BW GOLD LTD
a subsidiary company of Artemis Gold Inc

Blackwater Gold Project

Wetland Management and Offsetting Plan

March 2022

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ACRONYMS AND ABBREVIATIONS

Aboriginal Groups or Indigenous nations	Lhoosk'uz Dené Nation, Ulkatcho First Nation, Nadleh Whut'en First Nation, Saik'uz First Nation, Stellat'en First Nation and Nazko First Nation (as defined in the Project's Environmental Assessment Certificate #M19-01)
Artemis	Artemis Gold Inc.
BACI	Before After Control Impact
BC	British Columbia
BCWF	British Columbia Wildlife Federation
Blackwater or Project	Blackwater Project or Blackwater Gold Project
BMP	Best management practices
BW Gold	BW Gold LTD.
CDC	Conservation Data Centre
CEA Agency	Canadian Environmental Assessment Agency
CEO	Chief Executive Officer
CM	Construction Manager
COO	Chief Operating Officer
CSFN	Carrier Sekani First Nations
CWEA	Consolidated Wetlands Effects Assessment
DS	Decision Statement
DUC	Ducks Unlimited Canada
EA	Environmental Assessment
EAC	Environmental Assessment Certificate
EC	Environment Canada
ECCC	Environment and Climate Change Canada
EM	Environmental Manager
EMC	Environmental Monitoring Committee
EMLI	Energy, Mines and Low Carbon Innovation
EMS	Environmental Management System
ENV	Ministry of Environment and Climate Change Strategy
EPCM	Engineering, Procurement and Construction Management
ERM	ERM Canada Consultants Ltd
FLNRO	Ministry of Forests, Lands and Natural Resource Operations

FLNRORD	Ministry of Forests, Lands, Natural Resource Operations, and Rural Development
FWSS	Freshwater Supply System
GM	General Manager
ha	Hectare
IAAC	Impact Assessment Agency of Canada
Indigenous groups or Aboriginal Peoples	Ulkatcho First Nation, Lhoosk'uz Dené Nation, Nadleh Whut'en First Nation, Stellat'en First Nation, Saik'uz First Nation, Nazko First Nation, Skin Tyee Nation, Tŝilhqot'in Nation, Métis Nation British Columbia, and Nee-Tahi-Buhn Band (as defined in the federal Decision Statement)
IPMP	Invasive Plant Management Plan
Joint MA/EMA Application or Application	Joint *Mines Act/Environmental Management Act* Permits Application
LDN	Lhoosk'uz Dené Nation
km	Kilometre
LSA	Local Study Area
m	Meter
MAR	Mine Access Road
MOE	Ministry of Environment
MOF	Ministry of Forests
NFN	Nazko First Nation
NWFN	Nadleh Whut'en First Nation
Project	Blackwater Gold Project
QA/QC	Quality assurance/quality control
RCP	Reclamation and Closure Plan
RIC	Resource Inventory Committee
RVMA	Riparian Vegetation Management Area
SFN	Saik'uz First Nation
SOP	Standard Operating Procedure
StFN	Stellat'en First Nation
TEM	Terrestrial ecosystem mapping
TL	Transmission Line
TNTBC	The Nature Trust of BC

TSF	Tailings Storage Facility
UFN	Ulkatcho First Nation
VC	Valued Component
VMP	Vegetation Management Plan
VP	Vice President
WMA	Wildlife Management Area
WMMP	Wildlife Mitigation and Monitoring Plan
WMOP	Wetlands Management and Offsetting Plan

1. PROJECT OVERVIEW

The Blackwater Gold Project (the Project) is a gold and silver open pit mine located in central British Columbia (BC), approximately 112 kilometres (km) southwest of Vanderhoof, 160 km southwest of Prince George, and 446 km northeast of Vancouver.

The Project is presently accessed via the Kluskus Forest Service Road (FSR), the Kluskus-Ootsa FSR and an exploration access road, which connects to the Kluskus-Ootsa FSR at km 142. The Kluskus FSR joins Highway 16 approximately 10 km west of Vanderhoof. A new, approximately 13.8 km road (Mine Access Road) will be built to replace the existing exploration access road, which will be decommissioned. The new planned access is at km 124.5. Driving time from Vanderhoof to the mine site is about 2.5 hours.

Major mine components include a tailings storage facility (TSF), ore processing facilities, waste rock, overburden and soil stockpiles, borrow areas and quarries, water management infrastructure, water treatment plants, accommodation camps and ancillary facilities. The gold and silver will be recovered into a gold-silver doré product and shipped by air and/or transported by road. Electrical power will be supplied by a new approximately 135 km, 230 kilovolt (kV) overland transmission line (TL) that will connect to the BC Hydro grid at the Glenannan substation located near the Endako mine, 65 km west of Vanderhoof.

The Blackwater mine site is located within the traditional territories of Lhoosk'uz Dené Nation (LDN), Ulkatcho First Nation (UFN), Skin Tyee Nation and Tsilhqot'in Nation. The Kluskus and Kluskus-Ootsa FSRs and TL cross the traditional territories of Nadleh Whut'en First Nation (NWFN), Saik'uz First Nation (SFN), and Stellat'en First Nation (StFN; collectively, the Carrier Sekani First Nations [CSFNs]) as well as the traditional territories of the Nazko First Nation (NFN), Nee Tahi Buhn Band, Cheslatta Carrier Nation and Yekooche First Nation (BC EAO 2019a, 2019b).

Project construction is anticipated to take two years. Mine development will be phased with an initial milling capacity of 15,000 tonnes per day (t/d) or 5.5 million tonnes per annum (Mtpa) for the first five years of operation. After the first five years, the milling capacity will increase to 33,000 t/d (12 Mtpa) for the next five-years, and to 55,000 t/d or 20 Mtpa in Year 11 until the end of the 23-year mine life. The Closure phase is 24 to approximately 45 years, ending when the Open Pit has filled and the TSF is allowed to passively discharge to Davidson Creek, and the Post-closure phase is 46+ years.

New Gold Inc. (New Gold) received Environmental Assessment Certificate #M19-01 (EAC) on June 21, 2019 under the 2002 *Environmental Assessment Act* (BC EAO 2019c) and a Decision Statement (DS) on April 15, 2019 under the *Canadian Environmental Assessment Act, 2012* (CEA Agency 2019). In August 2020, Artemis Gold Inc. (Artemis) acquired the mineral tenures, assets and rights in the Blackwater Project that were previously held by New Gold Inc. On August 7, 2020, the Certificate was transferred to BW Gold LTD. (BW Gold), a wholly-owned subsidiary of Artemis, under the *2018 Environmental Assessment Act*. The Impact Assessment Agency of Canada (IAAC) notified BW Gold on September 25, 2020 to verify that written notice had been provided within 30 days of the change of proponent as required in Condition 2.16 of the DS, and that a process had been initiated to amend the DS.

2. PURPOSE AND OBJECTIVES

The purpose of the Wetland Management and Offsetting Plan (WMOP) is to manage potential impacts to wetlands and provide a plan to offset the loss of wetland and wetland functions caused by the Project within the early works construction period or until a new WMOP has been approved by the EAO. Early works construction includes only those activities approved in the Mines Act and Environmental Management Act Early Works permits. Prior to any other construction activities occurring, additional baseline data outlined below will be collected and reported out on to all required groups. The plan will also be updated in 2022 to incorporate additional information provided by the summer 2022 baseline programs proposed (Appendix E and F). This updated WMOP will address the full scope of project development construction activities. In order to ensure that wetlands are appropriately protected through construction, the primary mitigation measure in this plan is the avoidance of direct and indirect effects to potential wetland areas. The WMOP applies to the mine site (referred to as on-site), off-site Project infrastructure and activities associated with the Early Works Program and the Construction, Operations and Closure phases.

The WMOP objectives are to:

- Protect all wetlands until additional baseline studies can be completed;
- Avoid all potential wetland areas as mapped by Terrestrial Ecosystem Mapped (TEM) during early works and up until the necessary baseline information has been collected and reported out on;
- Provide pre-construction surveys to identify extent and flag 30 m buffers around all Terrestrial Ecosystem Mapped (TEM) wetlands during early works and up until the necessary baseline information has been collected by QP. Work with the IEM to schedule site visits when tree clearing is taking place in proximity to flagged wetland areas. Aboriginal Group Monitors on rotation at the time of the surveys will be invited to participate in surveys;
- Establish workplan objectives for baseline fieldwork to be conducted in the summer of 2022; and
- Identify and establish a wetland offsetting program at Mathews Creek Ranch and other areas as required to meet offsetting objectives.

Once data are collected, and prior to the commencement of any activities beyond early works construction, the baseline data will be reported out on to all required groups and the plan will be updated before the end of 2022. The WMOP plan and objectives will be revised to:

- Describe the current state of baseline knowledge of wetlands in the Project area;
- Describe the wetlands that would be altered or lost as a result of the Project based on existing baseline data;
- Address uncertainty in the extent and types of wetlands on-site by describing additional baseline studies that will be conducted on-site;
- Describe potential effects on wetland functions;
- Identify the measures to mitigate wetland impacts;
- Describe the offsetting measures, including a schedule and timeline for implementation;
- Describe the program to monitor the effectiveness of the mitigation measures and offsetting; and
- Describe how input from Indigenous groups was considered in developing the WMOP.

2.1 Staged Approval

BW Gold acknowledges that the current WMOP does not enable the Project to achieve its no-net-loss of wetland function obligation. To that end, no wetlands will be impacted until additional baseline studies are completed in 2022.

BW Gold is committed to working with Lhoosk'uz Dené Nation (LDN) and Ulkatcho First Nation (UFN) to address these uncertainties. BW Gold is collaborating with LDN and UFN to design and undertake pre-construction surveys in 2022 to map and classify wetlands within the mine site and associated linear features (Section 11.2). The results of these surveys will, in part, be used to update wetland accounting in the WMOP in Q4 2022. BW Gold will also be working with LDN, UFN and conservation organizations during this period to identify additional potential wetland offset opportunities in the region (Section 10.6).

BW Gold will achieve no-net-loss of wetland from Project development and will not disturb wetlands without an approved commensurate offsetting plan in place. However, understanding that there are a number of uncertainties to address, balanced with BW Gold's plan to address these uncertainties, BW Gold is seeking a staged approval for this iteration of the WMOP, with this iteration being considered for review and approval for early works construction only. An updated wetlands baseline report and updated version of the WMOP will be provided for further review and comment in Q4 2022 (Section 15) once the 2022 field studies have been completed and results are available for incorporation into the plan.

3. ROLES AND RESPONSIBILITIES

BW Gold has the obligation of ensuring that all commitments are met and that all relevant obligations are made known to mine personnel and site contractors during all phases of the mine life. A clear understanding of the roles, responsibilities, and level of authority that employees and contractors have when working at the mine site is essential to meet Environmental Management System (EMS) objectives.

Table 3-1 provides an overview of general environmental management responsibilities during all phases of the mine life for key positions that will be involved in environmental management. Other positions not specifically listed in Table 3-1 but who will provide supporting roles include independent environmental monitors, an Engineer of Record (EOR) for each tailings storage facility and dam, an Independent Tailings Review Board (ITRB), TSF qualified person, geochemistry qualified professional, and other qualified persons and qualified professionals.

Table 3-1: BW Gold Roles and Responsibilities

Role	Responsibility
Chief Executive Officer (CEO)	The CEO is responsible for overall Project governance. Reports to the Board.
Chief Operating Officer (COO)	The COO is responsible for engineering and Project development and coordinates with the Mine Manager to ensure overall Project objectives are being managed. Reports to CEO.
Vice President (VP) Environment & Social Responsibility	The VP Environment & Social Responsibility is responsible for championing the Environmental Policy Statement and EMS, establishing environmental performance targets and overseeing permitting. Reports to COO.
General Manager (GM) Development	The GM is responsible for managing project permitting, the Project's administration services and external entities, and delivering systems and programs that ensure Artemis's values are embraced and supported, Putting People First, Outstanding Corporate Citizenship, High Performance Culture and Rigorous Project Management and Financial Discipline. Reports to COO.
Mine Manager	The Mine Manager, as defined in the Mines Act, has overall responsibility for mine operations, including the health and safety of workers and the public, EMS implementation, overall environmental performance and protection, and permit compliance. The Mine Manager may delegate their responsibilities to qualified personnel. Reports to GM.
Construction Manager (CM)	The CM is accountable for ensuring environmental and regulatory commitments/ and obligations are being met during the construction phase. Reports to GM.
Environmental Manager (EM)	The EM is responsible for the day-to-day management of the Project's environmental programs and compliance with environmental permits, updating EMS and MPs. The EM or designate will be responsible for reporting non-compliance to the CM, and Engineering, Procurement and Construction Management (EPCM) contractor, other contractors, the Company and regulatory agencies, where required. Supports the CM and reports to Mine Manager.
Departmental Managers	Departmental Managers are responsible for implementation of the EMS relevant to their areas. Report to Mine Manager.
Indigenous Relations Manager	Indigenous Relations Manager is responsible for Indigenous engagement throughout the life of mine. Also responsible for day-to-day management and communications with Indigenous groups. Reports to VP Environment & Social Responsibility.

Role	Responsibility
Community Relations Advisor	Community Relations Advisor is responsible for managing the Community Liaison Committee and Community Feedback Mechanism. Reports to Indigenous Relations Manager.
Environmental Monitors	Environmental Monitors (includes Environmental Specialists and Technicians) are responsible for tracking and reporting on environmental permit obligations through field-based monitoring programs. Report to EM.
Aboriginal Monitors (AM)	Aboriginal Monitors are required under EAC condition 17 and will be responsible for monitoring for potential effects from the Project on the Indigenous interests. Indigenous Monitors will be involved in the adaptive management and follow-up monitoring programs. Report to EM.
Employees and Contractors	Employees are responsible for being aware of permit requirements specific to their roles and responsibilities. Report to departmental managers.
Qualified Professionals and Qualified Persons	Qualified professionals and qualified persons will be retained to review objectives and conduct various aspects of environmental and social monitoring as specified in EMPs and social MPs.

BW Gold will employ a qualified person as an EM who will ensure that the EMS requirements are established, implemented and maintained, and that environmental performance is reported to management for review and action. The EM is responsible for retaining the services of qualified persons or qualified professionals with specific scientific or engineering expertise to provide direction and management advice in their areas of specialization. The EM will be supported by a staff of Environmental Monitors that will include Environmental Specialists and Technicians and by a consulting team of subject matter experts in the fields of environmental science and engineering.

During the Construction phase, BW Gold will be entering into multiple EPC contracts, likely for the Transmission Line, Process Plant, Tailings and Reclaim System, and 25kV Power Distribution. Each engineer/contractor will have their own CM and there will be a BW Gold responsible PM and/or Superintendent who ultimately reports to the GM Development. Some of the scope, such as the TSF and Water Management Structures will be self-performed by BW Gold, likely using hired equipment. Other smaller scope packages may be in the form of EPCM contracts. The EPCM contractors will report to the CMs who will ultimately be responsible for ensuring that impacts are minimized, and environmental obligations are met during the Construction phase. For non-EPCM contractors, who will perform some of the minor works on site, the same reporting structure, requirements, and responsibilities will be established as outlined above. BW Gold will maintain overall responsibility for management of the construction and operation of the mine site and will therefore be responsible for establishing employment and contract agreements, communicating environmental requirements, and conducting periodic reviews of performance against stated requirements.

The CM is accountable for ensuring that environmental and regulatory commitments/obligations are being met during the construction phase. The EM will be responsible for ensuring that construction activities are proceeding in accordance with the objectives of the EMS and associated MPs. The EM or designate will be responsible for reporting non-compliance to the CM and EPCM contractor, other contractors, and regulatory agencies, where required. The EM or designate will have the authority to stop any construction activity that is deemed to pose a risk to the environment; work will only proceed when the identified risk and concern have been addressed and rectified.

Environmental management during operation of the Project will be integrated under the direction of the EM, who will liaise closely with departmental managers and will report directly to the Mine Manager. The EM will be supported by the VP of Environment and Social Responsibility in order to provide an

effective and integrated approach to environmental management and ensure adherence to corporate environmental standards. The EM will be accountable for implementing the approved MPs and reviewing them periodically for effectiveness. Departmental area managers (e.g., mining, milling, and plant/site services) will be directly responsible for implementation of the EMS and EMPs relevant to their areas. All employees and contractors are responsible for daily implementation of the practices and policies contained in the EMS.

During Closure and Post-closure staffing levels will be reduced to align with the level of activity associated with these phases. Prior to initiating closure activities, BW Gold will revisit environmental and health and safety roles and responsibilities to ensure the site is adequately resourced to meet permit monitoring and reporting requirements. The Mine Manager will have overall responsibility for Closure and Post-closure activities at the mine site.

Pursuant to Condition 19 of the Project's EAC #M19-01, BW Gold has established an Environmental Monitoring Committee (EMC) to facilitate information sharing and provide advice on the development and operation of the Project, and the implementation of EAC conditions, in a coordinated and collaborative manner. Committee members include representatives of the Environmental Assessment Office (EAO), UFN, LDN, NWFN, StFN, SFN, NFN, Ministry of Energy, Mines and Low Carbon Innovation (EMLI), Ministry of Environment and Climate Change Strategy, and Ministry of Forests, Lands, Natural Resource Operations and Rural Development (FLRNORD).

Pursuant to Condition 17 of the EAC, Aboriginal Group Monitor and Monitoring Plan, BW Gold will retain or provide funding to retain a monitor for each Aboriginal Group prior to commencing construction and through all phases of the mine life. The general scope of the monitor's activities will be related to monitoring for potential effects from the Project on the Aboriginal Group's Aboriginal interests.

4. COMPLIANCE OBLIGATIONS, GUIDELINES, AND BEST MANAGEMENT PRACTICES

This section describes the legislation, obligations, guidelines, and best management practices that relate to this plan.

4.1 Legislation

Federal legislation or regulations applicable to the WMOP includes:

- *Canadian Environmental Protection Act*, 1999;
- *Fisheries Act*, 1985;
- *Impact Assessment Act*, 2019;
- *Migratory Birds Convention Act*, 1994;
- *Species at Risk Act*, 2002; and
- *United Nations Declaration on the Rights of Indigenous Peoples Act*, 2021.

Provincial legislation or regulations applicable to the WMOP includes:

- *Declaration on the Rights of Indigenous Peoples Act*, 2019;
- *Environmental Assessment Act*, 2018;
- *Riparian Areas Protection Regulation,* 2019;
- *Riparian Areas Protection Act,* 2016;
- *Forest and Range Practices Act*, 2002;
- *Land Act*, 1996;
- *Mines Act*, 1996;
- Health, Safety and Reclamation Code for Mines in BC, 2021; and
- *Water Sustainability Act*, 2014.

4.2 Environmental Assessment Certificate and Decision Statement Conditions

The WMOP addresses the requirements in EAC Condition 24 and federal DS Conditions 5.1 to 5.5. Concordance tables identifying where the requirements in the EAC and DS are addressed in the WMOP are identified in Appendix C and Appendix D, respectively.

4.3 Guidelines and Best Management Practices

Guidance documents that have informed the mitigation measures and best management practices to mitigate wetland impacts include:

- Wetlands of British Columbia: A Guide to Identification (FLNRORD 2004);
- Wetland Ways: Interim Guidelines for Wetland Protection and Conservation in British Columbia (Cox and Cullington 2009);
- Forested Wetlands – Functions, Benefits and the Use of Best Management Practices (Welsh et al. 1995);

- Riparian Area Management Guidebook (MOF 1995);
- Approved Work Practices for Managing Riparian Vegetation. A Guide to Incorporating Riparian Environmental Concerns into the Management of Vegetation in BC Hydro's Transmission and Distribution Corridors (BC Hydro et al. 2003);
- Guidance on Measures to Avoid Causing Harm to Fish and Fish Habitat (DFO 2013);
- The Federal Policy on Wetland Conservation (EC 1991);
- Riparian Management Area Guidebook (BC MOF 1995);
- Operational Framework for Use of Conservation Allowances (EC 2012);
- Develop With Care, Environmental Guidelines for Urban and Rural Land Development in British Columbia (BC MOE & BC MFLRNO 2014); and
- Federal Policy on Wetland Conservation Guidance for Application and Implementation in Environmental Assessment (ECCC 2017).

4.4 Existing Permits

Aside from the DS and EAC conditions identified in Section 4.2, there are no other existing permit requirements or conditions related to wetlands. In order to implement the wetland offset, it is anticipated that permits may be required under the *Land Act* and *Water Sustainability Act*.

4.5 Linkage to Other Management Plans

The WMOP is linked to the:

- Reclamation and Closure Plan (RCP; Chapter 4 of the Joint *Mines Act/Environmental Management Act* Permits Application [Application]);
- Construction Environmental Management Plan (Appendix 9-C of the Application);
- Surface Erosion Prevention and Sediment Control Plan (Appendix 9-A of the Application);
- Vegetation Management Plan (VMP; Appendix 9-F of the Application);
- Invasive Plant Management Plan (IPMP; Appendix 9-G of the Application);
- Wildlife Mitigation and Monitoring Plan (Appendix 9-H of the Application); and
- Fish habitat offsetting plans required by DS Condition 3.11.

5. ADAPTIVE MANAGEMENT FRAMEWORK

The WMOP is a living document that will evolve over time in response to the results of the wetland monitoring program and engagement with Indigenous groups and regulatory agencies, changing conditions or development at the mine site, and updates to scientific methods.

Additionally, this version of the plan is intended to satisfy the management of impacts to wetlands from early works and a revised version of this plan will be drafted in Q4 2022 with additional input from LDN and UFN specifically addressing:

- Uncertainty associated with baseline studies and the extent of wetlands within the local study area;
- Uncertainty associated with baseline studies and the classification of wetlands within the local study area;
- Uncertainty associated with wetland offsetting activities at Mathews Creek Ranch; and
- The need for additional offsetting projects to meet the no-net loss requirement from EAC Condition 24 and federal DS Conditions.

The WMOP incorporates adaptive management as follows:

- Plan
  - Conduct pre-construction surveys within the mine site, airstrip and airstrip access road, freshwater supply system, and mine access road to confirm absence of blue- or red-listed wetlands, wetland extent, class, and function.
  - Confirm potentially impacted wetlands.
  - Develop offsetting plan.
- Do
  - Implement mitigation measures.
  - Implement offsetting plan.
- Monitor
  - Conduct wetland monitoring and prepare related reports.
  - Prepare DS and EAC annual reports.
- Adjust
  - Review the effectiveness of the implementation of offsets and mitigation measures.
  - Update the WMOP as required.

6. TRAINING AND AWARENESS

Employees and contractors will receive training in wetland management and awareness on their arrival on site through an environmental on-boarding training session and prior to the start of work as part of the Site Orientation. The purpose of this training is to provide all site personnel with a basic level of environmental awareness and an understanding of their obligations regarding compliance with regulatory requirements, commitments, and best practices. Refresher training will be provided to all personnel annually.

Site supervisors will be provided with a copy of the WMOP and will receive additional training with respect to the requirements that are outlined in operational SOPs.

BW Gold will regularly review and update this plan and provide refresher training when there are changes to the plan including changes to monitoring, and adaptive management thresholds and related management responses.

BW Gold is planning to host a 1-2 day ‘wetlands awareness’ workshop on site in June or July 2022 during the period of time when the additional baseline studies are being conducted. BW Gold has had some preliminary discussions with LDN, UFN, Ecologic, ERM and the BC Wildlife Federation in regards to organizing this workshop and will continue to meet with those groups to ensure that the workshop meets its objectives.

7. WETLAND BASELINE INFORMATION

Wetlands are “lands that are saturated with water long enough to promote wetland or aquatic process as indicated by poorly drained soils, hydrophytic vegetation, and various kinds of biological activity adapted to a wet environment” (National Wetlands Working Group 1988). In Canada there are five classes of wetlands (bog, fen marsh, swamp, and shallow open water) that are organized into wetland associations based on floristic and biogeochemical properties (Mackenzie and Moran 2004). The following section describes the baseline conditions for the mine site as surveyed in 2011 to 2013 as well as the baseline conditions for the Transmission line as surveyed in 2017. It is anticipated that wetland baseline information will be collected in 2022 to improve the accuracy of wetland mapping and classification.

7.1 Baseline Methods

A total of 209 wetland-related surveys were completed between summer 2011 and summer 2013 in the Mine Site Local Study Area (LSA; Appendix 5.1.2.5A in Appendix Volume 8 of the Project’s Application for an Environmental Assessment Certificate/Environmental Impact Statement [Application/EIS]; New Gold 2015). Sample plots are shown on Figure 7.1-1. Sections 7.1.1 to 7.1.3 provide details regarding the methods used to undertake these surveys.

As a result of the change to the TL alignment during the EA process in response to Nadleh Whut’en First Nation (NWFN), Stellat’en First Nation (StFN) and Saik’uz First Nation (SFN) concerns, additional wetland surveys were undertaken in July 2017 along the entire length of the proposed new alignment and three re-routes to confirm wetland locations and identify wetland type. Methods used to conduct these surveys are provided in Section 7.1.2.

Additional pre-construction wetland surveys within the mine site will be conducted in collaboration with LDN and UFN. A scope of work for those surveys is currently under development (Section 7.1.3).

7.1.1 Wetland Classification

Baseline wetland surveys undertaken to support the environmental assessment (EA) included wetland ecosystem mapping in accordance with terrestrial ecosystem mapping (TEM) protocols (RIC 1998) and field studies between spring 2011 and fall 2013 to classify wetland ecosystems. Wetlands were classified in accordance to the site unit classification model (MacKenzie and Moran 2004) based on the Biogeoclimatic Ecosystem Classification (Pojar et al. 1987) and Canadian Wetland Classification System (Warner and Rubec 1997) systems. Groups of co-occurring plants are used to further sub-classify wetlands into “associations” that are designated with a code (e.g., Wf02) and a name that describes the vegetation association (e.g., scrub birch–water sedge).

Listed Wetlands

The British Columbia Conservation Data Center (BC CDC 2012) tracks and records ecosystems conservation status. Wetlands identified as blue-listed are ecosystems of special concern and red-listed ecosystems are at risk of lost.

A search for provincially listed wetlands in the Biogeoclimactic Ecosystem Classification (BEC) sub-zones in the Project area in the Stuart Nechako Natural Resource District identified a number of listed wetland associations (Table 7.1-1).

It should be noted that the same wetland association (e.g., Wf02, scrub birch–water sedge) can occur in multiple regions and BEC subzones. In some regions that association may be common, while it may be declining in other regions or BEC subzones and be listed with the BC CDC. Therefore, the region, BEC subzone and association must all be known to identify a listed wetland.

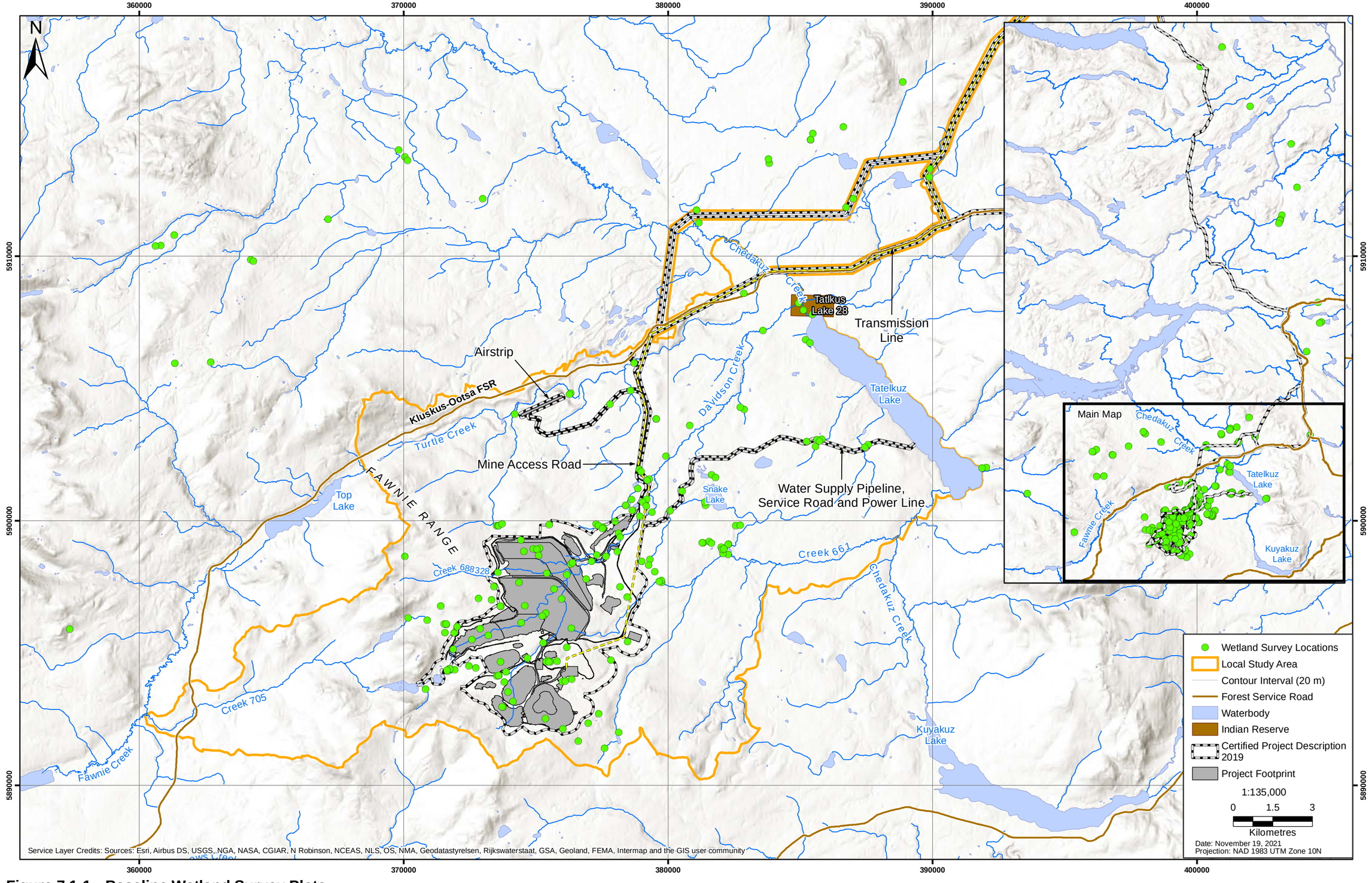

Figure 7.1-1: Baseline Wetland Survey Plots

Table 7.1-1: Summary of Listed Wetland Associations within the BEC Sub-Zones of the Project Area

ESSF mv 1	ESSF mvp	SBS dk	SBS dw3	SBS mc2	SBS mc3
		■ Wf02 ■ Wf05 ■ Wf06 ■ Wf08 ■ Wf11 ■ Wm02 ■ Wb01 ■ Ws03 ■ Ws05	■ Wm02 ■ **tamarack / low birch / bluejoint reedgrass - sedges / peat-mosses** ■ Wb12	■ Wf02 ■ Wf05 ■ Wf08 ■ **Wf09** ■ **Wf10** ■ Wb10 ■ Wb11 ■ Wb12	

Note: Bolded wetlands are red listed in the corresponding BEC Zone; other wetlands are blue listed in the corresponding BEC Zone.

Classification data recorded in the field was compared against the wetland types identified in Table 7.1-1 to identify if any on-site wetlands were red- or blue-listed.

7.1.1.1 Sampling Effort

Field surveys to classify and assess wetland resources were completed July to August 2011, July to September 2012, and July to August 2013. Survey intensity varied based on wetland study area. Biochemical and water quality data were primarily collected upstream, on-site and downstream, of the mine site. Other data collection surveys (e.g., TEM, hydrological and ecological/habitat) were completed throughout the wetland study area to meet functional assessment needs.

Wetland Functional Assessments

Field sampling was conducted to assess wetland function and classification in Mine Site Local Study Area (LSA). Baseline data were collected to describe four primary wetland functions (hydrological, biochemical, ecological and habitat; Table 7.1-2):

- Water sampling for biochemical function;
- Hydrodynamic indicator observations for hydrological function;
- Wetland classification for ecological function; and
- Wildlife observations for habitat function.

Table 7.1-2: Wetland Functional Assessments Conducted within the Mine Site Study Area

Wetland Function	Assessment Component
Hydrological	■ Hydrogeomorphic (HGM) classification
Biochemical	■ Water quality ■ Nutrients ■ Organics
Ecological/Habitat	■ Size ■ Shape ■ Distribution on the landscape ■ Species richness and diversity ■ Ecosystems and species at risk ■ Wildlife habitat potential

Reference wetlands were selected and sampled in an area approximately 13 km NNW of the mine site. This area was selected because it:

1. Is located in a similar geomorphic setting as the mine site;
2. Has a similar water source and hydrodynamics as the mine site;
3. Is located in a similar biogeoclimatic region and aspect as the mine site; and
4. Contains common wetland plant associations found in the mine site.

These reference sites can be used in future monitoring programs to assess wetland function in the mine site relative to conditions in similar, fully functioning, self-sustaining ecosystems (Brinson and Rheinhardt 1996; Rheinhardt et al. 1999). Reference sites included 3 bogs, 6 fens, 1 marsh, 1 swamp, and 1 shallow-water class for a total of 12 wetlands.

Hydrological Functional Assessment

In the baseline report hydrodynamics of wetlands are determined by the characteristics of the main water sources and sinks, and the interaction of these with site topography and wetland substrate (peat, mineral, and vegetation cover). Hydrological function relates to the contribution of the wetland to the flow of surface water and groundwater in the area of interest. The HGM classification system places the wetland in the context of the larger watershed system (Smith et al. 1995; Hanson et al. 2008). HGM also helps evaluate the basic hydrological wetland processes and conditions relative to other wetlands. These hydrological characteristics of wetlands exert a strong influence upon the ecological character, biota and functional performance of wetlands.

In the baseline report HGM is a hierarchical classification described by *systems* and *element groups*. There are six HGM *systems* recognized regionally in BC (BC MOFR and BC MOE 2010): upland, palustrine, lacustrine, fluvial, estuary, and marine. These systems describe the influence of major water source(s) and hydrological processes. The *element group* depicts the patterns of waterflow related to the general water sources, hydrodynamics, and connectivity in the landscape. Refer to Tables 2.11 and 2.12 in the Field Manual for Describing Terrestrial Ecosystems (BC MOFR and BC MOE 2010) for more information on HGM units.

In the baseline report wetland hydrology may be difficult to determine, as the contribution of seasonal water flows, precipitation and groundwater are not always readily apparent. However, the HGM classification can be used to guide understanding of hydrological mechanisms. Water balance information also adds to hydrological understanding, but only deals with bulk water volume transfers and not with wetland water levels, which may be important to wetland flora and fauna.

Biochemical Functional Assessment

Surface water samples were collected at selected wetlands following standard water collection guidelines and laboratory protocols as described in the *Water and Air Baseline Monitoring Guidance Document for Mine Proponents and Operators* (BC MOE 2012). Surface water samples were collected and analyzed for routine physical parameters, major ions, nutrients, total and dissolved metals, and organic carbon. During sampling, in-situ field measurements (i.e., pH, conductivity, dissolved oxygen, and temperature) were also measured in several areas in the wetlands.

At some sample locations, open water areas were not present. In these cases, a shallow groundwater well was dug by the initial field crew several days in advance of sampling, to allow for stabilization of the water column within the well. In locations where open water was present but not easily accessible, sample bottles were opened and an extension pole was used to collect the water samples. Sample bottles were laboratory sterilized and therefore did not require pre-rinsing. Samples were packed with ice and shipped via ground courier to the AMEC Edmonton assay lab within 24 hours of collection.

Water quality results were compared to the British Columbia Approved Water Quality Guidelines (BC MOE 2006). The ammonia (NH_3) guideline is based on biologically available un-ionized ammonia, whereas laboratory analysis is based on the ionized form. The proportion of un-ionized ammonia in water varies with pH and temperature; therefore, the BC MOE Water Quality Guidelines are a compendium of working water quality guidelines in BC.

Ecological/Habitat Functional Assessment

In the baseline report the ecological functional assessment quantifies the extent, structure, and complexity of the sampled wetlands. Wetland ecosystems were identified and inventoried as per provincial TEM standards. Once mapped and classified, the area of wetland ecosystems was calculated using ArcMAP 10.0 (ESRI Redlands, CA). Wetland class, area, and distribution were then described and summarized.

A list of potentially occurring wildlife species (e.g., amphibians, birds, mammals, and invertebrates (dragonflies, damselflies, and lepidoptera) was developed for each wetland classification. Species selected for initial inclusion were identified as locally dependent on wetlands for a portion of their lifecycle (Stevens 1995; Delesalle 1998; and Klinkenberg 2013). The species list was refined based on the life requisites for each species (BC CDC 2012) and reviewed to determine the likelihood of wetland use as identified by BGC zone and wetland class (MacKenzie and Moran 2004). Wildlife survey data (i.e., wildlife detections) and literature research associated with biological productivity and support of biodiversity were used to determine habitat function ratings (Hanson et al. 2008) for each wildlife data collection location.

Wildlife biodiversity attributes were determined by the presence of significant wildlife species, including species at risk, species related to recreation or subsistence, and commercially valued species (Hanson et al. 2008). Commercially valued species were derived from the *BC Hunting and Trapping Regulations* (BC MFLNRO 2010).

Habitat functionality values were developed for specific wildlife species that spend a critical portion of their lifecycle (e.g., breeding, nesting, or foraging) in wetlands. Wildlife species ratings were determined by dividing the average number of annual usage events detected (e.g., moose were rated for both winter and fall use) by the number of wildlife species expected to use specific wetland habitat. Overall habitat functional values were ranked into high (1 to 2), moderate (2 to 3), and low (≥3) categories for each wetland.

Vegetation biodiversity analyses focused on data collections associated with rare plant surveys and comprehensive wetland data (i.e., with full vegetation, water quality, and wildlife data). Summary statistics including plant species richness and Shannon's Diversity Indices were calculated using PC-ORD v6 (McCune and Mefford 2011).

7.1.2 Transmission Line Surveys

Wetland survey plots were identified using Terrain Resource Information Management data, aerial photographs, and TEM (ERM 2017). A total of 32 wetland plots were surveyed and an aerial reconnaissance of the new alignment and the three re-routes was conducted. Wetland survey methods followed MacKenzie (1999) and MacKenzie and Moran (2004), in accordance with Section 5.1.2.5 of the Application Information Requirements (EAO 2014).

7.1.3 Pre-Construction Surveys

BW Gold is currently developing a scope of work in collaboration with LDN and UFN to survey wetlands within the mine site in 2022 (Appendix E and F). The scope of work will identify the specific spatial location of each wetland as well as the classification of that wetland. There may continue to be refinements to the workplan from Ecologic and the RFP, prior to the field work actually being completed, however, the workplans are anticipated to remain materially unchanged. It is anticipated that wetland surveys will be

conducted between June and August such that wetland mapping will be updated in September 2022 which will inform a revised WMOP in Q4 2022. The survey objectives are to confirm the absence of red-listed or blue-listed wetlands and assess wetland type, function and extent.

As required by EAC Condition 24(b), these results will be used to provide a detailed description of each wetland that will be lost or altered on the mine site. This description will include an assessment of each wetland and wetland function that would be lost or altered (Mackenzie and Moran 2004) and the location and extent of these wetlands in relation to the local watershed.

The scope of work is anticipated to include:

1. The potential wetland near the plant site will be delineated with flagging and GPS coordinates by a QP from ERM and Indigenous Monitors from LDN and UFN will be invited to participate. The plant site tree clearing activity has also been flagged for the project IEM who will be invited to observe tree clearing near the delineated potential wetland polygon (Appendix G). Sediment and Erosion Control measures such as silt fencing and haybales will be installed after the tree clearing to ensure any potential impacts to the delineated wetland from spring freshet are mitigated. This area will be monitored closely during the spring melt period. A post-trip report will be prepared and provided to Aboriginal Groups and the EAO.
2. Detailed mapping of wetlands from aerial photographs on the mine site at a scale of 1:5,000.
3. Field surveys of the mine site to classify mapped wetlands into wetland associations based on the vegetation communities at each site.
4. Detailed mapping and field surveys of the Mathews Creek offsetting site to identify the current conditions on site and provide baseline data for a future monitoring program (see Section 11, Monitoring).
5. Reconnaissance field surveys of other wetlands in the regional area to assess them as potential additional offsetting areas.

7.2 Summary of Baseline Results

The following sections provide an overview of wetland class and relative size of wetlands the study area for each Project component, as presented in the Application/EIS, and summarized in Table 7.2-1. Detailed baseline data for wetlands are provided in Appendix D. Surveys in 2021 and 2022 will be used, in part, to verify this dataset and add to it (i.e., map extent).

Table 7.2-1: Total Wetland Area by Class

Project Component	Wetland Area (ha)					Total
	Swamp	Bog	Fen	Shallow Open Water	Marsh	
Mine Site	421.25	101.4	39.34	10.35	2.77	**575.11**
Transmission Line (LSA)	58.18	14.38	27.29	1.34	0.26	**101.45**
Mine Access Road (Corridor)	4.00	1.66	0.51	0.11	0.00	**6.28**
Freshwater Supply System (Corridor)	8.14	1.64	1.08	0.05	0.00	**10.91**
Airstrip and Airstrip Access Road (Corridor)	0.88	1.07	0.00	0.00	0.00	**1.95**

7.2.1 Mine Site

Based on the Application/EIS (Section 5.3.7 in Volume 3 of the Application/EIS), 575.15 hectares (ha) (13.0% by area) of the Mine Site is classified as wetlands. Swamp wetlands are the most common wetland class at 421.25 ha (9.5%) followed by bogs at 101.40 ha (2.3%), fens at 39.34 ha (0.9%), shallow open water 8.19 ha (0.2%), and marshes at 2.77 ha (0.1%). No blue- or red-listed wetlands were found in the Mine Site because there are no listed wetlands were identified in the ESSFmv1 and ESSFmvp BEC subzones in the Stuart Nechako Natural Resource District.

7.2.2 Transmission Line

The 2017 wetland surveys identified a total of 485 wetland polygons covering 1,101.7 ha (6.5%) in the new transmission alignment and three re-routes LSAs (ERM 2017). Of this total, 336 polygons comprising 724.8 ha are located within the new transmission alignment LSA, 66 polygons comprising 178.1 ha are within the Mills Ranch re-route LSA, and 83 polygons comprising 198.8 ha are within Big Bend re-route LSA. No wetlands were identified in the Stellako re-route LSA.

The 2017 surveys identified 17 listed wetlands belonging to four blue-listed wetland associations (Wb01, Wf02, Wf05, and Wf08; 7.9 ha in total) in the transmission alignment LSA. No red-listed wetlands were identified in any of the LSAs. The Mills Ranch re-route was not re-surveyed in 2017 as the area was closed due to wildfires. The Application/EIS (New Gold 2015) identified five blue-listed wetlands in this re-route (four belonging to Wb01 and one belonging to Wf08; 1.9 ha in total). No listed wetlands were identified in the Stellako or Big Bend re-routes. All listed wetlands were within the SBSdk biogeoclimatic zone.

7.2.3 Other Project Components

Based on the Application/EIS (Section 5.3.7 in Volume 3 of the Application/EIS), wetlands comprise approximately 6.28 ha (6.1%) of the Mine Access Road (MAR) corridor, 11.03 ha (8%) of the freshwater supply system (FWSS) corridor, and 1.95 ha (3.8%) of the airstrip and airstrip access road corridor (Section 5.3.7 of Volume 3 of the Application/EIS) as follows:

- MAR: Swamp wetlands are the most common wetland class mapped (4.00 ha; 3.90%) followed by bogs (1.66 ha; 1.60%), fens (0.51 ha; 0.50%), and marshes (0.11 ha; 0.10%). Shallow open water class is not present.
- FWSS: Swamp wetlands are the most common wetland class mapped (8.14ha; 5.90%) followed by bogs (1.64 ha; 1.20%), fens (1.08 ha; 0.80%), and marshes (0.05 ha; <0.01%). Shallow open water class is not present.
- Airstrip and Airstrip Access Road: Swamp wetlands are the most common wetland class mapped (0.88 ha; 1.70%) followed by bogs (1.07 ha; 2.10%). Shallow open water, fen and marsh classes are not present. Note that this Project component is no longer being constructed.

7.3 Baseline Uncertainty

During development of the WMOP two areas of uncertainty were identified as they relate to baseline data:

- Mapping methodology used to identify locations and size of wetlands;
- Predictive modeling of wetland area that mapped riparian areas; and
- Wetland classification and function.

The locations and sizes of wetlands were derived from the Terrestrial Ecosystem Mapping (TEM). In TEM, polygons are drawn on aerial photos to identify groups of vegetation communities. For each polygon, the

TEM lists the three most common vegetation types along with their approximate percent cover. This mapping includes wetlands. Therefore, the area of each TEM polygon is known, and the approximate percent coverage of wetlands in each polygon, but the actual location of the wetland, its extent in the polygon and exact size is not recorded. This has implications for how impacts to wetlands projected to be potentially impacted by project development activities were assessed (Section 8.1) as well as specific management and mitigation measures where the exact location of a wetland is needed.

Wetland classification in the mine site relied on a predictive model that incorporated terrestrial ecosystem components. This model identified a number of riparian corridors as wetlands. A sample of these riparian corridors surveyed in 2021 were found to have sites dominated by well-drained soil. Wetlands do not have well drained soils. This means the mine-site TEM mapping likely overestimated wetland extent and/or incorrectly classified wetlands. For comparison, approximately 5% of the landscape in BC is mapped as wetland (BC MOE 2021); however, the wetlands baseline from 2011-2013 listed approximately 13% of the area as wetlands. This is double the provincial average and suggests that the extent of wetlands was overestimated by the combination of TEM mapping and predictive modeling.

In contrast, wetland mapping for the transmission line identified the specific location and area of each wetland separately.

To address these areas of uncertainty, BW Gold has actively worked hand-in-hand with LDN and UFN and their technical consultants in evaluating how to proceed with a limited Early Works tree clearing scope in delineating a small wetland area near the tree clearing planned to occur in April 2022 where the future plant site will be located (refer to Appendix G for map) as well as developing two scopes of work (Appendix E and F) to conduct wetland surveys to map wetlands within the project footprint and the Mathews Creek Ranch wetland complex at the 1:5,000 scale and classify wetlands according to Mackenzie and Moran (2004). The potential wetland near the plant site will be delineated by a QP from ERM and Indigenous Monitors from LDN and UFN will be invited to participate. The plant site tree clearing activity has also been flagged for the project IEM who will be invited to observe tree clearing near the delineated potential wetland polygon. Full-scale wetland surveys will be conducted in June-July 2022 and used to update the wetland mapping so that in Q4 2022 a revised WMOP will then be produced with spatially accurate wetland locations (Appendix E and Appendix F). These data will also be able to support identification of any potentially red- or blue-listed wetlands.

8. POTENTIAL EFFECTS ON WETLAND FUNCTIONS

Potential effects on wetlands were assessed in the Application/EIS (New Gold 2015; Section 5.3.7), and later updated in the Consolidated Wetlands Effects Assessment (CWEA; ERM 2017d) that considered changes to the water management and treatment plan and revised transmission line alignment. This section provides a summary of the effects assessment methodologies, results, and a discussion on assessment uncertainties that impact this WMOP.

8.1 Assessment Methods and Indicators of Effects

Potential Project effects on wetlands and wetland functions were quantitatively and qualitatively assessed. Baseline wetland functions for mapped wetlands were assessed for wetland class in the LSA. Project effects on wetlands and wetland functions were determined by overlaying the Project footprint (mine footprint and linear corridor components) on mapped wetlands and then calculating direct loss of wetland extent using Geographical Information System (GIS) analysis.

The loss of wetland functions was assessed by documenting wetland functions for the federal wetland class, calculating lost area of each wetland class, and evaluating degraded wetland functions and hydrologically altered wetlands. Wetlands were classified by HGM unit to characterize and assess effects on hydrologic functions (Hanson et al. 2008).

Criteria used to characterize residual effects on the wetland value component (VC) are described in Section 4.3.5.1 of the Application/EIS, and include: magnitude, geographic extent, duration, reversibility, frequency and context. Definitions for these criteria are as defined in Table 4.3-4 of the Application/EIS, except for duration. Due to changes in Project design, the end of the Closure phase was extended to Year 41, rather than Year 35 as described in the Application/EIS. This change affected duration definitions for long-term and chronic, and updated definitions were presented in the CWEA (ERM 2017, Table 2-1). These revised definitions were applied in ERM (2016a, 2016b, 2017a, 2017b, and 2017c).

Significance definitions are presented in Section 4.3.5.3 of the Application/EIS (significant, not significant-negligible, not significant-minor, not significant-moderate). The CWEA relied on a wider range of criteria rating combinations to determine significance than specific examples presented in Application/EIS, however, the approach remained consistent with the Canadian Environmental Assessment Agency's (2015) *Operational Policy Statement: Determining Whether a Designated Project is Likely to Cause Significant Adverse Effects under the Canadian Environmental Assessment Act, 2012* and the EAO's (2013) *Guideline for the Selection of Valued Components and Assessment of Potential Effects*.

8.2 Spatial and Temporal Boundaries

The Project effects assessment included six Project components: the mine site, mine access road, freshwater supply pipeline, airstrip and access road, transmission line, and improvements to the Kluskus FSR (no longer being considered at this time). The mine site LSA and RSA for the wetland VC used in the Application/EIS were based on watershed drainage basins where Project components are likely to affect hydrological resources (Table 8.2-1). The spatial boundaries for the wetland LSA and RSA were a combination of those for the aquatics disciplines, the Ecosystem VC, and the Plant Species and Ecosystems at Risk VC.

The LSA for the wetlands VC was based on watershed boundaries so that Project effects on surface and groundwater resources would be fully incorporated into the wetlands effects assessment. The linear components were included in this LSA, so the 100 m area associated with the linear components were incorporated into the effects assessment. In addition, the transmission line extends north beyond these watershed boundaries. As a result, the LSA also included 100 m on both sides of the corridor for this linear component. Descriptions and sizes of the linear component boundaries are provided in Table 8.2-2.

Table 8.2-1: Description of Wetland LSA and RSA

Study Area	Description	
Local Study Area	Mine Site:	Entire watersheds of Davidson Creek, Creek 661, Turtle Creek, and Creek 705. Tributaries flowing in to the south side of Tatelkuz Lake; Chedakuz Creek from confluence with Creek 661 to Tatelkuz Lake. Chedakuz Creek from Tatelkuz Lake to confluence with Turtle Creek.
	Linear Components:	Transmission line, mine access road, airstrip, freshwater supply pipeline, and Kluskus FSR upgrade – 100 m beyond the linear component boundary.
Regional Study Area	Mine Site:	Entire watershed of Chedakuz Creek not included in the LSA. Includes entire watershed of Laidman Lake not included in the LSA.
	Linear Components:	Transmission line, mine access road, airstrip, freshwater supply pipeline, and Kluskus FSR upgrade – 500 m beyond the proposed linear component boundary.

Table 8.2-2: Description of Linear Component Boundaries used for the Wetland VC

Study Area	Description
Transmission Line (LSA)	1,040 m wide running along the length of the new alignment (134.3 km) and re-routes (Stellako 7.2 km, Mills Ranch 15.3 km and Big Bend 20.4 km)[1]
Mine Access Road (Corridor)	Mine Access Road (15 km long, 120 m wide)
Airstrip and Airstrip Access Road (Corridor)	Airstrip (2 km long, 200 m wide) including associated access road (10 m wide)
Freshwater Supply Pipeline (Corridor)	Water Pipeline (20 km long, 110 m wide)

[1] The LSA for the 2017 wetland surveys was wider than the 340 m wide LSA defined in the Application/EIS and ERM (2017e).

Temporal boundaries in the Application/EIS included a 2-year construction phase, 17-year operations phase, 18-year closure phase, and the post-closure phase (that at the time was estimated for a minimum of 35 years following closure). For each of the four phases, a wetland impacts analysis was conducted for the wetlands effects assessment using a single footprint that captured the site disturbances across time. The mine site footprint reflected the extent of disturbance over these four phases. Consistent temporal boundaries were used in the CWEA, except that the end of closure was extended to Year 41 which is constant with the current mine plan, as previously mentioned in Section 8.1.

8.3 Significance of Residual Effect

Following mitigation, residual effects of loss and alteration of wetland extent and function are anticipated. The majority of wetland loss of extent and alteration of function will occur during construction of the mine site. Loss and alteration due to the transmission line, mine access road, airstrip and access road, and FWSS is expected to be minimal with the implementation of mitigation measures and BMPs.

The magnitude of residual effects is rated as **moderate** (between 10% and 20% reduction) because loss (6.7%), alteration (4.3%), and potential hydrological effects (89.9 ha, 1.8%) of wetlands is predicted to result in a 13% change from baseline conditions[1]. The residual effect is **local** in geographic extent, as loss and alteration of wetlands is entirely confined within the LSA.

[1] Overall loss and alteration was assessed by combining loss of wetland extent, area of degraded functions and area of hydrologically-altered wetlands.

The loss of wetlands on the mine site will be **chronic** in duration and **irreversible** because wetlands will be permanently lost within the footprint of mine site components. Loss will be **one time** in frequency while effects associated with alteration will be **intermittent**. The context is rated as **moderate**. The likelihood that the effect will occur is **high**.

Overall, the Project's residual effects on wetlands are anticipated to be **not significant** (**moderate**), given the moderate magnitude and local geographic extent of the effects. Confidence in this assessment is **high** because the extent of direct wetland loss is well understood and the assessment is considered to be conservative even though mitigation measures and compensation will mitigate effects related to the amount of lost wetland extent and function and altered wetland function.

8.4 Cumulative Effects

As described in Section 5.3.7.5.4 of the Application/EIS, the Project will affect the loss of wetland extent and function in combination with forestry, agricultural, and mineral exploration activities in the RSA (New Gold 2015).

Past and present wetland loss was calculated by reviewing recent orthophoto imagery and spatial resource road data to identify roads (primarily forestry related), existing transmission line ROWs, agriculture, mineral exploration and other footprints such as gravel pits. Where these footprints were located within 50 m of wetlands, the footprints were digitized and the potential for loss or alteration was assessed. For example, where an existing road crossed a wetland, the pre-disturbance extent of the wetland was digitized to create a pre-disturbance wetland shape. This was then clipped out using the disturbed road area and identified as lost. To calculate alteration of wetland function, 50 m buffers (the same distance used in the assessment) were created around disturbance footprints that intersected with wetlands. Past and present wetland loss and alteration affect 0.4% and 2% of wetlands in the RSA. Future loss and alteration of wetlands is mainly attributed to the Project (6.7% and 4.3% respectively).

Forestry activities (primarily road building) are responsible for the majority of past and present effects to wetlands. As road density is high and access to most areas in the RSA is well established, future forestry effects in the RSA on wetlands are anticipated to be minimal (<1%). Cumulative effects to wetlands in the RSA for all past, present, and future activities are expected to result in the loss of 7.3% and alteration of 7.1% of wetlands. Avoidance is the key mitigation measure used to reduce effects to wetlands and was employed when locating Project infrastructure. Avoidance is also the principle mitigation measures used by forest licensees. Most licensees use the riparian management areas and measures described in the Riparian Management Area Guidebook (BC MOF 1995), which minimize the loss of wetland extent and reduce the alteration of wetland functions. Both the Project and forest licensees implement mitigation measures to reduce alteration of wetland hydrology, particularly in relation to roads, by ensuring drainage connections are maintained and changes in flow are avoided.

The magnitude of cumulative effects on wetlands is **low** (<10% loss) without the Project and **moderate** with the Project (>10% affected). The geographic extent is regional because wetland loss due to forestry occurs throughout the RSA. Duration is **chronic** as forest harvesting and other activities will continue for the foreseeable future. Frequency is **intermittent** as most disturbance will occur sporadically over time. Effects are reversible for most alteration but are **irreversible** in wetlands which have been lost, which is conservative as it does not consider the effects of reclamation and development of a reclamation plan will be a legal requirement. The context is **moderate** as wetlands are resilient to alteration but are not resilient to loss, particularly in peat wetlands. Due to the combined loss of wetland extent and functions associated with the Project and other forestry, agriculture, and mining activities, the significance determination for residual cumulative effects with the Project is **not significant** (**moderate**).

8.5 Assessment Uncertainty

As discussed in Section 7.3, the exact locations of wetlands are not known at the mine site and all off site infrastructure, except the transmission line. They were mapped as a percentage of larger terrestrial ecosystems. To be conservative in the assessment it was assumed that the wetland area was lost first. For example, if a terrestrial polygon was 5 ha and it contains 10% wetland and 50% of the polygon was affected by the project the assessment assumed that loss was 0.5 ha wetland and 2 ha terrestrial ecosystems (100% of the wetland and the remaining terrestrial ecosystem). This likely overestimated the amount of lost wetland. Additionally, within the transmission line options all wetlands under the right of way were identified as lost. However, it is expected that most non-forested wetlands will not be lost because tree clearing will not be required in these areas and generally transmission line infrastructure is not constructed in wetlands as they have geo-technically unstable soils and are often in depressions. Locations of wetland loss in the transmission line was identified February 24, 2022; however, wetland losses will not occur until wetland offsetting is sufficient for the project. Wetlands affected by the transmission line are described in Table 8.5-1.

There are no methods in BC that are able to quantify the amount of wetland function at one wetland and compare it to another wetland. There are methods for measuring and describing aspects of function and then qualitative descriptors of function associated with individual wetland classes. For this assessment it was assumed that all wetlands currently on the landscape were functioning at maximum capacity, i.e., they had all wetland functions specific to the wetland class as defined by Hanson et al. (2008). To quantify the loss of function a class/area approach was used where the functions associated with each class were assumed lost to the magnitude of the wetland area.

To address these areas of uncertainty, BW Gold has actively worked hand-in-hand with LDN and UFN and their technical consultants developing two scopes of work collaboratively (one developed by Ecologic and another that will be issued to consultants as an RFP – Appendices E and F) to conduct wetland surveys to map wetlands in the mine site within the project footprint as well as the offset location. More information is available in Sections 7.1.3 and 7.3.

Table 8.5-1 Wetlands Affected by Transmission Line Construction

Wetland ID	Wetland Class	Listed Status	Start Chainage	End Chainage	Length in ROW (m)	Area in ROW (m^2)	ROW Access Road Crossing?	Vehicle Crossing Type	Map Sheet
WT-001	Swamp		1+047	1+115	68	276	No	N/A	
WT-002	Swamp		1+115	1+244	129	987	No	N/A	
WT-003	Swamp		8+880	9+001	122	5,931	Yes	Ice/snow crossings or use timber mats, driving mats, or log corduroys	A2-3
WT-005	Bog		12+431	12+482	51	144	No	N/A	A2-4
WT-006	Swamp		12+450	12+523	73	4,402	No	N/A	A2-4
WT-006	Swamp		13+022	13+043	21	4,402	No	N/A	A2-4
WT-007	Swamp		13+168	13+195	27	182	No	N/A	A2-4, A2-5
WT-008	Swamp		13+488	13+566	78	3,748	Yes	Ice/snow crossings or use timber mats, driving mats, or log corduroys	A2-4, A2-5
WT-009	Swamp		14+083	14+290	206	6,144	No	N/A	A2-5
WT-009	Swamp		14+397	14+651	254	6,144	No	N/A	A2-5
WT-010	Swamp		16+858	16+913	55	2,488	Yes	Ice/snow crossings or use timber mats, driving mats, or log corduroys	A2-10
WT-011	Swamp		25+726	25+819	93	2,382	No	N/A	A2-7
WT-012	Swamp		27+113	27+169	56	1,331	No	N/A	A2-7
WT-013	Fen		27+145	27+187	42	536	No	N/A	A2-7
WT-014	Swamp		35+325	35+429	104	4,863	No	N/A	A2-9
WT-015	Fen		40+782	40+829	47	3,342	Yes	Ice/snow crossings or use timber mats, driving mats, or log corduroys	A2-10
WT-016	Swamp		41+261	41+288	26	1,365	No	N/A	A2-10, A2-11
WT-017	Swamp		42+629	42+701	72	3,586	Yes	Ice/snow crossings or use timber mats, driving mats, or log corduroys	A2-11

Wetland ID	Wetland Class	Listed Status	Start Chainage	End Chainage	Length in ROW (m)	Area in ROW (m^2)	ROW Access Road Crossing?	Vehicle Crossing Type	Map Sheet
WT-018	Swamp		43+040	43+118	78	3,837	Yes	Ice/snow crossings or use timber mats, driving mats, or log corduroys	A2-11
WT-019	Swamp		43+590	43+651	61	3,050	Yes	Ice/snow crossings or use timber mats, driving mats, or log corduroys	A2-11
WT-020	Swamp		44+999	45+034	35	1,847	No	N/A	A2-11, A2-12
WT-021	Swamp		45+757	45+782	25	133	No	N/A	A2-12
WT-022	Marsh		47+151	47+187	36	342	No	N/A	A2-12
WT-023	Swamp		47+887	48+123	236	10,716	Yes	Ice/snow crossings or use timber mats, driving mats, or log corduroys	A2-12
WT-024	Swamp		48+955	49+019	64	3,209	Yes	Ice/snow crossings or use timber mats, driving mats, or log corduroys	A2-12
WT-025	Fen		49+245	49+265	20	299	No	N/A	A2-12
WT-026	Swamp		55+359	55+403	44	712	No	N/A	A2-14
WT-027	Fen		57+564	57+616	51	398	No	N/A	A2-14
WT-028	Fen	Blue	58+513	58+528	15	837	No	N/A	A2-14, A2-15
WT-029	Fen	Blue	58+476	58+513	37	1,853	No	N/A	A2-14
WT-030	Bog		58+933	59+008	75	3,809	Yes	Ice/snow crossings or use timber mats, driving mats, or log corduroys	A2-14, A2-15
WT-031	Fen	Blue	60+277	60+323	46	2,098	Yes	Ice/snow crossings or use timber mats, driving mats, or log corduroys	A2-15
WT-032	Shallow Open Water		60+881	60+929	48	1,034	Yes	Ice/snow crossings, clear span bridge or use timber mats, driving mats, or log corduroys	A2-15
WT-033	Fen		60+952	60+995	43	2,008	Yes	Ice/snow crossings or use timber mats, driving mats, or log corduroys	A2-15

Wetland ID	Wetland Class	Listed Status	Start Chainage	End Chainage	Length in ROW (m)	Area in ROW (m^2)	ROW Access Road Crossing?	Vehicle Crossing Type	Map Sheet
WT-034	Fen		61+046	61+144	98	985	No	N/A	A2-15
WT-035	Fen		61+338	61+361	23	134	No	N/A	A2-15
WT-036	Swamp		61+740	61+793	53	1,976	No	N/A	A2-15
WT-037	Swamp		62+587	62+645	58	2,129	Yes	Ice/snow crossings or use timber mats, driving mats, or log corduroys	A2-15
WT-039	Swamp		66+203	66+369	166	4,211	No	N/A	A2-16
WT-040	Swamp		66+506	66+578	72	364	No	N/A	A2-16
WT-041	Bog	Blue	66+584	66+765	181	6,356	No	N/A	A2-16
WT-042	Swamp		66+537	66+634	98	2,231	No	N/A	A2-16
WT-043	Swamp		67+204	67+246	42	287	No	N/A	A2-16
WT-044	Swamp		67+160	67+204	43	412	No	N/A	A2-16
WT-045	Fen		77+373	77+689	316	11,044	Yes	Ice/snow crossings or use timber mats, driving mats, or log corduroys	A2-18
WT-046	Swamp		77+780	77+854	73	1,679	Yes	Ice/snow crossings or use timber mats, driving mats, or log corduroys	A2-18
WT-047	Bog		78+972	79+044	72	3,431	Yes	Ice/snow crossings or use timber mats, driving mats, or log corduroys	A2-18, A2-19
WT-048	Swamp		79+044	79+094	50	2,571	Yes	Ice/snow crossings or use timber mats, driving mats, or log corduroys	A2-18, A2-19
WT-049	Bog	Blue	79+214	79+409	195	12,274	No	N/A	A2-19
WT-049	Bog	Blue	79+498	79+546	48	12,274	No	N/A	A2-19
WT-050	Fen	Blue	79+409	79+498	88	4,204	No	N/A	A2-19
WT-051	Shallow Open Water		79+546	79+667	121	4,280	No	N/A	A2-19

Wetland ID	Wetland Class	Listed Status	Start Chainage	End Chainage	Length in ROW (m)	Area in ROW (m^2)	ROW Access Road Crossing?	Vehicle Crossing Type	Map Sheet
WT-051	Shallow Open Water		79+702	79+734	31	4,280	No	N/A	A2-19
WT-052	Swamp		79+667	79+702	35	857	No	N/A	A2-19
WT-053	Swamp		80+579	80+725	146	7,508	No	N/A	A2-19
WT-054	Swamp		82+859	82+887	28	1,494	No	N/A	A2-19
WT-055	Swamp		87+081	87+148	67	3,349	No	N/A	A2-20
WT-056	Fen		88+421	88+538	116	5,646	No	N/A	A2-21
WT-057	Swamp		89+497	89+545	49	1,326	No	N/A	A2-21
WT-058	Swamp		91+821	91+859	38	2,132	No	N/A	A2-21
WT-059	Swamp		92+883	92+919	36	1,848	No	N/A	A2-21, A2-22
WT-061	Bog		94+575	94+647	72	1,882	No	N/A	A2-22
WT-062	Fen		105+263	105+317	54	2,001	No	N/A	A2-24
WT-063	Swamp		105+604	105+650	46	2,310	No	N/A	A2-24
WT-065	Fen		106+770	106+828	59	1,793	No	N/A	A2-25
WT-066	Swamp		110+355	110+413	58	1,429	No	N/A	A2-25
WT-067	Swamp		114+525	114+659	133	3,252	No	N/A	A2-26, A2-27
WT-068	Swamp		114+945	115+122	177	7,005	Yes	Ice/snow crossings or use timber mats, driving mats, or log corduroys	A2-27
WT-069	Swamp		115+169	115+245	76	3,811	Yes	Ice/snow crossings or use timber mats, driving mats, or log corduroys	A2-27
WT-070	Swamp		115+296	115+351	55	493	No	N/A	A2-27
WT-071	Fen	Blue	115+122	115+169	47	5,761	Yes	Ice/snow crossings or use timber mats, driving mats, or log corduroys	A2-27

Wetland ID	Wetland Class	Listed Status	Start Chainage	End Chainage	Length in ROW (m)	Area in ROW (m^2)	ROW Access Road Crossing?	Vehicle Crossing Type	Map Sheet
WT-071	Fen	Blue	115+245	115+325	80	5,761	Yes	Ice/snow crossings or use timber mats, driving mats, or log corduroys	A2-27
WT-072	Swamp		115+325	115+585	260	9,402	Yes	Ice/snow crossings or use timber mats, driving mats, or log corduroys	A2-27
WT-074	Swamp		115+442	115+965	522	18,038	Yes	Ice/snow crossings or use timber mats, driving mats, or log corduroys	A2-27
WT-075	Swamp		115+685	115+780	95	4,346	Yes	Ice/snow crossings or use timber mats, driving mats, or log corduroys	A2-27
WT-076	Swamp		120+687	120+728	41	1,921	No	N/A	A2-28
WT-077	Bog		125+183	125+223	40	448	No	N/A	A2-29
WT-078	Swamp		125+372	125+637	265	9,376	Yes	Ice/snow crossings or use timber mats, driving mats, or log corduroys	A2-29
WT-079	Swamp		126+056	126+119	63	446	No	N/A	A2-29

9. MITIGATION AND MANAGEMENT MEASURES

This section summarizes the measures to mitigate potential Project effects on wetlands. BW Gold has followed the environmental mitigation hierarchy of avoidance, minimization, restoration and offsetting to identify mitigation measures (BC MOE 2014a, 2014b). In consideration of the gaps in site-specific wetland baseline and the mitigation hierarchy, BW Gold will not conduct any activities within 30 m of a wetland delineated by a qualified professional. Where wetlands have not been delineated by a qualified professional, BW Gold will not conduct any activities within 30 m of any TEM polygon mapped as having the potential to contain a wetland. The polygon areas containing wetlands and the early works areas targeted for clearing activities are presented in Figure 9-1. No wetlands will be affected until additional baseline studies in the mine site and the offsetting site are complete and the baseline data is reported out on to all required groups. As discussed in Section 7.3, pre-construction surveys will be conducted to flag TEM polygons mapped as having the potential to contain a wetland so as to avoid potential loss of wetlands before baseline surveys are complete.

Once baseline studies are complete and this plan is revised BW Gold will continue following the mitigation hierarchy to avoid the loss as per DS Condition 5.1. Measures to mitigate wetland impacts have taken into account British Columbia's *Wetland Ways: Interim Guidelines for Wetland Protection and Conservation in British Columbia* (Cox and Cullington 2009), and *Riparian Management Area Guidebook* (MOF 1995).

Table 9-1 summarizes the wetland mitigation and management measures that apply to all Project components, and references specific measures identified in EAC Condition 24 (referenced as 'P'), DS Condition 5.2 (referenced as 'DS') and BW Gold's Mitigations Table (EAC Condition 43; MT; November 20, 2020). The Mitigations Table includes all mitigation measures identified during the EA review. To avoid impacts on wetlands and other valued components, BW Gold sited Project infrastructure outside of the Blackwater River watershed to avoid important heritage and natural resources, including extensive wetland complexes. While this table has been included in this WMOP in order to accurately reflect the full suite of mitigation measures considered during the environmental assessment, BW Gold notes that the more stringent overarching avoidance measure of not conducting any activities within 30 m of any TEM polygon mapped as having the potential to containing a wetland would be adhered to throughout early works construction until the additional baseline data is collected and reported out on to all required groups. An updated WMOP will follow shortly after the reporting of baseline information is collected and the updated WMOP will be re-submitted to all required groups and the EAO for approval.

Table 9-2 summarizes the wetland mitigation and management measures that apply to the TL, and also references specific measures identified in EAC Condition 24 (referenced as 'P'), DS Condition 5.2 (referenced as 'DS') and BW Gold's Mitigations Table (EAC Condition 43; MT; November 20, 2020). Wetland impacts along the TL will be avoided or minimized by clear spanning wetland boundaries where feasible and siting TL towers and access roads in upland areas. Note that no construction activities will be occurring along the TL until permitted and a new WMOP has been approved by the EAO.

9.1 Wetland Buffer Zones

DS Condition 5.2, states that BW Gold will maintain a 30 m buffer of undisturbed vegetation around wetlands located within the mine site, excluding activities required to construct Project components, except during early works. However, under this plan during the early works period no TEM mapped polygon containing wetlands will be affected. Once this plan is updated BW Gold will follow DS Condition 5.2 where wetlands will be buffered by 30 m to the extent necessary for safety reasons to control invasive plants, or install and maintain erosion and sediment run-off control measures. An environmental monitor will observe work being done within the buffer, except when it is not possible for safety reasons.

Table 9-1: Mitigation Measures Applicable to All Project Components

Mitigation Table ID	Mitigation Measure	Reference Document	Mitigation Hierarchy	Project Phase
(MT 3-1)	Maintain or enhance existing drainage connections when designing and installing culverts for cross drainage, and avoid creating outlets that either drain wetlands or constrict the natural outlet during construction.		Minimize	Construction, Operations, and Closure
(MT 3-4)	Maintain drainage pathways and wetland hydrology by installing appropriately sized culverts for stream and wetland crossings.		Minimize	Construction, Operations, and Closure
(MT 3-3)	Establish protected riparian areas prior to clearing at locations.		Minimize	Construction, Operations, and Closure
(MT 3-3)	Locate fuel storage and refueling activities outside riparian areas.		Avoid	Construction, Operations, and Closure
(MT 3-12)	Place soil salvage stockpiles in locations where they will have no impact on natural drainages. Ensure that all water and tailings pipelines that interact with or intersect wetlands are raised enough to prevents hydrologic impacts to western toad dispersal.		Minimize	Early works, Construction, and Operations
(MT 3-13)	Direct surface runoff from plant site grading, open pit development, TSF construction and waste rock storage area development to the TSF basin or other designed sediment control structures.		Minimize	Construction, Operations, and Closure
(MT 3-14)	Control metal leaching by separating contact and non-contact surface water through diversion dams and collection trenches.		Minimize	Construction, Operations, and Closure
(MT 3-16)	Construct the Northern and Southern diversions to supplement the Freshwater Supply System (FWSS) to mitigate changes in flows in Davidson Creek and Chedakuz Creek, downstream of Tatelkuz Lake, and provide flexibility in apportionment of flow to Davidson Creek during Operations, and Closure.		Minimize	Construction, Operations, and Closure
(MT 3-17)	Locate project components, including roads and TL poles away from wetlands and riparian areas and alongside existing disturbed areas and existing infrastructure footprints.		Avoid	Construction
(MT 3-18)	Minimize the mine site footprint and avoid large scale clearing of old-growth forest, riparian stands and lichen-rich stands.		Avoid	Construction
(MT 3-19)	Pump water from Tatelkuz Lake to meet Davidson Creek instream flow needs until the end of Closure.		Minimize	Construction, Operations, and Closure

Mitigation Table ID	Mitigation Measure	Reference Document	Mitigation Hierarchy	Project Phase
(MT 3-21)	Use existing roads and follow existing linear disturbances to support TL construction. The final routing and required access roads will be established as part of the Final Transmission Line Routing Plan.		Avoid	Construction
(MT 3-22)	Place towers/poles away from the banks of rivers.		Avoid	Construction
(MT 3-29)	Locate project components away from wetlands and riparian areas.		Avoid	Construction
(MT 3-2)	Minimize pesticide and fertilizer use around aquatic resources and before precipitation events to limit chemical runoff from entering wetlands.		Minimize	Construction, Operations, and Closure
(MT 3-5)	Avoid clearing in wetland buffer areas.		Avoid	Construction
(MT 3-6, MT 3-27)	Replant native vegetation to expedite succession.		Minimize	Construction, Operations, and Closure
(MT 3-7)	Use low ground pressure equipment or tracked equipment for work in areas with saturated soils.		Minimize	Construction, Operations, and Closure
(MT 3-8, MT 3-9)	Use timber mats, driving mats, or log corduroys or other means of ground protection where needed to minimize disturbances to vegetation and reduce rutting		Minimize	Construction, Operations, and Closure
(MT 3-15; DS 5.2)	Establish 30 metre of undisturbed vegetation buffer zone around wetlands located outside the Project footprint.		Minimize	Construction, Operations, and Closure
(MT 3-20)	Progressive reclamation using local native vegetation, or appropriate commercially grown, weed-free native species.		Minimize	Construction, Operations, and Closure
(MT 3-24)	Flag or otherwise identify clearing limits as appropriate.		Avoid	Construction, Operations, and Closure
(MT 3-28) (MT 3-28)	Implement progressive wetland restoration during construction consistent with the concept of no-net-loss of wetlands.		Restore	Construction, Operations, and Closure
(MT 3-10)	Minimize unnecessary soil disturbance where possible.	Cox and Cullington 2009[1]	Minimize	Construction, Operations, and Closure
(MT 3-10)	Revegetate disturbed areas as soon as feasible with native plants where possible.	Cox and Cullington 2009[1]	Restore	Construction, Operations, and Closure
(MT 3-10)	Ensure reclamation seed mixes are appropriate for the climate and site conditions and use seed mixes that are virtually weed-free.	Cox and Cullington 2009[1]	Restore	Construction, Operations, and Closure

Mitigation Table ID	Mitigation Measure	Reference Document	Mitigation Hierarchy	Project Phase
(MT 3-10)	Minimize introduction and transport of invasive plants by ensuring earth moving equipment arrives in work areas clean.	Cox and Cullington 2009[1]	Minimize	Construction, Operations, and Closure
(MT 3-10)	Plant vegetation to minimize further impacts to wetland soils and remaining vegetation.	Cox and Cullington 2009[1]	Restore	Construction, Operations, and Closure
(MT 3-10)	Minimize the width of roads and trails consistent with maintaining safety and road design considerations.	Cox and Cullington 2009[1]	Avoid	Construction, Operations, and Closure
(MT 3-10)	Design approaches to wetlands so that the surface runoff carrying potential sediment is diverted before entering the wetland.	Cox and Cullington 2009[1]	Avoid	Construction, Operations, and Closure
(MT 3-10)	Manage unauthorized use of roads during and after construction and operations to minimize impacts to wetlands.	Cox and Cullington 2009[1]	Minimize	Construction, Operations, and Closure
(MT 3-10)	Maintain road running surfaces, ditches and cross drains to minimize erosion and sediment delivery.	Cox and Cullington 2009[1]	Minimize	Construction, Operations, and Closure
(MT 3-10)	Temporary and permanent road construction will follow guidance outlined for the appropriate soil conditions.	Welsh et al. 1995[2]	Minimize	Construction, Operations, and Closure
(MT 3-10)	Clearing practices will follow guidance outlined for the use and placement of skid trails and landings, and felling practices.	Welsh et al. 1995[2]	Minimize	Construction, Operations, and Closure
(MT 3-10)	Forest harvest practices employed during clearing will follow the general guidance outlined for felling, wind throw hazard management, and wildlife tree management.	MOF 1995[3]	Minimize	Construction, Operations, and Closure
(MT 3-9)	Activities and works in and around wetlands will be designed and planned to minimize loss or disturbance of wetlands.	DFO 2013[4]	Minimize	Construction, Operations, and Closure
(MT 3-9)	Approaches to wetlands will be designed and constructed such that they are perpendicular to the margin of the wetland to minimize loss or disturbance of wetland vegetation.	DFO 2013[4]	Minimize	Construction, Operations, and Closure
(MT 3-9)	Activities occurring near wetlands will be planned to ensure deleterious substances (e.g., sediment, solvent, fuel, etc.) do not enter the wetland.	DFO 2013[4]	Minimize	Construction, Operations, and Closure
(MT 3-9)	A response plan that is to be implemented immediately in the event of a sediment release or spill of a deleterious substance will be developed.	DFO 2013[4]	Minimize	Construction, Operations, and Closure
(MT 3-9)	Clearing of wetland vegetation will be minimized to the extent practical. Pruning or topping of vegetation will be utilized instead of grubbing.	DFO 2013[4]	Minimize	Construction, Operations, and Closure

Mitigation Table ID	Mitigation Measure	Reference Document	Mitigation Hierarchy	Project Phase
(MT 3-9)	Revegetation with native species suitable for the site will be used to stabilize wetland margins disturbed by activity associated with the Project.	DFO 2013[4]	Restore	Construction, Operations, and Closure
(MT 3-9)	Machinery used on site will be clean and maintained free of fluid leaks, invasive species and noxious weeds.	DFO 2013[4]	Minimize	Construction, Operations, and Closure
(MT 3-9)	Machinery will be operated on land above the high water mark of wetlands in a manner that minimizes disturbance to the wetland.	DFO 2013[4]	Minimize	Construction, Operations, and Closure
(MT 3-9)	Machinery will be washed, refueled and serviced in such a way as to prevent any deleterious substances from entering the wetland.	DFO 2013[4]	Minimize	Construction, Operations, and Closure

Notes:

[1] Wetland Ways: Interim Guidelines for Wetland Protection and Conservation in British Columbia (Cox and Cullington 2009)

[2] Forested Wetlands – Functions, Benefits and the Use of Best Management Practices (Welsh et al. 1995)

[3] Riparian Area Management Guidebook (MOF 1995)

[4] Guidance on Measures to Avoid Causing Harm to Fish and Fish Habitat (DFO 2013)

Table 9-2: Mitigation Measures and Best Management Practices Applicable to the Transmission Line

Mitigation Table ID	Mitigation Measure	Reference Document	Mitigation Hierarchy	Project Phase
(MT 3-9)	Riparian Vegetation Management Areas (RVMAs) will be specified.	BC Hydro et al. 2003[1]	Minimize	Construction, Operations, and Closure
(MT 3-9)	The hierarchy of vegetation management techniques will be implemented, which prioritizes pruning over topping or mowing of vegetation within RVMAs.	BC Hydro et al. 2003[1]	Minimize	Construction, Operations, and Closure
(MT 3-9)	Site-specific prescriptions will be developed, if required.	BC Hydro et al. 2003[1]	Minimize	Construction, Operations, and Closure
(MT 3-9)	Herbicides will be applied in accordance with Use Permit.	BC Hydro et al. 2003[1]	Minimize	Construction, Operations, and Closure
(MT 3-9)	Tracks or tires from heavy equipment may not enter the RVMA unless detailed in a prescription.	BC Hydro et al. 2003[1]	Minimize	Construction, Operations, and Closure
(MT 3-9)	Streams will not be crossed by vehicles and/or heavy machinery (unless at an existing road or ford crossing) is permitted unless detailed as a special provision in a site-specific prescription.	BC Hydro et al. 2003[1]	Minimize	Construction, Operations, and Closure
(MT 3-9)	Debris will not be removed from below the high-water mark without specific regulatory agency approval.	BC Hydro et al. 2003[1]	Minimize	Construction, Operations, and Closure
(MT 3-9)	Banks will not be disturbed without specific regulatory agency approval.	BC Hydro et al. 2003[1]	Minimize	Construction, Operations, and Closure
(MT 3-9)	No refueling of hand tools (chainsaws, etc.) within at least 15 m of a waterbody.	BC Hydro et al. 2003[1]	Minimize	Construction, Operations, and Closure
(MT 3-9)	Disturbance of low-growing shrub or grass species will be kept to a minimum.	BC Hydro et al. 2003[1]	Minimize	Construction, Operations, and Closure
(MT 3-9)	Trees will be directionally felled away from stream banks and aquatic areas to the extent allowed by the need to maintain safe working clearances from the electrical system.	BC Hydro et al. 2003[1]	Minimize	Construction, Operations, and Closure
(MT 3-9)	Site restoration will be completed during optimal seasonal timing (e.g., planting is best done in the spring and fall).	BC Hydro et al. 2003[1]	Minimize	Construction, Operations, and Closure
(MT 3-9)	Vegetation clearing contractors will only work within 15 m of a waterbody for which a generic or site-specific prescription is provided.	BC Hydro et al. 2003[1]	Minimize	Construction, Operations, and Closure

[1] Approved Work Practices for Managing Riparian Vegetation. A Guide to Incorporating Riparian Environmental Concerns into the Management of Vegetation in BC Hydro's Transmission and Distribution Corridors (BC Hydro et al. 2003)

10. WETLAND OFFSETTING PLAN

This section describes the wetland offsetting plan, required by DS Condition 5.3 and EAC Condition 24 d), f), g) and h). However, for the early works construction period no wetlands will be lost so no wetland offsetting will be required. Baseline studies in the mine site and the offsetting site(s) are required to refine offsetting objectives, approaches, and accounting. The details presented below are conceptual and will be updated once baseline studies have been completed. This section will be updated prior to impacting any wetland areas, and submitted to the EAO for approval.

Pursuant to Condition 5.3, the development of the plan has taken into account Canada's Federal Policy on Wetland Conservation, Environment and Climate Change Canada's Operational Framework for Use of Conservation Allowances and habitat needs for migratory birds, moose (*Alces alces*) and listed species at risk. When identifying mitigation measures, BW Gold has selected wetland restoration over wetland enhancement and wetland enhancement over wetland creation.

The Federal Policy on Wetland Conservation (Environment Canada 1991) requires wetland impacts be offset to meet the objective of no-net-loss to wetland function where a project:

- Requires a federal authorization;
- Receives federal funds;
- Is on federal lands;
- Is in an area of "significant wetland loss"; or
- Is in an area of "wetlands designated as ecologically important to a region."

The federal government guidance on the application of the Federal Policy (ECCC 2017) defines wetlands designated as ecologically important to a region as:

1. Areas of continental or regional significance to waterfowl within the joint venture planning boundaries of BC;
2. Estuaries and eelgrass beds; or
3. Red- or blue-listed wetlands.

The Project is located within an ecologically important region, triggered by definitions 1 and 3 above. As such, the Project is subject to no-net-loss of all wetland function.

This section describes:

- Current wetland balance by Project component and general arrangement sequence;
- Plans for on-site wetland creation;
- Plans for off-site compensatory wetlands;
- Opportunities for wetland offset partnerships, if necessary; and
- Implementation schedule for the offset plan.

The plan as presented does not meet the requirements for offsetting because there are a number of uncertainties with respect to the amount of wetland ecosystems that will be affected by the project. To that end the offsetting activities focus on wetland restoration in Mathews Creek Ranch to secure offsetting necessary for the first three years of development. It is anticipated that BW Gold will work closely with Indigenous Groups to identify, fund, and implement additional wetland restoration activities in order to achieve no-net-loss of wetland function for the Project.

10.1 Indigenous Engagement

BW Gold has engaged with Indigenous groups on wetland mitigation measures and wetland offset as follows:

- A Conceptual Wetland Compensation Plan was included in the Application/EIS (Appendix 5.3.7A in Volume 16 of the Appendices). The conceptual plan identified offset opportunities in both the Mathews Creek Wetland Complex and freshwater reservoir, which have been further developed in the WMOP. Wetland restoration in the freshwater reservoir has been removed as a component of the offsetting plan in response to comments received on the draft offsetting plan.
- BW Gold met with UFN/LDN and FLNRORD (Lori Borth) on September 9, 2021 regarding land securement for Mathews Creek.
- BW Gold presented the Mathews Creek Fisheries Offsetting Plan to UFN/LDN on September 23, 2021 and feedback on the riparian area planting prescription was requested.
- BW Gold has provided the draft WMOP to Indigenous groups for review and comment prior to submission of the draft plan in accordance with EAC and DS conditions.
- BW Gold met with LDN/UFN on November 9, 2021, November 19, 2021, and November 29, 2021 to discuss the comments received and have considered all comments in finalizing the draft plan.
- BW Gold presented on the WMOP during the December 2 EMC meeting, there was participation from Aboriginal groups and provincial regulators.
- BW Gold met with LDN/UFN and FLNRORD on December 18, 2021 as a follow-up to technical discussions on the WMOP from the EMC meeting.
- BW Gold met with LDN/UFN, Palmer and Ecologic on February 8, 2022 to review draft baseline workplan that Ecologic had prepared to collect additional data from the proposed Mathews Creek wetland offsetting site.
- LDN/UFN provided written comments on the draft workplan for the Mathews Creek offsetting site on February 14, 2022 and BW Gold responded to those comments on February 24, 2022 along with an updated workplan (V3).
- BW Gold met with LDN/UFN on February 15, 16, and 25, 2022 to develop a workplan RFP to complete project footprint baseline studies to update current datasets.
- As described in Sections 7.1.3 and 7.3, BW Gold has had several discussions with the UFN and LDN described above to develop scopes of work for additional mapping and field studies of wetlands in the mine site during 2022. These surveys and the workshops described in the workplans will be conducted in collaboration with UFN and LDN participants in the field.
- BW Gold will consider all comments and will continue to work collaboratively with the UFN and LDN to incorporate additional field studies and mapping and produce an updated plan in Q4 2022.

BW Gold will continue to engage with Indigenous groups on the implementation of the WMOP by reviewing monitoring results with the EMC. BW Gold is committed to involving Indigenous assistants during wetland restoration work at Mathews Creek Ranch as well as identifying additional offsetting sites required to achieve no-net-loss.

10.2 Mathews Creek Ranch

Wetland offsetting at the Mathews Creek Ranch (Figure 10.2-1) will focus efforts on restoration. A large natural wetland complex exists at Mathews Creek Ranch; however, it has been significantly degraded

through years of agricultural use. BW bought the ranch in 2013 and livestock has been kept off the land since that time. While it is anticipated that removal of livestock has reduced the agricultural pressure, there are a number of specific and targeted activities that BW Gold must complete in order to restore the wetland. This restoration plan will be developed and the initial phases will be executed with LDN and UFN beginning in 2022. Restoration efforts will also follow a multidisciplinary approach that will integrate the fish habit offsetting and wetland mitigation measures at the Mathews Creek Ranch. Mitigation measures and studies required to advance restoration of the Mathews Creek Ranch are described in Table 10.2-1.

The Mathews Creek Ranch wetland complex was selected as a compensation site because there has been intensive agriculture and livestock grazing in the area for the last 50 years. Wetland disturbance along the middle reaches of Mathews Creek, due to cattle ranching and drainage ditch excavation, have resulted in lowered water tables, altered wetland vegetation, soil rutting, and erosion of riparian areas (Application/EIS 5.3.7A – Wetland Compensation Plan).

To support restoration planning The Mathews Creek Ranch wetland complex has been organized into three zones (Figure 10.2-2). Within each of these zones, specific objectives for wetland restoration were identified. The predicted totals of wetland restoration for each wetland class were also identified to connect wetland restoration to wetland loss. Connecting the type of wetland restoration to the type of wetland loss will help achieve no-net-loss to wetland function.

The three zones are:

- Zone A – Mathews Creek Riparian Area and Fish Offsetting Ponds;
- Zone B – Hay Fields and Pasture Land; and
- Zone C – Wetland Drainage Area.

10.2.1 Zone A – Mathews Creek Riparian Area and Fish Offsetting Ponds

Baseline condition of the riparian area from a wetland extent and function perspective are not well understood nor is the difference between the pre- and post- cattle removal periods for this site. However, removing livestock from this area likely has had some benefit in terms of nutrient load reductions, improvements to water quality, and improvements to bank stability.

Within the immediate area of Mathews Creek four fish offsetting ponds are planned as an offsetting measure for the loss of fish habitat as a result of the project. Wetland restoration and fish habitat creation are mutually beneficial when considering the ecological synergies of complex ecosystems. However, in terms of wetland area the specific areas of the planned fish offsetting ponds have been removed from the wetland offsetting calculations so as to limit double counting of offsetting.

The specific wetland restoration objectives and associated actions for this area include:

Objective #1: *Restore water quality functions in wetlands altered by human activities*

- **Actions:** Remove livestock from floodplain wetlands to eliminate nutrient loading from animal waste, reduce erosion and sedimentation in Mathews Creek and associated wetlands, and improve the thermal regulation function of wetlands.

Objective #2: *Restore riparian vegetation*

- **Actions:** Evaluate current riparian vegetation community and develop and implement a planting strategy to expedite natural succession and achieve a functioning riparian ecosystem. This will include an evaluation of invasive and non-native plants that may require removal prior to or during planting of the riparian community.

Table 10.2-1: Mathews Creek Ranch Wetland Restoration Activities

Restoration Zone	Hydrological	Biochemical	Ecological	Habitat
Zone A (Mathews Creek and Fish Offsetting Ponds)	Restore riparian vegetation to reduce erosion potential. Through the fish habitat offsetting plan support development of open water ponds which will help store water reducing runoff potential.	Restore biochemical functions in wetlands altered by human activities by removing livestock to eliminate nutrient loading. Support development of functioning riparian vegetation to provide thermal regulation to creek.	Improve fish habitat, water quality, and thermal regulation in Mathews Creek to support brassy minnow (blue-listed fish found in the Mathews Creek area). Enhance diversity of ecosystem types by supporting development of woody riparian vegetation (swamp species), open water ponds with littoral marsh/fen emergent grass like environments, and shallow open waters.	Increase shallow-water and marsh habitat along Mathews Creek for migratory birds (incl. waterfowl) and moose. Creation of shallow open water and fish over wintering ponds will improve habitat available for migratory birds, fish, and wildlife.
Zone B (Hay Fields and Pasture)	Reduction of soil compaction will increase soil moisture storing more water on the landscape during precipitation events and after snow melt. Areas may need to be prepared "rough and loose" if compaction remains an issue.	Restore biochemical condition in wetlands altered by human activities by removing livestock to eliminate nutrient loading and soil compaction.	Develop an invasive plant management and re-vegetation plan. This plan will identify and describe invasive species and management practices to remove those invasive species and replace with native wetland plants.	Restore forested wetland habitat to support wildlife use. Planning appropriate tree species to create a mosaic of habitat that will support multiple species.
Zone C (Wetland Drainage)	Restore hydrologic processes in wetlands altered by human activities. Fill historical drainage ditches that artificially lower the water table of associated wetlands. Linear ditches will be backfilled with on-site soil that was removed to create the ditches and re-seeded. Restoration of wetland hydrology will improve flow moderation in Mathews Creek, reduce erosion, and enable the re-establishment of native wetland vegetation.	Support nutrient cycling by water retention allowing wetland process time to improve water quality.	Increase the sinuosity of artificial drainages impounding more water on the landscape providing additional aquatic habitat.	Supporting variety of aquatic habitat types to support use by wildlife species.

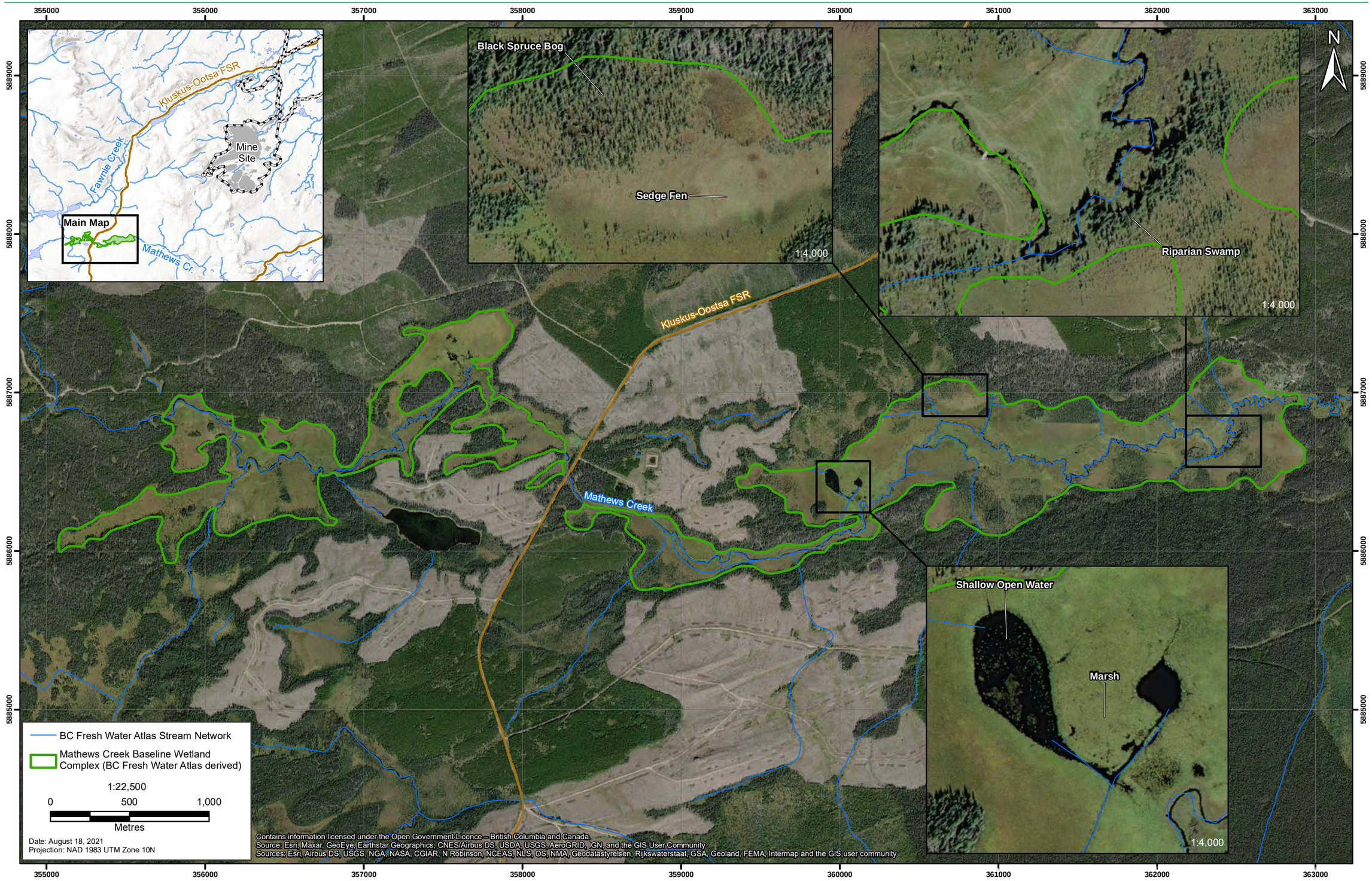

Figure 10.2-1: Mathews Creek Wetland Complex

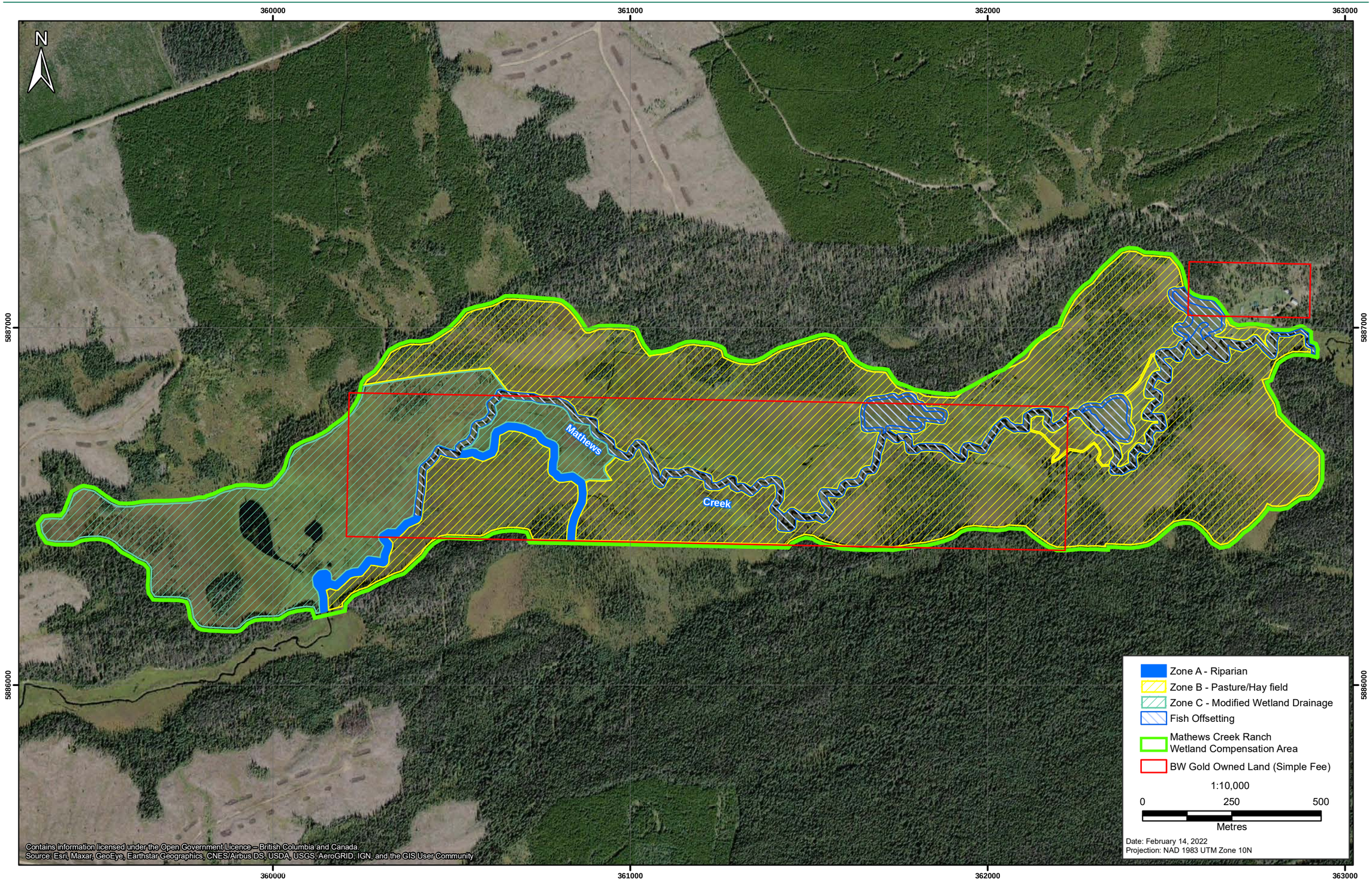

Figure 10.2-2: Mathews Creek Ranch Wetland Restoration Areas

Objective #3: *Improve fish habitat, water quality, and thermal regulation in Mathews Creek to support fulfillment of federal DS Condition 5.3 (brassy minnow is blue-listed and has been found in the Mathews Creek area)*

- **Actions:** Implement fish habitat creation, and wetland restoration and enhancement activities described in the Fish Habitat Offsetting Plan (Palmer 2021) for Mathews Creek, including riparian plantings, bank stabilization, increased sinuosity of tributaries, and large woody debris structures.

Objective #4: *Increase shallow-water and marsh habitat along Mathews Creek for migratory birds (incl. waterfowl) and moose*

- **Actions:** Create open water and marsh habitats in restored wetlands to provide habitat for migratory birds and moose. Install off-channel fish habitat in the Mathews Creek floodplain as described in the Fish Habitat Offsetting Plan (Palmer 2021).

10.2.2 Zone B – Hay Fields and Pasture Land

Similar to Zone A the baseline and current conditions of the hay fields and pasture land are not well understood. However, it is expected that much of this area would have been some combination of marsh or fen emergent grass like wetlands. Removal, of the livestock has likely improved soil compaction and potentially species composition, however, the amount of improvement is not well understood. To support restoration in these areas the following specific wetland restoration objectives and associated actions were identified:

Objective #1: *Restore biochemical condition in wetlands altered by human activities*

- **Actions:** Remove livestock from hay fields and pasture lands to reduce soil compaction and browse pressures.

Objective #2: *Restore forested wetland habitat to support wildlife use to support fulfillment of federal DS Condition 5.3 and EAC Condition 24 (f)*

- **Actions:** Eliminate agricultural production, and plant appropriate native trees, shrubs, herbs and graminoids along the riparian corridor and in patches to create a mosaic of habitat types in the restored wetlands. This is aimed at restoring a diversity of native plant communities in the wetlands to foster wildlife use by mammals such as migratory birds and moose, grizzly bear, amphibians, and invertebrates that utilize this resource.

Objective #3: *Invasive plant management*

- **Actions:** Develop an invasive plant management and re-vegetation plan. This plan will identify and describe invasive species and management practices to remove those invasive species and replace with native wetland plants.

10.2.3 Zone C – Wetland Drainage Area

As with Zones A and B the baseline and pre-development conditions are not well understood. However, a review of aerial imagery shows a number of aquatic features in the western extent of the Matches Creek Ranch wetland complex that are clearly man made. These features have likely contributed to a dewatering of the surrounding wetland and while the extent of this is not well understood this practice is well documented impact to wetlands from agriculture. To support restoration in these areas the following specific wetland restoration objectives and associated actions were identified:

Objective #1: *Restore hydrologic processes in wetlands altered by human activities*

- **Actions:** Fill historical drainage ditches that artificially lower the water table of associated wetlands. Linear ditches will be backfilled with on-site soil that was removed to create the ditches and re-seeded. Restoration of wetland hydrology will improve flow moderation in Mathews Creek, reduce erosion, and enable the re-establishment of native wetland vegetation.

Objective #2: *Evaluate wetland drainage*

- **Actions:** Conduct a review of the wetland drainage and riparian conditions to identify opportunities for enhanced surface water features and a slowed drainage patter to drive soil moisture and aquatic habitat.

10.2.4 Land Tenure and Long-term Preservation

The Mathews Creek habitat compensation areas consist of areas both on land owned by BW Gold and on Crown land which is also a range tenure area. BW Gold will protect the compensation works from ongoing cattle disturbances following the creation of the compensation measures for the duration of time that the Tailings Storage Facility is in use.

For the portions of the compensation areas on private land, BW Gold will not have cattle on the property.

For the portions of the compensation areas on Crown land, BW Gold has been working with MFLNRORD on protective measures that could be implemented.

BW Gold has been informed by MFLNRORD that in order to obtain a new range tenure, a potential tenure holder would need to own or lease associated lands within 10 km of the range tenure. All nearby cattle operations currently have their own range tenures. MFLNRORD has confirmed that at this time, there is no possibility of a potential range tenure in the area of the compensation works.

As a further backstop, MFLNRORD has committed to placing a Notice of Interest (NOI) over the Crown land area containing the Mathews Creek compensation measures. The NOI will indicate a land tenure conflict when future land status reports are accessed for the area and would identify the compensation area as an area that is undergoing watershed and riparian restoration. A note to file will also be added to indicate that it is not in the best interests of the area to have cattle on these tenures/incompatible use.

By way of BW Gold owning the private land in the area, and through continued collaboration with MFLNRORD, an added layer of protection has been given to the land to avoid future degradation from ranching and agricultural activity.

10.3 Schedule

Wetland offsetting began in 2013 with the removal of livestock and cessation of agricultural practices at the Mathews Creek Ranch. However, baseline data or monitoring data are not available to describe the state of wetlands that might have improved since that time. The schedule for 2022 will be to advance the restoration objectives and actions identified in Section 10.2 such that the WMOP can be updated in Q4 2022 with prescriptive plans for additional restoration activities at Mathews Creek that will be undertaken in 2023.

Wetland restoration activities at Mathews Creek Ranch are intended to offset approximately 178 ha of wetland. However, not all of this offset will be realized in year -2. Restoration activities require additional planning and time for execution so activities planned for Zone A – Mathews Creek Riparian Area will not be realized until year -1 and activities planned for Zone C – Wetland Drainage Area will not be realized until year 1.

10.4 Wetland Accounting

The Project will progressively affect wetlands spatially and temporally. Wetlands will not be affected in the early works construction period. During the summer of 2022 baseline studies will be conducted on the mine site and offsetting site. Once these studies are conducted a table of wetland accounting will be developed.

10.5 Additional Compensation Project Opportunities

BW Gold is committed to finding additional offsetting areas required to achieve no net loss of the Project. For 2022 BW Gold has developed a draft scope of work to work with the LDN and UFN as well as available and interested conservation groups like Ducks Unlimited Canada or the BC Wildlife Federation to identify candidate restoration sites. During the 2021 fall moose surveys, ERM also identified a number of potential wetland offsetting sites that will be verified during the baseline work in summer of 2022. These potential areas were mapped, and a trip report provided to LDN/UFN for review. The activities required in 2022 will include field based site selection and restoration prescriptions to restore wetlands within the region.

10.6 Offsetting Uncertainty

When developing a wetland offsetting plan the amount of impacted wetland needs to be known. Unfortunately, the baseline and assessment methodologies used have resulted in uncertainty with respect to the locations and types of wetlands in the mine site. This means that there is uncertainty associated with the amount of offsetting required for the project. The offsetting plan presented above provides a stepwise approach to accounting for loss and offset such that there is sufficient wetland area in the short term to offset Project effects but additional wetland area will be required beyond year +3 of operations.

There is also a limited dataset on the current state of the Mathews Creek Ranch wetland, increasing the uncertainty associated with restoration activities, success of the removal of agricultural pressures, and the trajectory of natural succession over the past 8 years.

An inventory of additional possible restoration sites in the Project area has not been undertaken. Additionally, wetland offsetting will require partnerships with Indigenous Groups and conservation organizations. Competing mandates and organization specific requirements may further limit availability of restoration sites.

11. MONITORING

A monitoring program will be implemented to assess the predicted effects of the Project on wetlands. This follow-up program will meet DS Condition 5.5. Monitoring will use select reference wetlands to represent natural conditions as benchmarks of functional values for comparison with wetlands affected by the Project. All wetland surveys, monitoring and associated data analysis and reporting will be conducted by or under the direction of a Qualified Professional.

Wetlands management is designed to prevent and minimize potential effects to wetland functions during all phases of the Project from baseline, through construction and operations, and after closure. It provides useful information to assess wetland functions and determine effective management strategies to ensure the long-term success.

This section outlines the wetlands implementation effectiveness and long-term monitoring plan for wetlands within the Blackwater Mine wetland offset site (Mathews Creek Wetland Complex) and mine area. This comprehensive plan includes the development of specific criteria to determine changes in wetland function and community establishment, and if unfavorable changes are detected, applicable strategies to refine and improve the outcomes will be implemented.

11.1 Objectives

The overall goal of the monitoring program is to measure any losses of wetlands on the mine site and transmission line and gains of wetlands at the offsetting site.

The objectives for the offsetting program in the Mathews Creek wetland complex are discussed in Section 10.

The objectives of the long-term monitoring plan for wetlands are:

1. Monitor the loss of wetland extent and function within the mine site.
2. Monitoring for changes in area and function at the following areas using a common set of methods to allow for comparison:
   - Measure the loss of area and/or function for any wetlands remaining on or immediately adjacent to the mine footprint.
   - Measure the loss of area and/or function of wetlands in the transmission line corridor.
   - Measure the natural changes in wetland area and function in a series of reference wetlands distant from the mine site – due to climate change, changes in forest cover, etc. Comparisons can then be drawn between natural processes occurring in these reference sites and measured changes in wetlands on the mine site, transmission line, and offsetting sites.
3. Monitor the effectiveness of wetland offsetting by measuring the gain in wetland extent or function using the same methods as in #2 above.

The program is organized to follow a Before-After Control-Impact (BACI) design, with the groups listed in Table 11.1-1.

Table 11.1-1: BACI Design for Wetland Monitoring Program

	Before	After
Control	Reference areas surveys 2022	Reference area surveys during construction, operations & closure.
Impact	Mine area surveys 2022 Transmission line surveys 2017, 2022	Mine area surveys during construction, operations. Transmission line surveys during construction, operations & closure.
Offset	Offset area surveys 2022	Offset area surveys during construction, operations & closure.

11.2 Pre-construction

There is a fair amount of uncertainty on the amount of wetland loss and offsetting as described in Section 10.1. As such, and pursuant to DS Condition 5.5.1, BW Gold is conducting pre-construction surveys within the CPD boundary (except the TL alignment and three re-routes) to supplement baseline data from the Environmental Assessment, confirm absence of red- or blue-listed wetlands, map wetland extent, and classify wetlands. These surveys have been initiated and will be completed in 2022.
The survey results will be provided to the IAAC, EAO, ECCC, FLNRORD and Indigenous groups.
The survey results will be used to refine the current wetland balance amount of wetland loss requiring compensation, provide a baseline for offsetting monitoring and assist in planning additional offsetting.

The scope of pre-construction surveys in 2022 is anticipated to include:

1. The potential wetland near the plant site will be delineated with flagging and GPS coordinates by a QP from ERM and Indigenous Monitors from LDN and UFN will be invited to participate. The plant site tree clearing activity has also been flagged for the project IEM who will be invited to observe tree clearing near the delineated potential wetland polygon (Appendix G).
2. Detailed mapping of wetlands from aerial photographs on the mine site at a scale of 1:5,000.
3. Field surveys of the mine site to classify mapped wetlands into wetland associations based on the vegetation communities at each site and identify any red or blue-listed wetlands on the mine site.
4. Field surveys of the mine site to assess wetland function and provide baseline conditions for future monitoring program (discussed below).
5. Detailed mapping and field surveys of the Mathews Creek offsetting site to identify the current conditions on site and provide baseline data for a future monitoring program.
6. Detailed mapping and field surveys of the reference sites to provide a baseline to measure natural change in the future.
7. Reconnaissance field surveys of other wetlands in the regional area to assess them as potential additional offsetting areas.

11.3 Monitoring Loss of Wetlands in the Project Boundary during All Phases

The extent, location, and type (class and association) of wetlands impacted by the development of the Project will be recorded in a GIS database using pre-construction polygons a base layer overlain by as-built survey results and reviewed by a QP. This database will be updated annually to record all actual wetland losses. The baseline surveys and assessment conclusions were conservative and overestimate the area of impacted wetlands so an accurate accounting of each affected wetland will help confirm EA predictions and determine the overall requirements for offsetting.

11.4 Monitoring of Loss and Gain in Wetlands

Wetland area and possibly function are expected to be reduced in the mine site and transmission line. This section describes the common monitoring tools that will be used to measure loss and gain of wetland area and function for the Project and offset areas. Methods will be common across areas to allow for accurate comparison between areas and through time. The areas to be monitored include:

- Wetlands remaining on or immediately adjacent to the mine footprint.
- Wetlands in the transmission line corridor.

- Wetlands in the reference area, which will measure natural change – due to climate change, changes in forest cover, etc. Comparisons can then be drawn between natural processes occurring in these reference sites and measured changes in wetlands on the mine site, transmission line, and offsetting sites.
- Wetlands in the Mathews Creek wetland complex and any additional offset areas.

Changes to wetland area and function will be evaluated for wetlands located within the mine site that remain after vegetation clearing by:

- Visual inspections at each wetland offset to monitor wetland ecosystems, including hydrological conditions and wetland extent (select wetlands). Visual inspections will include meandering transects through wetlands to identify accidental filling, pollutant discharge, or other stresses on wetland ecosystem functioning and vegetation cover.
- Photo-points to visually document each wetland over time (select wetlands).
- Vegetation monitoring (incl. invasive plants) to document plant cover, plant species, and survival to ensure the offset sites are on a successional trajectory towards the intended habitat types.
- Incidental wildlife use observations.

All wetland surveys, monitoring and associated data analysis and reporting will be conducted by or overseen by a Qualified Professional and will be conducted with representatives from the UFN and LDN, if available. All field work will follow best management practices, and invasive species avoidance and herpetofauna disease prevention protocols.

Understanding the loss and gain of wetlands will also provide a direct measurement of habitat loss and gain for wetland-dependent and wetland-favouring wildlife species and terrestrial invertebrates.

Pre-disturbance survey data will serve as baseline wetland condition and selected reference wetlands will represent natural conditions as benchmarks of functional values for comparison with wetlands affected by the Project.

11.4.1 Methods

Monitoring methods are adapted from a combination of recognized literature, guides and protocols listed in Table 11.4-1.

Table 11.4-1: Methodology Guides

Guide	Description
Wetland Ecological Functions Assessment: An Overview of Approaches (Hanson et al. 2008)	Provides an informed, overall approach to the assessment of wetland functions, providing elements to be considered, information requirements in the context of an EA, an approach to effects assessment, a review of assessment methods, and pertinent information such as specific information requirements, functions according to wetland class, generic potential effects and typical mitigations.
Field Supplement to Evaluating the Condition of Wetlands (Fletcher et al. 2018)	Wetland Protocol is a coarse-level filter for assessing the health of wetland. The form is intended to be completed mainly in the field, allow for consistency among users, gather pertinent data to inform the health of the wetland, and be cost effective as a tier 2 approach for monitoring.
Wetland Evaluation Guide. Final Report of the Wetlands are not Wastelands Project (Bond et al. 1992)	Provides a three-stage evaluation approach, providing steps to identify the benefits of a wetland and to establish their value to society and to compare their value to the value of the proposed alternatives: 1) General evaluation based on available information; 2) Requires a detailed inventory of wetland functions and benefits; and 3) Specialized analysis based on specific wetland and project values.

Guide	Description
Wetlands of British Columbia: A Guide to Identification (Mackenzie and Moran 2004)	Provides site classification and interpretative information for wetlands and related ecosystems. Site identification is based upon principles of Biogeoclimatic Ecosystem Classification (BEC) modified for wetland ecosystems.

The various documented methods for assessing wetland function, condition and values have relative merits and as pointed out by Hansen et al. (2008), no single method is appropriate for all situations.

To monitor wetland habitat and functions, a number of existing methods were reviewed. The decision framework outlined in Hansen et al. (2008) was applied to determine a structured approach to obtain information in order to understand and describe the functions of the wetlands in the Project area.

Wetland monitoring requires repeatable objective methods that are relatively quick and simple to complete. They must be adaptable to a range of wetland types and should facilitate analyses of wetland functions that are relevant to regulatory objectives. Hanson et al. (2008), outlines the relationships between primary functions and values (Table 11.4-2).

Table 11.4-2: Relationship between Wetland Functions and Values

Function Category	Functions	Key Values
Hydrological	■ Surface water storage and release ■ Flow moderation ■ Aquifer recharge and discharge	■ Replenish groundwater supplies ■ Moderation of storm water peaks ■ Climate moderation ■ Water flow maintenance during drought ■ Water velocity control ■ Removal of suspended sediments
Biochemical	■ Nutrient cycling ■ Organic soil development ■ Water quality services	■ Natural water quality improvement ■ Excess nutrient reduction ■ Sequestration of atmospheric carbon
Habitat	■ Biological productivity and diversity	■ Biodiversity provision ■ Wildlife habitat – habitat for species at risk ■ Erosion control
Climate	■ Carbon fixation and CO_2 balance ■ Rainfall and humidity increases ■ Micro-climate influences	■ Maintenance of current climate

Using the class/area approach the area of each wetland will quantify the amount of function. As each wetland at baseline is expected to provide all of the functions associated with the particular class of wetland using this approach gives a comparable measure for monitoring. The field data at select sites includes:

- Wetland properties, including:
  - hydrodynamic index,
  - water pathways,
  - hydric soil indicators, (rooting depth and depth to water), and
  - wildlife habitat use;

- Wetland location and extent;
- Vegetation composition; and
- Shallow groundwater levels.

11.4.2 Field Methods and Standards

Select permanent sampling plots and transects will be established on first site visit where reasonable to facilitate the collection of comparable data. Wildlife habitat value and use, and ecosystem data will be collected and recorded on standard RISC Ecosystem Field Forms to facilitate comparison of plot data. Wetland habitat information will be recorded at each location on a customized wetland function form to ensure consistency of data across all sites. The forms used are listed in Table 11.4-3.

Table 11.4-3: Wetland Monitoring Field Data Forms

Survey Name	Form ID	Type
Wetland Function	BW Wetland Function	Wetland assessment transects and plots crossing the wetland feature, and wetland feature perimeter transects.
Ecosystem/Site Visit	FS882(1,2,3)/FS1333	Upland/Riparian ecosystem plot.
Wildlife Habitat Assessment (WHA)	FS882(5)	Wildlife habitat value and use information recorded in ecosystem/SIVI plot and plot-in-context for wetland.

Wetland sites will need to be selected in 2022 in collaboration with LDN and UFN but will need to include:

1. Reference sites not affected by the project;
2. Sites where part of the wetland is identified as lost;
3. Sites adjacent to development; and
4. Sites within the Mathews Creek Ranch wetland complex.

Georeferenced pdf maps for use in the field consist of TRIM, proposed and existing infrastructure and predetermined survey location layers over ortho-images. The maps will be loaded to GPS activated tablets and used for field information and navigation. Survey tracks and plots will be recorded on the maps. Paper maps and a handheld GPS unit will be available as in-field back-up. Photos will be taken of survey locations and at pre-determined photo-points. All notable observations (animals and/or habitat features, cultural plants) will be recorded with field notes outlining habitat characteristics. Observations of disturbances and changes will be documented at each location.

Perimeter and meandering transects will be traversed to identify fringes/margins, in and out flow locations, as well as stresses on wetland ecosystem functioning and vegetation cover. Areas of open water and water control structures (i.e., beaver dams, culverts) will also be recorded.

Wetland transects, starting 10 m upslope of the wetland edge, will be walked at a right angle from the wetland edge toward the center of the wetland. Transect location and length will be varied for wetland size and any barriers encountered (deep water, channel, soft bottom etc.). Plots will be completed within each zone as indicated by a change in wetland class or plant association. Structural stage, soil description, depth to water, water pH and temperature, and dominant plant species, form, vigor and recruitment will be recorded. A 10x10 m plot size will be standard for sampling unless limited by the extent of the zone. Survey methods are adapted from those identified in the *Forest and Range Evaluation Program (FREP) wetland protocol* (Fletcher et al. 2018).

Soil nutrients will be characterized through observational data such as colour, level of decomposition, texture and water availability, and wetland class will be verified according to MacKenzie and Moran (2004). Plants will be identified to species using *Plants of Northern British Columbia – 2nd edition* (MacKinnon et al. 1999) and *E-Flora BC: Electronic Atlas of the Flora of British Columbia* (Klinkenberg 2018) and will include observations regarding vigor.

Wildlife habitat value and use will be recorded to assess the wetland's ability to support local and regional biodiversity. Wildlife habitat assessment (WHA) plots will be completed in conjunction with other monitoring and management programs, using Form FS 8882(5), to collect standardized information for evaluating habitat suitability and evidence of use. Survey methods for the WHA plots will follow standardized methodologies outlined in the *British Columbia Wildlife Habitat Rating Standards* (RIC 1999) and the *Field Manual for Describing Terrestrial Ecosystems* (MOELP and MOF 1998). Standardized wildlife habitat assessment forms (from the B.C. Provincial FS882 series) will be used to record data. Survey methods will use standardized methodologies outlined in *Standards for Terrestrial Ecosystem Mapping in British Columbia* (Resources Inventory Committee 1998).

In addition, shallow piezometers with data loggers will be installed at each wetland to measure water level fluctuations.

11.4.3 QA/QC Process and Standards

Field work will be conducted by or at the direction of a Qualified Professional knowledgeable in wetland and wildlife habitat:

- Wetland locations re-classed in the field will be reviewed to ensure consistency;
- Pre-determined sampling locations will ensure data is comparable over time;
- Recognized standard protocols and field forms will be used; and
- All data entry will be reviewed prior to analysis and reporting.

11.5 Timing and Frequency

Monitoring activities will be completed in accordance with Table 11.5-1. Field sampling will be planned to avoid the spring and early summer (April to June) when amphibian eggs have not yet hatched and are at risk of disturbance. Field work will be completed in conjunction with other field programs where possible for efficiency (e.g., water quality and wildlife) and will be compared to appropriate reference sites provisioned under their respective plans. Surveys will also follow preventative protocols against spreading chytrid fungus between wetlands, which causes a fatal infectious disease in amphibians. Protocols are described in the Wildlife Mitigation and Monitoring Plan, based on BC MOE (2008): *Standard Operating Procedures: Hygiene Protocols for Aquatic Field Research.*

Table 11.5-1: Wetland Monitoring Schedule

Scope	Frequency	Timing	Start	Endpoint
Monitoring within CPD boundary	Annual	July/August	Early Works	End of Operations
Monitoring within the Mine Site boundary	Annual	July/August	Early Works	End of Closure
Monitoring within the Transmission Line boundary	Annual	July/August	Early Works	End of Closure
Monitoring at Offsetting sites	Annual	July/August	Early Works	Performance standards achievement
Monitoring of Reference sites	Annual	July/August	Early Works	End of Closure

Note that additional baseline studies to be completed in 2022 will represent the first year of the monitoring program. Monitoring frequency may be updated based on the results of surveys in the future, in consultation with Indigenous groups.

11.6 Follow-up Program

Condition 5.5 of the DS requires a follow-up program be implemented to verify the predictions of the EA as it pertains to the adverse environmental effects of the Project on wetland functions and, along with EAC Condition 24(h), to determine the effectiveness of the mitigation measures as it pertain to wetlands. As part of the follow-up program, BW Gold shall:

5.5.1 Conduct pre-construction surveys within the mine site to confirm the absence of red or blue-listed wetlands. The Proponent shall provide the results of the survey to the Agency [IAAC] and to Indigenous groups prior to the start of construction. If the results of the survey demonstrate the presence of red or blue-listed wetlands within the mine site, BW Gold shall develop, prior to construction, and implement additional mitigation measures.

5.5.2 Monitor changes to wetland functions of wetlands located within the mine site and remaining after vegetation clearing required to construct project components during all phases of the Designated Project.

5.5.3 Monitor all compensatory wetland sites at a minimum annually, to ensure they meet or exceed performance standards for wetland functions established pursuant to condition 5.4 from the start of compensation until wetland functions are attained.

BW Gold conducted pre-construction surveys and plans to conduct additional pre-construction surveys in 2022 (Section 11.2). The WMOP has taken a conservative approach to wetland offsetting, however the effects assessment predictions for wetlands will be re-assessed based on the survey results and reported in the WMOP report (Section 14.1).

11.6.1 Performance Standards

Pursuant to DS Condition 5.4, wetland offset projects will be assessed and considered to be a success once the following performance standards are achieved:

- Agricultural practices (crop production and grazing) have ceased within offset areas of the Mathews Creek Wetland Complex;
- Drainage ditches have been filled, augmented, or designed such that water is retained on the landscape;
- Fencing is removed within offset areas of the Mathews Creek Wetland Complex;
- Hydrophytic wetland plant species are dominant plant species within offsetting area;
- Non-native and invasive plant species populations are not increasing; and
- No-net-loss of wetland considering: pre-construction wetland extent, as-built survey of Project footprint, and offset area.

12. UNCERTAINTY

There are a number of areas of uncertainty associated with this plan and they are described in Section 7.3 – Baseline Uncertainty, Section 8.5 – Assessment Uncertainty; and Section 10.6 – Offsetting Uncertainty. Specific elements of uncertainty and the planed actions to address these areas of uncertainty are presented in Table 12-1.

Table 12-1: Uncertainties and Approaches for Addressing

Category	Item No.	Uncertainty	Section(s) Where Uncertainty is Identified	Approach for Addressing Uncertainty	Section(s) Outlining Approach for Addressing Uncertainty
Baseline Data	1	Mapping methodology used to identify locations and size of wetlands	Section 7.3	BW Gold has collaboratively developed a scope of work with LDN and UFN to conduct wetland surveys to map wetlands in the mine site at the 1:5,000 scale and classify wetlands according to Mackenzie and Moran (2004). The wetland surveys will be conducted in 2022 and used to update the wetland mapping so that in Q4 2022 a revised WMOP can be produced with spatially accurate wetland boundaries.	Section 2.1 Section 7.1.3 Section 10.1
	2	Predictive modeling of wetland area that mapped riparian wetlands	Section 7.3	BW Gold has collaboratively developed a scope of work with LDN and UFN to conduct wetland surveys to map wetlands in the mine site at the 1:5,000 scale and classify wetlands according to Mackenzie and Moran (2004). The wetland surveys will be conducted in 2022 and used to update the wetland mapping so that in Q4 2022 a revised WMOP can be produced with spatially accurate wetland boundaries.	Section 2.1 Section 7.1.3 Section 10.1
	3	Wetland classification and function	Section 7.3	BW Gold has collaboratively developed a scope of work with LDN and UFN to conduct wetland surveys to map wetlands in the mine site at the 1:5,000 scale and classify wetlands according to Mackenzie and Moran (2004). The wetland surveys will be conducted in 2022 and used to update the wetland classification and function so that in Q4 2022 a revised WMOP can be produced.	Section 2.1 Section 7.1.3 Section 10.1

Category	Item No.	Uncertainty	Section(s) Where Uncertainty is Identified	Approach for Addressing Uncertainty	Section(s) Outlining Approach for Addressing Uncertainty
Assessment Methodology	4	Spatially lost wetlands used in assessment	Section 8.5	Complete wetland mapping to address baseline data as identified in Section 7.3 and update the WMOP to include revised mapping of affected wetlands.	Section 2.1 Section 5 Section 7.3 Section 10.3 Section 15
	5	Available methodology for quantifying the amount of wetland function	Section 8.5	To quantify the loss of function a class/area approach will be used? where the functions associated with each class were assumed lost to the magnitude of the wetland area. Additionally, monitoring parameters will be? focused on wetland specific parameters including: wetland extent, wetland vegetation; and shallow groundwater	Section 8.5 Section 11.4.1
Offsetting	8	Amount of offsetting required	Section 10.6	Wetland mapping will be completed to address baseline data as identified in Section 7.3	Section 7.3 Section 10.2
	9	Baseline status of the Mathews Creek Ranch	Section 10.6	Wetland mapping will be completed to address baseline data as identified in Section 7.3	Section 7.3 Section 10.2
	10	Natural succession at the Mathews Creek Ranch	Section 10.6	Wetland mapping will be completed to address baseline data as identified in Section 7.3	Section 7.3 Section 10.2
	11	Additional offsetting sites	Section 10.6	BW Gold will collaboratively develop a scope of work with LDN and UFN to inventory and map additional restoration sites in the region.	Section 10.6

13. EVALUATION AND ADAPTIVE MANAGEMENT

Adaptive management thresholds and management responses are provided in Table 13-1.

Table 13-1: Adaptive Management Response for Wetlands

Monitoring Result	Management Response
■ No Effect ■ Loss of wetland extent beyond Plan predictions <10% ■ High diversity of native species present (>80% of reference sites)	**No Action** ■ Continue monitoring program. ■ No change to mitigation measures.
Low level Unexpected monitoring results: ■ Wetland losses 10 to 20% more than predicted wetland loss at the schedule in Table 10.1-1	**Low level action – Review and Identify** ■ Continue monitoring program(s). ■ Evaluate monitoring results to identify: – The cause of additional loss. – If additional monitoring or other actions required. ■ Identify potential new mitigation measure(s) if trends continue and discuss as recommendations in monitoring report and update the WMP as necessary. ■ Inform appropriate stakeholders, Indigenous Groups and regulators through regular reporting schedule. ■ No modification to Adaptive Management Plan.
Medium level Unexpected monitoring results: ■ Wetland losses 20% to 30% more than predicted wetland loss at the schedule in Table 10.1-1 ■ Management Plan actions not implemented as expected	**Medium level action – Mitigations to Adjust Trend** ■ Continue monitoring program(s). ■ Evaluate monitoring results to identify: – If trend is related to Management Plan and activities. – The cause(s) of the unexpected monitoring results. Incident investigation or root cause analysis may be used to evaluate. ■ Inform appropriate Stakeholders, Indigenous groups and regulators through regular reporting schedule. ■ Identify mitigation measure(s): – Evaluate how measures may impact other aspects of the Adaptive Management Plan, regulatory requirements or stakeholder requirements. – Draft mitigation measures. ■ Implement new mitigation measures: – Update Adaptive Management Plan to include mitigation measures and any other changes included. ■ Monitor Changes: – Validate changes were implemented as planned. – If possible, identify any additional monitoring to evaluate the effectiveness of the implementation and effectiveness of any changes.

Monitoring Result	Management Response
High level Unexpected monitoring results: ■ Wetland losses more than 30% predicted wetland loss at the schedule in Table 10.1-1	**High level action – Mitigations to Stop Trend** ■ Immediately notify appropriate stakeholders, Indigenous groups and regulators. ■ Investigate monitoring results to identify: – If trend is related to Management Plan and activities. – The cause(s) of the unexpected monitoring results. Incident investigation or root cause analysis may be used to evaluate. ■ Identify mitigation measure(s): – Evaluate how measures may impact other aspects of the Adaptive Management Plan, regulatory requirements or stakeholder requirements. – Draft mitigation measures. ■ Engagement: – Engage stakeholders, Indigenous groups and regulators to identify any modifications to mitigation measures. – Identify roles and responsibilities for managing the change(s). – Engage stakeholders as appropriate for the Management Response Action Level, and those who may be impacted by the change. – Engagement to identify any modifications to the change(s). – Approve changes prior to implementation. ■ Implement new mitigation measures: – Update Adaptive Management Plan to include mitigation measures and any other changes included. ■ Monitor Changes: – Validate changes were implemented as planned. – If possible, identify any additional monitoring to evaluate the effectiveness of the implementation and effectiveness of any changes.

14. DOCUMENTATION AND RECORD KEEPING

14.1 Quality Assurance and Quality Control

Standard operating procedures (SOPs) will be established for environmental data collection as needed. SOPs cover all aspects of data collection, data processing, data QA/QC, and data management. SOPs will include duplicate sampling, relevant blanks, chain-of-custody procedures, and record keeping. SOPs will be reassessed and updated when necessary. Sampling personnel will have necessary training and accreditation.

Qualified professionals will follow the detailed scopes of work (Appendix E and F). Prior to field surveys BW Gold will conduct a workshop with field staff and Indigenous groups to ensure alignment on data collection and description of wetland features. Once surveys are complete a QA/QC review of the data will be conducted by a QP to validate that the standard forms used in the data collection are consistently filled out and spatial files are accurate.

Annual water quality monitoring will be used to monitor wetland biochemical functioning of offsetting wetlands using both in situ and surface water sample collection methods. Water collection guidelines and laboratory protocols will follow those described in the Water and Air Baseline Monitoring Guidance Document for Mine Proponents and Operators (BC MOE 2016).

Data analysis will be conducted using established and standardized workflows, and results will be cross-checked and validated. The annual reports will include detailed descriptions of the analytical methods, including the relevant validation and QA/QC procedures and results. The QA/QC program will be reviewed and updated annually to continuously improve the effectiveness and reliability of the WMOP to detect mine-related effects on wetland habitat and functions.

14.2 Records

The EM will be responsible for wetland data management. Monitoring data will be entered into an electronic database and have quality control checks completed upon receipt of results. Data will be entered into a standard format that allows for data reporting and analyses. Data and data comparisons will be stored in a single file format for each type of survey or monitoring activity. Monitoring data will be stored, at a minimum, for 25 years following the end of decommissioning of the Project and will be made available for review upon request.

Trip reports will be produced after each field visit summarizing the baseline data collected and the spatial files will be shared with indigenous groups and regulators in advance of the updated WMOP.

15. REPORTING

This section sets out DS and EAC reporting and information sharing requirements.

15.1 WMOP Pre-Construction Survey Report

After completion of wetland surveys in 2022, BW Gold will prepare a report on the results of the survey quantifying the wetland extent and describing the classes of wetlands and associated wetland functions found in the mine site. Given the BEC zones of the mine site it is not expected that listed wetlands will be encountered however, all wetlands will be compared against the list of listed wetlands provided by the BC Conservation Data Center. Pursuant to DS Condition 5.5.1, the WMOP Report will be sent to Indigenous groups, EAO, ECCC, FLNRORD, and IAAC.

15.2 Federal Decision Statement Annual Reporting and Information Sharing

DS Conditions 2.11, 2.12 and 2.13 set out annual reporting requirements related to the implementation of conditions in the DS. Condition 2.14 sets out information sharing requirements related to the annual reports. Reporting will commence when BW Gold begins to implement the conditions set out in the DS. Requirements in DS Conditions 2.11 to 2.14 are presented below.

DS Condition 2.11 requires:

> *"The Proponent [BW Gold] shall, commencing in the reporting year during which the Proponent begins the implementation of the conditions set out in this Decision Statement, prepare an annual report that sets out:*
>
> *2.11.1 the activities undertaken by the Proponent in the reporting year to comply with each of the conditions set out in this Decision Statement;*
>
> *2.11.2 how the Proponent complied with condition 2.1;*
>
> *2.11.3 for conditions set out in this Decision Statement for which consultation is a requirement, how the Proponent considered any views and information that the Proponent received during or as a result of the consultation, including a rationale for how the views have, or have not, been integrated;*
>
> *2.11.4 the information referred to in conditions 2.5 and 2.6 for each follow-up program;*
>
> *2.11.5 the results of the follow-up program requirements identified in conditions 3.14, 3.15, 3.16, 4.5, 5.5, 6.11, 6.12, 6.13, 6.14, 8.18.6, 8.20.5, 8.21, and 8.22 if required;*
>
> *2.11.6 any update made to any follow-up program in the reporting year;*
>
> *2.11.7 any modified or additional mitigation measures implemented or proposed to be implemented by the Proponent, as determined under condition 2.9 and rationale for why mitigation measures were selected pursuant to condition 2.5.4; and*
>
> *2.11.8 any change(s) to the Designated Project in the reporting year."*

DS Condition 2.12 requires: *"The Proponent [BW Gold} will provide the draft annual report to Indigenous groups, no later than June 30 following the reporting year to which the annual report applies. BW Gold will consult Indigenous groups on the content and findings in the draft annual report."*

DS Condition 2.13 requires: *"The Proponent [BW Gold], in consideration of any comments received from Indigenous groups pursuant to condition 2.12 shall revise and submit to the Agency [Impact Assessment Agency of Canada] and Indigenous groups a final annual report, including an executive summary in both official languages, no later than September 30 following the reporting year to which the annual report applies."*

DS Condition 2.14 requires*: "The Proponent [BW Gold] shall publish on the Internet, or any medium which is publicly available, the annual reports and the executive summaries referred to in conditions 2.11 and 2.13.*

The Proponent shall keep these documents publicly available for 25 years following the end of decommissioning of the Designated Project. The Proponent shall notify the Agency and Indigenous groups of the availability of these documents within 48 hours of their publication."

DS Condition 2.15 requires: *"When the development of any plan is a requirement of a condition set out in this Decision Statement, the Proponent [BW Gold] shall submit the plan to the Agency and to Indigenous groups prior to construction, unless otherwise required through the condition."*

15.3 Environmental Assessment Certificate Reporting

Pursuant to Condition 5 of the Project's Certificate, BW Gold will submit a report to the attention of the EAO and Aboriginal Groups on the status of compliance with the EAC at the following times:

a. At least 30 days prior to the start of Construction;
b. On or before March 31 in each year after the start of Construction;
c. At least 30 days prior to the start of Operations;
d. On or before March 31 in each year after the start of Operations;
e. At least 30 days prior to the start of Closure;
f. On or before March 31 in each year after the start of Closure until the end of Closure;
g. At least 30 days prior to the start of Post-Closure; and
h. On or before March 31 in each year after the start of Post-Closure until the end of Post-Closure.

BW Gold will submit reports to the EAO and Aboriginal Groups within the timelines specified in Condition 5.

16. PLAN REVISION

The WMOP will be updated in Q4 2022 to incorporate the 2021/2022 survey results which are expected to quantify the wetland extent within the mine site area. Moreover, additional wetland offsetting and restoration sites will be identified in 2022 and a restoration plan for these new areas will be identified in partnership with the LDN and UFN. The Q4 2022 update will also include a review of comments from ECCC received March 9, 2022.

Beyond the 2022 update, the WMOP will be reviewed annually and revised to include changes in baseline information availability, mitigation or monitoring methods including adaptive management actions. The wetland monitoring program may be updated from time to time based on the results of monitoring, changes to Project design, new Traditional Knowledge being made available, or following updates in the scientific understanding of wetland reclamation practices.

If the monitoring program indicates that there is no observable effect or a low effect on wetlands due to the Project, and target wetland standards have been attained at compensatory wetlands, the program may be discontinued following consultation with the IAAC, FLNRORD, Indigenous groups and EMC.

Updated versions of the WMOP will be provided to the IAAC, Environment and Climate Change Canada, EAO, EMLI, FLNRORD, Indigenous groups, and EMC for consultation on revisions.

17. QUALIFIED PROFESSIONALS

This management plan has been prepared and reviewed by, or under the direct supervision of, the following Qualified Professional:

Reviewed by:

Wade Brunham, M.Sc., PWS, R.P.Bio.
Partner, ERM

18. REFERENCES

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

Legislation

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Declaration on the Rights of Indigenous Peoples Act, SBC 2019, c 44.

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Migratory Birds Convention Act, 1994, SC 1994, c 22.

Mines Act, RSBC 1996, c 293.

Species at Risk Act, SC 2002, c 29.

United Nations Declaration on the Rights of Indigenous Peoples Act, SC 2021, c 14.

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APPENDIX A CONCORDANCE WITH ENVIRONMENTAL ASSESSMENT CERTIFICATE #M19-01 (JUNE 21, 2019)

Appendix A: Concordance with Environmental Assessment Certificate #M19-01 (June 21, 2019)

Table A-1: Environmental Assessment Certificate #M19-01 Conditions and Location in the Wetlands Management and Offsetting Plan

Condition	Requirement	Location in Plan
Condition 2 (Plan Development)	Where a condition of this Certificate requires the Holder to develop a plan, program or other document, any such plan, program or other document must, at a minimum, include the following information: a. purpose and objectives of the plan, program or other document;	Section 2
	b. roles and responsibilities of the Holder and Employees;	Section 3. Table 3-1
	c. names and, if applicable, professional certifications and professional stamps/seals, of those responsible for the preparation of the plan, program, or other document;	Section 17
	d. schedule for implementing the plan, program or other document throughout the relevant Project phases;	Section 11.5
	e. means by which the effectiveness of the mitigation measures will be evaluated including the schedule for evaluating effectiveness;	Section 11
	f. schedules and methods for the submission of reporting to specific agencies, Aboriginal Groups and the public and the required form and content of those reports; and process and timing for updating and revising the plan, program or other document, including any consultation with agencies and Aboriginal Groups that would occur in connection with such updates and revisions.	Section 15 Section 16
Condition 3 (Adaptive Management)	Where a condition of this Certificate requires the Holder to develop a plan, program or other document that includes monitoring, including monitoring of mitigation measures or monitoring to determine the effectiveness of the mitigation measures, the Holder must include adaptive management in that plan. The objective of the adaptive management is to address the circumstances that will require the Holder to implement alternate or additional mitigation measures to address effects of the Project if the monitoring shows that those effects: a. are not mitigated to the extent contemplated in the Application; b. are not predicted in the Application; or c. have exceeded the triggers identified in paragraph g) of this condition.	Section 13
	The adaptive management in the plan must include at least the following: d. the monitoring program that will be used including methods, location, frequency, timing and duration of the monitoring;	Section 11
	e. the baseline information that will be used, or collected where existing baseline information is insufficient, to support the monitoring program;	Section 7 Section 11.2

Condition	Requirement	Location in Plan
	f. the scope, content and frequency of reporting of the monitoring results;	Section 15
	g. the identification of qualitative and quantitative triggers, which, when observed through monitoring required under paragraph d), will require the Holder to alter existing, or develop new, mitigation measures to avoid, reduce, and/or remediate effects;	Section 13
	h. the methods that will be applied to detect when a numeric trigger, or type or level of change referred to in paragraph g), has occurred;	Section 11
	i. a description of the process for and timing to alter existing mitigation measures or develop new mitigation measures to reduce or avoid effects;	Section 16
	j. identification of the new and/or altered mitigation measures that will be applied when any of the changes identified in paragraphs a) to c) occur, or the process by which those will be established and updated over the relevant timeframe for the specific condition;	N/A
	k. the monitoring program that will be used to determine if the altered or new mitigation measures and/or remediation activities are effectively mitigating or remediating the effects and or avoiding potential effects; and	Section 11
	l. the scope, content and frequency of reporting on the implementation of altered or new mitigation measures. If there are any requirements or mitigation measures required in the plan, program or other document for which adaptive management, or elements of adaptive management listed in paragraphs d) to l) are assessed to be not appropriate or applicable, the plan must include identification of those requirements and measures, and the rationale for that assessment.	Section 15
Condition 4 (Consultation)	Where a condition of this Certificate requires the Holder consult a particular party or parties regarding the content of a plan, program or other document, the Holder must, to the satisfaction of the EAO: a. provide written notice to each such party that: i. includes a copy of the plan, program or other document; ii. invites the party to provide its views on the content of such plan, program or other document; and iii. indicates: i. if a timeframe for providing such views to the Holder is specified in the relevant condition of this Certificate, that the party may provide such views to the Holder within such time frame; or ii. if a timeframe for providing such views to the Holder is not specified in the relevant condition of this Certificate, specifies a reasonable period during which the party may submit such views to the Holder; b. undertake a full and impartial consideration of any views and other information provided by a party in accordance with the timelines specified in a notice given pursuant to paragraph (a); c. provide a written explanation to each such party that provided comments in accordance with a notice given pursuant to paragraph (a) as to: i) how the views and information provided by such party to the Holder have been considered and addressed in a revised version of the plan, program or other document; or ii) why such views and information have not been addressed in a revised version of the plan, program or other document; d. maintain a record of consultation with each such party regarding the plan, program or other document; and	Section 10.1

Condition	Requirement	Location in Plan
	e. provide a copy of such consultation record to the EAO, the relevant party, or both, promptly upon the written request of the EAO or such party. The copy of such consultation record must be provided to the EAO, relevant party, or both, no later than 15 days after the Holder receives the request for a copy of the consultation record, unless otherwise authorized by the EAO.	
Condition 24 (Wetland Management and Offsetting Plan)	The Holder must retain one or more Qualified Professionals to develop a Wetland Management and Offsetting Plan, to offset losses of wetland functions caused by the Project, in consultation with FLNRORD, ENV, ECCC, EMPR and Aboriginal Groups. In this Condition, "wetland function" refers to the hydrological, ecological and wildlife lifecycle requirements provided by wetlands. The plan must include at least the following: a. the means by which the mitigation measures identified in the in the Mitigations Table required under Condition 43 for the valued component Wetlands will be implemented;	Section 9 Table 9-1, Table 9-2
	b. a detailed description for each wetland that would be lost or altered as a result of the Project, including: i. an assessment of each wetland and wetland function that would be lost or altered based on Wetlands of British Columbia: A Guide to Identification (FLNRORD 2004, or as updated or replaced from time to time); and ii. the location and extent of these wetlands, including in relation to the local watershed;	Section 7.2
	c. a description of the methods used to determine the functions and overall condition of wetlands;	Section 7.1
	d. a description of the offsetting measures to be implemented by the Holder, including the amount and type of offsets required, the selection of offsetting sites, and a schedule and timeline for implementation of offsetting measures. The Holder is responsible for offsetting measures that compensate for expected losses of individual wetland functions described in (b);	Section 10
	e. a description of how the plan applies the hierarchy of mitigation measures set out in the BC EMP;	Section 9, Table 9-1, Table 9-2
	f. a description of how the selection of offsets took into account the extent to which the potential offsets would also provide additional habitat for grizzly bear and moose;	Section 10.2
	g. a description of how input from Aboriginal Groups was considered in the identification and selection of potential locations for wetland offsets; and	Section 10.1
	h. a description of how the implementation of the offsets and mitigation measures will be monitored for effectiveness.	Section 11
	The Holder must provide the draft plan that was developed in consultation with EMPR, ENV, FLNRORD, ECCC, and Aboriginal Groups to EMPR, ENV, FLNRORD, ECCC, Aboriginal Groups, and the EAO for review a minimum of 90 days prior to the planned commencement of Construction or as listed in the Document Submission Plan required by Condition 10 of this Certificate.	Noted
	The Holder must not commence Construction until the plan has been approved by the EAO, unless otherwise authorized by the EAO.	Noted

APPENDIX B CONCORDANCE WITH CANADIAN ENVIRONMENTAL ASSESSMENT AGENCY DECISION STATEMENT (APRIL 15, 2019)

Appendix B: Concordance with Canadian Environmental Assessment Agency Decision Statement

Table B-1: Federal Environmental Assessment Decision Statement Conditions and Location in the Wetland Management and Offsetting Plan

Condition	Requirement	Location in Plan
Condition 2.1 (General Conditions)	The Proponent shall ensure that its actions in meeting the conditions set out in this Decision Statement during all phases of the Designated Project are considered in a careful and precautionary manner, promote sustainable development, are informed by the best information and knowledge available at the time the Proponent takes action (including community and Indigenous traditional knowledge), are based on methods and models that are recognized by standard-setting bodies, are undertaken by qualified individuals, and have applied the best available economically and technically feasible technologies.	Noted
Condition 2.2 (General Conditions)	The Proponent shall, when mitigation is a requirement of a condition set out in this Decision Statement, give preference to avoiding the adverse environmental effect of the Designated Project over minimizing the adverse environmental effect of the Designated Project. If unable to avoid the adverse environmental effect, the Proponent shall give preference to minimizing the adverse environmental effect of the Designated Project over compensating for the adverse environmental effect of the Designated Project. If unable to minimize the adverse environmental effect, the Proponent shall compensate for the adverse environmental effect of the Designated Project.	Section 9, Table 9-1
Condition 2.3 (General Conditions)	The Proponent shall, where consultation is a requirement of a condition set out in this Decision Statement: ■ 2.3.1 provide a written notice of the opportunity for the party or parties being consulted to present their views and information on the subject of the consultation; ■ 2.3.2 provide all information available and relevant on the scope and the subject matter of the consultation and a period of time agreed upon with the party or parties being consulted, not less than 15 days, to prepare their views and information; ■ 2.3.3 undertake a full and impartial consideration of all views and information presented by the party or parties being consulted on the subject matter of the consultation; ■ 2.3.4 strive to reach consensus with Indigenous groups; and ■ 2.3.5 advise the party or parties being consulted on how the views and information received have been considered by the Proponent including a rationale for why the views have, or have not, been integrated. The Proponent shall advise the party or parties in a time period that does not exceed the period of time taken in 2.3.2.	Section 10.1
Condition 2.4 (Consultation)	The Proponent shall, where consultation with Indigenous groups is a requirement of a condition set out in this Decision Statement, determine and strive to reach consensus with each Indigenous group regarding the manner by which to satisfy the consultation requirements referred to in condition 2.3, including: ■ 2.4.1 the methods of notification; ■ 2.4.2 the type of information and the period of time to be provided when seeking input;	Section 10.1

Condition	Requirement	Location in Plan
	■ 2.4.3 the process to be used by the Proponent to undertake impartial consideration of all views and information presented on the subject of the consultation; and ■ 2.4.4. the period of time and the means by which to advise Indigenous groups of how their views and information were considered by the Proponent.	
Condition 2.5 (Follow-up and Adaptive Management)	The Proponent shall, where a follow-up program is a requirement of a condition set out in this Decision Statement, have a Qualified Professional, where such a qualification exists for the subject matter of the follow-up program, determine, as part of the development of each follow-up program and in consultation with the party or parties being consulted during the development, the following information: ■ 2.5.1 the follow-up activities that must be undertaken by a qualified individual; ■ 2.5.2 the methodology, location, frequency, timing and duration of monitoring associated with the follow-up program; ■ 2.5.3 the scope, content, format and frequency of reporting of the results of the follow-up program; ■ 2.5.4 the levels of environmental change relative to baseline conditions that would require the Proponent to implement modified or additional mitigation measure(s), including instances where the Proponent may require Designated Project activities to be stopped; and ■ 2.5.5 the technically and economically feasible mitigation measures to be implemented by the Proponent if monitoring conducted as part of the follow-up program shows that the levels of environmental change referred to in condition 2.5.4 have been reached or exceeded.	Section 11.6
Condition 2.6 (Follow-up and Adaptive Management)	The Proponent shall update and maintain the follow-up and adaptive management information referred to in condition 2.5 during the implementation of each follow-up program in consultation with the party or parties being consulted during the development of each follow-up program.	Section 16
Condition 2.7 (Follow-up and Adaptive Management)	The Proponent shall provide a draft of the follow-up programs referred to in conditions 3.14, 3.15, 3.16, 4.5, 5.5, 6.11, 6.12, 6.13, 6.14, 8.18.6, 8.20.5, 8.21, and 8.22, if required, to the party or parties being consulted during the development of each follow-up program for a consultation period of up to 60 days prior to providing follow-up programs pursuant to condition 2.8.	BW Gold will provide the WMOP to Indigenous groups
Condition 2.8 (Follow-up and Adaptive Management)	The Proponent shall provide the follow-up programs referred to in conditions 3.14, 3.15, 3.16, 4.5, 5.5, 6.11, 6.12, 6.13, 6.14, 8.18.6, 8.20.5, 8.21, and 8.22, if required, to the Agency and to the party or parties being consulted during the development of each follow-up program prior to the implementation of each follow-up program. The Proponent shall also provide any update(s) made pursuant to condition 2.6 to the Agency and to the party or parties being consulted during the development of each follow-up program within 30 days of the follow-up program being updated.	Section 16
Condition 2.9 (Follow-up and	The Proponent shall, where a follow-up program is a requirement of a condition set out in this Decision Statement: ■ 2.9.1 conduct the follow-up program according to the information determined pursuant to condition 2.5;	Section 11 Section 13

Condition	Requirement	Location in Plan
Adaptive Management)	■ 2.9.2 undertake monitoring and analysis to verify the accuracy of the environmental assessment as it pertains to the particular condition and/or to determine the effectiveness of any mitigation measure(s); ■ 2.9.3 determine whether modified or additional mitigation measures are required based on the monitoring and analysis undertaken in accordance with condition 2.9.2; and ■ 2.9.4 if modified or additional mitigation measures are required pursuant to condition 2.9.3, develop and implement these mitigation measures in a timely manner and monitor them in accordance with condition 2.9.2.	
Condition 2.10 (Follow-up and Adaptive Management)	Where consultation with Indigenous groups is a requirement of a follow-up program, the Proponent shall discuss the follow-up program with Indigenous groups and determine, in consultation with Indigenous groups, opportunities for their participation in the implementation of the follow-up program, including the analysis of the follow-up results and whether modified or additional mitigation measures are required, as set out in condition 2.9.	Section 2.1 Section 11
Condition 2.11 (Annual Reporting)	The Proponent shall, commencing in the reporting year during which the Proponent begins the implementation of the conditions set out in this Decision Statement, prepare an annual report that sets out: ■ 2.11.1 the activities undertaken by the Proponent in the reporting year to comply with each of the conditions set out in this Decision Statement; ■ 2.11.2 how the Proponent complied with condition 2.1; ■ 2.11.3 for conditions set out in this Decision Statement for which consultation is a requirement, how the Proponent considered any views and information that the Proponent received during or as a result of the consultation, including a rationale for how the views have, or have not, been integrated; ■ 2.11.4 the information referred to in conditions 2.5 and 2.6 for each follow-up program; ■ 2.11.5 the results of the follow-up program requirements identified in conditions 3.14, 3.15, 3.16, 4.5, 5.5, 6.11, 6.12, 6.13, 6.14, 8.18.6, 8.20.5, 8.21, and 8.22 if required; ■ 2.11.4 any update made to any follow-up program in the reporting year; ■ 2.11.7 any modified or additional mitigation measures implemented or proposed to be implemented by the Proponent, as determined under condition 2.9 and rationale for why mitigation measures were selected pursuant to condition 2.5.4; and ■ 2.11.8 any change(s) to the Designated Project in the reporting year.	Section 15.1
Condition 2.12 (Annual Reporting)	The Proponent shall provide a draft annual report referred to in condition 2.11 to Indigenous groups, no later than June 30 following the reporting year to which the annual report applies. The Proponent shall consult Indigenous groups on the content and findings in the draft annual report.	Section 15.1
Condition 2.13 (Annual Reporting)	The Proponent, in consideration of any comments received from Indigenous groups pursuant to condition 2.12 shall revise and submit to the Agency and Indigenous groups a final annual report, including an executive summary in both official languages, no later than September 30 following the reporting year to which the annual report applies.	Section 15.1

Condition	Requirement	Location in Plan
Condition 2.14 (Information Sharing)	The Proponent shall publish on the Internet, or any medium which is publicly available, the annual reports and the executive summaries referred to in conditions 2.11 and 2.13, the offsetting plan(s) referred to in condition 3.11, the compensation plan referred to in condition 8.18 and, if required, condition 5.3, the whitebark pine management plan referred to in condition 8.20, the communication plans referred to in conditions 6.15 and 10.5, the reports related to accidents and malfunctions referred to in conditions 10.4.2 and 10.4.3, the schedules referred to in conditions 11.1 and 11.2, and any update(s) or revision(s) to the above documents, upon submission of these documents to the parties referenced in the respective conditions. The Proponent shall keep these documents publicly available for 25 years following the end of decommissioning of the Designated Project. The Proponent shall notify the Agency and Indigenous groups of the availability of these documents within 48 hours of their publication.	Section 15.2
Condition 5.1 (Wetlands)	The Proponent shall mitigate the adverse environmental effects of the Designated Project on wetland functions with a preference for avoiding the loss of wetlands and wetland functions over minimizing the adverse effects on wetlands, and for minimizing the adverse effects on wetlands over compensating for lost or adversely affected wetlands, taking into account British Columbia's *Wetland Ways: Interim Guidelines for Wetland Protection and Conservation in British Columbia, and Riparian Management Area Guidebook*.	Section 9
Condition 5.2 (Wetlands)	The Proponent shall maintain, during construction and operation, a 30-metre buffer of undisturbed vegetation around wetlands located within the mine site, excluding activities required to construct project components. The Proponent shall conduct work or activity within the 30-metre buffer only to the extent necessary for safety reasons, to control invasive plants, or to install and maintain erosion or sediment run-off control measures. The Proponent shall have an independent environmental monitor observe work being done within the buffer, except when not possible for safety reasons. As part of the annual report, the Proponent shall include a summary of work or activities conducted for safety reasons within the 30-metre buffer.	Section 9.1
Condition 5.3 (Wetlands)	The Proponent shall, for adverse environmental effects from the Designated Project on wetlands that cannot be avoided or minimized pursuant to condition 5.1, set out mitigation measures in a wetland compensation plan. The Proponent shall develop the wetland compensation plan, prior to construction, in consultation with Indigenous groups, Environment and Climate Change Canada and other relevant authorities, and taking into account Canada's Federal Policy on Wetland Conservation, Environment and Climate Change Canada's *Operational Framework for Use of Conservation Allowances* and habitat needs for migratory birds, moose (*Alces alces*) and listed species at risk. When identifying mitigation measures, the Proponent shall select wetland restoration over enhancement and wetland enhancement over wetland creation. The Proponent shall start the implementation of the wetland compensation plan prior to the wetlands being adversely affected.	Section 9 Section 10
Condition 5.4 (Wetlands)	For any wetland creation required pursuant to condition 5.3, the Proponent shall establish, prior to wetland creation and in consultation with Indigenous groups, Environment and Climate Change Canada and other relevant authorities, performance standards for wetland functions.	Section 11.6.1

Condition	Requirement	Location in Plan
Condition 5.5 (Wetlands)	The Proponent shall develop, prior to construction and in consultation with Indigenous groups, Environment and Climate Change Canada and other relevant authorities, a follow-up program to verify the predictions of the environmental assessment as it pertains to the adverse environmental effects of the Designated Project on wetland functions and to determine the effectiveness of the mitigation measures as it pertain to wetlands. The Proponent shall implement the follow-up program during from construction through decommissioning and shall apply conditions 2.9 and 2.10 when implementing the follow-up program. As part of the follow-up program, the Proponent shall:	Section 11.6
Condition 5.5.1 (Wetlands)	■ conduct pre-construction surveys within the mine site to confirm the absence of red or blue-listed wetlands. The Proponent shall provide the results of the survey to the Agency and to Indigenous groups prior to the start of construction. If the results of the survey demonstrate the presence of red or blue-listed wetlands within the mine site, the Proponent shall develop, prior to construction, and implement additional mitigation measures;	Section 11.2
Condition 5.5.2 (Wetlands)	■ monitor changes to wetland functions of wetlands located within the mine site and remaining after vegetation clearing required to construct project components during all phases of the Designated Project; and	Section 11
Condition 5.5.3 (Wetlands)	■ monitor all compensatory wetland sites at a minimum annually, to ensure they meet or exceed performance standards for wetland functions established pursuant to condition 5.4 from the start of compensation until wetland functions are attained.	Section 11

APPENDIX C WETLAND BASELINE DATA

Table C-1: Environmental Baseline Data

Plot Number	Site Association	Realm Class	Zone	Sub Zone	BEC Site Unit	Elevation (m)	Seepage Depth (cm)	Strata Cover Tree (%)	Strata Cover Shrub (%)	Strata Cover Herb (%)	Strata Cover Moss (%)	Moisture Regime	Nutrient Regime	Structural Stage	Flooding Regime Freq	Rooting Depth (cm)	HydroGeo System	HydroGeo Sub System	Date	UTM Zone	UTM Easting	UTM Northing
T13086G	OW	Ww	SBS	mc3	SBSmc3	1,186			1	10		8	D	2c					16/07/2013	10	378123	5899507
T13116G	OW	Ww	SBS	mc3	SBSmc3	1,147				10									19/07/2013	10	378643	5900377
T13031G	Wb01	Wb	SBS	dk	SBSdk	978	16	20	70	30	90	7	B	3b					12/07/2013	10	394715	5952932
RPW043	Wb02	Wb	ESSF	mv1	ESSFmv1	1,303	0	0	25	45	35	7	B				P	bs	13/07/2012	10	374366	5897653
b12-002	Wb05	Wb	SBS	mc3	SBSmc3	1,134		0	55	50	70	7	B				P	ob	24/07/2012	10	381556	5899223
b12-054	Wb05	Wb	ESSF	mv1	ESSFmv1	1,362			50	47	55	8	C	2b			P	lb	28/07/2012	10	371611	5896084
b12-086	Wb05	Wb	SBS	mc2	SBSmc2	1,109		20	50	65	70	7	B	6			P	lb	31/07/2012	10	399853	5913478
B13012A	Wb05	Wb			SBSdk	936		5	45	25	45	7	B	7			P	lb	11/07/2013		392035	5902013
B13018B	Wb05	Wb			SBSmc3	1,168	20	5	30	25	75	8	D	7	A	25	P	lb	12/07/2013		377554	5899728
B13050B	Wb05	Wb			SBSmc3	1,017	0	5	50	45	45	8	D	7	A	35	P	ob	11/07/2013		382729	5904283
BWG-009	Wb05	Wb	ESSF	mv1	ESSFmv1	1,377		35	60	26	95	7	B	3b			P	ob	10/08/2011	10	371908	5895761
BWG-031	Wb05	Wb	ESSF	mv1	ESSFmv1	1,285		6	55	21	87	7	B	7			P	ob	13/08/2011	10	375368	5896505
BWG-042	Wb05	Wb	ESSF	mv1	ESSFmv1	1,383			50	37	90	7	A	2b			P	cb	14/08/2011	10	373681	5896748
BWG-078	Wb05	Wb	ESSF	mv1	ESSFmv1	1,263			20	45	80	7	A	2b			P	lb	18/08/2011	10	374896	5898928
BWR003B	Wb05	Wb			ESSFmv1	1,355	0		3	45	70	8	C		A	55	P	lb	13/07/2013		361316	5910791
BWR003C	Wb05	Wb			ESSFmv1	1,376	10	2	20	45	75	8	A	3b		35	P	lb	14/07/2013		360612	5910385
BWR019A	Wb05	Wb			SBSmc3	1,024	10					8	B	7a	A	30	P	cb	14/07/2013		372988	5912173
bwt-217	Wb05	Wb	SBS	dw3	SBSdw3	947		55	60	16	40	6	B	7			P	ob	27/09/2012	10	396423	5965852
BWVIS28	Wb05	Wb	ESSF	mv1	ESSFmv1	1,355		2	15	35	25	7	D	2b			P	lb	15/08/2011	10	371648.2	5894304
GIFTT23	Wb05	Wb	ESSF	mv1	ESSFmv1	1,375		3	5	45	18	7	C	3			P	cb	10/08/2011	10	373651	5896762
PL-237	Wb05	Wb	SBS	mc3	SBSmc3	1,005		20	70	25	90	6	D	5		32	P	lb	03/10/2012	10	387563	5902867
PL-239	Wb05	Wb	SBS	mc3	SBSmc3	1,035		20	55	80	10	7	C	4			P	lb	03/10/2012	10	385249	5902980
RPW013	Wb05	Wb	SBS	mc3	SBSmc3	1,188			30	39	80	6	B	2b			P	lb	12/07/2012	10	377296	5898688
RPW101	Wb05	Wb	SBS	mc3	SBSmc3	1,031		7	30	40	50	6	B				P	lb	12/07/2012	10	401896	5933697
T13069F	Wb05	Wb	SBS	mc3	SBSmc3	1,046	34	5	60	30	95	7	B	3b	R	42	P	bs	15/07/2013	10	376267	5904762
T13092V	Wb05	Wb	SBS	mc3	SBSmc3	1,173			50	20	95	7	B	3a					17/07/2013	10	377513	5899688
T13135G	Wb05	Wb	SBS	mc3	SBSmc3	1,131	2	30	30	40	80	7	D	5		23			20/07/2013	10	379173	5900531
T13140G	Wb05	Wb	SBS	mc3	SBSmc3	1,117	3	15	55	40	60	7	D	6		27			21/07/2013	10	378978	5901833
b12-007	Wb08	Wb	SBS	mc3	SBSmc3	1,108						7	A	3b			P	lb	24/07/2012	10	382559	5899812
BWVIS21	Wb08	Wb	ESSF	mv1	ESSFmv1	1,414			18	80	65	7	D	2b/3			P	ob	13/08/2011	10	372463.6	5894499
T13037G	Wb08	Wb	SBS	dk	SBSdk	972	45	60	30	20	90	6	C	5		35			12/07/2013	10	394433	5951931
T13060G	Wb08	Wb	SBS	mc3	SBSmc3	1,119	6	5	10	20	90	7	C	6					14/07/2013	10	380537	5901105
T13090G	Wb08	Wb	SBS	mc3	SBSmc3	1,174	35	30	45	40	95	6	C	6		24			17/07/2013	10	377281	5899856
b12-018	Wb10	Wb	ESSF	mv1	ESSFmv1	1,389	2		52	60	90	8	D	2b			P	cb	25/07/2012	10	373418	5897520
RPW021	Wb10	Wb	ESSF	mv1	ESSFmv1	1,313			15	32	70	8	B				P	cb	10/07/2012	10	374582	5896768
b12-038	Wb11	Wb	SBS	mc3	SBSmc3	1,084	5		55	40	75	8	B	3a			P	ob	27/07/2012	10	379555	5903851
RPW017C	Wb13	Wf	SBS	mc3	SBSmc3	1,246			1	35	7	7	D				P	lb	10/07/2012	10	375100	5898671
RPW033	Wb13	Wb	SBS	mc3	SBSmc3	1,142		0	1	25	55	7	B				P	cb	12/07/2012	10	382044	5898898
RPW033B	Wb13	Wb	SBS	mc3	SBSmc3	1,142				38	4	7	B				P	cb	12/07/2012	10	382109	5898923
T13148G	Wb13	Wb	ESSF	mv1	ESSFmv1	1,349	2					8	C	2b					21/07/2013	10	371637	5894328
b12-037	Wf01	Wf	SBS	mc3	SBSmc3	1,144				55	10	7	D				P	lb	27/07/2012	10	378399	5900592
b12-084	Wf01	Wf	SBS	mc3	SBSmc3	1,133	2		10	90	25	8	B	2b			P	ob	30/07/2012	10	381324	5899166
b12-090	Wf01	Wf	SBS	mc3	SBSmc3	1,045			35	85	5	8	B	2b			P	lb	31/07/2012	10	401262	5937307

Plot Number	Site Association	Realm Class	Zone	Sub Zone	BEC Site Unit	Elevation (m)	Seepage Depth (cm)	Strata Cover Tree (%)	Strata Cover Shrub (%)	Strata Cover Herb (%)	Strata Cover Moss (%)	Moisture Regime	Nutrient Regime	Structural Stage	Flooding Regime Freq	Rooting Depth (cm)	HydroGeo System	HydroGeo Sub System	Date	UTM Zone	UTM Easting	UTM Northing
bwt-225	Wf01	Wf	SBS	dk	SBSdk	930	85			90	1	8	D	2b		21	P	lb	28/09/2012	10	385446	5907788
BWVIS38	Wf01	Wf	ESSF	mv1	ESSFmv1	1,433		4	41	75	80	8	D				P	ob	17/08/2011	10	373797.7	5893891
GIFTT07	Wf01	Wf	ESSF	mv1	ESSFmv1	1,370		3	5	60	20	7	C	2			P	lb	12/07/2011	10	370887	5896231
GIFTT17	Wf01	Wf	ESSF	mv1	ESSFmv1	1,352		4	1	90	2	7	E	2			P	cb	14/07/2011	10	370833	5893621
RPW007	Wf01	Wf	SBS	mc3	SBSmc3	1,121			1	40	10	7	C	2b			P	ob	11/07/2012	10	382275	5899095
RPW061	Wf01	Wf	SBS	mc3	SBSmc3	1,125			9	75	2	7	C	2b			P	ob	11/07/2012	10	381292	5899154
RPW071	Wf01	Wf	SBS	mc3	SBSmc3	1,184			10	65		7	C	2b			P	lb	11/07/2012	10	379267	5898307
T13040	Wf01	Wf			SBSmc3														13/07/2013		389916	5913273
T13042	Wf01	Wf			SBSmc3														13/07/2013		389888	5912964
T13053G	Wf01	Wf	SBS	mc3	SBSmc3	1,026	2		10	60	70		D	2b					14/07/2013	10	385816	5903060
T13139G	Wf01	Wf	SBS	mc3	SBSmc3	1,118		30	25	55	95	3	C	6		32			21/07/2013	10	378909	5901919
b117110	Wf02	Wf	ESSF	mv1	ESSFmv1	1,277		0	35	22	70	7	D	2b			P	ob	12/08/2011	10	375299	5896432
b12-011	Wf02	Wf	SBS	mc3	SBSmc3	1,129	2	0	35	65	0	7	D				P	ob	24/07/2012	10	382281	5899129
b12-034	Wf02	Wf	SBS	mc3	SBSmc3	1,056			10	80	55	8	E				P	lb	14/07/2012	10	383790	5913681
b12-036	Wf02	Wf	SBS	mc3	SBSmc3	1,145	25		60	33	62	7	B	3a			P	lb	27/07/2012	10	378399	5900592
b12-051	Wf02	Wf	SBS	mc3	SBSmc3	1,062			55	55	75	7	C				P	tb	27/07/2012	10	385390	5914412
b12-057	Wf02	Wf	SBS	mc3	SBSmc3	1,160	20		36	55	55	7	B	2b		30	P	lb	28/07/2012	10	348880	5902925
b12-058	Wf02	Wf	SBS	mc3	SBSmc3	1,266			55	45	75	8	B	2b			P	lb	28/07/2012	10	375025	5898926
b12-060	Wf02	Wf	SBS	mc3	SBSmc3	1,300	2		35	50	70	7	B	2b			P	lb	28/07/2012	10	373522	5899817
B13013A	Wf02	Wf			SBSdk	930			25	30	20	8	D	2b		30	P	lb	11/07/2013		385199	5906847
B13018A	Wf02	Wf			SBSmc3	1,165	3	0	35	35	55	8	D	2b	A	50	P	lb	12/07/2013		377515	5899755
B13020A	Wf02	Wf			SBSmc3	1,100	5	0	20	40	43	8	D	2b	A	55	L	lb	12/07/2013		381412	5900584
B13027A	Wf02	Wf			SBSmc3	1,234	3	0	51	47	40	8	C		R	45	P	ob	09/07/2013		378454	5897119
B13037A	Wf02	Wf			SBSmc3	1,056			50	20	65	6	D		A		P	lb	10/07/2013		380816	5903596
B13050A	Wf02	Wf			SBSmc3	1,017	2					8	D	2d	A	55	P	lb	11/07/2013		382877	5904200
BWG-010	Wf02	Wf	ESSF	mv1	ESSFmv1	1,463		20	40	30	65	6	D	3a			P	lb	10/08/2011	10	375995	5893917
BWG-064	Wf02	Wf	ESSF	mv1	ESSFmv1	1,364		5	50	70	90	7	D	2b			P	ts	16/08/2011	10	370173	5896315
BWR001A	Wf02	Wf			ESSFmv1	1,532	4		22	60	75	8	D	2b	A	25	P	lb	13/07/2013		362703	5905982
BWR003A	Wf02	Wf			ESSFmv1	1,382	2		47	45	65	8	D	2b	A	50	P	lb	13/07/2013		360816	5910403
BWR005B	Wf02	Wf			SBSmc3	1,013	5					8	C		A	25	P	lb	13/07/2013		370142	5913615
BWR006B	Wf02	Wf			ESSFmv1	1,364	0		35	45	50	8	D	2b/3a	A	35	P	lb	13/07/2013		364315	5909803
BWR008A	Wf02	Wf			SBSmc3	1,122	9		60	45	65	8	D	2b	A	35	P	lb	13/07/2013		367141	5911387
GIFTT11	Wf02	Wf	ESSF	mv1	ESSFmv1	1,453		5	65	20	7	7	C	2b/3a			P	lb	12/07/2011	10	376111	5893930
GIFTT15	Wf02	Wf	ESSF	mv1	ESSFmv1	1,450		3	30	30	18	7	C	2			P	lb	14/07/2011	10	373597	5894140
RPW017B	Wf02	Wf	SBS	mc3	SBSmc3	1,249			30	25	30	8	C	3a			P	lb	10/07/2012	10	375037	5898916
RPW023	Wf02	Wf	ESSF	mv1	ESSFmv1	1,454			22	70	30	7	C				P	lb	14/07/2012	10	376346	5893991
RPW028	Wf02	Wf	ESSF	mv1	ESSFmv1	1,357			40	40	15	7	C				P	lb	12/07/2012	10	371612	5896090
RPW049	Wf02	Wf	SBS	mc3	SBSmc3	1,138			3	63	25	8	C	2b			P	ob	11/07/2012	10	381640	5899144
RPW100	Wf02	Wf	SBS	dk	SBSdk	966			3	55	6	7	C				P	lh	12/07/2012	10	399178	5928383
RPW105	Wf02	Wf	ESSF	mv1	ESSFmv1	1,426			12	40	43	7	C				P	ob	13/07/2012	10	373870	5894268
T13091V	Wf02	Wf	SBS	mc3	SBSmc3	1,175			25	80	15	8	D	2b					17/07/2013	10	377372	5899795
T13146G	Wf02	Wf	SBS	mc3	SBSmc3		1					8	C						21/07/2013		385575	5902784
BWG-004	Wf03	Wf	ESSF	mv1	ESSFmv1	1,368			19	70	90	7	D	2b			P	lb	10/08/2011	10	371526	5896099
BWG-037	Wf03	Wf	ESSF	mv1	ESSFmv1	1,443			15	60	90	7	D	2b			P	lb	13/08/2011	10	373529	5894134
BWG-053	Wf03	Wf	ESSF	mv1	ESSFmv1	1,347			10	78	45	7	D	2b			P	ob	15/08/2011	10	371764	5894371

Plot Number	Site Association	Realm Class	Zone	Sub Zone	BEC Site Unit	Elevation (m)	Seepage Depth (cm)	Strata Cover Tree (%)	Strata Cover Shrub (%)	Strata Cover Herb (%)	Strata Cover Moss (%)	Moisture Regime	Nutrient Regime	Structural Stage	Flooding Regime Freq	Rooting Depth (cm)	HydroGeo System	HydroGeo Sub System	Date	UTM Zone	UTM Easting	UTM Northing
BWVIS40	Wf03	Wf	ESSF	mv1	ESSFmv1	1,314			12	55	25	7	D	2b			P	lh	17/08/2011	10	372577.9	5895502
GIFTT16	Wf03	Wf	ESSF	mv1	ESSFmv1	1,348		1	1	40	5	7	E	2			P	ob	14/07/2011	10	371748	5894388
GIFTT18	Wf03	Wf	ESSF	mv1	ESSFmv1	1,275		0	2	40	50	7	B	2			P	ob	14/07/2011	10	375243	5896398
RPW028B	Wf03	Wf	ESSF	mv1	ESSFmv1	1,348			15	37	52	7	C				P	lb	12/07/2012	10	372022	5895970
RPW068	Wf03	Wf	ESSF	mv1	ESSFmv1	1,438			3	18	76	7	B		F		P	cb	13/07/2012	10	373668	5894655
b12-023	Wf04	Wf	SBS	dk	SBSdk	924	30	0	85	25	80	7	C	3a			P	lb	26/07/2012	10	381167	5911261
B13023A	Wf04	Wf			ESSFmv1	1,272	1		37	43	45	8	D	2b	F	50	P	ob	12/07/2013		378468	5895420
B13038B	Wf04	Wf			ESSFmv1	1,465	0		20	25	50	8	C	2b	F	25	P	ob	12/07/2013		377594	5891405
b12-052	Wf05	Wf	SBS	mc3	SBSmc3	1,063			10	75	80	8	D				P	tb	27/07/2012	10	385390	5914412
BWG-073	Wf05	Wf	ESSF	mv1	ESSFmv1	1,288			1	65	85	8	A	2b			P	lb	18/08/2011	10	373583	5899804
T13099G	Wf06	Wf	SBS	mc3	SBSmc3	1,052			15	50	10	8	D	2b					18/07/2013	10	386731	5911830
RPW001	Wf07	Wf	ESSF	mv1	ESSFmv1	1,439			10	75	53	6	C				P	lb	13/07/2012	10	373580	5894149
T13147G	Wf07	Wf	SBS	mc3	SBSmc3		3		30	60	80	8	D	3a		15			21/07/2013	10	385721	5902990
b12-039	Wf08	Wf	SBS	mc3	SBSmc3	1,077				45	40	8	B	2a			P	ob	27/07/2012	10	379555	5903851
b12-053	Wf08	Wf	ESSF	mv1	ESSFmv1	1,346	2		10	80	22	8	C	2b			P	ob	28/07/2012	10	371740	5894362
b12-059	Wf08	Wf	SBS	mc3	SBSmc3	1,256			3	50	15	8	B				P	lb	28/07/2012	10	375093	5898906
B13031A	Wf08	Wf			SBSmc3	1,108	0		5	60	25	8	D		R		P	ob	10/07/2013		379291	5901569
B13043A	Wf08	Wf			SBSmc3	1,084	0		7	60	45	8	D	2b	A	50	P	ob	12/07/2013		381647	5901732
B13043B	Wf08	Wf			SBSmc3	1,088		0	0	15	15	8	D				P	ob	12/07/2013		381797	5901633
RPW102	Wf08	Wf	SBS	mc3	SBSmc3	1,034		0	2	23	33	8	C				P	lb	12/07/2012	10	401522	5933531
RPW104	Wf08	Wf	ESSF	mv1	ESSFmv1	1,294			6	46	38	7	C				P	lb	13/07/2012	10	375500	5899831
b12-061	Wf10	Wf	SBS	mc3	SBSmc3	1,293				60	40	7	D	2b			P	lb	28/07/2012	10	373575	5899813
B13053A	Wf10	Wf			ESSFmv1	1,403	0		1	60	65	8	D	2b		35	P	lb	14/07/2013	10	372827	5897060
B13060A	Wf10	Wf			ESSFmv1	1,341	4		2	45	60	8	D	2b	F	40	P	ob	15/07/2013	10	371714	5894391
BWVIS12	Wf10	Wf	ESSF	mv1	ESSFmv1	1,402				45	10	7	D	2b			P	ob	12/08/2011	10	375435	5894699
RPW103	Wf10	Wf	ESSF	mv1	ESSFmv1	1,289			1	65	20	8	C				P	lb	13/07/2012	10	373726	5899875
b12-068	Wf11	Wf	ESSF	mv1	ESSFmv1	1,416	4	0	14	70	85	8	B	2b			P	ob	29/07/2012	10	375547	5894675
B13038A	Wf11	Wf			ESSFmv1	1,454	0		4	42	65	8	C	2b	A	40	P	lb	12/07/2013		378131	5891994
B13051A	Wf11	Wf			ESSFmv1	1,479	0		2	60	43	8	D	2b	F	40	P	lb	14/07/2013		370042	5898645
BWG-026	Wf11	Wf	ESSF	mv1	ESSFmv1	1,538			2	53	35	7	D	2b			P	cb	12/08/2011	10	373756	5892958
BWR002A	Wf11	Wf			ESSFmv1	1,529	1	0	15	50	60	8	D	2b	A	20	P	lb	13/07/2013		361349	5905943
BWVIS15	Wf11	Wf	ESSF	mv1	ESSFmv1	1,343		2	5	30	60	8	d	2b			P	lb	12/08/2011	10	357362	5895897
GIFTT08	Wf11	Wf	ESSF	mv1	ESSFmv1	1,406		0	3	55	15	7	D	2			P	ob	12/07/2011	10	375392	5894658
GIFTT24	Wf11	Wf	ESSF	mv1	ESSFmv1	1,536		1	3	35	25	7	D	2			P	cb	10/08/2011	10	373725	5892954
RPW017	Wf11	Wf	SBS	mc3	SBSmc3	1,247			0.5	55	13	8	D	2b			P	lb	12/07/2012	10	375138	5898949
RPW106	Wf11	Wf	ESSF	mv1	ESSFmv1	1,406			9	75	30	7	B				P	ob	12/07/2012	10	375497	5894651
B13041A	Wf12	Wf			ESSFmv1	1,572		0	7	20	30	8	C	2b	A	35	P	cb	12/07/2013		376983	5892353
T13076	Wf13	Wf	ESSF	mv1	ESSFmv1	1,591	13		5	75	90	7	D	2b					16/07/2013		376607	5891655
T13080G	Wf13	Wf	ESSF	mv1	ESSFmv1	1,538	17		10	20	95	8	D	2b		31			16/07/2013	10	377378	5892676
b12067b	Wm01	Wm	ESSF	mv1	ESSFmv1	1,315			30	15	2	8	D				P	lb	21/07/2012	10	376344	5895935
b12-082	Wm01	Wm	SBS	mc3	SBSmc3	1,136			2	70	45	8	C	2a			P	cb	30/07/2012	10	382111	5898963
B13014A	Wm01	Wm			SBSdk	928	2	0	5	60	10	8	D	2b	A		F	a	11/07/2013		385114	5907958
B13015A	Wm01	Wm			SBSdk	932			11	90	5	7	E	Sb	A	30	F	a	11/07/2013		384937	5908223
B13017A	Wm01	Wm			SBSmc3	1,085	30	0	1	35	5	7	D		A		P	cb	10/07/2013		379921	5902439
B13036A	Wm01	Wm			SBSmc3	1,187		0	0	82	5	6	D				P	lb	09/07/2013		379761	5897668

Plot Number	Site Association	Realm Class	Zone	Sub Zone	BEC Site Unit	Elevation (m)	Seepage Depth (cm)	Strata Cover Tree (%)	Strata Cover Shrub (%)	Strata Cover Herb (%)	Strata Cover Moss (%)	Moisture Regime	Nutrient Regime	Structural Stage	Flooding Regime Freq	Rooting Depth (cm)	HydroGeo System	HydroGeo Sub System	Date	UTM Zone	UTM Easting	UTM Northing
BWR005A	Wm01	Wm			SBSmc3	1,014	0			90	1	8	D	2b	A	30	P	lb	13/07/2013		370039	5913750
BWVIS04	Wm01	Wf	ESSF	mv1	ESSFmv1	1,345			5	80		7	E	2b			F	a	10/08/2011	10	371872	5895138
BWVIS19	Wm01	Wm	SBS	mc3	SBSmc3	1,234				10		8	E	2b			P	oh	13/08/2011	10	376901.5	5897785
GIFTT22	Wm01	Wm	SBS	mc3	SBSmc3	1,266			2	90	5	7	D	2			F	a	10/08/2011	10	374444	5896137
RPW002	Wm01	Wm	SBS	mc3	SBSmc3	1,134		0	0	40	5	7	D				P	lb	12/07/2012	10	382269	5898712
RPW003	Wm01	Wm	SBS	mc3	SBSmc3	1,127	2	0	9	37	3	6	D	2b	F		P	lb	11/07/2012	10	382079	5898753
RPW006	Wm01	Wm	SBS	mc3	SBSmc3	1,126		0	0	18	5	7	D	2b	A		P	cb	11/07/2012	10	382005	5898990
RPW011	Wm01	Wm	SBS	mc3	SBSmc3	1,214			2	65	3	8	C				P	lb	12/07/2012	10	376386	5898394
RPW059	Wm01	Wm	SBS	mc3	SBSmc3	1,184	0	0	2	62	1	7	D				P	ob	11/07/2012	10	379002	5898448
T13103G	Wm01	Wm	SBS	mc3	SBSmc3	1,059				10	20	8	C						18/07/2013	10	387007	5912163
T13121G	Wm01	Wm	SBS	mc3	SBSmc3	1,118	30		10	70		7	D	2b					19/07/2013	10	378859	5901193
T13126G	Wm01	Wm	SBS	mc3	SBSmc3	1,136				70		8	D	2b					19/07/2013	10	379037	5900683
T13005G	Wm02	Wm	SBS	dk	SBSdk	915	36		20	50	30	7	D	2b		25			09/07/2013	10	389050	5972523
b12-035	Ws04	Ws	SBS	mc3	SBSmc3	1,196			89	20	15	8	D	3a			P	lb	27/07/2012	10	379497	5898073
b12-085	Ws04	Ws	SBS	dk	SBSdk	926	36		80	55	55	6	D	3b		40	P	lb	31/07/2012	10	382867	5908593
B13016A	Ws04	Ws			SBSdk	949		0	35	60	1	6	D				P	lh	13/07/2013		383590	5907187
GIFTT21	Ws04	Ws	SBS	mc3	SBSmc3	1,223		4	30	47	5	7	D	3			P	lh	09/08/2011	10	375683	5897409
T13068G	Ws04	Ws	SBS	mc2	SBSmc2	1,039	47	2	65	50	30	6	D	3a		40			15/07/2013	10	376312	5904809
T13144G	Ws04	Ws	SBS	mc3	SBSmc3	1,023	25		75	60		6	D	3b		25			21/07/2013	10	378714	5905944
b12-008	Ws07	Ws	SBS	mc3	SBSmc3	1,107		50	6	60	80	7	C	5			P	lb	24/07/2012	10	382730	5899834
b12-025	Ws07	Ws	SBS	dk	SBSdk	944	20	60	5	55	70	6	D	5			P	ts	26/07/2012	10	381073	5911741
b12-033	Ws07	Ws	SBS	mc3	SBSmc3	1,054	3	26	14	65	50	7	D	5			P	ts	26/07/2012	10	383832	5913522
b12-048	Ws07	Ws	SBS	mc3	SBSmc3	1,117	25	30	50	50	25	6	D	5			P	lh	27/07/2012	10	386627	5914888
b12-050	Ws07	Ws	SBS	mc3	SBSmc3	1,065		45	5	35	10	7	C	5			P	tb	27/07/2012	10	385475	5914639
b12-063	Ws07	Ws	SBS	mc3	SBSmc3	1,192	25	7	60	40	20	7	D	3a		25	P	oh	28/07/2012	10	378080	5898834
b12-081	Ws07	Ws	SBS	mc3	SBSmc3	1,233		45	13	85	20	6	D	6			P	lh	29/07/2012	10	378176	5897508
B13012B	Ws07	Ws			SBSdk	930	7	10	25	55	20	6	D	7	A	30	P	lb	11/07/2013		391878	5901997
B13013B	Ws07	Ws			SBSdk	925		10	35	50	17	8	D	7			P	lb	11/07/2013		385361	5906733
B13031B	Ws07	Ws			SBSmc3	1,103	7	25	42	40	40	7	D		R	30	P	bs	10/07/2013		379212	5901533
B13036D	Ws07	Ws			SBSmc3	1,186	7	60	14	50	35	6	C		R		P	lb	09/07/2013		379664	5897699
BWG-033	Ws07	Ws	SBS	mc3	SBSmc3	1,263		34	20	45	40	5	D	5			P	oh	13/08/2011	10	375977	5897038
BWG-036	Ws07	Ws	SBS	mc3	SBSmc3	1,177		17	45	85	10	5	D	5			P	lh	13/08/2011	10	377641	5898646
BWG-050	Ws07	Ws	SBS	mc3	SBSmc3	1,213		35	25	70	60	7	D	6			P	lh	14/08/2011	10	376168	5897956
BWG-052	Ws07	Ws	SBS	mc3	SBSmc3	1,235		25	27	56	55	6	D	7			P	lh	14/08/2011	10	376321	5898355
bwt-210	Ws07	Ws	SBS	dk	SBSdk	797		55	30	25	60	5	C				P	cb	26/09/2012	10	380033	5979710
bwt-222	Ws07	Ws	SBS	mc3	SBSmc3	1,010	40	60	25	40	75	7	D	7			P	lh	27/09/2012	10	397489	5958015
PL-238	Ws07	Ws	SBS	mc3	SBSmc3	1,036				45	10	6	D	2			P	lb	03/10/2012	10	385631	5903050
RPW014	Ws07	Ws	SBS	mc3	SBSmc3	1,184		5	10	90	39	6	C	2b			P	lh	10/07/2012	10	377106	5898451
RPW060	Ws07	Ws	SBS	mc3	SBSmc3	1,177		10	14	75	7	6	D	2b			P	lb	11/07/2012	10	379317	5898522
T13036G	Ws07	Ws	SBS	dk	SBSdk	967		50	35	25	60	5	C	7a		50			12/07/2013	10	394484	5952178
T13038G	Ws07	Ws	SBS	dk	SBSdk	960	12	30	50	50	90	7	D	7a					12/07/2013	10	394202	5951483
T13046G	Ws07	Ws	SBS	mc3	SBSmc3	1,085	28	25	35	40	80	6	D			28			13/07/2013	10	377804	5904391
T13048F	Ws07	Ws	SBS	mc3	SBSmc3	1,055	28	25	30	40	90	6	D	7a	X	28	U		13/07/2013	10	378578	5904901
T13049G	Ws07	Ws	SBS	mc3	SBSmc3	1,005	30	15	40	60	50	6	D	6		30			14/07/2013	10	387436	5902757
T13058V	Ws07	Ws	SBS	mc3	SBSmc3		25	45	25	60	70	6	D	7a					14/07/2013	10	380074	5900365

Plot Number	Site Association	Realm Class	Zone	Sub Zone	BEC Site Unit	Elevation (m)	Seepage Depth (cm)	Strata Cover Tree (%)	Strata Cover Shrub (%)	Strata Cover Herb (%)	Strata Cover Moss (%)	Moisture Regime	Nutrient Regime	Structural Stage	Flooding Regime Freq	Rooting Depth (cm)	HydroGeo System	HydroGeo Sub System	Date	UTM Zone	UTM Easting	UTM Northing
T13064G	Ws07	Ws	SBS	mc2	SBSmc2	1,060	56	35	45	60	45	6	D	7a		33			15/07/2013	10	374201	5904006
T13073G	Ws07	Ws	ESSF	xvp	ESSFxvp	1,667	20	10	30	40	60	6	C	7a		24			16/07/2013	10	376023	5892118
T13089G	Ws07	Ws	SBS	mc3	SBSmc3	1,159	10	35	20	50	80	6	D	7a		22			17/07/2013	10	378184	5899366
T13096G	Ws07	Ws	SBS	mc3	SBSmc3	1,165		30	50	45	80	6	D	7a		27			17/07/2013	10	377998	5899952
T13119G	Ws07	Ws	SBS	mc3	SBSmc3	1,134	37		45	50	15	6	D	2b		37			19/07/2013	10	378620	5900781
T13125G	Ws07	Ws	SBS	mc3	SBSmc3	1,132	31	40	30	70	90	6	D	7a		19			19/07/2013	10	379192	5900802
T13128G	Ws07	Ws	SBS	mc3	SBSmc3	1,134		5	10	80		5	C	7a		27			20/07/2013	10	378933	5900160
T13131F	Ws07	Ws	SBS	mc3	SBSmc3	1,131	6	35	30	50	80	7	D	7a		30	P		20/07/2013	10	379386	5900310
b12-012	Ws08	Ws	ESSF	mv1	ESSFmv1	1,259		25	65	55	15	6	D	4			F	a	25/07/2012	10	375414	5898022
b12-014	Ws08	Ws	ESSF	mv1	ESSFmv1	1,286		55	11	45	70	6	D				P	lh	25/07/2012	10	374541	5898845
b12-017	Ws08	Ws	ESSF	mv1	ESSFmv1	1,345		40	33	55	25	6	D	6			P	lh	25/07/2012	10	373557	5898055
b12-022	Ws08	Ws	ESSF	mv1	ESSFmv1	1,393	10	50	30	65	60	6	D	6			P	lh	25/07/2012	10	373324	5897015
b12-042	Ws08	Ws	ESSF	mv1	ESSFmv1	1,240		50	20	60	50	6	D	6			F	a	27/07/2012	10	388880	5916591
b12-069	Ws08	Ws	ESSF	mv1	ESSFmv1	1,405	30	22	40	88	55	7	B	6			P	ob	29/07/2012	10	375808	5894689
b12-073	Ws08	Ws	ESSF	mv1	ESSFmv1	1,368	40	50	14	85	70	5	D	6		30	P	lh	29/07/2012	10	376164	5895223
BWG-003	Ws08	Ws	ESSF	mv1	ESSFmv1	1,449		62	10	70	45	6	D	7			P	bs	10/08/2011	10	371401	5896771
BWG-006	Ws08	Ws	ESSF	mv1	ESSFmv1	1,337			9	45	65	7	D	7			P	oh	10/08/2011	10	371560	5895765
BWG-040	Ws08	Ws	ESSF	mv1	ESSFmv1	1,427		65	23	40	65	6	D	6			P	bs	13/08/2011	10	372730	5894430
BWG-060	Ws08	Ws	ESSF	mv1	ESSFmv1	1,378		45	9	40	75	6	D	7			P	bs	15/08/2011	10	371930	5894366
BWG-077	Ws08	Ws	ESSF	mv1	ESSFmv1	1,278		65	22	45	85	6	D	5			F	a	18/08/2011	10	374427	5899269
BWR006A	Ws08	Ws			ESSFmv1	1,362	15	30	25	45	30	8	C	6	A	10	P	lb	13/07/2013		364210	5909865
BWVIS14	Ws08	Ws	ESSF	mv1	ESSFmv1	1,360		20	45	35		6	D	3			F	a	12/08/2011	10	375282	5895380
BWVIS35	Ws08	Ws	ESSF	mv1	ESSFmv1	1,501		17	15	35	25	5	d	7			F	a	17/08/2011	10	374135.6	5893165
BWVIS36	Ws08	Ws	ESSF	mv1	ESSFmv1	1,474		35	15	35	10	6	D	6			F	a	17/08/2011	10	373944.2	5893519
BWVIS39	Ws08	Ws	ESSF	mv1	ESSFmv1	1,331		40	35	30	10	6	D	6			P	ob	17/08/2011	10	372882.3	5895915
GIFTT09	Ws08	Ws	ESSF	mv1	ESSFmv1	1,633		2	5	85	5	7	D	2			P	bs	12/07/2011	10	375354	5892508
GIFTT19	Ws08	Ws	ESSF	mv1	ESSFmv1	1,314			18	4		6	D	6			F	a	09/08/2011	10	373200	5895665
GIFTT20	Ws08	Ws	ESSF	mv1	ESSFmv1	1,430		7	50	35	10	6	D	6			F	a	09/08/2011	10	374686	5894793
T13110G	Ws08	Ws	ESSF	mv1	ESSFmv1	1,333		10	40	65	90	5	C	6		30			18/07/2013	10	377834	5894720
B13020B	Ww	Ww			SBSmc3	1,099		0	0	20	0	8	D				L	lb	12/07/2013		381389	5900711
B13036C	Ww	Ww			SBSmc3	1,185		0	8	3	2	8	D				P	lb	09/07/2013		379749	5897741
BWR005C	Ww	Ww			SBSmc3	1,014				50		8	D				P	lb	13/07/2013		369809	5914007

Note: For information of the data summary fields and code see: BC MOFR and BC MOE (British Columbia Ministry of Forests and Range and British Columbia Ministry of Environment). 2010. Field Manual for Describing Terrestrial Ecosystems. 2nd Edition. Victoria, British Columbia. Land Manag. Handb. No. 25. Available at www.for.gov.bc.ca/hfd/pubs/Docs/Lmh/Lmh25-2.htm (accessed 12 December 2012).

APPENDIX D WETLAND MONITORING SUPPORTING DOCUMENTS

Appendix D: Wetland Monitoring Supporting Documents

1. WETLAND MONITORING

Wetlands are defined as areas “where the water table is at, near or above the surface”. They are seasonally or permanently inundated with water leading to the development of hydric soils and the establishment of obligate and facultative wetland flora and fauna species.

Wetlands are classified into five categories including fen, bog, swamp, marsh and shallow water. Each of these is sub-divided into a series of sub-categories and site associations based on soil characteristics, water type, water morphology, surface patterns, surface morphology, and vegetation communities.

Wetlands provide many valuable ecological services:

- Habitat for a variety of common and rare wildlife and vegetation species;
- Water movement regulation for nutrient control and flood prevention;
- Sediment control and pollutant filter; and
- Climate regulation including carbon fixation, CO_2 balance and micro-climate influences.

Potentially significant changes in changes in hydrology soils, species composition and structure can be detected through effective monitoring.

2. WETLAND SITE MONITORING SET-UP

A minimum of three wetland transects, three vegetation plots and one perimeter transect will be established at each wetland site. Locations will be determined at first site visit to represent all habitat types within the wetland as well as for accessibility. Initial transect tracks and plot locations are marked on the wetland map. Materials and equipment needed for initial plot set-up and maintenance during subsequent monitoring visits is listed in Table D-1.

Table D-1: Equipment Required for Set-up and Subsequent Monitoring Visits

Equipment	Set-up	Wetland Transect	Perimeter Transect	Vegetation Plot
GPS enabled tablet loaded with maps, backup paper maps	X	X	X	X
Compass, clinometer, GPS	X	X	X	X
Data sheets (WL, SIVI, WHA), pencils, permanent markers	X	X	X	X
Deif manual, lmh 52 and 24, plant id guides	X	X	X	X
Wildlife list, rare and cultural plants list	X	X	X	X
1.5 m long PVC pipes (or rebar)	X			
30 m measuring tape, folding measuring stick	X	X	X	X
Quadrat cross	X			X
Pigtail marking stakes, flagging tape	X			
Waders and non-felted boots, decontamination kit	X	X	X	X
Soil Auger, sample bags	X	X	X	X

Equipment	Set-up	Wetland Transect	Perimeter Transect	Vegetation Plot
Post Pounder or mallet	X			
Personal Gear (safety vest, bug head net, gloves etc)	X	X	X	X

Note: A repair kit consisting of replacement parts and tools is essential to have on hand during monitoring visits in case repairs or replacement is needed.

2.1 Wetland Transects

Each wetland monitoring station is comprised of three wetland transects with posts positioned at 10 m intervals. Transects begin 10 m upland of the wetland edge and run to the center of the wetland. Additional posts can be placed at transition zones, with additional posts established annually as transitions fluctuate. All posts are labelled permanently.

2.2 Vegetation Plots

A minimum of three vegetation plots will be established at each wetland site; more for larger wetlands and complexes. Each plot with consist of a 1 x 1 m vegetation subplot nested within a larger 20 x 20 m SIVI or Site plot and will share the same reference point. Plot center will be marked and all four corners of the subplot will be marked with pigtails. Plot center will be labeled permanently.

2.3 Perimeter Transects

Prior to setting up the transect start location, wetland size, shape and boundary will be determined from ortho-photos/Google Earth/FWA/TRIM and preliminary a preliminary boundary will be placed on the field map. A transect starting position will be established and marked. Any detours required due to access will also be clearly marked.

2.4 Wildlife Assessments

Prior to the initial site visit, all VCs and their habitat requirements will be determined. Wildlife assessments will be completed using WHA, CWD, and TAW plots and will include detailed wildlife use notes for the wetland and upland site. Plots will be completed to ensure coverage of all habitat types.

2.5 Photo-points

Permanent photo-points will be established within the site at multiple locations, including established plots, inflows/outflows, and any notable location determined during the initial visit. If possible, trail cameras will be setup in the wetland and programmed to take two photos/day.

2.6 Water Quality Stations

Water quality stations will be established at predetermined locations within the Mathews Creek Wetland Complex offset site. This will include the installation of shallow piezometers with data loggers to measure hydrological conditions. Permanent locations will be determined during initial site visit and will consider access as well as best placement for water quality sampling. Micro-climate stations may be considered for several offset/reference/mine site wetlands. Installation will follow existing standards for water quality monitoring.

2.7 Record Keeping

All file naming conventions will be determined prior to data collection to ensure accuracy and efficiency for data entry and analysis. Survey photos, photos of field data forms, Track and waypoint files will be uploaded to a dropbox or ftp site at the end of every day into a folder (Wetland Site ID/Date).

3. DATA FORMS

3.1 Wetland Monitoring Survey Field Data Form

Project: _____

Date (d/m/y): _____ Surveyors: _____

Map ID: _____ Wetland ID: _____

Loc UTM N: _____ E: _____ +/-: _____m

Loc Desc: _____

_____

_____

Weather: CC: _____ Precip: _____ Wind: _____ Air Temp: _____

BEC: _____ Wetland Class: _____ Size (ha) _____

Start Time: _____ End: _____ Total Time: _____

Photo Log ID: _____

GPS Track Log ID: _____

Site Forms:

Survey	Number Completed in Wetland Site	ID
Wetland Plot		
Wetland Transect		
Vegetation Plot/Subplot		
WHA		
TAW		
CWD		

3.2 Wetland Site

Wetland Survey Wetland ID: _____

Hyrologically Connected to a Stream: _____ Y _____ N

Wetland Complex: _____ Y _____ N

Hydrogeomorphic: ___ Palustrine ___ Fluvial ___ Lacustrine

___ Seepage Slope ___ Pond/Pothole ___ Basin/Hollow

Hydrodynamic Index: ___ St ___Sl ___ Mo ___ Dy ___ Vd

3.3 Wetland Transects

- Record Transect ID, bearing and slope
- Start 10 m upland and walk perpendicular to wetland center
- Mark and photograph start/end, transition locations
- Name transect track and segments by Wetland ID/Trans#_Seg#

For each segment (include upland segment) record:

- Vegetation: species, % cover, form, vigor, recruitment;
- Soil: depth to water, SMR, SNR, type; and
- Water: Temp, pH, depth.

3.4 Perimeter Track

Traverse perimeter of wetland, record in/outflows, wildlife observations and disturbances. Name Track and waypoints by Wetland ID/Boundary#.

3.5 Observations

Record all observations of terrestrial and aquatic wildlife, weeds, disturbance etc. Include location waypoint and photos wherever possible.

3.6 Comments

Record all relevant information regarding the wetland health, disturbances, wildlife use, concerns.

3.7 Site Diagram

Draw a site diagram.

3.8 Field Guides

- Wetlands: LMH 52
- Terrestrial: LMH 24
- Methods/descriptor codes: Deif Manual V2
- Plants of Northern BC, Plants of Western Boreal Forest

Other RIC site forms:

- SIVI
- WHA
- CWD
- TAW

3.9 Field Data Descriptions

Parameter	Description	
Hydrogeomorphic System	Describes the topographic position and hydrology of the site	Fluvial
		Lacustrine
		Palustrine, Basins and Hollows
		Palustrine, Seepage Slopes
		Palustrine, Ponds and Potholes
Hydrodynamic Index	Describes the magnitude of vertical and lateral water movement in the soil	Stagnant (St)
		Slugish (Sl)
		Mobile (Mo)
		Dynamic (Dy)
		Very Dynamic (Vd)
Soil Moisture	Average amount of soil water available for evapotranspiration by vascular plants over several years	Moist (M)
		Very Moist (VM)
		Wet (W)
		Very Wet (VW)
Soil Nutrient	Essential soil nutrients available to vascular plants over a period of several years	Very Poor (A)
		Poor (B)
		Medium (C)
		Rich (D)
		Very Rich E
		Hyper (F)
pH	A correlate measure of base cation availability – an indication of site productivity	Very Acidic (VA): <4.5 pH
		Moderately Acid (MA): 4.5-5.5 pH
		Slightly Acid (SA): 5.5-6.5 pH
		Neutral (N): 6.5-7.4 pH
		Alkaline (AK): >7.4 pH
Soil Drainage	Describes the speed and extent to which water is removed from a mineral soil in relation to additions	Deif page soil 23-24 tables 2.16 and 2.17 (see below)
		Drainage Classes I, p, v
		Sub Moisture Classes aq, pa, ac, sa
WHA	An assessment of the wildlife value for selected species; Wildlife use	TAW
		CWD
		WHA
		Wildlife Use
Wetland Size	The size of the wetland or wetland complex	Perimeter track in the field and GIS with TRIM and lidar
Plant Inventory	Species and % cover list collected at aquatic and upland plots	SIVI
		Modified wetland plot card

Drainage Class

Code	Class	Description
i	Imperfectly drained	Water is removed from the soil sufficiently slowly in relation to supply to keep the soil wet for a significant part of the growing season. Excess water moves slowly downward if precipitation is the major source. If subsurface water or groundwater (or both) is the main source, the flow rate may vary but the soil remains wet for a significant part of the growing season. Precipitation is the main source if available water storage capacity is high; contribution by subsurface or groundwater flow (or both) increases as available water storage capacity decreases. Soils generally have a wide range of texture, and some mottling is common
p	Poorly drained	Water is removed so slowly in relation to supply that the soil remains wet for much of the time that it is not frozen. Excess water is evident in the soil for a large part of the time. Subsurface or groundwater flow (or both), in addition to precipitation, are the main water sources. A perched water table may be present. Soils are generally mottled and/or gleyed
v	Very poorly drained	Water is removed so slowly in relation to supply that the soil remains wet for much of the time that it is not frozen. Excess water is evident in the soil for a large part of the time. Subsurface or groundwater flow (or both), in addition to precipitation, are the main water sources. A perched water table may be present. Soils are generally mottled and/or gleyed

Soil Moisture

Code	Moisture Subclass	Description	Saturation Period (mo.)	Moist Period (mo.)
aq	Aqueous	Free surface water	11.5–12	< 0.5
pa	Peraquic	Soil saturated for very long periods	> 10	< 2
ac	Aquic	Soil saturated for moderately long periods	4–10	2–8
sa	Subaquic	Soil saturated for short periods	< 4	8–11.5
ph	Perhumid	No significant water deficits in growing season	< 2	8–11.5
hu	Humid	Very slight deficits in growing season	< 0.5	> 11.5

APPENDIX E ECOLOGIC BLACKWATER WETLANDS WORK PLAN

ECOLOGIC CONSULTANTS LTD.
UNIT 2, 252 EAST 1ST STREET
NORTH VANCOUVER BC V7L 1B3
PHONE: 604 803-7146

MEMORANDUM

DATE:	February 18, 2022
TO:	Irene Tuite, M.Sc., R.P.Bio. – Aquatic Biologist Travis Desormeaux, Environmental Manager, BW Gold
FROM:	Jason Jones (Ph.D., R.P.Bio.), Jamie Fenneman (Ph.D., R.P.Bio.) and Ryan Durand (M.Sc., R.P.Bio.)
SUBJECT:	Blackwater Gold Project – 2022 Wetland Work Plan

TASK UNDERSTANDING

EcoLogic Consultants Ltd. (EcoLogic) understands that BW Gold has requested the support of vegetation and wetland specialist services related to fisheries and wetlands offsetting related to projected project effects from development of the Blackwater Gold Project Project. BW Gold and its consultants (including ERM) have developed a Wetland Management and Offsetting Plan (WMOP) for the Project, and has requested EcoLogic's support with wetland classification and functional assessments in the Mathews Creek complex. EcoLogic has been engaged to review the existing WMOP, conduct a site visit to complete surveys in conjunction with some combination of project consultants (e.g., ERM) and Aboriginal groups, Aboriginal monitors and their consultants, which would be used to evaluate the efficacy of the proposed strategies, develop construction level documents to supplement existing offsetting plans, and to provide overall recommendations for plan improvements.

PROPOSED TEAM

Two highly experienced individuals will lead the execution of the workplan, including but not necessarily limited to proposed field work and subsequent development of construction level-documents and offsetting plan updates:

- Jamie Fenneman, Ph.D., R.P.Bio. - Dr. Fenneman has more than 20 years of experience studying flora and fauna in British Columbia, and has collected and documented plants and wildlife throughout most of the province. He specializes in botanical inventories, rare plant surveys, and mitigation strategies for rare species. He also conducts inventories and surveys of small and large mammals, invertebrates, amphibians, and birds.

- Ryan Durand, M.Sc., R.P.Bio. – Mr. Durand is ecologist/project manager with over 20 years of experience. He has worked throughout western and northern Canada, including British Columbia, Nunavut, Northwest Territories, and Saskatchewan, primarily on energy and mining projects. He specializes in vegetation inventories, wetland and ecosystem classification and mapping, and watercourse mapping and assessments. He is proficient in air photo interpretation and GIS mapping, having completed over 50 mapping projects (encompassing over 8 million hectares) including Terrestrial Ecosystem Mapping, Predictive Ecosystem Mapping, Sensitive Ecosystems Inventory Mapping, and Wildlife Habitat Suitability Mapping.

WETLANDS WORK PLAN

Prior to the 2022 wetland field surveys, a sampling plan will be created to ensure that all of the representative wetland types within the compensation areas (as shown on Figure 10.2-2 in the WMOP and attached figure) are field checked. Existing baseline reports along with regional field guides will be used to develop a working list of known and potential wetland communities that may be present in the area.

Wetland Field Studies

Wetland field studies will have two components:

1. Detailed mapping and assessments of the Matthews Creek offsetting area; and
2. Reconnaissance field studies to locate additional potential offset or compensation sites in the regional.

Field work will be conducted in the early summer of 2022, with the date largely dependent on seasonal plant phenology. The wetland compensation area along Matthews Creek will be sampled per the *Field Manual for Describing Terrestrial Ecosystems* (2nd Edition). A combination of full (FS882 field forms) and visual plots will be completed to classify each wetland per *A Field Guide for Site Identification and Interpretation for the Southwest Portion of the Prince George Forest*, *Wetlands of British Columbia*, and the current *Bioegeoclimatic Ecosystem Classification Codes and Names* database. Field plots will include the collection of standard site, soil, vegetation, and evidence of wildlife use data (FS882 field forms), as well as wetland-specific data including pH, conductivity, turbidity, dissolved oxygen, hydrodynamic index, and observations of water flow and connectivity (including hydrogeomorphic position). Georeferenced photographs of all wetland types, as well as any important features, will be taken. *The Field Manual for Describing Terrestrial Ecosystems* (2nd edition) is applicable to natural and disturbed ecosystems.

Soils will be assessed and classified as per BC Provincial protocols, which are based on Canadian System of Soil Classification. The appropriate depth for soil sampling is dependant on soil type, depth to water, surface water levels, etc. Samples are typically collected from within the rooting zone in the B horizon in mineral soils, and the mesic layer in organic soils.

We are anticipating a survey intensity level 1 or 2, with over 50% of the polygons field checked. The actual number of wetland polygons and field plots will be determined after the draft ecosystem mapping is completed (before the field season) and we have a better understanding of the type and extent of wetlands in the study area.

Field studies within the Matthews Creek offsetting area will include the collections of vegetation tissue and soil samples (10 triplicate samples) for laboratory analysis of baseline metals. Ideally, only one plant species will be sampled to obtain consistent data across the complex. A potential candidate is *Carex aquatilis*, but the final determination will be made tin the field. We typically collect more samples than are actually required, thereby allowing the selection of the species that best represents the study area. Sampling methods will follow laboratory requirements for chain of custody, sampling containers, storage and hold times. As we will be sampling for baseline metals, storage requirements are minimal and preservatives are not required. Samples will be collected while wearing clean nitrile gloves to avoid contamination and stored in Ziploc bags. Each bag will be labelled, and stored in a cool location out of direct sunlight. ALS laboratory guidelines for metals samples using this method states that samples can remain viable for 6 months. We will coordinate with ALS in advance of the field program to maximize adherence to the laboratory's requirements.

Wetland health assessments will be completed within the Matthews Creek offsetting area as per FREP 2020, including the identification of any introduced species, evidence of soil alterations, evidence of altered drainage patterns, and any impediments to wildlife movement. The functional assessment methodology will be consistent with existing methodologies in use at the Project.

A reconnaissance-level survey of other potential wetland offset sites will be completed in the general area. These surveys will be largely road based with visual observations of wetland complexes that have been pre-selected using a GIS. The assessments will look for wetlands that have the potential to serve as additional offsetting sites, with a preference for complexes that are currently degraded, and those which contain similar wetland associations that have been identified within the Project footprint. A second trip during the summer of 2022 may be required to locate wetland function reference sites that match the type and extent of wetlands that occur within the project footprint (which we understand will be mapped and sampled during the 2022 field season).

Wetland Mapping

Wetland mapping of the compensation area will be completed at a scale of 1:5,000 using head-up digitizing on ortho imagery. The mapping will generally follow the Standard for Terrestrial Ecosystem Mapping in British Columbia (RIC 1998). Preliminary mapping will be completed prior to the field studies to aid the sampling design and to ensure that all wetland types are assessed in the field. Field data will be used to confirm the wetland classification on the final version of the mapping. Wherever possible, the mapping will produce polygons with a single ecosystem type (up to three ecosystems per polygon is permitted under the standard) to create a final map product with the most utility. The mapping will include the necessary attributes to classify each wetland, including site series or site association, structural stage, canopy composition and canopy modifiers, and disturbance. An internal QA/QC process will be

completed on the mapping, including checking spatial representation, wetland classification, and completeness of the attribute table. As the current wetland extent (Figure 10.2-2 in the WOMP) is based on the provincial base data, the mapped extent of the wetland complex is expected to change.

Deliverables

- Memo describing the methodology, study area and results. The memo will include a description of wetland health and function assessments.
- Spatial data including the ecosystem mapping and plot locations as ESRI shapefiles, .kml, and .kmz.
- Georeferenced digital photos for each plot and additional features.
- Field and laboratory data provided on an Excel spreadsheet.

WORKSHOPS

EcoLogic scientists will deliver a one-day vegetation and wetland workshop at the BW Gold project site during the middle of the field program with participation from all field work participants on wetland ecology and riparian plant identification based in the Mathews Creek area. The workshop logistics will be coordinated by BW Gold. Key topics will include:

- wetland function;
- wetland indicators (e.g., soil conditions, obligate wetland plants);
- identification and delineation of riparian areas;
- plant identification; and
- planning and executing reclamation and restoration activities.

EcoLogic will conduct an additional half-day workshop to help align all on-site consultants working on vegetation and wetland surveys on protocols and procedures.

SCHEDULE

- Review WOMP (Feb 2022)
- Develop workplan for wetland field work and incorporation into overall project plans (Feb-March 2022)
- Field visit (five 10-hr days, two people) for wetland classification and functional assessment, and two workshops (June-July 2022)
- Project reporting (August-September 2022)

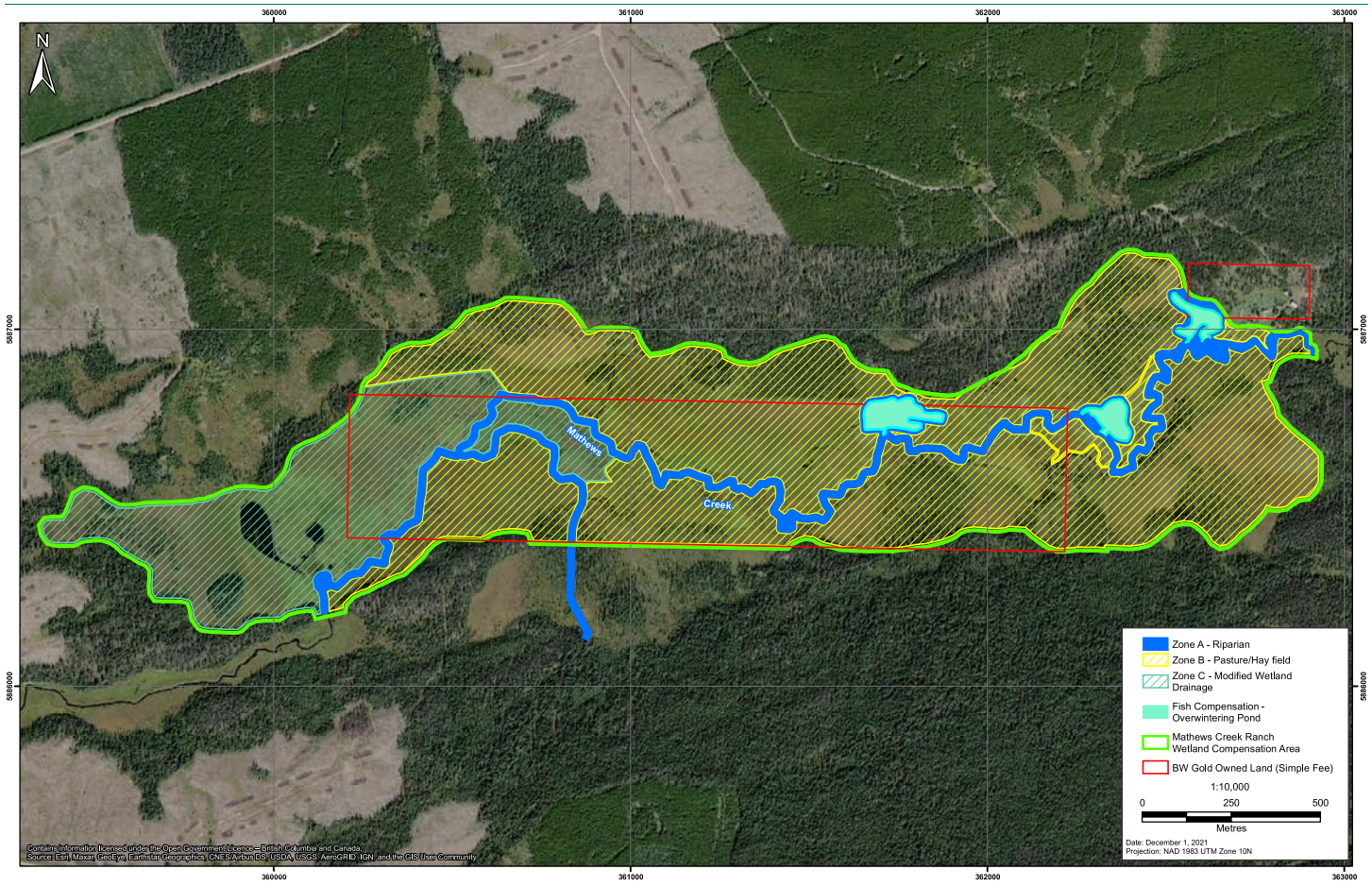


Figure 10.2-2: Mathews Creek Ranch Wetland Restoration Areas

APPENDIX F WETLANDS BASELINE DATA COLLECTION – REQUEST FOR PROPOSAL

Artemis Gold – Blackwater Project – Wetlands Baseline Data Collection – Mine Site, Transmission Line and Additional Candidate Offsetting Sites Request for Proposal (RFP)

1 The Project

Artemis Gold Inc. (Artemis) was granted a certificate under the Environmental Assessment Act for the Backwater Gold Project (the Project). As described in the Certified Project Description, the Project involves the development of an open pit gold and silver mine approximately 160 km southwest of Prince George, BC. Project components and activities include development of the mine site and access road, construction of the freshwater supply system, airstrip and access road, and electrical transmission line.

1.1 Purpose of the RFP

The purpose of the RFP is to seek proposals from environmental consulting firms to collect baseline information as described in sections 1.3to 1.5 to add to existing baseline information on wetlands (expected to be impacted by the Project) collected during the project EA phase.

The objective of this proposed work program is delineation for wetland and associated ecosystems and collect attributes to aid in the completion of an accurate wetland ecosystem map and wetlands function assessment to update the current ecosystem and wildlife suitability mapping. These data will be used to inform wetland habitat offsetting.

Section 1.1.1 outlines the Environmental Assessment Certificate (EAC) Condition 24 Wetlands Management and Offsetting Plan (BC EAO 2019). Section 1.1.2 outlines the federal Decision Statement (DS) Condition 5 Wetlands and Section 1.1.3 outlines DS Conditions 2.5, 2.9 and 2.10 Follow-up and Adaptive Management (CEA 2019). The successful firm will be expected to conduct work pursuant to these conditions.

1.1.1 Environmental Assessment Certificate Condition 24 Wetlands Management and Offsetting Plan

The EAC Holder must retain one or more Qualified Professionals to develop a Wetland Management and Offsetting Plan, to offset losses of wetland functions caused by the Project, in consultation with Ministy of Forest, Lands, Natural Resource Operations & Rural Development (FLNRORD), Ministry of Environment and Climate Change Strategy (ENV), Environment and Climate Change Canada (ECCC), Ministry of Energy, Mines and Petroleum Resources (EMPR) and Aboriginal Groups. In this Condition, “wetland function” refers to the hydrological, ecological and wildlife lifecycle requirements provided by wetlands.

The plan must include at least the following:

a) the means by which the mitigation measures identified in the in the Mitigations Table required under Condition 43 for the valued component Wetlands will be implemented;

b) a detailed description for each wetland that would be lost or altered as a result of the Project, including:

i) an assessment of each wetland and wetland function that would be lost or altered based on Wetlands of British Columbia: A Guide to Identification (FLNRORD 2004, or as updated or replaced from time to time); and

ii) the location and extent of these wetlands, including in relation to the local watershed;

c) a description of the methods used to determine the functions and overall condition of wetlands;

d) a description of the offsetting measures to be implemented by the Holder, including the amount and type of offsets required, the selection of offsetting sites, and a schedule and timeline for implementation of offsetting measures. The Holder is responsible for offsetting measures that compensate for expected losses of individual wetland functions described in (b);

e) a description of how the plan applies the hierarchy of mitigation measures set out in the BC EMP;

f) a description of how the selection of offsets took into account the extent to which the potential offsets would also provide additional habitat for grizzly bear and moose; habitat type, capability of habitat for those species, wildlife suitability and evidence of use/incidental observation;

g) a description of how input from Aboriginal Groups was considered in the identification and selection of potential locations for wetland offsets; and

h) a description of how the implementation of the offsets and mitigation measures will be monitored for effectiveness.

The Holder must provide the draft plan that was developed in consultation with EMPR, ENV, FLNRORD, ECCC, and Aboriginal Groups to EMPR, ENV, FLNRORD, ECCC, Aboriginal Groups, and the EAO for review a minimum of 90 days prior to the planned commencement of Construction or as listed in the Document Submission Plan required by Condition 10 of Blackwater Gold Project Certificate.

The Holder must not commence Construction until the plan has been approved by the EAO, unless otherwise authorized by the EAO.

1.1.2 Decision Statement - Condition 5 Wetlands

5.1 The Proponent shall mitigate the adverse environmental effects of the Designated Project on wetland functions with a preference for avoiding the loss of wetlands and wetland functions over minimizing the adverse effects on wetlands, and for minimizing the adverse effects on wetlands over compensating for lost or adversely affected wetlands, taking into account British Columbia's Wetland Ways: Interim Guidelines for Wetland Protection and Conservation in British Columbia, and Riparian Management Area Guidebook.

5.2 The Proponent shall maintain, during construction and operation, a 30-metre buffer of undisturbed vegetation around wetlands located within the mine site, excluding activities required to construct project components. The Proponent shall conduct work or activity within the 30-metre buffer only to the extent necessary for safety reasons, to control invasive plants, or to install and maintain erosion or sediment run-off control measures. The Proponent shall have an independent environmental monitor observe work being done within the buffer, except when not possible for safety reasons. As part of the annual report, the Proponent shall include a summary of work or activities conducted for safety reasons within the 30-metre buffer.

5.3 The Proponent shall, for adverse environmental effects from the Designated Project on wetlands that cannot be avoided or minimized pursuant to condition 5.1, set out mitigation measures in a wetland compensation plan. The Proponent shall develop the wetland compensation plan, prior to construction, in consultation with Indigenous groups, Environment and Climate Change Canada and other relevant authorities, and taking into account Canada's Federal Policy on Wetland Conservation, Environment and Climate Change Canada's Operational Framework for Use of Conservation Allowances and habitat needs for migratory birds, moose (Alces alces) and listed species at risk. When identifying mitigation measures, the Proponent shall select wetland restoration over enhancement and wetland enhancement over wetland creation. The Proponent shall start the implementation of the wetland compensation plan prior to the wetlands being adversely affected.

5.4 For any wetland creation required pursuant to condition 5.3, the Proponent shall establish, prior to wetland creation and in consultation with Indigenous groups, Environment and Climate Change Canada and other relevant authorities, performance standards for wetland functions.

5.5 The Proponent shall develop, prior to construction and in consultation with Indigenous groups, Environment and Climate Change Canada and other relevant authorities, a follow-up program to verify the predictions of the environmental assessment as it pertains to the adverse environmental effects of the Designated Project on wetland functions and to determine the effectiveness of the mitigation measures as it pertain to wetlands. The Proponent shall implement the follow-up program during from construction through decommissioning and shall apply conditions 2.9 and 2.10 when implementing the follow-up program.

As part of the follow-up program, the Proponent shall:

> 5.5.1 conduct pre-construction surveys within the mine site to confirm the absence of red or blue-listed wetlands. The Proponent shall provide the results of the survey to the Agency and to Indigenous groups prior to the start of construction. If the results of the survey demonstrate the presence of red or blue-listed wetlands within the mine site, the Proponent shall develop, prior to construction, and implement additional mitigation measures;

5.5.2 monitor changes to wetland functions of wetlands located within the mine site and remaining after vegetation clearing required to construct project components during all phases of the Designated Project; and

5.5.3 monitor all compensatory wetland sites at a minimum annually, to ensure they meet or exceed performance standards for wetland functions established pursuant to condition 5.4 from the start of compensation until wetland functions are attained.

1.1.3 DS Conditions 2.5, 2.9, and 2.10 Follow-up and Adaptive Management

2.5 The Proponent shall, where a follow-up program is a requirement of a condition set out in this Decision Statement, have a Qualified Professional, where such a qualification exists for the subject matter of the follow-up program, determine, as part of the development of each follow-up program and in consultation with the party or parties being consulted during the development, the following information:

- 2.5.1 the follow-up activities that must be undertaken by a qualified individual;
- 2.5.2 the methodology, location, frequency, timing and duration of monitoring associated with the follow-up program;
- 2.5.3 the scope, content, format and frequency of reporting of the results of the follow-up program;
- 2.5.4 the levels of environmental change relative to baseline conditions that would require the Proponent to implement modified or additional mitigation measure(s), including instances where the Proponent may require Designated Project activities to be stopped; and
- 2.5.5 the technically and economically feasible mitigation measures to be implemented by the Proponent if monitoring conducted as part of the follow-up program shows that the levels of environmental change referred to in condition 2.5.4 have been reached or exceeded.

2.9 The Proponent shall, where a follow-up program is a requirement of a condition set out in this Decision Statement:

- 2.9.1 conduct the follow-up program according to the information determined pursuant to condition 2.5;
- 2.9.2 undertake monitoring and analysis to verify the accuracy of the environmental assessment as it pertains to the particular condition and/or to determine the effectiveness of any mitigation measure(s);
- 2.9.3 determine whether modified or additional mitigation measures are required based on the monitoring and analysis undertaken in accordance with condition 2.9.2; and
- 2.9.4 if modified or additional mitigation measures are required pursuant to condition 2.9.3, develop and implement these mitigation measures in a timely manner and monitor them in accordance with condition 2.9.2.

2.10 Where consultation with Indigenous groups is a requirement of a follow-up program, the Proponent shall discuss the follow-up program with Indigenous groups and determine, in consultation with Indigenous groups, opportunities for their participation in the implementation of the follow-up program, including the analysis of the follow-up results and whether modified or additional mitigation measures are required, as set out in condition 2.9.

1.2 RFP Scope

The scope of proposed activities will include:

1. Collection of spatial data to complete an accurate map of wetlands to the 1:5000 scale in the mine site and transmission line
2. Collection of wetland health and function attributes to inform baseline description of wetland type and function
3. Collaborate with data collection in the Mathews Creek Offsetting Area to ensure alignment on methodology
4. Develop a QA/QC spatial layer of wetlands to support decision making following the EAC and Federal DS.

1.3 Wetlands Work Plan

Existing baseline reports along with regional field guides will be used to develop a working list of known and potential wetland communities that may be present in the project footprint, transmission line area and any identified additional candidate offsetting sites.

1.3.1 Wetland Field Studies

The 2022 program must provide updated baseline data for wetland ecosystems and wildlife to inform development planning and offsetting requirements. This will include updating the wildlife habitat suitability mapping for moose and grizzly bear (WWMP 2022 update), and to refine wetland offsetting accounting.

The work needs to include:

- A comprehensive work plan including number of staff, qualifications (including RP.Bio with wildlife experience), schedule of field work and deliverables to encompass all project tasks associated with this field program;
    - Detailed wetland mapping in the Project area LSA and RSA (included in shapefiles);
    - Effective wetland function assessments;
    - A wetland ecosystem data memorandum detailing:
        - wetland type, size, and hydrological, biochemical, ecological and habitat and functions.
        - wetland areas maps to update suitability for grizzly bear and moose in these high quality habitats.

1.4 Pre-Field Technical Activities

Digital colour air photos of the Project area obtained late 2021 and early 2022 will be made available to modify the previously delineated and mapped TEM polygons. Polygons containing wetland ecosystems should be split and boundaries modified to delineate distinct terrestrial and wetland ecosystems within the mapped (TEM) area and wetland polygons should be delineated for the areas within the RSA not covered by TEM. Refer to section 1.5.1 for mapping ratio and requirements.

The BC Conservation Data Centre should be queried for potential rare terrestrial or wetland ecosystems that could be found within the Project area with descriptions compiled on field cards identifying key characteristics for use in the field.

1.5 Methodology and Approach

Sampling must be conducted within the previously mapped wetland polygons (see attached shapefiles) within distinct terrestrial and wetland ecosystems in conjunction with wildlife habitat assessments following the methods outlined in BC MOFR and BC MOE (2010).

Sampling will need to be conducted in late June or early July 2022 (weather depending) to correspond with vegetation green-up and plant flowering to aid in plant identification for the ecosystem mapping. It is important the proposal consider how best to incorporate Indigenous environmental monitors into the field work. It is anticipated the work can be conducted in approximately 14 field days.

Site access will be by truck and helicopter. Helicopter landing sites should be determined to avoid nesting waterbirds and may be located outside of a wetland. If nesting birds are determined or suspected, the crew should walk to the site from the nearest safe landing location. Once on site, work will take place in areas that avoid disturbing the nesting birds. The cost for the truck and other field gear should be included in the proposal, however the cost of the helicopter will be handled by Artemis Gold, with the logistics planning being shared among Artemis and the successful bidder. A map of roads on the Project site and transmission line shapefiles have been included in the RFP for reference.

1.5.1 Wetland Mapping

Terrestrial and wetland ecosystem mapping must be completed at a scale of 1:5,000 following standard methods used in BC. Ecosystem mapping follows the standards outlined in the *Standard for Terrestrial Ecosystem Mapping in British Columbia* (RIC 1998a), with ecosystem classification following Banner et al. (1993) and wetland classification following Mackenzie and Moran (2004).

A combination of full (FS882) and visual plots (FS1333) will be completed to classify each wetland following the *Site Identification and Interpretation for the Southwest Portion of the Prince George Forest Region Field Guide* (BC DeLong, Tanner and Jull 1993), Wetlands of British Columbia (MacKenzie and Moran 2004), and the current *Bioegeoclimatic Ecosystem Classification Codes and Names* database (BECWeb 2016). Field plots must include the collection of standard site, soil, vegetation. Wildlife suitability and evidence of use data should be collected for moose, grizzly bear, birds, and beavers. Wildlife signs and sightings must be recorded with GPS coordinates, habitat type observed, position in relation to the whole wetland, referencing photographs and any other relevant notes.

Wetland-specific data including pH, conductivity, turbidity, dissolved oxygen, hydrodynamic index, water flow and connectivity, and hydrogeomorphic position must be recorded on wetland data forms designed

for the Blackwater Project. Forms will be developed by the successful consultant and signed off by the WMOP QP prior to start of field work. Georeferenced photographs must be taken of all wetland types and relevant features. All incidental wildlife use for wetland dwelling species such as waterbirds, western toad and bats must be noted.

1.5.2 Function Assessments

To assess the wetland habitat and functions, a number of existing methods were reviewed. The decision framework outlined in Hansen *et al.* (2008) was applied to determine a structured approach to obtain information in order to understand and describe the functions of the wetlands in the Project area.

Wetland function assessments must be completed using repeatable objective methods that are adaptable to a range of wetland types and will facilitate analyses of wetland functions that are relevant to regulatory objectives. Hanson *et al.* (2008), outlines the need for four primary functions to be included in an environmental assessment, including hydrological, biochemical, habitat (ecological), and climate (Table 1.5.2-1).

Table 1.5.2-1. Relationship between Wetland Functions and Values

Function Category	Functions	Key Values
Hydrological	Surface water storage and release	Replenish groundwater supplies
	Flow moderation	Moderation of storm water peaks
	Aquifer recharge and discharge	Climate moderation
		Water flow maintenance during drought
		Water velocity control
		Removal of suspended sediments
Biochemical	Nutrient cycling	Natural water quality improvement
	Organic soil development	Excess nutrient reduction
	Water quality services	Sequestration of atmospheric carbon
Habitat	Biological productivity and diversity	Biodiversity provision
		Wildlife habitat – habitat for species at risk
		Erosion control
Climate	Carbon fixation and CO^2 balance	Maintenance of current climate
	Rainfall and humidity increases	
	Micro-climate influences	

Wetland function assessments must be determined through a compilation of wetland ecosystem data, wildlife habitat value and habitat use, and specific wetland data (Table 1.5.2-2) collected on a customized wetland function form (Table 1.5.2-3).

Table 1.5.2-2. Wetland Data for Wetland Function Assessments

Parameter	Description		
Wetland Size	The size of the wetland or wetland complex	Perimeter track in the field using GPS, review with GIS using LiDAR and TRIM	
Hydrogeomorphic System (see Mackenzie and Moran 2004)	Describes the topographic position and hydrology of the site	Fluvial Lacustrine Palustrine, Basins and Hollows Palustrine, Seepage Slopes Palustrine, Ponds and Potholes	
Hydrodynamic Index (see Mackenzie and Moran 2004)	Describes the magnitude of vertical and lateral water movement in the soil	Stagnant (St) Sluggish (Sl) Mobile (Mo) Dynamic (Dy) Very Dynamic (Vd)	
Soil Moisture Regime (see Mackenzie and Moran 2004)	Average amount of soil water available for evapo-transpiration by vascular plants over several years	Moist (M) Very Moist (VM)	Wet (W) Very Wet (VW)
Soil Nutrient Regime (see Mackenzie and Moran 2004)	Essential soil nutrients available to vascular plants over a period of several years	Very Poor (A) Poor (B) Medium (C)	Rich (D) Very Rich (E) Hyper Rich (F)
pH (see Mackenzie and Moran 2004)	A correlate measure of base cation availability - An indication of site productivity	Very Acidic (VA): <4.5 pH Moderately Acid (MA): 4.5-5.5 pH Slightly Acid (SA): 5.5-6.5 pH Neutral (N): 6.5-7.4 pH Alkaline (AK): >7.4 pH	
Soil Drainage Classes (see BCMOFR and MOE 2010; Table 2.16)	Describes the speed and extent to which water is removed from a mineral soil in relation to additions	Imperfectly Drained (i) Poorly Drained (p) Very Poorly Drained (v)	
Sub Moisture Subclasses (see BCMOFR and MOE 2010; Table 2.17)	Describes the timing and duration of soil saturation	Aqueous (aq) Peraquic (pa) Aquic (ac)	Subaquic (sa) Perhumid (ph) Humid (hu)
Plant Inventory (see BCMOFR and MOE 2010)	Species and % cover list collected at aquatic and upland plots	Site Visit (SIVI; FS1333)	
Wildlife Assessments	An assessment of the value of the wetland for	Wildlife Habitat Assessment (FS882(5)) Tree Attributes for Wildlife (FS882(6))	

Parameter	Description	
(see BCMOFR and MOE 2010)	select wildlife species (ungulates, birds, amphibians)	Coarse Woody Debris (FS882(7))

Table 1.5.2-3. Field Data Forms Applied to Wetland Function Assessments

Survey Name	Form ID	Type
Wetland Function	BW Wetland Function	Wetland assessment transects and plots crossing the wetland feature, and wetland feature perimeter transects.
Ecosystem/Site Visit	FS882(1,2,3)/FS1333	Wetland ecosystem description as well as adjacent riparian/upland ecosystem plot(s).
Wildlife Habitat Assessment (WHA)	FS882(5)	Wildlife habitat value and use information recorded in within plot and plot-in-context area for wetland and adjacent riparian/upland area.
Tree Attributes for Wildlife (TAW)	FS882(6)	Fixed area plot located adjacent to the wetland plot.
Coarse Woody Debris (CWD)	FS882(7)	Two 24 m sampling transects with the start location associated with the wetland plot.

The perimeter of each wetland must be identified and surveyed for in flow and out flow locations. Areas of open water and water control structures (i.e., beaver dams, culverts) must also be recorded.

Survey methods are adapted from those identified in the Forest and Range Evaluation Program (FREP) wetland protocol (Fletcher *et al.* 2018). At each wetland, a transect, starting 10 m upslope of the wetland edge, is walked at a right angle from the wetland edge toward the center of the wetland. Transect length will vary for wetland size and any barriers encountered (deep water, channel, soft bottom etc.). Plots are completed in transect locations that indicate a change in wetland class or plant association. Structural stage, soil description, depth to water, water pH and temperature, and dominant plant species, form, vigor and recruitment will be recorded. In complex wetlands, additional ten meter transects will be conducted at right angles to the end of the first transect on either side.

Soil nutrients will be characterised through observational data such as colour, level of decomposition, texture and water availability, and wetland class was identified according to MacKenzie and Moran (2004). Plants will be identified using *Plants of Northern British Columbia, 2nd edition* (MacKinnon *et al.* 1999) and *E-Flora BC: Electronic Atlas of the Flora of British Columbia* (Klinkenberg 2018).

Wildlife habitat value and use is recorded to assess the wetland's ability to support local and regional biodiversity through a range of aquatic and terrestrial habitat types following the methods outlined in BC MOFR and BC MOE (2010). The wildlife observations will include a simple table with GPS coordinates, habitat, position, in relation to whole wetland and notes referencing photos.

A detailed ratings scheme for the wetland functions within the mapped wetland types needs to be calculated based on descriptions and ratings described in Hansen et al. (2008) and must be used to

provide a score that will be used to inform wetland function loss within the Project area and gains within the offset areas.

Hydrological function will need to be specifically studied at select wetlands across all wetland types by installing shallow groundwater piezometers and level loggers. During wetland ecosystem field surveys, a selection of wetland types in a variety of landscape positions will be identified. Selection criteria and justification will be documented. Shallow groundwater wells will be installed in the selected wetlands and will consist of 152 cm long, 2.5 cm diameter, slotted PVC pipe. The piezometers will be installed using a drive point, to approximately 1 m into the ground. Depending on the wetland, 4 to 8 groundwater wells will need to be installed at each site in a cross pattern. One axis of the cross will be perpendicular to the assumed direction of flow and the other parallel to the assumed direction of flow. Wetland elevations relative to one another will be surveyed using a builder's level, total station, or differential GPS accurate to within 5 cm vertical. In each wetland a minimum of two (2) level loggers will be installed to record water levels from June through November at 15-minute intervals. A barologger will also need to be installed at one of the sites to correct for barometric pressure changes during the monitoring period.

Assess the carbon capture in the wetland through an assessment of the peat layer. Describe the methodology proposed and include a suitable carbon capture metric.

1.6 Reporting

The successful bidder will prepare a field report that includes the objectives, methods and results of the field sampling for wetland ecosystem mapping and function assessments. Maps outlining the newly mapped terrestrial and wetland ecosystem polygons and attributes will be prepared and delivered as PDF maps as well as ArcMap shapefiles as per the latest BC Terrestrial Ecological Information standards (BC MOE 2012). The draft field report along with the shapefiles and maps outlining the newly mapped terrestrial and wetland ecosystem polygons and attributes will be required within 1 month of the field program being completed, and the final report completed by March 2023.

1.7 Half Day Workshop

To ensure quality assurance/quality control (QAQC) and logistics are addressed in advance of field work, a half day workshop with BW Gold/Project Team will be scheduled.

1.8 Deliverables

A technical wetlands work plan detailing any adaptive strategies used for this work will be drafted to support this scope of work. The final reporting will include monitoring criteria to ensure successful reclamation in the Matthews Creek Offsetting area and recommendations for a contingency plan in the event that wetland reclamation or habitat function does not meet the target criteria in the offset areas as outlined in the wetland management plan.

A preliminary trip report with accompanying shapefiles will need to be provided within 7 days after the field program with final reporting delivered in early Q4 2022. It must be understood that the results of this work will inform upcoming construction and interim results and be made available in a memo or series of memos.

The deliverables that must be developed for this scope of work include:

- Wetland work plan;
- Trip report will be provided after completion of field work (7 days after field work is complete);
- Interim reporting and mapping results and shapefiles to support upcoming construction;
- Report draft; and,
- Final reviewed report with maps and digital database.

1.9 References

BECWeb. 2016. *Bioegeoclimatic Ecosystem Classification Codes and Names database*. https://www.for.gov.bc.ca/hre/becweb/resources/codes-standards/standards-becdb.html.

BC EAO. 2019. *Assessment Report for Blackwater Gold Mine Project* (Blackwater) With respect to the Application by New Gold Inc. for an Environmental Assessment Certificate pursuant to the *Environmental Assessment Act,* S.B.C. 2002, c.43. Prepared by the Environmental Assessment Office. May 17, 2019.

BC MOFR and BC MOE. 2010. *Field Manual for Describing Terrestrial Ecosystems*. 2nd Edition. Victoria, British Columbia. Land Manag. Handb. No. 25. www.for.gov.bc.ca/hfd/pubs/Docs/Lmh/Lmh25-2.htm.

CEA Agency. 2019. *Decision Statement Issued under Section 54 of the Canadian Environmental Assessment Act, 2012* to New Gold Inc. c/o Ryan Todd, Director, Blackwater Project Sunlife Plaza Suite 610, 1100 Melville Street Vancouver, British Columbia V6E 4A6 for the Blackwater Gold Project.

Fletcher, N.F., D.B. Tripp, P.L. Hansen, L. Nordin M. Porter, and D. Morgan. 2018. *Field Supplement to Evaluating the Condition of Wetlands (Wetland Health Management Routine Effectiveness Evaluation)*. Forest and Range Evaluation Program, B.C. Ministry of Forests, Lands, Natural Resources Operations and Rural Development, Victoria, B.C.

Hanson, A., L. Swanson, D. Ewing, G. Grabas, S. Meyer, L. Ross, M. Watmough, and J. Kirkby. 2008. *Wetland Ecological Functions Assessment: An Overview of Approaches. Canadian Wildlife Service Technical Report Series No. 497*. Atlantic Region. 59 pp.

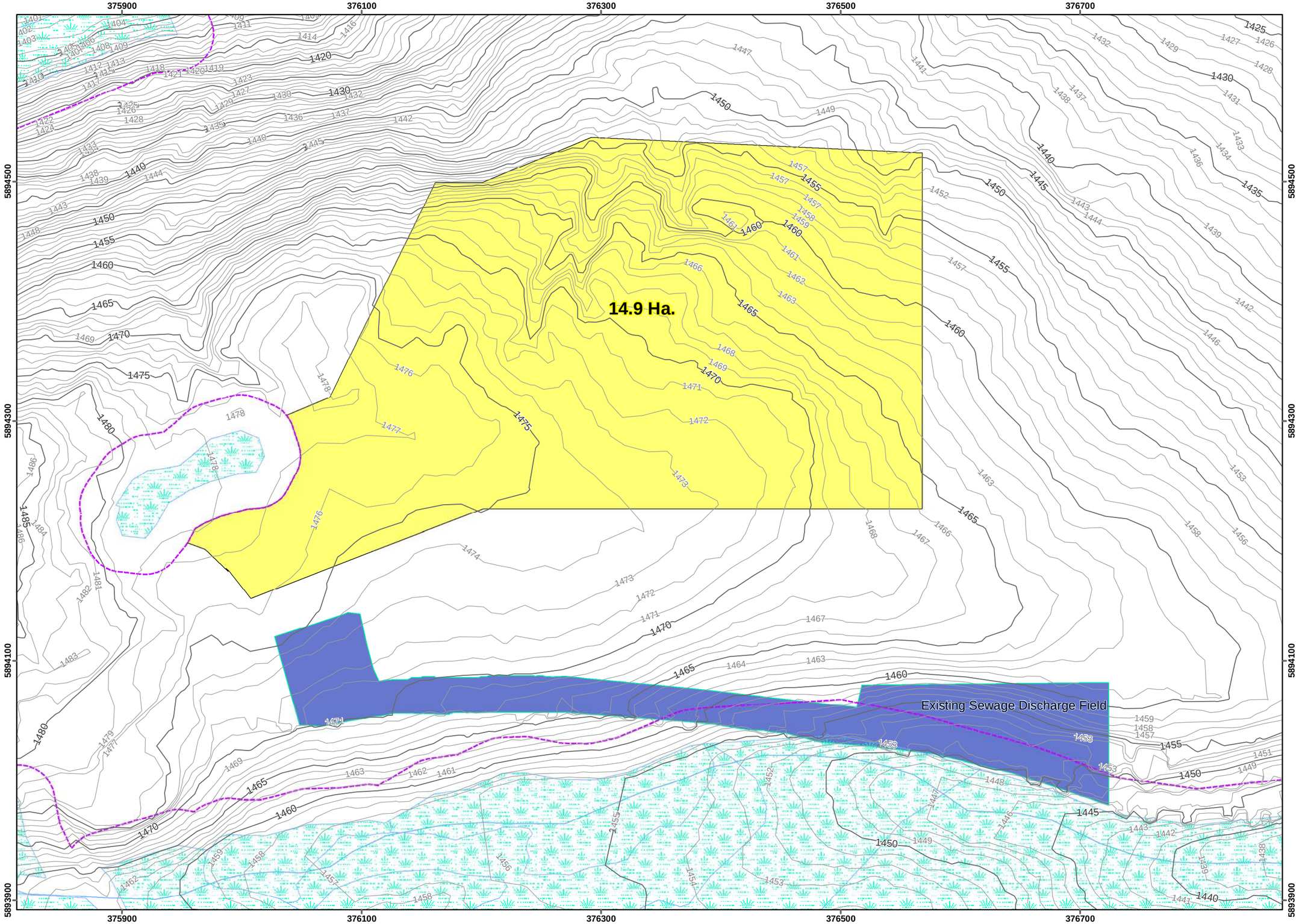
Klinkenberg, B. (Editor). 2013. E-Fauna BC: Electronic Atlas of the Fauna of British Columbia. Lab for Advanced Spatial Analysis, Department of Geography, University of British Columbia, Vancouver. http://www.geog.ubc.ca/biodiversity/efauna/index.shtml (accessed February 2012).

MacKenzie, W.H. and J.R. Moran. 2004. *Wetlands of British Columbia: A Guide to Identification*. B.C. Min. For., Res. Br., Victoria, B.C. Land Management. Handbook. 52.

Resources Inventory Committee (RIC). *1998. Standard for Terrestrial Ecosystem Mapping in British Columbia*.

Go through Form 882 and sub form 882-5 of the 882 family of forms to see if habitat data is collected

APPENDIX G CLEARING PLAN – PLANT SITE



ARTEMIS GOLD INC

Clearing Plan

Plant Site

DRAWING NUMBER	SCALE
BW-000-SIT-DWG-004	1:3,000

Legend

- Contours (5m Intervals)
- Contours (1m Intervals)
- Plant Site Early Works Clearing Area
- Existing Sewage Discharge Field
- 30m Wetland Buffer
- River/Stream - Definite
- River/Stream - Indefinite
- Waterbody
- Wetlands

N W E S

AVISON MANAGEMENT SERVICES LTD.

0 125 250 500 750 1,000 Meters

Document Path: S:\data\contracts\21_15 Blackwater Phase II NOW and OLTC\Spatial\Maps\Clearing_Plan\BW_Plant_Site_FEB_15_2022_Rev1.mxd