Water Ways Consulting

Tima Burn Aquatic Ecology Assessment

Report prepared for: Hawkeswood Mining

Date: September 2023

Report Number:34-2023

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Water Ways Consulting

Cover photo: Tima Burn

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1. INTRODUCTION

Hawkeswood Mining Limited are seeking resource consent to undertake alluvial gold mining along the Clutha River/Mata Au river terrace on the true left of the river just upstream of Millers Flat township (Figure 1). The mine area is placed between the Clutha River/Mata Au and Teviot Road. The Tima Burn, a small Clutha River/Mata Au tributary flows just to the southeast of the mine boundary (Figure 2).

Concerns have been raised regarding the potential for the mine to impact on the flow of the Tima Burn as ground water inflows into the mine pit may lead to dewatering of the Tima Burn as it flows across the alluvial terrace to the Clutha River/Mata Au.

This report provides an assessment of the instream values of the Tima Burn in the reach around the mine area and the possible effect of any loss of flow in the Tima Burn.

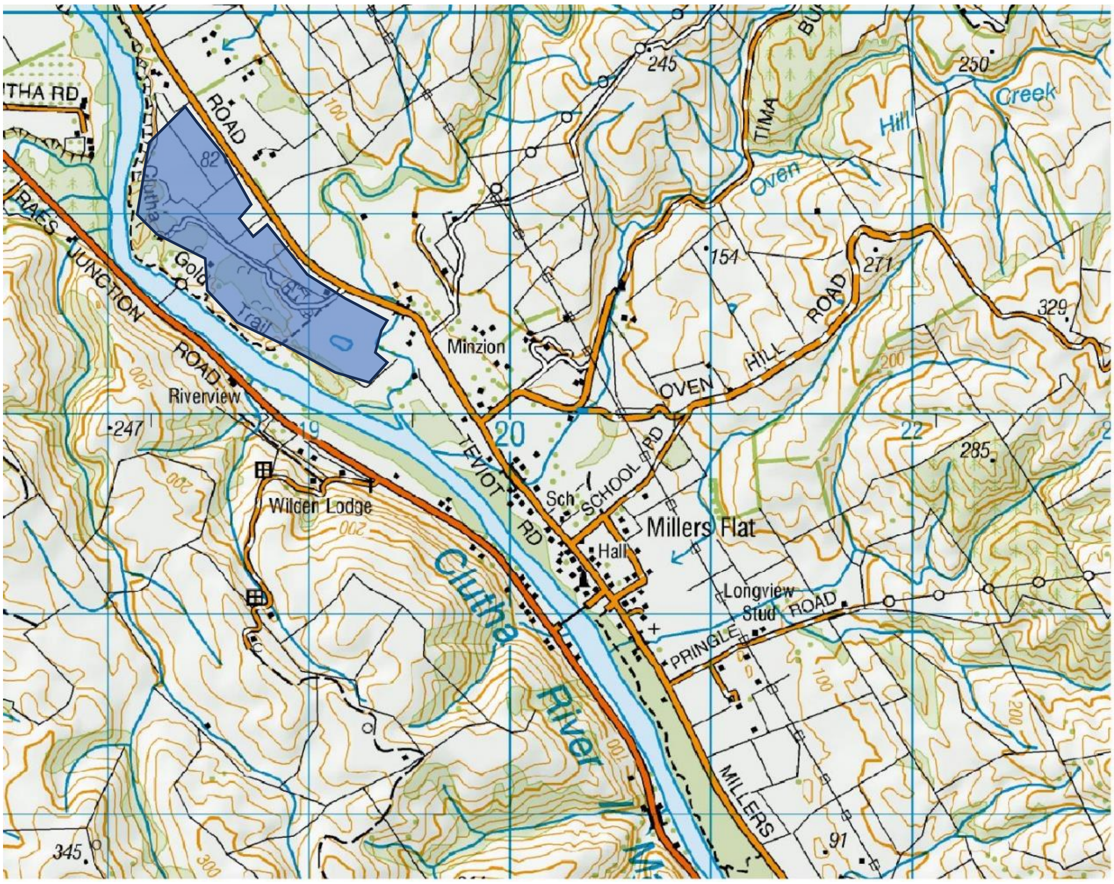

Figure 1: Approximate mine site location (shaded blue).

Figure 2: Mine site area and the location of the Tima Burn.

2. METHODS

A site visit was conducted to Tima Burn on the 3 September 2023. Electric fishing was conducted along 3 50—80 m reaches of the stream (Figure 3). All the fish collected were identified to species level and the lengths measured or estimated. Once fish were identified, they were returned to the stream. Additional fish information was retrieved from the New Zealand Freshwater Fish database (NZFFD).

Aquatic macroinvertebrates were assessed by examining the macroinvertebrates on the cobbles and boulders collected from riffle habitat. At each site at least ten cobbles were examined, and the macroinvertebrate species and their abundance noted. Macroinverterbates that were observed accumulating on the pole net while electric fishing was also recorded.

Periphyton cover was visually estimated at each site and the prevalent periphyton recorded.

The instream and riparian habitat were assessed with the stream bed substrate, habitat types, general stream character and vegetation on the stream banks being recorded.

Environmental DNA sampling was conducted at two sites Sites 1 and 3. At each site two spyringe sample were colelcted. At Site 1 the two samples filter 300 mm of water and at Site 3 350 mm of water. Samples were sent to Wilderlab for analysis.

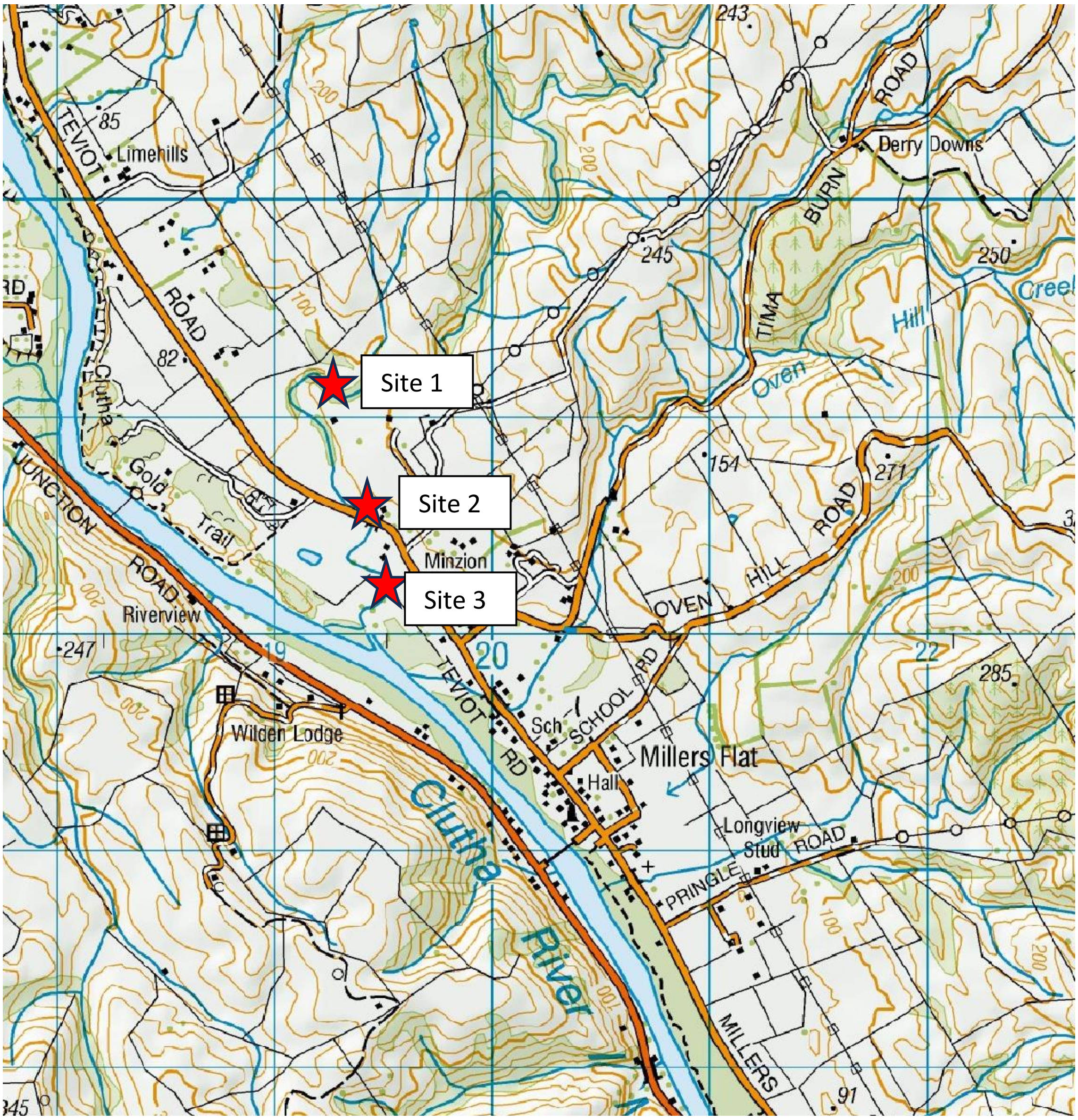

Figure 3: The location of stream survey sites.

3. SURVEY RESULTS

3.1. Habitat

3.1.1 General observations

The lower reaches of the Tima Burn flow through farmland with sheep and cattle grazing the predominant land use. Some riparian fencing was present especially downstream of Teviot Road. However, grazing has been occurring along the full length of the stream reach visited so while there is riparian fencing stock have grazed the stream banks and accessed the stream. The stream margins were a combination of grazed pasture grass and willow trees. Upstream of Teviot Road, between Sites 1 and 2 most of the willow trees have been cut down creating open grassy stream banks with a few popular trees and few remaining crack willows. Google Earth images shows the removal occurred between January 2018 and January 2019 and extended well upstream of Site 1. Downstream of Teviot Road most of the stream bank is lined with mature willow trees and pasture grass and introduced broom form the undergrowth.

In the proposed mine footprint and the upstream areas visited the vegetation was predominantly pasture grass. Part of the mine site was planted with a winter fodder crop for cattle. At the time of the site visit most of the winter fodder crop had been grazed and no ground cover was present, rather there was bare soil with the occasional plant stem. There was also a refuse transfer centre for Millers Flat rubbish. As such the mine site areas and adjacent areas visit were all highly modified areas with no obvious indigenous vegetation.

3.2. Site habitat observations[1]

3.2.1 Site 1

Site 1 was immediately downstream of areas of bedrock stream bed and the major riffle in this reach was a constructed riffle that provided erosion protection for an upstream vehicle ford. This was the areas with largest stream bed substrate – cobbles and small boulders and appeared to provide the best fish cover in the 100 m around the site. The riffle habitat did have good interstial spaces for fish and macroinverterbrates but the stream substrate in the upstream pool and run area was comprised of small cobble, gravel and fine gravel and sand and had no interstial space. The combination of abundant periphyton growths and accumulations of fine sediment indicated that there had been no winter floods to flush the periphyton and fine sediment. Small backwater areas with fine sediment were scattered along the reach.

3.2.2 Site 2

Site 2 was split into two distinct sections separated by two small bedrock waterfalls. Upstream of the waterfalls the stream had cobble dominated riffles and pool run habitat with finer stream bed material. The substrates were generally poorly consolidated and moved easily when walked on. There was some overhanging vegetation, instream vegetation and undercut banks in the pools. Downstream of the waterfalls there was a bedrock scour pool that transitioned into a cobble riffle and then a larger pool with a fine sediment substrate and some woody debris that provided fish cover.

3.2.3 Site 3

Site 3 was set along a crack willow lined section of the stream channel (Figure 4). The area was stock fenced, but cattle had been grazing within the fenced area. The willows form a continuous line along the stream and in some areas the willow root mat was extending well into the stream channel with some riffle areas being 90% or more covered in willow roots. The margins of pool habitat were also lined with willow roots. The substrate in the pools ranges from mud to cobble and there were areas of woody debris and leaf material to provide fish cover. This reach would be fully shaded when the willow trees are in leaf. The stream in this reach showed evidence of a declining flow with areas of exposed bed with no vegetation along the stream edge.

[1] See Appendix A for site photographs

Figure 4: Site 3 with willow trees extending into the channel and bare banks on the stream edge indicating a declining flow.

3.3. Periphyton

3.3.1 Site 1

Site 1 was characterised by a high percentage of the stream bed being covered by periphyton with coverage estimated to being between 80 5 and 90 % of the stream bed. Periphyton communities differed in riffle and run/pool habitat. In the riffle areas periphyton was predominantly thin (0.5 mm thick) and medium (0.5 mm - 3 mm thick) thick light brown films (Figure 5). There were small pockets of green filamentous algae in the riffle, but these appeared to be restricted to pockets of low water velocity. Small didymo patches were also present in the riffle. The run/pool periphyton community was dominated by brown filamentous algae with smaller areas of green filamentous algae. The filaments were up to 5 cm long.

Figure 5: Riffle periphyton community at Site 1.

Figure 6: Run periphyton community at Site 1.

3.3.2 Site 2

The periphyton at Site 2 was limited to small patches of thin brown and black films with coverage at less than 10 % of the stream bed. The filamentous algal and didymo observed at Site 1 did not appear to be present at Site 2.

3.3.3 Site 3

Willow roots extended well out into the stream, especially in the riffles in parts of this reach and this limited the habitat available for periphyton. The available cobble and gravel in riffle had no visible periphyton although the cobbles were slippery under foot indicating thin films were present. Pool habitat had no periphyton.

3.4. Macroinvertebrates

3.4.1 Site 1

Potamopyrgus snails were the common macroinvertebrate at Site 1. Every rock examined had these snails present. *Hydropysche* caddisflies were the next most common macroinvertebrate and were present on most rocks. Two other taxa, Leptophlebiidae mayflies (2 individuals) and a hydrobiosid caddisfly (1 individual) were observed. No stoneflies were present. The only macroinvertebrates observed on the stop net while electric fishing were worms. The worms were also noticeable while electric fishing and could be seen emerging from the stream substrate.

3.4.2 Site 2

Potamopyrgus snails were the common macroinvertebrate at Site 2. Every rock examined had these snails present. *Hydropysche* caddisflies were the next most common macroinvertebrate and were the only caddisfly taxa observed. A single *Physella* snail was also noted. No mayfly or stonefly nymphs were found.

The only macroinvertebrates observed on the stop net while electric fishing were worms. The worms were also noticeable while electric fishing and could be seen emerging from the stream substrate.

3.4.3 Site 3

Potamopyrgus snails were the common macroinvertebrate on rocks at Site 3. No mayfly, caddisfly or stonefly nymphs were found.

The only macroinvertebrates observed on the stop net while electric fishing were worms. The worms were also noticeable while electric fishing and could be seen emerging from the stream substrate and the worms here were most abundant of the three sites assessed.

3.5. Fish

3.5.1 Site 1

Two longfin eels and one upland bully were caught at Site 1. In total an estimated 100 m^2 was fished and this included riffle, run and pool habitat. The longfin eels were estimated to be 700 mm and 500 mm long and the upland bully was a small juvenile fish 39 mm long. The absence of adult upland bullies indicates that the juvenile caught has probably moved into the reach from an upstream adult population. Two small backwater areas were fish for lamprey but none were found

3.5.2 Site 2

Site 2 was split into two section, upstream and downstream of the small waterfall sequence. In total an estimated 100 m2 was fished split roughly 50:50 above and below the waterfalls. The deep scour pool immediately below the waterfalls was not fished as it was too deep to safely fish. Upstream of the waterfalls four long fin eels were caught in riffle and pool habitat. The estimated lengths were 700 mm, 650 mm, 600 mm, and 400 mm. No other fish were seen upstream of the waterfall.

Downstream of the waterfalls pool and riffle habitat was fished and one longfin eel (350 mm), two brown trout and one inanga were collected. Another eel evaded capture. The two trout were juvenile individuals, 117 mm and 132 mm long (Figure 7). The inanga was an adult individual, 94 mm long (Figure 8). It is likely that the waterfalls were of sufficient height to prevent the inanga moving further upstream, but the waterfalls would not stop brown trout upstream movement.

The adult inanga was an unexpected find as in October inanga are generally migrating into freshwater in the whitebait run. This adult individual could to be either an individual that migrated into freshwater in spring 2022 and remained over winter in the Tima Burn rather than spawning in the Clutha River /Mata Au estuary, or it is an individual that migrated into freshwater outside the usual whitebait season. Very low numbers of inanga whitebait do migrate back into freshwater outside the spring whitebait season (Allibone pers. obs., McDowall pers. com.) and this individual could be a late summer/autumn migrant.

Soft sediment areas of the pool below the waterfall were fished for lamprey juveniles but none were caught.

Figure 7: A brown trout caught at Site 2

Figure 8: The inanga caught at Site 2.

3.5.3 Site 3

At Site 3 and single 650 mm longfin eel was caught. No other fish were seen. Backwater areas suitable for lamprey were rare and when fished only worms were observed merging from the stream bed. Given the riffle habitat was compromised by willow roots the absence of riffle dwellers is not unexpected. However, fish were generally absent from the pool habitat despite the good cover amongst the fallen branches.

3.5.4 New Zealand Freshwater Fish database

The New Zealand Freshwater Fish database (NZFFD) has eight records for the Tima Burn between Site 1 and the Clutha River/Mata Au confluence. These records date from 1982 (historic) to 2018 (recent). Brown trout and longfin eel are the most frequently reported fish species. Upland bully is the next most frequently reported fish, but it has only been reported in the reach below Site 1 in the 1980s. More recent surveys did not find this fish. Shortfin eel, koaro, common bully, rainbow trout and Chinook salmon were also reported in the 1980s although only in very low numbers. Lamprey juveniles have been reported more recently (2016, 2000) both times upstream of Teviot Road. There are no previous records of inanga in the Tima Burn.

3.5.5 eDNA detections

At both Site 1 and 3 the highest eDNA sequence detections were made for three types of worms (sludge worms and blackworms) and a large number of other worm taxa also featured high in the number of sequences detected (see data Appendix B). At Site 1 and 3 longfin eel also had a high detection rate at both sites. Upland bully eDNA was also collected at both sites, but brown trout eDNA was only detected at Site 3.

Caddisfly and midge species were the most common insect group detected in the eDNA samples, but the sequence detection rate was low. There were very low detections of two mayflies, *Neozephlebia scita* at Site 1 and *Coloburiscus humeralis* at Site 3. There were no stonefly eDNA detections.

4. PRESENT STREAM HEALTH

The riparian margin of the lower Tima Burn has some stock fencing but appears grazed along the reach from Site 1 downstream. Crack willow removal is likely to have led to some habitat improvements as crack willow can clogged the stream channel and the root mats smother fish and macroinvertebrate habitat. Downstream of Teviot Road this crack willow impact still occurs.

The high periphyton cover at Site 1 also indicates that flushing flow over the winter have not occurred and may indicate some nutrient enrichment is occurring. The lack of periphyton at Site 2 does indicate the periphyton issue is not widespread. At Site 3 the lack of periphyton is in part due to the willow root mats and possibly due of the shading effects of the willow trees.

The macroinvertebrate communities at all sites were dominated by worms and *Potamopyrgus* snails. These two taxa are indicators of poor water and/or habitat quality. The low taxa diversity and low abundance are also good indicators of poor instream conditions. Site 3 appears to be the worst with only worms and snails observed with no insects of observed. This is supported by the eDNA data that shows worm species were common but most insect species were rare.

The fish community is had low diversity and low abundance. Only longfin eel was found at all three sites, and at Site 3 only single eel was located. The presence of a single juvenile upland bully at Site 1 also indicates this site supports a very poor fish community. As no adult bullies were present at any sites any spawning population of upland bullies may occur upstream of Site 1. The eDNA detections do indicate that upland bully may occur between Sites 1 and 3 but the density is expected to be low. Generally upland bullies are tolerant of low flows and can occupy poor habitat so could be present The absence of adults in the study reaches and the presence of only one juvenile is another indicator of poor habitat conditions. The presence of two brown trout and the inanga at Site 2 added some diversity to the general fish community. However, the absence of brown trout from both Sites 1 and 3 indicates the brown trout population is small in this reach. The lack of brown trout eDNA detections at Site 1 also indicate they are either absence or very rare upstream of Site 1. It is also notable that the brown trout and inanga where just downstream of a fish passage barrier and this is an area where fish often accumulate if they are attempting to penetrate upstream and the abundance of fish can be inflated at such locations.

The inanga is an unexpected find as the site is 106 km from the ocean and the furthest inanga have previously been reported upstream in the Clutha River/Mata Au is 23 km from the ocean. However, the presence of a single individual is a finding of interest but does not represent the presence of a significant population of inanga. The EDNA also failed to detect inanga indicating they are not common in the Tima Burn at this time.

Comparing this survey data to the data in the NZFFD the presence of longfin eel through the reach is the same as previous survey data. However, brown trout have previously been reported throughout the survey reach but appear nearly absent in this survey. Other rare species previously reported, rainbow trout, Chinook salmon, koaro, lamprey, shortfin eels were not found indicating a decline in community diversity and abundance of fish in general. Site 3 was the site where this was most obvious. None of these rare fish species were detected by the eDNA that also indicate they are unlikely to be present at this time in the Tima Burn.

In summary, the lower Tima Burn had all the indicators of a relatively poor-quality section of stream, with presence of some areas with high periphyton biomass, and low quality macroinvertebrate and fish communities with the stream habitat quality also affected by stock grazing and crack willows.

5. DIVERSION EFFECTS

5.1. Potential Effects

The proposed mine area does not encroach on the stream bed (Figure 2) so the only potential effect of the mine works is the loss of surface flow via draw down of the groundwater when water is being pumped out of the mine pit. This potential effect is most likely to occur along the stream reach below Teviot Road downstream towards Site 3 where the mine is the closest to the stream.

The stream draw down effect can be divided into three categories:

- lower flows but still a flowing stream with fish passage possible:
- continuous flow, remanent pools remain but fish passage through the reach is blocked; or
- all water lost from the reach.

The first category has limited effects associated with a reduction in habitat, but habitat and fish passage are still provided, and the instream community can be expected to remain intact. This is especially so if the duration of the draw down effect is short, e.g., less than three weeks.

The second category has effects on fish passage as it prevents passage during the draw down period. However, as different fish species and life history stages migrate at different times of the year there are species specific and time specific effects. The remanent pool habitat also provides refuge habitat for resident fish and macroinverterbrates. Therefore, stream life will be depleted, but some will use the refuge pools to survive the low flow period.

The third category causes the same fish passage issues as category 2 but as there is a loss of refuge habitat the resident fish and macroinvertebrates are eliminated from the dry reach. However, in this case *Potamopyrgus* snails can survive as they can close their operculum and avoid desiccation during the dry period.

5.2. Assessment of Effects

5.2.1 Natural state of the Tima Burn

Environmental Associates (2023), Mr Matt Hunter and some Otago Regional Council observations (see Environmental Associates 2023) have found the lower Tima Burn below Teviot Road is dry during the summer.

The aquatic fauna at Site 3, in the observed drying reach does support the observations of the Tima Burn drying. The fish community was very sparse, and the macroinvertebrate community was also characterised by abundant worms and *Potamopyrgus* snails but no insects. The low abundance of eels would indicate that few are recolonising the reach when the flow is restored. The other fish species in the Tima Burn as so rare that their absence from the lower Tima Burn could be due to their low numbers in general and/or them not recolonising the drying reach. The absence of insects and the presence of only drought tolerant species also indicates that upstream insect taxa, especially *Hydropysche*, the only common insect taxa observed, are not managing to recolonise the lower Tima Burn.

The stream at this site had bare stream banks showing the water level was dropping, and this was not observed at the two upstream sites. This may be indicating that flow is declining in this reach when the upstream reaches have stable flow and water levels. The growth of crack willow roots over the riffle habitat is also a feature associated with low or no flow (Allibone pers. obs.) as the willow roots expand out across the stream bed during the low flow periods presumably when the water velocity is insufficient to keep the root mats from extending across the stream.

The adult inanga at Site 2 also provides some support for a dry lower Tima Burn. If this individual was to spawn in late summer or early autumn 2023 it needed to start to migrate downstream to the tidal spawning areas in late summer or autumn. If the lower Tima Burn was dry when it needed to migrate it would have been forced to remain in the Tima Burn. The lack of elvers and large eels was also noticeable. The lack of small eels and elvers indicates that in recent years fish passage in December – March may have compromised and prevented elvers entering the Tima Burn. Therefore, it is likely that elver migrations into the Tima Burn occur periodically during wetter summers when any dry period does not encompass the full elver migration season.

5.2.2 Actual Effects

Accepting the Environmental Associates (2023) analysis and the observations of Mr Hunter that the Tima Burn dries and it is not connected to the aquifer the mine dewatering process will have no effect on the lower Tima Burn. The natural drying process will occur, and the resident aquatic fauna will be restricted to remanent pools or lost completely if full drying occurs.

Alternatively, if there is some connection between the aquifer and lower Tima Burn there is potential for the mine dewatering to lower the flow and increase the rate at which the Tima Burn dries. However, if this draw down occurs in the summer when natural drying occurs then the actual effect is the same as the natural drying. The only possible difference is the rate of drying may accelerate. However, the stream will still dry, and the aquatic fauna will be lost.

If dewatering the mine draws down the Tima Burn at other times of year the flow in the Tima Burn is most likely to be flowing at a higher level than in summer and drying the lower reach much less likely to occur. In this case there may be a reduction in habitat available, especially riffle habitat compared to that available at natural flows. However, given the fish fauna is sparse and found in pools a reduction in riffle habitat will have no effect. In this reach the fish abundance is limited by the rate of recolonisation and the summer drying events. Similarly, for the macroinvertebrate fauna the observed fauna is very limited and showed no evidence of insect colonisation even after flow has been re-established for probably more than six months. Therefore, a flow lowering or drying period outside the normal summer period will affect very little because very little is present in the lower Tima Burn.

5.2.3 Long Term Effects

The proposed mine has a short working period (two to three months) in the vicinity of the Tima Burn. Therefore, even if mine affects flow in the Tima Burn, once the mine pit has moved away from the Tima Burn natural flow processes will recommence and the Tima Burn's natural flow regime will re-establish. Even if the worst-case scenario eventuates with complete drying of some of the Tima Burn downstream of Teviot Road the macroinvertebrate community is one that survives drying periods in summer so it will have remain in place. The longfin eels will recolonise the reach as they do now. Additional losses of eels due an extended or extra drying is possible, but give the eel density is low this effect would be small. Furthermore, a single year event will have limited effect on the eel population, which is controlled by the longer-term recruitment, retention, mortality and out migration processes. The factor that may slow recovery is if the natural drying event occurs soon after any induced drying. However, even then recovery the recovery of the ecosystem to its present state would take less than a year.

6. CONCLUSION

The lower Tima Burn has a low diversity, low abundance, poor habitat/pollution tolerant macroinvertebrate and fish fauna. This fauna is the most depleted in the reach below Teviot Road where it is reported the Tima Burn dries in the summer. The low quality is further evidenced by thick periphyton layers along some reaches and stock access to the stream.

There will be no effects of the proposed mine on the Tima Burn if the stream is not connected to the groundwater that will be pumped from the mine pit. In the event the dewatering of the mine pit leads to a reduction in flow in the Tima Burn this is going to affect the reach that is already reported to dry in summer – the Tima Burn below Teviot Road. As such the affect will be to increase the rate of drying or slow rewetting after summer. If drying occurs in the summer months this will have the same effect as the natural drying.

If water draw down occurs during high flow periods, outside summer, the likelihood of drying is smaller and the effect is more likely to be a reduction in flow and some reduction of riffle habitat. This riffle habitat is already comprised in some of the lower Tima Burn by the encroachment of willow root mats and did not support any fish or sensitive macroinvertebrates. Therefore, a flow reduction is expected to have little effect on the lower Tima Burn aquatic fauna.

In the event that the mine does effect the Tima Burn water levels any loss of aquatic fauna will not be permanent and the stream will recover to its present low quality state in less than 12 months and most likely in less than six months.

7. REFERENCES

Environmental Associates Ltd. 2023. Response to S92 matters raised in respect to Hawkeswood Mining Limited application for resource Consent(s) RM23.474.

8. APPENDIX A – SITE PHOTOGRAPHS

Upstream of Site 1

Figure A1: Bedrock riffle habitat upstream of Site 1, note open grazed riparian zone.

Site 1

Figure A2: The boulder cobble riffle with run and pool habitat down and upstream respectively.

Site 2

Figure A3: Pool habitat upstream of the bedrock waterfalls.

Figure A4: Riffle habitat upstream of the bedrock waterfalls.

Figure A5: Pool and riffle habitat downstream of the bedrock waterfall, inanga and brown trout were caught at the pool riffle interface.

Site 3

Figure A6: Pool habitat with crack willow logjaw.

Figure A6: Riffle habitat overgrown by willow root mat.

9. APPENDIX B – AQUATIC SPECIES EDNA DETECTION DATA

ScientificName	TaxID	CommonName	Group	Tima1a	Tima1b	Tima3b	Tima3a
Tubifex tubifex	6386	Sludge worm	Worms	1181	1273	3877	2766
Nais elinguis	74736	Sludgeworm	Worms	1915	1700	1506	1359
Lumbriculus variegatus	61662	Blackworm	Worms	1289	1979	749	1061
Anguilla dieffenbachii	61127	Longfin eel; tuna;	Fish	1216	710	1016	1171
Eiseniella tetraedra	1302610	Squaretail worm	Worms	442	320	740	640
Aulodrilus pluriseta	76585	Aquatic oligochaete worm	Worms	130	115	605	918
Gobiomorphus breviceps	300741	Upland bully	Fish	209	356	78	293
Chaetogaster diastrophus	74727	Oligochaete worm	Worms	156	101	106	320
Cricotopus sp. NZeP20	1667446	NZ mining midge	Insects	222	148	71	69
Potamopyrgus antipodarum	145637	Mud Snail	Molluscs	143	148	100	93
Prostoma eilhardi	41366	Freshwater ribbon worm	Ribbon worms	62	40	344	37
Oxyethira albiceps	697957	Micro caddisfly	Insects	8	12	17	434
Bothrioneurum vejdovskyanum	188204	Worm	Worms	0	0	177	286
Enchytraeus buchholzi complex sp. 2 MK-2019	2664990	Grindal worm	Worms	266	71	52	12
Physella acuta	109671	Left handed sinistral snail	Molluscs	56	48	59	108
Henlea cf. andreae PDW-2010	913692	Worm	Worms	0	0	0	164
Aoteapsyche colonica	177870	NZ caddisfly	Insects	24	34	28	74
Psilochorema bidens	1968986	NZ caddisfly	Insects	25	44	33	57
Mesenchytraeus pelicensis	735361	Worm	Worms	0	13	86	54
Lumbricus rubellus	35632	Red earthworm	Worms	23	0	81	16
Henlea ventriculosa	913666	Worm	Worms	0	55	45	0
Acanthocyclops robustus	415614	Copepod	Crustaceans	12	0	55	32
Slavina appendiculata	188233	Worm	Worms	0	0	0	82
Aporrectodea caliginosa	302032	Worm	Worms	0	0	53	29
Stylodrilus heringianus	77571	Worm	Worms	20	7	24	27
Chaetogaster diaphanus	212246	Oligochaete worm	Worms	9	0	0	66
Hydroptilidae sp. 12KH6B	1877717	Purse-case caddisfly	Insects	0	0	35	31

Octolasion cyaneum	302033	Worm	Worms	0	25	35	0
Hydropsyche raruraru	1875509	Netspinning caddisfly	Insects	14	23	19	0
Rotaria rotatoria	231624	Rotifer	Rotifers	10	7	21	16
Audouinella hermannii	31360	Black algae	Red algae	0	15	9	20
Triplectides obsoletus	697963	NZ caddisfly	Insects	7	19	0	18
Limnodrilus hoffmeisteri	76587	Redworm	Worms	21	0	5	0
Nais communis/variabilis complex sp. A3	1138462	Sludgeworm	Worms	0	18	8	0
Pycnocentria evecta	633187	NZ caddisfly	Insects	16	0	6	0
Salmo trutta	8032	Brown trout	Fish	0	0	17	0
Hygraula nitens	1374232	Australian water moth	Insects	0	0	0	16
Sheathia transpacifica	2781386	Red alga	Red algae	6	10	0	0
Bimastos rubidus	2866284	Worm	Worms	0	15	0	0
Corynoneura scutellata	611450	Non-biting midge	Insects	0	0	0	14
Hudsonema sp. NZCAD669	1969062	Cased caddisfly	Insects	11	0	0	0
Tanytarsus sp. EJD-2015	1763607	Non-biting midge	Insects	0	0	0	9
Neozephlebia scita	551888	Mayfly	Insects	8	0	0	0
Coloburiscus humeralis	241031	NZ spinygilled mayfly	Insects	0	0	0	7
Enchytraeus bulbosus	913643	Worm	Worms	0	0	7	0
Bryophaenocladius sp. 8ES	1721116	Non-biting midge	Insects	0	0	7	0
Nais communis	188228	Sludgeworm	Worms	0	0	5	0