

Hydrology Report

2015 Southwestern Oregon Mineral Withdrawal

Rogue River-Siskiyou National Forest,
Bureau of Land Management Medford and Coos Bay Districts

/s/ Chris Park, Forest Hydrologist

Date: March 16, 2016

Hydrology

Introduction

The Southwestern Oregon Watershed and Salmon Protection Act of 2015 (S. 346 and H.R. 682) was introduced to Congress on February 3, 2015, proposing to withdraw certain lands in Curry County and Josephine County, Oregon from all forms of mineral entry, appropriation, or disposal under public land laws, subject to valid existing rights. This proposed legislation includes federally owned land within the area depicted on two maps submitted with the draft legislation. The areas include approximately 5,216 acres of BLM-managed public domain and revested Oregon California Railroad lands (O&C), and 95,806 acres of National Forest System (NFS) lands.

As a result of the legislative proposal, the Assistant Secretary of the Interior for Land and Minerals Management published a Notice of Proposed Withdrawal and Notification of Public Meetings in the Federal Register on June 29, 2015. The notice segregates for two years the described lands from settlement, sale, location, and entry under the public land laws, location and entry under the United States mining laws, and operation of the mineral and geothermal leasing laws.

The purpose and need of the proposed 5-year temporary withdrawal is to **maintain the current environmental baseline, relative to mining, mineral exploration and development, and geothermal energy development**, while Congress considers legislation enacting a permanent withdrawal from mineral entry for the federal lands depicted on the official maps.

The mining withdrawal areas has several valuable natural resources, one of which is water quality, along with biodiversity and sensitive species. Depending on the type of operation, site conditions and proximity to a waterbody, surface mining can generate chemicals and sediment that can negatively affect water quality. Instream mining, such as suction dredging, can also affect water quality if multiple dredges are working in close proximity to each other. The mining withdrawal will be analyzed for two time periods, 5 year and 20 year. The No Action alternative, which assumes no withdrawal is in place, will look at potential future mining activities. Past and present mining types and levels will be used to estimate future mining activities.

Proposed Action: 5-year Mineral Withdrawal

The Forest Service and BLM propose a 5-year withdrawal from location and entry under the United States mining laws, and operation of the mineral and geothermal leasing laws for approximately 5,216 acres of BLM-managed public domain and revested Oregon California Railroad Grant lands and 95,806 acres of National Forest System lands in Josephine and Curry Counties. An additional 1,680 acres of non-federal lands included in the external boundaries of the maps would not be affected.

Under withdrawal, no new mining claims may be located, mineral entry would be prohibited, and no mineral leasing is allowed.

Withdrawal from operation under the mining and mineral leasing laws is subject to valid existing rights (VER). Existing mining claims may be developed after a minerals validity examination determines that a discovery of a valuable mineral deposit existed at the time of the segregation.

No other land management activities are affected by withdrawal from mineral entry.

The duration of the requested withdrawal is five years. At the end of this period, the BLM will reevaluate the withdrawal concerning the desirability and justification for extending the withdrawal for an additional period.

Alternative Action: 20-year Withdrawal

In response to public input received during the 90-day comment period, we will analyze withdrawal for a 20-year period. This alternative is the same in detail as the proposed action, except for the extended time period.

No Action: No Mineral Withdrawal

Withdrawal from location and entry under the mining laws and operation of the mineral and geothermal leasing laws would not occur, and the current segregation would end with the Secretary's decision.

New mining claims could be established, and proposed plans of operation and notices of intent could be submitted. The agencies would proceed with evaluating and authorizing previously submitted PoOs, subject to site-specific NEPA analysis including specified mitigations and project design criteria for mining and mineral development.

Suction-dredge operations could occur outside of the streams currently covered by the State of Oregon's moratorium on motorized placer mining (Oregon Senate Bill 838, July 2013) and on all streams within the project area after the moratorium expires in January 2021.

Affected Environment

Table 1 lists the hierarchy of watersheds, also known as hydrologic units, present in the proposed mineral withdrawal areas. The subbasin is represented by the fourth field hydrologic unit code (HUC), the watershed by the fifth field HUC, and the subwatershed by the sixth field.

Table 1. Watersheds within the Southwestern Oregon Mineral Withdrawal Area

4 th Field HUC*	5 th Field HUC	6 th Field HUC
Illinois	West Fork Illinois River HUC 1710031104	Rough and Ready Creek 171003110404
Chetco	Hunter Creek HUC 1710031205	Upper Hunter 171003120501
		Lower Hunter 171003120502
	Pistol River HUC 1710031204	East Fork Pistol River-Pistol River 171003120401
		North Fork Pistol River-Pistol River 171003120402
		South Fork Pistol River 171003120403
		Crook Creek-Pistol River 171003120404
Smith	North Fork Smith River HUC 1801010101	Baldface Creek 180101010102

*hydrologic unit code

Water Quality Standards and Guidelines

Clean Water Act of 1972, as Amended. By the Water Quality Act of 1987 Public Law 100-4, Section 319 of the Clean Water Act.

Oregon Administrative Rules (OAR 340-41-001-975).

Department of Environmental Quality. Oregon's Administrative rules contain water requirements for the protection of identified beneficial uses of water.

ORA 340-41-0365(2)(b)(A)(I) Temperature Standard

To accomplish the goal identified in ORA 340-041-0120(11), unless specifically allowed under a Department approved surface water temperature management plan as required under ORA 340-041-0025(3)(a)(D), no measurable surface temperature increase resulting from anthropogenic activities is allowed.'

In a basin for which salmonid fish rearing is a designated beneficial use, and in which surface water temperatures exceed 64.0 F.

ORS 468 under laws relating to water quality:

468B.025 Prohibited activities: "Pollution" or "water pollution" means such alteration of the physical, chemical or biological properties of any water of the state, including change in temperature, taste color, turbidity, silt or odor of the water

468.943 Unlawful water pollution in the second degree: Criminal negligence violates ORS 468B or any rule, standard, license, permit or order adopted or issued under ORS chapter 468B is punishable by a fine of up to \$25,000 (1993 c.422 s.11)

ORA 340-41-065:

(1) Notwithstanding the water quality standards contained below, the highest and best practicable treatment and/or control of wastes, activities, and flow shall in every case be provided so as to maintain dissolved oxygen and overall water quality at the highest possible levels and water temperature...

West Fork Illinois River Watershed

The West Fork of the Illinois River joins the East Fork near Cave Junction at an elevation of 1280 feet. Rough and Ready Creek subwatershed has its highest elevation at Josephine Mountain at 4764 feet. The highest elevation in the Whiskey Creek subwatershed is on its divide with Rough and Ready, at 3925 feet. The highest elevation for the main stem of the West Fork of the Illinois River is relatively low, with the divide near 3680 feet (about 1 1/2 miles west of the low pass at Randolph-Collier tunnel on Highway 199).

The shallow, rocky soils on most parts of the Josephine Ultramafic have little capacity for water storage, leading to high runoff. High runoff causes the stream to be flashy with rapid channel rise in response to rainfall. Meandering and braided channels are evident across Rough and Ready Creek's alluvial fan. Loss of surface flow becomes evident during low summer flows. Hunter Creek watershed

Hunter Creek, a southwest and west flowing fourth order stream, is located in the coast range in west central Curry County in southwestern Oregon. Hunter Creek drains a basin area of 28,404 acres of moderate to steeply sloped dissected mountainous terrain before emptying into the Pacific Ocean approximately two miles south of Gold Beach, Oregon (T37S, R15W, Section 12). Elevations range from sea level to 3,366 feet at the top of Quosatana Butte. Annual precipitation ranges from 80 – 130 inches (depending on wetness of the winter and location within the watershed). Most of the precipitation occurs between October and April in the form of rain. Fifteen percent, or 4,195 acres, of the Hunter Creek watershed is located in the transient snow zone and can receive moisture in the form of rain or snow. The ownership distribution in the

watershed encompasses: USFS 25%, BLM 12 %, State lands <1% and the remaining 63% is in private ownership. Management allocations of public land include Late Successional Reserves (59%), Matrix (32%), and Riparian Reserves (6%). The remaining 3% of public land is managed as General Forest, Special Wildlife Sites, Special Interest Areas, and Botanical Areas.

Fire suppression has caused the level and continuity of fuels to increase, leaving the watershed susceptible to larger, more intense fires (e.g. Biscuit Fire). Moderate timber harvest and road development on public lands has altered some watershed processes and functions. Past land uses and management directives such as stream cleanout operations (removal of instream wood), road construction in valley bottoms, and logging within the riparian forest have created conditions that have increased sediment loads and decreased riparian habitat and aquatic habitat complexity.

Pistol River Watershed

The Pistol River watershed encompasses approximately 67,250 acres of Curry County. About 58 percent of the basin is federal land managed by the RRS and the BLM (5 percent). About 42 percent of the basin is privately owned. Forestry, whether public or private, is the dominant land use, involving 97 percent of the watershed. The remaining 3 percent is used for farming, livestock grazing, and rural homes. The Pistol River is located in the Klamath Mountain Province in southwestern Oregon. The Pistol River drains into the Pacific Ocean, with the mouth of the river located between the towns of Brookings and Gold Beach Oregon.

The first Euro-American settlers were miners who came to the area in the 1850's. Following or accompanying the miners were early settlers, farming in the flat lands along the rivers and major creeks and grazing cattle and sheep in the surrounding hills. Currently the flat land near the mouth of the Pistol River is occupied by residences and ranches. The middle portion of the watershed is primarily owned by private timber companies. The upper portion of the watershed is primarily NFS land. Timber commodity production has been an important human use of the middle and upper portions of the watershed since World War II. Fire suppression has caused the level and continuity of fuels to increase, leaving the watershed susceptible to larger, more intense fires (e.g. Biscuit Fire). Moderate timber harvest and road development on public lands has altered some watershed processes and functions.

North Fork Smith River watershed

The North Fork of the Smith River watershed was designated a key watershed under the Northwest Forest Plan. There are 13 miles of the North Fork of the Smith River within Oregon. It flows south from the flank of the Chetco River watershed divide in the Kalmiopsis Wilderness. It meets the Smith River at Gasquet, California where it flows across Del Norte County to the Pacific Ocean at Smith River, California. The North Fork of the Smith was designated a Wild and Scenic River in 1988. The Outstandingly Remarkable Values are scenery, fisheries, and water quality. The portions designated 'Wild' are above Horse Creek and below Baldface Creek to the Oregon/California state line. The portion between Horse Creek and Baldface Creek is designated 'Scenic'.

The North Fork of the Smith watershed receives approximately 100 to 150 inches of precipitation per year. About 53% of the watershed is in the rain-dominated zone (under 2500 foot elevation); 46% is in the transient snow zone (2500 to 4000 foot elevation, mostly in Baldface and Chrome Creeks); and, 1% is in the snowpack zone (along the Chetco Divide). The three largest streams, North Fork of the Smith River, Baldface Creek, and Chrome Creek, show evidence of considerable stream power by the size and volume of sediment and large wood that they move. Ultramafic soils are shallow and porous and occupy roughly half of the watershed. This

contributes to the flashiness and power of these streams. The ownership distribution in the watershed encompasses: USFS 98%, State lands 1% and the remaining 1% is in private ownership.

Past and Current Mining Activities within the Withdrawal Area

Within the proposed withdrawal boundaries, the minerals nickel and chromium predominate are recognized as potential resources. Exploration on nickel mineralization has been carried out by the United States (US Bureau of Mines, US Geological Survey) as well as State and numerous private interests, though no production has occurred. Nickel-laterite deposits near Red Flat in Curry County had mining claims located in 1939, though exploration occurred prior to that time. In 1937 it was reported that a few shallow trenches and a 32-foot exploration shaft had been excavated. The U.S. Bureau of Mines (USBM) explored the area using hand auger sampling in 1945, with follow-up drilling in 1952 and 1953. The USBM drilled 22 exploration holes ranging from 20 feet to 117 feet; the area contained about 5 miles of exploration roads and 15,000 feet of trenching investigation. Other than the Nickel Mountain Mine near Riddle, no production of nickel has been recorded.

Less than 12 association and individual placer claims are currently located on streams within the withdrawal boundaries. However, no operation proposals are on record with the Forest Service for activities on those claims. There are two plans of operations for suction dredging on BLM managed lands. Major gold-producing areas are located outside of the withdrawal boundaries. No significant gold prospecting or mining activity has been recorded within subject lands. Additionally, “pocket” gold, the main source of placer gold deposits in the region, are not widely recognized within subject lands.

Oregon, chromite production has been restricted to periods of wartime emergency. The largest of 23 producing occurrences in Curry County is the Sourdough (Baldface) mine, located outside of the withdrawal boundary, worked in 1918, 1941-1944, and 1951-1958. Black sands deposits along the coast have been recognized and subjected to some exploration but no production data is available. Past chromite production occurred outside of withdrawal boundaries.

Water Quality

Stream Temperature

Stream temperature is driven by the interaction of many variables. Energy exchange may involve solar radiation, longwave radiation, evaporative heat transfer, convective heat transfer, conduction, and advection. With the exception of solar radiation, which only delivers heat energy, these processes are capable of both introducing and removing heat from a stream. While interaction of these variables is complex, certain of them are more important than others (when assessing what is influencing stream temperature) (Beschta, 1987). Solar radiation is the singularly most important radiant energy source for the heating of streams during daytime conditions (Brown, 1985; Beschta, 1997) (figure 1). The loss or removal of riparian vegetation can increase solar radiation input to a stream increasing stream temperature.

Total Flux Solar Longwave Evaporation Convection Conduction

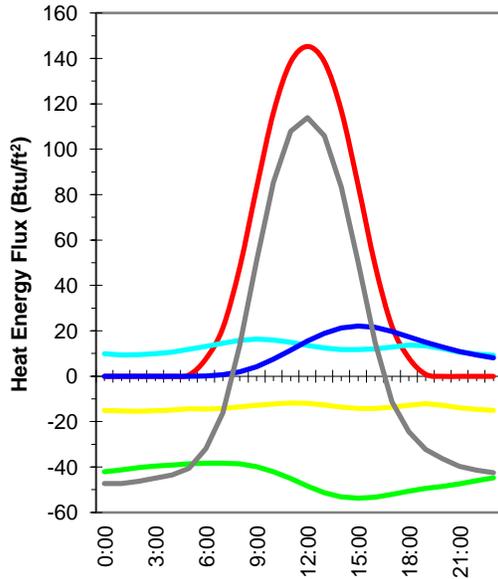


Figure 1. Daily Heat Energy Balance

Department of Environmental Quality (DEQ) 303(d) list of Water Quality Limited

The DEQ 303(d) lists water bodies that are impaired for a various pollutants. The following streams within the withdrawal area are listed:

<u>Water Body Name</u>	<u>Pollutant</u>	<u>Status</u>
Rough and Ready Creek	Temperature	Approved TMDL
Hunter Creek	Temperature	

Rough and Ready Creek has a large areas of ultramafic geology that characteristically has low vegetation productivity. Tree are naturally sparse and widely spaced, producing an open canopy. Trees in the riparian area that are providing summer stream shade produce low quality shade allowing a large amount of solar radiation to reach the stream surface. As a result streams flowing through ultramafic geology are warmer than streams flowing through well vegetation riparian areas.

Hunter Creek is 63% under private management, and of that a large portion is managed for timber production. In the past there was not adequate protection of trees adjacent to a flowing stream that resulted in a loss of stream shade.

Effects of Mining on Stream Temperature

Recreational suction dredging operations are confined to the wetted width of the stream. Therefore, the actual mining operation does not directly affect riparian vegetation. Stream shade remains the same throughout the operation, so there is no increase in stream temperature as the

result of mining. Sources identified as increasing stream temperature are, timber harvest, roads, water withdrawal and mining (other than suction dredging) in riparian areas.

Increases in sediment loading to a stream can result in the stream aggrading causing the width of the stream to increase. This can increase the surface area of the water resulting in higher solar radiation absorption and increased stream temperatures. Suction dredging does not introduce new sediment into the stream, but does move or relocate existing streambed material. The suction dredging operation creates piles in the stream channel as the miner digs down into the streambed. The stream flow may split and flow around the pile decreasing the wetted surface area for a few feet. However, within the stream reach that the miner is working, the change is so small that the overall wetted surface area can be assumed to be the same, so the total solar radiation absorption remains unchanged.

Surface mining in a riparian area has the potential to remove trees that are providing stream shade. No surface mining has occurred within the riparian in the withdrawal area so there has been no loss of stream shade.

Turbidity

Turbidity results from an increase in suspended sediment that reduces water clarity. Suction dredging can increase water turbidity by picking up bed material and dispersing it into the water. The loss of water clarity during the suction dredging operation is a function of the type of streambed material being run through the dredge. Coarse materials, such as gravels, cobbles and coarse sands, will settle out and not remain suspended in the water. So when a miner is operating in this type of material, there is no increase in turbidity. When miners encounter material generally finer than 0.4mm, it will become suspended in the water and reduce clarity. Fines can be mixed in the bed material or present in what is called a "clay pocket". A "clay pocket" is an area of concentrated fines down in the streambed.

The State Standard controlling turbidity levels in a stream is ORA 340-41-(basin)(2)(c). It states that no more than a 10% cumulative increase in natural stream turbidity shall be allowed, as measured relative to a control point immediately upstream of the turbidity causing activity. Under General Permits 700PM, turbidity will be localized within the general area of the dredging activity and that turbidity shall not be visible 300 feet downstream of one or more working suction dredges. So, if turbidity is visually detectable 300 feet downstream as stated in the 700PM permit, it exceeds the State Standard.

How much, if any, turbidity is created by suction dredging is highly variable. Factors affecting turbidity are the volume of water in the stream, stream section type (pool, riffle or glide), bed material, and the number of operators in an area.

When it has been observed that the state standard for turbidity appears to be exceeded, it usually occurs when more than one dredge is in use in the same area. However, one operator can exceed the Standard if they are not in compliance with their permit.

No surface mining has occurred in the withdrawal area so no sediment has been delivered that would affect water clarity.

Hazardous Material

Fuel used to power the dredge is a hazardous material if it enters a live stream. Operators are required to store their fuel 100 feet or more from the stream. No hazardous fuel spill, associated with suction dredging, has been documented on the Forest. If a fuel spill(s) has occurred, it has not been reported or it was not apparent during the Forest Service mining site visits.

Channel Morphology

A stream channel is in a constant state of adjustment during winter flows maintaining a balance between sediment, stream flow and instream structures. If a suction dredge operation removes instream structures, such as wood and boulders, it can cause the channel to change. Instream structures can provide stability to a channel by establishing a control point to maintain the stream gradient or produce pools and cover for fish habitat.

A suction dredging operation typically leaves one or several cone shaped holes in the streambed with the excavated material in a pile downstream. Limited Forest visual and photo point monitoring shows the holes are filled and piles redistributed with winter flushing flows.

A problem occurring from suction dredging is when a miner undercuts a streambank causing it to become unstable and fail into the stream. General permit 700PM restricts miners from undercutting streambanks. The first winter stream flows during a storm usually redistributes the streambed material that was displaced by suction dredging.

No surface mining has occurred in the withdrawal area so no sediment has been delivered that would affect channel morphology.

Proposed Exploration Boreholes – Hydrogeology

Both Red Flat Nickel Corporation (RFNC) and Cleopatra have proposed to drill mineral exploration boreholes to not-to-exceed 50 feet. Observations during exploration activities in 2007 through 2009 at 12 deep sonic drill boreholes to a depth of 118 feet below ground surface did not indicate the presence of groundwater.

This lack of groundwater observations suggests these materials encountered during exploration drilling are of higher relative permeability, otherwise, shallow groundwater would likely have been observed in previous mineral exploration boreholes (Alpine Environmental Consultants Hydrogeological Report for RF-38, Williams 2015). Furthermore, while no data is readily available to suggest the presence of an aquifer(s) at the proposed exploration site, Williams does suggest (professional judgment) one or more aquifers are likely present in fractured bedrock greater than 118 feet. A sustainable yield in any groundwater well would be highly variable due to the nature of the fractured bedrock (i.e. fracture connectivity). Local and regional recharge to the aquifer(s) is most likely in the form of infiltration of precipitation and groundwater discharge via seeps, springs and gaining streams within the Hunter Creek and Pistol River catchments (Williams 2015).

No groundwater quality samples have been collected and analyzed due to the lack of wells within the site. Given the lateritic nature of the soil (rich in iron and aluminum) and weathered bedrock along with high precipitation (up to 75 inches/year), it is unlikely the local rocks within 50 feet of the land surface contain leachable constituents that would pose an unacceptable risk to human or ecological receptors (Williams 2015).

There are no known public water supply wells or established municipal water supply within the Hunter Creek or Pistol River catchments.

Springs, perennial streams, wetlands and fens are present at the site. All these features are considered Riparian Reserves under the Northwest Forest Plan (USDA 1994) and require

protections buffers. Any future exploration boreholes would maintain a minimum of a 200 foot buffer from streams and wetlands with a 300 foot buffer for fish-bearing streams.

Analysis Framework

Analysis of the action alternatives (5-year and 20-year withdrawal) will display the effects of precluding mineral entry. Analysis of the no action alternative will display the general effects of these known activity areas being open to mineral entry, as contrasted with mineral entry being precluded. Specific details and effects of the proposed PoOs will not be analyzed. Site-specific NEPA for those projects would include alternatives, project design criteria, and required mitigation measures, which are beyond the scope of this analysis.

Analysis will focus primarily on

1. areas where proposed mineral plans of operation under consideration at the time of segregation;
2. areas of suction dredge activity, as characterized by recent levels permitted by the State of Oregon;
3. the distribution of existing claims and the potential for resource conflicts (e.g. whether or not existing claims occur in areas with TES species, sensitive wetlands, popular recreation sites, or other high-value resources).

Three proposed plans of operations (PoOs) for nickel laterite mining or exploration were submitted, but not yet approved, prior to segregation. Those PoOs include:

- ◆ RF-38 (location: T37S, R13W, Sec. 18, 19, 29-32; T37S, R14W, Sec. 13, 24, Willamette Meridian)
- ◆ Cleopatra (location: T41S, R10W, Sec. 5-8, 17, 18; T41S, R11W, Sec. 1, 12, Willamette Meridian)
- ◆ RnR (location: T40S, R9W, Sec. 8, 9, 21, 22, Willamette Meridian)

Existing claims in the withdrawal areas total 234 lode and 45 placer claims. To date, no existing claims have been proven valid following the BLM's validity examination process.

Environmental Consequences

Proposed Action – 5-year Withdrawal

Direct, Indirect, and Cumulative Effects

There will be no new mining claims within the minerals withdrawal boundary. However, on lands withdrawn from mineral entry that have existing, legally recorded mining claims, some activities may still occur. Those claims would be subjected to valid existing rights determinations (performed by the FS and/or BLM). If valid existing rights are determined to hold true, it can be shown that there has been a discovery of locatable minerals, then the claim holder might be able to initiate those operations if NEPA was completed and the activity would be subject to existing rules and regulations. If the claim was determined to lack discovery, then the claim could be declared “null and void,” and a new claim would not be established.

Mining can occur under the 5-year withdrawal alternative. Given the lack of mining activity in the past and currently, it is unlikely that an existing claim would pursue a right determination. Because of no surface mining activity, and no suction dredging operations on Forest Service

managed land and only two operating plans on BLM managed lands, there will be no direct, indirect and cumulative effects to water quality within the 5 year withdrawal period. The baseline condition, no action alternative, would remain the same.

Exploratory bore holes are proposed and could proceed within the withdrawal area if it were demonstrated it is a valid claim. See the no action alternative for more detail.

Alternative Action – 20-year Withdrawal

Direct, Indirect, and Cumulative Effects

A 20-year mineral withdrawal would have similar effects as the 5-year mineral withdrawal because current baseline conditions would remain. See 5-year direct, indirect and cumulative effects discussion in this report.

No Action – No Withdrawal

Direct, Indirect, and Cumulative Effects

The no action alternative establishes the current baseline condition of the withdrawal area. No suction dredging operation proposals are on record with the Forest Service for activities on existing claims. There are two plans of operations for suction dredging on BLM managed lands. Major gold-producing areas are located outside of the withdrawal boundaries. No significant gold prospecting or mining activity has been recorded within withdrawal boundary.

Increases in turbidity results from an increase in suspended sediment that reduces water clarity. When it has been observed that the State Standard for turbidity appears to be exceeded, it usually occurs when more than one dredge is in use in the same area. The low level of suction dredging operations in the withdrawal area will have no effect on water quality.

No surface mining has occurred in the withdrawal area. There has been ongoing exploration using bore holes and heavy equipment trenching. Both Red Flat Nickel Corporation (RFNC) and Cleopatra have proposed to drill mineral exploration boreholes up to 50 feet deep. Observations during exploration activities in 2007 through 2009 at 12 deep sonic drill boreholes to a depth of 118 feet below ground surface did not indicate the presence of groundwater.

Given the lateritic nature of the soil and weathered bedrock (rich in iron and aluminum), along with high precipitation (up to 75 inches/year), it is unlikely the local rocks within 50 feet of the land surface contain leachable constituents that would pose an unacceptable risk to human or ecological receptors (Williams 2015).

Springs, perennial streams, wetlands and fens are present at the site. All these features are considered Riparian Reserves under the Northwest Forest Plan (USDA 1994) and require protections buffers. Any future exploration boreholes would maintain a minimum of a 200 foot buffer from streams and wetlands with a 300 foot buffer for fish-bearing streams. There would be no affect to groundwater, wetland or fens if boring occurred in the future. \

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