Gold Crown Hazardous Fuels Reduction Project

Hydrology Report

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For:

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Introduction

Proposed Action Overview

The Idaho Panhandle National Forests- Sandpoint Ranger District has begun conducting environmental analysis for the Gold Crown Fuels Reduction Project, in the area commonly referred to as “Gold Hill”. National Forest System (NFS) lands within the project area are located in sections 5, 6, and 8 of Township 56 North, Range 1 West of the Boise Meridian; sections 30-32 of Township 57 North, Range 1 West of the Boise Meridian; and section 25 of Township 57 North, Range 2 West of the Boise Meridian, in Bonner County, Idaho.

The project would implement fuels reduction on approximately 573 acres within a project boundary area of approximately 8601 acres. The primary objective of this project is to reduce wildland fuels on NFS lands and lessen the risks associated with a landscape fire event in the area between Bottle Bay and Sagle Slough. The secondary objective of this project is to improve the overall health and resilience of the residual forest stands.

The project includes a combination of treatments designed to reduce and remove excess fuels and promote a stand structure where intense fire is less likely**.** Stand treatments would include timber harvest and slash treatment, hand slashing and burning of ground and ladder fuels in some areas, and precommercial thinning of certain stands of younger, sapling-size trees. Removal of the cut vegetation would include tractor, skyline, and helicopter yarding methods.

Treatment area access would include the construction of permanent and temporary roads, and the reconditioning and maintenance of existing roads. There would be a total of approximately 2.2 miles of new permanent road construction which would be put into a closed (storage) condition post-project. Another 0.13 mile of temporary road would be constructed for project activities and then decommissioned once the project is finished. A further 0.3 mile of existing roads would require reconditioning for log truck traffic. There are 8.5 miles of existing roads that would receive normal road maintenance for log hauling.

Regulatory Framework

Forest Plan Direction and other Management Direction

Forest Wide and Management Area Direction Relevant to the Watershed Resource and the Proposed Action

Goals:

Maintain High Quality Water to protect fisheries habitat, water based recreation, public water supplies, and be within State water quality standards.

Objectives:

Riparian Areas: Riparian Areas will be managed to feature dependant resources (fish, water quality, maintenance of natural channels, certain vegetation and wildlife communities) while producing other resource outputs at levels compatible for the objective for dependent resources.

Water: Management activities will comply with State Water Quality standards. This will be accomplished through the use of the Best Management Practices. The outcome of these best management practices will be monitored to determine their effectiveness. Water quality that is below Forest Standards will be improved through restoration projects and through the scheduling of timber harvest and road building activities where appropriate.

Standards:

- Management activity 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.
- Maintain concentrations of total sediment or chemical constituents within State standards.
- Implement project level standards and guidelines for water quality contained in the Best Management Practices (Soil and Water Conservation Practices) including those defined by State regulation or agreement between the State and Forest Service such as:
    - Idaho Forest Practices Rule
    - Rules and Regulations and Minimum Standards for Stream Channel Alterations
    - Best Management Practices and Road Management Activities
    - Cooperate with the States to determine the necessary instream flow for various uses. Instream flows should be maintained by acquiring water rights or reservations.
    - Manage public water system plans for multiple uses by balancing present and future resources with public water supply needs. Project plans for activities in public water systems will be reviewed by the water users and the State.

      Streams not defined as public water systems, but used by individuals for such purposes, will be managed to the standards stated below or to the fisheries standards whichever is applicable.

Inland Native Fish Strategy

The Inland Native Fish Strategy (INFS) amended Forest Plans with the signing of the INFS decision notice in 1995. The INFS strategy provides direction for the management of fish habitat within the Interior West. Riparian Management Goals, Riparian Management Objectives (RMOs) and standards and guidelines are listed within the INFS Decision document (USDA 1995). Specifically, INFS defines Riparian Habitat Conservation Areas (RHCAs) (special stream management zones, or managed stream buffers). These RHCAs widths are as follows:

Fish Bearing Perennial Streams

- 300 feet on from the edge of both stream channel bank

Non-Fish Bearing Perennial Streams

- 150 feet from the edge of both stream channel banks

Ponds, Lakes, reservoirs, Wetlands greater than one acre

- 150 feet from the edge of the riparian vegetation, seasonally saturated soil,

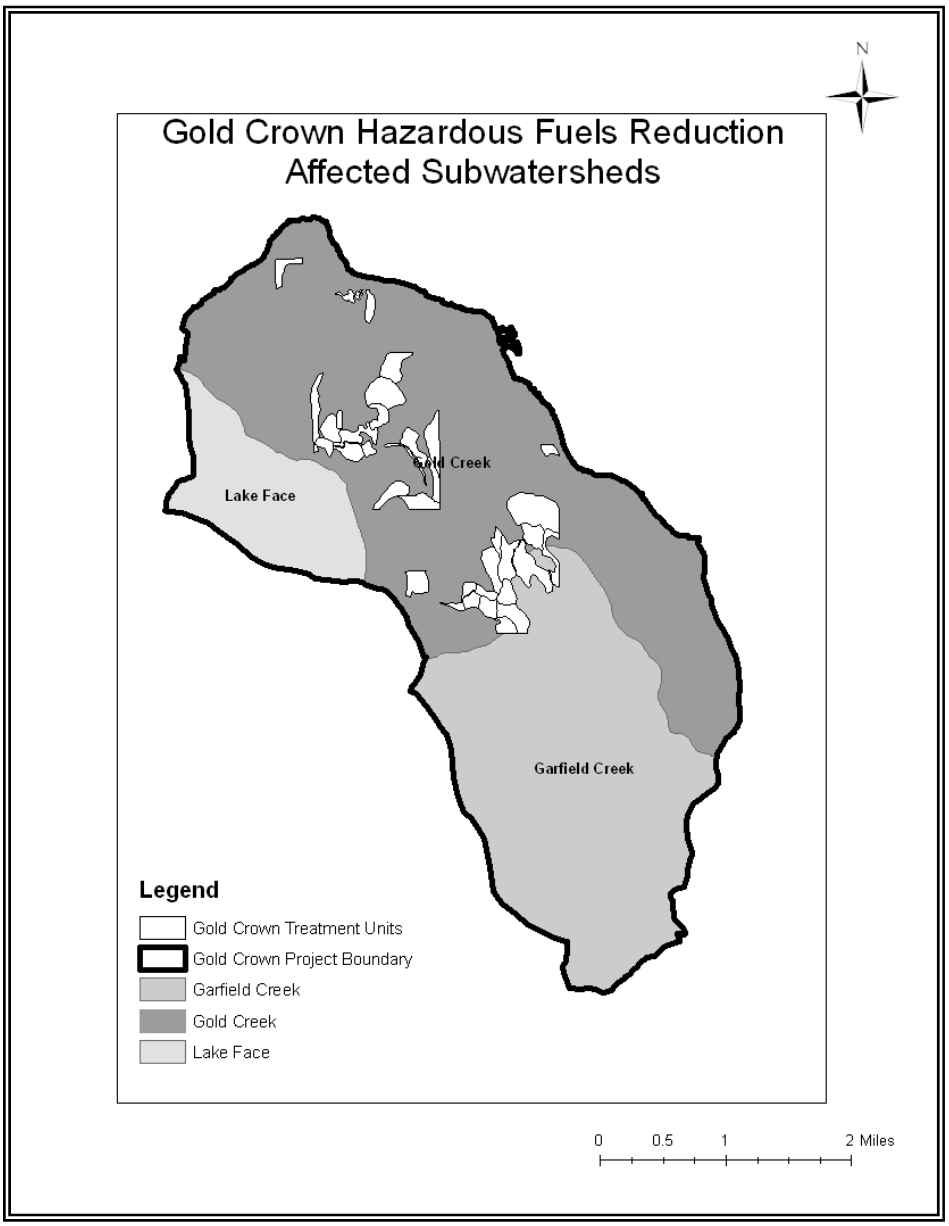
Seasonally flowing or intermittent streams and wetlands less than one acre

- 50 feet slope distance
    - 60 feet or ½ of a site potential tree height for this project

Existing Condition

The project area is located on gentle to moderately steep (5 – 50 percent) face drainages that

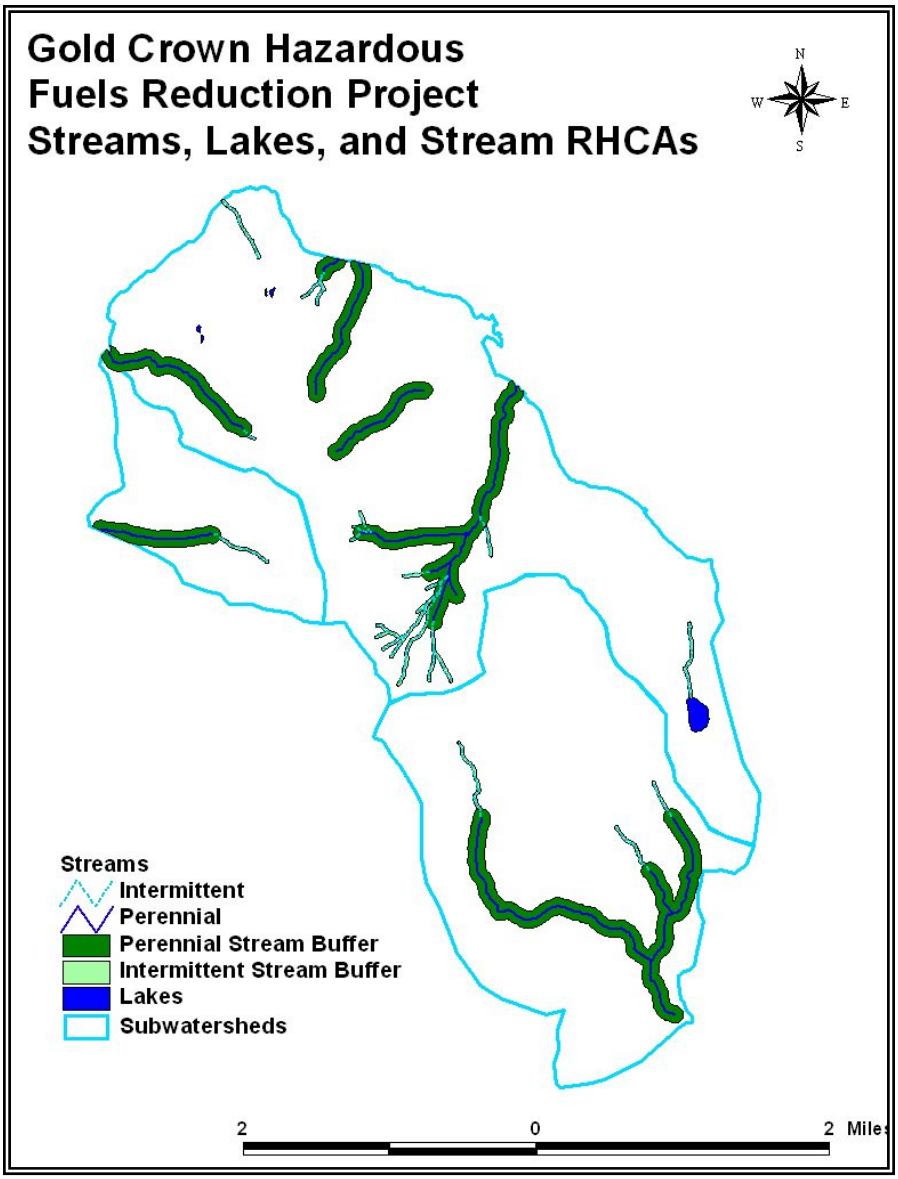
Figure 1. Subwatersheds within the Gold Crown Project Boundary



overlook Lake Pend Oreille. Elevations range from approximately 2080 feet at the lakeshore to 4042 feet the summit of Gold Hill. Shrubs, grasses, scattered timber and rock outcrops dominate the southern and western aspects in this area. Narrow strips of trees also occur on the western aspects between rocky outcrops. Dense forest stands comprise most of the northern and eastern slopes, as well as draws and riparian areas throughout the area. Although most of the stands are a mixture of conifer species, some moist draws and benches also contain a deciduous hardwood component, including red alder, paper birch, and rocky mountain maple.

The project is entirely located above Lake Pend Oreille (Hydrologic Unit Code 17010214).

Figure 2. Streams and RHCAs in relation to subwatersheds within the project area.



There are three subwatersheds (delineated by the IPNF) which are overlain by the project boundary: Lake Face (850 acres) Garfield Creek (3119 acres) and Gold Creek Gulch (4632 acres)

(*See Figure 1*). Gold Gulch subwatershed encompasses the majority of the project activities. There are no treatments planned for the Lake Face subwatershed.

Precipitation (approximately 33 inches annually) is dominated by winter snowfall. Streamflow is generally derived from shallow groundwater sources. Overland flow is uncommon due to the abundance of vegetation, duff, and litter layers.

All of the streams within the project area are mapped as intermittent or ephemeral streams. Field surveys were conducted in late summer during a relatively dry year for the project area. There are three named streams within the project area: Hays Gulch, Gold Gulch, and Garfield Creek. All channels were dry except for several seeps contributing to some limited stream flow. However, several streams, including Gold Gulch, Hays Gulch, and Garfield Creek, have stream channel characteristics that indicate that they are perennial streams; even though they are mapped as intermittent (stream mapping is usually done using 1:24000 scale maps and aerial photos, so errors in channel regime mapping are not uncommon). For the purpose of this analysis and project implementation, the mapping of stream channel regime was updated to include stream channel regime information gathered from field and computer modeling (*See Figure 2*).

As noted above, there are three named streams within the project area: Hays Gulch, Gold Gulch, and Garfield Creek. The total stream miles within the project area is 17.4 miles (10.7 perennial and 6.7 intermittent). Most of the streams are steep, appear to be bedrock controlled and often follow faulting or jointing within the local geologic structure. Stream substrates tend to be large boulder, cobble sized material with interstitial sands. These larger substrates armor the channel banks and maintain stream channel stability- except as noted below. Several of the streams have permanent seeps at their source that produce discontinuous flow downstream.

All stream segments that were visited during field reviews in September of 2007 appear to be relatively stable. Stream shade and instream large woody debris appeared to be abundant at all sites. There was some stream channel instability noted in the intermittent tributary headwaters of Gold Gulch in SW ¼ of NW ¼ of Section 5. This instability is natural for the steepness of the subwatershed and the local fine depositional soils in the headwater basin of Gold Gulch. There was no evidence of past management activities in the area and there were no uphill disturbances found that would account for the gullying (less than 2 feet) in these tributary streams.

Providence Lake (approximately 17 acres) and 4 other small lakes (less than an acre each) are also located within the project boundary. There are several sinks or ephemeral ponds that exist as a result of the bench shape topography in the area. Most of these ponds appear to dry up annually, but they appear to maintain sufficient moisture subsurface to pose problems for heavy equipment.

All streams within the project area flow into Pend Oreille Lake. There are no streams in the project area that are identified by the State of Idaho as not supporting Beneficial Uses. Therefore, none of the streams in the project area are listed as water quality impaired on the State's 303(d) list. Pend Oreille Lake, however, was placed on Idaho's 1994 Section 303(d) list as a "threatened" water body and retained on the 1996 and 1998 lists. The State of Idaho has identified Lake Pend Oreille (ID17010214PN018L_0L) as not supporting Beneficial Uses due to elevated nutrients in near-shore areas. The pollutant of concern is phosphorus which increases the growth of algae in the lake. A Total Maximum Daily Load (TMDL) was written in 2000 and subsequently approved by the Environmental Protection Agency (EPA). The main sources of the phosphorous are believed to be near-shore septic systems and runoff from developed areas with fertilized lawns. Phosphorus transported in the sediment of eroded soils associated with silvicultural activities is

also a concern, but it is not noted as a major constituent in the current phosphorus loading in the lake.

The project area has experienced a variety of land uses in addition to the roading activities. Past and current uses include silvicultural vegetation management on both public and private lands, residential development, agricultural land use, and mining. Residential development is still on the rise as roads are being built and land is being cleared near-shore for future construction. The major impacts to water quality and water yield have come from these near shore residential development activities as there is little buffering capacity between the development activities and the shoreline to trap and store sediment.

The past and current activities further upslope include mining, silvicultural vegetation management, and roading activities. These past and current land uses do not appear to be contributing measurable water quality problems. Furthermore, there is reduced opportunity for these activities (with the exception of roads) to impact water quality because they lack proximity to existing stream channels.

There are approximately 62 miles of roads in the project area. This total includes a mixture of paved State and County roads; paved, graveled, and native surface private roads; and native surface FS Forest Development Roads. There are also approximately 4.7 miles of hiking trails. The Forest Service roads which would be mainly used for the project activities are the FS 2462 system and its spur roads. These roads are generally in good condition. There were no major areas of road surface rilling or gullying. There are 9 intermittent or ephemeral stream crossings along FS road 2462 that act as drainage relief for seeps and intermittent stream channels, but none of them were identified as undersized or plugged with debris during field visits. Some road drainage concerns were identified on the 2642 C Road, but can be ameliorated with road maintenance activities. All other stream crossings were on paved county maintained roads with little or no indications of sediment delivery.

Sediment modeling using the Water Erosion Prediction Project model (WEPP) indicates that sediment delivery averages 0.07 tons/year at each native road surface stream crossing site (based on model runs using 30 years of climate data). The minimum delivery rate estimate was less than $1/10^{th}$ ton/year and maximum delivery rates were 0.13 tons/year.

Methodology for Analysis

Water resource and road conditions were determined using aerial photography, GIS data, water quality information from the Idaho Department of Environmental Quality- Water Quality Division, and field reconnaissance by both Hydro Technicians and a Forest Service Enterprise Hydrologist. Landtype descriptions and hazard ratings were gathered from landtype descriptions and characteristics described in the Idaho Panhandle National Forests Land Systems Inventory (see project file). Field reconnaissance surveys of the project area were conducted during field seasons (summer) in 2007.

The Watershed Erosion Prediction Project (WEPP) model was used for further analysis with hillslope and road runoff and erosion predictions (Elliot 1999a; Elliot 1999b). WEPP is designed to assist as a tool to evaluate runoff, erosion, and sediment delivery potential from forest roads, harvest activities, prescribed fires, and wildfires, using input values for forest conditions developed by scientists at the Rocky Mountain Research Station (Elliot 1999a, Elliot 1999b). WEPP was used for this analysis to estimate changes in runoff and maximum sediment delivery

distances The WEPP results were rounded up to provide for a conservative estimate of potential runoff and sedimentation impacts from thinning and roading activities. Estimates of erosion and sedimentation are not considered absolute values, but rather are estimates only for the purpose of comparing alternatives.

Actual erosion and sediment delivery rates would be expected to be lower than the WEPP model ouput figures reflect. This is because the WEPP model does not account for the mitigation measures to control erosion and sedimentation that the Forest Service would implement. Forest Service soil and water conservation practices have been found to greatly reduce impacts to water quality and soil resources (Seyedbagheri 1996). In particular, the model does not account for the improvements in road and trail drainage and design features to reduce erosion and sedimentation from the transportation system.

Information on streamflow and activities on private land was not available. Therefore, impacts to runoff and potential for rain-on-snow events are derived from runoff estimates from the WEPP model and qualitative analysis. Additional cumulative impacts from private lands were interpreted from aerial photography. Equivalent Clearcut Area (ECA) or WATSED models analyses were not performed due to the small size of these face subwatersheds. Both of these methodologies are suitable for watersheds ranging in size from 3rd order to 5th order (approximately 10,000 to 40,000 acre) watersheds. Gold Gulch is the only subwatershed that approaches a 3rd order subwatershed. However, most of the stream channels in the area are ephemeral/ intermittent, and therefore would make any estimate of runoff questionable using either of the ECA or WATSED models.

Environmental Consequences

Issues/Concerns:

The issues and concerns regarding water resources for this project are:

- Water Quality
    - Further impacts to Pend Oreille Lake (303(d) listed) through project related sediment delivery
- Impacts to stream channels and downstream fish habitat through changes in in-channel large woody debris and stream channel shade.
- Changes to water yield due to the proposed vegetation management.

No-Action Alternative (Alternative A)

Direct and Indirect Effects- No Action (Alternative A)

The no-action alternative (Alternative A) of the Gold Crown Fuels Reduction Project would result in no vegetation or fuels reduction treatments being performed, no new road construction or reconditioning, and no unscheduled maintenance of existing roads in the project area. Therefore, there would be no direct effects to water quality, stream channels, or changes to water yield as a result of the no-action alternative.

The no action alternative could indirectly result in a higher risk of a stand-replacing, high-intensity wildfire (see Fire, Fuels, and Air Quality report.) A high-severity fire is not certain to occur within the project area during a given timeframe. However, the occurrence of a high-intensity wildfire would have an increased potential for impacts to hydrologic systems in severely-burned watersheds. The Soils report (see project file) concluded that such a fire event could increase the potential for soil erosion and sediment delivery to streams. This is caused by the loss of forest interception of rain and snowfall, and the reduction of ground cover at the soil surface which provides for a watershed with flashy runoff characteristics. This, in turn, could pose detrimental effects to water quality. Other potential detrimental effects to hydrologic systems in the project area could include the destabilization of stream channels due to excessive sediment loading and increased peak flows, and overall increases in average annual water yield resulting from the loss of upslope evapotranspiration.

The proposed vegetation and fuel treatments would reduce the chance that a wildfire could have as severe of an effect on the hydrologic resources and surrounding private property in treated areas as it could in untreated areas because there would be a reduction in the tons per acre of dead and dying fuels on treated sites (see Fire, Fuels, and Air Quality report).

Furthermore, unscheduled road maintenance items (specifically that related to the 2642 C Road where some drainage problems were identified) would not be performed as part of the no-action alternative (Alternative A.) Rather, they would not be accomplished until the next scheduled road maintenance occurs in the area. As a result, the short-term negative impacts related to road maintenance work, followed by the long-term benefits derived from improving the drainage and reducing overall sediment delivery potential would be delayed or would not occur.

Cumulative Effects- No Action (Alternative A)

We can assume that within this project area, which is entirely within the wildland-urban interface, a foreseeable, future action will be wildfire suppression. Land management agencies and those with firefighting responsibilities in the area will have to continue to fight wildfires in the area to protect homes, private property, and public infrastructure. Additionally, natural ecological processes, including forest stand succession and tree mortality will also continue to occur. When the indirect effects of the no-action alternative are added cumulatively to the future wildfire suppression and natural forest ecological processes, we can predict there will be additional accumulations of down, woody debris (or fuels) and a higher fire hazard prior to the next stand-replacing fire event. In this case, the potential detrimental indirect effects to hydrologic systems and resources (listed above) may be increased. These potential cumulative effects could include an increase in the destabilization of stream channels due to excessive sediment loading and increased peak flows, and overall increases in average annual water yield resulting from the loss of upslope evapotranspiration.

Proposed Action- Alternative B

Overview of the Proposed Action

Proposed treatments include reducing live and dead ladder and down fuels through a combination of: commercial thinning, commercial thinning with group selection, regeneration harvest, special hazardous fuel harvest on rock outcrops, hand thinning and piling, and overstory removal/precommercial thinning.

Table 1. Gold Crown Hazardous Fuels Reduction Proposed Action Vegetation Treatments.

Silvicultural Method	Acres	Harvest Method	Acres	Slash Removal Method	Acres
Thinning	129.11	Combination-Tractor/Line Pull	50	Broadcast Burn	263
Thinning w/ Group Selection Harvest	214	Hand Work	6	Broadcast Burn, YUM	22
Regeneration Harvest	207	Helicopter	65 (88*)	Excavator pile corridors	36
Overstory Removal w/ Precommercial thinning of understory	6	Mechanical (Tractor or CTL)	203 (180*)	Grapple Pile and Burn	191
Hazardous Fuels removal on rocky outcrops	11	Skyline	238	Hand Pile and Burn	6
Hand Thin, Prune, and Slash	6	Tractor swing to skyline	11	No slash treatment necessary	13
				Yard Unmerchantable Material	42
Total	573	Total	573	Total	573

* Indicates that one unit (#27) was analyzed for detrimental effects as a ground-based unit. However, if access via an existing private road is declined, the unit will be pursued as helicopter.

Road work to access treatment areas would include the following:

Table 2. Gold Crown Hazardous Fuels Reduction Proposed Road Treatments.

Proposed Road Work	Miles
New Permanent Road Construction- put in storage following project activities	2.2 miles
Existing Road Access (FS Road 2642/ Sky Meadow Road)- requires maintenance	8.5 miles
Existing Road - reconditioning	0.30 mile
New Temporary Access	0.13 mile

Project Design Features and Mitigation Measures

- Apply R1/R4 Best Management Practices.
- Apply INFS RHCA buffers.
- Recommend Slash Filter windrows for 100 feet on fillslope of new road construction at hardened ford crossings.
- Apply gravel cap to road/stream crossings, for 50 feet on each side of the stream.

Direct and Indirect Effects- Proposed Action (Alternative B)

The primary concerns for water resources on this project are to ensure that there are no further additions of nutrients to Pend Oreille Lake from the proposed treatments. The potential addition of nutrients could come from sediment derived from logging and slash treatments on vegetation management units, or from road construction or road maintenance activities.

The project would require a minimum of 60 feet of intermittent stream RHCA buffers on all vegetation treatment activity areas- wider for perennial non-fish bearing and perennial fish bearing streams. There would be no mechanical entry into these stream buffer zones. Incidental hand thinning or prescribed fire fuels treatment might occur, but direct ignition of fuels would not occur within RHCA zones. It is also expected that the project would follow R1/R4 Soil and Water Conservation Practices (Best Management Practices) (BMPs) (USDA 1988).

It is very unlikely that there would be direct or indirect effects to water quality, stream channels, lakes, or wetlands resulting from this project. All streams within the project area that are adjacent to activity units will be buffered by Riparian Habitat Conservation Area stream buffers. Treatments are not scheduled to occur within RHCAs. So it is not expected that the project would have any influence on streams within the project area. WEPP modeling indicates that sediment delivery from the proposed treatment units would not traverse through the 60 feet of intermittent RHCA stream buffers (150 feet for perennial non-fishbearing streams and 300 for perennial fish bearing streams) to a stream channel. Therefore, it is expected that the likelihood of sediment impacting water quality from treatment unit activities is very low. Further, it is not expected that sediment from treatment unit activities would affect downstream water quality in Pend Oreille Lake due to the low potential for sediment delivery through the RHCAs.

Any potential for sediment derived project activities would come from road construction and use and would most likely come from use of FS Rd 2462, or its spurs. None of the proposed new road construction or temporary road construction crosses a perennial channel. There are two proposed crossings on ephemeral channels and both of these will be hardened with coarse roadbed material to prevent erosion and sediment delivery. WEPP modeling indicates that sedimentation at these two sites would be approximately less than $1/10^{th}$ ton at each site the first year of construction and less in following years. However, to ensure that sediment is not delivered downstream any measurable distance, it is *recommended* that slash filter windrows be constructed for 100 feet on either side of the crossing on the downhill side of all new and temporary road construction which cross intermittent channel or swale areas that connect to downstream intermittent channels. There are some crossings of swale areas, but these locations are not considered stream channels and will not conduct sediment significant distances downslope. Further, all existing stream channel crossings on FS RD 2462 that are tributary to Gold Gulch are *recommended* to be graveled to prevent any potential for sediment delivery from road maintenance activities.

WEPP modeling indicates that sediment delivery from road maintenance and use activities on those roads would be negligible. In all modeled scenarios, sediment delivery is currently 0.13 tons or less annually for each of the intermittent stream crossings on these roads. The addition of the proposed road construction and maintenance work will add soil disturbance and traffic, but it is not expected that there will be a substantial increase in sediment delivery. WEPP modeling shows an increase from road use and maintenance activities to approximately 0.27 ton/yr for 1 to 2 years while project activities are occurring. Afterwards, sediment delivery would drop back to the current condition.

These are amounts that are well within the variation of natural sediment inputs and would not be differentiable from natural or project caused sedimentation. Stream channel stability would not be affected locally as downstream channels tend to be well armored with boulder and cobble material. Sedimentation downstream should also be minimized. Most of the intermittent stream channel crossings are tributary to Gold Gulch. Sediment transport distances would need to exceed 1.5 miles to affect downstream lake resources. But the volumes of predicted sediment delivery from the project are far too small to have any measurable consequences over that distance. The combination of in-channel sediment storage and the variation in natural background sediment transport would make measuring or discerning project related sedimentation at the lake improbable.

Further, it is expected that the implementation of Soil and Water Conservation Practices (SWCPs) (also known as Best Management Practices or BMPs) would prevent the delivery of the any sediment generated from roading activities. Several studies have found BMPs and site specific project design features to be effective in controlling impacts from forest management activities to water quality and stream habitats (Megahan *et al*. 1992; Seyedbagheri 1996). The specific BMPs which apply to this project are SWCP 15.21 - Maintenance of Roads, 15.23 - Traffic Control During Wet Periods, and 15.25 - Obliteration of Temporary Roads (USDA 1988).

Timber harvest that removes a large portion of the forest canopy may lead to increased peak flows because the trees are not present to intercept rain or snow, and fewer trees are using water from the soils in a process called transpiration. Opening the canopy of a forest can result in higher peak flows occurring earlier in the season whereas, base flows are sometimes reduced. Therefore there is the potential that total water yield could be increased (Benoit 1974).

The subwatershed that is receiving the most treatments is Gold Gulch (532 acres) (*See Table 4*). The Gold Gulch subwatershed itself is a series of approximately 3 – 4 smaller face subwatersheds. The small subwatershed encompassing Gold Gulch is the primary channel of concern for fisheries issues as it has the most likelihood of supporting fish populations. There are approximately 240 acres of proposed treatments within this smaller subwatershed (approximately 17% of the smaller subwatershed). An estimated 140 of those acres would lose canopy cover (approximately ten percent of the smaller subwatershed). These treatment units generally overlay north to northwest aspects.

The remainder of the treatment units is concentrated in two smaller drainages that encompass Sections 30 and 31 at the northern edge of the project area. There would be approximately 152 acres of canopy reduction over northeast, north and northwest aspects in these units. This reduction in canopy represents approximately 18 percent of the 833 acres over these two smaller subwatersheds.

Tractor units will provide for the most canopy removal leading to these percentages. Canopy cover will be reduced over much of the activity units in Gold Creek subwatershed- especially in the tractor units, so there is potential for some effects(i.e. very localized and short term increases in peak flows and overland flow) in severe weather conditions (rain-on-snow events, severe floods, tornados, etc.), although the risk is minimal. These effects would be virtually immeasurable compared to the watershed response under background natural conditions. The reason for this is that the project area is relatively small as compared to the size of the watershed it overlays, and it is not expected that the project will have an effect on infiltration runoff characteristics in activity units. The canopy removal is also spread out spatially over the landscape which further diffuses any potential for concentrating project related runoff and

increasing downstream channel erosion. So the effects of a severe weather occurrence would be minimal in terms of water quality, impacts to stream channel form and function, or fish habitat.

Garfield Creek subwatershed would receive approximately 71 acres of treatment and Lake Face would not receive any treatment. It is unlikely that the relatively low amount of treatment area in Garfield Creek subwatershed would affect runoff or have an impact on rain-on snow events. The 71 acres of treatment is located in the upper slopes of the watershed and is a relatively small percentage of the total watershed area (two percent). Further, the proposed units overlay east, south, and west aspects which would disrupt the timing of runoff from each aspect and preclude the proposed units from contributing to any unified runoff scenario other than a rare large scale rain-on-snow (ROS) event. Therefore, it is not expected that increases in peak flows or annual water yield related to project activity would occur.

The Lake Face Subwatershed would not receive any treatment activity, so there would be no change from the current condition. The proposed project would not have any influence on water quality, water yield, or fish habitat within the Lake Face Subwatershed.

Table 3. Watershed areas in relation to project acres and treatment unit acres.

Subwatershed	Watershed Area within the project boundary (acres)	Treatment Unit acres	% of Watershed	Predicted Increase in Runoff
Gold Gulch	4632	502	11%	0%
Garfield Creek	3119	71	2%	0%
Lake Face	850	0	0%	0%

In summary, the project is very unlikely to produce negative effects through sedimentation, increased stream temperatures, changes in water yield, or decreased amounts of large wood for stream channel stability.

Cumulative Effects- Proposed Action (Alternative B)

The cumulative effects area for this project is the same as the project boundary. Due to the nature of these lake face watersheds, the cumulative effects boundary is relatively limited in extent (*See Figure 2*). The project area is bounded by Pend Oreille Lake on the north, northeast, and northwest. All of the proposed activities are hydrologically upstream from the lake, so extending the cumulative effects boundary to the southwest and west would only serve to dilute potential cumulative effects associated with the proposed project. Past vegetation management projects were considered in this cumulative effects analysis if they still have a recovering effect, generally those projects implemented within the past 40 years. All known roads and residential development areas were also considered.

Past and present projects in or near the Gold Crown Fuels Reduction Project include timber harvest, road building, residential development, agricultural land use, mining, firewood gathering, and dispersed recreation. Within the project area there is an assortment of land ownerships including public Forest Service- and Bureau of Land Management-administered lands, private lands in forested settings utilized for residential use and commercial timber harvest, and private lands in agricultural settings utilized for pastures. The range of activities associated and within this cumulative effects area includes home construction, road building and maintenance, forest silvicultural activities (thinning, harvesting, and planting), and dispersed recreation.

The known past, present, and foreseeable future activities are displayed below:

- Big Grouse 1997 44 acres
- Gold Hill 1995 308 acres
- Grouse Mountain Sagle 1987 42 acres
- Other unknown sales 1969, 1971 540 acres

Reasonably foreseeable future actions include continued residential development along and immediately uphill of the lakeshore, continued use of the transportation system, fuelwood and food gathering, recreation, possible wildfire suppression, fish and wildlife management, noxious weed treatments and incidental salvage following the project. Overall, there is a substantial amount of past, current land use activity within the cumulative effects area.

However, it is not anticipated that there would be any cumulative effects to watershed resources resulting from this project. There are no expected direct or indirect effects to watershed resources within the project area. The implementation of RHCAs will prevent adverse effects to water quality from vegetation treatment unit activities, and impacts from roads and road use will be minimized with the implementation of BMPs. Current and predicted sediment delivery from roads and road use activities is anticipated to be relatively small, so it is not expected that there would be a measurable direct or indirect from these activities. Since there are no expected direct or indirect effects to watershed resources, it is also anticipated that there would not be any measurable cumulative effects resulting from the implementation of the project.

Compliance with the Forest Plan and Other Regulatory Direction

Forest Plan Consistency

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 Twin Skin project will meet standard BMPs (USDA 1988). Site-specific BMPs were also included with this project as mitigation measures to improve water quality. Please see paragraph above.

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

The net production and delivery of sediment from the proposed management activities is expected to decrease by implementing the road reconstruction and maintenance. Petroleum products used in the operation and maintenance of heavy equipment are the primary chemical constituents which could be delivered to streams. The proposed management activities would meet State standards for chemical constituents given that “Required Design Criteria”, State and site-specific BMPs, and INFS standards would be applied for the project.

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

Specified road reconstruction is needed for this project to be consistent with Idaho Forest Practices Rules. 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 Required Design Criteria and BMPs are specified and are listed in this report. Soil and water conservation principles were used during design to determine the location and types of treatments including which areas should be avoided or restored. The specified and designed measures meet those required by the State Forest Practices Act and are consistent with Forest Service standards. Stream crossing upgrades would meet minimum standards for stream channel alterations and are covered under a Memorandum of Understanding with the State of Idaho.

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. State and site-specific standards and INFS standards are specified and would be applied. Factors that put water quality at-risk were identified as well as what can be done to minimize or eliminate those risks.

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

Maintenance of existing biota will be defined as maintaining the physical integrity of these streams. Best Management Practices and riparian guidelines will be used to accomplish this objective. Protection of the integrity of riparian conservation areas (which includes first and

second order streams) was approached through project design strategies and specified actions in the BMPs.

Executive Order 11990 & Executive Order 11988

This project meets the requirements of Executive Orders 11990and 11988, which apply to protection of wetland and floodplains. Executive Order 11990 requires that federal agencies follow avoidance, mitigation, and preservation procedures with public input before proposing new construction in wetlands. Executive Order 11998 requires all federal agencies to take actions to reduce the risk of flood loss, restore and preserve the natural and beneficial values in floodplains, and minimize the impacts of floods on human safety, health, and welfare. These features are protected through implementation of BMPS and Forest Plan Standards and Guidelines. The riparian protection components of the project (INFS RMOs, Forest Service BMPs) are designed to improve condition of riparian areas (including wetlands) and floodplain function.

CWA regulations, state water quality regulations

The proposed project will be consistent with the requirements of the Clean Water Act, 33 U.S.C. 1251. The objective of the Act is to restore and maintain the chemical, physical and biological integrity of the Nation's waters. (Section 101(a)). It also regulates discharge of dredged or fill material into navigable waters (waters of the U.S.) (Section 404). The Forest Service abides by the Clean Water Act through the implementation of Best Management Practices (BMPs) otherwise know as Soil and Water Conservation Practices within the Forest Service. The Soil and Water Conservation Practices Handbook (FSH 2509.22) was developed in concert between the USDA Forest Service and Idaho Department of Environmental Quality. It is a formalized agreement with the specific purpose to respond to the objectives defined by Congress in the Federal Water Pollution Control Act, as amended. The main objective of this law is to restore and maintain the chemical, physical, and biological integrity of the Nation's water. Sediment and water temperature, the pollutants of concern, will not permanently increase in the waters of the Gold Crown Project. These pollutants to water quality will be prevented through implementation of BMPS and Forest Plan Standards and Guidelines. The riparian protection components of the project (INFS RMOs, Forest Service BMPs) are designed to improve condition. Risks to beneficial uses will not be changed by this project. There will be no detrimental increase in sediment or stream temperature through management activities in the Gold Crown Project Area.

Water Quality Limited Lakes

By following site specific BMPs, INFS guidelines, and RHCA buffers, there will be no detrimental cumulative effects to the streams, or net increase in siltation, suspended solids, or thermal modifications, thus no violation to the TMDL regulations or Clean Water Act. Please see Fisheries Report for more information regarding temperature concerns.

Designated Beneficial Uses

By following the above BMPs, required design features and design recommendations, and adhering to the above laws and regulations, designated beneficial uses will be maintained.

Army Corp Discharge, Dredge and Fill Permits

The proposed harvesting and road reconstruction will not detrimentally affect wetlands or streams. The proposed stream crossings upgrades recommended are covered under the "silvicultural road exemption" of the nationwide permit.

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