

From: Josie Burrows [REDACTED]
Sent: Monday, 22 May 2023 10:42 a.m.
To: Josie Burrows
Subject: FW: [#TM-D12420] S92 response for Cold Gold Clutha Limited
Attachments: 20230310_CGCL CIA_FINAL_V3.pdf; MEMO 21141 - Cold Gold CIA and s92 response_Final.pdf; S92 response April 2023 for QLDC and ORC for Cold Gold Clutha Limited.pdf

Sensitivity: General

From: Darryl Sycamore [REDACTED]
Sent: Wednesday, 19 April 2023 3:38 pm
To: Josie Burrows [REDACTED]; Kirstyn Royce [REDACTED]
Cc: Peter Hall [REDACTED]; Danny [REDACTED]
Subject: [#TM-D12420] S92 response for Cold Gold Clutha Limited

Hi Kirstyn & Josie

Please find attached the s92 reply for Cold Gold Clutha, a supplementary report by E3 Scientific and the Cultural Impact Assessment.

If you can please advance this to public notification as soon as practicable that would be appreciated.

Kind regards

Darryl Sycamore

*Resource Management
Planner*

03 477 4783
021 125 5554
darryl@terramark.co.nz
Terramark.co.nz

Level 1
330 Moray Place
Dunedin 9016
dunedin@terramark.co.nz



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Cultural Impact Assessment: Cold Gold Clutha Suction Dredging on the Mata-au



Mō tātou, ā, mō kā uri a muri ake nei.

For us, and for our children after us.

This report has been prepared by Aukaha (1997) Ltd for Cold Gold Clutha Limited (CGCL) on behalf of Te Rūnanga o Moeraki, Kāti Huirapa Rūnaka ki Puketeraki, Te Rūnanga o Ōtākou, and Hokonui Rūnanga. Intellectual property rights are reserved by Aukaha (1997) Ltd on behalf of Te Rūnanga o Moeraki, Kāti Huirapa Rūnaka ki Puketeraki, Te Rūnanga o Ōtākou, and Hokonui Rūnanga.

Acknowledgement:

The preparation of this report was undertaken with assistance from the following rūnaka:

- Te Rūnanga o Moeraki
- Kāti Huirapa Rūnaka ki Puketeraki
- Te Rūnanga o Ōtākou
- Hokonui Rūnanga

Front cover photo: The Mata-au. Source: Aukaha (1997) Ltd.

Version (Final): [22.3.2023]

 Aukaha	
Aukaha Ltd. 268 Stuart Street PO Box 446 Dunedin 9054 Phone 03-477-0071	Prepared by: Kate Timms-Dean, Gabby Golding, and Tim Vial
	Reviewed by: Te Rūnanga o Moeraki Kāti Huirapa Rūnaka ki Puketeraki Te Rūnanga o Ōtākou Hokonui Rūnanga
	Report 1 of 1 For Cold Gold Clutha Limited and Terramark

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Toitū te Mana, Toitū te Whenua: Kā Rūnaka

There are four papatipu rūnaka with shared authority in the Mata-au area affected by the activity proposed by Cold Gold Clutha Ltd.¹

Te Rūnanga o Moeraki

The takiwā of Te Rūnanga o Moeraki centres on Moeraki and extends from the Waitaki to the Waihemo, and inland to the Main Divide. The interests of Te Rūnanga o Moeraki are concentrated on the Moeraki Peninsula area and surrounds, including Rakahineatea Pā, Koekohe, and Te Kai Hīnaki with its boulders. In addition, the interests of the rūnaka extend north and south of the Moeraki Peninsula to the boundaries of their takiwā.



Kāti Huirapa Rūnaka ki Puketeraki

The takiwā of Kāti Huirapa Rūnaka ki Puketeraki centres on Karitāne and extends from the Waihemo to Purehurehu, north of Heyward Point. Their takiwā extends inland to the Main Divide, sharing interests in the lakes and mountains to Whakatipu-wai-māori.



Te Rūnanga o Ōtākou

The coastal rūnaka of takiwā of Te Rūnanga o Ōtākou centres on Ōtākou on the Otago Peninsula and extends from Purehurehu to Te Mata-au. The inland reaches of their takiwā includes shared interests in the lands and mountains to the western coast with rūnaka to the north and south.



Hokonui Rūnanga

The takiwā of Hokonui Rūnanga centres on the Hokonui region and includes shared interests in the lakes and mountains between Whakatipu-waitai and Tawhititarere with other Murihiku rūnaka, and those located from Waihemo south.



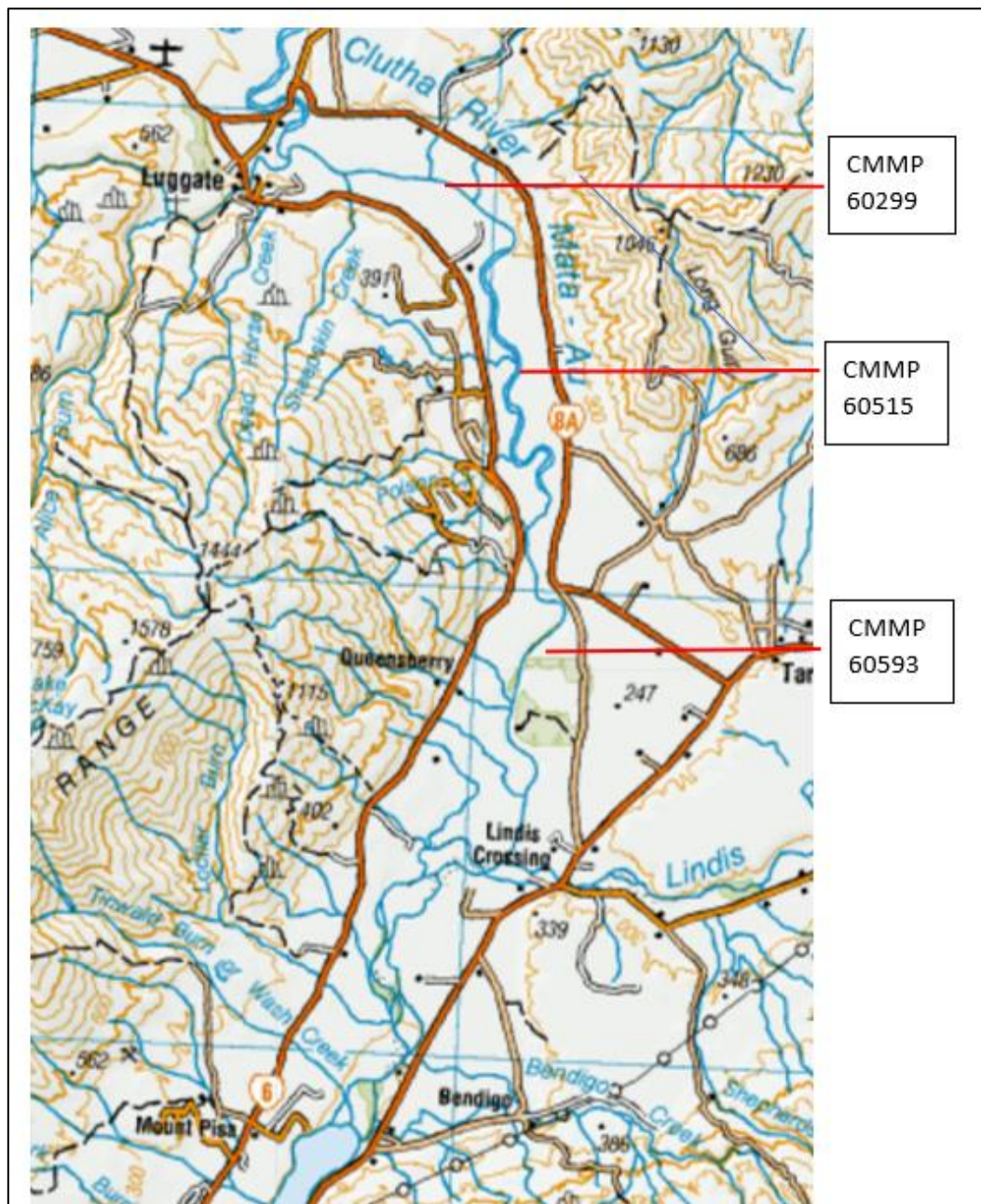
Te Rūnanga o Moeraki, Kāti Huirapa Rūnaka ki Puketeraki, Te Rūnanga o Ōtākou, and Hokonui Rūnanga (referred to as Kāi Tahu ki Otago or Kā Rūnaka) collectively represent whānau and hapū who are mana whenua within the Otago region. The interests of Kāi Tahu ki Otago along the Mata-au are shared with Ngāi Tahu ki Murihiku.

¹ See Appendix 1 for a glossary of Māori terms.

1.0 He Reo Arataki: Introduction

Cold Gold Clutha Limited (CGCL) has operated suction dredge mining for gold along 66kms of the Mata-au riverbed between the Roxburgh Dam and Tuapeka Mouth for the last ten years under an existing mining permit.² CGCL recently purchased further mining permits³ to enable the relocation of dredging into the upper reaches of the Mata-au between Luggate and the top of Lake Dunstan, as shown by Whakaahua 1.

Whakaahua 1: Combined area of mining permits 60299, 60515 and 60593⁴



² CMMP 53215.

³ CMMP 60299, 60515, 60593 (refer to Appendix 2).

⁴ NZ Topo Map, 2023; NZPAM, 2023.

CGCL holds existing resource consents associated with mining permit 53215 for the lower Mata-au, as shown by Tūtohi 1:

Tūtohi 1: Existing consents and concessions – Lower Mata-Au⁵

Terretorial authority	Consent number	Activity
CODC	RC 130219	Land use consent: <ul style="list-style-type: none"> - Operation of a dredge - Commercial vessel in a waterbody - Exceeding noise thresholds - Earthworks/vegetation clearance for construction of a slipway
ORC	RM20.087.01	Discharge permit - To discharge contaminants, namely sediment to water for the purpose of operating a suction dredge during alluvial gold mining
ORC	RM20.087.02	Land use / structure - To disturb the bed of the Clutha River/ Mata-Au for the purpose of operating a suction dredge or bucket ladder dredge
ORC	RM20.087.03	Water permit – To take and use surface water from the Clutha River/ Mata-Au for the purpose of operating a suction dredge for alluvial gold mining
ORC	RM20.325	Land use consent – To excavate a slipway and place concrete blocks and soil armouring on the bed of the Clutha River/Mata-Au for the purpose of maintaining a dredge vessel
DOC	-	Concession to construct a slipway in the marginal strip for the purpose of extracting a dredge from the river for transport, maintenance, and maritime survey.

CGCL are seeking resource consents for the relocation of dredging to the Upper Mata-au associated with mining permits 60299, 60515, 60593, as shown by Tūtohi 2:

Tūtohi 2: Consents being sought – Upper Mata-Au⁶

Terretorial authority	Activity
ORC	The disturbance of the bed of the river for the mining activity The disturbance of the bed of the river for construction of slipways The take of water; and The discharge of sediment to water
QLDC	Mineral extraction within a watercourse Storage of hazardous goods (fuels and oils)
CODC	The use of a maritime vessel for commercial use Earthworks and vegetation clearance within 10m of the margin of a waterbody Earthworks exceeding 20m ³ To enable more than three persons to operate a commercial activity.
DOC/LINZ	Concessions: <ul style="list-style-type: none"> - Use of land and river margins - Creation of slipways in marginal strip - Transportation of the dredge within the roading network

⁵ Sycamore, 2021, p. 3.

⁶ Ibid, pp. 3-4.

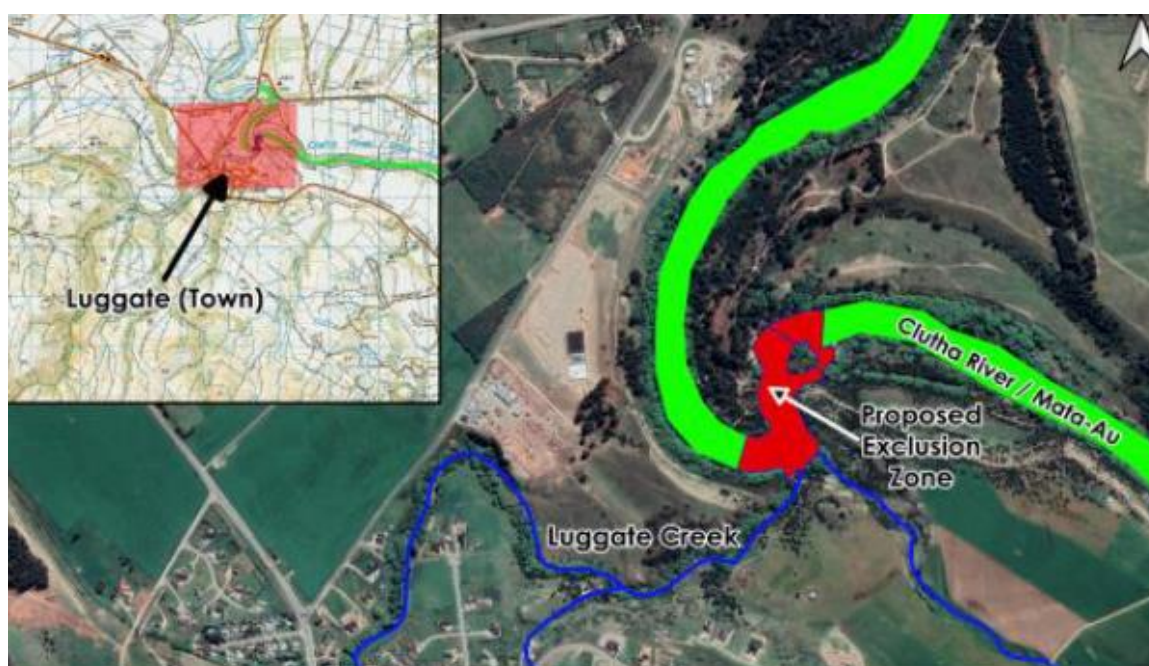
2. Summary of the proposed activity

CGCL propose relocating the suction dredge to the Upper Mata-au and will operate within both the Central Otago and Queenstown Lakes Districts. The key elements of the proposed dredging activity are summarised below.

2.1 The Location

The dredging area is prescribed by the combined mining permits and commences just south of Luggate Bridge and continues downstream to the confluence with Lake Dunstan. An area of the bed in the vicinity of the Luggate Creek confluence and Devil's Nook has been excluded from the application due to the ecological sensitivity of these areas and the potential for adverse effects from suction dredging.⁷ These areas are identified in red in Whakaahua 2 below:

Whakaahua 2: Exclusion area highlighted in red⁸



CGCL have further proposed as a condition of consent that a 20m exclusionary zone be established around tributary confluences of greater than 1m width, as the confluence of lower order streams with the Mata-au provides important ecological habitat.⁹

2.2 The Dredging Activity

Dredging is a long-standing method of mining in waterways and has been used for such purposes on the Mata-au extensively in the past, as illustrated by Whakaahua 3:

⁷ Ibid, p. 5.

⁸ Ibid, p. 5.

⁹ Ibid, p. 4.

*Whakaahua 3: Historic approach to mining in the Mata-au near Cromwell, 1890s*¹⁰



CGCL utilises a suction type dredge that uses hydraulically driven high-pressure water pumps to generate water flow and suction in the main pipe via venturi induction jets. The main suction pipe has an internal diameter of 350mm and is controlled by an operator located in the wheelhouse.

The pipe is lowered to the river bottom by hydraulic winches and river gravels are entrained into the main pipe as a slurry. The gravels are discharged onto a classification screen at the rear of the dredge where all oversize material and excess water is discharged immediately back into the river. Classified material is pumped on board and fed through gold recovery systems comprising standard gold riffle tables. All fines and water are discharged back into the river. There are no chemical processes involved in the activity.

Areas are 'spot mined' where a site is identified that is favourable for gold accumulation, and then worked. In this context parts of the riverbed are discretely mined rather than blanket mining the entire riverbed throughout the entire mining permit area. As the dredge moves forward, any depressions are progressively reinstated by gravels returned to the watercourse.

CGCL has found that gold in the mid-reaches of the Clutha does not lie uniformly in the gravels from bank to bank, rather it is located in narrow non-contiguous longitudinal bands. These areas are found by spot dredging until an economic band is found and then mined.

No more than a hectare will be mined anywhere within the permit areas in any given month. Over any calendar year the mining area is not likely to exceed more than 10ha. Mining will only occur in an area once which limits the extent of effects in any particular site.

The rate of mining is self-limiting, and areas will not be re-worked because there will be minimal gold within them.

¹⁰ Ibid, p. 5.

Maximum depths will depend on the depth to bedrock where the gold either sits on the basement rock or is contained within crevasses or depressions, ranging from 2m to 15m in depth.

Surface water will be taken at a maximum rate of 400 litres per second, with a daily maximum take of 18,720m³ based on a maximum 13-hour working day. This take represents the maximum rate, and it is unusual to operate the dredge at full speed as it greatly reduces the chances of retaining the gold in the riffles.

All water will be returned directly to the Mata-au at the point of take and as such, is considered non-consumptive, and therefore not subject to assessment to allocation, metering, minimum flow or and efficiency assessment.¹¹

2.3 The Dredge Vessel

The dredge is a Maritime NZ registered vessel No MNZ 134266 named “CGC1”. The dredge operates in accordance with Maritime Transport Operating Rules, has a valid Maritime Transport Operator Certificate (MTOC) and a comprehensive and audited Maritime Transport Operator Plan (MTOP).¹²

The dredge is a self-powered commercial vessel being a steel pontoon catamaran 23.9 metres in length with a beam of 6.6 metres. Propulsion is via twin 550hp Detroit Diesel engines driving Ultrajet 375 waterjets. Dredging power is hydraulic, powered by an Isuzu 600hp 6WG1TC marine diesel engine.

The main propulsion engines are used to manoeuvre the dredge about the river to position for dredging, re-fuelling and for retreat during flood events. Such manoeuvring occurs a maximum of once a week for refuelling and otherwise only very occasionally. The dredge is normally static for dredging operations.

The dredge utilises two 500kg main mooring anchors to position itself in the river. These anchors are located within the river wet bed with the anchor warps crossed over for stability. This means that the anchor warps are immediately in front of the dredge (not out to the sides) and typically submerge within 10-20m. To minimise the risk of anchor failure (slippage), the anchors themselves are also tied back with wire rope to the riverbank where possible usually to a large willow tree or rock protrusion. There is no impediment to river users and minimum risk to other vessels.

The dredge also occasionally requires two 150kg stern anchors where necessary for stability.

Due to the size of the Clutha River and the bespoke anchoring system, substantial clear passage is provided down at least one side and normally both sides for other river users to pass. On occasion where side lines are utilised, typically when moored against the riverbank during a flood event or for maintenance, these are highlighted with marking tape and/or marker buoys.

¹¹ Ibid, pp. 4-5.

¹² The MTOP is a live document specific to the dredge that is audited and approved by Maritime NZ. The MTOP outlines all aspects of the vessel including management, operational procedures, crew, crew training, reporting, safety systems and procedures, maintenance plans and procedures, safety, and environmental risk assessment and management; *ibid*.



Crew access to the dredge is by way of a service tender. This craft is a 200hp 5.5m RIB jet boat which falls within Maritime NZ survey and operational requirements for the dredge. The tender is launched and retrieved at either public boat access points or via private property with landowner permission. The tender is typically moored just off the riverbank at night. When on board, the tender is tethered alongside the dredge. Safe operation and maintenance of the tender is included in the Maritime Transport Operating Plan. Cold Gold maintains easement concessions with LINZ & DOC where relevant.¹⁴

2.4 Refuelling and Hazardous Materials

A self-bunded fuel storage tank owned and supplied by South Fuels will be located well above maximum flow levels on private property adjacent to the river. The location is not yet confirmed and is likely to move between several properties as the dredge moves within the river.

Weekly refuelling of up to 5,000L of diesel fuel is a strictly monitored procedure to avoid any spillage. Refuelling will be direct shore to ship. Cold Gold maintains (or will seek any additional) easement concessions with LINZ and DOC where relevant with respect to landing and refuelling.

The hydraulic process involves the use of hydraulic oils. These are contained within the dredge by tray bunds in the event a line was to burst. Continuous maintenance is carried out on the plant to ensure no pipes or connections are compromised to limit the risk of failure.

¹³ Ibid.

¹⁴ Ibid.

In-water hydraulic systems are separate from on-board systems in that they utilise biodegradable-oil which, in the event of a leak or spillage, break down far faster than mineral oils and are non-toxic. The risk of failure for the in-water system has been assessed as low.

The Maritime Transport Operator Plan (MTO) specifies all procedures for the safe operation, maintenance, and management of potential contaminants along with all other aspects of the vessel and its operation. Maritime NZ assessed and considered the dredging operation “has a low-risk profile” and “continues to hold a risk rating of Low”.¹⁵

¹⁵ Ibid.

3.0 He Kaupapa Mahi: Methodology

The key elements of the project methodology are set out below.

3.1 Review of literature

A desktop review of the project area was undertaken, focusing on detailed documentary research, to inform the drafting of a cultural values assessment related to the proposed dredging activity.

Reference material has been derived from the following key sources:

- a. The Kāi Tahu ki Otago NRMP¹⁶
- b. Ngāi Tahu cultural maps¹⁷
- c. District Plan wāhi tūpuna mapping
- d. Recorded archaeological sites via ArchSite,¹⁸ and
- e. Available ecological and environmental monitoring data and reports.

Other relevant policies, plans, government and industry literature and reports, and academic research publications were identified as further source material during the review of literature.

3.2 Cultural values assessment

A cultural values assessment identifies key mana whenua values in the area affected by the proposed activity, particularly focused on the affected reach of the Mata-au from Te Wairere (Lake Dunstan) to Luggate.

The cultural values statement provided below was drafted by Aukaha kaimahi, and presented to mana whenua representatives for review, comment, and amendment. All material released by Aukaha has been assessed and approved by mana whenua, to ensure that the final statement accurately reflects the position of Kā Rūnaka.

3.3 Cultural impact statement

A cultural impact statement identifies the impacts of the proposed activities on the cultural values identified, and proposes recommended actions and expectations to protect these values. In the case of this application, cultural impacts in terms of the following will be a focus of the assessment:

1. Mana whenua values
2. Wāhi tūpuna and ara tawhito values
3. Wai māori values
4. Ecological and native biodiversity values
5. Māori archaeological values
6. Equity of Environmental Outcomes

¹⁶ KTKO, 2005.

¹⁷ TRONT, 2023.

¹⁸ NZAA, 2023.

4.0 Ko te Manawa Kāi Tahu: Cultural Values Framework

4.1 Whakapapa Relationship with Te Taiao

Kāi Tahu are bound to the land, water and all life supported by them by whakapapa. The following account of Kāi Tahu whakapapa and creation stories is sourced from the words of Rāwiri Te Mamaru, a raketira of Moeraki in the mid-1800s following the death of the famed Kāi Tahu leader, Matiaha Tiramōrehu:

Nā Te Pō, ko Te Ao	<i>From eternity came the Universe</i>
Nā Te Ao, ko Te Ao Marama	<i>From the Universe, the bright clear light</i>
Nā Te Ao Marama, ko Te Ao Tūroa	<i>From the bright clear light, the enduring light</i>
Nā Te Ao Tūroa, ko Te Kore Te Whiwhia	<i>From the enduring light, the void unattainable</i>
Nā Te Kore Te Whiwhia, ko Te Kore Te Rawea	<i>From the void unattainable, the void intangible</i>
Nā Te Kore Te Rawea, ko Te Kore Te Tamaua	<i>From the void intangible, the void unstable</i>
Nā Te Kore Te Tamaua, ko Te Kore Matua	<i>From the void unstable, the void endowed with paternity</i>
Nā Te Kore Matua, ko Te Mākū	<i>From the void of paternity came moisture</i>
Nā te Mākū, ka noho i a Mahoranui ātea	<i>From the moisture came limitless thought.</i>
Ka puta ki waho ko Raki	<i>Then came the visible heavens</i>
Nā Raki, ka noho i a Poko haru a te Pō	<i>The visible heavens combined with the great abyss to produce the numberless sorceries and the ultimate calamity!</i>
Ko Aoraki me Rakamaomao, tana a Tāwhirimātea	<i>Thence to Aoraki and the winds and weather</i>
Ka tū te Rakiwhānoa	<i>To the creator of land</i>
Ui rā ki Te Maha-a-nui ā Māui	<i>And the canoe of Māui.</i>
Ko te Ao Tākata!	<i>And finally, to people!</i>
Tīhei mauri ora!	<i>I cough, the breath of life.</i>

Wai is a central element in our creation traditions and is present very early in the whakapapa of the world. In this kōrero, darkness gives rise to the light, and through an abyss of nothingness, moisture materialises as the first iteration of wai.

The whakapapa continues down to Rakinui and his wives, Pokoharua-i-te-Pō and Papatūānuku. The children of Rakinui and his wives created the elements of te taiao, including mountains, rivers, forests, and seas, and all living things.

Kāi Tahu claim the same descent from Raki and his wives and are therefore connected to all things by whakapapa. Kāi Tahu tribal whakapapa thus links the cosmological world of the atua to present and future generations, giving rise to a spiritual relationship with te taiao and a respect for the mauri of that environment.

Similarly, whakawhanaukataka is expressed in the resource management approach “Ki Uta Ki Tai”, which emphasises the holistic management of the interrelated elements within the natural

environment. Water released by Raki makes its way into rivers, which in turn connect the entire landscape from the mountains to the sea. From the sea, water evaporates, condenses, and falls again on Papatūānuku, an eternal holistic cycle.

4.2 Mauri

Mauri flows from our living world and down through whakapapa, linking all aspects of our world. The mauri of water represents the essence that binds all things, acting as a life-giving force, and connecting the environment, from the mountains to the sea.

Mauri is an observable measure of environmental health and well-being. Waterbodies with an intact and strong mauri are characterised by good quality waters that flow with energy and life, sustain healthy ecosystems and support mahika kai and other cultural values. The primary resource management principle for Kāi Tahu is the protection of mauri. Concepts such as tapu, noa and rāhui are therefore applied by mana whenua to protect the mauri of a resource.

However, the mauri of a waterway is unable to protect itself against unnatural actions and interventions such as damming, diversions, altered flow regimes, discharges, and activities that impact on the riverbed. Kā Rūnaka have seen this pattern take place over and over throughout the history of European settlement in Te Waipounamu, with many behaviours and actions that undermine and degrade the mana and the mauri of our waterways still in evidence today. For the Mata-au, this history is implicitly linked to the impacts of mining, damming, abstraction, and land use practices.

4.3 Rakatirataka and Kaitiakitaka

Rakatirataka refers the exercise of mana in order to give effect to Kāi Tahu culture and traditions. In the management of the natural world, rakatirataka is underpinned by the obligations placed on mana whenua as kaitiaki. Kaitiakitaka is an expression of rakatirataka. Wai māori is a taoka that is governed under the domain of rakatirataka, in accordance with Kāi Tahu tikaka and the principles of kaitiakitaka.

The whakapapa connection with te taiao imposes a kaitiakitaka obligation on mana whenua to protect wai and all the life it supports, in accordance with customs, knowledge, and mātauranga developed over many generations. The duty of kaitiakitaka is not merely about guarding or caretaking but involves acting as an agent for environmental protection and decision-making, on behalf of tūpuna and mokopuna. The focus of kaitiakitaka is to ensure environmental sustainability for future generations, as expressed in the whakataukī mō tātou, ā, mō kā uri a muri ake nei.

4.4 Mahika Kai

Mahika kai practices underpin the Kāi Tahu relationship with Otago's rivers, lakes, wetlands, moana and the broader environment. Our cultural identity as whānau and hapū is tied to our resources. Fundamental to our culture is our ability to learn and practise customary gathering of food and other resources, to put kai on the table at the marae and at home and to ensure that the knowledge of customary practices is passed on from generation to generation.

The inland lakes and waterways of the Otago region once supported rich and healthy mahika kai resources. The lakes, waterways and their surrounds attracted Kāi Tahu hunter-gatherer parties that

would travel inland from the coast to camp at nohoaka often located adjacent to lakes and waterways to engage in mahika kai activities.

For mahika kai to be sustained, populations of species must be present across all life stages and must be plentiful enough for long term sustainable harvest. Safe access to mahika kai sites must be available, kai must be safe to gather, safe to harvest and safe to eat and management and harvesting practices must be able to be carried out in accordance with tikaka.

The transmission of mātauraka necessitates whānau being able to access healthy mahika kai to carry out customary practices.

4.5 Wāhi Tūpuna

Wāhi tūpuna are interconnected ancestral places, landscapes and taoka that reflect the history and traditions associated with the long settlement of Kāi Tahu whānui in Otago. Wāhi tūpuna are characterised not only by natural and physical aspects, but also by the place names and associated traditions and events that bind us to the landscape, just as the landscape itself is a part of us. Such landscapes are linked by whakapapa in our creation traditions, underpinning our mana whenua status, and breathing life into our mātauraka and tikaka. Such ancestral landscapes are treasured places that transcend the generations.

4.6 Wāi Māori

Wai is an integral and enduring part of our wāhi tūpuna. The Otago landscape is criss-crossed by many and varied waterbodies, from many sources, including lakes, awa and their tributaries, puna, and groundwater. Water is the lifeblood of the environment and of the many life forms that depend on it. Water, as a result, is of high significance for Kāi Tahu, both for its practical applications and for the spiritual meaning it embodies. Rivers are a symbol of permanence and a source of spiritual meaning.

Water was, and is, used extensively by mana whenua for spiritual and common uses. Wai is used to remove tapu, and in ceremonies. Waterways like the Mata-au were important pathways, whether traversed by waka or mōkihi, or followed on foot and they are often still recognised as ara tawhito.

4.7 Taoka

Indigenous species are valued as taoka by Kāi Tahu, as are the habitats through which taoka species survive and thrive. The ecosystems provided by wai māori, in lakes, rivers, wetlands, estuaries, and at the coast, offer lifegiving habitats for indigenous species Whanaukataka is at the heart of this relationship, rather than an economic model of ownership. Thus, when the health of a waterway is degraded, the impacts are far-reaching, for the waterway, for the ecosystems, habitats, and species it supports, and for the people.

5.0 He taura whiri kotahi: Mana whenua associations with the Mata-au

5.1 Wai Māori

The wai that descends from the mountains to the great inland lakes is tapu, reflecting the mana of the mountains and carrying an intact mauri. The Mata-au, linking the pure waters of the Upper Lakes with the bountiful coastal environment, is an awa of status and significance for Kāi Tahu. The awa as it flows from Lake Wānaka to the outlets of the Matau and Kōau branches at Tauhinu is joined by significant tributaries, including the Ōrau, Paetarariki, Lindis, Kawarau, Ōtewhata, Manuherekia, Poumahaka, Tuapeka, Waitāhuna and the Waiwera, which increase its size and volume.



Whakaahua 5: Red bridge across the Mata-au at Luggate ¹⁹

5.2 Wāhi Tūpuna

The Mata-au is a significant component of an integrated cultural landscape. The awa was an ara tawhito that provided access from the coast to the upper lakes of Wānaka, Hāwea, and Whakatipu-wai-māori. The entire system acted as a significant wāhi mahika kai. Weka, kōura, and tuna were key food sources collected along its length, and there were bountiful stands of tī kōuka from which to source kāuru.

Along its length, a myriad of wāhi tūpuna are recorded, attesting to the long-standing importance of the Mata-au as a food source, a place of travel and activity, and reflecting the physical and spiritual connection between the mountains and the coast. The recorded wāhi tūpuna in the reach of the river over which CGCL proposes to operate are described in Tūtohi 3.

¹⁹ Verduyn-Cassels, 2008.

Tūtohi 3: Wāhi tūpuna in the area of the dredging activity (north to south)²⁰

Ikoa Māori	Location/Ikoa Pākehā	Description
Te Rua Tūpāpaku	Luggate	A kāika mahika kai located on the Mata-au where weka, tuna and kāuru were gathered. It is also recorded as a fortified permanent pā, and that Rāwiri Te Maire and Te Maihāroa lived there.
Autāia	Near Queensbury	A kāika mahika kai located on the Mata-au where weka, tuna, and kāuru were gathered.
Te Kōareare o Te Pāhi	Downstream from Queensbury	A wāhi mahika kai located on the Mata-au where tuna and weka were gathered.
Kā Iwi o te Weka	Downstream of Lindis Crossing	A wāhi mahika kai on the Mata-au where tuna and weka were gathered.
Mahaka Katia	Northern end of Lake Dunstan	A wāhi mahika kai located on the Mata-au where tuna and weka were gathered.
Otakihia	Northern end of Lake Dunstan	Rapids that were located at what is now the northern end of Lake Dunstan

Recorded archaeological sites in the area provide further evidence of this connection, with finds of a rock shelter (G40/119), and an oven with moa bones (G40/67) located near Luggate. The archaeological record for this second site references moa leg bones that had been broken open for human consumption, as well as tracheal bones and eggshell fragments.²¹ These taoka signify that this area has a long history of occupation and use, including a period before the extinction of the moa over 500 years ago.

Tūtohi 4: Recorded Māori archaeological sites in area of proposed activity²²

Site number	Description	Details
G40/67	Umu	Oven with moa bones, indications of human interaction. Included large bones, tracheal bones, and fragments of eggshell mixed with ashes
G40/119	Rock shelter	A large shelter (4m x 4m x 1.3m) 10m above Luggate Creek. Charcoal stains on the ceiling. Northeast facing, likely site for habitation.
G41/10	Artefact – toki	Find of a dark grey toki with black lines running through it.
G41/283	Artefact	Find of a patu onewa.
G41/287	Umu	Find of a scattering of burnt stones and blackened soil covering about 0.2ha.
G41/288	Umu	Find of a pile of burnt greywacke boulders with large pieces of charcoal. No bone or other midden was found.
G41/298	Umu	Find of fragments of burnt greywacke pebbles in an irrigation ditch bank.

²⁰ TRONT, 2023.

²¹ Ritchie, 1978.

²² NZAA, 2023.

Downstream of Luggate, identified Māori archaeological sites are absent through to the area surrounding Lindis Crossing, although the reason for this absence is unclear. Further south around Te Kōareare o Te Pāhi, several sites have been recorded including ovens and artefacts.

The recorded archaeological sites in the reach of the river over which CGCL proposes to operate are described in Tūtohi 4 above.

5.3 Mahika Kai and Biodiversity

Historical vegetation records and research indicates that the flora of area was most likely dominated by stands of tawai and tawairauriki interspersed with thickets of mānuka and kānuka. Valleys such as that in the vicinity of modern-day Luggate were likely to be dominated by tussock grasslands interspersed with wetland areas.

Native beeches like tawai and tawairauriki provide an important habitat for the beech scale insect or honeydew, a native species of aphid that is a vital food source for many native birds and insects. It lives in the bark of most types of native beech, providing a high-sugar, high-energy food source for tūi, korimako, and kākā.²³

Certain mahika kai species were crucial to ensuring food security for southern Māori. The river itself is recorded as having been a source of weka and tuna, which are referenced throughout the district as significant and plentiful food sources. Not only were populations of weka and tuna bountiful, but their meat was also easily processed for long-term storage; tuna by drying over racks, and weka by preserving in their own rendered fat within pōhā bags. Umu such as the site recorded at Luggate were used during the preservation process for weka, moa, and kāuru. Kāuru was extensively gathered and cooked along the Mata-au in the past, evidenced by the many umu tī identified in the archaeological layer along the river's length. Kāuru was cut into logs and cooked in umu within baskets made from tī kōuka leaves. The logs were then beaten on a flat stone and then strung in pairs on a drying rack for storage. To prepare for eating, the logs were soaked and twisted to separate the fibre from the porridge called waitau kāuru. It tasted sweet and could be mixed with berries or harakeke honey to enhance the flavour.²⁴ Kāuru could also be eaten fresh by cutting branches or the root and peeling back the outer bark to expose the sweet inner flesh.²⁵

Locations such as Te Rua Tūpāpaku were preferred sites for settlements and campsites by whānau in the past, due to the natural features that signified it as a suitable site for economic activity. As well as providing a ready source of food and access to transportation and trade, the looping nature of the awa creates a highly defensible position, making it the perfect spot for a pā such as Te Rua Tūpāpaku. Further downstream, mana whenua have identified further wāhi tūpuna, similarly referencing the mahika kai values linked to cornerstone species of tuna, weka, and kāuru.

²³ DOC, 2022; Orwin, 2007.

²⁴ Scheele, 2007.

²⁵ Beattie, 1994.

6.0 E rite ana ki te karo o te moa: The Kāi Tahu history of loss

6.1 The Kāi Tahu Deeds

Te Tiriti o Waitangi was signed by representatives of Kāi Tahu whānui in late May and early June of 1840.²⁶ Subsequently, between 1844 and 1864, Kāi Tahu agreed a series of land sales with the Crown. The Crown defaulted on key elements of these agreements, resulting in widespread land alienation and economic deprivation for mana whenua.²⁷

The 1848 Kemp's Deed was the largest of the Crown land purchases, comprising 13,551,400 acres for which £2,000 was paid. Although the deeds promised a tenth of the land would be retained as reserves for Kāi Tahu, less than 6,500 acres were allocated within the footprint of the deed.²⁸

Over time ancestral lands were surveyed, sold, and settled and it was increasingly difficult to follow kā ara tawhito and to access wāhi tūpuna and wāhi mahika kai. Changes in the ancestral landscape and the loss of mahika kai resources impacted on Kāi Tahu communities, contributing to the displacement of whānau, loss of knowledge and identity, and economic hardship.

The loss of connection to the whenua that took place as a result of the Deeds, coupled with the visible deterioration, degradation and modification of lakes, rivers, and waterways since that time, is a source of great mamae for mana whenua. This is particularly true given the obligations of mana whenua as kaitiaki whenua in their takiwā, mō tātou, ā, mō kā uri a muri ake nei.

6.2 Impacts of Infrastructure

The development of roads, towns, and infrastructure caused physical changes to the landscape and adverse impacts on the cultural values of significant landmarks and wāhi tūpuna. Activities that significantly modified rivers and tributaries proliferated, including mining, irrigation, damming, dredging and the draining of wetlands and lakes. These activities had significant impacts on mana whenua values, wāhi tūpuna, biodiversity, and the mauri of our rivers. This disregard of mana whenua values, and the needs of awa as entities in their own right, reflects the pattern of settlement throughout Aotearoa.

The impacts of dams on migratory species and the health of waterways were particularly severe. Damming has effectively disrupted the migratory paths of taoka species that evolved in the waterways of Otago. The impact of this and other pressures are clear in the decline in the populations, for example, of tuna, which have been reduced by up to 90%.²⁹ The loss of access to the bountiful harvests of tuna from the Upper Lakes that whānau and hapū once enjoyed was significant and pronounced after the dams were built.³⁰

Damming of the Mata-au at Hāwea in the 1950s raised the water level of the lake by 20m, later providing storage for the Roxburgh and Clyde power stations. Large fluctuations in lake level have significant ecological impacts on waterways, including shoreline erosion, inundation and mortality of terrestrial vegetation, and a decrease in light available to littoral and benthic plant communities.³¹

²⁶ Waitangi Tribunal, 1991, s4.2.

²⁷ Ibid.

²⁸ TRONT, 1997.

²⁹ Clucas, 2019.

³⁰ Jellyman & Harding, 2012.

³¹ Young, Smart, & Harding, 2004.

6.3 Impacts of Mining

Gold mining had a myriad of impacts on the relationship of mana whenua with their ancestral landscapes and mahika kai resources. When gold was struck in Otago in 1862, thousands flocked to the goldfields of Te Waipounamu. A number of Kāi Tahu people saw the benefits to be had from joining the gold rush, as well as engaging in other paid work like shearing and labouring. In 1862, Māori gold miners were recorded as catching weka and whekau.³²

Nevertheless, the influx of people, and the wealth that the gold rush produced, created a further wedge between Kā Rūnaka and the hinterland. Kāi Tahu whānau increasingly faced barriers to accessing customary landscapes and resources in Central Otago and the Upper Lakes. When a group of mana whenua from the coast undertook a heke inland in an attempt to retain access to their traditional land and resources, they were unable to progress past Ōmārama. They stayed there until 1879, when they were forcibly ejected. From that point onwards, the primary economic activity available to mana whenua in the Upper Lakes region was as labourers.³³

The growth of Luggate during the Gold Rush is a good example of the way this period drove settlement and environmental modification. The number of heritage sites around this stretch of the Mata-au is considerable, referencing a range of economic and social activities in the area prior to 1900. Archaeological sites significantly reference mining activities including evidence of tailings, damming, water races, pipework, and sluicing.³⁴ Gold dredging began operating in the area in 1890, and at one stage, there were four dredges operating between the Luggate Punt and Albert Town.

6.4 Impact of Pastoralism

Agriculture and pastoralism imposed significant barriers for mana whenua accessing the inland areas of Otago. Access to the sites associated with mahika kai was inhibited, both through fencing by landowners, and as a result of the environmental impacts on the resources themselves. The result of this separation has been far-reaching for mana whenua.

The introduction of rabbits to Te Waipounamu for meat and hunting in the 1830s saw the explosion of their population. From the 1870s, rabbit plagues became a concern, leading to major impacts for farming. Weka and kāhu were their only natural predators, but they were unable to keep up with the spread of rabbit numbers.³⁵

Farmers used a variety of methods of control rabbits, with poisons and toxins being employed from the 1880s. Native species like weka became significant victims of poisoning, and rabbit populations continued to soar. In the same decade, stoats, and other mustelids were released as a further rabbit control measure, but immediately began to prey on native species.³⁶ The impact of these introduced species on native species has been profound and continues to hamper their survival today due to habitat loss and predation.

Whereas historic vegetation was heavily weighted towards beech forest and tussock lands, vegetation is now dominated by exotic grasslands for agriculture. Limited remnant stands of tawai, and tōtara are still present in pockets, mainly in gorges and on spurs in areas like Luggate Creek.³⁷

³² Beattie, 1945.

³³ Kleinlangevelsloo & Clucas, 2017.

³⁴ Upper Clutha Historical Records Society, 2022.

³⁵ Peden, 2008.

³⁶ Ibid; Brockie, 2007.

³⁷ Wardle, 2010.

6.5 Impacts on Mahika Kai

The significance of mahika kai as a cornerstone of Kāi Tahu kawa and tikaka cannot be overstated. It was through these practices that knowledge and skills were handed down, and through the seasonal practice of heke that the relationship with whenua and wai māori was sustained. This continued reaffirmation of ahikāroa across the seasons was a significant means of actioning rakatirataka and mana, but also provided opportunities for reconnection with the actions, stories, and knowledge of atua and tūpuna.

Thus, the deprivation suffered by Kāi Tahu over this time encompassed not only the material loss of land as an asset base and seasonal hunting grounds, but the loss of a spiritual connection to te taiao, and the ability to exercise rakatirataka, a fundamental building block of Kāi Tahu life and identity, and the transmission of mātauraka.³⁸

Modification and loss of habitat that began in the 19th Century and the introduction of freshwater fish species including trout and salmon has impacted significantly on indigenous fisheries. While native freshwater fish species are present in this reach of the Mata-au, including bullies, tuna, galaxiids, and kōura, the area is also known for as brown and rainbow trout fisheries and spawning areas. Limited spawning areas for kōaro are also present, with presence of chinook salmon and perch having also been identified.³⁹

The modification of the land and environment and the impacts on mahika kai continues through practices that include dredging. For mana whenua, this is a history that replays over and over, with echoes of the losses of the past reverberating through to the future. The resulting legacy issues and cumulative effects have contributed to significant inequities in environmental outcomes. This includes the continued degradation of waterways and the associated impact on the indigenous species that they support.⁴⁰

³⁸ Waitangi Tribunal, 1991.

³⁹ Jager & Millar, 2021.

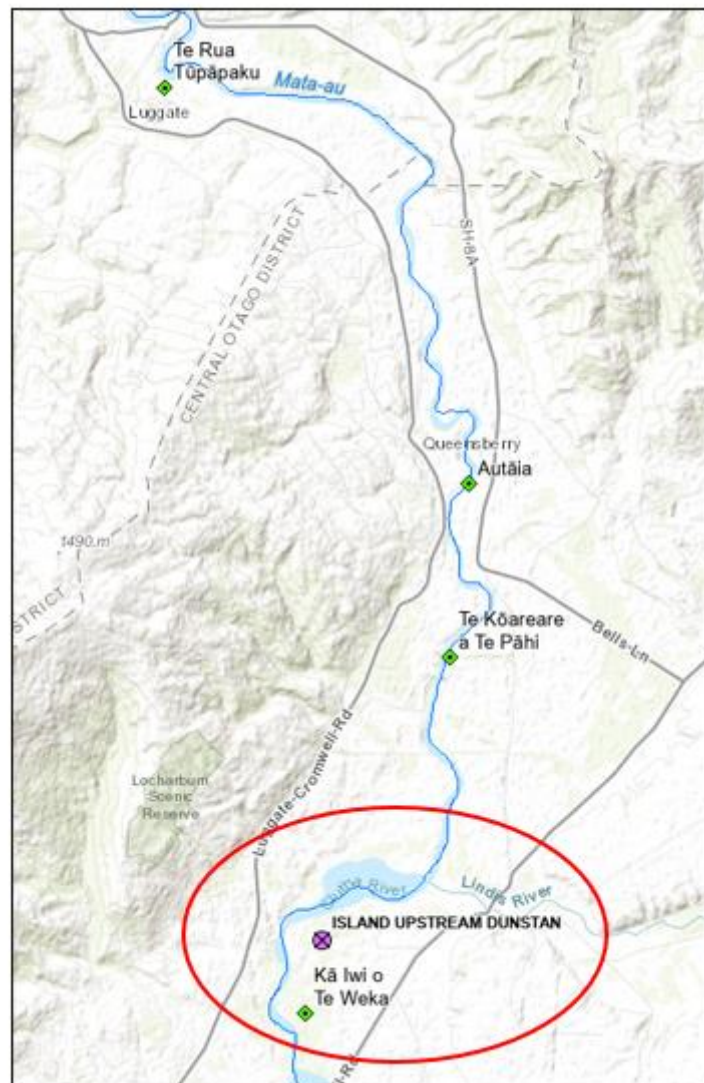
⁴⁰ See Section 6.8 for discussion regarding equity of environmental outcomes.

7.0 He ara poutama: Statutory framework

7.1 Ngāi Tahu Claims Settlement Act 1998 (NTCSA 1998)

The NTCSA 1998 was enacted to settle the historical Ngāi Tahu claims against the Crown and provides redress under Te Tiriti o Waitangi. The Crown apology in section 4 explicitly recognises the rakatirataka of Kāi Tahu within its takiwā. The Act provides specific provisions that provide for the exercise of rakatirataka and kaitiakitaka by mana whenua in relation to mahika kai, taoka species, and other resource management matters. These include rights in relation to the management of specified significant areas such as statutory acknowledgement areas, tōpuni, and nohoaka.

Whakaahua 7: Nohoaka in the Dredging Area ⁴¹



Under Schedule 40 of the NTCSA 1998, the Mata-au is recognised as a statutory acknowledgement area and the Crown has acknowledged the cultural, spiritual, historic, and traditional association of Kāi Tahu with the Mata-au. Statutory acknowledgements aim to improve opportunities for mana whenua engagement in resource management processes.

⁴¹ Ngāi Tahu Claims Settlement Act 1998.

Nohoaka entitlements were created and granted under Schedule 95 of the NTCSA 1998, providing for seasonal occupation and use by Kāi Tahu whānui on specific areas of Crown-owned land near waterbodies for the harvest of natural resources. These sites are intended as partial redress for the loss of mahika kai through the alienation of land. There is a nohoaka site located on an island upstream of Lake Dunstan within the area of the proposed dredging activity, as shown by Whakaahua 7 above.

7.2 Resource Management Act 1991

The Resource Management Act 1991 recognises and provides for the Kāi Tahu values and interests in the Mata-Au.

The relationship of Kā Rūnaka with the Mata-au catchment is a matter of national importance that must be recognised and provided for in managing natural and physical resources.⁴² The depth and breadth of the relationship of mana whenua with wai māori and the Mata-au are discussed in Section 5.0.

In achieving the purpose of the Act particular regard is required to kaitiakitaka.⁴³ Kāi Tahu whānau exercise kaitiakitaka in this catchment. Maintaining a balance between the right to access and use natural resources, and the responsibility to care for te taiao, with a focus on providing a sustainable base for future generations is implicit in kaitiakitanga. This is the underpinning meaning of the whakataukī, Mō tātou, ā, mō kā uri a muri ake nei.

7.3 National Policy Statement for Freshwater Management 2020 (NPSFM 2020)

Te Mana o te Wai is a fundamental concept in the NPSFM 2020 and refers to. “...*the fundamental importance of water and recognises that protecting the health of freshwater protects the health and well-being of the wider environment. It protects the mauri of the wai.*”⁴⁴

The concept of Te Mana o te Wai represents a significant paradigm shift in freshwater management. The previous focus on the scale and significance of the effects of resource use is now redirected onto the mauri or life-force of water and the enquiry becomes how do users of resources protect the water's health and well-being?

Mana whenua have undertaken a robust process to define Te Mana o te Wai in Otago. Our definition of Te Mana o te Wai is informed and framed by our vision for freshwater and aligns with the central elements of our creation traditions. This definition is informed by our knowledge and mātauraka about te taiao and wai māori.

The objective of the NPSFM is to ensure that natural and physical resources are managed in a way that prioritises:

- first, the health and well-being of water bodies and freshwater ecosystems.
- second, the health needs of people (such as drinking water).
- third, the ability of people and communities to provide for their social, economic, and cultural well-being, now and in the future.

⁴² Resource Management Act 1991, section 6(e)

⁴³ Resource Management Act 1991, section 7(a)

⁴⁴ NPSFM 2022, s.1.3.

7.4 Proposed Regional Policy Statement 2021 (PORPS)

The PORPS vision for the Clutha Mata-Au Freshwater Management Unit (FMU) is that:

- Management of wai māori recognises that the Clutha Mata-au is a single connected system ki uta ki tai, and that the source of the wai is pure, coming directly from Tawhirimatea to the top of the mauka and into the awa.
- The ongoing relationship of Kāi Tahu with wāhi tūpuna is sustained.
- Water bodies support thriving mahika kai and Kāi Tahu whānui have access to mahika kai:
- Indigenous species migrate easily and as naturally as possible along and within the river system; and
- In the Upper Lakes rohe, the high quality waters of the lakes and their tributaries are protected, recognising the significance of the purity of these waters to Kāi Tahu and to the wider community.⁴⁵

The PORPS provides for Te Mana o te Wai and recognises that:

- *water is the foundation and source of all life - na te wai ko te hauora o ngā mea katoa.*
- *there is an integral kinship relationship between water and Kāi Tahu whānui, and this relationship endures through time, connecting past, present and future,*
- *each water body has a unique whakapapa and characteristics,*
- *water and land have a connectedness that supports and perpetuates life, and*
- *Kāi Tahu exercise rakatirataka, manaakitaka and their kaitiakitaka duty of care and attention over wai and all the life it supports.*⁴⁶

⁴⁵ Proposed Regional Policy Statement, LF-VM-O2 – Clutha Mata-au FMU vision.

⁴⁶ Proposed Regional Policy Statement, LF-WAI-O1 – Te Mana o te Wai.

8.0 Mauri Tū, Mauri Ora: Cultural Impact Assessment

This cultural impact assessment evaluates the potential impact that the proposed activity may have on mana whenua cultural values as identified by Kā Rūnaka. On the basis of this assessment, Kā Rūnaka provide the following responses to the proposal from CGCL.

8.1 Wāhi Tūpuna and Ara Tawhito values

The Mata-au is a significant waterway to Kāi Tahu, connecting the mountainous regions of the heartland with the life-giving ecosystems of the coast. The headwaters are located amongst mountains often named for significant tūpuna, with the waters flowing from them being considered the purest. As the wai of the Mata-au travels through the whenua, it is fed by uncountable tributaries and streams, combining to create an awa of huge might and strength. This comprises the whakapapa of the river, a source of life and well-being, a wellspring of knowledge, memory, and connection, and a focus for identity.

Mana whenua associations with the Mata-au are found all along its length, including stories and memories, original placenames, and the archaeological evidence found in these places. The Mata-au was part of an ara tawhito that provided access for Kā Rūnaka from the coast to the upper lakes of Wānaka, Hāwea, and Whakatipu-wai-māori. The entire system acted as a significant wāhi mahika kai, with weka and tuna key food sources that were collected along its length. It is through these associations that whānau connect with the ancestral landscape experienced by the tūpuna.

However, the Mata-au has suffered significant modification. The “*power and movement of the Clutha/Mata-au rushing through restrictive gorges with many rapids*”, has changed to smooth, slow water.”⁴⁷ The mana and mauri of the Mata-au has consequently been degraded.

Today the awa is recognised as a statutory acknowledgement area, and as such, has legal recognition as a place of importance to Kā Rūnaka, and to Kāi Tahu whānui.⁴⁸ The Mata-au is also mapped as a wāhi tūpuna under the QLDC District Plan.⁴⁹

Mana whenua aspirations and intentions for the Mata-au in terms of wāhi tūpuna and ara tawhito values include:

- Recognition of wāhi tūpuna and ara tawhito, and the values associated with them.
- Reconnecting whānau to the awa.
- Enabling access to, and use of, wāhi tūpuna and nohoaka sites.

The resource consent application does not provide adequate information to explain how the impacts of this dredging activity on wāhi tūpuna and ara tawhito values will be mitigated by CGCL. The Mata-au has been significantly modified and degraded by mining and dredging in the past and further modification is not supported by mana whenua.

8.3 Wai Māori values

Wai māori is a taoka that has a central place in the whakapapa of creation. The waters that feed major rivers like the Mata-au contribute to the whakapapa of this awa as it travels from the mountains to the sea. Different waterbodies were seen for their intrinsic values by tūpuna, each

⁴⁷ KTKO, 20005, p. 133.

⁴⁸ Te Rūnanga o Ngāi Tahu Act 1996, Schedule 40.

⁴⁹ QLDC, 2021.

having its own mana and mauri. The ecological services provided by waterways were well recognised by tūpuna and are valued as a taoka. Waterways were significant sources of food and resources for mana whenua in the past, which became a driver for cultural practices related to learning, knowledge, and intergenerational well-being. Safeguarding the mauri of the Mata-au and restoring mahika kai and taoka values is a priority for Kā Rūnaka.

However, current data for the Mata-au at Luggate Bridge suggests, in almost all cases, that water quality is degrading, or at best water quality trends are indeterminate, as shown Tūtohi 5:

*Tūtohi 5: Water quality at Luggate Bridge*⁵⁰

Measure	E. coli	Clarity	Turbidity	Total Nitrogen	Total Phosphorous
State	In the best 25% of all sites	In the best 50% of all sites	In the best 50% of all sites	In the best 25% of all sites	In the best 25% of all sites
Trend	Very likely degrading	Likely degrading	Indeterminate	Very likely degrading	Indeterminate

The trends for clarity and turbidity particularly concern mana whenua given the nature of the proposed dredging activity.

The application takes an effects-based approach to dredging and proposes the adoption of conditions to manage those effects. The application concludes, without any supporting evidence, that there will be no discernible adverse effects on water quality beyond the zone of reasonable mixing. No monitoring is proposed as part of the application to manage the effects of dredging on water quality. Overall, mana whenua are unable to assess whether the proposed dredging activity provides for the mauri of the Mata-au and gives effect to Te Mana o te Wai due to the paucity of the information provided in the application.

8.4 Ecological and biodiversity values

The protection of ecological and biodiversity values is strongly associated with the protection of mana whenua values for freshwater. Retention and restoration of indigenous freshwater ecosystems is a crucial element of upholding Te Mana o te Wai. The Mata-au provides an important habitat for many native species, including fish, bird, and plant species.

In the past, mahika kai and taoka species including tuna, weka, and kāuru were significant food sources for whānau. Modification of the awa, changes in land usage practices, and the introduction of exotic species has significantly influenced the distribution and abundance of these mahika kai species, contributing to the disconnection between whānau and the awa. Consequently, the restoration of habitats for mahika kai species and the reinvigoration of indigenous biodiversity is a significant aspiration for Kā Rūnaka.

It is noted that the freshwater assessment undertaken by E3 Scientific only included macroinvertebrate sampling in three locations in the Central Otago district.⁵¹ There were no sampling sites within the Queenstown Lakes District and the effects on ecological values in that reach of the Mata-au are unknown. Moreover, all samples were taken from wadeable depths,

⁵⁰ LAWA, 2022b.

⁵¹ Jager & Millar, 2021.

whereas it is proposed that dredging will occur on the riverbed at depths between 2m and 15m. This raises the question of whether the freshwater assessment is fit for purpose.⁵²

The identification of tributaries of wider than 1m as exclusion zones for the proposed activities is welcomed, but this does not go far enough to support mana whenua values related to ecology and biodiversity. Disturbance of the bed and sedimentation should be avoided in the vicinity of all tributaries in the area of proposed activity.

Kā Rūnaka believe that there is insufficient evidence on the effects of gold mine dredging on instream benthic environments and therefore, on taoka species and their survival. Of most concern are the effects on sediment dwelling species such as ammocoetes, as well as the eggs of kanakana, bully, and galaxiid species, and juvenile kōura and tuna.

The application concludes that any elvers or mature eel drawn through the dredge would survive unharmed and that the impact on the tuna population will be inconsequential. The conclusions reached by the applicant are not supported by evidence. The potential effects of dredging on the tuna population above Lake Dunstan concerns mana whenua. Overall, mana whenua are unable to assess the effects of this application on ecological and biological values.

8.5 Archaeological values

Archaeological sites provide further evidence of mana whenua associations with the Mata-au catchment and the surrounding cultural landscape. Sites referencing habitation and food gathering are common, indicating that the awa was a place where whānau lived and worked.⁵³

Māori archaeology provides evidence of mana whenua associations and connections beyond the mātauraka and kōrero passed down from tūpuna and through whānau. However, these sites can be difficult to identify. Given the history of mana whenua associations with this area other sites may be present that have not been identified. Changes to the awa through damming and other modification may mean that these sites are not restricted to the land surrounding the awa, but may also be present in the river itself, either on the bed or the banks.

The draft consent application places significant emphasis on archaeology related to goldmining activities within the catchment, with a strong focus on dredging relics. Māori archaeology is not discussed.

The resource consent application does not recognise and provide for Māori archaeological values. Given the significant mana whenua associations and long history of occupation along the awa in the past, the adoption of an accidental discovery protocol may not be sufficient to identify and protect Māori archaeological sites.

8.6 Equity of Environmental Outcomes

Throughout the Kāi Tahu history of loss, a significant feature of the social and political landscape was the lack of equity in environmental outcomes. For mana whenua, this has resulted in significant loss of mahika kai and taoka species and the modification of wāhi tūpuna with consequential impacts on Kāi Tahu communities. The current dredging proposal perpetuates a pattern of extractive use of the Mata-au. The application does not propose environmental mitigation to off-set the effects of the

⁵² Further queries and concerns with the contents of the freshwater assessment are provided in Appendix 3.

⁵³ See section 5.2 above.

dredging proposal. Overall, the proposal is focused on economic use of the Mata-au to the detriment of environmental outcomes.

9.0 He kupu whakamutuka: Conclusion

This CIA has been prepared to assess the cultural impacts associated with the proposed dredging of the Mata-au between Luggate and Lake Dunstan.

The Mata-au is a significant waterway for Kāi Tahu, connecting the mountainous regions of the inland area with the life-giving ecosystems of the coast. Mana whenua associations with the Mata-au are found all along its length, including stories and memories, original placenames, and archaeological evidence of the long history and occupation of this area. The awa has its own whakapapa, is a source of life and well-being, a wellspring of knowledge, memory, and connection, and is a focus for identity.

The whakapapa connection with the Mata-au imposes a kaitiakitaka obligation on mana whenua to protect the awa and all the life it supports for future generations, as expressed in the whakataukī mō tātou, ā, mō kā uri a muri ake nei.

Kā Rūnaka believe that there is insufficient evidence on the effects of gold mine dredging on instream benthic environments and therefore, on taoka species and their survival. Hokonui Rūnanga have taken the firm stance of opposing any suction dredge mining due to the unknown effects on benthic species, including ammocoetes (juvenile kanakana that live 3-4 years in the sediment after their larval stages), Kākahi from spat to adult, eggs of multiple fish species including kanakana and galaxiids and also migrating elver.⁵⁴ An ecological management plan prepared by a suitably qualified freshwater ecologist should form part of the application and be reviewed annually.

Mana whenua are unable to assess whether the proposed dredging activity provides for the mauri of the Mata-au and gives effect to Te Mana o te Wai. The application is focused on the economic benefits of gold dredging and does not address the effects of this activity on the health and wellbeing of the Mata-au. Further, inadequate information has been provided to enable mana whenua to assess whether the effects of dredging on wāhi tūpuna and ara tawhito, ecology and biodiversity, and archaeology will be addressed. Overall, mana whenua are concerned that the current dredging proposal perpetuates existing inequities in environmental outcomes.

⁵⁴ See Appendix 4 for a summary of the position of Hokonui Rūnaka on gold dredging applications.

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Appendix 1: Glossary of Māori terms

Ahikāroa	The long-burning fires of occupation
Ara tawhito	Ancestral trails
Atua	Deity, early ancestor
Awa	River
Hapū	Kinship group, clan
Harakeke	New Zealand flax
Heke	Migration, movement
Kai Tahu whānui	The collective of the individuals who descend from one or more of the five primary hapū of Hāwea, Rapuwai, Waitaha, Kāti Māmoe and Kāi Tahu
Kāika mahika kai	Food gathering settlement
Kaitiaki whenua	Environmental protectors
Kaitiakitaka	The exercise of guardianship by the mana whenua of an area in accordance with tikaka Māori in relation to natural and physical resources, and includes the ethic of stewardship
Kāuru	The edible part of the tī kouka or cabbage tree
Kawa	Protocol
Koekohe	Hampden Beach
Kō	Digging stick
Kōau	The south branch of the Mata-au downstream from Balclutha
Kōura	Freshwater crayfish
Korimako	Bellbird
Mātauraka	Knowledge, wisdom
Mahika kai	Practices, knowledge, and activities related to food gathering, including food gathering resources and species
Mamae	Pain, distress
Mana	Status, prestige, honour
Mana whenua	Customary authority exercised by an iwi or hapū in an identified area, and the people mandated to exercise it on their behalf
Mata-au	Clutha River
Matau	The north branch of the Mata-au downstream from Balclutha
Mauri	Life force, life essence
Mokopuna	Grandchildren, descendants

Mōkihi	Reed raft
Murihiku	The area of Te Waipounamu south of the Waitaki River
Nohoaka	Seasonal occupation sites
Ōrau	Cardrona River
Ōtewhata	Fraser River
Paetarariki	Hāwea River
Pā	Fortified settlement
Papatipu rūnaka	Tribal councils
Pōhā	Kelp bag; a receptacle to hold preserved birds
Rakatirataka	Chiefly authority
Takiwā	Territory
Taoka	Treasure
Tapu	Spiritual restrictions
Tauhinu	Inch Clutha
Tawai	Silver beech
Tawairauriki	Black beech, Mountain beech
Te taiao	The natural environment
Te Tiriti o Waitangi	The Treaty of Waitangi
Tī kōuka	Cabbage tree
Tikaka	Correct procedure
Toki	Adze, adzes
Tōpuni	Recognition of Kāi Tahu connection to prominent landscape features and conservation areas under the Ngāi Tahu Settlement Act 1998
Tuna	Eel, long-finned eel
Tūpuna	Ancestor
Umu	Earth oven
Umu tī	Earth ovens for processing kāuru
Wāhi mahika kai	Places where mahika kai was practiced
Wāhi tūpuna	Ancestral landscape of significance to iwi
Wai	Water
Wai māori	Freshwater
Waitau kāuru	A porridge made from reconstituted preserved kāuru
Waka	Canoe
Whakapapa	Genealogy

Whakataukī	Proverb
Whakatipu-wai-māori	Lake Whakatipu
Whānau	Extended family
Whanaukataka	A sense of family connection
Whekau	Laughing owl
Whenua	Land

Appendix 2: Cold Gold Clutha Limited – Upper Clutha Mineral Permits

Term

10 years commencing on 8 February 2017

Land Area

49.737 hectares

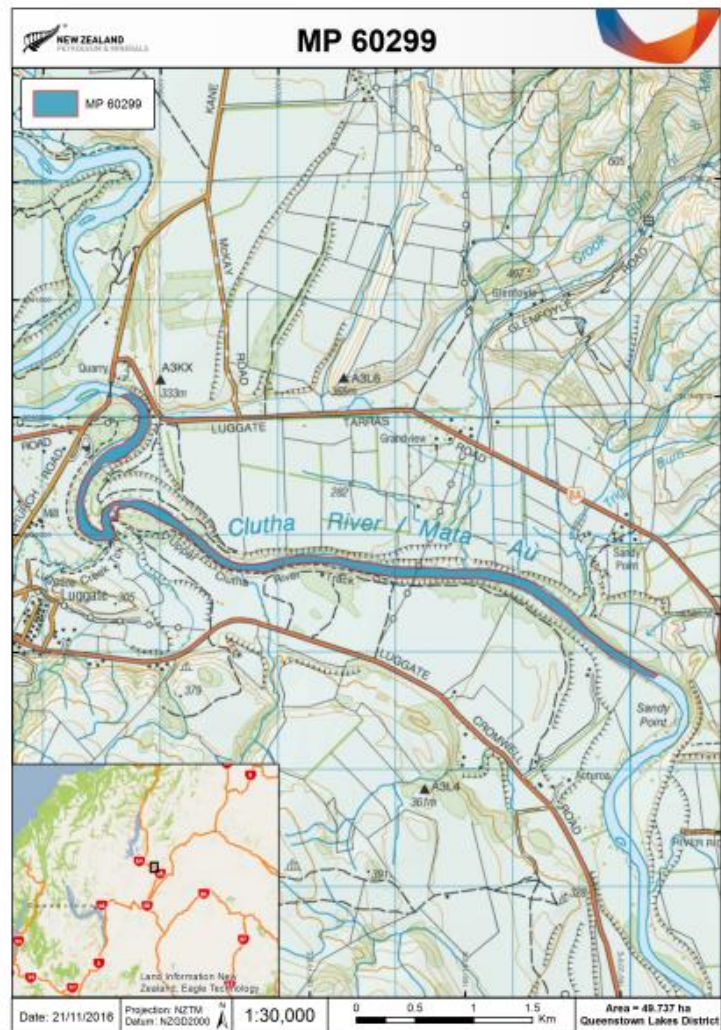
Regional Council:

Otago Regional Council

Territorial Authority

Queenstown-Lakes District

Source: New Zealand Petroleum & Minerals, Minerals Permit Webmaps



Term

10 years commencing on 4 June 2019.

Land Area

49.902 hectares

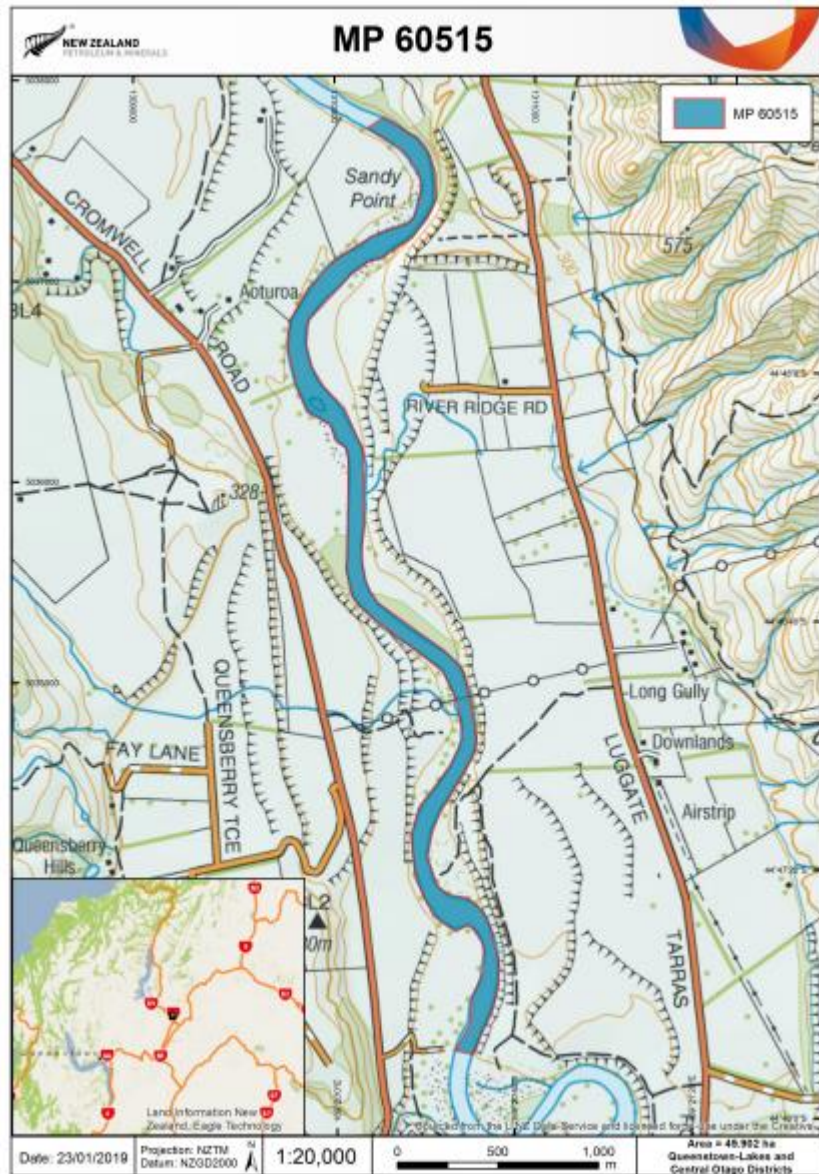
Regional Council:

Otago Regional Council

Territorial Authority

Queenstown-Lakes District, Central Otago District Council

Source: New Zealand Petroleum & Minerals, Minerals Permit Webmaps



Term

10 years commencing on 26 February 2021.

Land Area

199.70 hectares

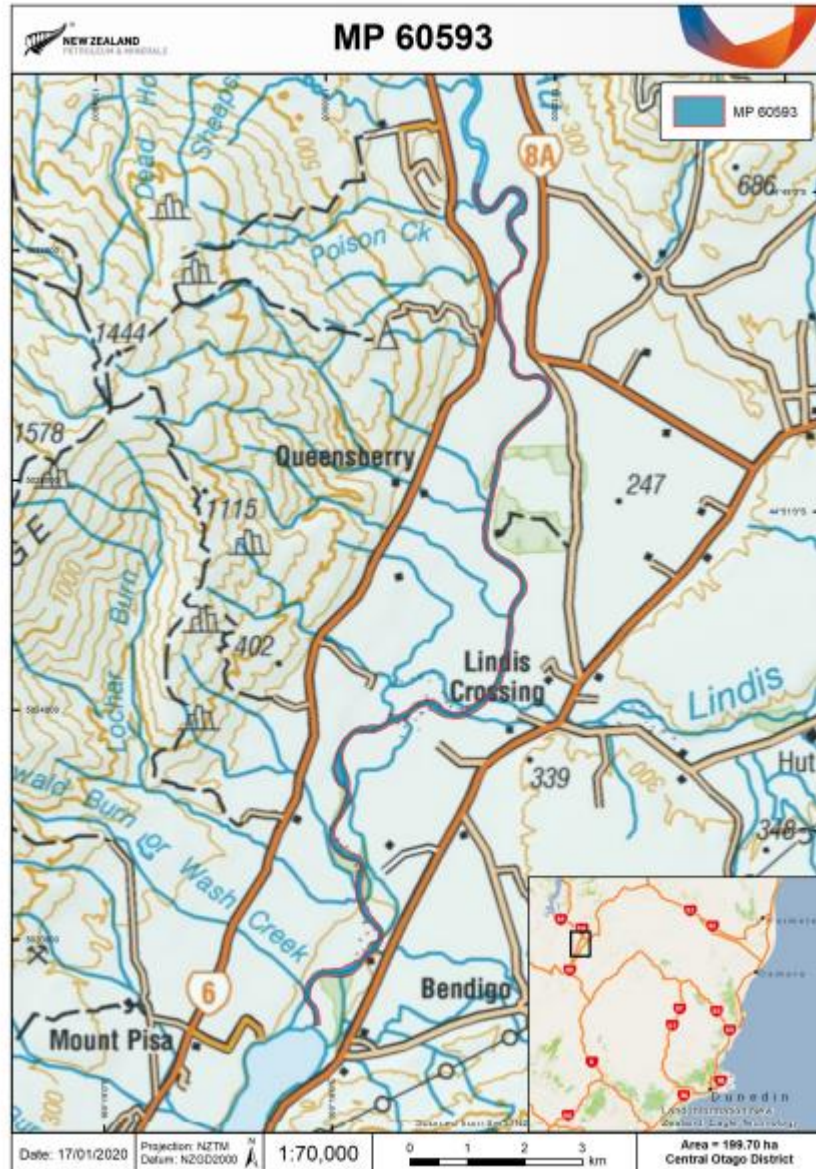
Regional Council:

Otago Regional Council

Territorial Authority

Central Otago District Council

Source: New Zealand Petroleum & Minerals, Minerals Permit Webmaps



Appendix 3: Responses to the freshwater assessment report⁵⁵

Summary of report content	Aukaha response
“Upland bully and common bully prefer gentle flowing, stream margins. These species and their habitat will be protected as the dredge cannot enter water shallower than 0.8m.” ⁵⁶	Areas to avoid should be based on presence of suitable habitat rather than depth. Although a depth of 0.8m and shallower will cover some habitat, there may be exceptions along this stretch of the river, which includes habitat for tuna, kanakana, and common and upland bully.
“No lamprey are recorded in the Upper Clutha / Mata-au.” ⁵⁷	The presence of kanakana cannot be ruled out due to a lack of surveying.
“The juvenile lamprey, ammocoetes in the Mataura River, show a preference for sandy spots at the banks of the rivers” (DoC, 2008). ⁵⁸	More recent research indicates that kanakana have also been identified nesting under large boulders. ⁵⁹
“... the fish are more likely to pass through [sluicing equipment] unharmed and will be returned back to the Clutha River / Mata-au with the tailings.” ⁶⁰	There is no evidence provided to support this claim.
“Gravels and cobbles will settle immediately behind the dredge reinstating and backfilling the substate as works are occurring.” ⁶¹	There is no evidence provided to support this claim.
Information about the annual work programme. ⁶²	The annual work programme must be reviewed by a suitably qualified ecologist with knowledge of fish spawning and feeding habitats, to ensure that none of the sections will disturb indigenous fish habitat.

⁵⁵ Jager & Millar, 2021.

⁵⁶ Ibid, p. 24

⁵⁷ Ibid, p. 25

⁵⁸ Ibid, p. 25.

⁵⁹ NIWA, 2013.

⁶⁰ Jager & Millar, p. 25.

⁶¹ Ibid, p. 29.

⁶² Ibid, p. 33.

Appendix 4: The position of Hokonui Rūnaka on instream gold dredging applications

The Hokonui Rūnanga in the first instance will oppose all instream gold dredging applications. Hokonui Rūnanga believe there is insufficient evidence on the effects of gold dredge mining on instream benthic environments and therefore to taonga species and their survival. Of most concern are the effects on sediment dwelling species, i.e., kākahi and ammocoetes, along with the eggs of kanakana, bully and *galaxiids* species, and juvenile koura and tuna. With the nation-wide push for te mana o te wai, this activity does not comply with national and Ngai Tahu ki Murihiku freshwater directives.

In certain circumstances, Hokonui may administer conditions to resource consents for a dredging activity. These may include the following conditions and is not an exhaustive list:

Proposed consenting conditions:

- Sufficient assessment of Te Tangi a Taurira and the cultural significance of the waterway and area where the activity is taking place.
- Abide by the maps provided by the Conservation Department to exclude the areas which have been identified for non-migratory species and kākahi habitat;
- If kākahi are discovered during mining, works in the area the kākahi was discovered shall cease immediately. Conservation Department will be advised;
- No mining in slack water (pools) where sediment has accumulated as a likely habitat for ammocoetes (juvenile lamprey).
- Mining only outside of elver migration time. Elver migration times are from December 1st – March 31st.
- Mining only outside of kanakana spawning time. Kanakana spawning times are from December 1st – February 31st.
- Ensure that any dredging activity should not undermine riverbanks, a 2-metre buffer is recommended;
- Fish found entrained in the machinery should be returned to the river if alive; if deceased, they should be reported to DOC and Hokonui Rūnanga.
- Survey and assess if any visible bird nesting sites are present. If present provide an appropriate agreed setback from site.
- Biosecurity measures e.g., check, clean, dry as well as avoid disturbing Lagarosiphon beds;
- No refuelling would occur in the waterbody or in areas where fuel can enter the waterbody
- Conspicuous discolouration should not exceed 50 m past the zone of reasonable mixing;
- A condition limiting the timing or distance that one area can be actively dredged e.g. A distance no more than 100 m or 4 x the rivers width (whichever is smaller) and a time period of two months or more must elapse before an area can be disturbed within 100m of a previously disturbed area in the same river or stream.
- Monitoring and review conditions as feasible.
- Small nozzle size up to (51/2 inch or 139 mm) only to be used on any smaller waterways.

To: Danny Walker Ref: 21141
Cc: Darryl Sycamore
From: Mark Hamer & Bryony Miller
Date: 19/4/2023
Subject: Response to Cultural Impact Assessment – Suction dredge gold mining in the Clutha River

1 Introduction

A Cultural Impact Assessment (CIA) of the suction dredge gold mining activity within the Clutha River was undertaken by Aukaha Ltd on the 23/3/2023 on behalf of the following four runaka:

- Te Rūnanga o Moeraki
- Kāti Huirapa Rūnaka ki Puketeraki
- Te Rūnanga o Ōtākou
- Hokonui Rūnanga

This CIA raised concerns regarding freshwater ecological impacts of the proposed activity. Cold Gold Ltd requested e3Scientific to provide comment on these concerns. This memo outlines the specific issues addressed within the CIA and provides responses to these.

Ecological comment is also provided regarding potential effects of a 200 m reasonable mixing zone from the dredge activity, as referred to in the s92 Request for Further Information from the Otago Regional Council.

2 Ecological Response to 200 m Reasonable Mixing Zone

The section 92 specifically stated:

Page 19 of the application describes that typically there will be no discolouration evident 50 m beyond the point of discharge, and any conspicuous discolouration will be managed to ensure no visual plume

occurs beyond 100 m. Page 20 then says that the majority of sediment will fall out of the water column within 25 m of the discharge point.

However, the application states that a reasonable mixing zone of 200 m is sought "as a precautionary approach should any unforeseen pulses of clays or finer sediments be released that do not drop out of the water column quickly to ensure the dredge does not fall into non-compliance". The application describes this as an adaptive management model.

This does not appear to be an adaptive management approach, but instead a set limit of 200 m. An adaptive management approach would need to involve a 'monitor', 'trigger', 'action', 'cease' approach to ensure that the conditions don't allow for a conspicuous discharge to 200 m at all times, given that

At this point, both E3 Scientific and Ms Coates have indicated that they support a zone of reasonable mixing of 100 m.

Ms Coates review describes that if a zone of reasonable mixing of 200 m is sought, there would need to be evidence that sediment plumes beyond 100 m were insignificant enough so as to not alter fish and invertebrate behaviour.

If the applicant is still seeking a zone of reasonable mixing of 200 m, please

- a. provide an assessment of the effects of the proposal on aquatic ecology, and
- b. provide an explanation on the adaptive management approach proposed, including potentially a set of adaptive management conditions for consideration.

Here is e3scientific's response to question's a and b:

- a. Suspended sediment is known to influence feeding efficiencies in salmonids (Greer, et al., 2015) and lead to weight loss (Cavanagh, et al, 2014). However, for native fish exposed to increased suspended sediment loads there is a reduction in feeding for some species (but not kōaro) and the exposure to high turbidity (640 NTU) for several hours did not suppress their feeding rates once back in clear water (Rowe & Dean, 1998). Cavanagh, et al, (2014) found effects on fish growth rates at turbidity's of 5-15 NTU. Laboratory trials have shown that kōaro will avoid high turbidity (25-420 NTU) 50% of the time and longfin eel elver didn't show any avoidance of suspended sediment (Boubee, et al., 1997).

High suspended sediment loads have been shown to reduce overall abundance and diversity in East Coast North Island streams though (Richardson & Jowett, 2002). Increased suspended sediment levels do not appear to affect eels (up to 200 NTU) but can directly affect juvenile fish through clogging gills leading to reduced growth rates (Cavanagh, et al., 2014). Indirectly, increases in sediment can influence migration, feeding success, growth rates, community structure and population size (Cavanagh, et al, 2014).

In terms of macroinvertebrates, lab trials found that even sensitive taxa were not affected by high (turbidity = 20000 NTU) short term doses of sediment (Suren, et al., 2005). However, it has also been found that increased suspended sediment will increase invertebrate drift, reduce invertebrate densities and alter community structure (Ryan, 1991).

All of the aforementioned suspended sediment levels are significantly higher than 1.62 (NTU) found 5 m below the dredge outfall. Therefore, e3scientific do not foresee an effect of suspended sediment on the aquatic ecology other than some avoidance behaviour.

- b. An example of an adaptive management approach would be to suggest "The conspicuous change in colour or visual clarity of the Clutha River/ Mata-Au must reduce by 75% by a distance of 100 metres downstream from the point of discharge or 100% by 200m".

In this scenario a weighted Secchi disk could be used to measure visual clarity at the dredge prior to starting dredging for the day. The adaptive management approach could be to continually visually assess from the dredge if a plume is visible at 100 m downstream of the dredge. If a plume is visible at 100 m downstream, Secchi disk readings should be taken at 100 and 200 m downstream of the dredge. At least once per day Secchi disk readings at the dredge, 100 and 200 m downstream of the dredge shall be undertaken even if no plume is observed at 100 m downstream of the dredge.

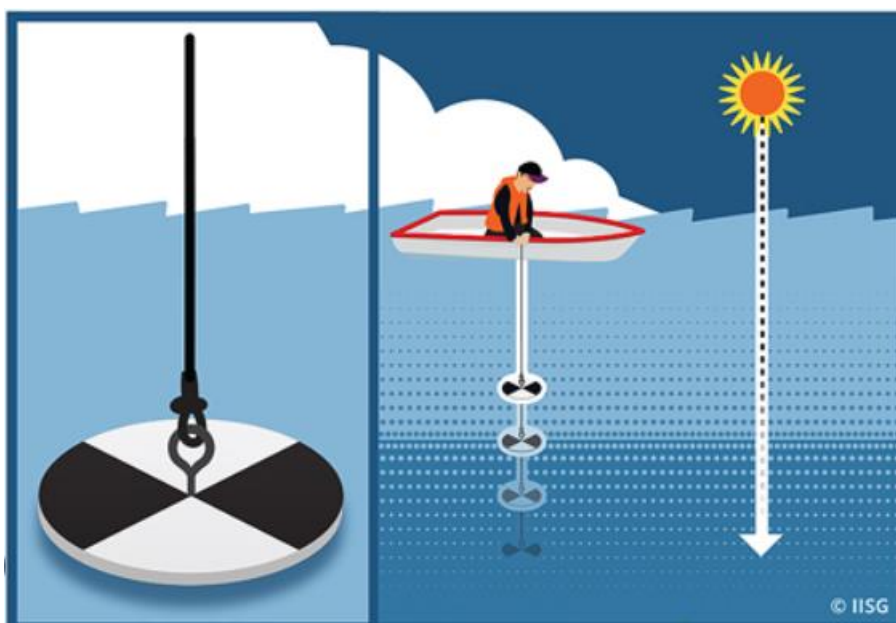


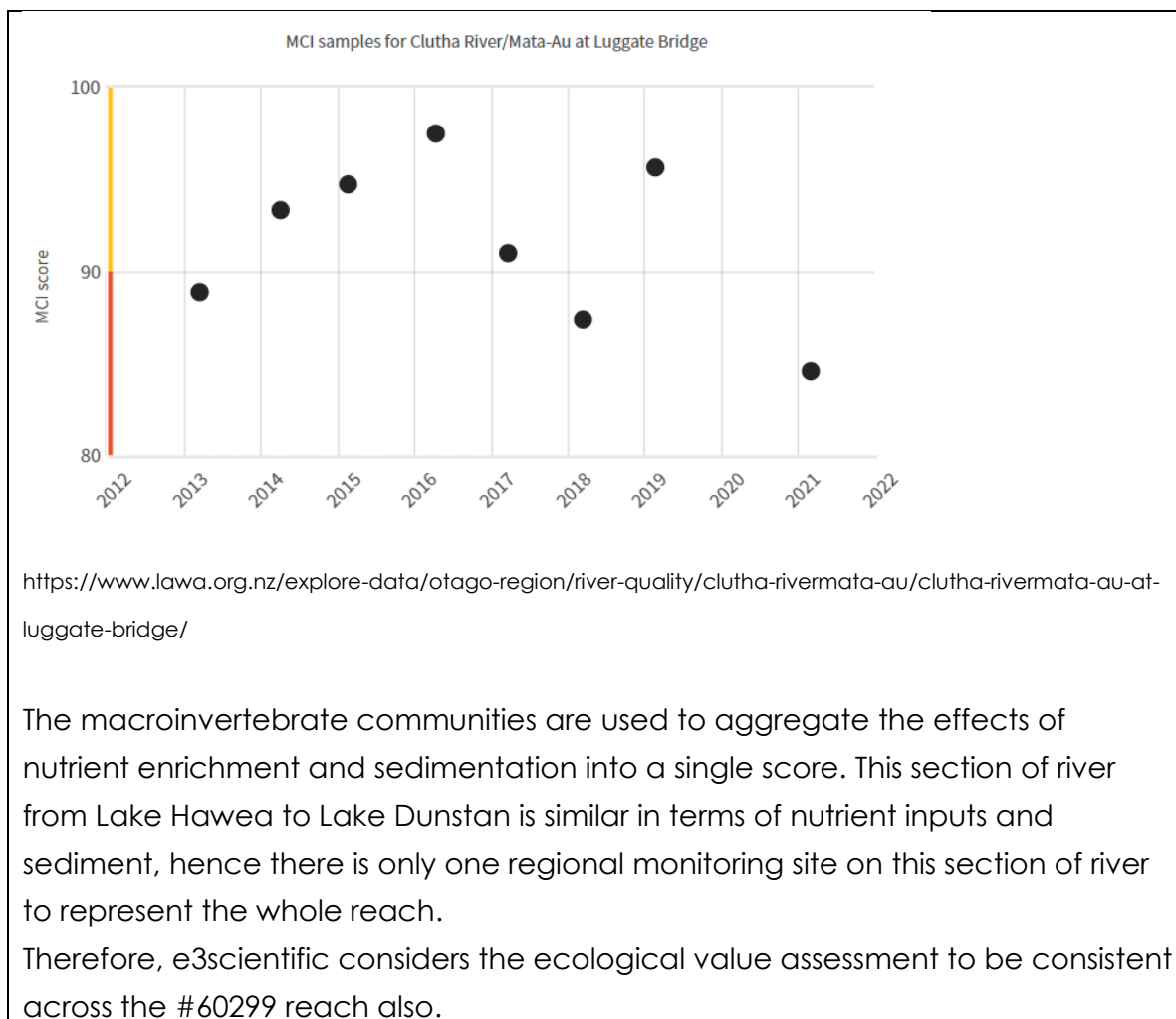
Figure 1: Example of a Secchi disk.

3 Ecological Responses to CIA matters

The table below provides both the CIA concerns and responses to address these specific concerns. Please note; these responses are restricted to matters of freshwater ecology and do not extend into cultural values.

Matter 1: It is noted that the freshwater assessment undertaken by e3Scientific only included macroinvertebrate sampling in three locations in the Central Otago district. There were no sampling sites within the Queenstown Lakes District and the effects on ecological values in that reach of the Mata-au are unknown.

The permit application #60299 was added after the field monitoring was undertaken hence no sampling was initially undertaken in the Queenstown Lakes District. However, the NIWA has a macroinvertebrate monitoring site at Luggate at the upper end of the #60299 reach. The results from Luggate Bridge site are comparable with that of the e3Scientific report (Jager, 2021) with MCI scores ranging from 85 to 98 over the last 10 years.



Matter 2: Moreover, all samples were taken from wadeable depths, whereas it is proposed that dredging will occur on the riverbed at depths between 2m and 15m. This raises the question of whether the freshwater assessment is fit for purpose.

Macroinvertebrates are difficult to sample in this wide deep river, sampling methods are limited to shallower edge habitats for safety and practicality reasons. Edge macroinvertebrate fauna's known to be more responsive than benthic fauna and are considered better for large river biomonitoring (Collier, et al., 2014).

In this case however e3scientific agree the macroinvertebrate monitoring would not identify direct effects of the proposed activity. Rather, it is used to help provide input to the ecological value assessment undertaken. A previous study has shown no significant difference in macroinvertebrate communities 5 days after suction dredging has occurred (Thompson, 2001). Therefore, e3scientific suggest trying to sample the deeper mid river habitats is not warranted.

Matter 3: The identification of tributaries of wider than 1m as exclusion zones for the proposed activities is welcomed, but this does not go far enough to support mana whenua values related to ecology and biodiversity. Disturbance of the bed and sedimentation should be avoided in the vicinity of all tributaries in the area of proposed activity.

e3scientific agree it would be best to map and confirm agreed tributary exclusion zones during the consenting process.

Matter 4: Kā Rūnaka believe that there is insufficient evidence on the effects of gold mine dredging on instream benthic environments and therefore, on taoka species and their survival. Of most concern are the effects on sediment dwelling species such as ammocoetes, as well as the eggs of kanakana, bully, and galaxiid species, and juvenile kōura and tuna.

e3scientific agree little is known on the effects of suction dredge mining on freshwater ecological values in New Zealand.

Contact Energy have recently advised e3scientific that 593 adult lamprey have been trapped and transferred upstream of Roxburgh Dam in the last 12 years but not upstream of Clyde Dam. It is therefore very unlikely that lamprey will be present in this section of the Clutha River. In addition to this, lamprey ammocoetes prefer very slow flowing edge and backwater habitat consisting of silt substrates (Jellyman & Glova, 2002), not the sand and gravels and swift water present in the suction dredge localities. The only known location of lamprey eggs are on the underside of boulders in small streams (Baker, et al., 2016), so again this activity is unlikely to impact on lamprey eggs and development. The stretch of the Clutha River / Mata-Au in which suction dredging is proposed is identified as spawning habitat for brown trout and rainbow trout only, with a short stretch identified as kōaro spawning habitat. However, kōaro spawn at stream edges during high flow events, an area outside the suction dredging activity.

Matter 5: The application concludes that any elvers or mature eel drawn through the dredge would survive unharmed and that the impact on the tuna population will be inconsequential. The conclusions reached by the applicant are not supported by evidence. The potential effects of dredging on the tuna population above Lake Dunstan concerns mana whenua.

The intent of that statement was that the migration pathway of eels is unlikely to be affected. Adult eels would avoid the suction dredge operation because

migrating adults travel mostly at night and along the river bank edges. While in theory eel elver could bury themselves in mid-river substrates during the day and be present in the suction dredge area, on their migration upriver they would actively avoid the operations sound (Sand, et al., 2000) and sediment plume and therefore be very unlikely to be entrained by the dredge.

Matter 6: Hokonui Rūnanga have taken the firm stance of opposing any suction dredge mining due to the unknown effects on benthic species, including ammocoetes (juvenile kanakana that live 3-4 years in the sediment after their larval stages), Kākahi from spat to adult, eggs of multiple fish species including kanakana and galaxiids and also migrating elver.

As mentioned above e3scientific suggest it is very unlikely that lamprey will be present in this river reach.

Kākahi predominantly inhabit lake environments, in riverine environments they prefer the base of riverbanks in slow flowing runs and silt sediment (Melchior, et al., 2022) rather than this compacted substrate and fast flowing river reach.

Of the fish species likely to be present in the proposed reach, Clutha flathead galaxias, upland bully, common bully, rainbow and brown trout may spawn in gravels. This is outlined in Table 6 of the Suction Dredge Mining Upper Clutha River Freshwater Assessment Report (e3scientific, 2021) along with the likely spawning periods. Also, within the cited report (on page 23 and 24) is an explanation of why only trout spawning should be considered in the Clutha River mainstem with regards to this activity.

Matter 7: An ecological management plan prepared by a suitably qualified freshwater ecologist should form part of the application and be reviewed annually.

e3scientific agree that an ecological management plan could be prepared. However, given the proposed consent conditions it is considered that this can be completed as a condition of consent, not form part of the application.

Matter 8: The presence of kanakana cannot be ruled out due to a lack of surveying and more recent research indicates that kanakana have also been identified nesting under large boulders.

As stated above - Contact Energy have recently advised e3scientific that a total of 593 adult lamprey have been trapped and transferred upstream of the Roxburgh Dam in the last 12 years. However, none were released above Clyde dam therefore e3scientific suggest lamprey presence is very unlikely.

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19 April 2023

Kirstyn Royce
for the
Queenstown Lakes District Council
Private Bag 50072
Queenstown 9348

Josie Burrows
for the
Otago Regional Council
70 Stafford Street
Private Bag 1954
Dunedin 9054

Dear Kirstyn and Josie

RE: s92 RESPONSE FOR APPLICATION BY COLD GOLD CLUTHA LIMITED

On behalf of Cold Gold Clutha Limited, we submit our response to the further information requests to both the Otago Regional Council and Queenstown Lakes District Council for resource consent to carry out suction dredge gold mining in the Clutha River.

The proposal is not a new mining venture in the Clutha River. The Cold Gold Clutha dredge has been operating since early 2012 on the Clutha River between Roxburgh Dam and Tuapeka Mouth. These consents were recently re-consented and will expire in 2035 and authorises mining within over 900 hectares of the riverbed. The proposed operation in the Upper Clutha will adopt the same equipment and methodology as that already consented downstream of the subject site.

The existing environment is a relevant consideration as it includes the live consents held by Cold Gold Clutha for the ongoing mining within the Clutha River from the Roxburgh Dam downstream to Tuapeka Mouth over 900 hectares of riverbed. Whilst this activity is within in a different part to the river, it is nonetheless the same dredge applying the same dredging methodology. Both the authorised and proposed mining area are within a statutory acknowledgement areas that enjoy a number of Schedule 1A values. The concept of Ki Uta ki Kai applies presumably in much the same manner for the authorised mining areas and that proposed as it is relevant at a catchment level.

The permitted baseline provides a basis for any assessment of effects. For the river bed contained within mining permits 60515, 60593 and 60299 the permitted activity rule enable up to 55 separate dredges each with a maximum internal nozzle of 150mm. As noted in the application, it is fanciful to consider the permitted area would include 55 dredges equally spaced 500m apart, however this provides some context of what activity and effects arising from that activity could by right occur without consent. The baseline does provide for a 6-inch dredge that can operate in shallower reaches (i.e. in water up to 0.2m deep) that is considered more ecologically sensitive i.e within the confluence of any tributary or areas where finer sediments that host a range of habitat. The proposed activity will, in contrast, ensure those more sensitive areas remain undisturbed.

The matter of the offsetting is also relevant in this situation whereby should the dredge obtain consent to operate in the Upper Clutha albeit with some effects, the dredge will by default not operate in the mid-reaches where those effects that are authorised will not occur.

Appended to this response is the Cultural Impact Assessment (CIA) and a supplementary ecological assessment by E3 Scientific addressing the ecological issues raised in the CIA and also further discussion in relation to the proposed 200m zone of reasonable mixing sought by the applicant.

Surveying, Resource Management and Engineering Consultants

DUNEDIN 9054
PO Box 235 - 477 4783
dunedin@terramark.co.nz

MOSGIEL 9053
PO Box 235 - 489 7107
mosgiel@terramark.co.nz

BALCLUTHA 9240
PO Box 178 - 418 0470
balclutha@terramark.co.nz



Below are responses to both the further information requests sought by planners for the Queenstown Lakes District Council and Otago Regional Council.

ORC s92 Questions

1. ***Pages 5 and 6 of the application describe the location of the proposed suction dredging. It states that the mining will be limited to the exclusive area as specified on mining permits 60515, 60593 and 60299 "or any subsequent consolidation or alteration to these permits", with two exclusions.***

With respect to the statement "or any subsequent consolidation or alteration to these permits", please advise whether the applicant intends that the extent of suction dredging in the Clutha River / Mata-Au may be greater than that shown in Figure 1 of the application, or just that the numbers of the permits may change.

The statement refers to the option of consolidating the three permits into a single permit covering the area prescribed in the three existing permits which may reduce costs of administration. Alternatively the applicant may wish to surrender a portion of a permit as they no longer wish to mine that area. As an example, it may be credible to surrender the area of riverbed near Luggate identified as having sensitive ecological values as no mining will occur there and annual fees to NZPAM are calculated on a 'per hectare' or 'square kilometre' basis. The applicant will not be extending the area of the permits, and if they do, they will require additional consents if they elect to use a dredge that exceeds the permitted activity threshold where that consent would be assessed on its merits.

2. ***Page 14 of the application states that resource consent is sought for abstraction at a maximum rate of 400 L/s for an average of 12 hours per day. Page 5 states that surface water will be taken at a maximum rate of 400 L/s with a daily maximum take of 18,720 m³ based on a 13-hour working day. Please confirm the maximum annual volume sought.***

Page 14 refers to the average period mined in a day, being 12 hours. Page 5 details the take over a 13 hour day of 18,720m³. The maximum rate of abstraction remains at 400 L/sec however operators tend to run the engines at around 70% rate as this improves gold recovery, reduces noise, reduces sediment discharges and improves fuel efficiency. In that regard, the question asking the maximum rate of abstraction is of little use in terms of assessing effects. At full power, applying the average take of 17,278m³ over a 12 hour day, should mining occur every day over a year, the maximum take is 6,306,674m³.

As the take is non-consumptive, where all the water is returned to the watercourse immediately behind the dredge the rate and volume of take is largely irrelevant. The Clutha River is also not particularly sensitive to water takes, which is in part demonstrated by the permitted activity rule allowing every landholding to take water at a rate of 100 litres per second up to 1,000,000 litres per day, every day.

3. ***Page 19 describes that there are two water intakes – one for the intake to the pump and one for the nozzle. Please confirm whether these two intakes have a combined abstraction rate of 400 L/s. If not, please explain.***

Correct there are two intakes for the non-consumptive water takes. The maximum rate of abstraction for both takes is 400L/s. To assist, the figure below shows how a suction dredge works. A common misperception is that gravel is sucked through the pump. The pump actually pumps only water shown as the red intake, which is delivered to a venturi or power jet. As the water in the red moves into the powerjet, the pipe narrows increasing pressure creating a

vacuum. The water (in red) joins the dredge immediately above the suction hose (which draws up water and gravels). The vacuum created through the venturi effect seeks to be equalised by drawing water and gravels up the suction hose shown in blue. Both water takes pass over through the dredge and are returned back to the waterbody only a few meters downstream of the take.

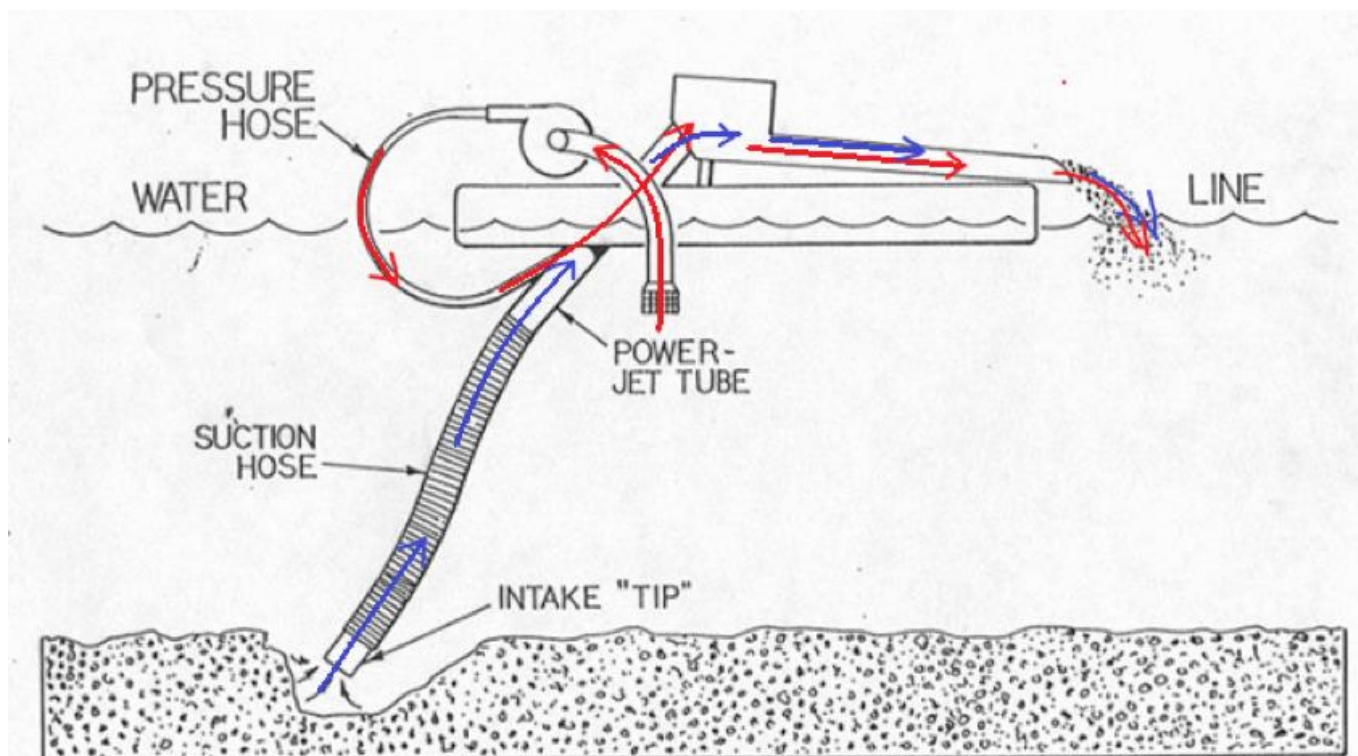


Figure 1 – The intakes and discharge of a dredge

4. ***Please advise how long the works within the bed of the Clutha River / Mata-Au to construct the slipway, remove the dredge and re-instate the slipway at Rongahere Road are anticipated to take.***

One day for each.

5. ***With respect to the Queensberry slipway:***
 - a. ***Please provide the NZTM 2000 co-ordinates, property parcel and land ownership details of the proposed Queensberry slipway location.***

1,310,061-5,035,771

- b. ***To provide a more comprehensive understanding of the site of the slipway, please provide photographs of the site, in particular the area directly adjacent to and within the bed of the Clutha River.***

Figure 7 of the application to the ORC provides some context. This is shown again as Figure 2 below which illustrates the vegetation within the slipway area.

- c. ***Please advise how long the works within the bed of the Clutha River / MataAu to construct the slipway at Queensberry are anticipated to take.***

One day

- d. ***It is understood that the proposed slipway at Queensberry is intended to remain in place for the duration of the consent, such that it can be used to remove the dredge as required for maintenance. Please confirm whether that is correct.***

That is correct. Retaining the access will ensure disturbance of the bank only occurs once and allows the restoration with grasses for stabilisation. The form of the riverbank is shown in Figure 2 below which illustrates how the slipway is in a natural lee of the river flow to avoid erosion and scour risk during fuller flows.

- e. ***Page 13 proposes a condition of a 100 m exclusion/setback from any bird nesting colonies. Please explain how this condition is proposed to work in practice, e.g., if the ecologist identifies that there is a nest in the location of or within 100 m of the proposed slipway will the slipway location be moved or will works wait until the nesting season is finished. If the slipway is to be moved, please provide details on other potential slip locations including coordinates, property parcel, land ownership, vegetation removal required, etc.***

The suggested condition is upon reflection not considered necessary in my own view which finds support in the ORC audit by Babbage Consultants in questions 10(c) and 10(d) of their assessment dated 10 October 2022.

The applicant is not aware of any nesting colonies in the area and typically they tend to be found on island features where colonies can occupy without risk of predation.

The permitted baseline is also relevant. Permitted activity rule 13.5.1.7 allows a 6-inch dredge to mine immediately adjacent to a bird colony as of right. Jetboats, dog walkers and other recreationalists may also disturb bird nesting colonies. However, the greatest concern to bird colonies are ferrets, weasels and stoats.

- f. ***Will there be any deposition of material (e.g., riprap) required for the construction of the slipway?***

No. The formation of the river bed is such that the use of concrete blocks for bank stability will not be required.

6. ***Please describe whether any vegetation removal is required within the bed of the Clutha River / Mata-Au associated with the construction of the Rongahere Road and Queensberry slipways. If so, please advise the species vegetation that will be removed.***

Figure 7 of the application to the Regional Council (also shown as Fig 2 below) shows an aerial view of where the slipway will be located at Queensbury and is shown again below. The site comprises exotic pasture. There is a possibility individual exotic tree species being either willow or poplar may be damaged or removed as part of the vehicle manoeuvring or slip process. The ecological assessment by Babbage for the ORC in q11 finds that any vegetation that may need removal will consist of willow which has limited ecological value.



Figure 2 – Proposed Queensbury slip location

For the Rongohere Road slipway. This site has been used previously and the impact on vegetation will not extend beyond the redistribution of exotic pasture species.

7. ***Please provide an assessment against the relevant provisions of the National Environmental Standards for Freshwater (NES:F) to determine whether there are any applicable rules, in particular regulations 52, 53 and 54.***

Regulations 52, 53 and 54 do not apply.

8. ***If any vegetation removal is required within the bed of the river, please provide an assessment against the relevant rules to determine whether resource consent is required (in particular, Rule 13.7.1.1 of the Regional Plan: Water).***

Vegetation for removal will comprise exotic pastures and maybe a number of individual crack willow which the RP:W considers having an invasive nature. Babbage in their assessment for the ORC considers willow have limited ecological value.

9. ***Page 19 of the application describes that typically there will be no discolouration evident 50 m beyond the point of discharge, and any conspicuous discolouration will be managed to ensure no visual plume occurs beyond 100 m. Page 20 then says that the majority of sediment will fall out of the water column within 25 m of the discharge point.***

However, the application states that a reasonable mixing zone of 200 m is sought "as a precautionary approach should any unforeseen pulses of clays or finer sediments be released that do not drop out of the water column quickly to ensure

the dredge does not fall into non-compliance". The application describes this as an adaptive management model.

This does not appear to be an adaptive management approach, but instead a set limit of 200 m. An adaptive management approach would need to involve a 'monitor', 'trigger', 'action', 'cease' approach to ensure that the conditions don't allow for a conspicuous discharge to 200 m at all times, given that

At this point, both E3 Scientific and Ms Coates have indicated that they support a zone of reasonable mixing of 100 m.

Ms Coates review describes that if a zone of reasonable mixing of 200 m is sought, there would need to be evidence that sediment plumes beyond 100 m were insignificant enough so as to not alter fish and invertebrate behaviour.

If the applicant is still seeking a zone of reasonable mixing of 200 m, please

- a. ***provide an assessment of the effects of the proposal on aquatic ecology, and***
- b. ***provide an explanation on the adaptive management approach proposed, including potentially a set of adaptive management conditions for consideration.***

There are a number of key points to highlight in relation to the request to applying a reasonable mixing zone of 200m.

The applicant seeks a 200m zone of reasonable mixing not because they consider there will be a plume extending to that limit, but to provide surety that they will not fall foul of their conditions of consent. In parts of the river, the current is fast which carries the plume downstream whilst it falls out of the water column. Should the dredge hit a pocket of finer sediments, given the flow velocity of the river, there is potential the plume will extend 100m beyond the dredge.

For the sediment plume and any visual or ecological considerations there are a number of issues to consider up front, such as-

- a. The dredge mines at a fixed rate which is considered most efficient. The applicant cannot artificially increase the rate of operation to then 'work to' the 200m zone.
- b. The Google image (in Figure 17 of the QLDC application) provides a clear indication of the sediment plume when operating. This is shown again below. What is useful to note is the applicant had no prior knowledge of when that image was being taken such that they could actively manipulate the plume extent. This should be treated as a fair representation of the plume under normal conditions. Having first hand experience suction dredge mining in multiple Otago rivers, it is my professional opinion this is a fair representation of the plume.
- c. The video provided to the ORC of the water sampling for laboratory analysis shows a similar plume to that of the Google image.
- d. The laboratory results show the turbidity returns to the background levels after 45m and the suspended solids returns to the background level after 20m.
- e. The permitted baseline provides for a significant number of dredges all operating within the permits held by the applicant. The effects of the single larger dredge will be less than that of the baseline over a number of variables i.e disturbance, effects on ecology, noise.
- f. The applicants already hold a consent to mine 900hectares of the Clutha River and have done so for over 10 years with no complaints from the public nor compliance breaches.

The Rationale for the 200m Zone of Reasonable Mixing

Whilst Cold Gold Clutha are confident any discharge plume will typically be less than 100m downstream from the discharge point under most conditions, the risk of breaching their consent conditions (albeit with no ecological consequences) is of significant consent.

Having considered the receiving environment, Council regulations and the permitted baseline, the applicants seek a 200m setback from the point of discharge. I consider that request is both reasonable and appropriate. It is even more appropriate given other Councils provide a clear definition to work with, but the ORC has not.

We promote a condition of no visually conspicuous sediment plume beyond 200m downstream of the discharge point – being the defined zone of reasonable mixing which is consistent with the effects set out under s107(1)(c-g). At the proposed zone of reasonable mixing, the sediment plume will not be visually conspicuous and defines a point sampling where can be taken for compliance purposes. This approach has support from the applicant's ecologist of E3 Scientific.

The statutory minimum standards in section 70 (permitted activities) and section 107 (discharge permits to discharge to water) require that point source discharges should not on their own or in combination with other contaminants, cause standards to be breached after reasonable mixing (e.g. no conspicuous change to colour, temperature or clarity).

The ORC does not prescribe the zone of reasonable mixing and relies on the following definition which is not particularly helpful or relevant in this situation. Their definition reads:

The process where undiluted effluent disperses through receiving waters. Mixing results in a mixing zone where the concentration of contaminants varies from that in the effluent to that of the fully mixed receiving water. Reasonable mixing may be said to have occurred at some point between the point of discharge and the point at which the effluent is completely mixed with the receiving water. Beyond the reasonable mixing zone, the effluent and water mix complies with any water quality standards for the water body.

In this case, the contaminant in question is simply the remobilisation of sediments within the waterbody, rather than the introduction of a new contaminant. The definition has a focus of effluent which is of little comparative use given sediment is naturally occurring within the waterbody, necessary for a waterbodies ecological health and drops out, whereas effluent and the nutrients within the effluent (except for suspended solids) remain in situ and potentially leads to a cascade of environmental outcomes.

Other Councils adopt differing methods to determine the zone of reasonable mixing which is more prescriptive and provide some useful guidance to support the proposed 200m setback approach for compliance monitoring purposes. For example, the Hawkes Bay Resource Management Plan defines the zone of reasonable mixing as: In relation to flowing surface water bodies, for the purposes of rules in this Plan, means the mixing of contaminants in surface water at whichever of the following is the least:

- (i) a distance 200 metres downstream of the point of discharge, or
- (ii) a distance equal to seven times the bed width of the surface water body, but which shall not be less than 50 metres, or
- (iii) the distance downstream at which mixing of contaminants has occurred across the full width of the surface water body, but which shall not be less than 50 metres.

Given the wet bed in this area is approximately 75-80m wide, under this definition limb (i) adopting a point 200m downstream of the discharge is the lessor of the prescribed distances and would apply. Limb (ii) would provide for a 560m zone of reasonable mixing, and given the nature of the contaminant, limb (iii) simply cannot occur.

For the Horizons One Plan, reasonable mixing is also prescribed and states:

In relation to the discharge of contaminants into surface water, means either: (a) a distance downstream of the discharge that is the least of:

- (i) the distance that equals seven times the width of the river at the point of discharge when the flow is at half the median flow, or
- (ii) 200 metres from the point of discharge or, for discharges to artificial watercourses including farm drainage canals, 200 metres from the point of discharge or the property boundary, whichever is the greater, or
- (iii) the point at which mixing of the particular contaminant concerned has occurred across the full width of the body of water in the river

Again using this prescribed definition of reasonable mixing a 200m setback would apply.

For the Taranaki Freshwater Plan, reasonable mixing is defined as seven times the width of the channel at the point of discharge. Under this definition the zone of reasonable mixing would fall between 525m and 560m.

In *Southland Regional Council v New Zealand Deer Farms Limited (2004)*, which related to a prosecution for disturbance of a river bed (section 13) in contravention of permitted activity standards. The Plan defined the Reasonable Mixing Zone for the purposes of the standards as being 200m downstream. The Court indicated that "a zone of reasonable mixing will vary depending on the size of the waterway, velocity of the water, tributaries and the like."..."I have concluded that in order to properly interpret these provisions it is clear that the question of reasonable mixing will be dependent on site specific factors."

The decision notes the reasonable mixing zone shall be determined on a case by case basis. In my view the site specific factors include having particular regard include-

- The purposes for which the waters are to be managed (where specified in the 3rd Schedule),
- The scale and sensitivity of the waterbody,
- The nature of the likely effects of the particular contaminants in the context of the particular receiving waters, and
- The mixing characteristics of the receiving waters and behaviour of the sediment plume,
- The existing environment which includes live consents to mine in 900ha of the same riverbed downstream of the proposed mining area, and
- The permitted baseline.

Having considered the factors above it is my opinion that whether the zone of reasonable mixing is 100m or 200m, the standards for each water class in the 3rd Schedule would be met. Should the dredge operate in the proposed mining area, there will be no mining (or effects thereof) in the 900ha authorised by consent further downstream. The permitted baseline allows for many smaller dredges creating a 100m sediment plume. These smaller dredges also mine more sensitive parts of the river that the applicant cannot with a larger plant.

IN the absence of a suitable definition in the RP:W, we defer to other Council plans which provide a specified method for defining what constitutes some useful guidance.

It is my opinion the site specific factors of the Clutha River will result in a range of effects that are significantly less than that permitted even when a 200m zone of reasonable mixing is adopted as a performance standard where no conspicuous plume may extend beyond.

Assessment of effects of the proposal on aquatic ecology

Questions have been raised about the intent to extend the reasonable mixing zone to 200m. Irrespective of that, the facts remain the bulk of the sediment plume will fall out of the water column in the first 50m. This is shown in the Google image, video and laboratory testing.

However, given the velocity of the river, there may be times the sediment may persist in the water column longer. The applicant is concerned that at times where pockets of finer sediments are found and the river velocity is high, that the plume will be visible beyond 100m. This does not mean more sediment is in the water, rather it is being carried from the dredge at a rate quicker than the same sediments can fall through the water column.

Both the applicants and Council's ecologists agree the effects on the aquatic habitat are acceptable and by inference consent should not be declined on that basis. In my understanding, for Class AE waters (being water managed for aquatic ecosystems) a sediment plume contained within 100m will not exceed the specified standards in the 3rd Schedule. In my view, the same amount of sediment extending typically less than 100m from the dredge but potentially sporadically no more than 200m will not breach the Class AE standards and therefore it's my understand the effects on aquatic ecology continue to remain acceptable. This interpretation is supported by the E3 ecologists supplementary report dated 19 April 2023.

How other applications for suction dredging have been assessed in terms of ecology

The ORC has processed a number of consents for suction dredge mining, most of which are for rivers that include species considered sensitive to disturbance and are appended to Schedule 7 of the Regional Plan:Water.

The permitted activity rule for suction dredge mining stipulates dredging is not permitted in waterbodies identified in Schedule 7 and therefore consent is required in these waterbodies irrespective of the dredge size. The Clutha River is not identified as a waterbody sensitive to suction dredge mining, which informs the permitted baseline. Of interest no consent for suction dredge mining in the Otago region has ever been declined due to the effects on ecology.

A number of consent applications and the scientific assessments are detailed below and provide some context to the question of how dredging affects ecology. A number of the more interesting applications are-

- the Pomahaka River for two separate mining permits and consent holders each using a six inch dredge,
- Kye Burn using a 6 inch dredge,
- the Clutha River – being the current consents authorising Cold Gold Clutha to mine the middle reaches of the river, and
- The Nevis River using an 8inch dredge and a 20ton excavator, and also a separate permit using a 5inch dredge.

The first examples were all been assessed in 2021 and rely on three different independent ecological peer reviews. They give recognition to the NPSFM and Te Mana o Te Wai.

Jens Schumann – Pomahaka River (Mining Permit 50371)

This application sought to use a 6inch dredge within 39 hectare mining permit. The Pomahaka River is highly regarded for the presence of threatened galaxiid species and is a Statutory Acknowledgement area. The Department of Conservation opposed the application in relation to ecological and heritage values and Te Runanga o Hokonui opposed the application due to cultural values and the proposal being inconsistent with Te Mana o te Wai.

The application was assessed by E3 Scientific for the ORC, who noted with regards to effects macroinvertebrates, macrophytes and water clarity downstream from the dredge, the effects from the activity on these freshwater values were considered less than minor. The presence of Clutha flathead galaxiids and their spawning times were discussed and a condition of consent to avoid the Clutha flathead galaxiids spawning times was adopted. The proposed activity was considered to have a less than minor effect on the ecological values.

The application was also further peer reviewed by Babbage Consultants for the Council. The ecological assessment recommended the consent be granted subject to conditions.

It was found the application would result in less than minor effects and was consistent with Te Mana o te Wai. This consent was approved subject to conditions of consent.

The Big Nugget Company Ltd – Pomahaka River (Mining Permit 41447)

This application was to use a 6-inch dredge with a 46ha area. Like the Schumann consent, the river has significant ecological values and is within a Statutory Acknowledgement Area.

The application was externally peer reviewed by independent ecologists who recommended consent be granted subject to conditions.

In their submission, Hokonui Rūnaka stated there are Common and Upland, Non-Migratory Galaxiids, Kanakana, Tuna – Long Fin and Short Fin eel and Koura. The independent ecology assessment also confirmed the presence of the Threatened, Nationally Vulnerable Pomahaka galaxias.

Hokonui Rūnanga opposed the application due to (in their view), insufficient evidence of effects of the suction dredge mining on instream benthic environments. The application was assessed by Council planners as being generally consistent with the Te Rūnanga o Ngāi Tahu Freshwater Policy Statement 1999.

It was noted in a report tabled that many invertebrate species in New Zealand display traits that infer disturbance resistance and some are physically capable of passing through a suction dredge without damage (Griffith and Andrews, 1981). Another study in 1998 (Bagrie) was discussed in which two sites, one dredged, one un-dredged, found higher numbers of invertebrate species and higher values for measures of ecosystem health using the Macroinvertebrate Community Index (MCI) at the dredged site.

The adverse effects were considered to be less than minor and found to be consistent with the relevant statutory documents, including the NPSFM, PRPS PORPS and RPW. The consent was approved by an independent hearings commissioner.

Cold Gold Clutha Limited – Clutha River/ Mata-Au (Mining Permit 53215)

This consent was to use a 12inch dredge fixed to a maritime vessel over 901ha of the Clutha River/ Mata-Au. The Clutha is a Statutory Acknowledgement River. This was a replacement permit as the dredge had operated in the river for the previous decade.

It was accepted that accounting for the scale of the river and dynamic nature of the river, the effects of the activity were considered to be less than minor as it is the remobilisation of bed material and the size of the discharge plume is relatively small.

Council staff found, the proposed activity will not adversely affect values of the Clutha River/ Mata-Au as given in Schedules 1A 1AA, 1B, 1C and 1D, nor will it affect the natural character or amenity values associated with the Clutha River/ Mata-Au.

Overall the proposal was considered to be consistent with the policies and objectives of the RPS and PORPS. The application was considered to be consistent with the policies of the NPS-FM and Te Mana o te Wai.

The application was assessed to be in general accordance with the iwi management plan. The written approval of Te Ao Marama, the consultancy acting for Southland Rūnaka and Aukaha, the consultancy acting for Otago Rūnaka were sought and obtained. They raised no concerns.

The consent was approved under delegated authority on a non-notified basis.

45 South Mining Limited – Kye Burn (Mining Permit 60566)

This proposal was to operate a 6-inch dredge with 40.3ha of Kye Burn.

The Kye Burn is a significant habitat for trout, trout spawning, but crucially habitat for indigenous species threatened with extinction, such as the Central Otago roundhead galaxias (*Galaxias anomalus*) and Taieri flathead (*Galaxias depressiceps*). These species were identified by the Department of Conservation (DoC) in their submission who highlighted the Kye Burn was one of a handful of reference rivers for galaxiid preservation and of the highest value to the Department.

Dr Richard Allibone from Waterways Consulting Limited provided an ecological assessment of the application on behalf of Council's Resource Science Unit. Dr Allibone concludes that the potential impact of the activity will be less than minor in terms of direct disturbance on the fish populations.

The applicant has also proposed a condition that allows the extent of the downstream sediment plume from the mining to 200m. Dr Allibone concluded in his technical audit that effects are considered to be less than minor in terms of direct disturbance on fish populations or ecology as a result of the 200m plume.

The Kye Burn is listed in Schedule 1D of the Otago Regional Water Plan and contains a number of cultural values. Aukaha on behalf of the local Rūnaka was notified of the application as an affected party and did not submit. The Ngāi Tahu Freshwater Policy Statement 1999 was assessed by the Council's processing planner and considered that, overall, the application is generally consistent with the objectives and policies of the NTFP.

The effects on the mobile and non-mobile fauna was assessed as less than minor and the proposal was considered to be consistent with Te Mana o Te Wai.

Consent was granted subject to conditions by an independent hearings commissioner.

Golden Bush Mining Limited – Nevis River (Mining Permit 41851)

Golden Bush Mining sought to suction dredge mine a 89ha portion of the Nevis River using up to an 8-inch dredge. They also sought to use a 20ton excavator in the bed of the river to move gravels and rocks.

The Nevis is in Schedule 7, and the ecology is considered sensitive to suction dredge mining due to the presence of the Nevis Galaxias. The DoC website states "the Nevis galaxias were isolated and evolved here after a rare and fascinating geological event where the river changed direction. Classified as 'Nationally Vulnerable', they share the same threat status as Hector's dolphins". Sampling and electrofishing unsurprisingly found these galaxiids only exist in tributaries where trout cannot gain access.

This application was processed via the limited notification pathway and approved subject to conditions. The ORC's Science Unit considered the effects of the activity on the ecology was less than minor. The use of the excavator in the riverbed was approved with the exception of a reach known as 'the Dell'. It is relevant to note this application was considered prior to the introduction of the NPSFM.

Mokihinui Gold Limited – Nevis River (Mining Permit 52465)

Mokihinui Gold sought to suction dredge mine a 39ha portion of the Nevis River using a 5-inch dredge. As noted above, the Nevis is appended in Schedule 7, and the ecology is considered sensitive to suction dredge mining due to the presence of the Nevis Galaxias.

Affected party approvals from all stakeholders were obtained and the consent was approved non-notified. The ORC's Science Unit considered the effects of the activity on the ecology was less than minor. This application was also considered prior to the introduction of the NPSFM.

Conclusion

Overall, it is my opinion that the effects of the activity on the aquatic ecology will be less than minor. This interpretation is consistent with every other ORC consent application processed for suction dredge mining in Otago including those rivers identified in Schedule 7 of the RP:W.

Whether the zone of reasonable mixing is 100m or 200m downstream will be of negligible consequence to the aquatic ecology.

Provide an explanation on the adaptive management approach proposed, including potentially a set of adaptive management conditions for consideration.

Cold Gold Clutha value the social license they have to operate the dredge in the mid-reaches of the Clutha and take their compliance responsibilities seriously. No complaint has been received to my knowledge to the ORC about the operation of the dredge.

They welcome any sensible adaptive management model and propose the following conditions-

1. Notwithstanding the requirements of any other conditions of this consent the discharge shall not give rise to a conspicuous change in the colour or visual clarity after a reasonable mixing zone of 200m from the dredge discharge point.
2. Prior to commencing mining in a location, the dredge operator shall make visual estimations along the river margin defining 50m, 100m, 150, and 200m from the point of discharge for a reference point.
3. Should there be a conspicuous change in the colour or visual clarity between 150m and 200m from the point of discharge, the consent holder shall-
 - (a) Assess whether the 200m threshold has been exceeded,
 - (b) Assess whether there have been any events or failures that could have resulted in the greater discharge plume,
 - (c) Assess the nature of the sediments and bed substrate,
 - (d) Make alterations to the engine speed or hydraulic nozzle to minimise the discharge.
4. Should there be a conspicuous change in the colour or visual clarity beyond 200m from the point of discharge, the consent holder shall-
 - (a) Immediately reduce the engine speed and lift the hydraulic arm to cease the intake of additional sediments,
 - (b) Make a record of the breach in a logbook specifying date and time, and a GPS location,
 - (c) Allow the remaining plume to dissipate before recommencing mining.

10. *Page 23 promotes a condition that no works shall take place within 150 m of designated camping or recreation areas between 24 December and 3 January or the Easter weekend.*

- a. ***Please advise the locations of these designated camping and recreation areas within the extent of the proposed dredging activities.***
- b. ***Please advise whether other dates or public holidays should be included in this exclusion period to mitigate effects on recreation and amenity. For example, the weekends associated with Otago Anniversary Day, Waitangi Day or ANZAC Day when there may be more holiday makers.***

Having considered the question, it is now my opinion there are no areas within the permitted area that this condition should apply. In the consents previously approved for within the mid-reaches there were a couple of locations such as Pinders Pond public campsite (on the river margin), and the Island Block historic suspension bridge where this condition was considered appropriate.

The public or recreationalists may observe the dredge in various locations within the permitted area. However being visible and on a temporary basis does not constitute an adverse effect. Based on my personal observations of suction dredge mining and having a family home on the river margin within the approved permit in the mid-reaches, I can advise the public are almost always curious about the mining operation and have no concerns. The previous decade of mining on the Clutha River by the applicant provides a useful barometer to the general public's view of the activity.

11. *Please provide an assessment of the effects of the proposed slipways at Beaumont and Queensberry on natural character and amenity, in particular the Queensberry slipway in relation to its permanent nature.*

There will be less than minor effects on natural character, recreation or amenity as the slipway will comprise a gentling inclining slope that will quickly re-grass. The significant scale of the river and limited number of public users further mitigates the effects of any disturbance. In comparison, the river margins include numerous permanent pump sheds and piping infrastructure that are clearly not part of the natural environment.

12. ***Ms Coates has advised, with respect to fish entrainment, that if any At Risk or Threatened Fish are identified as having been entrained during suction dredging activities, the exclusion areas should be revisited, and potentially extended or new exclusion areas created. Please advise whether you are comfortable with this recommendation and would like it to form part of your proposal.***

Cold Gold Clutha are happy to adopt a condition to this effect.

13. ***Ms Coates has recommended amendments to proposed conditions 23 (from application) and the additional condition recommended by E3 Scientific (page 44 of the E3 Scientific report), such that they say:***

Condition 23:

Should any sports fish redds be identified by the Otago Fish & Game Council in consultation with the consent holder within the 1,500 metre section of the Clutha River/ Mata-Au approved for mining at any time between 1 May and 31 August, the consent holder must then liaise with the Otago Fish & Game Council and determine an alternative ~~1,500-metre~~ section of the Clutha River/ Mata-Au as identified in Condition 22. The length of the alternative section must not exceed 1500m, or 1500m less the length that has already been mined between 1 May and 31 August, whichever is smaller. Once determined, the Consent Authority must be notified of the amended mining location within 5 working days.

E3 Scientific consent recommendation:

The dredge operator is to maintain a photographic record of any fish observed to be entrained by the suction dredge. If the species survives, the fish should be photographed, and the record should be entered into the NZFFD with species and location provided. If mortality is observed, the fish should be photographed and photographs ~~this~~ shall be reported provided to the consenting authority in a brief quarterly report with species and GPS location provided.

Please advise whether you are comfortable with these changes and would like them to form part of your proposal.

With respect to the first question, the applicant is agreeable to this suggestion.

In relation to the photographing of any species entrained in the dredge, the applicant advises they have seen this happen with what appeared to be a trout only once, and there is no time to determine species, capture, photograph or determine survivability. On that basis, I do not consider the condition is workable given the frequency of events and that trout function as a pest species.

14. ***Mr Macdiarmid has recommended the following conditions of consent:***

- ***The Applicant shall consult the Engineering section of the Otago Regional Council (ORC Engineering) prior to slipway work commencing, and all works including reinstatement shall be undertaken as directed by and to the satisfaction of ORC Engineering.***
- ***Slipway reinstatement shall include suitable compaction and revegetation to match adjacent ground conditions, contour and cover.***
- ***The applicant shall inspect and photograph the slipway sites annually and following significant flood events during their establishment and for two years after reinstatement, with brief reports and photographs to be submitted to the Consent Authority. Any damage shall be remediated promptly if necessary.***
- ***Slipway gradients should be no steeper than 2.5V:1H.***

- ***If erodible soils, such as silts, are encountered in the Queensberry slipway, temporary erosion protection should be provided to prevent erosion during flooding.***

Please advise whether you are comfortable with these conditions forming part of your application.

The applicant is agreeable to these proposed conditions.

- 15. The Clutha River / Mata-Au at the location of the proposed suction dredging is identified in Schedule 1D of the RPW as having a wide range of values to Kāi Tahu and is the subject of a statutory acknowledgement under the Ngāi Tahu Claims Settlement Act 1998.**

The Clutha River / Mata-Au is within areas for which the Rūnaka represented by both Aukaha and Te Ao Marama Inc.

Please provide an assessment of cultural effects of the proposal, whether that be a Cultural Impact Assessment, Cultural Values Assessment or other documentation as determined appropriate by Aukaha, Te Ao Marama Incorporated and Te Rūnanga o Ngāi Tahu.

Please find attached a copy of the Cultural Impact Assessment. The concerns highlighted in the CIA are consistent with those in previous suction dredge mining applications.

The memo by E3 Scientific dated 19 April appended to this report provides some commentary to the issues raised from an ecological perspective.

- 16. *The E3 Scientific report puts forward some additional conditions (pages 40 – 44). Please confirm whether all conditions presented in the E3 Scientific report form part of the application.***

Some of the conditions are considered ultra vires or unworkable and cannot be adopted. We welcome suggested conditions 1, 7, 10, 11, 12, 13, 14, 15, 16 and the proposed additional condition at the top of page 44.

We also welcome the suggested approach by E3 in their 19 April memo in terms of using the Secchi disk as an alternative (albeit a little more complex) method of managing the 200m zone of reasonable mixing.

- 17. *Proposed conditions 19 – 23 relating to the submission of an Annual Work Programme require preparation of the document in consultation with Otago Fish and Game and the Alexandra office for the Department of Conservation, as well as further consultation with Otago Fish and Game with respect to dredging during sports fishing season and identification of sports fish redds.***

Consent conditions cannot confer responsibilities to any person except the consent holder, so consent conditions which include requirements of other persons can be risky if the other parties are not fully on board.

Please advise whether these conditions have been discussed with Otago Fish and Game and the Alexandra office for the Department of Conservation and advise whether they are comfortable with the proposed conditions.

Agreed, please disregard this suggestion. It is my view the third parties do not need to be consulted with further once consent is obtained on the basis that the decision makers will have a sufficient understanding of the effects and issues based on the application, the three Council's planners and multiple ecologists.

- 18. Proposed condition 6 states "No beaches above the normal upper flow level must be disturbed or mined. For the purpose of this consent the level is defined as 400 cubic metres per second".**
- a. **Please explain why this condition has been proposed and what effects it is to mitigate (e.g., erosion / scour or ecology effects).**
 - b. **Please explain why an 'upper' flow level is appropriate rather than a 'lower' flow level, why 400 m³/sec flow level is proposed and where this flow measurement is to be measured.**

I understand this phrase was carried over from other consent decisions and is not particularly helpful due to its ambiguity. The intent is to protect beaches that may contain terrestrial plant communities but can tolerate short periods of inundation. It may be better to state no beaches that are part of the dry-bed when the flow is 400 cubic meters per second shall be disturbed or mined. This will ensure beaches cannot be mined during fuller flows. In terms of the origin of the 400m³/sec standard, it is my recollection this was derived by the ORC's Science Unit and is almost certainly an arbitrary figure assumed to address the risk.

Queenstown Lakes District Council s92 Questions

1. **The Clutha River Mata Au is a Statutory Acknowledgement area and the operational area of the activity is identified as within a Wāhi Tūpuna area under the Proposed District Plan. Please provide a Cultural Impact Assessment of the activity, which addresses the matters set out in the objectives and policies in Chapter 5 Tangata Whenua of the Proposed District Plan.**

The Cultural Impact Assessment requested is appended.

2. **The application includes an assessment of the effects of noise undertaken in 2013 between Ettrick and Millers Flat, However, as this noise assessment is 9 years old and is for a different location and jurisdiction, and while the difficulties in providing an updated assessment are recognised, it is equally difficult to rely on this assessment to assess the effects of any potential breach. There are two potential categories under which noise could be assessed; being Rule 36.5.14 for 'commercial motorised craft' and Rule 36.3.2.6 and 36.5.1 which are relevant for assessing noise receivers within the Rural Zone. Please provide an acoustic assessment by a suitably qualified and experienced person which addresses the sound levels of the dredge at 25m from the craft to determine if it does or not meet the specified standards for motorised craft, and that also includes analysis of sensitive receivers in alignment with the respective zone provisions.**

No noise assessment has been sought from a suitably qualified person as requested. It is the view of Cold Gold that they will comply with the noise standards. Having the luxury of the previous ten years mining with the dredge in the Clutha River, in a less-incised portion of the riverbed and near townships there has been no issue raised about noise. The rural zone is a contrasting environment where rural farming activity or jet boats/ jetski travel up the river. It is not necessarily a quiet area, although it certainly can be very quiet too. Noise is an anticipated element in the rural zone.

With respect to Rule 36.5.1 in which the assessment location is 'any points within the notional boundary of a residential unit'. The notional boundary is defined as a line 20 metres from part of any living accommodation or the legal boundary where this is closer to the living accommodation. There are many areas within the permitted mining area where there are no residential units for 500m to over

1.0km. When considering the inverse square law where for the doubling of the distance from the noise source (in a free field situation), the sound intensity will diminish by 6dBA and on that basis the likelihood of any breach is low. Given the noise source is within an incised river bed, the sound pressure is assumed to be further diminished given any residential unit will be both set back from the source and within the 'lee' relative to the source and obscuring topography.

It is assumed the few residential properties along the proposed mining permit area will be buffered to some extent as the residential units are set back from the bank margin such that the topography will reflect or attenuate pressure. Had there been a noise issue, this would have been identified over the previous ten years mining, including near the townships of Millers Flat and Ettrick.

The applicants also advise new baffling and modifications are proposed for the dredge prior to moving upstream to further attenuate noise at the source. Any noise assessment prior to these upgrades would be erroneous.

Should the dredge be found to breach the noise standards, the applicant has advised they will relocate or modify the dredge or alternatively seek an additional resource consent. In the case of the latter, any sensitive receivers (if there are any) will likely to be considered an affected party should consent be sought.

3. ***At the assessment of Policy 6.3.5.1 on Page 32 of the Application, it states that "No new structures will be constructed beyond temporary fuel storage and a mobile office, both of which will be located away from the margins and comply with the bulk and location provisions for the zone." That is the only reference to the mobile office within the application. Please provide details regarding the mobile office and the dimensions of the fuel storage structures. Please confirm the expected timeframes that these will remain in any one place. It would also be helpful to understand site selection process for the storage areas. Please also confirm compliance with Rule 35.4.13 and provide an assessment under Policy 35.2.5.2.***

The location for any office or bulk fuel storage is not yet confirmed. Any structures associated with the mobile office or temporary fuel storage will however comply with the rules subject to the zone, or a fresh consent will be required. They will be sited in a manner and an colours typical of the rural zone such that they are considered discrete. In effect, any structure will not appear any different to any other rural building within the rural zone.

For clarity, the bulk onshore tank will be double skinned, or banded and will be above a 1 in 50-year flood level and within a safely accessible location. Spill kits will be provided.

Yours faithfully
Terramark Ltd



Darryl Sycamore
 Resource Management Planner