

26. SUMMARY AND CONCLUSIONS

26.1 INTRODUCTION

This Application for an Environmental Assessment Certificate/Environmental Impact Statement (Application/EIS) for the proposed Murray River Coal Project (the Project) represents HD Mining's application, under the British Columbia (BC) *Environmental Assessment Act* (2002a) and the federal *Canadian Environmental Assessment Act, 2012* (CEAA 2012; 2012) for approval to proceed to the permitting stage for the Project.

In this Application/EIS, HD Mining has reported the findings of the assessment with respect to the potential effects of the Project on the baseline environmental, economic, social, heritage and health setting. The assessments have been broadly scoped and are comprehensive, and have followed the effects assessment methodology detailed in Chapter 5. The effects assessment reflects the feedback provided during the pre-Application/pre-EIS stage of the environmental assessment process by Aboriginal groups, provincial and federal government agencies, and the public.

HD Mining, in conducting the assessments, has been supported by technical specialists who have applied rigorous analytical procedures and expert professional judgement to the assessment analysis. The Application/EIS has systematically identified issues of concern; scoped potential effects and evaluated their potential to affect environmental, economic, social, heritage, and health Valued Components (VCs); and identified mitigation measures to prevent effects or reduce them to acceptable levels. With mitigation measures applied, residual effects have been identified and assessed to determine their significance. Summaries of the results of the assessment are provided in Sections 26.2 to 26.5, below.

Moving forward, as described in Section 1.8, HD Mining will engage the Mine Review Committee (MRC) in the coordinated authorizations process to apply for the multiple project-specific provincial authorizations required to progress the Project, including authorizations under *Mines Act* (1996), the *Environmental Management Act* (2003), and the *Water Act* (2006). HD Mining anticipates that some permit applications will be submitted during the EA review period, and that where appropriate, the MRC will work to conduct review of the permits in parallel with the EA review. Through consultation with the MRC, permit applications will be developed in phases, with specific applications for permits, licences and other authorizations being effectively bundled together to allow for a coordinated review by the various natural resource agencies involved.

26.2 SUMMARY OF PUBLIC CONCERNS AND MITIGATION

Appendix 2-G of Chapter 2 (Information Distribution and Consultation) contains a table summarizing issues raised by local governments, tenure holders, stakeholders, and other members of the public during the pre-Application/pre-EIS phase and the Proponent's responses and mitigations to address those concerns, in accordance with Section 13.5 of the Section 11 Order and Section 10.3 of the EIS Guidelines. There are no outstanding public concerns.

26.3 SUMMARY OF ABORIGINAL CONCERNS, EFFECTS ON ABORIGINAL AND TREATY RIGHTS AND RELATED INTERESTS, AND MITIGATION

Appendix 2-E of Chapter 2 (Information Distribution and Consultation) contains a table summarizing the comments, issues, and concerns raised by Aboriginal groups during the pre-Application/pre-EIS phase, and the Proponent’s responses and mitigations to address those concerns, in accordance with Section 11.4 of the Section 11 Order and Section 9.2 of the EIS Guidelines for the Project. There are no outstanding Aboriginal concerns.

The relationship of VCs to Aboriginal groups’ Aboriginal and treaty rights and related interests are presented in Table 26.3-1.

Table 26.3-1. Relationship of Valued Components to Aboriginal Groups’ Aboriginal and Treaty Rights and Related Interests

| Aboriginal Group | Aboriginal or Treaty Right or Related Interest | Valued Components |
|---|---|---|
| WMFN | Routes of Access and Transportation | Fishing Opportunities and Practice |
| | | Hunting and Trapping Opportunities and Practices |
| | | Gathering Opportunities and Practices |
| | | Habitations, Trails, Burial Sites and Cultural Landscapes |
| | Water Quality and Quantity | Surface water |
| | | Sediment |
| | | Aquatic Resources Groundwater |
| | Healthy Populations of Game in Preferred Harvesting Locations | Woodland caribou |
| | | Rocky Mountain elk |
| | | Moose |
| Mountain goat | | |
| Grizzly bear | | |
| Cultural and Spiritual Relationships with the Land | Furbearers (fisher as a representative species) | |
| | Hunting and Trapping Opportunities and Practices | |
| | Habitations, Trails, Burial Sites and Cultural Landscapes | |
| Abundant Berry Crops in Preferred Harvesting Areas | Harvestable plants | |
| | Country foods | |
| | Gathering Opportunities and Practices | |
| Traditional Medicines in Preferred Harvesting Areas | Harvestable plants | |
| | Country foods | |
| | Gathering Opportunities and Practices | |
| Feelings of Safety and Security | Habitations, Trails, Burial Sites and Cultural Landscapes | |
| | Harvesting | |
| | Recreational Use | |
| Lands and Resources Available within the Constraints of Time and Cost | Woodland caribou | |
| | Rocky Mountain elk | |
| | Moose | |

(continued)

Table 26.3-1. Relationship of Valued Components to Aboriginal Groups' Aboriginal and Treaty Rights and Related Interests (continued)

| Aboriginal Group | Aboriginal or Treaty Right or Related Interest | Valued Components |
|---------------------------|--|--|
| WMFN (<i>cont'd</i>) | Lands and Resources Available within the Constraints of Time and Cost (<i>cont'd</i>) | Mountain goat Grizzly bear Furbearers (fisher as a representative species) Hunting and Trapping Opportunities and Practices |
| | Socio-cultural Institutions for Sharing and Responsibility | Woodland caribou Rocky Mountain elk Moose Mountain goat Grizzly bear Furbearers (fisher as a representative species) Hunting and Trapping Opportunities and Practices Harvestable plants Country foods Gathering Opportunities and Practices |
| | Healthy Connection to and Adequate Protection for and Respect for Spiritual Sites | Habitations, Trails, Burial Sites and Cultural Landscapes |
| SFN | Subsistence Resources | Woodland caribou Rocky Mountain elk Moose Mountain goat Grizzly bear Furbearers (fisher as a representative species) Hunting and Trapping Opportunities and Practices Fish (including Bull Trout and Arctic Grayling) Fish habitat Fishing Opportunities and Practice |
| | Cultural, Spiritual and Ceremonial Resources | Furbearers (fisher as a representative species) Hunting and Trapping Opportunities and Practices Harvestable plants Country foods Gathering Opportunities and Practices Habitations, Trails, Burial Sites and Cultural Landscapes |
| | Habitation Resources | Habitations, Trails, Burial Sites and Cultural Landscapes |
| | Access to Resources | Fishing Opportunities and Practice Hunting and Trapping Opportunities and Practices Gathering Opportunities and Practices Habitations, Trails, Burial Sites and Cultural Landscapes |
| MLIB | Hunting | Woodland caribou Rocky Mountain elk Moose Mountain goat Grizzly bear Furbearers (fisher as a representative species) Hunting and Trapping Opportunities and Practices |

(continued)

Table 26.3-1. Relationship of Valued Components to Aboriginal Groups' Aboriginal and Treaty Rights and Related Interests (continued)

| Aboriginal Group | Aboriginal or Treaty Right or Related Interest | Valued Components |
|------------------|---|--|
| BRFN | <p>Travel and Access</p> <p>Hunting</p> <p>Fishing</p> <p>Gathering</p> <p>Habitations and Community Gatherings</p> | <p>Fishing Opportunities and Practice</p> <p>Hunting and Trapping Opportunities and Practices</p> <p>Gathering Opportunities and Practices</p> <p>Habitations, Trails, Burial Sites and Cultural Landscapes</p> <p>Woodland caribou</p> <p>Rocky Mountain elk</p> <p>Moose</p> <p>Mountain goat</p> <p>Grizzly bear</p> <p>Furbearers (fisher as a representative species)</p> <p>Hunting and Trapping Opportunities and Practices</p> <p>Fish (including Bull Trout and Arctic Grayling)</p> <p>Fish habitat</p> <p>Fishing Opportunities and Practice</p> <p>Harvestable plants</p> <p>Country foods</p> <p>Gathering Opportunities and Practices</p> <p>Habitations, Trails, Burial Sites and Cultural Landscapes</p> |
| HLFN | <p>Quantity and Quality of Wildlife</p> <p>Quantity and Quality of Fish</p> <p>Wildlife Habitat</p> | <p>Woodland caribou</p> <p>Rocky Mountain elk</p> <p>Moose</p> <p>Mountain goat</p> <p>Grizzly bear</p> <p>Furbearers (fisher as a representative species)</p> <p>Hunting and Trapping Opportunities and Practices</p> <p>Fish (including Bull Trout and Arctic Grayling)</p> <p>Fish habitat</p> <p>Fishing Opportunities and Practice</p> <p>Woodland caribou</p> <p>Rocky Mountain elk</p> <p>Moose</p> <p>Mountain goat</p> <p>Grizzly bear</p> <p>Furbearers (fisher as a representative species)</p> <p>Bats</p> <p>Raptors</p> <p>Waterfowl</p> <p>Songbirds (black-throated green warbler as a representative species)</p> <p>Amphibians (western toad as a representative species)</p> |

(continued)

Table 26.3-1. Relationship of Valued Components to Aboriginal Groups' Aboriginal and Treaty Rights and Related Interests (completed)

| Aboriginal Group | Aboriginal or Treaty Right or Related Interest | Valued Components |
|---------------------------|--|--|
| HLFN (<i>cont'd</i>) | Wildlife Migration Patterns | Woodland caribou Rocky Mountain elk Moose Mountain goat Grizzly bear Furbearers (fisher as a representative species) Bats Raptors Waterfowl Songbirds (black-throated green warbler as a representative species) Amphibians (western toad as a representative species) |
| | Vegetation Loss | Forested ecosystems BC CDC listed ecosystems Harvestable plants Rare plants and lichens and associated habitat |
| | Non-Aboriginal Hunting and Poaching | Hunting and Trapping Opportunities and Practices |
| | Direct Destruction of Hunting Areas | Woodland caribou Rocky Mountain elk Moose Mountain goat Grizzly bear |
| | Direct Destruction of Trapping Areas | Hunting and Trapping Opportunities and Practices Furbearers (fisher as a representative species) |
| | Direct Destruction of Fishing Areas | Hunting and Trapping Opportunities and Practices Fish (including Bull Trout and Arctic Grayling) Fish habitat Fishing Opportunities and Practice |
| | Direct Destruction of Gathering Areas | Harvestable plants Gathering Opportunities and Practices |
| | Water and Ecosystems | Surface water Sediment Aquatic Resources Groundwater Forested ecosystems BC CDC listed ecosystems |

The Project is not predicted to adversely affect the Aboriginal and treaty rights and related interests of any Aboriginal group identified in the Section 11 Order and EIS Guidelines, except for Saulteau First Nations. Potential effects of the Project on Saulteau First Nations' Aboriginal and treaty rights and related interests, and accommodation measures proposed by the Proponent, are summarized in Table 26.3-2.

Table 26.3-2. Potential Residual Effects on Aboriginal and Treaty Rights and Related Interests and Accommodation Measures

| Potential Residual Effects On First Nations Activities | Accommodation Measures |
|---|---|
| <p>Hunting rights: The exercise of Aboriginal and treaty rights with respect to the quantity of populations of game (WMFN, SFN, MLIB, BRFN, HLFN), experience of the environment while hunting and trapping (WMFN, SFN, MLIB, BRFN, HLFN), and perceived quality of harvested resources (WMFN, SFN, KLMSS) may differ between future conditions with the Project and future conditions without the Project</p> | <p>The Proponent will work with Aboriginal groups to facilitate their participation in ongoing monitoring, during pre-mine, during construction and operations, and post-mine periods.</p> |
| <p>Fishing rights (SFN): The Project may affect SFN's fishing rights due to: reduced quality of fishing experience associated with Project-related noise and visual changes; and reduced perceived quality of fishing resources. <u>The exercise of SFN's Treaty 8 rights may differ</u> between future conditions with the Project and future conditions without the Project with respect to quality of experience while fishing and perceived quality of fish resources.</p> | <p>The Proponent will work to maintain Aboriginal groups' continuity of use via ongoing monitoring to prevent the creation of 'avoidance areas' for Aboriginal peoples.</p> |
| <p>Gathering rights (SFN): The success of SFN's gathering activities in the LSA may be adversely affected due to loss and alteration of harvestable plants in the LSA. SFN members may perceive reduced quality of resources gathered in the LSA, despite a prediction of no residual effects on country foods. While residual cumulative effects on harvestable plants are predicted to be not significant, the exercise of SFN's Treaty 8 rights with respect to berries, medicines, and other plants may differ between future conditions with the Project and future conditions without the Project. In addition, the exercise of SFN's Treaty 8 gathering rights with respect to the experience of the environment while gathering and the perceived quality of gathered resources may differ between future conditions with the Project and future conditions without the Project.</p> | <p>The Proponent will engage in ongoing communication with Aboriginal groups, including translation of technical reports for Aboriginal membership</p> |
| <p>Cultural, spiritual, and ceremonial rights (SFN): SFN cultural, spiritual and ceremonial resources could be adversely affected by Project activities during Construction and Operation. Depending on their locations, a SFN sacred site, medicinal plant gathering area, and general trapping area may be adversely affected during site clearing and/or SFN access to the sites may be restricted during the life of the Project. The Project may adversely affect SFN cultural continuity related to teaching of children, due to sensory disturbance. Future conditions for the exercise of SFN's cultural, spiritual, and ceremonial treaty rights are expected to differ between future conditions with the Project and future conditions without the Project.</p> | <p>The Proponent will work with SFN prior to Construction to identify land use sites utilized by SFN members for cultural, spiritual, and ceremonial uses, and sites may provide visual contact with the Project. Should such site be determined, the Proponent will work with SFN to develop appropriate accommodation measures.</p> |
| <p>Habitation rights (SFN): If SFN habitations (a previous cabin and a camping site) overlap with the Project footprint, the habitations could potentially be adversely affected due to site clearing activities during Construction. SFN members access to these sites will be restricted. Given these potential direct effects, SFN's exercise of its Treaty 8 rights with respect to habitation resources is may differ between future conditions with the Project and future conditions without the Project.</p> | <p>The Proponent will work with SFN prior to Construction to identify the locations of the previous cabin and campsite. The Proponent will work with SFN to develop appropriate avoidance and/or other accommodation measures.</p> |

26.4 SUMMARY OF RESIDUAL EFFECTS AND MITIGATION MEASURES

This section summarizes the results of the effects assessments presented in Chapters 6 through 19, which identify the residual effects, mitigation measures, and significance determination for both Project-specific and cumulative effects. Separate tables are provided for environmental (Table 26.4-1), economic (Table 26.4-2), social (Table 26.4-3), health (Table 26.4-4), and heritage (Table 26.4-5) Valued Components (VCs).

Table 26.4-1. Summary of Residual Effects and Mitigation for Environmental VCs

| Residual Effects | Project Phase | Mitigation Measures | Significance | |
|--|-------------------------|--|----------------------------|----------------------------|
| | | | Project | Cumulative |
| Air Quality (Chapter 6) | | | | |
| Increase in TSP, PM ₁₀ , PM _{2.5} | Operation | Emission reduction measures. Fugitive dust reduction measures. | Not Significant (moderate) | Not Significant (moderate) |
| Dust Deposition | All phases | Emission reduction measures. Fugitive dust reduction measures. | Not Significant (minor) | Not Significant (minor) |
| Increase in greenhouse gas emissions (GHGs) | All phases | Emission reduction measures and methane liberation reduction measures. | Not Significant (minor) | Not Applicable |
| Groundwater (Chapter 7) | | | | |
| Groundwater Quantity: change in water levels, gradients and flow direction related to the underground mine | Operation, Post Closure | Groundwater flow into the mine will be collected and managed | Not Significant (moderate) | Not Residual |
| Groundwater Quantity: change in water levels, gradients and flow direction related to surface subsidence | Operation, Post Closure | Subsidence Management Plan | Not Significant (moderate) | Not Residual |
| Groundwater Quantity: change in water levels, gradients and flow direction related to the CCR piles | Operation, Post Closure | Liners under the Coarse Coal Rejects (CCR) piles, seepage collection drain systems, closure covers at Post Closure | Not Significant (minor) | Not Residual |
| Groundwater Quality: change groundwater quality related to seepage from the CCR piles | Operation, Post Closure | Liners under the CCR Piles, seepage collection drain systems, closure covers at Post Closure | Not Significant (minor) | Not Residual |
| Surface Water and Aquatic Resources (Chapter 8) | | | | |
| Change in surface water quantity in M20, M17B, and M19A creeks | All phases | Water Management Plan | Not Significant (minor) | Not Residual |

(continued)

Table 26.4-1. Summary of Residual Effects and Mitigation for Environmental VCs (continued)

| Residual Effects | Project Phase | Mitigation Measures | Significance | |
|--|---|---|----------------------------|----------------------------|
| | | | Project | Cumulative |
| Surface Water and Aquatic Resources (Chapter 8; cont'd) | | | | |
| Change in surface water quality (elevated selenium concentrations) in M19A Creek | Decommissioning and Reclamation, Post Closure | Erosion and Sediment Control Management Plan; Water Management Plan; ML/ARD Management Plan; Selenium Management Plan | Not Significant (minor) | Not Residual |
| Change to aquatic resources from surface water quality (elevated selenium concentrations) in M19A Creek | Decommissioning and Reclamation, Post Closure | Erosion and Sediment Control Management Plan; Water Management Plan; ML/ARD Management Plan; Selenium Management Plan | Not Significant (minor) | Not Residual |
| Fish and Fish Habitat (Chapter 9) | | | | |
| No residual effects identified | | | | |
| Terrain Stability (Chapter 10) | | | | |
| Increased risk of geohazards (mass movement of surficial materials, active fluvial processes, or soil erosion) resulting from subsidence | All phases | Monitoring of subsidence will allow for identification of new areas of instability and the appropriate management response. | Not Significant (moderate) | Not Significant (moderate) |
| Terrestrial Ecology (Chapter 11) | | | | |
| Loss and alteration of ecologically valuable soil | All phases | Minimize loss of soil quality and quantity by adhering to the Site Preparation and Soil Salvage Plan | Not significant (moderate) | Not Significant (moderate) |
| Loss and alteration of forested ecosystems | All phases | Minimize loss and adaptively manage effects through an ecosystem based approach | Not significant (moderate) | Significant (major) |
| Loss and alteration of rare ecosystems | Construction and Operation | Minimize loss and adaptively manage effects through an ecosystem based approach | Not significant (moderate) | Significant (major) |
| Loss and alteration of harvestable plants | Construction and Operation | Minimize clearing; dust abatement; invasive plant control | Not significant (minor) | Not significant (moderate) |
| Loss and alteration of rare plants and lichens and associated habitat | Construction and Operation | Minimize clearing; dust abatement; invasive plant control | Not significant (moderate) | Significant (major) |

(continued)

Table 26.4-1. Summary of Residual Effects and Mitigation for Environmental VCs (completed)

| Residual Effects | Project Phase | Mitigation Measures | Significance | |
|---|----------------------------|--|----------------------------|----------------------------|
| | | | Project | Cumulative |
| Wetlands (Chapter 12) | | | | |
| Loss of extent | Construction and Operation | None | Not significant (moderate) | Not significant (moderate) |
| Alteration of function | Operation to Post Closure | Air Quality and Dust Control Plan, Access Management Plan, Erosion and Sediment Control Plan, Selenium Management Plan, Aquatic Effects Monitoring Plan, Spill Response Plan, and Invasive Plant Management Plan | Not Significant (moderate) | Not Significant (moderate) |
| Wildlife and Wildlife Habitat (Chapter 13) | | | | |
| Moose: Habitat Loss and Alteration | Construction and Operation | Reducing footprint to smallest possible size, speed limits, avoiding salt licks, limiting noise disturbance. | Not Significant (minor) | Not Significant (minor) |
| Moose: Disruption of Movement | Construction and Operation | Reducing footprint to smallest possible size, speed limits, avoiding salt licks, limiting noise disturbance. | Not Significant (minor) | Not Significant (minor) |
| Grizzly Bear: Disruption of Movement | Construction and Operation | Reducing footprint to smallest possible size, speed limits, avoiding salt licks, limiting noise disturbance. | Not Significant (minor) | Not Significant (moderate) |
| Fisher: Habitat Loss and Alteration | Construction and Operation | Reducing footprint to smallest possible size, speed limits, avoiding salt licks, limiting noise disturbance. | Not Significant (minor) | Not Residual |
| Fisher: Disruption of Movement | Construction and Operation | Reducing footprint to smallest possible size, speed limits, avoiding salt licks, limiting noise disturbance. | Not Significant (minor) | Not Residual |

Table 26.4-2. Summary of Residual Effects and Mitigation for Economic VCs

| Residual Effects | Project Phase | Mitigation Measures | Significance | |
|--|---------------------------------|--|----------------------------|----------------------------|
| | | | Project | Cumulative |
| Employment and Income (Chapter 14) | | | | |
| Decrease in Employment and Income at Decommissioning and Reclamation | Decommissioning and Reclamation | Recruitment, Training and Employment Plan, Procurement Strategy, and Workforce Transition Plan | Not Significant (moderate) | Not Residual |
| Economic Activity (Chapter 14) | | | | |
| Increased Competition for Labour and Wage Inflation | Construction and Operation | Recruitment, Training and Employment Plan, and Procurement Strategy | Not Significant (moderate) | Not Significant (moderate) |

Table 26.4-3. Summary of Residual Effects and Mitigation for Social and Land Use VCs

| Residual Effects | Project Phase | Mitigation Measures | Significance | |
|--|--|---|-------------------------|-------------------------|
| | | | Project | Cumulative |
| Childcare Services (Chapter 15) | | | | |
| LSA community members may have reduced access to child care services | Construction and Operation | The Proponent will share information about its projected workforce needs with elected officials and childcare service providers | Not Significant (minor) | Not Significant (minor) |
| Children in child care facilities may experience decreased quality of child care services | Construction and Operation | The Proponent will share information about its projected workforce needs with elected officials and childcare service providers | Not Significant (minor) | Not Significant (minor) |
| Harvesting (Chapter 16) | | | | |
| Change in harvest locations for guide outfitters licences 701254 and 701258 and trappers TR0721T003 and TR0721T005 | Construction, Operation | Wildlife Management Plan, Noise Management Plan, Subsidence Management Plan | Not significant (minor) | Not significant (minor) |
| Industrial Land Use (Chapter 16) | | | | |
| Economic impact on overlapping tenure holders | Operation, Decommissioning and Reclamation | Longwall exclusion zone, regular communication with overlapping tenure holders, Subsidence Management Plan | Not significant (minor) | Not Residual |

(continued)

Table 26.4-3. Summary of Residual Effects and Mitigation for Social and Land Use VCs (continued)

| Residual Effects | Project Phase | Mitigation Measures | Significance | |
|---|--|--|----------------------------|----------------------------|
| | | | Project | Cumulative |
| Current Use of Lands and Resources for Traditional Purposes (Chapter 17) | | | | |
| Reduced quality of experience while fishing (SFN and HLFN), hunting (SFN, WMFN, and KLMSS), gathering (SFN), and while using habitations, trails, and cultural and spiritual sites (SFN) | Construction, Operation, Decommissioning and Reclamation | Noise Management Plan; Provision of information about expected noise characteristics and timing to Aboriginal groups; Commitment to undertake a visual impact assessment (“visual simulation”), develop visual quality objectives with Aboriginal groups, and engage in monitoring | Not significant (minor) | Not significant (moderate) |
| Reduced harvesting success in preferred areas for moose (MLIB, WMFN, BRFN, HLFN, SFN and KLMSS), grizzly bear (SFN and KLMSS) and fisher (SFN and KLMSS), and blueberries, firewood, and medicinal plants (SFN) | Construction, Operation, Decommissioning and Reclamation | Wildlife Mitigation and Monitoring Plan, Noise Management Plan, Subsidence Management Plan; Provision of information regarding expected effects to harvestable resources in the vicinity of the Project to Aboriginal groups | Not significant (moderate) | Not significant (moderate) |
| Perceived reduction in quality of resources harvested in the LSA, including fish (SFN and HLFN), wildlife (SFN, WMFN and KLMSS), and plants and berries (SFN) | Construction, Operation, Decommissioning and Reclamation | Regular communication and sharing of information, including results of the proposed environmental monitoring programs; Inclusion of Aboriginal groups in ongoing monitoring programs | Not significant (moderate) | Not significant (moderate) |

Table 26.4-4. Summary of Residual Effects and Mitigation for Health VCs

| Residual Effects | Project Phase | Mitigation Measures | Significance | |
|--------------------------------|---------------|---------------------|--------------|------------|
| | | | Project | Cumulative |
| Health (Chapter 18) | | | | |
| No residual effects identified | | | | |

Table 26.4-5. Summary of Residual Effects and Mitigation for Heritage VCs

| Residual Effects | Project Phase | Mitigation Measures | Significance | |
|--|---------------|---------------------|--------------|------------|
| | | | Project | Cumulative |
| Heritage Resources (Chapter 19) | | | | |
| No residual effects identified | | | | |

The mitigation measures outlined in Tables 26.4-1 to 26.4-5 will be implemented and monitored through an Environmental Management System (EMS), which is described in Chapter 24. Management plans outlined within the system include:

- Air Quality and Dust Control;
- Noise;
- Site Preparation and Soil Salvage;
- Erosion and Sediment Control;
- Water Management;
- Metal Leaching and Acid Rock Drainage;
- Flocculent;
- Explosives and Nitrogen;
- Selenium;
- Invasive Plants;
- Wildlife;
- Waste Management;
- Archaeological Resources;
- Subsidence;
- Recruitment, Training and Employment;
- Site Access;
- Spill Response; and
- Emergency Response.

As part of the bulk sample program, HD Mining has begun implementation of their EMS. These plans will continue to be adjusted and augmented over time to support additional permitting requirements and new Project phases/ activities, and to incorporate learnings from continual improvement.

26.5 FEDERAL SUMMARY

This section provides HD Mining's conclusions related to the changes to the environment pursuant to section 5 of CEAA 2012. Section 5 describes specific categories of direct and indirect effects that will be considered in the environmental assessment. These include changes to components of the environment within federal jurisdiction, changes to the environment that would occur on federal or transboundary lands, effects of changes to the environment on Aboriginal peoples, and changes to the environment that are directly linked or necessarily incidental to federal decisions and the effects of those changes in the human environment (Table 26.5-1).

Table 26.5-1. Summary of Federal Areas of Interest under the *Canadian Environmental Assessment Act, 2012*

| Federal Area of Concern | Changes to the Environment |
|---|--|
| Changes to Components of the Environment within Federal Jurisdiction | |
| Fish and Fish Habitat | Direct mortality; erosion and sedimentation; water quality; habitat loss. |
| Aquatic Species at Risk | No aquatic species at risk, as defined under the <i>Species at Risk Act</i> (2002b) will be affected by the Project. |
| Migratory Birds | Habitat loss and alteration; sensory disturbance; direct mortality; chemical hazards. |
| Changes to the Environment that Would Occur on Federal or Transboundary Lands | |
| None | |
| Changes to the Environment that are Directly Linked or Necessarily Incidental to Federal Decisions | |
| None | |
| Effects of Changes to the Environment on Aboriginal Peoples | |
| None | |

26.5.1 Changes to Components of the Environment within Federal Jurisdiction

Pursuant to Section 5(1)(a) of the CEAA 2012, the components of the environment within the legislative authority of Parliament are fish as defined in section 2 of the *Fisheries Act* and fish habitat as defined in subsection 34(1) of that Act, aquatic species at risk as defined in subsection 2(1) of the *Species at Risk Act* (2002b), and migratory birds as defined in subsection 2(1) of the *Migratory Birds Convention Act, 1994* (1994) and any other component of the environment that is set out in Schedule 2. A summary of changes to these components as a result of the Project are described below.

26.5.1.1 Fish and Fish Habitat

Fish and fish habitat was included as a receptor Valued Component (VC) in the Project's environmental assessment. Fish and fish habitat receptor VC sub-components included in the assessment process are:

- Fish, which includes:
 - Bull Trout (*Salvelinus confluentus*); and
 - Arctic Grayling (*Thymallus arcticus*).
- Fish habitat.

Potential Effects

Potential key effects were identified as: direct mortality, erosion and sedimentation, and water quality, and habitat loss.

Direct Mortality

Project-specific modes with the potential to impose direct mortality on fish in the LSA include the construction and maintenance of roads and bridges and also increased fishing pressure and harvesting of fish species arising from increased road access.

The geographic scope of direct mortality will be localized, but potential effects would be associated with all Project phases, and can affect fish species by causing mortality to all fish life history stages.

Erosion and Sedimentation

Potential Project-specific sources of erosion and sedimentation include access roads, Coal Processing Site, Decline Site, Shaft Site, and sites with water management infrastructure. Sedimentation and erosion can take place during all Project phases. The geographic scope of erosion and sedimentation can range from localized to far-reaching events, depending on the amount and type (e.g., particle size) of sediment that is introduced into the aquatic environment.

Erosion and sedimentation can affect fish habitat in many ways, including the physical alterations to habitat in the form of increased turbidity, smothering primary and secondary producers (food source), reducing visibility, diminishing feeding efficiency, increasing exposure to elevated metal concentrations, and leading to habitat avoidance by aquatic organisms.

Erosion events can be lethal to incubating fish eggs in streambeds and larvae present in the substrate because of fine sediment being deposited within the interstitial spaces of gravel (Platts and Megahan 1975; Lisle 1989). High total suspended solid (TSS) levels can lead to behavioural changes in fish, such as alterations in migration routes and spawning behaviour (Cordone and Kelley 1961).

TSS and fine particulates produced by erosion can cause minor physical damages, such as gill damage, leading to decreased fitness because of reduced ability to feed, spawn, and avoidance predators.

Recovery from sedimentation will be more rapid in high-velocity streams relative to wetlands or lakes. Many streams and rivers in the RSA have naturally high sediment loads due to natural sediment sources (e.g., M20 Creek), and thus will not be affected to the extent of clear, low-velocity streams.

Water Quality

The health of fish, other aquatic life, and sediment quality are all intimately linked to the quality of the water in the aquatic environment. Chemical contaminants may enter the aquatic environment from a number of sources as a result of Project activities in all phases and may pose a risk to fish.

Examples of types of chemicals that could be introduced into the aquatic environment as a result of Project activities include metals, petroleum products, and nitrogen and phosphorus associated with sewage disposal.

Exposure of fish to metals in their aquatic habitat can lead to accumulation of those contaminants in fish tissue. Presently, mercury is the only metal for which Health Canada or CCME guidelines exist for fish tissue (CCME 1999; Health Canada 2011). The aquatic life guideline for selenium concentration in fish for British Columbia (Beatty and Russo 2014) lists two thresholds for selenium: 1) 11 µg/g DW (equivalent to 11 mg/kg DW) in ovary or eggs, and 2) 4 µg/g DW (equivalent to 4 mg/kg DW) in muscle.

Mercury can bioaccumulate through the food chain and pose a greater risk to higher trophic level organisms. Elevated tissue mercury concentrations in fish have been associated with sublethal

effects such as decreased growth, developmental and reproduction abnormalities, and neurological and behavioural effects (Kidd and Batchelar 2012). From baseline studies, mercury concentrations in Slimy Sculpin from all sites sampled in all years were lower than the Health Canada guideline of 0.50 mg/kg WW for maximum total mercury in fish tissue (CCME 1999; Health Canada 2011).

Selenium has been associated with reproductive and developmental toxicity, particularly in egg-laying vertebrates (Chapman et al. 2009). From baseline studies, mean selenium concentrations measured in Slimy Sculpin were higher at tributary sites and lower at Murray River mainstem sites. The highest mean selenium concentrations were recorded at M20 Creek (2.4 mg/kg WW in 2012 and 2.3 mg/kg WW in 2011). The lowest mean selenium concentrations were recorded at MR DS (0.8 mg/kg WW in 2005 and 0.9 mg/kg WW in 2012).

Petroleum products can affect fish and fish habitat in many ways, including physiological toxicity (lethal or sub-lethal effects) or behavioural changes in fish and loss of productive habitat capacity. Routine Project-related traffic creates a risk of diesel fuel or lubricants entering fish habitat, either directly or due to runoff associated with precipitation. Activities involving mechanized equipment in or near waterways, such as road, bridge, or other infrastructure can lead to introduction of small amounts of fuel, oil, or petroleum-based lubricants into the aquatic environment.

The potential for petroleum products to enter waterways during normal Project activities is likely small in geographic scope, since only small quantities in localized areas would be introduced to aquatic environments.

Introduction of nitrogenous compounds (ammonia, nitrate, and nitrite) and phosphorus into the aquatic environment may occur as a result of Project activities involving operation of the sanitary sewer system at the Decline Site and Coal Processing Site, which may contribute to alterations in productive capacity and eutrophication, as well as the potential for toxicity to fish (CCME 2004) in downstream environments

Habitat Loss

Fish habitat loss refers to removing or physically altering aspects of the environment that are directly or indirectly used by fish. More specifically, fish habitat loss can refer to the removal of riparian and instream habitat, and the restricting of fish passage. Potential Project-specific fish habitat loss may occur during the upgrading of bridges and access roads, near the CCR North and South sites, and installation of intake and outfall sites located on the Murray River. Potential changes to flow conditions in M20 Creek may occur due to drawdown of the water table, and subsidence.

Mitigation Measures

Direct Mortality

Access to the Murray River by Project staff within the LSA and RSA will be mitigated and controlled on Project access roads during Construction and Operation phases. Sport fishing for Arctic grayling and Bull Trout already occurs within the LSA and RSA in the Murray River and larger creeks. There will be no sanctioned opportunities for employees or contractors to engage in fishing while on site

during mine Construction or Operation phases. Access to the Murray River will not increase as a result of the Project, thus the Project will not increase fishing pressure or harvest.

To mitigate direct mortality effects within fish-bearing streams, access road and site construction and maintenance activities will be done in accordance with best management practices (BMPs) such as the Land Development Guidelines for the Protection of Aquatic Habitat (DFO 1993), Standards and Best Practices for Instream Works (BC MWLAP 2004), and DFO's operational statements for bridge and culvert maintenance (DFO 2007). Appropriate fisheries operating windows for fish-bearing streams will be adhered to where possible. Mitigation strategies include isolating Project work sites to prevent fish movement into the work site, salvaging/removing fish from the enclosed work site, and environmental monitoring.

If BMPs and plans are implemented and followed, there is a low probability that a potential effect caused by direct mortality on fish (both at the individual and population level) will not be fully mitigated.

Erosion and Sedimentation

To minimize the effects on fish and their habitats, several mitigation measures relating to erosion and sedimentation will be required. Mitigation strategies will be tailored to address Project-specific issues associated with erosion and sedimentation. Mitigation objectives outlined in accordance with BMPs such as the DFO Land Development Guidelines for the Protection of Aquatic Habitat (DFO 1993), Standards and Best Practices for Instream Works (BC MWLAP 2004), Fish-Stream Crossing Guidebook (BC MOF 2002), and Pacific Region Operational Statements (DFO 2007) all provide guidelines for the mitigation of erosion and sedimentation effects on fish and fish habitat.

Erosion and sedimentation will be mitigated in the LSA and RSA through the implementation of BMPs, particularly during construction and road maintenance. BMPs relating to erosion and sedimentation are described under the Erosion and Sediment Control Management Plan for the Project (Section 24.5). The Erosion and Sediment Control Management Plan will provide performance-based environmental specifications for preventing and controlling the release of sediments during all phases of the Project to minimize adverse effects to downstream water quality.

These measures will be monitored and modified, as necessary, to ensure compliance with regulatory requirements and BMPs. When in-water work occurs, an environmental monitor will be on site monitoring water quality. Construction and maintenance activities near areas of fish-bearing waters will occur during appropriate fisheries operating windows for fish-bearing streams. In-water works occurring outside of fisheries operating windows will only be conducted under a permit.

Construction activities (i.e., equipment access, site clearing, etc.) will be conducted in a manner that minimizes riparian vegetation effects and maintains fish habitat and stream bank integrity.

With the implementation of the above measures, potential effects caused by erosion and sedimentation on fish (both at the individual and population level) will be appropriately mitigated.

Water Quality

For the Coal Processing Site, a number of mitigation measures will be implemented under the Water Management Plan (Section 24.6). Freshwater diversion channels will be constructed to divert non-contact water away from Project infrastructure. Water that has been in contact with coal or mine infrastructure will be directed to on-site ponds, and treated as appropriate to meet applicable permit criteria prior to release to the environment. Discharges may occur year-round in all phases of the Project. They will be closely managed to minimize potential for effects in the receiving environment (i.e., Murray River). The potential for water quality effects in the Murray River (the receiving environment) will be monitored regularly in accordance with the Selenium Management Plan (Section 24.10).

Petroleum products will be in use during the Construction, Operation, and Decommissioning and Reclamation phases. DFO Land Development Guidelines for the Protection of Aquatic Habitat (DFO 1993), BC MOE Standards and Best Practices for Instream Works (BC MWLAP 2004), and Pacific Region Operational Statements (DFO 2007) all provide guidelines for the mitigation of petroleum product effects and spills on the aquatic environment.

When instream work occurs, an Environmental Monitor will be on site monitoring water quality, and for activities near areas of fish-bearing waters, appropriate fisheries operating window requirements for fish-bearing streams will be adhered to. In certain circumstances, instream work may need to occur outside of the least risk windows. Therefore, necessary permits will be obtained from appropriate agencies and work will comply with necessary conditions.

Effluent from the sewer system and water treatment may include septic ground disposal systems that meet requirements for setback from waterbodies as required in the Sewerage System Regulation (BC Reg. 326/2004) to prevent effects to surface waters. Fish exposure to sewage effluent spills or leaks to streams is not expected to occur with proper design and engineering of the sanitary sewer system.

In addition to the specific mitigation measures outlined above, the Water Management Plan (Section 24.6), and Selenium Management Plan (Section 24.10) outline monitoring that will be implemented. This monitoring will detect alterations to the receiving environment, including changes to fish tissue and health. Additional monitoring of fish health will be triggered if alterations in water quality and aquatic resources are detected. This plan will include provisions for identification of causes of alteration and implementation of additional mitigation measures or adaptive management strategies, if effects are identified.

Habitat Loss

To mitigate fish habitat and passage effects related to road and bridge maintenance, and/or construction and decommissioning of the water intake or outfalls on fish-bearing streams crossings, any work performed will follow applicable DFO's operational statements (DFO 2007) and DFO's (1993) Land Development Guidelines for the Protection of Aquatic Habitat. Efforts will be undertaken to minimize potential effects from the Project on fish habitat and fish passage, and to avoid serious harm to fish and fish habitat.

For all instream work within fish-bearing streams, an environmental monitor will be on site to monitor water quality and related effects. Appropriate fisheries operating windows for fish-bearing streams will be adhered to whenever feasible. Alternatively, appropriate permits will be acquired for out-of-window activities. Serious harm to fish or fish habitat related to the Construction, Operation, Decommissioning and Reclamation, and Post Closure phases of the Project are not anticipated.

Changes in water quantity and their associated effects on fish habitat in M20 Creek are likely to occur gradually over time. Monitoring of flow conditions to determine if reduced flows are evident will allow for evaluation of potential mitigation measures, which could include modification of mining methods (e.g., rate of retreat, specific panel layouts) to reduce potential for flow effects during mining of subsequent panels.

Residual Effects

Although potential effects on fish and fish habitat were identified related to direct mortality, erosion and sedimentation, and habitat loss, with the implementation of the mitigation measures described above, residual effects are not anticipated.

Water quality modelling was conducted to predict concentrations of various metals at water quality modelling nodes downstream of proposed Project infrastructure (see Chapter 8, Assessment of Surface Water and Aquatic Resources Effects). Water quality model predictions were compared to the BC Water Quality Guidelines for the protection of aquatic life, or to the Canadian Council of Ministers of the Environment water quality guidelines when BC guidelines were not available. When water quality was predicted to exceed the applicable guidelines, a comparison of the predicted water quality to baseline water quality at the site was also done. This baseline comparison was important for ensuring that only parameters that are predicted to increase due to Project-related activities are identified. This step excludes parameters that have concentrations higher than guidelines during baseline studies, as this is not a Project-related effect.

The screening procedure identified selenium as the only contaminants of potential concern (COPC) for fish. Selenium was found to be a COPC during the Decommissioning and Reclamation, and Post Closure phases during January, February, and March in M19A Creek. Aside from selenium in M19A Creek, no other COPCs for fish were identified at any other surface water modelling node.

Because the interval of selenium concentration exceeding guidelines is between January and March during Decommissioning and Reclamation and Post Closure, the period of potential exposure of fish to high levels of selenium in M19A Creek will occur during the overwintering life history stage. The only potential overwintering habitat observed in M19A Creek was provided by sections of the stream flooded by beaver dams (Section 9.5.3). Although the beaver dams appear to restrict fish movement from M19 Creek into M19A Creek currently, a breach in the beaver dams could provide access for fish, and to establish populations in M19A Creek. However, in the event the beaver dams are breached, the only available potential overwintering habitat will drain and be lost. Thus, the loss of potential overwintering habitat will eliminate the possibility for adults to be exposed to high selenium concentrations from January to March (Decommissioning and Reclamation and Post Closure) and decrease the likelihood of potential toxic effects in eggs and larvae to a negligible level.

Moreover, the likelihood of selenium levels causing sub-lethal toxicity to eggs and larvae is also lessened by the life history of the VC species. Fluvial Bull Trout and Arctic grayling often migrate considerable distances from overwintering habitat to spawning sites. Migratory fish species have lower risk of maternal transfer of Project-related selenium from the female fish body burden to the eggs, because selenium is metabolized and Project-related body burdens may be eliminated from fish while overwintering and migrating in habitat lower in selenium concentration (Hamilton 2004).

Residual effects due to increases in selenium concentrations are not predicted to occur in the fish-bearing reaches of M19 Creek, M20 Creek, Twenty Creek, or the Murray River. Although M19 Creek is immediately downstream of M19A Creek, the water selenium guideline is no longer exceeded once water reaches M19 Creek and selenium concentrations are predicted to be within natural variability. Therefore, effects to Arctic grayling, Bull Trout, and other fish species in M19 Creek are not expected. Sufficient baseline data are available for multiple reference and receiving environment sites, and will be used to monitor and detect potential changes in fish tissue metals.

Potential effects were also considered in relation to loss of fish habitat due to reduction flow in M20 Creek as a result of dewatering of the underground mine. The results of the groundwater modelling were input to the water balance model to assess change in flow in M20 Creek. These results indicate that over the period of Operation, baseflow conditions (e.g., winter months) in M20 Creek may see reductions of between 2 and 16% (Base Case of 9%). Between April and August, freshet and summer flow conditions overprint the reduction in baseflow such that the annual changes are generally less than 1%. Slimy Sculpin are the only documented fish species that utilize M20 Creek for all life history stages and on a perennial (year-round) basis. Arctic Grayling and Bull Trout may use M20 Creek in an ephemeral manner; moving from the Murray River to M20 Creek sporadically during suitable flow conditions (e.g., early summer) for opportunistic feeding forays. Habitat and habitat use during important or critical life history stages (e.g., spawning, egg incubation) of Arctic Grayling and Bull Trout have not been documented in M20 Creek. Given the above characterization of fish habitat within M20 Creek, the seasonality and periodicity of fish habitat use, and the periodicity of potential changes in streamflow, residual effects to fish and fish habitat in lower M20 Creek are unlikely.

Summary of Effects to Fish and Fish Habitat

After all mitigation measures are applied, no residual effects on fish and fish habitat are predicted to result from the Project. Serious harm to fish or fish habitat related to the Construction, Operation, Decommissioning and Reclamation, and Post Closure phases of the Project are not anticipated. As no residual effects were predicted for fish and fish habitat, no cumulative effects are predicted and no cumulative effects analysis was performed.

26.5.1.2 *Aquatic Species at Risk*

No aquatic species at risk listed under the *Species at Risk Act* (2002b) occur in the Project area or have the potential to be affected by the Project.

26.5.1.3 *Migratory Birds*

Ten species of raptors were recorded within the RSA during baseline studies for the Project, and an additional ten species are known to occur in the RSA based on the results of other baseline studies. All 20 of these species, except rough-legged hawk, are year round residents or seasonal breeders in the Peace Region; rough-legged hawk are seasonal migrants in the Peace Region.

A total of 72 songbird species were identified during the 2010 baseline studies. These species occupy a diverse array of habitats, including coniferous forest, deciduous forest, mixed forest, wetlands, and anthropogenic habitats. Twenty-three species were found in only one habitat. However, no significant differences were found in species diversity and equitability among habitat types.

Three species of conservation concern were observed during baseline surveys: barn swallow, black-throated green warbler, and olive-sided flycatcher. All three are provincially blue-listed (Special Concern). In addition, the barn swallow has been listed as Threatened by COSEWIC and the olive-sided flycatcher is listed on Schedule 1 of SARA as Threatened. Five other species of conservation concern were detected during roadside surveys in previous years (Westcam 2008) and possibly breed in the Murray River area; bay-breasted warbler, Canada warbler, Cape May warbler, Connecticut warbler, and rusty blackbird.

The black-throated green warbler was used as a representative species for habitat suitability modelling.

The RSA supports at least 35 different species of migratory waterbirds. Three groups of waterbirds that occupy different types of habitat have been observed in the RSA during baseline studies: 1) waterbirds, 2) cavity-nesting waterfowl, and 3) riverine birds. Waterbirds (e.g., dabbling ducks, geese) use lakes, swamps, marshes, and shallow open-water wetlands. Cavity-nesting waterfowl (e.g., common goldeneye) nest in mature forested areas, usually within 1 km of suitable wetlands. Riverine birds (e.g., harlequin duck) use montane rivers and streams. Habitat loss and alteration assessments were conducted separately for each of these three waterbird groups due to their varying habitat preferences.

Potential Effects

Raptors, songbirds and waterbirds were each assessed for the following potential effects: habitat loss and alteration; sensory disturbance; and direct mortality. Waterbirds were also evaluated for effects due to chemicals of potential concern (COPCs) in on-site water storage ponds and the wetlands along M19A creek. The potential effects of disruption of movement, indirect mortality, and attractants were scoped out of the assessment because they were determined to have no interaction with Project components/activities.

Habitat Loss and Alteration

Of the 112,311 ha of available forest nesting habitat for raptors in the RSA, 210 ha (0.2% of the suitable nesting habitat in the RSA and 2.7% of the suitable nesting habitat in the LSA) would be lost or fragmented due to Project development.

At the end of Operation, a total of 237 ha (1.8% of the high-quality black-throated green warbler breeding habitat in the RSA, 5.9% of the high-quality breeding habitat in the LSA) will be lost or altered due to Project development.

A total of 5.2 ha of waterbird habitat will be lost or altered within the Mine Site Assessment Footprint due to the Project during Construction and Operation. The area lost represents 0.1% of the suitable wetland habitat available in the RSA and 0.9% in the LSA.

For cavity-nesting waterfowl, the loss or alteration of mature forest within 1 km of wetlands was calculated within the Mine Site Assessment Footprints. A total of 149 ha of suitable cavity-nesting habitat will be lost due to the Project during Construction and Operation. This represents approximately 0.1% of available suitable habitat within the RSA and 2.9% in the LSA.

A total of 5.9 km of suitable riverine habitat will be lost or altered (i.e., Project footprint and buffers) due to Project development during Construction and Operation. The total lost or altered habitat represents 0.3% of available riverine habitat in the RSA and 5.0% in the LSA.

Sensory Disturbance

Noise disturbance was calculated by overlaying noise contours for continuous Project-related noise, and instantaneous vehicle traffic with areas of high-quality habitat from suitability models. The areas of high-quality breeding habitat that fell within the 45 dBA noise modelling contour for Project noise and 75 dBA for vehicle traffic were calculated.

Less than 1% of the high quality habitat in the RSA may be disturbed due to continuous Project noise and vehicle traffic noise during both Construction and Operation for each of: raptors, songbirds and waterbirds.

Direct Mortality

Construction activities could result in direct mortality of raptors, songbirds, and waterbirds through clearing of vegetation actively used for nesting.

Chemical Hazards

During Operation, water storage ponds are predicted to contain chemicals that will exceed the guidelines for wildlife species. Selenium is predicted to occur above wildlife guidelines, among others, and has been identified as a chemical of potential concern for waterfowl. The Project will be monitoring water quality in all Project ponds and if ponds contain chemicals above wildlife guidelines, appropriate mitigation will be applied to exclude wildlife from these ponds.

Exposure to selenium in M19A Creek was determined to be unlikely because waterbirds are not present during the winter when the selenium concentrations are predicted to exceed guidelines.

Mitigation Measures

The potential effects on all wildlife, including migratory birds will be minimized through mitigation measures outlined in the Wildlife Mitigation and Monitoring Plan (Section 24.16). Mitigation measures will include, but are not limited to:

- avoidance of important habitat where practical alternatives are available (e.g., habitat loss and alteration was minimized through Project design);
- scheduling vegetation clearing activities outside of sensitive periods, where feasible;
- when clearing cannot be scheduled outside the raptor sensitive period, a qualified on-site monitor will conduct a reconnaissance survey prior to clearing to identify nests.
- noise mitigation measures for operation of vehicles and equipment;
- adherence to speed limits;
- monitoring of bird use in on-site ponds, and, if necessary, installation of deterrent/exclusion measures; and
- re-vegetation of some reclaimed components during Decommissioning and Reclamation.

Residual Effects

The area of habitat loss/alteration and the area potentially disturbed by noise were rated as a small component of habitat available in the RSA and neither of these effects were rated as residual effects.

Direct mortality will be mitigated by conducting clearing outside of the bird breeding season or conducting pre-clearing surveys during the bird breeding season and this effect was therefore not rated as residual.

Waterbirds can use on-site ponds at industrial sites, particularly during migration. Mitigation for on-site ponds includes water testing and exclusion of waterbirds if COPCs in water exceed wildlife guidelines. As a consequence, chemical hazards for waterfowl were not rated as a residual effect for waterfowl.

Summary of Effects to Migratory Birds

After all mitigation measures are applied, no residual effects on migratory birds are predicted to result from the Project. As no residual effects were predicted for migratory birds, no cumulative effects are predicted and no cumulative effects analysis was performed.

26.5.2 Changes to the Environment that Would Occur on Federal or Transboundary Lands

Pursuant to Section 5(1)(b) of CEAA 2012 (2012), a federal EA must consider a change that may be caused to the environment that would occur on federal lands, in a province other than the one in which the act or thing is done or where the physical activity, the designated project or the project is being carried out, or outside Canada.

No effects to federal lands or other Canadian provincial lands are predicted for the Project. No transboundary changes are predicted for the Project.

26.5.3 Effects of Changes to the Environment on Aboriginal Peoples

26.5.3.1 Health and Socio-economic Conditions

Effects of Project-related environmental changes on Aboriginal people's health was assessed in relation to the following VCs (see Chapter 18, Assessment of Health Effects):

- drinking water quality;
- air quality;
- quality of country foods; and
- noise.

Effects of Project-related environmental changes on Aboriginal groups' social conditions was assessed in relation to the following VCs (see Chapter 15, Assessment of Social Effects):

- health services;
- emergency services;
- educational services;
- childcare services;
- community infrastructure;
- housing;
- crime and other social problems; and
- social integration.

Effects of Project-related environmental changes on Aboriginal groups' economic conditions was assessed in relation to the following VCs (see Chapter 14, Assessment of Economic Effects):

- employment and income; and
- economic activity.

The assessment of effects to human health from drinking water relies on the baseline water quality data collected between 2010 and 2014 (Appendix 8-D) and Project-related water quality predictions as presented in Chapter 8 and Appendix 8-E. To assess residual effects to human health from changes in drinking water quality due to Project-related activities, future surface water quality was modeled. No contaminants of potential concern were identified in the drinking water assessment and no human health risks due to ingestion of surface water were identified. No significant adverse health effects are predicted for Aboriginal peoples.

The Project has the potential to affect childcare in Local Study Area (LSA) communities, including Aboriginal communities. In addition, Aboriginal peoples may utilize childcare services in adjacent

non-Aboriginal communities. Project-related population growth and increased employment in these communities will increase demand on already limited childcare services, thereby reducing the ability of primary caregivers to secure childcare spaces for their children. Increased demand on childcare services could also reduce the quality of services rendered, as it will adversely impact the childcare giver-to-child ratio, which is a determinant of childcare outcomes. Mitigation measures for potential social effects include informing elected officials and health care service providers about expected population effects related to Project employment, so that communities and service providers can plan to meet anticipated future demand for childcare services. No significant adverse social effects are predicted for Aboriginal peoples.

The Project is expected to result in two adverse economic effects in LSA communities, including Aboriginal communities. The Project is expected to result in increased competition for labour and in wage inflation during Construction and Operation. The Project is expected to reduce employment and income during Decommissioning and Reclamation. Mitigation measures for potential economic effects include a Recruitment, Training and Employment Plan, a Procurement Strategy, a Workforce Transition Plan and continued engagement with Aboriginal and non-Aboriginal communities. No significant adverse economic effects are predicted for Aboriginal peoples.

26.5.3.2 *Physical and Cultural Heritage*

Potential effects of the Project on cultural heritage were assessed as part of the assessment of current use of lands and resources for traditional purposes (see Section 26.5.3.3). Potential effects of the Project on cultural physical heritage was assessed in relation to the following VCs:

- archaeological sites; and
- significant paleontological sites.

There are two archaeological sites within the LSA, and an additional seven sites within 500 m of the LSA. As both sites within the LSA are located within the underground mine exclusion zone, the potential for adverse effects have been reduced through Project design. If avoidance is not possible mitigation measures will be determined in consultation with the British Columbia Archaeological Branch and carried out by the Project Archaeologist under a *Heritage Conservation Act* Permit. Mitigation may involve detailed mapping and photography.

There are currently no known paleontological sites within the LSA. Potential effects to as-yet unknown archaeological and paleontological sites, if present, will be mitigated through the measures outlined in the Heritage Management Plan including educating Project personnel, implementation of a chance find procedure, and, if necessary, additional studies. Residual effects on heritage resources are predicted to be not significant and the assessment concludes there will be no cumulative heritage effects.

26.5.3.3 *Current Use of Lands and Resources for Traditional Purposes*

Potential effects of the Project on Aboriginal people's current use of lands and resources for traditional purposes was assessed in relation to the following VCs:

- fishing opportunities and practices;
- hunting and trapping opportunities and practices;
- gathering opportunities and practices; and
- use of habitations trails, cultural and spiritual sites.

The assessment focused on key effects related to: 1) a change in access or ability to access or use land use areas; 2) a change in the quality of experience of the natural environment; 3) a change in harvesting success; and 4) a change to the perceived quality of resources. The effects were assessed for each of the Project phases.

Measures to mitigate potential effects included implementing a Wildlife Mitigation and Monitoring Plan, Noise Management Plan, Closure and Reclamation Plan, and Subsidence Management Plan. HD Mining will work with the SFN to confirm the location of habitations and the sacred site within the Project footprint and to develop appropriate avoidance and/or other mitigation measures.

The following residual effects were identified: 1) reduced quality of experience while fishing (SFN and HLFN), hunting (SFN, WMFN, and KLMSS), and gathering (SFN), and while using habitations, trails, and cultural and spiritual sites (SFN); 2) reduced harvesting success in preferred areas for moose (MLIB, WMFN, BRFN, HLFN, SFN and KLMSS), grizzly bear (SFN and KLMSS), and fisher (SFN and KLMSS), and blueberries, firewood, and medicinal plants (SFN); and 3) perceived reduction in quality of resources harvested in the LSA, including fish (SFN and HLFN), wildlife (SFN, WMFN and KLMSS), and plants and berries (SFN). All residual effects are rated as Not Significant (moderate). The residual effects were carried forward into the cumulative effects assessment. All cumulative residual effects were also rated as Not Significant (moderate).

26.5.3.4 *Any Structure, Site or Thing that is of Historical, Archaeological, Paleontological or Architectural Significance*

Potential effects of the Project on any structure, site, or thing that is of historical, archaeological, paleontological, or architectural significance was assessed as part of the assessment on physical and cultural heritage (Section 26.5.3.2). The Project is not expected to have any effect on any structure, site, or thing that is of historical, archaeological, paleontological, or architectural significance.

26.5.4 Changes to the Environment that are Directly Linked or Necessarily Incidental to Federal Decisions

Pursuant to Section 5(2)(a) of the CEAA 2012 (2012), a federal EA must evaluate changes to the environment that are directly linked or necessarily incidental to federal decisions as a result of the Project.

Potential federal permits related to the Project include:

- *Navigation Protection Act (1985c);*
- *Fisheries Act (1985b);*

- *Species at Risk Act* (2002b);
- *Radiocommunications Act* (1985d); and
- *Nuclear Safety and Control Act* (1997).

The *Navigation Protection Act* (NPA) provides conditions for the approval or permitting by Transport Canada for “works” on the List of Scheduled Waters, as well as for navigable waters for which opt-in requests by work owners under s.(4) of the NPA are accepted.

A federal decision under NPA is not required for the Project due to the following:

- no components of the project will be on a scheduled waterway, and HD Mining has decided to not opt-in to the NPA regime for any waters affected by the Project.
- there is no tailings storage facility/impoundment proposed in a navigable water body; and
- HD Mining holds no existing works on unscheduled waterways previously approved under the former act (*Navigable Waters Protection Act*) that require modifications.

The Murray River is navigable, and intake/outfall infrastructure are planned on the right bank of the river. HD Mining may seek advice from Transport Canada in relation to design of infrastructure to minimize potential obstructions to boaters and to establishing appropriate signage.

Recent amendments to the *Fisheries Act* (1985b) centre on the prohibition against serious harm to fish and apply to fish and fish habitat that are part of or support commercial, recreational, or Aboriginal fisheries. Proponents are responsible for avoiding and mitigating serious harm to fish that are part of or support commercial, recreational, or Aboriginal fisheries. When proponents are unable to completely avoid or mitigate serious harm to fish, their projects will normally require authorization under Subsection 35(2) of the *Fisheries Act* (1985b) in order for the Project to proceed without contravening the Act.

DFO interprets serious harm to fish as:

- the death of fish;
- a permanent alteration to fish habitat of a spatial scale, duration, or intensity that limits or diminishes the ability of fish to use such habitats as spawning grounds, nursery, rearing, food supply areas, migration corridors, or any other area in order to carry out one or more of their life processes; and
- the destruction of fish habitat of a spatial scale, duration, or intensity that results in fish no longer being able to rely on such habitats for use as spawning grounds, nursery, rearing, food supply areas, migration corridor, or any other area in order to carry out one or more of their life processes.

With the application of mitigation measures, including appropriate DFO guidance and land development guidelines, serious harm to fish or fish habitat related to the Construction, Operation, Decommissioning and Reclamation, and Post Closure phases of the Project are not anticipated.

Wildlife baseline studies identified three species (olive-sided flycatcher, peregrine falcon, and western toad) listed on Schedule 1 of the *Species at Risk Act* (2002b). Canada warbler and rusty blackbird, also listed on Schedule 1 of the *Species at Risk Act* (2002b), were also observed in the RSA during long term monitoring of Timber Forest License 48 but were not observed during baseline studies for the Project, nor on the Project location. The only other SARA-listed species likely to occur in the area is Common nighthawk, which was not observed during baseline studies, or by other monitoring programs reviewed as part of the baseline studies.

Canadian warblers were evaluated under the VC of songbirds in Section 13.7.17 for habitat loss and alteration, sensory disturbance and direct mortality, none of which were considered as residual effects due to the project. Black-throated green warbler as a proxy for other songbirds (Section 13.7.18). Rusty blackbirds nest near the edges of water and were evaluated under the VC of waterbirds (Section 13.7.19). Olive-sided blackbirds often nest in snags, similar to raptor species and so both olive-sided blackbirds and peregrine falcons were evaluated under the VC of raptors (Section 13.7.15). Songbirds, waterbirds and raptors were all evaluated for habitat loss and alteration, sensory disturbance and direct mortality. Habitat mapping was conducted for black-throated green warbler as a proxy for songbirds. Waterbird habitat alteration was evaluated using mapping of wetland and pond habitat, while raptor habitat was mapped using old and mature forests. In each case, the footprint, subsidence area (habitat alteration) and noise profiles were overlaid on mapping of high-quality habitat. Habitat for each of these three VCs is widespread and abundant in the largely forested RSA. The potential effect of direct mortality was addressed using standard mitigation measures. No effects were rated as residual once standard mitigation measures were applied.

Western toads were evaluated under the VC of amphibians for habitat loss and alteration, disruption of movement, direct mortality, attractants and chemical hazards (Section 13.7.21). Habitat mapping and baseline surveys identified western toad in the LSA and habitat loss and alteration was evaluated by comparing the project footprint and subsidence area with high quality habitat, which was not considered a residual effect. Standard mitigation to roads and on-site water ponds addressed the other potential effects evaluated and were not considered residual effects as well.

Most of the mining, including the main tunnel systems, will be within the coal seams, where use of explosives is not necessary. Small amounts of explosives may be required when constructing the Production Decline, excavating rock tunnels, and when mining between coal seams. Explosives will not be stored on site. When blasting is required, a local blasting company will be contracted to provide the necessary explosives and conduct the blasting. All blasting will be conducted by qualified persons in a manner consistent with the Health, Safety and Reclamation Code for Mines in British Columbia. No permit will be required under the *Explosives Act*.

Permits may be required under the *Radiocommunications Act* (1985d), and the *Nuclear Control and Safety Act* (1997). These permits are not expected to result in a change to the environment.

Overall, changes to the environment from the Project that are directly linked or necessarily incidental to a federal decision are not predicted.

26.5.5 Effects of a Change to the Environment

Pursuant to Section 5(2)(b) of CEAA 2012 (2012), a federal EA must evaluate changes to the environment that are directly linked or necessarily incidental to federal decisions as a result of the Project that result in an effect to health or socio-economic conditions, physical and cultural heritage, or any site or thing that is of historical, archaeological, paleontological or architectural significance.

Potential federal permits related to the Project include:

- *Navigation Protection Act* (1985c);
- *Fisheries Act* (1985b);
- *Species at Risk Act* (2002b);
- *Explosives Act* (1985a);
- *Radiocommunications Act* (1985d); and
- *Nuclear Safety and Control Act* (1997).

Changes to the environment from the Project that are directly linked or necessarily incidental to a federal decision are not predicted to result in an effect to health or socio-economic conditions, physical and cultural heritage, or any site or thing that is of historical, archaeological, paleontological or architectural significance.

26.5.6 Summary of Significant Adverse Environmental Effects

No Project-specific significant adverse effects were identified through the effects assessment.

26.6 SUMMARY OF COMMITMENTS

Table 26.6-1 identifies key commitments that have been derived from the Application/EIS to mitigate potential effects on environmental, economic, social, health, and heritage VCs.

26.7 CONCLUSION

The Murray River Coal Project (the Project) is expected to have substantial and long-lasting beneficial implications for the economies of local communities, the province, and Canada, while producing no significant Project-specific adverse effects to environmental, economic, social, health or heritage valued components. This section summarizes the steps taken by HD Mining in the environmental assessment process that led to that conclusion.

The Project has gone through a rigorous environmental assessment process that has included: alternatives analyses for key design decisions; collection of comprehensive environmental and socio-economic baseline data; and a consultation and information distribution program with local communities, First Nations, Métis, local business and all levels of government. These have all contributed to the Project that has been described and assessed in this Application/EIS.

Table 26.6-1. Table of Commitments

| No. | Commitment | Timing | Application Section |
|--|---|--|--------------------------------------|
| <i>Consultation and Engagement</i> | | | |
| 1. | HD Mining will continue to consult and engage with Aboriginal groups through the life of the Project. | All project phases | 1.2 2.4 |
| <i>Project Design</i> | | | |
| 2. | HD Mining will develop the Project in a manner consistent with what is described in the Application/EIS. However, the company will continue to pursue improvements and efficiencies as the Project advances to further mitigate potential environmental effects of the Project. Any material changes to Project design that result will be re-evaluated against the conclusions of the Application/EIS and communicated to BC EAO and the CEA Agency. | All project phases | 1.2 24.1 |
| 3. | HD Mining will continue to develop the Project with closure in mind. During the <i>Mines Act</i> permitting process, a detailed closure plan will be filed, and an appropriate financial security established for the Project. | All project phases | 3.9.1 24.1 |
| <i>Environmental Management System</i> | | | |
| 4. | HD Mining will implement an Environmental Management System for the Project that follows the framework outlined in the Application/EIS. This program will be developed over time to meet the needs of Project phases and their activities and associated permits. The EMS will include the implementation of management plans and the development of detailed environmental monitoring programs. | All project phases | 24 |
| <i>Air Quality</i> | | | |
| 5. | HD Mining will monitor ground-level dust deposition values at locations surrounding the Project, and will work with other industrial users to minimize potential effects associated with road dust. | All project phases | 6.7.1.1 6.7.2 24.2.4 24.2.5 |
| 6. | HD Mining will monitor methane concentrations within the mine, and based on monitoring results, will implement appropriate measures to reduce GHG emissions (e.g., flaring, catalytic oxidation, capture and use). | All project phases | 6.7.1.2 6.7.2 24.2.4 24.2.5 |
| <i>Subsidence</i> | | | |
| 7. | HD Mining will monitor subsidence above active mining areas. Based on the results of monitoring, a site specific subsidence prediction model will be calibrated and used to support mine planning. | Prior to the start of Operation Operation | 24.15.3 24.15.4 24.15.5 |
| 8. | Where subsidence is predicted to cause surface disturbance, mitigation measures will be implemented by HD Mining in conjunction with regulators or the owners of affected infrastructure. | Prior to the start of Operation Operation | 24.15.3 24.15.4.3 |

(continued)

Table 26.6-1. Table of Commitments (completed)

| No. | Commitment | Timing | Application Section |
|---------------------------|---|---------------------------|--|
| <i>Selenium</i> | | | |
| 9. | HD Mining will implement a Selenium Management Plan. The plan focusses on potential effects to M19A Creek, but will be adaptive based on the results of monitoring. | All project phases | 24.10 24.10.7 (Monitoring and Reporting) |
| <i>Employment</i> | | | |
| 10. | HD Mining will continue to advance development and implementation of an underground mining training plan in order to transfer employment from temporary foreign workers to local Canadian workers by 10 per cent per year over 10 years. | Construction Operation | 24.16.3 24.16.4 |
| <i>Heritage Resources</i> | | | |
| 11. | Further archaeological studies will be conducted if there are revisions to the Project footprint, and also during Operation in advance of mining individual longwall panels. Appropriate mitigation measures will be developed and implemented based on the results of this work. | Construction Operation | 24.15.5 |
| <i>Cumulative Effects</i> | | | |
| 12. | HD Mining will continue to participate in the NE Murray River Aquatic CEA Framework Steering Committee, including sharing Project-related data. | All project phases | 8.11.4 |

The key benefits of the Project are:

- the Project is expected to result in substantial economic benefits to British Columbia and Canada as a whole for well over 35 years, including:
 - direct Project employment of approximately 18,264 person-years in British Columbia (through Construction and Operation);
 - total GDP (direct, indirect, and induced) generated by the Project of approximately \$7.921 billion in British Columbia;
 - total tax revenue (federal and provincial) of approximately \$1.183 billion from economic activity in BC and \$2.135 billion for all of Canada;
- underground mining produces limited waste rock, and a small surface footprint;
- Project infrastructure and disturbance is at low elevation (outside of core caribou habitat), and in areas of pre-existing disturbance;
- roads and utilities infrastructure (e.g. power, natural gas, rail) already exist and minimal expansion is required to support the Project; and
- dewatering of flotation tailings allows co-mingling of coarse and fine coal rejects in a single facility (no subaqueous tailings storage).

Key improvements to Project design that resulted through the course of the environmental assessment process include:

- change from an overland conveyor over Murray River to a second decline with an underground conveyor that goes under Murray River;
 - this design change reduces potential surface environmental effects associated with overland conveyors and a river crossing; it also results in a better and safer mine plan.
- addition of geomembrane liners under the CCR piles as part of the seepage collection system to reduce potential effects to the aquatic receiving environment.

Development of the Project would represent the first underground metallurgical coal mine using longwall mining in British Columbia, and the only currently operating longwall mine in Canada. HD Mining is well suited to develop the Project, with multiple operating longwall mines in China. HD Mining is committed to training Canadians in the underground longwall mining method.

Based on the Project design, the potential for environmental effects was assessed following a methodology in accordance with the Application Information Requirements and EIS Guidelines. A list of 48 Valued Components (VCs) was identified for assessment. For each VC, the assessment included the following steps:

1. conduct desk-based review of available scientific data, technical reports in the vicinity of the Project;
2. carry out detailed field baseline studies to fill information gaps and confirm presence/absence of VCs;
3. consider feedback from the EA Working Group, Aboriginal groups and the public regarding the requirements for assessment;
4. define assessment boundaries (spatial, temporal, administrative and technical);
5. identify key potential effects to the VC as a result of interaction with Project components/activities;
6. identify mitigation measures designed to reduce or eliminate the effects;
7. identify residual effects – those remaining after all mitigation measures will be applied;
8. classify residual effects as significant or not significant and assign a probability of occurrence and a confidence in its occurrence; and
9. repeat steps 4 to 8 for identified residual effects in the context of cumulative effects assessment, by considering the potential for Project-specific effects to interact with similar effects from other past, present and future projects/activities occurring in the region.

The effects assessment was a process that reduced a detailed list of potential interactions between Project components and VCs into a list of 146 potential effects, and then, after mitigation, to a focused list of 32 residual effects. Of the residual effects, 14 were assessed to be Not Significant (moderate), and 18 were assessed to be Not Significant (minor).

Through the cumulative effects assessment, 3 significant residual cumulative effects were identified related to forested ecosystems, rare ecosystems, and rare plants. This conclusion is reflective of the high level of past/present activity in the region, and is consistent with findings of other assessments completed regionally.

As a result of the environmental assessment, HD Mining has incorporated many mitigation measures into Project design to avoid potential effects. HD Mining will continue to interact with local and Aboriginal communities, neighbouring tenure holders, and government agencies regarding how the Project will be developed.

The Project is anticipated to create substantial and long-lasting benefits for the economies of local communities, the province, and Canada, and is expected to do so without resulting in significant adverse environmental effects due the careful siting of the Project facilities and HD Mining's mitigation measures, commitments, and management framework. HD Mining is of the opinion that the approval of this Application/EIS for the Project should receive due consideration on the part of the regulatory agencies.

REFERENCES

Definitions of the acronyms and abbreviations used in this reference list can be found in the Acronyms and Abbreviations section.

1985a. *Explosives Act*, RSC. C. E-17.

1985b. *Fisheries Act*, RSC. C. F-14.

1985c. *Navigation Protection Act*, RSC. C. N-22.

1985d. *Radiocommunications Act*, RSC. C. R-2.

1994. *Migratory Birds Convention Act*, 1994, SC. C. 22.

1996. *Mines Act*, RSBC. C. 293.

1997. *Nuclear Safety and Control Act*, SC. C. c. 9.

2002a. *Environmental Assessment Act*, SBC. C. 43.

2002b. *Species at Risk Act*, SC. C. 29.

2003. *Environmental Management Act*, C. 53.

2006. *Water Act*, RSBC. C. 483.

2012. *Canadian Environmental Assessment Act, 2012*, SC. C. 19. s. 52.

Sewerage System Regulation, BC Reg. 326/2004.

BC MWLAP. 2004b. Standards and best practices for instream works. British Columbia Ministry of Water, Land and Air Protection, Ecosystems Standards and Planning, Biodiversity Branch.

Beatty, J. M. and G. A. Russo. 2014. Ambient Water Quality Guidelines for Selenium Technical Report Update. British Columbia Ministry of Environment, Water Protection and Sustainability Branch, Environmental Sustainability and Strategic Policy Division: n.p.

CCME 1999. Canadian Environmental Quality Guidelines. Updated 2006. Winnipeg, Canadian Council of Ministers of the Environment.

Chapman, P. M., W. J. Adams, M. L. Brooks, C. G. Delos, S. N. Luoma, W. A. Maher, H. M. Ohlendorf, T. S. Presser, and D. P. Shaw. 2009a. Ecological Assessment of Selenium in the Aquatic Environment: Summary of a SETAC Pellston Workshop. Society of Environmental Toxicology and Chemistry: Pensacola, FL. CCME 2004

Cordone, A. J. and D. W. Kelley. 1961. The influences of inorganic sediment on the aquatic life of streams. *California Fish and Game* 47:188-227. Vol. 47, No. 2. California Department of Fish and Game, Inland Fisheries Branch: Sacramento, CA.

Department of Fisheries and Oceans Canada (DFO). 2007. Pacific Region Operational Statement: Maintenance of Riparian Vegetation in Existing Rights-of-Way. DFO/2007-1283. Vancouver, BC.

DFO. 1993. Land development guidelines for the protection of aquatic habitat. Department of Fisheries and Oceans, Ottawa, ON.

- Hamilton, S. J. 2004. Review of selenium toxicity in the aquatic food chain. *Science of the Total Environment*, 326: 1-31.
- Health Canada. 2011. Canadian guidelines for chemical contaminants and toxins in fish and fish products. <http://www.inspection.gc.ca/food/fish-and-seafood/manuals/standards-andmethods/eng/1348608971859/1348609209602> (accessed October 2013).
- Kidd, K. and K. Batchelar. 2012. 5 - Mercury. Volume 31, Part B. In *Fish Physiology - Homeostasis and Toxicology of Non-Essential Metals*. Ed. C. M. Wood, A. P. Farrell, and C. J. Brauner. 237-295. San Diego, CA: Academic Press.
- Lisle, T. E. 1989. Sediment transport and resulting deposition in spawning gravels, North Coastal California. *Water Resour Res*, 25:1303-19.
- Platts, W. S. and W. Megahan. 1975. Time trends in channel sediment size composition in salmon and steelhead spawning areas: South Fork Salmon River, Idaho. USDA Forest Service General Technical Report. Ogden, UT: Intermountain Forest and Ranger Experimental Station.
- Westcam. 2008. Monitoring Birds in TFL48 for Sustainable Forestry: Six-year Summary, Occurrence of "Listed" Species, and Pre-treatment Herbicide Application Summary. Prepared for Canadian Forest Products Ltd. by Westcam Consulting Services: Chetwynd, BC.