# Condition 3.16 Follow-up Program – March 2024 Results

## Blackwater Gold Ltd.

TRITON Environmental Consultants

Progressive Aboriginal RELATIONS SILVER LEVEL
Canadian Council for Aboriginal Business

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This report is based on facts and opinions contained within the referenced documents, including the results of any data collection programs carried out in relation to this report. We have attempted to identify and consider facts and documents relevant to the scope of work, accurate as of the time period during which we conducted this analysis. However, the results, our opinions, or recommendations may change if new information becomes available or if information we have relied on is altered.

We applied accepted professional practices and standards in developing and interpreting data. While we used accepted professional practices in interpreting data provided by Blackwater Gold Ltd. or third-party sources, we did not verify the accuracy of any such data.

This report must be considered as a whole; selecting only portions of this report may result in a misleading view of the results, our opinions, or recommendations.

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## Acronyms and Abbreviations

| *Acronym or Abbreviations* | *Definition* |
|---|---|
| BC | British Columbia |
| BWG | Blackwater Gold Ltd. |
| CEAA | *Canadian Environmental Assessment Act, 2012* |
| DO | dissolved oxygen |

## Symbols and Units of Measure

| *Symbol or Unit of Measure* | *Definition* |
|---|---|
| % | percent |
| µS/cm | microsiemens per centimeter |
| °C | degree Celsius |
| km | kilometre |
| m | metre |
| mg/L | milligram per litre |

# 1.0 Introduction

Blackwater Gold Ltd., a subsidiary company of Artemis Gold Inc. (BWG), is currently constructing, with plans to operate within the year, the Blackwater Gold Project (the Project). The Project, an open pit gold and silver mine, is located approximately 160 km southwest of Prince George, British Columbia (BC; Figure 1). The Project received several approvals and authorizations, including a Federal Decision Statement issued under the *Canadian Environmental Assessment Act, 2012* (CEAA 2012) on April 15, 2019.

Long-term aquatic monitoring programs have been implemented, in accordance with regulatory approval conditions, in waterbodies in the Project area. A Follow-up Program, monitoring fish and fish habitat in Tatelkuz Lake and Chedakuz Creek, was developed by Palmer (2023) to fulfill Condition 3.16 of the Federal Decision Statement.

## *1.1 Scope of Work*

Triton Environmental Consultants Ltd. (Triton) was retained by BWG to complete fisheries sampling and aquatic monitoring programs in support of the Project.

This report describes the methods and results of:

- The Tatelkuz Lake Littoral Zone Limnology Assessment field program, completed in March 2024 to fulfill data collection for long-term monitoring requirements described in the Follow-up Programs for the Federal Decision Statement Condition 3.16 (sub-condition 3.16.1 Tatelkuz Lake Littoral Zone Surveys Prior to Operations); and
- The lower Chedakuz Creek winter habitat assessments field program, completed in March 2024 to fulfill data collection for long-term monitoring requirements described in the Follow-up Programs for the Federal Decision Statement Condition 3.16.

This report is intended to be appended to the *Blackwater Gold Project: Condition 3.16 Follow-up Program 2023 Results Report* authored by Palmer.

## *1.2 Study Area*

The March 2024 assessments were conducted on Tatelkuz Lake and lower Chedakuz Creek. Specific assessment locations are shown in Figure 1 and site location information is provided in Appendix 2-1.

# Blackwater Gold

## Figure 1.
## Tatelkuz Lake and Chedakuz Lake Assessment Site Locations

| Project No. | Date | Revision |
|---|---|---|
| **12009** | **May 10, 2024** | **00** |
| Prepared By | Reviewed By | Page Size |
| **TK** | **SH** | **11 x 17** |


- Fish Habitat
- Limnology Site
- Littoral Fish Habitat

**Basedata**

- Gravel Road
- Indian Reserve

**Hydrology**

- Streams
- Lake

0 500 1,000 1,500 m

Scale: **1:30,000**

Projection: **NAD 1983 UTM Zone 10N**

Base map Source: **ESRI World Imagery**



TRITON Environmental Consultants

**File Path:** G:\1.0 Projects\12009 Blackwater Fisheries Support\12009 Blackwater Fisheries Support.aprx\12009-Tatelkuz and Chedakuz Lake Assessment Site Locations_240509

CC_MT2
CC_MT3
CC_MT6
TATELKUS LAKE 28
Chedakuz Creek
Davidson Creek
TL BMC1
TL LIM 3
Tatelkuz Lake
TL BMC2
TL BMC3
Chedakuz Creek
TL BMC4
N
384000
386000
388000
390000
392000
5908000
5906000
5904000
5902000

# 2.0 Methods

Tatelkuz Lake sampling included a limnological survey at a point mid-lake previously established by Palmer (2023) and winter assessments of littoral (nearshore) habitat associated with Brassy Minnow (*Hybognathus hankinsoni*). Chedakuz Creek sampling included assessments of overwintering fish habitat at three sites located at the upstream, mid-point, and downstream extents of lower Chedakuz Creek between Tatelkuz Lake and its confluence with Davidson Creek.

## *2.1 Tatelkuz Lake*

The following sampling was conducted at a single mid-lake site (TL LIM3):

- Secchi depth was collected by lowering a Secchi disc into the water column and recording the depth (m) at which the disc was no longer visible. The depth (m) at which the disc re-appeared was recorded as the disc was pulled up through the water column.
- A vertical profile, including measurements of temperature (°C), pH, conductivity (µS/cm), specific conductance (mS/cm) and dissolved oxygen (mg/L and %) was collected at 1.0 m meter intervals from the water surface (under the ice) to maximum lake depth using a YSI ProQuatro multiparameter meter. Descending and ascending values were averaged.
- Measurements were taken of snow depth and ice thickness (m).
- The surface water sample was collected below the ice and shipped to a CALA certified laboratory (ALS Laboratories), for analysis of total epilimnetic phosphorous (mg/L) and total nitrogen (mg/L).

Winter nearshore assessments at four sites (TL BMC1 through TL BMC4) included:

- Measurements of snow and ice thickness depths (m);
- Measurements of maximum water depth (m); and
- *in-Situ* water quality, including temperature (°C), pH, conductivity (µS/cm), and dissolved oxygen (mg/L and %). Water quality measurements were collected using a YSI ProQuatro multiparameter meter.

## *2.2 Lower Chedakuz Creek*

Assessments at three overwintering sites included:

- Measurements of snow and ice thickness depths (m)
- Measurements of maximum water depth (m); and
- *in-Situ* water quality, including temperature (°C), pH, conductivity (µS/cm), and dissolved oxygen (mg/L and % saturation) collected at 1 m depth. Water quality measurements were collected using a YSI ProQuatro multiparameter meter.

# 3.0 Results

## *3.1 Tatelkuz Lake*

Snow depth, ice thickness depth, maximum water depth and mean sechhi depth at TL LIM3 and the four nearshore sites are presented in Table 1.

**Table 1. Tatelkuz Lake (TL Lim3) winter assessment, March 2024.**

| *Waterbody* | *Site Name* | *Sample Date* | *Snow Depth (m)* | *Ice Thickness (m)* | *Water Depth (m)* | *Secchi Depth (m)* |
|---|---|---|---|---|---|---|
| Tatelkuz Lake | TL LIM3 | March 14, 2024 | 0.12 | 0.46 | 28.95 | 3.03 |
| Tatelkuz Lake | TL BMC1 | March 12, 2024 | 0.11 | 0.42 | 2.80 | - |
| Tatelkuz Lake | TL BMC2 | March 12, 2024 | 0.11 | 0.39 | 3.60 | - |
| Tatelkuz Lake | TL BMC3 | March 12, 2024 | 0.12 | 0.36 | 6.40 | - |
| Tatelkuz Lake | TL BMC4 | March 12, 2024 | 0.10 | 0.37 | 0.66 | - |

Vertical profiles of mean temperature and dissolved oxygen at TL LIM3 are shown in Figure 2. Raw ascending and descending vertical profile data are included in Appendix 2-2. Water temperature increased from 1.9°C near the surface to 3.5°C at depth, while dissolved oxygen levels decreased from 11.81 mg/L near the surface to 1.5 mg/L at depth. pH ranged from 6.93 to 8.0. Conductivity ranged from 103.1 µS/cm to 135.6 µS/cm.

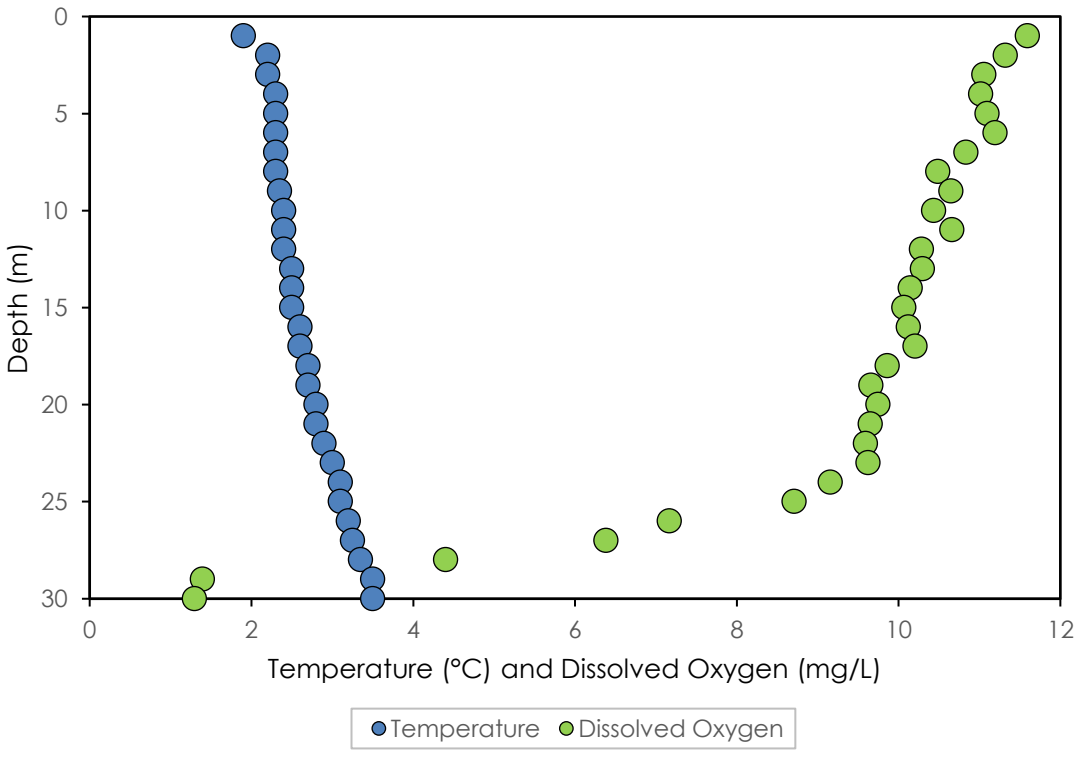


**Figure 2. Tatelkuz Lake temperature (°C) and dissolved oxygen (mg/L) profile at TL LIM3 in March 2024**

Total phosphorus and total nitrogen results for the surface water sample collected from TL LiM3 on March 12, 2024, are provided in Table 2. Total phosphorous was above the approved BC Water Quality Guidelines for aquatic life (MWLRS 2023; 0.005 to 0.015 mg/L).

**Table 2. Total phosphorous and total nitrogen in Tatelkuz Lake (TL LIM3), March 2024**

| *Waterbody* | *Site Name* | *Date* | *Total Phosphorus (mg/L)* | *Total Nitrogen (mg/L)* |
|---|---|---|---|---|
| Tatelkuz Lake | TL LIM3 | March 12, 2024 | 0.0295 | 0.686 |

*In-Situ* water quality measurements at the four littoral assessment sites are provided in Table 3. Dissolved oxygen levels were above the minimum BC Approved Water Quality Guidelines for aquatic life (MWLRS 2023; 9 mg/L for buried embryos/alevin, 5 mg/L for all other life stages).

**Table 3. *In-Situ* water quality data for Tatelkuz Lake littoral habitat sites, March 2024**

| *Waterbody* | *Site Name* | *Temperature (°C)* | *pH* | *Conductivity (µS/cm)* | *Dissolved Oxygen (mg/L)* | *Dissolved Oxygen (%)* |
|---|---|---|---|---|---|---|
| Tatelkuz Lake | TL BMC1 | 1.2 | 8.78 | 129.4 | 10.14 | 71.7 |
| Tatelkuz Lake | TL BMC2 | 0.2 | 7.96 | 102.4 | 12.62 | 86.5 |
| Tatelkuz Lake | TL BMC3 | 0.4 | 8.25 | 102.7 | 13.68 | 94.5 |
| Tatelkuz Lake | TL BMC4 | 0.7 | 8.08 | 107.7 | 11.17 | 77.9 |

### *3.2 Lower Chedakuz Creek*

Lower Chedakuz Creek was ice free at the time of assessment on March 12, 2024; consequently, measurements of snowpack and ice thickness depths were nil. Maximum water depth (m) and i*n-Situ* water quality measurements are shown in Table 4. Water temperatures ranged from 1.8 °C to 3.0 °C, pH from 7.71 to 7.84, and conductivity from 114.5 to 115.9 µS/cm. Dissolved oxygen levels were generally high, ranging from 12.28 mg/L to 13.40 mg/L, and above the minimum BC Approved Water Quality Guidelines for aquatic life (MWLRS 2023).

**Table 4. Habitat data and *In-Situ* water quality data for lower Chedakuz Creek sites, March 2024.**

| *Waterbody Name* | *Site Name* | *Max Water Depth (m)* | *Temperature (°C)* | *pH* | *Conductivity (µS/cm)* | *Dissolved Oxygen (mg/L)* | *Dissolved Oxygen (%)* |
|---|---|---|---|---|---|---|---|
| Chedakuz Creek | CC_MT2 | 0.4 | 3.0 | 7.84 | 114.5 | 12.50 | 93.5 |
| Chedakuz Creek | CC_MT3 | 0.15 | 2.8 | 7.71 | 115.8 | 13.40 | 99.1 |
| Chedakuz Creek | CC_MT6 | 0.5 | 1.8 | 7.73 | 115.9 | 12.28 | 88.3 |

# 4.0 Closing

Limnological sampling at the mid-lake on Tatelkuz Lake showed a temperature gradient warming at depth, and dissolved oxygen levels decreasing with depth but the absence of any hypolimnion and evidence of stratification. Dissolved oxygen levels were above the minimum BC Approved Water Quality Guidelines for aquatic life in the uppermost 24 m. Surface samples for total phosphorus and total nitrogen were also collected; total phosphorus levels exceeded the BC Approved Water Quality Guidelines for aquatic life.

Dissolved oxygen and pH levels were within BC Approved Water Quality Guidelines for aquatic life at the four Tatelkuz Lake Littoral Habitat Sites, as well as at the lower Chedakuz Creek sites, which were ice-free at the time of survey.

# 5.0 References

CEAA. 2012. Canadian Environmental Assessment Act (CEAA), SC. C.19, s. 52.

[MWLRS] Ministry of Water, Land and Resource Stewardship. 2023. British Columbia Approved Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture – Guideline Summary. Water Quality Guideline Series, WQG-20. Prov. B.C., Victoria B.C.

Palmer. 2023. Follow-up Programs for Condition 3.16 of the Blackwater Mine Project Decision Statement Issued under Section 54 of the Canadian Environmental Assessment Act, 2012. Prepared for BW Gold Ltd. May 6, 2023.

Palmer. 2024. Blackwater Gold Project: Condition 3.16 Follow-up Program 2023 Results Report, in Support of the Environmental Assessment Decision Statement under the Canadian Environmental Assessment Act, 2012. Prepared for Artemis Gold Inc. March 15, 2024.

# APPENDIX 1

# SITE PHOTOGRAPHS


**Photo 1**. **TL Lim3** – Overview of water quality and water sampling equipment in use at TL Lim3.


**Photo 2**. **TL Lim3** – View of augered hole showing ice depth and condition at sampling site.


**Photo 3**. **TL BMC1** - View looking West towards Tatelkuz Lake Ranch from site location.


**Photo 4**. **TL BMC2** - View looking West towards shore from site location. Augered hole visible in foreground.


**Photo 5**. **TL BMC3** - View of augered hole showing ice depth and condition at sampling site.


**Photo 6**. **TL BMC4** - View looking West towards shore at augered holes where frozen to bottom conditions were found.


**Photo 7**. **CC_MT6** - View looking upstream from site location.


**Photo 8**. **CC_MT3** - View looking downstream from site location.


**Photo 9**. **CC_MT2** - View looking upstream from site location.


**Photo 10**. **CC_MT2** - View looking downstream from site location.

# APPENDIX 2

# FIELD DATA

## Appendix 2-1: Site Names and Locations

| *Waterbody* | *Site Name* | *UTM Zone* | *UTM Easting* | *UTM Northing* | *Assessment Date* |
|---|---|---|---|---|---|
| Tatelkuz Lake | TL LIM 3 | 10 | 387247 | 5905786 | 2024-03-14 |
| Tatelkuz Lake | TL BMC1 | 10 | 385856 | 5907635 | 2024-03-12 |
| Tatelkuz Lake | TL BMC2 | 10 | 388980 | 5903362 | 2024-03-12 |
| Tatelkuz Lake | TL BMC3 | 10 | 389674 | 5902558 | 2024-03-12 |
| Tatelkuz Lake | TL BMC4 | 10 | 390766 | 5900866 | 2024-03-12 |
| Chedakuz Creek | CC_MT2 | 10 | 385363 | 5907798 | 2024-03-12 |
| Chedakuz Creek | CC_MT3 | 10 | 385048 | 5907951 | 2024-03-12 |
| Chedakuz Creek | CC_MT6 | 10 | 385018 | 5908220 | 2024-03-12 |

## Appendix 2-2. Tatelkuz Lake (TL LIM3) Vertical Profile Data

| Depth (m) | Temperature (°C) ▼ | Temperature (°C) ▲ | DO (%) ▼ | DO (%) ▲ | DO (mg/L) ▼ | DO (mg/L) ▲ | Conductivity (µS/cm) ▼ | Conductivity (µS/cm) ▲ | Specific Conductance (µS/cm) ▼ | Specific Conductance (µS/cm) ▲ | pH ▼ | pH ▲ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1.9 | 1.9 | 82.4 | 85.2 | 11.38 | 11.81 | 103.3 | 105.3 | 184.6 | 188.4 | 7.09 | 8.00 |
| 2 | 2.2 | 2.2 | 82.8 | 81.6 | 11.40 | 11.24 | 103.1 | 105.2 | 182.5 | 186.2 | 7.10 | 7.77 |
| 3 | 2.2 | 2.2 | 82.9 | 78.0 | 11.39 | 10.72 | 103.7 | 105.1 | 183.4 | 185.9 | 7.10 | 7.77 |
| 4 | 2.3 | 2.3 | 80.4 | 79.6 | 11.06 | 10.97 | 104.0 | 105.3 | 183.9 | 186.1 | 7.09 | 7.61 |
| 5 | 2.3 | 2.3 | 80.3 | 80.4 | 11.06 | 11.13 | 104.0 | 105.3 | 183.9 | 186.2 | 7.10 | 7.48 |
| 6 | 2.3 | 2.3 | 82.1 | 80.9 | 11.27 | 11.12 | 103.9 | 105.2 | 183.6 | 185.8 | 7.10 | 7.43 |
| 7 | 2.3 | 2.3 | 80.0 | 78.3 | 10.97 | 10.70 | 103.9 | 105.0 | 183.4 | 185.4 | 7.09 | 7.30 |
| 8 | 2.3 | 2.3 | 76.5 | 76.4 | 10.49 | 10.48 | 103.8 | 104.9 | 183.1 | 185.0 | 7.09 | 7.26 |
| 9 | 2.3 | 2.4 | 78.4 | 77.3 | 10.75 | 10.55 | 103.8 | 104.7 | 182.9 | 184.6 | 7.09 | 7.24 |
| 10 | 2.4 | 2.4 | 75.9 | 76.1 | 10.39 | 10.48 | 103.6 | 104.6 | 182.6 | 184.2 | 7.08 | 7.17 |
| 11 | 2.4 | 2.4 | 76.4 | 78.2 | 10.46 | 10.86 | 103.5 | 104.4 | 182.1 | 183.5 | 7.07 | 7.16 |
| 12 | 2.4 | 2.4 | 75.1 | 75.5 | 10.24 | 10.33 | 103.4 | 104.4 | 181.7 | 183.4 | 7.05 | 7.16 |
| 13 | 2.5 | 2.5 | 75.1 | 75.6 | 10.26 | 10.33 | 103.4 | 104.2 | 181.5 | 182.9 | 7.05 | 7.15 |
| 14 | 2.5 | 2.5 | 74.9 | 73.6 | 10.23 | 10.06 | 103.4 | 104.2 | 181.4 | 182.7 | 7.05 | 7.14 |
| 15 | 2.5 | 2.5 | 73.3 | 74.9 | 10.01 | 10.12 | 103.3 | 104.0 | 181.0 | 181.2 | 7.03 | 7.13 |
| 16 | 2.6 | 2.6 | 74.1 | 74.4 | 10.10 | 10.14 | 103.3 | 104.0 | 180.8 | 181.9 | 7.03 | 7.11 |
| 17 | 2.6 | 2.6 | 72.8 | 77.4 | 9.93 | 10.48 | 103.2 | 103.8 | 180.4 | 181.3 | 7.03 | 7.08 |
| 18 | 2.7 | 2.7 | 72.6 | 72.4 | 9.88 | 9.84 | 103.3 | 103.8 | 180.2 | 181.4 | 7.02 | 7.07 |
| 19 | 2.7 | 2.7 | 71.2 | 72.7 | 9.46 | 9.86 | 103.4 | 103.9 | 180.1 | 180.8 | 7.02 | 7.12 |
| 20 | 2.8 | 2.8 | 70.4 | 73.7 | 9.51 | 9.98 | 103.7 | 104.1 | 180.3 | 180.9 | 7.00 | 7.20 |
| 21 | 2.8 | 2.8 | 70.8 | 71.9 | 9.57 | 9.73 | 103.9 | 104.2 | 180.3 | 180.7 | 7.01 | 7.15 |
| 22 | 2.9 | 2.9 | 69.8 | 72.0 | 9.45 | 9.73 | 104.0 | 104.4 | 180.0 | 180.5 | 7.01 | 7.17 |
| 23 | 3.0 | 3.0 | 71.1 | 71.8 | 9.58 | 9.67 | 104.1 | 104.5 | 179.8 | 180.1 | 7.00 | 7.17 |
| 24 | 3.1 | 3.1 | 68.4 | 68.1 | 9.19 | 9.12 | 104.4 | 104.8 | 179.7 | 180.1 | 6.98 | 7.16 |
| 25 | 3.1 | 3.1 | 63.9 | 65.7 | 8.59 | 8.83 | 105.0 | 105.3 | 180.3 | 180.7 | 6.97 | 7.14 |
| 26 | 3.2 | 3.2 | 54.9 | 51.9 | 7.37 | 6.96 | 105.8 | 107.1 | 181.5 | 183.6 | 6.93 | 7.08 |

| Depth (m) | Temperature (°C) ▼ | Temperature (°C) ▲ | DO (%) ▼ | DO (%) ▲ | DO (mg/L) ▼ | DO (mg/L) ▲ | Conductivity (µS/cm) ▼ | Conductivity (µS/cm) ▲ | Specific Conductance (µS/cm) ▼ | Specific Conductance (µS/cm) ▲ | pH ▼ | pH ▲ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 27 | 3.2 | 3.3 | 45.7 | 49.3 | 6.13 | 6.64 | 108.4 | 109.4 | 186.0 | 187.7 | 6.95 | 7.07 |
| 28 | 3.3 | 3.4 | 37.2 | 28.4 | 4.98 | 3.82 | 110.4 | 111.7 | 188.3 | 190.5 | 6.95 | 7.01 |
| 29 | 3.5 | 3.5 | 11.4 | 9.6 | 1.53 | 1.26 | 130.5 | 135.6 | 221.7 | 230.2 | 7.00 | 7.02 |
| 30 | 3.5 | 3.5 | 9.8 | 9.8 | 1.29 | 1.30 | 132.7 | 132.7 | 225.5 | 225.5 | 7.02 | 7.02 |

▼ – descending value; ▲ – ascending value