Appendix A – Best Management Practices and Forest Plan Consistency for Aquatic Resources

Changes Between the FEIS and FSEIS

Practice 15.25 (Obliteration of Temporary Roads) has been added to the list of best management practices.

Site-Specific Best Management Practices

PRACTICE 11.05 - Wetlands Analysis and Evaluation

Objective: To delineate wetlands within sale areas in order to prevent damage to facilities or degradation of soil and water resources.

Effectiveness: High

Compliance: FPA Rule 4.d.v(c) – Meets

PRACTICE 13.03 - Tractor Operation Excluded from Wetlands, Bogs, & Wet Meadows

Objective: To maintain wetland functions and avoid adverse soil and water resource impacts associated with the destruction or modification of wetlands, bogs and wet meadows.

Effectiveness: Much of this mitigation consists of avoiding the impact [40 CFR 1508.20(a)]. The Forest Service has near-complete control over construction operations. Effectiveness is expected to be high.

Compliance: FPA Rule 3.h.iii - Meets

Implementation: At a minimum, the following specific protective requirements for wetlands identified on the Sale Area Map (SAM) will be incorporated into CT6.61# (Wetlands Protection):

1. Soil and vegetation along lakes, bogs, swamps, wet meadows, springs, seeps, or other sources where the presence of water is indicated will be protected from disturbance which would cause adverse effects on water quality, quantity, and wildlife and aquatic habitat (FPA Rule 3.h.iii].
2. An equipment exclusion zone shall extend a minimum of 50 feet from the wetlands, bogs, and wet meadows.

PRACTICE 13.04 - Revegetation of Surface Disturbed Areas

PRACTICE 14.14 - Revegetation of Areas Disturbed by Harvest Activities

Objective: To protect soil productivity and water quality by minimizing soil erosion.

Effectiveness: Revegetation can be moderately effective at reducing surface erosion after one growing season following disturbance and highly effective in later years. Effectiveness has been shown to vary from 10 percent on 3/4:1 slopes to 36 percent on 1:1 slopes to 97 percent on 1:1

slopes in later years (King, John G. and E. Burroughs. Reduction of Soil Erosion on Forest Roads. Intermountain Research Station General Technical Report, 1988).

Compliance: FPA Rules 3.d.iii & e.i, ii - Meets

Implementation: All temporary roads, landings, and skid trails in the sale area will be seeded within one year after harvesting is completed. Seed mixes and fertilizer specifications will be incorporated into Timber Sale Contract provision CT6.601# (Erosion Control Seeding). Timber Sale Contract provision CT6.623# (Temporary Road, Skid Trail/Skid Road and Landing) will identify that scarification/ripping of compacted landings and closed roads will be a minimum of 4 inches, not to exceed 2 feet.

a. All temporary roads, landings, and skid trails will also be fertilized to give the new plants extra support in becoming established.

b. The standard Idaho Panhandle National Forests moist site erosion control seed mix will be used.

PRACTICE 14.06 - Riparian Area Designation

PRACTICE 15.12 - Control of Construction in Riparian Areas

Objective: To minimize the adverse effects on Riparian Areas with prescriptions that manage nearby logging and related land disturbance activities.

Effectiveness: Moderate

Compliance: FPA Rules 3.g.ii, iii, & iv; 3.f.iv - Meets

Implementation: Riparian areas will be protected through the following requirements that will be incorporated into timber sale layout, or into the timber sale contract as identified below:

1. Provide the large organic debris, shading, soil stabilization, wildlife cover, and water filtering effects of vegetation along Class I streams [FPA Rule 3.g.i-iii]. The following measure(s) are implemented during sale layout:

   (a) A Stream Protection Zone that consists of a buffer of 300 feet slope distance from the edge of the channel for West Gold Creek. No timber harvest activities shall occur within the Stream Protection Zone.

   (b) A Stream Protection Zone that consists of a buffer of 100 feet slope distance from the edge of the channel for the intermittent tributaries to West Gold Creek. No timber harvest activities shall occur within the Stream Protection Zone.

2. Waste resulting from logging operations, such as crankcase oil, filters, grease and fuel containers, shall not be placed inside the Stream Protection Zones [FPA Rule 3.f.iv and TSC Provision BT6.34].

PRACTICE 14.11 - Log Landing Erosion Prevention and Control;

PRACTICE 14.12 - Erosion Prevention & Control During Timber Sale Operations;

PRACTICE 14.15 - Erosion Control on Skid Trails.

Objective: To protect water quality by minimizing erosion and subsequent sedimentation derived from log landings and skid trails.

Effectiveness: Moderate

Compliance: FPA Rules 3.e.i, ii; 3.d.iii - Meets

Implementation: The following criteria will be used in controlling erosion and restoring landings and skid trails to minimize erosion:

General:

1. Deposit waste material from construction or maintenance of landings and skid and fire trails in geologically stable locations at least 100 feet outside of the appropriate Stream Protection Zone [FPA Rule 3.f.iii].
2. Skid trails and landings will be seeded with a mix specified in C6.601#.

Landings:

1. During period of use, landings will be maintained in such a manner that debris and sediment are not delivered to any streams.
2. Landings shall be reshaped as needed to facilitate drainage prior to fall and spring runoff. Landings shall be stabilized by establishing ground cover or by some other means within one year after harvesting is completed [FPA Rule 3.e.ii].
3. Landings will drain in a direction and manner that will minimize erosion and will preclude sediment delivery to any stream.
4. After landings have served the Purchaser's purpose, the Purchaser shall ditch or slope them to permit the water to drain or spread [Provision BT6.63 (Landings)].

Skid Trails:

1. Skid trails and fire trails shall be stabilized whenever they are subject to erosion, by waterbarring, cross-draining, outsloping, scarifying, seeding, or other suitable means. This work shall be kept current to prevent erosion prior to fall and spring runoff [FPA Rule 3.e.i].
2. The sale administrator and/or watershed specialist will designate the spacing of water bars on skid trails. [Reference FSH 7709.56]

PRACTICE 14.19 - Acceptance of Timber Sale Erosion Control Measures Before Sale Closure

Objective: To assure the adequacy of required timber sale erosion control work.

Effectiveness: High

Compliance: No directly related FPA Rule

Implementation and Responsibility: Timber Sale Contract provision B6.35 requires that upon the purchaser's written request and assurance that work has been completed, the Forest Service shall perform an inspection. Areas that the purchaser might request acceptance for are specific requirements such as logging, slash disposal, erosion control, or snag felling. In evaluating acceptance the following definition will be used by the Forest Service: "Acceptable" erosion control means only minor deviation from established standards, provided no major or lasting impact is caused to soil and water resources. Certified Timber Sale Administrators will not accept as complete erosion control measures that fail to meet these criteria.

PRACTICE 15.03 - Road and Trail Erosion Control Plan

Objective: To minimize the effects of erosion and the degradation of water quality through erosion control work and road design.

Effectiveness: Moderate

Compliance: No Related FPA Rule

Implementation: Prior to the start of construction, the Contractor shall submit a schedule for proposed erosion control work as required in the Standard Specifications. The schedule shall include all erosion control items identified in the specifications. Erosion control work to be done by the Contractor will be defined in Standard Specification 204 and/or in the Drawings. The schedule shall consider erosion control work necessary for all phases of the project. The Engineer will certify that the Contractors Erosion Control Plan meets the specifications of Std. FS Spec. Section 204.

PRACTICE 15.07 - Control of Permanent Road Drainage

Objective: To minimize the erosive effects of concentrated water and the degradation of water quality by proper design and construction of road drainage systems and drainage control structures.

Effectiveness: Moderate. Designed and controlled ditches, cross drain spacing, and culvert discharge prevent water from running long distances over exposed ground.

Compliance: FPA Rules 4.c.viii; 4.d.iii(a) & (b) - Meets

Implementation: The following items will be included in the timber sale contract provisions or road contract special project specifications.

1. Drainage ways shall be cleared of all debris generated during construction and/or maintenance that potentially interfere with drainage or water quality [IFPA Rule 4(c)(ii), Timber Sale Contract Clause C5.4, and Standard Road Specifications-Special Project Specification 204.04].

2. During and following operations on out-sloped roads, out-slope drainage shall be retained and berms shall be removed on the outside edge except those intentionally constructed for protection of road grade fills [IFPA Rule 4(c)(vi) and Timber Sale Contract Clause C5.4].

3. Cross drains and relief culverts shall be constructed to minimize erosion of embankments. The time between road construction and installation of erosion control devices shall be minimized. Drainage structures or cross drains shall be installed on uncompleted roads

which are subject to erosion prior to fall or spring runoff. Relief culverts shall be installed with a minimum grade of 1 percent [IFPA Rule 4(c)(viii) and Standard Road Specifications-Special Project Specification 204.1].

4. Cross drains and relief culverts will be installed so as to minimize concentrations of intercepted water (see also Practice 15.02 f.(3)).

PRACTICE 15.08 - Pioneer Road Construction

Objective: To minimize sediment production and mass wasting associated with pioneer road construction.

Effectiveness: Moderate

Compliance: No directly related FPA Rule

Implementation: The following contract specifications will be required:

1. Construction of pioneer roads shall be confined to the designed location of the road prism unless otherwise approved by the Contracting Officer (Std. FS Spec. 203.11).
2. Pioneering shall be conducted so as to prevent undercutting of the designated final cut slope, and to prevent avoidable deposition of materials outside the designated roadway limits (Std. FS Spec. 203).
3. Permanent culverts will be installed at wet crossings during the pioneer phase unless positive control of sediment can be accomplished during installation, use, and removal of the temporary structure.

PRACTICE 15.09 - Timely Erosion Control Measures on Incomplete Road and Stream crossing Projects

Objective: To minimize erosion of, and sedimentation from, disturbed ground on incomplete projects.

Effectiveness: Moderate

Compliance: FPA Rules 4.c.ii,iii,iv; & 4.d.iii - Meets

Implementation: The following measures will be implemented during projects:

1. Temporary culverts, side drains, flumes, cross drains, diversion ditches, energy dissipaters, dips, sediment basins, berms, debris racks, or other facilities needed to control erosion will be installed as necessary. The removal of temporary culverts, culvert plugs, diversion dams, or elevated stream crossing causeways will be completed as soon as practical;
2. The removal of debris, obstructions, and spoil material from channels and floodplains;
3. Seeding with an erosion control seed mix approved for use on the Idaho Panhandle National Forests to minimize erosion.
4. Install drainage structures or cross drain uncompleted roads that are subject to erosion prior to fall or spring runoff. (Std Spec 204)

Erosion control measures must be kept current with ground disturbance, to the extent that the affected area can be rapidly "closed," if weather conditions deteriorate. Areas must not be abandoned for the winter with remedial measures incomplete.

PRACTICE 15.10 - Control of Road Construction Excavation and Sidecast Material

PRACTICE 15.18 - Disposal of Right-of-Way and Roadside Debris

See also Practice 13.05

Objective: To insure that unconsolidated excavated and sidecast material, construction slash, and roadside debris, generated during road construction, is kept out of streams and to prevent slash and debris from subsequently obstructing channels.

Effectiveness: High

Compliance: FPA Rule 4.c.iii,iv; & 4.d.i,ii,iii

The slash windrow and other erosion control devices will not be placed in existing stream channels or obstruct culvert outfalls. Large limbs and cull logs may be bucked into manageable lengths and piled alongside the road for fuelwood.

Implementation: In the construction of road fills near streams, compact the material to reduce the entry of water, minimize the amount of snow, ice, or frozen soil buried in the embankment. No significant amount of woody material shall be incorporated into fills. Slash and debris may be windrowed along the toe of the fill, but in such a manner as to avoid entry into a stream and culvert blockage.

Where slash windrows are not desirable or practical, other methods of erosion control such as erosion mats, mulch, and straw bale or fabric sediment fences will be used. Where exposed material (excavation, embankment, borrow pits, waste piles, etc.) is potentially erodible, and where sediments would enter streams, the material will be stabilized prior to fall or spring runoff by seeding, compacting, rip-rapping, benching, mulching or other suitable means.

The following standard specs will be included in all road contracts that include clearing and excavation.

1. Standard Specification 201 (Slash Treatment)
2. Standard Specification 203 (Excavation and Embankments)

PRACTICE 15.13 - Controlling In-Channel Excavation

Objective: To minimize downstream sedimentation by insuring that all in-channel excavations are carefully planned.

Effectiveness: High

Compliance: SCA Rule 9,1(a) - Meets

Implementation: Location and method of stream crossings will be designed and agreed to prior to construction. The following items highlight some of the principal provisions incorporated into the TSC that will govern channel protection:

1. Construction equipment may cross, operate in, or operate near stream courses only where so agreed to and designated by the Forest Service prior to construction (B6.5, B6.422). Crossing of perennial stream channels will be done in compliance with the specifications in the Stream Channel Alteration Act Rules and Regulations and included in the project specifications.

2. No construction equipment shall be operated below the existing water surface except that fording the stream at one location only will be permitted, and work below the water level that is necessary for culvert bedding or footing installations will be permitted to the extent that it does not create unnecessary turbidity or stream channel disturbance [SCA Rule 9,1 (a) and Standard Road Specifications-Special Project Specification 204.04].

3. Wheeled or track laying equipment shall not be permitted to operate within 5 feet slope distance of the apparent high water mark of Class II streams and 75 feet of Class I streams. (C6.6 Erosion Prevention and Control).

4. Construction of any hydraulic structures in stream channels will be in compliance with the Rules and Regulations pertaining to the Stream Channel Protection Act, Title 42, Chapter 38, Idaho Code).

PRACTICE 15.21 - Maintenance of Roads

Objective: To conduct regular preventive maintenance operations to avoid deterioration of the roadway surface and minimize disturbance and damage to water quality, and fish habitat.

Effectiveness: Moderate

Compliance: FPA Rule 4.d.i, ii, iii, iv, v - Meets

Implementation: For roads in active timber sale areas standard TSC provision B5.4 (Road Maintenance) requires the purchaser to perform or pay for road maintenance work commensurate with the purchasers use. Purchaser's maintenance responsibility shall cover the before, during, and after operation period during any year when operations and road use are performed under the terms of the timber sale contract (C5.4 - Road Maintenance). Purchaser shall perform road maintenance work, commensurate with purchaser's use, on roads controlled by Forest Service and used by purchaser in connection with this sale except for those roads and/or maintenance activities which are identified for required deposits in C5.411# and C5.412#. All maintenance work shall be done concurrently, as necessary, in accordance with T-specifications set forth herein or attached hereto, except for agreed adjustments (TSC C5.4- T301, 310).

1. Sidecast all debris or slide material associated with road maintenance in a manner to prevent their entry into streams [IFPA Rule 4(d)(i), Timber Sale Contract Clause C5.4, and Standard Road Specification-Special Project Specification T108].

2. Repair and stabilize slumps, slides, and other erosion features causing stream sedimentation [IFPA Rule 4(d)(ii), Timber Sale Contract Clauses C5.4 and C5.253, and Special Project Specification T108].

3. Active Roads. An active road is a forest road being used for hauling forest products, rock and other road-building materials. The following maintenance shall be conducted on such roads.

(a) Culverts and ditches shall be kept functional.

(b) During and upon completion of seasonal operations, the road surface shall be crowned, out-sloped, in-sloped or water barred, and berms removed from the outside edge except those intentionally constructed for protection of fills.

(c) The road surface shall be maintained as necessary to minimize erosion of the subgrade and to provide proper drainage.

(d) If road oil or other surface stabilizing materials are used, apply them in such a manner as to prevent their entry into streams [IFPA Rule 4(d)(iii)] and Timber Sale Contract Clauses C5.441 and C6.341].

Effectiveness: These measures should effectively minimize erosion from roads.

4. Inactive roads. An inactive road is a forest road no longer used for commercial hauling but maintained for access (e.g., for fire control, forest management activities, recreational use, and occasional or incidental use for minor forest products harvesting). The following maintenance shall be conducted on inactive roads.

   (a) Following termination of active use, ditches and culverts shall be cleared and the road surface shall be crowned, out-sloped or in-sloped, water barred or otherwise left in a condition to minimize erosion. Drainage structures will be maintained thereafter as needed.

   (b) The roads may be permanently or seasonally blocked to vehicular traffic [FPA Rule 4.d.iv].

   (c) Roads will be seeded and fertilized.

   (d) The roads may be permanently or seasonally blocked to vehicular traffic.

5. Abandoned Roads. An abandoned road is not intended to be used again. No subsequent maintenance of an abandoned road is required after the following procedures are completed:

   (a) The road is left in a condition suitable to control erosion by out-sloping, water barring, seeding, or other suitable methods.

   (b) Ditches are cleaned.

   (c) The road is blocked to vehicular traffic.

   (d) The department may require the removal of bridges and culverts except where the owner elects to maintain the drainage structures as needed.

For roads not in an active timber sale area, road maintenance must still occur at sufficient frequency to protect the investment in the road as well prevent deterioration of the drainage structure function. This will be accomplished by scheduling periodic inspection and maintenance, including cleaning dips and cross drains, repairing ditches, marking culvert inlets to aid in location, and cleaning debris from ditches and culvert inlets to provide full function during peak runoff events (FSH 7709.15).

PRACTICE 15.24 - Snow Removal Controls

Objective: To minimize the impact of snow melt on road surfaces and embankments and to reduce the probability of sediment production resulting from snow removal operations.

Effectiveness: Moderate

Compliance: No directly related FPA Rule

Implementation: For Forest roads that will be used throughout the winter, the following measures will be employed:

1. The Purchaser is responsible for snow removal in a manner that will protect roads and adjacent resources.
2. Rocking or other special surfacing and/or drainage measures may be necessary before the operator is allowed to use the roads.
3. During snow removal operations, banks shall not be undercut nor shall gravel or other selected surfacing material be bladed off the roadway surface. Ditches and culverts shall be kept functional during and following roadway use. If the road surface is damaged, the Purchaser shall replace lost surface material with similar quality material and repair structures damaged in blading operations.
4. Snow berms shall not be left on the road surface or shall be placed to avoid channelization or concentration of melt water on the road or erosive slopes. Berms left on the shoulder of the road shall be removed and/or drainage holes opened at the end of winter operations and before the spring breakup. Drainage holes shall be spaced as required to obtain satisfactory surface drainage without discharge on erodible fills. On insloped roads, drainage holes shall also be provided on the ditch side, but care taken to insure that culverts and culvert inlets are not damaged.

PRACTICE: 15.25 - Obliteration of Temporary Roads

Objective: To reduce sediment generated from temporary roads by obliterating them at the completion of their intended use.

Effectiveness: High. Following use, obliteration would bring full recovery within 3-5 years.

Compliance: No FPA rules directly address road obliteration. Obliteration exceeds standards for abandoned roads (4.04.e.i-iv).

EXPLANATION: Temporary roads are constructed for a specific short-term purpose, such as, ski area development roads, logging spurs on a timber sale, and so forth. In order to prevent continued low level casual use, such roads are obliterated at the completion of their intended use. Due to short-term nature of temporary roads, continued maintenance funds can not be used for work on temporary roads. Temporary roads that are allowed to remain in use beyond their prescribed time are subject to continued, uncorrected damage, and they can become chronic sediment sources.

Effective obliteration is generally achieved through a combination of the following measures:

a. Road effectively drained and blocked.

b. Temporary culverts and bridges removed and natural drainage on figuration re-established.

c. Road returned to resource production through revegetation (grass, browse, or trees).

d. Sideslopes reshaped and stabilized.

IMPLEMENTATION: For timber sales, temporary road closure, stabilization and removal of temporary structures are accomplished by the Timber Purchaser. The certified Sale Administrator assures compliance with plans and the Timber Sale Contract. Forest Service supervisors are responsible for insuring that other temporary roads developed by the Forest Service met design standards and management requirements. Temporary road development on Forest Service lands that are allowed through special use permits and/or easements are subject to the same obliteration requirements as temporary roads on timber sales. District Rangers or their representatives are responsible for assuring the obliteration of such roads is accomplished.

REFERENCES: Timber Sale Contract provisions B6.62, B6.5, C6.6, and C6.601; FSM 2522; SWCP 11.03, 11.08, 11.09, 13.04, 14.12 - 14, 14.19, and 15.03; NFMA; FSH 2409.15, Timber Sale Administration Handbook; see references in "Best Management Practice" Definition (05--2 and 3).

Idaho Panhandle National Forest Forest Plan Consistency (IPNF, II-33)

Specific management objectives in the Idaho Panhandle National Forests Forest Plan pertaining to water resources are:

1. **Management activities on Forest Lands will not significantly impair the long-term productivity of the water resource and ensure that state water quality standards will be met or exceeded.**

   Idaho State Best Management Practices (BMPs) are designed to protect the long-term productivity of the water resource and ensure state water quality standards will be met. The West Gold Project will meet standard BMPs. Site-specific BMPs were also included with this project as mitigation measures to improve water quality.

2. **Maintain concentrations of total sediment or chemical constituents within state standards.**

   The net production and delivery of sediment from the No Action alternative is only expected to decrease if the recommendations for road reconstruction and maintenance are implemented. Alternative B & C would substantially reduce production and potential for delivery of sediment to streams.

   The action alternatives would likely meet State standards for chemical constituents given that “Required Design Criteria for All Action Alternatives,” State and site-specific BMPs, and INFS standards would be applied if an action alternative is selected.

3. **Implement project level standards and guidelines for water quality contained in the Best Management Practices.**

Specific road maintenance and repair is needed for Alternative A to be consistent with Idaho Forest Practices Rules. The action alternatives are consistent with this criterion. In addition to standard State BMPs, other soil and water conservation practices that are approved BMPs are built into the timber sale contract. Site-specific BMPs are specified and are listed in the BMP portion of this appendix. Soil and water conservation principles were used during alternative design to determine the location and types of treatments including which areas should be avoided or restored. The specified and designed measures surpass those required by the State Forest Practices Act and are consistent with Forest Service standards.

4. Cooperate with the states to determine necessary instream flows for various uses.

Instream flows are not an issue with any of the proposed projects. Therefore, this standard is not applicable to any alternative.

5. Manage public water system plans for multiple uses by balancing present and future resources with public water supply needs.

Streams not defined as public water systems, but used by individuals for such purposes, will be managed to standards established by the state's forest practices rules and/or the National Forests' BMPs or to the fisheries standards whichever is applicable

West Gold Creek is not defined as a public water system.

6. Activities within non-fishery drainages, including first and second order streams, will be planned and executed to maintain existing biota.

The existing biota will be maintained in first and second order streams through standard and site specific BMPs and the application of INFS standards and guidelines. Site Specific BMPs and applicable INFS standards and guidelines are listed and described in the BMP portion of this appendix.

7. It is the intent of this plan that models be used as a tool to approximate the effects of National Forest activities on water quality values.

All alternatives meet this standard. The WATSED model was used to predict water and sediment yield changes. Road drainage crossings were inventoried to assess erosional hazards and risks to aquatic ecosystems, using the *Methods for Inventory and Environmental Risk Assessment of Road Drainage Crossings* (Flanagan et al 1998). This method gathered information on road-stream crossings that included fill volumes, culvert sizes, erosional features, and other variables, then ranked each crossing for treatment (project file).

A modified version of the R1/R4 fish and fish habitat inventory (Overton et al 1997) was conducted along West Gold Creek and some of its tributaries during the 2000 field season. Additional stream information was collected to determine stream channel types, cross sectional profiles, woody debris composition and stream temperature. Existing and potential in-channel and stream-bank erosion sites were also documented with this survey.

Appendix B – Fisheries Management Direction and Guidelines

Changes Between the FEIS and DSEIS

Under the section entitled "Forest Plan Guidelines," the discussion has been changed to reflect the passage of an amendment to the Forest Plan that eliminated the requirement to monitor fry emergence success.

Inland Native Fish Strategy Standards and Guidelines (USDA Forest Service 1995, A7-A13)

Only INFS standards and guidelines that apply to the range of alternatives for the West Gold Project are addressed here; those standard and guidelines that do not apply are in the INFS document located in the project file. These INFS standards and guidelines are addressed with comments in italics as follows:

1. Timber Management (A-7)

TM-1. Prohibit timber harvest, including fuelwood cutting, in Riparian Habitat Conservation Areas, except as described below.

a. Where catastrophic events such as fire, flooding, volcanic, wind, or insect damage result in degraded riparian conditions, allow salvage and fuelwood cutting in Riparian Habitat Conservation Areas only where present and future woody debris needs are met, where cutting would not retard or prevent attainment of other Riparian Management Objectives, and where adverse effects can be avoided to inland native fish. For priority watersheds, complete watershed analysis prior to salvage cutting in RHCAs.

b. Apply silvicultural practices for Riparian Habitat Conservation Areas to acquire desired vegetation characteristics where needed to attain Riparian Management Objectives. Apply silvicultural practices in a manner that does not retard attainment of Riparian Management Objectives and that avoid adverse effects on inland native fish.

Using "Standard Widths Defining Interim RHCAs," no commercial timber harvest activities are proposed under the action alternatives within RHCAs in the project area.

Effectiveness: High. No commercial harvest is to occur within the RHCAs.

2. Roads Management (A-7-8)

RF-1. Cooperate with Federal, Tribal, State, and county agencies, and cost-share partners to achieve consistency in road design, operation, and maintenance necessary to attain Riparian Management Objectives.

The proposed activities are all on National Forest lands, but have been coordinated with all those listed where applicable.

Effectiveness: High. This coordination is standard policy.

RF-2. For each existing or planned road, meet the Riparian Management Objectives and avoid adverse effects to inland native fish by:

a. Completing watershed analyses prior to construction of new roads or landings in Riparian Habitat Conservation Areas (RHCAs) within priority watersheds.

This project area is within an INFS priority watershed and the Gold EAWS (USDA 2002) has been completed; however, no construction of new roads, temporary roads, or landings is proposed within RHCAs.

b. Minimizing road and landing locations in Riparian Habitat Conservation Areas.

No new roads or landings are proposed within RHCAs under any of the action alternatives.

Effectiveness: High.

c. Initiating development and implementation of a Road Management Plan or a Transportation Management Plan. At a minimum, address the following items in the plan:

1. Road design criteria, elements, and standards that govern construction and reconstruction.
2. Road management objectives for each road.
3. Criteria that govern road operation, maintenance, and management.
4. Requirements for pre-, during-, and post-storm inspections and maintenance
5. Regulation of traffic during wet periods to minimize erosion and sediment delivery and accomplish other objectives such as protection of the road surface.
6. Implementation and effectiveness monitoring plans for road stability, drainage, and erosion control.
7. Mitigation plans for road failures.

The interdisciplinary team (IDT) evaluated access and road improvement needs within the project area. The project includes spot gravelling to improve drainage on Forest Roads 2707, 2707A, and 332.

Effectiveness: Moderate.

d. Avoiding sediment delivery to streams from the road surface.

1. Outsloping of the roadway surface is preferred, except in cases where outsloping would increase sediment delivery to streams or where outsloping is unfeasible or unsafe.

This standard is applied directly for the proposed temporary roads.

Effectiveness: High. Roads would be constructed with this design.

2. Route road drainage away from potentially unstable stream channels and hillslopes.

Effectiveness: High. Improved road drainage would be part of the road package. Water would be less concentrated below existing roads than at present.

e. Avoiding disruption of natural hydrologic flow paths.

Roadwork associated with this project including road reconstruction and decommissioning will be completed.

Effectiveness: *High. Road reconstruction projects would restore the hydrologic flow paths.*

f. Avoid sidecasting of soils or snow. Sidecasting of road material is prohibited on road segments within or abutting RHCAs in priority watersheds.

Gold Creek is a priority watershed. Sidecasting of snow and/or soils would be prohibited at all stream crossings

RF-3. Determine the influence of each road on the Riparian Management Objectives. Meet Riparian Management Objectives and avoid adverse effects on inland native fish by:

a. Reconstructing road and drainage features that do not meet design criteria or operation and maintenance standards, or that have been shown to be less effective than designed for controlling sediment delivery, or that retard attainment of Riparian Management Objectives, or do not protect priority watersheds from increased sedimentation.

b. Prioritizing reconstruction based on the current and potential damage to inland native fish and their priority watersheds, the ecological value of the riparian resources affected, and the feasibility of options such as helicopter logging and road relocation out of Riparian Habitat Conservation Areas.

c. Closing and stabilizing; or obliterating and stabilizing; roads not needed for future management activities. Prioritize these actions based on the current and potential damage to inland native fish in priority watersheds, and the ecological value of the riparian resources affected.

The proposed road reconstruction and maintenance described in Chapters II and III originate from the above standards. The action alternatives would meet this standard.

Effectiveness: *High. Existing roads are proposed for reconstruction with the Timber Sale Contract, so the likelihood that the projects would be completed is high.*

RF-4. Construct new, and improve existing, culverts, bridges, and other stream crossings to accommodate a 100-year flood, including associated bed load and debris, where those improvements would/do pose a substantial risk to riparian conditions. Substantial risk improvements include those that do not meet design and operation maintenance criteria, or that have been shown to be less effective than designed for controlling erosion, or that retard attainment of Riparian Management Objectives, or that do not protect priority watersheds from increased sedimentation. Base priority for upgrading on risks in priority watersheds and the ecological value of the riparian resources affected. Construct and maintain crossings to prevent diversion of streamflow out of the channel and down the road in the event of crossing failure.

The proposed road crossing improvements originate from the above standard. The action alternatives would meet this standard.

Effectiveness: High. There are no stream crossings for any of the temporary roads proposed under Alternatives B or D.

RF-5. Provide and maintain fish passage at all road crossings of existing and potential fish-bearing streams.

The only crossing of a fish-bearing stream is the West Gold Creek crossing on Forest Road 2707. This crossing is a bottomless arch and is unlikely to be a migration barrier for fish.

Effectiveness: *High. There are currently no crossings that are known fish barriers in the project area. The proposed road design would maintain fish passage.*

3. Fires/Fuels Management (A-11)

FM-1. Design fuel treatment and fire suppression strategies, practices, and actions so as not to prevent attainment of Riparian Management Objectives, and to minimize disturbance of riparian ground cover and vegetation. Strategies should recognize the role of fire in ecosystem function and identify those instances where fire suppression or fuel management actions could perpetuate detrimental conditions, or be damaging to, long-term ecosystem function or inland native fish.

FM-2. Locate incident bases, camps, helibases, staging areas, helispots, and other centers for incident activities outside of Riparian Habitat Conservation Areas. If the only suitable location for such activities is within the Riparian Habitat Conservation Area, an exemption may be granted following a review and recommendation by a resource advisor. The advisor would prescribe the location, use conditions, and rehabilitation requirements, with avoidance of adverse effects to inland native fish a primary goal. Use an interdisciplinary team, including a fishery biologist, to predetermine incident base and helibase locations during presuppression planning.

FM-3. Avoid delivery of chemical retardant, foam, or additives to surface waters. An exception may be warranted in situations where overriding immediate safety imperatives exist, or, following a review and recommendation by a resource advisor and a fishery biologist, when the action agency determines that an escape fire would cause more long-term damage to fish habitats than chemical delivery to surface waters.

FM-4. Design prescribed burn projects and prescriptions to contribute to the attainment of the Riparian Management Objectives.

The proposed prescribed burn projects described in Chapters II and III originate from the above standards. The action alternatives would meet this standard.

Effectiveness: High. Planting of long-lived tree species to provide for large woody debris recruitment would follow prescribed burning within the RHCAs.

FM-5. Immediately establish an emergency team to develop a rehabilitation treatment plan to attain Riparian Management Objectives and avoid adverse effects on inland native fish whenever a wildfire or a prescribed fire burning out of prescription significantly damages Riparian Habitat Conservation Areas.

The proposed fires/fuels management described in Chapter 2, and 3 originate from the above standards. The action alternatives would meet this standard.

Effectiveness: Moderate to High. Prescribed fire in the project area is designed to meet these standards.

4. General Riparian Area Management (A-12)

RA-1. Identify and cooperate with Federal, Tribal, State and local governments to secure instream flows needed to maintain riparian resources, channel conditions, and aquatic habitat.

This project does not adversely affect instream flows.

RA-2. Trees may be felled in Riparian Habitat Conservation Areas when they pose a safety risk. Keep felled trees on site when needed to meet woody debris objectives.

Slashing of the understory may occur within RHCAs in order to accomplish burning and planting of long-lived species such as cedar, larch, and white pine.

RA-3. Apply herbicides, pesticides, and other toxicants, and other chemicals in a manner that does not retard or prevent attainment of Riparian Management Objectives and avoids adverse effects on inland native fish.

By following the BMPs listed in the Sandpoint Noxious Weed FEIS, all alternatives would meet this standard.

Effectiveness: High. Standards would be met as required by the Sandpoint Noxious Weed EIS.

RA-4. Prohibit storage of fuels and other toxicants within Riparian Habitat Conservation Areas. Prohibit refueling with Riparian Habitat Conservation Areas unless there are no other alternatives. The Forest Service must approve refueling sites within a Riparian Habitat Conservation Area or Bureau of Land Management and have an approved spill containment plan.

Effectiveness: High. This is a standard BMP that is part of the timber sale contract.

RA-5. Locate water-drafting sites to avoid adverse effects to inland native fish and instream flows, and in a manner that does not retard or prevent attainment of Riparian Management Objectives.

Effectiveness: Moderate. This standard would be applied in the prescribed burn plans associated with the West Gold project. However, wildfire suppression is beyond the scope of this project and water drafting associated with such an emergency would be addressed as a separate issue.

5. Watershed and Habitat Restoration (A-12)

WR-1. Design and implement watershed restoration projects in a manner that promotes the long-term ecological integrity of ecosystems, conserves the genetic integrity of native species, and contributes to attainment of Riparian Management Objectives.

Effectiveness: High. The proposed watershed restoration projects originate from the above standard. The action alternatives would meet this standard.

WR-2. Cooperate with Federal, State, local, and Tribal agencies, and private landowners to develop watershed-based Coordinated Resource Management Plans (CRMPs) or other cooperative agreements to meet Riparian Management Objectives.

Effectiveness: Moderate to High. Cooperation at the multiple levels as listed occurred within the framework for developing the proposed activities of this project and is consistent with the recommendations in the Lake Pend Oreille Bull Trout Problem Assessment (PBTTAT 1998), the Lake Pend Oreille Bull Trout Conservation Plan-Final Draft (Resource Planning Unlimited 1999), and Gold EAWS (USDA 2002).

6. Fisheries and Wildlife Restoration (A-13)

FW-1. Design and implement fish and wildlife habitat restoration and enhancement actions in a manner that contributes to attainment of the Riparian Management Objectives.

Effectiveness: High. Improvements to culverts, road decommissioning, and riparian planting are habitat enhancement actions that will be implemented in a manner that contributes to attainment of Riparian Management Objectives.

FW-4. Cooperate with Federal, Tribal, and State fish management agencies to identify and eliminate adverse effects on native fish associated with habitat manipulation, fish stocking, fish harvest, and poaching.

Cooperation at the multiple levels as listed occurred within the framework for developing the proposed activities of this project. Using the INFS Standard Widths Defining Interim RHCAs for the project activities, habitat manipulation does not apply. Fish stocking, harvest and/or poaching are all regulated by State management guidelines.

Effectiveness: High. Existing habitat would be preserved under this project.

Forest Plan Guidelines (USDA 1987, pp. II – 29-31)

Fry Emergence (Fish Standard 1 and 2):

On June 2, 2005, the Forest Supervisor for the Idaho Panhandle National Forests signed a decision notice and finding of no significant impact that amended the Forest Plan to modify or remove objectives, standards, and monitoring requirements pertaining to fry emergence success (IPNF, 2005). The amendment was implemented because the fry emergence objectives, standards and monitoring requirements that were in the IPNF Forest Plan did not contribute as well as Inland Native Fish Strategy (INFS) objectives, standards, guidelines, and monitoring direction towards meeting the goals of providing sufficient habitat in support of maintaining diverse and viable populations of fish species across the forest. In addition, because of the limited application of the fry emergence models and their unreliability and the inability to determine fry emergence success in the field due to high variability affected by multiple natural and human-caused factors, the Forest Service was not able to state with any degree of certainty whether measures of fry emergence success were accurate or precise.

State of Idaho Governor's Bull Trout Plan

The following describes a "step down" process from the Governors Bull Trout Plan.

Governors Bull Trout Plan (State of Idaho 1996):

- The mission of the plan is to "…maintain and or restore complex interacting groups of bull trout populations throughout their native range in Idaho.
- The Plan created the Basin Advisory Groups, which oversee the Watershed Advisory Groups (WAG). The Technical Advisory Team's role is to assist the WAG with issues regarding recovery of bull trout in each key watershed.

Lake Pend Oreille Key Watershed Problem Assessment (Technical Advisory Team 1998)

- Threats and limiting factors to restoration of bull trout in Gold Creek include excess bedload in stream channels from historic mining activities, lack of large woody debris in some reaches, and inputs of fine sediment from the Kickbush slide. Poaching and disturbance of spawning bull trout also pose a potential threat.

Lake Pend Oreille Bull Trout Conservation Plan (Final Draft; LPOWAG July 1999)

- Watersheds were ranked by the TAT based on the following criteria:
    - The probability of persistence for bull trout;
    - Current habitat/watershed conditions;
    - The need for watershed restoration and/or protection;
    - The potential to increase bull trout numbers.
- (South) Gold Creek is a High Priority subwatershed for restoration.
- The conservation plan emphasizes restoration activities in High Priority watersheds only.

The Final Draft of the Lake Pend Oreille Bull Trout Conservation Plan was forwarded to the Governor's office as the final plan. The WAG has not regrouped to implement the plan; however, many of the restoration activities are being accomplished through other means (Dave Mosier personal communication 2001). The Kickbush Slide repair was completed in summer of 2002. The CERCLA cleanup of mining activities in Gold Creek began in summer of 2002, and will be a multi-phase project over several years. Other activities including the purchase of private land parcels and road closures for bull trout protection, as well as increased law enforcement presence to discourage poaching, have been implemented, and will continue to occur.

Appendix C – Vegetation Information

Changes Between the FEIS and DSEIS

This appendix has been supplemented with information about Forest Plan standards for old growth. This new section explains what the standards are, how well the IPNF as a whole meets the standards, and how well the proposed project and alternatives meet the standards. Additional information on the existing condition of old growth in the project area can be found in the project files.

Regulatory Framework

Regulatory constraints applying to the management of forest vegetation include the State Forest Practices Acts, Forest and Rangeland Renewable Resources Planning Act of 1974 (RPA), National Forest Management Act of 1976 (NFMA), Idaho Panhandle National Forests Forest Plan (USDA 1987) and Forest Service policy.

- *RPA states, "It is the policy of Congress that all forested lands in the National Forest System be maintained in appropriate forest cover with species of trees, degree of stocking, rate of growth, and conditions of stand designed to secure the maximum benefits of multiple use sustained yield management in accordance with land management plans."*
- *The 1976 National Forest Management Act directs that Forest Plans will be developed which specify guidelines to identify the suitability of lands for resource management; provide for the diversity of plant and animal communities based on the suitability and capability of land areas to meet multiple-use objectives; where appropriate, to the degree practicable, preserve the diversity of tree species similar to that existing in the planning area; insure that timber will be harvested from National Forest System Lands only where soil, slope, or other watershed conditions will not be irreversibly damaged; the lands can be adequately restocked within five years after harvest; protection is provided for streams, streambanks, shorelines, lakes, wetlands, and other bodies of water where harvests are likely to seriously and adversely affect water conditions and fish habitat; and the harvesting system used is not selected primarily because it will give the greatest dollar return or the greatest unit output of timber.*
- *Any cut designed to regenerate an even-aged stand of timber must be determined to be appropriate to meet the objectives and requirements of the land management plan and, in the case of clearcutting, is the optimum method; has had an interdisciplinary review of impacts and the cuts are consistent with the multiple use of the general area; will be shaped and blended, to the extent practicable, with the natural terrain; meets established, suitable size limits; and is carried out in a manner consistent with protection of soil, watershed, fish, wildlife, recreation, esthetic resources, and the regeneration of the timber resource.*
- *NFMA amended RPA and requires that stands of trees shall generally have reached the culmination of mean annual increment of growth prior to harvest, but this does not preclude the use of sound silvicultural systems such as thinning and other stand improvement measures; it also allows salvage or sanitation harvest following fire, windthrow, or other catastrophe or within stands in imminent danger of insect and disease attack.*

Forest Service policy directs land managers to:

- *Use only those silvicultural practices that are best suited to the land management objectives for the area. Consider all resources, as directed in the appropriate forest plan.*
- *Prescribe treatments that are practical in terms of cost of preparation, administration, transportation systems, and logging methods.*
- *Monitor practices, using procedures specified in forest plans to ensure objectives are met.*
- *Before scheduling stands for regeneration harvest, ensure, based on literature, research, or local experience, that stands to be managed for timber production can be adequately restocked within five years of final harvest. Five years after final harvest means five years after clearcutting, final overstory removal in shelterwood cutting, the seed tree removal cut in seed tree cutting or after selection cutting.*
- *Perform all silvicultural activities in the most cost effective manner consistent with resource management objectives.*

Forest Service policy further directs that:

- *The size of tree openings created by even-aged silvicultural methods will normally be 40 acres or less. With some exceptions, creation of larger openings will require 60-day public review and Regional Forester approval.*
- *For management purposes, cut areas created by even-aged management will no longer be considered openings when both vegetation and watershed conditions meet management objectives established for the management area.*
- *Management activities will promote programs that provide a sustained yield of forest products consistent with the multiple-use goals established in Regional Guides and the Forest Plan.*
- *Timber management activities will be the primary process used to minimize the hazards of insects and diseases and will be accomplished primarily by maintaining stand vigor and diversity of plant communities and tree species.*
- *Protection of timber stands from insect and disease problems will center around the silvicultural treatments prescribed for timber management activities.*
- *Proposed activities will be consistent with Management Area objectives. Descriptions and objectives of these Management Areas are included in the Forest Plan.*

WEST GOLD ALTERNATIVE B
STAND TREATMENTS

Unit	Stand ID	Acres	Alternative B Prescription	Size Class	Forest Cover Type	Alt B. Harvest System	Fuels Treatment	Reforestation
06	63201001	3.57	Thin	IMSA	DF	S	LL	NONE
06	63201043	7.07	Thin	IMSA	DF	S	LL	NONE
07	63302032	22.87	Thin & Group Select	IMSA	L	S	UB	NONE
08	63301034	38.23	Irregular Shelterwood	IMSA	DF	S	UB	PP/WL
09	63301025	23.86	Irregular Shelterwood	IMSA	DF	S	UB	WL/WP
10	63301013	8.81	Thin	IMSA	DF	S	LL	NONE
10	63302028	16.59	Thin & Group Select	MHRS	PP	S	LL	NONE
11	63302042	9.97	Thin & Group Select	IMSA	DF	S	LL	NONE
12	63302043	12.60	Seedtree w/reserves	IMSA	GF/WH	S	UB	WL/WP
13	63302004	10.87	Irregular Shelterwood	IMSA	L	H	UB	WP/WL
15	63302004	4.44	Irregular Shelterwood	IMSA	L	H	UB	WL/WP
16	63302046	19.43	Rehabilitation	IMSA	DF	S	UB	WL/WP
17	63302002	18.36	Seedtree w/reserves	IMSA	GF/WH	S	UB	WL/WP
17	63302004	34.19	Seedtree w/reserves	IMSA	L	H	UB	WL/WP
18	63302045	14.15	Irregular Shelterwood	IMSA	LP	S	UB	WL/PP/WP
19	63302045	7.61	Irregular Shelterwood	IMSA	LP	S	GP	NONE
19	63302045	13.48	Thin	IMSA	LP	T	GP	NONE
20	63302021	35.87	Thin & Group Select	IMSA	C	S	LL	NONE
21	63302049	13.24	Irregular Shelterwood	IMSA	DF	S	UB	WL/WP
22	63302003	18.18	Thin & Group Select	IMSA	DF	S	LL	NONE
23	63302020	14.07	Irregular Shelterwood	IMSA	C	S	UB	WL/WP
23	63302022	7.64	Irregular Shelterwood	IMSA	DF	H	UB	WL/WP
23	63302022	23.28	Irregular Shelterwood	IMSA	DF	S	UB	WL/WP
23	63302023	58.95	Irregular Shelterwood	IMSA	DF	S	UB	PP/WL/WP
23	63302023	12.12	Irregular Shelterwood	IMSA	DF	H	UB	PP/WL/WP
24	63202008	12.29	Irregular Shelterwood	IMSA	DF	S	UB	PP
24	63202031	6.76	Irregular Shelterwood	IMSA	L	H	UB	PP/WL
24	63202031	7.89	Irregular Shelterwood	IMSA	L	S	UB	PP/WL

WEST GOLD ALTERNATIVE B
STAND TREATMENTS

Unit	Stand ID	Acres	Alternative B Prescription	Size Class	Forest Cover Type	Alt B. Harvest System	Fuels Treatment	Reforestation
24	63202032	19.29	Irregular Shelterwood	IMSA	DF	S	UB	PP
24	63202037	28.23	Irregular Shelterwood	IMSA	DF	S	UB	PP/WL
24	63202038	10.24	Irregular Shelterwood	IMSA	DF	S	UB	PP
24	63302013	12.99	Irregular Shelterwood	IMSA	DF	S	UB	PP
24	63302013	2.97	Irregular Shelterwood	IMSA	DF	H	UB	PP
25	63202032	4.80	Thin & Group Select	IMSA	DF	H	WTY	NONE
25	63202038	5.24	Thin & Group Select	IMSA	DF	H	WTY	NONE
26	63202025	28.58	Underburn Only	MHRS	PP	None	UB	NONE
27	63202004	21.17	Rehabilitation	IMSA	DF	H	SL/UB	PP/WL/WP
27	63202004	19.34	Rehabilitation	IMSA	DF	S	SL/UB	PP/WL/WP
27	63202020	6.67	Rehabilitation	MHRS	GF/WH	H	SL/UB	PP/WL/WP
27	63202027	17.22	Rehabilitation	IMSA	DF	S	SL/UB	PP/WL/WP
27	63202027	9.92	Rehabilitation	IMSA	DF	H	SL/UB	PP/WL/WP
27	63202028	22.00	Rehabilitation	SAWT	DF	S	SL/UB	PP/WL/WP
27	63202028	11.75	Rehabilitation	SAWT	DF	H	SL/UB	PP/WL/WP
27	63202041	3.13	Rehabilitation	MHRS	C	H	SL/UB	PP/WL/WP
27	63202048	4.55	Rehabilitation	MLRS	DF	S	SL/UB	PP
28	63302007	23.73	Thin	IMSA	GF/WH	H	LL	NONE
29	63202006	12.71	Rehabilitation	IMSA	DF	S	SL/UB	WL/WP
30	63202042	2.27	Final Removal w/Reserves	MULT	L	H	LL	NONE
31	63202002	14.25	Irregular Shelterwood	IMSA	GF/WH	H	UB	PP/WL
31	63202002	31.10	Irregular Shelterwood	IMSA	GF/WH	S	UB	PP/WL
31	63202003	38.83	Irregular Shelterwood	IMSA	DF	H	UB	PP/WL
31	63202003	2.28	Irregular Shelterwood	IMSA	DF	T	UB	PP/WL
31	63202003	31.06	Irregular Shelterwood	IMSA	DF	S	UB	PP/WL
31	63202014	3.28	Irregular Shelterwood	IMSA	DF	H	UB	PP/WL
31	63202018	21.46	Irregular Shelterwood	IMSA	DF	H	UB	PP/WL
31	63202018	21.58	Irregular Shelterwood	IMSA	DF	S	UB	PP/WL

WEST GOLD ALTERNATIVE B
STAND TREATMENTS

Unit	Stand ID	Acres	Alternative B Prescription	Size Class	Forest Cover Type	Alt B. Harvest System	Fuels Treatment	Reforestation
31	63202019	20.45	Irregular Shelterwood	MLRS	GF/WH	H	UB	PP/WL/WP
31	63202019	11.36	Irregular Shelterwood	MLRS	GF/WH	T	UB	PP/WL/WP
31	63202019	5.41	Irregular Shelterwood	MLRS	GF/WH	S	UB	PP/WL/WP
31	63202022	6.36	Irregular Shelterwood	IMSA	DF	S	UB	PP/WL
31	63202022	7.97	Irregular Shelterwood	IMSA	DF	T	UB	PP/WL
31	63202023	2.88	Irregular Shelterwood	IMSA	LP	T	UB	PP/WL
31	63202024	6.23	Irregular Shelterwood	MHRS	LP	S	UB	PP
31	63202024	1.86	Irregular Shelterwood	MHRS	LP	H	UB	PP
31	63202024	5.36	Irregular Shelterwood	MHRS	LP	T	UB	PP
32	63202017	13.82	Thin & Group Select	IMSA	DF	S	UB	NONE
33	63202023	6.71	Thin	IMSA	LP	S	UB	NONE
34	63202026	1.78	Thin & Group Select	IMSA	DF	S	UB	NONE
34	63202026	2.31	Thin & Group Select	IMSA	DF	T	UB	NONE
35	63201024	40.25	Irregular Shelterwood	MHRS	L	H	UB	NONE
35	63201025	21.96	Irregular Shelterwood	MHRS	L	H	UB	NONE
36	63201043	31.41	Thin & Group Select	IMSA	DF	H	UB	NONE
37	63201010	7.67	Thin & Group Select	IMSA	DF	H	UB	NONE
37	63201011	4.82	Thin & Group Select	MHRS	DF	H	UB	NONE
38	63201003	9.47	Thin & Group Select	IMSA	DF	H	UB	NONE
38	63201004	8.23	Thin & Group Select	IMSA	PP	H	UB	NONE
38	63201007	7.02	Thin & Group Select	IMSA	DF	H	UB	NONE
39	63201014	4.98	Thin & Group Select	SAWT	DF	H	UB/LL	NONE
39	63201032	14.88	Thin & Group Select	MULT	PP	H	UB/LL	NONE
40	63302007	11.37	Thin	MULT	GF/WH	H	LL	NONE
41	63202008	23.01	Irregular Shelterwood	IMSA	DF	H	UB	PP
41	63202009	9.20	Irregular Shelterwood	IMSA	GF/WH	H	UB	PP
41	63202038	7.19	Irregular Shelterwood	IMSA	DF	H	UB	PP
41	63202040	13.43	Irregular Shelterwood	IPOL	LP	H	UB	PP

WEST GOLD ALTERNATIVE B
STAND TREATMENTS

Unit	Stand ID	Acres	Alternative B Prescription	Size Class	Forest Cover Type	Alt B. Harvest System	Fuels Treatment	Reforestation
42	63202026	10.09	Thin & Group Select	IMSA	DF	H	UB	NONE
42	63202036	7.83	Thin & Group Select	IMSA	DF	H	UB	NONE
42	63202042	5.43	Thin & Group Select	MULT	L	H	UB	NONE
43	63302003	8.12	Thin	IMSA	DF	H	LL	NONE
44	63302007	63.54	Thin	MULT	GF/WH	H	LL	NONE
45	63302021	7.34	Irregular Shelterwood	IMSA	DF	H	GP	WL/WP
46	63302049	6.96	Irregular Shelterwood	IMSA	DF	H	UB	WP/WL
48	63302049	14.06	Thin & Group Select	IMSA	DF	H	LL	NONE
	TOTAL	1,337.79						

Size Class
IMSA – Immature sawtimber
MHRS- Mature high risk
MULT – Multistory
SAWT – Sawtimber
IPOL – Immature Pole

Forest Cover
DF – Douglas-fir
GF – grand fir
WH – western hemlock
LP – lodgepole pine
PP – ponderosa pine
L - larch
C - cedar

Harvest System
T – tractor
S – skyline
H – helicopter

Fuels
UB – underburn
LL – limb and lop
GP – grapple pile
WTY – whole tree yard

Reforestation
WL – western larch
WP – white pine
PP – ponderosa pine

WEST GOLD ALTERNATIVE C
STAND TREATMENTS

Unit	Stand ID	Acres	Size Class	Forest Cover Type	Alternative C Prescription	Alt C Harvest system	Fuels Treatment	Reforestation
06	63201001	3.57	IMSA	DF	Thin	S	LL	NONE
06	63201043	7.07	IMSA	DF	Thin	S	LL	NONE
07	63302032	22.87	IMSA	L	Thin & Group Select	S	UB	NONE
08	63301034	38.23	IMSA	DF	Irregular Shelterwood	S	UB	PP/WL
09	63301025	23.86	IMSA	DF	Irregular Shelterwood	S	UB	WL/WP
10	63301013	8.81	IMSA	DF	Thin	S	LL	NONE
10	63302028	16.59	MHRS	PP	Thin & Group Select	S	LL	NONE
11	63302042	9.97	IMSA	DF	Thin & Group Select	S	LL	NONE
12	63302043	12.60	IMSA	GF/WH	Seedtree w/reserves	S	UB	WL/WP
13	63302004	10.87	IMSA	L	Irregular Shelterwood	H	UB	WP/WL
15	63302004	4.44	IMSA	L	Irregular Shelterwood	H	UB	WL/WP
16	63302046	19.43	IMSA	DF	Rehabilitation	H	UB	WL/WP
17	63302002	18.36	IMSA	GF/WH	Seedtree w/reserves	S	UB	WL/WP
17	63302004	34.19	IMSA	L	Seedtree w/reserves	H	UB	WL/WP
18	63302045	14.15	IMSA	LP	Irregular Shelterwood	S	UB	WL/PP/WP
19	63302045	13.48	IMSA	LP	Thin	T	GP	NONE
19	63302045	7.61	IMSA	LP	Thin	S	GP	NONE
20	63302021	35.87	IMSA	C	Thin & Group Select	S	LL	NONE
21	63302049	13.24	IMSA	DF	Irregular Shelterwood	S	UB	WL/WP
22	63302003	18.18	IMSA	DF	Thin & Group Select	S	LL	NONE
23	63302020	10.18	IMSA	C	Irregular Shelterwood	H	UB	WL/WP
23	63302020	3.90	IMSA	C	Irregular Shelterwood	S	UB	WL/WP
23	63302022	22.79	IMSA	DF	Irregular Shelterwood	H	UB	WL/WP
23	63302022	8.13	IMSA	DF	Irregular Shelterwood	S	UB	WL/WP

WEST GOLD ALTERNATIVE C
STAND TREATMENTS

Unit	Stand ID	Acres	Size Class	Forest Cover Type	Alternative C Prescription	Alt C Harvest system	Fuels Treatment	Reforestation
23	63302023	32.03	IMSA	DF	Irregular Shelterwood	H	UB	WL/WP
23	63302023	39.04	IMSA	DF	Irregular Shelterwood	S	UB	PP/WL/WP
24	63202008	12.29	IMSA	DF	Irregular Shelterwood	S	UB	PP
24	63202031	14.66	IMSA	L	Irregular Shelterwood	H	UB	PP/WL
24	63202032	19.29	IMSA	DF	Irregular Shelterwood	H	UB	PP
24	63202037	20.68	IMSA	DF	Irregular Shelterwood	H	UB	PP/WL
24	63202037	7.55	IMSA	DF	Irregular Shelterwood	S	UB	PP/WL
24	63202038	3.11	IMSA	DF	Irregular Shelterwood	H	UB	PP
24	63202038	7.13	IMSA	DF	Irregular Shelterwood	S	UB	PP
24	63302013	15.95	IMSA	DF	Irregular Shelterwood	H	UB	PP
25	63202032	4.80	IMSA	DF	Thin & Group Select	H	WTY	NONE
25	63202038	5.24	IMSA	DF	Thin & Group Select	H	WTY	NONE
26	63202025	28.58	MHRS	PP	Underburn Only	None	UB	NONE
27	63202004	21.17	IMSA	DF	Rehabilitation	H	SL/UB	PP/WL/WP
27	63202004	19.34	IMSA	DF	Rehabilitation	S	SL/UB	PP/WL/WP
27	63202020	6.67	MHRS	GF/WH	Rehabilitation	H	SL/UB	PP/WL/WP
27	63202027	9.92	IMSA	DF	Rehabilitation	H	SL/UB	PP/WL/WP
27	63202027	17.22	IMSA	DF	Rehabilitation	S	SL/UB	PP/WL/WP
27	63202028	11.75	SAWT	DF	Rehabilitation	H	SL/UB	PP/WL/WP
27	63202028	22.00	SAWT	DF	Rehabilitation	S	SL/UB	PP/WL/WP
27	63202041	3.13	MHRS	C	Rehabilitation	H	SL/UB	PP/WL/WP
27	63202048	4.55	MLRS	DF	Rehabilitation	S	SL/UB	PP
28	63302007	23.73	IMSA	GF/WH	Thin	H	LL	NONE
29	63202006	12.71	IMSA	DF	Rehabilitation	S	SL/UB	WL/WP
30	63202042	2.27	MULT	L	Final Removal w/Reserves	H	LL	NONE
31	63202002	45.35	IMSA	GF/WH	Irregular Shelterwood	H	UB	PP/WL

WEST GOLD ALTERNATIVE C
STAND TREATMENTS

Unit	Stand ID	Acres	Size Class	Forest Cover Type	Alternative C Prescription	Alt C Harvest system	Fuels Treatment	Reforestation
31	63202003	72.17	IMSA	DF	Irregular Shelterwood	H	UB	PP/WL
31	63202014	3.28	IMSA	DF	Irregular Shelterwood	H	UB	PP/WL
31	63202018	43.04	IMSA	DF	Irregular Shelterwood	H	UB	PP/WL
31	63202019	37.22	MLRS	GF/WH	Irregular Shelterwood	H	UB	PP/WL/WP
31	63202022	14.33	IMSA	DF	Irregular Shelterwood	H	UB	PP/WL
31	63202023	2.88	IMSA	LP	Irregular Shelterwood	H	UB	PP/WL
31	63202024	13.44	MHRS	LP	Irregular Shelterwood	H	UB	PP
32	63202017	13.82	IMSA	DF	Thin & Group Select	H	UB	NONE
33	63202023	6.71	IMSA	LP	Thin	H	UB	NONE
34	63202026	4.09	IMSA	DF	Thin & Group Select	H	UB	NONE
35	63201024	40.25	MHRS	L	Irregular Shelterwood	H	UB	NONE
35	63201025	21.96	MHRS	L	Irregular Shelterwood	H	UB	NONE
36	63201043	31.41	IMSA	DF	Thin & Group Select	H	UB	NONE
37	63201010	7.67	IMSA	DF	Thin & Group Select	H	UB	NONE
37	63201011	4.82	MHRS	DF	Thin & Group Select	H	UB	NONE
38	63201003	9.47	IMSA	DF	Thin & Group Select	H	UB	NONE
38	63201004	8.23	IMSA	PP	Thin & Group Select	H	UB	NONE
38	63201007	7.02	IMSA	DF	Thin & Group Select	H	UB	NONE
39	63201014	4.98	SAWT	DF	Thin & Group Select	H	UB/LL	NONE
39	63201032	14.88	MULT	PP	Thin & Group Select	H	UB/LL	NONE
40	63302007	11.37	MULT	GF/WH	Thin	H	LL	NONE
41	63202008	23.01	IMSA	DF	Irregular Shelterwood	H	UB	PP
41	63202009	9.20	IMSA	GF/WH	Irregular Shelterwood	H	UB	PP
41	63202038	7.19	IMSA	DF	Irregular Shelterwood	H	UB	PP
41	63202040	13.43	IPOL	LP	Irregular Shelterwood	H	UB	PP
42	63202026	10.09	IMSA	DF	Thin & Group Select	H	UB	NONE

WEST GOLD ALTERNATIVE C
STAND TREATMENTS

Unit	Stand ID	Acres	Size Class	Forest Cover Type	Alternative C Prescription	Alt C Harvest system	Fuels Treatment	Reforestation
42	63202036	7.83	IMSA	DF	Thin & Group Select	H	UB	NONE
42	63202042	5.43	MULT	L	Thin & Group Select	H	UB	NONE
43	63302003	8.12	IMSA	DF	Thin	H	LL	NONE
44	63302007	63.54	MULT	GF/WH	Thin	H	LL	NONE
45	63302021	7.34	IMSA	DF	Irregular Shelterwood	H	GP	WL/WP
46	63302049	6.96	IMSA	DF	Irregular Shelterwood	H	UB	WP/WL
48	63302049	14.06	IMSA	DF	Thin & Group Select	H	LL	NONE
	TOTAL	1,337.79						

Size Class
IMSA – Immature sawtimber
MHRS- Mature high risk
MULT – Multistory
SAWT – Sawtimber
IPOL – Immature Pole

Forest Cover
DF – Douglas-fir
GF – grand fir
WH – western hemlock
LP – lodgepole pine
PP – ponderosa pine
L - larch
C - cedar

Harvest System
T – tractor
S – skyline
H – helicopter

Fuels
UB – underburn
LL – limb and lop
GP – grapple pile
WTY – whole tree yard

Reforestation
WL – western larch
WP – white pine
PP – ponderosa pine

WEST GOLD ALTERNATIVE D
STAND TREATMENTS

Unit	Stand ID	Acres	Size Class	Forest Cover Type	Alternative D Prescription	Alt. D Harvest System	Fuels Prescription	Reforestation
06	63201001	3.57	IMSA	DF	Thin	S	LL	NONE
06	63201043	7.07	IMSA	DF	Thin	S	LL	NONE
07	63302032	22.87	IMSA	L	Thin & Group Select	S	UB	NONE
08	63301034	38.23	IMSA	DF	Improvement Cut	S	UB	NONE
10	63301013	8.81	IMSA	DF	Thin	S	LL	NONE
10	63302028	16.59	MHRS	PP	Thin & Group Select	S	LL	NONE
11	63302042	9.97	IMSA	DF	Thin & Group Select	S	LL	NONE
19	63302045	10.79	IMSA	LP	Thin	S	GP	NONE
19	63302045	15.79	IMSA	LP	Thin	T	GP	NONE
20	63302021	35.87	IMSA	C	Thin/Group Select	S	LL	NONE
22	63302003	18.18	IMSA	DF	Thin & Group Select	S	LL	NONE
26	63202025	28.58	MHRS	PP	Underburn Only	None	UB	NONE
28	63302007	23.73	IMSA	GF/WH	Thin	H	LL	NONE
30	63202042	2.27	MULT	L	Final Removal w/Reserves	H	LL	NONE
32	63202017	13.82	IMSA	DF	Thin & Group Select	S	UB	NONE
33	63202023	10.02	IMSA	LP	Thin	H	UB	NONE
36	63201043	31.41	IMSA	DF	Thin & Group Select	H	UB	NONE
37	63201010	7.67	IMSA	DF	Thin & Group Select	H	UB	NONE
37	63201011	4.82	MHRS	DF	Thin & Group Select	H	UB	NONE
38	63201003	9.47	IMSA	DF	Thin & Group Select	H	UB	NONE
38	63201004	8.23	IMSA	PP	Thin & Group Select	H	UB	NONE
38	63201007	7.02	IMSA	DF	Thin & Group Select	H	UB	NONE
39	63201014	4.98	SAWT	DF	Thin & Group Select	H	UB/LL	NONE
39	63201032	14.88	MULT	PP	Thin & Group Select	H	UB/LL	NONE

WEST GOLD ALTERNATIVE D
STAND TREATMENTS

Unit	Stand ID	Acres	Size Class	Forest Cover Type	Alternative D Prescription	Alt. D Harvest System	Fuels Prescription	Reforestation
40	63302007	11.37	MULT	GF/WH	Thin	H	LL	NONE
42	63202026	10.09	IMSA	DF	Thin & Group Select	H	UB	NONE
42	63202036	7.83	IMSA	DF	Thin & Group Select	H	UB	NONE
42	63202042	5.43	MULT	L	Thin & Group Select	H	UB	NONE
43	63302003	8.12	IMSA	DF	Thin	H	LL	NONE
44	63302007	63.54	MULT	GF/WH	Thin	H	LL	NONE
48	63302049	14.06	IMSA	DF	Thin & Group Select	H	LL	NONE
	TOTAL	**475.08**						

Size Class
IMSA – Immature sawtimber
MHRS- Mature high risk
MULT – Multistory
SAWT – Sawtimber
IPOL – Immature Pole

Forest Cover
DF – Douglas-fir
GF – grand fir
WH – western hemlock
LP – lodgepole pine
PP – ponderosa pine
L - larch
C - cedar

Harvest System
T – tractor
S – skyline
H – helicopter

Fuels
UB – underburn
LL – limb and lop
GP – grapple pile
WTY – whole tree yard

Reforestation
WL – western larch
WP – white pine
PP – ponderosa pine

Forest Plan Standards for Old Growth

The 2004 Idaho Panhandle National Forests Plan Monitoring and Evaluation Report (pp. 66-74) describes the old growth inventory and monitoring conducted on this National Forest. This report provides most of the information used in discussing compliance with the following 1987 Forest Plan standards. An update on our FIA old growth estimates is taken from Appendix C of the Forest Plan CER (Comprehensive Evaluation Report). Both documents are located in the reference list, and a copy of Appendix C of the CER is in the vegetation project file.

10a. A definition for old growth is being developed by a Regional task Force and will be used by the forest when completed. As an interim guideline, stands classified as old growth should meet the definition given by Thomas (1979).

Forest plan Standard 10a incorporates the definitions of old growth developed by the Regional Old Growth Task Force, documented in: *Green et al. (1992, errata corrected 02/05). Old Growth Forest Types of the Northern Region. USDA, Forest Service, Northern Region.*

10b. Maintain at least 10 percent of the forested portion of the Idaho Panhandle National Forests as old growth.

The 1987 Idaho Panhandle National Forest (IPNF), Forest Plan, Standard 10b calls for maintaining "10% of the forested portion of the IPNF as old growth." The Forest Plan identified 2,310,000 forested acres on the IPNF. Therefore, the Forest Plan Standard requires maintaining 231,000 acres of old growth on the Forest.

The IPNF uses a multi-scale approach to monitoring old growth based on two separate, independent tools. These are:

1) Forest Inventory and Analysis (FIA) data used to calculate IPNF Forest-wide and mid-scale old growth percentages. (FIA old growth results for the IPNF are available for the first time this year.)

2) IPNF stand map displaying all stands allocated for old growth management, with old growth allocation recorded in the TSMRS database.

1) Old Growth Estimates from FIA Data

The National Forest Inventory and Analysis (FIA) program provides a congressionally mandated, statistically-based, continuous inventory of the forest resources of the United States. Since 1930 the FIA program has been administered through the Research and Development branch of the Forest Service, which makes it administratively independent from the National Forest System. The people who administer the FIA inventory on the IPNF are employees of the Interior West Forest Inventory and Analysis work unit, headquartered at the USFS Rocky Mountain Research Station in Ogden, Utah.

FIA inventory design is based on the standardized national FIA grid of inventory plots that covers all forested portions of the United States (all ownerships). FIA protocols specify sample plot location within this systematic grid. Both sample plot location and data collection standards are strictly controlled by FIA protocols. The sample design and data collection methods are scientifically designed, publicly disclosed, and repeatable. Data collection protocols are publicly

available on the internet (http://www.fia.fs.fed.us/). There are also stringent quality control standards and procedures, carried out by FIA personnel of the Rocky Mountain Research Station. Adherence to the standards and procedures assures that there is no bias in sample design, plot location, trees selected for measurement, or the measurements themselves.

FIA does not provide a 100 percent annual census of every tree on every acre in a national forest. With approximately 2,500,000 acres on the IPNF alone, and hundreds to thousands of trees per acre, that would not be possible. Rather, the FIA design provides a statistically sound representative sample designed to provide unbiased estimates of forest conditions at large and medium scales. This inventory design is appropriate for making estimates of old growth percentages at the scale of a national forest, or large areas of forest land. More detail on the statistical foundation of using FIA data to assess old growth on national forests is found in: *Application of Forest Inventory and Analysis (FIA) Data to Estimate the Amount of Old Growth Forest and Snag Density in the Northern Region of the National Forest System by Raymond L. Czaplewski, Ph.D. November 5, 2004* [available from Northern Region, US Forest Service].

Because FIA data come from a statistical sample rather than a 100 percent census, we describe attributes calculated from these data as estimates, and the accuracy of these estimates can be computed and reported as confidence limits. The IPNF is using a 90 percent confidence interval for old growth estimates. That means that if a different set of randomize sample points was collected 100 different times, the estimates of old growth amounts would be within this interval 90 percent of the time. This indicates that if we measured every acre there is a 90 percent probability that the proportion of old growth for this entire population would be within this confidence interval. There is a five percent probability that the proportion of old growth would be less than the lower confidence limit. There is an equal five percent probability that the proportion of old growth would be greater than the upper confidence limit.

Using FIA data to assess the percent of old growth allows us to base our monitoring on an unbiased, statistically sound, independently designed and implemented representative sample of forest conditions on the Idaho Panhandle National Forests (IPNF). This inventory is reasonably current because FIA plots on the IPNF were established from 2000 to 2004. To remain current, FIA re-measures ten percent of its plots every year. As these re-measured plots accumulate, we will periodically update our FIA old growth report. Current FIA old growth estimates are presented at this time. Updated reports of old growth on the IPNF, as estimated from FIA plots, will be available in subsequent years.

FIA plot data are tested against the old growth minimum criteria in table 1 of *Green et al. (1992, errata corrected 02/05)*. The old growth minimum criteria are the number of trees per acre that exceed old growth minimum ages and diameters, and a minimum forest density measured as basal area per acre. The values are specific by habitat type and forest type combinations. Plots that meet old growth minimum criteria are classified as old growth. Data analysis is automated in the Forest Service Northern Region "FIA Summary Database."

Based on FIA data, the estimated percent of old growth on the forested lands of the IPNF is 11.8 percent. The 90 percent confidence intervals of this estimate are 9.5 percent to 14.0 percent. Given these values, we conclude that the IPNF is meeting Forest Plan Standard 10b that calls for maintaining "10 percent of the forested portion of the IPNF as old growth."

FIA old growth percentages by geographic area also provide evidence that our old growth is well distributed across the IPNF. Note that as the sample size becomes larger, the confidence intervals are tighter. Estimates for the IPNF as a whole provide the tightest confidence intervals.

Estimates of percentage of Old Growth by Zones and associated 90% confidence intervals are as follows:

Zone	Standard Error	90% Confidence Interval Lower Bound	Estimate of Percent Old Growth	90% Confidence Interval Upper Bound	Total Number PSUs	Number Forested PSUs
Central Zone	2.2	5.4%	9.2%	12.7%	116	115
North Zone	2.1	10.0%	13.4%	17.1%	181	167
South Zone	2.5	7.8%	12.0%	16.4%	116	115

Estimates of percentage Old Growth by IPNF Geographic Areas and associated 90% confidence intervals are as follows:

IPNF Geographic Areas	Standard Error	90% Confidence Interval Lower Bound	Estimate of Percent Old Growth	90% Confidence Interval Upper Bound	Total Number PSUs	Number Forested PSUs
Coeur d'Alene	2.2	5.4%	9.2%	12.7%	116	115
St. Joe	2.5	7.9%	12.0%	16.5%	116	115
Sandpoint / Pend Oreille	3.7	5.3%	11.1%	17.6%	54	47
Bonners Ferry / Kootenai	3.5	10.2%	15.9%	21.9%	68	66
Priest Lake	3.9	6.3%	12.5%	19.3%	59	54

Estimates of percentage Old Growth by IPNF Landscape Areas and associated 90% confidence intervals are as follows:

IPNF Landscape Areas	Standard Error	90% Confidence Interval Lower Bound	Estimate of Percent Old Growth	90% Confidence Interval Upper Bound	Total Num PSUs	Number Forested PSUs
Priest Lake South	3.8	1.1%	6.8%	13.6%	32	29
Priest Lake North	7.1	7.8%	19.0%	31.4%	27	25
Selkirks	5.2	10.7%	18.9%	27.7%	35	33
Purcell / Boulder	4.8	5.4%	12.8%	21.2%	33	33
Cabinet / Scotchman	5.2	3.9%	11.9%	20.8%	21	21
Pend Oreille	5.3	2.5%	10.5%	20.0%	33	26
Lakeface / Lower CdA	4.4	1.5%	8.0%	15.9%	28	28
Little North Fork CdA	4.8	1.5%	8.7%	17.5%	20	20
Upper Coeur d' Alene	1.8	0.0%	2.0%	5.5%	25	25

IPNF Landscape Areas	Standard Error	90% Confidence Interval Lower Bound	Estimate of Percent Old Growth	90% Confidence Interval Upper Bound	Total Num PSUs	Number Forested PSUs
Central North Fork CdA	4.8	6.6%	14.4%	22.0%	43	42
Little N. Fk. Clearwater	7.5	10.0%	21.8%	35.0%	24	24
St. Maries/Lower St. Joe	3.6	0.0%	4.3%	11.3%	19	19
West Central St. Joe	2.7	0.0%	2.6%	8.0%	29	28
East Central St. Joe	7.5	8.7%	20.4%	33.6%	22	22
Upper St. Joe	5.2	3.5%	11.3%	20.6%	22	22

2) IPNF Stand-Level Map of Old Growth

This is the first year we've had FIA old growth data available for the entire Forest. In past years we've reported forest-wide old growth results by tallying the acres of stands allocated for old growth management, and comparing this total to the Forest Plan ten percent standard. We continue to do that this year, and will also compare the results to the FIA old growth estimates, which have a known statistical accuracy. This comparison should provide an additional measure of the reliability of old growth monitoring results.

The IPNF stand-level old growth map represents a census of those stands allocated for old growth to meet Forest Plan standards. The stand-level old growth allocation allows us to distribute old growth across the Ranger Districts and landscape in ways that make ecological sense at the landscape scale; it also serves as a basis for project planning, when we need to take a more detailed look at old growth allocations within a potential project area. The stand map also allows us to display to the public that adequate amounts of old growth are allocated and distributed across the landscape.

The IPNF stand-level old growth allocation represents a different approach to monitoring old growth from the FIA sample, and was designed and implemented independent of the FIA inventory. Forest stand information is gathered by Ranger District personnel. Allocation of old growth stands is usually based on a field examination. Most old growth stands are examined with a formal systematic grid of stand exam plots that counts and measures trees on these plots. A smaller proportion of stands were allocated to old growth based on notes and measurements from walk-through field verification surveys by foresters and forestry technicians knowledgeable about old growth definitions. Less than 1.5 percent of old growth stands were allocated from photo inventory; all of those stands will be field verified before any forest management projects are carried out in those watersheds.

Stand-level old growth allocation utilizes the latest stand inventory data to assess how well stands meet the old growth definitions in the IPNF Forest Plan, as specified in *Green et al. (1992, errata corrected 02/05).* The old growth definitions in *Green et al. (1992, errata corrected 02/05)* are in two parts. First, there are tables of "Old Growth Type Characteristics." These tables include both "minimum criteria" (minimum age, tree diameter, number of old large trees, and basal area) and

"associated characteristics" (ranges of numbers or proportions of snags, canopy layers, diameter distributions, broken tops, and large down wood). Pages 11 and 12 of *Green et al. (1992, errata corrected 02/05)* explain that: "The minimum criteria are used to determine if a stand is potentially old growth. Where these values are clearly exceeded, a stand will usually be old growth. The associated structural characteristics may be useful in decision making in marginal cases, or in comparing relative values when making old growth evaluations." *Green et al. (1992, errata corrected 02/05)* also warn that: "A stand should not be accepted or rejected as old growth simply on the basis of associated characteristics." The associated characteristics are not part of the base old growth definition.

Speaking of the minimum criteria, *Green et al. (1992, errata corrected 02/05)* further state: "Because of the great variation in old growth stand structures, no set of numbers can be relied upon to correctly classify every stand…Do not accept or reject a stand as old growth based on the numbers alone; use the numbers as a guide." Second, on pages 11 and 12, *Green et al. (1992, errata corrected 02/05)* provide guidance for incorporation of landscape ecology considerations and a full range of resource values (including human values) in the selection of stands to be managed as old growth. Professional consideration of a wide and complex variety of factors is necessary to make old growth allocations at the stand scale.

When making old growth allocation decisions for individual stands in individual landscapes, ranger district personnel use the "Old Growth Type Characteristics" tables; they also incorporate the variety of other old growth resource values and landscape design criteria, as explained in pages 11 to 12 of *Green et al. (1992, errata corrected 02/05).* Taking these other considerations into account is fully consistent with Forest Plan standard 10c, which states: "Areas will be selected as old growth management stands based on a combination of wildlife, cost efficiency, and other resource values (interdisciplinary process)."

In response to old growth concerns, from 1990 through 1993 the IPNF did a forest-wide inventory of old growth resources and worked with local public Forest Watch groups to allocate and map old growth. This is the original source of the IPNF stand-level old growth allocation and map. Since then, we have continued to update our old growth stand allocation as the forest has changed from natural events and as new information has became available.

Starting in 2001, the IPNF began a comprehensive review of old growth data and did some new field reviews and exams to incorporate changes in conditions on the ground. This ongoing review, monitoring and updating of the old growth stand allocation is reflected in changes in old growth stand acres reported in annual monitoring reports over the years. These changes are evidence that we are working to keep the stand-level allocation current as conditions change. Each year's monitoring report contains the most current old growth stand information available. The stand information below was extracted from our database in March 2005 and represents the approximate situation at the end of 2004. Evaluating this stand-level old growth allocation information together with the FIA old growth estimates provides the most comprehensive picture of old growth on the IPNF.

The IPNF does not do timber harvest that removes allocated old growth. We ceased regeneration harvest of allocated old growth stands a number of years ago. However, old growth distribution will never be entirely static because forests are living, changing natural communities. Disturbances such as fire, insects, pathogens, and weather events may reduce the amount of old growth in some

areas. Meanwhile, other stands will grow and age into old growth status. The IPNF has approximately 600,000 acres of mature forest (generally dominated by trees 100+ years old), substantial amounts of which have the potential to mature into old growth in the next few decades. We will continue to update our old growth stand data in response to changing conditions and as we obtain new information. The priority for our updating efforts will be those watersheds where we are considering management activities.

The IPNF has approximately 6,500 individual old growth stands distributed across 2.5 million acres of National Forest. It is not practical to visit every old growth stand every year. Because natural changes are continually occurring (this includes both disturbances that remove old growth, and other stands maturing into old growth), information about some allocated stands may be outdated at any given time. However, to ensure that all management actions are designed based upon current old growth conditions, we take a closer look at old growth allocations within a project area whenever any management activity is being considered that could possibly impact old growth. Furthermore, to ensure that we're meeting Forest Plan old growth standards forest-wide, we use FIA estimates to monitor the amount of old growth across the forest and at other large scales.

The forest-wide stand map provides us with stand-level information that is a useful starting point at the project scale when we are considering any management activity. Before making any management decisions that could possibly impact old growth, we take a detailed look at old growth allocations for that project area and the OGMUs that encompass the project area. We closely review and verify all old growth allocations within the project area, as well as review all potential treatment stands, and look for previously unidentified stands that may now meet old growth criteria. The objectives of this review are to be sure we have the best old growth allocation and landscape arrangement possible within that project area, and to be sure we're not inadvertently, negatively impacting old growth.

Where appropriate, project design may also include identification of potential future old growth in the area. Project-scale review often results in changes in old growth status for a few individual stands. We sometimes find that some previous old growth stands no longer meet criteria because of insect and disease or weather mortality. However, because other stands have grown into old growth status, or because we also find previously un-inventoried old growth, this project-scale review commonly results in a net increase in old growth in the project area.

We record old growth allocations in the Forest Service Northern Region Timber Stand Management Record System (TSMRS) database, because there are database fields and codes designed for recording stand old growth status. TSMRS is a very large Forest Service database used across the Northern Region. Any database is simply an electronic box with pre-defined fields to store specific information items. It is not possible to make meaningful sweeping general statements about the reliability of a large, widely used database. The completeness and reliability of any specific data field in any database depends upon the local effort devoted to gathering and maintaining that specific information.

In the last few years the IPNF has spent over $320,000 in Districtwide reviews and updating of old growth stand information in TSMRS. In addition, for all potential management projects, TSMRS old growth information is subject to additional project area review and validation (as explained above) prior to any management action on the ground. This assures that we don't inadvertently take any management action that negatively impacts old growth, and that all our project plans are based

on the current old growth status for that project area. The old growth information currently in the IPNF portion of the TSMRS Database has been substantially reviewed since 2001, with updates made as appropriate. Much of this updating has taken place within the last two years. That updating continues as the forest changes and new information becomes available.

The TSMRS database contains codes indicating individual stand old growth status. The actual stand exam data that provide the basis of the old growth determination are stored in the FVEG database, and other information and field notes are in the individual stand folders. This information is updated when new exams are done.

Our database allows us to track old growth in several categories, depending upon how it was identified in the inventory and how it is currently allocated. We separate our old growth into the "allocated" old growth stands that are specifically identified and "retained" to meet the 231,000-acre forest plan standard, and "additional" old growth that serves old growth ecological functions, even though it is not formally allocated.

"Existing Old Growth" (TSMRS Special Uses code 9) meets (and often exceeds) *Green et al. (1992, errata corrected 02/05)* old growth minimum criteria at the stand level. "Ancient Cedar" (Special Uses code 2) is also part of our existing allocated old growth, but we track it separately because we want to take special note and care of these unique stands. "Ancient Cedar" stands contain trees over five feet in diameter, with ages over 500 years old; they far exceed minimum old growth criteria. Ancient cedar stands are retained regardless of their size.

"Potential Old Growth" (Special Uses code 11) meets, or comes close to meeting a number of old growth minimum criteria, but is lacking somewhat in some criteria. However, if it is listed as "allocated", it does contribute to old growth functions at some scale. The most common situation is that the "potential old growth" has more than enough large trees to meet old growth criteria, but some of the trees are not quite old enough. However, these are usually the largest and oldest trees we have in a given area, and with a little more time can be expected to meet the age criteria as well. Some "potential old growth" is included in our old growth allocation because it is close to meeting the minimum criteria, is the best that we have available in an area, and contributes to distribution of old growth characteristics across the landscape.

Other allocated "potential old growth" stands are small patches that contribute to the integrity of a larger block of old growth, or serve as part of a corridor or as stepping stones, linking two larger old growth blocks. Larger old growth patches are generally more valuable as wildlife habitat, and linkages across the landscape are important. Allocated potential old growth contributes to the functional integrity of old growth at the landscape scale, and is managed as part of our old growth allocation. This is consistent with the direction in *Green et al. (1992, errata corrected 09/04)* about the importance of using landscape ecology considerations, as well as individual stand attributes, in selecting land to be allocated as old growth.

Old growth can be monitored by tallying acres of stands allocated and mapped as old growth. Totals from the IPNF stand-level map are presented in table C-2. Forest Plan Standard 10b calls for maintaining 231,000 acres of old growth (ten percent of our forested acres). We have identified and allocated 278,552 acres of forest stands (12.1 percent of IPNF forested acres) to be retained as old growth. Old growth status in 98.5 percent of these stands has been field verified. Clearly, the IPNF has allocated enough acres of old growth stands to meet and exceed Forest Plan Standard 10b for the amount of old growth to be retained. We also have

an additional 7,444 acres (0.3 percent of forested acres) of previously field examined, unallocated old growth stands that provide old growth habitat for wildlife and serve other ecological functions.

Table C-2. Acres of old growth stands by river sub basin, based on stand-level examination

Sub-Basin (River)	Allocated Ancient Cedar *(code 2)*	Allocated Field Verified Old Growth *(code 9)*	Allocated Photo Inventory Old Growth *(code 10)*	Allocated Potential Old Growth *(code 11)*	Total Allocated Old Growth *(codes 2, 9, 10, 11)*	Additional Field Verified Old Growth *(code 12)*	Total All Old Growth *(codes 2, 9, 10, 11, 12)*
St. Joe	1,945	58,920	971	13,160	**74,996**	7,444	**82,440**
Coeur d'Alene	208	56,216		8,836	**65,260**		**65,260**
Pend Oreille	63	19,265	55	5,208	**24,591**		**24,591**
Kootenai	516	59,737	254	5,346	**65,853**		**65,853**
Priest	1,880	40,866	2,833	2,273	**47,852**		**47,852**
Forest Total	**4,612**	**235,004**	**4,113**	**34,823**	**278,552**	**7,444**	**285,996**

If we just count the field-identified stands that correspond to the minimum criteria in table 1 of *Green et al. (1992, errata corrected 02/05))*, (codes 2, 9, & 12 above), regardless of allocation status, the IPNF shows 247,060 acres, which equals 10.7 percent of IPNF forested acres. This also meets and exceeds Forest Plan Standard 10b. for the amount of old growth to be retained, and does so without counting any of our "Allocated Potential Old Growth".

Summary -- Comparison of Two Tools for Monitoring Old Growth

As explained above, the IPNF is using a multi-scale approach to monitoring old growth, based on two separate, independent tools. These are:

1) Forest Inventory and Analysis (FIA) data used to calculate IPNF Forest-wide and mid-scale old growth percentages.

2) IPNF stand map displaying all stands allocated for old growth management, with old growth allocation recorded in the TSMRS database.

These two independent tools use significantly different designs and are administered and carried out by different people. FIA old growth estimates are based on a statistically sound, representative sample of the entire National Forest, administered by the Rocky Mountain Research Station in Ogden, Utah. This sample is designed to provide unbiased estimates of forest conditions at medium and large scales. Total acres from the IPNF old growth stand-level map are a census of stands allocated for old growth management, based upon examination of selected individual forest stands for old growth characteristics. The stand inventory is carried out or directed by IPNF Ranger District personnel. The stand-level map is a fine-scale tool that allows us to allocate old growth stands across the Ranger Districts and landscape in a way that serves as a basis for project planning.

As displayed above, the two independent Forest Service old growth monitoring tools produce remarkably similar results at the forest scale:

- **Based on FIA data, the current estimate of the proportion of old growth on the forested portion of the IPNF is 11.8 percent. The 90 percent confidence intervals of this estimate are 9.5 percent to 14.0 percent.**
- **The IPNF total acres of mapped stands allocated and maintained for old growth is 12.1 percent of forested lands.**

The percent of forested acres of stands allocated for old growth is well within the 90 percent confidence interval of the FIA inventory. From statistical perspective, at the 90 percent confidence level, the two numbers are not significantly different. Together, these two monitoring tools offer compelling evidence that the IPNF is meeting Forest Plan standards for the amount of old growth to be retained.

10c. Select and maintain at least five percent of the forested portion of those old growth units that have five percent or more of existing old growth.

The West Gold project area encompasses portions of two old growth management units (OGMUs) #17 and # 18, which have 2.2 percent and 3.8 percent old growth respectively. All existing old growth will be maintained in these OGMUs.

10d. Existing old growth stands may be harvested when there is more than 5% in an old growth unit, and the Forest Total is more than 10%.

The IPNF does not do timber harvest that removes allocated old growth stands. The Forest has greater than ten percent old growth, but the old growth management units (OGMUs) that encompass the West Gold project area have less than five percent old growth. **All existing old growth will be maintained** (see vegetation section of project file for old growth distribution).

10e. Old growth stand should reflect approximately the same habitat types series distribution as found on the Idaho Panhandle National Forests.

The following table displays habitat type series distribution for old growth compared to all our forested acres.

Table C-3. Old growth habitat type series distribution

Habitat Type Series	% IPNF Acres by Inventoried Habitat Type Series	Allocated Old Growth Acres by Habitat Type Series	% of Allocated Old Growth Acres by Habitat Type Series
Ponderosa Pine	< 0.1%	0	0.0%
Douglas Fir	6.8%	7,997	2.9%
Grand Fir	14.6%	14,648	5.3%
Western Red Cedar	15.9%	50,863	18.3%
Western Hemlock	37.7%	110,646	39.7%
Subalpine Fir	15.2%	52,081	18.7%
Mountain Hemlock	9.7%	41,911	15.0%
Lodgepole Pine	< 0.1%	0	0.0%

As displayed above, old growth on the IPNF does reflect approximately the habitat type series distribution of the forest. On 79 percent of the land the amount of old growth is proportional to, or

more than proportional to the distribution of that habitat type series. Old growth distribution is less than proportional to habitat type series distribution only in the Douglas-fir and grand fir series, which occupy the driest 21 percent of the land. The dry habitat type group (all of the Douglas-fir and the dry end of the grand fir series) occupies approximately ten percent of IPNF land. The moist end of the grand fir series (which is still drier than the rest of the forest) covers another 11 percent of IPNF land, and is often found at lower elevations and southerly aspects, and is subject to significant moisture stress during drought years.

The low proportion of old growth in these two dry habitat type series is a function of the combined effects of the huge 1910 fire and other big early 20th century fires, subsequent suppression of most low- and mixed-severity fires, early 20th century timber cutting, root diseases, and bark beetles. Much of the old growth inventoried on these two habitat type series is currently dominated by Douglas-fir or grand fir, which are at risk from bark beetles and root diseases. Where the moister, non-riparian grand fir habitat types are adjacent to dry sites, fires, root diseases, and bark beetles that strike the dry sites have a high probability of carrying over into adjacent Douglas-fir / grand fir stands. During drought years, grand fir growing on upland grand fir habitat types is at risk from *Scolytus* bark beetles. Active management will be necessary to restore more resilient tree species, and increase the proportion of old growth on our dry habitat types and adjacent grand fir habitat types (Arno 1996, Arno et al. 1997, Fiedler 1996, Harrington 1996, Graham et al. 2004, Graham et al. 1999, Hessburg et al. 2005, Spies et al. 2006, Habeck 1990).

The natural processes that maintained old growth on dry sites were very different from those on moister sites. Historically, most of these dry forest habitat types were subject to frequent low-severity underburns and mixed severity fires that thinned out smaller trees and favored large trees of the most fire-resistant species (ponderosa pine and western larch). Frequent low-severity fires reduced the total number of smaller trees (thus limiting moisture demands that caused tree stress on these dry sites), and reduced dead woody fuels and live ladder fuel accumulations (thus reducing the risk of stand replacing crown fires). These low- and mixed-severity fires were natural process that maintained dry site old growth forest structures (Arno 1996, Arno et al. 1997, Fiedler 1996, Harrington 1996, Graham et al. 2004, Graham et al. 1999, Hessburg et al. 2005, Spies et al. 2006, Habeck 1990).

Now, on dry habitat types, approximately 70 years of effective fire suppression has allowed in-growth of dense stands of smaller trees and accumulation of high woody fuel loads. Lack of fire has favored Douglas-fir and grand fir over ponderosa pine and larch. The large number of trees in these denser stands creates higher moisture demands than in the historic, fire-maintained open stands. This higher moisture demand stresses trees during drought years, and predisposes stands to bark beetle outbreaks. During drought years, this can result in high levels of mortality among the old trees in these dense stands (Arno 1996, Fiedler 1996).

Dense Douglas-fir and grand fir are also more susceptible to root diseases and bark beetles than historic forest structures. Compared to the historic forest, dense Douglas-fir / grand fir stands on dry sites have a lower probability of surviving long enough to become old growth. Those dry site fir stands that do get old enough are less likely to be as resilient as the historic old growth structures (Hessburg and Agee 2003). In addition, during fires the dense small trees in the understory serve as fuel ladders that carry flames into the upper canopy of large old trees. This new situation increases the risk of stand-replacing crown fire, which will kill old trees that historically were able to survive surface fires. Decades of fire suppression on dry sites have transformed stand structures in a way

that threatens the continued existence of old growth on these dry sites and reduces the chance that younger stands will survive long enough to become old growth.

On these dry sites, hands-off management of existing overly dense mature and immature fir-dominated stands is not likely to increase the amount of future old growth. Active restoration by mimicking of historic disturbance processes may be necessary to meet Forest Plan standard for maintaining old growth on dry habitat types. In those places where we find dry site old growth stands with unnatural in-growth of dense smaller trees (particularly firs), we may consider restoration opportunities. Restoration may include various mixes of prescribed fire, thinning, and planting of historic shade-intolerant, fire-adapted tree species. The existing large old trees will be retained. In existing old growth, the driving objectives will be maintenance of old growth characteristics, and restoration of historic old growth structures and processes. In mature and immature stands where old growth and fire-adapted species are lacking, restoration activities may be necessary to create forests that are more likely to survive long enough to become old growth.

10f. One or more old-growth stands per old growth unit should be 300 acres or larger. Preferences should be given to a contiguous stand; however, the stand may be subdivided into stands of 100 acres or larger if the stands are within one mile. The remaining old growth management stands should be at least 25 acres in size. Preferred size is 80 plus acres.

Within old growth management units (OGMUs) #17 and #18, **all old growth is being managed for retention.** Within these OGMUs there are no old growth stands or combination of stands that are 300 acres or larger (see vegetation section of project file for old growth distribution).

10g. Roads should be planned to avoid old growth management stands to maintain unit size criteria.

There is no road construction planned through old growth stands.

10h. A long-term objective should be to minimize or exclude domestic grazing within old growth stands.

The proposed activities do not include domestic grazing allotments. There are currently no grazing allotments in the area, and it is unlikely that grazing would occur in the project area. This standard would be met by all alternatives.

10i. Goals for lands to be managed as old growth within those lands suitable for timber production are identified in the management area prescriptions.

Forest Plan Standard 10i presents “goals for lands to be managed as old-growth” within some of the timber production Management Areas. Only the four Management Areas have specific Forest Plan old growth goals. The table below displays both those goals by management area, and what we have currently allocated for old growth. Current old growth allocations on the IPNF meet and far exceed these Forest Plan goals.

Table C-4. Acres of allocated old growth on the IPNF compared to management area goal

Management Area	Management Area goal: "Maintain approximately *xxxxx* acres"	Allocated Old Growth acres
1	25,000	97,453
2	6,000	21,644
3	400	1,880
4	4,000	13,485

No stands of allocated old growth are proposed for harvest. One dry site stand of potential old growth ponderosa pine is proposed for underburning to maintain the old growth characteristics of this stand. All standards would be met in action alternatives in the West Gold analysis area. (see vegetation section of project file for location of and a review of old growth in the West Gold project).

Appendix D – Cumulative Effects Analysis Information

In *Lands Council v. Powell*, the U.S. Court of Appeals for the 9th Circuit held that, under the circumstances presented in the case, proper cumulative impact analysis required some cataloging of past projects and their effect on the current project area. Furthermore, such cataloguing should provide sufficient detail to allow for analysis of the differences between prior projects and proposed projects, which could provide the information necessary to consider alternatives that might have less impact on the environment.

Within this DSEIS, we have provided information concerning relevant past, present and reasonably foreseeable projects and activities that have occurred, are occurring, or are proposed to occur within each of the resource cumulative effects areas examined in this analysis (see Chapter 1 and Figure D-1). Additionally, an adequately detailed discussion of the effects of these past, ongoing, and reasonably foreseeable activities has been provided in Chapter 3 to promote an informed assessment of environmental considerations.

The Council on Environmental Quality (CEQ), whose responsibility it is to coordinate federal environmental efforts and work closely with agencies and other White House offices in the development of environmental policies and initiatives, has provided guidance to federal agencies on the consideration of past actions in cumulative effects analysis (CEQ 2005)[1]. CEQ stated that "generally, agencies can conduct an adequate cumulative effects analysis by focusing on the current aggregate effects of past actions without delving into the historic details of individual past actions" (CEQ 2005 p. 2). Cumulative impact is defined in CEQ's NEPA regulations as the "impact on the environment that results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions…" (40 CFR 1508.7). CEQ has interpreted this regulation as referring only to the cumulative impact of the direct and indirect effects of the proposed action and its alternatives when added to the aggregate effects of past, present, and reasonably foreseeable future actions (CEQ 2005 p. 2).

During the preparation of the DSEIS, the Forest Service determined what information regarding past actions was useful and relevant to the analysis of cumulative effects. While CEQ found that cataloging past actions and specific information about the direct and indirect effects of a past project's design and implementation could in some contexts be useful to predict the cumulative effects of the proposal, the regulations do not require the Forest Service to catalog or exhaustively list and analyze all individual past actions (CEQ 2005 p. 3).

This DSEIS has provided a description of known past activities and their effects; however, due to the marked difference between past and current land management practices and policies, this analysis did not further aid in assessing whether one form or another of the proposed activities would assist in meeting the project's purpose and need for action with minimal environmental harm. The evolution that has occurred in land management practices is the result of science and

[1] CEQ Memorandum to the Heads of Federal Agencies regarding Guidance on the Consideration of Past Actions in Cumulative Effects Analysis, June 24, 2005.

our ongoing monitoring actions. The following discussion explains how past forest management activities have changed over time.

On the forest, early to mid 20th century road construction activities focused construction mainly through river valleys, riparian areas, floodplains, and adjacent hillsides. The roads efficiently provided access but decreased the land's effectiveness as wildlife habitat and constricted stream channels, while providing a new avenue for erosion and discharge of sediment into streams. Roads on national forest lands often were simply an expansion of existing trails and paths that provided access so that they would accommodate newer equipment and current land uses. In some situations, roads were developed on abandoned railroad beds. In both cases, the location and design were predetermined from the previous use and era. As time progressed, roads were "designed" and located to achieve their primary purpose, which was to provide access and haul product at a minimal cost. In the decades following World War II (1950s –'70s), the road network was rapidly expanded to support the domestic need for lumber in housing construction.

Over the last twenty years, both road design and location have evolved as necessary tools to not only provide efficient access; but also to protect the valuable watershed resources they encroached upon. Forest Service Best Management Practices (BMPs) (FSH 2509.22 Soil and Water Conservation Practices Handbook) currently incorporated into road construction/reconstruction activities on the forest include:

- Road surfacing (gravel, etc…) was incorporated to not only provide better trafficability; but also to prevent and control erosion from the road surface.
- Road drainage controls are now being incorporated into designs that:
    - Reduce the erosive flows in ditches by providing frequent cross-drains to relieve ditch flows;
    - Avoid water movement down the road by dispersing the drainage quickly by crowning or outsloping the road surface;
    - Stabilize ditches by lining; and
    - Disperse drainage water (that often carries sediment) onto stable forested slopes before ditches discharge into waterways.
    - Allow new and existing stream crossings to safely pass extreme events (i.e. 100 year flood event).
- Special construction techniques and designs have been utilized (i.e., full- or partial-benching of roads) to avoid unstable side casting of waste materials; windrowing clearing slash to prevent sediment delivery to streams from construction activities themselves as well as from erosion of road fills and treads that are not yet protected with erosion control vegetation.
- Some roads now are designed to take advantage of the non-uniformities of the slopes they cross by "rolling grades" and grade breaks to prevent the potential for accumulations of water or excessive ditchflows that have destabilized the road bed or cause surface erosion in the past.
- Designers and planners develop road networks that avoid highly erosive or unstable slopes utilizing the *land system inventory*, hydrologists, soil scientists, and geotechnical engineers.

- Road crossings are being located at more stable sites and crossing designs are now considering water quality and fish passage as primary design criteria, rather than criteria that just account for costs and traffic efficiency.
- Roads are being located well away from streams and their riparian areas where ever practicable; and the number of crossing sites is being minimized. These features are in stark contrast to past road locations that sometimes resulted in chronic sources of sediments, extended exposure of streams to direct sunlight resulting in temperature elevations, and nearly permanent reductions of the replacement sources of the structural components of streams and aquatic cover, riparian deadfall.
- In the past, when a road's utility ended, the road was simply abandoned. These abandoned roads have been a substantial water quality and slope stability issue as they have deteriorated, especially without any maintenance. Current practice is to restore key abandoned or no longer useful roads to a "hydrologically neutral" condition where its remnants are self-maintaining and are no longer disturbing slope stability or the movement of slope water, either on or below the soil surface or the natural functions and adjustments of streams, wetlands, and other water bodies.

Impacts to forest water and soil resources from logging practices and road activities have also been reduced over the past 20 years with the introduction of Best Management Practices (BMPs) and Inland Native Fish Strategy (INFS) management direction. Based on research studies, current BMPs and INFS Riparian Habitat Conservation Areas (RHCAs) can reduce sediment yields compared with historical practices (Quigley and Arbelbide 1997a, USDA Forest Service 1995).

In 1972, Section 208 of the Clean Water Act Amendments established the regulatory framework for non-point source pollution control thorough use of BMPs. BMPs are defined in Idaho as a practice or combination of practices determined to be the most effective and practicable means of preventing or reducing the amount of pollution generated by non-point sources (IDAPA 20.02.01). BMP monitoring is annually conducted by the forest to validate the implementation and effectiveness of BMPs associated with land management activities. Monitoring results are used to adapt future management actions where improvements in meeting water quality objectives are indicated. Forest monitoring of BMPs indicates that in most cases they continue to function as expected and are meeting their intent (USDA Forest Service 2002b, 2003, 2004).

At the time the IPNF Forest Plan was written (1987), the emphasis was on developing a commodity production strategy while minimizing impacts to watersheds and aquatic resources, including fish. The strategy for watershed management was constructed in the forest plan as a "maintenance" objective. In some situations, thresholds, or "minimum impact" standards defined the criteria for maintenance. To ensure that watersheds and aquatic resources were maintained during forest management activities, BMPs were applied. Despite the existing forest plan standards and BMPs, the condition of fish habitat on the forest was declining, primarily due to timber harvest and road building activities (USDA Forest Service 1992).

In 1995, the forest plan was amended to include INFS management direction (USDA Forest Service 1995). The implementation of INFS gave greater protection to aquatic resources, especially riparian-dependent systems. The management direction provided by the INFS amendment is designed to protect and maintain the structure and function of riparian and aquatic systems. INFS contains goals for healthy, functioning watersheds, riparian areas, and associated fish habitats; Riparian Management Objectives (RMOs), and performance-based standards and guidelines for land management activities (i.e., timber, roads, grazing, recreation, minerals,

fire/fuels, lands, riparian area management, watershed restoration, fisheries and wildlife restoration). Instead of allowing some "acceptable" level of effects on riparian and aquatic systems, INFS aims to protect aquatic resources from detrimental effects. INFS gives riparian-dependent resources priority over other resources in the Riparian Habitat Conservation Areas (RHCAs), so that while RHCAs are not "lock out" zones, activities that occur in them must either benefit riparian and aquatic resources or at least "not slow the rate of recovery below the near natural rate of recovery if no additional human caused disturbance was placed on the system" (USDA Forest Service 1995). Incorporation of the INFS management direction into the forest plan has led to improvement in the condition of aquatic resources by offering greater protections to the critical riparian areas. In addition, INFS allows for and encourages watershed restoration. Restoration has occurred over the years across the IPNF. Over 1,300 miles of roads have been decommissioned on the IPNF from 1991-2003 (USDA Forest Service 2003).

Harvest methods and removal of timber products from the national forest has changed substantially over time. Early harvest methods (1950s, '60s, and '70s) focused primarily on financial objectives of providing low cost wood products. Harvest placement often occurred in the highest volume, easily accessible stands. Timber harvest often occurred within riparian areas and adjacent to streams. Most of the harvest prescriptions were primarily designed to produce healthy young stands with shorter rotation ages.

Modern timber harvest prescriptions and design emphasizes desired conditions of the forest after the harvest. This usually results in the retention of various amounts of trees in a post-harvest stand, addressing objectives that may include wildlife habitat, watershed conditions, hazardous fuels, visual quality, soil productivity, forest health and others. On sites determined suitable for timber production, timber harvest may also produce timber products on a regulated basis while compatible with these other resource objectives and values. Some examples where timber production and resource objectives can be achieved simultaneously are:

- Reducing tree densities to decrease bark beetle hazard, thereby prolonging the development of the forest and maintaining tree cover
- Managing tree canopies to limit fire spread from the forest floor to the tree crowns
- Developing flamulated owl habitat in ponderosa pine forest through removal of smaller stems crowding larger trees, thereby providing more room to grow for the remaining trees, and open stand conditions favored by the owl
- Designing harvest patterns across the landscape to facilitate wildlife movement, such as providing corridors and preserving travel routes for ungulates. Also, using harvest prescriptions and landscape patterns as part of a wildfire hazard reduction strategy
- Increasing the amount of native western white pine, western larch and ponderosa pine, which generally are insect and disease resistant and are long-lived, as well as increasing western red cedar in valley bottoms, where it historically was more abundant than today
- Using variable retention harvests to meet visual management objectives

Other elements of modern harvest prescriptions that address specific resource objectives include retention of snags for cavity nesters, retention of down wood for soil nutrition and wildlife habitat, maintaining sediment-filtering vegetation near riparian areas, and maintaining vegetation diversity through hardwood retention and protection of rare plants.

Increased environmental awareness has also lead to improvements in logging systems that we use to remove trees from the forest. Early harvests emphasized cheap, labor intensive logging

methods, such as railroad, horse, short distance jammer systems, and tractor logging. Logging systems were selected primarily by the least expensive method to transport the trees from the forest to the mill. This sometimes involved harvesting on steep slopes, creating excessive soil disturbance and increasing the risk of erosion. Streams were sometimes used as a method to transport logs from the harvest site, causing impacts to the aquatic system and adjacent riparian habitat. Road systems were sometimes dense (ten miles/square mile) to facilitate rapid and inexpensive removals, in some cases compromising water quality.

Today's logging systems recognize and reduce the threat of environment harm in a number of ways. Tractor logging generally occurs on slopes 35 percent or less, and is limited to designated locations, reducing soil impacts. Skyline and other cable yarding systems are used on steeper slopes, which greatly reduces the amount of soil disturbance. Increasingly, helicopter logging is used, which extends yarding distances and thereby reduces road densities. A suite of best management practices and forest plan standards and guidelines aids in the development of the least impactive design possible. Monitoring during and after the sale is completed provides a valuable feedback loop that quickly identifies and corrects variances should they occur.

The forest ceased regeneration harvest of allocated old growth stands a number of years ago. Presently, our focus is on maintaining the old growth stands that we have and allocating additional stands for future old growth as they mature. On drier sites, restoration of old growth may include various mixes of prescribed fire, and thinning to restore historic more open old growth stand structures and reduce risk of stand replacing fire. Planting of shade-intolerant, fire-adapted species may also be done if these are in short supply. On these dry sites, our objective is to restore and sustain the old growth by retaining the large old trees, preserving the old growth characteristics, and restoring historic old growth structures and processes (USDA Forest Service 2003, USDA Forest Service 2004, Quigley and Arbelbide 1997).

For the above stated reasons, changes in road construction/reconstruction and maintenance practices; implementation of INFS management direction and watershed BMPs; and changes in harvest practices and objectives, an individual analysis of past projects cannot be clearly compared to analysis of the proposed actions.

However, for most resources analyzed, the effects of past actions are accounted for in the discussion of the existing condition. Additionally, the effects of past actions that are similar to activities proposed are discussed when they would be useful in describing the possible effects of the proposed action.

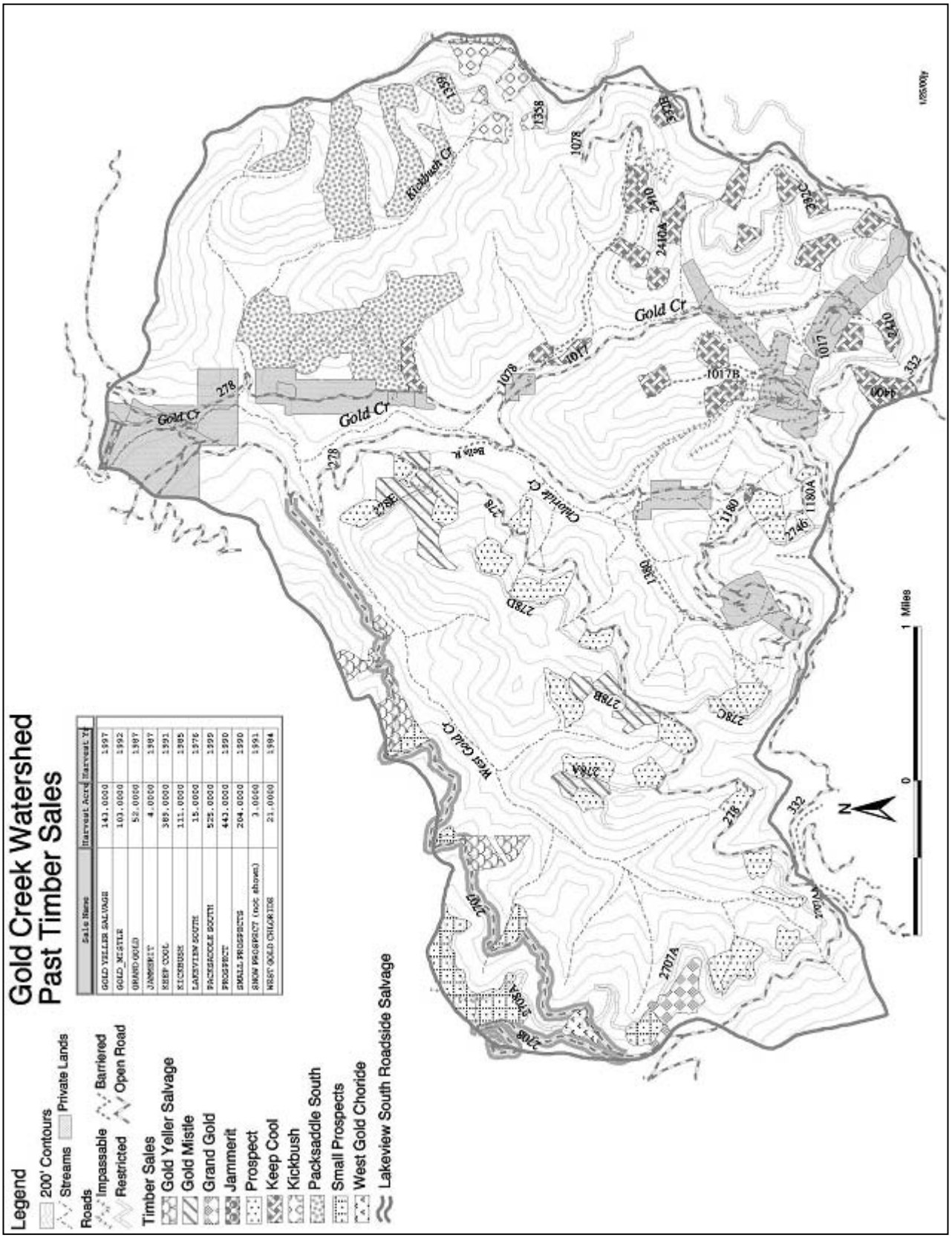


Figure D-1. Past Timber Sales in the Gold Creek Watershed

Appendix E - References

This appendix includes references and literature cited in the EIS and/or the project file.

Abella, Scott R. and Neil W. MacDonald. 2000. Intense burns may reduce spotted knapweed germination. *In:* Ecological Restoration. 18(2): 203-204. *In:* Fire Effects Information System. An online database at http://www.fs.fed.us/database/feis/plants/forb/cenmac/all.html.

Acheson, Stanich and Story. November 2000. Describing air resource impacts from prescribed fire projects In NEPA documents for Montana and Idaho in Region 1 and Region 4. USDA Forest Service. Available at the Sandpoint Ranger District.

Allen, Michael F. 1991. The ecology of mycorrhizae. Cambridge University Press. Cambridge, U.K. p. 132.

Allen, Karen and Katherine Hansen. 1999. Geography of exotic plants adjacent to campgrounds, Yellowstone National Park, USA. *In:* The Great Basin Naturalist. 59(4):315-322. *In:* Fire Effects Information System. An online database at http://www.fs.fed.us/database/feis/plants/forb/cenmac/all.html.

Amaranthus, M.P.; J.M. Trappe and R.J. Molina. 1989. Long-term forest productivity and the living soil. *In*: Maintaining the long-term productivity of Pacific Northwest forest ecosystems. D.A. Perry, ed. pp. 36-49.

Anderson, Hal E. 1982. Aids to determining fuel models for estimating fire behavior. Gen. Tech. Rep. INT-GTR-122, April 1982. USDA Forest Service Intermountain Forest and Range Experiment Station. Ogden, Utah.

Arno, Stephen F. 1996. The concept: restoring ecological structure and process in ponderosa pine forests. *In*: Hardy, Colin C. and Stephen F. Arno, eds. 1996. The use of fire in forest restoration. Gen. Tech. Rep. INT-GTR-341. U.S. Department of Agriculture Forest Service Intermountain Research Station. Ogden, Utah. pp. 37-38.

Arno, Stephen F.; Helen Y. Smith and Michael A. Krebs. 1997. Old growth ponderosa pine and western larch stand structures: influences of pre-1900 fires and fire exclusion. Research Paper INT-RP-495. USDA Forest Service Intermountain Research Station. 19 pp.

Arno, Stephen F. 1999. Undergrowth response, shelterwood cutting unit. *In:* Smith, Helen Y. and Stephen F. Arno, eds. Wildland fire in ecosystems: effects of fire on flora. General Technical Report RMRS-GTR-42-vol. 2. USDA Forest Service Rocky Mountain Research Station. Ogden, UT. pp. 97-120. *In*: Fire Effects Information System. An online database at http://www.fs.fed.us/database/feis/plants/forb/cenmac/all.html.

Baker, T.G.; G.M. Will and G.R. Oliver. 1989. Nutrient release from silvicultural slash: leaching and decomposition of *Pinus radiata* needles. Forest Ecology and Management. (27):53-60.

Balda, R. P.; W. S. Gaud and J. D. Brawn. 1983. Predictive models for snag nesting birds. In Snag Habitat Management. General Technical Report RM-GTR-99. USDA Forest

Service, Rocky Mountain Range and Experiment Station. *In*: Ghalambor, C. 2003. Conservation assessment of the pygmy nuthatch in the Black Hills National Forest, South Dakota and Wyoming. USDA Forest Service, Rocky Mountain Region.

Barber, B.L. and D.H. Van Lear. 1984. Weight loss and nutrient dynamics in decomposing woody Loblolly pine logging slash. Soil Science Society of America. (48):906-910.

Bedunah, Don and Jeff Carpenter. 1989. Plant community response following spotted knapweed (*Centaurea maculosa*) control on three elk winter ranges in western Montana. *In:* Fay, Peter K.; Lacey, John R., eds. Proceedings of the knapweed symposium; 1989 April 4-5; Bozeman, MT. Montana State University: 205-212. *In*: Fire Effects Information System. An online database at http://www.fs.fed.us/database/feis/plants/forb/cenmac/all.html.

Belt, G.H.; J. O'Laughlin and T. Merrill. 1992. Design of forest riparian buffer strips for the protection of water quality: analysis of scientific literature. Idaho Forest, Wildlife and Range Policy Analysis Group. Report No. 8.

Benda, L. and T. Dunne. 1997. Stochastic forcing of sediment supply to channel networks from landsliding and debris flows. Water Resources Research. 33(12):2849-2863.

Benda, L. and T. Dunne. 1997a. Stochastic forcing of sediment routing and storage in channel networks. Water Resources Research. 33(12):2865-2880.

Berris, S. N. and R. D. Harr. 1987. Comparative snow accumulation and melt during rainfall in forested and clear-cut plots in the western Cascades of Oregon. *In*: Water Resources Research. 23(1):135-142.

Beschta, R.L. 1978. Long-term patterns of sediment production following road construction and logging in the Oregon Coast Range. Water Resources Research. 14(6):1011-1016.

Bilby, R.E. and G.E. Likens. 1980. Importance of organic debris dams in the structure and function of stream ecosystems. Ecology. 61(5):1107-1113.

Bilby, Robert E.; Kathleen Sullivan and Stanley H. Duncan. 1989. The generation and fate of road-surface sediment in forested watersheds in southwestern Washington. *In*: Forest Science. 35(2):453-468.

Bisson, P.A. and J.R. Sedell. 1982. Salmonid populations in streams in clearcut vs. old growth forests of western Washington. *In*: Meehan, W.R., T.R. Merrall, J.W. Matthews Eds. Fish and Wildlife Relationships in Old-Growth Forests. Proceedings of a Symposium. Amer. Inst. Fish. Res. Bios. pp 121-130.

Bjornn, T.C. and D.W. Reiser. 1991. Habitat requirements of salmonids in streams. *In:* W. R. Meehan, editor. Influences of forest and rangeland management on salmonid fishes and their habitats. American Fisheries Society Special Publication 19. Bethesda, Maryland. pp 83-138.

Briese, D.T. 1996. Biological control of weeds and fire management in protected natural areas: are they compatible strategies? *In:* Biological Conservation. 77(2-3):135-142. *In*: Fire Effects Information System. An online database at http://www.fs.fed.us/database/feis/plants/forb/hypper/all.html.

Bull, E.L.; R.S. Holthausen and M. G. Henjum. 1990. Techniques for monitoring pileated woodpeckers. Gen. Tech. Rep. PNW-GTR-269. USDA Forest Service Pacific Northwest Research Station, Portland, Oregon. 13 pp.

Bull, E.L.; C.G. Parks and T.R. Torgersen. 1997. Trees and logs important to wildlife in the Interior Columbia River Basin. Gen. Tech. Rep. PNW-GTR-391. USDA Forest Service Pacific Northwest Research Station, Portland, Oregon. 28 pp.

Burroughs, E.R. and J.G. King. 1989. Reduction of soil erosion on forest roads. USDA Forest Service, Intermountain Research Station GTR-INT-264. 18 pp.

Burroughs, E.R.; F.J. Watts; J.G. King; D.F. Haber; D. Hansen and G. Flerchinger. 1983. Measurement of the relative effectiveness of rocked roads and ditches in reducing surface erosion, Rainy Day Road, Nez Perce National Forest, Idaho. 34 pp.

Byler, James and Robert L. James. 1997. Service trip report of forest health and root disease in the West Gold project area. Letter to the Sandpoint District Ranger dated July 31, 1997. Available in the project file.

Cacek, Charles C. 1989. The relationship of mass wasting to timber harvest activities in the Lightning Creek basin. Masters Thesis, Eastern Washington University.

Campbell, M.H. and E.S. Delfosse. 1984. The biology of Australian weeds. 13. *Hypericum perforatum* L. *In:* The Journal of the Australian Institute of Agricultural Science. 50(2):63-73. *In:* Fire Effects Information System. An online database at http://www.fs.fed.us/database/feis/plants/forb/hypper/all.html.

Carr, William. 1989. An evaluation of forest soil tillage using the winged subsoiler on landings in the Prince George Forest District: A pilot study. Contract report for the Silviculture Branch, Ministry of Forests, Victoria, British Columbia. 24 pp.

Cassirer, E. Frances; J.D. Reichel; R.L. Wallen and E.C. Atkinson. 1996. Harlequin Duck (*Histrionicus histrionicus*) USDA Forest Service/Bureau of Land Management habitat conservation assessment and conservation strategy for the U.S. Rocky Mountains.

Cassirer, F.E. 1995. Harlequin duck monitoring in northern Idaho, 1995. Idaho Dept. of Fish and Game, Boise, Idaho. 19 pp.

Chamberlin, T.W.; R.D. Harr and F.H. Everest. 1991. Timber harvesting, silviculture, and watershed processes. *In*: William R. Meehan, eds. Influences of forest and rangeland management on salmonid fishes and their habitats. American Fisheries Society Special Publication 19:181-205. Bethesda, Maryland.

Chapman, D.W. 1988. Critical review of variables used to define effects of fines in redds of large salmonids. Transactions of the American Fisheries Society. 117(1):1-21.

Christensen, A.G.; J.L. Lyon and J. W. Unsworth. 1993. Elk management in the Northern Region: considerations in forest plan updates or revisions. Gen. Tech. Rep. INT-303. USDA Forest Service, Intermountain Research Station, Ogden, Utah. 10 pp.

Clark, L.R. and R.N. Sampson. 1995. Forest ecosystem health in the inland west: A Science and Policy Reader. Forest Policy Center, Washington D.C. 37 pp.

Clark, T.W., A.H. Harvey, R.D. Dorn, D.L. Genter and Groves, eds. 1989. Rare, sensitive and threatened species of the greater Yellowstone ecosystem. Northern Rockies Conservation Cooperative, Montana Natural Heritage Program, the Nature Conservancy and Mountain West Environmental Services. 153 pp.

Cohen, Jack D. 1999. Reducing the wildland fire threat to homes. Where and how much? Gen Tech Rep. PSW-GTR-173. Rocky Mountain Research Station. Missoula, Montana.

Cole, P. 2000. Wildlife biologist for the Idaho Department of Fish and Game. Telephone communication with David Roberts, project wildlife biologist.

Cook, M.J. and J.G. King. 1983. Construction cost and erosion control effectiveness of filter windrows on fill slopes. USDA Forest Service, Intermountain Forest and Range Experiment Station. Research Note INT-335. 5 pp.

Cooper, Stephen et al. 1991. Forest habitat types of north Idaho: a second approximation. Gen. Tech. Rep. INT-GTR-236. USDA Forest Service Intermountain Research Station. Ogden, Utah. 135 pp.

Copeland, J. P. 1996. Biology of the wolverine in Central Idaho. M.S. Thesis, University of Idaho, Moscow, ID. 138 pp.

Copstead, Ronald L.; David Kim Johansen and Jeffry Moll. 1998. Water/road interaction: introduction to surface cross drains. USDA Forest Service San Dimas Technology and Development Center. San Dimas, California.

Council on Environmental Quality. 2005. Memorandum to the Heads of Federal Agencies regarding Guidance on the Consideration of Past Actions in Cumulative Effects Analysis. 5 pages.

Crane, M. F. and William C. Fischer. 1986. Fire ecology of the forest habitat types of central Idaho. General Technical Report INT-218. USDA Forest Service Intermountain Research Station. Ogden, UT. 85 pp. *In*: Fire Effects Information System. Species profile for oceanspray (*Holodiscus discolor*). Online at http://www.fs.fed.us/database/feis/plants/shrub/holdis/all.html.

Crenshaw, J. G. 1987. Effects of the Cabinet Gorge Kokanee Hatchery on wintering bald eagles in the lower Clark Fork River and Lake Pend Oreille, Idaho. U.S. Department of Energy, Bonneville Power Administration. Portland, Oregon. 82 pp.

Cross, D. 1992. Status of bull trout on the Idaho Panhandle National Forests. 4 pages.

Dahlgren, Dorothy and Simmone Caronneau Kincaid. 1991. In all the West, no place like this. A Pictorial History of the Coeur d'Alene Region. Museum of North Idaho. 227 pp.

Dambacher, J.M. and K.K. Jones. 1995. Stream habitat of juvenile bull trout populations in Oregon and bench marks for habitat quality. Oregon Department of Fish and Wildlife, Research and Development Sections.

DeBano, L.F. 1981. Water repellent soils: a state-of-the-art. Gen. Tech. Rep. PSW-46. USDA Forest Service Pacific Southwest Forest and Range Experiment Station. Berkeley, California. 21 pp.

DeBano, L.F. 1991. The effect of fire on soil properties. *In:* Proceedings--Management and Productivity of Western Montane Forest Soils. Harvey, A and L. Neuenschwander, compilers. Gen. Tech. Rep. INT-280. USDA Forest Service Intermountain Research Station. pp. 151-155.

DiTomaso, Joseph M. 2000. Invasive weeds in rangelands: species, impacts, and management. In: Weed Science. 48(2)255-265. *In:* Fire Effects Information System. An online database at http://www.fs.fed.us/database/feis/plants/forb/cenmac/all.html.

Drlik, T.; I. Woo and S. Swiadon, editors. 1998. Integrated vegetation management guide. Bio-Integral Resource Center. Berkeley, California. 16 pp.

Duncan, S.H.; R.E. Bilby; J.W. Ward and J.T. Heffner. 1987. Transport of road surface sediment through ephemeral stream channels. *In*: Water Resources Bulletin. 23(1):113-119.

Dykstra P. and M. Curran. 2002. Skid road recontouring in British Columbia: 7-yr. tree growth results. Res. Br. B.C. Min. For. Victoria, B.C. Tech Rep. 001.

Edmonds, R.L. 1987. Decomposition rates and nutrient dynamics in small diameter woody litter in four ecosystems in Washington, USA. Canadian Journal of Forest Resources. 17:449-509.

Elliot, William J. and David E. Hall. 1997. Water Erosion Prediction Project (WEPP) Forest Applications. USDA Forest Service, Intermountain Research Station General Technical Report. March 1997.

Ellis, Mark W.; Ronald J. Taylor and Richy Harrod. 1999. The reproductive biology and host specificity of *Orobanche pinorum* Geyer (Orobanchaceae). *In*: Madrono. (46)1:7-12.

Ellison, L.E.; M.B. Wunder; C.A. Jones; C. Mosch; K.W. Navo; K. Peckham; J.E. Burghardt; J. Annear; R. West; J. Siemers; R.A. Adams and E. Brekke. 2004. Colorado bat conservation plan. Colorado Committee of the Western Bat Working Group.

Engle, J.C. and C.E. Harris. 2001. Idaho species of special concern element state rankings reviews. Non-game and endangered wildlife program, Conservation Data Center, Idaho Department of Fish and Game. Boise, ID. *In:* Draft conservation of species at risk in the Northern Region. 2004. USDA Forest Service Northern Region.

Evans, David and Associates. 2005. Conservation assessment of eleven sensitive moonworts (Ophioglossaceae; *Botrychium* subgenus *Botrychium*) on the Idaho Panhandle National Forests. Spokane, Washington.

Everest, F.H.; R.L. Beschta; J.C. Scrivener; K.V. Koski; J.R. Sedell and C.J. Cederholm. 1987. Fine sediment and salmonid production: a paradox. Pages 97-142. *In*: Salo, E. O. and T. W. Cundy, editors. Streamside management: Forestry and fishery interactions. University of Washington, Institute of Forest Resources. Contribution No. 57. Seattle, Washington.

Executive Order 13112. 1999. Invasive species. Order by President Bill Clinton to prevent the introduction of invasive species and provide for their control. Signed February 3, 1999. Washington D.C.

Fiedler, Carl E. and Dennis A. Lloyd. 1992. Autecology and synecology of western larch. *In*: Ecology and management of Larix forests: a look ahead. Proceedings of an international symposium. Compilers: Wyman C. Schmidt and Kathy J. McDonals. USDA Forest Service Intermountain Research Station. Ogden, Utah. pp. 118-122.

Fiedler, Carl E. 1996. Silvicultural applications: restoring ecological structure and process in ponderosa pine forests. *In*: Hardy, Colin C. and Stephen F. Arno, eds. 1996. The use of fire in forest restoration. Gen. Tech. Rep. INT-GTR-341. U.S. Department of Agriculture Forest Service Intermountain Research Station. Ogden, Utah. pp. 39-40.

Fiedler, Carl E. et al. 2001. A strategic assessment of fire hazard in Montana. University of Montana School of Forestry. September 29 2001. Missoula, Montana.

Fins, Lauren, James Byler et al. 2001. Return of the giants – restoring white pine ecosystems by breeding and aggressive planting of blister rust-resistant white pines. Station Bulletin 72. University of Idaho. Moscow, Idaho. 20 pp.

Fire Effects Information System. 2005. Summaries of the biology, ecology and relationship of living organisms to fire. An online database at http://www.fs.fed.us/database/feis/index.html.

Flanagan, S.A.; M.J. Furniss; T.S. Ledwith; S. Thiesen; M. Love; K. Moore and J. Ory. 1998. Methods for inventory and environmental risk assessment of road drainage crossings. USDA Forest Service San Dimas Technology and Development Center. San Dimas, California.

Flatten, B. 2003. Determining appropriate winter logging conditions for protection of the soil resource. Okanogan and Wenatchee National Forests. Draft report.

Foltz, R.B. and M.A. Truebe. 1995. Effect of aggregate quality on sediment production from a forest road. Proceedings of the 6th International Conference on Low-Volume Roads, 1995 June 25-29, Minneapolis, MN. Washington, DC: National Academy Press. pp. 49-57.

Fraley, J.J. and B.B. Shepard. 1989. Life history, ecology and population status of migratory bull trout (*Salvelinus confluentus*) in the Flathead Lake and River system, Montana. *In*: Northwest Science. 63(4).

Froehlich, H.A., and D.H. McNabb. 1983. Minimizing soil compaction in Pacific Northwest forests. *In*: E.L. Stone (Ed.). Forest soils and treatment. impacts. Proceedings of 6th North Am. Forest Soils Conference. University of Tennessee Conference. Knoxville, Tennessee. pp. 159-192.

Froehlich, H.A.; D.W.R. Miles and R.W. Robbins. 1985. Soil bulk density recovery on compacted skid trails in central Idaho. Soil Science Society of America. (49):1015-1017.

Fulwider, Edwin. 1993. Caro Lou the miner's daughter: a memoir of the Lakeview Mining District Lakeview Idaho. The Keepsake Press. Green Valley, Arizona. Chapter 3, page 1.

Garrison, M.T. and J.A. Moore. 1998. Nutrient management: a summary and review. *In*: Intermountain Forest Tree Nutrition Cooperative Supplemental Report. (98):5.

Garrison-Johnston, M.T.; J.A Moore and G.J. Niehoff. 2003. Douglas-fir beetle infestations are associated with certain rock and stand types in the inland Northwestern United States. Environmental Entomology. 32(6):1364-1369.

Garrison-Johnston, M.T.; T.M. Shaw; L.R. Johnson and P.G. Mika. 2004. Intermountain Forest Tree Nutrition Cooperative, Presentation at the Potassium Meeting. April 23, 2004. Idaho Panhandle National Forests. Coeur d'Alene, Idaho.

Ghalambor, C. 2003. Conservation assessment of the pygmy nuthatch in the Black Hills National Forest, South Dakota and Wyoming. USDA Forest Service, Rocky Mountain Region.

Goetz, F. 1989. Biology of the bull trout, *Salvelinus confluentus*, a literature review of bull trout. Eugene, Oregon. USDA Forest Service, Willamette National Forest. 53 pp. *[as cited in]* Rieman, B. E. and J. D. McIntyre. 1993. Demographic and habitat requirements of conservation General Technical Report INT-302. USDA Forest Service.

Goggans, Rebecca. 1985. Habitat use by flammulated owls in northeastern Oregon. Thesis submitted to Oregon State University. Corvallis, Oregon.

Golder Associates. 2006. Final report on Gold Creek and Chloride Gulch stream channel assessment. Coeur d'Alene, Idaho.

Gorman, O. T. and J. R. Karr. 1978. Habitat structure and stream fish communities. Ecology. 59(3): 507-515.

Graham, Harvey et al. 1992. Response of western larch to site preparation. In: Ecology and management of Larix forests: a look ahead. Proceedings of an international symposium. Compilers: Wyman C. Schmidt and Kathy J. McDonals. USDA Forest Service Intermountain Research Station. Ogden, Utah. pp. 185-191.

Graham, R.T.; A.E. Harvey; M.F. Jurgenson; T.B. Jain; J.R. Tonn and D.S. Page-Dumroese. 1994. Managing coarse woody debris in forests of the Rocky Mountains. Research paper INT-RP-477. USDA Forest Service Intermountain Research Station.

Graham, Russell T; R.L. Rodriquez; K.M. Paulin; R.L. Player; A.P. Heap and R. Williams. 1999. The northern goshawk in Utah: habitat assessment and management recommendations. Gen. Tech. Rep. RMRS-GTR-22. USDA Forest Service. Rocky Mountain Research Station. Ogden, Utah. 48 pp.

Graham, Russell T.; Alan E. Harvey; Theresa B. Jain and Jonalea R. Tonn. 1999a. The effects of thinning and similar stand treatments on fire behavior in western forests. PNW-GTR-463. 27 pp.

Graham, R.T.; S. McCaffrey and T.B. Jain, eds. 2004. Science basis for changing forest structure to modify wildfire behavior and severity. Research paper RMRS-GTR-120. USDA Forest Service Rocky Mountain Research Station.

Gray, D.H. and W.F. Megahan. 1981. Forest vegetation removal and slope stability in the Idaho batholith. Research Paper. INT-271. 23 pp.

Green, P.; J.D. Sirucek; W. Hann; A. Zack and B. Naumann. 1992. Old-growth forest types of the Northern Region. R-1 SES 4/92 (errata corrected 02/05). US Forest Service Northern Region. Missoula, MT.

Gucinski, Hermann; Michael J. Furniss; Robert R. Ziemer and Martha H. Brookes. 2001. Forest roads: a synthesis of scientific information. General Technical Report PNW-GTR-509. USDA Forest Service Pacific Northwest Research Station. Portland, Oregon. 103 pp.

Gunter, Donald. 2006. Personal communication with Anna Hammet, project botanist, regarding likelihood of a spring underburn in proposed Unit 26 reaching the riparian zone below the unit with no fireline constructed. Don Gunter is the project silviculturist.

Habeck, James. R. 1990. Old-growth ponderosa pine-western larch forests in western Montana: ecology and management. Northwest Environmental Journal Volume 6(2):271-291.

Hagle, Susan K. 2000. Personal communication with Don Gunter, project silviculturist, regarding root disease. Sue Hagle is a Northern Region Forest Pathologist.

Hagle, Susan K. 2000a. Root disease succession regimes. *In:* Hagle, S.; J. Schwandt; T. Johnson; S. Kegley; C. Bell Randall; J. Taylor; I. B. Lockman; N. Sturdevant and M. Marsden. 2000. Successional functions of pathogens and insects: Ecoregion Sections M332a and M333d in northern Idaho and western Montana. Volume 2: Results. R1-FHP-2000-11. Missoula, MT: USDA Forest Service, State and Private Forestry, Cooperative Forestry and Forest Health Protection, Northern Region.

Hagle, Susan K. et al. 2000c. Part 6: Results, Part 2: Successional trends. *In:* Hagle, S.; J. Schwandt; T. Johnson; S. Kegley; C. Bell Randall; J. Taylor; I. B. Lockman; N. Sturdevant and M. Marsden. 2000. Successional functions of pathogens and insects: Ecoregion Sections M332a and M333d in northern Idaho and western Montana. Volume 2: Results. R1-FHP-2000-11. Missoula, MT: USDA Forest Service, State and Private Forestry, Cooperative Forestry and Forest Health Protection, Northern Region.

Hagle, Susan K. 2002. Diseases, insects and forest succession. Draft submitted to Western Forester. November-December 2002. Society of American Foresters.

Hagle, Susan K. 2005. Personal communication with Don Gunter, project silviculturist; update on expected mortality by species, causes of mortality, and thinning effects relevant to the IPNF. Derived from permanent plot monitoring data. Sue Hagle is a Northern Region Forest Pathologist.

Hammet, Anna E. 1991-2005. Personal observations of the project botanist concerning earliest emergence of sensitive moonworts (*Botrychium* subgenus *Botrychium*) during 15 years of rare plant surveys and monitoring on the Kaniksu portion of the Idaho Panhandle National Forests.

Hammet, Anna E. 1999-2005. Personal observations of weed infestation levels on roads in the West Gold project area, noting an overall decline in population density of weed species along road prisms in the project area after initial and follow-up treatments. A summary is in the project file, Section F.

Hammet, Anna E. and Robert Klarich. 1996. Personal observations of project botanist (Hammet) and former Bonners Ferry weeds program manager (Klarich) that oxeye daisy

(*Leucanthemum vulgare*) has the potential to spread into areas that have experienced tree canopy reduction to below approximately 55 percent.

Han, Han-Sup; D. Page-Dumroese; S.K. Han and J. Tirocke. 2005. Effect of slash, machine passes, and soil wetness on soil strength in a cut-to-length harvest. USDA Forest Service Gen. Tech. Rep. PSW-GTR-194. 10 pp.

Harr, R.D. 1986. Effects of clearcutting on rain-on-snow runoff in western Oregon: A new look at old studies. Water Resource Research. 22(7):1095-1100.

Harrington, Michael G. 1996. Prescribed fire applications: restoring ecological structure and process in ponderosa pine forests. *In:* Hardy, Colin C. and Stephen F. Arno, eds. 1996. The use of fire in forest restoration. Gen. Tech. Rep. INT-GTR-341. U.S. Department of Agriculture Forest Service. Intermountain Research Station. Ogden, Utah. p. 41.

Harris, P. and R. Cranston. 1979. An economic evaluation of control methods for diffuse and spotted knapweed in western Canada. Canadian Journal of Plant Science. 59:375-382. *In*: Fire Effects Information System. An online database at http://www.fs.fed.us/database/feis/plants/forb/cenmac/all.html.

Harris, J.A. and A.M. Gill. 1997. History of the introduction and spread of St. John's wort (*Hypericum perforatum* L.) in Australia. *In:* Jupp, Paul W.; David T. Briese; Richard H. Groves, eds. St. John's wort: *Hypericum perforatum* L. - integrated control and management: Proceedings of a workshop; 1996 November 13-14. Canberra, Australia. *In*: Plant Protection Quarterly. 12(2):52-56. *In:* Fire Effects Information System. An online database at http://www.fs.fed.us/database/feis/plants/forb/hypper/all.html.

Harrison, R.D.; N.J. Chatterton and R.J. Page [and others]. 1996. Effects of nine introduced grasses on ecological biodiversity in the Columbia Basin. *In:* Rangelands in a sustainable biosphere: Proceedings, 5th international rangeland congress; 1995 July 23-28; Salt Lake City, UT and Denver, CO. *In:* Society for Range Management. pp. 211-212. *In*: Fire Effects Information System. An online database at http://www.fs.fed.us/database/feis/plants/forb/cenmac/all.html.

Harvey, Stephen J. and Robert M. Nowierski. 1989. Spotted knapweed: allelopathy or nutrient depletion? *In:* Fay, Peter K and John R. Lacey, eds. Proceedings: knapweed symposium; 1989 April 4-5. Montana State University. Bozeman, MT. p. 118. *In:* Fire Effects Information System. An online database at http://www.fs.fed.us/database/feis/plants/forb/cenmac/all.html.

Haupt, H.F. 1959. Road and slope characteristics affecting sediment movement from logging roads. Journal of Forestry. 57(5):329-332.

Hayward, G.D. and R.E. Escano. 1989. Goshawk nest-site characteristics in western Montana and northern Idaho. *In*: The Condor. 91:476-479.

Hayward, G.D. and J. Verner, tech. eds. 1994. Flammulated, boreal, and great gray owls in the United States: a technical conservation assessment. Gen. Tech. Rep. RM-253. USDA Forest Service Rocky Mountain Forest and Range Experiment Station. Fort Collins, Colorado. pp. 14-41.

Heidman, J. 1988. Regeneration strategies for ponderosa pine. In: Ponderosa pine – the species and its management. Symposium proceedings. David M/ Baumgartner and James E. Lotan, eds. Spokane, Washington.

Hejl, S.J. 1994. Human-induce changes in bird populations in coniferous forests in western North America during the past 100 years. Studies in Avian Biology. 15:232-246**.**

Hessburg, P.F. and J.K. Agee. 2003. An environmental narrative of inland northwest United States forests, 1800-2000. Forest Ecology and Management. 178:23-59.

Hessburg, P.F.; J.K. Agee; J.K. and J.F. Franklin. 2005. Dry forests and wildland fires of the inland northwest USA: contrasting the landscape ecology of the pre-settlement and modern eras. Fire Ecology and Management. 211:117-139.

Hickenbottom, Jennifer A.S. 2001. A comparative analysis of surface erosion and water runoff from existing and recontoured Forest Service Roads: O'Brien Creek Watershed. Master Thesis. University of Montana. Missoula, Montana.

Hilborn, R. and C.J. Walters. 1992. Quantitative fisheries stock assessment: choice, dynamics and uncertainty. Chapman and Hall. New York, New York. 570 pp.

Hitchcock, C. Leo; Arthur Cronquist; Marion Ownbey and J.W. Thompson. 1959. Vascular Plants of the Pacific Northwest. Part 4: Ericaceae through Campanulaceae. University of Washington Press. Seattle, Washington. Page 432.

Hobbs, Richard and Stella E. Humphries. 1995. An integrated approach to the ecology and management of plant invasions. *In:* Conservation Biology. 9(4):761-770.

Hoelscher, B. 1993. Pend Oreille Lake fishery assessment. Water Quality Status Report No. 102. Division of Environmental Quality. Boise, Idaho.

Howle, R. Richard and Ralph Ritcey. 1987. Distribution, habitat selection and densities of flammulated owls in British Columbia. *In:* Biology and conservation of northern forest owls. Symposium proceedings. Feb 3-7, 1987. Winnipeg, Manitoba.

Huffmann, E.L.; L.H. MacDonald and J.D. Stednick. 2001. Strength and persistence of fire-induced soil hydrophobicity under ponderosa and lodgepole pine, Colorado Front Range. Hydrological Processes. (15):2877-2892.

Hungerford, R.D. 1984. Native shrubs: suitability for revegetating road cuts in northwestern Montana. USDA Forest Service, Intermountain Forest and Range Experiment Station, Ogden, Utah. Research Paper INT-331. 13 pp.

Hutto, Richard L. 1995. USDA Forest Service Northern Region Songbird Monitoring Program Distribution and Habitat Relationships. USDA Forest Service contract #R1-95-05. Second Report. Division of Biological Sciences. University of Montana. Missoula, Montana. 21 pp.

ICDC. 2005. Idaho Dept. of Fish and Game Conservation Data Center. Element Occurrence Records contained in an electronic database. Boise, Idaho.

IDEQ. 2000. Gold Creek TMDL. Idaho Department of Environmental Quality. Boise, Idaho.

IDEQ. 2001. Idaho's 2000 Forest Practices Water Quality Audit. Final Report. Idaho Department of Environmental Quality. Boise, Idaho.

IDEQ. 2003. *Draft* Gold Creek Sediment Total Maximum Daily Load and Watershed Restoration Implementation Plan. March 2003. Idaho Department of Environmental Quality. Boise, Idaho.

IDEQ. 2005. Principles and Policies of the 2002 Integrated [303(d)/305(b)] Report. Idaho Department of Environmental Quality. Boise, Idaho.

IDEQ. 2006. Idaho Administrative Code IDAPA 58.01.02. Water Quality Standards. Idaho Department of Environmental Quality. Boise, Idaho.

IDFG. 1980. Letter to the Forest Supervisor for the Idaho Panhandle National Forests regarding management objectives for spring, summer and fall elk habitat. Idaho Department of Fish and Game. Boise, Idaho.

Idaho Lakeview Mine Tailings Operable Unit. 2002. Draft Engineering Evaluation/Cost Analysis. Idaho Panhandle National Forests. Bonner County, Idaho.

Idaho Partners in Flight. 2000. Idaho bird conservation plan. Version 1.0.

Intermountain Forest Industry Association in cooperation with Montana logging Association, Idaho Logging Safety, Associated Logging Contractors, Inc., Plum Creek, USDA Forest Service, Montana Department of State Lands and Idaho Department of Lands. 1995. Risk Assessment for Identifying Reserve Trees. Available at USDA Forest Service Northern Regional Office, Missoula, Montana.

Jakober, M.J. 1995. Autumn and winter movement and habitat use of resident bull trout and westslope cutthroat trout in Montana. Master's Thesis. Montana State University. Bozeman, Montana.

Johnson-Groh, C. L., and D. R. Farrar. 1989. [Abstract] Ecological monitoring of *Botrychium campestre* and a new species of *Botrychium* in western Minnesota. Unpublished report on file at: Idaho Department of Fish and Game, Conservation Data Center, Boise, ID.

Johnson-Groh, C. L., and D. R. Farrar. 1993. Population dynamics of prairie moonworts (*Botrychium* subgenus *Botrychium*) in Iowa and Minnesota (abstract). American Journal of Botany 80 (supplement): 109. *In*: Evans, David and Associates. 2005. Conservation assessment of eleven sensitive moonworts (Ophioglossaceae; *Botrychium* subgenus *Botrychium*) on the Idaho Panhandle National Forests. Spokane, Washington.

Johnson-Groh, C.L., and D.R. Farrar. 1996. [Abstract] Effects of leaf loss on moonwort ferns, *Botrychium* subgenus *Botrychium*. American Journal of Botany 83(Supple.): 127.

Johnson-Groh, C.L., and D.R. Farrar. 2003. *Botrychium* inventory and monitoring technical guide. Revised draft. Unpublished. 37pp.

Karr, J.R. and D.R. Dudley. 1981. Ecological perspectives on water quality goals. Environmental Management. (5):55-68.

Karr, J.R. and K.E. Freemark. 1983. Habitat selection and environmental gradients: dynamics in the "stable" tropics. Ecology. 64(6): 1481-1494.

Keinath, D.A. 2004. Fringed myotis (*Myotis thysanodes*): a technical conservation assessment. USDA Forest Service Rocky Mountain Region.

Keller, B. 2000. *Myotis thysanodes* (Fringed myotis): digital atlas of Idaho. Available online at http://imnh.isu.edu/digitalatlas/bio/mammal/mamfram.htm (accessed November 5, 2004).

Keppeler, E.T. 1998. The summer flow and water yield response to timber harvest. USDA Forest Service General Technical Report PSW-GTR-168. pp 35-53.

Kershner, J.L., PhD. 2001. Telephone conversation with S.F. Dekome, Forest Fish Biologist, on October 30, 2001. Dr. Kershner is the Aquatic Ecology Unit Leader (Washington Office, USDA Forest Service), and Associate Professor at Utah State University, Logan Utah.

Kilpatrick, C. 1987. Peregrine falcon habitat and potential reintroduction site survey of the Sandpoint Ranger District of the Idaho Panhandle National Forests. Unpublished report. 37 pp.

King, J.G. 1993. Streamflow and sediment yield responses to forest practices in north Idaho. Interior cedar-hemlock-white pine forests: ecology and management: symposium proceedings, March 2-4, 1003. Spokane, Washington, USA. Washington State University. Pullman, Washington. 1994. pp 213-220.

Kingery, H. and C.K. Ghalambor. 2001. Pygmy nuthatch (*Sitta pygmaea*). *In* The birds of North America. A. Poole and F. Gill, eds. Philadelphia, PA. *In:* Ghalambor, C. 2003. Conservation assessment of the pygmy nuthatch in the Black Hills National Forest, South Dakota and Wyoming. USDA Forest Service Rocky Mountain Region.

Kirchner, James W.; Robert C. Finkel; Clifford S. Riebe et al. 2001. Mountain erosion over 10 yr., 10 k.y. and 10 m.y. time scales. *In*: Geology. 29(7):591-594.

Knorr, O.A. 1961. The geographical and ecological distribution of the black swift in Colorado. Wilson Bulletin 73(2): 155-170.

Knorr, O.A. 1993. Black swift (*Cypseloides niger*) nesting site characteristics: some new insights. Avocetta 17: 139-140. *In:* Wiggins, D.A. 2004. Black swift (*Cypseloides niger*): a technical conservation assessment. USDA Forest Service. Rocky Mountain Region.

Kochenderfer, J.N. and J.D. Helvey. 1987. Using gravel to reduce soil losses from minimum standard forest roads. Journal of Soil and Water Conservation. 42(1):46-50.

Koehler G.M. and J.D. Brittell. 1990. Managing spruce-fir habitat for lynx and snowshoe hares. Journal of Forestry. 5 pp.

Krag, Raymond. 1991. Options for reducing soil disturbance during timber harvesting. *In:* Canadian Forest Industries, CPPA Woodlands Paper. October/November, 1991. pp. 60-64.

Kun, Peter. 1970. Geology of the Lakeview Mining District, Idaho. Master's Thesis, University of Idaho, Moscow, Idaho. page 78.

Kuntz, T. and R. Martin. 1982. *Plecotus townsedii*. Mammalian Species No. 175. American Soc. Mamm. 5 pp.

Lacey, John R.; Clayton B. Marlow and John R. Lane. 1989. Influence of spotted knapweed (*Centaurea maculosa*) on surface runoff and sediment yield. Weed Technology. 3(4):627-631. *In*: Fire Effects Information System. An online database at http://www.fs.fed.us/database/feis/plants/forb/cenmac/all.html.

Landsberg, Johanna. 1992. Effects of disruption of fire regimes on site productivity. *In*: Fire in Pacific Northwest Ecosystem: Exploring Emerging Issues. pp. 8-10.

Laskowski, R.; B. Berg; M. Johansson and C. McClaugherty. 1995. Release pattern for potassium from decomposing forest needle and leaf litter. Long-term decomposition in a Scots pine forest. Canadian Journal of Botany. (73):2019-2027.

Lee, D.C.; J.R. Sedell; B.E. Rieman; R.F. Thurow and J.E. Williams. 1997. Chapter 4: Broadscale assessment of aquatic species and habitats. *In*: Thomas M. Quigley and Sylvia J. Arbelbide, Technical Ed. An Assessment of Ecosystem Components in the Interior Columbia Basin and Portions of the Klamath and Great Basins, Vol. III. PNW GTR-405.

Leege, T.A. 1984. Guideline for evaluating and managing summer elk habitat in northern Idaho. Wildlife Bulletin No. 11. Idaho Department of Fish and Game.

LeJeune, Katherine D. and Timothy R. Seastedt. 2001. *Centaurea* species: the forb that won the west. Conservation Biology. 15(6):1568-1574.

Leptich, D.J. and P. Zager. 1991. Road access management effects on elk mortality and population dynamics. In: Christensen, A. G., L. J. Lyon, and T. N. Lonner; comps. Proceedings: elk vulnerability symposium. 1991. Montana State University, Bozeman, Montana. pp. 174-181.

Lesica, Peter. 1997. Demography of the endangered plant *Silene spaldingii* (Caryophyllaceae) in northwest Montana. *In:* Madrono 44(4): 347-358.

Lesica, Peter. 1999. Effects of fire on the demography of the endangered, geophytic herb *Silene spaldingii* (Caryophyllaceae). *In:* American Journal of Botany. 86(7):996-1002.

Lewis, Joseph W. Draft in progress. Mapping risk from forest insects and diseases. USDA Forest Service. Washington, D.C. 17 pp.

Lichthardt, J. 1995. Conservation strategy for *Allotropa viragta* (Candystick). U.S. Forest Service, Northern and Intermountain Regions. Idaho Department of Fish and Wildlife. Boise, ID. 26pp.

Lichthardt, J. 1997. Revised report on the conservation status of *Silene spaldingii* in Idaho. Idaho Department of Fish and Game Conservation Data Center. Boise, Idaho. Unpublished technical report.

Lichthardt, Juanita. 2003. Conservation strategy for clustered lady's-slipper orchid (*Cypripedium fasciculatum*) in US Forest Service Region 1. Idaho Conservation Data Center. Boise, Idaho.

Luce, C.H. 1997. Effectiveness of Road Ripping in Restoring Infiltration Capacity of Forest Roads. Restoration Ecology 5(3):265-270.

Lux, Dave. 2002. Personal communication between the District fire management officer and Rachel Docherty, project fire/fuels specialist, regarding burning of piles in the fall. February 13, 2002.

Lux, David. 2006. Personal communication with Anna E. Hammet, project botanist, concerning the potential for spring burning to occur when *Botrychium* species are likely to have emerged aboveground. Dave Lux is the District fire management officer.

MacDonald, L.H. and J.A. Hoffman. 1995. Causes of peak flows in northwestern Montana and northeastern Idaho. Water Resources Bulletin. 31(1):79-94.

Mack, C.M. and K. Laudon. 1998. Idaho wolf recovery program: recovery and management of gray wolves in Idaho. Progress Report 1995-1998. Nez Perce Tribe, Department of Wildlife Management, Lapwai, Idaho. 28 pp.

Maddox, D.M. 1979. The knapweeds: their economics and biological control in the western states, USA. *In*: Rangelands 1(4): 139-141. *In:* Fire Effects Information System. An online database at http://www.fs.fed.us/database/feis/plants/forb/cenmac/all.html.

Marin, Manuel. 1997. Some aspects of the breeding biology of the black swift. Wilson Bulletin 109(2): 290-306.

Maron, John L.; Montserrat Vila; Riccardo Bommarco; Sarah Elmendorf and Paul Beardsley. 2004. Rapid evolution of an invasive plant. *In*: Ecological Monographs. 74(2):261-280. *In*: Fire Effects Information System. An online database at http://www.fs.fed.us/database/feis/plants/forb/hypper/all.html.

Maxell, BE. 2000. Management of Montana's amphibians: a review of factors that may present a risk to population viability and accounts on the identification, distribution, taxonomy, habitat use, natural history, and the status and conservation of individual species. Report to USFS Region 1, Order Number 43-0343-0-0224. University of Montana, Wildlife Biology Program. Missoula, Montana. 161 pp.

MAXIM Engineering and Environmental Consultants. 2006. Final Conjecture mine engineering evaluation/cost analysis. Idaho Panhandle National Forests. Bonner County, Idaho.

McCaughey, W.W.; P.E. Farnes and K.J. Hansen. 1997. Historic role of fire in determining annual water yield from Tenderfoot Creek Experimental Forest, Montana, USA. 65th annual meeting, Western Snow Conference, May 4-8, 1997, Banff, Alberta, Canada: Joint meeting with the 54th annual Eastern Snow Conference.

McEllin, S.M. 1979. Nest sites and population demographies of white-breasted and pigmy (sic) nuthatches in Colorado. *In:* Condor. 90(3):348-352.

McGarigal, Ken and Barbara Marks. 1995. FRAGSTATS: spatial pattern analysis program for quantifying landscape structure. USDA Forest Service Pacific Northwest Research Station Gen. Tech. Rep. PNW-GTR-351.

McIver, James D. and Lynn Starr. 2000. Environmental effects of postfire logging: literature review and annotated bibliography. USDA Forest Service Pacific Northwest Research Station Gen. Tech. Rep. PNW-GTR-486.

Megahan, W.F.; N.F. Day and T.M. Bliss. 1978. Landslide occurrence in the western and central northern Rocky Mountain physiographic province in Idaho. *In:* C.T. Youngberg, ed. Forest soils and land use, Proceedings of the 5th North American Forest Soils Conference. Colorado State University. Ft. Collins, Colorado. pp. 116-139.

Megahan, W.F. 1983. The hydrologic effects of clearcutting and wildfire on steep granitic slopes in Idaho. Water Resources Research. 19(3).

Megahan, Walter F.; John P. Potyondi and Kathleen A. Seyedbagheri. 1992. Best management practices and cumulative effects from sedimentation in the South Fork Salmon River: an Idaho case study. pp. 401-414.

Megahan, W.F. and G.L. Ketcheson. 1996. Predicting downslope travel of granitic sediments from forest roads in Idaho. American Water Resources Association. Water Resources Bulletin, Vol. 32, No. 2. April 1996.

Megahan, Walter F. 1990. Erosion and site productivity in western-Montana forest ecosystems. *In*: Proceedings, Management and Productivity of Western-Montana Forest Soils. Gen. Tech. Rep. INT-280. USDA Forest Service Intermountain Research Station. pp. 146-150.

Meisner, J.D. 1990. Effect of climatic warming on the southern margins of the native range of brook trout, *Salvelinus fontinalis*. Canadian Journal of Fisheries and Aquatic Sciences. 47:1065-1070.

Merrill, E.H. 1982. Shrub responses after fire in an Idaho ponderosa pine community. Journal of Wildlife Management. 46(2):496-502. *In*: Noste, Nonan B. and Charles L. Bushey. 1987. Fire response of shrubs of dry forest habitat types in Montana and Idaho. General Technical Report INT-239. USDA Forest Service Intermountain Research Station. Ogden, Utah.

Mesa, Matthew G. 1991. Variation in feeding, aggression, and position choice between hatchery and wild cutthroat trout in an artificial stream. Transactions of the American Fisheries Society. 120:723-727.

Miller, G. 1992. Gold Power projects resource file report: Fisheries. Contract no. 53-0281-1-114, Biosystems Analysis, Inc. Tiburon, California. 5 pages.

Mills, Frederick J. 1891. Field notes of the survey of the Boise Meridian through Townships 50-57 North, both inclusive. Bureau of Land Management, Idaho State Office, Boise, Idaho.

MOA. 1990. North Idaho Smoke Management Memorandum of Agreement, June 1990.

Montana Partners in Flight. 2000. Montana bird conservation plan, Version 1.0. 2000. Blacked-backed woodpecker. Available online at http://biology.umt.edu/landbird/mbcp/mtpif/mtbbwo.htm and Montana bird conservation plan for black swift - version 1.0. Available online at http://biology.dbs.umt.edu/landbird/mbcp/MTPIF/mtblsw.htm.

Moore, J.A.; D.A. Hamilton, Jr.; Y. Xiao and J. Byrne. 2004. Foliar characteristics of four conifer species in the interior Northwest United States. Western Journal of Applied Forestry. 19(1):13-24.

Moore, J.A.; P.G. Mika; T.M Shaw and M.T. Garrison. 2004a. Bedrock type significantly affects individual tree mortality for various conifers in the inland Northwest, USA. Canadian Journal of Forest Resources. 34:31-42.

Morris, L.A. and R.E. Miller. 1994. Evidence for long-term productivity change as provided by field trials. *In*: Dyck, W.J., Cole, D.W., Comerford, N.B., comps., eds. Impacts of Forest Harvesting on Long-term site productivity. London; Chapman and Hall: pp. 41-80.

Morrison, M.L. and M.G. Raphael. 1993. Modeling the dynamics of snags. Ecological Applications: 3(2):322-330.

Mosier, Dave. 2001. Personal communication with Shanda Dekome, former IPNF North Zone fisheries biologist (current Forest fisheries biologist).

Neary, D.G., K.C. Ryan, and L.F. DeBano, eds. 2005. Wildland fire in ecosystems: effects of fire on soils and water. Gen. Tech. Rep. RMRS-GTR-42-vol.4. Ogden, UT: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 250 pp.

Nelson, R.L.; M.L. McHenry and W.S. Platts. 1991. Mining. *In*: W. R. Meehan, editor. Influences of forest and rangeland management on salmonid fishes and their habitats. American Fisheries Society Special Publication 19, Bethesda, Maryland. pp. 425-457.

Niehoff, Gerald. 1985. Technical guide to determine potential soil damage by prescribed burning and wildfire. Unpublished paper available from Idaho Panhandle National Forests Soil Scientist, Coeur d'Alene, Idaho. 6 pp.

Niehoff, Gerald. 2002. Soil NEPA analysis process and source of soil disturbance model coefficients. Unpublished report available from Idaho Panhandle National Forests Supervisors Office, Coeur d'Alene, Idaho.

Nielson, Ken; Robert W. Bosworth and Joe Barreca. 2004. Bonner County, Idaho Wildland/Urban Interface Fire Mitigation Plan. May 2004. Available online at http://www2.state.id.us/lands/nat_fire_plan/county_wui_plans/bonner/bonner_county_plan.htm.

Nieman, Jim. 2006. Personal communication between Jim Nieman (IPNF North Zone geotechnical engineer) and Jason Gritzner (project hydrologist) regarding mine clean-up activities in the Gold Creek watershed.

Noste, Nonan V. 1982. Vegetation response to spring and fall burning for wildlife habitat improvement. *In*: Baumgartner, David M., compiler. Site preparation and fuels management on steep terrain: Proceedings of a symposium; 1982 February 15-17; Spokane, WA. Pullman, WA: Washington State University, Cooperative Extension. pp. 125-132. *In*: Fire Effects Information System. An online database at http://www.fs.fed.us/database/feis/plants/forb/cenmac/all.html.

Noste, Nonan B. and Charles L. Bushey. 1987. Fire response of shrubs of dry forest habitat types in Montana and Idaho. General Technical Report INT-239. USDA Forest Service Intermountain Research Station. Ogden, Utah.

O'Farrell, M. J. and E. H. Studier. 1980. *Myotis thysanodes*. *In:* Mammalian Species. 137:1-5.

Ochsmann, Jorg. 2001. On the taxonomy of spotted knapweed (*Centaurea stoebe* L.). *In*: Smith, Lincoln, ed. Proceedings, 1st international knapweed symposium of the 21st century, 2001 March 15-16; Coeur d'Alene, Idaho. Albany CA: USDA Agricultural Research Service. pp. 33-41. *In*: Fire Effects Information System. An online database at http://www.fs.fed.us/database/feis/plants/forb/cenmac/all.html.

Olson, Bret E. 1999. Impacts of noxious weeds on ecologic and economic systems. *In*: Sheley, Roger L.; Petroff, Janet K., eds. Biology and management of noxious rangeland weeds. Corvallis, OR: Oregon State University Press. pp. 4-18. *In*: Fire Effects Information System. An online database at http://www.fs.fed.us/database/feis/plants/forb/cenmac/all.html.

Overton, C.K.; S.P. Wollrab; B.C. Roberts and M.A. Radko. 1997. R1/R4 Fish and Fish Habitat Standard Inventory Procedures Handbook. General Technical Report INT-GTR-346. USDA Forest Service Intermountain Research Station. Ogden, Utah.

PBTTAT. 1998. Lake Pend Oreille key watershed bull trout problem assessment. Prepared for the Lake Pend Oreille Watershed Advisory Group and the State of Idaho. Panhandle Bull Trout Technical Advisory Team. 100 pp.

Palviainen, M.; L. Finer; A. Kurka; H. Mannerkoski; S. Piirainen and M. Starr. 2004. Release of potassium, calcium, iron and aluminum from Norway spruce, Scots pine and silver birch logging residues. Plant and Soil. 259:123-136.

Parendes, Laurie A. and Julia A. Jones. 2000. Role of light availability and dispersal in exotic plant invasion along roads and streams in the H.J. Andrews Experimental Forest, Oregon. *In*: Conservation Biology. 14(1):64-75. *In*: Fire Effects Information System. An online database at http://www.fs.fed.us/database/feis/plants/forb/hypper/all.html.

Patten, R. 1989. Watershed Response Model for Forest Management, WATBAL. Technical Users Guide, rev. November 15, 1999.

Peck, J.H.; C.J. Peck and D.R. Farrar. 1990. Influences of life history attributes on formation of local and distant fern populations. *In*: American Fern Journal. 80(4):126-142.

Penland, John R. 1908. Field notes of the survey of *Subdivisions and Meanders of fractional Township No. 53 North Range N0. 1 West and Resurvey of the Boise Meridian through T 53 N of the Boise Meridian.* Bureau of Land Management Idaho State Office, Boise, Idaho.

Penny, Diane. 1995. Monitoring *Botrychium lanceolatum* ssp. *lanceolatum* in Hanna Flats Cedar Grove. Unpublished technical report. Priest Lake Ranger District.

Peterson, W.R.. 1963 and Stone, L. R. 1990. Fire History Maps. 8 pages. Available at the Sandpoint Ranger District Office.

Pfingsten, B. 1983. Evaluating wild ungulate habitat: use of forage quality as a relative index. Western Wildlands. 9:24-27.

Philipek, F.M. 1985. Over-snow logging. Analysis of impacts to lithic scatters. USDA Forest Service Pacific Northwest Region. *In*: Studies in Cultural Resource Management No. 5. 41 pp.

Plotnikoff, M.; M. Schmidt and C. Bulmer. 2000. Retrospective studies of soil conditions and forest productivity on rehabilitated landings: Interior of British Columbia. *In*: Proceedings, From science to management and back: a science forum for southern interior ecosystems of B.C. C. Hollstedt, K. Sutherland and T. Innes, editors. South Interior For. Ext. and Res. Partnership. Kamloops, British Columbia. pp. 113-117.

Poff, R.J. 1996. Effects of silvicultural practices and wildfire on productivity of forest soils. Sierra Nevada Ecosystem Project final report to Congress: status of the Sierra Nevada. Volume II: Assessment and scientific basis for management options. Centers for Water and Wildland Resources, University of California, Davis. pp. 477-495.

Powell, G.W.; B.M. Wikeem; A. Sturko and J. Boateng. 1997. Knapweed growth and effect on conifers in a montane forest. Canadian Journal of Forestry Resources 27(1997):1427-1433.

Powers, R.F. 1990. Are we maintaining the productivity of forest lands? Establishing guidelines through a network of long-term studies. pp.70-81. *In*: Harvey, A.E and L.F. Neuenschwander (Eds.). Proceedings—Management Productivity of Western Montane Soils. Boise, Idaho, April 10-12. USDA Forest Service Intermountain Research Station and University of Idaho, Moscow, Idaho.

Pratt, K.L. 1985. Pend Oreille trout and char life history study. Idaho Department of Fish and Game in cooperation with Lake Pend Oreille Idaho Club. Boise, Idaho.

Quigley, Thomas M. and Sylvia J. Arbelbide, tech. eds. 1997. An assessment of ecosystem components in the interior Columbia basin and portions of the Klamath and Great Basins. Volume I. USDA Forest Service Gen. Tech. Rep. PNW-GTR-405. Pacific Northwest Research Station. Portland, Oregon. pp. 61, 181 and 184.

Quigley, Thomas M. and Sylvia J. Arbelbide, tech. eds. 1997a. An assessment of ecosystem components in the interior Columbia basin and portions of the Klamath and Great Basins. Volume II. USDA Forest Service Gen. Tech. Rep. PNW-GTR-405. Pacific Northwest Research Station. Portland, Oregon. p. 1346.

Quigley, Thomas M. and Sylvia J. Arbelbide, tech. eds. 1997b. An assessment of ecosystem components in the interior Columbia basin and portions of the Klamath and Great Basins. Volume III. USDA Forest Service Gen. Tech. Rep. PNW-GTR-405. Pacific Northwest Research Station. Portland, Oregon.

Quigley, Thomas M.; Richard W. Haynes and Russell T. Graham. 1996. Integrated Scientific Assessment for ecosystem management in the Interior Columbia Basin and portions of the Klamath and Great Basins. USDA Forest Service Gen. Tech. Rep. PNW-GTR-382. Pacific Northwest Research Station. Portland, Oregon.

Rabe, M.J.; T.E. Morrell; H. Green; J.C. deVos, Jr. and C.R. Miller. 1998. Characteristics of ponderosa pine snag roosts used by reproductive bats in northern Arizona. Journal of Wildlife Management. 62:612-621.

Rasheed, S.A.; P.F.J. Garcia and S.L. Holroyd. 1995. Status of the fringed myotis in British Columbia. Wildlife Working Report WR-73. pp. 1-17.

Redente, E.; N. Cotts and R. Schiller. 1994. Abandoned road restoration methods tested at Grand Tetons National Park. 14(2). Spring 1994. Park Science.

Reel, S.; L. Schassberger and W. Ruediger. 1989. Caring for our natural community. USDA Forest Service. Northern Region Wildlife and Fisheries publication.

Rees, Norman E.; Paul C. Quimby, Jr.; Gary L. Piper; Eric M. Coombs; Charles E. Turner; Neal R. Spencer and Lloyd V. Knutson, eds. 1996. Biological control of weeds in the west. Western Society of Weed Science. Bozeman, Montana.

Reeves, G.H.; L.E. Benda; K.M. Burnett; P.A. Bisson and J.R. Sedell. 1995. A disturbance-based ecosystem approach to maintaining and restoring freshwater habitats of evolutionarily significant units of anadromous salmonids in the Pacific northwest. American Fisheries Society Symposium. 17:334-349.

Reid, L.M. and S. Hilton. 1998. Buffering the buffer. PSW-GTR-168. *In*: Conference on coastal watersheds: the Caspar Creek story. USDA Forest Service. pp. 71-80.

Resource Planning Unlimited. 1999. Lake Pend Oreille Bull Trout Conservation Plan: Final Draft. July 1999. Developed by the Lake Pend Oreille Bull Trout Watershed Advisory Group. 43 pp.

Reynolds, R.T.; R.T. Graham; M.H. Reiser; R.L. Bassett; P.L. Kennedy; D.A. Boyce Jr.; G. Goodwin; R. Smith and E.L Fisher. 1991. Management recommendations for the northern goshawk in the southwestern United States. USDA Forest Service, Southwestern Region. 184 pp**.**

Reynolds, R.T. and B.D. Linkhart. 1992. Flammulated owls in ponderosa pine. *In:* Old-growth forests in the southwest and Rocky Mountain regions; proceedings of a workshop. USDA Forest Service. Gen. Tech. Report RM-213. pp. 166-169.

Rice, Peter M. 1996. Invaders Database. An interactive website at http://invader.dbs.umt.edu./. University of Montana. Missoula, Montana.

Rice, Peter M. and Chris Toney. 1997. Susceptibility of Northern Region habitat types to invasion by five noxious weed species - first approximations. Unpublished technical report. University of Montana. Missoula, Montana.

Ridenour, Wendy M. and Ragan M. Callaway. 2001. The relative importance of allelopathy in interference: the effects of an invasive weed on a native bunchgrass. Oecologia. 2001(126):444-450.

Rieman, B.E. and J.D. McIntyre. 1993. Demographic and habitat requirements for conservation of bull trout. General Technical Report INT-302. USDA Forest Service Intermountain Research Station. Ogden, Utah. 38 pp.

Rieman, B. and K. Apperson. 1989. Status and analysis of salmonid fisheries: westslope cutthroat trout synopsis and analysis of fishery information. Job performance representative. Idaho Department of Fish and Game. Project F-73-R-11, Subproject No. 11, Job No. 1. Boise, Idaho. 113 pp. In: Iron Honey FEIS, Coeur d'Alene River Ranger District, IPNF.

Roche, Ben F., Jr.; Gary L. Piper and Cindy Jo Talbot. 1986. Knapweeds of Washington. Washington Sate University, Cooperative Extension, College of Agriculture and Home Economics. Pullman, WA. 41 pp. *In*: Fire Effects Information System. An online database at http://www.fs.fed.us/database/feis/plants/forb/cenmac/all.html.

Rochelle, James A. 1998. Forest Wildlife and Fragmentation Management Implications. Conference Summary. November 18-19, 1998. Portland, Oregon.

Rockwell, F.I. 1917. Western White Pine - Part I: the tree and the stand. USDA Forest Service, Northern Rocky Mountain District, Office of Silviculture. Missoula, Montana. 215 pp.

Rone, Regina. 2006. Nordman Subsoiling. Field report monitoring of bulk densities in Units 3 and 5 of the Nordman timber sale that were subsoiled in 2003. Report dated March 22, 2006. Idaho Panhandle National Forests Priest Lake Ranger District. Nordman, Idaho.

Rosgen, D. 1996. Applied river morphology. Wildland Hydrology. Pagosa Springs, Colorado.

Ruediger, B.; J. Claar; S. Gniadek; B. Holt; L. Lewis; S. Mighton; B. Naney; G. Patton; T. Rinaldi; J. Trick; A. Vandehey; F. Wahl; N. Warren; D. Wenger and A. Williamson. 2000. Canada lynx conservation assessment and strategy. USDA Forest Service, USDI Bureau of Land Management, and USDI National Park Service. Forest Service Publication #R1-00-53. Missoula, Montana. 142 pp.

Ruggiero, Leonard F.; Lawrence L.C. Jones and Keith B. Aubry. 1991. Plant and animal habitat associations in Douglas-fir forests of the Pacific Northwest: an overview. *In*: Ruggiero, Leonard F.; Keith B. Aubry; Andrew B. Carey and Mark H. Huff, technical coordinators. Wildlife and vegetation of unmanaged Douglas-fir forests. General Technical Report PNW-GTR-285. USDA Forest Service Pacific Northwest Research Station. Portland, OR. pp. 447-462. *In*: Fire Effects Information System. An online database at http://www.fs.fed.us/database/feis/plants/forb/hypper/all.html.

Ruggiero, L.F. et al., technical editors. 1994. The scientific basis for conserving forest carnivores: American marten, fisher, lynx and wolverine in the Western United States. Gen. Tech. Rep. RM-254. USDA Forest Service, Rocky Mountain Forest and Range Experiment Station. Ft. Collins, CO. 184 pp.

Samson, F.B. 2006. A conservation assessment of the northern goshawk, black-backed woodpecker, flammulated owl, and pileated woodpecker in the Northern Region, USDA Forest Service. Unpublished report on file. Forest Service Northern Region, Missoula, Montana.

Sampson, Arthur W. and Kenneth W. Parker. 1930. St. Johnswort on range lands of California. Bulletin 503. University of California, College of Agriculture, Agriculture Experiment Station. Berkeley, CA. 47 pp. *In*: Fire Effects Information System. An online database at http://www.fs.fed.us/database/feis/plants/forb/hypper/all.html.

Schlosser, I.J. 1982. Trophic structure, reproductive success, and growth rate of fishes in a natural and modified headwater stream. Can. J. Fish. Aquat. Sci. 39:968-978.

Schmidt, R. Gordon. 1996. Can We Restore the Fire Process? What Awaits Us if We Don't. *In:* The Use of Fire in Forest Restoration. USDA Forest Service, Intermountain Research Station, General Technical Report INT-GTR-341. June 1996. pp. 85-86.

Schwandt, John. 1996. Report of IPNF Pathologist on insect and disease field trip to the Packsaddle Timber Sale, Sandpoint Ranger District. September 10, 1996. 8 pp.

Scott, V.E. 1979. Bird responses to snag removal in ponderosa pine. *In*: Journal of Forestry 77, pp. 26-28. *In*: Ghalambor, C. 2003. Conservation assessment of the pygmy nuthatch in the Black Hills National Forest, South Dakota and Wyoming. USDA Forest Service Rocky Mountain Region.

Scott, Joe H. and Elizabeth D. Reinhardt. 2001. Assessing crown fire potential by linking models of surface and crown fire behavior. Research Paper RMS-RP-29. USDA Forest Service Rocky Mountain Research Station. Ft. Collins, Colorado. 59 pp.

Seyedbagheri, K.A. 1996. Idaho Forestry Best Management Practices: Compilation of research on their effectiveness. USDA Forest Service, Intermountain Research Station, Gen. Tech. Rep. INT-GTR-339. October 1996. 89 pp.

Shearer and Schmidt. 1992. Natural regeneration after harvest and residue treatment in a western larch forest of northwestern Montana, U.S.A. *In:* Ecology and management of *Larix* forests: a look ahead. Proceedings of an international symposium. Compilers: Wyman C. Schmidt and Kathy J. McDonals. USDA Forest Service Intermountain Research Station. Ogden, Utah. p. 169.

Sheley, Roger L. and B.F. Roche. 1982. Rehabilitation of spotted knapweed infested rangeland in northeastern Washington. *In*: Western Society of Weed Science 31. Abstract. *In*: Fire Effects Information System. An online database at http://www.fs.fed.us/database/feis/plants/forb/cenmac/all.html.

Sheley, Roger L.; James S. Jacobs and Michael F. Carpinelli. 1998. Distribution, biology, and management of diffuse knapweed (*Centaurea diffusa*) and spotted knapweed (*Centaurea maculosa*). *In*: Weed Technology. 12(2):353-362. *In*: Fire Effects Information System. An online database at http://www.fs.fed.us/database/feis/plants/forb/cenmac/all.html.

Sheley, Roger L.; James S. Jacobs and Michael L. Carpinelli. 1999. Spotted knapweed. *In*: Sheley, Roger L. and Janet K. Petroff, eds. Biology and management of noxious rangeland weeds. Oregon State University Press. Corvallis, OR. pp. 350-361. *In*: Fire Effects Information System. An online database at http://www.fs.fed.us/database/feis/plants/forb/cenmac/all.html.

Shelly, J. Steven and Robert K. Moseley. 1988. Report on the Conservation Status of *Howellia aquatilis*, a Candidate Threatened Species. Montana Natural Heritage Program. Helena, Montana. pp 29-30.

Shepard, B.B.; B.E. May and W. Urie et al. 2002. Status of westslope cutthroat trout (*Oncorhynchus clarki lewisi*) in the United States: 2002. February 2002. 94 pp.

Smith, J.K., and W.C. Fischer. 1997. Fire Ecology of the Forest Habitat Types of Northern Idaho. USDA Forest Service Intermountain Research Station, Gen. Tech Rep. INT-GTR-383. Ogden, Utah.

Spies, Thomas A., Miles A. Hemstrom, Andrew Youngblood and Susan Hummel. 2006. Conserving old-growth forest diversity in disturbance-prone landscapes. Conservation Biology. 20(2):351-362.

Spurr, S.H., and B.V. Barnes. 1980. Forest Ecology. John Wiley & Sons, New York, Chapter 16. pp 421-428 and 437-439.

Stark, N.M. 1979. Nutrient losses from timber harvesting in a larch/Douglas-fir forest. USDA Forest Service Research Paper INT-231. Intermountain. Forest and Range Experiment Station. Ogden, Utah. 41 pp.

State of Idaho. 1996. Governor Philip E. Batt's State of Idaho bull trout conservation plan. Boise, Idaho. July 1, 1996.

Steed, Robert. 2006. Personal communication with project hydrologist Jason Gritzner concerning the TMDL in Gold Creek on the Sandpoint Ranger District of the Idaho Panhandle National Forests (IPNF). Robert Steed is the IDEQ Surface Water Ecologist. May 16, 2006.

Stewart, Cathy. 1996. "Restoring Historic Landscape Patterns Through Management: Restoring Fire Mosaics on the Landscape." *In*: The Use of Fire in Forest Restoration. USDA Forest Service, Intermountain Research Station, Gen. Tech. Rep. INT-GTR-341. June 1996. p. 49.

Swanston, Douglas N. and Frederick J. Swanson. 1976. Timber harvesting, mass erosion, and steepland forest geomorphology in the Pacific Northwest. In: Geomorphology and engineering; Donald R. Coates, ed. Dowden, Hutchinson and Ross, Inc. Stroudsburg, Pennsylvania.

Swift, L.W., Jr. 1984. Soil losses from roadbed and cut and fill slopes in the southern Appalachian Mountains. Southern Journal of Applied Forestry. 8(4):209-216.

Switalski, T.A.; J.A. Bissonette; T.H. DeLuca; C.H. Luce and M.A. Madej. 2004. Benefits and impacts of road removal. Frontiers in Ecol. and Env. 2(1):21-28.

Thomas, Jack Ward, tech. ed. 1979. Wildlife habitats in managed forests – the Blue Mountains of Oregon and Washington. USDA Forest Service Agricultural Handbook No. 553. p. 137.

Thomas, J.W. and D.E. Toweill, eds. 1982. Elk of North America-ecology and management. Wildl. Manage. Inst., Stackpole Books, Harrisburg, PA. 698 pp.

Thorson, D.M. 1984. Fisheries/sediment impact analysis for Keep Cool – Prospect Timber Sale. Memo to the District Ranger, Sandpoint Ranger District. 6 pp.

Tisdale, E.W. 1976. Vegetational responses following biological control of *Hypericum perforatum* in Idaho. *In*: Northwest Science. 50(2):61-75. *In*: Fire Effects Information System. An online database at http://www.fs.fed.us/database/feis/plants/forb/hypper/all.html.

Tisdale, E.W.; M. Hironaka and W.L. Pringle. 1959. Observations on the autecology of *Hypericum perforatum*. In: Ecology. 40(1):54-62. *In*: Fire Effects Information System. An online database at http://www.fs.fed.us/database/feis/plants/forb/hypper/all.html.

Tucker, P.A.; D.L. Davis and R.R. Ream. 1990. Wolves: identification, documentation, population monitoring and conservation considerations. Northern Rockies Natural Resources Center, National Wildlife Federation. Missoula, Montana. 27 pp.

Tyser, Robin W. 1990. Ecology of fescue grasslands in Glacier National Park. *In*: Boyce, Mark S. and Glenn E. Plumb, eds. National Park Service Research Center, 14th annual report. Laramie, WY: University of Wyoming, National Park Service Research Center. pp. 59-60. *In*: Fire Effects Information System. An online database at http://www.fs.fed.us/database/feis/plants/forb/cenmac/all.html.

Tyser, Robin W. and Carl H. Key. 1988. Spotted knapweed in natural area fescue grasslands: an ecological assessment. Northwest Science. 62(4):151-160.

USDA Forest Service. Geographic Assessment of the Pend Oreille River Basin. Unpublished report. Idaho Panhandle National Forests. Coeur d'Alene, Idaho.

USDA Forest Service. 1916. Pend Oreille National Forests Classification.

USDA Forest Service. 1968. Sundance Fire. Research Paper INT-56. Intermountain Forest and Range Experiment Station. Ogden, Utah. p. 1.

USDA Forest Service. 1971. Useful trees of the United States - western white pine (*Pinus monticola*). FS-72 (TDS-2). Washington, D.C.

USDA Forest Service. 1981. Guide for Predicting Sediment Yields from Forested Watershsheds. Northern Region and Intermountain Region; Soil and Water Management**.**

USDA Forest Service. 1987. Forest Plan, Idaho Panhandle National Forests, Northern Region. Coeur d'Alene, Idaho.

USDA Forest Service. 1988. Idaho Panhandle National Forests Forest Plan Monitoring and Evaluation Report. Coeur d'Alene, Idaho.

USDA Forest Service. 1989. Economic Analysis for Forest Plan Implementation. Northern Region, Missoula, Montana.

USDA Forest Service. 1989a. Idaho Panhandle National Forests Forest Plan Monitoring and Evaluation Report. Coeur d'Alene, Idaho.

USDA Forest Service. 1991. Idaho Panhandle National Forests Forest Plan Monitoring and Evaluation Report. Coeur d'Alene, Idaho.

USDA Forest Service. 1992. Idaho Panhandle National Forests Forest Plan Monitoring and Evaluation Report. Coeur d'Alene, Idaho.

USDA Forest Service. 1993. Idaho Panhandle National Forests Forest Plan Monitoring and Evaluation Report. Coeur d'Alene, Idaho.

USDA. Forest Service. 1994. Conservation Strategy for *Howellia aquatilis*. Flathead National Forest. USDA Forest Service Northern Region. Missoula, Montana. April, 1994; updated November 17, 1994.

USDA Forest Service. 1995. Inland Native Fish Strategy Environmental Assessment: Decision Notice and Finding of No Significant Impact. Idaho Panhandle National Forest, Coeur d'Alene, Idaho.

USDA Forest Service. 1995a. Idaho Panhandle National Forests Forest Plan Monitoring and Evaluation Report. Coeur d'Alene, Idaho.

USDA Forest Service. 1995b. Streamlining biological evaluations and conclusions for determination of effects to listed, proposed and sensitive species. Letter from Northern Region Regional Forester. August 17, 1995. Missoula, Montana.

USDA Forest Service. 1996. Internal memo documenting the floods of water year 1996.

USDA Forest Service. 1996a. Wildland Fire Suppression Tactics Reference Guide. USDA Forest Service National Wildfire Coordinating Group. pp. 20, 24, 32-33.

USDA Forest Service. 1996b. Idaho Panhandle National Forests Forest Plan Monitoring and Evaluation Report. Coeur d'Alene, Idaho.

USDA Forest Service. 1997. First Order Fire Effects Model (FOFEM). USDA Forest Service Intermountain Research Station, Gen. Tech. Rep. INT-GTR 344. Ogden Utah.

USDA Forest Service. 1997a. Biophysical Classification: Habitat Groups and Descriptions (finalized in 1997). Landscape Ecology Peer Group. Northern Region (Region 1). Missoula, Montana.

USDA Forest Service. 1997b. Idaho Panhandle National Forests Forest Plan Monitoring and Evaluation Report. Coeur d'Alene, Idaho.

USDA Forest Service. 1998. Northern Region Overview Detailed Report and Summary, October 1998. Northern Region, Missoula, Montana.

USDA Forest Service. 1998a. Toward an Ecosystem Approach: An Assessment of the Coeur d'Alene River Basin. USDA Forest Service, Idaho Panhandle National Forests. Ecosystem Paper #4. February, 1998.

USDA Forest Service. 1998b. Idaho Panhandle National Forests Forest Plan Monitoring and Evaluation Report. Coeur d'Alene, Idaho.

USDA Forest Service. 1998c. Sandpoint Noxious Weed Control Project Environmental Impact Statement. Idaho Panhandle National Forests, Sandpoint Ranger District. Available at the Sandpoint Ranger District office.

USDA Forest Service. 1999. Idaho Panhandle National Forests Forest Plan Monitoring and Evaluation Report. Coeur d'Alene, Idaho.

USDA Forest Service. 1999a. Douglas-fir Beetle Project, Final Environmental Impact Statement. Idaho Panhandle National Forests and Colville National Forest. Coeur d'Alene, Idaho. pp. 542-546.

USDA Forest Service. 1999b. Roads Analysis: Informing decisions about managing the national forest transportation system. Misc. Rep. FS-643. USDA Forest Service. Washington, D.C. 222 pp.

USDA Forest Service. 2000. Idaho Panhandle National Forests Forest Plan Monitoring and Evaluation Report. Coeur d'Alene, Idaho.

USDA Forest Service. 2000a. Northern Region Snag Management Protocol. Missoula, Montana.

USDA Forest Service. 2001. Idaho Panhandle National Forests Forest Plan Monitoring and Evaluation Report. Coeur d'Alene, Idaho.

USDA Forest Service. 2001a. Guide to noxious weed prevention practices. Version 1.0. Available online at http://fsweb.sanjuan.r2.fs.fed.us/range/fsweedprevention_070.doc.

USDA Forest Service. 2001b. Forest Service Manual 2080. Noxious weeds. Supplement No. R1 2000-2001-1. Northern Region. Missoula, Montana.

USDA Forest Service. 2002. Gold Creek Ecosystem Assessment at the Watershed Scale. Unpublished report available at the Sandpoint Ranger District. Sandpoint, Idaho.

USDA Forest Service. 2002a. Little Blacktail Ecosystem Restoration Project: Final Environmental Impact Statement. Sandpoint Ranger District. Sandpoint, Idaho.

USDA Forest Service. 2002b. Idaho Panhandle National Forests Forest Plan Monitoring and Evaluation Report. Coeur d'Alene, Idaho.

USDA Forest Service. 2003. Idaho Panhandle National Forests Forest Plan Monitoring and Evaluation Report. Coeur d'Alene, Idaho.

USDA Forest Service. 2004. Idaho Panhandle National Forests Forest Plan Monitoring and Evaluation Report. Coeur d'Alene, Idaho.

USDA Forest Service. 2005. Region 1 sensitive species list update. Missoula, Montana.

USDA Forest Service. 2005a. Idaho Panhandle National Forests Forest Plan Amendment for Fry Emergence. Decision Notice and Finding of No Significant Impact. Coeur d'Alene, Idaho.

USDI Bureau of Reclamation. 1991. Habitat management guide for bald eagles in northwestern Montana. Billings, Montana. 29 pp.

USDI Fish and Wildlife Service. 1987. Northern Rocky Mountain Wolf Recovery Plan. Denver, Colorado. 119 pp.

USDI Fish and Wildlife Service. 1993. Grizzly Bear Recovery Plan. Missoula, Montana. 181 pp.

USDI Fish and Wildlife Service. 1994. Selkirk Mountain Woodland Caribou Recovery Plan. Portland, Oregon. 71 pp.

USDI Fish and Wildlife Service 2000. Section 7 guidelines - *Silene spaldingii* Spalding's catchfly (proposed Threatened). United States Fish and Wildlife Service Snake River Basin Office. Boise, Idaho.

USDI Fish and Wildlife Service. 2000a. Endangered and Threatened wildlife and plants: 12-month finding for an amended petition to list the westslope cutthroat trout as Threatened throughout its range. Federal Register Volume 65(73). 50 CFR Part 17. April 4, 2000.

USDI Fish and Wildlife Service. 2004. Update of Forest- and District-wide species list, Endangered, Threatened, Candidate and Species of Concern within the Idaho Panhandle

National Forests. (This update dropped *Spiranthes diluvialis* Sheviak as suspected to occur in the IPNF). SP# 1-9-04-SP-219. April 14, 2004. Spokane, Washington.

USDI Fish and Wildlife Service. 2004a. Designation of critical habitat for the Klamath River and Columbia River populations of bull trout. 50 CFR Part 17. Federal Register Volume 69(193). October 6, 2004.

USDI Fish and Wildlife Service. 2006. Updated Species List for Bonner and Kootenai Counties, Idaho (3/1/2006). Upper Columbia Fish and Wildlife Office, Spokane, Washington. Accessed online at http://www.fws.gov/easternwashington/ESA.html.

USDI and USDA. 1995. Federal Wildland Fire Management Policy and Program Review, Draft Report, June 9, 1995.

USDI and USDA. 1996. Federal Wildland Fire Management Policy and Program Review, Implementation Action Plan Report. May 23, 1996.

USDI Bureau of Land Management and USDA Forest Service. 1997. Upper Columbia River Basin Draft Environmental Impact Statement (UCRB DEIS). Volume 1, Chapter 2. p. 59.

Vanderhorst, J. 1997. Conservation assessment of sensitive moonworts (*Botrychium* subgenus *Botrychium*) on the Kootenai National Forest. Montana Natural Heritage Program, Helena, MT. 82 pages plus appendices.

Vanhof, M.J. 1995. Full citation not listed in document. *In*: Keinath, D.A. 2004. Fringed myotis (*Myotis thysanodes*): a technical conservation assessment. USDA Forest Service Rocky Mountain Region.

Wallace, Richard L. 1979. Taxonomic analysis cutthroat trout from streams of the Panhandle National Forests, Idaho. Unpublished report. Department of Biological Sciences. University of Idaho. Moscow, Idaho. 15 pp.

Ward, Darold E. 1992. Biomass consumption and emissions production. Smoke Management Training. Northern Rockies Training Center. Missoula, Montana.

Warren, N. technical editor. 1990. Old growth habitats and associated wildlife species in the northern Rocky Mountains. Northern Region Report R1-90-42: USDA Forest Service, Missoula, Montana. 47 pp.

Washington National Heritage Program. 2006. Field guide to selected rare vascular plants of Washington. Available online at http://www.dnr.wa.gov/nhp/refdesk/fguide/htm/fsp_asmi.htm. Species profile for *Astragalus microcystis*.

Watson, A.K. and A.J. Renney. 1974. The biology of Canadian weeds. 6. *Centaurea diffusa* and *C. maculosa*. *In*: Canadian Journal of Plant Science. 54: 687-701. *In*: Fire Effects Information System. An online database at http://www.fs.fed.us/database/feis/plants/forb/cenmac/all.html.

Weldon, L.; A.B. Bail and C. R. Graham. 2001. Conservation strategy for *Botrychium pumicola* (pumice grape fern) on the Deschutes, Fremont and Winema National Forests and Prineville District, Bureau of Land Management. Oregon. 22pp.

Weller, T.J. and C.J. Zabel. 2001. Characteristics of fringed myotis day roosts in northern California. Journal of Wildlife Management. (65):489-497.

Wells, C.G.; R. Campbell; L. DeBano; C. Lewis; R. Fredriksen; E.C. Franklin; R. Froehlich; and P. Dunn. 1979. Effects of fire on soil. USDA General Technical Report WO-7. 34 pp.

Whitson, Tom D.; Larry C. Burrill; Steven A. Dewey et al. 1991. Weeds of the west. Western Society of Weed Science. Bozeman, Montana.

Wiggins, David A. 2004. Black swift (*Cypseloides niger*): a technical conservation assessment. USDA Forest Service Rocky Mountain Region.

Wisdom, M.J.; R.S. Holthausen; B.C. Wales; C.D. Hargis; V.A. Saab; D.C. Lee; W.J. Hann; T.D. Rich; M.M. Rowland; W.J. Murphy and M.R. Earnes. 2000. Source habitats for terrestrial vertebrates of focus in the Interior Columbia Basin: broad-scale trends and management implications, Volume 2 – Group level results. Gen. Tech. Rep. Threatened and Endangered Species, Sensitive Species and Management Indicator Species and the level of analysis required. PNW-GTR-485. USDA Forest Service Pacific Northwest Research Station. pp 181-190, 209-215, 224-229, 242-248, 258-265, 305-311.

Young, Richard P. 1983. Fire as a vegetation management tool in rangelands of the Intermountain Region. *In*: Monsen, Stephen B; Shaw, Nancy, compilers. Managing Intermountain rangelands - improvement of range and wildlife habitats: Proceedings; 1981 September 15-17; Twin Falls, ID; 1982 June 22-24; Elko, NV. General Technical Report INT-157. USDA Forest Service Intermountain Forest and Range Experiment Station. Ogden, UT. pp. 18-31. *In*: Fire Effects Information System. Species profile for oceanspray (*Holodiscus discolor*). Online at http://www.fs.fed.us/database/feis/plants/shrub/holdis/all.html.

Zack, Arthur and P. Morgan. 1994. Fire History on the Idaho Panhandle National Forest, Draft.

Zack, Arthur. 1999. Historic Vegetation Data Sources: Idaho Panhandle National Forests. Unpublished bibliography dated June 4, 1999. Available from Idaho Panhandle National Forests ecologist, Coeur d'Alene, Idaho. 5 pp.

Zack, Arthur. 2000. Synthesis and interpretation of terrestrial information. *In:* Geographic Assessment of the Pend Oreille River Basin. USDA Forest Service. Idaho Panhandle National Forests, Coeur d'Alene, ID. Unpublished report.

Zack, Arthur. 2002. Personal communication between Art Zack, IPNF Forest Ecologist and Don Gunter, project silviculturist, regarding fire return intervals on the IPNF.

Appendix F - List of Preparers

West Gold Project Interdisciplinary Team Members:

Name	Title	Area of Expertise
Chad BaconRind	Fisheries Biologist	Aquatic Species and Habitat
Don Gunter	Silviculturist	Forest Health and Productivity
Anna E. Hammet	Botanist	TES Plants and Noxious Weeds
Dave Lux	District Fire Management Officer	Fire/Fuels and Air Quality
David Roberts	Wildlife Biologist	Wildlife Species and Habitat
Jason Gritzner	Hydrologist	Erosional Processes and Hydrology
Debbie Scribner	Information Management Specialist	Database Information and GIS Mapping
Judy York	Writer – Editor	Document Preparation
A.J. Helgenberg	Project Team Leader	Project Coordination Public Involvement Document Preparation Soils Analysis

Support Team Members – The following individuals provided technical or other support to the analysis:

Name	Title	Area of Support
Shanda Dekome	Fisheries Biologist	Fisheries Analysis Support
Lonnie Newton	Assistant Fire Management Officer	Fire/Fuels and Air Quality Analysis Support
Angelic Koch	Supervisory Engine Leader	Fire/Fuels and Air Quality Analysis Support
Linda Bernhardt	Biological Technician	Wildlife Technical Support
Gina Rone	IPNF Soil Scientist	Soils Analysis
Tom Sandberg	Archaeologist	Heritage Resources Analysis
James Barrett	Silviculturist	Visual Analysis
Anita Hanson	Timber Contract Specialist	Financial Analysis

Appendix G - Glossary

A

Air Pollutant – Any substance in air that could, if in high enough concentration, harm humans, animals, vegetation, or material. Air pollutants may include almost any natural or artificial matter capable of being airborne, in the form of solid particles, liquid droplets, gases, or a combination of these.

Air Quality – The composition of air with respect to quantities of pollution therein; used most frequently in connection with "standards" of maximum acceptable pollutant concentrations.

Alternative – In an Environmental Impact Statement (EIS), one of a number of possible options for responding to the purpose and need for action.

Amenity – Resource use, object, feature, quality, or experience that is pleasing to the senses; typically refers to resources for which monetary values are not or cannot be established, such as scenic or wilderness values.

Aquatic – Pertaining to water.

Aspect – The direction the slope of a hillside or landform faces (for example, a slope with a southern aspect faces south).

Assessment – The collection, integration, examination, and evaluation of information and values.

Attainment Area – A geographic area that is in compliance with the National Ambient Air Quality Standards (see below). An area considered having air quality as good as or better than the national ambient air quality standards as defined in the Clean Air Act. An area may be an attainment area for one pollutant and a non-attainment area for others.

B

Basin (river) –In general, the area of land that drains water, sediment, and dissolved materials to a common point along a stream channel. River basins are composed of large river systems.

Bedload – Sediment moving in or near a streambed.

Beneficial Uses – Any of the various uses that may be made of water including, but not limited to, domestic water supplies, industrial water supplies, agricultural water supplies, navigation, recreation in and on the water, wildlife habitat, and aesthetics. The beneficial use depends on actual use, the ability of the water to support a non-existing use either now or in the future, and its likelihood of being used in a given manner. The use of water for the purpose of wastewater dilution or as a receiving water for a waste treatment facility effluent is not considered a beneficial use.

Best Management Practices (BMPs) – Practices determined by the State of Idaho to be the most effective and practicable means of preventing or reducing erosion, and water pollution to meet water quality goals.

Biological Diversity (biodiversity) – The variety and variability among living organisms and the ecological complexes in which they occur.

Board Foot (bf) – A unit of wood 12” x 12” x 1”.

Broad Scale – A large regional area, such as a river basin; typically a multi-state area.

BTU (British Thermal Unit) – The quantity of heat required to raise the temperature of one pound of water one degree Fahrenheit at a specified temperature. For this EIS, the measurement unit used to measure heat intensities in fire behavior modeling.

Bulk density – The ratio between the mass and apparent volume of a given sample. BD = mass(g)/ volume (cc)

C

Canopy – In a forest, the branches from the uppermost layer of trees; on rangeland, the vertical projection downward of the aerial portion of vegetation.

Canopy Closure – The amount of ground surface shaded by tree canopies as seen from above. Used to describe how open or dense a stand of trees is, often expressed in 10 percent increments.

Carbon Monoxide – A colorless, odorless, poisonous gas produced by incomplete fossil fuel combustion; primarily emitted by motor vehicles and other mobile sources. Carbon monoxide is an air pollutant that interferes with the blood’s ability to carry oxygen to the body’s tissues and results in numerous adverse health effects.

Channel (stream) – A stream or riverbed through which the main current of water flows.

Classified Road – A road wholly or partially within or next to National Forest lands determined to be needed for long-term motor vehicle access.

Clearcutting – A regeneration harvest method that removes all merchantable trees in a single cutting, except for wildlife trees or snags. A “clearcut” is an area from which all merchantable trees have been cut.

Climate – The composite or generally prevailing weather conditions of a region throughout the year, averaged over a series of years.

Coarse Woody Debris (soils) - Pieces of woody material derived from tree limbs, boles, and roots in various stages of decay, generally having a diameter of at least three inches and a length greater than three feet.

Commodity – Commercial article that can be bought, sold and transported, such as mining, agricultural, timber, or other forest products.

Compaction – Making soil hard and dense, decreasing its ability to support vegetation because the soil can hold less water and air and because roots have trouble penetrating the soil.

Competition – An interaction that occurs when two or more individuals make demands on the same resources that are in short supply.

Composition (species) – The mix of different species that make up a plant or animal community, and their relative abundance.

Connectivity – The arrangement of habitats that allows organisms and ecological processes to move across the landscape; patches of similar habitats are either close together or linked by corridors of appropriate vegetation. The opposite of fragmentation.

Corridor (landscape) – Landscape elements that connect similar patches of habitat through an area with different characteristics. For example, streamside vegetation may create a corridor of willows and hardwoods between meadows or through a forest.

Cover – (1) Trees, shrubs, rocks, or other landscape features that allow an animal to partly or fully conceal itself. (2) The area of ground covered by plants of one or more species.

Cover Type – A vegetation classification depicting a genus, species, group of species, or life form of tree, shrub, grass, or sedge. The present vegetation of an area.

Crown – The part of a tree containing live foliage; treetops.

Crown Fire – A forest fire that burns in the crowns of trees.

Cumulative Effects – Impacts on the environment that result from the incremental impact of an action when added to other past, present, and reasonably foreseeable future actions. Cumulative effects can result from individually minor but collectively significant actions taking place over a period of time. In this EIS, potential cumulative effects include those that were assessed for all ownerships, including lands administered by other federal lands and non-federal lands, especially regarding terrestrial and aquatic species.

D

Data – Facts used in an analysis.

Debris (organic) – Logs, trees, limbs, branches, leaves, bark, etc., that accumulate, often in streams or riparian areas.

Decay (decomposition) – The breakdown of organic matter, usually as a result of bacterial or fungal actions.

Decommission (roads) – Activities that result in the stabilization and restoration of unneeded roads to a more natural state. May include removal of all stream crossings and full recontour of the entire road prism, introduction of woody debris, and revegetation as needed. Fully decommissioned roads would be removed from the transportation system.

Degradation – (1) General lowering of the earth's surface by erosion or moving of materials from one place to another. (2) Reduction in value or quality.

Degrade (habitats) – Measurably change a feature at a defined scale in a way that: further reduces habitat quality, where existing conditions meet or are worse than the objective; reduces habitat quality, where existing conditions are better than the objective.

Density (stand) – The number of trees growing in a given area, usually expressed in terms of trees per acre.

Detrimental Soil Disturbance – The effects of compaction, displacement, rutting, severe burning, surface erosion, loss of surface organic matter, and soil mass movement.

Direct Effects – Impacts on the environment that are caused by the action and occur at the same time and place.

Displacement (soils) – The removal and horizontal movement of soil from one place to another, usually by mechanical forces such as dozer blades, repeated vehicular traffic, or the yarding of logs.

Disturbance – Refers to events that alter the structure, composition, or function of terrestrial or aquatic habitats. Natural disturbances include, among others, drought, floods, wind, fires, wildlife grazing, and insects and diseases. Human-caused disturbances include, among others, actions such as timber harvest, livestock grazing, roads, and the introduction of exotic species.

Dominant – A group of plants that by their collective size, mass, or number exert a primary influence on other ecosystem components.

Downed Wood – A tree or part of a tree that is dead and laying on the ground.

Duff – The partially decomposed organic material of the forest floor that lies beneath freshly fallen leaves, needles, twigs, stems, bark, and fruit.

E

Early Succession – The stage of forest stand structure created by some form of natural or human-caused disturbance such as wildfire or tree cutting. Trees in this stage consist of seedlings and saplings less than 5 inches in diameter.

Emission – A release of air contaminants into the outdoor atmosphere.

Endangered Species – A plant or animal species listed under the Endangered Species Act that is in danger of extinction throughout all or a significant portion of its range.

Environment – The combination of external physical, biological, social, and cultural conditions affecting the growth and development of organisms and the nature of an individual or community.

Erosion – The wearing away of the land surface by running water, wind, ice, gravity, or other geological activities; can be accelerated or intensified by human activities that reduce the stability of slopes or soils.

Even-aged Stands – Stands of trees of approximately the same age. Silviculture methods that generate even-aged stands include clearcutting, shelterwood, and seed tree.

Exotic – A plant or animal species introduced from a distant place; not native to the area.

F

Fines (sediment) – Sediment particles smaller than 0.2 inch. Excessive fines in streams can trap newly hatched fish and decrease the amount of water percolating through spawning gravels. High fine sediment loads slow plant growth and reduce available food, oxygen, and light.

Fire Regime – The characteristics of fire in a given ecosystem, such as frequency, predictability, intensity, and seasonality.

Floodplain – The portion of a river valley or level lowland next to streams that is covered with water when the river or stream overflows its banks.

Forage – Vegetation (both woody and non-woody) eaten by animals, especially grazing and browsing animals.

Forbs – Broad-leaf plants; includes plants that commonly are called weeds or wildflowers.

Forest Health – The condition in which forest ecosystems sustain their complexity, diversity, resiliency, and productivity to provide for specified human needs and values. It is a useful way to communicate about the current condition of the forest especially with regard to resiliency, a part of forest health that describes the ability of the ecosystem to respond to disturbances. Forest health and resiliency can be described, in part, by species composition, density, and structure.

Forest Plan (Forest Land and Resource Management Plan) – A document that guides natural resource management and establishes standards and guidelines for a National Forest; required by the National Forest Management Act.

Fragmentation (habitat) – The break-up of a large land area (such as a forest) into smaller patches isolated by a different land type and lacking corridors of appropriate vegetation to allow organisms and ecological processes to move across the landscape. The opposite of connectivity.

Fry – A recently hatched fish, after the yolk sac has been absorbed.

Fuel (fire) – Dry, dead parts of trees, shrubs, and other vegetation that can burn readily.

Fuel Ladder – Vegetation structures or conditions such as low-growing tree branches, shrubs, and other vegetation that can burn readily and contribute to crown fires (see above).

Fuel Load – The dry weight of combustible materials per unit area; usually expressed as tons per acre.

Fuel Model – A means of organizing fuels data for input into a fire behavior model. Fuel models describe the fuel complex, fuel loading, fuel bed depth, and moisture of extinction (upper limits of fuel moisture beyond which a fire would no longer spread with a uniform burning front) in such fuels as grass, shrubs, timber, and logging slash groups.

G

Game Species – Wild animals that people hunt or fish for food or recreation according to prescribed seasons and limits.

Gradient – A rate of vertical elevation change per unit of horizontal distance; also called slope.

Ground Fire – A fire that burns the organic material in the soil layer and the decayed material or peat below the ground surface.

H

Habitat – A place that provides seasonal or year-round food, water, shelter, and other environmental conditions for an organism, community or population of plants or animals.

Habitat Guild – An artificial assemblage of rare plants that have similar habitat requirements. Rare plant habitat guilds occurring in the IPNF include aquatic, peatland, deciduous riparian, wet forest, moist forest, dry forest, subalpine and cold forest.

Habitat Type – A group of plant communities having similar habitat relationships.

Harvest – (1) Felling and removal of trees from the forest; (2) removal of game animals or fish from a population, typically by hunting or fishing.

Headwaters – Beginning of a watershed; unbranched tributaries of a stream.

Historical Range of Variability (HRV) – The natural fluctuation of ecological and physical processes and functions that would have occurred during a specified period of time. In this EIS, refers to the range of conditions that are likely to have occurred prior to settlement of the project area by Euro Americans (approximately the mid-1800s), which would have varied within certain limits over time. HRV is discussed in this document only as a reference point, to establish a baseline set of conditions for which sufficient scientific or historical information is available to enable a comparison to current conditions.

Homogeneous – Regular, similar; uniform throughout.

Hydrologic – Refers to the properties, distribution, and effects of water. "Hydrology" refers to the broad science of the waters of the earth-their occurrence, circulation, distribution, and physical properties, and their reaction with the environment.

Hydrologic Unit Code (HUC) – A hierarchical coding system developed by the U.S. Geological Survey to identify geographic boundaries of watersheds of various sizes.

I

Immature Forest Structure – The stage of stand development consisting of trees between 5 and 21 inches in diameter that are less than 100 years old.

Implement – To carry out.

Improvement Cutting – The removal of less desirable trees of any species in a stand of poles or larger trees, primarily to improve composition and quality.

Indicator Species – A species that is presumed to be sensitive to habitat changes; population changes of indicator species are believed to best indicate the effects of land management activities.

Indirect Effects – Impacts on the environment that are caused by the action and are later in time or farther removed in distance but are still reasonably foreseeable.

INFS – Inland Native Fish Strategy for the Intermountain, Northern and Pacific Northwest Regions (Forest Service).

Intermittent Stream – A stream that flows only at certain times of the year when it receives water from other streams or from surface sources such as melting snow.

Invasion (plant) – The movement of a plant species into a new area outside its former range.

Irregular Shelterwood With Reserves – A shelterwood prescription cut with irregular spacing leaving individual trees and groups of trees (see Shelterwood With Reserves).

Irretrievable Commitment – A term that applies to losses of production or commitment of renewable natural resources. For example, while an area is used as a ski area, some or all of the timber production there is "irretrievably" lost. If the ski area closes, timber production could resume; therefore, the loss of timber production during the time the area is devoted to skiing is irretrievable but not irreversible, because it is possible for timber production to resume if the area is no longer used as a ski area.

Irreversible Commitment – A term that applies to non-renewable resources, such as minerals and archaeological sites. Losses of these resources cannot be reversed. Irreversible effects can also refer to effects of actions on resources that can be renewed only after a very long period of time, such as the loss of soil productivity.

Issue – A matter of controversy, dispute, or general concern over resource management activities or land uses.

L

Landscape - All the natural features such as grasslands, hills, forest, and water, that distinguish one part of the earth's surface from another part; usually that portion of land which the eye can comprehend in a single view, including all its natural characteristics.

Large Snag – A standing dead tree with a diameter at breast height of at least 21 inches.

Large Woody Debris – Pieces of wood that are of a large enough size to affect stream channel morphology.

Lethal (stand-replacing) Fires – In forests, fires in which less than 20 percent of the basal area or less than 10 percent of the canopy cover remains; in rangelands, fires in which most of the shrub overstory or encroaching trees are killed.

Long-term – Generally refers to a period longer than 10 years. The length of time is dependent upon the resource in question.

M

Maintain – (1) To continue. (2) For this document, the term is intended to convey the idea of keeping ecosystem functions, processes, and/or components (such as soil, air water, vegetation) in such a condition that the ecosystem's ability to accomplish current and future management objectives is not weakened. Management activities may be compatible with ecosystem maintenance if actions are designed to maintain or improve current ecosystem condition.

Management Direction – A statement of goals and objectives, management prescriptions, and associated standards and guidelines for attaining them.

Mass Failure (erosion) – A large land slump, in which a mass of rock or soil slips in one unit down from a cliff or slope.

Mature Forest Structure – The stage of stand development consisting of trees between 9 and 21 inches in diameter and greater than 100 years old.

Merchantable Timber – Timber that can be bought or sold.

Minimize – Apply best available technology, management practices, and scientific knowledge to reduce the magnitude, extent, and/or duration of impacts.

Mitigation – Measures designed to counteract environmental impacts or to make impacts less severe.

Monitoring – A process of collecting information to evaluate whether or not objectives of a project and its mitigation plan are being realized. Monitoring allows detection of undesirable and desirable changes so that management actions can be modified or designed to achieve desired goals and objectives while avoiding adverse effects to ecosystems.

Morphology – Form and structure.

Multiple-use Management – The management philosophy articulated by the Multiple Use-Sustained Yield Act of 1960. This law provides that the renewable resources of the National Forests are to be managed in the combination that best meets the needs of the American people. It further stipulates that the Forest Service is to make judicious use of the land for some or all of these resources and related services over areas large enough to ensure that sufficient latitude exists to subsequently adjust management in conformity with changing needs and conditions.

N

National Ambient Air Quality Standards (NAAQSs) – Standards set by the Federal Environmental Protection Agency for the maximum levels of air pollutants that can exist in the outdoor air without unacceptable effects on human health or the public welfare.

National Environmental Policy Act (NEPA) – An act of Congress passed in 1969 declaring a national policy to encourage productive and enjoyable harmony between people and the environment, to promote efforts that will prevent or eliminate damage to the environment and the biosphere and stimulate the health and welfare of people, and to enrich the understanding of the ecological systems and natural resources important to the nation, among other purposes.

National Forest Management Act (NFMA) – A law passed in 1976 requiring the preparation of Forest Service regional guides and forest plans and the preparation of regulations to guide that development.

Native – (1) one born or reared in a particular place. (2) something original or indigenous to a particular locality.

Native Species – Species that normally live and thrive in a particular ecosystem or region.

Natural Resources – Water, soil, wild plants and animals, air, minerals, nutrients, and other resources produced by the earth's natural processes.

No Action Alternative – An alternative of an EIS that would not change current management activities. NEPA requires full analysis of a no action alternative to provide a baseline for comparison of effects with those of action alternatives. Selection of the no-action alternative would not necessarily preclude a change from current conditions.

Nonlethal Fire – In forests, fires in which more than 70 percent of the basal area or more than 90 percent of the canopy cover survives; in rangelands, fires in which more than 90 percent of the vegetation cover survives (implies that fire is occurring in a herbaceous-dominated community).

Non-point Source Pollution – Pollution whose source is not specific in location; the sources of the pollutant discharge are dispersed, not well defined or constant. Examples include sediments from logging activities and runoff from agricultural chemicals.

Noxious Weed – A plant species designated by federal or state law as generally possessing one or more of the following characteristics: aggressive and difficult to manage; parasitic a carrier or host of serious insects or disease; or non-native, new, or not common to the United States.

According to the Federal Noxious Weed Act (PL 93-639), a noxious weed is one that causes disease or has other adverse effects adverse effects on man or his environment and therefore is detrimental to the agriculture and commerce of the United States and to the public health.

O

Old Growth – Forests that are distinguished by old trees and related structural attributes. They encompass the later stages of stand development that typically differ from earlier stages in characteristics such as tree age, size, number of large trees per acre and basal area. Attributes such as decadence, dead trees, the number of canopy layers and canopy gaps are also important, but are more difficult to describe because of high variability both between and among types of old growth. For example, dry old growth forests dominated by ponderosa pine differ in these attributes from moist and wet old growth forests of western hemlock and western redcedar. Methods for defining old growth in the Northern Region of the Forest Service are found in Green et al. (1992).

Openings – In this EIS, openings as described in reference to regeneration cutting units are areas that are designed to regenerate a predominantly even-aged stand of timber (this may include reserve patches and individual trees). See Vegetation project file "Authorization to Exceed 40-acre Opening Size Limitation."

Overstory – The upper canopy layer.

P

Particulates – Solid particles or liquid droplets suspended or carried in the air.

Patch – An area of uniform vegetation that differs in structure and composition from what surrounds it. Examples might include a patch of forest surrounded by a cutover area or a patch of dense young forest surrounded by a patch of open old forest.

Pattern – The spatial arrangement of landscape elements (patches, corridors, matrix) that determines the function of a landscape as an ecological system.

Perennial Stream – A stream that flows water year-round.

PM_{10} – Particulate matter that measures 10 micrometers in diameter or less, a size considered small enough to invade the alveolar regions of the lung. PM_{10} is one of six pollutants for which there is a national ambient air quality standard.

Pool – Portion of a stream where the current is slow, often with deeper water than surrounding areas and with a smooth surface texture. Often occur above and below riffles and generally are formed around stream bends or obstructions such as logs, root wads, or boulders. Pools provide important feeding and resting areas for fish.

Preferred Alternative – The alternative identified in a Draft Environmental Impact Statement that has been initially selected by the agency as the most acceptable resolution to the problems identified in the purpose and need.

Prescribed Fire – Intentional use of fire under specified conditions to achieve specific management objectives.

Prescription – A management pathway to achieve a desired objective(s).

Project Area – In this EIS, refers to National Forest lands to which decisions in the Record of Decision will apply.

Proper Functioning Condition (PFC) – Riparian and wetland areas achieve Proper Functioning Condition when adequate vegetation, landform, or large woody debris is present to dissipate stream energy associated with high water flows. Attainment of Proper Functioning Condition reduces erosion and improves water quality; filters sediment, captures bedload, and aids floodplain development; improves floodwater retention and groundwater recharge; develops root masses that stabilize streambanks against cutting action; develops diverse ponding and channel characteristics to provide habitat and water depth, duration, and temperature necessary for fish production, waterfowl breeding, and other uses; and supports greater biodiversity. The functioning condition of riparian and wetland areas is a result of the interaction of geology, soil, water, and vegetation.

Proposed action – A proposal by a federal agency to authorize, recommend, or implement an action.

Q

Qualitative – Traits or characteristics that relate to quality and can't be measured with numbers.

Quantitative – Traits or characteristics that can be measured with numbers.

R

Record of Decision (ROD) – An official document in which a deciding official states the alternative that will be implemented from a prepared Final EIS.

Recovery – (1) Return of an ecosystem to a specified condition after a disturbance; (2) return of a previously threatened or endangered species to a condition of population viability.

Recruitment Old Growth – Stands that do not yet have the characteristics of old growth but are being managed to develop those characteristics over time.

Redd – Spawning nest made by salmonid fish species in the gravel bed of a river.

Reforestation – Treatments or activities that help to regenerate stands of trees after disturbances such as harvest or wildfire. Typically, reforestation activities include preparing soil, controlling pests, and planting seeds or seedlings.

Regeneration – The process of establishing new plant seedlings, whether by natural means or artificial measures (planting).

Regeneration Cutting - For this EIS**,** this technique involves removing most of the trees for the purpose of providing growing space for planted or natural seedlings. Both live and dead trees would be retained in an irregular spacing to provide wildlife habitat, maintain visual quality, provide shelter for seedlings, provide a seed source for natural regeneration, and provide woody debris for long-term site productivity. Generally, less than 30% of the trees would remain on these areas. The resulting view would be an open stand with scattered standing trees and patches of trees. Most of these trees would remain on site for a considerable time after seedlings have established. The size of open areas would range from approximately five acres to several hundred acres. Logging slash and other debris would be treated, where necessary, to reduce the fire hazard and to prepare the sites for reforestation. Prescribed fire or mechanical methods would be used. Most of the areas would be reforested with western larch, ponderosa pine and/or white pine. Silvicultural prescriptions may include irregular shelterwood with reserves, seed tree with reserves, final removal with reserves and shelterwood.

Rehabilitation – 1) In the West Gold project, several forest stands have been decimated by root disease and insect attack. Rehabilitation of these stands would include removal of a small number of trees per acre followed by slashing of the brush and seedling/sapling grand fir and Douglas-fir to create a fuel bed for burning. Burning would prepare the stands for reforestation with desired tree seedlings. Rehabilitation and reforestation in the West Gold project area would be used where there are already large openings created by root disease and insect attack. 2) Relating to visual quality objectives (VQOs), rehabilitation is a short-term management alternative used to restore landscapes containing views that do not meet VQOs to a desired visual quality.

Resilient, Resilience, Resiliency – (1) The ability of a system to respond to disturbances. Resiliency is one of the properties that enable the system to persist in many different states or successional stages. (2) In human communities, refers to the ability of a community to respond to externally induced changes such as larger economic or social forces.

Restoration – Holistic actions taken to modify an ecosystem to achieve desired, healthy and functioning conditions and processes. Generally refers to the process of enabling the system to resume acting or continue acting following disturbance as if the disturbance were absent.

Restoration management activities can be either active (such as control of noxious weeds, thinning of over-dense stands of trees, or redistributing roads) or more passive (more restrictive, hands-off management direction that is primarily conservation-oriented).

Revegetation – Establishing or re-establishing desirable plants on areas where they are absent or of inadequate density, by management alone (natural revegetation) or by seeding or transplanting (artificial revegetation).

Riffle – Relatively shallow section of a stream or river with rapid current and a surface broken by gravel, rubble or boulders.

Riparian Area – Area with distinctive soil and vegetation characteristics between a stream or other body of water and the adjacent upland; includes wetlands and those portions of floodplains and valley bottoms that support riparian vegetation.

Road Work, Road Maintenance - Includes, as needed, installation of rolling dips, installation of relief culverts, rolling the road grade for increased drainage, armoring of culvert catch basins and outlets, and adding gravel surfacing, replacing existing stream crossings, cut and fill slope stabilization, and removal of encroaching road fills.

S

Salmonid – One of a number of fishes of the genus *Onchorhynchus* of the North Pacific, which ascend freshwater streams to spawn. Bull char (commonly known as bull trout) are salmonids.

Salvage – The harvest of trees that are dead, dying, or deteriorating due to fire, wind, insect or other damage or disease.

Scale – (1) The level of resolution under consideration (for example, broad scale or fine scale); (2) the ratio of length on a map to true length.

Scoping – The early stages of preparation of an environmental impact statement, used to solicit public opinion, receive comments and suggestions, and determine the issues to be considered in the development and analysis of a range of alternatives. Scoping may involve public meetings, telephone conversations, mailings, letters, or other contacts.

Sediment – Solid materials, both mineral and organic, in suspension or transported by water, gravity, ice, or air; they may be moved and deposited away from their original position and eventually will settle to the bottom of the stream.

Seed Trees – Mature trees left standing after timber harvest to provide seeds to regenerate the new stand; seed tree cutting is a harvest prescription.

Seed Tree With Reserves – a cutting method in which some or all of the seed trees are retained after regeneration has become established to attain goals other than regeneration.

Selective Cutting – a cutting method that removes only a portion of trees in a stand. For this EIS, this technique would remove trees in areas where there is the opportunity to maintain or enhance the health, growth, or wind firmness of desired existing trees. Trees removed would generally be smaller or less dominant trees in the stand, species not desired for future stand composition, or diseased or dead trees that are not needed to meet future stand objectives. Trees removed would provide growing space for the remaining trees. These stands would generally not be open enough to allow for successful establishment of desired tree species. The number of trees remaining in these areas would vary, but stands would generally have the appearance of being thinned. Fuel hazards may be reduced by use of fire or mechanical methods where appropriate. Silvicultural prescriptions may include treatments such as thinning, improvement cutting and salvage cutting.

Sensitive Species – Species identified by a Forest Service Regional Forester for which population viability is a concern either (a) because of significant current or predicted downward trends in

population numbers or density, or (b) because of significant current or predicted downward trends in habitat capability that would reduce a species' existing distribution.

Seral – Refers to the stages that plant communities go through during succession. Development stages have characteristic structure and plant species composition. Early seral refers to plants that are present soon after a disturbance or at the beginning of a new successional process (such as seedling or sapling growth stages in a forest); mid seral in a forest would refer to pole or medium sawtimber growth stages; late or old seral refers to plants present during a later stage of plant community succession (such as mature and old forest stages).

Shade-tolerant – Species of plants that can develop and grow in the shade of other plants. Generally these are fire-intolerant species.

Shelterwood – Prescription that cuts most trees in a stand, leaving those needed to create sufficient shade to produce a new age class in a moderated microenvironment.

Shelterwood Removal Cut – A final removal that releases established regeneration from competition with overstory trees after they are no longer needed for shelter under the shelterwood regeneration method. If the removal is a sequence of a shelterwood with reserves regeneration method, reserve trees are retained during the final removal cut.

Shelterwood With Reserves – Prescription where some or all of the shelter trees in a shelterwood harvest unit are retained after regeneration has become established to attain goals other than regeneration.

Short-term – Generally refers to a period of 10 years or less.

Silviculture – The practice of manipulating the establishment, composition, structure, growth, and rate of succession of forests to accomplishment specific objectives.

Site – A specific location of an activity or project, such as a campground, a lake, or a stand of trees to be harvested.

Snag – A standing dead tree, usually larger than five feet tall and six inches in diameter at breast height. Snags are important habitat for a variety of wildlife species and their prey.

Soil – The earth material that has been so modified and acted upon by physical, chemical and biological agents that it will support rooted plants.

Soil Disturbance – Disturbance of the soil surface from activities such as road construction or reconditioning, tree skidding and fuels treatment. In this EIS, used to describe effects of the alternatives on soil productivity.

Soil Productivity - The capacity of a soil to produce plant growth, due to the soil's chemical, physical, and biological properties (such as depth, temperature, water-holding capacity, and mineral, nutrient, and organic matter content).

Spatial – Related to or having the nature of space.

Spawning Habitat – Areas used by adult fish for laying and fertilizing eggs.

Species – A population or series of populations of organisms that can interbreed freely with each other but not with members of other species.

Specified Road – A road with specific features designed by Forest Service engineers and included in the timber sale contract.

Stand – A group of trees in a specific area that is sufficiently alike in composition, age, arrangement, and condition to be distinguishable from the forest in adjoining areas.

Stand Composition – The species of vegetation that make up a stand.

Stand Density – Refers to the number of trees growing in a given area, usually expressed in trees per acre.

Stand-replacing Fire – See lethal fire.

Stand Structure – The mix and distribution of tree sizes, layers and ages in a forest. Some stands are all one size (single-story), some are two-story, and some are a mix of trees of different ages and sizes (multi-story).

Step-down – In this EIS, refers to the process of applying broad scale science findings and land use decisions to site-specific areas using a hierarchical approach of understanding current resource conditions, risks and opportunities.

Storage (roads) - Includes removal and recontour of all stream crossings and, as needed, recontour of unstable fill slopes, cutslope stabilization, ripping the road tread, installation of no-maintenance cross ditches, and revegetation. Storage also includes some kind of road closure method such as with a guardrail barrier, gate, an earthen berm, or a short section of full recontour. These roads would remain as classified roads on the transportation system.

Structure – the size and arrangement, both vertically and horizontally, of vegetation.

Structural Stage – A stage of development of a vegetation community that is classified on the dominant processes of growth, development competition, and mortality.

Subbasin – A drainage area of approximately 800,000 to 1,000,000 acres, equivalent to a 4th-field hydrologic unit code (HUC). Hierarchically, subwatersheds (6th-field HUC), which in turn are contained within a watershed (5th-field HUC), which in turn are contained within a subbasin (4th-field HUC). This concept is shown graphically in Figure 2-1.

Substrate – The soil or underlying rock on which an organism is growing or to which it is attached.

Subwatershed – A drainage area of approximately 20,000 acres, equivalent to a 6th-field Hydrologic Unit Code (HUC). Hierarchically, subwatersheds (6th-field HUC) are contained within watershed (5th-field HUC), which in turn contained within a subbasin (4th-field HUC). This concept is shown graphically in Chapter 2.

Succession – A predictable process of changes in structure and composition of plant and animal communities over time. Conditions of the prior plant community or successional stage create conditions that are favorable for the establishment of the next stage. The different stages in succession are often referred to as seral stages.

Surface Fire – A fire that burns surface litter, dead woody fuels, other loose debris on the forest floor, and some small vegetation, without significant movement into the overstory, usually with a flame less than a few feet high.

Sustainability – (1) Meeting the needs of the present without compromising the abilities of future generations to meet their needs; emphasizing and maintaining the underlying ecological processes that ensure long-term productivity of goods, services, and values without impairing productivity of the land. (2) In relation to snags, it refers to the continuous production of snags over the long-term.

T

Temporary Roads - Those roads not intended to be retained for long-term management.

Terrestrial – Pertaining to the land.

Thermal cover – Cover used by animals to protect them against weather.

Thinning – An operation to remove stems from a forest for the purpose of reducing fuel, maintaining stand vigor, regulating stand density/composition, or for other resource benefits.

Threatened Species – Species listed under the Endangered Species Act that are likely to become endangered within the foreseeable future throughout all or a significant portion of their range.

Topography – Physical features of the ground surface such as hills, plains, mountains and steepness of slope.

Tribe – Term used to designate any Indian tribe, band, nation or other organized group or community (including any Alaska Native village or regional or village corporation as defined in or established pursuant to the Alaska Native Claims Settlement Act) that is recognized as eligible for the special programs and services provided by the United States to Indians because of their status as Indians.

U

Unclassified Road – A road on National Forest land that is not managed in the forest transportation system.

Underburn – A burn by a surface fire that can consume ground vegetation and ladder fuels.

Understory – Plants that grow beneath the canopy of other plants. Usually refers to grasses, forbs, and low shrubs under a tree or shrub canopy.

Uneven-aged Silvicultural Systems – Methods of forest management in which trees of different species in a given stand are maintained at many ages and sizes to permit continuous natural regeneration. Selective cutting is one example of an uneven-aged management method.

Ungulates – Hoofed, plant-eating mammals such as elk, deer and cattle.

V

Viability – In general, viability means the ability of a population of a plant or animal species to persist for some specified time into the future. For planning purposes, a *viable population* is one

that has the estimated numbers and distribution of reproductive individuals to ensure that its continued existence will be well distributed in the planning area.

Viable Population – A population that is regarded as having the estimated numbers and distribution of reproductive individuals to ensure that its continued existence is well distributed in the project area.

Visual Resources – The visible physical features of a landscape.

W

Water Quality Limited – A Clean Water Act classification for waters where application of best management practices or technology-based controls are not sufficient to achieve designated water quality standards.

Watershed – (1) The region draining into a river, river system, or body of water. (2) In this EIS, a watershed also refers specifically to a drainage area of approximately 50,000 to 100,000 acres, which is equivalent to a 5th-field Hydrologic Unit Code (HUC). Hierarchically, subwatersheds (6th-field HUC) are contained within a watershed (5th-field HUC), which in turn is contained within a subbasin (4th-field HUC). This concept is shown graphically in Figure 2-1.

Weed – A plant considered undesirable, unattractive, or troublesome, usually introduced and growing without intentional cultivation.

Wetland – In general, an area soaked by surface or groundwater frequently enough to support vegetation that requires saturated soil conditions for growth and reproduction; generally includes swamps, marshes, springs, seeps, bogs, wet meadows, mudflats, natural ponds, and other similar areas.

Wildfire – A human or naturally caused fire that does not meet land management objectives.

Woody – Composed of wood or woody fibers.

Appendix H – List of SEIS Recipients

The following agencies, organizations and individuals were mailed a copy of this Final SEIS in paper or compact disc format, received only the Summary as requested, or planned to view the document on the Idaho Panhandle National Forests internet website.

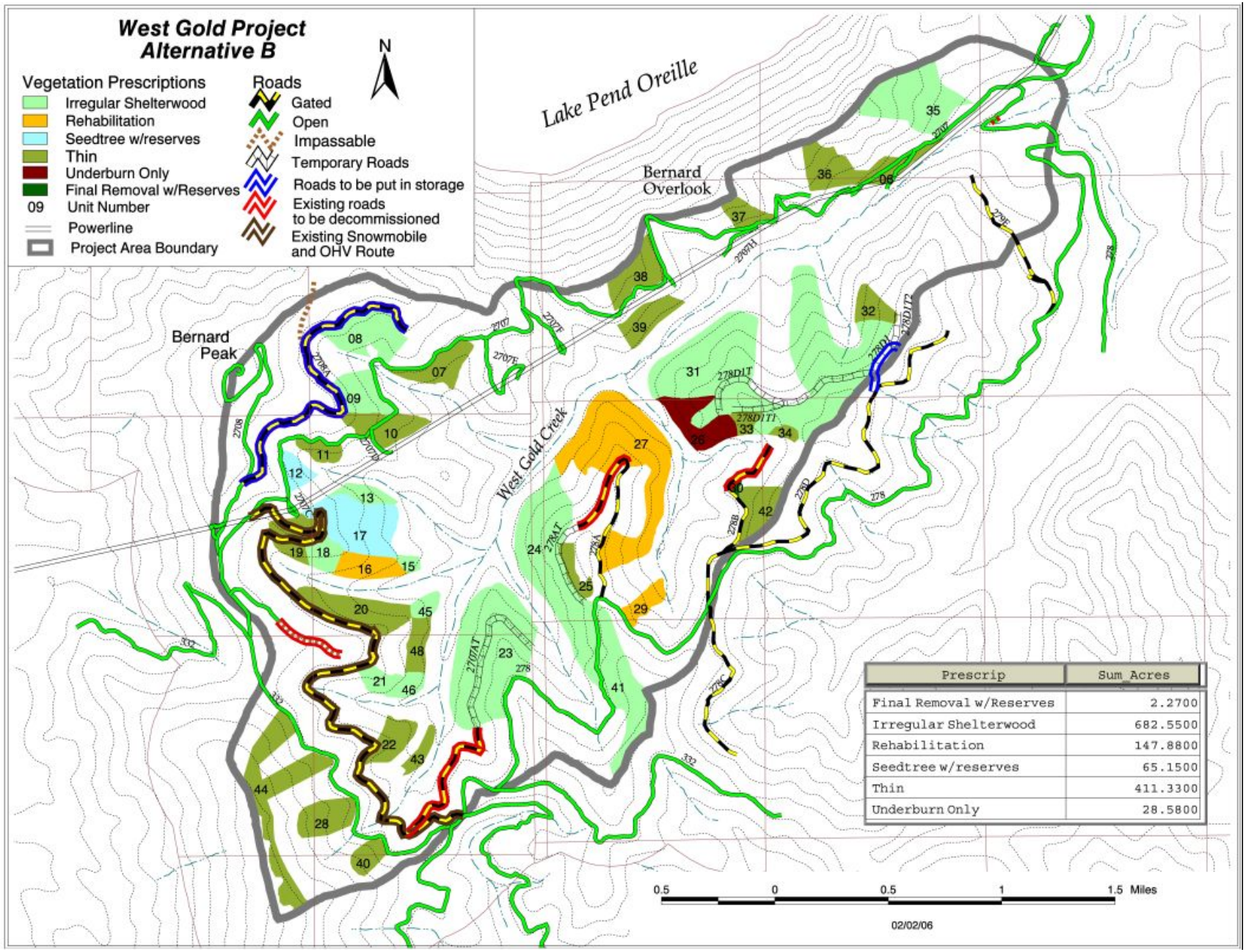
Organization	Last Name	First Name
ENVIRONMENTAL PROTECTION AGENCY		EIS REVIEW COORDINATOR
US ENVIRONMENTAL PROTECTION AGENCY	EIS FILING SECTION	OFFICE OF FEDERAL ACTIVITIES
USDA FOREST SERVICE	ECOSYSTEM MANAGEMENT COORDINATOR	
USDA NATL AGRIGULTURAL LIBRARY		HEAD ACQ & SERIALS BRANCH
USDI FISH & WILDLIFE SERVICE	MARTIN	SUSAN
IDAHO DEPARTMENT OF ENVIRONMENTAL QUALITY	BERGQUIST	JUNE
IDAHO FISH AND GAME	CORSI	CHARLES
OFFICE OF CIVIL RIGHTS	POLICY AND PLANNING DIVISION	USDA
OFFICE OF ENVIRONMENTAL AFFAIRS	DEPARTMENT OF INTERIOR	
US ENVIRONMENTAL PROTECTION AGENCY	EIS FILING SECTION	OFFICE OF FEDERAL ACTIVITIES
IDAHO NATIVE PLANT SOCIETY	HOUGH	PHIL
IDAHO CONSERVATION LEAGUE	OPPENHEIMER	JONATHAN
ALLIANCE FOR THE WILD ROCKIES	SEDLER	LIZ
WILDWEST INSTITUTE	JUEL	JEFF
THE LANDS COUNCIL	ELLERSICK	TANIA
KOOTENAI ENVIRONMENTAL ALLIANCE	MIHELICH	MIKE
HAPPY HERMIT RESORT	UTZ	RONALD
	LANG	BUD
	DANFORTH	RON & GAIL
	LAUER	FRAN
	DOYLE	JANICE

NOTE

Appendix I (Maps and Graphics) is not bound into this document but should be included with the FSEIS. If you did not receive this Appendix, please call A.J. Helgenberg at 208-265-6643.

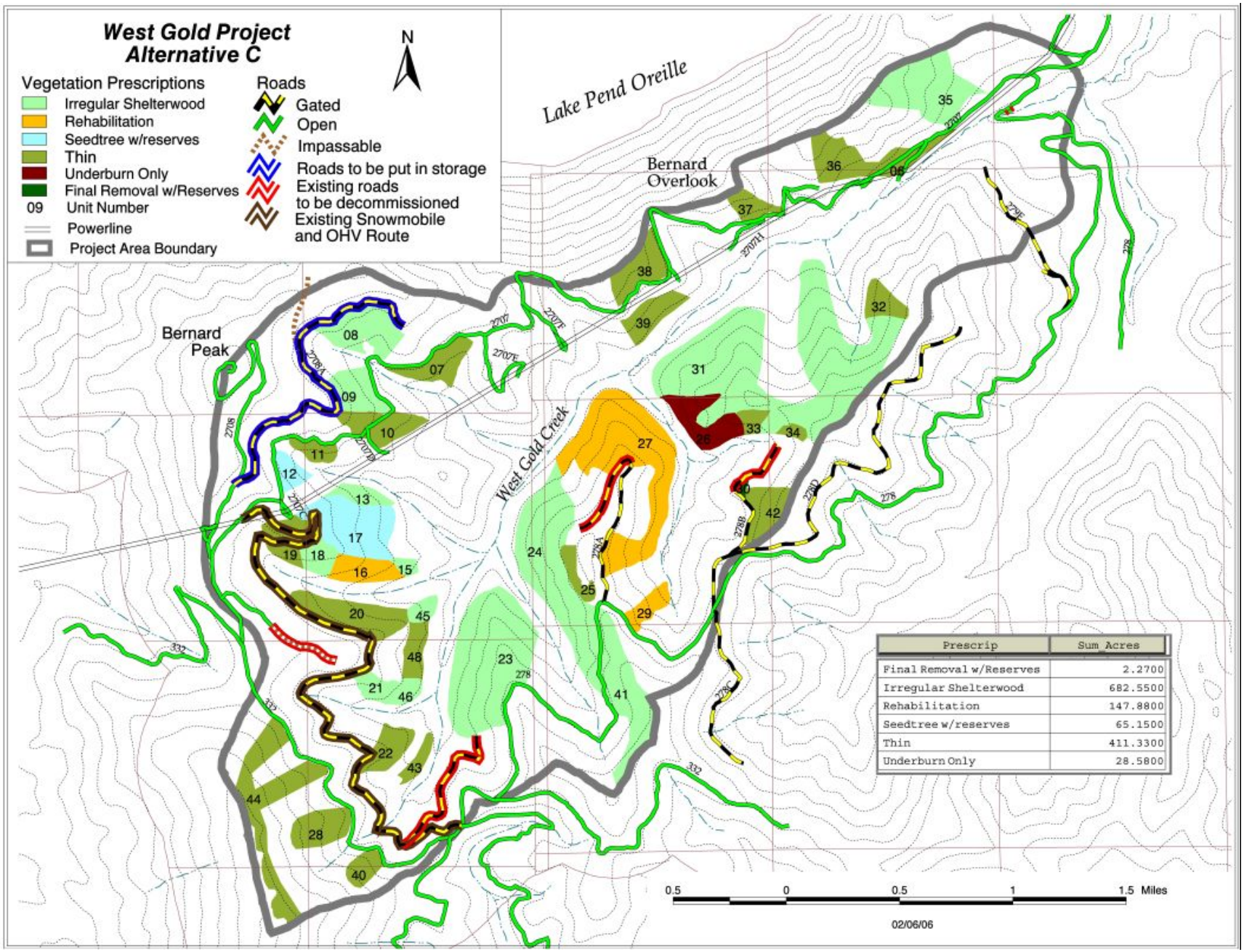
Appendix I - Color Maps and Graphics

For ease of production and collation, only the color maps and graphics are located in this section. **All other figures are located in the main document.** See the Table of Figures at the beginning of the Final SEIS.



Prescrip	Sum Acres
Final Removal w/Reserves	2.2700
Irregular Shelterwood	682.5500
Rehabilitation	147.8800
Seedtree w/reserves	65.1500
Thin	411.3300
Underburn Only	28.5800

Figure 3. Proposed road construction, decommissioning, and vegetation prescriptions in Alternative B. Thinning is a selective cutting prescription. All other prescriptions except underburning are regeneration cutting prescriptions.



Prescrip	Sum Acres
Final Removal w/Reserves	2.2700
Irregular Shelterwood	682.5500
Rehabilitation	147.8800
Seedtree w/reserves	65.1500
Thin	411.3300
Underburn Only	28.5800

Figure 4. Proposed road decommissioning and vegetation treatment in Alternative C. Thinning is a selective cutting prescription. All other prescriptions except underburning are regeneration cutting prescriptions.

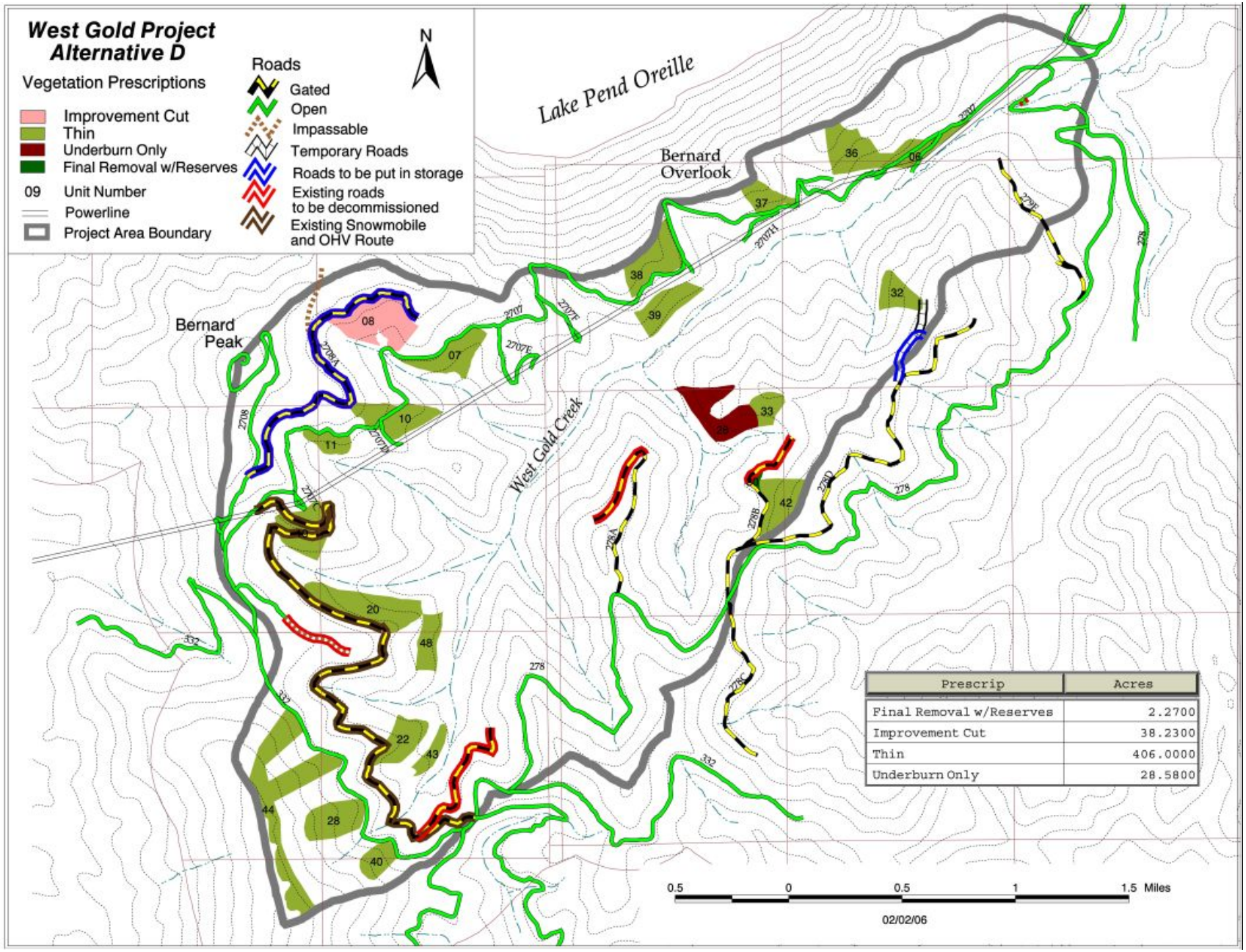


Figure 5. Proposed road construction, decommissioning, and vegetation prescriptions in Alternative D. Final removal with Reserves is the only regeneration cutting proposed.

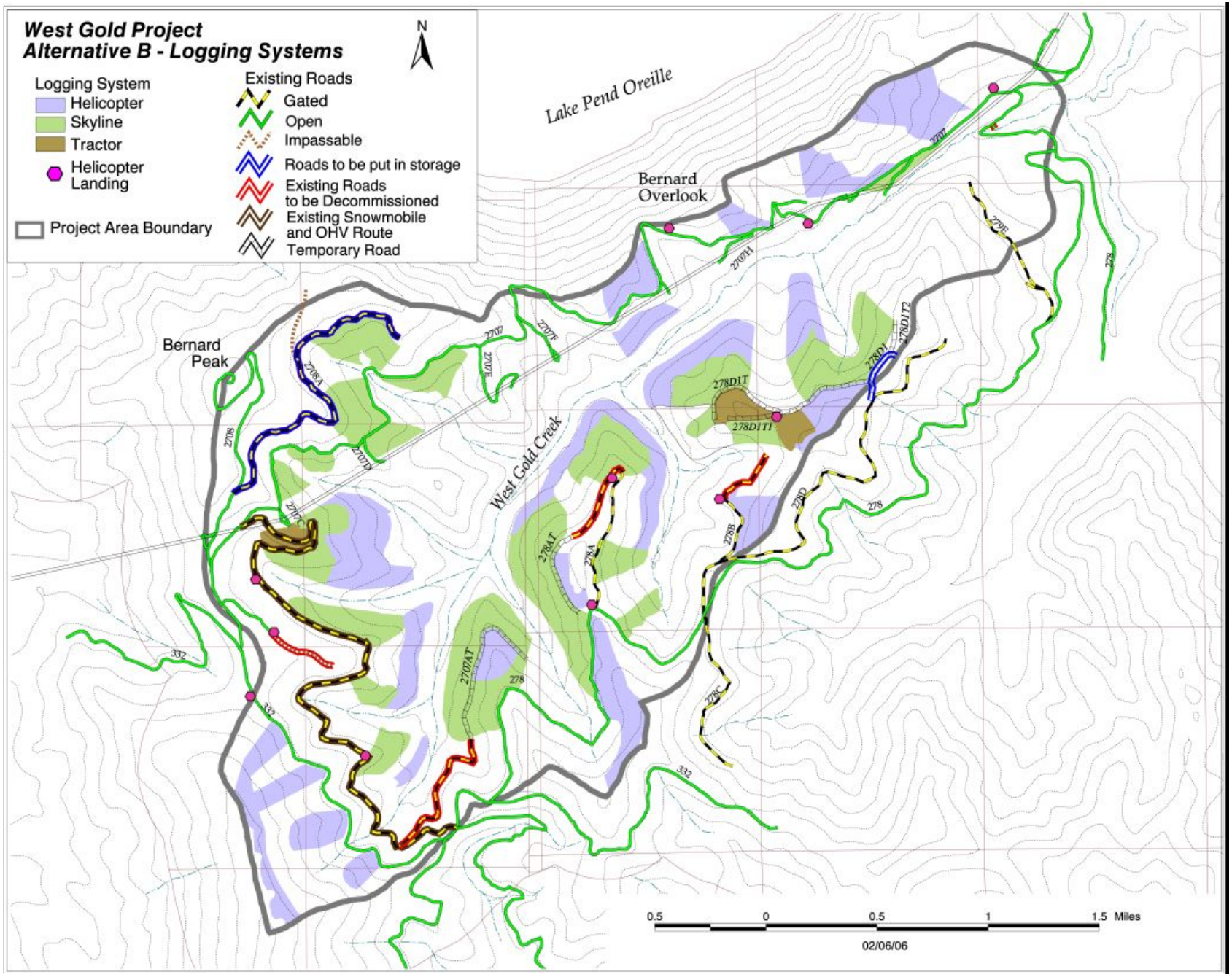


Figure 6. Alternative B - Logging Systems

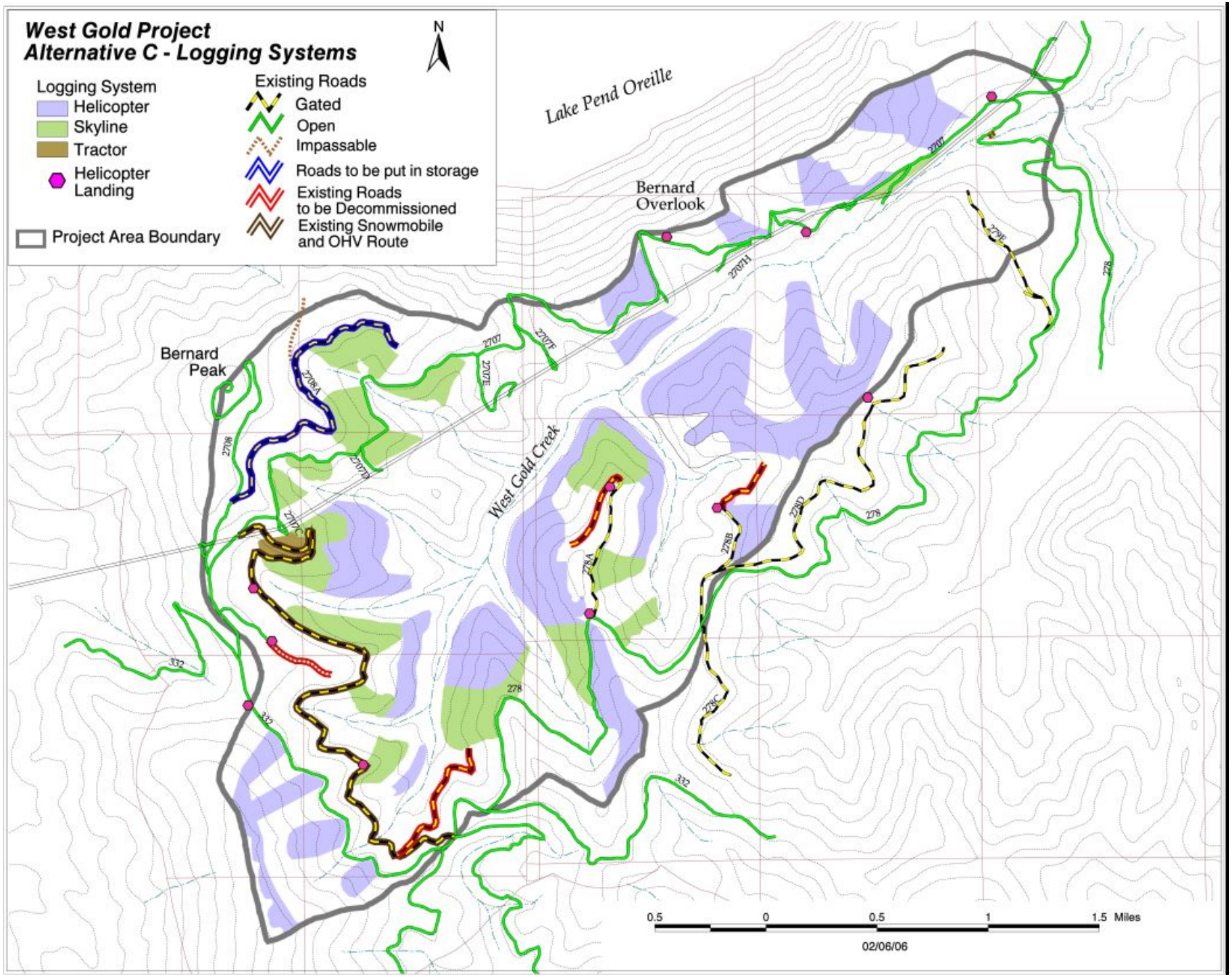


Figure 7. Alternative C - Logging Systems.

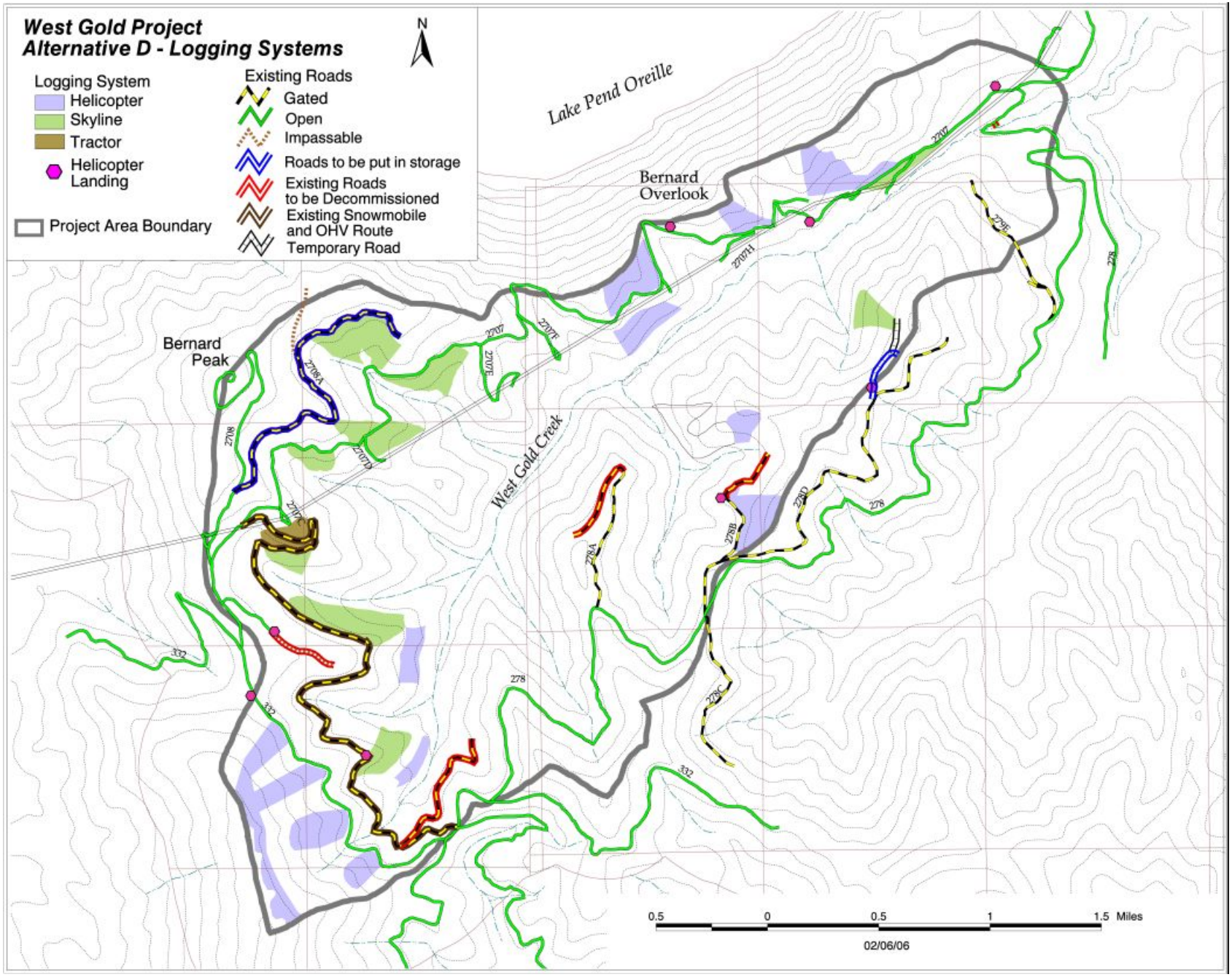
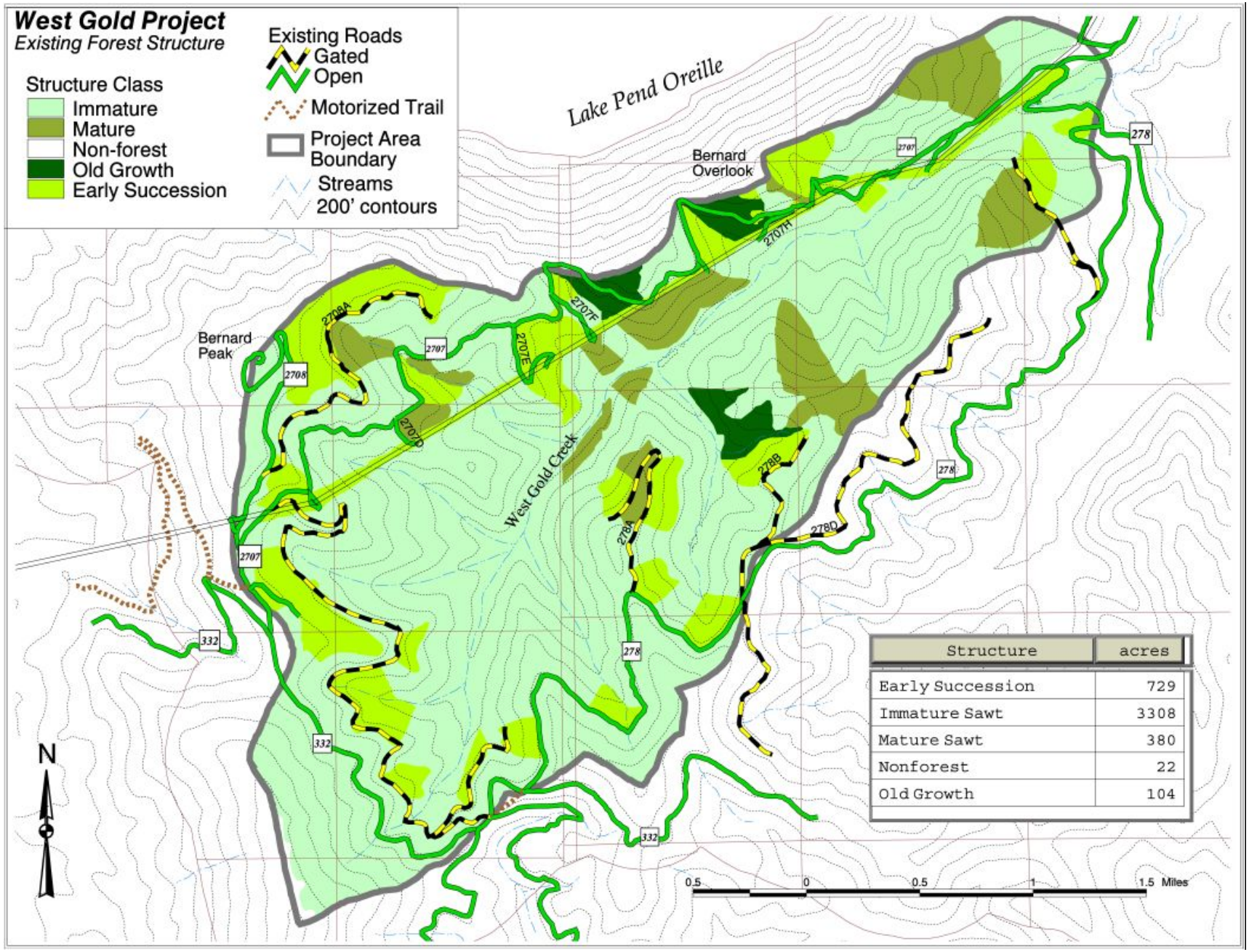
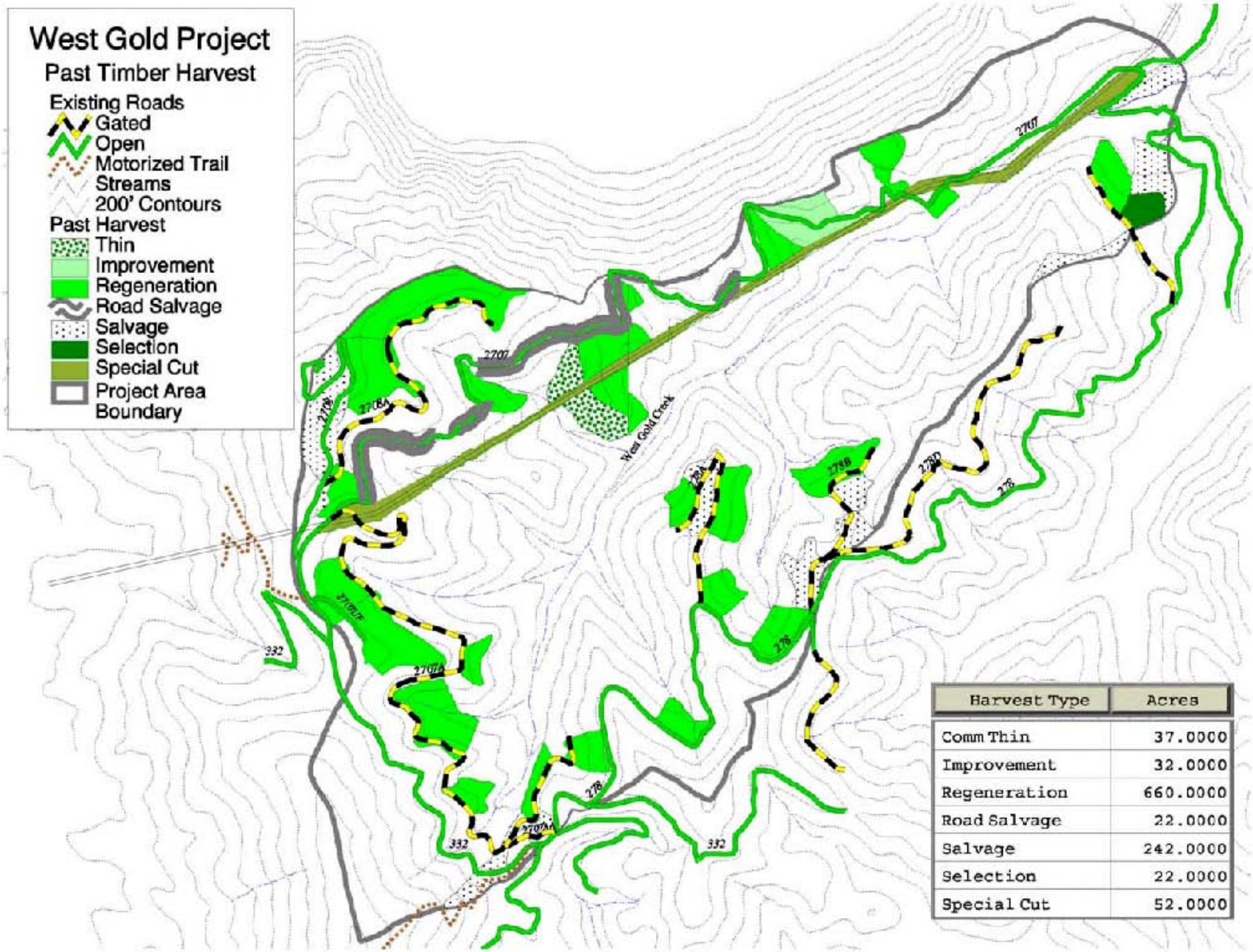


Figure 8. Alternative D Logging Systems.



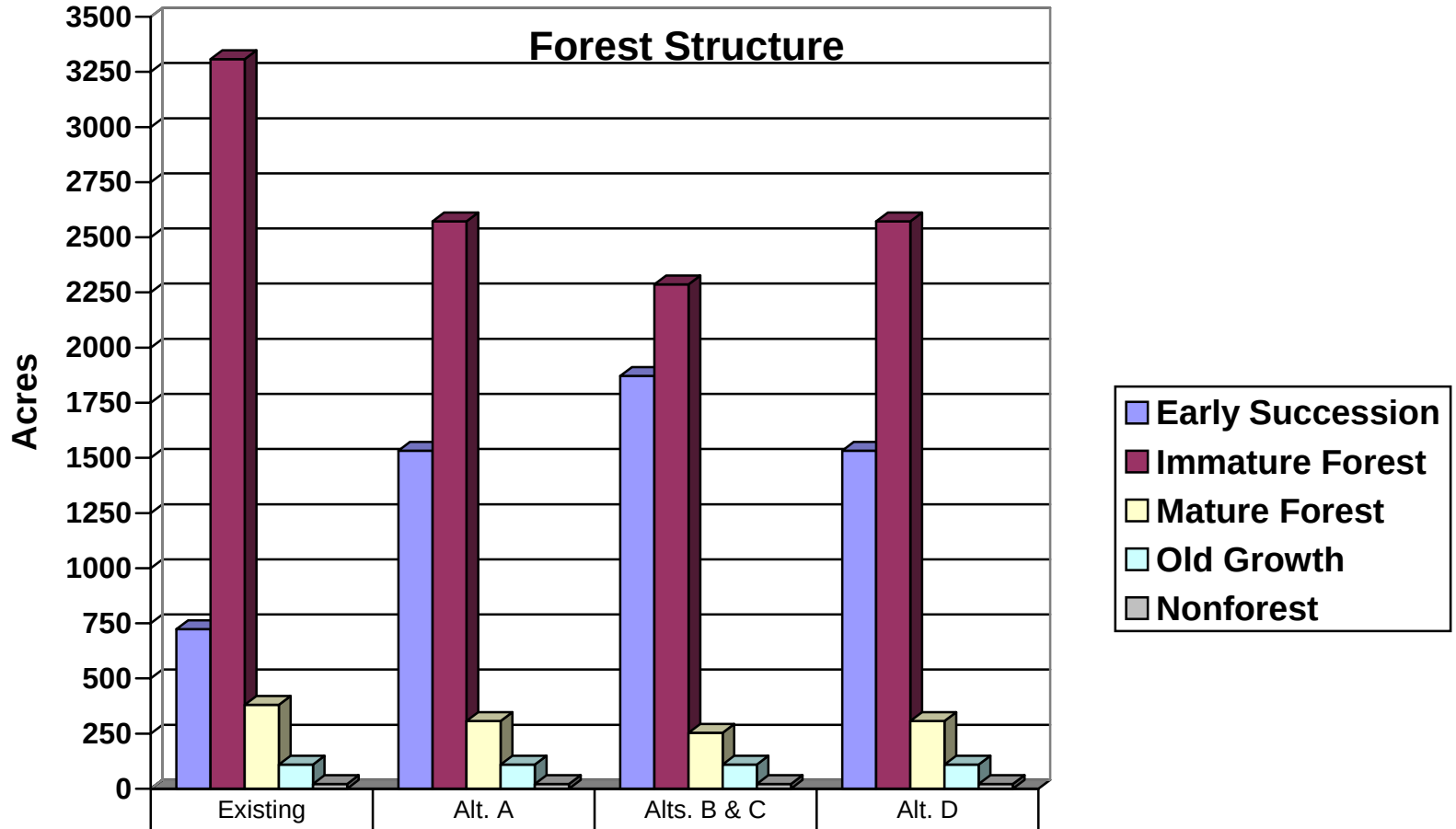
Structure	acres
Early Succession	729
Immature Sawt	3308
Mature Sawt	380
Nonforest	22
Old Growth	104

Figure 10. Existing forest structure in the West Gold project area.



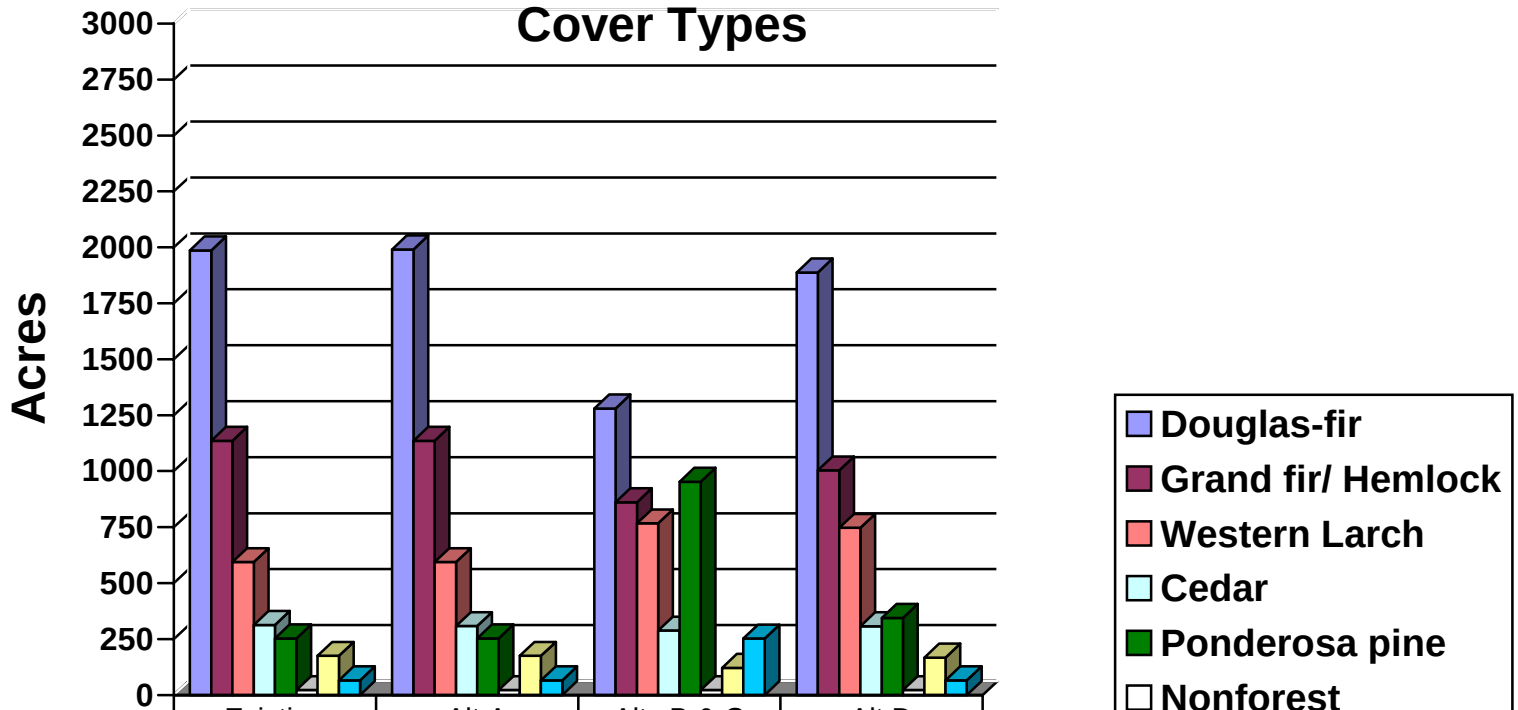
Harvest Type	Acres
Comm Thin	37.0000
Improvement	32.0000
Regeneration	660.0000
Road Salvage	22.0000
Salvage	242.0000
Selection	22.0000
Special Cut	52.0000

Figure 11. Past National Forest timber harvest. Refer to figure 10 to see current stand structure of these past harvests.



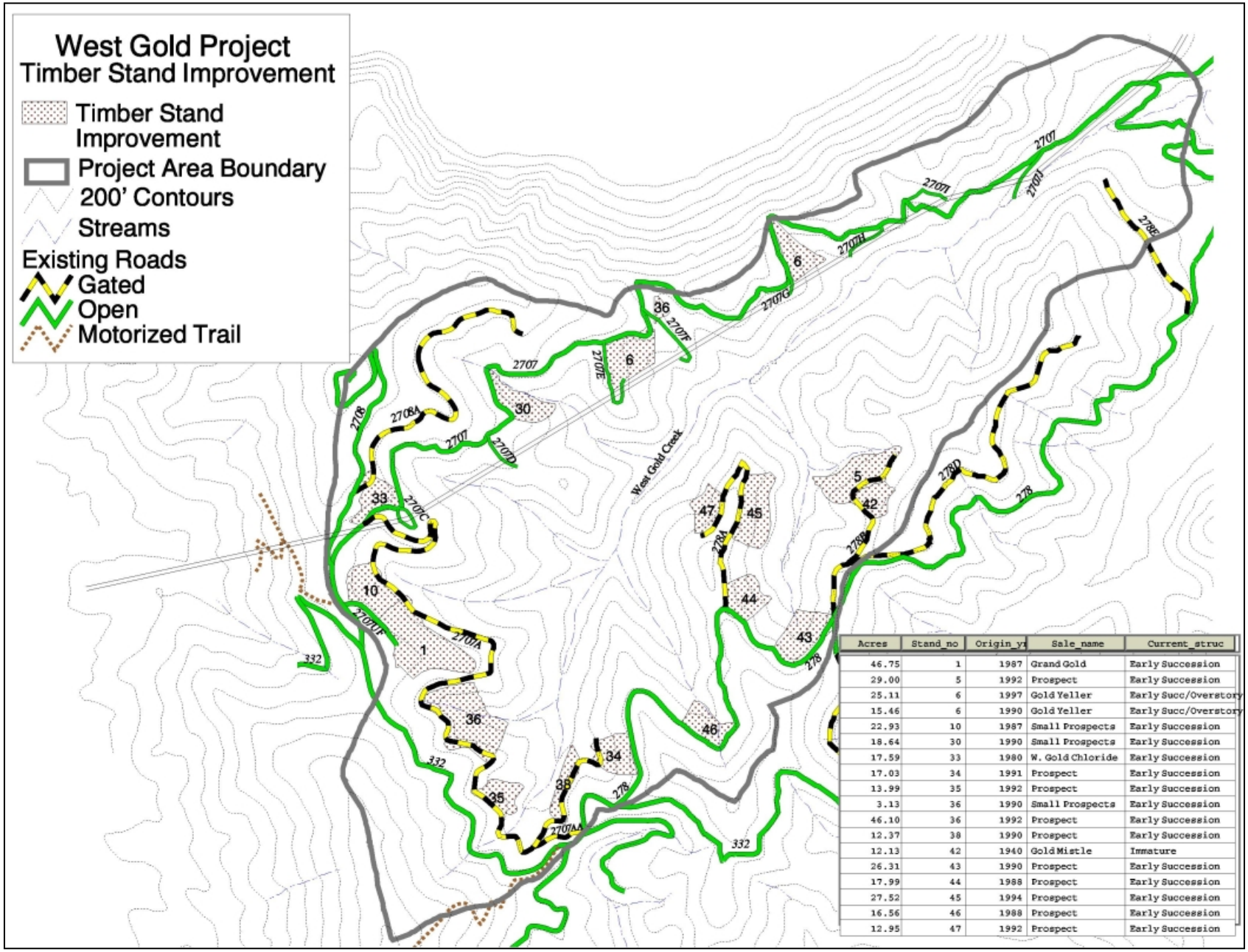
	Existing	Alt. A	Alts. B & C	Alt. D
Early Succession	723	1,532	1,871	1,532
Immature Forest	3,308	2,572	2,287	2,572
Mature Forest	380	307	253	307
Old Growth	110	110	110	110
Nonforest	22	22	22	22

Figure 12. A comparison between acres of existing forest structure in the project area and resulting forest structure with each alternative.



	Existing	Alt A	Alts B & C	Alt D
Douglas-fir	1,986	1,991	1,280	1,888
Grand fir/ Hemlock	1,135	1,135	861	1,003
Western Larch	594	594	767	747
Cedar	313	308	288	307
Ponderosa pine	253	253	952	344
Nonforest	22	22	22	22
Lodgepole pine	175	175	121	167
White Pine	65	65	252	65

Figure 13. A comparison between acres of existing forest cover types in the project area and resulting forest cover types with each alternative.



Acres	Stand_no	Origin_yr	Sale_name	Current_struc
46.75	1	1987	Grand Gold	Early Succession
29.00	5	1992	Prospect	Early Succession
25.11	6	1997	Gold Yeller	Early Succ/Overstory
15.46	6	1990	Gold Yeller	Early Succ/Overstory
22.93	10	1987	Small Prospects	Early Succession
18.64	30	1990	Small Prospects	Early Succession
17.59	33	1980	W. Gold Chloride	Early Succession
17.03	34	1991	Prospect	Early Succession
13.99	35	1992	Prospect	Early Succession
3.13	36	1990	Small Prospects	Early Succession
46.10	36	1992	Prospect	Early Succession
12.37	38	1990	Prospect	Early Succession
12.13	42	1940	Gold Mistle	Immature
26.31	43	1990	Prospect	Early Succession
17.99	44	1988	Prospect	Early Succession
27.52	45	1994	Prospect	Early Succession
16.56	46	1988	Prospect	Early Succession
12.95	47	1992	Prospect	Early Succession

Figure 14. Map showing future timber stand improvement

Appendix J – Response To Public Comments and Agency Letters Received

Response to Public Comments

Introduction

This appendix 1) lists the names of individuals, agencies and organizations that commented; 2) explains how public comments were received, processed and evaluated; 3) shows the individual comments received and our responses to them; and 4) provides entire copies of the federal and state agency letters we received. Public involvement activities to date are described in Chapter II, Public Involvement.

Processing and Evaluating Public Comments

We received ten comment letters on the DSEIS. Of these, four were from environmental groups, three were from property owners in the Lakeview area, and three were from Federal and State agencies.

All respondents are identified by a mailing list identification number. The names of all respondents and their identification numbers are listed below.

We used content analysis to categorize all substantive comments, issues and ideas. As comment letters were received, they were date-stamped and copies were distributed to the decision maker and the interdisciplinary team for review. The letters were then prepared for the content analysis process--substantive comments were coded, then grouped into categories by subject. Substantive comments are those comments that express a specific concern relating to the proposed project. Statements contributing extraneous information or issues not specific to the project were not considered. Comments received that had to do with forest plan revision and forest plan monitoring issues not relevant to the West Gold project were deemed outside the scope of this project and were also not considered.

Comments were sorted by category so that specialists could identify similar comments and easily respond to comments pertaining to their expertise. Similar comments presented by several people or comments that were extremely lengthy were summarized (as per FSH 1909.15 section 24.1). The comments we received provided the basis for changing features of the original alternatives presented in the DSEIS, adding and/or changing design features and analyses, and making clarifications in the FSEIS.

The comment letter received from the WildWest Institute and the Alliance for the Wild Rockies is 143 pages long. The first 25 pages of this letter contain comments specifically directed toward the DSEIS. These comments were considered as outlined above. The balance of the letter from the WildWest Institute and the Alliance for the Wild Rockies includes the joint appeal filed by the Ecology Center, Lands Council and Kootenai Environmental Alliance in 2003; the appeal filed by the Alliance for the Wild Rockies in 2003; the comments submitted jointly in 2002 on the original West Gold Project DEIS by of the Ecology Center, Idaho Sporting Congress, and Alliance for the

Wild Rockies; and the comments submitted in 2002 by the Lands Council on behalf of the Upper Columbia River of the Sierra Club and Forest Conservation Center. The issues raised in the appeals were considered individually to determine whether they warranted further assessment. The original DEIS-specific comments were addressed and considered in the original FEIS.

List of Respondents

The following individuals, groups, and agencies submitted comments on the West Gold DSEIS. The number next to each name corresponds to the respondent's mailing list identification number. These numbers help identify the source of each comment.

1	U.S. Department of the Interior
2	J. Oppenheimer, Idaho Conservation League
3	Liz Sedler, Alliance for the Wild Rockies
3a	Liz Sedler, Alliance for the Wild Rockies Appeal Issues - 2002
4	Mike Mihelich, Kootenai Environmental Alliance
5	Jeff Juel, The WildWest Institute
5a	Jeff Juel, The WildWest Institute – Ecology Center Appeal Issues - 2002
6	Happy Hermit Resort
7	Idaho Department of Fish and Game
8	U.S. Environmental Protection Agency
9	Robert Danforth
10	Janice Doyle

Responses to Comments

Comments are displayed in italics and organized by subject in alphabetical order. All responses are in bold type. Letters from State and Federal agencies are included in their entirety later in this section as required. Responses to comments from these letters are included with other comments below.

Subjects by page number:

Alternatives 3
Aquatics 4
Available Information and Literature Cited 29
Clearcuts/Exceeding 40-acre Opening Limit 30
Finances 30
Fire and Fuels 31
Forest Plan 32
Local Access 32
Noxious Weeds 34
OHV Route 36
Old Growth 36
Roads and Roadless Areas 43
Salvage 44
Sensitive Species 44
Soils 44
Vegetation 49
Wildlife 50

Alternatives

2 *The Forest Service is proposing to implement Alternative B under the West Gold project proposal. We believe that it is in the best interest of the public, fish and wildlife, and the Forest Service to select Alternative C in lieu of the proposed alternative. As the finances analysis points out in the SEIS for the project, all "action" alternatives would be economically viable (SEIS, III-172). Selection of Alternative C over Alternative B would still enable the Forest Service to accomplish the purpose and need of the project, while simultaneously limiting the negative environmental effects of the project.*

2 *…not constructing any new roads would benefit wildlife species in the area. Implementation of Alternative C would not lead to the construction of roads in capable flammulated owl habitat (SEIS, III-101). Managing for flammulated owls will also benefit black-backed woodpeckers (SEIS, III-104), which require similar habitat needs.*

7 *IDFG agrees with and supports the Project goals and objectives to restore our forests to a more natural and healthy species composition…we would like to re-emphasize that it is imperative to protect West Gold Creek and potentially impacted segments of Gold Creek from any adverse impacts (sediment, temperature increases, etc.), to the greatest extent possible, in order to protect bull trout and westslope cutthroat trout.*

…we could support Alternative C. Alternative C would cause a smaller increase in sediment and for a shorter duration than would Alternative B. Although Alternative D would potentially have less impact than either Alternative B or C, we agree with your assessment that it would not meet your restoration goals within a reasonable time, which may lead to increased disease problems and the potential for uncontrolled fire.

RESPONSE: All projects start with a "proposed action"— a plan that is put forth to the public to best achieve our objectives or "purpose and need." It is not until we receive comments from the public on that proposed action that we determine what issues or concerns the public has. These comments lead us to develop alternatives to the proposed action, which provide the basis for comparing effects.

When we designed the proposed action for the West Gold project, we designed it to include temporary roads that we believed would have little impact on the watershed, and would achieve our objectives more efficiently and economically than not having new roads and requiring more use of helicopter logging. Alternative C, which essentially is the same as the proposed action but without the temporary road construction, was developed upon receiving comments concerned with the effects of road construction on the watershed. Although we knew prior to analysis that Alternative C would likely have fewer effects than B, we didn't know what the *magnitude* of effects would be until we conducted our analysis.

The proposed action should not be confused with the "preferred alternative"— the alternative that is preferable once all alternatives are analyzed and considered. The deciding officer has the authority to select an alternative other than the proposed action; the selected alternative will be identified in the Record of Decision (ROD).

Aquatics

Aquatics - Fisheries

2 *We believe the Forest Service can utilize selective logging, leaving behind the desired species, to accomplish the desired, long-term stand structural conditions without limiting impacts to beneficial uses in Gold Creek. This practice will benefit not only bull trout but also westslope cutthroat trout.*

RESPONSE: Selective logging (Alternative D) was considered in the DSEIS with respect to aspects of vegetation, wildlife, aquatics and other resource requirements. The preferred alternative will be disclosed in the Record of Decision (ROD).

2 *Furthermore, additional roads will increase the erosion potential as well as sediment delivery into Gold Creek. This stream maintains the highest bull trout spawning population in the Pend Oreille subbasin (SEIS, III-122) as well as a vibrant Westslope cutthroat trout population. The value of these fisheries is incalculable. Therefore the Sandpoint Ranger District should take every precaution to ensure that these fisheries are enhanced and protected. The practice of not constructing any additional roads will facilitate protection of these fisheries.*

RESPONSE: The Forest Service has analyzed all of the action alternatives, and the deciding officer will take these comments into consideration when selecting an alternative in the Record of Decision (ROD).

3 *The potential of the West Gold project to cause adverse modification of downstream designated bull trout critical habitat must be addressed in the FSEIS and the amended BA.*

4 *On page III-163 it is indicate critical habitat has not been designated for bull trout. The FSEIS should provide information that will indicate whether the proposed logging and road building activities would result in destruction or adverse modification of the habitat that may be designated as critical habitat in the future by the Fish and Wildlife Service.*

RESPONSE: The USFWS released the Final Rule on Designation of Critical Habitat for the Klamath River and Columbia River Populations of Bull Trout on October 6, 2004 (USDI 2004a). Stream reaches regulated under INFS were excluded from critical habitat designation, because INFS provides substantial protection and restoration for bull trout and bull trout habitat. INFS was amended into the IPNF Forest Plan in 1995. All waters impounded behind dams (i.e. Pend Oreille Lake) were excluded as well.

Sediment delivery was a key issue identified internally and based on public comment (DSEIS II-4). Short-term direct and indirect effects would include a maximum estimated 24.2 tons of sediment over the life of the project and a maximum four percent increase in peak flows with Alternative B (DSEIS III-149 to III-151). Cumulatively, the West Gold Project and past, present, and reasonably foreseeable actions would result in a net decrease in sediment delivery within the Gold Creek watershed (DSEIS III-160). The temperature regime present in West Gold and Gold Creeks would not be affected by project related activities due to the implementation of INFS buffers (DSEIS I-13 and II-19), which would retain canopy cover that prevents solar inputs to the streams, and ground water (spring) influences present in the lower Gold Creek drainage that keep water temperatures low (DSEIS III-129 and Golder Associates 2006). Based on the above information, (specifically the net decrease in sediment delivery), the project activities would have a beneficial effect on designated bull trout critical habitat in the private ownership areas of Gold Creek. Additionally, Best Management Practices (BMPs) would be implemented and all activities would be designed to protect water quality and fisheries habitat (DSEIS II-19). This information is included in the FSEIS.

4 *The FSEIS needs to provide expert agency comments that will indicate whether data exists regarding the degree of fine and/or coarse bedload movement in the streams and creeks in the Gold Creek watershed.*

RESPONSE: There are no data regarding the degree of fine and/or coarse bedload movement (i.e. scour chain data) in the Gold Creek watershed that we are aware of. However, stream surveys from 2003 (Gold Creek) and 2000 (West Gold Creek) include Wolman pebble count data and compiled reports that document the surveys (see the project file, Section J). The following is a short synopsis of some of the survey results:

Below the West Fork Gold Creek confluence, Gold Creek is predominantly boulder and bedrock for almost 900 meters. Below that reach, the channel appears to be in a state of dynamic equilibrium; banks are stable, the substrate is moving through the system at a consistent rate, good large woody debris recruitment potential is present, and no threat of road failures exist. The predominant substrate is cobble in riffles and gravel in the pools.

More complete data are included in the project file (Section J) for both Gold Creek and West Gold Creek. As is typical of most streams, small gravels and sediments are typically deposited behind energy reducing features (i.e. debris jams) until remobilized and moved downstream.

4 *On page III-150 the following statement is made. "In-channel sediment levels have remained relatively stable since 1955 and would continue to remain that way in the short term." There is no supporting data or high quality information on page III-150 that explains the procedures that were used for the sediment level analysis. The SDEIS needs to describe the equipment that was used as part of the measurements for in-channel sediment levels, and list the most recent year the measurements took place.*

RESPONSE: See Reference Condition section for Aquatics (DSEIS III-133 to III-136). Specifically, figures 22 and 23 (DSEIS III-134 and III-136, respectively) display graphs of historic and existing condition of sediment fluctuations within the West Gold subwatershed and Gold Creek watershed associated with road construction activities.

There is a thorough description of the WATSED Model on pages III-124 and III-125 of the DSEIS. DSEIS (III-126) explains the stream survey methodology as follows:

"A modified version of the R1/R4 fish and fish habitat inventory (Overton et al. 1997) was conducted along West Gold Creek and some of its tributaries during the 2000 field season (project file, Section J). Additional stream information was collected to determine stream channel types, cross sectional profiles, woody debris composition and stream temperature. Existing and potential in-channel and stream-bank erosion sites were also documented with this survey. No landslides, fires, or major rain on snow events have acted to change fish habitat conditions in the watershed since this inventory occurred."

Additionally, a stream survey was conducted in Gold Creek in 2003 (see the project file, Section J). Environmental consequences for Watershed and Fisheries discusses the methodology for analyzing sediment yield (DSEIS III-144 and III-145), direct and indirect effects analysis (DSEIS III-145 to III-153), and cumulative effects (DSEIS III-159 to III-163) from sediment yield.

4 *The monitoring comments that were submitted to the Sandpoint Ranger District by Idaho Fish & Game, both the July 4, 2002 and again on October 3, 2002 stressed the importance of long-term monitoring in the analysis area, including flow measurement monitoring. The information presented in the FEIS, including pages II-27 and II-28 does not mention any long-term monitoring of the effects to fisheries and fisheries habitat from logging and road activities as was requested by Idaho Fish & Game in 2002.*

The FSEIS monitoring section needs to state each specific aquatics and fisheries monitoring activities that would be performed as part of the West Gold timber sale project, describe the number of years the monitoring activities would occur, and list the estimated cost to perform each aquatics and fisheries monitoring program.

5a *The information presented in Chapter II of the FEIS, pages II-26 and II-27 as well as on page J-17 of the FEIS clearly indicates that long-term monitoring of the effects to fisheries and fisheries*

habitat from logging and road activities is not mandatory and therefore likely will not occur as requested by Idaho Fish and Game, in violation of NEPA.

RESPONSE: The Regulations language cited in the appeal on this point [40 CFR 1500.1(b)] is concerned with information being available before a decision is made and before actions are taken. It is not concerned with collecting monitoring information following implementation. While the DSEIS (II-29 and II-30) states, "[n]ot all monitoring is considered mandatory [and monitoring is] dependent upon the availability of funds and other resources," it is clear in the DSEIS that the permanent stream channel cross-section monitoring will continue on an annual basis (II-31). Although the IPNF Forest Plan (USDA Forest Service 1987) does not require that monitoring be performed after every project, monitoring is conducted on a sample basis. For watershed and fisheries, the plan shows (on page IV-11 and 12) what items are to be monitored and how often (items G-1 thru G-4). This monitoring has been occurring and has been reported in various Forest Plan Monitoring and Evaluation Reports over the years. Additionally, IDF&G and Forest Service fisheries staff conduct bull trout redd counts yearly on Gold Creek and will continue to do so in the future. The monitoring proposed in the DSEIS is in compliance with NEPA.

5 *The West Gold project is represented as a watershed restoration project, yet it is impossible to tell from the DSEIS if the watershed restoration actions proposed (road storage and decommissioning, road maintenance, culvert upgrades, etc.) are proposed merely because they can be done with a timber sale contract, or if those identified are in fact the very highest priority regardless for improving water quality and fish habitat.*

RESPONSE: On pages III-154 to III-159 of the DSEIS, past, present and reasonably foreseeable activities describe watershed improvement activities (i.e. mine clean-up efforts, the Kick Bush Slide repair, road maintenance activities, etc.) that have been implemented or are underway. The aquatics cumulative effects analysis (DSEIS III-159 to III-161) discusses the cumulative sediment delivery and reduction within the Gold Creek watershed. Although activities under the Alternative B would result in an estimated 24.2 tons of sediment delivery, the decommissioning of 1.7 miles of existing roads would reduce sediment yields over the long term. The greatest benefit would be realized through the improvement and removal of the high-risk culverts that would improve watershed conditions by reducing the net associated risk of sediment delivery from culvert failure by a minimum of 1,752 tons up to an estimated 2,572 tons. Given the magnitude of the sediment reduction activities already completed or that are currently underway within the Gold Creek watershed, the proposed watershed restoration activities are the highest priority we can implement since it is not possible to predict when culvert failure would occur.

3a *The conclusion in the Biological Assessment (BA) that Alternative C-Modified 'May Affect but is Not Likely to Adversely Affect' the West Gold/Gold Creek bull trout populations is not supported by information presented in the Biological Assessment or FEIS. It is therefore arbitrary and capricious in violation of the APA, and failed to use the best available science in violation of NEPA.*

RESPONSE: The DSEIS (II-4 and III-145 to III-163) goes into detail concerning the direct, indirect and cumulative effects the alternatives would have on the watershed and fisheries. The analysis includes the historic and predicted water yield, peak flows, low flows, sediment

yield, stream channel morphology, and how they will affect bull trout. The analysis is based on appropriate data, research and protocols (DSEIS Appendix E, pp. E-1to E-22; and project file, Section J).

The analysis (DSEIS III-163) concludes:

"The action alternatives, in conjunction with present and reasonably foreseeable actions, would result in a net decrease in sediment yield, and an overall reduction in sediment risk in the future. Based on the direct and indirect effects discussed above, the risk of any sediment delivery actually reaching a live channel is very low. The modeled short-term increase in sediment yield directly associated with the action alternatives is very small compared to the overall reduction in sediment yield through mine reclamation and slide stabilization, as well as the reduced risk of culvert failure and sediment delivery associated with culvert upgrades. Any increases in water yield would be localized and would not be measurable in fish-bearing channels.

With the long-term reduction in sediment delivery to the Gold Creek drainage (through the Kick Bush slide repair, continuing mine cleanups, and road maintenance), fish habitat would be improved over time. This would lead to improvements in spawning and rearing habitat for fisheries and other cold water biota. As salmonid spawning and cold water biota are identified as the beneficial uses of both the West Gold and Gold Creek drainages, beneficial uses would continue to be supported in the Gold Creek watershed. The cumulative effects of the action alternatives combined with other past, present, and reasonably foreseeable actions in the Gold Creek watershed would result in improvements to the beneficial uses of salmonid spawning, including bull trout and westslope cutthroat trout, and habitat for all cold water biota."

The analysis supports the determination. The U.S. Fish and Wildlife Service reviewed the original BA, including the impacts from the project and the rationale for the determination, and concurred with the fisheries biologist's determination that the project 'May Affect but is Not Likely to Adversely Affect' bull trout. The analysis is in compliance with NEPA and APA.

3a *In violation of NEPA, the FEIS and BA gloss over and fail to consider the very real potential for stochastic events, such as rain-on-snow (ROS) events, and their impacts on bull trout spawning and rearing as a result of Alternative C-Modified.*

RESPONSE: The DSEIS (I-5 to I-7) discusses the findings from the Gold Creek Ecosystem Assessment (EAWS), including that the West Gold Creek subwatershed is in a ROS zone, which, when combined with the current sediment risks from roads, can put fish spawning habitat at risk. Therefore, part of the purpose and need of the project was to reduce road densities and the potential sediment risks from existing roads to maintain and improve the aquatic habitat in West Gold Creek. The DSEIS (III-131 to III-144) describes the reference and existing conditions of watershed and erosional processes related to impacts from ROS and other catastrophic events. This included estimated water yield responses from ROS events within the West Gold Drainage. The DSEIS (III-151 to III-153) explains that with the stream channel and landtype characteristics of West Gold Creek and its tributaries, the estimated changes in peak flows, estimated changes in sediment yields, and the potential

increases in flows from a ROS event, would not affect stream channel morphology, and therefore, would not change fish habitat. Finally, the DSEIS (III-161 to III-163) describes the cumulative effects to peak flows from ROS events within the Gold Creek Watershed.

The greatest impacts observed from ROS events occur when culverts become plugged from resulting floods and debris flows. Improving or removing the high-risk culverts significantly reduces the risk of a road failure.

The analysis sufficiently considered stochastic events, such as ROS, and is in compliance with NEPA.

5a *The West Gold project results in a short-term adverse impact on fisheries and ignores the cumulative effects of the project on fisheries.*

RESPONSE: The DSEIS analyzes the direct, indirect and cumulative effects of the project on fisheries and fish habitat in both the long term and short term (III-150, III-153, and III-163). This analysis includes the cumulative impact of the Packsaddle South Timber Sale in Kick Bush Gulch (see the response to Issue 6, above). The DSEIS states (III-163):

"The action alternatives, in conjunction with present and reasonably foreseeable actions, would result in a net decrease in sediment yield, and an overall reduction in sediment risk in the future. Based on the direct and indirect effects discussed above, the risk of any sediment delivery actually reaching a live channel is very low. The modeled short-term increase in sediment yield directly associated with the action alternatives is very small compared to the overall reduction in sediment yield through mine reclamation and slide stabilization, as well as the reduced risk of culvert failure and sediment delivery associated with culvert upgrades. The potential short-term increase in sediment may affect individual westslope cutthroat trout in the upper watershed, but would not begin a trend towards federal listing. In the long term, the reduction in sediment yield is expected to benefit survival of individuals. Similarly, cumulative effects from the action alternatives and reasonably foreseeable actions may affect, but are not likely to adversely affect, federally listed bull trout, and are expected to benefit individual survival in the long term. Any increases in water yield would be localized and would not be measurable in fish-bearing channels.

With the long-term reduction in sediment delivery to the Gold Creek drainage (through the Kick Bush slide repair, continuing mine cleanups, and road maintenance), fish habitat would be improved over time. This would lead to improvements in spawning and rearing habitat for fisheries and other cold water biota. As salmonid spawning and cold water biota are identified as the beneficial uses of both the West Gold and Gold Creek drainages, beneficial uses would continue to be supported in the Gold Creek watershed. The cumulative effects of the action alternatives combined with other past, present, and reasonably foreseeable actions in the Gold Creek watershed would result in improvements to the beneficial uses of salmonid spawning, including bull trout and westslope cutthroat trout, and habitat for all cold water biota."

The U.S. Fish and Wildlife Service (USFWS) concurred with the determination of effects to bull trout (PF, Sec. J, Doc. J-7). The analysis of short term and long term, direct, indirect, and cumulative effects is in compliance with NEPA.

5a *The project violates ESA because it harms critical habitat for bull trout.*

RESPONSE: The USFWS released the Final Rule on Designation of Critical Habitat for the Klamath River and Columbia River Populations of Bull Trout on October 6, 2004 (USDI 2004a). Stream reaches regulated under INFS were excluded from critical habitat designation, because INFS provides substantial protection and restoration for bull trout and bull trout habitat. All waters impounded behind dams (i.e. Pend Oreille Lake) were excluded as well. INFS was amended into the current IPNF Forest Plan in 1995. All waters impounded behind dams (i.e. Pend Oreille Lake) were excluded as well.

Sediment delivery was a key issue identified internally and based on public comment (DSEIS II-4). Short term direct and indirect effects would include a maximum estimated 24.2 tons of sediment over the life of the project and a maximum four percent increase in peak flows with Alternative B (DSEIS III-149 to III-151). Since all harvest activities would occur outside RHCAs, the risk of sediment from those activities reaching a stream channel is very low. By using timing restrictions, onsite direction, and BMPs, sediment delivery to occupied fish habitat associated with culvert removals and upgrades would be minimized. Since the identified culverts are located high in the drainage, the likelihood that any escaped sediment would be transported into the lowest reaches of West Gold and Gold Creeks below their confluence is very low (DSEIS III-150). As a result, there would be no short-term direct or indirect effect to bull trout designated critical habitat.

Cumulatively, the West Gold Project and past, present, and reasonably foreseeable actions would result in a net decrease in sediment delivery within the Gold Creek watershed (DSEIS III-160). The temperature regime present in West Gold and Gold Creeks would not be affected by project related activities due to the implementation of INFS buffers (DSEIS I-13 and II-19), which would retain canopy cover that prevents solar inputs to the streams, and ground water (spring) influences present in the lower Gold Creek drainage that keep water temperatures low (DSEIS III-129 and Golder Associates 2006). Additionally, Best Management Practices (BMPs) would be implemented and all activities would be designed to protect water quality and fisheries habitat (DSEIS II-19).

Cumulatively, the West Gold Project and past, present, and reasonably foreseeable would not result in the destruction or adverse modification of bull trout critical habitat. Since it was determined that the project "may affect, but is not likely to adversely affect" bull trout individuals, and USFWS concurred with this determination (project file, Section J), implementation of the project would not jeopardize the species and is in compliance with the Endangered Species Act. This information is included in the FSEIS.

Aquatics - General

2 *Regardless of which alternative the Forest Service selects, there are some additional management considerations that could be taken into account. In order to reduce sediment delivery from roads that would remain in place, the Forest Service should armor the road surfaces with gravel within 150 feet of stream crossings.*

RESPONSE: Road surfacing would occur at all drainage crossings (DSEIS II-19). This and other road maintenance activities to improve aquatic habitat are described on page II-20 of the DSEIS.

2 *Additionally, the Forest Service fails to disclose any road densities for the project area or the Gold Creek drainage in chapter 3 of the SEIS despite the watersheds analysis found there. Road densities can provide an important indication of the condition of a watershed. At a minimum, road densities should not exceed more than 2 miles per square mile in a watershed. Road densities higher than this value are often considered an indication of a watershed in poor functional condition. The Forest Service should determine this value, disclose it in the final impact statement, and consider further road decommissioning to protect this important watershed, its fisheries, and its wildlife.*

RESPONSE: Road densities have been considered, as they are addressed in the Gold Creek Ecosystem Assessment at the Watershed Scale (USDA Forest Service 2002) and addressed in the FSEIS. All action alternatives for the West Gold project would reduce road densities through road decommissioning (DSEIS II-12, II-13, II-14, III-147 and III-148).

2 *The Forest Service has not disclosed the equivalent clearcut area (ECA) that will result under the vegetation treatments in the "action" alternatives. There is no indication that the agency has complied with the forest plan with respect to this criterion. If the amount of ECA is too high, this could also lead to the degradation of water temperature in Gold Creek. High ECA will also increase erosion and sediment delivery potential.*

RESPONSE: Equivalent Clearcut Acres (ECA) are a component of the cumulative watershed effects analysis and disclosed in WATSED (project file, Section I). It is true that higher ECA contributes to an increase in sediment delivery as well as increased peak flows. Because sediment and peak flow are the physical parameters that directly affect aquatic habitat and watershed resources, the Aquatics section of the DSEIS focuses on these specific parameters.

3 *The DSEIS concludes that the sediment produced by the alternatives combined with sediment reduction as a result of reclamation, etc., would result in a net decrease in sediment delivery in the Gold Creek watershed. DSEIS at III-161. However, one important component is missing from this calculation/conclusion. That is that the areas disturbed by the reclamation and rehabilitation actions likely will continue to contribute sediment until vegetation grows back and the areas are stabilized. The amount of sediment that is being delivered from the reclamation areas and other rehabilitation efforts should be disclosed and considered in the FSEIS. In any case, adding more sediment to the system will likely cause the Forest Service to fail to fulfill non-discretionary duties required under the Endangered Species Act.*

RESPONSE: Mitigation measures and BMPs designed to reduce sediment delivery are discussed on page III-158 of the DSEIS. Also, the Conjecture Mine EECA has been added to literature cited in the FSEIS; it contains a detailed description of the timing and mitigation measures that will be used during mine clean-up (MAXIM 2006). The actual implementation of mine clean up activities in these drainages will not begin until July. During this time, the intermittent reaches of Gold Creek and Chloride Gulch are dry. Therefore, if any sediment were delivered to streams during restoration efforts, it would not be delivered to critical bull trout reaches.

3 *According to the scientific literature, maintaining bull trout populations requires stream channel and flow stability (Rieman and McIntyre 1993). Juvenile and adult bull trout frequently*

inhabit side channels, stream margins, and pools with suitable cover. These areas are sensitive to activities that directly or indirectly affect stream channel stability and alter natural flow patterns. For example, altered stream flow in the fall may disrupt bull trout during the spawning period and channel instability may decrease survival of eggs and young juveniles in the gravel during winter through spring (Fraley and Shepard 1989; Pratt 1992; Pratt and Huston 1003). Clearcutting and watershed disruption are linked to increased water yield, bedload movement, more frequent flooding or scour events. (Rieman and McIntyre 1993)

Habitat alteration in upland areas, like steep mountain hillsides, or in headwater or intermittent streams that do not have bull trout populations can adversely affect bull trout in downstream habitat. (Testimony of Prof. James Karr, University of Washington before Committee of Merchant Marine and Fisheries). Upland timber management can significantly harm bull trout habitat by changing stream runoff patterns. Regional differences make it difficult to predict hydrological impacts of upland logging, but forest management activities can affect bull trout habitat by altering normal frequencies of high or low stream flows.

In addition, the FSEIS should consider potential decreases in water yield during the late summer low flows that could adversely affect bull trout spawning in the lower reaches of West Gold.

RESPONSE: The effects of increased stream flow would primarily be seen in the spring months during runoff, after bull trout fry have emerged from the stream gravels. However, the bedrock-controlled nature of the lower Gold Creek and West Gold Creek channels has made them resilient to natural and human-caused disturbances over time; as a result, habitat degradation in these streams has been relatively minor (DSEIS III-136). A maximum increase in water yield of four percent over the existing condition would likely be undetectable in West Gold Creek, and any additionally energy would be dissipated by energy reducing features found in the stream (DSEIS III-152). Stream survey data from the summer of 2000 indicate that woody debris recruitment is high, except where boulders and bedrock dominate the stream substrate (DSEIS III-153). During periods when bull trout are spawning (September/October), peak flows have attenuated and stream flow in the lower reaches of Gold Creek, and West Gold is regulated by the release of ground water in springs (DSEIS III-129). It is clear that the lower Gold Creek springs are critical to the continued spawning and occurrence of bull trout in lower Gold Creek below West Gold Creek, since they deliver a significant flow of cold water to lower Gold Creek (Golder Associates 2006).

3 *The DSEIS estimates peak flows increased to 18% above the baseline after a large stand replacing wildfires in 1850 and 1897. DSEIS at III-151. Because the estimated peak flow increase to 13% above base as a result of Alt. B is less than that caused by the stand replacing wildfires, it is considered in the DSEIS to be within the historic range of variability ("HRV"), and therefore acceptable. Id. The stand replacing wildfires were the result of natural forces, as opposed to human caused events. The fact that the estimated increases in peak water yield as a result of logging are within the "HRV" does not render them "acceptable" or negate their potential for adverse impacts on bull trout and their habitat.*

The estimated peak flow increase as a result of the proposed project would be only 4% less than what are described as catastrophic events that caused major channel changes. This increase in peak flows will directly affect stream channel stability and alter natural flow patterns, and may

impact spawning and reduce egg and fry survival due to adverse modification of critical bull trout spawning and rearing habitat in lower West Gold and Gold Creeks.

RESPONSE: In 2002, the Forest Service conducted a detailed analysis of all action alternatives, and selected alternative C (modified), based partly on concerns for reducing the potential for higher peak flows in Gold and West Gold Creeks (see the original West Gold ROD). As was the case in 2002, the deciding officer has the authority to select an alternative other than the proposed action. It should be noted that Gold and West Gold Creeks frequently experience peak flows higher than were estimated by WATSED for the historical fires during rain-on-snow events (DSEIS III-133). These events have been instrumental in contributing to the stability and resilience of these channels (DSEIS III-139).

In examining stream survey records and relevant literature, we found no evidence that peak flows resulting from the widespread fires that occurred throughout the Gold Creek watershed caused major channel changes (see project file, Sections I and J). In the Gold Creek EAWS (USDA Forest Service 2002) on page 31, for Lower Gold and West Gold it states that, "No natural or human-related disturbances have altered the stream channel or erosional processes to a degree that would affect the ability of Lower Gold/West Gold to achieve reference conditions."

We do not think that the potential increase in peak flow would adversely affect bull trout habitat. Bull trout primarily inhabit in the lower reaches of Gold Creek and have been know to occasionally use the lowest reach of West Gold Creek (DSEIS III-126) that are boulder and bedrock controlled (DSEIS III-136, III-143). These channel types are stable and resilient with respect to fluctuations in flow and sediment (DSEIS III-136, III-153). These reaches are B type sediment transport reaches with minimum gradients of 3.6 percent (DSEIS III-140 and III-141; Golder Associates 2006) and are not capable of storing the fine-grained sediment that could encapsulate spawning gravels.

3 *The FSEIS must provide the source and scientific basis for: 1) the estimate of increased peak flows after fires that occurred in 1850 and 1896, 2) the current estimated increases in peak flows from the proposed alternatives, and 3) the scientific basis for the conclusion that the projected increases will not adversely affect bull trout habitat in West Gold and Gold Creeks.*

RESPONSE: The estimated increases in peak flow were generated in WATSED using data obtained from the fire history for the area documented in the EAWS (2002) and DSEIS (III-54 to III-56). Increases for peak flows from the proposed alternatives were also generated in WATSED using values from the activity table in the DSEIS (II-12, III-151 and III-152). The scientific basis and the strengths and limitations for the WATSED model are discussed in the DSEIS (pp. III-124 and III-125). WATSED is a tool to compare alternatives, and is used in conjunction with field work, data analysis, and overall judgment to reach conclusions (DSEIS III-124, III-125, III-126…). WATSED does not provide a precise prediction of peak flows (DSEIS III-124, III-125).

Bull trout primarily inhabit in the lower reaches of Gold Creek and have been known to occasionally use the lowest reaches of West Gold Creek (DSEIS III-126) that are boulder- and bedrock-controlled (DSEIS III-136, III-143). These channel types are stable and resilient with respect to fluctuations in flow and sediment (DSEIS III-136, III-153). These

reaches are B type sediment transport reaches with minimum gradients of 3.6 percent (DSEIS III-140 and III-141; Golder Associates 2006) and are not capable of storing the fine-grained sediment that could encapsulate spawning gravels.

3 *The FSEIS should consider the increase in magnitude and frequency of instantaneous peak flows that will result from the canopy removal and large openings in Alternatives B and C. Leaving islands or clumps of trees here and there will not alter the impacts that this loss of canopy will have on West Gold's hydrologic equilibrium, or reduce the potential for instantaneous peak flow events. It is widely acknowledged in the scientific literature that canopy removal influences snow accumulation and melt rates, evapotranspiration rate, and soil infiltration and transmission routes.*

RESPONSE: Changes in canopy cover have occurred over throughout history in this watershed with corresponding effects to peak flow. High instantaneous peak flows have contributed to the stability and resiliency of the West gold stream channel throughout history (DSEIS III-133, III-138). A removal of canopy cover is anticipated under any of the alternatives proposed in the West Gold project, even the No Action alternative (Alternative A). Table 9 (DSEIS III-19) indicates that a maximum of 41 percent and a minimum of 34 percent of the project area (not the entire drainage) would be in an early successional stage following treatment under the action alternatives. Under Alternative A, canopy cover would also be reduced by 34 percent within the project area and is predicted to be in an early succession stage following mortality caused by agents such as root disease, insect attack, wind and other disturbance mechanisms (DSEIS III-19). All of the action alternatives are estimated to have peak flows that are within the natural historic range of variability (DSEIS III-132, III-151, III-152 and III-161). The instantaneous peak flows that may result from canopy removal would not exceed those naturally produced by rain-on-snow events.

3 *Most of the West Gold watershed is susceptible to rain-on-snow events. The high magnitude flash floods triggered by these events has the potential to scour the channel of large woody debris which currently provides the cover and habitat complexity that bull trout require, adversely modifying critical habitat. Furthermore, mid-winter and spring rain-on-snow floods have the potential to flush accumulated sediment in the upper watershed downstream to spawning areas where bull trout eggs are incubating during the winter, smothering the eggs and dramatically reducing fry emergence.*

RESPONSE: Rain-on-snow events have historically occurred in the West Gold drainage on a variety of land cover types and have always played a significant role in the redistribution of sediment and woody debris in that system (DEIS III-138 and III-139). Our stream surveys show that large woody debris is prevalent throughout the West Gold system and does contribute to habitat complexity (DSEIS III-143). In the lower reaches, where bull trout populations have been documented, pools are deep and usually formed by bedrock or boulders and wood is generally used for cover (DSEIS III-143). These channel types tend to be more stable with respect to fluctuation in flow and sediment yields (DSEIS III-152, III-153, Chamberlin et al. 1991, Rosgen 1996). With the exception of where the power line parallels the creek, the recruitment potential for large wood is good. Through implementation of our Forest Plan and the Inland Native Fish Strategy, no harvest would occur within riparian areas (DSEIS III-153), so there would be no depletion of this resource.

4 *The sediment risk discussions in Chapter III of the DSEIS do not include information relating to the flood frequency curve that applies to the sites in the West Gold subwatershed. There is also no information in Chapter III that discusses the hydraulic capacity of the four culverts that are described on page III-140 as having a moderately high risk for failure.*

The sediment risk analysis in the FSEIS is required to provide high quality information concerning one or more flood frequency curves that have been established as part of the sediment risk analysis.

The FSEIS is required to provide high quality information listing the hydraulic capacity for each of the corrugated metal culverts (pipes) that are listed in Table 20, page III-141 of the DSEIS.

The FSEIS needs to display figures similar to Figure 4 shown on page 20 of the Flanagan et al document. The Figure 4 concerns T, Flood Recurrence Interval (years). The figures in the FEIS need to include data showing the discharge necessary to overtop each of the roads that are shown in Table 20, page III-141 of the SDEIS, and the recurrence interval (T) in years for each of the roads.

RESPONSE: Figure 4 on page 20 of Flanagan et al. (1998) represents a generic process for determining culvert design capacity. Quantitative information that describes the drainage area, discharge event, and hydraulic capacity of each culvert is referenced on DSEIS (III-126 and table 20 on III-141) and is included in the project file, Section I.

4 *The FSEIS needs to include information relating to the estimated maximum particle sizes that potentially would be mobilized during peak flows in the West Gold subwatershed, if this information is known.*

RESPONSE: The IPNF uses methods for inventory and environmental risk assessment of road drainage crossings developed by Flanagan et al. (1998). Included in these methods is an evaluation of sediment transport, which we have addressed in our assessment (project file, Section I). In determining sediment transport capabilities of culverts, Flanagan et al. (1998) do not actually incorporate maximum particle size into the capability assessment.

4 *The FSEIS needs to indicate whether the Sandpoint Ranger District or IPNF produced any storm damage reports relating to crossing failures/culvert failures in the Gold Creek watershed following large storm events. If one or more storm damage reports were written, a copy of the report(s) should be included in the project files.*

RESPONSE: There was one recorded failure in the West Gold watershed of a culvert on the 2707A. The results of this failure are discussed on DSEIS III-143. The culvert was replaced and the inventory of its replacement is in the project file (Section I). It is unknown at this point if there is a report specifically documenting the event.

4 *The FSEIS needs to provide high quality information that would describe the estimated volume of sediment that was released from the Kick Bush Slide area each year after the 278 Road and spur roads were completed.*

Response: The Kick Bush slide was estimated to be delivering approximately 194 tons of sediment per year to the Gold Creek watershed (DSEIS III-156, III-160 and project file, section I). The Kick Bush slide was repaired in 2003.

4 *The FSEIS needs to provide information that will indicate the year(s) Road 278 and spurs 278A through E were constructed.*

RESPONSE: Road 278 was constructed in 1980, and its spurs were constructed in 1987 (DSEIS III-135 and WATSED analysis in project file, Section I).

4 *On page III-155 of the SDEIS figure 29 displays a map, titled "Cumulative Effects Analysis Area for Watershed and Fisheries". The map displays the cumulative effects analysis area for the Gold Creek watershed. Included in the cumulative effects analysis area map is a portion of section 2, along with section 11, a portion of section 12, two section 13's, and a portion of section 14. Section 11 is labeled Kick Bush Gulch.*

RESPONSE: Kick Bush Gulch is a subwatershed within the greater Gold Creek watershed (see maps on DSEIS III-127 and III-155).

4 *The cumulative effects analysis sections of the West Gold SDEIS found in Chapter III, including pages III-153 and III-154, do not mention the 370 acres of logging in the south-facing slopes in Kick Bush Gulch as a result of the Packsaddle South timber sale, nor is there any mention of the total amount of acres logged in sections 11, 12, 13, and 14. Sections 11, 13, and 14 are completely within the West Gold cumulative effects analysis area for watershed and fisheries. A majority of section 12 also is within the cumulative effects analysis area.*

The timber sales listed in Table 5, page III-8 of the SDEIS were limited to the West Gold drainage. Table 5 does not list the timber sales that have taken place in the entire cumulative effects analysis area, which is the Gold Creek watershed. NEPA at 40 CFR 1500.1(b) requires high quality information with expert agency comments. The FSEIS is required to provide high quality information that will accurately describe and list the FS timber sales that have taken place in the Gold Creek watershed, including the number of logging units and number of acres logged.

The cumulative effects analysis is required to indicate whether the Packsaddle South timber sale, contract # 55780-6 resulted in approximately 370 acres of logging in the Kick Bush Gulch area.

RESPONSE: Past activities and events, including timber sales, are discussed on pages I-8 and III-154 of the DSEIS. These activities were accounted for in the cumulative effects analysis using WATSED (see project file, Section I), and were described in detail in the Gold Creek Ecosystem Analysis at the Watershed Scale (USDA Forest Service 2002).

4 *The Gold Creek watershed is within the Pend Oreille subbasin, which is a high priority subbasin for restoration and protection of aquatic resources, especially bull trout, page III-126 of the SDEIS. Due to the importance of the threatened bull trout and NEPA requirements, the cumulative effects analysis in the FSEIS is required to provide accurate information regarding FS timber sale activity at the Gold Creek watershed level.*

RESPONSE: Past activities and events, including timber sales, are discussed on page I-8 and III-154 of the DSEIS. These activities were accounted for in the cumulative effects analysis using WATSED (see project file, Section I), and were described in detail in the Gold Creek Ecosystem Analysis at the Watershed Scale (USDA Forest Service 2002).

4 *On page II-19 the following statements are made. "Best Management Practices (BMPs) are the primary mechanism to enable the achievement of water quality standards. The Forest Service*

Handbook 2509.22 (Soil and Water Conservation Handbook) outlines BMPs that meet the intent of the water quality protection elements of the Idaho Forest Practices Act."

The following sentence is found on page II-19. "Research and monitoring have evaluated the effectiveness of BMPs (Seyedbagheri 1996, USDA Forest Service Monitoring Reports 1995-2004)."

The report by Ms. Seyedbagheri on page three includes the following information. "Fewer than 100 references that actually give quantitative effectiveness data on specific BMPs were found; the majority of these were based on Intermountain Research Station data. Many BMPs have not been researched at all in Idaho. Many studies had important implications for various BMPs, but did not provide quantitative effectiveness data." It appears from the report that it would be more accurate to state that research has evaluated the effectiveness of only a limited number of BMPs that are found in Idaho FPA regulations.

5 *The FS assumes the BMPs will protect the aquatic systems in the watersheds. This assumption is flawed as is attested by the degraded fisheries conditions that already exist. Consequently, this assumption violates the CWS, Idaho Code and IDAPA.*

RESPONSE: The report that is referred to (Seyedbagheri 1996) a ten-year old publication that provides one source of information. Extensive research has been done before and since 1996 that addresses the elements of many BMPs and their effectiveness. Indeed, research itself developed many of those elements. Seyedbagheri may be the only research publication that itemizes the Idaho FPA BMPs, but one cannot ignore all the supporting research or the practical assessments and evaluations outside of research that address the same and similar practices.

The 1987 Forest Plan requires that a Monitoring and Evaluation Report be completed each year. The purpose of this report is to determine how the IPNF is doing in meeting the goals outlined in the Forest Plan. Included in these reports are annual BMPs Implementation & Effectiveness Reports. A report has been completed for each year since 1988. Since 1998, we have put the monitoring and evaluation reports on the IPNF website. Monitoring and evaluation reports are also included in the project file (Section O).

The State of Idaho audits BMP implementation annually and effectiveness quadrennially. Idaho Dept of Lands (IDL) performs the annual audits, and Idaho Dept of Environmental Quality and IDL jointly conduct the BMP effectiveness audits. See their respective websites for the results.

5 *The West Gold Project is represented as a watershed restoration project, yet it is impossible to tell from the DSEIS if the watershed restoration actions proposed (road storage and decommissioning, road maintenance, culvert upgrades etc.) are proposed merely because they can be done with a timber sale contract, or if those identified are in fact the very highest priority regardless for improving water quality and fish habitat.*

RESPONSE: In the Gold Creek EAWS (USDA Forest Service 2002), West Gold is considered a watershed functioning at risk. This is primarily due to the fact that a large percentage of the drainage is in the rain-on-snow zone, and there is the potential for road failure (DSEIS I-6). For this reason, attention is given to roads in this area (DSEIS I-4). Not

all roads scheduled for decommissioning would be associated with the sale contract (DSEIS III-175, Appendix I pages I-2 to I-7). Some road work would be accomplished using appropriated or other funding (DSEIS II-11). Riparian disturbance is low, and the channel is functioning properly.

8 *Other options would be to consider additional road decommissioning or other stream crossing improvement which would reduce existing sediment delivery to West Gold Creek. Helicopter logging areas, such as "unit 6", would further reduce potential sediment loading into West Gold Creek.*

RESPONSE: Road surfacing would occur at all drainage crossings and other road maintenance activities to improve aquatic habitat are described on page II-20 of the DSEIS. Alternative treatment suggestions will be considered and disclosed in the Record of Decision (ROD).

5a *The FEIS failed to include an assessment to determine whether the selected alternative would increase the potential for rain-on-snow (ROS) events. The FEIS also wholly ignores and fails to disclose the Forest Service's own research (King, 1989) on the accuracy of a peak flow model in estimating increases in peak flows from logging and roads in Northern Idaho.*

RESPONSE: Rain-on-snow events are generated through specific weather events described in the DSEIS (III-138). While it is stated that changes in forest vegetation can affect the frequency and magnitude of these events (DSEIS III-138), canopy removal does not cause rain-on-snow events, nor would the maintenance of current conditions prevent them from occurring. The proposed vegetation treatments are designed to trend conditions toward their natural or accepted ranges (DSEIS I-4, III-8 to III-24). The DSEIS (I-6) discusses the findings from the Gold Creek Ecosystem Assessment, including that the West Gold Creek subwatershed is in a ROS zone, which, combined with the current sediment risks from roads, can put fish spawning habitat at risk. Therefore, part of the purpose and need of the project was to reduce the potential sediment risks from existing roads to maintain and improve the aquatic habitat in West Gold Creek (DSEIS I-4). The DSEIS (III-131 to III-134 and III-139 to III-140) describes in detail the reference and existing conditions of watershed and erosional processes related to impacts from ROS and other catastrophic events. This includes a description of peak flow responses from ROS events within the West Gold Drainage. The DSEIS (III-152, III-153) explains that, with the stream channel and landtype characteristics of West Gold Creek and its tributaries, the estimated changes in peak flows, estimated changes in sediment yields, and the potential increases in flows from a ROS event would not affect stream channel morphology and therefore would not change fish habitat. Finally, the DSEIS (III-162) describes the cumulative effects to peak flows from ROS events within the Gold Creek Watershed.

King (1989) is not referenced in the DSEIS because the findings from his report do not relate to the methodology used to measure peak flow increases for this project. His research paper studied water yield increases based on equivalent clearcut acreage (ECA). That procedure determines increases in water yield through average annual flows, which are flows averaged over a one-year period. It is true average annual flows do underestimate water yield responses. In the West Gold Project analysis, the issue indicators for water yield increases were increases in peak flows, not average annual flows. Peak flows are the values estimated

during the high runoff periods, which are usually the channel forming flows. Since King (1989) does not use the same methodology the West Gold Project used, it was not cited.

The analysis included analysis of ROS events, considered appropriate literature, and is in compliance with NEPA.

5a *The FEIS fails to disclose that small headwater channels are especially vulnerable to increased erosion and sediment transport to downstream habitats caused by increased peak flows.*

RESPONSE: The Gold Creek Ecosystem Assessment at the Watershed Scale (EAWS) considered stream channel characteristics associated with the headwater drainages throughout the Gold Creek Watershed. The EAWS (pp. 24 to 28) documents the existing and reference condition of the stream channels within the project and cumulative effects analysis area. The DSEIS documents the potential impacts to stream channel morphology (III-152 to III-153) and the reference condition of West Gold Creek (III-131 to III-135); describes the existing condition of West Gold Creek, its tributaries, and the overall inherent sensitivity of each stream channel type (III-140 and 141); and discusses the effects from water yield increases. The Gold Yeller Monitoring Review (project file, Section I) documents the response of small headwater channels to previous timber harvests in the West Gold Creek subwatershed. Based on the stream channel and landtype characteristics of West Gold and its tributaries, the estimated changes in peak flows and the potential increases in flows from a ROS event would not affect stream channel morphology from any of the action alternatives. The DSEIS sufficiently analyzed erosion and sediment transport from the headwater channels.

5a *The FEIS does not substantiate the claim that logging will provide more water for fish habitat.*

RESPONSE: The DSEIS does not make this claim.

Aquatics - 303(d)/TMDL/Temperature

2 *The main problem with the Gold Creek drainage is not sediment at this time. However, we do encourage the agency to be cautious of the potential for erosion and sediment delivery associated with logging, road construction and other management activities. According to the BURP survey conducted by the Idaho Department of Environmental Quality, Gold Creek is listed under section 303(d) of the Clean Water Act for both "unknown" pollutants (usually sediment) and temperature (SEIS, III-122). Bull trout require some of the most stringent, cold temperature conditions compared to other salmonids in the Western U.S.*

Accordingly, the agency should limit management activities that would increase the water temperature in Gold Creek and its tributaries. For example, the agency is proposing 898 acres of regeneration harvest (SEIS, II-9). Regeneration harvest removes >70% of the canopy (SEIS, III-41). Canopy cover is important for shading snow pack, delaying snowmelt into later in the spring or early summer, and reducing the threat of flash-flooding and management-induced stream channel modifications. Furthermore, the delay of snowmelt helps to maintain low water temperatures in salmonid streams. Therefore, the Sandpoint Ranger District should consider the use of selective harvest rather than regeneration harvest to limit impacts to water temperature, for which Gold Creek is 303(d) listed.

Furthermore, the Forest Service is proposing vegetation treatments that will result in openings greater than 40 acres (SEIS, II-16). Openings greater than 40 acres will drastically decrease shade in the watershed and hence increase the rate of snowmelt in the Gold Creek watershed in early spring. This will result in increases in water temperature in late spring and the critical summer months in Gold Creek due to the reduced delay in snowmelt. Since a TMDL has not been completed for the Gold Creek watershed, the agency has an obligation for the non-degradation of criteria pollutants (in this case temperature) in the Gold Creek watershed under the Clean Water Act.

RESPONSE: Upon advice from IDEQ and further review of the 2002 Integrated 303(d)/305(b) Report (IDEQ 2005), it was found that a 303(d) listing for "unknown" for Gold Creek was for the Gold Creek that flows confluent to the Pack River on the north side of the Pend Oreille basin and not for the Gold Creek of interest in this analysis. The current status of Gold and West Gold Creeks is clarified in the FSEIS.

The temperature regime present in West Gold and Gold Creeks would not be affected by the proposed project related activities due to the implementation of INFS buffers (DSEIS I-13, II-19 and III-153), which will retain canopy cover that provides shade to the streams and riparian areas, and ground water (spring) influences present in the lower Gold Creek drainage that keep water temperatures low where bull trout are found (DSEIS III-129, Golder Associates 2006). The purpose of INFS is to protect aquatic and riparian habitat, and is based on years of scientific research. Through the implementation of INFS, the USFS is compliant with the non-degradation of criteria pollutants (temperature) in Gold Creek under the Clean Water Act. During periods when bull trout are spawning (September/October), peak flows have attenuated and stream flow in the lower reaches of Gold Creek and West Gold is regulated by the release of ground water in springs (DSEIS III-129). It is clear that the lower Gold Creek springs are critical to the continued spawning and occurrence of bull trout in lower Gold Creek (below West Gold Creek) since they deliver a significant flow of cold water to lower Gold Creek (Golder Associates 2006). Melt water from a snow pack ablating later in the spring would not further improve temperature conditions in the lower reaches of Gold and West Gold Creeks that are controlled by ground water. Additionally, Best Management Practices (BMPs) will be implemented and all activities would be designed to protect water quality and fisheries habitat (DSEIS II-19).

It is also important to point out that a removal of canopy cover is anticipated under any of the alternatives analyzed in the West Gold project, even the No Action alternative (Alternative A). Table 9 (DSEIS III-19) indicates that a maximum of 41 percent and a minimum of 34 percent of the project area (not the entire drainage) would be in an early successional stage following treatment. Under alternative A, canopy cover would also be reduced. Thirty-four percent of the project area is predicted to be in an early succession stage following mortality caused by agents such as root disease, insect attack, wind and other disturbance mechanisms (DSEIS III-19).

Increases in peak flows owing to canopy openings were analyzed using WATSED (DSEIS III-151, III-152, III-161 and III-162). It should be noted that small increases were also estimated to occur under the no action alternative owing to canopy openings created by root disease, insect attack, etc. (DSEIS II-38, II-39, III-145 and III-151). The estimated increases in peak flow would be undetectable (DSEIS III-152). The bedrock controlled nature of the

lower Gold Creek and West Gold Creek channels where bull trout are found have made them resilient with respect to fluctuations in flow and sediment to natural and human-caused disturbances over time (DSEIS III-136 and III-153).

4 *NEPA requires high quality information with expert agency comments, 40 CFR 1500.1(b). The TMDL information presented in Chapter III does not present an accurate description of the TMDL status of Gold Creek. The Forest Service's West Gold FEIS, November 2002, on page III-97 presented information that indicated West Gold from the headwaters to Pend Oreille Lake was a 303(d) water quality limited segment. This segment continues to be a 303(d) water quality limited segment as the pollutant problems continue to exist.*

The pollutants of concern were, and still are, sediment and metals. The sediment TMDL implementation plan has not been completed. As was noted by Idaho DEQ in their July 17, 2002 letter to the Sandpoint Ranger District, the yearly sediment transport to the stream exceeds natural background by 2,255.3 tons/yr. The Final Supplemental EIS is required to accurately indicate the status of the sediment TMDL that applies to the West Gold watershed.

The aquatics analysis in the FSEIS needs to indicate the tons of sediment reduction required per year from the West Gold watershed in order to be in compliance with the EPA approved sediment TMDL.

RESPONSE: The status of the TMDL in Gold Creek and West Gold Creeks is clarified in the FSEIS. The current status of the Gold Creek TMDL is that there is an approved sediment TMDL and an sediment reduction allocation developed for the subwatersheds of Gold Creek and Chloride Gulch from their headwaters to the Lake Pend Oreille. West Gold Creek was never 303(d) listed until the 2002 integrated report. Upon advice from the IDEQ, it was also found that Gold Creek was never on the 303(d) list for metals; therefore, there is no TMDL for metals. The current TMDL for Gold Creek focuses on the subwatersheds where the center of the mining activity in the watershed occurred, which has been identified as the primary activity contributing to sedimentation in the watershed (Gold Creek TMDL, revised 11/00, p. 110).

The intent of the TMDL is being met by sediment reductions achieved through past, present, and planned restoration work on the major mine sites (Idaho Lakeview and Conjecture mines), the repair of the Kick Bush Slide, as well as stream restoration, and road maintenance and decommissioning activities (DEIS III-154 to III-58, III-160). Monitoring and an evaluation of water quality as outline in the TMDL will determine if restoration activities have been effective in restoring water quality.

The current 303(d) list includes Gold Creek and West Gold as impaired for temperature from source to mouth. The Gold Creek that appears on the 303(d) list for "unknown" refers to the Gold Creek that flows confluent to the Pack River on the north side of the Lake Pend Oreille basin. It was mistakenly thought to be referring the Gold Creek of interest in this area. A TMDL for temperature on these water bodies has not yet been created. Although a TMDL has not been created, no management activities should negatively affect the current status of that water body with respect to the identified pollutant. Through the implementation of Inland Native Fisheries Strategy, and the requisite riparian habitat conservation areas, no harvesting of riparian areas will take place, therefore there will be no additional solar gain or increased temperatures to these listed waters (DEIS III-153).

Furthermore, temperature data for Gold and West Gold suggest that temperatures are currently within the acceptable range for the state of Idaho for bull trout (see DEIS III-128 and the project file, Section J).

4 *The FSEIS also needs to correct the following statement made on page III-161 of the DSEIS. "Therefore, based on the sediment budget analysis in table 24 above, none of the alternatives would impair beneficial uses within Gold Creek, and all would meet the intent of the Gold Creek TMDL."*

The DSEIS in Chapter III, including page III-161, does not contain an accurate representation of the sediment TMDL that exists for the Gold Creek watershed. The DSEIS also does not contain an accurate representation of TMDL requirements found in Idaho Water Quality Standards, IDAPA 58.01.02.

The FSEIS needs to provide an accurate description of the Idaho WQS that apply to high priority impaired water bodies where there is an approved sediment TMDL.

RESPONSE: Matters regarding the TMDL in Gold Creek are clarified in the FSEIS. The approved TMDL for Gold Creek contains a sediment reduction allocation of 2,256.3 tons/yr for Gold Creek and Chloride Gulch from their headwaters to the Lake Pend Oreille (IDEQ 2000). The intent of the TMDL is being met by sediment reductions achieved through past, present, and planned restoration work on the major mine sites (Idaho Lakeview and Conjecture mines), the repair of the Kick Bush Slide, as well as stream restoration, and road maintenance and decommissioning activities (DEIS III-154 to III-158, III-160). There will be a net reduction in sediment in the Gold Creek watershed and the cumulative effects area DSEIS (III-159 to III-161, including table 24). This does meet Idaho Water Standards, IDAPA 58.01.02.054.06 for pollutant trading.

4 *The FSEIS needs to include a copy of the 2001 EPA Region 10 letter to Idaho DEQ that listed the water bodies in HUC's 17010213 and 17010214 that have an approved sediment TMDL.*

RESPONSE: It is not the responsibility of the Forest Service to provide a list of water bodies with approved TMDLs outside of the cumulative effects area of the proposed project. A complete list of water bodies with approved sediment TMDLs can be found in IDEQ's 2002 Integrated Report (IDEQ 2005).

8 *EPA's concern with the DSEIS is the potential short term (5-15 year) increase in sediment delivery to West Gold Creek, a tributary to Gold Creek and an important spawning area for bull trout. Gold Creek has an approved Total Maximum Daily Load (TMDL) for sediment which needs to be addressed in the DSEIS. The TMDL calls for a 90% reduction in sediment loading in Gold Creek with a target of achieving natural background sediment loading. Because West Gold Creek sediment loading is about 50% above natural background, this should be considered as part of the Final Supplemental EIS and explain how this project is consistent with the sediment TMDL for Gold Creek.*

Because Alternative B increases sediment by approximately 22% for the first two years with a gradual decrease to current levels in 15 years, it does not appear that this Alternative is consistent with the sediment TMDL for Gold Creek. Alternative D would have the least short term impact of an estimated 6% increase in sediment yield, declining to current levels in 5 years. Alternative C

would increase sediment by approximately 16% then decline to current levels in 5 years. Alternative C would appear to meet the project objectives and have less short term impacts than Alternative B. We support the overall objectives of the project and therefore encourage further consideration of Alternatives C and D. While stream channels within the project area may be tolerant of short term increase of sediment loading, it cold impact the lower reaches in Gold Creek, which are recognized key spawning areas for bull trout.

RESPONSE: The status of the TMDL in Gold Creek and West Gold Creeks is clarified in the FSEIS. The current status of the Gold Creek TMDL is that there is an approved sediment TMDL and a sediment reduction allocation developed for the subwatersheds of Gold Creek and Chloride Bush to Lake Pend Oreille (Gold Creek TMDL, revised 11/00, p. 110). There is no TMDL for West Gold (Steed personal communication 2006). The current TMDL for Gold Creek focuses on the subwatersheds where the center of the mining activity in the watershed occurred, which has been identified as the primary activity contributing to sedimentation in the watershed (Gold Creek TMDL, revised 11/00, p. 110). The intent of the TMDL is being met through net sediment reductions achieved through past, present, and planned restoration work on the major mine sites (Idaho Lakeview and Conjecture mines), the repair of the Kick Bush Slide, as well as stream restoration, and road maintenance and decommissioning activities in those drainages (DEIS III-154 to III-158, III-160; Steed personal communication 2006). Monitoring and an evaluation of water quality as outline in the TMDL will determine if restoration activities have been effective in restoring water quality.

Alternatives C and D are considered in light of objectives to maintain and improve aquatic habitat for bull trout and other cold-water biota in the cumulative effects area. As discussed in the DSEIS, the cumulative effects of past, present, and reasonable foreseeable activities in the Gold Creek watershed will result in a net reduction in sediment (II-39, III-153 to III-163). Furthermore, the channel types in these lower reaches of Gold and West Gold Creek that are used by bull trout are stable and resilient with respect to fluctuations in flow and sediment (DSEIS III-136, III-153). These reaches are B type sediment transport reaches with minimum gradients of 3.6 percent (DSEIS III-140 and III-141, Golder Associates 2006) and are not capable of storing the fine-grained sediment that could encapsulate spawning gravels.

3a *Implementation of the West Gold project as described in the FEIS and ROD will violate Idaho Code and the CWA by increasing pollution in impaired waters.*

RESPONSE: The status of water quality (as listed by the IDEQ) for Gold Creek and West Gold is clarified in the FSEIS. As discussed in the DSEIS (III-122 and III-123), Gold Creek is currently a water quality-limited segment. The current status of the Gold Creek TMDL is that there is an approved sediment TMDL and a sediment reduction allocation developed for the subwatersheds of Gold Creek and Chloride Bush to Lake Pend Oreille (Gold Creek TMDL, revised 11/00, p. 110). Under this status, there is to be no net increase in sediment entering Gold Creek due to management activities. The current TMDL for Gold Creek focuses on the subwatersheds where the center of the mining activity in the watershed occurred, which has been identified as the primary activity contributing to sedimentation in the watershed (Gold Creek TMDL, revised 11/00, p. 110). The intent of the TMDL is being met through net sediment reductions achieved through past, present, and planned

restoration work on the major mine sites (Idaho Lakeview and Conjecture mines); the repair of the Kick Bush Slide; and stream restoration and road maintenance and decommissioning activities in those drainages (DEIS III-154 to III-158, III-160; Steed personal communication 2006).

As IDEQ points out, Idaho Code (IDAPA 58.01.02.054 Section 04) allows for pollutant trading in creeks with approved TMDLs as long as the total load remains constant or decreases (IDEQ 2006). The DSEIS (III-159 to III-161, and table 24) displays that the Idaho Lakeview Mine clean-up and Kick Bush Slide Road repair that has been completed has reduce sediment entering the creek by at least 276 tons per year. The maximum sediment load the West Gold Project would deliver is 24 tons of sediment to the creek over the life of the project for a net decrease of 252 tons. Funding has been secured for the continuation of mine reclamation work on the Conjecture mine as well. Work will begin this year (DSEIS III-158). Additionally, sediment risk will be reduced by between 1,753 and 2,572 tons through the improvement or removal of at-risk culverts (DSEIS III-159 to III-161). The project is in compliance with the CWA and the State of Idaho water quality standards.

5a *The West Gold project violates the Clean Water Act (CWA). The proposed logging with Alternative C modified is in direct violation of the CWA, Section 303(d) Total Maximum Daily Load (TMDL) requirements, and the increase in sediment yields with selected Alternative C is a violation of 40 CFR 130.12(c). The analysis associated with the sediment reduction due to removals and replacements of culverts does not contain a high degree of scientific accuracy as required by NEPA.*

RESPONSE: The status of water quality (as listed by the IDEQ) for Gold Creek and West Gold is clarified in the FSEIS. As discussed in the DSEIS (III-122 and III-123), Gold Creek is currently a water quality-limited segment. The current status of the Gold Creek TMDL is that there is an approved sediment TMDL and a sediment reduction allocation developed for the subwatersheds of Gold Creek and Chloride Bush to Lake Pend Oreille (Gold Creek TMDL, revised 11/00, p. 110). Under this status, there is to be no net increase in sediment entering Gold Creek due to management activities. The current TMDL for Gold Creek focuses on the subwatersheds where the center of the mining activity in the watershed occurred, which has been identified as the primary activity contributing to sedimentation in the watershed (Gold Creek TMDL, revised 11/00, p. 110).

The intent of the TMDL is being met through net sediment reductions achieved through past, present, and planned restoration work on the major mine sites (Idaho Lakeview and Conjecture mines), the repair of the Kick Bush Slide, as well as stream restoration, and road maintenance and decommissioning activities in those drainages (DEIS III-154 to III-158, III-160; Steed personal communication 2006).

As IDEQ points out, Idaho Code (IDAPA 58.01.02.054 Section 04) allows for pollutant trading in creeks with approved TMDLs as long as the total load remains constant or decreases (IDEQ 2006). The DSEIS (III-159 to III-161, and Table 24) displays that the Idaho Lakeview Mine clean-up and Kick Bush Slide Road repair that has been completed has reduce sediment entering the creek by at least 276 tons per year. The maximum sediment load the West Gold Project would deliver is 24 tons of sediment to the creek over the life of the project for a net decrease of 252 tons. Funding has been secured for the

continuation of mine reclamation work on the Conjecture mine as well. Work will begin this year (DSEIS III-158). Additionally, sediment risk will be reduced by between 1,753 and 2,572 tons through the improvement or removal of at-risk culverts (DSEIS III-159 to III-161).

The sediment risk analysis (DSEIS III-140 and III-141 and project file, Section I) and methodology (DSEIS III-126) are based on Methods for Inventory and Environmental Risk Assessment of Road Drainage Crossings (Flanagan et al. 1998). The protocol was used for assessing the erosional hazards and risks to aquatic and riparian ecosystems of road-stream crossings, ditch-relief culverts, and other road drainage features (Flanagan et al. 1998). The project file (Section I) contains information on the data collected and the results from the drainage structure inventory protocol. Flanagan et al. (1998) is peer reviewed, is an accepted methodology, and contains the high degree of scientific accuracy required by NEPA.

Aquatics - WATSED

3 *The FSEIS must provide the source and scientific basis for: 1) the estimate of increased peak flows after fires that occurred in 1850 and 1896, 2) the current estimated increases in peak flows from the proposed alternatives, and 3) the scientific basis for the conclusion that the projected increases will not adversely affect bull trout habitat in West Gold and Gold Creeks.*

RESPONSE: The estimated increases in peak flow were generated in WATSED using data obtained from the fire history for the area documented in the EAWS (2002) and DSEIS (III-54 to III-56). Increases for peak flows from the proposed alternatives were also generated in WATSED using values from the activity table in the DSEIS II-12 (III-151 and III-152). A description of the scientific basis, the strengths, and limitations for the WATSED model are discussed in the DSEIS III-124 and III-125. WATSED is a tool to compare alternatives, and is used in conjunction with field work, data analysis, and overall judgment to reach conclusions (DSEIS III-124 to III-126). Hydrologists and other watershed specialists evaluated the watershed and streams on-site with measured observations of conditions to supplement their conclusions. WATSED was not used for the precise prediction peak flows (DSEIS III-124 and III-125).

Bull trout primarily inhabit in the lower reaches of Gold Creek and have been known to occasionally use the lowest reaches of West Gold Creek (DSEIS III-126) that are boulder- and bedrock-controlled (DSEIS III-136 and III-143). These channel types are stable and resilient with respect to fluctuations in flow and sediment (DSEIS III-136 and III-153). These reaches are B type sediment transport reaches with minimum gradients of 3.6 percent (DSEIS III-140 and III-141; Golder Associates 2006) and are not capable of storing the fine-grained sediment that could encapsulate spawning gravels.

4 *There is no discussion in the DSEIS of the WATSED model's inability to accurately account for routing of sediment through streams, and the model's insufficient recognition of stream dynamics, habitat responses, and beneficial uses. The FSEIS needs to provide expert agency comments with high quality information that indicates how the model accounts for routing of sediment through streams, and how the model accounts for stream dynamics, and impacts to habitat responses, and beneficial uses.*

RESPONSE: A detailed discussion of the WATSED model and its ability to deal with stream dynamics, habitat response, and beneficial uses in the DSEIS (III-124 and III-125). On page III-125 the document specifically states that no main channel hydrologic or hydraulic processes are modeled directly. The results of WATSED provide one set of information to the technical user, who, along with knowledge of the model and its limitations, data analysis, and professional judgment must integrate all information sources to make the appropriate findings and conclusions on the effects to habitat and beneficial uses (DSEIS III-125).

4 *Also, the WATSED discussions in the SDEIS do not mention the model and the ECA procedure. John G. King in his 1989 paper "Streamflow Responses to Road Building and Harvesting: a Comparison with the Equivalent Clearcut Area Procedure" examined the veracity of a model for changes in peakflow as a function of Equivalent Clearcut Area, (ECA), which is a parameter input for WATSED use. [USDA Forest Service Intermountain Research Station, Research Paper INT-401. 13 p.] …*

The FSEIS needs to provide high quality information with expert agency comments that will indicate there are significant limitations of the ECA component associated with the WATSED model.

RESPONSE: Although ECA is a parameter of the WATSED model, the ECA model methodology is not equivalent to the WATSED model (which was used in this analysis), and has a different set of limitations. The overall limitations of the WATSED model are discussed on pages III-124 and III-125 of the DSEIS.

4 *Also concerning the model is the issue of estimates of historical peak flows. On page III-131 the following sentences are found. "Figure 20 displays the estimate changes in magnitude, duration and patterns of peak flows from past fires, road construction and timber harvest activities between 1848 and 2040 in the West Gold drainage" and "One effect of this open landscape was higher peak flows and greater fluctuations in flows than are present in West Gold and Gold Creeks today." On page III-131 the following statement is made. "Large spikes in 1850 and 1896 are attributed to a combination of fires that burned over 76 percent of the cumulative effects area."*

There is no information presented on pages III-131 and III-132 that indicates why the year 1848 was chosen as the starting point regarding historic peak flows as shown in Figure 20 on page III-132. It also appears the estimates of historic peak flows from 1848 were derived exclusively from the WATSED model. The FSEIS needs to provide high quality information that will describe the procedures of the model that are used when estimating peak flows that occurred approximately 158 years ago. There should also be expert agency comments that will indicate whether the model is capable of estimating monthly flows of water in the West Gold drainage back to the year 1848.

RESPONSE: The reason this time period was selected for modeling is discussed on page III-131 of the DSEIS. This date was chosen to demonstrate the effects of large scale land cover change on runoff and sediment, to establish the likely watershed response pattern based on the patterns of natural disturbance in the past, and to provide some perspective on watershed impacts and recovery. The procedures for estimating peak flows for this period are the same as those that would be used for any period, and are described on pages III-124 and III-125 of the DSEIS and in USDA Forest Service (1981) and Patten (1989). The

WATSED model will provide estimates of sediment and water yield based on the input parameters it is given.

4 *The aquatics analysis does not mention the U.S. Army Corps of Engineers document "Engineering and Design RUNOFF FROM SNOWMELT", EM 1110-2-1406, dated 31 March 1998.*

In Chapter 2, at 2-2 the following sentence is included in the discussion of Energy and Mass Balance of the Snowcover. "The basic equations and coefficients that describe snowmelt at a point have been derived primarily from various laboratory and field experiments."

On page 2-5 of Chapter 2 the turbulent transfer discussions at c. (1) includes the following sentence that mentions coefficients. "Computation of the transfer of sensible and latent heat from the atmosphere is complex from a theoretical standpoint, and exchange coefficients are derived empirically from controlled experiments." Also on page 2-5 at c. (2) bulk transfer coefficients are show in equations 2-6 and 2-7.

NEPA at 40 CFR 1500.1(b) requires accurate scientific analysis and NEPA at 40 CFR 1502.24 requires the scientific integrity of the discussions and analyses in environmental impact statements.

In order to meet the NEPA requirements of 1500.1(b) and 1502.24, the FSEIS is required to provide high quality information that describes how the model incorporates the results of processes that include r-o-s events, in the calibration of its driving coefficients.

The Watershed section of the FSEIS also is required to list and describe the "driving coefficients" that are associated with the calibration of the model.

RESPONSE: The WATSED model cannot predict sediment and peak flow in response to isolated rain-on-snow events (DSEIS III-125). The weather patterns that result in rain-on-snow events are incorporated into the calibration of the models driving coefficients when they are a part of the long-term climate record (DSEIS III-125 and project file Section I). The U.S. Army Corps of Engineers document referred to does include a variety of conceptual models that describe snowmelt under a variety of conditions. "Depending on the climatological and local weather condition, the relative importance of these processes differs widely" (p. 2-5). The various components on these conceptual models will vary widely over a watershed, and thus are useful only in estimating snowmelt as a result very site specific conditions that occur in time and space. Peak flows from rain-on-snow events have been a component (not annually) of the natural processes that have contributed to the overall morphology and stability of stream channels in this area (DSEIS III-133, III-138). Peak flows from rain-on-snow events are higher and over a shorter duration than those modeled in WATSED (DSEIS III-133).

5 *The DSEIS refers to the use of the modeling procedures, yet if fails to disclose the amount of error inherent in the use of the models for the purposes they are being used. The models have not been verified on the ground here, and therefore it's reasonable, scientifically, for commenters and the public to expect the IPNF to be far more cautious about using such models.*

RESPONSE: WATSED was designed to address and integrate a vast and complex array of landtypes and disturbances within the context of a watershed and organize the evaluation

according to rule sets established by the author and cooperators. In the case of WATSED, the rule sets reflect watershed processes and functions based on research, data and analyses collected both locally and regionally. Forest Plan monitoring reports (USDA Forest Service 2000, 1999, and 1998b) described how calibration and validation of WATSED had been an annual process on the forest and where changes have been made. The model, however, also included simplifying assumptions, and does not include all possible controlling factors. Therefore, the use of models is to provide one set of information to the technical user, who, along with a knowledge of the model and its limitations, other models, data, analysis, experience and judgment must integrate all those sources to make the appropriate findings and conclusions (DSEIS III-124, III-125). Hydrologists and other watershed specialists evaluated the watershed and streams on-site with measured observations of conditions to supplement their conclusions.

The cited monitoring reports go into specifics of how accurately WATSED estimates the real world for various watersheds. For example, the 1999 Forest Plan Monitoring Report (USDA Forest Service 1999), after discussing the reports of the year's WATSED monitoring, concludes (p. 33) "[t]he findings from the three sets of comparisons indicate that the WATSED measured responses[,] in terms of the three watersheds[,] are within a reasonable range. They also suggest that natural sediment loads, both measured and predicted are close, with the outstanding exception of Halsey Creek. In two cases, the recovery relationships for predicted suspended loads appear to be higher than expected or measured. The findings from these three sites have generated additional information needs and action items for the next year…" The aquatics specialist is aware of these reports, and of WATSED's limitations.

5a *The FEIS fails to disclose the inaccuracies of the WATSED model's sediment analysis, in violation of NEPA.*

RESPONSE: The DSEIS (III-124 and III-125) discusses the use of the WATSED model and its limitations:

"WATSED was designed to address and integrate a vast and complex array of landtypes and disturbances within the context of a watershed and organize the evaluation according to rule sets established by the author and cooperators so that relative differences among alternatives can be compared in an objective manner. The rule sets reflect watershed processes and functions based on research, data, and analyses collected locally and regionally. Forest Plan monitoring reports (USDA Forest Service 2000, 1999, and 1998b) described how calibration and validation of WATSED had been an annual process on the forest and where changes have been made. The model, however, also included simplifying assumptions, and does not include all possible controlling factors. Therefore, the use of models is to provide one set of information to the technical user, who, along with a knowledge of the model and its limitations, other models, data, analysis, experience and judgment must integrate all those sources to make the appropriate findings and conclusions."

The cited monitoring reports go into specifics of how accurately WATSED estimates the real world for various watersheds. For example, the 1999 Forest Plan Monitoring Report, after discussing the reports of the year's WATSED monitoring, concludes on page 33 that "[t]he

findings from the three sets of comparisons indicate that the WATSED measured responses[,] in terms of the three watersheds[,] are within a reasonable range. They also suggest that natural sediment loads, both measured and predicted are close, with the outstanding exception of Halsey Creek. In two cases, the recovery relationships for predicted suspended loads appear to be higher than expected or measured. The findings from these three sites have generated additional information needs and action items for the next year…" The watershed specialist is aware of these reports, and WATSED's limitations. The use of WATSED by the aquatics specialist is appropriate and in compliance with NEPA.

5a *The appellants contend the use of the WATSED model as a component of the cumulative effects analysis is in violation of NEPA. The cumulative effects analysis sections of the West Gold FEIS do not mention the 370 acres of logging on the south-facing slopes in Kick Bush Gulch as a result of the recent Packsaddle South Timber Sale.*

RESPONSE: The cumulative effects analysis area map for watershed and fisheries (DSEIS, III-127 and III-155) clearly displays that Kick Bush Gulch is within the cumulative effects analysis area for WATSED. Under the heading of Past Activities and Events the DSEIS (III-154) states, "[t]he Gold Creek Ecosystem Analysis at the Watershed Scale (USDA Forest Service 2002) discusses in detail the history, acreage, and mileages for each activity and their time periods." The Gold Creek Ecosystem Analysis at the Watershed Scale (EAWS) lists in Table 9 and displays in a map (Fig. 6) the Packsaddle South and all other timber sales in the watershed. The cumulative effects area used in the WATSED modeling took into account the Packsaddle South Timber Sale, and is in compliance with NEPA.

Available Information and Literature Cited

4 *The FSEIS also needs to indicate whether the DN/FONSI and Environmental Assessment associated with the Prospect timber sale are currently available at the Sandpoint Ranger Station.*

There also needs to be high quality information in the FSEIS that will indicate whether there are any missing Monitoring and Evaluation reports associated with the timber sale, including road-monitoring reports. If there is any incomplete or unavailable information relating to the construction and maintenance of Road 278, or incomplete or unavailable Sandpoint Ranger District or IPNF Monitoring and Evaluation reports that addressed the problems associated with Road 278, the FSEIS needs to describe the incomplete or unavailable documents or reports in order to be in compliance with NEPA regulations at 40 CFR 1502.22. It is important to note that the CEQ Memo of June 24, 2005, pages three and four does not address the issue of incomplete or unavailable information that has already been produced, such as the environmental documents associated with the Prospect timber sale.

RESPONSE: The DN/FONSI and Environmental Assessment associated with the Prospect timber sale are available at the Sandpoint Ranger District office. The effects of that sale have been considered as appropriate throughout the DSEIS. Specific reference to the effects of past timber harvest are addressed in Appendix D (Cumulative Effects Analysis Information), and in the existing condition and cumulative effects discussion section of each resource area.

5 *It is our intention that you include in the record and review all of the literature and other incorporated documents we've cited herein.*

RESPONSE: Your comments including the literature and other incorporated documents are part of the project record. We have reviewed all literature and other incorporated documents.

Clearcuts/Exceeding 40-acre Opening Limit

5a *Clearcuts greater than 40 acres in size are not fully justified, as per NFMA. Openings greater than 40 acres were not generally contemplated in the Forest Plan to deal with such situations as the alleged vegetative imbalance. Since the Forest Service's response to alleged imbalances is a consistent pattern forest wide and beyond, it would violate NFMA and NEPA to approve of such actions in the context of this project.*

Response: There are no clearcuts proposed in the West Gold Project (DSEIS, II-9 to II-14). However, harvesting of 16 units under Alternative B or C would result in the creation of openings in excess of 40 acres (DSEIS, II-16). The Forest Plan does contemplate the creation of openings greater than 40 acres in size (Forest Plan, p. II-32). The plan says that creation of openings of 40 acres or more must conform to current regional guidelines regarding public notification, environmental analysis and approval. When greater than 40-acre openings are proposed, the Forest Supervisor must submit a recommendation to the Regional Office to exceed the 40-acre open size. A 60-day public review period is also required. A letter to the Regional Forester from the Forest Supervisor, dated May 2, 2002, (project file, Section D) describes the justification for exceeding the 40-acre opening size on each of the 16 units. An authorization to exceed the 40-acre size limit was issued by the Regional Office on May 16, 2002 (project file, Section D). The 60-day public review period was initiated in 1998. The action is, therefore, in compliance with NEPA and NFMA.

Finances

5a *The FEIS fails to disclose the potential for the restoration projects not being completed due to lack of funds because the sale will actually be below cost. The FEIS did not disclose to the public the potential negative impacts to restoration work in the event the high bid was substantially lower than the figure cited by the Forest Service. The Forest Service is in violation of the NEPA, which requires high quality information, including budget information.*

RESPONSE: The potential impacts of not completing restoration projects are considered in the existing condition of potentially affected resource areas and the environmental consequences of the No Action alternative. There is a very high probability (for reasons stated below) that restoration activities planned under the action alternatives would be funded either from revenue generated by the sale of timber and/or from appropriated or other funding.

The interdisciplinary team (ID team) used the Transaction Evidence (TE) appraisal method to determine the potential value of trees removed and to provide the decision maker information on the economic viability of the alternatives. TE appraisal results found that "using a timber sale to accomplish project objectives would be economically viable under all

"action" alternatives and none are expected to be below cost." (See Chapter III pages 171 and 172 for more information regarding the TE appraisal method).

All sales offered on the North Zone of the IPNF last year sold, with an average overbid of $9.30/ccf.

Fire and Fuels

5 *In response to these scientific concerns, we ask that the FS disclose what fire history methodology it uses, acknowledge the limitations of the fire history methodology, and disclose what project-area data it's relying upon.*

RESPONSE: The Forest Service has recorded and mapped the spatial location of fire disturbances over approximately 130 years for both the Sandpoint Ranger District and the West Gold project area. Fires were initially mapped with colored pencil on a district map, but are now digitized and mapped using GIS (geographic information system) computer software. A map of the recorded fire history for the West Gold project area is available on line at http://www.fs.fed.us/ipnf/eco/yourforest/gis/index.html#fire.

Records of more recent fire ignitions were obtained from a national database containing information submitted by the Forest Service and Idaho Department of Lands. Forest Service ignition records cover the years 1960-2000, while the Idaho Department of Lands records cover the years 1981-2000. These records include the year, size, location, and cause of each fire reported.

The DSEIS (Section 3.13a Reference Condition) discusses the fire history information we have for the project area. The discussion includes scientific research from the Coeur d'Alene Fire History Study (Zack and Morgan 1994). This research was conducted adjacent to our project area. In addition, historical accounts from the original land survey notes and historical photos within the West Gold project area give us an understanding of how current, and historic disturbance patterns have influenced vegetation development and fuel loadings. The historic conditions presented represent one set of conditions at given points in time. They do not display the full range of conditions that occurred on these sites. The above information allows for reasoned conclusions about what may happen if fire suppression were to continue and provides a frame of reference for management decisions.

The precision in estimating fire dates is discussed in detail in the Coeur d'Alene Fire History Study (Zack and Morgan 1994). For origin dates in the 20th century at the 90 percent confidence interval was estimated to be + or – two percent of the tree ring count, for 19th century the 90 percent confidence interval was estimated to be + or – three percent of the tree ring count, and for 18th century of older the error was estimated to be + or – four percent . We also used scientific research from Fire Ecology of the Forest Habitat Types of Northern Idaho (Smith and Fischer 1997) for fire history information by habitat type groups. They caution that the estimates of historic fire intervals based on tree scar data are conservative because low-severity fires can affect stand development without scaring trees or inducing substantial regeneration.

5 *The DSEIS refers to the use of the modeling procedures, yet if fails to disclose the amount of error inherent in the use of the models for the purposes they are being used. The models have not*

been verified on the ground here, and therefore it's reasonable, scientifically, for commenters and the public to expect the IPNF to be far more cautious about using such models.

The BehavePlus 3.0.1 model assumes that fire is no longer affected by the source of ignition and the fire is not being affected by suppression action. Fire behavior is heavily weighted toward fine fuels, due to fuels larger than one inch having little effect on rate of spread and fuels larger than three inch having no effect. The model assumes that fuels are continuous and uniform, the more uniform the fuel bed, the better the model will predict the fire behavior that occurs. The model works best in grass and not as well in timber that is mixed with scattered down and dead. Uniform weather and topography are also assumed, changes in slope and weather parameters require new calculations.

At high wind speeds fire spread rate can become difficult to predict. It fact, studies have shown that at high wind speeds, the spread rate can actually decrease when the wind speed increases. In BehavePlus 3.0.1, the wind speed at which predictions of rate of spread by the Rothermel spread model become unreliable is called the "wind speed limit".

Forest Plan

5a *The West Gold project is based on an out of date Forest Plan, which is not in compliance with NFMA and NEPA.*

RESPONSE: On February 14, 2003, Congress passed House Joint Resolution 2, also known as the Consolidated Appropriations Resolution, 2003. Sec. 320 of the resolution states, "Prior to October 1, 2003, the Secretary of Agriculture shall not be considered to be in violation of subparagraph 6(f)(5)(A) of the Forest and Rangeland Renewable Resources Planning Act of 1974 (16 U.S.C. 1604(f)(5)(A)) solely because more than 15 years have passed without revision of the plan for a unit of the National Forest System. Nothing in this section exempts the Secretary from any other requirement of the Forest and Rangeland Renewable Resources Planning Act (16 U.S.C.1600 et seq.) or any other law: Provided, that if the Secretary is not acting expeditiously and in good faith, within the funding available, to revise a plan for a unit of the National Forest System, this section shall be void with respect to such plan and a court of proper jurisdiction may order completion of the plan on an accelerated basis."

The Idaho Panhandle National Forests' Plan revision process is well underway (the Proposed Land Management Plan was completed in May of 2006) and is expected to be completed in 2006. The project is, therefore, in compliance with NEPA, NFMA and Congressional intent.

Local Access

6 *When will the logging operations begin?*

RESPONSE: If an action alternative is selected, after the decision is made and the appeal process is completed, we hope to advertise the sale(s) this fall. It is unlikely that any logging operations would begin prior to the spring of 2007.

6 *How many logging contracts will be issued?*

RESPONSE: Either one or two logging contracts would be issued if there is a decision to implement an action alternative.

6 *What is the time frame for completing the entire West Gold Creek Project?*

RESPONSE: If there is a decision to implement an action alternative, all road work and logging would likely be completed by 2011. Prescribed burning and tree planting could commence as early as 2007, and could continue until 2014. Other restoration projects such as noxious weed treatments and timber stand improvement (DSEIS II-5) would likely continue through 2014.

6 *Will proper traffic direction signs be installed to route residents and customers to our business?*

RESPONSE: If either Road 278 or 332 would be blocked for logging, then signs would be posted advising residents and forest travelers of the availability of alternate travel routes.

6 *Will the skyline logging be the only procedure that could impact restrictions or closure to Road 278?*

RESPONSE: All action alternatives would have helicopter units above Road 332. Additionally, Alternatives B and C propose helicopter units above Road 278 (DSEIS Appendix I, Figures 6, 7 and 8). Depending on the location of the helicopter landings used and the direction of yarding, logging any of these units may necessitate the closure of Road 278 and/or Road 332. However, maintenance would be completed on an alternate route (Road 2707) before any prolonged helicopter logging related to closure of Road 278 or 332 occurred. This requirement would be implemented through the timber sale contract(s). Prescribed burning activities in units below Roads 332 and 278 also have the potential to necessitate short-term closures of these roads. As with any logging-related closures, maintenance would be completed on an alternate route (Road 2707), and signs would be posted.

6 *Should Road 278 be restricted or closed for logging, will it be opened for access during weekends and holidays or possibly weekday traffic in the evenings?*

RESPONSE: Any of these scenarios is possible. In any case, maintenance of an alternate route (Road 2707) would be completed prior to any prolonged closure. Additionally, hauling would not be allowed on weekends and holidays to reduce safety hazards during high use times by visitors (DSEIS II-17).

6 *Will I be able to get supplies to our resort during winter months by snowmobile from the Bunco Road (Road 332)?*

RESPONSE: No winter logging would occur in any units accessed by Roads 2707A or 2707AA when Road 332 is plowed, or is scheduled to be plowed. These roads provide a snowmobile bypass route when winter logging dictates the use of Road 332 for log haul. No winter logging would occur on Road 278 unless other snowmobile or drivable road access were available for Lakeview residents and businesses (DSEIS II-17 to II-18).

6 *Will all considerations be given to keep FSFD 278 open for local access? Should Road 278 be restricted or closed, will one or more of the "drivable" access roads (1017, 1180, 2707) be improved to handle the current traffic access to the area?*

9 *We are concerned about the effect of project activities on the availability of safe access to Lakeview.*

10 *If you will offer 2707 as an alternative route when there are closures due to logging will this road be improved?*

RESPONSE: A new design feature has been added to chapter II of the FSEIS under "Features Common to Alternatives B, C and D - Features Related to Timing of Activities." This feature states that units requiring the blockage of Road 278 or 332 would not be logged until maintenance was completed on Road 2707 and that at least one of these routes would remain open. This requirement would be implemented through the timber sale contract(s).

Noxious Weeds

2 *Constructing no new roads as proposed under Alternative B would limit the potential to spread noxious weeds and invasive plants. Increased road densities translate into an increase in the potential for introducing these species. New roads bring in more equipment and motorized vehicles, which may carry the seeds or biomass from these plants…the agency cannot be responsible for public users who are either unaware of the threat or unwilling to inspect and wash their own equipment. Even if the Forest Service prohibits the public from using management roads, the agency lacks the personnel to adequately enforce such closures.*

RESPONSE: The DSEIS (page II-4) identified noxious weeds as a key issue. Alternative C was developed in part to address the issue of noxious weeds related to new road construction and increased road densities. All of the alternatives have been analyzed for their potential effects on noxious weed establishment and spread (DSEIS, III-36 through III-51).

5 *The Sheep Creek Salvage FEIS (USDA Forest Service, 2005a) states at p. 173: Noxious weed presence may lead to physical and biological changes in soil. Organic matter distribution and nutrient flux may change dramatically with noxious weed invasion. Spotted knapweed (Centaurea biebersteinii D.C.) impacts phosphorus levels at sites (LeJeune and Seastedt, 2001) and can hinder growth of other species with allelopathic mechanism. Specific to spotted knapweed, these traits can ultimately limit native species' ability to compete and can have direct impacts on species diversity (Tyser and Key 1988, Ridenour and Callaway 2001).*

The IPNF must disclose how the productivity of the land been affected in the project area and forestwide due to noxious weed infestations, and how that situation is expected to change in the coming years and decades.

RESPONSE: The three references cited above (LeJeune and Seastedt 2001, Tyser and Key 1988, Ridenour and Callaway 2001) were not listed in the commenter's Literature Cited section. We presume the three documents referenced are as follows:

LeJeune, Katherine D. and Timothy R. Seastedt. 2001. *Centaurea* species: The forb that won the west. Conservation Biology 15(6):1568-1574.

Tyser, Robin W. and Carl H. Key. 1988. Spotted knapweed in natural area fescue grasslands: an ecological assessment. Northwest Science (62)4:151-160.

Ridenour, Wendy M. and Ragan M. Callaway. 2001. The relative importance of allelopathy in interference: the effects of an invasive weed on a native bunchgrass. Oecologia (2001)126:444-450.

The Sandpoint Ranger District Noxious Weed Project FEIS (USDA Forest Service 1998c), which was incorporated by reference into the DSEIS, addresses the issue of the effect of noxious weeds on native species diversity (see the Sandpoint Noxious Weed Control Project FEIS on pp. II-1; III-3, 4, 7; and IV-4, 5). Discussion of the role of allelopathy and nutrient limitations in the dominance of spotted knapweed in open grasslands, which occur as inclusions in some forested habitat in the project area, has been added to the FSEIS (Chapter III, Noxious Weeds section). Also discussed is the limitation of available light, which is likely a major factor in the distribution of spotted knapweed in forested habitats that dominate the project area. Finally, a discussion of a study of the effects of knapweed species on the growth of conifer seedlings is included.

5a *There should be no promises made by the Forest Service to adequately mitigate the spread of weed infestations occurring when it clearly states on page III-37 of the FEIS that the Forest Service already knows it cannot prevent the spread of these noxious weeds.*

RESPONSE: In the discussion of noxious weeds, the DSEIS (III--47) states, "Under all alternatives, cumulative effects with regard to new invaders are expected to be low when combined with all of the above past, current, ongoing, and reasonably foreseeable actions. Under Alternative A, because no new disturbance would occur, and because current treatment and monitoring would continue, no new invaders would be expected to become established. Under Alternatives B, C and D, because of mitigation measures designed to detect and eradicate new invaders, no new invaders are expected to become established."

The DSEIS (III-48) further states, "cumulative effects [under all action alternatives] with regard to existing weed infestations are expected to be low for oxeye daisy, Canada thistle, bull thistle, sulfur cinquefoil, rush skeletonweed, dalmatian toadflax, orange and meadow hawkweed, and common tansy, based on their current levels of infestation." The FSEIS has added a statement regarding the observed success of recent weed treatment efforts (Hammet personal observations 1999-2005). The DSEIS (III-48) continues with the following:

"Cumulative effects for spotted knapweed and goatweed would likely be moderate, given their current levels of infestation. Off-road infestations of spotted knapweed and common goatweed would be expected to persist, since these species are considered to be naturalized in the project area. Treatment of off-road infestations with biological control agents may reduce the size of the infestations but would not eliminate them."

The discussion of *Adverse Effects Which Cannot Be Avoided* (DSEIS, III-177) states, "Mitigation measures…would reduce but would not eliminate the risk of weed spread from proposed activities."

OHV Route

5a *Biological, fire, and soil impacts from the new off highway vehicle (OHV) trail are not disclosed in the FEIS.*

RESPONSE: After the November, 2002 West Gold Record of Decision (ROD) was litigated, the Forest service elected to defer any timber harvesting and road construction actions. However, one element of the decision was allowed to proceed: a change in motorized access on roads 2707A and 2707AA to vehicles less than 50 inches in width. The impacts are considered in the existing condition and cumulative effects analyses of various resources where appropriate.

Old Growth

2 *As the SEIS points out, the old growth management units (OGMUs) that encompass the West Gold project area have less than 5 percent old growth (C-20). We appreciate the fact that the Forest Service will not log any old growth during project implementation. However, we encourage the agency to recruit old growth in the OGMUs that encompass the project area by leaving all trees greater than 18 inches dbh. This practice will also aid in recruiting more snags for the benefit of wildlife. Further, we encourage you to designate specific stands for inclusion as recruitment old growth to help attain the require 5% minimum in the OGMU in the future.*

RESPONSE: A review of old growth in the project area was completed and can be found in the project file, Section D. The review contains the information for designation of old growth in the project area. Currently, we have old growth at nearly 12 percent on the Forest (see Draft Appendix C to Forest Plan Revision in the project file, Section D), and there is no requirement to designate additional recruitment. Nearly all stands in the West Gold project area are at least five decades away from reaching the age requirements of old growth, and many will change as a result of natural disturbance (e.g. insects, disease and fire) before reaching old growth. There are small stands or portions of stands containing large old trees in parts of other units; these stands are not defined as old growth or designated for recruitment old growth. We have added a design feature in Chapter II to ensure these large old trees would be retained.

If we want to recruit old growth for the future, we need to favor potentially long-lived species. Setting a diameter limit on trees to be harvested is not a good way to accomplish this desired objective. For example, Douglas-fir and grand fir trees that are competing with desired potentially long-lived trees (i.e. ponderosa pine and western larch), may not be removed by diameter limits; these trees would remain and would be in competition for nutrients, water and sunlight. They also may contribute to the increase of ladder fuels and the risk of stand replacement fire on these dry habitat types continues.

Douglas-fir in our area grows quickly and can easily attain 18 inches diameter or more in 80 to 100 years, but it is generally not a long-lived species (see page III-13 of the DSEIS for further explanation).

5 *There remains much doubt and lack of clarity in the information the IPNF provides regarding old growth in the project area, District-wide, and forestwide. It fails to answer essential, fundamental questions.*

RESPONSE: Appendix C in the DSEIS and the project file (Section D) give an explanation of the Forest, District and Project area inventory and management of old growth. A "Review of Old Growth for West Gold Analysis-2005" in the project file (Section D) describes the review of stands within this analysis area and those stands allocated as old growth.

5 *Does all the "allocated" old growth in the affected OGMUs meet the IPNF's own or accepted scientific criteria for old growth? How much doesn't really serve old-growth associated wildlife species' needs?*

RESPONSE: Allocated old growth is explained in Appendix C (page C-18) in the DSEIS. In the OGMUs within the West Gold project area there are both "Existing Old Growth" and "Potential" Old Growth stands in this allocation. The stands and locations are documented in "Old Growth Review for West Gold Analysis-2005" in the project file (Section D). The DSEIS also disclosed that the FIA inventory plot data were tested against the old growth minimum criteria in table 1 (North Idaho Zone Old Growth Type Characteristics) of Green et al. (See Appendix C- page C-14). All old growth identified by FIA meets old growth standards.

The old growth within the OGMUs associated with the project area contributes to those wildlife species associated with dry habitat types (i.e. pileated woodpecker and flammulated owl). As discussed in the DSEIS (III-13, III-99 through III-103, and III-110 through III-114) and shown on suitability maps located in the project file (Section H), the old growth within the OGMUs is considered suitable to those wildlife species associated with dry habitat types for given stand characteristics.

5 *The IPNF doesn't disclose all the considerations for old growth allocation to allow anyone to review the field data and be able to reach agreement with the IPNF. The IPNF's apparent failure to accept numerical minimums of canopy layers, snags, and large down logs as old-growth criteria, they are not considering the best scientific information available on OG wildlife habitat needs.*

Since the IPNF does not recognize the importance of canopy layers, snags, defective trees, and large down logs n terms of objective old-growth criteria, the proposed activities approved for areas that would otherwise develop into old growth are problematic. The amounts of those structures within old growth (Green et al., 1992) could easily be substantially eliminated with the planned activities.

RESPONSE: Old growth definitions used for all allocations of old growth in the West Gold OGMUs are found in Green, et al. 1992 (errata corrected 02/05). Within this document is an explanation for the criteria used to determine old growth.

Old growth field data within the West Gold OGMUs are available in the project file (Section D).

The criteria the commenter listed above are shown as associated characteristics in Green, et al. 1992 (errata corrected 02/05). On page 11 of this document is an explanation of the "Use of Old Growth Type Descriptions." In paragraph three is the statement ,"A stand should

not be accepted or rejected as old growth simply based on the basis of associated characteristics." Future old growth will not be identified solely by associated characteristics.

With this in mind, some stands that are prescribed for thinning have the potential for reaching old growth structure in the future. These stands, which are primarily dry-site stands, have a high composition of ponderosa pine but have had fire exclusion for many decades. This fire exclusion has allowed an increase in the amount of fuel (down logs, dead and green trees) so that they are now at risk of loss to stand replacement fire. Thinning and underburning will increase the possibility of these stands reaching the old growth stage but these stands are generally nearly five decades away from meeting the necessary age requirements for old growth. In that time frame, more snags, defective trees, canopy layering and large down logs will occur.

In addition, the DSEIS has mitigation measures identified in Features Designed to Protect Wildlife Habitat and Soil Productivity that require retention of snags and snag recruitment trees along with coarse woody debris. These requirements would help maintain stand attributes now and into the future.

5 *Since field reviews are necessary for accuracy of OG inventories, the failure provide information on the accuracy of the IPNF's forestwide inventory leaves compliance with the 10% Forest Plan standard very much in doubt, which is where it has been since before the Douglas-fir Beetle project in the late 1990s.*

RESPONSE: Forest Old Growth Standard 10b, which requires at least ten percent of the forested portion of the IPNF as old growth, is addressed in Appendix C of the West Gold DSEIS. The accuracy standards of the Forest old growth inventories and explanations are as described in the following paragraphs:

The IPNF is using a multi-scale approach to monitoring old growth, based on two separate, independent tools. These are:

1) **Forest Inventory and Analysis (FIA) data used to calculate IPNF Forest-wide and mid-scale old growth percentages.**
2) **IPNF stand-level map displays all stands allocated for old growth management, with old growth management allocation recorded in the TSMRS database.**

1) Old Growth Percentages From FIA Data --

FIA inventory design is based on the standardized national FIA grid of inventory plots that covers all forested portions of the United States. The sample plots are located randomly within the systematic grid of cells. The FIA design provides a statistically sound representative sample designed to provide unbiased estimates of forest conditions at large and medium scales. Because FIA data comes from a statistical sample rather than a 100% census, we describe attributes calculated from this data as estimates and the accuracy of these estimates can be computed and reported as confidence limits. The IPNF used a 90% confidence interval for old growth estimates. That means that if a different set of randomize sample points was collected 100 different times, the estimates of old growth amounts would be within this interval 90% of the time. This indicates that there is a 90% probability that the true amount of old growth is within this confidence interval. There is a 5% probability that the true amount of old growth is less then the lower confidence limit. And, there is an equal 5% probability that the true amount of old growth is greater than the upper confidence limit.

Below are the most current FIA data estimates of old growth and the confidence limits of those estimates for the entire IPNF.

	90% Confidence Interval Lower Bound	Estimate of Percent Old Growth	90% Confidence Interval Upper Bound
Total IPNF	**9.5%**	**11.8%**	**14.0**

2) IPNF Stand-Level Map of Old Growth --

The IPNF 1987 Forest Plan, Standard 10b. states: "Maintain at least 10% of the forested portion to the IPNF as old growth." The IPNF stand-level map of old growth identifies those stands allocated for old growth management to meet this Forest Plan standard, and allows us to display those stands to the public. We keep track of these stands in the TSMRS database. This forest-wide stand map also provides a useful starting point at the project scale when we are considering any management activity, and need to take a more detailed look at old growth allocations within the project area.

One way to monitor compliance with our Forest Plan is by tallying up the acres of stands allocated for old growth management, and comparing this total to the Forest Plan standard. This stand-level map is not a sample of stands, but is simply a tally or census of all stands allocated for old growth management. Because this is a census rather than a sample, it is not appropriate to call the total stand acres an estimate, and it is not possible to calculate any confidence limits or statistical error estimates. However, comparing results of two different ways of monitoring an item (like old growth) does provide an indication of the reliability of those methods. We can compare total acres of allocated old growth stands recorded in TSMRS to the FIA old growth estimates that have a known accuracy. When we compare results of these two independent tools at the forest-wide and district-wide scales, we find that they produce remarkably similar results, and that the total percent of allocated old growth stand acres on the IPNF are within the 90% confidence limits of FIA estimates of old growth.

At the Forest-wide scale, the FIA estimate of the proportion of old growth and number of allocated acres of old growth stands both exceed the Forest Plan 10% standard:

- **Using FIA data, the current estimate of the proportion of old growth on the forested lands of the IPNF is 11.8%. The 90% confidence intervals of this estimate are 9.5% to 14.0%.**
- **The IPNF stand-level total of mapped acres allocated and maintained for old growth equals 12.1% of forested lands. This stand-level percentage is well within the 90% confidence interval of the FIA inventory.**

Information on how stands were allocated to old growth is contained in the latest IPNF Forest Plan Monitoring Report. The IPNF does not do timber harvest that removes allocated old growth. We ceased regeneration harvest of allocated old growth stands a number of years ago. However, old growth distribution will never be entirely static because forests are living, changing natural communities. Disturbances such as fire, insects, pathogens, and weather events may reduce the amount of old growth in some areas. Meanwhile, other stands will grow and age into old growth status. The IPNF has approximately 6,500 individual allocated old growth stands distributed across 2.5 million acres of National Forest. It is not practical to visit every old growth stand every year. To keep our old growth stand map as up-to-date as possible, we not only do periodic forest-wide reviews and updates, but we also take a closer look whenever any management activity is being considered that could possibly impact old growth.

Before making any management decisions within project areas, we closely review all old growth allocations within the project area, as well as review all potential treatment stands, and look for previously unidentified stands that may now meet old growth criteria. The objectives of this review are to be sure we have the best old growth allocation and landscape arrangement possible within that project area, and to be sure we're not inadvertently, negatively impacting old growth. Project-scale review often results in changes in old growth status for a few individual stands. We sometimes find that some previous old growth stands no longer meet criteria because of insect and disease or weather mortality. However, because other stands have grown into old growth status, or because we also find previously un-inventoried old growth, this project-scale review commonly results in a net increase in old growth in the project area.

FIA data is not used to estimate amounts of old growth at the project or Old Growth Management Unit (OGMU) scale. Those spatial scales are too small to have adequate numbers of FIA plots for meaningful estimates or confidence intervals. However, within the project area, all potential old growth stands were reviewed and validated. This stand-by-stand validation is a census rather than a sample. The OGMU and project scale old growth validation process is documented in the project record under Forest Vegetation and contains field exam sheets.

Because the project-scale validation is not a sample, but a review of all old growth stands, it is not appropriate to call it an estimate, and there are no error estimates or confidence intervals to be reported. We have simply identified those stands within the project area boundaries that meet old growth definitions. However, we have disclosed (above) the accuracy of the estimates of old growth derived from FIA data, for the entire IPNF.

5 *The DSEIS does not disclose the historic range of old-growth habitat in this project area. The scientific basis for the IPNF's position, namely that maintaining 10% old-growth on the Forest is plenty to maintain population viability of all species needing old-growth habitat, has never been established. The FS does not cite adequate scientific basis—it is merely an arbitrary figure.*

RESPONSE: The DSEIS compares old growth in the West Gold drainage and the Gold Watershed with the historic Pend Oreille subbasin (pages III-11 through III-13). The historic range of old growth is best described at a larger scale than the project area. As and example, we know that historic stand replacement fire often occurred at a much larger scale that the project area. It is more accurate to consider the historic range for the Pend Oreille subbasin or the North Zone of the IPNF. This can be found in the North Zone Geographic Assessment (USDA Forest Service unpublished report) on page 29.

It is beyond the scope of this project analysis to assess whether the ten percent old growth standard for the IPNF is scientifically valid. The 1987 forest plan made the decision on how much old growth was necessary to maintain. We are required to follow the IPNF's standards for old growth management. Each of these standards and the manner in which the West Gold EIS complies with the standards are discussed in Appendix C.

5 *Since there is no scientific basis for assuming that 10% old growth is enough for species viability, and since there is no scientific basis to support the IPNF's use of its MIS as adequately "indicating" for other species including the Sensitive wolverine, black-backed woodpecker, fisher, flammulated owl, etc., the proof would be in the monitoring. And nothing else shows the FS has completed or is committed to the monitoring that would insure old-growth species' viability.*

RESPONSE: The West Gold project is not the appropriate level for determining the validity of the Forest Plan's contention that species viability would be preserved by maintaining at least ten percent old growth. The West Gold is a site specific project with a narrowly defined purpose and need. There are only two stands in the West Gold drainage that are allocated as old growth and another stand that is allocated as potential old growth (DSEIS III-13). The two allocated old growth stands are not proposed for any treatment, while underburning only is proposed for the allocated potential old growth. Consequently, it's irrelevant to link species viability to old growth for a site-specific plan that has no adverse effects on existing old growth.

5 *The IPNF does not disclose the significance of the effects on OG wildlife species' populations of habitat degradation of old growth because of firewood cutting and illegal poaching of trees due to unrestricted access. The IPNF did not present an analysis of the impacts of open roads through old growth in the OGMUs.*

RESPONSE: The DSEIS speaks to habitat degradation or habitat that has been irretrievably lost through past actions on pages III-102, III-106, III-109, and III-113. There is only one road, Forest Road 2707, that goes through two old growth stands within OGMU #18. This road was built in the early 1950s, prior to the designation of two old growth stands along this road. Recent field inventory of these two stands indicate that they still meet North Idaho old growth definitions.

5 *The DSEIS does not provide a comparison between the natural historic range and current conditions regarding patch size, edge effect, and interior forest of old growth in the OGMUs.*

RESPONSE: The DSEIS uses historic information derived from the North Zone Geographic area as a whole and the Pend Oreille Subbasin Assessment (USDA Forest Service unpublished report, pp. 46-47) to identify changes between historic conditions of patch size, edge effect, and core areas of old growth and the existing condition within the OGMUs in the West Gold analysis area. The findings of the geographic assessment are similar for the OGMUs in West Gold (DSEIS, pp. III-14 and III-15).

5 *The IPNF FIA analysis does not assure that habitat quality regarding block size and spatial distribution of old growth is sufficient for maintaining viable populations of wildlife in the IPNF. Nor is it disclosed in the DSEIS if the criteria for OG identification during the FIA inventory is consistent with the Green et al., 1992 criteria to be meaningful for wildlife habitat analyses.*

RESPONSE: The process used for designating old growth meets the IPNF Forest Plan standards for Old Growth and Old Growth Management Indicator Species. Appendix C of the DSEIS documents the multi-scale approach to monitoring old growth based on two separate, independent tools. These are:

1) **Forest Inventory and Analysis (FIA) data used to calculate IPNF Forest-wide and mid-scale old growth percentages.**
2) **IPNF stand-level map displays all stands allocated for old growth management, with old growth management allocation recorded in the TSMRS database.**

One advantage of using two separate, independent tools for monitoring old growth is being able to address a wide variety of old growth related questions. FIA data come from a

statistically designed sample, and provide a scientifically sound method of estimating the amount of old growth, with a known accuracy displayed as confidence limits. Because the FIA old growth estimates (with accuracy shown as confidence intervals) can be displayed at a variety of spatial scales, we know that old growth is well distributed spatially across the landscape, including in the landscapes immediately surrounding the project area. These results are displayed in the project file (Section D) and in Appendix C of the FSEIS.

The IPNF stand-level map of old growth provides an additional tool to address questions of both spatial distribution and block size. The IPNF Forest Plan provided for spatial aspects of old growth habitat quality through some of the old growth standards. Forest Plan standard 10c provides for spatial distribution of old growth by Old Growth Management Areas of approximately 10,000 acres. Forest Plan standard 10f provides for old growth block size considerations. (This project responds to these standards as explained in Appendix C of the DSEIS).

Appendix C (taken from the 2004 IPNF Forest Plan Monitoring Report) explains the use of the FIA inventory and the use of the IPNF stand level mapping. For the stand level mapping an inventory of old growth was completed on the Sandpoint Ranger District in 1993 as directed by then Forest Supervisor Bill Morden. Sandpoint Ranger District worked with the Audubon Society, represented by Liz Sedler, in delineation and selection of old growth stands (see project file, Section D - *A Review of Old Growth for West Gold Assessment-2005).* This inventory and selection process incorporated block size, linkage, integrity, and position on the landscape (see project file, Section D - *May 7, 1991 Letter, Forest Plan Explanation: Implementing Old Growth Standards)*. Note: All old growth on the Sandpoint Ranger District was selected and is managed for old growth retention.

The DSEIS disclosed that the FIA inventory plot data were tested against the old growth minimum criteria in table 1 of Green et al. (1992 errata corrected 2/05) (see Appendix C-page C-14).

5 *Since the DSEIS provides inadequate analysis regarding the size, quality, and spatial relation of habitat blocks needed by the old growth associated wildlife species in the affected OGMUs, the analysis completely fails to disclose the quantitative or qualitative significance of cumulative effects due to past logging in the area and across the Forest.*

RESPONSE: All old growth within OGMU #18 and #19 have been allocated. The DSEIS does disclose adequate block size for allocated old growth per the Forest Plan (DSEIS, Appendix C). The IPNF Forest Plan (1987) page II-5 links population viability of old growth MIS to the Forest Plan's standards for old growth.

Aerial photos and discussions with a retired employee who participated in the timber harvest program on the Sandpoint Ranger District indicated that past logging within the project area since the IPNF Forest Plan of 1987 was not within old growth stands.

5 *The IPNF ignores the fact that some types of old growth are maintained by low intensity disturbances (Arno, Smith & Krebs 1997; Habeck 1990; Habeck 1988).*

RESPONSE: The IPNF acknowledges that some types of old growth are maintained by low-intensity disturbances (especially fire). The references you quote documenting the need to

treat in dry site old growth are quoted on page III-59 of the DSEIS for the same reason. The discussions on pages III-9 (Dry Habitat Type Group) and III-11 (b. Forest Structure) are also examples of this acknowledgement. The DSEIS proposes to treat one potential dry-site old growth stand by under burning only, to maintain this stand through low intensity disturbance. The DSEIS on page III-13 discusses that two other old growth stands in the analysis area have already been treated by low intensity burning to maintain old growth character.

Roads and Roadless Areas

2 *Despite the Forest Service's reasoning for not decommissioning road 2707A, we encourage the Sandpoint Ranger District to consider decommissioning this road. The agency claims that this road is necessary for a snowmobile bypass as well as an alternate OHV route (SEIS, III-174). However, on page III-141 of the SEIS, the Forest Service points out that there are more problems associated with this road than perhaps any other road in the project area. The single largest threat to stream channels in the project area is the potential impact of stream crossing failures associated with flash floods or rain on snow events (SEIS, III-138 and 139). There are at least 5 problematic stream crossing on road 2707A.*

As part of the project proposal, problematic culverts are supposed to be replaced. Rather than attempt to address the problematic culverts by replacing them, we feel the agency could best address threats to Gold Creek in the project area by decommissioning this road. We believe that following project completion, this road will no longer be necessary as a snowmobile bypass, will no longer be necessary for management objectives given the proximity to roads 332 and 2707, and would drastically reduce the road density and erosion potential in the project area. OHV users could continue to use roads 332 and 2707. Furthermore, the agency has a roads maintenance backlog, which is not likely to be addressed any time soon due to budget cuts.

RESPONSE: Our objective in providing OHV access on Road 2707A and 2707AA was to accommodate increasing motorized use in this area. This route provides an alternative to the mixed traffic Road 332. In the winter, Roads 2707A and 2707AA provide snowmobile route if Road 332 is plowed. Unlike many other parts of the District with Threatened and Endangered species concerns, we have an opportunity to provide for motorized use in this area.

The portion of Road 2707A (0.7 miles) not needed for the snowmobile bypass and OHV route is proposed for decommissioning. Two culverts (and associated fills) with moderately high risk failure would be removed in this decommissioning (DSEIS III-148). Of the remaining three crossings on the Road 2707A, two have had recent improvements (DSEIS III-141) and the third is proposed for upgrading (DSEIS III-148).

5 *The DSEIS does not clarify any roadless boundary issues. It is not adequate to merely accept previous, often arbitrary roadless inventories—unroaded areas adjacent to inventoried areas were often left out. Additionally, there is a lot of public support for adding unroaded areas as small as 1,000 acres in size to the roadless inventory.*

RESPONSE: The West Gold Project area does not contain, nor is it adjacent to, any inventoried roadless areas (DSEIS I-2, USDA Forest Service 1987). It is beyond the scope of this decision to designate roadless areas.

Salvage

5a *The ROD raises the possibility that timber salvage of up to 1 million board feet after timber sale contracts are completed will occur and is included in analysis. We find that it is not included in the elk discussion, transportation system planning, soil impact analysis, watershed analysis, etc. Until a full analysis of this salvage is documented, we insist that a separate decision be made if the Forest plans additional logging.*

RESPONSE: The opportunity for future salvage of groups of trees damaged by weather, fire or insects within cutting units was dropped as a feature of the action alternatives (DSEIS II-1).

Sensitive Species

5a *In failing to prepare conservation strategies and complete a Biological Evaluation (BE) for sensitive species that considers cumulative effects the FS has ignored its own policies. Therefore the FEIS and ROD violate NEPA and the ROD is arbitrary and capricious in its determination that the project would be consistent with NFMA.*

Response: Cumulative effects to sensitive species are addressed in Chapter III of the DSEIS for the wildlife, fisheries and rare plant resources. A summary of conclusion of effects of all the alternatives are in the FSEIS, Appendix K. According to direction from the Northern Regional Office, in a letter dated August 17, 1995, there is no longer a need to have a "stand alone" biological evaluation for sensitive species; "…documentation of effects and the rationale for conclusion of effects will be consolidated into the main text or appendix of the EA or EIS" (USDA Forest Service 1995b).

The Forest Service Manual states, "…units must develop conservation strategies for those sensitive species whose continued existence may be negatively affected by the forest plan or a proposed project." This project will not negatively impact the continued existence of any of the sensitive species addressed in the DSEIS; therefore, conservation strategies are not required.

However, as noted in the DSEIS (III-36) a conservation strategy for the sensitive plant species clustered lady's slipper (*Cypripedium fasciculatum* Kell.) on the IPNF has been prepared (Lichthardt 2003), and a conservation strategy for sensitive moonworts on the IPNF is being prepared. See the discussion in the DSEIS (III-30) regarding effects of the alternatives to clustered lady's slipper as they relate to the findings in the conservation strategy.

The FSEIS and ROD are in compliance with NEPA, NFMA, and the Forest Service Manual with regard to cumulative effects to sensitive species.

Soils

2 *The Forest Service has not yet determined the exact location of the helicopter landings for the units that would be logged with helicopters. We encourage the Sandpoint Ranger District not to locate these landings in riparian habitat conservation areas (RHCAs). The agency should also attempt to place the landings adjacent to roads rather than at the end of roads. When helispots are*

placed at the end of roads, forest users may turn them into dispersed sites, which may be heavily impacted by use.

RESPONSE: Potential helicopter landing locations are shown in Appendix I (figures I-6, I-7 and I-8) of the DSEIS. None of these potential locations are located in an RHCA. None of these potential locations are located at the end of roads, and most of the locations are on roads with restricted access (gated). Helicopter landings associated with existing classified roads would be scarified and seeded after use. Non-dedicated landings (associated with temporary road construction) would be subsoiled and revegetated (DSEIS III-81 to III-82). Language stating that landings would not be constructed in RHCAs has been added to description of design features associated with the Inland Native Fish Strategy in Chapter II.

2 *We also encourage the Forest Service to helicopter log or altogether avoid logging in unit 6. As the SEIS points out, one thinning prescription in unit 6 is characterized as having a high mass failure potential (III-147). If the agency insists on logging this unit, we believe that the Forest Service could utilize helicopter logging to reduce the likelihood for mass failure vis-à-vis skyline yarding given that neighboring unit 36 will be logged with a helicopter. While unit 36 is being helicopter logged, the contractor might as well treat unit 6 simultaneously to avoid further increases in mass failure potential in unit 6.*

8 *Helicopter logging areas, such as "unit 6," would further reduce potential sediment loading into West Gold Creek.*

RESPONSE: Landtypes serve only as caution for mid-level planning purposes and not for site-specific design and decisions. A site-specific, on the ground review of this area revealed that it does not have a high risk of mass failure (see project file). Concerning the potential for sediment to arise from activities within his unit, monitoring has shown that very little (0-2 percent) ground disturbance would result from the proposed skyline based system (Niehoff 2002, USDA Forest Service 2003, and USDA Forest Service 2004). Additionally, a 300-foot no-cut buffer would be placed between unit 6 and West Gold Creek. In the unlikely event that additional sediment was generated by the proposed activities, this buffer would effectively filter them out (USDA Forest Service 1995).

5 *The DSEIS refers to the use of the modeling procedures, yet if fails to disclose the amount of error inherent in the use of the models for the purposes they are being used. The models have not been verified on the ground here, and therefore it's reasonable, scientifically, for commenters and the public to expect the IPNF to be far more cautious about using such models.*

RESPONSE: Data from which the Soil Disturbance or Spreadsheet Model coefficients were derived are discussed in the DSEIS (III-78) and in the referenced document by Niehoff (2002). This model is an analysis tool that considers soil response relationships as a result of forest practices. The estimated responses are combined with locally collected data and analysis to determine the findings of probable effects. They serve as a starting point to provide information that, when combined with its limitations, experience, judgment and field observations, integrate those sources to make the appropriate findings and conclusions.

Limitations of the model are discussed in the DSEIS (III-77). While soil productivity standards currently in effect define soil compaction in quantitative terms, many other forms of soil damage (e.g. displacement and puddling) are qualitative. Quantitative measurements

of density, porosity and strength make sampling complex, time consuming and expensive. The techniques used, such as the onsite assessment method for detrimental soil disturbance (Niehoff 2002), are qualitative and employ professional judgment with the intent to provide the best data available to protect the soil resource in the long term. Impacts of soil disturbances are not absolute and are affected by soil type, local climatic and vegetation conditions, and other compensation factors.

5 *Regarding soil productivity, it is not clear at all from reading the DSEIS that the IPNF actually made proper estimates of existing detrimental disturbance based on scientifically sound methodology, using experts adequately qualified to assess the complexities of soil qualities and cumulative impacts, which could accurately reflect existing soil productivity limitations and damage.*

RESPONSE: A description of the methods used to determine the levels of existing detrimental disturbance is in DSEIS (III-72 to III-73). Clarification and further explanation of the approach used has been added to the Soils Methodology section of the FSEIS.

5 *The DSEIS fails to include a map showing the boundaries of all previously established "activity areas" as the R-1 Soil Quality Standards define "activity areas", and present all available data on levels of existing detrimental disturbance within those activity areas, in either a tabular or map form. Then, based on that data the IPNF will be in a better position to analyze the water yield and other hydrological implications of the various amounts of hydrologically dysfunctioning soils, within each project area watershed and subwatershed, and disclose them to the public. ... The models the DSEIS uses do not consider compacted soils, for example, for cumulative effects watershed analyses.*

RESPONSE: A map indicating past harvest areas is included in Appendix I (I-9) of the DSEIS. Data on the existing levels of disturbance in areas that have existing disturbance are located on page III-84 of the DSEIS. The model used for cumulative effects watershed analysis uses information on existing conditions and landtypes and considers the impacts from proposed treatments to determine the potential effects of each alternative. Each landtype description includes information on potential effects of tractor logging including ability of the soil to be compacted.

5 *We object to the FS's assumption that use of BMPs will result in meeting soil quality standards and maintaining soil productivity, since no BMP monitoring has ever occurred on the IPNF to validate such assumptions.*

RESPONSE: Each mitigation described on pp. II 24 - II 26 of the DSEIS to meet soil quality standards and maintain soil productivity is part of BMP mitigation standards that have a proven, qualified and quantifiable track record. IPNF monitoring reports can be viewed at:
http://www.fs.fed.us/ipnf/eco/manage/forestplan/index.html - fpmon

5 *The DSEIS does not adequately demonstrate the effectiveness of the soil mitigation measures proposed.*

RESPONSE: Each mitigation described on pp. II 24 to II 26 of the DSEIS contains at least one or several reference sources (monitoring and scientific papers) regarding the estimated

effectiveness of the designed practices to minimize detrimental impacts on soils. IPNF monitoring reports can be viewed at:

http://www.fs.fed.us/ipnf/eco/manage/forestplan/index.html - fpmon

5 *The meaning of "soil productivity" in the terminology of NFMA is largely ignored…For example, the IPNF fails to consider the soil productivity implications of any level of road density in project area watersheds. And the implications of "sustained yield" in the context of soils damaged at* ***any*** *level of percent detrimental disturbance has never been a part of the IPNF's dialogue.*

RESPONSE: Requirements regarding soil productivity are described on pages III-71 to III-72 of the DSEIS and are summarized as follows: Management direction in the IPNF Forest Plan (II-17) is to manage the soil resource to maintain long-term productivity. The 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.

IPNF Forest Plan Monitoring Item K-1 addresses Prescriptions and Effects on Land Productivity. The Forest Soil Resource objective is described as follows: "… to maintain and restore long-term productivity, to support healthy vegetative communities and protect watersheds. Key elements of maintaining long-term soil productivity include retaining surface organic layers, surface volcanic ash and the bulk density of the surface volcanic ash within natural ranges of variability." Monitoring items include the following (IPNF 2004 Monitoring Report, p. 55):

- **Compaction**
- **Removal of topsoil (displacement)**
- **Organic matter and coarse woody debris left on site**
- **Effects of burning**

The IPNF Forest Plan was prepared in accordance with regulations and principles of the Multiple-Use Sustained-Yield Act of 1960, the guidelines and standards prescribed by the National Forest Management Act of 1976, and the National Environmental Policy Act of 1969.

The Multiple Use-Sustained Yield Act of 1960 directs the Forest Service to achieve and maintain outputs of various renewable resources in perpetuity without permanent impairment of the land's productivity (MUSY 1960 sec. 4(b)). Section 6 of the National Forest Management Act of 1976 to "insure research on and based on continuous monitoring and assessment in the field evaluation of the effects of each management system to the end that it will not produce substantial and permanent impairment of the productivity of the land" (NFMA 1976 sec. 6(g)(3)(C)). The Code of Federal Regulations for Forest Planning requires the Forest Service to measure effects of prescriptions, including "significant changes in land productivity" (Code of Federal Regulations 36 CFR Part 200, Section 1, 1987). To comply with requirements, the Chief of the Forest Service charged each Forest Service Region to develop soil quality standards for detecting soil disturbances indicating a loss in long-term productive potential. These standards and guidelines are built into Forest Plans.

The Regional Soil Quality standards were revised in November 1999. As included in Forest Plan Standard (1) and as discussed above, detrimental soil disturbance includes the effects of compaction, displacement, rutting, severe burning, surface erosion, loss of surface organic matter, and soil mass movement. The revised standard specifies that 85 percent of an activity area (i.e. cutting unit) must have soil that is in satisfactory condition. In areas where more than 15 percent detrimental soil conditions exists from prior activities, the cumulative detrimental effects from project implementation and restoration should not exceed the conditions prior to the planned activity and should move toward a net improvement in soil quality. These standards do not apply to intensively developed sites such as mines, developed recreation sites, administrative sites, and permanent roads or landings. These standards are based on the lowest magnitude of adverse change detectable, given the current monitoring technology (Powers 1990).

5 *What data does the IPNF have on the efficacy of its soil restoration efforts?*

RESPONSE: Subsoiling skid trails, temporary roads and landings after each entry can reduce the opportunity for cumulative detrimental soil conditions. Monitoring on the Priest Lake Ranger District (IPNF) found that decompaction efforts were successful in improving approximately 50 percent of the area (Rone 2006). Proven to increase the survival and growth of seedlings, subsoiling begins the process of restoring areas of previous compaction, when followed by vegetation establishment (http://fsweb.sdtdc.wo.fs.fed.us/programs/fm/fy04/Subsoiling/subsoilingmain.shtml). Decompaction efforts can result in soil profile mixing depending on inherent rock content and operator skill (Rone 2006).

Nevertheless, site productivity losses due to localized soil mixing need to be weighed against the benefits of enhancing infiltration and improving seedbed establishment conditions and growth (Dykstra and Curran 2000). While ripping and subsoiling alone may in some cases only provide temporary improvements, it is the incorporation and re-introduction of organic material that will likely accelerate the restoration of a site's hydrologic and ecologic function (Luce 1997).

5 *The DSEIS does not adequately consider the fine ecological balance existing site-specifically in soils, nor the implications for ecological health.*

RESPONSE: The DSEIS (III-77 to III-86) considered the effects on many ecological functions of soils including, but not limited to, nutrients, water infiltration, hydrologic function, woody debris, and organic layers, all of which are indicators for and have an effect on ecological health.

5a *The scientific adequacy of the Forest Service's methodology for maintaining soil productivity has never been demonstrated. The Forest Service's determination that it may permanently damage the soil on 15 percent of an activity area and still meet NMFA and planning regulations is arbitrary.*

RESPONSE: In order to meet NFMA direction and manage National Forest System lands without permanent impairment, the policy of the Northern Region is to "…not create detrimental soil conditions on more than 15 percent of an activity area" (FSM, 2554.03). Detrimental soil disturbance is not equal to permanent damage. At no point has the Forest

Service determined that projects may permanently damage 15 percent of the soil in an activity area. Arguments regarding the Regional supplement to the Forest Service Manual are beyond the scope of the West Gold analysis.

The ID team did analyze the impact the project would have on the soil resource (DSEIS, III-71 to III-86) and included design features for the project to protect soils and site productivity (DSEIS, II-24 to II-26). The DSEIS also recognizes there will be some adverse impacts to soil (III-179). The project is, therefore, in compliance with NFMA.

Vegetation

2 *The DSEIS points out that there are some limited aspen clones in the project area (III-11). Aspen has been on the decline throughout much of the Rocky Mountains. The Forest Service should consider thinning conifers in some of the locations where aspens are found in the project area. To stimulate regeneration, the agency should girdle aspens or use prescribed fire.*

RESPONSE: On page II-22 of the DSEIS, Retention of Hardwood Trees, "Selected conifers in and around aspen patches would be removed to reduce competition for water, nutrients and sunlight." Burning is scheduled in many proposed units, and aspen clones within those units would be stimulated.

2 *The SEIS also points out that Western white pine is expected to increase by 4% in the project area (III-19), but will not resemble historical stand composition percentages in the project area. The Forest Service should consider the possibility of planting rust-resistant stock in the project area in an attempt to facilitate achievement of historical composition. By planting rust-resistant white pine stock in the project area, more individual white pines will be available for natural selection of and recruitment of even more resistant stocks.*

RESPONSE: Planting of rust-resistant white pine stock is proposed in regeneration cutting units on appropriate habitat types. See page II-10 of the DSEIS (Vegetation Treatment Definitions).

5 *The Forest Service (FS) admits that the project area and IPNF have been fundamentally changed by fire suppression, logging, and roadbuilding, so the FS must consider how much native forest it has fundamentally altered compared to historic conditions forestwide before pursuing "treatments" here. As stated above, the Forest Plan is out of date and you need to put that fact in perspective. Essentially, this means considering new scientific information on all kinds of changes away from "historic conditions"—<u>and in the forestwide context of Forest Plan Revision</u>—not on a project-level basis prior to revision.*

RESPONSE: The West Gold Project has incorporated the latest scientific findings into the analysis of this project (see pages I-4 through I-6 Overview of Scientific Findings and pages III-3 through III-16 Characterization of the Coniferous Vegetation).

5 *The DSEIS makes a case for logging as a way to reduce insect and disease damage to timber stands. As far as we are aware, the FS has no empirical evidence to indicate its "treatments" for "forest health" decrease, rather than increase, the incidence of insects and diseases in the forest. Since the FS doesn't cite research that proves otherwise, we can only conclude that "forest health" discussions are unscientific and biased toward logging as a "solution."*

RESPONSE: On pages III-3 through III-5 of the DSEIS, a Characterization of the Coniferous Vegetation is given starting with the Columbia River Basin then the Northern Region Overview next the Pend Oreille Subbasin Geographic Assessment and then the Gold Creek Ecosystem Assessment and finally the West Gold analysis area. Each of these analyses documents the changes in species from "forests dominated by western white pine, western larch and ponderosa pine to forests dominated by shade tolerant grand fir, and Douglas-fir. These later species are less adapted to fire, drought and natural climatic variability than the species they replaced. The results are more insect and disease activity and higher fire risk (III-5, III-6 and III-56).

One of the Purpose and Need statements of the West Gold project is to (DSEIS, I-4) "Restore desired forest cover, structure, pattern and species composition across the landscape where they are outside natural or historic ranges." This would be done by changing forest composition (species mix) to emphasize long-term dominance of shade intolerant species, such as ponderosa pine western larch, and western white pine. This change in species composition would be accomplished through regeneration cutting followed by planting of the desired species and selective cutting by thinning to favor retention of these species. Logging, preparing the sites for planting through burning or slash piling and planting would provide the tools to accomplish this and reduce the amount of insect and disease activities. These tools have been used for decades and through careful implementation are proven to be effective.

5 *The IPNF cites absolutely no data collected in the analysis area or interpretation of data done with adequate scientific veracity to show that there is genuinely a problem with forest or tree density, that has been caused by fire suppression, and or any that logging will cure.*

RESPONSE: The effects of fire suppression in the interior northwest are well documented in several studies and illustrated by photographs. On dry habitat types, tree density has been shown to increase because low-intensity frequent fires that kept these stands open (by killing encroaching Douglas-fir and grand fir) have been suppressed (Arno 1996, Fiedler 1996, Smith and Fischer 1997, Habeck 1990, Graham et al. 2004, Hessburg et al. 2005, Spies et al. 2006). In the West Gold project area, the stands on drier habitat types as described in the DSEIS (III-9) were typically maintained in an open forest structure by frequent low-intensity fire. As stated on page III-56 of the DSEIS, the historic disturbance mechanism of fire has been interrupted by fire suppression activities for the past 60-70 years. Although a tree measurement analysis comparing existing condition with historic conditions has not been conducted in the project area, field reviews by foresters and review of historic photos show these changes (USDA Forest Service 2002, project file Section D, 1930s aerial photography and current aerial photography).

Wildlife

Wildlife - Black-Backed Woodpecker

5 *The FS has yet to design a consistent, workable, scientifically defensible strategy to ensure viable populations of the black-backed woodpeckers. The cumulative impacts of the IPNF's ongoing fire suppression policy are also not adequately considered.*

5a *The EIS would not adequately protect...black-backed woodpeckers...*

RESPONSE: The West Gold project is not the appropriate planning level for developing a conservation strategy for the black-backed woodpecker, or for addressing the agency's fire suppression policies. The project did do a site-specific analysis on black-backed woodpeckers and determined that, while portions of their source habitat have been affected by past, present and foreseeable actions, sufficient habitat remains within the analysis area (including snag retention measures) to continue incidental or minor use by black-backed woodpeckers (DSEIS, III-103 to III-107).

The changes in species composition from historical vegetation patterns have increased the incidence of insect and disease (DSEIS, III-6). Douglas-fir beetle and fir engraver activity has recently been very high (project file Section D - Aerial Detection Surveys). These conditions historically have not been known to occur over large landscapes in the Idaho Panhandle National Forests (USDA Forest Service unpublished report).

Consequently, insects and disease will continue to exert their influence on treated and untreated areas within the West Gold drainage, providing conditions for both nesting and foraging. It is important to note that, while regeneration cutting would open the forest canopy to provide growing space for natural or planted trees, it would retain both live and dead trees in an irregular spacing for sustained foraging opportunities.

The DSEIS gives a full accounting of the effects of the alternatives on black-backed woodpecker (III-103 to III-107).

Wildlife - Boreal Toad

5 *The DSEIS does not adequately consider cumulative effects on upland habitat for boreal toads. This does not make sense, since such small populations that are likely to persist are especially susceptible to fragmentation and extirpation due to isolation of smaller populations.*

RESPONSE: The primary risk factor for toads is loss of breeding habitat. Breeding habitat is associated with standing water bodies (e.g. lakes, ponds) and slow-moving streams and backwater channels (Maxell 2000). Stream channels within the West Gold project area, especially those associated with activities, are well-entrenched and confined channels with efficient transport of water and sediment (UDSA 2000). Consequently, breeding habitat is severely limited. Also, there are no known records or observations of boreal toads within the West Gold Creek drainage. Therefore, the West Gold project is not expected to have any meaningful impacts to the boreal toad. This explanation can be found in the project file (Section H).

In addition, Maxell (2000) identifies risk factors associated with breeding habitat, of which none relate to upland habitat. If there were isolated pockets of potential breeding habitat, these sites would be protected through project design features (DSEIS, II-19 to II-20).

Wildlife - Elk

2 *To lend further credibility to the argument for lower road densities is the importance of elk habitat security. Many of our members are elk hunters and value the importance of protecting elk habitat. As the SEIS correctly points out, higher road densities are correlated with decreased elk security (III-96). Roads are the most influential factor in terms of measuring elk habitat*

effectiveness (SEIS, III-114). Higher road densities result in increased motorized use, which drives out elk herds and reduces available foraging habitat. High snowmobile use also decreases winter elk security and causes large game species to expend unnecessary energy during critical winter months. The agency should not construct any additional roads as part of this project, should consider more road decommissioning, and should also consider OHV and snowmobile restrictions to protect wild game populations.

5a *The EIS would not adequately protect…Rocky Mountain elk…*

RESPONSE: Proposed access management in the project area is based on a completed roads analysis (project file, Section C). Access management and its effects are discussed in detail in the Roads and Access Management section of the DSEIS (III-173 to III-177). Regarding the construction of additional roads as part of the project, all new roads proposed in Alternatives B and D would be decommissioned or put into storage following the completion of the project (DSEIS II-13). Alternative C proposes no new road construction (DSEIS II-13). Finally, regarding Elk Security, the effects of the different alternatives on elk habitat effectiveness were analyzed (DSEIS III-114 to II-118). The model used considers the length of roads, their use status and the distribution of hiding and thermal cover (DSEIS III-114).

The DSEIS (III-114 to III-118) gives a full accounting of the effect of the alternatives on Rocky Mountain elk.

Wildlife - Flammulated Owl

5 *According to the DSEIS, flammulated owls use primarily open, old forests dominated by ponderosa pine and thus alleges that the flammulated owl would benefit from logging. However, according to the Grade/Dukes Timber Sale Biological Evaluation, Payette NF, research indicated that flammulated owl nests "occurred in old growth ponderosa pine/Douglas fir exhibiting two canopy levels and averaging 55% canopy closure".*

RESPONSE: Old forests consisting of ponderosa pine and Douglas-fir seem to be a key component of flammulated owl territories (Reynolds and Linkhart 1992). Variability in structure of these old stands seems important to support life functions of flammulated owls (Wisdom et al. 2000). While there would be no harvesting in allocated old growth stands, treatments are designed to advance dependable or stable habitat (focusing on the development and persistence of large diameter ponderosa pine and Douglas-fir) and to rejuvenate habitat that has been degraded by insect and disease (DSEIS, III 99 to III-103). Measures were developed to achieve desired habitat conditions including values for canopy cover and structural complexity (DSEIS, II-23).

Howle and Ritcey (1987) found that flammulated owls selected forest structure that was generally open with canopy closure ranging from 35-65 percent except in pockets of regenerating Douglas-fir. Goggans (1986) described flammulated owls using forest stands characterized by ponderosa pine/Douglas-fir with canopies less than 50 percent.

5 *The DSEIS does not analyze the existing condition of the proposed cutting units or the effect of the project on these habitat components or their distribution throughout existing flammulated owl habitat.*

RESPONSE: The DSEIS conducted a full and detailed discussion on the existing condition of the proposed cutting units and the effect of the project on these habitat components or their distribution throughout existing flammulated owl habitat (DEIS III-99to III-103).

5 *The FS does not have adequate forestwide population or population trend data on the flammulated owl or its habitat. Management activities could displace the owl from cutting units and portions of the project area.*

RESPONSE: It is possible that management activities could displace owls from portions of the project area; however, this impact would only apply to those acres that are currently considered suitable for nesting. The proposed actions would only treat 41 acres of suitable habitat (areas where presence is most likely), which represents less than one percent of the analysis area. Consequently, the risk of displacement is low. If displacement were to occur as a result of management activities, the worst-case scenario would be loss in productivity for probably one nesting season.

If flammulated owls are located during project layout and implementation, management activities would be altered to include proper protection measures (DSEIS, II 23).

Wildlife - Goshawk

5a *It is not clear whether goshawk viability is in fact being maintained or how goshawk viability is expected to be maintained into the future if this and other cumulative actions proceed. The FS has not incorporated up-to-date quantitative science into this analysis and has therefore not demonstrated that it is maintaining goshawk viability.*

RESPONSE: One difference between the DSEIS and the original EIS is that the DSEIS conducted a full and detailed analysis for the northern goshawk. Goshawk nesting habitat is considered limited within the West Gold drainage because the area is dominated by immature forests with high relief slopes and a significant amount of drier habitats (DSEIS III-95). Only 17 acres, or less than one percent of the analysis area, consists of suitable habitat that is proposed for treatment. These 17 acres would be selectively harvested (thinned) to help sustain forest structure and promote future development of goshawk nesting habitat (DSEIS III-108). Reynolds et al. (1991) acknowledge that thinning treatments in nest areas or potential nest area can help maintain forest structure for goshawks and promote faster tree growth and crown development for developing nesting habitat.

Cumulatively, implementation of any of the action alternatives would not jeopardize populations of northern goshawks because treatments would maintain/improve existing suitable habitat, advancing dependable or stable habitat, rejuvenate degraded habitat and would not affect allocated old growth associated with goshawk nesting habitat. Samson (2006) has concluded that short-term viability is not an issue in Region 1 for the northern goshawk, including the Idaho Panhandle National Forests. For these reasons, the wildlife biologist determined the project would not cause a loss of viability to the population or species (DSEIS III-110).

Wildlife - Harlequin Duck

5a *The EIS would not adequately protect harlequin ducks or their habitat. The wording in the harlequin duck design feature does not assure harlequin ducks would be protected.*

RESPONSE: Applying Best Management practices and Inland Native Fish Strategy (INFS) would maintain riparian vegetation structure and function (DSEIS II-19 and II-20). Increases in peak flow under any alternative would probably not be detectable in the main West Gold channel and could not be differentiated from normal climatic fluctuations (DSEIS III-151). The risk of sediment delivery generated from logging activities actually reaching a live channel is very low. This risk would be immediately reduced by culvert upgrades and removals (DSEIS III-150). Therefore, the substrate and turbidity levels would be maintained for benthic vertebrate food supply and suitable feeding conditions.

In addition, the INFS and harlequin duck protection measures (DSEIS II-23) would screen populations from possible disturbances during the active breeding season. For these reasons, the West Gold project is not expected to impact harlequin ducks or their habitat.

Wildlife - Lynx

5 *In order to meet the requirements of the FS/USFWS Conservation Agreement for Canada lynx, the FS agreed to insure that all project activities are consistent with the Lynx Conservation Assessment and Strategty (LCAS), and that programmatic Standards of the LCAS are met. The DSEIS does not adequately demonstrate consistency.*

RESPONSE: The Canada Lynx Conservation Assessment and Strategy (Ruediger et al. 2000) directs agencies to delineate lynx analysis units (LAUs) to evaluate and analyze effects of planned and on-going projects on lynx and their habitat, and provide guidance for addressing these risk factors. Both snow conditions (influenced by elevation and aspect) and vegetation types are important factors to consider in defining lynx habitat. The West Gold drainage is not part of a designated LAU because it lies within a low to mid-elevation zone (2,000 to 4,500 feet), and comprises a high proportion of dry habitats.

According the Canada Lynx Conservation Assessment and Strategy (Ruediger et al. 2000) dry forest types do not provide lynx habitat, and most lynx occurrences are within 5,000-6,500 feet elevation zone. For these reasons, the West Gold project would have no effect on lynx or their habitat. No cumulative effects are expected (West Gold Biological Assessment).

Wildlife - Methodology

5 *The DSEIS refers to the use of the modeling procedures, yet if fails to disclose the amount of error inherent in the use of the models for the purposes they are being used. The models have not been verified on the ground here, and therefore it's reasonable, scientifically, for commenters and the public to expect the IPNF to be far more cautious about using such models.*

RESPONSE: For the wildlife analysis, predictive models were used to help understand the relationships between forest management activities and response through habitat-based wildlife suitability. Habitat suitability analysis is based on predicting the effects of proposed actions on important habitat parameters that are supported in literature. The analysis comes from literature where the statistical parameters and details are disclosed. Appendix

E - References provides the literature citings for this analysis. The interpretation of wildlife habitat relation data, modeling rules and vegetation values are located in Section * - Wildlife of the project file.

Timber Stand Management Record System (TSMRS) data bases and aerial photos (1933, 2004) were used, initially, as the basis for analysis. Field reviews and walk-through exams (1996-2002, 2005) were conducted to validate and, where necessary, to update vegetation information (project file Section D -Forest Vegetation). This information was then compiled into a spreadsheet and evaluated (based on modeling parameters) to determine habitat suitability (DSEIS III 88-89).

Recent field reviews were conducted in most proposed action stands and stands outside treatment areas but within the analysis areas to monitor and validate the habitat-based modeling. This added a high degree of accuracy and confidence to the habitat suitability analyzes.

5 *The DSEIS fails to substantiate the reasons for not analyzing impacts on many MIS and Sensitive wildlife species. These species' historic range includes the land in the project area, so omitting cumulative effects analyses makes no sense biologically.*

RESPONSE: The DSEIS (III-88) discloses a screening process used to determine whether or not a species should be analyzed. It states that species were removed from a detailed discussion if they were considered absent from the project area, or impacts could be avoided, or impacts would be considered inconsequential or discountable given the type or magnitude of the action. A more detailed explanation is provided in the project file (Section H).

Wildlife - Old Growth Dependent Species

5 *The IPNF does not disclose the block sizes considered adequate by the IPNF for old-growth allocation and to meet all OG wildlife species' requirements.*

5 *Since the DSEIS provides inadequate analysis regarding the size, quality, and spatial relation of habitat blocks needed by the old growth associated wildlife species in the affected OGMUs, the analysis completely fails to disclose the quantitative or qualitative significance of cumulative effects due to past logging in the area and across the Forest.*

RESPONSE: All old growth within OGMU #18 and #19 has been allocated. The DSEIS does disclose adequate block size for allocated old growth, per Forest Plan direction (DSEIS Appendix C). The IPNF Forest Plan (1987) page II-5 links population viability of old growth MIS to the Forest Plan's standards for old growth.

Review of aerial photos and discussions with a retired employee who participated in the timber harvest program on the Sandpoint Ranger District indicated that past logging within the project area was not within old growth stands.

5 The *DSEIS* fails to disclose the degree to which edge effects on old growth species' habitat exist, and how much total edge effect would be increased, by the alternatives. *Cumulative effects on old-growth habitat and on old-growth associated species include increased fragmentation, reduced older forest patch sizes, increased high-contrast edge, reduced availability of interior habitat, and decreased forested connectivity. These effects would reduce the ability to provide for*

the habitat needs of old-growth associated species for decades to come following implementation of the timber sale and other activities in the cumulative effects analysis area.

RESPONSE: Discussions of forest fragmentation and subsequent edge effects are only meaningful if made in the context of historical landscape conditions. Northwest forests, including the West Gold drainage, were naturally fragmented by disturbances such as fire. The West Gold drainage has been burned extensively within the last 150 years, resulting in few remaining stands with older trees (DSEIS III-13). Consequently, it is the natural fragmentation through fire that reduced older forest patch sizes and reduced availability of interior habitat. Further fragmentation is prevented by restoring forest composition and structure.

The high rate of mortality in many Douglas-fir dominated stands has changed and is changing the structure of these stands from mature and immature trees to brush and Douglas-fir/grand fir seedling stands (DSEIS III-6). This has created instability of habitat conditions for old growth associated species. Proposed actions would help stabilize habitat conditions for old growth associated species by maintaining existing suitable habitat, advancing dependable or stable habitat, and rejuvenating degraded habitat (DSEIS III 100-102, 108-109, 111-113).

5 *USDA Forest Service, 2004a further discusses the fragmentation effects on old-growth habitat, effects that would be exacerbated by the West Gold Project.*

RESPONSE: The proposed actions would not harvest allocated old growth and would not change the percent of old growth within the project area (DSEIS III-19); therefore, old growth would not be fragmented. While there would be no harvesting in allocated old growth, a low-intensity burn is prescribed in an allocated old growth stand to help increase the probability of the survival of key old growth components (DSEIS III-21). In addition, the proposed treatments are expected to increase the amount of future old growth by promoting the persistent of long-lived seral species (DSEIS III-20and III-21). Therefore, the perceived fragmentation would be improved and not exacerbated by the proposed actions.

5 *The IPNF falls far short of analyzing and disclosing these cumulative effects on OG wildlife species' viability, caused by the current conditions and by the proposed timber sale.*

RESPONSE: The DSEIS provides full disclosure of cumulative effects and rationale for why these actions would not cause a loss of viability to the populations or species (DEIS III 109-110, 113-114). Additional discussion regarding species viability has been added in the summary of cumulative effects in the FSEIS.

5a *The FEIS and ROD violate NFMA and the IPNF Forest Plan by failing to provide sufficient old growth habitat to provide for population viability and diversity of plant and animal communities dependent on such diverse and important habitat. The FS has failed to accurately disclose the degree to which activities associated with the project will further adversely affect the old growth Management Indicator Species, pileated woodpecker. The FEIS and ROD fail to demonstrate consistency with Forest Plan Standards and guidance regarding long-term retention of sufficient habitat to assure viability of species that need standing and down trees.*

RESPONSE: This comment has been adequately addressed by responses to similar comments in the Old Growth and Wildlife - Old Growth Dependent Species sections of this appendix.

Wildlife - Pileated Woodpecker

5 *The preference for large diameter of nesting trees for the pileated woodpecker is notably absent from the DSEIS…Effectively, the IPNF provides inadequate commitment to leaving specific numbers and sizes of largest trees favored by this MIS.*

RESPONSE: The DSEIS appropriately acknowledges that the pileated woodpecker has specific nesting requirements, specifically large trees…with nest cavities usually located more than 30 feet above the ground (DSEIS, III-95 to III-96). Issue indicators used to measure effects on the pileated woodpecker are changes in nesting habitat, including quality and abundance of large diameter trees and snags (DSEIS, III-98). In addition, wildlife tree design features (DSEIS, II-21 and II-22) direct that snag and defective tree retention practices focus on the largest diameter size class represented in the stand with specific numbers and sizes. In addition, harvest activities would focus on the retention of desired tree species such as ponderosa pine (DSEIS III 19-20).

Wildlife - Pine Marten

5a *The FEIS fails to discuss the pine marten in adequate detail to disclose impacts on and assure the viability of the species. This, despite the fact it is an MIS and the project area falls within its historic range.*

RESPONSE: The species screen (DSEIS III-88 and III-89) indicates a detailed discussion for this species is not necessary because the species or habitat does not occur in the affected area. The DSEIS then directs the reader to the project file for more information. The project file (Wildlife-Section G) indicates that marten are most abundant in mature to old growth true fir or spruce-fir forests and generally avoid drier coniferous forests. True fir or spruce-fir forests are mostly absent from the West Gold drainage (Warren 1990). Ruggiero et al. (1994) also state that marten are closely associated with late-successional stands of mesic conifers, especially those with complex physical structure near the ground.

Marten have not been documented in the project area. Past fire, and to a lesser extent, past logging has restricted the availability of large patches of older forests, especially in the riparian zones. The vast majority of stands within the project area are characterized as immature with a significant amount situated on more dry and moderately warm sites. These existing habitat conditions would be considered marginal and irrelevant. Consequently, presence of the species is considered unlikely or incidental.

Wildlife - Snags

5 *Although admitting that snags may be cut down for safety reasons during logging operations (due to OSHA regulations), the DSEIS does not consider in any quantitative fashion the level of loss of standing snags, or resultant impacts to wildlife. The IPNF fails to disclose <u>how much</u> snag loss would be expected because of safety concerns and also skyline corridors and other methods of log removal—the loss could be more significant that disclosed, because the IPNF doesn't provide any idea the degree of snag loss due to these concerns.*

RESPONSE: The DSEIS acknowledges the loss of some snags from logging operations. However, design features are provided to minimize these losses (DSEIS II-21 and II-22). Prescribed burning would recruit new snags by fire-killing some residual green trees to help compensate for this loss (DSEIS II-22). A site-specific burn plan would be prepared that would stipulate an acceptable amount of trees killed by burning (DSEIS II-18). In addition, the strategic placement of uncut clumps or patches of trees and snags will help protect snags from logging operations. Riparian Habitat Conservation Areas (RHCAs), no-cut protection zones along perennial and intermittent streams, would be additional compensation for snags that may be cut down for safety reasons (DSEIS II-19).

It is worth noting that retention objectives are accounted for on a treatment level scale and are not managed on a per acre basis. It would be extremely difficult to predict how much snag loss is anticipated, especially when the natural density and distribution varies across the landscape, and the perceived safety risk will vary among operators.

While current conditions may not meet these objectives due to existing stand structure, long-term management objectives are intended to manage snag habitat to exceed Forest Plan guidelines.

5 *The Northern Region Snag protocol has not been subject to independent scientific peer review and validation from post-implementation monitoring. Nor has it been the subject of a contextually proper NEPA and NFMA review as a forest plan amendment.*

RESPONSE: The Northern Region Snag Management Protocol is an *optional* snag retention strategy.

5 *The Forest Plan's reliance on Thomas et al., 1979 was severely criticized in Bull et al. 1997. The FS has not responded to this new scientific information that seriously calls into question its snag standards and guidelines. Harris (1999) and ICBEMP DSEIS Appendix 12 also present scientific information that contrasts greatly with the IPNF on this topic.*

RESPONSE: Wildlife tree retention guidelines (DSEIS, II-21 to II-22) rely heavily on recommendations provided by Bull et al. (1997), which states that published data suggests that populations of cavity nesters were viable in stands of ponderosa pine and mixed-conifer forests that contained about four snags per acre and a large component of old growth.

Design features for the West Gold project exceed recommendations provided by Bull et al. (1997), the Upper Columbia River Basin Draft Environmental Impact Statement (USDA AND USDI 1997), and Idaho Panhandle National Forests Forest Plan (USDA Forest Service 1987).

5a *The EIS would not adequately protect snag habitat...*

The DSEIS gives a full accounting of proposed actions on snag habitat (III-100 to III-102, III-110 to III-114). Also, see the previous response to comments related to snags. As stated previously, measures have been described in the DSEIS (II-21 to II-22) to protect snags and other wildlife trees, and to compensate for losses that would occur through logging activities.

It should be noted that in high-risk stands, desired snag habitat is generally lacking due to past large-scale lethal fires and the preponderance of short-lived tree species and root disease. Consequently, snag retention objectives would not be met in these areas (DSEIS II-21). Therefore, it is reasonable that if appropriate snags do not exist in an area it is not possible to retain them.

Federal and State Agency Letters

This section provides entire copies of the federal and state agency letters we received. They include the following:

- United States Department of the Interior
- Idaho Department of Fish and Game
- United States Environmental Protection Agency

United States Department of the Interior

OFFICE OF THE SECRETARY
Office of Environmental Policy and Compliance
500 NE Multnomah Street, Suite 356

Portland, Oregon 97232-2036

9043.1
IN REPLY REFER TO

ER06/262

Electronically Filed

May 5, 2006

A.J. Helgenberg
West Gold Project Team Leader
Sandpoint Ranger District
1500 Hwy 2, Suite 110
Sandpoint, Idaho 83864

Dear Mr. Helgenberg:

The Department of the Interior has reviewed the Draft Supplemental Environmental Impact Statement for the West Gold Project, Idaho Panhandle National Forests, Bonner County, Idaho. The Department does not have any comments to offer.

We appreciate the opportunity to comment.

Sincerely,

Preston A. Sleeger
Regional Environmental Officer

05/17/2006 12:02 FAX 208 765 7426 FOREST SUP TEAM → SANDPOINT 002/002

RECEIVED
MAY 17 2006
BY:
faxed to DG : AJ

IDAHO DEPARTMENT OF FISH AND GAME
PANHANDLE REGION
2885 West Kathleen Avenue
Coeur d'Alene, Idaho 83815

Dirk Kempthorne/Governor
Steven M. Huffaker/Director

May 15, 2006

Ms. Ranotta McNair, Forest Supervisor
Idaho Panhandle National Forests
US Forest Service
3815 Schreiber Way
Coeur d'Alene, Idaho 83815

Dear Ranotta:

REFERENCE: WEST GOLD DRAFT SUPPLEMENTAL EIS

Thank you for the opportunity to comment on the West Gold Project Supplemental Environmental Impact Statement. IDFG agrees with and supports the Project goals and objectives to restore our forests to a more natural and healthy species composition. We do not have any additional comments to add to our previous letter dated October 3, 2002. However, we would like to re-emphasize that it is imperative to protect West Gold Creek and potentially impacted segments of Gold Creek from any adverse impacts (sediment, temperature increases, etc.), to the greatest extent possible, in order to protect bull trout and westslope cutthroat trout.

As we noted in our previous letter, we could support Alternative C. Alternative C would cause a smaller increase in sediment and for a shorter duration than would Alternative B. Although Alternative D would potentially have less impact than either Alternative B or C, we agree with your assessment that it would not meet your restoration goals within a reasonable time, which may lead to increased disease problems and the potential for uncontrolled fire.

We look forward to continuing to work closely with you on this and coming projects.

Sincerely,

Charles "Chip" E. Corsi
Regional Supervisor

CEC:MTB:kh

C: Tracey Trent

File: USFS West Gold Supplemental EIS

Keeping Idaho's Wildlife Heritage

Equal Opportunity Employer • 208-769-1414 • Fax: 208-769-1418 • Idaho Relay (TDD) Service: 1-800-377-3529 • http://fishandgame.idaho.gov

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
1200 Sixth Avenue
Seattle, WA 98101

MAY 15 2006

RECEIVED
MAY 17 2006

Reply To
Attn Of: ETPA-088

Ref: 00-032-AFS

Mr.A.J.Helgenberg, Team Leader
USDA Forest Service
Sandpoint Ranger District
1500 Highway 2, Suite 110
Sandpoint, ID 83864

Dear Mr. Helgenberg:

The U.S. Environmental Protection Agency (EPA) has reviewed the draft supplemental Environmental Impact Statement (DSEIS) for the **West Gold Creek Project in the Idaho** (CEQ No. 20060089), in accordance with our responsibilities under the National Environmental Policy Act (NEPA) and Section 309 of the Clean Air Act. Section 309, independent of NEPA, specifically directs EPA to review and comment in writing on the environmental impacts associated with all major federal actions and the documents adequacy in meeting NEPA requirements. Under our policies and procedures, we evaluate the document's adequacy in meeting NEPA requirements.

The West Gold Creek DSEIS evaluates a range of alternatives to improve forest health and watershed within the Gold Creek Watershed. The DSEIS evaluates three action alternatives with various levels of logging, prescribed burning, temporary road building and existing road improvements. The Forest Service has identified Alternative B as the proposed alternative.

EPA is supportive of the overall objectives being proposed to restore desired forest structure and provide wildlife habitat diversity within the Gold Creek Watershed. We also support decommissioning 1.7 miles of road and correcting problems at several high risk road crossings within the Forest will result in some significant long term improvements in the watershed.

EPA's concern with the DSEIS is the potential short term (5-15 year) increase in sediment delivery to West Gold Creek, a tributary to Gold Creek and an important spawning area for bull trout. Gold Creek has an approved Total Maximum Daily Load (TMDL) for sediment which needs to be addressed in the DSEIS. The TMDL calls for a 90% reduction in sediment loading in Gold Creek with a target of achieving natural background sediment loading. Because West Gold Creek sediment loading is about 50% above natural background, this should be considered as part of the Final Supplemental EIS and explain how this project is consistent with the sediment TMDL target for Gold Creek

Because Alternative B increases sediment by approximately 22% for the first two years with a gradual decrease to current levels in 15 years, it does not appear that this Alternative is consistent with the sediment TMDL for Gold Creek. Alternative D would have the least short

term impact of an estimated 6% increase in sediment yield, declining to current levels in 5 years. Alternative C would increase sediment by approximately 16% then decline to current levels in 5 years. Alternative C would appear to meet the project objectives and have less short term impacts than Alternative B. We support the overall objectives of the project and therefore encourage further consideration of Alternatives C and D. While stream channels within the project area may be tolerant of short term increase of sediment loading, it could impact the lower reaches in Gold Creek, which are recognized key spawning areas for bull trout.

Other options would be to consider additional road decommissioning or other stream crossing improvements which would reduce existing sediment delivery to West Gold Creek. Helicopter logging areas, such as "unit 6", would further reduce potential sediment loading into West Gold Creek.

We have assigned a rating of EC-2 (Environmental Concerns – Insufficient Information) to the DSEIS based on the information provided above. This rating and a summary of our comments will be published in the Federal Register. A copy of the rating system used in conducting our review is enclosed for your reference.

Thank you for the opportunity to review this draft EIS. If you would like to discuss these comments, please contact Krista Rave-Perkins at (206) 553-6686, or myself at (206) 553-1601.

Sincerely,

Christine B. Reichgott, Manager
NEPA Review Unit

Enclosure

U.S. Environmental Protection Agency Rating System for
Draft Environmental Impact Statements
Definitions and Follow-Up Action*

Environmental Impact of the Action

LO – Lack of Objections

The U.S. Environmental Protection Agency (EPA) review has not identified any potential environmental impacts requiring substantive changes to the proposal. The review may have disclosed opportunities for application of mitigation measures that could be accomplished with no more than minor changes to the proposal.

EC – Environmental Concerns

EPA review has identified environmental impacts that should be avoided in order to fully protect the environment. Corrective measures may require changes to the preferred alternative or application of mitigation measures that can reduce these impacts.

EO – Environmental Objections

EPA review has identified significant environmental impacts that should be avoided in order to provide adequate protection for the environment. Corrective measures may require substantial changes to the preferred alternative or consideration of some other project alternative (including the no-action alternative or a new alternative). EPA intends to work with the lead agency to reduce these impacts.

EU – Environmentally Unsatisfactory

EPA review has identified adverse environmental impacts that are of sufficient magnitude that they are unsatisfactory from the standpoint of public health or welfare or environmental quality. EPA intends to work with the lead agency to reduce these impacts. If the potential unsatisfactory impacts are not corrected at the final EIS stage, this proposal will be recommended for referral to the Council on Environmental Quality (CEQ).

Adequacy of the Impact Statement

Category 1 – Adequate

EPA believes the draft EIS adequately sets forth the environmental impact(s) of the preferred alternative and those of the alternatives reasonably available to the project or action. No further analysis of data collection is necessary, but the reviewer may suggest the addition of clarifying language or information.

Category 2 – Insufficient Information

The draft EIS does not contain sufficient information for EPA to fully assess environmental impacts that should be avoided in order to fully protect the environment, or the EPA reviewer has identified new reasonably available alternatives that are within the spectrum of alternatives analyzed in the draft EIS, which could reduce the environmental impacts of the action. The identified additional information, data, analyses or discussion should be included in the final EIS.

Category 3 – Inadequate

EPA does not believe that the draft EIS adequately assesses potentially significant environmental impacts of the action, or the EPA reviewer has identified new, reasonably available alternatives that are outside of the spectrum of alternatives analyzed in the draft EIS, which should be analyzed in order to reduce the potentially significant environmental impacts. EPA believes that the identified additional information, data, analyses, or discussions are of such a magnitude that they should have full public review at a draft stage. EPA does not believe that the draft EIS is adequate for the purposes of the National Environmental Policy Act and or Section 309 review, and thus should be formally revised and made available for public comment in a supplemental or revised draft EIS. On the basis of the potential significant impacts involved, this proposal could be a candidate for referral to the CEQ.

* From EPA Manual 1640 Policy and Procedures for the Review of Federal Actions Impacting the Environment. February, 1987.

Appendix K – Biological Assessments and Evaluations

File Code: 2670 **Date: May 23, 2006**

Subject: Biological Assessment, Threatened and Endangered Plants
West Gold Supplemental Environmental Impact Statement
Sandpoint Ranger District

To: District Ranger

I. Introduction

The purpose of this assessment is to evaluate and describe potential effects of Alternative C (the preferred alternative), as modified in the Record of Decision, of the West Gold Supplemental Final Environmental Impact Statement (FSEIS) on threatened or endangered plant species, and to determine whether any such species or habitat is likely to be affected by the proposed action. This assessment was prepared in accordance with USDA Forest Service policy (FSM 2672.4).

In June of 2005, USFWS changed its method of updating species lists; it now provides updates online and lists species known or suspected to occur by county. According to the US Fish and Wildlife Service (USFWS), the threatened plant species water howellia (*Howellia aquatilis* A. Gray) and Spalding's catchfly (*Silene spaldingii* Wats.) are suspected to occur in the IPNF in Kootenai County but not in Bonner County (USDI 2006). There are no endangered plant species known or suspected to occur in the district.

While most of the project area lies within Bonner County, a portion extends into Kootenai County. Therefore, it is appropriate to address the potential for effects of the West Gold project on water howellia and Spalding's catchfly.

II. Preferred Alternative

The USDA Forest Service proposes several activities on National Forest lands in the Sandpoint Ranger District. Maps showing the location of proposed treatment units are included in the West Gold FSEIS.

The following treatments are proposed:

<u>Selective timber harvest</u> would occur on approximately 411 acres:

- To reduce competition and increase tree growth within stands, and
- Where there is the opportunity to maintain or enhance the growth of western larch or ponderosa pine, or to move the stand toward desired structural stages

<u>Regeneration cutting and reforestation</u> would occur on approximately 898 acres:

- To remove undesirable trees, trees susceptible to or infested with root diseases, or trees at risk of being killed by insects.

Fuels treatment would occur as follows: prescribed burning would occur on 948 acres, slashing and burning would occur on 129 acres (a total of 1,077 acres of underburning), about 223 acres would be limb and lopped, about 28 acres would be grapple piled and approximately 10 acres yarded with limbs and tops attached. Approximately nine acres of landing debris would be burned.

Road decommissioning and maintenance: Approximately 1.4 miles of existing classified and 0.7 mile of existing unclassified road would be decommissioned. The remaining 0.3 mile of existing unclassified road would become part of the permanent road system. Approximately 1.7 miles of existing classified road would be put into storage. Maintenance activities would occur on approximately 25.5 miles of road.

Road construction and storage resulting from the modification of Alternative C: Alternative C oreiginally specified no road construction. Under Alternative C as modified in the Record of Decision, approximately 850 feet of permanent road and a helicopter landing would be constructed. This road and landing would be put into storage at the completion of the project.

III. Listed Threatened Plant Species

Water howellia (*Howellia aquatilis*) - a member of the family Campanulaceae, is suspected to occur in the Pend Oreille sub-basin ecosystem. According to the Conservation Strategy for *Howellia aquatilis* - Flathead National Forest (USDA 1994), there are currently 110 known occurrences of the species; most occurrences are in Montana and Washington, with only one known occurrence in Idaho.

Water howellia is an annual aquatic species restricted to small pothole ponds or the quiet water of abandoned river oxbows. It occurs at elevations from 10 feet in Washington to 4,420 feet in Montana. The species reproduces only by seed; germination occurs in October, presuming the plant's habitat has dried sufficiently to expose the seeds to oxygen. Because of this restrictive habitat requirement, population numbers in a given year are directly influenced by the extent of pond drawdown at the end of the previous growing season (USDA 1994).

Botanists from the US Forest Service, State of Idaho Department of Lands and Idaho Fish and Game Conservation Data Center have conducted floristic surveys of many wetlands in the Pend Oreille subbasin ecosystem over the past decade, but have not located any occurrences of the species. An 1892 sighting approximately 10 miles northwest of the Decision Area has not been relocated (Shelly and Moseley 1988).

No potentially suitable habitat for water howellia occurs in the Decision Area.

Spalding's catchfly – a member of the plant family Caryophyllaceae, occurs in dry grassland habitats and grassland inclusions in ponderosa pine and Douglas-fir forest. Suitable habitat for this species is typically dominated by fescues (*Festuca* species) and other bunchgrasses, but also has a high density of forbs. Soil types on which it has been found include loam, silty loam, granitic, loamy basaltic and loess (USDI 2000).

This long-lived perennial forb often exhibits periods of dormancy (both within a growing season and over several growing seasons), which can render habitat clearance surveys problematic (Lesica 1997). Periodic dormancy may allow individuals to persist below ground during drought years (Lesica 1997).

Potential threats to its habitat include conversion to agricultural, residential or other uses; overgrazing; soil compaction and other ground disturbance; exotic species invasion; herbicide use; and activities that would negatively impact the species' pollinators (Lichthardt 1997). Wildfire and prescribed fire may also be detrimental to individualss, although fires may benefit the species by burning off heavy accumulations of duff and litter which impede germination and seedling growth (Lesica 1999).

Because habitat for Spalding's catchfly cannot be accurately determined using Timber Stand Database information, a Forest-wide habitat analysis was conducted using Satellite Imagery Landtype Classification (SILC). This reflection of the species' habitat occurrence and distribution is an approximation and serves as a coarse filter for habitat suitability. Further review of areas identified by SILC, such as aerial photograph interpretation and field verification, is necessary to determine the true extent of suitable habitat for Spalding's catchfly.

Based on evaluation of SILC and aerial photographs of the Decision Area, habitat for Spalding's catchfly in the Decision Area is low.

IV. On-site Inspection

Floristic surveys of the Decision Area were conducted in 2000. All plant species encountered were recorded during the surveys. The surveys targeted areas proposed for harvest activities. No listed plant species were identified, and the Decision Area was confirmed as having no suitable habitat for any listed plant species.

V. Analysis of Effects

Water howellia - There is no suitable habitat for water howellia in the Decision Area. No direct, indirect or cumulative effects would occur from project implementation.

Spalding's catchfly – No suitable habitat for this species occurs in the Decision Area. There is low potential for occurrence of Spalding's catchfly in the Pend Oreille subbasin. No direct, indirect or cumulative effects to the species or suitable habitat would occur from project implementation.

VI. Determination of Effects

No sightings of water howellia or Spalding's catchfly have been documented in the Decision Area. The Decision Area has no suitable habitat for these species.

Based on the above considerations, implementation of Alternative C as modified by the Record of Decision would have **no effect** on water howellia or Spalding's catchfly or their habitats.

Prepared by:

/s/Anna E. Hammet
IPNF North Zone Botanist

Literature Cited

Lesica, Peter. 1997. Demography of the endangered plant *Silene spaldingii* (Caryophyllaceae) in northwest Montana. Madrono 44(4):347-358.

Lesica, Peter. 1999. Effects of fire on the demography of the endangered, geophytic herb *Silene spaldingii* (Caryophyllaceae). American Journal of Botany 86(7): 996-1002.

Lichthardt, J. 1997. Revised report on the conservation status of *Silene spaldingii* in Idaho. Idaho Department of Fish and Game Conservation Data Center. Boise, Idaho. Unpublished technical report.

Shelly, J. Steven and Robert K. Moseley. 1988. Report on the Conservation Status of *Howellia aquatilis*, a Candidate Threatened Species. Montana Natural Heritage Program. Helena, MT. Pages 29-30.

USDA. 1994. Conservation Strategy for *Howellia aquatilis*. Flathead National Forest. USDA Forest Service Northern Region. Missoula, Montana. April, 1994; updated November 17, 1994.

USDI Fish and Wildlife Service. 2006. Updated Species List for Bonner and Kootenai Counties, Idaho (3/1/2006). Upper Columbia Fish and Wildlife Office, Spokane, Washington. Accessed online at http://www.fws.gov/easternwashington/ESA.html.

USDI Fish and Wildlife Service. 2000. Section 7 guidelines - *Silene spaldingii* Spalding's catchfly (proposed Threatened). United States Fish and Wildlife Service Snake River Basin Office. Boise, Idaho.

SENSITIVE SPECIES BIOLOGICAL EVALUATION
SUMMARY OF CONCLUSION OF EFFECTS

Project Name: West Gold

Species	Alternative A	Alternative B	Alternative C	Alternative D
1. Aquatic Species	NI	NI	NI	NI
2. Deciduous Riparian Species	NI	NI	NI	NI
3. Peatland Species	NI	NI	NI	NI
4. Wet Forest Species	NI	NI	NI	NI
5. Moist Forest Species, except 6 below…	NI	NI	NI	NI
6. *Botrychium* species	NI	MIIH	MIIH	MIIH
7. Subalpine Species	NI	NI	NI	NI
8. Cold Forest Species	NI	NI	NI	NI
9. Dry Forest Species, except #10 below	NI	NI	NI	NI
10. *Cypripedium fasciculatum*	NI	MIIH	MIIH	MIIH

NI = No Impact

MIIH = May Impact Individuals or Habitat, but Will Not Likely Contribute To A Trend Toward Federal Listing Or Loss Of Viability To The Population Or Species

WIIH = Will Impact Individuals Or Habitat With A Consequence That The Action May Contribute To A Trend Toward Federal Listing Or Cause A Loss Of Viability To The Population Or Species*

BI = Beneficial Impact

Rationale: Rationale is included in the West Gold FSEIS.

Recommendations: See Chapter II of the FSEIS for required mitigation measures.

Prepared by: /s/ Anna E. Hammet Date: May 23, 2006
Botanist

* Considered a trigger for a significant action in NEPA

Form 1 (R1/4/6-2670-95)

Biological Assessment	USDA Forest Service	Idaho Panhandle National Forests	Sandpoint Ranger District 1500 Highway 2, Suite 110 Sandpoint, ID 83864-9509 (208) 263-5111

File Code: 2670 Date: May 22, 2006

Ref: Biological Assessment, *wildlife*, West Gold Project

To: Forest Supervisor

Introduction

The purpose of this assessment is to evaluate and describe potential effects of Alternative C (the preferred alternative), as modified in the Record of Decision, of the West Gold Supplemental Final Environmental Impact Statement (FSEIS) on threatened or endangered wildlife species, and to determine whether any such species or habitat is likely to be affected by the proposed action. This assessment was prepared in accordance with USDA Forest Service policy (FSM 2672.4).

Proposed Action

The USDA Forest Service proposes several activities on National Forest lands in the Sandpoint Ranger District. Maps showing the location of proposed treatment units are included in the West Gold FSEIS.

The following treatments are proposed:

Selective timber harvest would occur on approximately 411 acres:

- To reduce competition and increase tree growth within stands, and
- where there is the opportunity to maintain or enhance the growth of western larch or ponderosa pine, or move the stand toward desired structural stages

Regeneration cutting and reforestation would occur on approximately 898 acres:

- To remove undesirable trees, trees susceptible to or infested with root diseases, or trees at risk of being killed by insects

Fuels treatment would occur as follows: prescribed burning would occur on 948 acres, slashing and burning would occur on 129 acres (for a total of 1,077 acres of underburning), about 223 acres would be limbed and lopped, about 28 acres would be grapple piled and approximately 10 acres yarded with limbs and tops attached. Approximately nine acres of landing debris would be burned.

Road decommissioning and maintenance: Approximately 1.4 miles of existing classified and 0.7 miles of existing unclassified road would be decommissioned. 0.3 mile of an existing unclassified road would become part of the permanent road system. Approximately 1.7 miles of existing classified road would be put into storage. Maintenance activities would occur on approximately 25.5 miles of road.
Road construction and storage resulting from the modification of Alternative C: Alternative C originally specified no road construction. Under Alternative C as modified by the Record of Decision, approximately 850 feet of permanent road and a helicopter landing would be constructed. This road and landing would be put into storage at the completion of the project.

Listed Species

On March 1, 2006 the U.S. Fish and Wildlife Service provided a list of threatened and endangered species that may occur on the Idaho Panhandle National Forests (http://www.fws.gov/easternwashington/). These species include the woodland caribou *(Rangifer tarandus caribou)*, bald eagle *(Haliaceetus leucocephalu)*, Canada lynx *(Lynx Canadensis)*, gray wolf *(Canis lupus)*, and grizzly bear *(Ursus arctos)*.

Effects Analysis and Determinations

Threatened and Endangered Species Summary of Conclusion of Effects

Species	Species or Habitat Present on the District?	Probability of Occurrence in APE?[1]	Species or Habitat Potentially Affected?	Determination of Effects
Woodland Caribou	Yes	Low	No	No Effect
Bald Eagle	Yes	Low	No	No Effect
Canada Lynx	Yes	Low	No	No Effect
Gray Wolf	Yes	Low	No	No Effect
Grizzly Bear	Yes	Low	No	No Effect

Woodland caribou

The population is generally found above 4,000 feet elevation in the Selkirk Mountains in Engelmann spruce/subalpine fir and western red cedar/western hemlock forest types. They are highly adapted to upper elevation boreal forests and do not occur in drier low elevation habitats except as rare transients. Seasonal movements are complex and normally occur as altitudinal patterns, moving to traditional sites for different seasons.

[1] APE- Area of Potential Effect

The population is threatened by habitat fragmentation and loss, and excessive mortality from predators and illegal human take (USDI 1994).

The Selkirk caribou population was emergency listed as Endangered in 1983 and a final ruling of its status appeared in the Federal Register in 1984 (USDI 1994). The recovery area for the population resides in the Selkirk Mountains of northern Idaho, northeastern Washington and southern British Columbia, Canada.

As part of the plan for recovery, caribou were augmented into the ecosystem from source populations in British Columbia between 1987 and 1990. By 1990, the population was increased to approximately 55 to 70 animals. The population remained somewhat stable through the early 1990's but a decline in numbers occurred in 1996 that was believed to be the result of increased rates of predation.

In 1996, a second augmentation plan was completed by Washington Department of Fish and Wildlife and the USDI Fish and Wildlife Service. As a result of this plan, animals were augmented in 1996 through 1998. Caribou numbers have been regularly followed with annual censuses and monitoring of radio-collared animals. Over the last several years, the Selkirk population has been fairly sable at around 40 animals.

The West Gold project does not provide any suitable habitat for woodland caribou and is well outside areas designated for its recovery. There have been no reported sightings of caribou in the vicinity of the project. In addition, the action area is located mostly below 4,000 ft elevation in an area that, historically, probably not utilized by woodland caribou. For these reasons, the project would have ***no effect*** on woodland caribou.

Bald eagle

Bald eagles are winter visitors and yearlong residents of northern Idaho. They are attracted to the area's larger lakes and rivers, which provide most of their foraging opportunities (e.g. fish, waterfowl). Accordingly, bald eagles select isolated shoreline areas with larger trees to pursue such activities as nesting, feeding, loafing, etc. Nesting habitat usually includes dominant trees that are in close proximity to a sufficient food supply and within line-of-sight of a large body of water (usually within 0.25 mile of water). Nest trees typically are large ponderosa pine, Douglas-fir, western larch or cottonwood trees with open crowns in areas that are relatively free from human disturbance (USDI 1991).

During migration and at wintering sites, eagles tend to concentrate on locally abundant food. Roost sites are usually located in stands of mature or old growth conifers that provide protection from inclement weather.

All of the area covered by this FSEIS is included in Zone 7 as designated in the Pacific States Bald Eagle Recovery Plan. At the time of federal listing, bald eagles were uncommon in this zone. Originally, there was a target of two additional territories over

and above the existing two territories associated with the Lake Pend Oreille Lake-Pend Oreille River area. Today, there are at least 28 territories within this area.

The West Gold project area is outside the normal activity and use patterns of bald eagles. The area is separated and obscured from a direct line-of-sight to Lake Pend Oreille by a ridge system and high relief slopes that drop into the lake. Consequently, primary use areas (i.e. shoreline areas) are adequately buffered from any proposed action.

There are no known nesting territories or winter roost sites in close proximity to the project area. The nearest known nesting territory is at about seven miles to the north @ Whiskey Rock. The nearest winter roost lies on the south end of Lake Pend Oreille, on a north-facing slope near Echo Bay (Crenshaw 1987). Nearby shorelines are heavily vegetated, providing sufficient nesting and winter roost opportunities for bald eagles. Consequently, it is unlikely that eagles would move inland from Lake Pend Oreille to nest or roost in the West Gold drainage. For these reasons, the West Gold project would have **no effect** on bald eagles or their habitat. No cumulative effects are expected.

Canada lynx

Both snow conditions and vegetation types are important factors to consider in defining lynx habitat. In North America, the distribution of lynx is nearly coincident with that of the snowshoe hare, its primary prey. Lynx occur in boreal, sub-boreal and western Montane forests and are uncommon or absent from the wet coastal forests of North America. Lynx habitat quality is believed to be lower in the southern periphery of its range because landscapes are more heterogeneous in terms of topography, climate, and vegetation (Ruediger et al. 2000).

Lynx are considered low-density species with home ranges averaging 24 square miles, depending on prey abundance. In northern Idaho and northwestern Montana, lynx generally occur in moist, cold habitat types above 4,000 feet elevation (Koehler and Brittell 1990). As a specialized predator, lynx have stratified or separated themselves from other competitors by unique adaptations. Their large feet and long legs permit lynx to move easily over the snow, enabling them to find a niche at higher elevations where snow persists much of the year, thereby, giving them a competitive advantage with other competitors.

Primary habitat that contributes to lynx habitat is higher elevation lodgepole pine, subalpine fir, and Engelmann spruce habitats. Secondary vegetation, when interspersed with subalpine forests, includes cool, moist Douglas-fir, grand fir, western larch and aspen forests (Ruediger et al. 2000).

Lynx use both ends of the forest successional spectrum; young-aged stands where they hunt for snowshoe hares, and mature stands where they have their kittens. Ideally, quality lynx habitat would include a mosaic of the vegetative patterns across the landscape, providing sustainable forage in juxtaposition to denning habitat.

Lynx populations in Alaska and most of Canada are generally considered stable to slightly dropping. The conservation of lynx populations is of concern in the western mountains of United States because of the peninsular and disjunct distribution of suitable habitat at the southern periphery of the species' range. Both historic and recent lynx records are scarce, which makes identifying range reductions and determining the historical distribution of populations in the region difficult (Koehler and Aubrey in Ruggiero et al. 1994).

The Canada Lynx Conservation Assessment and Strategy (Ruediger et al. 2000) directs agencies to delineate lynx analysis units (LAUs) to evaluate and analyze effects of planned and on-going projects on lynx and their habitat, and provide guidance for addressing these risk factors. Both snow conditions (influenced by elevation and aspect) and vegetation types are important factors to consider in defining lynx habitat. The West Gold drainage is not part of a designated LAU because it lies within a low to mid-elevation zone (2,000 to 4,500 feet), and comprises a high proportion of dry habitats. According the Canada Lynx Conservation Assessment and Strategy (Ruediger et al. 2000) dry forest types do not provide lynx habitat, and most lynx occurrences are within 5,000-6,500 feet elevation zone. For these reasons, the West Gold project would have ***no effect*** on lynx or their habitat. No cumulative effects are expected.

Gray wolf

Wolves are highly social animals with large home ranges that include a variety of habitat types. While conservation requirements for wolf populations are not fully understood, a sufficient, year-round prey base (primarily ungulates) and sufficient space with minimal human exposure are considered key components of wolf habitat (USDI 1987, Tucker et al. 1990). Wolf distribution is largely influenced by distance from human activity (wolves are highly susceptible to human-caused mortality). The density and distribution of open roads provides an indicator for the level of risk to human-caused mortality.

The northern Rocky Mountain wolf (a subspecies of the gray wolf) was listed as Endangered in 1973. However, based on enforcement problems and a trend to recognize fewer subspecies of wolves, the entire species was listed as Endangered throughout the entire lower 48 states, except Minnesota in 1978 (USDI 1987). In the past, substantial declines in numbers of wolves resulted from control efforts to reduce livestock and big game depredations. By the 1940s, the Rocky Mountain wolf was essentially eradicated from its range.

In 1994, final rules in the Federal register made a distinction between wolves that occur north of Interstate 90 and wolves that occur south of Interstate 90, in Idaho. Gray wolves occurring north of Interstate 90 are federally listed as endangered species while wolves south of Interstate 90 are listed as part of a nonessential, experimental population with special regulations defining their protection and management.

The West Gold project occurs north of Interstate 90 and is within the region where wolves are federally listed as endangered. The project also lies within the northwest

Montana Recovery Area (Mack and Laudon 1998). Occasional sightings have been reported on National Forest lands.

Although there are occasional individual wolf sightings in North Idaho, they are suspected to be mostly transients passing through the area. A new wolf pack was confirmed in 2005 in vicinity of the Callahan Creek/Grouse Creek/Boulder Creek area, in the Cabinet Mountains, which are about 34 miles north of the project area. There are no credible sightings or evidence of wolfs or wolf packs in close proximity to the project.

Due to the ability of gray wolves to thrive under a variety of land uses, successful wolf recovery in the northern Rocky Mountains does not depend on land-use restrictions, with the possible exception of temporary restrictions around active den sites on federally managed lands (USDI 2003). The proposed action is not expected to have a meaningful change in abundance and distribution of prey species, or security (see Rocky Mountain elk discussions in the West Gold FSEIS). For these reasons the West Gold project would have ***no effect*** on gray wolves or their habitat.

Grizzly bear

Contiguous, relatively undisturbed mountainous habitat having a high level of topographic and vegetative diversity characterizes most areas where the species remains. Grizzly bears are considered habitat generalists, having a broad of habitat tolerance (USDI 1993). Use patterns are usually dictated by food distribution and availability combined with a secure environment. Grizzlies commonly choose riparian areas and other low elevation areas with wet meadows during the spring and generally are found at higher elevation meadows, ridges, and open brush fields during the summer.

The grizzly bear was listed as threatened in 1975. It was originally distributed in various habitats throughout western North America. Today, it is confined to less than 2 percent of its original range and represented in five or six population centers south of Canada, including Cabinet-Yaak and Selkirk ecosystems that are located in northeastern Washington, northern Idaho and northwestern Montana. Habitat loss and direct and indirect human-caused mortality is related to its decline (USDI 1993).

The proposed project lies outside areas designated for grizzly bear recovery. Grizzly bear are not known to occur within the planning area and are not likely to occur there based on the current distribution of the species. No reliable sightings of grizzly bear have been documented in the area. Therefore, West Gold project would have ***no effect*** on grizzly bears or their habitat. No cumulative effects are expected.

Conservation Measures to Reduce or Avoid Adverse Effects

None

Prepared by: /s/David Roberts
David Roberts
Sup. Wildlife Biologist

Literature Cited

Crenshaw, J. G. 1987. Effects of the Cabinet Gorge Kokanee Hatchery on wintering bald eagles in the lower Clark Fork River and Lake Pend Oreille, Idaho. U.S. Department of Energy, Bonneville Power Administration, Portland, OR. 82 pp.

Koehler G. M. and J. D. Brittell. 1990. Managing spruce-fir habitat for lynx and snowshoe hares. Journal of Forestry. 5 pp.

Mack, C. M. and K. Laudon. 1998. Idaho wolf recovery Program: Recovery and Management of gray wolves in Idaho. Progress report 1995-1998. Nez Perce Tribe, Department of Wildlife Management, Lapwai, ID. 28 pp.

USDI Bureau of Reclamation. 1991. Habitat Management Guide for Bald Eagles in northwestern Montana. 29 pp.

Tucker, P.A., D. L. Davis, and R. R. Ream. 1990. Wolves: Identification, documentation, population monitoring and conservation considerations. Northern Rockies Natural Resource Center of the National Wildlife Federation, Missoula, MT.

Ruediger, B., J. Claar, S. Gniadek, B. Holt, L. Lewis, S. Mighton, B. Naney, G. Patton, T. Rinaldi, J. Trick, A. Vandehey, F. Wahl, N. Warren, D. Wenger, and A. Williamson. 2000. Canada lynx conservation assessment and strategy. USDA Forest Service, USDI Bureau of Land Management, and USDI National Park Service. Forest Service Publication #R1-00-53, Missoula, MT. 142 pp.

Ruggiero, L. F., K. B. Aubry, S. W. Buskirk, L. J. Lyon, and W. J. Zielinski, tech. eds. 1994. The Scientific Basis for Conserving Forest Carnivores: American Marten, Fisher, Lynx, and Wolverine in the Western United States. Gen. Tech. Rep. RM-254. Ft. Collins CO: USDA, Forest Service, Rocky Mountain Forest and Range Experiment Station. 184 pp.

USDI Fish and Wildlife Service. 1987. Northern Rocky Mountain wolf recovery plan. Denver, CO. 119 pp.

USDI Fish and Wildlife Service. 1993. Grizzly Bear Recovery Plan. Missoula, MT. 181 pp.

USDI Fish and Wildlife Service. 1994. Recovery Plan for Woodland Caribou in the Selkirk Mountains. Portland, Oregon. 71 pp.

USDI Fish and Wildlife Service. 2006. Updated species list for Bonner County. Upper Columbia Fish and Wildlife Office. Spokane, WA.

Sensitive Species Biological Evaluation
Summary of Conclusion of Effects**

Project Name: WEST GOLD FSEIS

Species	Alt. A	Alt. B	Alt. C	Alt. D
Northern Goshawk *(Accipiter gentiles)*	**MIIH**	**MIIH**	**MIIH**	**MIIH**
Common Loon *(Gavia immer)*	**NI**	**NI**	**NI**	**NI**
Harlequin Duck *(Histrionicus histrionicus)*	**NI**	**NI**	**NI**	**NI**
Flammulated Owl *(Otus flammeolus)*	**MIIH**	**MIIH**	**MIIH**	**MIIH**
Fringed Myotis *(Myotis thysanodes)*	**MIIH**	**MIIH**	**MIIH**	**MIIH**
Pygmy Nuthatch *(Sitta pygmaea)*	**MIIH**	**MIIH**	**MIIH**	**MIIH**
Black-Backed Woodpecker *(Picoides artcusi)*	**MIIH**	**MIIH**	**MIIH**	**MIIH**
Fisher *(Martes pennanti)*	**NI**	**NI**	**NI**	**NI**
Wolverine *(Gulo gulo)*	**NI**	**NI**	**NI**	**NI**
Townsend's Big-Eared Bat *(Plecotus townsendi)*	**NI**	**NI**	**NI**	**NI**
Northern Bog Lemming *(Synaptomys borealis)*	**NI**	**NI**	**NI**	**NI**
Boreal Toad *(Bufo boreas boreas)*	**NI**	**NI**	**NI**	**NI**
Black Swift *(Cypseloides niger)*	**NI**	**NI**	**NI**	**NI**
Coeur d' Alene Salamander *(Pethodon vandyei idahoensis)*	**NI**	**NI**	**NI**	**NI**
Peregrine Falcon *(Falco peregrinus anatum)*	**NI**	**NI**	**NI**	**NI**

/s/David Roberts Date: 5/23/06
Sup. Wildlife Biologist

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 populations or species.*
BI= Beneficial impact.

* Trigger for significant action as defined in NEPA
** Note: Rationale for conclusion of effects is contained in the NEPA document

Form 2 (R1/4/6-2670-95)

Biological Assessment and Bull Trout Matrix

File Code:	2672.4	**Date:**	May 26, 2006
Route To:	West Gold Project File		

Subject: Biological Assessment for West Gold Project

To: Ranotta McNair, Forest Supervisor

Introduction

The U. S. Fish and Wildlife Service (USFWS) lists two fish species that occur, potentially occur, and/or habitat exists within the Kaniksu portion of the Idaho Panhandle National Forests as endangered or threatened under the Endangered Species Act (ESA) of 1973 (USDI, 2000). The Kootenai River population of white sturgeon (*Acipenser transmontanus*) is listed as "endangered" (USDI, 1994) and the Columbia River Distinct Population Segment of bull trout (*Salvelinus confluentus*) is listed as "threatened" (USDI, 1998).

The purpose of this assessment is to evaluate and describe potential effects of Alternative C (the preferred alternative), as modified in the Record of Decision, of the West Gold Supplemental Final Environmental Impact Statement (FSEIS) on these two fish species, and to determine whether any such species or habitat is likely to be affected by the proposed action. It was prepared in accordance with Section 7(c) of ESA, and manual direction to review all Forest Service activities to ensure that such activities do not contribute to a downward trend in population numbers or density of sensitive species and/or a downward trend in habitat capability (FSM 2672.1 and 2672.4).

Summary of Activity

The USDA Forest Service proposes several activities on National Forest lands in the Sandpoint Ranger District. Maps showing the location of proposed treatment units are included in the West Gold FSEIS.

The following treatments are proposed:

<u>Selective timber harvest</u> would occur on approximately 411 acres:

- To reduce competition and increase tree growth within stands
- Where there is the opportunity to maintain or enhance the growth of western larch or ponderosa pine, or move the stand toward desired structural stages

<u>Regeneration cutting and reforestation</u> would occur on approximately 898 acres:

- To remove undesirable trees, trees susceptible to or infested with root diseases, or trees at risk of being killed by insects

Table 1. Activities proposed in Alternative C (the preferred alternative), as modified in the Record of Decision.

Activities	Alternative C
Vegetation Treatments (Acres)	
Selective Cutting	
Thin	411
Improvement Cut	0
Regeneration Cutting	
Irregular Shelterwood	683
Rehabilitation	148
Seedtree w/Reserves	65
Final Removal w/Reserves	2
Underburn Only	29
Total Stand Treatment Acres	**1,338**
Logging Systems (Acres)	
Helicopter	891
Skyline	405
Tractor	13
Road Work (Miles)	
Road Construction	0.16
New Road Storage	0.16
Existing Classified Road Decommissioning	1.4
Existing Road Storage	1.7
Road Maintenance	27.9
Fuel Treatments (Acres)	
Underburn (includes 29 acre underburn shown above)	1,077
Limb and Lop	223
Grapple Pile	28
Whole Tree Yard	10
Burn landing debris	9
Total Fuels Treatment*	**1,347**

** The number of total fuel treatment acres exceeds cut acres by the burn landings acreage*

Fuels treatment would occur as follows: prescribed burning would occur on 948 acres, slashing and burning would occur on 129 acres (for a total of 1,077 acres of underburning), about 223 acres would be limbed and lopped, about 28 acres would be grapple piled and approximately 10 acres yarded with limbs and tops attached. Approximately nine acres of landing debris would be burned.

Road decommissioning and maintenance: Approximately 1.4 miles of existing classified and 0.7 miles of existing unclassified road would be decommissioned. 0.3 mile of an existing unclassified road would become part of the permanent road system. Approximately 1.7 miles of existing classified road would be put into storage. Maintenance activities would occur on approximately 25.5 miles of road.

Road construction and storage resulting from the modification of Alternative C: Alternative C originally specified no road construction. Under Alternative C as modified by the Record of Decision, approximately 850 feet of permanent road and a helicopter landing would be constructed. This road and landing would be put into storage at the completion of the project.

Location: Harvest units are located in the West Gold Creek drainage, which is part of the Pend Oreille River sub-basin. West Gold Creek is the only fish-bearing stream in the project area. The legal description of the project area is: All or portions of Sections 13, 14, 23, 24, 25, 26, 35, and 36 in Township 53 North, Range 2 West; and Sections 8, 9, 10, 16, 17, 20, 21, and 29 in Township 53 North, Range 1 West, Boise Meridian, Bonner County, Idaho (see Figure 1).

Duration: The project is expected to take 7 years to complete.

Time period: The project is expected to begin in 2007 and all activities should be completed by 2014.

Prefield/Field Review

Prefield information was gathered from district fish/hydrology files, stream inventories, field reviews, historical records, aerial photographs, analysis of watershed conditions, published scientific literature, discussions with Fisheries Biologists and electrofishing/stocking data from the Idaho Department of Fish and Game (IDF&G), the United States Fish and Wildlife Service (USFWS), electrofishing data from the Idaho Division of Environmental Quality (DEQ) and comprehensive knowledge of the fisheries resources in the Pend Oreille River Basin. Descriptions are limited to historic natural (i.e., wildfire) and human-caused (i.e., timber harvest and roading) disturbances, overall conditions, and habitat connectivity (migration barriers).

All roads and streams within the project area were surveyed during the 2000 field season. Road drainage crossings were inventoried to assess erosional hazards and risks to aquatic ecosystems, using the *Methods for Inventory and Environmental Risk Assessment of Road Drainage Crossings* (Flanagan et al 1998). Information on road-stream crossings that included fill volumes, culvert sizes, erosional features, and other variables was gathered, and then each crossing was ranked for treatment.

A modified version of the R1/R4 fish and fish habitat inventory (Overton et al 1997) was conducted along West Gold Creek and some of its tributaries in 2000 and Gold Creek during the 2003 field season. Additional stream information was collected to determine stream channel types, cross sectional profiles, woody debris composition and stream temperature. Existing and potential in-channel and stream-bank erosion sites were also documented with this survey.

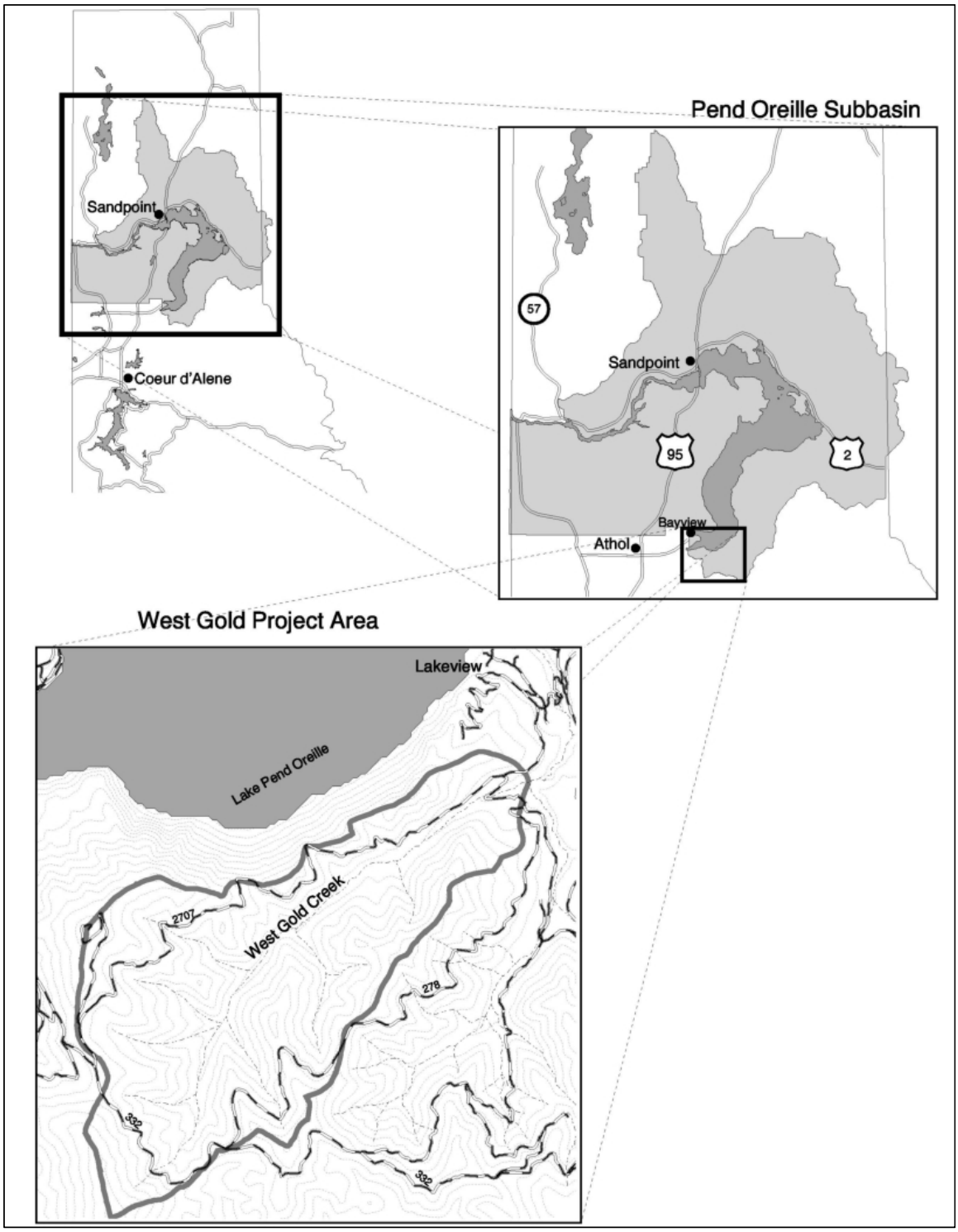


Figure 1. Vicinity Map of the West Gold Project Area.

Existing Habitat Condition:
The following are general descriptions of the watersheds within the analysis area. The West Gold project area encompasses the entire West Gold drainage. For detailed descriptions of existing conditions of bull trout populations and habitat conditions for Gold Creek refer to the attached matrix.

The West Gold drainage is approximately 4,543 acres and is one of five subwatersheds within the 13,900-acre Gold Creek watershed. The watershed is within Lake Pend Oreille Sub-basin, which is a high priority sub-basin for restoration and protection of aquatic resources, especially bull trout (State of Idaho 1996). Gold Creek is also the second most important tributary for bull trout spawning within the Lake Pend Oreille Subbasin (PBTTAT 1998).

Since West Gold Creek drains into Gold Creek, and the majority of bull trout spawning and rearing is in Gold Creek, with incidental use of the lowest reach of West Gold Creek, the following paragraphs focus on conditions in the Gold Creek watershed (the cumulative effects area for the watershed and fisheries analysis).

The Bull Trout Problem Assessment states that excess bedload in stream channels from past mining disturbance is the single greatest limiting factor for bull trout in the Gold Creek Watershed and has caused fragmentation and decreased available spawning and rearing habitat for bull trout and other aquatic species. The assessment also mentions how the mine waste has added material to the delta at the mouth of Gold Creek and threatens to block access between Gold Creek and Lake Pend Oreille at low flows in some years. Besides excess bedload, testing on waste rock at the mines showed heavy metal concentrations in various segments of Gold Creek, although the degree to which it is affecting downstream water quality is not clear[2]. Bedload effects from past mining were estimated to cause 70% of the threats to bull trout in the Gold Creek Watershed (PBTTAT 1998). Efforts to clean up these mine sites are underway; rehabilitation efforts began in 2003 and will continue for several years.

Roads, the powerline corridor, past timber harvest, and illegal fish harvest are additional continuing threats to bull trout in the Gold Creek watershed. The Kick Bush slide, a very steep road cut on Road 278, had a history of failures that contributed fine sediment to Gold Creek. During fall rains, sediment from the road enters Gold Creek and was deposited on bull trout redds. The Kick Bush slide was repaired in 2003.

The powerline corridor has caused site-specific effects to fish habitat, most notably the lack of large woody debris in channel segments where the corridor parallels or crosses the stream; however, recent data shows the effects have not been as detrimental as previously thought, especially in West Gold Creek. Past timber harvest has led to loss of long-term woody debris recruitment in some headwater tributaries. Poaching of adult bull trout occurs in lower Gold Creek (PBTTAT 1998). Through continuing funding from the

---

[2] *Surface water tests for heavy metals were performed in the summers of 1996 and 1997 and results are only representative of the conditions occuring at time of testing, not a constant level.*

Cabinet Gorge and Noxon dams re-licensing agreement, the Idaho Department of Fish and Game has increased law enforcement efforts in the Lake Pend Oreille area to reduce poaching.

Other, relatively minor, threats to bull trout in the Gold Creek Watershed include past severe wildfires (streams are still recovering), urbanization (residential home sites along lower Gold Creek), and dams (lake level fluctuations from Albeni Falls dam may hinder migration of spawning fish between Gold Creek and Lake Pend Oreille (PBTTAT 1998).

Physical attributes of fish habitat are mainly defined by stream channel condition. The bedrock-controlled nature of the lower Gold Creek and West Gold Creek channels have made them resilient to natural and human-caused disturbances over time. As a result, habitat degradation in these streams is relatively minor.

The historic distribution of bull trout in the Gold Creek Watershed is unknown. Their current distribution is limited to lower Gold Creek and lower West Gold Creek; they cannot access habitat in upper Gold Creek or Chloride Gulch. It is possible that more habitat was historically available to bull trout; however, it is unlikely that upper Gold and Chloride Gulch historically flowed year round.

Over two decades of redd counts indicate a stable bull trout population trend; however, it is unknown how these numbers compare with historic populations. No known population data exist from the pre-mining era. It appears that bull trout are currently using much of the available spawning habitat in lower Gold Creek, yet continuing effects from past mining and other disturbances (e.g. sediment from Kick Bush Slide) are likely depressing spawning and fry emergence success (Everest et al 1987; Bjornn and Reiser 1991; Nelson et al 1991).

Table 1. Bull Trout redd counts in Gold Creek from 1983 to 2005

Year	# Redds
1983	131
1984	124
1985	11
1986	78
1987	62
1988	111
1989	122
1990	84
1991	104
1992	93
1993	120
1994	164
1995	95
1996	100
1997	76

Year	# Redds
1998	120
1999	147
2000	168
2001	127
2002	203
2003	126
2004	167
2005	200

Analysis of Effects

Species	Habitat Present	Habitat Absent	Species Present	Species Absent
Endangered:				
White sturgeon *Acipenser transmontanus*		X		X
Threatened:				
Bull trout *Salvelinus confluentus*	X		X	

Further explanations for above table:

- White sturgeon are found only in the main Kootenai River, outside of the cumulative effects areas for this project.
- Bull trout currently inhabit the Gold Creek watershed.

Riparian Habitat Conservation Areas
In this project, Standard Widths Defining Riparian Habitat Conservation Areas (RHCAs) as outlined in the Inland Native Fish Strategy (USDA Forest Service 1995) will be applied. No commercial harvest will take place in riparian areas. Ground-disturbing activities within the RHCA are limited to those that are expected to benefit fish resources and watershed health (e.g., road maintenance activities, culvert removals and upgrades, and site prep for burning followed by planting of long lived tree species).

Direct/Indirect Effects (General):

Vegetation Treatments

Timber Harvest:
Activities occurring on sensitive landtypes consist only of vegetation prescriptions and logging activities. One thinning prescription in unit 6 is categorized to have high mass failure potential and high sediment delivery potential. The prescription for this unit is to thin approximately 11 acres of the stand with a skyline yarding logging system.

Treatments on this landtype recommend minimal soil disturbance and timing restrictions (project file). Skyline logging will be appropriate on this landtype and harvest activities will be restricted to the summer months when soils are not saturated.

Additional activities proposed on sensitive landtypes include vegetation prescriptions and logging on high and moderate sediment delivery potential landtypes. Sediment delivery rates from the proposed harvest activities on these landtypes are reflected in the WATSED sediment runs. Since the majority of these units are going to be helicopter logged and there would be no logging within the RHCAs, the risk of any actual sediment delivery from these activities to a stream channel is very low. Research studies and monitoring results conducted on the Idaho Panhandle National Forest verify that when RHCAs or buffer strips are incorporated into timber sales, sediment delivery to stream channels is not measurable or is negligible (USDA Forest Service 2000, 1999, 1998, 1997, Belt et al 1992, Reid and Hilton 1998).

Reforestation and Riparian Planting:
Planting would be done by hand crews and would be accessed from existing system roads. This activity would reduce the amount of time needed for vegetative and hydrologic recovery following regeneration harvesting, which would reduce potential for sediment production and delivery. There would be no direct or indirect effects to fisheries or other cold-water biota from this activity.

Noxious Weed Control:
This activity would follow guidelines established in the Sandpoint Noxious Weeds Control Project EIS (USDA Forest Service 1998b). Effects to aquatic resources were analyzed in that document and its adaptive strategy. No additional effects to watershed or fisheries are expected to occur.

Watershed Restoration Activities

Ground-disturbing activities in the RHCAs are restricted to watershed restoration and may include the following (see Table 1; not all of these activities will occur in RHCAs):

Decommission includes removal and recontour of all stream crossings and, as needed, recontour of unstable fill slopes, cut slope stabilization, ripping the road tread, installation of no-maintenance cross ditches, and revegetation. Decommissioning also includes some kind of road closure method such as an earthen berm. Approximately 1.4 miles of existing road will be decommissioned.

Road storage includes removing all stream crossings and drainage culverts. Waterbars that do not require periodic maintenance will be installed. Roadbeds will be scarified and seeded with a weed-free seed mix. The remaining roads will be closed to traffic by recontouring a portion of the road near the beginning of the road section. Approximately 1.7 miles will be put into long-term storage.

Roadwork will be a critical part of this project in order to comply with BMPs and the Forest Plan related to road maintenance and water quality protection. Road work includes reconstruction which includes installation of additional relief culverts (to more

frequently cross drain the road), spot gravelling (to reduce surface erosion), installing graded rolling dips, drivable dips, or drivable waterbars (to cross drain surface water), brushing, blading, shaping, and ditch cleaning (to maintain drainage). Approximately 27.9 miles of roads will be treated.

Sediment Risk Associated with Drainage Structures

Alternative C proposes replacing or removing drainage structures at risk and therefore would reduce potential for road crossing failures. Increasing the size of the culvert or removing the drainage structure would reduce the chance failure, as a result of reduced capacity. The crossings along the 2707A road would either be upgraded or removed with the decommissioning of the last 0.7-mile of this road. The crossing on the 278 road would also be upgraded. By making these improvements, the likelihood that culverts would fail in the event of a flash flood or debris flow triggered by a large stand-replacing fire followed by high-intensity rain or rain-on-snow event is greatly reduced, as opposed to taking no action. These improvements would reduce the net associated risk of sediment delivery to West Gold Creek by 2,572 tons.

Direct and indirect effects from watershed restoration activities include short-term increases in sediment delivery to streams during culvert and road removals, as well as culvert upgrades. However, with timing restrictions, onsite direction, and BMPs, sediment input would be limited and there will also be an immediate reduction in risk of sediment delivery from crossing failures.

Road Construction/Landing Construction

Approximately 0.16 miles of road construction is proposed outside the project area boundary and within the Chloride Gulch drainage (and within the cumulative effects area). The road, 278 D1, would take off the 278D road to the ridge and then split off in two separate roads. This road will not be constructed on any sensitive land types, will not cross any intermittent or perennial stream channels, and incorporates design features described in Chapter II of the EIS. Therefore, the risk of sediment delivery from the construction of this road is low. This road will be put into storage at the end of this project.

All landings will be outside of RHCAs.

Fuels Treatments

Prescribed Burning for Fuel Reduction:

On the south-facing dry site units, the prescribed burns would be done in the spring when fuel and soil moisture would not result in a severe burn that could produce hydrophobic soils or eliminate the soil duff layer. Firelines, where needed, would be frequently waterbarred to prevent erosion. The proposed burns are located on slopes with a low potential for sediment production and delivery with the use of riparian buffers (USDA 1995) on prescribed burn units.

Direct and indirect effects from prescribed burning activities include a low potential of sediment from firelines, released nutrients, or water foaming agents would be delivered to

streams and tributaries. A reduction in risk of severe fire within treated areas is expected from this type of fuel reduction activity.

Prescribed burns may include some understory slashing and burning within the RHCAs, but outside of the riparian area. There would be no removal of the overstory canopy. These activities are designed to reduce competition among tree species. Following these activities with planting of long-lived tree species would expedite desirable tree growth in these areas, resulting in long-term increases in LWD recruitment potential for West Gold Creek and its tributaries.

Mechanical Slash Disposal and Site Preparation:
Proposed units for grapple piling will be accessed from existing roads, skid trails, and firelines. Only areas that can be reasonably accessed will be treated. Erosion from these treatments is not anticipated. The proposed grapple piles are located on slopes with a low potential for sediment production and delivery with the use of riparian buffers on grapple pile units.

Effects to Water Yield:

The WATSED Model
The anticipated sediment and water yield runoff modification for the West Gold subwatershed were estimated from the methods documented in the R1/R4 Sediment Guides (USDA Forest Service 1981) and the WATBAL Technical User Guide (Patten 1989). The version calibrated for the Idaho Panhandle National Forests, known as WATSED, is an analysis tool that spatially and temporally organizes typical watershed response relationships as a result of forest practices. The estimated responses are combined with other sources of information and analyses to help determine the findings of probable effects.

WATSED estimates a series of anticipated annual values over a period of years. The model predicts an estimate of most likely mean annual sediment loads (reported as tons per square mile per year), and the expected sediment load modifications over time. The estimate of additional loading is expressed as a percent of the “natural” (i.e., historic mean load prior to significant development activities) sediment load, which is based on the history of disturbances and average climate patterns in the watershed. In this analysis, the existing condition represents the year 2002, which is prior to any anticipated disturbances related to the proposed activities.

The estimates of sediment and peak flow reflect how watersheds with similar conditions and landtypes have responded over time to a similar history of disturbance. WATSED is not intended or designed to model event-based processes and functions, or specific in-channel responses. It does, however, incorporate the results of those processes in the calibration of its driving coefficients. WATSED does not evaluate increases in sediment and peak flows specifically resulting from “rain-on-snow” events or other stochastic events, nor does it attempt to estimate in-channel and stream-bank erosion. The Idaho Panhandle National Forests (IPNF) frequently validates the WATSED coefficients and

estimates using long-term water quality monitoring networks on the IPNF (USDA Forest Service, 2000, 1999, and 1998).

The forest management activities used to calibrate the model include standard BMPs and Soil and Water Conservation Practices; therefore, standard BMPs and Soil and Water Conservation Practices are necessary requirements for maintaining an effective confidence level in the model's use. Non-standard BMPs, management or natural disturbances not related to forest practices, and site-specific non-standard BMPs must be integrated into the final analysis to fully determine watershed response.

WATSED was designed to address and integrate a vast and complex array of landtypes and disturbances within the context of a watershed and organize the evaluation according to rule sets established by the author and cooperators. In the case of WATSED, the rule sets reflect watershed processes and functions based on research, data, and analyses collected locally and regionally. Forest Plan monitoring reports (USDA Forest Service 2000, 1999, and 1998) describe how the calibration and validation of WATSED has been an annual process on the forest and where changes have been made. The model, however, also includes simplifying assumptions, and does not include all possible controlling factors. Therefore, the use of models is to provide one set of information to the technical user, who, along with a knowledge of the model and its limitations, other models, data, analysis, experience and judgment must integrate all those sources to make the appropriate findings and conclusions.

Effects of the Project

Figure 2 compares the percent increase in water yield values to the Alternative A (the "no action" alternative, which is also the existing condition). Alternative C (the preferred alternative) raises water yield to 12 percent, a 4 percent increase over the existing condition. Increases in water yield under this alternative would probably not be detectable in the main West Gold channel and could not be differentiated from normal climatic fluctuations.

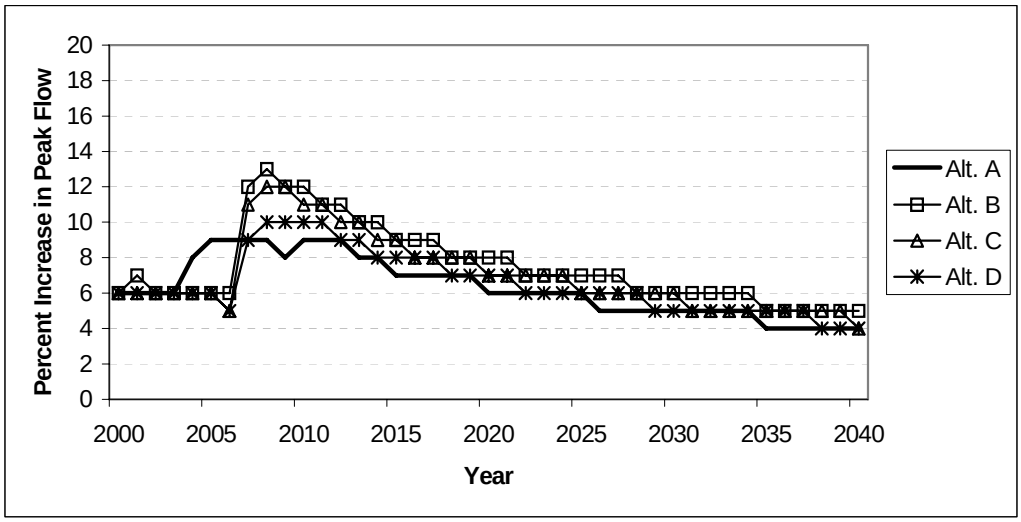


Figure 2. Alternative comparisons in water yield increases for West Gold Creek.

Alternative C is within the historic range of variability (HRV). The maximum HRV was measured at 17 percent, which is 5 percent higher than Alternative C. This alternative also mimics the recovery pattern from what occurred naturally following fires of the late 1880s. From the fires, it was estimated that recovery gradually occurred over 20 years. This is apparent in figure 2 with recovery occurring in 2030 for Alternative C. Since any change in water yield associated with this project would likely be undetectable in West Gold Creek or downstream in Gold Creek, additional bedload scour during high flows would not be expected. Redds existing in the cumulative effects area would not be affected by the expected increase in water yield.

Effects to Sediment Delivery:

Increases in sediment delivery can affect fish habitat by filling in the interstitial spaces in spawning gravels. This results in decreased water flow through the gravels that is imperative for oxygen delivery to the incubating eggs and removing wastes. Filling of interstitial spaces can also displace macroinvertebrates, thereby reducing an important food source for fishes. High amounts of sediment can fill in pools and reduce rearing habitat for juvenile fishes.

Since all harvest related ground disturbing activities will occur outside of RHCAs and the majority of units will be helicopter logged, the risk of any sediment generated by logging activities actually reaching a live channel is very low. By utilizing timing restrictions, onsite direction, and BMPs, sediment delivery associated with culvert removals and upgrades would be minimized. Removing or upgrading these culverts will result in an immediate reduction in the risk of sediment delivery from crossing failures. Since the identified culverts are located high in the drainage, the likelihood that any escaped sediment would be transported into the lowest reaches of West Gold and Gold Creek below the confluence is very low. The higher-gradient channel types present in West Gold Creek would likely carry any sediment to the nearest low gradient area where it would settle out. Sands and gravels would likely be deposited on the nearest gravel bars or other energy reducing features.

Effects to Temperature:

The temperature regime present in West Gold and Gold Creeks would not be affected by the proposed project related activities due to the implementation of INFS buffers, which will retain canopy cover that provides shade to the streams and riparian areas, and ground water (spring) influences present in the lower Gold Creek drainage that keep water temperatures low where bull trout are found (Golder Associates, 2006). Through the implementation of INFS the USFS is compliant with the non-degradation of criteria pollutants (temperature) in Gold Creek under the Clean Water Act. During periods when bull trout are spawning (September/October), peak flows have attenuated and stream flow in the lower reaches of Gold Creek and West Gold is regulated by the release of ground water in springs. It is clear that the lower Gold Creek springs are critical to the continued spawning and occurrence of bull trout in lower Gold Creek (below West Gold Creek) since they deliver a significant flow of cold water to lower Gold Creek (Golder

Associates 2006). Melt water from a snow pack abating later in the spring would not further improve temperature conditions in the lower reaches of Gold and West Gold Creeks that are controlled by ground water. Additionally, Best Management Practices (BMPs) will be implemented and all activities would be designed to protect water quality and fisheries habitat.

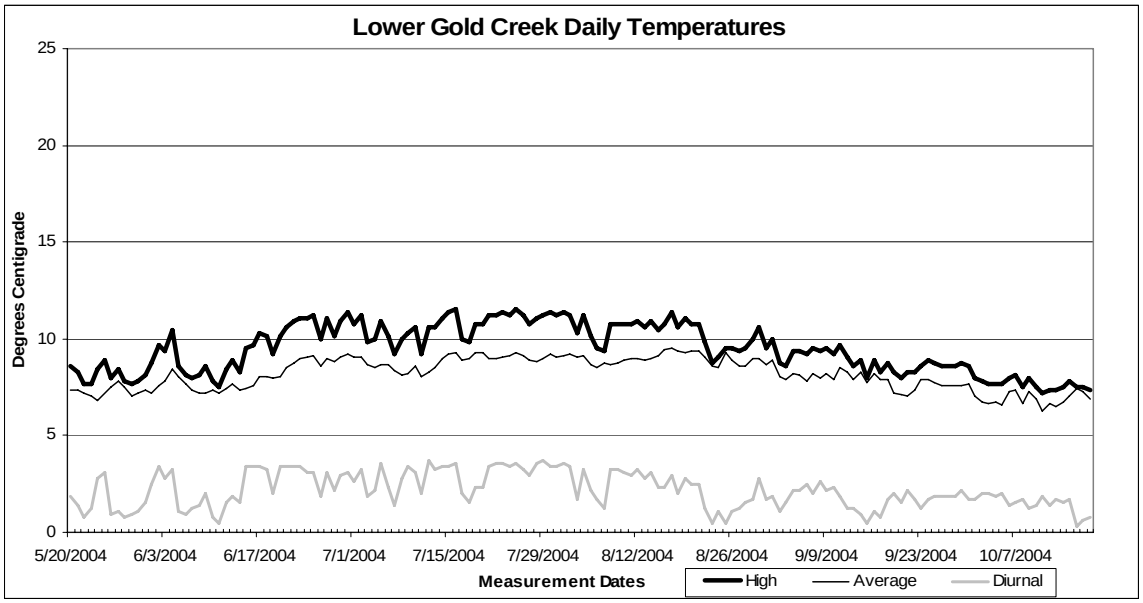


Figure 3. Thermograph for Lower Gold Creek

Cumulative Effects

Federal Activities

Kick Bush Slide Road Repair

The Kick Bush slide was an eroding cutslope along Road 278. The site was a chronic sediment source to Kick Bush Gulch and Gold Creek. The stabilization of the cutslope was completed in 2003. The estimated sediment reduction from the Kick Bush slide is about 193.6 tons per year. Over the long term, there will be a substantial decrease in sediment delivery to the Gold Creek watershed.

Gold Creek and Chloride Mine Clean Up

Extensive mine reclamation work has been accomplished in the Chloride Gulch drainage. The Idaho Lakeview had been identified as on of the top two priority cleanup sites within the watershed. Planning efforts entailed a cleanup of 2,260 cubic yards of tailings that containing elevated concentrations of antimony, arsenic, cadmium, copper, lead and zinc. Average arsenic concentrations in tailings of the Idaho Lakeview mine were 3,784 mg/kg (Idaho Lakeview Mine Tailings Operable Unit 2002). These tailings composed the stream banks and floodplain of Chloride Gulch. It is estimated that an average annual rate of between 42 and 122 tons/year of tailings and waste rock were being contributed to Chloride Gulch from the Idaho Lakeview mine annually (project file).

In 2003, a contract was awarded to begin phase 1 of a four-phase reclamation plan for the Idaho Lakeview Mine. In phase 1 alone, 5,200 yd^3 of tailings were removed. By 2005, more than 64,500 yd^3 of tailings and waste rock had been removed from Chloride Gulch. Approximately 560 tons of mine waste materials contaminated waste rock and tailings that were moving downstream as bedload and forming banks and floodplains were also removed, effectively mitigating the adverse effects of sediment contribution since the commencement of mining activity in that drainage.

Restoration of the Chloride Gulch stream channel at and below the Idaho Lakeview Mine has also occurred. Approximately 2,200 feet of the stream channel was restored either actively or passively back to its natural pattern, profile and dimensions. In actively restored stretches of stream, native trees and shrubs were also planted and coarse woody debris was placed in the stream.

Activities on Private Lands within the Gold Creek Watershed

Private land makes up seven percent of the Gold Creek watershed, with the majority of the land within or near the town of Lakeview. The private lands around Lakeview primarily consist of summer homes and a year round hotel. Some of the private roads accessing these homes have delivered sediment to Gold Creek from road fill failures and road surface runoff. Sediment delivery levels from these private roads are based on the level of road maintenance activities.

The other portions of private lands are the abandoned and active mine claims and parcels scattered in the Upper Gold Creek and Chloride Gulch drainages. The impacts of those lands are discussed in the abandoned mine section.

Idaho Department of Lands has received a permit for harvesting trees near the headwaters of Chloride Gulch (project file). According to the permit information, timber harvesting has recently occurred near the Weber mine. Timber harvest activities must follow the rules and best management practices set by the Idaho Forest Practices Act (Idaho Forest Practices Act, Title 38, Chapter 13, Idaho Code). These rules and BMPs are designed to limit sediment delivery to stream channels and to minimize any cumulative watershed effects.

Other activities scheduled to take place on private land include restoration projects. The EPA has secured $1.5 million for mine reclamation work (as described below) on the portion of Conjecture Mine waste that resides on private land in upper Gold Creek. The overall project will clean up tailings and waste rock from on both private and Forest Service lands. The bulk of the material resides on private land. Although the amount of sediment that will be removed from potential transport through the hydrologic system is currently unknown, it will be substantial. The total volume of material is expected to exceed that of the Idaho Lakeview Mine by approximately 30 percent (Nieman pers. comm. 2006). Restoration work will begin in 2006.

Avista is also planning to decommission a short service road that fords lower Gold Creek. The road originally served as access to a sub-station and crossed the creek in a prime bull trout spawning area. Presently the road is gated, but it is breeched regularly by ATVs

and serves as a source of sediment to lower Gold Creek. Avista plans to obliterate road segments on both sides of the ford (approximately 0.4 miles) in 2006 and access the sub-station from the west side of the stream. Obliteration will consist of laying road fill material back to its natural slope and revegetating the area. This action will also help to reduce sediment in Gold Creek.

The cumulative effects of current and reasonable foreseeable activities on private lands are anticipated to produce a net benefit to watershed conditions in the Gold Creek watershed.

Cumulative Effects to Sediment Yield

By evaluating the direct and indirect effects of the proposed alternatives with present and ongoing activities, there would not be any cumulative effects from increases in sediment yield to West Gold and Gold Creek. Alternative C will improve and/or remove the high-risk culverts, thus reducing the net associated risk of sediment delivery by an estimated 267 tons. The decommissioning of 1.4 miles of existing roads would also reduce sediment yields over the long term.

Studies have discussed that when disturbance patterns created by timber harvesting are used to mimic natural disturbances, activities should be concentrated in a drainage rather than dispersed, that riparian areas need protection, and that harvest rotations should require longer intervals (Reeves et al 1995*)*. Alternative C best addresses these criteria by concentrating all activities within West Gold, incorporating riparian habitat conservation areas, and prescribing vegetation treatments that are needed throughout the West Gold Subwatershed.

Within Gold Creek, the ongoing activities, such as the mine cleanup in Gold Creek and acquiring road maintenance work along FSR 278 will greatly reduce the majority of sediment that is contributed to this watershed. The likelihood of sediment delivery from the West Gold project is very small both in risk and associated potential quantity when compared to the previous sediment levels that the mines and the Kick Bush slide were delivering.

With the combination of the West Gold project and the other activities within the Gold Creek watershed, there would be a net decrease in risk of sediment delivery. Over the tenure of the project, this alternative would generate an estimated 8.7 tons of sediment (project file). Overall, there would be a net decrease of 1752 tons of sediment yield when considering the difference between the removal of the at-risk culverts and road decommissioning activities to the generated sediment from the proposed activities. Therefore, this project would not impair beneficial uses within Gold Creek and would meet the intent of the Gold Creek TMDL. Alternative C would provide the greatest cumulative benefit in reducing short and long-term sediment yields, since no temporary roads are constructed and it treats the greatest amount of acres.

The estimated maximum increase in sediment yield, while actual delivery to bull trout habitat is unlikely, is within the HRV; sediment delivery levels have remained relatively

stable since 1955, and would continue to remain at approximately 90% above natural conditions in the short term. Within Gold Creek, the ongoing activities such as the mine cleanup in Gold Creek and acquiring road maintenance work along FSR 278 will greatly reduce the majority of sediment that is contributed to this watershed. The estimated sediment increases from the West Gold project are inconsequential when compared to the previous sediment levels that the mines and the Kick Bush slide were delivering.

In the Watershed Restoration Activities section on pages 7-8 of this biological assessment, drainage structure improvements would reduce the net associated risk of sediment delivery to West Gold Creek by 267 tons/year. Routine annual road maintenance, mine reclamation activities, and repair of the Kick Bush slide on FSR 278, will reduce sediment delivery to the entire Gold Creek watershed dramatically as is discussed in the Cumulative Effects section on pages 11-15 of this biological assessment. With the combination of the West Gold project and the other activities within the Gold Creek watershed, there would be a net decrease in sediment delivery. Therefore, this project would not impair beneficial uses within Gold Creek and would meet the intent of the Gold Creek TMDL. Alternative C would provide the greatest cumulative benefit in reducing short and long-term sediment yields, since no temporary roads are constructed and it treats the greatest amount of acres. Any increase in sediment delivery directly associated with this project will be mainly attributable to the crossing upgrades and may affect bull trout individuals but is not likely to have an effect on the overall bull trout population in Gold Creek.

Cumulative Effects to Water Yield: Increases in Peak Flows

When combining the direct and indirect effects with the imminent activities on private lands, there would not be any cumulative effects to West Gold and Gold Creek due to increases in peak flows with this project. Water yield increases are within the magnitude, intensity and duration when comparing the historic range of variability from past natural events. The historic fires modeled in West Gold burned much of the Gold Creek watershed (USDA Forest Service 2002), therefore, it can be assumed that the magnitude, intensity and duration of the water yield increases associated with these fires were very similar to each other and much larger than increases expected from this project (see Figure 3). Since the proposed harvest activities only account for 9 percent of the total area within the watershed and the reasonably foreseeable activities would not significantly increase peak flows, the increases in flows from West Gold would increase peak flows in Gold Creek, to a much smaller degree.

Cumulative Effects to Peak Flows from Rain-On-Snow Events

In the event of a rain-on-snow event, peak flow increases would not cause any cumulative effects to West Gold and Gold Creek. These events are natural processes that occur episodically in time and space. Vegetation prescriptions would trend vegetation towards conditions and patterns, which would be similar to those formed by past disturbance events. The greatest impacts observed from rain-on-snow events occur when culverts become plugged from resulting floods and debris flows. By improving or removing the high-risk culverts, the risk to a road failure is significantly reduced and net associated risk of sediment delivery would drop by 2,574 tons.

Cumulative Effects to Stream Channel Morphology

Estimated peak flow increases would also not affect channel incision nor stream bank erosion. The existing condition of West Gold and Lower Gold Creek are such that they are well armored with bedrock and large substrate, have excellent stream vegetation, and are stable and resilient. Stream survey data from the summer of 2000 and 2003 indicates that woody debris recruitment levels are high, except where boulders and bedrock dominate the stream substrate and where powerline runs adjacent to West Gold Creek (project file). These pool formative features and beaver dams also dissipate stream energy. West Gold and its tributaries are not alluvial channels. The dominant stream bank material is primarily composed of boulders, cobbles and bedrock outcrops that are not easily erodible. In addition, the channels are well confined and entrenched, which allow sediment and debris to be easily transported. A maximum increase in water yield of 5 percent over the existing condition would likely result in some elevated flows in the headwaters, but would be undetectable in West Gold Creek.

Overall, stream channel morphology to West Gold and Lower Gold Creek will be maintained and improved since known sediment delivery sources are being rehabilitated. This includes the reduction of 193 tons of sediment from the Kick Bush slide; the removal and upgrades of at risk culverts; the work associated with the mine cleanup and stream channel restoration work at the Lakeview Operable Unit; and acquiring road maintenance work along FSR 278.

Cumulative Effects to Fisheries

The West Gold project, in conjunction with ongoing activities, may cause a slight amount of sediment yield in the short term, but will result in an overall reduction in sediment delivery and risk of sediment delivery in the long term. The short-term increase in sediment yield from the West Gold project is very small compared to the overall reduction in sediment yield and risk of sediment delivery resulting from the culvert upgrades, the Kick Bush Slide repair, and the mine cleanup. The short-term increase in sediment may affect individual westslope cutthroat trout, but would not lead toward a trend in federal listing. In the long term, the reduction in sediment yield is expected to benefit survival of individuals. Similarly, cumulative effects from the project and reasonably foreseeable actions may affect, but are not likely to adversely affect, federally listed bull trout, and are expected to benefit individual survival in the long term. Any increases in water yield would be localized and would not be measurable in fish-bearing channels.

Determination of Effects on Species

White sturgeon: This project will have *no effect* on white sturgeon because there is no habitat within the effects area.

Bull trout: This project *may effect, but is not likely to adversely affect* bull trout. Bull trout currently inhabit the Gold Creek Watershed. Road related activities, including maintenance, obliteration, and culvert upgrades could produce a short-term increase in sediment delivery to streams in the watershed. However, these activities will reduce

sediment delivery in the long term. Removal and upgrades of culverts will also immediately decrease the risk of sediment from crossing failures. Therefore, the long-term effects from the project are a net reduction in sediment and are a benefit to bull trout habitat.

Conditions, Mandatory Conservation Requirements and Recommendations
The Conditions of this Biological Assessment must be met to preserve the determination stated in this document unless otherwise agreed and documented by the appropriate personnel. They include:

1. BMPs (Best Management Practices):
    - BMPs for watershed resources will be adhered to (see Chapter II-Features Designed to Protect Water and Fish Habitat, and Appendix A in the EIS).
2. Timing:
    - Road work (e.g. replacement of culverts, installation of rolling dips, armoring of culverts) and road decommissioning within any live crossing will take place after July 15th, to reduce risk of effects from sediment during spring runoff and to avoid effects to westslope cutthroat trout redds, and before September 15th to protect bull trout redds.

Recommendations of this Biological Assessment include fisheries enhancement opportunities that were identified during the assessment of the cumulative effects area. These opportunities do not need to be implemented to preserve the determination stated in this document.

List of Preparers

Prepared By: /s/ Chad T. BaconRind Date: May 26, 2006
Sandpoint Fisheries Biologist

Reviewed By: /s/ Shanda Fallau Dekome Date: May 26, 2006
Forest Fisheries Biologist

Literature Cited

Belt, G.H., J. O'Laughlin, and T. Merrill. 1992. Design of Forest Riparian Buffer Strips for the Protection of Water Quality: Analysis of Scientific Literature. Idaho Forest, Wildlife and Range Policy Analysis Group. Report No. 8.

Bjornn, T. C. and D. W. Reiser. 1991. Habitat requirements of salmonids in streams. *In:* W. R. Meehan, editor. Influences of forest and rangeland management on salmonid fishes and their habitats. American Fisheries Society Special Publication 19. Bethesda, Maryland. pp 83-138.

Everest, F. H., R. L. Beschta, J. C. Scrivener, K. V. Koski, J. R. Sedell, and C. J. Cederholm. 1987. Fine sediment and salmonid production: a paradox. Pages 97-142 *in* Salo, E. O. and T. W. Cundy, editors. Streamside management: Forestry and fishery interactions. University of Washington, Institute of Forest Resources, Contribution No. 57, Seattle.

Flanagan, S.A., M.J. Furniss, T.S. Ledwith , S. Thiesen, M. Love, K. Moore, and J. Ory. 1998. Methods for Inventory and Environmental Risk Assessment of Road Drainage Crossings. San Dimas Technology and Development Center. San Dimas, CA.

Golder Associates. 2006. Final report on Gold Creek and Chloride Gulch stream channel assessment. Coeur d'Alene, Idaho.

Idaho Lakeview Mine Tailings Operable Unit. 2002. Draft Engineering Evaluation/Cost Analysis. Idaho Panhandle National Forests. Bonner County, Idaho.

Nelson, R. L., M. L. McHenry, and W. S. Platts. 1991. Mining. In: W. R. Meehan, editor. Influences of forest and rangeland management on salmonid fishes and their habitats. American Fisheries Society Special Publication 19, Bethesda, Maryland. pp. 425-457.

Overton, C.K., S.P. Wollrab, B.C. Roberts, and M.A. Radko. 1997. R1/R4 Fish and fish Habitat Standard Inventory Procedures Handbook. General Technical Report INT-GTR-346. Ogden, UT: U.S. Department of Agriculture, Forest Service, Intermountain Research Station.

Patten, R. 1989. Watershed Response Model for Forest Management, WATBAL. Technical Users Guide, rev. November 15, 1999.

PBTTAT. 1998. Lake Pend Oreille key watershed bull trout problem assessment. Prepared for the Lake Pend Oreille Watershed Advisory Group and the State of Idaho. Panhandle Bull Trout Technical Advisory Team. 100 pages.

Reid, L.M. and S. Hilton. 1998. Buffering the buffer. In: Conference on Coastal Watersheds: The Caspar Creek Story, May 6, 1988, Ukiah, California. USDA Forest Service PSW-GTR-168

Reeves, G. H., L. E. Benda, K. M. Burnett, P. A. Bisson, and J. R. Sedell. 1995. A disturbance-based ecosystem approach to maintaining and restoring freshwater habitats of evolutionarily significant units of anadromous salmonids in the Pacific northwest. American Fisheries Society Symposium 17:334-349.

Rosgen, D. L. 1996. Applied River Morphology. Wildland Hydrology Books. Pagosa Springs, CO.

State of Idaho. 1996. Governor Philip E. Batt's State of Idaho bull trout conservation plan. Boise, Idaho. July 1, 1996.

USDA Forest Service. 1981. Guide for Predicting Sediment Yields from Forested Watershsheds. Northern Region and Intermountain Region; Soil and Water Management**.**

U.S.D.A., Forest Service. 1989. Caring for the natural community: Region 1 - Threatened, Endangered and Sensitive Species Program. U.S.D.A. Forest Service, Northern Region.

U.S.D.A. Forest Service. 1995. Inland Native Fish Strategy Environmental Assessment Decision Notice and Finding of No Significant Impacts.

USDA Forest Service. 1998. Idaho Panhandle National Forests Forest Plan Monitoring and Evaluation Report. Coeur d'Alene, ID.

USDA Forest Service. 1998b. Sandpoint Noxious Weed Control Project Environmental Impact Statement. Idaho Panhandle National Forests, Sandpoint Ranger District. Available at the Sandpoint Ranger District office.

USDA Forest Service. 1999. Idaho Panhandle National Forests Forest Plan Monitoring and Evaluation Report. Coeur d'Alene, ID.

USDA Forest Service. 2000. Idaho Panhandle National Forests Forest Plan Monitoring and Evaluation Report. Coeur d'Alene, ID.

USDA Forest Service. 2002. Gold Creek Ecosystem Assessment at the Watershed Scale. Unpublished report available at the Sandpoint Ranger District, Sandpoint, Idaho.

USDI Fish and Wildlife Service, 1994. Federal Register, Vol. 59, No. 171, September 6, 1994. 50 CFR Part 17. Endangered and Threatened Wildlife and Plants: Determination of Endangered Status for the Kootenai River Population of the White Sturgeon.

USDI Fish and Wildlife Service, 1998. Federal Register, Vol. 63, No. 111, June 10, 1998. 50 CFR Part 17. Endangered and Threatened Wildlife and Plants: Determination of Threatened Status for the Klamath River and Columbia River Distinct Population Segments of Bull Trout.

USDI Fish and Wildlife Service, 2000. Federal Register. Vol. 65, No. 73, April 4, 2000. 50 CFR Part 17. Endangered and Threatened Wildlife and Plants: 12-Month Finding for an Amended Petition To List the Westslope Cutthroat Trout as Threatened Throughout Its Range.

USDI Fish and Wildlife Service, 2002. Biannual Forest Wide Species List: FWS 1-9-03-SP-002; October 2, 2002

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

Authorizing Agency: Bureau of Land Management/**US Forest Service** Management Unit(s): **Sandpoint RD**
Watershed: **Gold Creek** Subwatershed Name:
Action Type: Vegetation Treatment
Specific Actions (list):

West Gold Project

Pathway	Indicators	Status of Baseline	Effects of the Action(s)	Basis for Rationale
Subpopulation Characteristics	Subpopulation Size	**FA**/FR/UR/?	R/**M**/D/NA	PJ and Pop. data; Strong bull trout population in Gold Creek. Redd count data shows second strongest spawning population in Pend Orielle Sub-Basin. Project implementation would not change this.
	Growth and Survival	**FA**/FR/UR/?	R/**M**/D/NA	PJ and Pop. data; Redd count data indicate fairly constant spawning runs.
	Life History Diversity and Isolation	**FA**/FR/UR/?	R/**M**/D/NA	PJ and Pop. Data. All life forms present in Gold Creek watershed. Population is connected to Pend Orielle. Some strong neighboring populations.
	Persistence and Genetic Integrity	**FA**/FR/UR/?	R/**M**/D/NA	PJ and Pop. data; Bull trout population persistence and genetic integrity high in Gold Creek Watershed and the Pend Oreille sub-basin. Redd count data from 1983 to 2005indicates high probability of persistence. Brook trout are not known to inhabit Gold or West Gold creeks, therefore hybridization is not likely.

Water Quality .	Temperature	FA/**FR**/UR/?	R/**M**/D/NA	PJ and survey data; In the summers of 2000 and 2001, maximum temperatures were: 15°C in lower West Gold Creek above the confluence with Gold Creek, likely due to high number of springs in the area; 16.5°C above the powerline corridor. Bull trout only incidentally use the lowest reach of West Gold Creek. Temperatures may exceed 13° C during bull trout rearing, not meeting standards for bull trout rearing. No harvest planned within the RHCA, using INFISH buffers, temperatures not affected by project.
	Sediment	FA/**FR**/UR/?	**R**/M/D/NA	PJ and survey data; WATSED model indicates that sediment delivery is approx 90% above normal in Gold and West Gold Creeks. Contributing factors include: roads/road crossings and past management activities. The West Gold Project includes road and drainage improvement. A reduction in short and long term risk of sediment delivery is expected as a result of removal of continual sources of sediment. Other activities, such as the repair of the Kick Bush Slide and mine reclamation efforts will decrease the long-term sediment delivery to the cumulative effects area. Fines stored behind old beaver dams and within pools would continue to route through the West Gold Creek system for some time.
	Chemical Contaminants/Nutrients	**FA**/FR/UR/?	R/**M**/D/NA	Not a 303 (d) stream for chemical contaminants or nutrients.
Habitat Access	Physical Barriers	**FA**/FR/UR/?	R/**M**/D/NA	PJ and survey data; there are no known man-made migration barriers on Gold or West Gold Creeks, however, excessive bedload from past mining activities have created a delta at the mouth of Gold Creek that is a barrier in some low water years.

Habitat Elements	Substrate Embed.	FA/**FR**/UR/?	**R**/M/D/NA	PJ and survey data; See sediment**.** An overall decrease in sediment delivery will result in lower substrate embeddeness in the long term.
	LWD	FA/**FR**/UR/?	R/**M**/D/NA	PJ and survey data. No harvest in RHCA- understory slashing and burning in some units within RHCA, but outside of riparian area, followed by planting with long lived tree species will result in a long-term increase in LWD from project. Survey data indicates that LWD frequency is moderate, except where West Gold is adjacent to the powerline corridor, where LWD recruitment is low. In the lower reaches of West Gold and Gold creeks, survey data indicates the majority of pools formed by boulders and bedrock intrusions
	Pool Frequency & Quality	FA/**FR**/UR/?	R/**M**/D/NA	PJ and survey data; Pool habitat in the lower reaches of West Gold and Gold creeks are primarily boulder/bedrock formed. Embeddedness of substrate as a result of fines has reduced quality if not to some degree quantity of pools. Surveys show 10 pools per 100 m in Reach 1 of West Gold. Pool quality and complexity exceeds all other reaches of West Gold. No harvest within RHCAs. The Wepp Road model predicts minimal sediment delivery from these sources. No change to pool quantity is anticipated from this project; possible improvement to quality as a result of long-term sediment reduction due to restoration activities.
	Off-channel habitat	**FA**/FR/UR/?	R/**M**/D/NA	PJ and survey data; little to no off channel habitat noted from stream surveys, very few braids or side-channels, appropriate for the major channel type (Rosgen B). No loss of off-channel habitat from project (FA.).
	Refugia	**FA**/FR/UR/?	R/**M**/D/NA	PJ; FA except in localized sections directly affected by mines.

Channel Condition and Dynamics	Width/Depth Ratio	**FA**/FR/UR/?	R/**M**/D/NA	PJ and survey data; W/D ratio from field surveys is what would be expected using Rosgen stream classifications and is good overall. No effect to w/d ratio from project (FA.)
	Streambank Condition	FA/**FR**/UR/?	R/**M**/D/NA	PJ and survey data; Within the project area, streambanks are stable (FA.) Riparian vegetation was removed adjacent to the powerline corridor(UR.)
	Floodplain Connectivity	**FA**/FR/UR/?	R/**M**/D/NA	Survey data and PJ; Valley is highly confined and stream sinuosity is low/moderate. Floodplain is accessible.
Flow/ Hydrology	Change in Peak/Base Flows	**FA**/FR/UR/?	R/**M**/D/NA	Under Alternative C, due to the design of the prescriptions, percent water yield would increase to 12.0%, or 3.0 above the existing condition. With this slight increase, there would be no measurable effect in the duration and intensity of peak flows, which would have no direct, indirect and cumulative effects from implementation of this project**.**
	Increase in Drainage Networks	**FA**/FR/UR/?	R/**M**/D/NA	PJ and survey data; There is little evidence of increased channel length in Project Area channels. Proposed stream crossings will be designed so that ditchlines will not drain directly into stream channels. These crossings will also be obliterated after timber sale activities are completed. No increase in active channel length with project.
Watershed Conditions	Road Density and Location	FA/**FR**/UR/?	R/**M**/D/NA	PJ and survey data; Total road density of 3.6 mi/mi². Roads are high on the slopes, well outside of the RHCAs, except at the 2707 crossing of West Gold.
	Disturbance History	FA/**FR**/UR/?	R/**M**/D/NA	PJ and modeling. Early historical fires, timber harvest, powerline clearing, and road construction, are all disturbance factors. Though some disturbances in the project area are recovering, the powerline corridor and roads will continue to be maintained.

	Riparian Conservation Areas	FA/**FR**/UR/?	R/**M**/D/NA	PJ and survey data; Past timber harvesting in the RHCAs occurred in a few headwater locations in the project area. These clearcuts are recovering. Understory slashing and burning activities within RHCAs to prep site for planting long lived tree species will expedite LWD recruitment and thermal cover.
	Disturbance Regime	FA/**FR**/UR/?	R/**M**/D/NA	PJ and survey data. Overall, natural processes within the watershed are stable. Restoration activities will improve resiliency be reducing sediment delivery to stream channels. This will be accomplished through road decommissioning,
Integration of Species and Habitat Conditions	Habitat Quality and Connectivity	FA/**FR**/UR/?	R/**M**/D/NA	PJ. The proposed project will not change habitat quality and connectivity.

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 Judgment

DICHOTOMOUS KEY DETERMINATION

1. Does the authorizing agency have discretionary authority to grant, modify, or amend provisions of the use authorization(s)? **Yes**/No

A "**No**", results in a "**NO EFFECT**" determination and the evaluation is completed. If "**Yes**", move to question #2.

2. Are there naturally reproducing species listed or proposed for listing currently or historically present at any time of the year in riverine habitat directly or indirectly affected by the actions? **Yes**/No

If "**Yes**", continue with question #3 through #11. If "**No**", document the "**NO EFFECT"** determination and the evaluation is completed.

3. Can the action change the existing input of Large Woody Debris (LWD) into historic or occupied habitat? Yes/**No**/NA
4. Can the action affect stream morphology for historic or occupied habitat? Yes/**No**/NA
5. Can the action affect properly functioning condition of the riparian area for historic or occupied habitat? Yes/**No**/NA
6. Can the action affect water quality and/or quantity in historic or occupied habitat? Yes/**No**/NA
7. Can the action affect the water flow regime/annual hydrography in historic or occupied habitat? Yes/**No**/NA
8. Can the action affect juvenile or adult behavior related to survival or reproduction? Yes/**No**/NA
9. Will the action involve toxic and/or hazardous materials, which may reach, occupied habitat? Yes /**No**/NA
10. Can the action affect juvenile or adult access to habitat? Yes/**No**/NA

11. Can the action affect substrate material? **Yes/No/NA (**See rationale within BA – "Effects on Species")

"**No**" responses to question #3-11 would result in a **"NO AFFECT"** finding and should be documented in the action file.

A "**Yes**" to any of the questions #3-11, results in a "**MAY AFFECT**" determination; continue with questions #12-14.

12. Are the effects described in #3-11 inconsequential/temporary in nature? **Yes**/No/NA
13. Do the actions employ Best Management Practices (BMP's) designated to meet State water quality standards? **Yes**/No/NA

14. Is mitigation established that would preclude or reduce measurable effects on species and their habitat? **Yes**/No/NA

"**Yes**" responses to #12-14 results in a "**NOT LIKELY TO ADVERSELY AFFECT**" determination.

"**No**" responses to #12-14 results in a "**LIKELY TO ADVERSELY AFFECT**" determination. **If the project can't be mitigated to a "NOT LIKELY TO ADVERSELY AFFECT," go to Documentation of Expected Incidental Take.**

The following mitigation has been identified for projects to reverse any "**LIKELY TO ADVERSELY AFFECT**" determinations:

Project	**Mitigation**
West Gold Timber Sale may affect, but is not likely to adversely affect bull trout due to the expected, short-term increase in sediment deliver associated with this project.	

DETERMINATION OF EFFECT BY PROJECT AND AGENCY

Agency: USFS/BLM **Mgmt Unit:** Sandpoint RD

ACTION	**DETERMINATION**
West Gold Project	May Affect, Not Likely to Adversely Effect

Biologist Signature: /s/ Chad T. BaconRind

Agency: USFS/BLM **Mgmt Unit:**

ACTION	**DETERMINATION**

Biologist Signature: _____

Sensitive Species Biological Evaluation for Fisheries
Summary of Conclusion of Effects

File Code: 2672.4 **Date:** 5/26/06
Route To:

Subject: Biological Evaluation (Fisheries)

To: Forest Supervisor, Ranotta McNair

Project Name: West Gold Project; Alternative C (as modified by the decision)

Project Description: See Fisheries Biological Assessment

Determination of Effects:

Sensitive Species:

Species	No Effect	May Impact Individuals, but Will Not Likely Result in a Trend Toward Federal Listing or Reduced Viability for the Population or Species	Likely to Impact Individuals or Habitat with a Consequence that the Action May Contribute Towards Federal Listing or Reduced Viability for the Population or Species**	Beneficial Effect
Burbot *Lota lota*	X			
Interior redband trout *Oncorhynchus mykiss gairdneri*	X			
Westslope cutthroat trout *Oncorhynchus clarki lewisi*		X		

**Considered a trigger for a significant action.

Rationale: See Fisheries Biological Assessment

Prepared by: /s/ Chad T. BaconRind Date: May 26, 2006