

# **Buckhorn Access Project Final Environmental Impact Statement Summary**

## **INTRODUCTION**

Crown Resources Corporation submitted an amended Plan of Operations (Crown Resources, 2005) to the Okanogan and Wenatchee National Forests in March 2005 for permission to construct or reconstruct access roads, build a pipeline and a treated water infiltration area, construct fence, drill wells and construct utilities on National Forest System lands to facilitate their plan to mine an ore body on their private lands that are surrounded by Federal lands (National Forest System and Bureau of Land Management lands). Some of the surrounding Federal lands are unpatented mining claims, where here include lode and placer claims and mill sites. The proponent intends to mine their private lands under the authority of Washington State laws. The project activities for which the Forest Service has discretion to make a decision are located approximately 3 - 8 air miles east of Chesaw, Washington, in Sections 23-26 and 36, Township 40 North, Range 30 East; Sections 7-9, 16-19, 21, 25-28 and 31-32, Township 40 North, Range 31 East; Sections 1, 2 and 11, Township 39 North, Range 30 East; and Sections 2-5, Township 39 North, Range 31 East, Willamette Meridian (see vicinity map, Figure S-1, next page). The ownership status of lands within the project area is presented in the map following the vicinity map (Figure S-2).

### **Background**

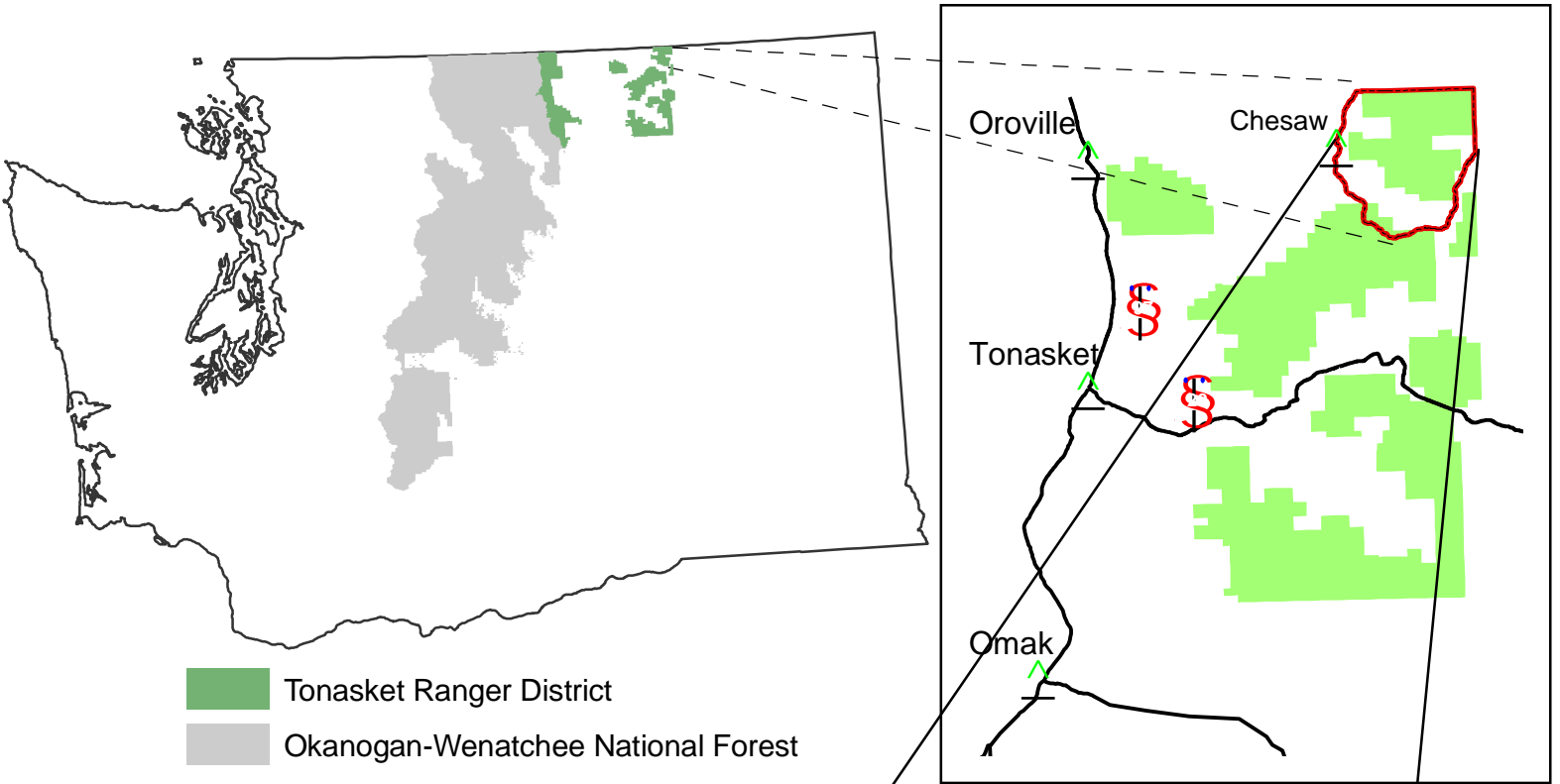
The Buckhorn Access Project is proposed to give Crown/Kinross (the Proponent) access to their private lands within the Buckhorn Block of the Okanogan and Wenatchee National Forests, and provide for facilities on their unpatented claims on National Forest System lands. The mineral deposit and the enclosing lands were originally studied as part of the 1997 Crown Jewel Mine project, when they were under Federal land ownership. The Forest Service and Washington State Department of Ecology prepared an Environmental Impact Statement (EIS) as joint lead agencies. The 1997 Record of Decision for the final EIS approved an open pit mine, and related activities on National Forest System and Bureau of Land Management lands. Because of subsequent voiding or reversal of Washington State permits by the State appellant board, Crown Resources submitted a new Plan of Operations for an underground mine in June 2003, and the Forest Service and Washington State Department of Ecology announced a notice of intent to file a supplemental EIS in September 2003. Subsequently, in December 2004, the lands under which the ore body is located were transferred to Crown Resources Corporation ownership through patenting under the 1872 Mining Law, as amended (1872 Mining Law). Now private, these patented lands remain surrounded by a large block of Crown/Kinross' unpatented mining claims on National Forest System and BLM managed lands. These private lands include the mine itself and most of the mine facilities.

Once the mine site became private land, Forest Service decision space was narrowed to only those activities that still would actually occur on National Forest System lands and rights of way; Crown Resources submitted an amended Plan of Operations covering only those activities in March 2005. The Forests withdrew their notice of intent to file a

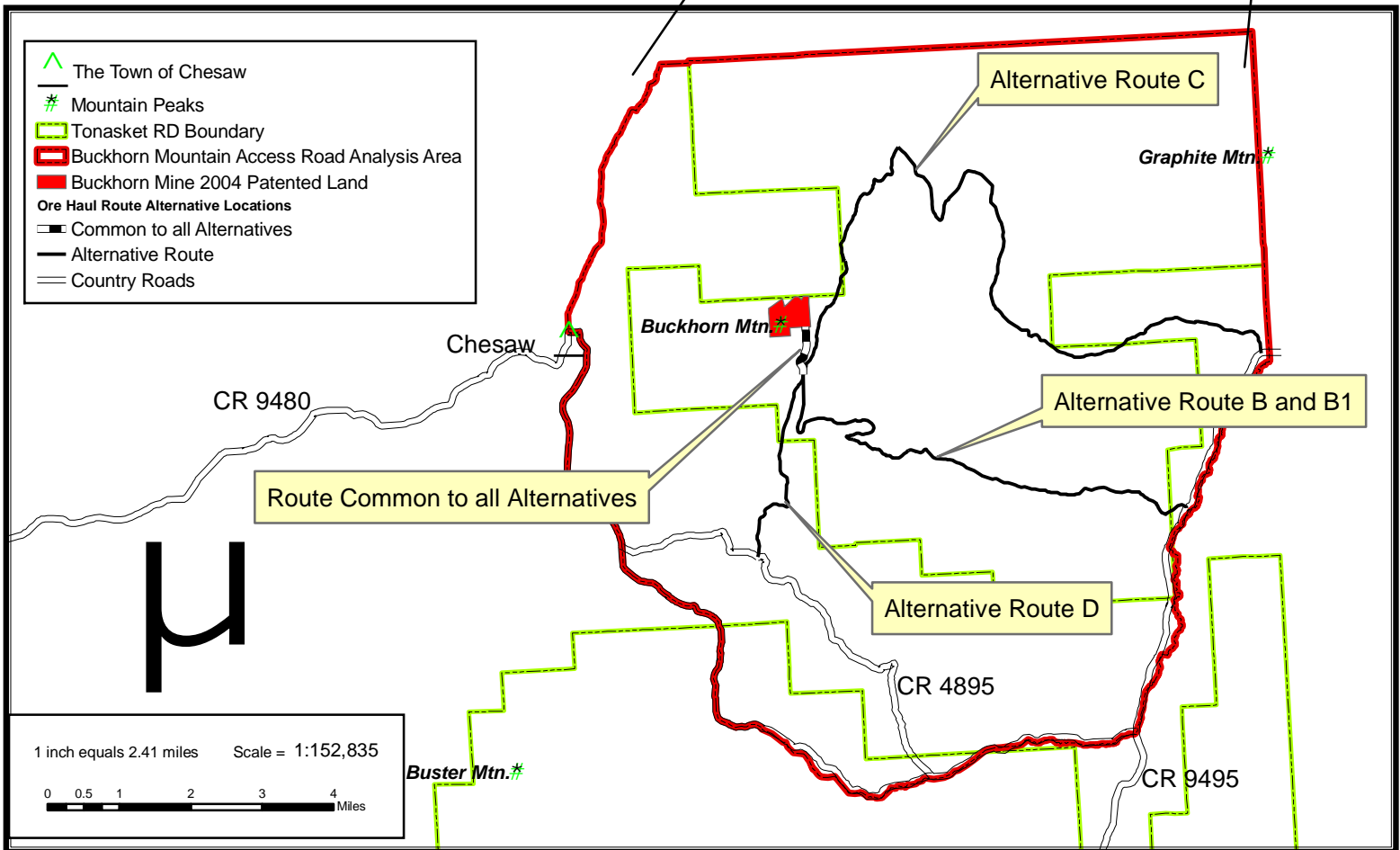
Figure S-1: Vicinity Map

# Project Vicinity Map

## Buckhorn Access Project

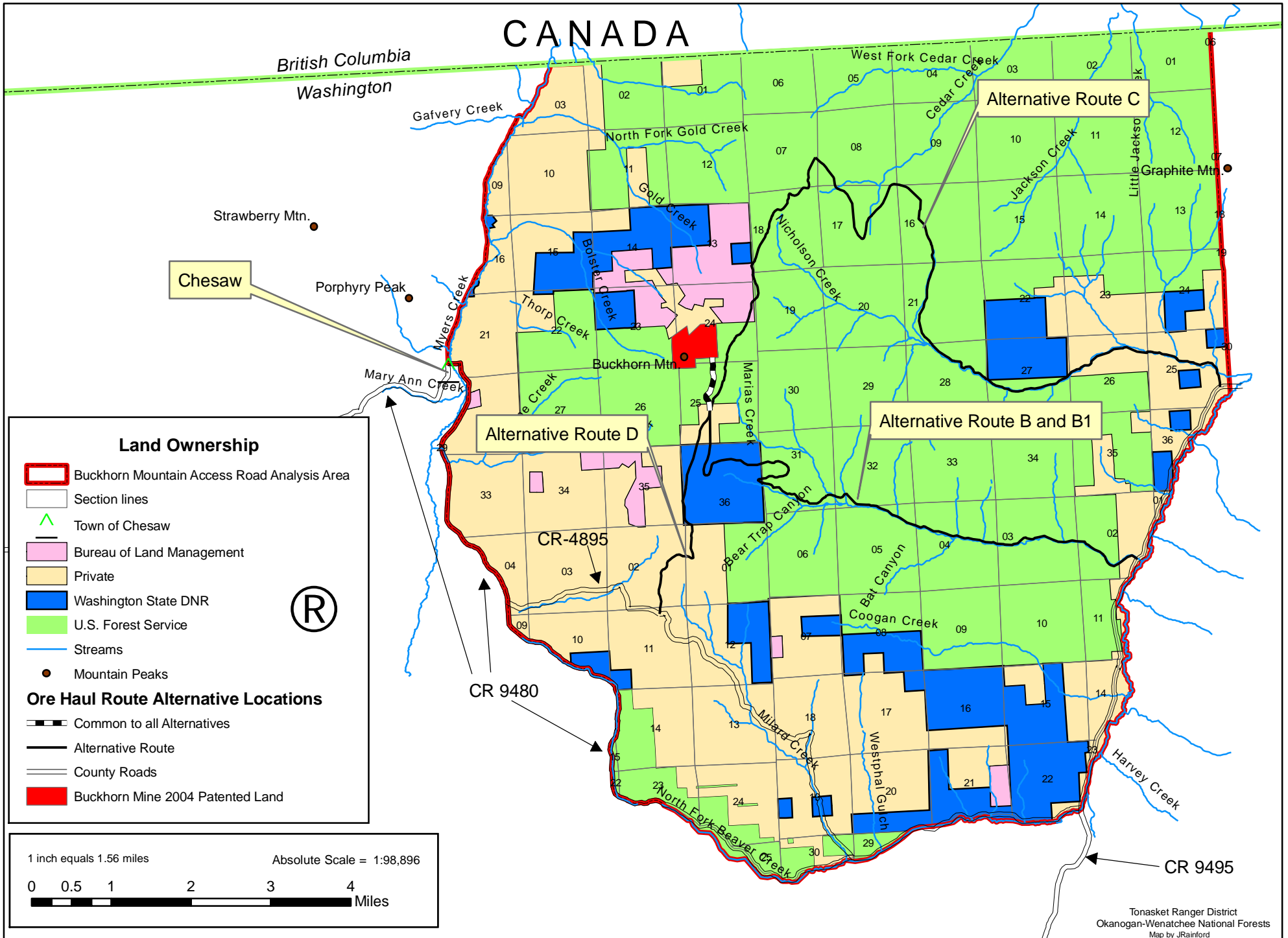


- Tonasket Ranger District
- Okanogan-Wenatchee National Forest



# Buckhorn Access Project

Figure S-2: Ownership Map



supplemental EIS. The Forests initiated new scoping on those activities over which the Forest Service still had decision authority in March 2005. The State of Washington, Department of Ecology (DOE), released a final supplemental EIS in 2006 for the entire mine project and Forest personnel continued to work closely with DOE and the Washington State Department of Fish and Wildlife in designing mitigation and analyzing the activities on National Forest System lands and cumulative effects with activities occurring on State and private lands. The project will eventually require more than 40 permits or authorizations from other Federal, State and local agencies to proceed as described in Washington State DOE's final supplemental EIS (2006). After releasing a preliminary Environmental Assessment for the project in December 2005, the Forest Supervisor made the decision in July 2006 to publish a draft Environmental Impact Statement (DEIS), and released a DEIS in August 2006. Kinross Gold Corporation acquired Crown Resources Corporation on August 31, 2006. The proponent is referred to as Crown/Kinross throughout this document.

## **PURPOSE AND NEED**

The purpose and need for the project is to respond to Crown/Kinross' request for access to their private lands and unpatented mining claims, and to utilize their unpatented mining claims for mining related facilities reasonably incident to mining activities taking place on private lands as required by law, while minimizing impacts to National Forest System lands and considering impacts to residents living along National Forest rights-of-way. The 1872 Mining Law and the Forest Service's Surface Management regulations at 36 CFR 228, Subpart A, and the amended Forest Plan as described above, require that mining claimants be given reasonable access to their unpatented mining claims<sup>1</sup>. The patented lands mining claim group (including recently patented claims) is an inholding surrounded by National Forest System and Bureau of Land Management lands, and the mining claimant has no other reasonable access. The Alaska National Interests Lands Conservation Act of 1980 (ANILCA), provides for access to non-federally owned land adequate to secure the owner reasonable use and enjoyment thereof within National Forest System lands and lands managed by the Secretary of the Interior under the Federal Land Policy and Management Act of 1976. Several amendments to the LRMP may be needed to fulfill this need because reasonable access may not be able to be granted without allowing access through deer winter range or exceeding road density standards in the LRMP or increasing sediment already above the LRMP standard. In addition, the patenting of the Buckhorn Mountain area left Management Area 14-19 in three small parcels, which makes manageability of the area difficult.

## **PROPOSED ACTION**

The Forest Supervisor for the Okanogan and Wenatchee National Forests proposes to approve Crown's Plan of Operations to reconstruct 5.25 miles of the Forest Roads 3550 and 3550-125; construct 1.5 miles of new access road off the end of Forest Road 3550-125 to the lower portal of the mine; and to build a fence, a pipe line, a treated water infiltration area and access roads, monitoring wells, and underground utility conduits (power line, data line, telephone line) on National Forest System lands and rights-of-way. The Proponent would be permitted to utilize these roads daily to haul ore and supplies to and from the private land inholding, once construction is complete. Trucks,

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<sup>1</sup> The infiltration gallery and pipeline, many water monitoring sites and their associated access roads, as well as the upper part of the ore and supply haul routes are on Crown/Kinross unpatented mining claims.

averaging approximately 55 round trips per day (50 ore trucks and 5 supply trucks), would haul along the route, although average daily trips would increase just before and after spring breakup, when hauling is not feasible or permitted. Employee access, 24 hours/day, would be allowed on the haul route and Forest Roads 3575-120, 3575, 3575-100, and 3575-150. Only the haul route, Forest Roads 3575-120 and 3575-140 to the water tower, access roads to the infiltration gallery and pipeline (3575-120, 3575-125, 3575-127, and 3575-142), and to monitoring wells and surface water monitoring sites may be snowplowed. In addition, the following structures would be constructed to compensate for impacts to wildlife and range operations:

- a corral in lower Marias Creek,
- a well servicing three cattle troughs in mid-Marias Creek
- a water augmentation line from the infiltration gallery pipeline to the Roosevelt Adit and to a new water trough in upper Marias Creek
- water guzzlers in the headwaters of Ethel and South Fork Bolster Creeks

During initial construction, about 8 months in length, the Pontiac Ridge/Cow Camp access route, Forest Road 3575-120, and Forest Road 3575-140 would be used by the Proponent. After approximately 3 months for construction/ reconstruction of the Marias Creek haul road, most construction traffic would switch to that route.

The proposed action would require amendments to four Forest Plan standards and guidelines, two relating to road density, one relating to designation of an open route through deer winter range, and one relating to sediment. Road density standards would be exceeded in MA14-18 and 14-19, and the Marias Creek road would be designated as an open route where it passes through deer winter range in MA-14 and MA-26. Sediment in Marias Creek currently exceeds the Forest Plan standard for 20% fines, and this project would introduce additional sediment into the creek. In addition, the three small parcels left of MA14-19 after land patenting would be combined with their adjacent management areas. This alternative is presented as Alternative B in the FEIS.

## **DECISION FRAMEWORK**

The Forest Supervisor for the Okanogan and Wenatchee National Forests must decide whether or not to approve the Proponent's Plan of Operations as submitted, or approve a Plan of Operation and road use permit for another route or with additional mitigation measures and monitoring items. Additionally, the Forest Supervisor must decide whether to grant a special use permits to the Ferry County PUD and other providers for utility access. The Forest Supervisor will consider both the impacts as a result of project activities on National Forest System lands and rights-of-way, and cumulative impacts off of National Forest System lands, particularly to home owners along National Forest System rights-of-way, in choosing the preferred alternative. The Forest Supervisor must also decide whether or not to amend the Okanogan National Forest Land and Resource Management Plan to implement the project. Table S-1 below indicates the potential permits, associated with the Buckhorn Access Project (other permits are required on State and private lands for the Buckhorn Mountain Project to implement the project analyzed in the State of Washington Department of Ecology, FSEIS, 2006):

**Table S-1: Potential Permits Required for the Buckhorn Access Project**

<b>Permit</b>	<b>Issued to</b>	<b>Permitting Agency</b>
Plan of Operations	Crown/Kinross	Forest Service
Road Use Permit	Crown/Kinross	Forest Service
Powerline Special Use Permit	Ferry County PUD	Forest Service
Telephone/Dataline Special Use Permit <sup>2</sup>	Verizon Northwest	Forest Service
Nationwide Clean Water Act 404 Permit (wetlands)	Crown/Kinross	Corps of Engineers
Stormwater Permit	Crown/Kinross	Environmental Protection Agency
National Pollutant Discharge Elimination System (NPDES) 402 Permit (infiltration/augmentation)	Crown/Kinross	Washington State Department of Ecology
Hydraulic Project Approval	Crown/Kinross	Washington State Department of Fish and Wildlife

## **PUBLIC INVOLVEMENT AND CONSULTATION**

### **Scoping**

On March 29, 2005 a scoping package was mailed to the list of individuals who had been known to have commented during the 2003 scoping process. Some individuals were missed in that mailing and an additional mailing was done in April 2005, including residents on rural postal routes and post office box holders in the vicinity of the project, and all individuals were notified that the scoping period was being extended by 15 days. Over 100 letters were received in response to the 2005 scoping effort.

A preliminary Environmental Assessment was sent to the public and agencies on December 8, 2005 for a 30-day comment period. 116 timely letters, and several untimely letters were received. The Interdisciplinary Team spent several days in January 2006 considering all comments and documenting responses. Additional time was spent clarifying, editing and supplementing the analysis prior to publication of the draft Environmental Impact Statement. The Forest Service decided to convert the EA to an Environmental Impact Statement because enough questions had been raised both internally and externally about possible significant impacts that an EIS was appropriate. Scoping was reinitiated with the filing of the Notice of Intent to file an EIS in the Federal Register in July 2006; 14 additional letters were received during the additional scoping period, resulting in two new issues, although only one was determined to be a key issue. A draft Environmental Impact Statement was published in August 2006 for a 45-day comment period. Forty-two letters, and several untimely letters, were received in response to the DEIS. Because a few individuals and organizations were missed during the mailing of the DEIS, those individuals were also given a separate 45-day comment period on the DEIS, and one letter was received. All comments received on the preliminary EA and DEIS are summarized and responded to in Appendix F of this FEIS.

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<sup>2</sup> May not be necessary if Crown/Kinross decides to use satellite technology

## **Consultation and Coordination**

Separate government to government consultation was conducted with the Yakama Indian Nation and the Confederated Tribes of the Colville Indian Reservation. Consultation was initiated in September, 2003, and has continued throughout development of this Environmental Impact Statement. The Colville Tribes have reserved rights for hunting, fishing and gathering in the project area. Consultation with the Confederated Tribes was completed in January, 2007. The Yakama Indian Nation expressed no concerns regarding the project. Numerous meetings occurred and correspondence exchanged to explain the project and its effects, and consult with the Colville Tribal Council and its sub-committees and personnel. Documentation of all correspondence and meetings can be found in the project record.

Consultation has been completed with the State Historic Preservation Officer and a concurrence letter dated October 14, 2005 was received for those activities requiring consultation. Consultation has been re-initiated as a result of a new heritage find near the junction of the Toroda and Marias Creek roads, and final concurrence letter was received dated December 18, 2006.

Consultation with the U.S. Fish and Wildlife Service was initiated in September 2004 prior to the land patenting. U. S. Fish and Wildlife Service concurred with the Forests determination that the project would not adversely affect any threatened or endangered species. Additional consultation was conducted in January, 2006 and UFWFS again concurred with the determinations in a letter dated February 16, 2006.

This project has been closely coordinated with the State of Washington, Department of Ecology. Forest Service interdisciplinary team (IDT) members have been involved in the development and review of much of the State's analysis and the Forest Service has sought reviews by the DOE during the development of this EIS. Mitigation development was also coordinated with the Washington State Department of Fish and Wildlife.

The Forest Service also coordinated with the U. S. Army Corps of Engineers regarding impacts and mitigation to wetlands on NFS lands and the U. S. Environmental Protection Agency (EPA) regarding completion of the EIS. Coordination with EPA consisted of meetings, letters and other correspondence, telephone conversations and a field trip.

## **Issues**

Issues were identified during the public scoping process that raised concerns about the proposed action. These key issues were utilized to develop alternatives or additional mitigation and monitoring not included in the proposed action. The issues identified below as a result of public scoping are considered important enough to analyze in detail. Each issue also identifies how the issue will be measured during the analysis process.

1. Construction of the boundary fence on National Forest System lands will remove more land than was patented from use by wildlife, recreationists, Tribal members, and the grazing permittee.

### *Measured by:*

- *Acres closed on NFS lands,*
- *Miles of boundary fence on NFS lands, and*

- *Qualitative discussion of impact of boundary fence on wildlife, recreationists, Tribal members and grazing permittee.*
2. Cows will get inside the mine boundary fence or could be injured or killed on access roads, increasing range permittee expenses.

*Measured by:*

- *Qualitative discussion of the potential for cows to get inside fence and potential for increased permittee expenses,*
  - *Miles of road fenced along access roads,*
  - *Miles of fence constructed, and*
  - *Estimated numbers of cows killed or injured annually.*
3. Construction, reconstruction and haul along the proposed haul routes will cause sedimentation and toxic substances to enter and degrade riparian areas and wetlands, decreasing water quality, and adversely impacting fish, amphibians, and plants that use these areas.

*Measured by:*

- *Miles of unpaved haul road on National Forest System lands*
  - *Tons of sediment increased in streams,*
  - *Miles of construction within riparian habitat conservation areas,*
  - *Acres of construction in riparian habitat,*
  - *Acres of construction in wetlands, seeps, springs and ponds,*
  - *Acres of construction within wetland riparian habitat conservation areas,*
  - *Water temperature increases,*
  - *Number of threatened, endangered, or sensitive plants destroyed,*
  - *Estimated annual tons/gallons of toxic supplies hauled over National Forest System lands, and*
  - *Qualitative discussion regarding potential for toxic substances to enter streams, riparian areas, aquatic species and wetlands.*
4. Construction, reconstruction, haul, and employee traffic on proposed haul routes will cause air quality degradation from dust, exhaust and other toxic substances that will impact vegetation, tourism, recreational activities, viewpoints, aesthetic enjoyment of the area, and the quality of life, health, safety and solitude for residents.

*Measured by:*

- *Tons of total suspended particulates (TSP) produced,*
- *Tons of PM10 size particulate matter produced,*
- *Qualitative discussion of effects of dust on vegetation,*
- *Number of potential viewpoints where dust is likely to be seen,*
- *Number of residences along each potential haul route,*
- *Cumulative number of residences along potential haul route to junction of Forest Road 3575 and Okanogan County Road 9495,*
- *Qualitative discussion regarding impact on residential quality of life, health, safety and solitude,*
- *Number of dispersed sites along potential haul routes,*
- *Qualitative discussion regarding impact on recreation,*
- *Changes in visibility in Class I airsheds, and*
- *Miles of proposed road pavement on ore haul route.*



5. Heavy mine traffic will increase noise from trucks and use of compression brakes, which will impact tourism, recreational activities, aesthetic enjoyment of the area, the potential wilderness, and the quality of life and solitude for residents. Noise from the new road on the open south facing slopes of Marias Creek will carry for long distances and potentially impact property owners along Pontiac Ridge road and Millard Creek. Noise adjacent to the Jackson Creek Inventoried Roadless Area could affect its potential for wilderness designation.

*Measured by:*

- *Qualitative discussion on potential noise effects on Coogan and Nicholson-Marias Ridge unroaded areas,*
- *Number of residences along potential haul routes,*
- *Number of dispersed sites along potential haul routes,*
- *Noise levels at 50', 100', 200' and 500' from haul routes,*
- *Acres with noticeable noise effects on Jackson Creek inventoried roadless area,*
- *Qualitative discussion of effect on future potential wilderness designation of Jackson Creek inventoried roadless area, and*
- *Qualitative discussion regarding impacts on residential quality of life and solitude from noise.*

6. Project activities will disturb wildlife, including threatened, endangered and sensitive species, through human presence, noise, and increased road density, and will create a semi-impermeable barrier to movement from the ore truck route.

*Measured by:*

- *Acres of impacted lands within set distances of haul, supply and employee routes during construction and during operations for species sensitive to disturbance (distance varies by species),*
- *Road density by management area,*
- *Miles of road in deer winter range,*
- *Miles of road in deer summer range, and*
- *Qualitative discussion of impacts from barrier along haul routes.*

7. Traffic to and from the mine will spread noxious weeds onto National Forest System lands or from National Forest System lands to other ownerships. The company's proposal to use herbicides to treat noxious weeds has the potential to affect non-target species.

*Measured by:*

- *Acres of soil disturbance,*
- *Acres of existing noxious weeds along haul routes,*
- *Potential for use of herbicides under existing decisions, and cumulative effects analysis of effect on non-target species, and*
- *Qualitative discussion of potential for weed spread onto NFS lands across NFS lands and from NFS lands to private lands.*

8. The proposed action will have cumulative impacts with the mine and borrow site, which will have significant effects on the environment, and will have cumulative impacts with other past, present and reasonably foreseeable future actions.

*Measured by:*

- *Decreases in area stream flows at average annual precipitation for cumulative activities*
- *Qualitative assessment of effects on seeps, springs, ponds and wetlands from cumulative activities*
- *Potential for introduction of noxious weeds from borrow site, and*
- *Impacts on Toroda Creek stream flows from water use for dust abatement*
- *Cumulative number of residences along potential haul route to junction of Forest Road 3575 and Okanogan County Road 9495.*

9. Use of dust suppression or snow removal chemicals and/or water may cause impacts to streams, wetlands and riparian areas.

*Measured by:*

- *Potential for chemicals to reach streams, wetlands, RHCA's and riparian habitat,*
- *Qualitative discussion of the effects of magnesium and sodium chloride on vegetation,*
- *Potential increases of chlorides in streams, and*
- *Comparison of increases in chlorides to surface water quality criteria and threshold for impacts to fish.*

10. Increasing daily haul trips before and after spring break up will greatly increase impacts of homeowners along routes.

*Measured by:*

- *Increased number of daily trips by alternative before and after spring breakup,*
- *Number of homeowners along each route, and*
- *Passage rates of ore haul trucks before and after spring breakup.*

11. Road construction, reconstruction, haul, employee traffic, and mining will adversely affect members of the Confederated Tribes of the Colville Reservation and may impact cultural resources of concern to Tribal members, and their reserved rights reserved by Executive Order, to hunt, fish and gather on the former north half of the Colville Reservation.

*Measured by:*

- *Number of historic properties affected;*
- *Qualitative discussion of big game expected to be lost due to project activities,*
- *Qualitative discussion of fish expected to be lost due to project activities,*
- *Qualitative discussion of potential to impact cultural plants, and*
- *Indian allotments within 2 miles of haul, employee and supply routes.*

12. Mine traffic has the potential to disturb residents during non-haul hours along Forest Service rights-of-way.

*Measured by:*

- *Hours of expected truck traffic outside of 6AM to 6PM,*
- *Hours of operation along haul, employee and supply routes,*
- *Number of vehicles expected to operate outside of 6AM to 6PM, and*
- *Miles of proposed road pavement on ore haul route.*

13. The water infiltration gallery on National Forest System lands will impact water quality and quantity in seeps, springs, ponds, wetlands, aquifers, residential wells and creeks/the infiltration gallery does not belong on National Forest System lands.

*Measured by:*

- *Acres of disturbance from water infiltration gallery and related facilities,*
- *Potential impacts to flows to springs, seeps, ponds and wetlands as a result of water infiltration,*
- *Potential increases in chlorides in streams and aquifers, and*
- *Qualitative discussion on potential for impacts on aquifers, residential wells and creeks from water infiltration on National Forest System lands.*

14. New road construction is unnecessary and will increase already high road densities and cause higher maintenance costs.

*Measured by:*

- *Miles of new road construction by alternative,*
- *Open road density by alternative, and*
- *Maintenance costs by alternative*

## **CHANGES BETWEEN DRAFT AND FINAL EIS**

The major changes between draft and final EIS relate to cumulative effects between the Buckhorn Access Project and the State of Washington, Department of Ecology's final supplemental EIS for the Buckhorn Mountain (Mining) Project. The Forest Service DEIS relied on information in WADOEs DSEIS because that was the most current finalized information available. Changes in the Forest Service FEIS primarily relate to water quantity and quality, their indirect effects to aquatic life and wetlands, and the adaptive management strategy. Outfalls have been identified on maps and figures have been provided showing water treatment and management in relation to outfalls. Additionally an error in the chloride calculations has been corrected, and sand used for winter traction has been added to sediment estimates. Disturbance acres have been updated based on more recent information from the Proponent, and partial reclamation of the Marias Creek road (Forest Road 3550 and 3550-125) to its original usable surface has been included in Alternative B1 in response to issues raised internally and externally relating to road maintenance costs. More information is provided regarding the archaeological site found near the Toroda and Marias road junction. Appendix F has been added for Response to Comments on the preliminary EA and DEIS<sup>3</sup>.

## **ALTERNATIVES**

Alternatives were developed and analyzed to address environmental and social issues, to respond to public and agency concerns and input, and to satisfy regulations of the National Environmental Policy Act (NEPA). Scoping, as discussed in Chapter I, was used to identify concerns and potential issues. Key issues were identified in an interdisciplinary process by the Interdisciplinary Team using information gathered during public and internal scoping, site specific knowledge of the analysis area, resource expertise, and professional judgment.

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<sup>3</sup> Required by NEPA Implementing Regulations.

The key issues were used to formulate the alternatives by emphasizing resolution of one or more issues within an alternative. Management requirements, mitigation measures, and monitoring requirements were incorporated into the development of the alternatives. The objective of developing and reviewing the alternatives is to provide the agency decision-maker and the public with a reasonable range of alternatives for consideration.

### **Alternative A – No Action Alternative**

Under this alternative, new approvals for the use of National Forest System lands would not be granted. The No Action Alternative would preclude the installation of an infiltration gallery; the reconstruction, construction, and new use of roads; the installation of a new monitoring well; and the installation of utility lines on National Forest System land. Complete reclamation of previous exploration and development activities would commence at the first available opportunity, as approved in previous NEPA documents.

There would be no additional physical disturbance to National Forest System lands except what has been previously approved as part of environmental documents prepared for exploration and pre-development activities.

Reclamation on National Forest System lands under existing NEPA decisions for exploration and pre-development activities would consist of plugging and capping existing monitoring wells and piezometers, re-contouring access roads to monitoring wells, re-vegetation with grasses, shrubs, and/or trees of previously disturbed sites, removing weirs and water level recording equipment from existing surface water monitoring sites, and the monitoring of reclamation activities.

This alternative is required under the National Environmental Policy Act, and provides a baseline for comparison of effects. The Proponent, however, is entitled to reasonable access to their private lands and unpatented mining claims under ANILCA and the 1872 Mining Law, as amended.

### **Forest Plan Amendments Included in Action Alternatives**

Due to the structure of mineral laws and regulations, the Forest Service's Minerals Management Programs are largely responsive in nature. A major part of these programs is responding to applications and proposals submitted from outside the agency. Forest Service responsibility for such mineral exploration and mining proposals lies mainly in providing reasonable surface protection and reclamation requirements within specified time frames and in assuring compliance of the same. Management implications for the Forest Service require that mineral exploration and development be facilitated while accommodating the needs and conservation of other resources to the fullest extent possible.

To provide the proponent with reasonable access to their private lands under ANILCA and unpatented mining claims under the 1872 Mining Law, if approved, the Forest Service would include amendments to the Okanogan National Forest Land and Resource Management Plan (Forest Plan). These amendments are part of this NEPA document. The Forest Plan did not attempt to accommodate potential large mining

operations when developing Management Area Standards and Guidelines because of the difficulty in predicting actual locations or kinds of developments. It was expected that such operations would not be able to meet standards and guidelines developed principally for vegetation management projects (see page 4-21 of the Forest Plan). If an action alternative is selected, this decision would include non-significant amendments of the Forest Plan.

To implement this project, non-significant, site-specific amendments involving one Forest Plan Forest-wide standard and guideline, and three Forest Plan management area standards and guidelines are required under some alternatives. Most of Management Area (MA) 14 -19 was transferred to private ownership in the December 2004 patenting, leaving three small isolated areas behind. Under all action alternatives, MA 14-19 would be dissolved and combined with the two adjacent Management Areas due to the small area remaining in the Management Area after patenting.

Management Area 14-18 (Alternative B) would exceed Forest Plan Standard and Guideline MA 14-17A; limiting open road densities to two miles open to motorized use per square mile. The current road density in this Management Area is 3.8 miles per square mile. After proposed road construction, road density would increase to 4.2 miles per square mile in Alternative B. Although Management Areas 26-15 and 26-16 currently do not meet Forest Plan standards, project activities would not affect road densities in these management areas (except as described below) so no amendment is required.

Management Area 14-18 (Alternatives B and B1) would not meet Forest Plan Standard and Guideline MA 14 -17B; prohibiting motorized access in deer winter range, December 1<sup>st</sup> through March 31<sup>st</sup>, except for designated through routes. Portions of the Marias Creek haul route, Forest Road (FR) 3550-125, which is not currently designated as a through route, would be designated as a through route for project ore and supply haul and employee access during the winter for the life of the project. Closing the mining operation down for four months a year was not considered to provide reasonable access.

Snowplowing would be permitted in Management Area 14-18 under all alternatives along the designated ore and supply haul route, and FR 3575-143 to provide access to the water tower. These roads would not be open to the public from December 1<sup>st</sup> to March 31<sup>st</sup>.

Marias and Nicholson Creeks presently exceed Fisheries Forest-wide Standard and Guideline 3-3. "Fines in spawning areas (pool tail-outs and glides) should be maintained at less than 20 percent as the area weighted average." Fines in lower Marias Creek on National Forest System lands presently average 32 percent (Reach 3) and average 21 percent in Nicholson Creek (average of two reaches). In looking at the data for 79 individual pools, 80% of the pools in Marias Creek were below 20% embedded and thus met the guideline. About 40% of the remaining pools were more than 80% embedded which indicates these serve as sediment catchment pools. Though generally not considered good sites for spawning, such pools provide hiding and rearing habitat and thermal refuge for fish. Nicholson Creek is similar. All alternatives would slightly increase fines in Marias and Nicholson Creeks.

Because of the small size of MA 14-19 remaining, approximately 68 acres, after patenting, 66 acres of this Management Area would be combined with MA 26-15. Both Management Areas are Deer Winter Range emphasis. Standards and Guidelines for MA-26 are more restrictive of management activities so a higher level of protection to deer would be afforded under this combination. 2 acres of MA 14-19 would be combined with MA 25-18. A lower level of protection to deer would be afforded under this combination but the amount of area involved is not significant.

Some long-term effects would occur with the construction/reconstruction of the mine access roads, which would remain at the end of project activities. Forest Road 3550-125 would again be closed December 1<sup>st</sup> to March 31<sup>st</sup> in MA 14-18 at the end of ore haul.

The amendments would be non-significant as defined in 36 CFR, Part 219, 219.10, because the amendments would not result in any substantial changes in overall outputs or effects predicted in the Forest Plan. These amendments are non-significant amendments to the Forest Plan for the following reasons:

- Timing: The timing factor examines at what point over the course of the Forest Plan period the Plan is amended. Both the age of the underlying document and the duration of the amendment are relevant considerations. The Forest Service Handbook indicates that the later the time period, the less significant the change is likely to be. The Okanogan Forest Plan was approved in 1989, 17 years ago, and is currently being revised and a new Forest Plan should be signed in 2007.
  - The new Plan would incorporate new science regarding the location and management of deer winter range and would likely provide direction that supersedes the current deer management standards and guidelines.
  - The new Plan would incorporate new science regarding the management of fish habitat and would likely provide direction that supercedes the current management standards and guidelines and is similar to INFISH.
  - Use of Forest Road (FR) 3550-125, including new construction in Section 31, during the winter range closure period of December 1<sup>st</sup> to March 31<sup>st</sup> would be for a period of less than 10 years (Alternatives).
  - Snowplowing in Management Areas 14-18 and 14-19 would only be allowed on the designated ore and supply haul route, and Forest Road 3575-143 to provide access to the water tower. These roads would not be open to the public from December 1<sup>st</sup> to March 31<sup>st</sup>.
  - Alternative B1 would close roads in Bear Trap Canyon in Management Areas 14-18, 25-18 and 26-16 reducing project road density in all three Management Areas, so no amendment to Standard and Guideline MA 14-17A is needed in this alternative.
  - The fencing of much of lower Marias Creek off from cattle use, and the construction of hardened cattle crossing/watering areas in Marias Creek should decrease sediment delivery from trampling of stream banks by cattle.
  - Hydrologic modeling using the WEPP model and additional analysis outside the model indicates that there should be little change in stream

sedimentation in these drainages due to the numerous erosion prevention measures incorporated as part of road construction/reconstruction for the mine haul route.

- *Location and Size:* Two of the three amendments only apply to MA's 14-18 and 14-19, an area of less than 1.2 square miles, 750 acres. The road totals about 1.5 miles in length within these MA's. The third amendment is to correct a technicality that is in the Forest Plan. The objectives of providing areas for fish reproduction are met. In looking at the data for 79 individual pools, 80% of the pools in Marias Creek were below 20% embedded and thus met the guideline.
  - The 1872 Mining Law and the amended Forest Plan, require that mining claimants be given reasonable access to mining claims. The newly patented lands are an inholding surrounded by National Forest System and Bureau of Land Management lands, and the mining claimant has no other reasonable access. The Alaska National Interests Lands Conservation Act of 1980 (ANILCA) also provides for access to non-federally owned land adequate to secure the owner reasonable use and enjoyment thereof under the Federal Land Policy and Management Act of 1976.
  - The snowplowing amendment only applies to about 6 acres of land in these two Management Areas.
  - This does not change management direction for the rest of the 1.7 million acre Okanogan National Forest.
- *Goals/Objectives/Outputs:* The change would not alter the long-term relationships between the levels of goods and services projected by the Forest Plan.
  - The General Mining Law of 1872, as amended, established the statutory right of U.S. Citizens to explore for and/or develop mineral resources and encouraged such activity consistent with the Mining and Mineral Policy Act and the Federal Land Policy and Management Act. The regulations for implementing these laws require responsible federal agencies to include adequate provisions to minimize, to the extent practicable, and comply with other applicable federal and state laws and regulations.
  - Due to the structure of mineral laws and regulations, the Forest Service's Minerals Management Program is largely responsive in nature. A major part of the minerals management program will be responding to applications and proposals submitted from outside the agency. Forest Service responsibility for such proposals lies mainly in providing reasonable surface protection and reclamation requirements within specified time frames and in assuring compliance of the same. The basic objective will be to facilitate minerals exploration and development on National Forest System land while accommodating the needs and conservation of other resources to the fullest extent possible. This is acknowledged in the Forest Plan on page 4-21.
  - The goals of INFISH are being met by the project because adverse impacts to inland native fish are being avoided.

- Management Prescription:
  - The designating of Forest Road (FR) 3550-125 and the new haul route to the Lower Portal as designated through routes, for the period of December 1<sup>st</sup> to March 31<sup>st</sup>, does not change any management prescriptions. It meets the structure of mineral laws and regulations and the Forest Service's Minerals Management Program.
  - The adding of MA 14-19 to MA 26-15 and MA 25-18 would change management prescriptions. In the case of MA 26-15, standards and guidelines would be more restrictive for timber harvesting and grazing use, but a higher level of protection would be provided for deer. The two acres added to MA 25-18 are considered incidental.

### **Alternative B – Proposed Action**

This alternative is Crown/Kinross's proposal for use of National Forest System lands to mine the minerals deposit on patented lands and transport ore to an existing mill outside of Republic, Washington. This alternative uses Forest Road 3550 (Marias Creek) and 3550-125, along with new construction of a road to the lower portals on private lands. This alternative is based on the Amended Plan of Operations for the Proposed Buckhorn Mt. Project on Lands Administered by the US Forest Service (Crown Resources, 2005) submitted on March 15, 2005 and subsequent clarifications of this plan. This amendment was necessary due to changes in the land status because of the issuance of patents for the Buckhorn Mountain ore deposit. A map of this alternative is included as Figure S-3, Alternative B, at the back of this summary. Details relating to this alternative are provided in Table S-2, which follows the description of alternatives.

### **Alternative B1 – Modified Proposed Action**

Modifications to the Proponent's proposal were made to respond to as many public and agency issues as possible, while still using the Marias Creek ore and supply haul route. Issues addressed with this alternative are:

- Paving and washing of the first 0.5 miles of the Marias Creek road would provide for safety by allowing track-on to occur on the Forest Service road and reduce dust.
- Paving of the first 0.5 miles of the Marias Creek road would reduce the amount of dust suppression chemicals that would need to be used potentially reducing chemical impacts to streams, wetlands, and riparian areas; most of this section of road is directly adjacent to Marias Creek.
- The speed limit would be 25 mph, as opposed to 30 mph in Alternative B, decreasing accidents with other vehicles and wildlife and dust.
- Road reclamation of the new road between the 3575-120 road and the patented land would be more extensive. Road reclamation of the portion of road across National Forest System land and right-of-ways from the end of the pavement to Forest Road 3575-120 would return this road to its present 17 – 18' usable surface at the end of the project.



- Road closures in MA 14-18 would eliminate the need to amend the Okanogan National Forest Land and Resource Management Plan road density standard in MA 14-18.
- Empty ore trucks would not be allowed to operate outside of 6:00 a.m. to 6:00 p.m. to minimize impacts to residents and wildlife.
- Access from December 1 to March 31 for water monitoring would only be permitted by snowmobile to minimize impacts to wildlife, unless on a road already plowed for other mine activities.
- Restricting supply trucks to between 6:00 a.m. and 6:00 p.m. on National Forest roads, except infrequent, unplanned supply traffic necessary to provide immediately needed supplies, would decrease impacts to tourism, aesthetic enjoyment of the area, the quality of life and solitude for residents, recreational activities, and wildlife.

The main differences between this alternative and the Proponent's proposal has to do with road reclamation of the new road between FR 3575-120 and the patented land; reclamation of Forest Roads 3550 and 3550-125 back to its present width at the end of ore haul; paving the lower 0.5 miles of the haul route from Toroda Creek Road to 150' past the first crossing of Marias Creek; ore and supply haul trucks, either loaded or unloaded, would only be allowed on Forest Roads between 6:00 a.m. and 6:00 p.m., except infrequent, unplanned supply deliveries; reducing the speed limit on Forest roads to 25 mph; and allowing only snowmobile access for water monitoring December 1 to March 31 on roads not approved for snowplowing.

A map of this alternative is included as Figure S-4, Alternative B1, at the back of this summary. Details relating to this alternative are provided in Table S-2, which follows the description of alternatives.

### **Alternative C**

This alternative was designed to use a different ore, supply, and employee access route than the Marias Creek route to address issues that arose relating to the Marias Creek route. Many of the same issues relating to the Marias Creek route simply transfer to the Nicholson Creek route, but a different land base and set of residents would be affected. Because of the greater number of residents living along the Forest Service right-of-ways in this alternative, additional mitigation measures were added to reduce impacts to those residents.

The main differences between this alternative and the Proponent's proposal include:

- The ore and supply haul route would be the Nicholson Creek route which responds to the dust and noise issues raised by residents on the Pontiac Ridge Road and Marias Creek, and sedimentation issues associated with Marias Creek.
- Road reclamation standards for the new road between FR 3575-120 and the lower portal.
- Paving the lower portions of the haul route from Toroda Creek Road to 50' past the cattle guard after private land (2.4 miles paved) to minimize the effects of dust on residents, minimize the use of dust suppressants, and avoid track-out onto County Roads.

- 25 mph speed limit.
- Ore haul trucks, either loaded or unloaded, would only be allowed to haul between 6:00 a.m. and 6:00 p.m. on National Forest System roads, Monday – Saturday to minimize impacts to residents outside normal working hours and on Sundays.
- Supply haul trucks would be restricted to a 6:00 a.m. to 6:00 p.m. schedule, Monday – Friday, except for infrequent unplanned, unforeseen supply shortages to minimize impacts to residents outside normal working hours.
- Access from December 1 to March 31 for water monitoring would only be permitted by snowmobile to minimize impacts to wildlife, unless on a road already snow plowed for other mine activities.
- There is a lower need for land disturbing mitigation due to impacts to the Cedar grazing allotment. Where the cattle congregate in the north pasture is mostly away from the haul route, so less mitigation would be needed than Alternatives B and B1 to reduce the interaction between haul vehicles and cattle; and
- Amendments to the Okanogan Forest Plan for travel through deer winter range and road density in MA 14-18 are not needed. Forest Road 3575 is presently a designated open road through deer winter range.

A map of this alternative is included as Figure S-5, Alternative C, at the back of this summary. Details relating to this alternative are provided in Table S-2, which follows the description of alternatives.

### **Alternative D**

This alternative was designed to result in the least impacts to National Forest System lands, particularly relating to sedimentation, air quality, water quality, recreational impacts, wildlife, and road maintenance impacts. Because more residents live along Forest Service rights-of-way in this alternative than in Alternatives B and B1, paving of the road past most of these residences was incorporated into the alternative to reduce air quality impacts to these residents and supply and ore haul days were restricted to Monday through Friday.

The main differences between this alternative and the Proponent's proposal are:

- The ore and supply haul route would be from OCR 4895 (Pontiac Ridge Road) up FR 3575-120, minimizing disturbance on National Forest System land.
- Road reclamation of the new road between the 3575-120 road and the patented land.
- Paving the lower portion of the haul and supply route from OCR 4895 to Section 36, DNR land (1.3 miles paved).
- 25 mph speed limit.
- Ore haul trucks, either loaded or unloaded, would only be allowed to haul between 6:00 a.m. and 6:00 p.m. on National Forest roads, Monday – Friday.
- Supply haul trucks would be restricted to a 6:00 a.m. to 6:00 p.m. schedule, Monday – Friday, except for infrequent unplanned, unforeseen supply shortages.

- Access to water monitoring sites during snowbound months would only be permitted by snow machine to minimize impacts to wildlife, unless on a road already plowed open for other mine operations. Several surface water monitoring stations are located in closed areas in deer winter range in the Ethel Creek drainage and along Forest Road 3575-100.
- A lower need for range mitigation since very little of the Cedar allotment on National Forest System land would be affected by this alternative.
- Amendments to the Okanogan Forest Plan for travel through deer winter range and road density in deer winter range in Management Area 14-18 and stream fines in Marias and Nicholson Creeks are not needed.

A map of this alternative is included as Figure S-6, Alternative D, at the back of this summary. Details relating to this alternative are provided in Table S-2 below.

**Table S-2: Comparison of Components by Alternative**

	<b>Alternative A</b>	<b>Alternative B</b>	<b>Alternative B1</b>	<b>Alternative C</b>	<b>Alternative D</b>
Ore Haul Route	Not Applicable	Marias Creek (3550, 3550-125, new road to mine site). 8.4 miles total length (OCR to patented land) 1.5 miles construction on National Forest (N.F.) land or N. F. ROW, 5.2 miles reconstruction on N. F. System land or N.F. ROW.	Marias Creek (3550, 3550-125, new road to mine site). 8.4 miles total length (OCR to patented land) 1.5 miles construction on N.F. System land or N.F.ROW, 5.2 miles reconstruction on N.F. System land or National Forest ROW.	Nicholson Creek (3575, 3575-150, 3575-100, 3575-120, new road to mine site; 13.3 miles total length (OCR to patented land site); 0.6 miles of construction on N.F. land or ROW; 12.4 miles of reconstruction on N.F. land or ROW.	Cow Camp to Pontiac Ridge Road (3575-120), new road to mine site; 4.1 miles total length OCR to patented land site; 0.6 miles of construction on N.F. land or ROW; 2.1 miles of reconstruction on N.F. land or ROW.
Ore Trucks/Day	0	50 – 70 round trips/day, mostly Monday to Friday with possible reduced haul on Saturdays and Sundays depending on mill supply needs; About 25 additional trucks per day before and after Spring break-up on County Roads for up to 3 weeks.	50 – 70 round trips/day, mostly Monday to Friday with possible reduced haul on Saturdays and Sundays depending on mill supply needs; About 25 additional trucks per day before and after Spring break-up on County Roads for up to 3 weeks.	Averages 60 round trips/day; most haul Monday to Friday with possible reduced haul on Saturdays. No Sunday haul. About 30 additional trucks per day before and after Spring break-up on County Roads for up to 3 weeks.	Averages 70 round trips/day Monday to Friday. No haul on Saturdays and Sundays. About 35 additional trucks per day before and after Spring break-up on County Roads for up to 3 weeks.
Supply Haul Route During Ore Haul Route Construction	Not Applicable	Hwy 97 to OCR 9480 to OCR 4895 to FR 3575-120 & 3575-140. Average 10 – 20 trucks/day. Snow removal as necessary. Most haul Monday – Saturday.	Hwy 97 to OCR 9480 to OCR 4895 to FR 3575-120 & 3575-140. Average 10 – 20 trucks/day. Snow removal as necessary. Most haul Monday – Saturday.	Hwy 97 to OCR 9480 to OCR 4895 to FR 3575-120 & 3575-140. Average 10 – 20 trucks/day. Snow removal as necessary. Most haul Monday – Saturday.	Hwy 97 to OCR 9480 to OCR 4895 to FR 3575-120 & 3575-140. Average 10 – 20 trucks/day. Snow removal as necessary. Most haul Mon.– Sat.
Supply Haul Route During Operations	Not Applicable	Marias Creek (3550, 3550-125, new road to lower portal); Hwy 20 to OCR 9495 to FR 3550.	Marias Creek (3550, 3550-125, new road to lower portal); Hwy 20 to OCR 9495 to FR 3550.	Nicholson Creek (3575, 3575-150, 3575-100, 3575-120, new road to lower portal); Hwy 20 to OCR 9495 to FR 3575.	Pontiac Ridge to 3575-120, new road to lower portal; Hwy 97 to OCR 9480 to OCR 4895 to FR 3575-120.
Employee Transportation Route	Not Applicable	Any route during snow free months. Only FR 3550 route plowed in winter. If requested by the Proponent, the Forest Service would consider allowing the 3575-120 road to be plowed open in the winter for employee access.	Any route during snow free months. Only FR 3550 route plowed in winter. If requested by the Proponent, the Forest Service would consider allowing the 3575-120 road to be plowed open in the winter for employee access.	Any route during snow free months. Only ore haul route plowed in winter. FR 3550-125 & 130 closed 12-1 to 3- 31. If requested, the F.S. would consider allowing the 3575-120 road to be plowed open in the winter for employee access.	Any route during snow free months. FR 3550-125 & 130 closed December 1 to March 31 <sup>st</sup> (not to be plowed). Only ore haul route plowed in winter. Other access roads may not be plowed in winter.
Operating Schedule Ore Haul	Not Applicable	Loaded trucks 6:00 a.m. to 6:00 p.m. only, 7 days/week. Unloaded ore trucks may be traveling outside 6:00 a.m. to 6:00 p.m. schedule.	Loaded and unloaded trucks – 6:00 a.m. to 6:00 p.m. only; 7 days/week. No ore haul trucks may be on N.F. roads outside these hours.	Loaded and unloaded trucks – 6:00 a.m. to 6:00 p.m. only, 6 days/week (Mon. - Sat.). No ore haul trucks on N.F. roads outside these hours.	Loaded and unloaded trucks – 6:00 a.m. to 6:00 p.m. only; 5 days/week (Mon. – Fri.). No ore haul trucks on NFS. roads outside these hours.
Operating Schedule Supply Haul	Not Applicable	Supplies mostly 6:00 a.m. to 6:00 p.m., 7 days a week. Some trucks outside these hours.	Supplies only 6:00 a.m. to 6:00 p.m., 7 days a week. Only infrequent, unplanned supply traffic outside these hours.	Supplies 6:00 a.m. to 6:00 p.m.; Monday – Friday. Only infrequent, unplanned supply traffic outside these hours.	Supplies 6:00 a.m. to 6:00 p.m.; Monday – Friday. Only infrequent, unplanned supply traffic outside these hours.
Employee Schedule	Not Applicable	Employee start times mostly 6:00 – 8:00 a.m. /p.m.	Employee start times mostly 6:00 – 8:00 a.m. /p.m.	Employee start times mostly 6:00 – 8:00 a.m. /p.m.	Employee start times mostly 6:00 – 8:00 a.m. /p.m.
Water Supply Access Route	Not Applicable	FR 3575-120 going south from new Marias Creek access route and then 3575-140 to FR 3575-143. Route snowplowed in winter	FR 3575-120 going south from new Marias Creek access route and then 3575-140 to FR 3575-143. Route snowplowed in winter	FR 3575-120 going south from new access route and then 3575-140 to FR 3575-143. Route snowplowed in winter	FR 3575-120 and then 3575-140 to FR 3575-143. Route snowplowed in winter

	Alternative A	Alternative B	Alternative B1	Alternative C	Alternative D
Project Fence	Not Applicable	3-strand, wildlife permeable, barbed wire fence. Enclose 74 ac. NFS, 1.7 miles long; posted "No Trespassing" signs. Gated where cross roads. No public access inside fence.	3-strand, wildlife permeable, barbed wire fence. Enclose 74 ac. NFS, 1.7 miles long; posted "No Trespassing" signs. Gated where cross roads. No public access inside fence.	3-strand, wildlife permeable, barbed wire fence. Enclose 74 ac. NFS, 1.7 miles long; posted "No Trespassing" signs. Gated where cross roads. No public access inside fence.	3-strand, wildlife permeable, barbed wire fence. Enclose 74 ac. NFS, 1.7 miles long; posted "No Trespassing" signs. Gated where cross roads. No public access inside fence.
Infiltration Area and Supply Pipeline	Not Applicable	Near junction 3575-120 and 125 roads; pipeline about 4,640' to dosing tank. Road along route.	Near junction 3575-120 and 125 roads; pipeline about 4,640' to dosing tank. Road along route.	Near junction 3575-120 and 125 roads; pipeline about 4,640' to dosing tank. Road along route.	Near junction 3575-120 and 125 roads; pipeline about 4,640' to dosing tank. Road along route.
Dust Suppression	Not Applicable	Magnesium chloride and water used.	Magnesium chloride, water; pave from OCR 9845 to 150' past first Marias Creek crossing (0.5 miles paved)	Magnesium chloride, water; pave from OCR 9845 to cattle guard past end private land (2.4 miles paved)	Magnesium chloride, water; pave from south boundary Section 36 to OCR 4895 (1.3 miles paved)
Snow Removal	Not Applicable	Blading and sand. No blading of snow below road within 100' of creeks. Snowplowing to monitoring sites possible.	Blading and sand. No blading of snow below road within 100' of creeks. No snowplowing to monitoring sites where not already snowplowed.	Blading and sand. No blading of snow below road within 100' of creeks. No snowplowing to monitoring sites where not already snowplowed.	Blading and sand. No piling of snow within 50' of creeks. No snowplowing to monitoring sites where not already snowplowed.
Utilities	Not Applicable	Electricity - buried in road prism of ore haul route.  Telephone - From existing line at Cow Camp up FR 3575-120 and new road to patented land.	Electricity - buried in road prism of ore haul route.  Telephone - From existing line at Cow Camp up FR 3575-120 and new road to patented land.	Electricity - buried in road prism of FR 3575, 3575-100, 3575-120, and in new road to lower portal. Not all in ore haul route. Telephone - From existing line at Cow Camp up FR 3575-120 and new road to patented land.	Electricity - buried in road prism of ore haul route.  Telephone - From existing line at Cow Camp or new line buried with power line on ore haul route.
Road Closures during Construction and Operations	Not Applicable	All newly constructed roads and FR 3550-125 past the 3550-130 junction. The reconstructed road up to the 3550-130 junction and the reconstructed FR 3575-120 junction with the new road would remain open to public use. Forest Roads inside the project fence closed to the public.	All newly constructed roads and FR 3550-125 past the 3550-130 junction. The reconstructed road up to the 3550-130 junction and the reconstructed FR 3575-120 junction with the new road would remain open to public use. Forest Roads inside the project fence closed to the public.	All newly constructed roads. Forest roads inside project fenced closed to public.	All newly constructed roads. Forest roads inside project fenced closed to public.
Surface Water Monitoring Sites	Existing NEPA documents	Surface water monitoring sites at 12 locations on N.F. land on Buckhorn Mt. (SW-1, -2, -5, -7, -9, -10, -11, -14, GW-2, and 2 - 3 new sites in Marias Creek, Additional new sites may be determined by WADOE during permitting.	Surface water monitoring sites at 12 locations on N.F. land on Buckhorn Mt. (SW-1, -2, -5, -7, -9, -10, -11, -14, GW-2, and 2 - 3 new sites in Marias Creek, Additional new sites may be determined by WADOE during permitting.	Surface water monitoring sites at 12 locations on N.F. land on Buckhorn Mt. (SW-1, -2, -5, -7, -9, -10, -11, -14, GW-2, and 2 - 3 new sites in Nicholson Creek, Additional new sites may be determined by WADOE during permitting.	Surface water monitoring sites at 12 locations on N.F. land on Buckhorn Mt. (SW-1, -2, -5, -7, -9, -10, -11, -14, and GW-2. Additional new sites may be determined by WADOE during permitting.

	Alternative A	Alternative B	Alternative B1	Alternative C	Alternative D
Water Monitoring Wells	Existing NEPA documents.	1 new monitoring well (MW-13) on N.F. land, 7 existing monitoring wells (MW-1, -3, -4, -7, -9-11, -12) on N.F. land. 4 new piezometers at the Infiltration Gallery on N.F. land, 3 new piezometers on N.F. land in Myers Creek basin, staff gauges at 17 seeps/springs (all but 2 on N.F. land), 5 staff gauges, and 10 mini-piezometers at Nicholson and Marias Creek headwater wetlands.	1 new monitoring well (MW-13) on N.F. land, 7 existing monitoring wells (MW-1, -3, -4, -7, -9-11, -12) on N.F. land. 4 new piezometers at the Infiltration Gallery on N.F. land, 3 new piezometers on N.F. land in Myers Creek basin, staff gauges at 17 seeps/springs (all but 2 on N.F. land), 5 staff gauges, and 10 mini-piezometers at Nicholson and Marias Creek headwater wetlands.	1 new monitoring well (MW-13) on N.F. land, 7 existing monitoring wells (MW-1, -3, -4, -7, -9-11, -12) on N.F. land. 4 new piezometers at the Infiltration Gallery on N.F. land, 3 new piezometers on N.F. land in Myers Creek basin, staff gauges at 17 seeps/springs (all but 2 on N.F. land), 5 staff gauges, and 10 mini-piezometers at Nicholson and Marias Creek headwater wetlands.	1 new monitoring well (MW-13) on N.F. land, 7 existing monitoring wells (MW-1, -3, -4, -7, -9-11, -12) on N.F. land. 4 new piezometers at the Infiltration Gallery on N.F. land, 3 new piezometers on N.F. land in Myers Creek basin, staff gauges at 17 seeps/springs (all but 2 on N.F. land), 5 staff gauges, and 10 mini-piezometers at Nicholson and Marias Creek headwater wetlands.
Site Reclamation	Existing NEPA documents	100% of infiltration and augmentation facilities, monitoring wells and remove fence, 1 lane road with turnouts to lower portal from Cow Camp (rip one lane closed), leave utilities in road but disconnected. Remove manholes and upper and lower sections of pipelines.	100% of infiltration and augmentation facilities, monitoring wells and remove fence, 1 lane road with turnouts to lower portal from Cow Camp (re-contour to one lane road), leave utilities in road but disconnected. Remove manholes and upper and lower sections of pipelines. F.R. 3550 and 3550-125 would be reclaimed back to their previous 17 – 18' width with intervisible turnouts.	100% of infiltration and augmentation facilities, monitoring wells and fence, 1 lane road with turnouts to lower portal from Cow Camp (re-contour to one lane road), leave utilities in road but disconnected after private land on 3575 road. Remove manholes and upper and lower terminus of pipelines.	100% of infiltration and augmentation facilities, monitoring wells and remove fence, 1 lane road with turnouts to lower portal from Cow Camp (re-contour to one lane road), leave utilities in road but disconnected at Cow Camp. Remove manholes and upper and lower terminus of pipelines.
Speed Limit	35 mph	30 mph	25 mph	25 mph	25 mph
Project Life	4 years (1 year reclamation, 3 years reclamation monitoring)	13 - 15 years (1 year construction, 8 years operations, 1 year reclamation, 3 - 5 years reclamation monitoring). Water monitoring may continue for up to 25 – 60 years.	13 - 15 years (1 year construction, 8 years operations, 1 year reclamation, 3 - 5 years reclamation monitoring). Water monitoring may continue for up to 25 – 60 years.	13 - 15 years (1 year construction, 8 years operations, 1 year reclamation, 3 - 5 years reclamation monitoring). Water monitoring may continue for up to 25 – 60 years.	13 - 15 years (1 year construction, 8 years operations, 1 year reclamation, 3 - 5 years reclamation monitoring). Water monitoring may continue for up to 25 – 60 years.

## **IDENTIFICATION OF THE PREFERRED ALTERNATIVE**

The Forest Service has identified Alternative B1 as the preferred alternative with the following modifications: decreased paving and a 30-mile per hour speed limit. Because the analysis shows that storm related sedimentation may actually increase from road paving because of the shorter time for the water to reach the roadside ditches, paving would only be done on approximately the first 800 feet of Forest Road 3550 (Marias Creek Road) to allow for any mud/dust track-out from the gravel road to occur on the Forest Service road prior to the more heavily used County Road 9495 (Toroda Creek Road) to address public safety concerns. Locating the transition from gravel to pavement at about 800 feet from the Toroda/Marias road junction would allow this track-out to occur at a point that is furthest away from Marias Creek to ensure adequate distance for vegetation to intercept sediment. Additionally, the road construction/reconstruction design speed for the Forest Road 3550 is 30 miles per hour, except on a few corners where it is 20 miles per hour, and the difference in effects to wildlife does not justify a 25 miles per hour speed limit for the whole length. 35 miles per hour is the Okanogan County speed limit on most gravel roads. These modifications are within the range of alternatives fully analyzed.

## **COMPARISON OF ALTERNATIVES**

This section summarizes the impacts of the alternatives. Environmental consequences of each alternative are described in detail in Chapter III, Affected Environment and Environmental Consequences of the Final Environmental Impact Statement. The following table, Comparison of Alternatives with Mitigation (S-3), compares alternatives to the key issues and other factors important to assess by alternative. Effects are with mitigation in place. Issues are identified earlier in this chapter.

When reviewing specific alternative actions in acres and volumes, please note there may be some minor differences. These differences are due to rounding and are not important to the descriptions of the actions or their effects. Noted that the effects described below are for National Forest System lands and right-of-ways unless otherwise noted.

**Table S-3: Comparison of Alternatives with Mitigation in Place**

	<b>Alternative A</b>	<b>Alternative B</b>	<b>Alternative B1</b>	<b>Alternative C</b>	<b>Alternative D</b>
Acres National Forest System (NFS) land not available to public	None	74 acres	74 acres	74 acres	74 acres
Acres disturbed on NFS land and right-of-ways (ROW)	None	57 acres	57 acres	65 acres	26 acres
Timber removed from NFS land and right-of-ways (mbf)	None	370 mbf	370 mbf	265 mbf	225 mbf
Miles of boundary fence on NFS lands	None	1.7 miles	1.7 miles	1.7 miles	1.7 miles
Impact of boundary fence on wildlife	None	Short disturbance during construction, loss of small amount of habitat, and minor movement barrier to wildlife species.	Same as B	Same as B	Same as B
Impact of boundary fence on recreationists	None	74-acre area would not be available for use; most use is related to deer, bear, and bird hunting.	Same as B	Same as B	Same as B
Impact of boundary fence on grazing permittee. Estimated annual AUMs of grazing lost	None	74-acre area not available for use, AUM's lost very slight, no change in permit numbers	Same as B	Same as B	Same as B
Potential for cows to get inside project boundary fence and potential for increased permittee expense	None	Slight, infrequent due to coordination between permittee and company; company to maintain fence and communicate with permittee	Same as B	Same as B	Same as B
Miles of road fenced from cattle access	None	Approximately 4 miles	Approximately 4 miles	No roads fenced to keep cattle away from roads.	No roads fenced to keep cattle away from roads
Miles of cattle fence construction	None	Approximately 5 miles	Approximately 5 miles	Approximately 0.8 miles around Grass Lake	No fencing proposed
Estimated number of cows killed or injured annually	None	Slight, 0 - 4 each year depending upon accidental breach of a fence	Same as B	≥ B since roadway is not fenced and travel distance is longer. Roadway not fenced since cows do not tend to hang out on ore haul route. >D because D route is shorter with less potential for livestock to be in the area of roadway.	Less than B, B1, & D because less road is not fenced and less time of cattle scheduled in area of D route.



	<b>Alternative A</b>	<b>Alternative B</b>	<b>Alternative B1</b>	<b>Alternative C</b>	<b>Alternative D</b>
Impact on Tribal members from boundary fence	None	No fish and likely no cultural plants in 74-acre area. Fence passable by deer and other game species. Tribal members would not be able to hunt in 74-acre area, but can access areas directly adjacent.	Same as B	Same as B	Same as B
Miles of construction within riparian habitat conservation areas on NFS lands	None	4.0 miles	4.0 miles	2.6 miles	None
Acres of construction in riparian habitat on NFS or right-of-ways.	None	0.1 acres	0.1 acres	0.2 acres	0 acres
Acres of construction in wetlands on NFS lands or right-of-way.	None	0.1 acres	0.1 acres	0.2 acres	0 acres
Predicted changes in stream temperature in Marias Creek	None	None	None	None	None
Predicted changes in stream temperature in Nicholson Creek	None	None	None	None	None
Potential for toxic materials added to the road surface to enter streams, riparian areas, and wetlands on NFS lands and ROW and impact aquatic life	None	High potential for salts to enter streams, riparian areas & wetlands, but low predicted impacts from chlorides and magnesium. Low potential for spills.	Same as B.	High potential for salts to enter streams, riparian areas and wetlands, but low predicted impacts from chlorides and magnesium. Low potential for spills.	Very low, 1 stream crossing on National Forest System lands and right-of-ways. Low potential for spills.
Number of T.E.S. plants lost	None	Estimated 21 plants lost from effects of chlorides.	Same as Alternative B	Estimated 5 plants loss from effects of chlorides.	Estimated 5 plants loss from effects of chlorides.
Annual tons of TSP produced during ore and supply haul and employee access on NFS land	None	678 tons	523 tons	945 tons	211 tons
Annual tons of PM10 produced during ore and supply haul and employee access on NFS land	None	181 tons	139 tons	251 tons	56 tons
Number of potential viewpoints where dust is likely to be seen from activities on NFS land	None	3 locations totaling ¾ mile on Ferry County Road 502; 1 location at junction of FR 3550 and OCR 9845	3 locations totaling ¾ mile on Ferry County Road 502;	3 locations totaling ¾ mile on Ferry County Road (FCR) 502;	3 locations totaling ¾ mile on Ferry County Road 502;

	<b>Alternative A</b>	<b>Alternative B</b>	<b>Alternative B1</b>	<b>Alternative C</b>	<b>Alternative D</b>
Effects of dust on vegetation	None	Less than Alternative C, but more than Alternatives B1 or D. Vegetation along roads is susceptible to chronic decreases in photosynthesis, growth, and plant nutrition.	< Alt.B & C because of paving; however > Alt.D. Vegetation along roads is susceptible to chronic decreases in photosynthesis, growth, and plant nutrition.	Because of the longer road route, this alt. would have the most impact. Vegetation along roads is susceptible to chronic decreases in photosynthesis, growth, and plant nutrition.	Since this alt. has the least amount of road mileage, it would have the least impact from dust. Vegetation along roads is susceptible to chronic decreases in photosynthesis, growth, and plant nutrition.
Number of residences along potential haul route on Forest Service roads and ROW (within 500')	None	1 residence	1 residence	9 residences	7 residences
Cumulative number of residences along haul route to junction FR 3575 and OCR 9495 (within 500')	None	11 residences	11 residences	9 residences	24 residences
Impact of construction/reconstruction on residential quality of life, health, safety, and solitude	None	Construction/reconstruction would cause very serious noise impacts on 2 residences for approximately 3 months.	Same as B	Construction/reconstruction would cause very serious noise impacts on 9 residences for approximately 4 months.	Construction/reconstruction would cause very serious noise impacts on 7 residences for approximately 2 months.
Disturbance impact of ore and supply haul on residential quality of life, health, safety, and solitude	None	2 slight impacts (one residence generally not occupied in winter); Little effect on safety of residents since access to residences generally not on haul route.	Same as B	2 very serious impacts since houses within 90' of road; 3 substantial impacts; 4 slight impacts (one residence generally not occupied in winter); Access road to residences would likely be safer due to double lane road and snowplowing in winter.	2 substantial impacts 5 slight impacts (one residence generally not occupied in winter); Access road to residences would likely be safer due to double lane road and snowplowing in winter
Number of dispersed recreation sites along potential hauls routes	None	1 destroyed; 1 moderate disturbance (>125'); and 3 severe disturbance (<125')	Same as B	17 sites impacted; 16 severe disturbance (<125'); and 1 moderate disturbance (>125')	0 sites impacted
Potential noise effects on Coogan and Nicholson-Marias Ridge unroaded areas	None	Slight effect Coogan and Nicholson-Marias Ridge outside construction period. Noise near ambient 1000' from road.	Similar to B	No effect Coogan, slight effect Nicholson-Marias Ridge outside construction period. Noise near ambient 1000' from road.	None

	<b>Alternative A</b>	<b>Alternative B</b>	<b>Alternative B1</b>	<b>Alternative C</b>	<b>Alternative D</b>	
Impact of employee traffic on residential quality of life, health, safety, and solitude (impacts by residences)	None	2 residences would be slightly impacted. Little effect on safety of residents since access to residences generally not on haul route.	Same as B	2 residences would be substantially impacted, 7 residences would be slightly impacted. Access road to residences would likely be safer due to double lane road and snowplowing in winter.	1 residence would be substantially impacted, 6 residences would be slightly impacted. Access road would likely be safer due to double lane road and snowplowing in winter.	
Impact on recreation	None	Substantial since most of the recreating public would avoid Marias Creek drainage for the duration of construction and operations.	Same as B	Substantial since most of the recreating public would avoid the ore and supply haul route during construction and operations.	Very slight since small amount of recreation use on National Forest lands along the ore and supply haul route. Most of route off NFS lands.	
Changes in visibility in Class 1 airsheds	None	Very slight	Very slight	Very slight	Very slight	
Total miles of road from patented mine boundary to County roads	N/A	8.4 miles	8.4 miles	13.3 miles	4.1 miles	
Miles of total road on NFS lands and ROWs	N/A	6.7 miles	6.7 miles	13.0 miles	2.7 miles	
Miles of unpaved haul road on NFS lands and ROWs	N/A	6.7 miles	6.2 miles	10.6 miles	1.4 miles	
Miles of proposed road pavement on ore haul route	N/A	0 miles	0.5 miles	2.4 miles	1.3 miles	
Summertime noise levels (LEQ) along ore and supply haul route	50' 100' 200' 500'	No change	60 decibels 56 51 45	Same as B	Same as B	Same as B
Acres with noticeable noise effects within Jackson Creek inventoried roadless area (w/i 500' of road)	0	0	0	91 acres	0	
Gray wolf and wolverine assessment model security habitat	47,730 acres (23%) of security habitat in Myers and Toroda W.S.	35 acres of security habitat lost; no change in percent of total acres affected	240 ac. security habitat created; no change in percent of total acres affected	20 acres of security habitat lost; no change in percent of total acres affected	20 acres of security habitat lost; no change in percent of total acres affected	
Mule deer winter habitat disturbance index of acres impacted by roads.	1,238 out of 13,199 acres (9%) of deer winter range within Buckhorn block currently impacted	2,870 additional acres impacted (4,108 acres, 31% of total) affected	1,860 additional acres (3,098 acres, 23% of total) affected. The area affected is less than Alt. B due to road closures	1,119 additional acres impacted (2,357 acres, 18% of total) affected	550 additional acres impacted (1,788 acres, 14% of total) affected	

	<b>Alternative A</b>	<b>Alternative B</b>	<b>Alternative B1</b>	<b>Alternative C</b>	<b>Alternative D</b>
Late Successional Forest, Non-winter Habitat affected by roads and trails	3,066 acres out of 32,575 total acres (9%) currently affected by roads	14 additional acres affected; no change in percent of total acres affected	21 less acres affected due to road closures; no change in percent of total acres affected	10 additional acres affected; no change in percent of total acres affected	10 additional acres affected; no change in percent of total acres affected
Late Successional Forest Non-winter Security Habitat impacted by roads and trails	10,823 acres out of 32,757 total acres (33%) currently impacted	9 additional acres affected; no percent change in total acres affected	99 less acres affected due to road closures; no percent change in total acres affected	3 additional acres affected; no percent change in total acres affected	3 additional acres affected; no percent change in total acres affected
Late Successional Forest Winter Security Habitat impacted by roads and winter trails	9,430 acres out of 32,757 total acres (29%)	19 additional acres affected; no change in percent of total acres affected	16 less acres affected; no change in percent of total acres affected	12 additional acres affected; no change in percent of total acres affected	12 additional acres affected; no change in percent of total acres affected
Riparian Non-winter Habitat Influence Index; acres affected by roads and trails	6,050 acres out of 18,197 acres total (33%) currently impacted	2 additional acres affected; no change in percent of total acres affected	64 less acres affected; no change in percent of total acres affected	No additional acres affected; no change in percent of total acres affected	No additional acres affected; no change in percent of total acres affected
Road density by MA area (Forest Plan Standard) during project (miles per square mile) <sup>4</sup> :					Same as C
MA 14-17 (2.0)	1.0	1.0	1.0	1.0	1.0
MA 14-18 (2.0)	3.8	4.2	1.5	3.8	3.8
MA 14-19 (2.0)	1.7	1.7	1.7	1.7	1.7
MA 25-18 (3.0)	1.8	1.9	1.8	1.9	1.9
MA 26-16 (1.0)	1.4	1.4	1.1	1.4	1.4
Miles of road in deer winter range (Road density [miles/ square mile (m/m <sup>2</sup> )])	14.3 (1.5)	15.0(1.6)	12.8 (1.4)	13.0 (1.4)	13.0 (1.4)
Miles of road in deer summer range (Road density [m/m <sup>2</sup> ])	58.5 (1.8)	58.9 (1.8)	58.9 (1.8)	57.6 (1.7)	57.6 (1.7)
Impacts from creation of semi-permeable barrier along haul routes	None	Limits movement of wildlife, creates disturbance, and direct mortality. Effects greater than B1 & D.	Effects less than Alt. B and C, but greater than Alt. A & D.	Longest haul route, so greatest impact to wildlife.	Greater impact than Alt. A, but less than Alt. B, B1, & C. Shortest haul route, so least impacts.
Acres of soil disturbance	None	57 acres	57 acres	65 acres	26 acres
Acres of existing noxious weeds along haul routes	None	> 82 acres	> 82 acres	> 117 acres	8 acres
Potential for weed spread onto NFS lands across NFS lands and from NFS lands to private lands	No change	57 acres of disturbance, slight chance	Same as B	65 acres of disturbance; Greater chance from more weed acres	26 acres of disturbance; Least weed spread - fewer acres of weeds

<sup>4</sup> The estimates were based on “open” travel routes, and the substantial increase in the traffic volume along the ore haul route where the road currently exists was not part of the model. Therefore the intensity of impacts along the ore haul route would be substantially greater than under the existing conditions, but this substantial difference in intensity was not captured in the model.

	<b>Alternative A</b>	<b>Alternative B</b>	<b>Alternative B1</b>	<b>Alternative C</b>	<b>Alternative D</b>
Potential for use of herbicides under existing decisions, and cumulative effects analysis of effect on non-target species	Known noxious weed sites included in the District Integrated Weed Mgmt Program. Effects on non-target plants minimal.	Same as A, but increased potential for need for herbicide treatment from haul	Same as A, but increased potential for need for herbicide treatment from haul	Same as A, but increased potential for need for herbicide treatment from haul	Same as A, but increased potential for need for herbicide treatment from haul
Potential for introduction of noxious weeds from borrow site	No potential	Low potential; gravel required to be noxious weed seed free	Same as B	Same as B	Same as B
Sediment increases in year one (WEPP model) from road construction/reconstruction	None	49 tons first year in Marias, but reduced by 99% to less than 3 tons including winter sand	51 tons per year in Marias, but reduced by 99% to less than 3 tons including winter sand	42 tons first year in Nicholson, but reduced by 95% to 14-54 tons including sand	0
Potential for chemicals to reach streams, wetlands, RHCAs and riparian habitat	No potential	High if spill occurs	High if spill occurs	High if spill occurs	Low if spill occurs
Effects of magnesium chloride on vegetation	None	Less than Alternative C, but more than Alternative B1 or D	< Alternative C, and less than Alternative B because of paving work. > Alternative D	Greatest potential impacts from more roading	Since this alt. has the least amount of roads, it would have the least potential impact
Predicted increases of chlorides in streams <sup>5</sup>	N/A	147 ppm Marias Creek, 27 ppm direct/indirect and 41-61 ppm cumulative in Nicholson Creek	123 ppm Marias Cr., 27 ppm direct/indirect and 41-61 cumulative in Nicholson Creek	64 ppm direct/indirect Nicholson Cr., 77-91 cumulative; 9 ppm in Marias Cr.	No increase Up. Myers or Millard Creeks, 27 ppm direct/indirect, 41-61 cumulative in Nicholson Cr.; 9 ppm Marias Cr.
Impacts of increases in chlorides in streams on aquatic species	No increases in chlorides. Baseline is 3 ppm. State criteria is 230 ppm	See above; meets state chronic criteria of 230 ppm so no impacts on aquatic species.	See above, meets state chronic criteria of 230 ppm so no impacts on aquatic species.	See above, meets state chronic criteria of 230 ppm so no impacts on aquatics species.	No impact on Millard Creek. Meets State chronic criteria of 230 ppm.
Impacts on Toroda Creek stream flows from water use for dust abatement	None	1 – 5% increase in flows during mining and reclamation during May – Sept.; 0.1 – 1.1% decrease during Oct. – April based on actual use.	Same as B	Same as B	Not as much water needed for dust abatement so less impacts than B
Number of cultural resource properties present and affected	0	5	5	5	5
Number of eligible historic properties affected	0	1	1	1	0

<sup>5</sup> Using flows in WADOEs FSEIS; see Hydrology section in Chapter 3 for calculations using Golder 2006a or draft NPDES permit.

	<b>Alternative A</b>	<b>Alternative B</b>	<b>Alternative B1</b>	<b>Alternative C</b>	<b>Alternative D</b>
Potential to impact cultural plants	None	Less than Alternative C, but more than Alternative D	Same as Alternative B	Since this alt has the most road widening it would have the greatest potential	Since this alt. has the least amount of roads, it would have the least potential
Number of Indian Allotments within 2 miles of access route	N/A	1 Allotment	1 Allotment	1 Allotment	1 Allotment
Big game expected to be lost due to project activities on NFS land	No big game expected to be lost.	Greater than in Alt. A, B1, and D	Less than Alternative B and C, but greater than Alts. A & D.	Greater than Alts. A, B, B1 and D due to longest haul route.	Less than Alts. B, B1, & C due to shorter haul route
Fish expected to be lost due to project activities on NFS land	None	Some, but with culvert replacements may just retreat to Toroda Creek	Same as B	Same as B	None
Lineal feet of stream channel within INFISH RHCAs potentially affected	None	20,856' (4.0 miles)	20,856' (4.0 miles)	13,622' (2.6 miles)	None
Effects on seeps, springs, ponds, and wetlands cumulative activities	None	Flows in seeps, springs, ponds, and wetlands in Myers Creek and above infiltration and augmentation sites reduced from mine dewatering but no cumulative effect from Buckhorn Access Project. Flows to seeps, springs, ponds, and wetlands below augmentation and infiltration sites may have slightly reduced or increased flows depending on the site and time of year. Augmentation and infiltration designed to mostly offset flow reductions due to mine dewatering on private lands.			
Hours of expected truck traffic outside 6:00 a.m. to 6:00 p.m.	None	No restrictions on truck traffic except full ore haul trucks 6:00 a.m. to 6:00 p.m.	Ore and supply haul trucks, full or empty, 6:00 a.m. to 6:00 p.m., except infrequent, unplanned supply traffic	Ore and supply haul trucks, full or empty, 6:00 a.m. to 6:00 p.m., except infrequent, unplanned supply traffic.	Ore and supply haul trucks, full or empty, 6:00 a.m. to 6:00 p.m., except infrequent, unplanned supply traffic.
Hours of operation along haul, employee and supply routes	None	Vehicles operating 24 – 7. Most impacts 5:00 a.m. to 9:00 p.m.	Employee vehicles operating 24-7. Most trucks 6:00 a.m. – 6:00 p.m., except infrequent, unplanned supply traffic, 7 days a week. Most impacts 5:00 a.m. to 9:00 p.m.	Employee vehicles operating 24-7. Trucks 6:00 a.m. – 6:00 p.m., except infrequent, unplanned supply traffic. Supply haul Monday to Friday, ore haul Monday to Sat. No trucks on Sunday. Most impacts 5:00 a.m. to 9:00 p.m.	Employee vehicles operating 24-7. Most trucks 6:00 a.m. – 6:00 p.m., except infrequent, unplanned supply traffic, Mon. - Fri. No trucks on Saturdays and Sundays. Most impacts 5:00 a.m. to 9:00 p.m.
Number of vehicle trips expected to operate outside 6:00 a.m. to 6:00 p.m.	None	Up to 110 passenger type vehicles and 18 trucks	Up to 110 passenger type vehicles and 1 truck.	Up to 110 passenger type vehicles and 1 truck.	Up to 110 passenger type vehicles and 1 truck.
Passage rate by residences from ore haul before/during/after spring breakup (minutes)	0	3.6/0/3.6	3/6/0/3/6	3.1/0/3.1	2.2/0/2.2
Acres of disturbance from water infiltration gallery and pipeline	None	6	6	6	6

	Alternative A	Alternative B	Alternative B1	Alternative C	Alternative D
Number of daily trips (one way) by alt. during operations (snow free months) <sup>6</sup> FR 3550 Monday-Friday Saturday Sunday FR 3575 Monday-Friday Saturday Sunday FR 3575-120 Monday-Friday Saturday Sunday	Decrease of 3 to 6 trips per day	277 (108ht <sup>7</sup> +169pv <sup>8</sup> ) 277 (108ht+169pv) 277 (108ht+169pv)  few (pv) few (pv) few (pv)  51 (pv) 51 (pv) 51 (pv)	Same as B	few (pv) few (pv) few (pv)  296 (127ht+169pv) 288 (119ht+169pv) 169 (pv)  51 (pv) 51 (pv) 51 (pv)	few (pv) few (pv) few (pv)  45 (pv) 45 (pv) 45 (pv)  326(151ht+175pv) 175 (pv) 175 (pv)
Increased # of daily trips by alt. before and after spring breakup, assuming 3 weeks of shut down	None	Potentially 25 additional ore trucks per day	Same as B	Potentially 30 additional ore trucks per day	Potentially 35 additional ore trucks per day
Qualitative discussion of noise impacts to homeowners along routes during spring breakup.	None	2 residences have slight increase in noise since they are both located more than 300 feet from the haul route.	Same as B	2 residences have very serious impacts; 4 residences have substantial impacts; 3 residences have slight impacts.	2 residences have very serious impacts; 5 residences have slight impacts due to noise from additional trucks.
Acres of springs, seeps, ponds, and wetlands lost from project activities	None	0.1 acres (Marias Creek Watershed)	0.1 acres (Marias Creek Watershed)	0.2 acres (Nicholson Creek Watershed)	0
Annual road maintenance costs	\$79,281	\$141,508	\$108,162	\$184,183	\$121,395
Approximate mileage from mine site to the mill at Republic.	N/A	47 miles	47 miles	49 miles	Via Curlew – 54 miles Via Wauconda Pass – 50 miles
Potential for impacts on aquifers, residential wells and creeks from water infiltration on NFS lands	No impacts on aquifers, residential wells, and creeks	No adverse impacts. Infiltration would raise groundwater levels near infiltration site slightly during mining resulting in enhanced seep & spring areas in Nicholson Creek. Water would meet state water quality requirements set in NPDES permit	Same as B	Same as B	Same as B

<sup>6</sup> Total employee count is less than 240 one-way trips because of variable employee daily work schedules

<sup>7</sup> Heavy truck

<sup>8</sup> Passenger vehicle

	Alternative A	Alternative B	Alternative B1	Alternative C	Alternative D
Decreases in stream flows from activities on NFS land					
Marias Creek	None	None	None	None	None
Nicholson Creek	None	None	None	None	None
Bolster Creek	None	None	None	None	None
Ethel Creek	None	None	None	None	None
Gold Creek	None	None	None	None	None
Estimated annual tons/ gallons of supplies hauled over NFS roads					
• Cement/lime/fly ash	None	12,000 tons	Same as B	Same as B	Same as B
• Diesel fuel	None	500,000 gallons			
• Antifreeze	None	1,800 gallons			
• Gasoline	None	4,000 gallons			
• Explosives	None	730 tons			
• Propane	None	130,000 gallons			
• Motor oil	None	20,000 gallons			
• Hydraulic fluid	None	15,000 gallons			
• Magnesium chloride	None	72,000 gallons			
• Resins	None	161 cu. ft.			
• Salts	None	38,000 pounds			
• Shotcrete additives	None	24,000 gallons			
• Oxidizers	None	420 gallons			
• Acids	None	4,300 gallons			
• Bases	None	9,900 gallons			
Predicted changes to average annual baseflow at individual stream stations (Fig. II-5). Positive values indicate an increase in baseflow from the "No-Action" case.					
<u>Stream</u> <sup>9</sup> <u>Station</u>		No-Action (gpm) <sup>10</sup>	During Mining (Yr 7)(gpm) <sup>11</sup>	Post Closure (gpm) <sup>12</sup>	
Nicholson SW-9	None	14	-13.5	+6.6	Same as Alternative B
Nicholson SW-7		69	+9.7	+4.9	
Nicholson SW-1		230	+9.8	+4.9	
Marias SW-8		31	0	-0.1	
Marias SW-2		110	-0.1	-0.3	
Roosevelt GW-2		31	-4.7	-1.6	
Gold SW-10		6	--	<1	
Gold SW-4		36	-0.1	-0.3	
Bolster, N SW-11		4	--	<1	
Bolster, N SW-12		26	-0.3	-0.6	
Bolster SW-14		16	--	-2	
Bolster SW-13		47	-3.2	-2.5	
Ethel SW-5		100	-0.3	-0.8	

<sup>9</sup> Stations for each stream are listed from highest to lowest elevation

<sup>10</sup> Predicted "No- Action" modeled baseflow (Ecology FSEIS, 2006)

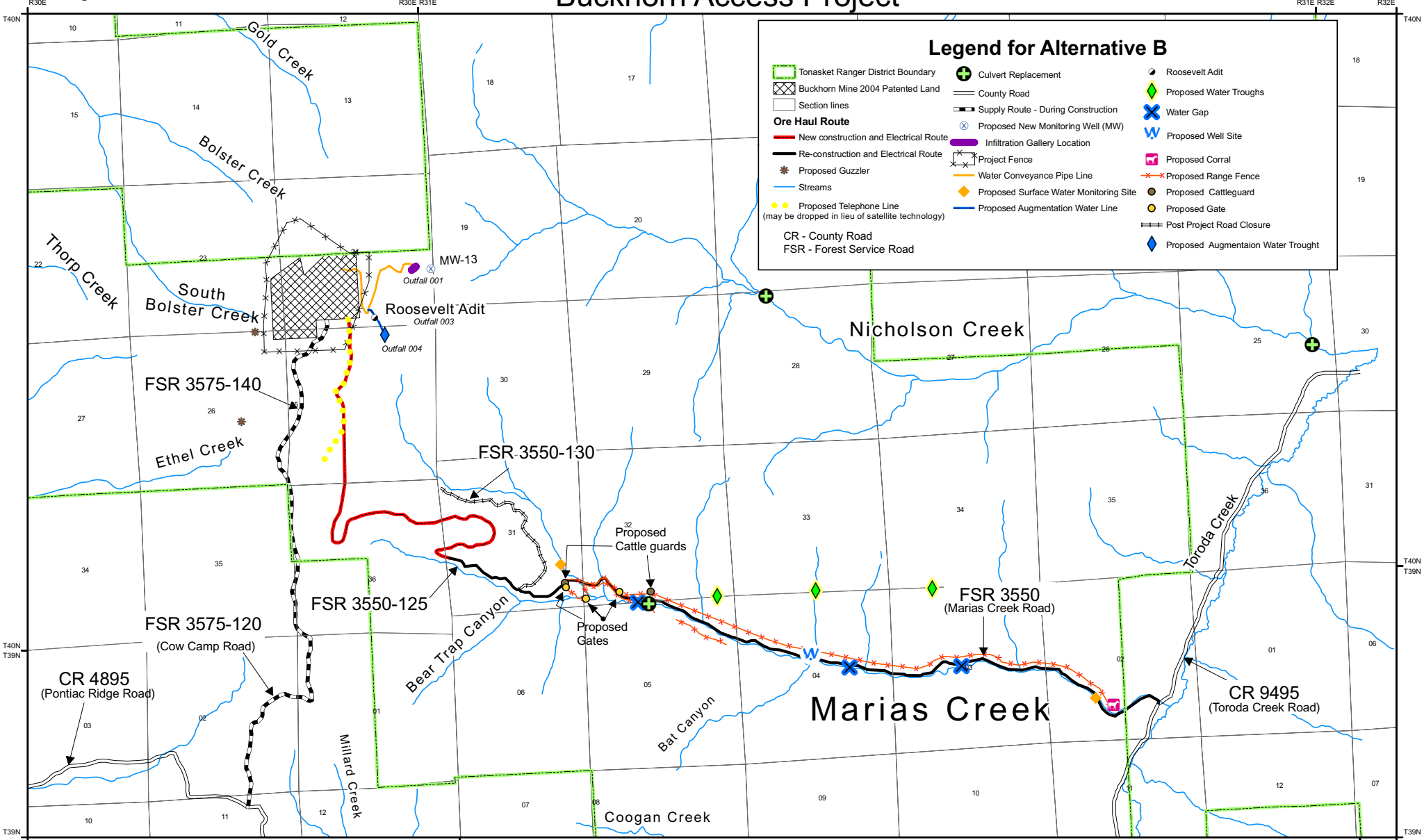
<sup>11</sup> Includes augmentation flows at outfalls 001 and 002. From Aquatic Resources Mitigation Plan (Golder, 2006a)

<sup>12</sup> Without augmentation flows. From Ecology FSEIS (2006) and Golder Aquatic Resources Mitigation (2006a)



Figure S-3

# Buckhorn Access Project



### Legend for Alternative B

Tonasket Ranger District Boundary	Culvert Replacement	Roosevelt Adit
Buckhorn Mine 2004 Patented Land	County Road	Proposed Water Troughs
Section lines	Supply Route - During Construction	Water Gap
<b>Ore Haul Route</b>	Proposed New Monitoring Well (MW)	Proposed Well Site
New construction and Electrical Route	Infiltration Gallery Location	Proposed Corral
Re-construction and Electrical Route	Project Fence	Proposed Range Fence
Proposed Guzzler	Water Conveyance Pipe Line	Proposed Cattleguard
Streams	Proposed Surface Water Monitoring Site	Proposed Gate
Proposed Telephone Line (may be dropped in lieu of satellite technology)	Proposed Augmentation Water Line	Post Project Road Closure
<b>CR - County Road</b>	Proposed Augmentation Water Trough	
<b>FSR - Forest Service Road</b>		

Tonasket Ranger District  
Okanogan-Wenatchee National Forests  
Map by J.Rainford

1 inch equals 0.57 miles  
0 0.25 0.5 1 1.5 2 Miles

Absolute Scale = 1:35,944

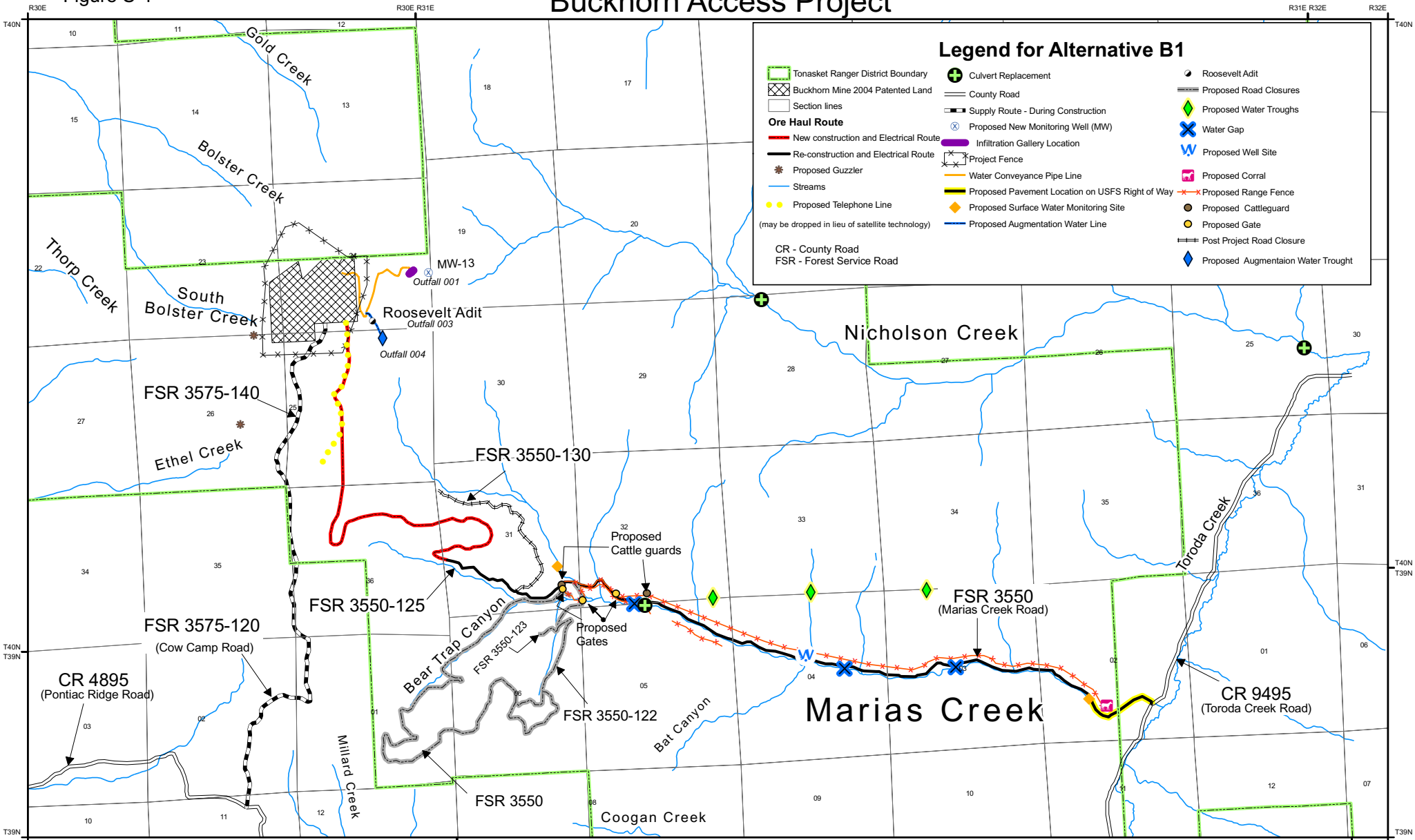
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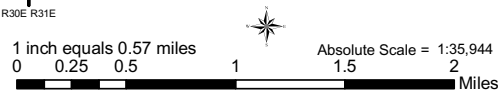
Figure S-4

# Buckhorn Access Project



### Legend for Alternative B1

Tonasket Ranger District Boundary	Culvert Replacement	Roosevelt Adit
Buckhorn Mine 2004 Patented Land	County Road	Proposed Road Closures
Section lines	Supply Route - During Construction	Proposed Water Troughs
<b>Ore Haul Route</b>	Proposed New Monitoring Well (MW)	Water Gap
New construction and Electrical Route	Infiltration Gallery Location	Proposed Well Site
Re-construction and Electrical Route	Project Fence	Proposed Corral
Proposed Guzzler	Water Conveyance Pipe Line	Proposed Range Fence
Streams	Proposed Pavement Location on USFS Right of Way	Proposed Cattleguard
Proposed Telephone Line (may be dropped in lieu of satellite technology)	Proposed Surface Water Monitoring Site	Proposed Gate
CR - County Road	Proposed Augmentation Water Line	Post Project Road Closure
FSR - Forest Service Road		Proposed Augmentation Water Trough



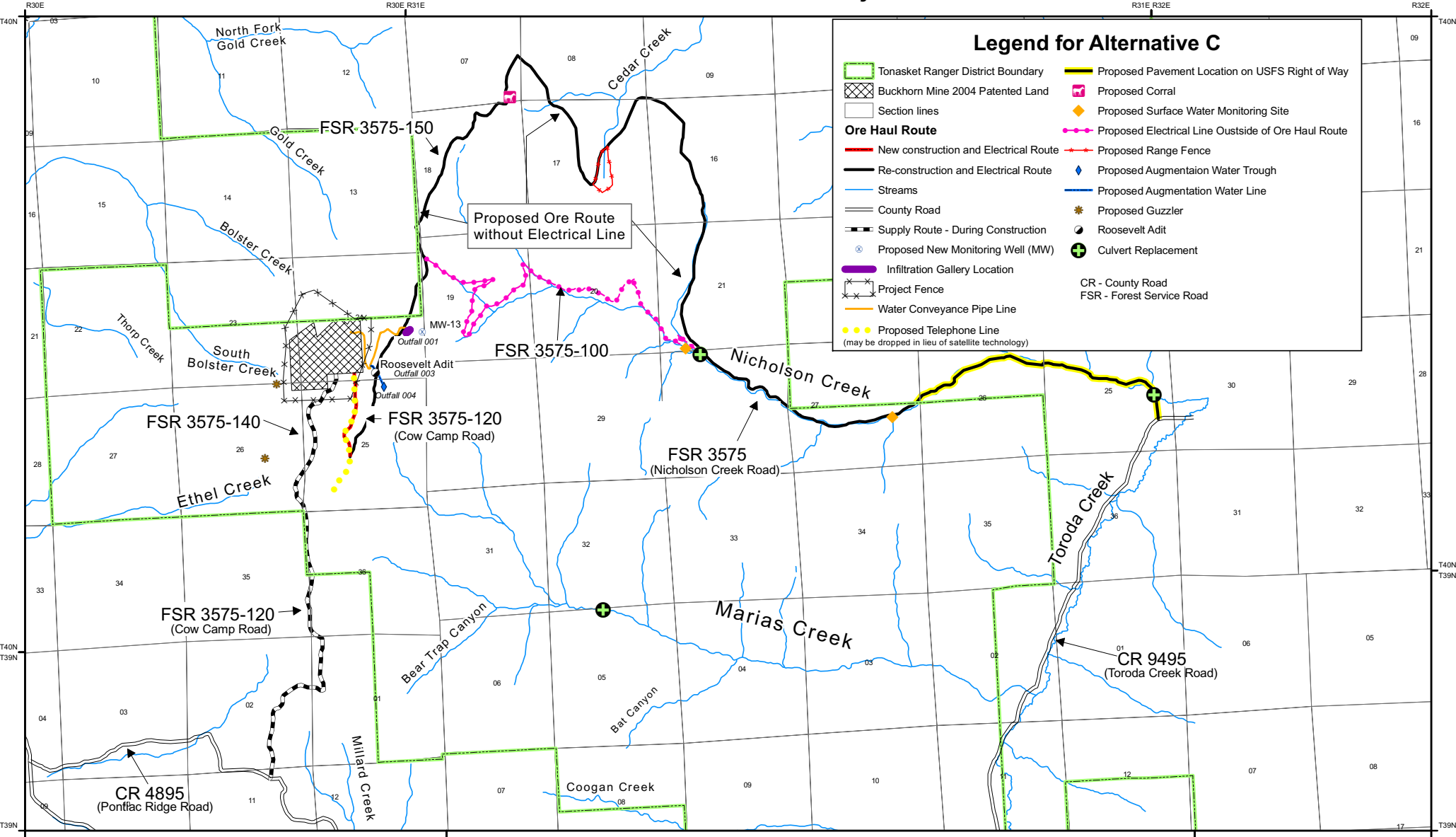
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Figure S-5

# Buckhorn Access Project



Tonasket Ranger District  
Okanogan-Wenatchee National Forests  
Map by JRainford

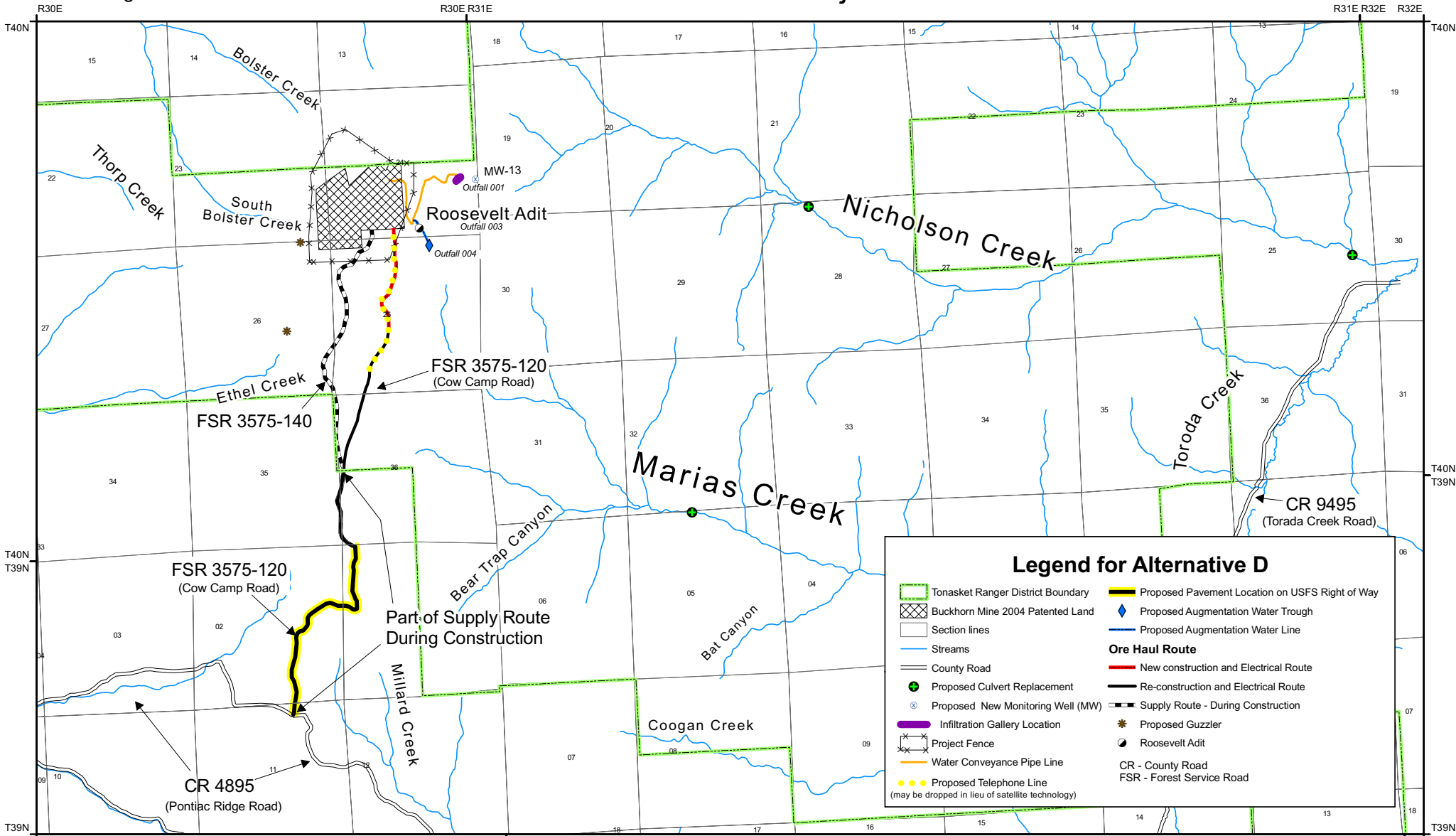
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1 inch equals 0.70 miles  
0 0.25 0.5 1 1.5 2 Miles  
Absolute Scale = 1:44,096



Figure S-6

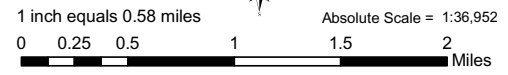
# Buckhorn Access Project



### Legend for Alternative D

Tonasket Ranger District Boundary	Proposed Pavement Location on USFS Right of Way
Buckhorn Mine 2004 Patented Land	Proposed Augmentation Water Trough
Section lines	Proposed Augmentation Water Line
Streams	<b>Ore Haul Route</b>
County Road	New construction and Electrical Route
Proposed Culvert Replacement	Re-construction and Electrical Route
Proposed New Monitoring Well (MW)	Supply Route - During Construction
Infiltration Gallery Location	Proposed Guzzler
Project Fence	Roosevelt Adit
Water Conveyance Pipe Line	CR - County Road
Proposed Telephone Line (may be dropped in lieu of satellite technology)	FSR - Forest Service Road

Tonasket Ranger District  
Okanogan-Wenatchee National Forests  
Map by JRainford



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