Appendix G

Biological Assessment
&
Biological Evaluations

Emerald Creek Garnet Area
Final Environmental Impact Statement

FISHERIES BIOLOGICAL ASSESSMENT FOR THE EMERALD CREEK RECREATIONAL GARNET AREA PROJECT

This biological assessment, prepared in accordance with U.S. Forest Service (USFS) 2672.41, evaluates the possible effects on habitat and populations of bull trout *Salvelinus confluentus* from activities associated with the proposed Emerald Creek Recreational Garnet Area Project. The bull trout is listed as a threatened species (Federal Register, June 10, 1998) and is listed as a "species of special concern" by the State of Idaho.

1. **THREATENED FISH SPECIES:** Bull Trout *Salvelinus confluentus*

2. **PROGRAM:** Recreational Mining

3. **LOCATION:** Idaho Panhandle National Forest
St. Joe Ranger District

Streams (Drainage): 281 Gulch
Garnet Gulch
East Fork Emerald
Pee Wee Gulch
No Name Gulch

4. PROPOSED ACTIVITY

The proposed activity will allow continued public recreational garnet collecting at the garnet area until the garnet resource is exhausted in 281 Gulch and Garnet Gulch. New methods of operation will be implemented to protect water quality and aquatic habitat. Operations will continue in 281 Gulch, from 2-4 years, until the accessible garnet gemstone resource is depleted. At that time, the Forest Service will move the operations to Garnet Gulch. A new road and trail will be constructed to access operations there. A parking lot will be constructed near the new site to accommodate people with disabilities and administrative vehicles. Previously dug areas in 281 Gulch will be restored to improve aquatic habitat and maintain water quality. Previously dug areas in Pee Wee Gulch and No Name Gulch will have large woody debris added to diversify aquatic habitats.

The Forest Service will obtain a 404 permit and 401 certification required under the Clean Water Act. Section 404 of the Clean Water Act requires a permit from the U. S. Army Corps of Engineers for operations in wetlands. Certification under section 401 of the 1974 Clean Water Act is also required from the Idaho Department of Environmental Quality for the 404 permit issued by the U.S. Army Corps of Engineers to ensure that my decision will not violate state water quality standards. This 401 certification in Idaho also ensures that the project will comply with water quality improvement plans (TMDLs) developed for affected water bodies and that the project will not adversely impact §303(d) listed streams (streams that do not meet water quality standards).

With information collected from surveys and exploration during 2002-2006, the Forest Service developed an operations and reclamation plan to address water and aquatic habitat concerns for the remaining area in 281 Gulch and the new collecting area in Garnet Gulch. The proposed action includes the following:

- Rehabilitation for previously dug areas in 281 Gulch will be implemented to improve aquatic habitat and assure maintenance of water quality (FEIS, Appendix C). Large, woody debris will be strategically placed in the stream along an estimated 1,000 feet of both Pee Wee and No Name Gulch to enhance aquatic habitat.
- The public collection site will remain in the East Fork and the main stem of 281 Gulch until the accessible garnet gemstone resource is depleted (estimated to be two to four years). At that time, the public collection site will be moved from 281 Gulch to Garnet Gulch where operations would continue for an estimated twenty years. On the West Fork of 281 Gulch no additional sites will be opened up.
- Starting in 2006 the recreation experience will change. In the past an area along the drainage was marked off for digging. Topsoil and overburden were mechanically removed and stockpiled. Visitors chose where to dig through the subsoil for the garnet-bearing gravels and then washed the garnets in place. Administration of the site in this manner will no longer be used. Instead, garnet-bearing gravels will be excavated and stockpiled with equipment. Visitors will then obtain garnet-bearing gravels from the stockpile and wash them at a sluice.
- Beginning in 2006 operations will include using heavy equipment for annual excavation and reclamation. Equipment will be needed from one to three times per year. The equipment will be used to remove and separately stockpile topsoil, overburden, and garnet-bearing gravels. Approximately three to nine feet of overburden will be removed to get to the gravels. Excavations will be reclaimed directly following (within approximately one week) removal of garnet-bearing gravels. This way, the stream will only be disturbed at the time the gravels are removed and then the soil layers will be replaced.
- A sluice will be set up for screening and washing garnet-bearing gravels. This will be in an upland area away from the wetlands. Water for the sluice operation will be obtained with water withdrawals from 281 and Garnet Gulches, will be stored in ponds and then recycled. The system will include settling ponds and sediment-control structures (Map 4). Sediment will be removed from settling ponds, be stockpiled, and be reused for reclamation.
- Newly excavated areas will be an estimated 50-100 feet wide and 150 feet long per year and will be excavated and reclaimed concurrently. Total excavated area (both upland and wetland) for 281 Gulch over two to four years is estimated to be two acres, and the total excavated area for Garnet Gulch over an estimated 20 years will be about 4.2 acres.
- When operations move to Garnet Gulch, a new road (0.68 mile) will be constructed to provide access for administration and people with disabilities. At the end of the road a small parking lot, toilet, administrative building and sluice will be constructed (approximately one acre of clearing). The new road will not accommodate buses and RVs; these vehicles will be parked at the existing 281 Gulch parking lot.
- A trail from the existing 281 Gulch Parking Lot on Road 447 to the new road up Garnet Gulch will be constructed (0.1 mile). This will allow visitors to go directly from the parking lot to the trail without having to walk along heavily traveled Road 447.
- When operations move to Garnet Gulch, most of the public (except disabled) will take the new access trail from the existing 281 Gulch Parking Lot on Road 447 up to the new administrative road and then hike along this road to the collection site. The hike will increase from what is now required to get to the 281 Gulch (0.4 mile) to 0.7 miles to get

to Garnet Gulch. Benches for rest stops will be installed along the route. Interpretive signs relating to the ancient Lake Clarkia and geology of the area will also be installed along the trail and road.

- When operations move to Garnet Gulch, the 281 Gulch access road (Road 3781) will be decommissioned and recontoured (0.35 mile or 1774 feet). The administrative building and toilet will be removed.
- A portion (1/2 acre) of the floodplain will be reestablished at the Pee Wee Gulch parking lot while leaving space for a vehicle pull-through.
- A total of four culverts will be replaced on Road 447 where it crosses Pee Wee Gulch, No Name Gulch, 281 Gulch, and Garnet Gulch.

Design Features and Mitigation Measures

See Appendix A for more details about operating methods, design features, and mitigation measures.

This alternative will utilize applicable Best Management Practices identified in relevant provisions of the Surface Mining and Dredge and Placer Operations (PF, Minerals). In addition, the following measures (referred to as "performance standards" by the Environmental Protection Agency) will also be adhered to. Where these features overlap with State of Idaho BMPs, these project-specific features will supersede the State of Idaho provisions.

A. General

1. **Adaptive Management:** Adaptive management will be utilized as the new operations are implemented. As methods are used and monitored they may be changed to provide better results for protecting resources and for providing a better experience for the public.

2. Previously dug areas in Pee Wee, No Name and 281 Gulches will not be re-entered for recreational garnet collecting.

B. Air Quality

This project will comply with procedural and substantive requirements of the Clean Air Act, State Implementation Plans and State Smoke Management Plans. Slash burning, if needed, will be conducted only when favorable weather and wind conditions exist.

C. Fish

1. A total of four culverts will be replaced where Road 447 crosses Pee Wee Gulch, No Name Gulch, 281 Gulch, and Garnet Gulch.
2. Channel disturbance in fish-bearing streams will only be done between July 15 and the beginning of autumn rains.
3. Water withdrawals for the sluicing operation will be minimized or discontinued during periods of low flow. See Design Features F. 3. d. & e. and N.12.
4. Habitat will be replaced during rehabilitation and reclamation using existing survey data. Large woody debris will be replaced in numbers to mimic natural conditions using survey data (PF, F-3/6).
5. Native tree species will be planted to replace existing trees that are removed for mineral excavation, and wherever possible trees and shrubs that are uprooted will be replanted during reclamation.

6. Fish will be removed and taken downstream from areas where temporary diversion of water in the stream channel is to take place. See Design Feature F. 2. e. and Appendix A p. 3.

D. Hazardous Materials

1. Outside of standard diesel and gasoline fuels and lubricants no hazardous chemicals or materials will be utilized for excavation or processing activities.
2. Refueling and maintenance of construction vehicles and equipment will not occur within floodplains or within 150 feet of live water. Refueling will follow the guidelines for mobile fueling of vehicles and heavy equipment found in Idaho Best Management Practices for Mining and Stormwater Management Guidelines (www.idl.idaho.gov/bureau/Minerals/ bmp_manual1992/bmp_index.htm).
3. If a piece of equipment is found to be leaking or seeping fuel or lubricants the equipment will be immediately taken out of service and corrective measures instituted to correct the problem and prevent a release. Any contaminated soil or materials will be removed from the site and disposed of in an approved sanitary facility designed to dispose of such materials. The Garnet Area administrative building and all equipment contractors will have spill prevention control and countermeasures kits.
4. During interim shutdown periods or periods of inactivity, all equipment stored on site will be parked away from areas of steep slopes, and gear boxes and fuel tanks will be underlain with absorbent pads.

E. Heritage Resources

An appropriate inventory was conducted for the proposed activities and cultural properties are known to be located within the area of potential effects. The Forest Cultural Resource Specialist made a preliminary determination that the project would have No Adverse Effect to these properties, and the State Historic Preservation Officer concurred with this determination. The Forest Service will contact the archaeologist for the Coeur d'Alene Tribe, per their request (PF, ACE-15) prior to excavations each year. If new cultural resource sites are discovered activities will stop at the garnet collection site, and the find will be reported to the IPNF Cultural Resource Specialist who will inventory the site and develop mitigations to protect the site in consultation with the State Historic Preservation Officer, appropriate Native American tribes and, if necessary, the Advisory Council on Historic Preservation.

F. Minerals (See Appendix A for extensive details and drawings)

1. General
   a. Operations and reclamation will follow Best Management Practices recommended by the State of Idaho that are relevant to this project (www2.state.id.us/lands/bureau/Minerals/ bmp_manual1992/bmp_index.htm on 1/12/06).
   b. Total disturbance over the life of the project is estimated to be 12-14 acres (this includes all roads, stockpiles, excavation, parking areas in 281 Gulch and Garnet Gulch, sluice areas and ponds) for up to approximately 24 years.

2. Excavations and Reclamation
   a. Each year in the fall (dry season) after the garnet area is closed for the season, an area (mining panel) will be excavated and garnet gravels will be removed and stockpiled

for use in the following year. The excavated area will be reclaimed as soon as excavation work is complete which is estimated to be within one week.

b. Auger testing for gemstone garnet will be implemented in order to facilitate engineering planning for annual excavations.

c. If required, a small interceptor trench will be constructed to divert surface or groundwater flow around the excavation site. The trenches will be armored with woody debris, straw bales, baffles, or other materials if necessary. Water will be diverted to a water containment/recycle system located at the lower end of the panel and will be moved to the sluice plant as make-up water or be sprinkled overland. There will be no direct discharge to streams.

d. Prior to excavation activities, vegetation will be cleared. Slash will likely be bundled and placed between the excavation area and the active channel. Logs and additional slash will be stockpiled for use during reclamation as needed.

e. In cases where the panel will include excavation immediately adjacent to or through stream channels, a culvert-like diversion or plastic-lined temporary water diversion channel will be used (See N. 8). The diversion will be routed around the excavation site. Fish will be removed from this section using block nets and will be taken downstream prior to water diversion.

f. For each panel, excavations will not be started until water control features are established and determined to be functional.

g. In riparian areas, excavations will start on the upper end of each mining panel and progress sequentially downstream. Excavator (track hoe), not bulldozers, will be used for excavations in wetlands.

h. The size of the panels will vary depending on depth of garnet gravels. Estimated size will be approximately 50 -100 feet by 150 feet. The goal is to have a garnet gravel stockpile that is of sufficient size for a season of public garnet collecting. This is estimated to be 545 cubic yards (See Minerals section in FEIS Chapter 3).

i. The panels will consist of a series of cuts by an excavator down to the base of garnet-bearing gravels, typically down to bedrock. Each panel will be excavated in a series of sequential cuts from top to bottom then be backfilled. A typical cut would be 8-10 feet wide. Disturbance will be kept to the smallest practicable area at any one time during excavations through concurrent and progressive backfilling, grading and revegetation.

j. Within each cut, the topsoil will be separated and set to the side, then subsoil will be separated and stockpiled to one side. Plywood or other material may be used under the stockpile to protect the underlying topsoil and aid in recovery of stockpiled materials (PF, PD-33). The garnet-bearing gravels will be removed using a tracked or wheeled loader or a portable conveyor system and then will be taken to the garnet gravel stockpile.

k. As soon as the garnet gravel is removed, the cut will be back-filled and reclaimed using spoils collected and stockpiled from the previous season's flume wash. Backfilling with these materials will ensure volumetric balances and original stream gradients are restored to their pre-mining conditions.

l. Subsoil and topsoil from the current excavation will then be returned to the site. Care will be taken when feasible to maintain the vegetative mat while excavating and

storing the topsoil. The immediate backfilling and reclaiming ensures that the mining panel will only be open for a short period of time (estimated to be one week).

m. Reclaimed areas will be planted with native shrub and tree species and be seeded and mulched. Where possible uprooted shrubs and trees would be replanted.

3. Flume Wash (Sluice)

a. A flume wash plant will be set up for the public to wash and recover garnets. This will consist of pump, water holding pond(s), flume, riprap-lined spillway, settling and recycling pond(s). It will be located out of the floodplain, in the upland area, and near the garnet gravel stockpile.

b. A flume (a long-linear, shallow-sloped, flat-bottomed trough) will be set up for washing garnet gravels. Running water will be pumped (from the settling pond below) or be gravity-fed into the upper end of the flume. The silt, sand and fine gravel mix will be screened to recover the garnets. The flume will be approximately 18 inches by 10 inches deep and will be constructed in short sections with enough length to accommodate up to 30 visitors at one time.

c. The sediment-laden wash water will be fed down the flume, then through a rock-lined raceway back into the settling-recycling pond system. The settling ponds will be designed to settle clay, silt and sand and then allow the waste water to be re-cycled. For spoils management, another smaller pond may be utilized to catch and settle coarser-grained materials. The settling ponds will be periodically excavated, and the spoils will be stockpiled for use during reclamation (see above under reclamation operations).

d. Water is needed to operate the flume wash plant (sluice). An estimated 100-200 gallons per minute will be needed. The Forest Service has acquired water rights to 281 Gulch and Garnet Gulch at the rate of 0.5 to 1.0 cubic foot per second (from 3.7 to 7.5 gallons per second). Prior to the summer season during high flows, water will be taken from a withdrawal point in the upper end of the gulch to the pond system at the flume wash site. The pond system will be filled slowly using a flexible hose or rigid pipe outfitted with a small diameter screen to prevent inadvertent entrapment of fish or small aquatic invertebrates. A pump system will then pump water from the pond system into the flume/sluice.

e. It is anticipated that during the driest part of the annual season there may be a need to store additional water to make up for increased evaporation and to minimize water withdrawals. A water make-up pond (an excavated depression or other above-ground storage system typically used to collect or store additional water) will be used for water storage if needed. Additionally, a water truck may be used to supplement if needed. (See N)12)

G. Noxious Weeds

A number of preventative and control measures will be taken to reduce the risk of noxious weed introduction and spread in accordance with the St. Joe Weed EIS (ROD, 10/12/99). Measures include:

1. All ground disturbance related to earth-moving activities will include mulching and reseeding as soon as practical after completion of ground-disturbing activity to minimize infestations.

2. Mulching agents such as hay or straw will be certified noxious weed-free before they are allowed on the project area.
3. All seed used for re-vegetation and erosion control purposes will be certified noxious weed-free. Native vegetation from the site will be used as much as possible. This includes trees, shrubs, and forbs.
4. A mix of species will also be used in rehabilitation of sites. Non-native annual grasses may be used in rehabilitation efforts. Some of these species are valuable for revegetating sites quickly to avoid erosion.
5. The timing of reseeding will normally be immediately after excavation operations are complete.
6. Off-road construction and mining equipment will be cleaned and inspected prior to entering the project area to remove dirt, plant parts, and material that may carry weed seeds. A provision will be included in the contract.
7. Sites where ground-disturbing activities are planned will be evaluated for existing infestations and treated if necessary prior to initiation of ground-disturbing activities.
8. If new populations of noxious weeds are found, treatment will be implemented in accordance with priorities set by the noxious weed program. New invader species will be slated for eradication immediately upon discovery. Other weed infestations will be treated according to the direction in the St. Joe Noxious Weed Project EIS and district priorities.

H. Rare Plants

1. The five lower-most panels (450 feet) that were proposed for mining in Garnet Gulch were eliminated from consideration for excavation because this area has the most extensive and healthy populations of naked mnium in the project area. All ground-disturbing activities will be confined to the panels above this point.
2. If previously undiscovered Threatened, Endangered, or Sensitive plant species are found project activities at that site will cease until an assessment and recommendation is made by the District Botanist. Measures to protect population viability and habitat for all known and newly discovered occurrences will include the following: altering or dropping activity, modifying the proposed activity and implementing buffers around plant occurrences.
3. If water is pumped from excavated areas and is applied over land, it will only be applied on relatively flat, well-vegetated areas. One potential site for this application is within the occupied habitat of *Rhizomnium nudum* (below the lowest panels on Garnet Gulch). If this site is used, the water application will only be deposited on the eastern bank of Garnet Gulch. The eastern bank has the least number of these plants. See N.11.
4. Restoration plans in 281 Gulch will be designed to avoid the naked mnium sites.
5. Any changes to the proposed extent of restoration activities in the West Fork of No Name Gulch will be reviewed by the District Botanist to ensure protection of rare plant sites located there.

I. Range

1. Adaptive management will be applied to address cattle use in the project area in order to prevent resource damage. Forest Service employees will immediately notify the

permittee of cattle presence in the current garnet collection site. The permittee will then be responsible for promptly removing their cattle. If such measures do not prove successful in eliminating resource damage from cattle, other options will be pursued.

2. A cattle guard will be installed at the junction of Road 447 and the new Garnet Gulch Road to prevent cattle from entering the Garnet Gulch Drainage.

J. Recreation

1. Improvements needed to establish the new operations will be constructed to maintain a rustic and natural experience as much as possible.
2. A 600-foot access trail will be constructed from the 281 Gulch parking lot to the Garnet Gulch access road. This trail will be for foot traffic only and will be built according to Forest Service specifications.
3. Benches for rest stops will be installed along the new trail and road. Interpretive signs relating to the ancient Lake Clarkia and the geology of the area will also be installed along the trail and road.
4. Informational materials will explain access restrictions and accommodations for getting to the garnet area administrative site for people who are unable to walk there. People with "disabled" designation in their vehicles will be allowed to drive through to the administrative site.

K. Roads

1. The State of Idaho Best Management Practices Manual will be followed in locating, constructing, operating and reclaiming mineral access roads with the objective of minimum resource damage (www2.state.id.us/lands/bureau/Minerals/bmp_manual1992/bmp_index.htm on 1/12/06).
2. The new road proposed in Garnet Gulch will be designed to minimum standards (14 feet wide plus curve and fill widening with turnouts) to accommodate maintenance equipment. Portions of this road will be graveled to maintain a stable base and minimize sediment yield.
3. Large equipment will be unloaded at the 281 Gulch parking area and be driven to the site.
4. The proposed Garnet Gulch road location, alignment, width, grades, and drainage were reviewed by a qualified engineer (PF, T-3); and designs will be utilized to minimize risks from unstable soils and slopes, surface water damage, and groundwater seepage.
5. The intersection of the proposed Garnet Gulch road with the existing road (Rd 447) runs through relatively steep ground. Some buttressing of the cut slopes will be designed as needed for slope stability and erosion control. (PF, T-3)
6. For the proposed Garnet Gulch road, no fill material will be placed on the old inactive headwall located 500 feet past the top of the cut of the existing road. Full bench construction will be necessary. (PF, T-3)
7. When the garnet collecting site at 281 Gulch is closed, the 0.35-mile access road (Road 3781) will be recontoured to the extent practicable to the original slope and be revegetated with species (grasses, forbs, shrubs, and/or trees) suitable for the site.
8. A gate and cattle guard will be installed at the beginning of the proposed road for Garnet Gulch at the junction with Road 447.

9. To sustain truck traffic during East Fork 281 Gulch restoration activities, portions of Road 3781 may be graveled to maintain a stable base and minimize sediment yield.
10. During restoration and excavation activities water will be applied to project roads as needed to minimize dust.

L. Safety

1. All operations will be conducted in a safe manner and in compliance with Mine Safety and Health Administration (MSHA), Occupational Safety and Health Administration (OSHA) and other applicable local, state and federal requirements and guidelines.
2. The road construction contract for Garnet Gulch will include appropriate public safety plans.

M. Scenic Resources

1. A rustic gateway will be installed at the beginning of the proposed road to Garnet Gulch instead of the brightly colored steel gate that is often used.
2. Prompt revegetation of the fill slopes for the proposed new road to Garnet Gulch will be implemented. If buttressing is used for the first sight distance (250 feet) of the proposed road, rock obtained from the immediate area (local rock with same coloring) will be used as much as possible.

N. Soils and Watershed

1. Structures will be located outside of the riparian areas and flood plains.
2. Auger test holes used for establishing the annual excavated area will be filled immediately.
3. All areas that are disturbed by gemstone extraction will be reclaimed concurrently with the excavation.
4. Topsoil and overburden will be excavated in soil layers and will be stockpiled to return the site to as near the pre-existing condition as possible. Returning topsoil and overburden to the excavated site will be implemented immediately upon removing the garnet gravel layer. It is estimated the excavated site will be open for one week. This concurrent reclamation (progressive backfilling, grading and backfilling) will reduce the amount of material exposed at any given time and will reduce the possibility of sedimentation.
5. If equipment is operated on areas that will not be excavated otherwise, one or a combination of the following methods will be used to minimize compaction of soils: minimum size and weight equipment, low ground pressure tracked vehicles (defined by contact pressures in the range from 5 to 10 psi), long-arm excavator, and/or construction mats or other suitable methods.
6. In areas where soils become compacted due to construction equipment, soils may be decompacted if needed.
7. Where disturbance to the stream channel occurs, reclamation will have a designed channel and incorporate large woody material, boulders, sedges, shrubs and trees.

8. Whenever possible, excavating will be scheduled for low-flow periods. Normal surface water flows will be conveyed past the work area by means of bypass channels, pipes, pumps, plastic linings or cofferdams.

9. During periods of high precipitation or runoff, earth-disturbing operations will be curtailed to prevent excessive erosion and sedimentation.

10. Diversion trenches, dewatering wells, grout curtains, coffer dams, slurry walls, geomembrane barriers and/or steel sheet piles may be used if needed to minimize groundwater seepage into active excavation cuts. These control features can effectively lower the groundwater table so that it will not go into excavation areas (National Seal Company, 1991; Cavalli, 1992; and Sherman, 1992).

11. If it is necessary to pump water from excavated areas, the water will be used in the sluicing system or stored for later use or be applied over land. For overland application the water will be dripped or sprinkled onto relatively flat, well-vegetated areas. If it is necessary to dispose of water in this manner in the occupied habitat of *Rhizomnium nudum* below the lowest panels on Garnet Gulch, it would only be deposited on the eastern bank of Garnet Gulch.

12. Water removal from 281 Gulch and Garnet Gulch for the sluicing operation will be limited to the amount necessary to initially fill the settling pond and the recycling or storage pond system and then to augment losses due to spillage, subsurface seepage, groundwater recharge and evaporation. Removal will be timed so that the initial filling occurs in the spring when flows are high. Periodically, when water becomes too low for effective sluicing due to losses from evaporation, spillage, and percolation, the system will be recharged with water from the stream source pending review by District Fish Biologist and District Hydrologist. During drier periods, only a small portion of the stream flow over an extended time period will be removed for augmentation. Additionally, a water truck may be used to supplement if needed. No digging or filling to accommodate water withdrawals is anticipated. A water truck may be used to supplement if needed.

13. Areas that are disturbed will be revegetated. Replanting and reseeding, if needed, will be conducted with approved seed and stock and will consist of planting densities and species appropriate to the site.

14. Sediment basins or settling ponds will be installed to collect sediment generated from the gemstone washing. The sediment will be removed from settling basins and will be stockpiled as far from the active channel as practicable until it is used for reclamation.

15. Disturbed sites will be covered using mulch, seed, slash, or erosion blanket while vegetation becomes established.

16. Erosion control structures will be utilized to prevent excessive run-off and erosion. Structures will be constructed in accordance with the Idaho Department of Environmental Quality Catalog of Stormwater Best Management Practices for Idaho Cities and Counties, 2nd Edition, April 2001, the U.S. Environmental Protection Agency's Storm Water Management of Construction Activities; Developing Pollution Prevention Plans and Best Management Practices, September 1992; and the Idaho Department Best Management Practices for Mining in Idaho, November 1992. Erosion control systems will be established as appropriate for the site. Specific design features will include implementation of the following practices:

a. Sediment control devices will be installed prior to surface-disturbing activity, be inspected regularly, and be cleaned to maintain at least 60 percent of their sediment-holding capacity. Site specific BMPs will be utilized where necessary to insure there will be no net increase in sediment yield from the site.

b. Sediment control methods may include barriers, silt fences, slash filter windrows, rolling dips, graveling, scattered slash, mulching and seeding, or other methods deemed appropriate for the site. Sediment traps and barrier systems will be inspected periodically and as needed during periods of inclement weather. Accumulated sediment will be periodically removed, possibly stockpiled and then be used in reclamation as needed.

c. Temporary access trails for equipment (e.g. to establish the garnet gravel stockpile) may be constructed with rolling dips and be armored with rock if needed.

d. Where possible, site design features will promote diffuse flow or runoff over the ground surface to prevent concentrated flow.

e. Temporary diversion of stream channels or alteration of channels or stream banks during operations will be kept to the minimum practical.

f. Sediment traps and sediment control devices for surface drainage will be maintained until disturbed areas are restored and revegetation requirements are met.

17. A channel would be reconstructed on the surface of the excavated panel that mimics the pre-disturbed existing channel in both size and shape (unless an alternative design is agreed to for habitat improvement). Valley and stream channel cross-sections and stream longitudinal profile survey data (project file) collected in 2002-2005 would be used to configure and locate the reconstructed channel. The streambanks would be stabilized using wraps of coir fabric or other biodegradable geo-textile. One or two wraps of the fabric would be used depending on existing channel depth, each lift about 12 inches (FEIS, Figure 18). Fabric or geo-textile and perhaps up to eight inches of gravel may be placed in the reconstructed stream bottom. Also logs and/or large cobbles to small boulders may be used for bank material to provide aquatic habitat and stream bank and channel stability. The reconstructed channels will be monitored for stability and streambank vegetative cover (FEIS, Appendix C).

O. Tree Clearing and Slash Handling

Trees will be cut only to the extent necessary for the operations. Associated slash and large wood will be used for reclamation as needed.

P. Wildlife

1. Riparian disturbance will be kept to the smallest area practicable in any one year of operation.

2. During reclamation, the topography will be returned to its previous slope and elevation. The existing amount of persistent pooled water (for amphibian habitat) will be maintained or increased.

Monitoring

Monitoring will be conducted on a sample basis and will be designed to verify that projects are implemented as designed, are effective and most efficient in meeting the project and Forest Plan objectives, and also to determine whether the project and Forest Plan goals and objectives for the area are still appropriate.

Forest Plan Monitoring

The Idaho Panhandle National Forests developed a plan to monitor implementation and effectiveness of management practices implemented under the Forest Plan and to validate the assumptions and models used in planning. The Forest prepares a Forest Plan Monitoring and Evaluation Report on an annual basis to document the results of this monitoring.

Forest-level monitoring may or may not take place specifically on this project, but information gathered and lessons learned at the broader level are applied back to specific project-level design, implementation, and monitoring. Forest Plan monitoring for the St. Joe Ranger District which address issues pertinent to the Emerald Creek Garnet Area include:

- Heritage Resources: Field monitoring is done by the Forest Service Archeologists to measure potential effects of land-disturbing projects on known cultural resources. Areas are surveyed prior to project implementation, and site specific plans are developed to protect newly identified sites.
- Threatened, Endangered, and Sensitive Plants: IPNF direction is to inventory and manage sensitive plants so that no new species have to be listed as threatened or endangered. Project areas are surveyed and projects are modified before ground-disturbing activities begin to attain this objective. Sensitive plants are protected according to site-specific management plans.
- Soils: IPNF objective is that management activities on Forest lands will not significantly impair the long-term productivity of the soil or produce unacceptable levels of sedimentation resulting from soil erosion. This is accomplished using technical guides developed in conjunction with the soil survey and Best Management Practices necessary to protect soil productivity and minimize erosion.
- Visual Quality: Decision documents are reviewed annually for Forest Plan visual quality objective compliance. Annually, up to two areas per district may be field reviewed after project completion. The objective of the field review is to determine if the Visual Quality Objectives (VQOs) were met as disclosed by the decision document for that project. A ten percent departure from Forest Plan direction after five years would initiate further evaluation of the visual resource management program.
- Water Quality: Forest Plan Appendix JJ established the IPNF water quality monitoring program. The water quality monitoring program is the result of a Memorandum of Understanding with the State of Idaho dated September 19, 1988. The agreement also replaced Forest Plan Appendix S (Best Management Practices) with Forest Service Handbook 2509.22 (Soil and Water Conservation Practice Handbook).

  According to Appendix JJ of the Forest Plan, in order to demonstrate water quality protection, monitoring plans address three primary questions:

  - Are BMPs implemented as designed?
  - Are the BMPs effective in controlling non-point sources of pollution?
  - Are beneficial uses of water protected?

  To provide answers to these questions, the following monitoring categories are utilized:

  - Baseline monitoring characterizes existing water quality conditions and long-term trends of stream systems. It also provides a control for monitoring and assessing

activities. Baseline monitoring sites throughout the Forest have been identified and established to representatively sample conditions on the Forest.

- Implementation monitoring shows whether or not prescribed BMPs were implemented as designed and in accordance with Forest Plan and project standards and guidelines. In addition to specific project monitoring discussed in this document, supplemental implementation monitoring include internal field reviews by interdisciplinary teams using a procedure similar to State audits.
- Effectiveness monitoring demonstrates if BMPs were effective in controlling pollutants to meet planned levels or resource management objectives. The intent is to focus on cause and effect relationships between land management activities and water quality. Effectiveness monitoring is done on a sample basis to characterize typical conditions so that results can be extrapolated. Emphasis is on major non-point pollution source contributing activities such as road construction, reconstruction, and maintenance; related erosion control BMPs; and riparian area management.

In the event of incorrect or inappropriate application of BMPs, or omission of prescribed BMPs, causes are identified along with corrective or preventive actions to be taken. Corrective measures are incorporated into: 1) modification of and adjustment to contracts; 2) administrative procedures; and 3) long-range plans as necessary to ensure BMPs are both properly designed and implemented.

- Wildlife: Big game management indicator species population trends are determined by the Idaho Department of Fish and Game. Hunter success rates and visual counts of animals are used to determine these population levels.

  Elk Habitat Potentials are monitored by ranger district and by individual Elk Habitat Unit annually.

  Northern goshawk nesting sites are monitored by ranger districts. Known nesting sites are visually inspected to determine occupancy. The monitoring frequency varies based on funding. Surveys are conducted for additional nesting sites during project planning or implementation if nests are sighted.

Project Monitoring (See FEIS Appendix C for more detail)

In addition to Forest Plan monitoring, project-specific monitoring will be conducted to ensure that implementation is consistent with the established standards and guidelines. Monitoring will also be conducted to determine the effectiveness of management activities and applied mitigation measures. Adaptive management will be utilized as the new operation is implemented. As methods are used and monitored they may be changed to provide better results to protect resources and provide a better experience for the public. Restoration of previously dug areas in 281 Gulch will be monitored according to the plans described in Appendix C of the FEIS. These same monitoring methods will be used in Garnet Gulch when operations are moved there. Specific monitoring developed for the project includes:

Baseline Data: Stream surveys conducted in the project area established a baseline for monitoring turbidity and stream flow. Sediment monitoring was conducted during 2001-2004 and turbidity was monitored in 2004-5 during operating seasons. Stream flow was estimated in 2002-3 based on measurements at the East Fork Emerald Creek gauging station and using area-discharge relationship and also measured for 281 Gulch. Garnet Gulch stream flow was measured in 2004 and 2006. Additional surveys measuring channel and valley cross sections and longitudinal profiles are also on file. Fisheries surveys established baseline information for

water temperature and residual pools. The reference area in Garnet Gulch for vegetative cover will be surveyed in summer 2006. Surveys confirmed the presence of the western boreal toad in 281 Gulch.

Implementation Monitoring: Project implementation generally involves the efforts of a variety of individuals with both specialized and general skills and training. Employees on the St. Joe District are accustomed to working together to achieve the desired project objectives. For example, the minerals administrator works with biologists or other specialist to ensure that mining operations and reclamation are implemented properly. At the recreational collecting site, the recreation specialist continually works with the geologists, hydrologist and biologists to ensure that the ongoing operations and end reclamation product is as planned. Joint field reviews are done as needed. These steady informal communications allow for incremental project adjustment throughout implementation to achieve the desired results. In addition to these less formal monitoring procedures, the following monitoring items will be conducted.

- Heritage Resources: All employees working at the Emerald Creek Garnet Area are required to promptly notify the Forest Archeologist upon discovery of a previously unidentified heritage resource. Work in that area will be halted until an assessment and protection measures are conducted. See Design Feature E for more detail.
- Channel Morphology: Measurements of channel and valley cross sections and longitudinal profiles taken prior to excavation will be used to re-establish channels in the excavated areas. The proposed reconstructed channels will be monitored for stability and stream bank vegetative cover (FEIS Appendix C).
- Minerals / Recreation: Daily garnet weights per person per day will be recorded to assess garnet removal. Comment forms will also be available to assess whether we are meeting the public's expectations.
- Sensitive Plants: Some water disposal may take place on *Rhizomnium nudum* sites on the eastern side of Garnet Gulch. It is not known what effect this will have on this moss. Annual monitoring will be conducted to determine if water disposal has detrimental effects to the population of *R. nudum*. If declines in the population are recorded, then alternate water disposal sites or methods will be employed.
- Range: Cattle use in the Emerald Creek Garnet Area will be reported to the permittee immediately. The permittee will then be responsible for promptly removing the cattle. Temporary electric fencing may be used on the recently reclaimed areas if needed.
- Safety: All operations will be conducted in a safe manner and in compliance with Mine Safety and Health Administration (MSHA), Occupational Safety and Health Administration (OSHA), and other applicable local, state and federal requirements and guidelines. If operations are found to be out of compliance with these regulations and the failure to comply presents a significant risk to the health, welfare or safety of the general public, operations will be terminated until corrective measures are implemented.
- Restoration: Restoration monitoring will be done according to the monitoring plan developed for the restoration work in 281 Gulch (FEIS, Appendix C).
- Water Quality: Water quality will be monitored to ensure compliance with IDAPA 58.01.02. (See Design Feature N.16., Erosion Control Plan in Appendix A and Appendix C). See effectiveness monitoring below.

Effectiveness Monitoring

- Water Quality: On-site monitoring will be conducted in a variety of ways. Visual inspections of sediment basins, operations and past rehabilitation will be conducted daily during operations and at a minimum once during mid-winter and once in early spring (see PF, SW-66 for list of previous site visits). Daily turbidity measurements will continue during operations both above and below newly reclaimed areas and at the sluice plant site. Automated sediment samplers will be installed in East Fork Emerald Creek above Garnet Gulch, between Garnet Gulch and 281 Gulch, and below 281 Gulch.
- Noxious Weeds: Forest Service employees monitor the garnet collection areas for new populations of noxious weeds. Areas where ground-disturbing activities occur would be inspected at least yearly for new populations of noxious weeds. Should new populations be found, treatment would be implemented in accordance with priorities set by the noxious weed program (Design Feature G.8.).
- Vegetative Success: In the first year following revegetation efforts there would be 100% ground cover consisting of a combination of native and annual vegetation and mulch. Reclaimed areas would be monitored until a minimum of 75% vegetative cover of that found within a reference area was established, ideally within three years. A minimum of 50% of all planted shrubs or trees would be maintained. Supplemental seeding and/or planting would occur as necessary to meet goals.
- Wetland Success: Observe continual increase in cover percentage, plant species diversity, size and age class during the monitoring period and also monitor for soil redoximorphic (anaerobic) conditions annually during the monitoring period or determine hydrophytic vegetative recovery as indicative of hydrologic recovery.
- Wildlife: Follow-up surveys for persistent pooled water and western boreal toad would be conducted on an annual basis.

5. OTHER ACTIVITIES

Dispersed Camping , Outfitter and Guides, Garnet Digging Outfitter, Bechtel Butte Garnet lease and prospecting , Fire Suppression, Gathering of misc. forest products, Control of Noxious Weeds, Road Maintenance, Biotic Factors, Data Gathering, Firewood cutting, Cattle Grazing, Timber stand improvement (tree pruning & planting, precommercial thinning, gopher baiting, fertilizing), Trail Maintenance, St. Maries River Basin Fuels Reduction Area 2 Emerald Creek CG, Emerald City Timber Sale, Emerald Butte Access DM, Unauthorized garnet digging.

6. POPULATION CHARACTERISTICS AND HABITAT REQUIREMENTS

Bull trout exhibit resident, fluvial and adfluvial life histories (Averett and MacPhee 1971, Bjornn and Likens 1986, and Goetz 1989). Resident populations remain in their natal streams throughout their life. Migratory populations (fluvial and adfluvial) use tributary streams for spawning and may remain in these areas throughout the summer. In the fall, fish that have not previously returned to rivers (fluvial) and lakes (adfluvial) migrate to deeper water where they congregate and over-winter. By adopting these life history strategies, bull trout populations are resilient to disturbances of short duration and consequence.

Bull trout life history cycle involves the following pattern. In the spring, adults begin migrating to the spawning stream where they remain in staging areas until spawning. Spawning occurs in

the fall in clear, headwater streams with a gravel or rubble bottom. Afterwards the adults return to the rivers or lakes from which they came. Eggs incubate in the spawning gravel during the winter and the fry emerge in the spring. Juveniles will remain in these streams for two to five years before migrating downstream to a river or lake. Resident bull trout follow the same yearly sequence for spawning and fry emergence as the fluvial and adfluvial, but the adults remain in the tributaries year round.

Bull trout in the St. Joe River and Coeur d' Alene systems are considered genetically unique when compared to other Columbia River halotypes (Williams, unpublished 1994). In a status review of bull trout on the Idaho Panhandle National Forests, bull trout in the St. Joe River system were designated as being "at moderate risk of extinction" (Cross 1992). The IPNF Forest Plan monitoring reports (1998, 2000, 2002, and 2003) indicate that bull trout populations appear to be stable throughout most of northern Idaho (USDA Idaho Panhandle Forest Plan Monitoring and Evaluation Reports 1998, 2000, 2002 and 2003).

Two unconfirmed sightings of bull trout were reported in the Emerald Creek Drainage (Emerald Resource Unit EIS, page III-42, 1993). No bull trout have been located during recent snorkel and electrofishing surveys within the East Fork of Emerald Creek or any tributaries to the East Fork of Emerald Creek (2001 and 2004) (project file F-1).

HABITAT REQUIREMENTS

Rieman and McIntyre (1993) suggest that five habitat characteristics are particularly important for bull trout. These are channel stability, substrate composition, cover, stream temperature, and migratory corridors. Requirements for good rearing habitat for bull trout include water temperatures below 15 degrees Celsius (Goetz 1989) and abundant cover (Fraley et al. 1989). Juvenile rearing habitat is generally in smaller tributaries where the fish will remain for 3-5 years before migrating downstream to seek more suitable habitat. Gravel areas near headwater streams are utilized by spawning bull trout in the fall.

The function of headwater streams and their importance to downstream supported fisheries has been reviewed by Bilby and Likens (1980) and Schlosser (1982). Their work suggests that organic debris dams are an important component of small stream ecosystems and that their loss results in considerable seasonal and annual variation in the trophic structure and total biomass of aquatic ecosystems.

Stream channel equilibrium (stability) is the balance between sediment yield, water yield, and channel morphology, which exists within a stream system. Studies indicate that shifts away from channel equilibrium can result in negative changes in the structure and function of stream ecosystems (Bilby and Likens 1980, Schlosser 1982) and their dependent fish populations. Bisson and Sedell (1982) reported that where stream channels have become destabilized, riffles elongated and in many cases extended through former pool locations resulting in loss of pool volume. They suggested that declines in older fish might be the result of their dependency upon deeper water habitats. The persistence of bull trout over time can best be provided by maintaining lateral and in-stream habitat complexity in association with channel stability (Karr and Freemark 1983, Karr and Dudley 1981).

7. Field Surveys and Habitat Conditions
Field Surveys:

The description of the current habitat elements is based on quantitative surveys conducted in 1998, 2001 and 2002 according to procedures outlined in the Region 1 Fisheries Habitat Evaluation Handbook (FSH2609.23) or the R1/R4 methodology (Overton et al 1997), woody debris inventory, qualitative stream reviews (1996-2005), historical records, aerial photographs review, review of the watershed report, and discussions with Idaho Department of Fish and Game (IDFG) and U.S. Fish and Wildlife Service (USFWS). All quantitative survey data, irregardless of age of data, remain valid based on recent qualitative reviews of the streams and lack of habitat altering events.

Habitat conditions:
The following tables and text display the issue indicators or measurable factors for each of the streams within the cumulative effects area (the East Fork of Emerald Creek). These features help determine the current condition and trend of the stream and its potential. The informally named tributary "Mystery Gulch", and Strom Creek are not addressed further due to the lack of fish use of those streams.

Table 1 - Stream Channel Conditions

Stream Name	Width to Depth Ratio	Streambank Condition	Floodplain Connectivity
East Fork Emerald	M	G	M
Little East Fork Emerald	L	G	G
281 Gulch	M	P/G[1]	G
Pee Wee Gulch	M	G	G
Garnet Gulch	M	G	G
No Name Gulch	M	G	G
Flat Creek	G	G	G
Swamp Creek	G	G	G
Post Creek	G	G	G
Highline Creek	G	F	M

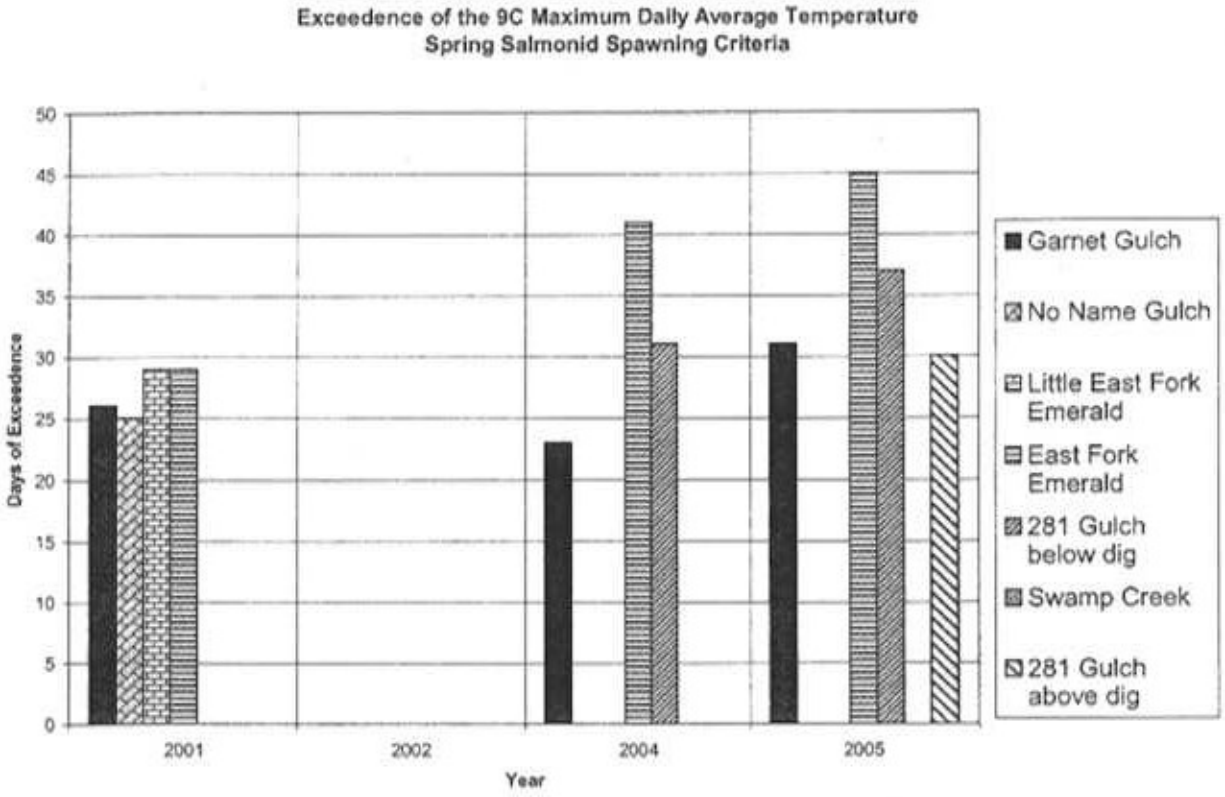
[1] In the areas associated with the recent garnet digging the banks are unstable therefore poor condition; in areas where there has not been digging or where the digging occurred in the past the banks are vegetated and in good condition.

Table 2 – Watershed Conditions (GIS-based) and Habitat Access

Stream Name	Road Density (mi/mi^2)	Road Density Rating	% of Stream Length with Encroaching Roads	RHCA Road Density (mi/mi^2)	% Past Harvest in RHCA	Physical Barriers*
281 Gulch	4.4	High	6.5	2.1	6	Y
Garnet Gulch	3.9	High	5.6	1.5	10	Y
No Name Gulch	3.8	High	8.5	1.9	10	N
Pee Wee Gulch	0.8	Moderate	1.4	0.7	0	N
Flat Creek	5.8	Extremely High	11.0	4.2	7	N
Swamp Creek	4.8	Extremely High	2.7	0.9	10	N
Post Creek	3.6	High	2.3	0.5	8	N
Highline Creek	5.2	Extremely High	9.0	7.7	11	N
Little E Fork Emerald	6.8	Extremely High	9.4	3.9	18	N
East Fork Emerald	3.9	High	12.1	7.0	10	Y

*** N = No Barrier, NB= Natural barrier, H = Human created, UK = unknown**

Figure 1 - Water Quality Conditions (Temperature)



* In 2002 temperature recorders were not placed until mid July, therefore not within the spring spawning period. Temperature recorders were only placed in Swamp Creek in 2002.

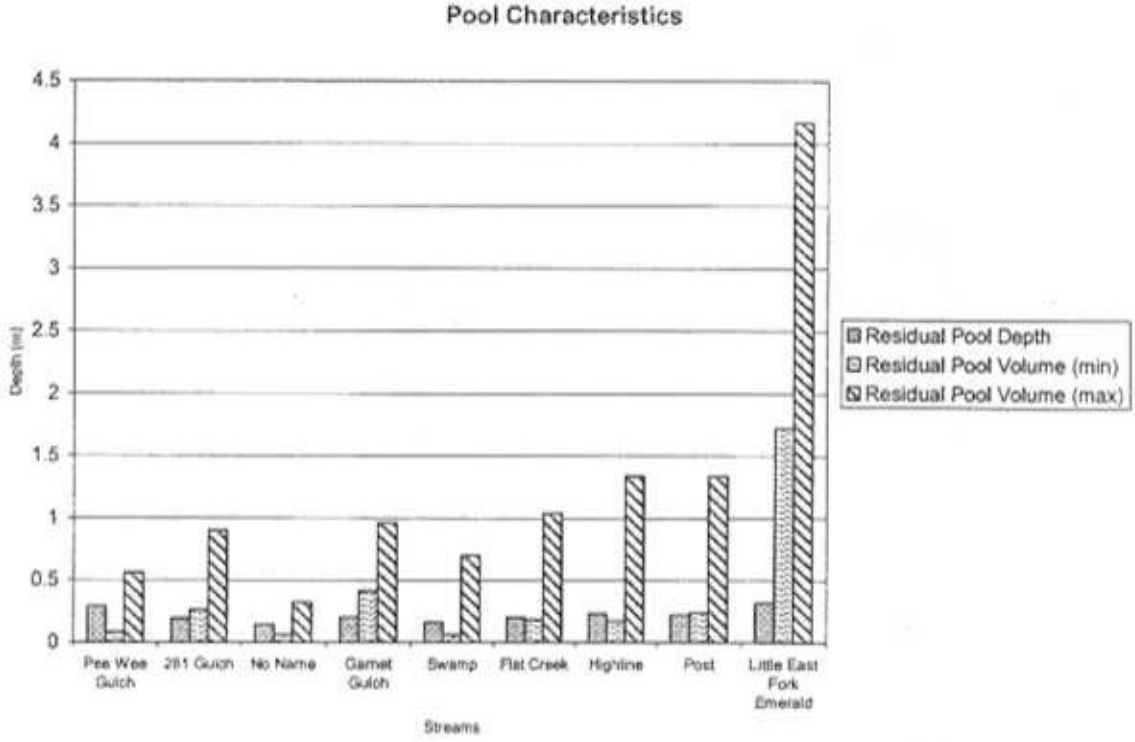
Individual Drainage Discussion

281 Gulch

Historic Activity: Timber harvest activity prior to 1933 treated approximately 65% of the lower portion of the drainage (review of 1933 aerial photographs) and, according to the district cultural resources specialist, was likely broadcast burned following the harvest. Forest Service operated recreational garnet mining began in this drainage in 1985 and has continued to the present. Activity began at the upper ends of the West and East Forks and has been working progressively downstream. The most recent (2005) operations were occurring in both forks, a short distance upstream of the confluence of the East and West Forks. The operating season was from July 1 (East Fork) and Memorial Day weekend (West Fork) until Labor Day weekend. During the extraction season the East Fork was diverted through a pipe approximately 150m long. Settling ponds constructed below the mining activity on both forks reduce the amount of sediment which continues downstream. Several other mitigation measures have been utilized to reduce the amount of sediment being transported downstream by this operation (see Recreation section of Emerald Garnet Area EIS). Following the seasonal closing the stream is rehabilitated to reduce the amount of sediment produced from the mined sections. The District Hydrologist has conducted monitoring of this operation (see Emerald Garnet Area EIS project file).

Habitat Elements

Figure 2 - Pool Characteristics: Residual Pool Depth & Residual Pool Volume



Flow/Hydrology: Flow at the culvert on 281 Gulch (under Road 447) was estimated to be approximately 0.22 cu ft/sec during March (Emerald Creek Garnet Area EIS, project file, F-30). Estimates of the discharge for the two-year peak flow ranged between 12 and 15cfs depending on the estimation method utilized (Emerald Creek Garnet Area EIS, Watershed Report).

Watershed Condition: 281 Gulch has a high total road density (Table 2). Six percent of the riparian length has been harvested associated with timber sales within this drainage, primarily in the headwaters. An additional 1.5 acres of riparian vegetation was disturbed in association with previous garnet mining in the East and West Forks of 281.

Water Quality: Figure 1 displays temperature information. In general temperatures are higher below the dig site than they are upstream of the dig site. This is likely due to the potential for warming in the ponds. Temperatures below the dig site exceeded Idaho state criteria each year, when it was monitored beginning prior to July.

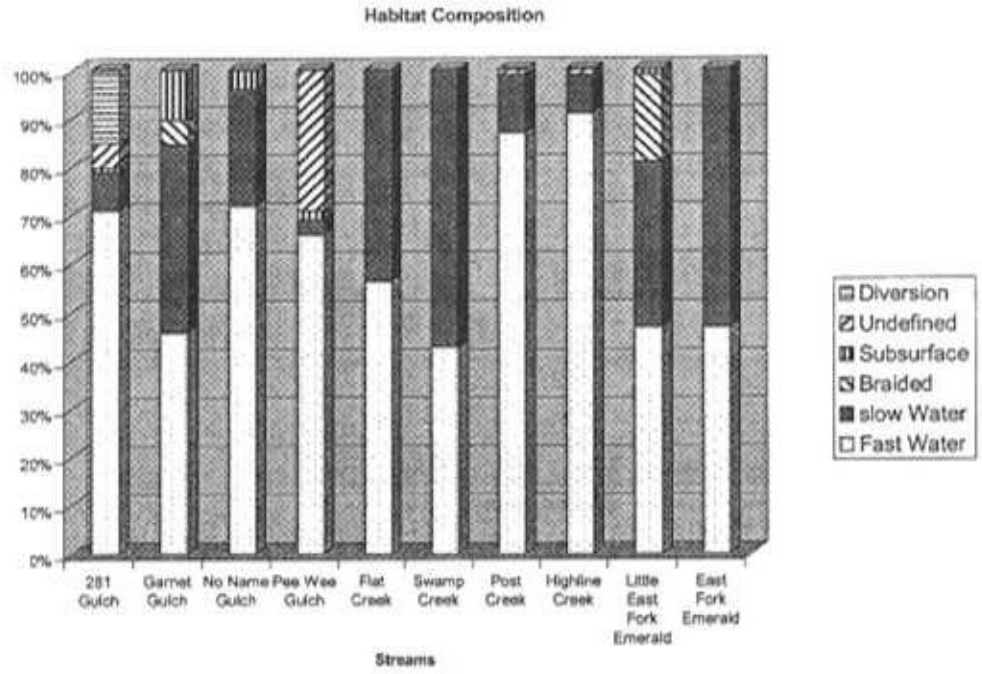
Sediment is generated within the active dig sites. but settling ponds within the basin are collecting fine sediments from the two tributaries before reaching the main stem of 281 Gulch. Some sediment does become entrained within the system during cleaning of the settling ponds. Turbidity was measured in 2004 and 2005. This sampling indicates that the garnet mining activities are meeting water quality standards (Emerald Creek Garnet Area EIS, Watershed section). The watershed report contains additional information on sediment production. Additional sources of potential sediment production include: two stream crossings in the headwaters, one stream crossing near the mouth, roads along six percent of the stream course and six percent harvest of the riparian zone.

There is no chemical contamination of the site. The gas-powered pump which is used to drain the settling pond at the downstream end of the West Fork of 281 Gulch is contained within a spill containment system.

Nutrient levels may be slightly higher than reference conditions due to cattle which occasionally enter this drainage, usually during the later part of the summer.

Figure 3 - Habitat Composition

(Slow water habitats are pools. Fast water habitats include: cascades, riffles, runs, glides.)



Habitat Access: There are two culverts on fish-bearing portions of 281 Gulch. Fish would have to jump slightly to enter the culvert under Road 447 which would create a migration barrier to some fish. The other culvert under Road 3781 is at stream grade and is therefore not a migration barrier.

Habitat Elements: In 2001 a quantitative habitat survey was conducted (approximately 3,300 feet) of the main stem of 281 Gulch and extending up a portion of the East Fork. A qualitative survey continued beyond the quantitative survey and determined that fish use would continue another 1,000 feet. Overall the stream habitat is primarily riffle habitat, with the segments in the mined areas having slightly higher percentages (Figure 3). The unmined segment (approximately 1650 feet) has a higher number of pools than the mined segments, when the settling ponds are not included. The pool qualities; residual pool depth and residual pool volumes, in the mined segments are similar to those of the unmined segment and the segment upstream of the recent mining.

Stream substrate is generally small-sized ranging from small gravel to fines. Substrate composition is largely a function of the parent schist geology, but fine substrate downstream of mining activity further restricts the quantity and quality of spawning habitat.

The riparian zone within the unmined areas has primarily brush species with timbered areas encroaching from the lower hill slopes. The riparian zone within the mined area is largely devoid of brush and tree species though grasses, sedges and some planted trees occur in rehabilitated sections.

Summary: 281 Gulch is used primarily as a spawning and early-rearing stream; however, the inherent properties of 281 Gulch (e.g. small size and schist geology) naturally limit the potential

for aquatic habitat conditions regarding native trout. Land management activities (primarily associated with mining and timber harvesting) within 281 Gulch have changed aquatic habitat conditions. The main limiting factors for fish production within 218 Gulch are higher stream temperatures, a culvert migration barrier, high total road density, and simplified habitat. The habitat of 281 Gulch is considered to be moderately altered / at moderate risk.

Garnet Gulch

Historic Activity: Extensive management activity has occurred within this drainage in the past. A review of historic aerial photos (1933) indicates that approximately 85% of the drainage was harvested and, according to the district cultural resources specialist, was likely broadcast burned following the harvest. There has been no organized Forest Service garnet mining operation in this drainage, but testing of the garnet resource did occur in 1978. Anecdotal information about the mining of the Emerald Creek area reports that unregulated rock hounding did occur in this drainage (Emerald Creek Garnet Area EIS project file F-29).

Flow/Hydrology: Flow at the culvert on Garnet Gulch was estimated to be approximately 0.16 cfs during March (Emerald Creek Garnet Area EIS project file, F-30). Estimates of the discharge for the two-year peak flow ranged between 10 and 13cfs, depending on the estimation method utilized (Emerald Creek Garnet Area EIS Watershed Report).

Watershed Condition: Garnet Gulch has a high total road density (Table 3). Some riparian harvest has occurred within this drainage, but the drainage is still considered to be in good condition (Table 3).

Water Quality: Temperature data is displayed in Figure 1. Temperatures in general are slightly lower than the majority of the other streams within the East Fork Emerald Creek drainage; however, some days do exceed the Idaho State Criteria for spring salmonid spawning temperatures.
Sources of potential sediment production include: five stream crossings in the headwaters, one stream crossing near the mouth, roads along six percent of a stream course and ten percent harvest of the riparian zone.
Chemical contamination and nutrient levels are expected to be similar to reference conditions because of the low potential for chemical introduction (minimal number of road/stream intersections and low use of those roads), the lack of agricultural activity and the lack of grazing.

Habitat Access: The culvert under Road 447 requires a slight jump for fish to get into the culvert. This culvert is a low-flow migration barrier.

Habitat Elements: There is approximately 4,000 feet of fish-bearing stream in the Garnet Gulch drainage. Garnet Gulch passes through a culvert immediately upstream from its confluence with the East Fork. The stream averages about four feet wide. The substrate is predominately gravel. Woody debris is plentiful and stable in the channel. The quantitative survey identified that the instream habitat is primarily run and pool (Figure 3). The pool habitat was primarily created by woody debris. Pools are slightly more developed in the second reach (Figure 2). The second reach contains two large (22.7 and 13.5 m long), human-created pools. During the survey, which occurred in June, short segments of the channel, downstream of and within the section proposed for mining, were subsurface. The riparian zone is primarily forbs with some conifers. The vegetation becomes denser moving upstream to a point where it is difficult to see the channel.

Summary: Garnet Gulch is primarily a spawning and early rearing stream. Compared to other fish-bearing streams of similar size within the drainage Garnet Gulch has higher fish utilization, lower temperatures, similar or higher percentage of pool habitat and a higher percentage of subsurface flow. Although temperatures are lower than other streams within the drainage; high temperatures, high road density and the culvert low flow migration barrier are the main limiting factors to fish production within Garnet Gulch. The habitat of Garnet Gulch is considered adequate.

No Name Gulch

Historic Activity: A review of historic aerial photographs (1933) indicates that almost this entire drainage (about 95% based on aerial photograph estimation) was harvested and, according to the district cultural resources specialist, was likely broadcast burned following the harvest. No Name Gulch was mined for garnet gems from 1974 until 1984. This mining occurred from the confluence with the East Fork of Emerald Creek upstream about 700 feet. At this point the stream forked. Another 1,000 feet (approximately) of stream up the left fork of No Name and approximately 500 feet up the right fork of No Name were also mined. A variety of reminders of the past mining are still evident within the stream channel: metal fence posts, wood planks, etc.

Flow/Hydrology: Flow at the culvert on No Name Gulch was estimated to be approximately 0.10 cfs during March (Emerald Creek Garnet Area EIS project file, F-30).

Watershed Condition: No Name Gulch has a high total road density (Table 2). Some riparian harvest has occurred within this drainage, but it is still considered to be in good condition (Table 2).

Water Quality: Temperature data is displayed in Figure 1. Only one year of temperature data was collected for No Name Gulch. In general, temperatures in No Name are slightly lower than the majority of the other streams within the East Fork Emerald Creek drainage, however temperatures still exceed the Idaho State Criteria for spring salmonid spawning temperatures on some days.
Sources of potential sediment production include: six stream crossings in the headwaters, one stream crossing near the mouth, roads along 8.5 percent of stream courses and ten percent harvest of the riparian zone.
Chemical contamination and nutrient levels are expected to be similar to reference conditions because of the low potential for chemical introduction (minimal number of road/stream intersections and low use of those roads), the lack of agricultural activity and the lack of grazing.

Habitat Access: The culvert under Forest Service Road 447, near the confluence with the East Fork of Emerald Creek, is undersized as evidenced by the erosion around the inlet of the culvert. The bottom of this culvert is also rusting through. This culvert would be a migration barrier to some aquatic species but most fish species would be able to pass through.

Habitat Elements: A qualitative review of this stream was conducted in July 2000 by the district fisheries biologist (Emerald Creek Garnet Area EIS project file F-9), and a quantitative habitat survey was conducted in June 2001 (Emerald Creek Garnet Area EIS project file F-9). The reviews began at the confluence with the East Fork of Emerald Creek. The quantitative review was conducted on approximately 1,300 feet of stream, the main stem and up the right fork. No Name Gulch is a small stream averaging 3.3 feet wide, ranging between 1.6-5.9 feet. The quantitative survey divided the stream into two reaches based on valley bottom, gradient and substrate. The substrate is predominately small gravel. The overall habitat (Figure 3) was

primarily fast water habitats (72%). Slow water habitats (pools) comprised only 24% of the stream. Approximately half of these pools are created by woody debris although the majority of the woody debris is small due to the limited amount of conifers in the riparian zone. Pools are less developed with lower residual pool volumes and depths in this drainage than in Garnet Gulch (Figure 2).
The riparian zone is primarily grass and forbs. An old road parallels the channel for about the lower ¼ mile of stream, and according to the historic aerial photos (1933) the road continued up the left fork of No Name Creek at one time. Beyond the end of the old road the stream has greater quantities of woody debris, and the riparian zone is predominately brush and sparsely spaced conifers.

Summary: No Name Gulch is primarily a spawning and early rearing stream. Limiting factors within No Name Gulch include higher stream temperatures; an undersized, rusting culvert; lower amounts of slow water habitats; and lower quality slow water (pool) habitat. The habitat of No Name Gulch is considered moderately altered / at moderate risk.

Pee Wee Gulch

Historic Activity: This drainage received extensive management activity in the past. A review of historic aerial photographs (1933) indicates that almost this entire drainage (about 95% based on aerial photograph estimation) was harvested and, according to the district cultural resources specialist, was likely broadcast burned following the harvest. Pee Wee Gulch was mined for garnet gems from 1979 until 1984. This mining occurred from the confluence with the East Fork of Emerald Creek upstream about 1,100 feet. Fence posts, old bridge planks and other remnants of the mining activity are still evident in the stream.

Flow/Hydrology: Flow at the culvert on Pee Wee Gulch was estimated to be approximately 0.03 cfs during March (Emerald Creek Garnet Area EIS, project file, F-30).

Watershed Condition: Pee Wee Gulch has a moderate total road density (Table 2). Some riparian harvest occurred within this drainage; but it is an extremely minor amount, therefore the riparian area is considered to be in good condition.

Water Quality: No temperature data was collected on Pee Wee Gulch. Sources of potential sediment production include one stream crossing near the mouth and road along 1.4% of a stream course. Chemical contamination and nutrient levels are expected to be similar to reference conditions because of the low potential for chemical introduction (minimal number of road/stream intersections and low use of those roads), the lack of agricultural activity and the lack of grazing.

Habitat Access: There are no migration barriers on Pee Wee Gulch, however the culvert under Forest Service Road 447 is likely undersized for the 100-year flood event.

Habitat Elements: Pee Wee Gulch is a small stream averaging 2.2 feet wide. The habitat is primarily fast water habitat (66%) with minor amounts of pool habitat (3%) and 2.1% of the stream went subsurface (Figure 3). About 29% of the stream was so densely overgrown with brush and forbs the surveyor was unable to determine habitat types within those sections. This stream had a very low amount of pool habitat as compared to the other small drainages within the project area, although the pools that did occur had similar physical attributes as those in similar sized drainages within the analysis area (Figure 2).

The stream banks along Pee Wee Gulch were primarily lined with brush and forbs which were very dense along some sections, thus indicating stable banks. Conifers occasionally occur within the riparian zone, but they are primarily located on the hill slopes. The valley bottom varies from 10 feet wide up to 30 feet wide. The width of the valley, therefore, dictates how much influence the conifers on the hill slope would have on the channel. The substrate at the lower end of the stream is primarily gravel and sands. Moving upstream the substrate increased in size with some fines present.

Summary: Pee Wee Gulch is primarily a spawning and early rearing stream. Limiting factors within Pee Wee Gulch include lower amounts of slow water habitats. The habitat of Pee Wee Gulch is considered to be adequate.

Flat Creek

Historic Activity: The stream survey conducted during 2002 found evidence of past mining activity. Timber harvest activity prior to 1933 treated approximately 20% of the lower portion of the drainage (review of 1933 aerial photographs). The district cultural resources specialist stated that the area was likely broadcast burned following the harvest. The Forest Archaeologist reported that a log chute was likely located in this drainage (Emerald Creek Garnet Area EIS, project file F-27). There has been no regulated garnet mining in this drainage.

Flow/Hydrology: No flow data is available for Flat Creek.

Watershed Condition: Flat Creek has extremely high total road density (Table 2). Some riparian harvest has occurred within this drainage, but the drainage is still considered to be in good condition (Table 2).

Water Quality: No temperature data was collected on Flat Creek. Sources of potential sediment production include: 14 stream crossings in the headwaters, one stream crossing near the mouth, roads along 11 percent of stream courses, and seven percent harvest of the riparian zone. Chemical contamination and nutrient levels are expected to be similar to reference conditions because of the low potential for chemical introduction (minimal number of road/stream intersections and low use of those roads), the lack of agricultural activity and the lack of grazing.

Habitat Access: The fish-bearing portion of the stream has one culvert. This culvert passes under Forest Service Road 447. The culvert is not a migration bearer due to low gradient and substrate within the culvert. The culvert, however, is likely undersized for this drainage; and therefore, the substrate within the culvert reduces its capacity even further and increases the risk of failure.

Habitat Elements: A habitat survey was conducted in 2002 from the confluence with the East Fork of Emerald Creek upstream approximately 1,400 feet. The stream habitat is fairly evenly split between fast (57%) and slow (44%) habitats (Figure 3). Pool quality is fair, with residual pool depths being similar to some drainages of similar size but lower than some drainages of smaller size (Figure 2).
The majority of the woody debris within the channel is smaller sized (351 pc/1,000 feet). There are only two pieces of large woody debris per 1,000 feet of stream. This was the lowest amount of large woody debris for any of the surveyed streams.
The riparian zone appears to be healthy with areas of good canopy cover. Another indicator of riparian condition is that beaver activity is present in the drainage. Beaver utilize an area if there is sufficient riparian vegetation.

Summary: Flat Creek is a spawning and early rearing stream. There is limited information about temperature conditions, the physical habitat provides sufficient diversity although the quality of the pools might limit their usefulness. The culvert under Forest Service Road 447 is not currently a limiting factor, but it does present a high risk for failure and thus a potential for increasing sediment to the channel. Road densities are extremely high. The habitat of Flat Creek is considered to be moderately altered / at moderate risk.

Swamp Creek

Historic Activity: The stream survey conducted during 2002 found evidence of past mining activity. Timber harvest activity prior to 1933 treated approximately 30% of the lower portion of the drainage (review of 1933 aerial photographs). The district cultural resources specialist stated that the area was likely broadcast burned following the harvest. The Forest Archaeologist reported that a log chute was likely located in this drainage (Emerald Creek Garnet Area EIS, project file F-27). No regulated garnet mining has occurred in this drainage.

Flow/Hydrology: Discharge taken during the habitat survey of July 2002 ranged from 0.01 to 0.022 m/sec (Emerald Creek Garnet Area EIS, project file F-30).

Watershed Condition: Swamp Creek has extremely high total road density (Table 2). Some riparian harvest has occurred within this drainage, but the drainage is still considered to be in good condition.

Water Quality: Temperature data was collected in Swamp Creek in 2002; however, the recorder was not deployed until after the salmonid spring spawning period. The fall temperature criteria were exceeded during some days in the fall (Emerald Creek Garnet Area EIS, project file F-5). Sources of potential sediment production include: three stream crossings in the headwaters, one stream crossing near the mouth, roads long 2.7% of stream courses and ten percent harvest of the riparian zone. Chemical contamination and nutrient levels are expected to be similar to reference conditions because of the low potential for chemical introduction (minimal number of road/stream intersections and low use of those roads), the lack of agricultural activity and the lack of grazing.

Habitat Access: The fish-bearing portion of the stream has one culvert. This culvert passes under Forest Service Road 447. The culvert is not a migration bearer due to the low gradient and substrate within the culvert. The culvert, however, is likely undersized for this drainage and, therefore, the substrate within the culvert reduces its capacity even further and increases the risk of failure. In addition water is flowing under the culvert which can increase the risk of failure.

Habitat Elements: A quantitative habitat survey was conducted in 2002 from the confluence with the East Fork of Emerald Creek upstream for approximately one mile. Overall there was slightly more slow water habitat (57%) than fast water habitat (43%). Pool quality was lower than streams of similar size. Various segments of the stream went subsurface, but these were not quantified. Woody debris was present in both large (3 pc/1,000 feet) and small sizes (22 pc/1,000 feet). Total woody debris quantities were, however, lower in Swamp Creek than in some of the adjacent streams. Riparian vegetation consisted of dense understory. Stream banks were well vegetated and stable.

Summary: Swamp Creek is a spawning and early rearing stream. Although the temperature data is limited, it appears that temperature may be a limiting factor within this drainage. Habitat diversity is good but the quality of the pools may be limiting. The culvert under Road 447 is not currently a limiting factor, but it does present a high risk for failure and thus a potential for

increasing sediment to the channel. Road density is extremely high for this drainage however the majority of the roads are located high on the ridges. The habitat of Swamp Creek is considered to be moderately altered / at moderate risk.

Post Creek

Historic Activity: Timber harvest activity prior to 1933 treated approximately 90 percent of the drainage (review of 1933 aerial photographs). The district cultural resources specialist stated that the area was likely broadcast burned following the timber harvest. The stream survey conducted during 2002 found evidence of the past activity including a railroad bridge, an old road, and stumps. The Forest Archaeologist further confirmed the level of activity in the drainage by stating that it is that likely a log chute was located in this drainage (Emerald Creek Garnet Area EIS, project file F-27). There has been no regulated garnet mining in this drainage.

Flow/Hydrology: No flow data is available for Post Creek.

Watershed Condition: Post Creek has a high total road density (Table 2). Some riparian harvest occurred within this drainage, but the drainage is still considered to be in good condition (Table 2).

Water Quality: No temperature data is available for Post Creek. Sources of potential sediment production include three stream crossings in the headwaters, one stream crossing near the mouth, roads encroaching on 2.3 percent of the stream course and eight percent harvest of the riparian zone. Chemical contamination and nutrient levels are expected to be similar to reference conditions because of the low potential for chemical introduction (minimal number of road/stream intersections and low use of those roads), the lack of agricultural activity and the lack of grazing.

Habitat Access: There are two culverts on the fish bearing portion of Post Creek. These culverts are placed adjacent to each other under Forest Service Road 447, near the confluence with the East Fork of Emerald Creek. These culverts may be low flow migration barriers due to the division of the stream flow into the two pipes.

Habitat Elements: A quantitative habitat survey was conducted in 2002 from the confluence with the East Fork of Emerald Creek upstream for approximately one mile. Overall the majority of the habitat was fast water habitat (87%), and slow water habitat (pools) was only 12 percent (Figure 3). Pool quality, residual pool depth and volumes, was the highest for streams of similar size (Figure 2). There were 13 pc/1,000 feet of large woody debris and 98 pc/1,000 feet small woody debris. In some areas the quantities caused it to be difficult to see the channel. Riparian vegetation consisted of dense understory. Stream banks were well vegetated and stable.

Summary: Post Creek is a spawning and early rearing stream. The main limiting factor for fish production is the low diversity of habitats, and the culverts under Road 447 may be limiting. The habitat of Post Creek is considered to be adequate.

Highline Creek

Historic Activity: In the 1910s and 1920s a railroad line went up this stream system (Sims, personal communication). The 1930s aerial photos show logging activity in this drainage and the presence of a "logging camp". There has been no regulated garnet mining in this drainage.

Flow/Hydrology: No flow data is available for Highline Creek.

Watershed Condition: Highline Creek has extremely high total road density (Table 2). Some riparian harvest occurred within this drainage, but the drainage is still considered to be in good condition (Table 2).

Water Quality: No temperature data is available for Highline Creek. Sources of potential sediment production include four stream crossings in the headwaters, roads long nine percent of stream courses and 11 percent harvest of the riparian zone. Chemical contamination and nutrient levels are expected to be similar to reference conditions because of the low potential for chemical introduction (minimal number of road/stream intersections and low use of those roads), the lack of agricultural activity and the lack of grazing.

Habitat Elements: A quantitative habitat survey was conducted in 2002 from the confluence with the East Fork of Emerald Creek upstream for approximately 2,000 feet. Overall the majority of the habitat was fast water habitat (91%) and slow water habitat (pools) was only eight percent (Figure 3). Pool quality, residual pool depth and volumes, was similar or lower than in streams of similar size (Figure 2). Woody debris densities were lower than in some adjacent streams. Large woody debris quantities were 15 pieces/1,000 feet and small woody debris were 70 pieces/1,000 feet. Some of the logs were cut logs. Riparian vegetation was dense in some areas, but the presence of Road 1489 on the eastern side of the stream reduces the amount of riparian vegetation and the potential for woody debris recruitment.

Summary: Highline Creek is a spawning and early rearing stream. The main limiting factor for fish production is the low diversity of habitats, the streamside road, and extremely high road densities. The habitat of Highline Creek is considered to be moderately altered / at moderate risk.

Little East Fork Emerald

Historic Activity: A review of historic aerial photographs (1933) indicates that timber harvest prior to 1933 occurred on approximately 25 percent of the drainage. A railroad system was constructed up this drainage to facilitate the removal of the timber. Parts of the old railroad system remain evident in the stream today. There has been no regulated garnet mining in this drainage.

Flow/Hydrology: No flow data is available for Little East Fork Emerald.

Watershed Condition: Little East Fork Emerald has extremely high total road density (Table 2). A moderate amount of riparian harvest occurred within this drainage (Table 2).

Water Quality: Temperature data was collected one year in Little East Fork Emerald Creek. Temperatures were shown to exceed Idaho State criteria on 29 days (Figure 1). Sources of potential sediment production include 30 stream crossings in the headwaters, roads along 9.4% of the stream course and 18 percent harvest of the riparian zone. Chemical contamination and nutrient levels are expected to be similar to reference conditions. This is due to the low potential for chemical introduction (although there are several road/stream intersections the use on these roads is low), the lack of agricultural activity and the lack of grazing.

Habitat Elements: In 2001 the Forest Service conducted a quantitative survey on approximately the lower two miles of stream. This review divided the channel into four reaches based on channel form, valley bottom, gradient and substrate. The habitat has equal amounts of run and pool habitat. The next most common type is braided habitat. The variety of habitat indicates good diversity for this stream (Figure 3). Currently the stream likely has more pools in the lower section than were present at the time of the survey because beaver since moved into the system and built dams which create more pool habitat. Pool habitat in general appears to be of

fair quality based on residual pool volume (maximum) and residual pool volume (mean), although residual pool depth is small and is similar to much smaller drainages (Figure 2). The riparian zone consists primarily of brush at the lower end of the stream.

Summary: Little East Fork Emerald Creek is a spawning and rearing stream. The main limiting factors to fish production are higher stream temperatures, extremely high road densities and fair residual pool depth. The habitat of Little East Fork Emerald Creek is considered to be moderately altered / at moderate risk.

East Fork Emerald

Historic Activity: Mining and timber activity have had a long-term and influential impact on the fish habitat of this drainage, starting as early as the 1860s. Other impacts to the stream include grazing, railroad construction and recreational activities. These activities changed fish habitat and channel stability by channelizing and relocating sections of stream (1 ½ miles of stream), removing in-stream woody debris, and removing overhead cover. Anecdotal reports state that garnet mining began in the East Fork of Emerald Creek in the mid-40s. This early mining occurred on the lower approximately 2.5 miles of stream.

Various projects have been conducted within the East Fork Emerald Creek drainage to improve instream and riparian conditions. Some woody debris is being added to the stream as pieces of the old railroad deteriorate and collapse into the channel. The Forest Service added large woody debris (109 pieces) to East Fork Emerald Creek to increase the diversity of fish habitat. Trees and shrubs were planted along different segments of stream in 1992, 2001, 2002, and 2005. Sediment reduction projects include six miles of road obliteration, and 11 miles of resurfacing of Road 447. A 15-acre cattle exclosure was constructed around the stream in 2000-2001.

Flow/Hydrology: Estimates of the discharge for the two-year peak flow ranged between 247 and 324 cfs depending on the estimation method utilized (Emerald Creek Garnet Area EIS,Watershed Report).

Watershed Condition: East Fork Emerald has a high total road density (Table 2). Some riparian harvest associated with timber sales has occurred within this drainage, but the greatest source of riparian harvest was due to the construction of the railroad. Two parking areas are located within the RHCA along East Fork Emerald Creek, between 281 Gulch (approximately 0.47 acres) and Pee Wee Gulch (approximately 0.85 acres). These parking areas are graveled and the 281 parking lot has an outhouse adjacent to it. The riparian condition is considered to be in poor condition due to the combination of these activities.

Water Quality: Temperature data was collected for four years (Figure 1). During three years temperatures, on some days, exceeded the Idaho State spring Salmonid spawning temperature criteria. The number of days of exceedance ranged from 29 to 45 days. During 2002, the year which did not show an exceedance, the temperature recorder was not deployed until after the spring salmonid spawning period. The state of Idaho has developed a Total Maximum Daily Load (TMDL) for temperature for the East Fork (ID DEQ, 2003 p. 91). See the Water section in this chapter for more discussion on the temperature TMDL. Sources of potential sediment production include: 20 culvert stream crossings, three bridges, roads along 12.1% of stream courses and ten percent harvest of the riparian zone. There is a very low risk of chemical contamination of the stream. This risk is primarily associated to vehicles traveling along the streamside road. Nutrient levels may be slightly higher than reference conditions due to cattle use within the lower portion of the drainage. A cattle exclosure is located around the stream approximately 2.5 miles upstream for the mouth of the stream.

Habitat Elements: Fish habitat was surveyed in the lower four miles of the East Fork up to the confluence with the Little East Fork Emerald in 1992 and again in 2001 (Emerald Creek Garnet Area EIS, project file F-1). The 1992 survey determined that 43 percent of the surveyed stream length was pool habitat, 37 percent was riffle/run habitat, and 20 percent was glide habitat. The 2001 survey reports habitats are essentially the same as the 1992 survey. The minor difference could be a result of surveyor bias or due to the lower water levels during the 2001 survey. The 2001 survey reports 53 percent slow water habitats and 47 percent fast water habitats (Figure 3). These percentages describe a stream with fairly good diversity of habitat, although only Reach 9 meets the INFS riparian management objective (RMO) for pool frequency. Pool habitat is fairly well represented; however, the quality of the pool habitat was low. The lack of quality pools is related to the shallowness and lack of cover (seven percent) and especially lack of wood debris cover (two percent) based on 1992 surveys. In-stream cover in the summer is greater due to the amount of aquatic vegetation. This type of cover is not as useful as woody debris because it does not persist through the winter and does not provide the complexity of woody debris. The potential for large woody debris recruitment to the stream is low due to the limited amount of riparian trees. The upper portion of East Fork, upstream of Little East Fork, is primarily runs and pools. Beaver activity is common in this section and is creating pools and slack water areas. Upstream of the East Fork Emerald and Pee Wee Creek confluence, the East Fork valley bottom narrows and has a coniferous riparian zone.

Summary: East Fork Emerald Creek is a spawning and rearing stream, with added importance as an over-wintering area. The limiting factors for fish production are high stream temperatures, high road density, streamside road, and low complexity of habitat. The habitat of East Fork Emerald Creek is considered to be moderately altered / at moderate risk.

Summary of Cumulative Effects Area Streams

In general none of the streams of the cumulative effects area are in pristine condition (Table 3). They all are recovering from activity (timber harvest, railroads, mining) which occurred in the late 1800s and early 1900s. Trees are growing and riparian canopy has increased by 50 percent when comparing 2002 conditions to conditions in 1969 (Macy, 404 channel permit 2005).

Table 3 - Current Status of Streams

Stream	Unaltered	Adequate	Moderately Altered / Moderate Risk	Highly Altered / High Risk
281 Gulch			X	
Garnet Gulch		X		
No Name Gulch			X	
Pee Wee Gulch		X		
Flat Creek			X	
Swamp Creek			X	
Post Creek		X		
Highline Creek			X	
Little East Fork Emerald			X	
East Fork Emerald			X	

Eight of the streams, because of small size and limited flow, are considered to provide limited amounts of spawning and early rearing habitat. The remaining two streams are larger and

provide spawning, rearing and important over-wintering habitat. Of the smaller eight streams, two (Pee Wee Gulch and No Name Gulch) were impacted in the past by organized recreational garnet digging, one (281 Gulch) currently has recreational garnet digging and one (Garnet Gulch) has had past unauthorized digging and some authorized testing. Habitat diversity within the smaller, early rearing streams has dominant habitat types that range from 46-91 percent of the stream habitat. Streams which have been previously mined have similar or higher percentages of fast water habitat as some of the unmined streams. Woody debris data was not collected on all the streams but quantities of surveyed streams ranged between 77-91 percent of all wood being small-sized, and large woody debris ranging between 1-17 percent. Temperature data in all streams, where data was collected, indicate days which exceeded Idaho State temperature standards for salmonid spring spawning.

7. EFFECTS ON SPECIES AND HABITAT

The proposed activities occur within 281 Gulch, Garnet Gulch, Pee Wee Gulch, No Name Gulch and East Fork of Emerald. None of the other streams described in the habitat conditions section will be influenced by this proposed project therefore they will no longer be addressed.

Direct/Indirect Effects

Population Characteristics (Population Size, Growth and Survival, Diversity, Isolation, Persistence).

Bull trout have not been documented in any of the streams of the project area (Emerald Creek Garnet Area PF F-1) therefore the implementation of this project will have no effect on population characteristics. In the extremely unlikely event that bull trout do move into 281 Gulch or Garnet Gulch, design features have been developed to reduce the potential for direct/indirect mortality of fish. Fish would be captured using electrofishing equipment and would be relocated downstream prior to excavation of stream channel panels (Design Feature (DF): C.6.). The potential exists for some mortality associated to this relocation, but this procedure should be less impactive than allowing fish to remain during channel relocation. Fish screens would be utilized on all water intake equipment to prevent entrapment (DF: F.3.e.). In addition to these actions the lack of proposed mining activity in five similar drainages within the East Fork Emerald drainage provides similar habitat conditions to the current conditions of 281 Gulch and Garnet Gulch, which would be available if bull trout do move into the East Fork Emerald drainage.

Watershed Condition (sensitive landtypes/road density/riparian harvest/elevation/physical barrier):

Sensitive Landtypes: There will be four acres of high sensitivity and three to 5.5 acres of moderate sesitivity landtypes affected by this project in the Garnet Gulch drainage. There will be 2.7 acres of high sensitivity and 0.6 acres of moderate sensitivity landtypes in 281 Gulch affected by this project. Landtypes are based on surface erosion hazard, sediment delivery efficiency and landslide potential. To reduce the effects to these sensitive landtypes various mitigation measures have been developed including: having exposed pits for only short periods of time (DF: N.4) revegetating the site as soon as the soil layers have been replaced (DF: F.2.m and DF: K.13), road located to minimize risk to unstable soils (DF: K.5), buttressing of cutslopes (DF: K.5) and no fill material placed on the old inactive headwall (DF: K.6).

Road Density: Road density would increase in Garnet Gulch from 3.9 mi/mi^2 to 4.6 mi/mi^2, due to the construction of the road into the Garnet Gulch dig location. This density would maintain the drainage in the high density category. A small portion of the new road is in the East Fork Emerald Creek drainage, but it is so small that there would be no change to total

road density. The removal of Road 3781 (0.35 miles) would reduce road density in 281 Gulch from 4.4 mi/mi^2 to 3.8 mi/mi^2. This density is still considered to be in the high range. The effects of the new road would be reduced due to the use of several design features (DF: K.1-9).

Riparian Harvest: Garnet gravel extraction will occur in 281 Gulch initially. When the garnet resource has been depleted in 281 Gulch activity will move to Garnet Gulch. The extraction of garnet gravel in either drainage will annually occur on between 0.2 and 0.4 acres of land within the RHCA. This amount of disturbance would shift downstream yearly. To reduce the impacts of this activity the sites will be replanted immediately with grasses, forbs, brush and trees. It is estimated that it would take approximately three years for riparian vegetation to become reestablished (DiGiacomo, personal communication).

In addition to the annual effect, there will be sustained disturbance with the RHCA related to the overburden stockpiles and the operation area. In 281 Gulch this consists of about 1 acre and in Garnet Gulch about 3 acres.

The one acre parking area, proposed for the Garnet Gulch drainage, is not within the RHCA therefore there would be no direct effects for the construction of this parking area or the use of the area.

Restoration work within 281 Gulch would include about 1,200 feet of riparian planting along areas which were previously mined in the East and West Fork. This activity would stabilize streambanks, reduce potential for overland sediment flow entering the channel, and in the long term would produce shading for the stream and future woody debris recruitment.

This proposal would rehabilitate the parking area at Pee Wee Gulch. Riparian vegetation would become reestablished along East Fork of Emerald Creek when the parking lot at Pee Wee Gulch is removed. This would improve sediment filtration between Road 447 and the East Fork of Emerald Creek. In addition, conifers planted within the area previously occupied by parking lot would eventually grow and provide shade to the stream as well as future potential woody debris recruitment.

Elevation: 281 Gulch has approximately 90% of the drainage within the rain-on-snow elevational zone (ROS), however none of the proposed activity is within the ROS zone. Approximately 94% of the Garnet Gulch drainage is within the ROS. Between 0.2 and 0.4 acres of vegetation within the Garnet Gulch ROS will be affected annually. Removal of vegetation in the ROS zone can change water yield volumes and timing of peak flows. The watershed report stated that "no increase in water yield is expected because no consequential change in vegetation would occur from this activity".

Physical Barriers: All culverts, within the project area, which are migration barriers or causing hydrologic concerns would be replaced. The replacement of the existing culverts has the potential to cause temporary increases in sedimentation and turbidity, modification to the hydrology, temporary loss of riparian vegetation, streambank alteration, and long-term improvement to fish passage and habitat access. Negative effects should be minimal due to implementation of BMPs and would be short term. Positive effects would be long-term improvement to fish migration.

Water Quality (temperature, sediment, chemical/nutrients):

Temperature: Annually between 0.2 and 0.4 acres of riparian vegetation will be impacted. Removal of riparian vegetation has the potential to increase solar exposure to the stream thus

increasing the potential for increased stream temperatures. The effects of disturbance to the riparian zone is expected to have a minor influence on temperature because of the southeast to northwest orientation of the drainage, current low density of coniferous vegetation and the minor amount of stream length affected (approximately 150').

Sediment: Garnet bearing gravel would be excavated in panels which are approximately 50-100 feet by 150 feet. Some panels include the stream channel others panels are within the RHCA but do not include the stream channel. This activity within the stream channel and the RHCA has the potential to introduce sediment to the stream. To reduce the potential for sediment introduction several design features were developed:

- The excavation sites would be kept as dry as possible by use of interception trenches or other methods (Design Feature M.10.). Water from the excavation sites would not be discharged into active waters (Design Feature M.11.).
- There would be sediment control features between operations sites and the stream which would reduce the potential for sediment introduction to the channel.
- The settling and holding ponds would be developed outside of the floodplain but within the RHCA. The spoils which are periodically extracted from the settling pond would be stockpiled and used later during reclamation. Sediment transport from these sites is unlikely due to the use of sediment filters between the sites and the stream.
- Auger testing within the RHCA would cause very minor disturbance of small areas that are proposed for mining and would be rehabilitated quickly (DF: M.2) thus preventing transport of sediment to the channel.
- Temporary access trails would be created to transport the gravel bearing soil to the stockpile area. These would be short trails which would be treated with various methods to reduce the potential for sediment movement (DF: F.2.i); therefore this should not increase sediment to the channel.
- Any trees removed during site preparation for this proposal would be retained for use during restoration to further reduce the potential for sediment transport to the stream.
- The excavation sites would be replanted immediately with grasses, forbs, brush and trees. These plantings would reduce the potential for sediment input from overland flow. It is estimated that it would take approximately three years for riparian vegetation to become reestablished (DiGiacomo, pers. com.).

Chemical Contamination: The potential for chemical contamination is due to the use of construction vehicles and water pumps within the RHCA. The likelihood of chemical contamination is very low due to the implementation of design features (Design Feature D.1 through 4) to control hazardous materials. In case of an accident, emergency procedures have been developed to ensure quick response to the situation (Design Feature D.3.).

Habitat Elements (substrate embeddedness/large woody debris/pool frequency/large pools/off-channel habitat/refugia):

Garnet Gulch and 281 Gulch will be altered during the mining of the panels which include the stream channels. Annually approximately 150 feet of stream could be disturbed; this is approximately four percent of the fish-bearing stream length of Garnet Gulch and three percent of the fish-bearing stream length of 281 Gulch. In some years there would not be excavation within the channel because it would occur on the bench outside of the wetlands area.
The mining of the stream channel panels would involve the construction of a diversion channel, diversion of flow from the existing channel to the diversion channel, mining of the original channel location, reconstruction of the channel and return of the water to its original channel

location. Measurements of the existing channel were collected, and following the mining the channel would be returned to that configuration. In-stream habitat diversity would be created within the new channel. Woody debris would be incorporated into the new channel to provide habitat complexity and dissipation of flow energy. Streambanks would be developed using bioengineering methods. Vegetation removed prior to mining would be replanted, and additional native and desirable non-native species would be planted. The area would also be mulched. These reconstruction efforts should reduce the amount of sediment put into suspension when the water is returned to the original location and should aid in the rapid reestablishment of stable banks. The diversity of habitat can be returned to the existing composition; however, the quality of the in-stream habitat would be reduced until the channel stabilizes and vegetation becomes established.

Rehabilitation of previously mined areas in Pee Wee, No Name and 281 Gulches would increase the diversity of habitat within those drainages. There is a potential for minor amounts of sediment becoming suspended during the in-stream activity, but this would be temporary and the diversity created would, in the long term, be a benefit to the aquatic condition.

Stream Channel Conditions (width to depth ratio/streambank condition/floodplain connectivity):

Garnet Gulch and 281 Gulch stream channels will be altered during the mining of the panels which include the stream channels. Annually approximately 150 feet of stream could be disturbed. The mining of the stream channel panels would involve the construction of a diversion channel, diversion of flow from the existing channel to the diversion channel, mining of the original channel location, reconstruction of the channel and return of the water to its original channel location. Measurements of the existing channel were collected, and following the mining the channel would be returned to that configuration. Streambanks would be developed using bioengineering methods. Vegetation removed prior to mining would be replanted, and additional native and desirable non-native species would be planted. Design Feature F.2.k. describes that backfilling with stockpiled spoils will ensure volumetric balances and that the original stream gradients are restored to pre-mining conditions.

Flow/Hydrology (hydrograph characteristics):

Design Feature N.12.was developed to maintain sufficient flows to provide similar flow conditions as what currently exists. The loss of canopy cover associated with the construction of the parking areas could potentially cause an increase in water yields, however because of the small size of the area (one to three acres) no affects are anticipated (see Emerald Creek Garnet Area EIS Watershed section). Loss of canopy associated with the removal of vegetation for the panels is not anticipated to cause a change to water yields (see Emerald Creek Garnet Area EIS Watershed section).

Species/Habitat Integration: Due to the lack of bull trout occurrence in the project area there is no risk of impact to the species and therefore there will be no affect to species/habitat integration.

Cumulative Effects

Table 4 lists the current and reasonably foreseeable activities within the cumulative effects area. Some of these activities are Forest Service authorized activities; others are general uses which do

not require specific authorization. This table provides a summary of the direct and indirect effects from the individual activities. These activities and their effects were taken into consideration during the cumulative effects analysis.

Table 4 - Summary of Effects of Current and Reasonable Foreseeable Actions

Activity	Type of Potential Effect	Direct/Indirect Effects	Reference
Dispersed Camping	Alteration of streambanks and increased nutrient loading	Minimal	St. Joe River/NF Clearwater Basins BA, July 1998
Outfitter and Guides	Primarily associated with effects of camping & stock use	Minimal	Outfitter Guide Programmatic BA, 2004 (project file)
Garnet Digging Outfitter	Same as associated to general public operation	See effects common to all alts	Effects analysis for this document
Bechtel Butte Garnet lease and prospecting	Activity is on the ridge top	No effects	Bechtel Butte Mineral App BA, 2003
Fire Suppression	Reduced shading due to hazard tree felling in RHCA; Chemical contamination	Minimal based on implementing INFS Guidelines.	St.Joe River/NF Clearwater Basins BA, July, 1998
Gathering of misc. forest products	Primarily due to influence of roads	Minimal based on implementing INFS guidelines	Programmatic Road Maint. BA, 2004 Determination: May affect, not likely to adversely affect.
Control of Noxious Weeds	Potential for chemical contamination	No Effect	St. Joe Noxious Weeds EIS, 10/1999
Road Maintenance	Increased sediment, temp & chemical contamination; decreased LWD	Yes	Programmatic Road Maint. BA, 2004 Bull Trout Determination: May affect, not likely to adversely affect.
Biotic Factors	Further expansion of brook trout or rainbow trout	Minimal	Influenced by habitat conditions (Shepard 2004).
Data Gathering		No effect	No ground-disturbing activity
Firewood cutting	Potential for reduction in LWD recruitment	Minimal	Firewood permit specifies no firewood cutting within 300 feet of a stream.
Cattle Grazing	Potential for increased sedimentation, nutrients and temperature. Specific to this project is the potential to damage restoration efforts.	Yes	SM Grazing Allotments BA, June 2000 Bull Trout Determination: May affect, not likely to adversely affect. The potential for damage to restoration efforts is addressed in a design feature.
Timber stand improvement (tree pruning & planting, precommercial thinning, gopher baiting, fertilizing)	Potential for chemical contamination from gopher baiting.	Minimal	Pocket Gopher Control BA, 2002. Bull Trout Determination: May affect, not likely to adversely affect.
	Tree pruning, precommercial thinning tree planting	No Effect	No ground disturbing activity, canopy cover maintained or increased.
Trail Maintenance	Increased sediment, temp & chemical contamination; decreased LWD	Minimal	Programmatic Trail Maint. BA, 2004 Bull Trout Determination: May affect, not likely to adversely affect.
St. Maries River Basin Fuels Reduction Area 2 Emerald Creek CG	Potential for increased sedimentation, water yield or effect to stream habitat.	Minimal	SM River Basin Fuels Reduction Area 2 Emerald Creek CG BA 2005. Bull Trout Determination: May affect, not likely to adversely affect.
Emerald City Timber Sale	Low potential for sediment or water yield increases, or effect to stream habitat.	Minimal	Emerald City BA, 2005. Bull Trout Determination: May affect, not likely to adversely affect.
Emerald Butte Access DM	Sedimentation	None	Potlatch Access – Emerald Butte BA 2005. Bull trout Determination: No Effect
Unauthorized garnet digging	Sedimentation, loss of habitat,	Minimal	Law enforcement and posting area as No digging should reduce potential

281 Gulch

Habitat Elements and Stream Channel Conditions: Over the life of the project 600 feet, (14%) of 281 Gulch fish-bearing water would be affected. When this is combined with the area which was previously dug the percentage of alteration would be 53% of the fish-bearing section of 281 Gulch. The segment of 281 Gulch which would be altered under these alternatives would be reclaimed immediately following disturbance thus reducing the time that the stream is altered. The restoration effort of previously dug areas will increase the rate at which that section is stabilized.

Watershed Conditions and Water Quality: There are approximately 89 acres of RHCA within 281 Gulch. This alternative proposes to alter an average of 0.3 acres annually, which over a period of potentially four years (at most) equates to 1.2 acres of disturbance of the term of the project. Previous mining activity disturbed approximately three acres (combined in the East and West Forks of 218). The combination of past and proposed RHCA disturbance equals approximately five percent of the RHCA vegetation of 281 Gulch. Approximately 80% of the past activity has received various amounts of riparian planting and currently has complete ground cover however trees are still not large enough to provide shading.

Garnet Gulch

Habitat Elements and Stream Channel Conditions: Over the life of the project 1,700 feet (40%) of Garnet Gulch fish-bearing water would be affected. The segment of Garnet Gulch which would be altered would be reclaimed immediately following disturbance thus reducing the time that the stream is altered.

Watershed Conditions and Water Quality There are approximately 85 acres of RHCA within Garnet Gulch. Over the life of the project about eight percent of the RHCA vegetation of Garnet Gulch would be disturbed for this project.

East Fork Emerald Creek

Integration of Species and Habitat Conditions: Several design features were developed to reduce the potential for sediment transport to East Fork Emerald which would greatly reducing the potential for impacts to fish habitat within the East Fork. Cumulatively there would be disturbance to 15 percent of the spawning and early rearing stream habitat of the East Fork Emerald Creek Drainage and five percent alteration of any type of fish-bearing waters within the East Fork Emerald Creek Drainage.

9. CONDITIONS

All conditions/design criteria described in this BA must be met to preserve the determination of effects stated in this BA unless otherwise agreed to and documented by the appropriate personnel.

10. CONSULTATION WITH OTHERS AND REFERENCES

Informal consultation with:

Tracy Gravelle, Project Leader, St. Joe Ranger District
John Macy, District Hydrologist, St. Joe Ranger District
Chris Dail, Geologist, Idaho Panhandle National Forest

Chuck Stock, Wildlife Biologist, St. Joe Ranger District
Joe Dupont, Fishery Biologist, Idaho Fish and Game, Coeur d'Alene, Idaho

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11. DETERMINATION OF EFFECTS

Based upon the evaluated effects, existing site conditions, and required conditions contained in this BA, the proposed Emerald Creek Recreational Garnet Area project has the following determination:

Bull Trout – (Threatened Species, ESA): "MAY AFFECT, NOT LIKELY TO ADVERSELY AFFECT"

WRITTEN BY: Lisa Hawdon 8/2/06
Lisa Hawdon, Zone Fishery Biologist, St. Joe Ranger District

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CHECKLIST FOR DOCUMENTING ENVIRONMENTAL BASELINE AND EFFECTS OF PROPOSED ACTION(S) ON RELEVANT INDICATORS

Authorizing Agency: **US Forest Service** Management Unit(s): **USFS**
6th HUC Watershed: **170103040404** Subwatershed Name: **Emerald Creek**
Action Type: Recreational Mining

Specific Actions (list): See Detailed BA

Pathway	Indicators	Status of Baseline	Effects of the Action(s)	Basis for Rationale
Subpopulation Characteristics	Subpopulation Size	FA/FR/**UR**/?	R/**M**/D/NA	Effects of the proposed action will not extend beyond the 7th code HUC and highly unlikely that they will extend beyond the 8th code HUC see text of BA
	Growth and Survival	FA/FR/**UR**/?	R/**M**/D/NA	Same as above
	Life History Diversity and Isolation	FA/FR/**UR**/?	R/**M**/D/NA	Same as above
	Persistence and Genetic Integrity	FA/FR/**UR**/?	R/**M**/D/NA	Same as above
Water Quality	Temperature	FA/FR/**UR**/?	R/**M**/D/NA	Same as above
	Sediment	FA/FR/**UR**/?	R/**M**/D/NA	Same as above
	Chemical Contaminants/Nutrients	**FA**/FR/UR/?	R/**M**/D/NA	Same as above
Habitat Access	Physical Barriers	FA/**FR**/UR/?	**R**/M/D/NA	Within the project area, there will be culverts which are migration barriers replaced with fish passage culverts
Habitat Elements	Substrate Embed.	FA/FR/**UR**/?	R/**M**/D/NA	Effects of the proposed action will not extend beyond the 7th code HUC and highly unlikely that they will extend beyond the 8th code HUC see text of BA
	LWD	FA/**FR**/UR/?	R/**M**/D/NA	Same as above
	Pool Frequency & Quality	FA/**FR**/UR/?	R/**M**/D/NA	Same as above
	Off-channel habitat	FA/**FR**/UR/?	R/**M**/D/NA	Same as above
	Refugia	FA/**FR**/UR/?	R/**M**/D/NA	Same as above
Channel Condition and Dynamics	Width/Depth Ratio	FA/**FR**/UR/?	R/**M**/D/NA	Same as above
	Streambank Condition	FA/**FR**/UR/?	R/**M**/D/NA	Same as above
	Floodplain Connectivity	FA/**FR**/UR/?	R/**M**/D/NA	Same as above
Flow/Hydrology	Change in Peak/Base Flows	FA/**FR**/UR/?	R/**M**/D/NA	Same as above
	Increase in Drainage Networks	FA/**FR**/UR/?	R/**M**/D/NA	Same as above
Watershed Conditions	Road Density and Location	FA/FR/**UR**/?	R/**M**/D/NA	Same as above
	Disturbance History	FA/FR/**UR**/?	R/**M**/D/NA	Same as above
	Riparian Conservation Areas	FA/**FR**/UR/?	R/**M**/D/NA	Same as above
	Disturbance Regime	FA/**FR**/UR/?	R/**M**/D/NA	Same as above
Integration of Species and Habitat Conditions	Habitat Quality and Connectivity	FA/FR/**UR**/?	R/**M**/D/NA	Same as above

Status: Functioning Appropriately - FA Functioning at Risk - FR
Functioning at Unacceptable Risk - UR

Effect: R - Restore: the action will result in a positive change in the indicator evaluated
M - Maintain: the action will have no effect on the status of the indicator evaluated
D - Degrade: the action will result in a negative change in the indicator evaluated
PJ: Professional Judgement

Appendix B

SENSITIVE SPECIES BIOLOGICAL EVALUATION

SUMMARY OF CONCLUSION OF EFFECTS*

Project Name: Emerald Creek Garnet Area Project

Alternative: Alternative B

Species	No Impact	May Impact Individuals Or Habitat, But Will Not Likely Contribute To A Trend Towards Federal Listing or Loss Of Viability To The Population Or Species	Will Impact Individuals Or Habitat With A Consequence That The Action May Contribute To A Trend Towards Federal Listing Or Cause A Loss Of Viability To The Population Or Species	Beneficial Impact
Westslope Cutthroat Trout		XX		

Conditions: Include any actions or activities that are necessary to maintain the determination of effects.

Recommendations: Include any activities or opportunities that are optional.

Conditions:

See Emerald Creek Garnet Area Project FEIS

Recommendations:

See Emerald Creek Garnet Area Project FEIS

* Note: The rationale for the conclusion of effects is contained in the NEPA document

Form 1 (R-1/4/6-2670-95)

SENSITIVE SPECIES BIOLOGICAL EVALUATION
SUMMARY OF CONCLUSION OF EFFECTS*

Project Name: Emerald Creek Garnet Area

Species	ALT A	ALT B	ALT C
Westslope Cutthroat Trout	MIIH	MIIH	MIIH

Comments:

Prepared by: Lisa Hamilton Date: 8/2/06

NI =No Impact
MIIH =May Impact Individuals Or Habitat, But Will Not Likely Contribute To A Trend Towards Federal Listing Or Loss Of Viability To The Population Or Species
WIFV =Will Impact Individuals Or Habitat With A Consequence That The Action May Contribute To A Trend Towards Federal Listing Or Cause A Loss Of Viability To The Population Or Species
BI = Beneficial Impact

* Note: Rationale For Conclusion Of Effects Is Contained In the Emerald Creek Garnet Area Project FEIS

Form 2 (R-1/4/6-2670-95)

Idaho Panhandle National Forests
St. Joe Ranger District

St. Maries Office
222 S. 7th St. Suite 1
St. Maries, ID 83861

Emerald Creek Garnet Area

Listed Wildlife Species BE

Introduction

T&E species are managed under the authority of the Endangered Species Act (ESA) (PL 94-205, as amended) and the National Forest Management Act (PL 94-588). USDA Forest Service policy (FSM 2672.4) requires that a review of activities be completed to determine how a proposed action may affect any threatened, endangered, or proposed species. This Biological Evaluation (BE) documents the analysis and determinations of effects on listed wildlife species from the proposed operations as described in the Emerald Creek Garnet Area EIS on the Idaho Panhandle National Forests.

Proposed Action

The Forest Service proposes to continue public recreational garnet collecting at the garnet area until the garnet resource is exhausted in 281 Gulch and Garnet Gulch. New methods of operation will be implemented to protect water quality and aquatic habitat. Operations will continue in 281 Gulch, from 2-4 years, until the accessible garnet gemstone resource is depleted. At that time, the Forest Service will move the operations to Garnet Gulch. A new road and trail will be constructed to access operations there. A parking lot will be constructed near the new site to accommodate people with disabilities and administrative vehicles. Previously dug areas in 281 Gulch would be restored to improve aquatic habitat and maintain water quality. This would include placing large woody debris in Pee Wee Gulch and No Name Gulch to diversify aquatic habitats.

The Forest Service will obtain a 404 permit and 401 certification required under the Clean Water Act. Section 404 of the Clean Water Act requires a permit from the U. S. Army Corps of Engineers for operations in wetlands. Certification under section 401 of the 1974 Clean Water Act is also required from the Idaho Department of Environmental Quality for the 404 permit issued by the U.S. Army Corps of Engineers to ensure that the project will not violate state water quality standards. This 401 certification in Idaho also ensures that the project will comply with water quality improvement plans (TMDLs) developed for affected water bodies and that the project will not adversely impact §303(d) listed streams (streams that do not meet water quality standards).

With information collected from surveys and exploration during 2002-2006, the Forest Service developed an operations and reclamation plan to address water and aquatic habitat concerns for the remaining area in 281 Gulch and the new collecting area in Garnet Gulch. The proposed action includes the following:

- Rehabilitation for previously dug areas in 281 Gulch will be implemented to improve aquatic habitat and assure maintenance of water quality (FEIS, Appendix C). Large, woody debris will be strategically placed in the stream along an estimated 1,000 feet of both Pee Wee and No

Name Gulch to enhance aquatic habitat.

- The public collection site will remain in the East Fork and the main stem of 281 Gulch until the accessible garnet gemstone resource is depleted (estimated to be two to four years). At that time, the public collection site will be moved from 281 Gulch to Garnet Gulch where operations would continue for an estimated twenty years. On the West Fork of 281 Gulch no additional sites will be opened up.
- Starting in 2006 the recreation experience will change. In the past an area along the drainage was marked off for digging. Topsoil and overburden were mechanically removed and stockpiled. Visitors chose where to dig through the subsoil for the garnet-bearing gravels and then washed the garnets in place. Administration of the site in this manner will no longer be used. Instead, garnet-bearing gravels will be excavated and stockpiled with equipment. Visitors will then obtain garnet-bearing gravels from the stockpile and wash them at a sluice.
- Beginning in 2006 operations will include using heavy equipment for annual excavation and reclamation. Equipment will be needed from one to three times per year. The equipment will be used to remove and separately stockpile topsoil, overburden, and garnet-bearing gravels. Approximately three to nine feet of overburden will be removed to get to the gravels. Excavations will be reclaimed directly following (within approximately one week) removal of garnet-bearing gravels. This way, the stream will only be disturbed at the time the gravels are removed and then the soil layers will be replaced.
- A sluice will be set up for screening and washing garnet-bearing gravels. This will be in an upland area away from the wetlands. Water for the sluice operation will be obtained with water withdrawals from 281 and Garnet Gulches, will be stored in ponds and then recycled. The system will include settling ponds and sediment-control structures (Map 4). Sediment will be removed from settling ponds, be stockpiled, and be reused for reclamation.
- Newly excavated areas will be an estimated 50-100 feet wide and 150 feet long per year and will be excavated and reclaimed concurrently. Total excavated area (both upland and wetland) for 281 Gulch over two to four years is estimated to be two acres, and the total excavated area for Garnet Gulch over an estimated 20 years will be about 4.2 acres.
- When operations move to Garnet Gulch, a new road (0.68 mile) will be constructed to provide access for administration and people with disabilities. At the end of the road a small parking lot, toilet, administrative building and sluice will be constructed (approximately one acre of clearing). The new road will not accommodate buses and RVs; these vehicles will be parked at the existing 281 Gulch parking lot.
- A trail from the existing 281 Gulch Parking Lot on Road 447 to the new road up Garnet Gulch will be constructed (0.1 mile). This will allow visitors to go directly from the parking lot to the trail without having to walk along heavily traveled Road 447.
- When operations move to Garnet Gulch, most of the public (except disabled) will take the new access trail from the existing 281 Gulch Parking Lot on Road 447 up to the new administrative road and then hike along this road to the collection site. The hike will increase from what is now required to get to the 281 Gulch (0.4 mile) to 0.7 miles to get to Garnet Gulch. Benches for rest stops will be installed along the route. Interpretive signs relating to the ancient Lake Clarkia and geology of the area will also be installed along the trail and road.
- When operations move to Garnet Gulch, the 281 Gulch access road (Road 3781) will be decommissioned and recontoured (0.35 mile or 1774 feet). The administrative building and toilet will be removed.

- A portion (1/2 acre) of the floodplain will be reestablished at the Pee Wee Gulch parking lot while leaving space for a vehicle pull-through.
- A total of four culverts will be replaced on Road 447 where it crosses Pee Wee Gulch, No Name Gulch, 281 Gulch, and Garnet Gulch.

Design Features and Mitigation Measures

The project will utilize applicable Best Management Practices identified in relevant provisions of the Surface Mining and Dredge and Placer Operations (PF, Minerals). In addition, the following measures (referred to as "performance standards" by the Environmental Protection Agency) will also be adhered to. Where these features overlap with State of Idaho BMPs, these project-specific features will supersede the State of Idaho provisions.

A. General

1. **Adaptive Management:** Adaptive management will be utilized as the new operations are implemented. As methods are used and monitored they may be changed to provide better results for protecting resources and for providing a better experience for the public.
2. Previously dug areas in Pee Wee, No Name and 281 Gulches will not be re-entered for recreational garnet collecting.

B. Air Quality

This project will comply with procedural and substantive requirements of the Clean Air Act, State Implementation Plans and State Smoke Management Plans. Slash burning, if needed, will be conducted only when favorable weather and wind conditions exist.

C. Fish

1. A total of four culverts will be replaced where Road 447 crosses Pee Wee Gulch, No Name Gulch, 281 Gulch, and Garnet Gulch.
2. Channel disturbance in fish-bearing streams will only be done between July 15 and the beginning of autumn rains.
3. Water withdrawals for the sluicing operation will be minimized or discontinued during periods of low flow. See Design Features F. 3. d. & e. and N.12.
4. Habitat will be replaced during rehabilitation and reclamation using existing survey data. Large woody debris will be replaced in numbers to mimic natural conditions using survey data (PF, F-3/6).
5. Native tree species will be planted to replace existing trees that are removed for mineral excavation, and wherever possible trees and shrubs that are uprooted will be replanted during reclamation.
6. Fish will be removed and taken downstream from areas where temporary diversion of water in the stream channel is to take place. See Design Feature F. 2. e. and Appendix A p. 3.

D. Hazardous Materials

1. Outside of standard diesel and gasoline fuels and lubricants no hazardous chemicals or materials will be utilized for excavation or processing activities.
2. Refueling and maintenance of construction vehicles and equipment will not occur within floodplains or within 150 feet of live water. Refueling will follow the guidelines for mobile

fueling of vehicles and heavy equipment found in Idaho Best Management Practices for Mining and Stormwater Management Guidelines (www.idl.idaho.gov/bureau/Minerals/bmp_manual1992/bmp_index.htm).

3. If a piece of equipment is found to be leaking or seeping fuel or lubricants the equipment will be immediately taken out of service and corrective measures instituted to correct the problem and prevent a release. Any contaminated soil or materials will be removed from the site and disposed of in an approved sanitary facility designed to dispose of such materials. The Garnet Area administrative building and all equipment contractors will have spill prevention control and countermeasures kits.
4. During interim shutdown periods or periods of inactivity, all equipment stored on site will be parked away from areas of steep slopes, and gear boxes and fuel tanks will be underlain with absorbent pads.

E. Heritage Resources

An appropriate inventory was conducted for the proposed activities and cultural properties are known to be located within the area of potential effects. The Forest Cultural Resource Specialist made a preliminary determination that the project would have No Adverse Effect to these properties, and the State Historic Preservation Officer concurred with this determination. The Forest Service will contact the archaeologist for the Coeur d'Alene Tribe, per their request (PF, ACE-15) prior to excavations each year. If new cultural resource sites are discovered activities will stop at the garnet collection site, and the find will be reported to the IPNF Cultural Resource Specialist who will inventory the site and develop mitigations to protect the site in consultation with the State Historic Preservation Officer, appropriate Native American tribes and, if necessary, the Advisory Council on Historic Preservation.

F. Minerals

1. General

a. Operations and reclamation will follow Best Management Practices recommended by the State of Idaho that are relevant to this project (www2.state.id.us/lands/bureau/Minerals/bmp_manual1992/bmp_index.htm on 1/12/06).
b. Total disturbance over the life of the project is estimated to be 12-14 acres (this includes all roads, stockpiles, excavation, parking areas in 281 Gulch and Garnet Gulch, sluice areas and ponds) for up to approximately 24 years.

2. Excavations and Reclamation

a. Each year in the fall (dry season) after the garnet area is closed for the season, an area (mining panel) will be excavated and garnet gravels will be removed and stockpiled for use in the following year. The excavated area will be reclaimed as soon as excavation work is complete which is estimated to be within one week.
b. Auger testing for gemstone garnet will be implemented in order to facilitate engineering planning for annual excavations.
c. If required, a small interceptor trench will be constructed to divert surface or groundwater flow around the excavation site. The trenches will be armored with woody debris, straw bales, baffles, or other materials if necessary. Water will be diverted to a water containment/recycle system located at the lower end of the panel and will be moved to the sluice plant as make-up water or be sprinkled overland. There will be no direct discharge to streams.

d. Prior to excavation activities, vegetation will be cleared. Slash will likely be bundled and placed between the excavation area and the active channel. Logs and additional slash will be stockpiled for use during reclamation as needed.
e. In cases where the panel will include excavation immediately adjacent to or through stream channels, a culvert-like diversion or plastic-lined temporary water diversion channel will be used (See N. 8). The diversion will be routed around the excavation site. Fish will be removed from this section using block nets and will be taken downstream prior to water diversion.
f. For each panel, excavations will not be started until water control features are established and determined to be functional.
g. In riparian areas, excavations will start on the upper end of each mining panel and progress sequentially downstream. Excavators (track hoe), not bulldozers, will be used for excavations in wetlands.
h. The size of the panels will vary depending on depth of garnet gravels. Estimated size will be approximately 50 -100 feet by 150 feet. The goal is to have a garnet gravel stockpile that is of sufficient size for a season of public garnet collecting. This is estimated to be 545 cubic yards (See Minerals section in FEIS Chapter 3).
i. The panels will consist of a series of cuts by an excavator down to the base of garnet-bearing gravels, typically down to bedrock. Each panel will be excavated in a series of sequential cuts from top to bottom then be backfilled. A typical cut would be 8-10 feet wide. Disturbance will be kept to the smallest practicable area at any one time during excavations through concurrent and progressive backfilling, grading and revegetation.
j. Within each cut, the topsoil will be separated and set to the side, then subsoil will be separated and stockpiled to one side. Plywood or other material may be used under the stockpile to protect the underlying topsoil and aid in recovery of stockpiled materials (PF, PD-33). The garnet-bearing gravels will be removed using a tracked or wheeled loader or a portable conveyor system and then will be taken to the garnet gravel stockpile.
k. As soon as the garnet gravel is removed, the cut will be back-filled and reclaimed using spoils collected and stockpiled from the previous season's flume wash. Backfilling with these materials will ensure volumetric balances and original stream gradients are restored to their pre-mining conditions.
l. Subsoil and topsoil from the current excavation will then be returned to the site. Care will be taken when feasible to maintain the vegetative mat while excavating and storing the topsoil. The immediate backfilling and reclaiming ensures that the mining panel will only be open for a short period of time (estimated to be one week).
m. Reclaimed areas will be planted with native shrub and tree species and be seeded and mulched. Where possible uprooted shrubs and trees would be replanted.

3. Flume Wash (Sluice)

a. A flume wash plant will be set up for the public to wash and recover garnets. This will consist of pump, water holding pond(s), flume, riprap-lined spillway, settling and recycling pond(s). It will be located out of the floodplain, in the upland area, and near the garnet gravel stockpile.
b. A flume (a long-linear, shallow-sloped, flat-bottomed trough) will be set up for washing garnet gravels. Running water will be pumped (from the settling pond below) or be gravity-fed into the upper end of the flume. The silt, sand and fine gravel mix will be screened to recover the garnets. The flume will be approximately 18 inches by 10 inches deep and will be constructed in short sections with enough length to accommodate up to 30 visitors at one

time.

c. The sediment-laden wash water will be fed down the flume, then through a rock-lined raceway back into the settling-recycling pond system. The settling ponds will be designed to settle clay, silt and sand and then allow the waste water to be re-cycled. For spoils management, another smaller pond may be utilized to catch and settle coarser-grained materials. The settling ponds will be periodically excavated, and the spoils will be stockpiled for use during reclamation (see above under reclamation operations).
d. Water is needed to operate the flume wash plant (sluice). An estimated 100-200 gallons per minute will be needed. The Forest Service has acquired water rights to 281 Gulch and Garnet Gulch at the rate of 0.5 to 1.0 cubic foot per second (from 3.7 to 7.5 gallons per second). Prior to the summer season during high flows, water will be taken from a withdrawal point in the upper end of the gulch to the pond system at the flume wash site. The pond system will be filled slowly using a flexible hose or rigid pipe outfitted with a small diameter screen to prevent inadvertent entrapment of fish or small aquatic invertebrates. A pump system will then pump water from the pond system into the flume/sluice.
e. It is anticipated that during the driest part of the annual season there may be a need to store additional water to make up for increased evaporation and to minimize water withdrawals. A water make-up pond (an excavated depression or other above-ground storage system typically used to collect or store additional water) will be used for water storage if needed. Additionally, a water truck may be used to supplement if needed. (See N)12)

G. Noxious Weeds

A number of preventative and control measures will be taken to reduce the risk of noxious weed introduction and spread in accordance with the St. Joe Weed EIS (ROD, 10/12/99). Measures include:

1. All ground disturbance related to earth-moving activities will include mulching and reseeding as soon as practical after completion of ground-disturbing activity to minimize infestations.
2. Mulching agents such as hay or straw will be certified noxious weed-free before they are allowed on the project area.
3. All seed used for re-vegetation and erosion control purposes will be certified noxious weed-free. Native vegetation from the site will be used as much as possible. This includes trees, shrubs, and forbs.
4. A mix of species will also be used in rehabilitation of sites. Non-native annual grasses may be used in rehabilitation efforts. Some of these species are valuable for revegetating sites quickly to avoid erosion.
5. The timing of reseeding will normally be immediately after excavation operations are complete.
6. Off-road construction and mining equipment will be cleaned and inspected prior to entering the project area to remove dirt, plant parts, and material that may carry weed seeds. A provision will be included in the contract.
7. Sites where ground-disturbing activities are planned will be evaluated for existing infestations and treated if necessary prior to initiation of ground-disturbing activities.
8. If new populations of noxious weeds are found, treatment will be implemented in accordance with priorities set by the noxious weed program. New invader species will be slated for eradication immediately upon discovery. Other weed infestations will be treated according to the direction in the St. Joe Noxious Weed Project EIS and district priorities.

H. Rare Plants

1. The five lower-most panels (450 feet) that were proposed for mining in Garnet Gulch were eliminated from consideration for excavation because this area has the most extensive and healthy populations of naked mnium in the project area. All ground-disturbing activities will be confined to the panels above this point.
2. If previously undiscovered Threatened, Endangered, or Sensitive plant species are found project activities at that site will cease until an assessment and recommendation is made by the District Botanist. Measures to protect population viability and habitat for all known and newly discovered occurrences will include the following: altering or dropping activity, modifying the proposed activity and implementing buffers around plant occurrences.
3. If water is pumped from excavated areas and is applied over land, it will only be applied on relatively flat, well-vegetated areas. One potential site for this application is within the occupied habitat of *Rhizomnium nudum* (below the lowest panels on Garnet Gulch). If this site is used, the water application will only be deposited on the eastern bank of Garnet Gulch. The eastern bank has the least number of these plants. See N.11.
4. Restoration plans in 281 Gulch will be designed to avoid the naked mnium sites.
5. Any changes to the proposed extent of restoration activities in the West Fork of No Name Gulch will be reviewed by the District Botanist to ensure protection of rare plant sites located there.

I. Range

1. Adaptive management will be applied to address cattle use in the project area in order to prevent resource damage. Forest Service employees will immediately notify the permittee of cattle presence in the current garnet collection site. The permittee will then be responsible for promptly removing their cattle. If such measures do not prove successful in eliminating resource damage from cattle, other options will be pursued.
2. A cattle guard will be installed at the junction of Road 447 and the new Garnet Gulch Road to prevent cattle from entering the Garnet Gulch Drainage.

J. Recreation

1. Improvements needed to establish the new operations will be constructed to maintain a rustic and natural experience as much as possible.
2. A 600-foot access trail will be constructed from the 281 Gulch parking lot to the Garnet Gulch access road. This trail will be for foot traffic only and will be built according to Forest Service specifications.
3. Benches for rest stops will be installed along the new trail and road. Interpretive signs relating to the ancient Lake Clarkia and the geology of the area will also be installed along the trail and road.
4. Informational materials will explain access restrictions and accommodations for getting to the garnet area administrative site for people who are unable to walk there. People with "disabled" designation in their vehicles will be allowed to drive through to the administrative site.

K. Roads

1. The State of Idaho Best Management Practices Manual will be followed in locating,

constructing, operating and reclaiming mineral access roads with the objective of minimum resource damage (www2.state.id.us/lands/bureau/Minerals/bmp_manual1992/bmp_index.htm on 1/12/06).

2. The new road proposed in Garnet Gulch will be designed to minimum standards (14 feet wide plus curve and fill widening with turnouts) to accommodate maintenance equipment. Portions of this road will be graveled to maintain a stable base and minimize sediment yield.
3. Large equipment will be unloaded at the 281 Gulch parking area and be driven to the site.
4. The proposed Garnet Gulch road location, alignment, width, grades, and drainage were reviewed by a qualified engineer (PF, T-3); and designs will be utilized to minimize risks from unstable soils and slopes, surface water damage, and groundwater seepage.
5. The intersection of the proposed Garnet Gulch road with the existing road (Rd 447) runs through relatively steep ground. Some buttressing of the cut slopes will be designed as needed for slope stability and erosion control. (PF, T-3)
6. For the proposed Garnet Gulch road, no fill material will be placed on the old inactive headwall located 500 feet past the top of the cut of the existing road. Full bench construction will be necessary. (PF, T-3)
7. When the garnet collecting site at 281 Gulch is closed, the 0.35-mile access road (Road 3781) will be recontoured to the extent practicable to the original slope and be revegetated with species (grasses, forbs, shrubs, and/or trees) suitable for the site.
8. A gate and cattle guard will be installed at the beginning of the proposed road for Garnet Gulch at the junction with Road 447.
9. To sustain truck traffic during East Fork 281 Gulch restoration activities, portions of Road 3781 may be graveled to maintain a stable base and minimize sediment yield.
10. During restoration and excavation activities water will be applied to project roads as needed to minimize dust.

L. Safety

1. All operations will be conducted in a safe manner and in compliance with Mine Safety and Health Administration (MSHA), Occupational Safety and Health Administration (OSHA) and other applicable local, state and federal requirements and guidelines.
2. The road construction contract for Garnet Gulch will include appropriate public safety plans.

M. Scenic Resources

1. A rustic gateway will be installed at the beginning of the proposed road to Garnet Gulch instead of the brightly colored steel gate that is often used.
2. Prompt revegetation of the fill slopes for the proposed new road to Garnet Gulch will be implemented. If buttressing is used for the first sight distance (250 feet) of the proposed road, rock obtained from the immediate area (local rock with same coloring) will be used as much as possible.

N. Soils and Watershed

1. Structures will be located outside of the riparian areas and flood plains.
2. Auger test holes used for establishing the annual excavated area will be filled immediately.
3. All areas that are disturbed by gemstone extraction will be reclaimed concurrently with the excavation.
4. Topsoil and overburden will be excavated in soil layers and will be stockpiled to return the

site to as near the pre-existing condition as possible. Returning topsoil and overburden to the excavated site will be implemented immediately upon removing the garnet gravel layer. It is estimated the excavated site will be open for one week. This concurrent reclamation (progressive backfilling, grading and backfilling) will reduce the amount of material exposed at any given time and will reduce the possibility of sedimentation.

5. If equipment is operated on areas that will not be excavated otherwise, one or a combination of the following methods will be used to minimize compaction of soils: minimum size and weight equipment, low ground pressure tracked vehicles (defined by contact pressures in the range from 5 to 10 psi), long-arm excavator, and/or construction mats or other suitable methods.
6. In areas where soils become compacted due to construction equipment, soils may be decompacted if needed.
7. Where disturbance to the stream channel occurs, reclamation will have a designed channel and incorporate large woody material, boulders, sedges, shrubs and trees.
8. Whenever possible, excavating will be scheduled for low-flow periods. Normal surface water flows will be conveyed past the work area by means of bypass channels, pipes, pumps, plastic linings or cofferdams.
9. During periods of high precipitation or runoff, earth-disturbing operations will be curtailed to prevent excessive erosion and sedimentation.
10. Diversion trenches, dewatering wells, grout curtains, coffer dams, slurry walls, geomembrane barriers and/or steel sheet piles may be used if needed to minimize groundwater seepage into active excavation cuts. These control features can effectively lower the groundwater table so that it will not go into excavation areas (National Seal Company, 1991; Cavalli, 1992; and Sherman, 1992).
11. If it is necessary to pump water from excavated areas, the water will be used in the sluicing system or stored for later use or be applied over land. For overland application the water will be dripped or sprinkled onto relatively flat, well-vegetated areas. If it is necessary to dispose of water in this manner in the occupied habitat of *Rhizomnium nudum* below the lowest panels on Garnet Gulch, it would only be deposited on the eastern bank of Garnet Gulch.
12. Water removal from 281 Gulch and Garnet Gulch for the sluicing operation will be limited to the amount necessary to initially fill the settling pond and the recycling or storage pond system and then to augment losses due to spillage, subsurface seepage, groundwater recharge and evaporation. Removal will be timed so that the initial filling occurs in the spring when flows are high. Periodically, when water becomes too low for effective sluicing due to losses from evaporation, spillage, and percolation, the system will be recharged with water from the stream source pending review by District Fish Biologist and District Hydrologist. During drier periods, only a small portion of the stream flow over an extended time period will be removed for augmentation. No digging or filling to accommodate water withdrawals is anticipated. A water truck may be used to supplement if needed.
13. Areas that are disturbed will be revegetated. Replanting and reseeding, if needed, will be conducted with approved seed and stock and will consist of planting densities and species appropriate to the site.
14. Sediment basins or settling ponds will be installed to collect sediment generated from the gemstone washing. The sediment will be removed from settling basins and will be stockpiled as far from the active channel as practicable until it is used for reclamation.
15. Disturbed sites will be covered using mulch, seed, slash, or erosion blanket while vegetation

becomes established.

16. Erosion control structures will be utilized to prevent excessive run-off and erosion. Structures will be constructed in accordance with the Idaho Department of Environmental Quality Catalog of Stormwater Best Management Practices for Idaho Cities and Counties, 2nd Edition, April 2001, the U.S. Environmental Protection Agency's Storm Water Management of Construction Activities; Developing Pollution Prevention Plans and Best Management Practices, September 1992; and the Idaho Department Best Management Practices for Mining in Idaho, November 1992. Erosion control systems will be established as appropriate for the site. Specific design features will include implementation of the following practices:
    a. Sediment control devices will be installed prior to surface-disturbing activity, be inspected regularly, and be cleaned to maintain at least 60 percent of their sediment-holding capacity. Site specific BMPs will be utilized where necessary to insure there will be no net increase in sediment yield from the site.
    b. Sediment control methods may include barriers, silt fences, slash filter windrows, rolling dips, graveling, scattered slash, mulching and seeding, or other methods deemed appropriate for the site. Sediment traps and barrier systems will be inspected periodically and as needed during periods of inclement weather. Accumulated sediment will be periodically removed, possibly stockpiled and then be used in reclamation as needed.
    c. Temporary access trails for equipment (e.g. to establish the garnet gravel stockpile) may be constructed with rolling dips and be armored with rock if needed.
    d. Where possible, site design features will promote diffuse flow or runoff over the ground surface to prevent concentrated flow.
    e. Temporary diversion of stream channels or alteration of channels or stream banks during operations will be kept to the minimum practical.
    f. Sediment traps and sediment control devices for surface drainage will be maintained until disturbed areas are restored and revegetation requirements are met.
17. A channel would be reconstructed on the surface of the excavated panel that mimics the pre-disturbed existing channel in both size and shape (unless an alternative design is agreed to for habitat improvement). Valley and stream channel cross-sections and stream longitudinal profile survey data (project file) collected in 2002-2005 would be used to configure and locate the reconstructed channel. The streambanks would be stabilized using wraps of coir fabric or other biodegradable geo-textile. One or two wraps of the fabric would be used depending on existing channel depth, each lift about 12 inches (FEIS, Figure 18). Fabric or geo-textile and perhaps up to eight inches of gravel may be placed in the reconstructed stream bottom. Also logs and/or large cobbles to small boulders may be used for bank material to provide aquatic habitat and stream bank and channel stability. The reconstructed channels will be monitored for stability and streambank vegetative cover (FEIS, Appendix C).

O. Tree Clearing and Slash Handling

Trees will be cut only to the extent necessary for the operations. Associated slash and large wood will be used for reclamation as needed.

P. Wildlife

Riparian disturbance will be kept to the smallest area practicable in any one year of operation.

During reclamation, the topography will be returned to its previous slope and elevation. The existing amount of persistent pooled water (for amphibian habitat) will be maintained or increased.

Location: The Emerald Creek Garnet Area Project Area is located in Latah County, Idaho. It includes 281 Gulch, Garnet Gulch, No Name Gulch, Pee Wee Gulch and a portion of the East Fork of Emerald Creek drainages primarily in Sections 7, 8, and 18, T42N, R1E, Boise Meridian.

Time Period: Activities would occur over a period of 12 to 24 years. Public digging activities would continue in 281 Gulch for two to four years then rehabilitation activities would begin. Public digging would begin in Garnet Gulch in two to four years then would continue for another 10 to 20 years.

Project Assessment Area

Analysis Scope and Methodology

Geographic Scope

The geographic scope of potential effects for this evaluation was determined based on the location of the proposed federal action and the home ranges/territories of species that may be impacted.

Direct and indirect effects are assessed within and adjacent to the areas where activities would occur (e.g. areas proposed for mining and adjacent stands as appropriate).

The wildlife analysis area for cumulative effects is approximately 6,950 acres. The analysis area is a part of a block of predominately NFS land with 94% of the area under Forest Service administration. The analysis area was delineated to provide perspective for an existing condition baseline, analysis of effects focusing on NFS lands, and to encompass reasonably foreseeable activities and/or other planned actions in the area.

Emerald Creek Garnet Area Wildlife Analysis Area

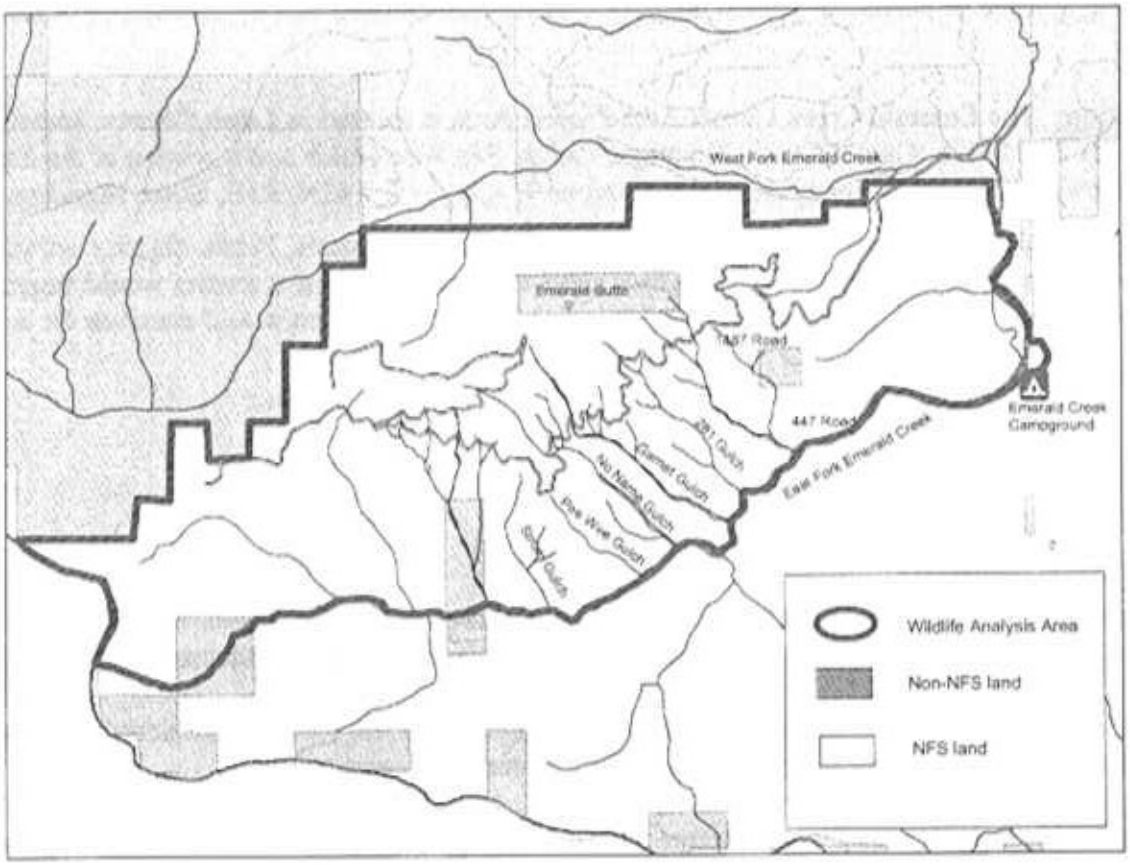

Figure 1

Methodology

The appropriate methodology and level of analysis needed to determine potential effects is influenced by a number of factors including: the scope of the proposed action, the potential for impacts, the potential risk to resources and species, and the information necessary to determine potential effects. The analysis is done at the level of intensity appropriate to address the risks and concerns for a given species.

Due to the location of the garnet resource, most potential impacts would be in and/or adjacent to relatively narrow streams and riparian areas. This then limits the area of potential impacts and limits (but doesn't necessarily eliminate) the need for detailed analysis on much of the upland habitat.

The analysis evaluates habitat in terms of human disturbance, the capability and suitability of vegetation (e.g. structure and composition), and other habitat elements (e.g. large bodies of water and available prey). For the purposes of this analysis, capable habitat is wildlife habitat that has the fixed attributes that enable it to produce habitat requirements for a given species currently or in the future. These fixed attributes include soils (or parent material, or landtype), slope, aspect, elevation, and habitat type. Suitable habitat is wildlife habitat that currently has both the fixed and the variable stand attributes that enable it to produce habitat requirements for a given species. Variable attributes change over time and may include seral stage, cover type, stand density, tree size, stand age, or stand condition.

Historic Condition

Lieberg, in a report to the Secretary of the Interior dated 1897-98, stated that the St. Mary [sic] basin "...originally contained the largest continuous body of old growth in the northern portion of the State". However, at the time of the report he described large tracts - burned twenty to twenty five years earlier – were still covered with dense brush. Information from Lieberg also indicates that approximately 15% of the basin was composed of "yellow pine" (i.e. ponderosa pine) stands. Other information indicates there were more mixed severity fires and fires occurred on a larger scale than compared to present.

Based on this and other data it is logical to infer that historically there were larger stand sizes - and depending on which "snapshot in time" you use as a reference - more mature/old forest structure and a greater abundance of large snags. These conditions would have provided different habitat than that which occurs today. There would have been more habitat for mature/old forest associated species and species associated with snags (and fire killed trees). This would likely include such species as: fisher (and other forest carnivores), flammulated owls, and black-backed woodpeckers. These same conditions would have provided less habitat for species associated with early seral forests (e.g. elk and deer).

Historic human access and disturbance was obviously very low and large remote areas likely provided habitat for species such as wolves.

Existing Condition

The fire history and human activities in the Emerald Creek Garnet Area wildlife analysis area and surrounding landscape have influenced the availability and distribution of wildlife habitat present today, particularly the level of late successional habitat and – indirectly - the acres of security.

At a landscape scale, land ownership patterns influence the availability of suitable habitat for some species, particularly species with large home ranges. The landscape surrounding the Emerald Creek Garnet Area wildlife analysis area (e.g. Emerald Creek, W.F. St. Maries River, Middle F. St. Marie River) contains significant amounts of non-NFS land (see Figure 1) including lands owned, managed and/or administered by: private timber companies, state agencies, and private individuals.

The dominant influences on the abundance and distribution of many species (e.g. road densities, amount and distribution of forest structures) are the result of past and current management activities on both non-NFS and NFS land. The management objectives on most non-NFS forested lands emphasize timber management and much of the land owned by private individuals is not forested (e.g. open fields). Subsequently, these lands do not contribute to wildlife habitat such as mature/old forest structures or they provide it at inherently low levels. Also, management objectives and practices on non-NFS lands tend to limit secure areas away from open/used roads. These landscape conditions then, regardless of conditions on NFS lands, influence the species present in the wildlife analysis area and the intensity of analysis need to determine potential effects. For example, it is predicted that wolf habitat selection and pack persistence would be favored where human influences are minimal (Oakleaf et. al., 2006).

Description of General Habitat

The project is in the East Fork Emerald Creek drainage a tributary of the St. Maries River. Elevation of the drainage ranges from 2,800' to just over 4,600' with >95% of the area below 4,000'. Cedar, Douglas-fir, and grand fir stands predominate in the area (approximately 32%, 24% and 22% of the area respectively) with lesser amount of other forest types (e.g. 7% lodgepole

pine). There are no sub-alpine fir or spruce forest types in the area.

Forest Structure - Past actions and events (e.g. historic logging and fires) in the early part of the 20th century have helped shape the existing condition in the analysis area (e.g. the prevalence of immature sawtimber size class). More recent past harvest activities on NFS and non-NFS lands have also affected the quantity, quality, and distribution of habitat (e.g. old growth and mature forest). In addition mining and grazing have created/maintained some current open/non-stocked stands (e.g. grass meadows). The existing condition of forest structure on NFS lands is displayed in the following table.

Size Class	Total acres	Per cent of Total acres*	Per cent of NFS acres**
Sawtimber	1,141	16%	18%
(no treatment)	(1,062)	(15%)	(>16%)
(intermediate treatment)	(79)	(1%)	(<2%)
Immature sawtimber	3,622	52%	56%
(no treatment)	(3,163)	(46%)	(49%)
(intermediate treatment)	(459)	(<7%)	(7%)
Multistory	177	3%	3%
Pole	39	<1%	<1%
Sapling	1,161	17%	18%
Seedling	148	2%	2%
Open/Non stocked**	198	3%	3%
NFS no data	19	<1%	<1%
Private land	444	6%	na

* percentages are rounded and may not total 100%

** includes stands recently harvested and planted or scheduled for planting but not yet updated in TSMRS

Access – There is approximately 1,795 feet of road (Road 3781) associated directly with the Forest Service garnet mining in 281 Gulch. The road goes from Road 447 to the dig site and is used to provide administrative access and access for disabled persons. The project area is bordered on the south by Road 447 - which is open to all uses – and on the north by Road 1487 – which is restricted to administrative use or motorized vehicles less than 50" wide. Existing total road density in the wildlife analysis area is 4.5 mi/mi^2 and open road density is 2.2 mi/mi^2.

Disturbance - Although it is difficult to quantify, disturbance is associated primarily with roads (including roads restricted to full-size vehicles but open to other motorized vehicles) and their juxtaposition on the landscape. Existing disturbance in the wildlife analysis area comes from the following sources:

- Current and Closed Timber Sales - on NFS and non-NFS lands – using Road 1487 for access for post sale activities
- Current recreational mining activity (281 Gulch)
- Grazing allotment activity
- General Forest use (e.g. recreating, hunting, camping, firewood gathering, etc.)
- ATV use of restricted roads
- Other uses (e.g. fire suppression and administrative use)

Listed Species - Wildlife

The project is in Latah County, the wildlife analysis area includes portions of Benewah and Shoshone Counties. The U. S. Fish and Wildlife Service (USFWS) in their Species Lists for those three counties (www.fws.gov/easternwashington/county%20species%list, 2006) identified three listed wildlife species that may occur:

- Bald eagle *(Haliaeetus leucocephalus)*
- Canada lynx *(Lynx canadensis)*
- Gray wolf *(Canis lupus)*

Analysis of Effects

The following table provides a short synopsis of listed species habitat and information regarding their relevancy to the analysis.

Common Name	Habitat	Existing Condition in the Wildlife Analysis Area
Bald Eagle	Nest near large bodies of water in areas relatively free from disturbance. Perch sites, roost sites and access to prey are essential components of winter habitat.	No large bodies of water are present and availability of prey is low. No nests are known or suspected. District records indicate occasional sightings in surrounding landscape.
Canada Lynx	Forests that provide a prey base of snowshoe hare (generally above 4,000'). Forage habitat - late and early successional stages with high stem/ branch density; dens - associated with down logs and overhead cover in/adjacent to forage habitat.	Based on elevation, forest type, and potential vegetation (habitat type) the WL analysis does not contain sufficient capable habitat to support the species and is not in a Lynx Analysis Unit.
Gray Wolf	Large areas with high prey densities and isolation from human activities. Availability of den and rendezvous sites.	No evidence of den or rendezvous sites. Human influences likely adversely affect presence and habitat use.

Bald Eagle

Bald eagles occupy riparian or lacustrine habitat almost exclusively during the breeding season (USDI, 1994). They select isolated shoreline areas with larger trees to pursue such activities as nesting, feeding, and loafing. Components of nesting habitat include proximity to sufficient food supply, the presence of dominant trees, and line-of-sight to a large body of water (often within 0.25 mile of water). Nest sites are commonly distributed around bodies of water ≥80 acres or major rivers.

Occasional sightings of bald eagles have been recorded in the lower St. Maries River and in the E.F. of Emerald Creek (but not in the project area). District sighting information indicates very limited use of the St. Maries River during winter and the area is not considered bald eagle wintering habitat. There are no bald eagle nests within 20 miles of the analysis area.

There are no large bodies of water in the project or analysis area. The E.F. of Emerald Creek and tributaries provide a limited prey base (e.g. because of stream size and fish habitat). Based on the lack of a large water body, the size of the East Fork of Emerald Creek, the limited prey base,

existing disturbance factors (e.g. open roads adjacent to streams), the quality of bald eagle habitat in the project and analysis area is considered low at best (USDI, 1994). The existing conditions preclude use of the project area by bald eagles and they are not expected to occur in the analysis area. Therefore, the proposed activities in the Emerald Creek Garnet Area Project would have no effect on bald eagles.

Canada Lynx

The "Canada Lynx Conservation Assessment and Strategy" (Ruediger et. al. 2000) provides direction for management of lynx on federal lands. As part of the programmatic planning standards, Lynx Analysis Units (LAUs) were delineated (in collaboration with the USFWS) to facilitate project planning. Based on the forest types, potential vegetation, and elevation the Emerald Creek Garnet Area was not included in any LAU and is not considered capable of providing sufficient habitat for lynx. The geographic location of the project precludes the potential for effects on the species. Therefore, the proposed activities in the Emerald Creek Garnet Area Project would have no effect on lynx.

Gray Wolf

Historically wolves were distributed throughout most of Idaho in unknown populations. Wolf packs of 4 to 10 animals appear to have ranged widely in the mountains of northern and central Idaho. A decline of native ungulates, control programs designed to eradicate wolves and conflicts with livestock and humans caused the decline of wolf populations in Idaho and led to the absence of a breeding population in Idaho (Hansen, 1986).

High prey densities - particularly big game - and minimal conflict with human interests and uses characterize wolf habitat. Other important habitat features for wolves include den and rendezvous sites (Hansen, 1986).

The Emerald Creek Garnet Area wildlife analysis area falls within the Central Idaho reintroduction area where gray wolves are classified as nonessential experimental populations. This classification treats wolves as proposed for listing under the ESA (i.e. instead of endangered). The reintroduction of wolves in Central Idaho did not envision conflicts with current or anticipated management actions. No changes in land use restrictions (other than the possibility of temporary restrictions near den sites) are required because of the reintroduction.

Existing Condition

There are no known wolf dens or rendezvous sites in the wildlife analysis area or the St. Maries Drainage (Mack et. al. 2005). Existing total road density in the wildlife analysis area is 4.5 mi/mi^2 and open road density is 2.2 mi/mi^2.

The wildlife analysis area and the surrounding landscape do not provide any habitat of extraordinary value for the conservation of the gray wolf (e.g. no den sites, rendezvous sites, or exceptional big game habitat).

Potential Effects

The proposed action would not directly or indirectly impact any known wolf den or rendezvous site. The proposed action would not interrupt any linkages or connections between habitats. The proposed action would not increase the likelihood of human wolf conflicts.

The wolf is a wide ranging species and the possibility of their presence in the analysis area can not be totally ruled out. However, the nearest known gray wolf territory is approximately 18+

miles from the project area and the human disturbance level (e.g. campground, highway and residences between project and known territory) make it unlikely that wolves would occur in the area as other than perhaps transitory individuals. Habitat relationships, the scope of the project, and the location of the project result in a low potential for effects (e.g. disturbance of transient individuals). Any effects that may happen would be inconsequential.

Cumulative Effects

There are no cumulative effects which would cause the federal action to contribute to the loss of key populations or adversely affect proposed critical habitat. The proposed action would not result in any irreversible or irretrievable commitment of resources which would violate Section 7(a)(2) of the ESA.

DETERMINATION OF EFFECTS

The determination of effects for each species that may occur in the area is displayed below.

Table 2 – Summary of Determinations

Species	No Effect	May Affect - Not Likely to Adversely Affect	May Affect - Likely To Adversely Affect	Beneficial Effect
Bald Eagle	X			
Canada Lynx	X			

Species	No Effect	Not Likely to Jeopardize the Continued Existence of the Species or Result in Destruction or Adverse Modification of Proposed Critical Habitat	Likely to Jeopardize the Continued Existence of the Species or Result in Destruction or Adverse Modification of Proposed Critical Habitat
Gray Wolf		X	

Recommendations: Any listed species seen in the area during the operating period should be reported to the district wildlife biologist.

Conditions: None

Prepared by: _____ Date: 8/22/06

Wildlife Biologist

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WILDLIFE SENSITIVE SPECIES BIOLOGICAL EVALUATION
SUMMARY OF CONCLUSION OF EFFECTS*

Project Name: Emerald Creek Garnet Area

Species	Alt. A	Alt. B	Alt. C
American Peregrine Falcon	NI	NI	NI
Black-backed Woodpecker	MIIH	MIIH	MIIH
Black Swift	NI	NI	NI
Common Loon	NI	NI	NI
Flammulated Owl	NI	NI	NI
Harlequin Duck	NI	NI	NI
Pygmy Nuthatch	NI	NI	NI
Fisher	MIIH	MIIH	MIIH
Fringed Myotis	NI	NI	NI
North American Wolverine	NI	NI	NI
Northern Bog Lemming	NI	NI	NI
Northern Goshawk	MIIH	MIIH	MIIH
Townsend's Big-Eared Bat	NI	NI	NI
Coeur d'Alene Salamander	NI	NI	NI
Western Toad	MIIH	MIIH	MIIH

Conditions: The determinations of effects are contingent on implementation of design features and riparian restoration as described in the NEPA document (or that meet the same intent).

Recommendations: The district biologist should be notified if any sensitive species are observed during implementation or operation.

Prepared by: Daniel R. Stus
Wildlife Biologist

Date: 8/22/06

NI = No Impact
MIIH = May Impact Individuals Or Habitat, But Will Not Likely Contribute To A Trend Towards Federal Listing Or Loss Of Viability To The Population Or Species
WIFV** = Will Impact Individuals Or Habitat With A Consequence That The Action May Contribute To A Trend Towards Federal Listing Or Cause A Loss Of Viability To The Population Or Species
BI = Beneficial Impact

*** Note: The rationale for the conclusion of effects is contained in the NEPA document**
**** Considered a trigger for a significant action in NEPA**