State of Montana Comments
Draft Terms of Reference – Cline Mining Corporation Lodgepole Project
April 12, 2006

Findings from the 1988 Flathead River International Study Board Reports to the International Joint Commission that are relevant to the proposed Cline Lodgepole Project

After three years of intensive evaluation and assessment by a bi-national group of 50 U.S. and Canadian scientists, the *Flathead River International Study: Board Supplementary Report* to the IJC in 1988 stated: "It became apparent during the impact assessment phase that the available data were often inadequate, and that an improved database was required before confident predictions could be made about the likely impacts of the proposed mine" (p. 3). The report goes on to state: "The information needed for confident prediction of impacts of the mine is substantially the same as that needed to determine necessary mitigative measures and to assess their effects." The report states further: "Data deficiencies of major concern include those describing ground water, sediment, nitrate and ammonia, nutrients, and various components of the biota including fish." Baseline and data assessment for the Sage Creek Coal mine did not include wildlife such as carnivores, ungulates, amphibians, reptiles and bird species nor important vegetative and riparian habitats of the transboundary Flathead.

In the 1988 Supplemental Report to the IJC, the following physical studies were identified for defining mitigation measures and for conducting the assessment for the proposed Sage Creek coalmine. These studies are applicable to the proposed Cline mine site.

1. Quantify the ground-water systems(s) including flow rates, water levels, connection between aquifers, extent of tertiary materials along creeks, and existing ground-water contributions to surface flow, especially in critical spawning areas.
2. Assess ground-water quality and temperatures within the existing ground-water system.
3. Investigate the permeability of pond and ditch areas, overburden dump sites, and other disturbed areas to allow an assessment of potential infiltration to ground water.
4. Obtain additional overburden analyses to assess any impacts for leaching of waste dumps.
5. Design and implement a water quality-sampling program at ground-water discharge points at existing mines in the Elk River valley. This information could be used to assess impacts at the mine site.
6. Conduct mapping and sampling to identify and locate phosphorus-rich geologic units.
7. Determine the sediment concentrations, loads, and carrying capacities of the various creeks, and the Flathead River at the International Boundary. Use the

results to refine the assessment of sediment impacts and of design of control processes.

8. Assess those water quality parameters that may be affected by the proposed mine. They include: concentrations of dissolved oxygen; temperature; concentrations and loads of total, particulate, and soluble reactive phosphorus; and compound of nitrogen. At the International Boundary, assess the seasonal levels of the metals aluminum, barium, cadmium, chromium, mercury, and lead.

To address biological data needs to mitigate the impacts on fish habitats and fish populations, especially bull trout, two approaches were offered for mitigation: on-site and off-site impacts at the Sage Creek site.

On-site:

1. Assess the biophysical characteristics of those streams that are impacted by the mine and the Flathead River, which will be directly affected by the mine. This would include:
    a. A description of the physical characteristics of fish habitats along the inhabited reaches of the streams including a determination of their relationship to ground-water sources;
    b. A determination of the abundance and diversity of algae and aquatic invertebrates above and below the mine site;
    c. A determination of the seasonal distribution of egg deposition, and of young-of-the-year, older juveniles, and adults of bull trout and cutthroat trout in relation to habitat type and, especially, ground-water influences;
    d. A detailed study of the characteristics of typical spawning sites of major species including such factors as water velocity and depth, substrate characteristics, intra-gravel water quality, and relationship to cover; and
    e. A study of fish production, including enumeration of spawning escapements, egg-to-fry survival, the densities of various life history states, and the production of downstream migrant juveniles.
2. Review the literature to determine what is known of the habitat requirements of various life history stages of bull trout and cutthroat trout, and the kinds of habitat improvements and habitat enhancement structures which might be appropriate for the study area creeks.
3. Conduct field studies to fill in the data gaps identified in 2 above.
4. Determine whether the bull trout populations in the mine site streams are genetically unique.
5. Identify factors controlling algal growth rates and standing crop in streams of the mine site area, and the Flathead River down to Flathead Lake.

Off-site:

1. Monitor spawning escapement of adult bull trout in those creeks that are impacted by the mine site in relation to other tributary streams of the Flathead River in Canada, the North Fork Flathead River and Flathead River in Montana.
2. Determine the extent of interchange of bull trout among Howell, Cabin and Couldrey Creeks, and other tributary streams of the Flathead River system.

3. Determine what opportunities exist for habitat enhancement in adjacent tributaries.
4. Determine whether Howell Creek bull trout can be imprinted to home to adjacent tributary streams.
5. Evaluate the success of hatchery production and survival of stocked bull trout in the Arrow Lakes, B.C. as a model for the Flathead system.

Terms of Reference

The following are our comments on the draft Terms of Reference:

1. The TOR must include a detailed description of the proposed project, in which all elements of the proposed mine are described. This information is essential for defining the effluent discharge from the mine site and needs to include the following:

- Technical information (design and dimensions) on settling ponds and waste dumps.
- Geophysical properties of the mine site.
- Location of settling and/or tailings ponds (including alternates).
- Location of waste dumps (including alternates)
- Dimensions of buffer strips
- Location of contaminated and uncontaminated ditches around the mine and waste sites
- Details on the road upgrade for the coal haul from the mine to Elko
- Storage of explosives on site.
- Multiple maps visually displaying the layout of the mine and all related infrastructure.

2. The study area for collection and assessment of baseline chemical, physical, biological and socio-economic data needs to be clearly defined in the TOR.

3. The Cline Mining Corp. Lodgepole Project study area must include the entire extent of the Flathead River drainage from the site of the mine to the outlet of the river in Flathead Lake. For example, bull trout spawning in the vicinity of the proposed mine are part of the same population of bull trout that occur in Flathead Lake within the State of Montana. Carnivores and ungulates migrate back and forth across the international boundary. Water quality changes in the vicinity of the proposed mine site could clearly impact waters of the United States.

4. The study area also must include the haul road from the mine to the proposed load-out facility at Elko. As proposed, the haul road will cross or come in close proximity to the following water bodies: North Lodgepole Creek, Lodgepole Creek, Morrissey Creek, the Elk River, and several unnamed tributaries, all of which need to be included in the scope of the Project study area. Since upgrades to this roadway and increased traffic have the potential to impact all of these waters, it is recommended that baseline water quality data (chemical, physical, and biological) and surface water hydrology data be collected at representative sites in all of these waters.

5. The TOR lack site-specific details regarding methods or approach to data collection. For example, the duration and frequency of the baseline water quality study is not adequately defined. A minimum of three years of data, ideally including wet, dry, and "normal" years is necessary to adequately characterize water quality conditions. Both the duration of the baseline water quality study and the frequency of sampling need to be defined.

6. The TOR are largely inadequate in terms of the type of groundwater data that will need to be collected at the mine site to address environmental concerns. The TOR needs to include a thorough assessment of subsurface water conditions and evaluation of groundwater discharge to Crab Creek (and its contribution to base flow of Crab Creek and Foisey Creek). The level of effort by Cline Mining to address the assessment of potential effects, mitigation measures, and residual effects (section 8.2.3) of the TOR is especially critical to address potential impacts to the Flathead River and its tributaries. Review of the February 22, 2006 Technical Report does not include the type of detailed groundwater evaluation required to achieve this effort.

7. The TOR must include a Canadian federal review under the Canadian Environmental Assessment Act and the environmental assessment must address cumulative impacts and transboundary impacts. The proposed mine triggers Section 47 of the CEAA, which, "Allows a foreign state or subdivision thereof (ie; the State of Montana) to initiate this reference through a request to the Canadian Minister of the Environment based on concerns that developments in one country will negatively impact another."

8. The TOR must include a Cumulative Effects Analysis (CEA) component. This needs to include any other reasonably foreseeable coal mining or mineral exploration projects (ie; the Lilyburt proposal) as well as existing activities within the Flathead and Elk River watersheds, such as forest harvest, road construction, and recreational and outfitter use, that may contribute additional impacts to each biophysical/environmental component.

9. Based on information obtained during the March 28, 2006 Working Group meeting, traffic may increase substantially on the haul road between the mine site and Elko (3 trucks/hour, 24 hours/day). The TOR need to specifically identify this issue and propose a study approach to assess potential impacts to wildlife.

10. With respect to wildlife, at the March 28, 2006 meeting of the Working Group, it was stated that 9 sites were visited in January of 2006 to assess the presence of forest carnivores. Since neither wolverine nor lynx were detected in this survey, no additional work was planned. Similarly, surveys for Harlequin Ducks consisted of a single survey on July 30,2005 in which a helicopter was used to fly the Wigwam River, Lodgepole Creek and North Lodgepole Creek.

This type of data collection is inadequate and provides only a snapshot of baseline conditions. Surveys for detecting tracks of forest carnivores, especially those that may occur in low densities like wolverines, fisher and lynx, need to be conducted by systematically following linear routes many miles in length, several times per year to

account for changes in snow conditions, seasonal changes in habitat use, and other variables.

The following comments apply to specific sections of the draft TOR:

3.0: PROJECT DESCRIPTION

- The draft TOR need to contain specific Project information, such as a detailed mine plan, water management, haul routes, road construction and project schedules, needed to identify which issues and information should be addressed and required in the Application.
- The draft TOR states that it will describe the Project in sufficient detail to allow a meaningful assessment of the Project effects. Until "…all key project components and activities [are] clearly identified and explained…" it will not be possible to identify all issues and information needs.

3.1: PROJECT BACKGROUND AND RATIONALE

The draft TOR lists components of the Application, including an analysis of alternatives.

- One alternative that should be considered is the "no action" alternative, including evaluation of other potential uses for the area.
- This evaluation needs to consider environmental, social and economic values of the other uses in relation to the anticipated impacts of the Project.

4.11: WILDLIFE AND FISHERIES PROTECTION PLAN

- The draft TOR notes that a Fisheries Protection Plan will be provided if there is a requirement for CMC to provide on-going mitigation for stream flows or for fish habitat compensation:

  What are the criteria for requirement of a Fisheries Protection Plan? Will one be required for the Project?
- There are migratory bull trout and westslope cutthroat trout that use the immediate project site in both the Flathead River and Lodgepole Creek. Bull trout are listed as Threatened under the United States Endangered Species Act (ESA) and westslope cutthroat trout have been petitioned for listing.
- Bull trout in the Elk River/Lake Koocanusa are currently strong populations that provide valuable recreational fisheries. At this time, both species in the Flathead Basin are considered weak stocks and angler harvest is not permitted. In the Flathead, both species were at higher levels in the late 1980's, when the coal mine in the Cabin Creek drainage was proposed.
- The Flathead Basin westslope cutthroat trout and bull trout populations influence the ESA designation for these species. Bull trout were listed in 1998 largely due to the documented declines in the Flathead Basin populations.
- Further declines in population status will influence the future status assessments for the species across their range and affect the ability of western United States to de-list bull trout and relieve regulatory constraints.

4.4 WATER MANAGEMENT PLAN

- The TOR need to include designs of the sediment ponds, spillways and ditches based on the design event(s) chosen or required for sediment drainage and control.

4.5 ML/ARD PREVENTION, MANAGEMENT AND MONITORING PLAN

- Geochemical characterization approach and methods needs to include paste extract analysis for electrical conductivity (EC), major cations and anions
- The TOR need to include description methods for rock and waste sample collection and preparation.

4.12.2 MINE

- The TOR need to include a detailed final reclamation and decommissioning plan (rather than a conceptual plan), including a post-mining topography map (1" = 200 or 300 meters with a 3-4 meter contour interval), identified seismic and static safety factor analysis
- The TOR need to include objectives for waste dumps and reclamation plans for Crab Creek and the Lodgepole drainages

5.0 RISK ASSESSMENT AND MANAGMENT:

- The draft TOR states that there will be risk assessments conducted on various aspects of the Project.

  Upon what information or databases will this be conducted?
- *In the Flathead River International Study: Board Report* under the International Joint Commission (IJC) 1988, the Board encountered two major problems with the terms of reference;

1.) Conceptual level of design was not adequate to develop reliable, quantitative predictions of impacts on water quality, quantity and biological resources;
2.) Baseline data required to assess impacts were not adequate requiring professional judgment, not data, to form conclusions.

- To address this concern, the TOR need to include a basin-wide comprehensive and quantitative baseline assessment of aquatic resources in both the Flathead and Wigwam river systems, including Flathead Lake and Lake Koocanusa used by the migratory trout.

6.0 OVERVIEW OF EFFECTS ASSESSMENT AND APPROACH METHODS:

- Effects assessments need to include cross-border effects, eg., hydrology, aquatic resources, vegetation and wildlife (including Threatened and Endangered species, and species of special concern in the U.S. and Montana, First Nations communities, land use, and cumulative effects).
- Study area boundaries need to include the entire Flathead River Basin, including the mining site-specific tributaries, the North Fork of the Flathead River, the main stem Flathead River and Flathead Lake. There is potential for project impacts to be observed in all four of these areas. Likewise the study area should include the Lodgepole Creek drainage, the Wigwam and Elk

rivers, and Lake Koocanusa given that impacts from the Project extend to all of these areas.

6.3 CUMULATIVE ENVIRONMENTAL EFFECTS

- Project impacts to water quality, migratory fish and wildlife are concerns that encompass the Wigwam, Elk and transboundary Flathead basins.
- The Effects Assessment needs to be conducted at these scales in a basin-wide approach. In addition, a basin-wide approach to baseline information collection and assessment will allow CMC to determine Project impacts by comparing aquatic conditions at the mine site to those in other tributaries, which will provide reference sections.
- This assessment needs to include social and economic impacts, such as those related to loss of fisheries in United State waters. For example, negative impacts to westslope cutthroat trout and bull trout could result in negative impacts to economies based on recreational fisheries in the Flathead Basin and in Lake Koocanusa. These economic impacts need to be addressed in the Effects Assessment.
- Quantify the cumulative impacts of the Cline Mine, proposed Lillyburt coalmine, proposed CBM developments and the gold mining proposal on air quality, wildlife populations and migratory patterns, water quality, including sediment, nutrients and heavy metals, water supply, fish and aquatic habitats in the transboundary Flathead River basin.
- Quantify the cumulative impacts of the Cline Mine, timber harvest and other changes in land use processes in the Wigwam drainage basin.
- Quantify the cumulative impacts of the above developments on the following federal and international designations: Glacier National Park, Waterton Lakes National Park, World Heritage site, Biosphere Reserve and the Wild and Scenic River of the NF of the Flathead.
- Quantify how existing land uses and practices within the transboundary Flathead and Wigwam drainage basins will change with the proposed developments described above.
- Cumulative effects analysis for wildlife needs to include an assessment of thresholds that may be reached when combined with other developments in the greater project area.

7.3 SURFACE WATER HYDROLOGY:

- The TOR need to include an assessment of the water drainage system for all existing roads and proposed road development, including small currently impassable roads used in past timber harvest operations.
- This section needs to address the increased efficiency of transporting rain and snowmelt waters across land to stream channels by these roads and the resulting impacts to channel morphology, sedimentation, and hydrology.
- Of significant importance is the upgrade and increased truck use on haul roads adjacent to Lodgepole Creek. Sedimentation will increase due to year round use by high numbers of large trucks. These sediments will be introduced into Lodgepole Creek and impact bull trout egg survival.

- The TOR need to include a comparison of the expected modified hydrograph of Lodgepole Creek with the existing hydrograph to assess impacts to channel morphology and sedimentation associated with channel changes. The pre-Project hydrograph must be well described to allow this comparison.

7.4.1 HYDROGEOLOGY BASELINE CONDITIONS

- The TOR need to include an evaluation of the quantity and quality of groundwater contributions from potentially affected geologic strata to all nearby surface streams.
- This work needs to be conducted at a scale that thoroughly characterizes the hydrogeologic conditions of the material to be mined, demonstrating which portions of the material are saturated and estimates of the character and quantity of groundwater contributions from this material to base flow in proximate streams.

8.0 WATER QUALITY AND AQUATIC FISH RESOURCES

- The study area for assessment of impacts to aquatic resources is limited to Foisey and Lodgepole creeks. An assessment at this scale would not include potential impacts to the North Fork of the Flathead River, the main stem Flathead River, and Flathead Lake and also the Wigwam and Elk rivers and Lake Koocanusa.
- The TOR need to include baseline conditions in not only Foisey and Lodgepole creeks, but also across the majority of these basins, including other important bull trout and cutthroat trout tributaries, downstream river sections and lakes, such as the North Fork and main stem Flathead River, and Flathead Lake.

8.2 WATER QUALITY (SURFACE WATER AND GROUNDWATER QUALITY)

- The TOR need to include baseline data on water quality and flow during a high flow year, an average year and drought year at a number of sites at the mine site and downstream in both the Flathead and Wigwam drainage basin (minimum of three years of data.) Synoptic measurements for all parameters are important within each of the major watersheds.
- Water Quality samples need to be taken at least two or three times during the rising limb of the hydrograph, one at peak discharge and two or three measuring during the descending limb and at base flow in August/September and one in the Winter (January or February).
- Baseline water quality samples should be taken for the major nutrients, and metals for a minimum of three years.
- The parameters in the report presented on March 28 need to be tied to flow.
- Quantify the amount of explosives that will be used at the mine site and the amount of nitrogen that can be expected be released in effluent discharges from the mine site and downstream. Determine the effect of increased nitrogen releases on the increased growth of algae and the greening of the Flathead and Wigwam rivers.

- The TOR need to include continuous depth integrated sediment data throughout the basin and tied to the hydrograph during a low, average and high flow years and especially at peak discharge as up to 90 percent of sedimentation occurs during this period.
- Water Budget. The TOR need to include a complete water budget for the mine site. Water used for washing the coal, mine site pumping, used on the roads etc.
- Define the relationship between surface water and ground water and the effects of dewatering streams and the groundwater recharge zones in the tributaries of the Flathead River that could be affected.
- Quantify the groundwater chemistry within and downstream of the mine site and the effects on surface water flows.

8.2.3 ASSESSMENT OF POTENTIAL EFFECTS, MITIGATION MEASURES AND RESIDUAL EFFECTS

- The TOR need to include a detailed characterization of geotechnical influence on inflowing groundwater from residual nitrates from blasting materials.
- The assessment of water quality needs to include suspended solids and petroleum hydrocarbons (fuels, oils, lubricants, solvents, etc.).
- The Flathead River *Board Supplement Report* also defined a number of mitigation measures for groundwater related impacts, surface water related impacts, needed waste dumps and nutrient controls and others impacts that should be quantified and assessed at this mine site.

8.3.1 FISHERIES BASELINE CONDITIONS:

- The document states that a baseline fisheries program will identify fish resources and describe biophysical habitat conditions in the three immediate tributaries to the Project and the Flathead River with reference to historical data sources and that the assessment will focus on fish presence, fish habitat, water quality and seasonal flows. Historic data sources include bull trout redd count surveys that describe redd numbers and locations of redds in Lodgepole Creek and the Flathead River.
- Fish presence and species distribution is an important fish step in assessing fishery resources, but provides limited information and does not prove absence. Generally, this type of information provides a snapshot in time of what was observed by the collector at that point in time. Fish presence information may change with the time of day, season-to-season, or year-to-year at any location in a stream.
- The TOR baseline fisheries data need to include more descriptive types of data designed to determine species abundance, seasonal migration patterns, habitat use by specific life stages, population status, and population demographics, such as genetic makeup, age structure and life history strategy.
- These types of fisheries information are needed to describe what fisheries resources exist in the Project area and be able to adequately assess potential impacts of the Project to these resources. Also, fish presence alone will not provide data to assess future changes to the fish populations.

- The TOR need to include a quantitative baseline data collection that incorporates spatial and temporal variation is needed to assess impacts to these fishery resources.
- The baseline collection needs to occur over a three to 10 year period to account for annual variation. In addition, assessing fish presence in only Foisey Creek and upper tributaries will not allow comparisons to fish populations in other portions of the basin. As stated in the above comments, the Project will impact fisheries in a much larger area than just the immediate tributaries.
- The Project would benefit from a comprehensive baseline data collection for fish populations throughout the Flathead Basin, Lodgepole Creek and the Elk River Drainage.
- In addition to the trout species, there are sculpin (Rocky Mountain and Columbia Mottled) in the Foisey/Lodgepole study area (Interior Reforestation.Ltd., 1997a,b). At this time there is little information describing the specie(s) distribution of sculpin in the Flathead River and tributaries.
- The TOR need to include a comprehensive study to determine which species of sculpin are present and may be impacted by the Project.
- The TOR need to include a distribution of sculpin species and an evaluation of the sensitivity of these species to mining pollutants. In some studies, sculpin are more sensitive to contaminants than trout. This relationship needs to be assessed for pollutants such as selenium and other mining wastes.
- The TOR fish habitat characterization needs to include techniques that assess specific seasonal habitats of each life stage. For example, spawning habitat should be assessed specifically to determine its quality by measuring fine sediment levels. Likewise, juvenile rearing habitat should be assessed for cover availability. Surveys should be designed to assess the critical habitat components that influence survival of the various life stages for each fish species.
- At this time, there is no documented use of tributaries to the Middle Fork of the Flathead River for spawning and rearing by westslope cutthroat trout from Flathead Lake. The Flathead Lake, North Fork and main stem Flathead River cutthroat trout fisheries appear solely dependent on westslope cutthroat trout production in the North Fork Flathead Drainage. Westslope cutthroat trout comprise the summer fishery in the North Fork and main stem reaches of the Flathead River. Numerous fishing guide services and equipment stores rely on these fisheries. An angler creel survey of these waters is needed to assess the potential impacts of the Project to these economies. Likewise, the westslope cutthroat trout and bull trout fisheries in Lodgepole Creek, the Wigwam and Elk rivers and Lake Koocanusa provide economic benefits to surrounding communities in both the US and British Columbia. An angler creel survey of these waters is needed to assess the potential impacts of the Project to these economies.

- A 1998 report, Selenium Mobilization from Surface Coal Mining in the Elk River Basin, British Columbia: A Survey of Water, Sediment and Biota

(McDonald and Strosher) from the Ministry of Environment, Lands and Parks, Kootenay Region, British Columbia, found elevated levels of selenium in water, sediments, and aquatic life including westslope cutthroat trout downstream of coal mining in the Elk River Drainage and recommended additional studies to further investigate selenium impacts. These recommended studies would provide baseline information on impacts to westslope cutthroat trout, side-channel wetlands, aquatic birds, and Lake Koocanusa and on release mechanisms responsible for high selenium concentrations. These issues should be revisited and considered in the draft TOR. In addition, the study is now 10 years old and should be repeated. There is the need to assess cumulative impacts of additional selenium mobilization from the proposed mining operations in the Lodgepole Creek Drainage and the associated impacts to the Elk River and Lake Koocanusa fish populations.

8.3.2 BENTHIC INVERTEBRATES AND PERIPHYTON:

- The TOR need to include a quantitative assessment that incorporates seasonal variation to assess impacts to these organisms.
- Baseline data need to be collected over a multiyear timeframe to address variation in population characteristics over time that may be due to diverse environmental conditions, such as the exceptionally high summer or fall stream flows in 2005.
- This needs to be conducted not only in the immediate three tributaries but also to all downstream waters, including reference reaches not impacted by the Project.
- The TOR need to include a basin-scale bioassessment (benthos and periphyton) assemblages and a quantitative physical habitat assessment via a statistically valid survey design.

8.3.3 IMPACT ASSESSMENT:

- The TOR need to address impacts to fish populations and other aquatic biota throughout the Flathead and Kootenai basins, downstream of the Project.
- The TOR need to include a quantitative assessment that incorporates spatial and temporal variation to assess impacts to the fishery resources.
- Baseline fisheries data should be collected over a multiyear timeframe (three to 10 years) to address variation in fish population characteristics over time. This should be conducted not only in the immediate three tributaries but also in all downstream waters, including reference reaches not impacted by the Project.
- The TOR need to include a delineation of important fish habitats, such as spawning or over-wintering areas to understand the existing fishery resources and assess impacts of the Project. The assessment for benthic invertebrates should be approached in the same manner.
- Impact assessments need to incorporate monitoring and impact data from the Elk River mines, including the effects of any failures of structures such as sediment ponds and waste rock dumps.

9.3 NOISE

- The draft TOR states that no baseline studies for noise are intended.
- Due to the wildlife values of the mine site, transboundary Flathead, and Lodepole/Wigwam, the TOR need to include baseline studies for noise and potential impacts to wildlife.

10.0 VEGETATION AND WILDLIFE

- The Vegetation and Wildlife sections need to be separated out into two distinct sections, each with their own baseline and impact assessment components.
- This section states that only habitats directly impacted by the mine's footprint, the load-out, the haul-out road, and the power line will be mapped and described.
- The TOR need to include a basin-wide assessment to better ascertain which habitats are rare and how this proposal may separate the connectivity of habitats.
- Given that this project will impact 2 large watersheds (the Elk and the Flathead), both should be mapped.
- John Weaver (2001) identified the Elko area and an area north of Fernie as potential linkage areas for grizzly bears to populations to the north and west of the project area. Areas important for linkage for grizzly bears invariably benefit most other mammalian species as well.

10.1.1 VEGETATION AND WILDLIFE BASELINE:

Amphibians

- The TOR need to include baseline data collection for all amphibian species in the Project area, tributaries not impacted by the Project, and the Flathead River.
- The TOR need to include a quantitative assessment for amphibian species that incorporates spatial and temporal variation .
- Baseline data for amphibians need to be collected over a multiyear timeframe to address variation in population characteristics and habitat used over time and across seasons.
- A simple one-time survey of any specific site will not provide reliable data to determine if amphibian species are absent from the site or what life stages potentially use the site seasonally.

Wildlife

- A number of large ungulate species and carnivores are known to summer and reproduce in the B.C. portion of the transboundary Flathead and winter in Waterton Lakes National Park and the lower portion of the Flathead basin within Glacier National Park, Flathead National Forest and the riparian corridor of the Flathead River.

- The TOR need to quantify the importance of the transboundary Flathead riparian corridor for wildlife species, periphyton, and physical and biological processes.
- The TOR need to quantify the migratory patterns of the large and mid-size carnivores as well as the large ungulate species.
- The TOR need to include data on the following mid-size carnivores: lynx, bobcat, wolverine, fisher,, badger, mink, river otters, and a number of large carnivores including wolves, grizzly bear, and mountain lion.
- The TOR need to include at least a three-year baseline data for the above species based on presence-absence inventories, demographic inventories and population trend analysis.
- The draft TOR states that a "wildlife" description and a "selected wildlife" suitability and capability mapping will be done only on areas directly impacted by this proposal. This needs to include both a local and basin-scale for both watersheds.
- Assuming that not every vertebrate species will be addressed, the TOR need to include a rigid and systematic survey consisting of small mammal trapping. It is very possible that species may be identified that were not known previously to occur in the area.
- In the case of lynx and wolverine, given their distribution throughout the Flathead drainage, there is absolutely no question that they use the project area and would be impacted by this proposed project. See Zielinski and Kucera (1995) for more detailed information on conducting surveys for forest carnivores.
- The TOR need to include track surveys to be conducted the entire length of the haul road for at least 3 years to better determine the locations of these primary points of crossing.

Birds

- The TOR need to include thorough and systematic breeding bird surveys and should be conducted for a minimum of 3 years to better ascertain which species occur in the area.
- The TOR need to include territorial counts and egg shell sampling for the pileated woodpecker, water ouzel and Harlequin ducks.

10.1.2 IMPACT ASSESSMENT:

Amphibians

- Impacts to all amphibian species and their sensitivity to expected mine pollutants need to be assessed.
- The TOR need to include a quantitative and comprehensive baseline assessment of amphibian species distribution that incorporates spatial and temporal variation is needed to assess impacts to these organisms.

Mammals

- This section does not address impacts to wildlife beyond the immediate area. The draft TOR states that the predictions for impacts on wildlife will be based on the project footprint.
- The TOR need to include the haul route and entire transboundary Flathead basin. Impacts from noise and disturbance can be far-reaching and should be considered from a basin-wide approach. Again, one example would be the travel corridor/linkage zone identified by Weaver (2001) for grizzly bears south of Fernie.
- The TOR need to define the effects of this and the other proposed mines on fragmentation and encroachment on habitats of large carnivores and what this will do to population numbers and genetic variability. According to a 2005 study on grizzly bears by Proctor, et. al., "Genetic analysis reveals demographic fragmentation of grizzly bears yielding vulnerable and small populations." They concluded that, "trans-border bear populations may be more threatened than previously thought and conservation efforts must be expanded to include international connectivity."
- The TOR need to quantify the effects of the proposed mine and other proposed developments in the transboundary Flathead on fragmentation of the available habitat for importance wildlife species, especially in the Crown of the Continent eco-region.
- The TOR need to assess the changes in winter ranges of a number of species such as mountain goats and sheep.
- The TOR wildlife assessment needs to include the impacts and disturbances associated with the haul road. As stated on 3/28, a minimum of 6 large trucks will be passing over this road each hour of every day, 365 days of the year. This is one large truck every 10 minutes, year-round. This does not include the large number of vehicle trips involved with transporting personnel, services and equipment each day.
- There are other issues relative to the haul road that are important beyond its effect on population connectivity. Roadsides planted to clover or other palatable cover may attract some species of wildlife, making them vulnerable to being struck or killed by vehicles or to being illegally shot. Dead ungulates may attract bears or other scavengers, increasing their vulnerability to mortality as well. McLellan (1989) showed that grizzly bears inhabiting the Flathead had higher rates of mortality if they used habitats near open roads. Salt on roads during the winter months to control ice may act to attract ungulates as well, making them vulnerable to being struck by a vehicle.

<u>11.0 AIR QUALITY</u>

- The TOR need to quantify the dust and particulate matter that will be released from the mine site and haul road and deposited in the Flathead and Wigwam rivers and tributaries. Define the impacts on water quality.
- The TOR need to quantify the impacts of dust and particulate matter in the lakes and air shed of Waterton Lakes National Park and Glacier National Parks. Both National Parks have Class 1 Air Quality standards.

15.1 SOCIO-COMMUNITY, SOCIO-ECONOMIC AND HEALTH:

- The scope of the detailed assessment must include the Flathead Basin in the United States, the Polebridge vicinity and the Flathead Valley including the Kalispell, Columbia Falls, and Whitefish vicinities and the Kootenai Basin in the United States, including Lake Koocanusa. There are potential impacts to these areas associated with degraded water quality and reduced migratory fish populations resulting from the Project.

15.2.7: BUSINESSES:

- This section should examine the businesses associated with recreational fisheries in the Flathead and Kootenai basins and the potential impacts to these businesses by development of the Project. To assess the potential impacts from the Project, baseline data collection should include angler creel surveys to determine angler use and catch in the river and lake fisheries and estimated economic values of these fisheries.

Potential for Dump and settling pond failures

- It was stated in the March 28th meeting at the St. Eugene Mission, B.C by one of the mine engineers that there would be dump failures at the Cline mine site. Please quantify the potential impacts that these dump failures will have on sedimentation, fisheries, and other ecological parameters.

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