative 2, and **may impact** individuals or habitat, but will not likely result in a trend toward federal listing or reduced viability for the population or species.

Alternative 7: Maintain FR411 Open

Alternative 7 operations are similar to Alternative 2, and **may impact** individuals or habitat, but will not likely result in a trend toward federal listing or reduced viability for the population or species.

Table 7. Determination of impacts of the Silver Strand mine project on Forest Service sensitive wildlife species that could occur in the project area.

Species	No Impact	May impact individuals or habitat [1]	Likely to impact individuals or habitat [2]	Beneficial Impact
Sensitive Species				
Coeur d'Alene salamander (USFWS Watch)		X		
Boreal toad	X			
Northern leopard frog	X			
Common loon	X			
Harlequin duck	X			
Northern goshawk (USFWS Watch)		X		
Peregrine falcon	X			
Flammulated owl	X			
Black-backed woodpecker	X			
Townsend's big-eared bat		X		
Fisher	X			
Wolverine	X			

[1] May affect/impact individuals or habitat, but will not likely result in a trend toward federal listing or reduced viability for the population or species.

[2]Likely to impact individuals or habitat, with a consequence that the action may contribute towards federal listing or result in reduced viability for the population or species.

5.5 Conservation Measures/Mitigation

Camping Onsite:
The POO states that four miners will be working one shift per day for five days per week, with some weekend maintenance work possible. Operation crews camping on-site may impact wildlife through creating noise during non-operating hours, utilization of Lone Cabin Creek, food storage, shower facilities, bodily waste, and garbage. These impacts will be reduced and/or avoided by following standard FS camping rules and restrictions, not creating excessive noise (loud talking, music or talk radio stations), avoidance of the creek and riparian corridor, following FS bear safe camping practices, placing and routinely maintaining portable toilets on-site (as per the POO p. 11), and daily removal of garbage from the work area.

Alternative 4: Land Disposal of Mine Discharged Water
If this alternative is selected, threshold water discharge quantities shall be identified beyond which the application hoses will be consistently monitored during spring and fall for Coeur d'Alene Salamander presence. If individuals are found, they will be documented by the district biologist, reported to the appropriate wildlife database managers, and the location site protected from human and/or machine disturbance. Water quality shall continue to be monitored on a routine schedule established by the biologist to maintain parameters favorable to salamander survival.

Determining Presence of Bat Habitat:
The resource consultants were not certified to enter the mine at the time of field inspections, and therefore cannot evaluate the potential for bat access to the either adit. Both adits #2 and #3 have metal gates at the entrance, and solid doors a short distance farther in the entrance feature. The district biologist will determine whether or not the doors are exclusionary prior to commencement of operations. If the district biologist determines that the doors are exclusionary, then they will continue to be used (or a similar system constructed) for the duration of the operation, thereby preventing bat access to each adit each night at the cessation of daily operations. If the doors are determined to have permitted bat access, (or if any other access points exist or are created during operations, natural or man-made, that connect with the stopes) then spring surveys will be conducted prior to commencement of operations. If no bats are found, then exclusionary doors or similar will be constructed and employed nightly for the duration of operations to prevents bats from colonizing the mine. If bats are found, the district biologist will work with the operators to devise a mitigation plan to reduce impacts to bats during operations. This mitigation will consider the effect of incremental paste backfilling over the course of the project.

Upon termination of the project, the district biologist will determine the availability of habitat remaining in the mine. If the entire mine has been occluded with paste backfill, then no habitat exists and no further mitigation is necessary. If some habitat continues to exist, then steps will be necessary to either close off the adits completely, or install bat-friendly gates. The IPNF Forest strategy calls for outfitting open mine features with bat-friendly gates, neutralizing the impact to bats (G. Worden 2003). If the mine adits are to be closed and the entries eliminated, then protocol surveys would be required prior to closing. The paste backfill technique proposed for this project is a new approach, but would be treated as identical to closing the adits.

5.6 Wildlife References Cited

Cassirer, Groves, and Genter. 1994. Coeur d'Alene salamander conservation assessment. for USDA Forest Service Region 1. Idaho Dept. of Fish and Game, Boise, ID.

Corkran, C.C., and C. Thoms. 1996. Amphibians of Oregon, Washington, and British Columbia. Lone Pine Publishing, Vancouver, British Columbia.

Dixon, R.D., and V.A. Saab. 2000. Black-backed woodpecker (Picoides arcticus). *In* The Birds of North America, No. 509. (A. Poole and F. Gill, eds.). The Academy of Natural Sciences, Philadelphia, and the American Ornithologists' Union, Washington DC.

Foresman, Kerry R. 2001. The Wild Mammals of Montana. American Society of Mammalogists. Special Publication No.12. 278 pp.

Hayward, G.D. and J. Verner (eds). 1994. Flammulated, boreal, and great gray owls in the United States: a technical conservation assessment. Fort Collins, Colorado.

Heinemeyer K.S. and J.L. Jones. 1994. Fisher biology and management: a literature review and adaptive management strategy. USDA Forest Service Northern Region, Missoula, MT. 108 p.

Idaho Conservation Data Center. 2003. ID Department of Fish and Game. Boise, ID.

Leonard, W.P., H.A. Brown, L.L.C. Jones, K.R. McAllister, and R.M. Storm. 1996. Amphibians of Washington and Oregon. Seattle Audubon Society, Seattle, Washington.

Nussbaum, Brodie and Storm. 1983. Amphibians and reptiles of the Pacific Northwest. University of Idaho Press. 332 p

Saab, V.A., and J.G. Dudley. 1998. Responses of cavity-nesting birds to stand-replacement fire and salvage logging in ponderosa pine/Douglas-fir forests of southwestern Idaho. U.S. Forest Service Res. Paper. RMRS-RP-11.

Sibley, David A. 2000. National Audubon Society The Sibley Guide to Birds. Knopf, Inc. NYNY. p. 96.

Stebbins, Robert C. 1985. A Field Guide to Western Reptiles and Amphibians. Peterson Field Guides, Houghton Mifflin Company, New York. 336 pp.

Squires, J.R., and R.T. Reynolds. 1997. Northern Goshawk (*Accipiter gentilis*). *In* The Birds of North America, No. 298. (A. Poole and F. Gill, eds.). The Academy of Natural Sciences, Philadelphia, PA, and the American Ornithologists Union, Washington D.C.

U.S. Forest Service. 1991. Coeur d'Alene River Ranger Station. Survey Protocol for Coeur d'Alene salamander populations.

-------- 1992. Interim Management Recommendations, Sensitive Species, *as cited in* Drywall Specialist Report.

-------- 1998. Geographic Assessment Coeur d'Alene River Basin

-------- 2002a. Wildlife sightings database - Central Zone - threatened, endangered, and sensitive species. Coeur d'Alene River Ranger Station.

-------- 2002b. WILDLIFEHABITAT2002.SQL. Select listed and sensitive species database query for ArcView. Coeur d'Alene River Ranger Station.

Worden, Gail. 2003. USFS Coeur d'Alene River Ranger Station. Personal communication.

Appendix A: Supplemental Effects Disclosure

Appendix A

Silver Strand Mining
Environmental Assessment
Supplemental Effects Disclosure

A. Introduction

This document supplements the Environmental Assessment for the proposed Silver Strand Mining project to address concerns over the mill site that exists on private lands and has been proposed as the processing site for ores transported from the Silver Strand Mine along FR 411, FR 206, FR209, and County Route 1-C.

The existing mill site will be used to process ore from proposed mining activity on the Idaho Panhandle National Forests. Under the authority of United States mining laws (30 U.S.C.21-54), the applicant has a statutory right to enter upon the public lands to search for, develop, and lay claim to mineral resources. The Forest Service has the responsibility to make sure that the activities are conducted so as to minimize adverse environmental effects on National Forest Service System surface resources (36 CFR 228, Subpart A). While the Forest Service has no regulatory authority over the actions proposed on private land, the development and operation of this mill site may be considered an "effect" of issuing the mining permit. This then results in environmental concerns over the maintenance of air and water quality and the prevention of noxious weed infestation and spread.

The applicant's purpose for using Forest Route (FR) 411, 206, and 209, and County Route (CR) 1-C is to access his claim and to transport mined ore to the processing facility on private land. The use of CR 1-C falls under the jurisdiction of Shoshone County. The Forest Service has no regulatory authority to permit/not permit use of this road or require the applicant to take measures for public safety and maintenance. However, concerns about road degradation and public safety from hauling activity may be considered an "indirect" effect of approving the Plan of Operations (POO).

B. Roles and Authorities

Silver Strand Mine (New Jersey Mining Company): The mining proposal located on Forest Service-managed lands is made under the authority of the United States Mining Laws (30 U.S.C.21-54), which confer a statutory right to enter upon the public lands to search for minerals. Under the General Mining Law of 1872, a citizen has a right to access Federal lands to search for, and remove, minerals and obtain title upon discovery. There is also a possessory right associated with mining, including the right to use the surface for mining purposes. Because of the rights associated with mining and mining claims, the claimant has a right to the removal of the mineral resources that he owns.

Forest Service: On lands administered by the Forest Service, the Organic Administration Act authorizes the Secretary of Agriculture to regulate the occupancy and use of the National Forest System Lands for the protection and management of forest resources. The Forest Service has the responsibility to make sure that the activities are conducted so as to minimize adverse environmental effects on National Forest Service System surface resources (36 CFR 228, Subpart A). The Forest Service has no legal right to deny exploration and mining proposals. Forest Service authority also does not extend beyond National Forest System lands; therefore, the Forest Service has no jurisdiction over the development or operation of a gold mill on private land or use of the County-maintained portion of CR 1-C. The use and maintenance of National Forest roads and trails are covered under the final approved POO.

State of Idaho: Under the Idaho Statutes (Title 47 Mines and Mining Chapter 15 Surface Mining), the State of Idaho Department of Lands administers the leasing and reclamation of surface mine sites. Under the 1971 Surface Mining Act, the State requires surface mining exploration projects have an approved reclamation plan, each approved reclamation plan must have a performance bond, exploration using motorized earth moving equipment requires a notice, water quality must be maintained and affected lands and disturbed watercourses must be reclaimed. In addition, the 1971 law created penalties for violation of the Act.

The Idaho Department of Environmental Quality (IDEQ) is also charged with protection of water quality under the Clean Water Act. The IDEQ comments on all mining operation permits received by the Idaho Department of Lands, but also enforces water quality standards when required.

The State of Idaho's rules and regulations apply to private lands; therefore, mining operations, including mills, located on private lands fall under the authority of the State of Idaho.

Other Federal Agencies: The National Pollutant Discharge Elimination System (NPDES), Section 402 of the Clean Water Act, provides states with the authority to administer a permit program to issue permits for discharges to navigable waters of the state. To date, Idaho has elected not to apply for the NPDES permitting program. The Environmental Protection Agency (EPA) performs NPDES permitting in Idaho. The U.S. Army Corps of Engineers may also be involved if there are to be any discharges or fill placed in waterbodies or wetlands under their 404 authority.

Shoshone County: The County Route 1-C is maintained by Shoshone County. Any haulage or problems related to maintenance on this road are the responsibility of Shoshone County. The Forest Service does not have any maintenance agreements or responsibilities concerning this stretch of road.

C. Relevant Consequences of Private Mill Site Operation

As discussed above, the Forest Service has no authority to regulate activities on private land. While the NJMC's use of a private mill is an imminently foreseeable action related to the proposed exploration and mining activity to occur at the Silver Strand Mine on National Forest

Service lands, the analysis of such an action must be done in cooperation with Idaho Department of Lands and the IDEQ. Therefore, the predicted consequences of the mill operation (described below) focuses on understanding whether the applicant has secured the necessary State and federal permits which will adequately maintain air and water quality and prevent the infestation and spread of noxious weeds.

Description of the Mill Site

The NJMC mill is located approximately two miles east of Kellogg, Idaho. The mill has a 100-tonne per day capacity. A crushing plant was built and commissioned in 1996. Approximately 5,000 tons of ore were processed at the mill during 1995 through 1996. A decision was made to upgrade the mill to a CIL (Carbon-In-Leach) process during this period. Test work using the CIL process on New Jersey ores indicated gold recoveries of up to 95% were achievable. Construction on a CIL circuit began in late 1996 and was suspended in the spring of 1997 due to the inability of the NJMC to raise sufficient funds. The concrete foundation work was completed before suspension of operations. During 2000, management of the NJMC completed a modest construction project, a 32- by 48 foot pole type building adjacent to the existing mill building. The NJMC also plans to install flotation capacity at its New Jersey mill. The flotation building is currently under construction at the New Jersey mill site (NJMC 2004).

Ore from the Silver Strand Mine will be dumped into a bin or on a pile on the ground. The Run-of-Mine (ROM) ore will pass 300mm size and must pass a 300mm grizzly to allow feeding to the crushing plant. Ore will be fed to the crushing plant, which consists of a jaw crusher, screen, and cone crusher. Ore will be crushed to <50mm in the jaw and to <15mm by the cone. The screen has 13mm openings. The crushing plant can produce 25 tonnes per hour (tph) with the product passing 15mm.

The crushing plant product will be fed by a conveyor belt to the ball mill at 4 tph. A weight belt will control the feed rate. Water will be added to the ore as it is fed into the ball mill. The ball mill is 1.8 meter in diameter by 1.8 meter long. Slurry discharging from the ball mill passes through a trommel screen and flows into the cyclone feed pump sump. The trommel screen will remove trash and large particles.

Water will also be added at the cyclone feed pump sump. The cyclone feed pump will transport the slurry to the hydrocyclone, which then classifies the slurry by particle size. Coarser particles are sent back to the ball mill for further grinding. Cyclone overflow at approximately 30% solids by weight flows by gravity to the flotation circuit. The flotation circuit recovers the sulfide minerals into a clean sulfide concentrate.

The hydrocyclone slurry is fed into a bank of five rougher flotation cells. Each cell is agitated with an impeller which forces air into the slurry. Reagents added to the rougher flotation cells include copper sulfite solution, a frother, and one or more collector chemicals. Sulfide minerals are attached to air bubbles, float to the surface of the cell, and overflow into a steel launder. The copper sulfite coats pyrite particles and make them appear as copper minerals for better recovery. The frother improves formation of bubbles and collectors coat sulfide particles to make them hydrophobic. The rougher flotation concentrate is upgraded to make it saleable for smelting by

processing in a bank of three cleaner cells. No further reagents are added to the cleaner cells, but the concentrate is further dewatered and recycled through the rougher flotation circuit. Final rougher tailings are pumped into an impoundment for gravity dewatering.

Cleaner concentrate will be dewatered to a moist filtercake in a plate and frame filter. Filtercake will fall into a concentrate bin and filtrate will flow back to the rougher cells. Trucks will drive under the bin for loading and transport to a regional smelter.

The mass balance for 100 tonnes of ore is approximately 10 tonnes of concentrate ($6<X<25$) with the remainder of approximately 90 tons as tailings ($75<X<94$). Approximately 50 tons of tailings will be used as backfill to fill the void represented by the 100 tons of extracted ore. Thus from 25 to 44 tons of tailings will remain at the mill site for each 100 tons processed.

NJMC has used the current mill for other mine projects in the past and has made no comments on the future uses of the site after the Silver Strand Mine is closed. The Idaho Department of Lands requires bonding for mining projects, but the Forest Service has no authority to set the amount of bond for activities that occur on private land, nor can the Forest Service impose any reclamation requirements on these lands.

Direct and Indirect Effects:

Air Quality:

The NJMC mill site is currently exempt from air quality permitting from IDEQ (NJMC 2/06/04). Air quality could be affected by the stockpile of ore stored on the mill site, the crushing of ore, by drying tailings, and from hauling of ore. The ore stockpile will consist of material that has not yet been crushed and processed. It is not expected that the material would have enough fines to generate extensive air quality problems. The crushing facilities are not contained within a building.

Water Quality:

The mill recycles all processed water and any stormwater that falls on the impoundment. No discharge is planned or expected as a result of processing the Silver Strand materials. It is NJMC's responsibility to ascertain whether the IDEQ would require any water quality permits. The mill site currently holds a cyanidization permit, although no cyanidization is planned for the Silver Strand Ore processing.

Noxious Weeds:

Any disturbed areas have the potential for noxious weed infestations. The NJMC mill site is inspected regularly, and a weed management plan is on file with the Shoshone County Weed District.

Cumulative Effects:

The Federal Action to be decided upon through the Environmental Assessment is whether to approve the mining Plan of Operations, and if so, under what terms and conditions. The Federal Action is limited to the activities proposed on the National Forest. Cumulative effects, as they relate to the Federal Action, involve consideration of the direct/indirect effects in context with

any added effects from other past, present, or reasonably foreseeable future actions. Because the mill site is located on private land, any direct or indirect effects from the mill site would not be additive to the direct/indirect effects of mining operations on the National Forest. In other words, there are no cumulative effects from the mill site and the mine because the affected areas of each are geographically distinct and separate.

Relevant Consequences of Ore Hauling on County Road 1-C

While the Forest Service does not permit or control the use of County Road 1-C from the intersection with FR 209 to the mill, an approved Plan of Operations for the mine will result in ore hauling along the road, and this may cause road degradation and create public safety concerns. The Forest Service portion of the proposed haul route is approximately 44.6 kilometers (27.9 miles) and use of these roads is evaluated in the EA.

Direct and Indirect Effects:

Road Degradation:

Hauling of ore on this County Road will cause additional road degradation. The equipment used to haul ore will meet County Road specifications for hauling equipment. It is expected that initially one truckload of material will be hauled per day. At full capacity one to two truck loads per day may be hauled to the mill site. Shoshone County does not require additional permitting if the vehicles and haul weights are within County Road standards. In special instances, like a major mine development, additional permitting is required. These sorts of agreements are between Shoshone County and the mining company.

Public Safety:

Users of County Road 1-C will notice an increase in traffic from the mining-related activities. The mining-related hauling will not be restricted to the workweek, and maintenance activities may be performed on weekends which may occasionally require truck use (NJMC 2003). Appropriate signage will be needed to call attention to points where trucks will enter and leave public roadways.

Cumulative Effects:

As discussed above, the Federal Action to be decided upon through the Environmental Assessment is whether to approve the mining Plan of Operations, and if so, under what terms and conditions. The Federal action is limited to the activities proposed on the National Forest. Cumulative effects as it relates to the Federal action involves consideration of the direct/indirect effects in context with any added effects from other past, present, or reasonably foreseeable future actions. The hauling of ore was considered because approximately 28 miles of the haul route is on Forest Service roads. Within this EA, measures to minimize impacts from the mining proposal are required under Alternative 2, as described in Chapter 2 of the EA. With respect to maintenance of the Forest roads (FR 411, 206, and 209) a road maintenance agreement between

the NJMC and the Forest Service will become part of the approved Plan of Operations. Regularly scheduled maintenance on the County Road will protect the surface, and there is little risk to public safety considering the additive effects of road use by the public (recreationists), Forest Service personnel involved in prescribed fire and other administrative tasks, livestock permittees, and the direct effects of hauling ore.