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

Prepared for:

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1.0 Introduction

Garcia and Associates (GANDA) prepared this Biological Assessment (BA) in compliance with Forest Service Manual 2672.4 and Section 7(b) of the Endangered Species Act (ESA) to evaluate the possible effects on habitat of listed species within the Silver Strand Underground Mine project area. Table 1 lists all species currently listed by the US Fish and Wildlife Service (USFWS) as threatened, endangered, or proposed that are known to occur within the Idaho Panhandle National Forests (IPNF). Not all of these species occur within the Coeur d'Alene River Ranger District or within the project area.

Table 1. Threatened, endangered, and proposed species on the Idaho Panhandle National Forests (IPNF)

Common Name	Scientific Name	Status (10/15/2003)
Plants		
Water howellia	*Howellia aquatilis*	Threatened
Spalding's catchfly	*Silene spaldingii*	Threatened
Ute's ladies'-tresses	*Spiranthes diluvialis*	Threatened
Fish		
Bull trout	*Salvelinus confluentus*	Threatened
White sturgeon	*Acipenser transmontanus*	Endangered*
Birds		
Bald eagle	*Haliaeetus leucocephalus*	Threatened
Mammals		
Gray wolf	*Canis lupus*	Threatened
Grizzly bear	*Ursus arctos horribilis*	Threatened
Lynx	*Lynx canadensis*	Threatened
Woodland caribou	*Rangifer tarandus caribou*	Endangered*

* Not found in the Coeur d'Alene River Ranger District

2.0 Proposed Action

On April 4, 2003, the Coeur d'Alene River Ranger District, IPNF 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 in the SE1/4, Section 19, T51N, R1W, Boise Meridian (Figure 1). On June 9, 2003, NJMC submitted additional information and modifications to the POO. The proposed mine site is located along the north side of an existing mine access road approximately 0.64 kilometer (0.4 mile) northeast of the access road's intersection with Forest Route (FR) 411, and approximately 73 vertical meters (240 feet) and from 29 to 121 horizontal meters (96 to 400 feet) from Lone Cabin Creek.

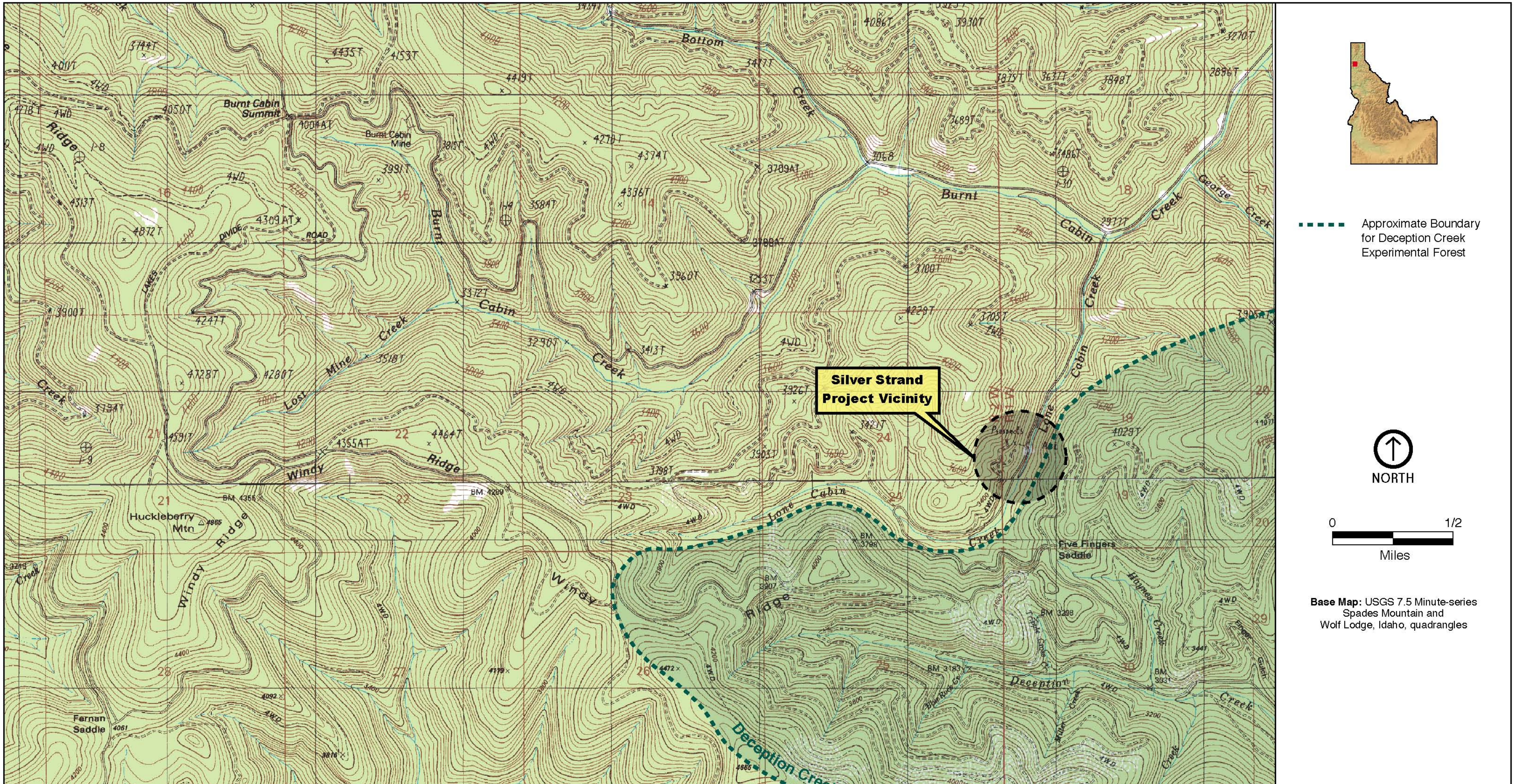

Figure 1. Silver Strand Project Vicinity.

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NATURAL & CULTURAL RESOURCE CONSULTANTS

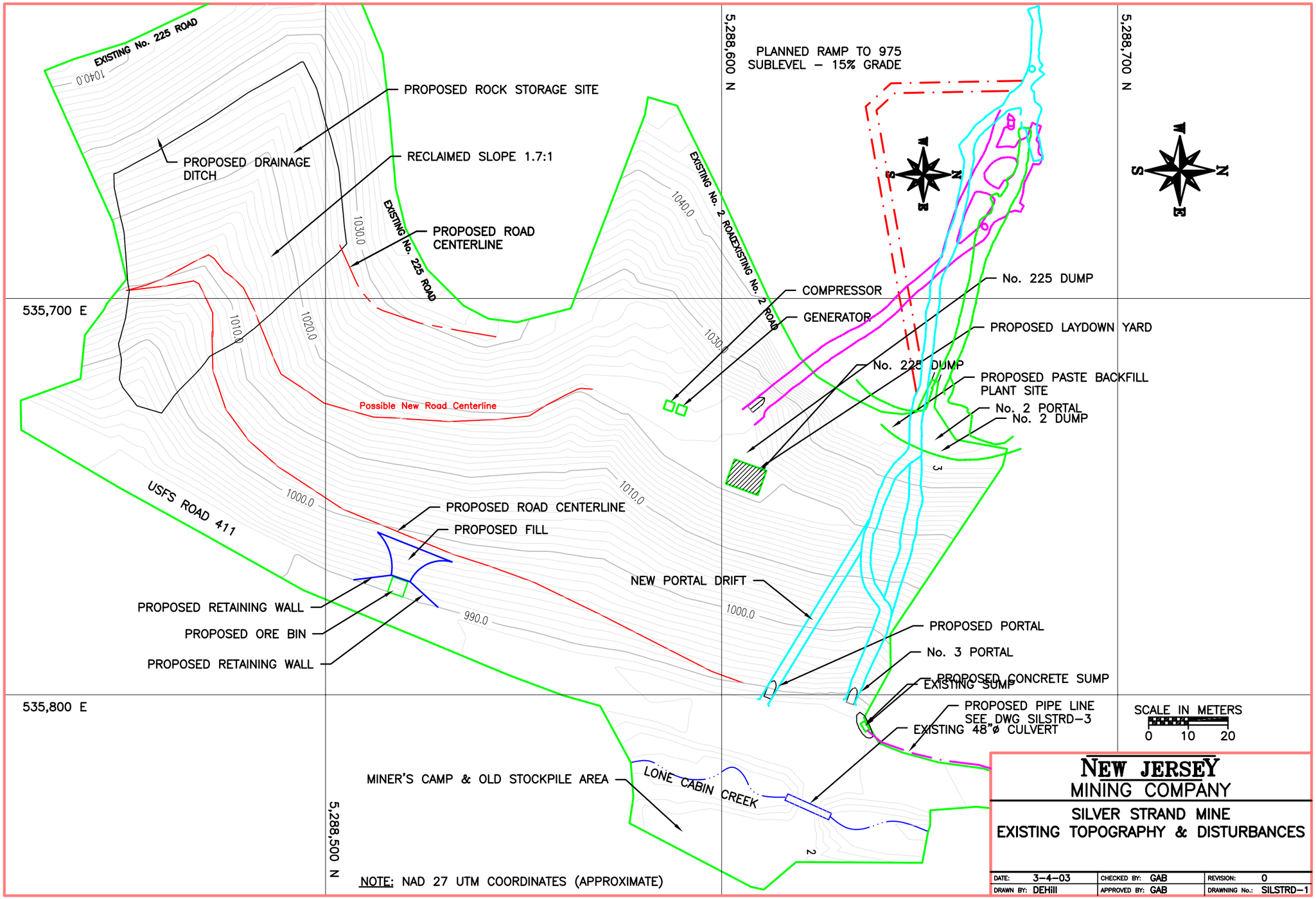
The proposed mine development plan includes an underground mine ramp and heading development, access trail rehabilitation and construction, portal excavation, waste rock dump construction, construction of a temporary pole building for maintenance and tool storage, drilling and completion of a waste water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

NJMC proposes to access the site via an existing mine access trail spurring off of FR 411 (Figure 2). 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).

The company intends to mine approximately 500-1000 tons per month utilizing standard cut and fill mining procedures. 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. 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.

About 0.65 hectare (1.61 acre) will need to be cleared for the rock storage site (RSS). Approximately an additional 0.26 hectare (0.11 acre) will be cleared for the right-of-way of the RSS-Ore Bin road. Another 0.1 hectare (0.04 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 by 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 cm (11.81 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.


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

The operation will require several small surface structures including an air compressor site, a 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 should 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 MSHA and ATF rules. A concrete sump is planned to be constructed near the current No. 3 portal 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 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 flowrate of 190 liters (50 gallons) per minute, the water velocity is 1.46 meters 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 2. 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 west of the Silver Strand ore body and intercepted a significant silicified and fractured zone of rock.

A new road will be constructed from the No. 3 Level portal 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 4.0 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%.

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 H to 1.0 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 (11.81 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 with a cemented paste backfill plug 3 meters (9.8 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 dozer and plant with grass and conifers. Remove any road culverts and pull fill material from those draws back onto the roadbed.

Watershed Restoration: Removal of the1.2 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.

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

Currently the USFWS (USFWS 2002) lists three species as Threatened for the IPNF: water howellia (*Howellia aquatilis*), Ute's ladies'-tresses (*Spiranthes diluvialis*), and Spalding's catchfly (*Silene spaldingii*). No Federally listed Endangered plant species occur on the IPNF.

3.1 Existing Condition and Inventory

GANDA conducted a habitat assessment on September 16, 2003. No habitat for federally listed threatened plant species occurs 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 (*Pseudotsuga menziesii*). Shrub stands are composed of chokecherry (*Prunus virginiana*), 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.

3.2 Threatened Plant Species

There are no known occurrences of threatened plant species in the Coeur d'Alene subbasin, although suitable habitat is suspected to occur.

Water howellia (*Howellia aquatilis*) is currently found in western Montana, northern Idaho, and Washington. It is an aquatic species that occupies sloughs, stagnant water, oxbows, and potholes that regularly dry to allow for seed set. A historic population at Spirit Lake has not been relocated since its discovery in 1892 and is presumed extirpated (Shelley 1994). No suitable aquatic habitat for water howellia occurs within the project area.

Ute's ladies'-tresses (*Spiranthes diluvialis*) is found in portions of Utah, Colorado, Wyoming, Montana, Nevada, and southern Idaho. This orchid is found in low elevation wetland and riparian areas as well as springs, seepages, mesic and wet meadows, meanders, floodplains, below the margin of conifer forests, and generally in wet areas of open shrub, grasslands or transition zones (USFWS 1998). In northern Idaho, potential habitat for Ute's ladies'-tresses is restricted to low elevation, low gradient streams and rivers and open broad alluvial valleys dominated by cottonwood, shrub and wet meadows, grass and forb communities (Mousseaux 1998). No suitable wetland or moist meadow habitat for Ute's ladies'-tresses occurs in the project area.

Spalding's catchfly (*Silene spaldingii*) is a perennial herb endemic to the Palouse prairie region of southeast Washington and adjacent Oregon and Idaho. A disjunct population occurs in northwest Montana (Lessica 1997). This species is suspected to occur on the IPNF. Suitable habitat consists of grasslands dominated by perennial grasses such as Idaho fescue (*Festuca idahoensis*), rough fescue (*Festuca scabrella*), and bluebunch wheatgrass (*Pseudoroegneria spicata*). Associated shrub species are snowberry (*Symphoricarpos albus*), shreddy ninebark

(*Physocarpus malvaceus*), and Nootka rose (*Rosa nutkana*). Ponderosa pine and Douglas-fir are occasionally scattered throughout these sites. The closest occurrence of Spalding's catchfly is in Spokane County, Washington. No suitable hard fescue grassland habitat occurs within the project area.

3.3 Analysis of Effects and Conclusion

No suitable habitat for water howellia, Ute's ladies'-tresses, or Spalding's catchfly occurs within the project area. There is no potential for these species to occur. There will be no effect to federally listed threatened plant species from the implementation of the proposed project.

Table 2. Analysis of effects for threatened plant species on the IPNF.

Species	Biological Determination	Analysis Area
Water howellia	No effect	Project area
Ute's ladies'-tresses	No effect	Project area
Spalding's catchfly	No effect	Project area

3.4 Botanical References

Lessica, P. 1997. Demography of the Endangered Plant, *Silene spaldingii* (Caryophyllaceae) in Northwest Montana. Madrono. Vol 44:4 p347-358.

Mousseaux, M. 1998. Idaho Panhandle National Forests Rare Plant Guild Descriptions. IPNF Botanist Coeur d'Alene, Idaho

Shelley, S. 1994. Conservation Strategy for *Howellia aquatilis* USDA Forest Service, Northern Region, Missoula, Montana.

United States Department of Interior Fish and Wildlife Service (USFWS). 1998. Section 7 Guidelines, S*piranthes diluvialis*¸ dated June 17, 1998. Upper Columbia Basin Field Office, Spokane, WA.

United States Department of Interior Fish and Wildlife Service (USFWS). 2002. Biannual Forest-wide species list. Reference Number 1-9-02-SP-213. Upper Columbia Basin Field Office, Spokane, WA.

4.0 Fisheries Resources

Currently, the USFWS (USFWS 2002a) lists one species as Threatened, bull trout (*Salvelinus confluentus*), and one species as Endangered, white sturgeon (*Acipenser transmontanus*), as occurring on the IPNF. The cumulative effects area that is defined 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. White sturgeon are only found within the mainstem of the Kootenai River in Idaho. Since their distribution falls outside of the cumulative impacts area for this project, this project will have no effect on white sturgeon.

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).

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 the Lone Cabin Creek drainage 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, timber harvest, and associated road building. 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 areas.

The concerns in Lone Cabin Creek are:

1. Potential delivery of sediments and mine drainage 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. 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 U.S. Bureau of Mines (USBM). 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 (MacDonald and Schick 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).
- Lead above AWQC in 5 of 27 samples (with several detection limits above hardness-corrected criteria).

Although 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. 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 good 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.

The three-pass electrofishing survey yielded westslope cutthroat trout and sculpin (*Cottus* spp.).

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).

4.2 Threatened Fish Species: Bull Trout

4.2.1 Habitat Requirements

Bull trout appear to have more specific habitat requirements than other salmonids (Rieman and McIntyre 1993). Habitat characteristics (including water temperature, stream size, substrate composition, cover and hydraulic complexity) have been associated with distribution and abundance (Jakober and MacMahon 1997; Rieman and McIntyre 1993). The habitat components required by bull trout are often summed up by the "Four C's" - cold, clean, complex, and connected. Bull trout exhibit patchy distributions because even under pristine conditions the required habitat components are not ubiquitous throughout river basins. Bull trout do not, and should not, be expected to simultaneously occupy all available habitat (USFWS 2000).

Stream temperature and substrate composition are important characteristics of suitable bull trout habitat. Bull trout have repeatedly been associated with the coldest stream reaches within basins. Very cold water is required for incubation (<8°C)(46°F), and juvenile rearing appears to be restricted to areas with cold water (15°C) (59°F) (MBTSG 1998). However, because they can display several life history types (resident, fluvial, adfluvial) within a single geographic area, they can also be found in larger, warmer river systems that may cool seasonally or provide migratory corridors and important forage bases.

Many factors can potentially limit the distribution of spawning and rearing habitat for bull trout, including barriers, water temperature, interactions with nonnative salmonids, geomorphic processes, or human disturbances. These factors are often not independent of one another. Current efforts, such as those through the American Fisheries Society (AFS) process, are underway to develop a model to define patches of suitable habitat for spawning and rearing bull trout. Surveys in Montana have found that the majority of bull trout spawning occurs in third and fourth order streams and little if any use of first order streams has been documented (MBTSG 1998). Limits to the distribution of larger juveniles (sub-adult) and adult bull trout are more difficult to identify because these fish may adopt migratory life histories and range far outside of spawning and rearing areas. However, juvenile rearing habitat is associated with cold water (<15°C /59° F seasonal maximum), and groundwater influenced streams tend to be preferred (Fraley and Shepard 1989).

High quality bull trout habitat is typically characterized by abundant cover in the form of large wood, undercut banks, boulders, etc.; clean substrate for spawning; interstitial spaces large enough to conceal juvenile bull trout; and stable channels. Juveniles prefer larger substrate and deep pools along with other forms of complex cover (MBTSG 1998). Because habitat has been degraded in many basins and bull trout populations in these basins may be depressed, the fish may utilize less optimal habitat. There are numerous examples of bull trout utilizing habitats that may be atypical.

Adult bull trout are top predators and like other top predators they require a large prey base and a large home range. Subadult and adult migratory bull trout move throughout and between basins in search of prey. Adult and subadult bull trout are largely piscivorous. Their food preferences include whitefish, smelt, sculpins, eggs drifting following redd construction, and other salmonids. Juvenile fish are benthic foragers and also feed on drifting insects. Part of the impetus for outmigration as bull trout mature is due to a shift in their diet from utilizing primarily invertebrates to piscivory.

4.2.2 Life History

Bull trout exhibit fluvial, adfluvial, and resident life histories, and more than one life history may be found in a watershed (Fraley and Shepard 1989). Although resident fish remain in the same stream throughout their life, migratory fish (fluvial and adfluvial) move up- and downstream within watersheds at different life stages and during reproductive cycles. Because migratory fish are not dependent upon a single type of habitat for all life stages, the species may be more resistant to catastrophic type disturbance. This migratory aspect of their lifestyle also confirms that bull trout should not be expected to inhabit all portions of acceptable habitat within a watershed at any given time.

Bull trout generally follow the following reproductive cycle in their migratory forms. Spawning migrations begin in the spring and adults remain in the tributaries until fall when active spawning begins. As noted previously, bull trout require cold, clear streams with good water quality, and generally prefer clean gravels for spawning. The outmigrating adults move downstream to larger waterbodies soon after spawning where they take advantage of higher productivity and deeper pools for overwintering (Fraley and Shepard 1989). Incubation of fertilized eggs lasts until the following spring when the fry emerge from the gravels. Juveniles may remain in their natal tributaries for several years before moving downstream to larger rivers to mature. Resident bull trout follow the same reproductive timing, but remain in the tributary habitat the entire year. However, even resident fish tend to move within a tributary to spawn and overwinter; therefore, their presence may be difficult to document with limited survey efforts.

4.2.3 Existing Bull Trout Population Status

The North Fork of the Coeur d'Alene River still has remnant populations of fluvial and resident bull trout and it is part of the critical habitat designated by the draft Bull Trout Recovery Plan (USFWS 2002b). However, the historical land uses in the area such as mining, timber harvest, road building and development have had devastating impacts to the range and status of the species. Historical and recent sightings and surveys confirm that bull trout distribution has been severely curtailed and that the numbers of bull trout may be more representative of scattered individuals rather than cohesive populations (USFWS 2002b).

Surveys conducted within Lone Cabin and Burnt Cabin creeks in 1997 found no bull trout present. GANDA surveyed Lone Cabin Creek as part of our site visit and found no bull trout. Consultation with Ed Lider of the USFS and Ray Hennekey of IDFG confirmed that bull trout are assumed absent from Burnt Cabin Creek and the Little North Fork Coeur d'Alene River (Lider and Hennekey, pers. comms. 2003).

4.2.4 Bull Trout Recovery Plan

The USFWS has released a draft Bull Trout Recovery Plan in compliance with Section 7 of the ESA (available on-line at http://pacific.fws.gov/bulltrout/). Each state within the historic range of bull trout has designated core areas, critical habitat units and management directives. In Idaho, the Coeur d'Alene Recovery Unit contains one core area, the Coeur d'Alene Lake Basin Core Area, which encompasses the entire Coeur d'Alene Lake, the St. Joe and Coeur d'Alene River subbasins, and all tributaries within these systems. The Silver Strand project area falls within the designated core area.

Using the criteria such as habitat quality, historic documentation of presence, recent documentation of presence, land use, and presence of potentially competitive species; and the best professional judgment of its members; the recovery unit team identified priority streams to focus the implementation of recovery activities to areas having the greatest potential for supporting bull trout. The priority streams include 1) known bull trout spawning streams; 2) other streams with evidence of bull trout recruitment and early life stage rearing; and 3) streams with habitat that may potentially support some level of recruitment, or local populations, since current habitat conditions have elements necessary for bull trout occupancy. Selected priority streams are considered the best of the best-remaining habitat for bull trout. No streams in the Little North Fork Coeur d'Alene River drainage are designated as priority streams (USFWS 2002b). The closest priority streams to the Silver Strand Area are in the North Fork Coeur d'Alene River system (Trail Creek and Teepee Creek), and in the Lake Pend Oreille sub-unit (Gold Creek, North Gold Creek, and West Gold Creek).

4.3 Analysis of Effects

The estimated effects described in this section are based on current knowledge of the environmental conditions, the ongoing and reasonably foreseeable activities, and the effects of management actions on Federal lands. Activities that will occur off USFS lands (e.g., at the NJMC mill near Kellogg) are not evaluated here but will be key to the project. A key activity that will occur off of public lands will be mineral crushing and processing through a flotation circuit using various acids and surfactants (NJMC 2003b, 2003d). NJMC proposes to store any tailings that cannot be used for backfill at the mill site (NJMC 2003d). An analysis of these effects is provided in a supplement to the EA.

Table 3. Analysis of effects for threatened and endangered fish species on the IPNF.

Species		Species or Habitat Present on District?	Species or Habitat Present in Project Area?	Species or Habitat Measurably Affected?	Cumulative Effects
Common Name	**Scientific Name**				
Threatened					
Bull trout	*Salvelinus confluentus*	Yes	Habitat present, no recent sightings	No	None
Endangered					
White sturgeon	*Acipenser transmontanus*	No	No	No	None

There are no suspected or documented occurrences of bull trout within the project area or the cumulative effects area (Lone Cabin Creek from the headwaters to Burnt Cabin Creek); however, the area does connect to potential bull trout habitat downstream. Therefore, this discussion will focus on potential impacts to habitat that could be used or colonized by bull trout in the future as gains in population are realized due to efforts under the recovery plan.

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 Effects

Sediment: Direct effects 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. The URS hydrologists report found that the new main access road would be problematic in terms of sediment delivery. The various Water Erosion Prediction Project (WEPP) models run found that the main access road, as proposed, would increase sediment delivery substantially (MacDonald and Schick 2004).

Water Quality: Potential effects 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 discharge 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 may 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 were 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 wastewater such as Arsenic (As) appear to be generated at low enough levels to meet DEQ and EPA guidelines. 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 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 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, ID DEQ, pers. comm. 2003). It is also the operator's responsibility to consult with the US Environmental Protection Agency (EPA) regarding the necessity of an NPDES permit when they are applying for the other required permits for the proposed mining activities.

Stream and Riparian Disturbance: 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 effect 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 effects 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 discharge is insufficient to meet their water needs for operation. Therefore, there is a potential effect 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. Because of the 303(d) listing of Lone Cabin and Burnt Cabin creeks for thermal effects, any water withdrawal during low-flow periods becomes problematic. A water right would be required for withdrawal from the creek (IDEQ 2000).

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

Fish Passage and Habitat: 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, this 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 actively fished. In addition, the public could still access the creek from the north via FR 206.

4.3.2 Indirect Effects

Indirect effects 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).

4.3.3 Cumulative Effects

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 (one mile) of riparian area along Burnt Cabin Creek downstream from its confluence with Lone Cabin Creek (E. Lider pers. comm. 2003), in the Silver Strand cumulative effects 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, e-mail 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 effects 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. If the Silver Strand Project succeeds in excluding the cattle from the Lone Cabin drainage, there could be a beneficial impact to the creek.

4.3.4 Determination of Effects on Bull 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 should not have measurable impact on the stream system. All recent surveys indicate that bull trout do not inhabit the Lone Cabin or Burnt Cabin Creek watersheds. With no potential to affect individuals or populations and no measurable effects on the stream there is "no effect on bull trout".

Analysis area: Lone Cabin Creek from headwaters to confluence with Burnt Cabin Creek and extending downstream 0.8 kilometer (0.5 mile) downstream.

Biological Determination: No effect

4.4 Mandatory Conservation Requirements

Conditions of this Biological Assessment 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 FR 411 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.

4.5 Fisheries References

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5.0 Wildlife Resources

Currently on the IPNF, the USFWS (2002) lists one species as endangered, woodland caribou (*Rangifer tarandus caribou*), and four species as threatened, the grizzly bear (*Ursus arctos horribilis*), bald eagle (*Haliaeetus leucocephalus*), gray wolf (*Canis lupus*), and the Canada lynx (*Lynx canadensis*). These species and their potential presence in relation to the proposed project are summarized in Table 4. Of these species, the woodland caribou does not occur on the Coeur d'Alene River Ranger District and is not considered further in this document.

Table 4. Federally listed threatened and endangered wildlife species on the Idaho Panhandle National Forests.

Species		Species or Habitat Present on District?	Species or Habitat Present in Project Area?	Species or Habitat Measurably Affected?	Cumulative Effects
Common Name	**Scientific Name**				
Threatened					
Grizzly bear	*Ursus arctos horribilis*	Yes	No	No	None
Bald eagle	*Haliaeetus leucocephalus*	Yes	No	No	None
Gray wolf	*Canis lupus*	Yes	No	No	None
Lynx	*Lynx canadensis*	Yes	No, Not in LAU	No	None
Endangered					
Woodland caribou*	*Rangifer tarandus caribou*	No	No	No	None

*Not found on the Coeur d'Alene River Ranger District

GANDA conducted a habitat assessment of the project area on September 16 and 17, 2003. The area was surveyed for species and habitat characteristics for the listed species, and was evaluated for potential effects from the proposed mining action.

5.1 Description of Species and Habitat

5.1.1 Grizzly Bear

5.1.1.1 Habitat Requirements:

The grizzly bear is a large omnivorous mammal, with a very slow reproductive cycle. Females average 5.5 years of age before reproducing, and have a 3-year reproductive interval. Mortality factors for grizzly bear include intraspecific predation, dispersal into marginal habitat, and human confrontation through direct conflict (e.g. predation on livestock, foraging on trash and improperly stored food), habitat conversion, and legal and illegal hunting. Contiguous mountainous habitat with a variety of vegetation types supports the remaining populations of grizzly bear. Cover is essential, and utilized cover is typically within a kilometer (0.62 miles) of meadow or open park habitat. The bear currently occupies only 2 percent of its historical range within the continental United States.

5.1.1.2 Reference and Existing Conditions:

Historically, grizzly bears were more widely distributed and abundant within the Coeur d'Alene River District. Hudson Bay Company records indicate grizzly bears were harvested by fur trappers in the area (USFS 1998). Grizzly bear habitat in the Coeur d'Alene mountains has undergone significant changes, and is influenced by human development and resource extraction such as timber harvest, road building, mining, recreation, and human communities that continue to expand into grizzly bear habitat (USFS 1998).

The grizzly bear was listed as threatened on July 28, 1975. Seven grizzly bear recovery zones have been established in the northern Rocky Mountains. The project site is one such recovery zone, but is not part of the recovery habitat (USFWS 1997). Twenty-three grizzly bear sightings exist in the Central Zone (USFS 2002), with no records occurring on the district. Grizzly bears are occasionally sighted in the Coeur d'Alene River Basin, most often in the Upper North Fork area (Worden pers. comm.).

5.1.1.3 Analysis of Effects:

Although the proposed project involves underground mining, there will be some level of surface disturbance (waste dumps, temporary stockpiles, loading and staging areas, etc.). The project site is in the recovery zone, but is not part of the recovery habitat. Although grizzly bears are not known to occupy the project area or vicinity, they could move through and use undeveloped portions of the project area for temporary cover or foraging. Potential direct effects of this project include increased risk of vehicle collisions with bears due to an increase in traffic levels from ore hauling activities, and potential for an increase in human access. Slightly higher road traffic could increase a chance of collision, but this chance is negligible due to the extremely low population density of bears in the region.

The project will not increase open road densities. The area to be mined comprises a very small percentage of foraging and travel habitats available to a transient bear moving through the project area. Grizzly bears are large, mobile animals sensitive to human activity, and the habitat surrounding the project area provides many options for the bear to avoid human presence associated with the project. Once the project is terminated, the haul road segment will be obliterated, temporary buildings removed, the waste rock dump covered with organic material, and the area returned to a relatively undisturbed state.

No indirect or cumulative effects of the project on this species are anticipated, because the project will not result in or contribute to any changes in adjacent land uses or other human activities that could affect grizzly bears.

5.1.1.4 Biological Determination:

The proposed action as outlined in the POO would not affect road density or human access to potential grizzly habitat, and would have **no effect** on grizzly bears or their habitat. Table 5, below, describes the effects for all species considered in this document.

5.1.2 Bald Eagle

5.1.2.1 Habitat Requirements

Bald eagles require open water habitats for foraging year-round and tall trees in stands for nesting and perching. Nest trees are usually located within a ¼ mile of large bodies of water such as rivers or lakes, and winter roosts require ice-free water for winter foraging of fish and waterfowl (MTBEWG 1991).

5.1.2.2 Reference and Existing Conditions

Historically bald eagles were common near larger rivers and lakes in northern Idaho. Similar to other raptor species, they suffered a severe decline from DDT poisoning over the past several decades, and continue to be affected by habitat loss, conversion and fragmentation. There are 143 bald eagle sightings in the Central Zone (USFS 2002). There are no records of this species in the ICDC database, although the USFS database has a record near Spades Mountain, approximately 3 miles from the project area.

5.1.2.3 Analysis of Effects

There is no foraging or wintering habitat near the Silver Strand project site. Therefore, the action alternatives would have no measurable effect on bald eagles or their habitat, and no further analysis is conducted for this species.

5.1.2.4 Biological Determination

The proposed action alternatives would have mo effect on the bald eagle. Table 5 describes the effects for all species considered in this document.

5.1.3 Gray Wolf

5.1.3.1 Habitat Requirements:

The gray wolf is a wide-ranging canine predator. The gray wolf historically ranged throughout all of Idaho, but direct elimination and reduction of habitat has reduced the range for gray wolf within Idaho to the areas of the State north of the Snake River, and eastern areas that border Wyoming and Montana (Tucker et al. 1990). Wolves dig dens to birth their pups, typically from late March to early May. Dens may receive annual use by a wolf pack, although they may abandon their dens if disturbed by human activity (Mech 1970). Wolves also develop rendezvous sites, which are specific resting and gathering areas for packs during the summer and fall following denning and whelping of pups. These areas are found in meadows with nearby forest cover, and have a system of developed trails and matted resting areas. In meeting their life cycle requirements, gray wolves use a variety of habitats including grasslands, coniferous and mixed forest, alpine areas, sagebrush steppe, and riparian zones (Mech 1970).

The gray wolf's primary prey species are whitetail deer, mule deer, Rocky Mountain elk, and moose. These ungulates compose nearly 100 percent of the gray wolf's diet in winter, with some supplementation of small mammals during the spring-fall period. Beaver may be an important alternate prey source during ice-free periods, and may be critical to wolf pup survival. As such, the habitats for these mammals are also important to wolf survival.

5.1.3.2 Reference and Existing Conditions:

Currently, the gray wolf is federally listed as Threatened north of Interstate 90, while wolves located south of the Interstate are classified as Experimental/non-essential. The latter classification denotes special regulations regarding their protection and management guidelines.

It is generally accepted that wolves will do well if human persecution is controlled and prey species are available. The Northern Rocky Mountain Wolf Recovery Plan (USFWS 1987) identifies key components of wolf habitat as: 1) sufficient, year-round prey base of ungulates and alternate prey (i.e., beaver and small mammals); 2) suitable and somewhat secluded denning and rendezvous sites, and; 3) sufficient spaced with minimal exposure to humans. This last component is thought to be less important than it used to be; wolves have adapted well to areas of relatively high human densities in the Midwest and some regions of the western United States as their numbers have increased. Road density (open and actively used) seems to be an indicator of the level of risk from collisions or poaching, although road density may become less of a factor as human tolerance changes. As wolf populations increase, however, it continues to be an important factor in habitat selection by wolves (Wydeven et al. 2003).

Reintroduction efforts in central Idaho and protection efforts throughout the northwest have been highly successful, and wolf numbers have been increasing since 1995. There are 74 sighting records for gray wolves in the Central Zone (USFS 2002). On the Coeur d'Alene River Ranger District, abundant ungulate prey includes white-tail deer (*Odocoileus virginianus*), moose (*Alces alces*), and Rocky Mountain elk (*Cervus elaphus*) (USFS 1998).

5.1.3.3 Analysis of Effects:

Ore will not be processed on site. This will result in slightly higher road traffic, and could increase a chance of collision. Wolves are large, mobile animals sensitive to human activity, and the habitat surrounding the project area provides many options for wolves to avoid human presence associated with the project.

The project will not increase open road densities. This project has a duration time of five years. Once the project is terminated, the haul road segment will be obliterated, temporary buildings removed, the waste rock dump covered with organic material, and reclamation efforts completed.

5.1.3.4 Biological Determination:

Because of small area affected and the winter closure, the proposed mining project as outlined in the POO will have **no effect** upon the gray wolf. Table 5 describes the effects for all species considered in this document.

5.1.4 Lynx

5.1.4.1 Habitat Requirements

Lynx are medium-size cats adapted to walking on snow. Lynx in the United States exist in the southernmost extensions of boreal habitat, which becomes progressively more fragmented southward due to climatic and human influence (Koehler and Aubrey 1994). Snowshoe hare is their primary prey. Lynx will also feed on red squirrels and other small rodents and birds during hare population lows, and may diversify their diet to include these prey species during the

summer months. In the western states, lynx are known to use lodgepole pine, spruce, and subalpine fir habitat types. Cedar-hemlock habitats have also been found to be important for lynx in north Idaho and far northeast Washington. Stand structure is considered more important than the composition of vegetation communities, as large woody debris and windfalls are needed for denning sites and thermal cover for kittens (Koehler and Aubrey 1994).

Denning areas need to be at least 1 hectare (2.5 acres) in size, proximal to foraging sites, and relatively free from human disturbance (Koehler and Aubrey 1994). Foraging areas need to provide adequate browse to maintain hare populations, and need to provide a variety of browsing heights so that food remains available to hares as snow depths change over the winter. However, during local population highs, competition for territory may cause Lynx to travel over 960 kilometers (600 miles) and cross lakes, rivers, shrub-steppe habitat, and agricultural fields in order to disperse (Koehler and Aubrey 1994).

Lynx historical range includes Alaska and Canada (except coastal forests), the western United States (particularly the Rocky Mountains and the Cascades), Great Lakes states, and New England. Factors which have reduced lynx range and abundance are logging and forest thinning, fire suppression, grazing, road and trail development, trapping and shooting, predation, road kill, and obstruction by highways and private developments (Ruediger et al. 2000). Lynx are suspected to be tolerant of some degree of human disturbance. Logging can be compatible with lynx in the long term if conducted in a manner that leaves or creates critical lynx and snowshoe hare habitat features. Forest roads are not considered barriers to lynx, and may be used as travel corridors if cover is adjacent and human use is infrequent. Roads and trails of all types can be detrimental to lynx if winter use (i.e. as snowmobile, snowshoe, or ski trails) compacts snow and allows lynx competitors, particularly coyote (*Canis latrans*) and bobcat (*Lynx rufus*), to enter lynx habitats that they would otherwise be excluded from by deep snow.

5.1.4.2 Reference and Existing Conditions

Historically the lynx was likely well distributed, but not common, in northern Idaho. The USFWS could not determine any change in lynx abundance and distribution over the past 50 years because no confirmed and substantiated records exist for this time period (USFWS 2000). Management guidelines for federal agencies were laid out in The Canada Lynx Conservation Assessment and Strategy (Ruediger et al. 2000). Agencies were required to delineate lynx analysis units (LAUs) to evaluate and analyze effects of planned and ongoing projects on lynx and their habitat. The project area does not lie in an LAU.

There are 17 sighting records for lynx in the Central Zone (USFS 2002), although neither the USFS nor the ICDC has any records within an 8-kilometer (5 mile) radius of the project area. The lynx habitat analysis model defines five habitat categories: 1) denning, the older complex stands; 2) high forage, usually 20-30 year old regenerating stands, some times with an overstory; 3) low forage, usually 80-100 year old stands that do not provide forage or large enough logs to be denning but provide good travel habitat; 4) unsuitable habitat, either habitat types or age classes that are not used by the lynx, or land forms that have no vegetation such as rock slides, and; 5) stand change in the last decade. Change in last decade is a criterion in the Lynx Strategy (Ruediger et al. 2000): "Management actions (e.g. timber sales, salvage sales) shall not change

more than 15 percent of lynx habitat within a LAU to an unsuitable condition within a ten year period."

The project area does not lie within an LAU.

5.1.4.3 Analysis of Effects

Potential effects of this project include an increased risk of vehicle collisions with lynx due to an increase in traffic levels from ore hauling activities. However, lynx are mobile animals sensitive to human activity, and the habitat surrounding the project area provides many options for wolves to avoid human presence associated with the project.

5.1.4.4 Biological Determination

It will create a relatively small area of disturbance, be closed in winter, not significantly increase road densities and access, and obliterate roads when terminated. Because of the small area affected and the winter closure, the proposed mining project as outlined in the POO will have **no effect** upon the lynx. Table 5 describes the effects for all species considered in this document.

Table 5. Biological determinations for federally listed species in the Silver Strand BA

Species	Biological Determination
Grizzly bear	No effect
Bald eagle	No effect
Gray wolf	No effect
Lynx	No effect

5.2 Wildlife References

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Appendix: Supplemental Effects Disclosure

Appendix

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.