

Ian Boothroyd - Summary of evidence

- 1 My evidence covers the aquatic ecology of the Ohinemuri River and the Managatoetoe Stream and the potential impacts that Project Martha might have on these receiving environments both during operation and post closure.
- 2 The existing water quality and aquatic and riparian ecology of the Ohinemuri River and Mangatoetoe Stream was assessed using several sources of monitoring and survey information.
- 3 For the most part water quality variables met the WRC 'Excellent' category for the physico-chemical components (pH, dissolved oxygen, turbidity) of water quality within the Ohinemuri River. Not all attributes monitored by WRC are the equivalent of those used in the National Policy Statement Freshwater Management (NPS-FM) categories listed but the median value for total phosphorus suggests at least satisfactory quality (WRC water quality categories).
- 4 The aquatic ecological values in the vicinity of the proposed abstraction are moderate and values increase towards the headwaters. The Ohinemuri River and its tributaries also has a valuable trout fishery, especially in its lower reaches.
- 5 A voluntary programme of riparian planting has been undertaken by Waihi Gold Ltd. (antecedent mining organisation to OGNZL) along all riparian areas adjacent to land it owns or obtained permission to plant from the adjacent owner (primarily that land is owned or managed by local authorities or central government bodies), including tributaries. the result is a mature riparian vegetation that contributes greatly to the ecological values of the Ohinemuri River (as well as natural character and amenity values).
- 6 I based my assessment of effects of the proposed abstraction on a FRE3 analysis, recommendations for flow requirements for physical habitat for fish and aquatic invertebrates in the Ohinemuri River (Jowett 2014), and my knowledge of the river and its fauna.
- 7 Some emphasis has been placed on the flow requirements for fish and invertebrates. It is important to recognise that the flow requirements proposed by Jowett (2014) are not the same as minimum flows, are not proposed as minimum flows, and nor is it the purpose or requirement of the application to establish minimum flows in the Ohinemuri River.
- 8 In my opinion, the life-supporting capacity of the river, including water quality, of the Ohinemuri River will be safeguarded and there will be little to no measurable or significant adverse effects resulting from the proposed modifications to the abstraction.

- 9 The 2xMALF threshold for abstraction means that river flows after the proposed abstraction (at 2xMALF) will always meet at least 90% optimum habitat flows (or greater) for fish species (including trout spawning and trout rearing). The threshold flow below which habitat declines sharply is also met for the fish species present, as a result of the 2xMALF threshold for the proposed abstraction.
- 10 I emphasise that it is not the intention of the proposed abstraction to drive flows down to 2xMALF at all times the abstraction is operating. Rather, the intention is to take up to 20% of the flow at or above 2xMALF up to a maximum of 270 m³/s, and leaving at least the remaining 80% to pass by.
- 11 For further context of the proposed abstraction, the amount of time (as a percentage of flows) that the Ohinemuri River naturally falls below 2xMALF is 31.69%. For the current water take consent held by OGNZL, the amount of time that the Ohinemuri River would fall below 2xMALF is 34.5% and for this application the figure would be 37.90% (a difference between the latter two of 3.4%).
- 12 Some attention has been given to the flow requirements for torrentfish. Torrentfish are not known from the upper Ohinemuri River (but are known from other tributaries downstream and within the larger Waihou River catchment.) Although torrentfish can penetrate far inland along river systems, they are not known as good climbing fish, and the masonry dam (downstream of the abstraction point) will be a substantial barrier for the juvenile fish. In addition, the natural flow character of the Ohinemuri River in the vicinity of the abstraction and immediately downstream means that the flows will be regularly well below the optimal flows for torrentfish (as indeed for many of the fish species).
- 13 The natural flow character of the Ohinemuri River in the vicinity of the abstraction and immediately downstream means that the flows will be regularly well below the optimal flows for many of the fish species present in the river.
- 14 In my opinion, although the proposed 'no take' threshold results in a limited period of reduced flow, it is not so substantially reduced to cause significant harm to the river beyond what happens on a regular basis naturally, and I do not consider that the proposed 'no take' flow will result in significant adverse effects to the ecological values of the river.
- 15 Fish and Game have also raised the potential impacts on instream temperature. The existing instream temperature already occurs above recommended levels, and in my opinion, requiring a temperature threshold will not alter the existing situation.
- 16 In my opinion, the increase in proposed abstraction will have a minimal impact on the ecological values for spawning, juvenile raising, and feeding of fishes; and no meaningful changes in areas suitable for desirable macroinvertebrates, periphyton and macrophytes.

- 17 In my opinion, there will be no meaningful impact on the natural flow variability and thus no impact on the wetland values and function associated with the proposed abstraction.
- 18 During the filling of the pit lake, the water quality is expected to be consistent with a eutrophic lake, and the extent of primary production during filling will be limited by the availability of phosphorus in the source waters.
- 19 After filling, the internal cycling of nutrients is likely to dominate nutrient availability and both physical and biogeochemical mechanisms will control nutrient availability resulting in a likely reduction in the trophic status of the lake.
- 20 Unless specifically provided for, there is unlikely to be extensive habitat for fish or benthic aquatic organisms in the pit lake. I do not expect the water quality and habitat within the pit lake to be suitable for trout (which are not climbing fish).
- 21 In my opinion, provision should be made for passage for eels to and from the lake at its outlet, as habitat for other fish is likely to be limited within the pit lake.
- 22 Once full, the lake water will discharge to Mangatoetoe Stream. I am confident that the discharge will not result in any adverse effects on the aquatic ecology of the Mangatoetoe Stream as 30 years of water quality and biological monitoring within the Ohinemuri River has demonstrated that the water quality standards applied in the current consent have proved very effective at protecting the aquatic ecology of the river. These standards are protective of aquatic life and therefore remain appropriate as water quality standards to be met in the Mangatoetoe Stream, and no changes are recommended.
- 23 In summary I do not expect the proposed change to the abstraction from the Ohinemuri River for lake filling, or the discharge from the lake once full will result in any adverse effects greater than minor on the Ohinemuri River or its tributary, the Mangatoetoe Stream.

