

The Hearing Commissioner

30 August 2024

9.00 am

Staff Report for Hearing

The recommendation in the staff report represents the opinion of the writer and it is not binding on the Hearing Commissioner. The report is evidence and has no greater weight than any other evidence that the Hearing Commissioner will hear and consider.

Hearing of Application – APP-20211135 Environment Southland’s Catchment Operations Division

Compiled by Stephen West, Principal Consents Officer at Environment Southland

Applicant:	Environment Southland’s Catchment Operations Division
Application Number:	APP-20211135
Location:	Titiroa tidegates, adjacent to Middleton Road South, Fortrose.
Activities for Consent:	To occupy part of the coastal marine area with a tidegate structure; To occupy part of the coastal marine area with a weir structure; and To dam and divert water.
Notification:	The application was limited notified on 14 August 2023 and eight submissions were received.
Hearing:	The hearing is scheduled to commence at 9.00 am on 30 August 2024 in the Council Chambers, Environment Southland, corner of Price Street and North Road, Waikiwi, Invercargill.

1 Recommendation

- 1.1 Based on the information to date, I recommend that the application be declined.
- 1.2 My reasons are:
 - 1.2.1 The tidegates have adverse effects on river values, including cultural and spiritual values, fish passage, inanga spawning, and water chemistry (particularly the extent of the saltwater wedge).
 - 1.2.2 More information is needed regarding the beneficial effects of the activity. I am concerned about the impacts on the upstream landowners and leaseholders if the application is refused, but the beneficial aspects of the activity are not adequately assessed.
 - 1.2.2.1 Even if it is accepted that the gates are beneficial during high spring tides, insufficient information has been provided to demonstrate that the closure of the gates at lower tidal levels is necessary to maintain drainage and protect against tidal flooding.
 - 1.2.3 The proposed offsetting of adverse effects on inanga by enhancing inanga spawning habitat has not been demonstrated to follow the steps and requirements of Section 3.24 of the NPSFM.
 - 1.2.4 The mitigations proposed by the applicant do not address adverse effects on cultural and spiritual values. The applicant has consulted with Te Ao Marama Inc., and the proposed enhancement of inanga spawning habitat will have some beneficial effect for mahinga kai, but it is unclear if this is sufficient. My current view, based on the provisions of Te Tangi a Tauria, and the submission from Te Ao Marama Inc., is that there is an adverse effect on cultural and spiritual values and, as such, a conflict with a number of policies.
- 1.3 I acknowledge that there is also scope to approve the application.
 - 1.3.1 The tidegates are recognised in the Southland Regional Policy Statement as a strategic facility, and therefore are regionally significant infrastructure.
 - 1.3.2 There are also policies that are supportive of the application, in terms of recognising positive effects on social and economic well-being, and in maintaining regionally significant infrastructure.
- 1.4 However, in terms of the supporting factors:
 - 1.4.1 The significant infrastructure policies are largely qualified by the need to avoid, remedy or mitigate adverse effects, either in the policy itself, the explanation to the policy, or via a supporting objective or policy. I expect that the applicant will provide further information about effects and mitigations that will allow more weight to be given to the infrastructure policies.

- 1.4.2 The previous consent was allowed to expire before this application was lodged, which complicates and undermines consideration of the tidegates as existing and regionally significant infrastructure.

- 1.5 If the application is approved, my recommendation is that it be approved for a term of no more than 5 years, and that conditions be imposed to require the proposed mitigation works and to monitor the effects of the tidegates and the effectiveness of the mitigations. My reasons for this term are discussed in Section 4.3 of this report.

- 1.6 I expect that further information will be provided prior to the hearing, or at the hearing itself, that may address the issues outlined above.

2. The Application

2.1 The proposed activities

2.1.1 The applicant has applied for resource consents to:

- (a) Occupy the coastal marine area with a tidegate and a weir structure, and
- (b) Dam and divert water.

2.1.2 The purpose is to protect land north of the tidegates from tidally influenced flooding and to enhance land drainage.

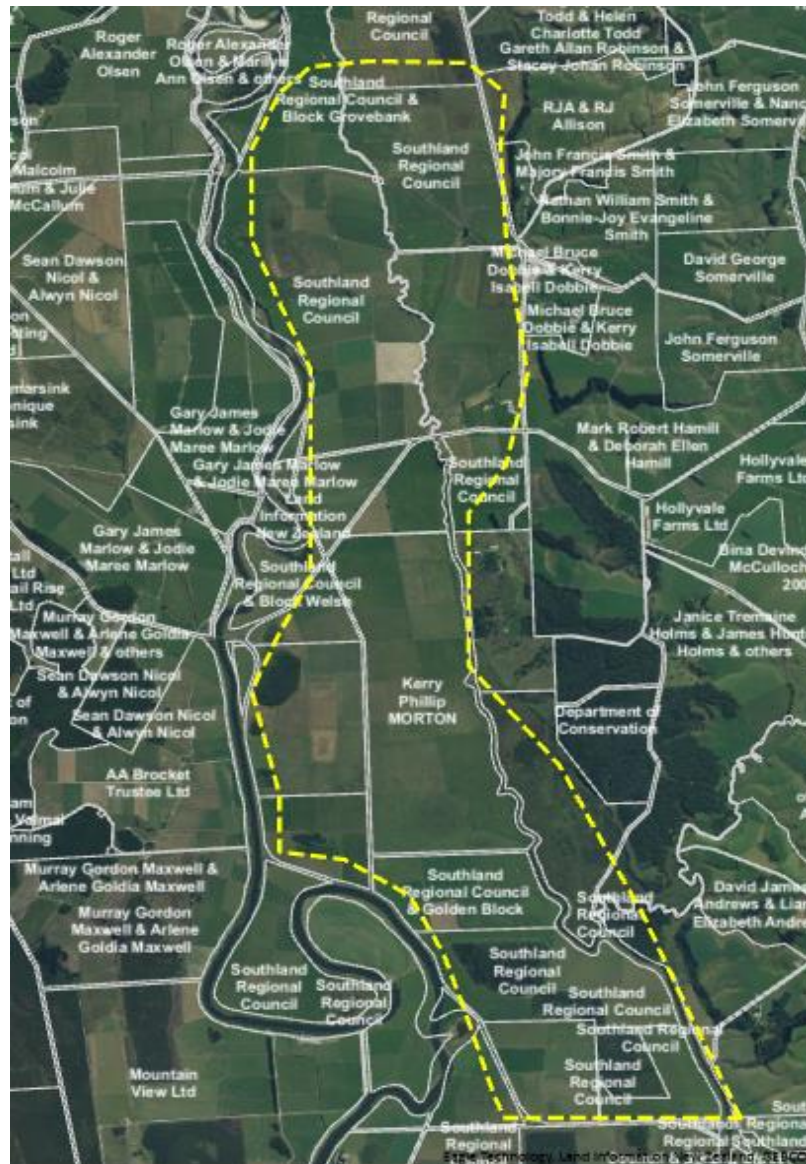
2.1.3 The Titiroa Stream is dammed by a weir and diverted through an artificial channel which contains the tidegates. The river then returns to its former channel downstream of the weir.



River flow is normally from the north to the south, except when reversed by tidal flows. The river is impeded by the weir, causing it to flow through the channel on the east side, passing through the tide gates, and then rejoining the former channel downstream.

2.1.4 As can be seen from the aerial photograph above, the tidegates are sited in a channel to one side of the former river channel. The main channel is blocked by a weir that can be over-topped during flood events. This arrangement was formed in the mid-1980s with the installation of the current tidegates.

- 2.1.5 The tidegates open and close depending on the direction of water movement. That means that they close on tidal inflows, reducing the potential for tides to cause higher water levels upstream of the gates.
- 2.1.6 The application states that the tidegates “influence approximately 11,500 hectares” of land. That would amount to half the total Titiroa Stream catchment, including the hilly areas and the land downstream of the gates. However the report on the Water Rights application in 1986 referred to drainage being affected on 1,150 hectares of land. That suggests that the gates influence drainage on land up to about 8 km north of the tidegates.
- 2.1.7 The map below shows property ownership north of the tidegates. The yellow dotted area approximates 1,150 hectares from the tidegates north, restricted by the Matāura River to the west and hillier land to the east. This is only an approximation, and the applicant may be able to provide a clearer plan of the land areas that benefit in terms of land drainage and tidal flooding from tidegates.



2.2 Description of the affected environment

- 2.2.1 The tidegates are sited on the Titiroa Stream, about 185 metres upstream of the Tokanui Gorge Road Highway bridge, about 3.2 km northwest of Fortrose.
- 2.2.2 The river has a catchment area of about 223 km², and flows into Toetoes Harbour. Based on its shape the Titiroa Stream or river is likely to be a modified river due to past straightening and drainage activities.
- 2.2.3 Pattle Delamore Partners Ltd¹ estimated flow in the Titiroa Stream in the vicinity of the tidegates on 3rd February 2022 as being 150 to 300 litres per second. Based on flow conditions at that time in the Mokoreta and Matāura Rivers, which were both below Q₉₅ flows, the estimated flow is likely to represent low flow conditions in the Titiroa Stream.
- 2.2.4 The Titiroa Stream is about 20 metres wide upstream of the gates, and about 30 metres wide downstream, although the ‘bypass channel’ is narrowed to about 6 metres wide either side of the gate location.
- 2.2.5 The site of the tidegates is tidally influenced, and the salt wedge (the seawater) extends about 160 metres upstream of the gates.
- 2.2.6 The Titiroa Stream in the vicinity of the tidegates is within the statutory acknowledgement area for the Matāura River, as shown in red in the plan below. That means that Ngāi Tahu have an acknowledged cultural, spiritual, historic and traditional association with the area. The statutory acknowledgement noted the importance of the area for mahinga kai. A copy of the statutory acknowledgement is attached to the submission by Te Ao Marama Inc.



¹ Titiroa Tide Gate Mitigation Options Report, (2022), G Scott, B Throssell & L Drummond, Pattle Delamore Partners Ltd

- 2.2.7 Information is provided in the application and submissions about the fish present in the Titiroa Stream. That includes both indigenous and exotic species.
- 2.2.7.1 Many of the indigenous species present in the Titiroa Stream are recognised as Taonga species in Appendix M of the proposed Southland Water & Land Plan, such as inanga (whitebait), tuna (longfin and shortfin eels), kanakana (lamprey and galaxiids), kokopu/hawai (common bully and redfin bully) and paraki/ngaiore (smelt and flounder).
- 2.2.7.2 Inanga (*galaxia maculatus*) and tuna (longfin eel) are classed as at risk and declining, and Gollum galaxias are classed as threatened and nationally vulnerable, as noted in the submission by Fish & Game NZ.
- 2.2.7.3 The report ‘Titiroa Tide Gate – Mitigation Options’ by Pattle Delamore Partners Limited (PDP), November 2022, explains that:
- 2.2.7.3.1 Whitebait are the juveniles of five galaxiid species, one of which is inanga (*galaxias maculatus*)
- 2.2.7.3.2 Inanga are diadromous (migrate between salt and freshwater as part of their life cycles). The juvenile inanga migrates upstream in spring, and mature inanga migrate downstream in autumn to spawn among riparian vegetation.
- 2.2.7.3.3 Inanga reproduction is synchronous with the spring tidal cycle. Section 1.2.1 of the report explains how spawning is linked to high spring tides. The report identifies the upstream extent of the salt wedge, gently sloping riverbanks, cover, the presence of tall thick grass with a root mat structure as important features for spawning areas.
- 2.2.7.4 In his submission Mr Holms referred to the presence of kokopu, shrimp, aua/kātaha (yellow-eye mullet), and koura (freshwater crayfish) in the stream prior to construction of the tidegates in the mid-1980s.
- 2.2.7.5 The main exotic/introduced fish species present in the stream is brown trout, but redfin perch is also present.
- 2.2.8 The Titiroa River is a popular whitebaiting river, with about 100 whitebait stands downstream of the bridge. The 1986 water right application noted that whitebait was made up of five species, and the most common in the Titiroa, *Galaxia maculatus*, is a poor climber or unable to climb².
- 2.2.9 The Titiroa Stream is not part of the protected waters under the Water Conservation (Mataura River) Order 1997.

² This was in reference to consideration of a fish ladder for the tidegates.

- 2.2.10 Much of the land downstream of the tidegates is owned by Environment Southland and includes developed pasture, wetlands, and rough vegetation near the river banks. It is generally flat, and the pasture areas are crossed by drains that, in many instances, have flap gates to prevent tidal effects on land drainage.
- 2.2.11 The application includes a High Value Area (HVA) biodiversity report that discusses the ecological values along the Titiroa River downstream of the Tokanui Gorge Road Highway bridge. The report identifies that the downstream area has very high ecological diversity and has habitats suitable for supporting several threatened and rare species.
- 2.2.12 There are wetlands in the wider area. The nearest is about 800 metres west of the tidegate structure. Part of a regionally significant and Ramsar wetland adjoins the lower reaches of the Titiroa Stream, about 850 metres south of the tidegates.
- 2.2.13 Upstream of the tidegates, the land is flat, bounded to the east by hilly ground, and to the west by the Matāura River. The land is generally pasture and developed for agricultural use, with scattered areas of indigenous vegetation.
- 2.2.14 The nearest wetland upstream of the tidegates is about 1.2 km northwest of the structure.
- 2.2.15 Much of the flood-prone area upstream of the gates is owned by Environment Southland and leased out, although there are also two large areas of privately owned land as well. The leases are for periods of three years³.
- 2.2.16 In considering the existing environment a complication is that the prior resource consent expired before the current application was made. Therefore the tidegates and weir are not legally occupying the coastal marine area nor legally damming and diverting flow. Case law⁴ indicates that the environment should be imagined as if the structures were not there. In the Port Gore Marine Farms decision the Court considered that view of the environment to be a logical consequence of expiry of earlier permits. The difficulty is that the gates and weir are physically in place and the environment is modified by their presence. So there is a difference between the legal and physical environments that will need to be borne in mind when considering the effects of the activity.

2.3 Planning framework

- 2.3.1 The occupation of the coastal marine area with the weir and tidegate structures is a **discretionary activity** under Rule 9.1.1 of the Regional Coastal Plan for Southland.

³ Pers. comment Environment Southland’s Property Officer.

⁴ Port Gore Marine Farms v Marlborough DC [2012] NZEnvC 72, para 140 and Otago Fish and Game Council v Otago Regional Council [2021] NZHC 3258, paras 133-137.

- 2.3.2 The damming of (coastal) water by the tidegates is not specifically authorised by a rule in the Regional Coastal Plan so is a **discretionary activity** under s87B of the Resource Management Act, with regard to s14(2) of the Act.
- 2.3.3 Under Section 104B the Council may grant or refuse consent for a **discretionary activity**, and if it grants the application, may impose conditions under Section 108 of the RMA.
- 2.3.4 The tidegates are fully within the coastal marine area boundary. The boundary is set by an agreement, as provided in s2 of the Resource Management Act, regarding the location of the mouth of the river for the purpose of defining the landward boundary of the coastal marine area.
- 2.3.5 The landward boundary of the coastal marine area in the bypass channel aligns with the upstream margin of the weir. Therefore the weir is a structure in the coastal marine area.
- 2.3.6 The application was also for the damming and diversion of water. However the activity status is less clear-cut.
- 2.3.7 In 1986 the current weir and tidegate arrangement was authorised by Water Rights under the Water & Soil Conservation Act. Those rights provided for damming the river to divert the river into a bypass channel, diversion of water, and damming the river with tidegates.
- 2.3.8 The 1986 works resulted in permanent change to the channel, so that the stream is diverted or realigned away from its former course, except when high flows cause over-topping of the weir. This was recognised in 1989 when the water permit for diversion into the side channel was surrendered. The view of the Southland Catchment Board (the Consent Authority) at the time was that the diversion had been completed and that a further consent for diversion would be required if it was ever decided to return the stream to its former course. Therefore, prior to the Resource Management Act, the side channel had become the riverbed, and the flow of the stream along it was part of the existing environment and was no longer classed as a diversion.
- 2.3.9 A differing view would be to consider that the stream flows along the tidegate channel due to the weir, which exists by resource consent. As a result, there is a diversion of water, and it only continues until the artificial structure, the weir, is removed.
- 2.3.10 The damming effect of the weir on the upstream side occurs outside the coastal marine area, (but is due to a structure within the coastal marine area). This situation is not clearly addressed in the proposed Southland Water & Land Plan. I do not consider that Rule 60(b) applies, because the associated damming does not arise from a dam or weir in the riverbed (as it is in the coastal marine area). Therefore the damming and diversion effects of the weir are **discretionary** under Rule 4 of the proposed Southland Water & Land Plan.
- 2.3.11 Rule 49 of the proposed Southland Water & Land Plan refers to taking and using water, or taking, diverting and using water. In practice, the rule is assumed to apply individually to each activity within that phrasing, so that water can be taken and used under Rule 49(c) without the need for a diversion.
- 2.3.11.1 Rule 49(b) would provide for a non-consumptive diversion as a restricted discretionary activity, provided that the water was returned within 100 metres of

the diversion point. In this case the diversion point of the bypass channel intake is 150 metres north of the outlet back to the river. However, if diversion is found to occur at the weir, then the water is returned within 100 metres. Therefore, I consider that the activity is a **restricted discretionary activity** under Rule 49(b)(ii).

2.3.11.2 However, if the diversion point is not the weir, then Rule 49(c) may apply. The rule defines diversions as discretionary, provided that any abstraction does not exceed the primary allocation. Abstraction is defined as removing water from the river, artificial watercourse or modified watercourse. As discussed, the diversion is due to a past realignment, so it is not an abstraction – the water remains within the existing channels. As such, the diversion would not contravene primary allocation. Therefore the diversion could be a discretionary activity under Rule 49(c).

2.3.11.3 If neither Rule 49(b) nor 49(c) are found to apply, then the diversion will be a non-complying activity under rule 49(d) and, as a result of bundling⁵, all activities will be considered as non-complying⁶.

2.3.12 As stated, the status is unclear, but I lean towards the perspective that there is an ongoing damming and diversion associated with the weir and channel. Other channel realignments have occurred where a river or stream has been shifted permanently, but those are not dependent on a weir to maintain the realignment. I consider that the damming is discretionary under Rule 4, and the diversion of flow is restricted discretionary under Rule 49(b). The activities should be bundled to discretionary activities.

2.4 Notification and submissions

2.4.1 The application was publicly notified on 14 August 2023.

2.4.2 Eight submissions were received. A copy of each submission is included in the appendices, but they are summarised in the table below. Comments from the submissions have sometimes been rephrased in the summary, largely for brevity, so the wording of the original submission should be preferred when considering the points made.

Submitter	Oppose/ Support	Issues/comments <i>Decision/Changes sought</i>	To be Heard?
Director-General of Conservation	Oppose	<ul style="list-style-type: none"> The Department administers the Conservation Act, the Wildlife Act and the Freshwater Fisheries Regulations. The site contains significant values for indigenous freshwater species. 	Yes

⁵ Bundling means that interrelated activities are considered on the basis of the most restrictive activity status.

⁶ Non-complying activities may only be approved if the adverse effects on the environment are minor, or if the activity(ies) are not contrary to the objectives and policies of the relevant plans.

Submitter	Oppose/ Support	Issues/comments <i>Decision/Changes sought</i>	To be Heard?
		<ul style="list-style-type: none"> • The application does not contain sufficient information on the effects of the gates on indigenous freshwater species, particularly migratory species. • The tidegates are inconsistent with the New Zealand Fish Passage Guidelines. • The tidegates are of an outdated passive design which prevents fish passage, adversely affecting fish population and habitat. There are alternatives. • There is insufficient information to demonstrate the scale of positive social and economic effects. • There is insufficient information to show that the tidegates need to close on every incoming tide. • The application does not consider alternatives that would close the gates only when water levels read a critical elevation, reducing the effects on fish passage. • The proposed habitat restoration does not adequately offset the adverse effects on freshwater species. • Policy 11(a) of the NZCPS requires that adverse effects on at-risk species (which includes inanga) are avoided. <p><i>The decision maker must provide for s6 matters, have particular regard to the intrinsic values of ecosystems, and to the NZCPS and NPSFM regarding passage for freshwater migratory species.</i></p>	
Fish & Game New Zealand, Southland Region	Oppose	<ul style="list-style-type: none"> • Fish & Game New Zealand is responsible for the management of sports fish and game birds within the Southland Region. • The Titiroa Stream is a significant habitat of indigenous and introduced birds, including game species that are hunted during the annual game bird hunting season. • The Titiroa River supports a lowland brown trout fishery. • The application does not address how the effects of the tide gates and diversion channel should be addressed. • Damming and diversion consents (including coastal permits for such activities) are for fixed durations and, other than as provided for under s124 (which does not apply in this case), do not carry existing use rights protections. It should not be assumed that the expired consent will be renewed or, if it is renewed, on the same conditions. 	Yes

Submitter	Oppose/ Support	Issues/comments <i>Decision/Changes sought</i>	To be Heard?
		<ul style="list-style-type: none"> • The environment should be considered as if the damming and diversion activities have been discontinued and are no longer part of the existing environment. • With regard to the practicalities of assessing the existing environment while excluding the effects of the currently unauthorised tidegates, that is a matter for the applicant to establish. The submission points to caselaw⁷ on this point. • The application should not be assessed on the basis of mitigations from the existing level of effects of an unauthorised activity. • The submission referred to fish found in the Titiroa Stream, and noted that some species move between freshwater and estuarine or marine waters as part of their lifecycle. That makes them vulnerable to impediments to that migration. • Fish passage can be affected by the tidegates by restricting the area through which fish must pass, by the water velocities through the gates, and by the amount of time that the tidegates are open. These are interrelated factors. • The fish survey carried out by the applicant was limited to the areas immediately upstream and downstream of the tidegates. It did not survey fish communities further upstream or downstream that could have been affected. • The comment about differences in fish populations likely being due to differences in habitat is unsubstantiated, particularly as the upstream and downstream areas surveyed were in close proximity and of similar form. • The commentary about water velocities did not adequately address the capability of fish at juvenile stages to migrate upstream against those velocities. • The application does not consider the effects of the tidegates on water quality. • The application does not adequately identify or map the areas of land that the tidegates protect from tidal flooding and impeded drainage, and at what water levels. 	

⁷ Ngati Rangi Trust v Manawatu-Whanganui Regional Council [2016] NZHC 2948.

Submitter	Oppose/ Support	Issues/comments <i>Decision/Changes sought</i>	To be Heard?
		<ul style="list-style-type: none"> • Due to the passive gate design, the tidegates are potentially closing at low levels that unnecessary for protection of drainage on upstream land. • The proposed enhancement of inanga spawning habitat does not provide sufficient certainty. The tidegates may reduce the value of the proposed upstream enhancement area, and the downstream area appears to be of limited suitability. • A number of relevant documents and matters were pointed out. • The application does not consider repurposing of the land owned by the applicant to increase ecosystem services aligned with water quality objectives for the catchment. • Due to climate change and sea level rise consideration needs to be had to continued protection of the low-lying land owned by the applicant that the tidegates were designed to protect. • The application does not adequately consider alternatives to the existing tidegates. Alternatives could include removal of the tidegates and replacement with gates that operate at critical levels but are more fish-friendly. • If granted, the consent must be subject to reviews and reporting on the effectiveness of mitigation. • The requested consent duration is not appropriate given the applicant’s past conduct on this matter, the effects of the tidegates on environmental values, lack of monitoring, and because such a term would impede the ability to implement a fish passage plan, as required by section 3.26(6) of the National Policy Statement for Freshwater Management 2020. • The application is contrary to the relevant planning documents. <p style="text-align: right;"><i>The application be declined.</i></p>	
L Frisby	Support	<ul style="list-style-type: none"> • Leases Environment Southland land for farming use. • Has been in area for 40 years. • There have been tidegates on the river since 1918. • If the tidegates are removed, it will badly affect three private farms. • Prior to the existing tidegates, the land was run-down, but it was uneconomic to drain land because it stayed wet all the time. • Depending on rainfall, the gates are open for more than half the day. 	Yes

Submitter	Oppose/ Support	Issues/comments <i>Decision/Changes sought</i>	To be Heard?
		<ul style="list-style-type: none"> • Despite the gates, there have been good runs of whitebait in the ditches and there are hundreds of eels and plenty of trout in the Titiroa River and Waimahaka Stream. • Ditches and creeks in the area are fenced off to provide habitat for whitebait species. • Low lying areas in the Titiroa and Matāura catchments have been retired to provide habitat. • It should be recognised that it is a modified river system. • The submission included photographs and appended some history text. 	
P & L Golden	Support	<ul style="list-style-type: none"> • Has farmed land adjacent the Titiroa River for 45 years and lived on the property for 59 years. • Has fenced off 8 ha of bush and tussock land as a wetland. • The tide gates have had a huge effect, in that land above the tidal structure remains accessible and farmable. • The South Island Fern Bird, which is at risk and declining in numbers, is present in a low-lying bush area on his property and may be detrimentally affected if the tidegates were removed. • Considering creating a pond wetland, but without the tidegates it would not be worth pursuing. • The tidegates replaced an earlier structure that had been damaged. <p style="text-align: right;"><i>That the tidegates be retained.</i></p>	Not stated.
A H Holms	Oppose	<ul style="list-style-type: none"> • The Holms family farm 900-acre (364 ha) property and have done so for 149 years. It is the largest privately owned property affected by the [Matāura Catchment Control] scheme. • Having lived beside the Waikahaka and Titiroa Rivers my whole life I have a vast practical knowledge of them. • The earlier tidegates/locks were ineffective due to blockages by weeds and logs and fell into disrepair. • In the 1980s alternative options for protecting land from tidal flooding were identified but not utilised. • Prior to the current tidegates the rivers were alive with a variety of fish, including kokopu, shrimp, whitebait, smelt, longfin eel, shortfin eel, flounder, koura, yellow-eyed mullet, brown trout, lamprey, and perch. 	Yes

Submitter	Oppose/ Support	Issues/comments <i>Decision/Changes sought</i>	To be Heard?
		<ul style="list-style-type: none"> • Prior to installation of the tidegates, had observed whitebait spawning in a drain approximately 1.5 miles (2.4 km) upstream of the tidegate location. • The shag rookery in the matais on the Waimahaka River used to feed locally, but since the tidegates were installed fly further to gather food for their young. • The tidegates have adversely affected water quality. Tidal flows used to provide flushing, but it is ow brackish and semi-stagnant. In addition, there is a siltation problem due to the lack of flushing flows. 	
K P Morton	Support	<ul style="list-style-type: none"> • Has a farm in the lower Titiroa catchment. About 160 ha would be badly affected by tidal flooding if it was not for the tidegates. • Creeks and streams on the property have been fenced off. • The tidegates are part of the wider Matāura [Catchment Control] Scheme. • The farm has been in the family since 1961, and they have paid for the tidegates in taxes and rates over the years. To remove them would be a waste of time and money. • Observes a lot of whitebait up the stream. • Successfully fishes the Titiroa River. • Commercial eeling has been successful in the river. 	Not stated.
Southland Recreational Whitebaiters Association	Support	<ul style="list-style-type: none"> • The Southland Recreational Whitebaiters Association represents its members in whitebaiting issues, including promoting responsible use of the whitebaiting resource. • There was a structure in the river in 1917 to control flooding upstream. • The existing tidegates cause the loss of 1.38 hectares of whitebait spawning habitat. • Whitebait spawning habitat downstream of the gates has improved as a result of fencing that excludes stock. • Questioned if the downstream spawning habitat areas would still flood if the tidegates were removed. • No information on the water levels and changes that would occur to the waterway and surrounding land if the tidegates were removed. • The tidegates trap whitebait south of the structure. • The Association supported changes by the Department of Conservation that now prevent whitebaiting north of the bridge. Those changes are 	No

Submitter	Oppose/ Support	Issues/comments <i>Decision/Changes sought</i>	To be Heard?
		likely to make a huge difference to the amount of whitebait moving upstream through the tidegates.	
Te Ao Marama Inc, on behalf of Ngā Rūnanga	Oppose	<ul style="list-style-type: none"> • The tidegates are within a significant cultural landscape to Ngāi Tahu because of historical and contemporary associations. Those include formation of landscape, wāhi ingoa (place names), mahinga kai, kaimoana, wāhi tapū, Māori land, Mātaitai and archaeological sites. • The Titiroa Stream is an area known for mahinga kai, in conjunction with Toetoe estuary and the neighbouring Matāura awa. • Awarua Rūnanga, as kaitiaki, are responsible for protecting the mana and mauri of the environment in this area. • The applicant had not provided for Ngāi Tahu values, rights and interests. • The tidegates are detrimental to the mauri, the health and well-being of the Titiroa Stream and its ecosystem. • The tidegates adversely impact threatened indigenous species and their habitats that are taonga. • The structure inhibits fish passage and detrimentally affects inanga spawning. • The fish survey was inadequate and failed to consider all taonga species known to the area, such as kanakana. • The application fails to provide data on the effectiveness of the structure, including what water levels affect land, and what land is or would be affected by inundation without the tidegates. • The application does not consider climate change, particularly the impacts of rising sea levels and increased flood events. • Lack of clarity on the proposed mitigations. Improved habitat does not improve migration of taonga species. • The application is contrary to the provisions of Te Tangi a Tauira, and is inconsistent with other relevant planning documents. • The activities are currently occurring unlawfully. • The diversion of waters into the diversion channel also requires a resource consent. • The submission included copies of the statutory acknowledgements for the Rakiura/Te Ara a Kiwa coastal marine area and the Matāura River, and policies from Te Tangi a Tauira. 	Yes

Submitter	Oppose/ Support	Issues/comments <i>Decision/Changes sought</i>	To be Heard?
		<p><i>Decline the application. Remove the structures and restore ki uta ki tai, the natural flows of the wai. Retire the surrounding land owned by Environment Southland and develop a management plan to restore the area to wetlands which would provide better long-term flood management for the area.</i></p>	

2.4.4 No pre-hearing meeting has occurred.

2.4.5 In the course of my work I have visited the Titiroa River and viewed the tidegates a number of times since the 1980s. For the purposes of this application, I inspected the tidegates on 16 March 2022, and again on 21 July 2022, during a flood event.

2.5 Effects on the environment

2.5.1 The effects⁸ of the proposal on the environment include effects on:

- Fish passage
- The spawning of inanga (whitebait)
- Cultural and spiritual values
- Water quality effects
- Natural character
- Navigational safety
- Positive effects on flooding and drainage of land upstream of the tidegates

2.5.2 The most significant adverse effect is on fish passage, including the spawning of inanga. That, in turn, is likely to impact on cultural values and recreational values.

2.5.3 The tidegates block fish passage during incoming tidal conditions and impede it when the gates are open due to water velocities.

2.5.4 The bypass channel will have an effect on water velocities that extends beyond the immediate area of the gates, due to the narrowness of the channel compared to the river channel upstream and downstream of the bypass.

⁸ In Resource Management Act, unless the context otherwise requires, the term **effect** includes—

- (a) any positive or adverse effect; and
- (b) any temporary or permanent effect; and
- (c) any past, present, or future effect; and
- (d) any cumulative effect which arises over time or in combination with other effects—
regardless of the scale, intensity, duration, or frequency of the effect, and also includes—
- (e) any potential effect of high probability; and
- (f) any potential effect of low probability which has a high potential impact.

- 2.5.5 A fish survey⁹ in 2001 found four migratory indigenous fish species were present both upstream and downstream of the gates, and in similar size ranges, indicating that fish were able to pass through the tidegates when they were open.
- 2.5.5.1 The applicant’s consultant determined that the gates had only a minor adverse effect on fish migration and that water velocity through the gates did not present too great a barrier to most migrating fish.
- 2.5.5.2 A further fish survey was carried out in 2022, as discussed in Section 3.6 of the Mitigations Options report by Pattle Delamore Partners Ltd. In that survey the sampling/fishing locations were approximately 200 metres upstream and downstream of the tidegates.
- 2.5.5.3 The submissions by Fish & Game New Zealand and Te Ao Marama Inc are critical of the applicant’s fish surveys, and its assessment of effects on fish passage, including due to water velocities.
- 2.5.5.3.1 They were of the view that a wider survey should have been undertaken (the 2001 fish survey sampling locations shown in the report are in the relatively still dead-end areas either side of the weir. The sampling locations for the 2002 survey were 200 metres upstream and downstream of the gates).
- 2.5.5.3.2 They were also dissatisfied by the consultant’s opinion that the difference in fish numbers upstream and downstream of the weir was due to habitat differences, because the physical conditions of the sampling areas appeared to be very similar (other than perhaps salinity). Section 2.1 of the 2001 fish survey report is clear that those areas were selected for that reason, as the two areas provided “an excellent side-by-side comparison between upstream and downstream communities”.

⁹ The fish survey was required under the conditions of the previous resource consent, AUT-204122, which expired in 2020. The condition required comparison of fish communities in communities in comparable sites upstream and downstream of the structure, an assessment of the flow profile immediately downstream of the tidegate structure to determine whether water velocities exceed the swimming speeds of native fish species, and a salinity survey of the Titiroa River to determine the upstream extent of the saltwater wedge, and whether the tidegates affect spawning of inanga.



Image from Section 3.6 of the Mitigation Options report showing the 2021 fish sampling sites in green, and the 2022 sampling sites in yellow.

2.5.5.4 Section 3.6 of the Mitigation Options report discusses a statistical analysis of the mean numbers of inanga caught upstream (2.2) and downstream (24.4) of the tidegates and the P-value¹⁰ of 0.016 provided “strong evidence” that there was a

¹⁰ P-value is the probability value. A p-value less than 0.05 is typically considered to be statistically significant. A p-value of 0.001 means that if the null hypothesis (the claim that there is no effect) was true there would be one-in-1,000 chance of observing results at least as extreme. Therefore, either a highly rare data result has been observed or the null hypothesis is incorrect.

Source: <https://www.investopedia.com/terms/p/p-value.asp#:~:text=A%20p%20value%20less%20than,null%20hypothesis%20is%20not%20rejected.>

significant decrease in numbers upstream compared to downstream of the tidegates. However the report noted that without undertaking a before and after study, it wasn’t possible to determine if the differences in fish abundance were due to the tidegates or reflect differences in habitat (such as the more estuarine conditions downstream).

- 2.5.6 The 2021 fish survey also considered water velocities through the tidegates, as it is a critical factor for the movement of fish upstream of the gates. The report described the opening cycle and the changes in velocity that were observed on 11 and 12 January 2021.
- 2.5.6.1 During the site visit the gates were open for 380 minutes (51% of the 12.5-hour tidal cycle).
- 2.5.6.2 Velocities were measured at a point in the channel about 2 metres below the tidegates.
- 2.5.6.3 The maximum water velocity was 1.328 m/s. The report notes that this was the peak recorded, and was not consistent throughout the water column.
- 2.5.6.4 The average water velocity calculated from a series of transects was 0.3559 m/s.
- 2.5.6.5 The velocity measurements occurred at a time when flow in the Mokoreta River at the McKays monitoring site was at a flow that is exceeded about 77% of the time. Using the McKays site as an indicator of flow conditions for the Titiroa Stream, it indicates that the Titiroa Stream was probably at or about similar flow conditions (i.e., about halfway between median flow and Q_{95}). So not a very low flow but still well below median flow.
- 2.5.6.6 Section 4.0 of the report stated that water velocity through the gates “*should not present too great a barrier to most migrating fish*”. The report noted that flow through the gates was essentially just normal river flow for sustained periods and that there were periods on the rising tide when there was virtually no downstream flow. In addition, “*even during the period when water velocity is greatest native fish may well be able to migrate upstream by swimming near the bottom of the water column*”.
- 2.5.6.7 The Council’s Senior Scientist – Surface Water Quality has questioned the applicant’s conclusion about water velocity effects on fish passage and whether the fish swimming speeds in Appendix D of the NZ Fish Passage Guidelines have been considered. She also queried whether the different life stages of the migratory species present in the Titiroa Stream were considered when assessing the barrier presented by the velocities through the gates.

The smaller (closer to 0) the p-value, the stronger is the evidence against the null hypothesis.

Source: [https://www.geo.fu-berlin.de/en/v/soga-r/Basics-of-statistics/Hypothesis-Tests/Introduction-to-Hypothesis-Testing/Critical-Value-and-the-p-Value-Approach/index.html#:~:text=The%20smaller%20\(closer%20to%200,null%20hypothesis%20is%20not%20rejected.](https://www.geo.fu-berlin.de/en/v/soga-r/Basics-of-statistics/Hypothesis-Tests/Introduction-to-Hypothesis-Testing/Critical-Value-and-the-p-Value-Approach/index.html#:~:text=The%20smaller%20(closer%20to%200,null%20hypothesis%20is%20not%20rejected.)

- 2.5.6.8 In terms of the applicant’s statement about velocities and normal flows, it is not only the gates that have an effect. The side channel is noticeably narrower than the natural channel of the stream in this vicinity. Therefore, if the same flow is passing through a smaller area, the velocities in the channel are likely to be higher than would occur in the natural channel and that effect would persist for the 190-metre length of the side channel¹¹. The applicant may be able to provide further comment on whether distance is also a factor when considering velocity effects on fish passage.
- 2.5.7 A salinity survey during a spring tide is described in Section 3.1 of the Titiroa Tide Gate – Mitigation Options report by Pattle Delamore Partners Ltd (November 2022).
- 2.5.7.1 It isn’t clearly stated, but I assume that the tidegates were shut while the readings were taken. The readings were taken during an incoming tide, which would typically have caused closure of the gates.
- 2.5.7.2 The results show a marked drop in salinity (as indicated by electrical conductivity) at the base of the water column (the ‘bed’ readings) about 5-10 metres either side of the tidegates.
- 2.5.7.3 The water surface salinity is more variable either side of the tidegates and there isn’t a clear change in the surface salinity until the upstream end of the bypass channel (about 70 metres upstream of the tidegates).
- 2.5.7.4 Although the report indicated that the salt wedge extends about 158 metres upstream of the tidegates, if the gates were closed, the extent of the salt wedge may have been truncated. PDP Ltd may be able to clarify if that is the case.
- 2.5.8 The tidegates cause damming on the upstream side as well as the downstream (coastal) side. The water flowing downstream is blocked at the gates, so water levels rise on the upstream side of the channel. Section 3.2 of the PDP Ltd Mitigation Options report estimates that the damming due to the gates affects water levels up 2.5 km upstream. However the level and extent of the effect on upstream water levels would not be as great as would occur in the absence of the gates, as they are closed by the relatively higher level on the downstream (coastal) side during the high tide cycle.
- 2.5.9 The authors of the Mitigation Options report considered that the tidegates were likely to interfere with inanga spawning migration during high spring tides, and by confusing the salinity ‘cues’ that inanga use to co-ordinate spawning behaviour. The gates may also interfere with

¹¹ A simple calculation shows that, if 300 litres per second flows through a 20-metre-wide channel that is 0.5 metres deep, the average velocity will be 0.03 m/s. If that same flow passes through a 7-metre-wide channel of the same depth, the average velocity will be 0.085 m/s. The 7-metre-wide channel would need a depth of 1.43 metres to maintain the average velocity of the wider channel. But over a relatively short distance in an area with a flat gradient, over-deepening of the channel to create more cross-sectional area is unlikely to overcome the effect of narrowing the channel on average velocities.

hatching by limiting the subsequent spring tide so that the eggs dry out before the next period of inundation.¹²

- 2.5.10 The applicant has determined that the gates have adversely affected inanga spawning habitat along 1.95 km of the river upstream of the gates, amounting to an area of 1.38 hectares. The applicant is proposing to address this effect by enhancing inanga spawning habitat.
- 2.5.11 In addition to the effect on spawning, the submission by the Southland Whitebaiters’ Association referred to whitebait being trapped by the gates at times. That would make the whitebait more susceptible to predation. Previously whitebait trapped below the tidegates were also able to be taken by fishermen but changes to whitebait fishing requirements in the area now prevent fishing upstream of the bridge.
- 2.5.12 The tidegates are likely to have an adverse effect on cultural and spiritual values, arising from the location and adverse effects on the waterway and taonga species.
- 2.5.13 Only mana whenua can determine if there is an adverse cultural or spiritual effect, and a cultural impact assessment or statement has not been provided, so my summation of impacts on cultural and spiritual values is inferred from a number of factors:
- 2.5.13.1 As discussed above, the tidegates are within a statutory acknowledgement area¹³ under the Ngāi Tahu Claims Settlement Act and that Ngāi Tahu have an acknowledged cultural, spiritual, historic and customary association with the area.
 - 2.5.13.2 Te Rūnanga o Ngāi Tahu is also a customary marine title applicant on behalf of the Papatipu Rūnanga.
 - 2.5.13.3 The submission by Te Ao Marama Inc. makes the following points:
 - 2.5.13.3.1 The area is a significant cultural landscape to Ngāi Tahu because of historic and contemporary associations, including the formation of the landscape, wāhi ingoa (place names), mahinga kai, kaimoana, wāhi tapū, Māori land, Mātaitai and archaeological sites.
 - 2.5.13.3.2 The Titiroa Stream is an area known for mahinga kai, in conjunction with Toetoes Estuary and the neighbouring Matāura awa. Those water bodies have cultural, spiritual, historic and traditional associations that have been recognised by the Crown.
 - 2.5.13.3.3 Awarua Rūnanga, as kaitiaki, are responsible for protecting the mana and mauri of the environment of this area.

¹² From A851628: Titiroa Tide Gate Mitigation Options Report, (2022), G Scott, B Throssell & L Drummond, Pattel Delamore Partners Ltd

¹³ the Matāura River under Schedule 42 of the Ngāi Tahu Claims Settlement Act 1998

- 2.5.13.3.4 The submission states that the structures are detrimental to the mauri, the health and well-being of the Titiroa Stream and its freshwater ecosystem.
- 2.5.13.3.5 The submission also states that the structures adversely impact threatened indigenous species that are taonga.
- 2.5.13.4 Adverse effects on inanga have been identified by the applicant and Te Tangi a Tauria refers to inanga as an important resource in terms of customary food gathering, such as in the Toetoes estuary.
 - 2.5.13.4.1 Inanga are listed as a taonga species in Appendix M of the proposed Southland Water and Land Plan, and Policy 1 of Section 3.6.13 of Te Tangi a Tauria is:

“Avoid coastal activities that may disturb, and have a direct or indirect detrimental impact, on areas of significant vegetation and habitats. Direct impacts may be physical damage while indirect impacts may include effects arising from siltation, deposition or displacement over time.”
 - 2.5.13.4.2 Policy 7 of Section 3.5.17 (Ngā Pononga a Tāne a Tangaroa – Biodiversity) of Te Tangi a Tauria¹⁴ is:

“The cultural, spiritual, historic and traditional association of Ngāi Tahu ki Murihiku with taonga species must be recognised and provided for within all management and/ or recovery plans associated with those species. This includes taonga species as per the Ngāi Tahu Claims Settlement Act (Appendix 4), and all other species identified as taonga by Ngāi Tahu ki Murihiku.”
- 2.5.13.5 There are a number of other policies in Te Tangi a Tauria that are relevant to the application. Some can be considered supportive or neutral to the proposal. However, the application appears to be inconsistent with, or conflict with, the following provisions:
 - 2.5.13.5.1 Policy 6 of Section 3.5.20 (Freshwater Fisheries) of Te Tangi a Tauria is:

“Ensure that all native fish species have uninhibited passage from the river to the sea at all times, through ensuring continuity of flow ki uta ki tai.”
 - 2.5.13.3.4 Policy 15 of Section 3.6.2 (Coastal Land Use and Development) of Te Tangi a Tauria states:

¹⁴ Te Tangi a Tauria is the Ngāi Tahu ki Murihiku Natural Resource and Environmental Iwi Management Plan 2008.

“Avoid adverse effects on mahinga kai resources and places and other areas of high cultural significance as a result of coastal protection works.

2.5.13.3.5 Policy 2 of Section 3.6.13 (Coastal Ecosystems) of Te Tangi a Taurira is to:

“Advocate protection of species located in the coastal environments that are of cultural importance to ensure continued cultural well-being”.

- 2.5.14 With regard to effects on cultural and spiritual values, the application states that the applicant sought comment from Te Rūnanga o Ngāi Tahu and consulted with Te Ao Marama Inc. The applicant also advised that it had met with a representative from Te Ao Marama Inc in November 2021 and endeavoured to provide further information following field work. In August 2023 (over two years after the application was lodged) the applicant advised that it had been unable to get a response from the affected parties (including Te Ao Marama Inc.).
- 2.5.15 The application also listed a number of provisions from Te Tangi a Taurira, but concluded that the proposed activity was consistent with the relevant policies.
- 2.5.16 The submissions point out that the proposal does not consider effects on water quality and sedimentation within the river. In Mr Holms’ view the water has become partly stagnant and there was significant siltation in the river channel. As mentioned earlier, the gates may have a more specific effect on water quality if it truncated the saltwater wedge, which would affect the estuarine habitat conditions upstream of the tidegates.
- 2.5.17 The Titiroa River is navigable for small boats. Those boats cannot pass through the tidegates but could be carried around it. The gates themselves are sited in the channel to one-side of the former channel, so could not be approached at speed. The weir is a low-relief structure, so potentially someone in a small boat may upon it with little warning, but it is more evident from the downstream (coastal side). On the upstream side the stream largely passes through private land, so it is unlikely that a jet boat would be launched upstream of the gates without an awareness of the weir and tidegates. I also note that our harbourmaster had no concerns with the proposal. Therefore I consider that adverse effects on navigation are no more than minor.
- 2.5.18 The river is modified to provide for the tidegates. However the diversion channel and the gates themselves are only evident when within about 100 metres. The outlet of the diversion channel is visible from the Tokanui Gorge Road Highway bridge, but the gates are not. I also note that the area surrounding the tidegates includes developed pasture, roads and a bridge. As such, I consider that visual effects on natural character are no more than minor.
- 2.5.19 The beneficial effects of the tidegates are less clearly defined.
- 2.5.19.1 Section 4.8 of the application states that the tidegate system has positive social and economic effects through drainage and flood protection of low-lying farmland upstream of the gates.

- 2.5.19.2 Section 2.1 and Section 4.8 of the application state that the tidegates influence drainage on approximately 11,500 hectares of improved pasture. (However, a report for the 1986 water right application referred to an area of 1,150 hectares.)
- 2.5.19.3 The Titiroa Tide Gate – Mitigation Options report by PDP Ltd states that upstream water inundation would extend as far upstream as Fleming Road, a distance of approximately 6 km, if the tidegates were not present. Section 3.3 of the report indicates that maximum inundation could extend to Gray Road, which is about 7.7 km upstream of the tidegates.
- 2.5.19.4 The floodplain area that benefits from the drainage and inundation protection of the tidegates would be about 1 km wide, bounded to the west by the Matāura River, and by hillier terrain to the east.
- 2.5.19.5 The applicant’s s92(1) response states that the land above and below the tidegates is within the Lower Matāura Floodway. Most of the land in the floodway was purchased by the Southland Catchment Board between 1974 and 1988. Those properties are now owned by Environment Southland and leased out. However there are two major land blocks, and two smaller blocks, that remain under private ownership.
- 2.5.19.6 As noted in the submissions by L Frisby, L Golden and K P Morton, the tidegates protect agricultural use on private and leasehold land from flooding and allow for drainage.
- 2.5.19.7 The agricultural land use activities on Environment Southland’s leasehold land are facilitated by the drainage and flood protection afforded by the tidegates, which benefits the leasees in terms of income.
- 2.5.19.8 The lease revenue gathered by Environment Southland is utilised in accordance with its policy on Leasehold Land Management, which states that surpluses will largely be utilised to fund natural disaster damage repairs within the leasehold land assets, fund capital works and maintenance for leasehold land, and to fund associated activities in the leasehold land catchment. So the tidegates indirectly contribute to income for Environment Southland that is utilised to support the leaseholdings and the management of the wider floodway.
- 2.5.19.9 Although a key beneficial effect of the tidegates is economic, through the facilitation of agricultural land use and production, no information has been provided on that economic value. Nor has the scale of benefit that accrues to the applicant alone compared to private individuals (either leasees or private owners of land in the floodway above the gates) been provided.
- 2.5.19.10 For the leasees and owners, their families and staff, of the properties within the floodplain protected by the tidegates there will be associations with the river and agricultural activities on the land. This social effect comes through to a degree in some of the submissions, particularly those submitters with a long-term association with the properties.
- 2.5.19.11 No information is available on how drainage and inundation may be affected if the tidegates only functioned at higher tides.

3. Assessment of the Proposal

3.1 Statutory Considerations

3.1.1 Section 104 of the Act sets out the matters to be considered when assessing an application for a resource consent. Section 104(1) of the Resource Management Act, 1991, states:

- (1) *When considering an application for a resource consent and any submission received, the consent authority must, subject to Part 2 and Section 77M, have regard to:*
- (a) *any actual and potential effects on the environment of allowing the activity; and*
 - (ab) *any measure proposed or agreed to by the applicant for the purpose of ensuring positive effects on the environment to offset or compensate for any adverse effects on the environment that will or may result from allowing the activity; and*
 - (b) *any relevant provisions of:*
 - (i) *a national environmental standard:*
 - (ii) *other regulations:*
 - (iii) *a national policy statement:*
 - (iv) *a New Zealand coastal policy statement*
 - (v) *a regional or proposed regional policy statement:*
 - (vi) *a plan or proposed plan; and*
 - (c) *any other matter the consent authority considers relevant and reasonably necessary to determine the application.*

Comment

3.1.2 All considerations are subject to Part 2 of the RMA, which sets out the purpose and principles that guide this legislation.

3.1.3 In *R J Davidson Family Trust v Marlborough District Council* [2018] NZCA 316, the Court of Appeal clarified how the words “subject to Part 2” under section 104(1) should be approached. In short, the Court found that:

3.1.3.1 Decision makers must have regard to Part 2 of the RMA when making decisions on resource consent applications where it is appropriate to do so. The extent to which Part 2 should be referred to depends on the nature and content of the planning documents being considered.

3.1.3.2 Where relevant planning documents have been prepared having regard to Part 2 of the RMA, and with a coherent set of policies designed to achieve clear environmental outcomes, consideration of Part 2 is not ultimately required. In this situation, consideration of Part 2 would not add anything to the evaluative exercise as genuine consideration and application of relevant plan provisions may leave little room for Part 2 to influence the outcome. However, the consideration of Part 2 is not prevented, but Part 2 cannot be used to subvert a clearly relevant restriction or directive policy in a planning document.

3.2.3.3 Where it is unclear from the planning documents whether consent should be granted or refused, Part 2 should be considered. The Court commented that absent such assurance, of if in doubt, it will be appropriate and necessary to refer to Part 2.

3.1.4 I consider that the Regional Policy Statement and the regional plans have been developed in accordance with the purpose of the Resource Management Act.

3.2 Part 2 of the Resource Management Act 1991

3.2.1 All considerations under Section 104 are subject to Part 2 of the RMA, which sets out the purpose and principles that guide this legislation.

3.2.2 The purpose of the Resource Management Act, as specified in Section 5 of the Act, is to *promote the sustainable management of natural and physical resources*. It states that:

“In this Act, “sustainable management” means managing the use, development, and protection of natural and physical resources in a way, or at a rate, which enables people and communities to provide for their social, economic, and cultural well-being and for their health and safety while:

- (a) sustaining the potential of natural and physical resources (excluding minerals) to meet the reasonably foreseeable needs of future generations;*
- (b) safeguarding the life-supporting capacity of air, water, soil, and ecosystems; and*
- (c) avoiding, remedying, or mitigating any adverse effects of activities on the environment.”*

3.2.3 Section 6 of the Act specifies matters of national importance, which must be recognised and provided for by those exercising functions and powers under the Act, in achieving the purpose of the Act. The matters listed in Section 6 of the Act include the following:

- | | |
|--------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Section 6(a) | <i>The preservation of the natural character of the coastal environment, wetlands and lakes and rivers and their margins, and the protection of them from inappropriate subdivision, use and development.</i> |
| Section 6(b) | <i>The protection of outstanding natural features and landscapes from inappropriate subdivision, use and development.</i> |
| Section 6(c) | <i>The protection of areas of significant indigenous vegetation and significant habitats of indigenous fauna.</i> |
| Section 6(d) | <i>The maintenance and enhancement of public access to and along the coastal marine area, lakes and rivers.</i> |
| Section 6(e) | <i>The relationship of Maori and their culture and traditions with their ancestral lands, water, sites, waahi tapu, and other taonga.</i> |
| Section 6(f) | <i>The protection of historic heritage from inappropriate subdivision, use, and development.</i> |

- Section 6(g) *The protection of recognised customary activities.*
- Section 6(h) *The management of significant risks from natural hazards.*

3.2.4 Other matters that the hearing panel must have particular regard for in achieving the purpose of the Act are listed in Section 7, as follows:

- Section 7(a) *Kaitiakitanga,*
- Section 7(aa) *The ethic of stewardship.*
- Section 7(b) *The efficient use and development of natural and physical resources.*
- Section 7(ba) *The efficiency of the end use of energy*
- Section 7(c) *The maintenance and enhancement of amenity values.*
- Section 7(d) *Intrinsic values of ecosystems.*
- Section 7(e) *[Repealed]*
- Section 7(f) *The maintenance and enhancement of the quality of the environment.*
- Section 7(g) *Any finite characteristics of natural and physical resources.*
- Section 7(h) *The protection of the habitat of trout and salmon.*
- Section 7(i) *The effects of climate change*
- Section 7(j) *The benefits derived from the use and development of renewable energy.*

3.2.5 Section 8 of the Act states:

“In achieving the purpose of the Act, all persons exercising functions and power under it, in relation to managing the use, development and protection of natural and physical resources, shall take into account the principles of the Treaty of Waitangi.”

3.3 Actual and potential effects (Section 104(1)(a))

3.3.1 The actual and potential effects of the proposed activities were considered earlier of this report.

3.4 Relevant provisions of National Environmental Standards and other regulations (Section 104(1)(b)(i) and (ii))

3.4.1 There are no national environmental standards or other regulations that apply to the determination of the proposed activities.

- 3.4.2 Under Regulation 60 of the Resource Management (National Environmental Standards for Freshwater) Regulations 2020 the provisions related to weirs and passive flap gates do not apply to structures that were in the river or connected area (defined as any part of the coastal marine area that is upstream from the mouth of a river, which in this case includes the area occupied by the tidegates and weir) on 2 September 2020. The previous consent for the tidegates and weir expired on 29 October 2020. Therefore they were existing structures on 2 September 2020 and the regulations 61-74 of the NES-Freshwater do not apply to them.
- 3.4.3 There are no registered human drinking water sites in the vicinity that could be adversely affected by the tidegates and weir.

3.5 Relevant provisions of national policy statements (Section 104(1)(b)(iii))

National Policy Statement for Freshwater Management 2020

- 3.5.1 The relevant national policy statement is the National Policy Statement for Freshwater Management 2020 (NPSFM).
- 3.5.2 The NPSFM applies to all freshwater (including groundwater) and, to the extent they are affected by freshwater, to receiving environments (which may include estuaries and the wider coastal marine area). The weir and the tidegates are within the coastal marine area, but the diversion of water and the upstream damming of water are in the freshwater environment and are therefore subject to the NPSFM.
- 3.5.3 The following provisions are of relevance to the application:

Te Mana o te Wai: (1) *Te Mana o te Wai is a concept that 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. Te Mana o te Wai is about restoring and preserving the balance between the water, the wider environment, and the community.*

(2) *Te Mana o te Wai is relevant to all freshwater management and not just to the specific aspects of freshwater management referred to in this National Policy Statement.*

Te Mana o te Wai encompasses the following six principles:

- (a) *Mana whakahaere: the power, authority, and obligations of tangata whenua to make decisions that maintain, protect, and sustain the health and well-being of, and their relationship with, freshwater*
- (b) *Kaitiakitanga: the obligation of tangata whenua to preserve, restore, enhance, and sustainably use freshwater for the benefit of present and future generations*
- (c) *Manaakitanga: the process by which tangata whenua show respect, generosity, and care for freshwater and for others*
- (d) *Governance: the responsibility of those with authority for making decisions about freshwater to do so in a way that*

prioritises the health and well-being of freshwater now and into the future

- (e) Stewardship: the obligation of all New Zealanders to manage freshwater in a way that ensures it sustains present and future generations*
- (f) Care and respect: the responsibility of all New Zealanders to care for freshwater in providing for the health of the nation.*

There is a hierarchy of obligations in Te Mana o te Wai that prioritises:

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

Objective	<i>The objective of this National Policy Statement is to ensure that natural and physical resources are managed in a way that prioritises:</i> <ul style="list-style-type: none"> <i>(a) first, the health and well-being of water bodies and freshwater ecosystems</i> <i>(b) second, the health needs of people (such as drinking water)</i> <i>(c) third, the ability of people and communities to provide for their social, economic, and cultural well-being, now and in the future.</i>
Policy 1	<i>Freshwater is managed in a way that gives effect to Te Mana o te Wai.</i>
Policy 2	<i>Tangata whenua are actively involved in freshwater management (including decision-making processes), and Māori freshwater values are identified and provided for.</i>
Policy 3	<i>Freshwater is managed in an integrated way that considers the effects of the use and development of land on a whole-of-catchment basis, including the effects on receiving environments.</i>
Policy 5	<i>Freshwater is managed (including through a National Objectives Framework) to ensure that the health and well-being of degraded water bodies and freshwater ecosystems is improved, and the health and well-being of all other water bodies and freshwater ecosystems is maintained and (if communities choose) improved.</i>
Policy 7	<i>The loss of river extent and values is avoided to the extent practicable.</i>
Policy 8	<i>The significant values of outstanding water bodies are protected.</i>
Policy 9	<i>The habitats of indigenous freshwater species are protected.</i>
Policy 10	<i>The habitat of trout and salmon is protected, insofar as this is consistent with Policy 9.</i>
Policy 13	<i>The condition of water bodies and freshwater ecosystems is systematically monitored over time, and action is taken where freshwater is degraded, and to reverse deteriorating trends.</i>

Policy 15 *Communities are enabled to provide for their social, economic, and cultural well-being in a way that is consistent with this National Policy Statement.*

Section 3.24 of the NPSFM 2020 inserts the following policy¹⁵ into the regional plans:

The loss of river extent and values is avoided, unless the council is satisfied:

- (a) That there is a functional need for the activity in that location; and*
- (b) The effects of the activity are managed by applying the effects management hierarchy.*

Where an activity falls within the exception described in the policy above, and would result in the loss of extent or values of a river, the NPSFM 2020 requires that any such application not be granted unless:

- (a) the council is satisfied that:*
 - (i) the applicant has demonstrated how each step in the effects management hierarchy will be applied to any loss of extent or values of the river (including cumulative effects and loss of potential value), particularly (without limitation) in relation to the values of: ecosystem health, indigenous biodiversity, hydrological functioning, Māori freshwater values, and amenity; and*
 - (ii) if aquatic offsetting or aquatic compensation is applied, the applicant has complied with principles 1 to 6 in Appendix 6 and 7, and has had regard to the remaining principles in Appendix 6 and 7, as appropriate; and*
 - (iii) there are methods or measures that will ensure that the offsetting or compensation will be maintained and managed over time to achieve the conservation outcomes; and*
- (b) any consent granted is subject to conditions that apply the effects management hierarchy.*

aquatic compensation means a conservation outcome resulting from actions that are intended to compensate for any more than minor residual adverse effects on a wetland or river after all appropriate avoidance, minimisation, remediation, and aquatic offset measures have been sequentially applied

aquatic offset means a measurable conservation outcome resulting from actions that are intended to:

- (a) redress any more than minor residual adverse effects on a wetland or river after all appropriate avoidance, minimisation, and remediation, measures have been sequentially applied; and
- (b) achieve no net loss, and preferably a net gain, in the extent and values of the wetland or river, where:
 - (i) no net loss means that the measurable positive effects of actions match any loss of extent or values over space and time, taking into account the type and location of the wetland or river; and
 - (ii) net gain means that the measurable positive effects of actions exceed the point of no net loss.

¹⁵ Now Policy 28A of the proposed Southland Water & Land Plan

Functional need means that the need for a proposal or activity to traverse, locate or operate in a particular environment because the activity can only occur in that environment.

Loss of value in relation to a natural inland wetland or river, means the wetland or river is less able to provide for the following existing or potential values:

- (a) or
- (b) any of the following, whether or not they are identified under the NOF process:
 - (i) ecosystem health
 - (ii) indigenous biodiversity
 - (iii) hydrological functioning
 - (iv) Māori freshwater values
 - (v) amenity values

The **effects management hierarchy** requires that:

- (a) adverse effects are avoided where practicable; and
- (b) where adverse effects cannot be avoided, they are minimised where practicable; and
- (c) where adverse effects cannot be minimised, they are remedied where practicable; and
- (d) where more than minor residual adverse effects cannot be avoided, minimised, or remedied, aquatic offsetting is provided where possible; and
- (e) if aquatic offsetting of more than minor residual adverse effects is not possible, aquatic compensation is provided; and
- (f) if aquatic compensation is not appropriate, the activity itself is avoided

Outstanding water body means a water body, or part of a water body, identified in a regional policy statement, a regional plan, or a water conservation order as having one or more outstanding values.

Comment

- 3.5.4 With some exceptions, the provisions of the NPSFM are high level and are, in general, not readily directly applied to individual activities. Rather they are expected to be given effect through regional plans.
- 3.5.5 The hierarchy described in the objective and, through Policy 1, Te Mana o Te Wai, prioritises the health and wellbeing of the river and ecosystem above the economic and social benefits that arise from the activity. For the purposes of this application that is likely to mean prioritising the avoidance and mitigation of adverse effects more than beneficial economic and social effects.
- 3.5.6 Regarding Policy 2, tangata whenua, as represented by Te Ao Marama Inc., have been involved in the development of the regional plans. The provisions of Te Tangi a Tauira are helpful in identifying Māori freshwater values.
- 3.5.7 Policy 3 refers to the effects of land use on freshwater. Given the level of the NPSFM, this policy is more appropriate to consideration of general land use on water quality within a plan or policy framework, rather than individual land uses. In the context of this application, the beneficial effects of the proposal are mainly on facilitation of land use through providing for drainage and protection from inundation. Viewed through the lens of Te Mana o te Wai, the policy provides for a holistic view of the activity, which allows for consideration of all the

effects on the environment above and below the tidegates and at the same time assigns a lesser value to beneficial effects associated with economic activity.

- 3.5.8 Policy 5 requires that the health and well-being of degraded water bodies and freshwater ecosystems be improved. Other water bodies and ecosystems, such as estuarine ecosystems, are to be maintained. In the context of this application, the tidegates appear to be having adverse effects, particularly in inanga spawning habitat and fish passage. The applicant is seeking to reduce the adverse effects through enhancement of inanga spawning habitat in the vicinity.
- 3.5.9 With regard to Policy 7, the activity impacts on, at least, ecosystem health and hydrological functioning, and it appears that it impacts on indigenous biodiversity and Maori freshwater values, so the proposal does result in the loss of river values.
- 3.5.10 Where there is a loss of river values, section 3.24 of the NPSFM imposes a number of requirements and considerations.
- 3.5.10.1 s3.24(3) of the NPSFM requires that the regional plan be changed to include specific restrictions on consent applications that involve loss of river values. That has not yet occurred¹⁶ so it is somewhat unclear how the requirements of s3.24(3) are to be applied in the meantime.
- 3.5.10.2 s3.24(2) states that the provisions of s3.24(3) apply to an application for a consent for an activity that results in the loss of river extent and values. That provision would not be required once s3.24(3) was incorporated into a plan. Therefore, even though s3.24(3) has yet to be inserted into the regional plan, my interpretation is that it should be given regard in the consent process directly from the NPSFM.
- 3.5.11 Under s3.24 of the NPSFM, the loss of values must be avoided unless the commissioner is satisfied that there is a functional need for the activity in this location and the effects are managed by applying the effects management hierarchy.
- 3.5.11.1 To the extent that the damming of tidal waters is desirable in the Titiroa Stream, there appears to be a functional need for the activity in this location.
- 3.5.11.2 Regarding the effects management hierarchy, the applicant has, in the mitigation options report, identified the need for enhancement of whitebait spawning habitat, which is a form of aquatic offsetting.
- 3.5.11.3 Principles 1-6 of Appendix 6 of the NPSFM must be complied with. Briefly, the principles are:
- I. An aquatic offset should be contemplated only after steps to avoid, minimise, and remedy adverse effects are demonstrated to have been sequentially exhausted.

¹⁶ The policy listed in s3.24(1) has been inserted in the proposed Water & Land Plan, but not the linked requirements under s3.24(3).

- II. Aquatic offsets are not appropriate in situations where the extent or values cannot be offset to achieve no net loss, and preferably a net gain, in the extent and values.
 - III. No net loss and preferably a net gain.
 - IV. An aquatic offset achieves gains in extent or values above and beyond gains that would have occurred in the absence of the offset.
 - V. Aquatic offset design and implementation avoids displacing harm to other locations.
 - VI. An aquatic offset is managed to secure outcomes of the activity that last at least as long as the impacts, and preferably in perpetuity.
- 3.5.11.4 The offsetting needs to be supported by methods or measures that it will be maintained and managed over time to achieve the conservation outcomes. This may take the form of a management plan for the enhanced spawning areas, for example.
- 3.5.11.5 With regard to effects on other river values, particularly hydrological functioning, ecosystem health, indigenous biodiversity and Māori cultural values, the applicant needs to demonstrate how these are addressed through the effects management hierarchy.
- 3.5.11.5.1 If the adverse effects cannot be sufficiently minimised, and aquatic offsetting is insufficient, the effects management hierarchy states that the activity itself must be avoided.
- 3.5.12 Policy 8 does not apply because the Titiroa Stream is not recognised in the regional plans, regional policy statement or a water conservation order as having one or more outstanding values.
- 3.5.13 Policies 9 and 10 are to protect the habitats of indigenous freshwater species and the habitat of trout and salmon. The fish survey and the mitigations report indicate that the proposal is not inconsistent with these provisions, subject to the enhancement of inanga spawning habitat. However, the submitters are unconvinced by the fish survey, and point to the lower numbers of fish upstream of the tidegates. The mitigations options report noted the statistical significance of the difference but could not be certain if it was due to the tidegates or if there were other factors at play.
- 3.5.14 Policy 13 supports monitoring, and also to reversing deteriorating trends. Therefore, if the application is approved, the policy provides for monitoring of effects. The policy also requires action to be taken if there is deterioration, rather than accepting continuance of activities that cause deterioration.
- 3.5.15 Policy 15 provides for communities to provide for their cultural, social and economic well-being, but in a way that is consistent with the NPSFM. As mentioned, the existing cultural, social and economic well-being of the lease-holders and landowners upstream of the tidegates is maintained by the effect of the gates on inundation and opportunity for land drainage. However, the NPSFM, through Te Mana o te Wai and the Objective, make this well-being a lesser priority.

3.6 New Zealand Coastal Policy Statement (Section 104(1)(b)(iv))

3.6.1 As the structures are sited within the boundaries of the coastal marine are the New Zealand Coastal Policy Statement 2010 is clearly applicable. The following provisions are relevant to the consideration of the application:

Objective 1 To safeguard the integrity, form, functioning and resilience of the coastal environment and sustain its ecosystems, including marine and intertidal areas, estuaries, dunes and land, by:

- maintaining or enhancing natural biological and physical processes in the coastal environment and recognising their dynamic, complex and interdependent nature;
- protecting representative or significant natural ecosystems and sites of biological importance and maintaining the diversity of New Zealand’s indigenous coastal flora and fauna; and
- maintaining coastal water quality and enhancing it where it has deteriorated from what would otherwise be its natural condition, with significant adverse effects on ecology and habitat, because of discharges associated with human activity.

Objective 2 To preserve the natural character of the coastal environment and protect natural features and landscape values through:

- recognising the characteristics and qualities that contribute to natural character, natural features and landscape values and their location and distribution;
- identifying those areas where various forms of subdivision, use, and development would be inappropriate and protecting them from such activities; and
- encouraging restoration of the coastal environment.

Objective 3 To take account of the principles of the Treaty of Waitangi, recognise the role of tangata whenua as kaitiaki and provide for tangata whenua involvement in management of the coastal environment by:

- recognising the ongoing and enduring relationship of tangata whenua over their lands, rohe and resources;
- promoting meaningful relationships and interactions between tangata whenua and persons exercising functions and powers under the Act;
- incorporating mātauranga Māori into sustainable management practices; and
- recognising and protecting characteristics of the coastal environment that are of special value to tangata whenua.

Objective 5 To ensure that coastal hazard risks taking account of climate change, are managed by:

- locating new development away from areas prone to such risks;
- considering responses, including managed retreat, for existing development in this situation; and
- protecting or restoring natural defences to coastal hazards.

Objective 6 To enable people and communities to provide for their social, economic, and cultural wellbeing and their health and safety, through subdivision, use, and development, recognising that:

- the protection of the values of the coastal environment does not preclude use and development in appropriate places and forms, and within appropriate limits;
- some uses and developments which depend upon the use of natural and physical resources in the coastal environment are important to the social, economic and cultural wellbeing of people and communities;
- functionally some uses and developments can only be located on the coast or in the coastal marine area;
- the coastal environment contains renewable energy resources of significant value;
- the protection of habitats of living marine resources contributes to the social, economic and cultural wellbeing of people and communities;
- the potential to protect, use, and develop natural and physical resources in the coastal marine area should not be compromised by activities on land;
- the proportion of the coastal marine area under any formal protection is small and therefore management under the Act is an important means by which the natural resources of the coastal marine area can be protected; and
- historic heritage in the coastal environment is extensive but not fully known, and vulnerable to loss or damage from inappropriate subdivision, use, and development.

Policy 2 In taking account of the principles of the Treaty of Waitangi (Te Tiriti o Waitangi), and kaitiakitanga, in relation to the coastal environment:

- (a) recognise that tangata whenua have traditional and continuing cultural relationships with areas of the coastal environment, including places where they have lived and fished for generations;
- (b) involve iwi authorities or hapū on behalf of tangata whenua in the preparation of regional policy statements, and plans, by undertaking effective consultation with tangata whenua; with such consultation to be early, meaningful, and as far as practicable in accordance with tikanga Māori;
- (c) with the consent of tangata whenua and as far as practicable in accordance with tikanga Māori, incorporate mātauranga Māori in regional policy statements, in plans, and in the consideration of applications for resource consents, notices of requirement for designation and private plan changes;
- (d) provide opportunities in appropriate circumstances for Māori involvement in decision making, for example when a consent application or notice of requirement is dealing with cultural localities or issues of cultural significance, and Māori experts, including pūkenga, may have knowledge not otherwise available;
- (e) take into account any relevant iwi resource management plan and any other relevant planning document recognised by the appropriate iwi authority or hapū and lodged with the council, to the extent that its content has a bearing on resource management issues in the region or district; and

- (i) where appropriate incorporate references to, or material from, iwi resource management plans in regional policy statements and in plans; and
 - (ii) consider providing practical assistance to iwi or hapū who have indicated a wish to develop iwi resource management plans;
- (f) provide for opportunities for tangata whenua to exercise kaitiakitanga over waters, forests, lands, and fisheries in the coastal environment through such measures as:
- (i) bringing cultural understanding to monitoring of natural resources;
 - (ii) providing appropriate methods for the management, maintenance and protection of the taonga of tangata whenua;
 - (iii) having regard to regulations, rules or bylaws relating to ensuring sustainability of fisheries resources such as taiāpure, mahinga mātaimai or other non-commercial Māori customary fishing; and
- (g) in consultation and collaboration with tangata whenua, working as far as practicable in accordance with tikanga Māori, and recognising that tangata whenua have the right to choose not to identify places or values of historic, cultural or spiritual significance or special value:
- (i) recognise the importance of Māori cultural and heritage values through such methods as historic heritage, landscape and cultural impact assessments; and
 - (ii) provide for the identification, assessment, protection and management of areas or sites of significance or special value to Māori, including by historic analysis and archaeological survey and the development of methods such as alert layers and predictive methodologies for identifying areas of high potential for undiscovered Māori heritage, for example coastal pā or fishing villages.
- Policy 3
- (1) Adopt a precautionary approach towards proposed activities whose effects on the coastal environment are uncertain, unknown, or little understood, but potentially significantly adverse.
 - (2) In particular, adopt a precautionary approach to use and management of coastal resources potentially vulnerable to effects from climate change, so that:
 - (a) avoidable social and economic loss and harm to communities does not occur;
 - (b) natural adjustments for coastal processes, natural defences, ecosystems, habitat and species are allowed to occur; and
 - (c) the natural character, public access, amenity and other values of the coastal environment meet the needs of future generations
- Policy 4
- Provide for the integrated management of natural and physical resources in the coastal environment, and activities that affect the coastal environment. This requires:
- (a) co-ordinated management or control of activities within the coastal environment, and which could cross administrative boundaries, particularly:

- (i) the local authority boundary between the coastal marine area and land;
 - (ii) local authority boundaries within the coastal environment, both within the coastal marine area and on land; and
 - (iii) where hapū or iwi boundaries or rohe cross local authority boundaries;
- (b) working collaboratively with other bodies and agencies with responsibilities and functions relevant to resource management, such as where land or waters are held or managed for conservation purposes; and
- (c) particular consideration of situations where:
- (i) subdivision, use, or development and its effects above or below the line of mean high-water springs will require, or is likely to result in, associated use or development that crosses the line of mean high-water springs; or
 - (ii) public use and enjoyment of public space in the coastal environment is affected, or is likely to be affected; or
 - (iii) development or land management practices may be affected by physical changes to the coastal environment or potential inundation from coastal hazards, including as a result of climate change; or
 - (iv) land use activities affect, or are likely to affect, water quality in the coastal environment and marine ecosystems through increasing sedimentation; or
 - (v) significant adverse cumulative effects are occurring or can be anticipated.

Policy 6 (1) In relation to the coastal environment:

- (a) recognise that the provision of infrastructure, the supply and transport of energy including the generation and transmission of electricity, and the extraction of minerals are activities important to the social, economic and cultural well-being of people and communities;
- (b) consider the rate at which built development and the associated public infrastructure should be enabled to provide for the reasonably foreseeable needs of population growth without compromising the other values of the coastal environment;
- (c) encourage the consolidation of existing coastal settlements and urban areas where this will contribute to the avoidance or mitigation of sprawling or sporadic patterns of settlement and urban growth;
- (d) recognise tangata whenua needs for papakāinga, marae and associated developments and make appropriate provision for them;
- (e) consider where and how built development on land should be controlled so that it does not compromise activities of national or regional importance that have a functional need to locate and operate in the coastal marine area;

- (f) consider where development that maintains the character of the existing built environment should be encouraged, and where development resulting in a change in character would be acceptable;
 - (g) take into account the potential of renewable resources in the coastal environment, such as energy from wind, waves, currents and tides, to meet the reasonably foreseeable needs of future generations;
 - (h) consider how adverse visual impacts of development can be avoided in areas sensitive to such effects, such as headlands and prominent ridgelines, and as far as practicable and reasonable apply controls or conditions to avoid those effects;
 - (i) set back development from the coastal marine area and other water bodies, where practicable and reasonable, to protect the natural character, open space, public access and amenity values of the coastal environment; and
 - (j) where appropriate, buffer areas and sites of significant indigenous biological diversity, or historic heritage value.
- (2) Additionally, in relation to the coastal marine area:
- (a) recognise potential contributions to the social, economic and cultural wellbeing of people and communities from use and development of the coastal marine area, including the potential for renewable marine energy to contribute to meeting the energy needs of future generations:
 - (b) recognise the need to maintain and enhance the public open space and recreation qualities and values of the coastal marine area;
 - (c) recognise that there are activities that have a functional need to be located in the coastal marine area, and provide for those activities in appropriate places;
 - (d) recognise that activities that do not have a functional need for location in the coastal marine area generally should not be located there; and
 - (e) promote the efficient use of occupied space, including by:
 - (i) requiring that structures be made available for public or multiple use wherever reasonable and practicable;
 - (ii) requiring the removal of any abandoned or redundant structure that has no heritage, amenity or reuse value; and
 - (iii) considering whether consent conditions should be applied to ensure that space occupied for an activity is used for that purpose effectively and without unreasonable delay

Policy 11 To protect indigenous biological diversity in the coastal environment:

- (a) avoid adverse effects of activities on:

- (i) indigenous taxa that are listed as threatened or at risk in the New Zealand Threat Classification System lists;
 - (ii) taxa that are listed by the International Union for Conservation of Nature and Natural Resources as threatened;
 - (iii) indigenous ecosystems and vegetation types that are threatened in the coastal environment, or are naturally rare;
 - (iv) habitats of indigenous species where the species are at the limit of their natural range, or are naturally rare;
 - (v) areas containing nationally significant examples of indigenous community types; and
 - (vi) areas set aside for full or partial protection of indigenous biological diversity under other legislation; and
- (b) avoid significant adverse effects and avoid, remedy or mitigate other adverse effects of activities on:
- (i) areas of predominantly indigenous vegetation in the coastal environment;
 - (ii) habitats in the coastal environment that are important during the vulnerable life stages of indigenous species;
 - (iii) indigenous ecosystems and habitats that are only found in the coastal environment and are particularly vulnerable to modification, including estuaries, lagoons, coastal wetlands, dunelands, intertidal zones, rocky reef systems, eelgrass and saltmarsh;
 - (iv) habitats of indigenous species in the coastal environment that are important for recreational, commercial, traditional or cultural purposes;
 - (v) habitats, including areas and routes, important to migratory species; and
 - (vi) ecological corridors, and areas important for linking or maintaining biological values identified under this policy.

Policy 14 Promote restoration or rehabilitation of the natural character of the coastal environment, including by:

- (a) identifying areas and opportunities for restoration or rehabilitation;
- (b) providing policies, rules and other methods directed at restoration or rehabilitation in regional policy statements, and plans;
- (c) where practicable, imposing or reviewing restoration or rehabilitation conditions on resource consents and designations, including for the continuation of activities; and recognising that where degraded areas of the coastal environment require restoration or rehabilitation, possible approaches include:
 - (i) restoring indigenous habitats and ecosystems, using local genetic stock where practicable; or
 - (ii) encouraging natural regeneration of indigenous species, recognising the need for effective weed and animal pest management; or
 - (iii) creating or enhancing habitat for indigenous species; or

- (iv) rehabilitating dunes and other natural coastal features or processes, including saline wetlands and intertidal saltmarsh; or
- (v) restoring and protecting riparian and intertidal margins; or
- (vi) reducing or eliminating discharges of contaminants; or
- (vii) removing redundant structures and materials that have been assessed to have minimal heritage or amenity values and when the removal is authorised by required permits, including an archaeological authority under the Historic Places Act 1993; or
- (viii) restoring cultural landscape features; or
- (ix) redesign of structures that interfere with ecosystem processes; or
- (x) decommissioning or restoring historic landfill and other contaminated sites which are, or have the potential to, leach material into the coastal marine area.

Policy 25 In areas potentially affected by coastal hazards over at least the next 100 years:

- (a) avoid increasing the risk of social, environmental and economic harm from coastal hazards;
- (b) avoid redevelopment, or change in land use, which would increase the risk of adverse effects from coastal hazards;
- (c) encourage redevelopment, or change in land use, where that would reduce the risk of adverse effects from coastal hazards, including managed retreat by relocation or removal of existing structures or their abandonment in extreme circumstances, and designing for relocatability or recoverability from hazard events;
- (d) encourage the location of infrastructure away from areas of hazard risk where practicable;
- (e) discourage hard protection structures and promote the use of alternatives to them, including natural defences; and
- (f) consider the potential effects of tsunami and how to avoid or mitigate them.

Comment

3.6.2 Similar to the NPSFM, the New Zealand Coastal Policy Statement (NZCPS) is a high-level document and, in general, its provisions are not readily directly applied to individual activities. Rather they are expected to be given effect through regional plans. However, with some exceptions (which do not apply to the activities in this resource consent application), the provisions of the Regional Coastal Plan were developed and became operative before the NZCPS came into effect. Therefore, consideration should be had to the provisions of the NZCPS.

3.6.3 Objective 6 is to enable people and communities to provide for their social, economic and cultural well-being, while recognising that protecting the values of the coastal environment does not preclude activities in appropriate places and forms. The objective also recognises that the potential to protect and to use natural resources in the coastal environment should not be compromised by activities on land. The objective can be viewed as supportive of the proposal,

but also recognises that activities associated with the land should be in appropriate places and provides for some integrated management of the land and coastal environments.

- 3.6.4 Policy 2 recognises that tangata whenua have traditional and continuing cultural relationships with areas of the coastal environment, supports consideration of the provisions of Te Tangi a Tauria, and seeks to provide opportunities for tangata whenua to exercise kaitiakitanga over waters and fisheries. Clause (f) of the policy refers to inclusion of cultural understanding in monitoring of natural resources and to appropriate management to protect taonga.
- 3.6.5 Policy 4 recognises the connection between the coastal environment and activities that affect it and requires integrated management of natural and physical resources. Of relevance to this application, the policy requires that particular consideration be had to situations where land may be affected by coastal inundation or where land use affects the coastal environment.
- 3.6.6 Policy 6(1)(a) recognises that provision of infrastructure is an activity that is important to the social, economic and cultural well-being of people and communities. This provision is supportive of the tidegates in that they contribute to the social and economic well-being of leaseholders and landowners upstream of the tidegates by providing for drainage and protect against tidal inundation, which makes the land suitable for agricultural activities.
- 3.6.7 Policy 7 is to protect indigenous biodiversity in the coastal environment by avoiding adverse effects on threatened indigenous species, and by avoiding significant adverse effects on habitats that are important during the vulnerable life stages of indigenous species and habitats of indigenous species that are important for recreational, traditional or cultural purposes. The policy also refers to avoiding significant adverse effects on habitats important to migratory species. There are threatened species present in the stream, such as inanga (*galaxia maculatus*), tuna (longfin eel) and Gollum galaxias. In addition, based on reduced fish numbers upstream, the tidegates appear to be affecting the spawning and migration of some species. The applicant’s assessment indicates that effects on inanga spawning habitat is the most significant effect and is intending to provide enhancements to offset that effect.
- 3.6.8 Policy 14 promotes restoration of the natural character of the coastal environment. In terms of visual effects on natural character, I think that the structures have only minor adverse effect.
- 3.6.9 Policy 25 refers to potential coastal hazards over the next 100 years. Clause (a) of the policy seeks to avoid increasing the risk of social, environmental and economic harm from coastal hazards and could be interpreted as supporting continued use of the tidegates. However, Clause (c) of the policy encourages changes in land use to reduce such risk. When considered together with Objective 5, my view is that Policy 25 is about the risks of coastal hazards associated with rising sea levels over the next 100 years. At this point I am unclear whether the existing structure is sufficient for projected increases in sea level. The applicant is seeking a 15-year term, and sea level rise is likely to be about 20 cm, within a projected range of 8-32 cm, over that period at Fortrose¹⁷.

¹⁷ Source: NZ SeaRise, <https://searise.takiwa.co/map/6233f47872b8190018373db9/embed>

3.7 Southland Regional Policy Statement 2017 (Section 104(1)(b)(v))

- 3.7.1 The Regional Policy Statement 2017 (SRPS) became operative on 9 October 2017.
- 3.7.2 The SRPS operates at a mid-level, providing a link between national direction and regional planning provisions. Therefore the objectives and policies of the SRPS will tend to be more broad than the corresponding plan provisions. However, the Regional Coastal Plan predates the SRPS, so reference to the SRPS is relevant to ensure consistency with higher level direction.
- 3.7.3 The following objective and policies in the **Regional Policy Statement** are of relevance to the consideration of this application:

Objective TW.3 Mauri and wairua are sustained or improved where degraded, and mahinga kai and customary resources are healthy, abundant and accessible to tangata whenua.

Objective TW.4 Wāhi tapu, wāhi taonga and sites of significance are appropriately managed and protected.

Policy TW.3 Take iwi management plans into account within local authority resource management decision making processes.

Policy TW.4 When making resource management decisions, ensure that local authority functions and powers are exercised in a manner that:

- (a) recognises and provides for:
- (i) traditional Māori uses and practices relating to natural resources (e.g., mātaimai, kaitiakitanga, manaakitanga, matauranga, rāhui, wāhi tapu, taonga raranga);
 - (ii) the ahi kā (manawhenua) relationship of tangata whenua with and their role as kaitiaki of natural resources;
 - (iii) mahinga kai and access to areas of natural resources used for customary purposes;
 - (iv) mauri and wairua of natural resources;
 - (v) places, sites and areas with significant spiritual or cultural historic heritage value to tangata whenua;
 - (vi) Māori environmental health and cultural wellbeing.
- (b) recognises that only tangata whenua can identify their relationship and that of their culture and traditions with their ancestral lands, water, sites, wāhi tapu and other taonga.

Policy WQUAN.1 Maintain instream values of surface water that derive from flows and levels of water, while recognising the special circumstances of the Waiau catchment.

Policy WQUAN.7 Recognise the social, economic and cultural benefits that may be derived from the use, development or protection of water resources.

Policy WQUAN.8 Integrate the management of land use, water quality, water quantity and use and development of resources wherever possible.

Objective BRL.1	All significant values of lakes and rivers are maintained and enhanced.
Policy BRL.2	Lawfully established structures and activities in the beds of lakes and rivers will be recognised, including the need for maintenance, enhancement and upgrading, while avoiding wherever practicable, mitigating or remedying, any adverse effects. Where the use, maintenance, enhancement and upgrading of such structures will have no more than minor adverse effects on the environment, these activities will be specifically provided for.
Policy RURAL.1	Recognise that use and development of Southland’s rural land resource enables people and communities to provide for their social, economic and cultural wellbeing.
Policy RURAL.5	The effects of rural land development shall be sustainably managed and land management practices encouraged so that: (a) soil properties are safeguarded; (b) soil erosion is minimised; (c) soil compaction and nutrient and sediment loss is minimised; (d) soil disturbance is reduced; (e) water quality is maintained or enhanced; (f) indigenous biodiversity is maintained or enhanced; (g) the mauri of water and soils is safeguarded.
Objective BIO.2	Maintain indigenous biodiversity in Southland and protect areas of significant indigenous vegetation and significant habitats of indigenous fauna for present and future generations.
Objective BIO.3	Enhance the range, extent and condition of indigenous biodiversity in Southland, with a particular emphasis on those areas most at risk to further loss or degradation.
Policy BIO.3	Protect indigenous biodiversity from adverse effects in the coastal environment as set out in Policy 11 of the New Zealand Coastal Policy Statement 2010.
Policy BIO.4	Manage a full range of indigenous habitats and ecosystems to achieve a healthy functioning state, and to ensure viable and diverse populations of native species are maintained, while making appropriate provisions for lawful maintenance and operation of existing activities. In giving effect to this policy, regard will be had to the following potential adverse effects: (i) fragmentation of, or reduction in the extent of, indigenous vegetation or habitats of indigenous fauna; (ii) fragmentation or disruption of connections and linkages between ecosystems or habitats of indigenous fauna; (iii) loss of, or damage to, buffering of ecosystems or habitats of indigenous fauna; (iv) loss or reduction of rare or threatened indigenous species’ populations or habitats.

Policy BIO.5	Encourage, promote and support biodiversity initiatives to retain, maintain and restore or enhance: <ul style="list-style-type: none"> (a) coastal ecosystems and habitats; (b) aquatic ecosystems and habitats; and (c) terrestrial ecosystems and habitats.
Policy BIO.8	Recognise the role of tangata whenua as kaitiaki, by providing for: <ul style="list-style-type: none"> (a) tangata whenua values and interests to be incorporated into the management of indigenous biodiversity; (b) consultation with tangata whenua regarding the means of maintaining and restoring or enhancing habitats identified in accordance with Policy BIO.1 that have particular significance to tangata whenua; (c) active involvement of tangata whenua in the protection of cultural values associated with indigenous biodiversity; (d) customary use of indigenous biodiversity according to tikanga.
Policy BIO.9	In addressing significant residual adverse effects (i.e., those effects left after all the appropriate avoidance, remediation, or mitigation actions have been taken), local authorities will consider the use of any biodiversity offset and/or environmental compensation measures offered by an applicant.
Objective COAST.2	Infrastructure, ports, energy projects, aquaculture, mineral extraction activities, subdivision, use and development in the coastal environment are provided for and able to expand, where appropriate, while managing the adverse effects of those activities.
Objective COAST.3	Coastal water quality and ecosystems are maintained or enhanced.
Objective COAST.4	The natural character of the coastal environment is restored, rehabilitated or preserved.
Policy COAST.2	Ensure adequate measures or methods are utilised within the coastal environment when making provision for subdivision, use and development to: <ul style="list-style-type: none"> (a) protect indigenous biodiversity, historic heritage, natural character, and natural features and landscape values; (b) maintain or enhance amenity, social, intrinsic, ecological and cultural values, landscapes of cultural significance to tangata whenua and coastal dune systems; (c) maintain or enhance public access; and (d) avoid or mitigate the impacts of natural hazards, including predicted sea level rise and climate change.
Policy COAST.3	Ensure that subdivision, use and development activities:

- (a) avoid adverse effects on areas of outstanding natural features and landscapes, and/or outstanding natural character;
- (b) avoid significant adverse effects, and avoid, remedy or mitigate other adverse effects on other natural features and landscapes and/or natural character in the coastal environment;
- (c) protect and provide for nationally significant, regionally significant, and critical infrastructure, including ports and energy projects for the region, including by:
 - (i) recognising that new development of the National Grid should seek to avoid adverse effects on the values of outstanding natural features and landscapes, and/or areas of outstanding or high natural character located within rural coastal environments. In the coastal environment, in some circumstances, adverse effects on those areas must be avoided.

Policy COAST.4	Recognise and make provision for nationally significant, regionally significant or critical infrastructure that has a functional, operational or technical need to be located within the coastal environment, and appropriate port, aquaculture, mineral extraction activities and energy projects that must be located within the coastal environment.
Policy COAST.5	Avoid, remedy or mitigate adverse effects of land-based and marine activities on coastal water quality and its ecosystems.
Objective NH.1	The risks to people, communities, their businesses, property and infrastructure from the effects of natural hazards are understood and avoided, remedied or mitigated, resulting in communities becoming more resilient.
Policy NH.4	In managing natural hazards, the following implementation priorities are to be adopted: <ol style="list-style-type: none"> 1. avoid exposure to areas at significant risk from natural hazards where practicable by adopting a precautionary approach; 2. mitigate the effects of natural hazards by managing land use in areas known to be susceptible to the effects of natural hazards; 3. undertake physical works needed to reduce the potential for the natural hazard to affect people and infrastructure.
Objective INF.1	Southland’s regionally significant, nationally significant and critical infrastructure is secure, operates efficiently, and is appropriately integrated with land use activities and the environment.
Policy INF.1	Recognise the benefits to be derived from, and make provision for, the development, maintenance, upgrade and ongoing operation of regionally significant, nationally significant and critical infrastructure and associated activities.

- Policy INF.2 Where practicable, avoid, remedy or mitigate the adverse effects of infrastructure on the environment. In determining the practicability of avoiding, remediating, or mitigating adverse effects on the environment, the following matters should be taken into account:
- (a) any functional, operational or technical constraints that require the physical infrastructure of regional or national significance to be located or designed in the manner proposed;
 - (b) whether there are any reasonably practical alternative designs or locations;
 - (c) whether good practice approaches in design and construction are being adopted;
 - (d) where appropriate, and such measures are volunteered by a resource user, whether any significant residual adverse effects can be offset or compensated for; and
 - (e) the need to give effect to the NPSET (2008) including that planning and development of the transmission system should seek to avoid adverse effects on outstanding natural landscapes, areas of high natural character and areas of high recreation value and amenity and existing sensitive activities.
- Policy INF.3 Protect regionally significant, nationally significant and critical infrastructure, particularly from new incompatible land uses and activities under, over or adjacent to the infrastructure.

Definitions

Critical infrastructure:

Infrastructure that provides services which, if interrupted, would have a significant effect on the wellbeing and health and safety of people and communities and would require reinstatement, and includes all strategic facilities.

Regionally significant infrastructure:

Infrastructure in the region which contributes to the wellbeing and health and safety of the people and communities of the region and includes all critical infrastructure.

Strategic facilities:

Includes:

- (a) critical infrastructure;*
- (b) nationally significant infrastructure;*
- (c) regionally significant infrastructure;*
- (d) gas and petroleum storage facilities;*
- (e) public healthcare facilities and medical centres;*
- (f) fire stations, police stations, ambulance stations, emergency coordination facilities;*
- (g) defence facilities;*

- (h) Invercargill, Gore, Manapōuri and Milford Sound/Piopiotaahi Airports, and Stewart Island/Rakiura Airstrip (Ryans Creek);*
- (i) Southland Public Hospital (Kew);*
- (j) lifeline utilities as defined in the Civil Defence Emergency Management Act 2002;*
- (k) flood and drainage infrastructure managed by the Southland Regional Council.*

Comment

- 3.7.4 Objective TW.3 and Policy TW.4 require that mahinga kai and customary resources are provided for and improved where degraded. I note that the submission by Te Ao Marama Inc refers to the impact on the mauri of the river, and the value of the area for mahinga kai. The applicant is proposing to address adverse effects by enhancing inanga spawning habitat, but it is unclear whether that is sufficient to give full effect to this policy and objective.
- 3.7.5 The provisions of Te Tangi a Taura are considered below in accordance with Policy TW.3.
- 3.7.6 Policy BIO.8 recognises the role of tangata whenua as kaitiaki by providing for protection of cultural values associated with indigenous biodiversity.
- 3.7.7 Policy WQUAN.1 requires that the instream values of surface water that derive from flows and levels be maintained. As the tidegates interfere with flows and appear to have adverse effects on such instream values, and because the gates are not currently authorised, the proposal will be inconsistent with this policy unless the commissioner is satisfied that the proposed mitigations are sufficient.
- 3.7.8 Policy WQUAN.7 is to recognise the social, economic and cultural benefits of the use of water, in this case associated with damming and diversion. Therefore, the policy is supportive of the proposal.
- 3.7.9 I have listed Policy RURAL.5 above but it is unlikely have been intended for these circumstances. The application is not for rural land use activities, but the beneficial effects of the tidegates are largely in terms of such land use. While the policy supports the tidegate operation at one level, at a broader level it brings into question the land use in the area protected by the tidegates, particularly if read in conjunction with Policy WQUAN.8, or with Policy 4 of the NZCPS, and recognising that the tidegates are currently unauthorised.
- 3.7.10 Policy BIO.4 seeks to both provide for existing facilities and to manage indigenous habitats and ecosystems to achieve a healthy functioning state. The wording of the policy appears to somewhat insulate existing activities from the intended improvement to indigenous habitats and ecosystems. The policy places more emphasis on the protection to existing indigenous species and habitats from new activities.
- 3.7.11 Policy BIO.9 recognises the use of offsets for adverse effects on biodiversity, such as the proposed enhancement of inanga spawning habitat.
- 3.7.12 Policy BRL.2 is to recognise lawfully established structures and activities in the beds of river, while avoiding, remedying or mitigating adverse effects on the environment. The tidegates were legally established, although they are currently unauthorised. The policy appears to be

relevant but provides little actual direction with regard to the determination of this application.

- 3.7.13 Section 3.2 of the application refers to the tidegates as a strategic facility and as regionally significant infrastructure under the Southland Regional Policy Statement (SRPS). The tidegates are not individually identified as such under the SRPS, but ‘flood and drainage infrastructure managed by the Southland Regional Council’ is a category of strategic facility, which is a subset of critical infrastructure under the SRPS. That, in turn, makes it regionally significant infrastructure.
- 3.7.14 Objective COAST.2 is to provide for infrastructure, while managing the adverse effects.
- 3.7.14.1 The explanation to the objective states that *“Making provision for development is important, while managing adverse effects (including temporary effects) and any conflicts of interest among different users of the coastal environment. Aspects that need to be balanced include the maintenance and enhancement of appropriate public access to and along the coastal environment and preserving the natural character of the area affected by the use and development, and protecting significant indigenous biodiversity and maintaining indigenous biodiversity, while taking into account any existing lawfully established developments.”*
- 3.7.15 Policy COAST.4 is to recognise and make provision for regionally significant or critical infrastructure that has a functional need to be located within the coastal environment.
- 3.7.15.1 The explanation to the policy states that *“Constraints to manage the effects on the environment from these activities are appropriate, and could include conditions relating to structures, occupation of the area, discharges to water, discharges to air and noise. However, in accordance with Policies 6(1)(a), 6(2)(a) and 8 of the NZCPS these types of activities need to be given recognition for the activities they facilitate, to enable appropriate development and diversification to occur to meet the changing needs of the region..... While recognising and making provision for these activities, tangata whenua interests need to be taken into account in accordance with sections 6(e), 7(a) and 8 of the Act, and Policy 2 of the NZCPS. “*
- 3.7.15.2 Therefore, while the policy appears to provide direct, and unqualified support for the activity, the explanation recognises that it is appropriate to manage the adverse effects on the environment of infrastructure.
- 3.7.16 Policy COAST.2 seeks to protect or maintain a variety of values, including indigenous biodiversity, amenity values, social values, ecological values, landscapes of cultural significance, public access, and avoiding or mitigating natural hazards, when providing for use and development. In this case the tidegates impact on a number of the listed values, while mitigating natural hazard effects on land use.
- 3.7.17 Objective INF.1 and Policy INF.1 are supportive of the continued operation of the tidegates.
- 3.7.17.1 The explanation to Objective INF.1 states that *“the term ‘appropriately’ is used in this objective to recognise that the extent to which adverse effects may be avoided, remedied, mitigated, or where appropriate, and such measures are volunteered by the resource user, offset or compensated for, may vary depending on the particular circumstances of each particular case.”*

3.7.17.2 Therefore, while not stated in the policy itself, the explanation shows that there was a recognition that the integration of infrastructure with the environment requires adverse effects to be avoided, remedied or mitigated, and in some cases, offset.

3.7.18 Policy INF.2 seeks to avoid, remedy or mitigate adverse effects from existing infrastructure, where practicable. The policy requires consideration of that practicability, including consideration of practical alternative designs. The mitigation options report does discuss the use of fish-friendly tidegates but considers that they would be ineffective at providing for inanga spawning.

3.8 Relevant provisions of the relevant regional plan objectives, policies and rules (Section 104(1)(b)(vi))

Regional Coastal Plan for Southland

3.8.1 The following provisions of the Regional Coastal Plan for Southland (RCP) have been operative since 2006, although the full plan was not operative until 2013.

3.8.2 I consider that the following provisions of the RCP are of relevance to the determination of this application:

Policy 4.2.1 Require that proposals for uses and developments in the coastal marine area justify the functional necessity for that location or demonstrate that there is no practicable alternative location outside the coastal marine area.

Policy 4.2.2 Where the adverse effects of use or development are more than minor, require alternative sites and methods be considered to determine the option that best avoids, remedies or mitigates the adverse effects of the use and development of the coastal marine area.

Policy 4.3.2 Manage the frequency, duration and regularity of activities where this avoids, remedies or mitigates the adverse effects of those activities on the coastal environment.

Objective 5.4.1.2 To protect the intrinsic values of ecosystems in the coastal marine area.

Policy 5.4.1.2 Protect the habitats of species in the coastal marine area which are important for commercial, recreational, traditional or cultural purposes.

Objective 5.6.1 To recognise and provide for cultural, spiritual and traditional values and uses of Ngai Tahu in the coastal marine area.

Policy 5.6.1 Have particular regard to the concept of kaitiakitaka in relation to managing the use, development and protection of natural and physical resources in the coastal marine area.

Policy 5.6.3 The tangata whenua shall be meaningfully consulted by the Council and/or applicants for resource consents when:

- a an activity could physically disturb a site identified in this Plan as being of significance to tangata whenua;
 - b an activity could have adverse effects on values of tangata whenua.

- Policy 5.6.4 Identify and protect the characteristics of the coastal marine area of special value to tangata whenua.

- Policy 5.6.5 It is a national priority to protect:
 - a characteristics of traditional spiritual, historical or cultural significance to Māori identified in accordance with tikaka Māori; and
 - b significant places or areas of historic or cultural significance, which in themselves or in combination, are essential or important elements of the natural character of the coastal marine area.

- Policy 5.10.1 Recognise the importance of the coastal marine area for social, cultural and economic activities.

- Objective 7.4.1.1 To reduce the adverse effects of taking, using, damming or diversion of water within the coastal marine area.

- Objective 7.4.3.1 To maintain the ability of fish species to be able to freely move up and down permanent waterbodies within the coastal marine area.

- Policy 7.4.3.1 Provide for effective fish passage through or around structures built within permanent waterbodies in the coastal marine area.

- Objective 9.1.2 To ensure that any exclusive or preferential occupation of the coastal marine area is justified.

- Policy 9.1.9 Apply a coastal occupation charging regime to persons who occupy Crown land, to the full or partial exclusion of others, in the coastal marine area of Southland.

- Objective 11.2.2 To recognise the social, economic, cultural and safety benefits of structures in the coastal marine area.

- Policy 11.2.3 In considering the use and development of the coastal marine area, preference will be given to structures that provide public benefit.

- Policy 11.2.4 Where use and development of the coastal marine area is appropriate, and public benefit arises, financial contributions for the use and occupation of the coastal marine area can be reduced or waived.

- Policy 11.2.5 Structures that could cause an impediment to safe navigation and are not readily visible shall be marked and/or lit in a manner that indicates the extent of the structure.

Policy 11.2.16	Avoid, remedy or mitigate the adverse effects of structures on the natural character, amenity, landscape, seascape and open space values of the coastal marine area.
Policy 11.4.4	Provide for the continuance, and enhancement of existing facilities and infrastructure in the coastal marine area that: <ul style="list-style-type: none"> a enables the public use and enjoyment of the coastal environment; b facilitates or contributes to the social and economic values of the region; c facilitates or contributes to safe use of the coastal area while avoiding wherever practicable, remedying or mitigating any adverse effects on the environment.
Objective 12.1.2	To avoid, remedy or mitigate the interference of coastal processes by coastal use and development where such interference could cause adverse effects.
Policy 12.1.1	The design of structures and reclamations is to take into account the effects of a possible sea level rise of 35 centimetres prior to 2050 AD, until such time as there is evidence that the rate of this is higher or lower.
Policy 12.1.3	Use and development of the coastal marine area should be located, designed and undertaken, so that the need for coastal protection works is avoided.
Policy 12.1.5	Take into account the effects of structures and activities on coastal processes and vice versa.
Policy 12.2.1	Undertake coastal protection works or maintenance of coastal protection works only where they are the best practicable option for future protection, after having had regard to the effects of these works and the options of abandonment or relocation.
Policy 12.2.8	Where protection works have not achieved the objective they were constructed for, they should be removed.
Objective 20.1.1	To facilitate integrated management of the land, coastal marine area and the economic exclusive zone.

Comment

- 3.8.3 Policy 5.4.1.2 is to protect the habitats of species that are important for recreational, traditional or cultural purposes, such as inanga.
- 3.8.4 Policy 5.6.3 requires meaningful consultation with tangata whenua. In this case the application states that the applicant was attempting to consult with Te Ao Marama Inc. The applicant also met with representatives of Te Ao Marama Inc, Fish & Game and DOC in November 2021 to discuss the application. Periodically thereafter until August 2023 the applicant indicated that

it was seeking to discuss and resolve issues with the affected parties. The protracted time period is largely due to when further information and the mitigation options report were available.

- 3.8.5 Policies 5.6.1 and 5.6.4 provide for cultural, spiritual and traditional values of Ngāi Tahu and seek to protect the characteristics of the coastal marine area of special value to tangata whenua. Given the reasons listed in Te Ao Marama Inc’s submission, the proposal conflicts with these policies.
- 3.8.6 The first part of Policy 5.6.5 is a strong policy that seeks to protect traditional, spiritual, historical and cultural characteristics of the coastal environment that are significant to Māori and, based on information in the submission of Te Ao Marama Inc., and from the statutory acknowledgement, the Titiroa Stream has those attributes. The policy refers to the protection of these characteristics being a national priority.
- 3.8.7 The second part of Policy 5.6.5 is to protect places of cultural significance that are essential or important elements of the natural character of the coastal marine area. I am unclear if that codifier applies in this location.
- 3.8.8 Policies 5.10.1, 11.2.2 and 11.4.4 are supportive of the application, in that they either provide for existing facilities and infrastructure or recognise social and economic values.
- 3.8.9 From the information to hand, the proposal appears to conflict with Policy 7.4.3.1. The fish survey shows a difference in fish numbers upstream and downstream of the weir. The Mitigation Options report shows that this is a statistically significant difference, but suggests that other factors may cause the difference, such as habitat preferences, even though the sampling sites were selected because they were essentially side-by-side across the weir. If the difference is explainable by more estuarine conditions on one side, that also seems to be an effect of the tidegates and weir on the extent of the tidal salt wedge. I expect that the applicant’s consultants will provide further information to clarify this matter at the hearing.
- 3.8.10 Policy 12.1.5 requires consideration of the effects on structures on coastal processes. In this case the tidegates and weir are designed to interfere with those processes. The policy is relatively neutral, in that the effects of the structures must be considered through the application process in any case. However Objective 12.1.2 is to avoid, remedy or mitigate interference with coastal processes where that interference causes adverse effects on the environment.
- 3.8.11 With regard to Policy 12.1.1, I am unclear if the tidegates will continue to be effective as sea level rises. The applicant may be able to provide more information about the design levels of the tidegates relative to projected increases in sea level.

Proposed Southland Water and Land Plan

- 3.8.12 The Proposed Southland Water and Land Plan (pSWLP) is operative, apart from provisions related to groundwater takes, weed and sediment removal for drainage maintenance, and incidental contaminant discharges arising from agricultural land use. None of the matters that are still under appeal relate to the activities proposed in this application, so the provisions discussed below are operative.

3.8.13 The proposed Southland Water and Land Plan contains the following provisions of relevance to the application. In some cases, I have abbreviated the policies, but where I have omitted a section, I have stated the topic of the section in a footnote.

Interpretation Statement:

All persons exercising functions and powers under this Plan and all persons who use, develop or protect resources to which this Plan applies shall recognise that:

- (i) Objectives 1 and 2 are fundamental to this plan, providing an overarching statement on the management of water and land, and all objectives are to be read together and considered in that context; and*
- (ii) the plan embodies ki uta ki tai and upholds Te Mana o Te Wai and they are at the forefront of all discussions and decisions about water and land.*

Objective 1	Land and water and associated ecosystems are sustainably managed as integrated natural resources, recognising the connectivity between surface water and groundwater, and between freshwater, land and the coast.
Objective 2	The mauri of water provides for te hauora o te taiao (health and mauri of the environment), te hauora o te wai (health and mauri of the waterbody) and te hauora o te tangata (health and mauri of the people).
Objective 3	Water and land are recognised as enablers of the economic, social and cultural wellbeing of the region.
Objective 4	Tangata whenua values and interests are identified and reflected in the management of freshwater and associated ecosystems.
Objective 5	Ngāi Tahu have access to and sustainable customary use of, both commercial and non-commercial, mahinga kai resources, nohoanga, mātaítai and taiāpure.
Objective 9B	The importance of Southland’s regionally and nationally significant infrastructure is recognised and its sustainable and effective development, operation, maintenance and upgrading enabled.
Objective 13	<p>Provided that:</p> <ul style="list-style-type: none"> (a) the quantity, quality and structure of soil resources are not irreversibly degraded through land use activities or discharges to land; and (b) the health of people and communities is safeguarded from the adverse effects of discharges of contaminants to land and water; and (c) ecosystems (including indigenous biological diversity and integrity of habitats), are safeguarded, <p>then land and soils may be used and developed to enable the economic, social and cultural wellbeing of the region.</p>

Objective 14	The range and diversity of indigenous ecosystems and habitats within rivers, estuaries, wetlands and lakes, including their margins, and their life-supporting capacity are maintained or enhanced.
Objective 15	Taonga species, as set out in Appendix M, and related habitats, are recognised and provided for.
Objective 17	Preserve the natural character values of wetlands, rivers and lakes and their margins, including channel and bed form, rapids, seasonably variable flows and natural habitats, and protect them from inappropriate use and development.
Objective 19	The passage of fish is maintained, or is improved, by instream structures, except where it is desirable to prevent the passage of some fish species in order to protect desired fish species, their life stages, or their habitats.
Policy 1	<p>Enable papatipu rūnanga to effectively undertake their kaitiaki (guardian/steward) responsibilities in freshwater and land management through the Southland Regional Council:</p> <ol style="list-style-type: none"> 1. providing copies of all applications that may affect a Statutory Acknowledgement area, tōpuni (landscape features of special importance or value), nohoanga, mātaimai or taiāpure to Te Rūnanga o Ngāi Tahu and the relevant papatipu rūnanga; 2. identifying Ngāi Tahu interests in freshwater and associated ecosystems in Murihiku (includes the Southland Region); and 3. reflecting Ngāi Tahu values and interests in the management of and decision-making on freshwater and freshwater ecosystems in Murihiku (includes the Southland Region), consistent with the Charter of Understanding.
Policy 2	<p>Any assessment of an activity covered by this Plan must:</p> <ol style="list-style-type: none"> 1. take into account any relevant iwi management plan; and 2. assess water quality and quantity, taking into account Ngāi Tahu indicators of health.
Policy 3	To manage activities that adversely affect taonga species, identified in Appendix M, and their related habitats.
Policy 20	<p>Manage the taking, abstraction, use, damming or diversion of surface water and groundwater so as to:</p> <ol style="list-style-type: none"> 1A. recognise that the use and development (such as primary production) of Southland’s land and water resources can have positive effects including enabling people and communities to provide for their social, economic and cultural wellbeing;

1. avoid where reasonably practicable, or otherwise remedy or mitigate, adverse effects from the use and development of surface water resources on:
 - (a) the quality and quantity of aquatic habitat, including the life supporting capacity and ecosystem health and processes of water bodies;
 - (b) natural character values, natural features, and amenity, aesthetic and landscape values;
 - (c) areas of significant indigenous vegetation and significant habitats of indigenous fauna;
 - (d) recreational values;
 - (e) the spiritual and cultural values and beliefs of tangata whenua;
 - (f) water quality, including temperature and oxygen content;
 - (g) the reliability of supply for lawful existing surface water users, including those with existing, but not yet implemented, resource consents;
 - (h) groundwater quality and quantity;
 - (i) mātaihai, taiāpure and nohoanga; and
 - (j) historic heritage values.

2. avoid, where reasonably practicable, or otherwise remedy or mitigate, adverse effects from the use and development of groundwater resources on¹⁸

3. ensure water is used efficiently and reasonably by requiring that the rate and volume of abstraction¹⁹

Policy 26A Recognise and provide for the effective development, operation, maintenance and upgrading of regionally significant, nationally significant and critical infrastructure in a way that avoids where practicable, or otherwise remedies or mitigates, adverse effects on the environment.

Policy 28A (1) The loss of river extent and values is avoided, unless the council is satisfied that:

- (a) there is a functional need for the activity in that location; and
- (b) the effects of the activity are managed by applying the effects management hierarchy.

¹⁸ Abbreviated as provision is only relevant to groundwater abstractions.

¹⁹ Abbreviated as provision applies to the efficiency of water takes/abstractions.

- Policy 32 Protect significant indigenous vegetation and significant habitats of indigenous fauna and maintain indigenous biodiversity associated with natural wetlands, lakes and rivers and their margins.
- Policy 37 Avoid or mitigate increased risks on the environment arising from climate change, taking into account the potential effects of rising sea levels and the potential for more variable and extreme weather patterns in coming decades.
- Policy 38 Reduce the susceptibility of the Southland community and environment to natural hazards by improving planning, responsibility and community awareness for the avoidance and mitigation of natural hazards.
- Policy 39A When considering the cumulative effects of land use and discharge activities within whole catchments, consider:
1. how to improve the integrated management of freshwater and the use and development of land including the interactions between freshwater, land and associated ecosystems (including estuaries and the wider coastal area); and
 2. through the Freshwater Management Unit process, facilitating the collective management of nutrient losses, including through initiatives such as nutrient user groups and catchment management groups.
- Policy 40 When determining the term of a resource consent consideration will be given, but not limited, to:
1. granting a shorter duration than that sought by the applicant when there is uncertainty regarding the nature, scale, duration and frequency of adverse effects from the activity or the capacity of the resource;
 2. relevant tangata whenua values and Ngāi Tahu indicators of health;
 3. the duration sought by the applicant and reasons for the duration sought;
 4. the permanence and economic life of any capital investment;
 5. the desirability of applying a common expiry date for water permits that allocate water from the same resource or land use and discharges that may affect the quality of the same resource;
 6. the applicant’s compliance with the conditions of any previous resource consent, and the applicant’s adoption, particularly voluntarily, of good management practices; and
 7. the timing of development of FMU sections of this Plan, and whether granting a shorter or longer duration will better enable implementation of the revised frameworks established in those sections.
- Policy 41 Consider the risk of adverse environmental effects occurring and their likely magnitude when determining requirements for auditing and supply of monitoring information on resource consents.

Definitions

Critical infrastructure:

Means infrastructure that provides services which, if interrupted, would have a significant effect on the wellbeing and health and safety of people and communities and would require reinstatement, and includes all strategic facilities.

Ngāi Tahu indicators of health:

A tool for Papatipu Rūnanga to facilitate monitoring and provide long term data that can be used to assess land, water and taonga species health over time.

Regionally significant infrastructure:

Means infrastructure in the region which contributes to the wellbeing and health and safety of the people and communities of the region and includes all critical infrastructure.

Comment

- 3.8.14 Policy 1 is to enable paptipu rūnanga to effectively undertake their kaitiakitanga responsibilities, including by reflecting Ngāi Tahu values and interests in the management of freshwater and freshwater ecosystems. While the tidegates are sited in the coastal environment, the effects extend into the freshwater environment, including an apparent effect on fish abundance upstream of the gates. Therefore it is appropriate to consider Ngāi Tahu values and interests in the determination of the application.
- 3.8.15 The provisions of Te Tangi a Tauria are considered later in this report in accordance with Policy 2(1).
- 3.8.16 The indicators of health referred to in Policy 2(2) are listed in the section on Te Tangi a Tauria. The indicators include, amongst other values, the flow characteristics, the abundance and diversity of species and uses of the river. The tidegates alter the flow characteristics of the river, the value of the area for mahinga kai is recognised in the statutory acknowledgement, and the applicant is proposing to enhance spawning habitat to offset the effects of the tidegates on the abundance of inanga.
- 3.8.17 Objective 5 is for Ngāi Tahu to have sustainable customary use of mahinga kai resources. Therefore effects on mahinga kai would be inconsistent with this objective.
- 3.8.18 With regard to Policy 3, the applicant has identified that the tidegates impact on inanga, a taonga species, and proposes enhancement of spawning habitat to offset that effect.
- 3.8.19 Objective 9B is to recognise and enable, and Policy 26A is to provide for, regionally and nationally significant infrastructure. The definition of regionally significant infrastructure includes all critical infrastructure. The definition of that, in turn, refers to strategic facilities. However strategic facilities are not defined in the plan. The SRPS lists flood and drainage infrastructure as strategic facilities, which would include the tidegates. Therefore Objective 9B and Policy 26A apply to the tidegates. The policy is to provide for regionally significant infrastructure in a way that avoids, remedies or mitigates adverse effects on the environment.

- 3.8.20 Objective 19 is to maintain or improve fish passage.
- 3.8.21 Policy 20 is to manage damming and diversion to avoid, where reasonably practicable, of otherwise mitigate adverse effects on aquatic habitat, including ecosystem health and processes of waterbodies, and the spiritual and cultural values of tangata whenua. The policy also recognises that damming and diversion of water can have positive effects by enabling people to provide for their economic well-being.
- 3.8.22 Policy 28A has been inserted by the NPSFM. The associated provisions under s3.24 of the NPSFM, such as the effects management hierarchy, have not, as yet, been included, but were discussed in 3.5.10 and 3.5.11 earlier in this report.
- 3.8.23 Policy 39A refers to the effects of land use activities and integrated management, including with ecosystems, estuaries and the coastal area. That allows for consideration of the beneficial effects of the tidegate operation on land use.
- 3.8.24 Policy 40 outlines factors that should be considered when setting consent durations. In this case the applicant is seeking a 15-year consent period. Factors supporting that term would be the permanence of the structure, based on the period that it has already been in place (38 years). Maintenance is likely to have extended the economic life of the structure, but the applicant may be able to provide comment on depreciation of the asset. Factors that would warrant a shorter term include past compliance (the fish survey required by the previous consent was provided almost four years late and after the expiry of the consent, and the tidegates have been operating without authorisation since 2020), relevant tangata whenua values, and certainty regarding the adverse effects of the activity. I note that the previous consent was issued for five years due to the lack of certainty about the effects on fish passage.

3.9 Any other matters considered relevant and reasonably necessary to determine the application (Section 104(1)(c))

Te Tangi a Tauria

- 3.9.1 I consider that Te Tangi a Tauria, the Ngai Tahu ki Murihiku Natural Resource and Environmental Iwi Management Plan 2008, is a matter that is relevant and reasonably necessary to the determination of the application, particularly in light of Policy TW.3 of the Regional Policy Statement for Southland.
- 3.9.2 Section 4.6 of Te Tangi a Tauria states that the Rūnanga Papatipu o Murihiku expect that local authorities will use the plan when assessing consent applications and making decisions under s104 of the RMA.
- 3.9.3 The following policies of Te Tangi a Tauria are of relevance to the consideration of the application:
- | | |
|------------------|------------------------------------------------------------------------------------------------------------------------------------|
| Policy 3.5.10(1) | The role of Ngāi Tahu ki Murihiku as kaitiaki of freshwater must be given effect to in freshwater policy, planning and management. |
| Policy 3.5.10(3) | Protect and enhance the mauri, or life supporting capacity, of freshwater resources throughout Murihiku. |

- Policy 3.5.10(4) Manage our freshwater resources wisely, mō tātou, ā, mō ngā uri ā muri ake nei, for all of us and the generations that follow.
- Policy 3.5.10(5) Promote the management of freshwater according to the principle of ki uta ki tai, and thus the flow of water from source to sea.
- Policy 3.5.10(8) Protect and enhance the customary relationship of Ngāi Tahu ki Murihiku with freshwater resources.
- Policy 3.5.11(2) Promote river management that adopts the priorities established in the Te Rūnanga o Ngāi Tahu Freshwater Policy 1997. The priorities are:
- Priority 1 Sustain the mauri of the waterbodies within the catchment.
 - Priority 2 Meet the basic health and safety needs of humans (drinking water).
 - Priority 3 Protect cultural values and uses.
 - Priority 4 Protect other instream values (indigenous flora and fauna).
 - Priority 5 Meet the health and safety needs of humans (sanitation).
 - Priority 6 Provide water for stock.
 - Priority 7 Provide for economic activities including abstractive uses.
 - Priority 8 Provide for other uses.
- Policy 3.5.11(3) Management of our rivers must take into account that each waterway has its own mauri, guarded by separate spiritual guardians, its own mana, and its own set of associated values and uses.
- Policy 3.5.11(7) The cultural importance of particular rivers (e.g., Statutory Acknowledgements, rivers associated with whakapapa and identity) must be reflected in the weighting of Ngāi Tahu responses and submissions on consents associated with these rivers.
- Policy 3.5.11(10) Ensure that all native fish species have uninhibited passage from the river to the sea at all times, through ensuring continuity of flow ki uta ki tai.
- Policy 3.5.11(16) Prioritise the restoration of those waterbodies of high cultural value, both in terms of ecological restoration and in terms of restoring cultural landscapes.
- Policy 3.5.16(2) Work towards the restoration of key mahinga kai areas and species, and the tikanga associated with managing those places and species.
- Policy 3.5.16(4) Consider the actual and potential effects of proposed activities on mahinga kai places, species and activities when assessing applications for resource consent.

- Policy 3.5.16(5) Use the enhancement of mahinga kai places, species and activities to off set or mitigate the adverse effects of development and human activity on the land, water and biodiversity of Murihiku.
- Policy 3.5.17(1) Use planning, policy and resource consent processes to promote the protection and, where necessary, enhancement, of native biodiversity of Murihiku, specifically:
- a. enhancement and restoration of degraded areas;
 - b. planting of native species to off set or mitigate adverse effects associated with land use activities;
 - c. the incorporation of biodiversity objectives into development proposals;
 - d. prohibiting the use of pest plant species in landscaping
- Policy 3.5.17(3) For Ngāi Tahu ki Murihiku, all species are taonga, whether weta, snail or kiwi, and the effects of an activity on species must consider all species equally.
- Policy 3.5.17(9) Promote the management of whole ecosystems and landscapes, in addition to single species.
- Policy 3.5.17(7) The cultural, spiritual, historic and traditional association of Ngāi Tahu ki Murihiku with taonga species must be recognised and provided for within all management and/ or recovery plans associated with those species. This includes taonga species as per the Ngāi Tahu Claims Settlement Act, and all other species identified as taonga by Ngāi Tahu ki Murihiku.
- Policy 3.5.20(5) Avoid compromising freshwater fishery values as a result of diversion, extraction, or other competing use for water, or as a result of any activity in the bed or margin of a lake or river.
- Policy 3.5.20(6) Ensure that all native fish species have uninhibited passage from the river to the sea at all times, through ensuring continuity of flow ki uta ki tai.
- Policy 3.6.1(1) Ensure the land, water and biodiversity at the interface of Southland’s coastal environment are managed in an integrated way through careful planning and policy instruments which avoid compartmentalising the natural environment.
- Policy 3.6.1(2) Recognise that the degree of connection between the coastal and inland environments is inherent when developing robust systems to address areas of degradation and mitigate for future and potential environmental effects.
- Policy 3.6.1(6) Respect, protect and enhance coastal areas of importance where possible.
- Policy 3.6.1(7) Protect and enhance kaimoana and kaimataitai for future generations.

- Policy 3.6.3(1) Any activity within, adjacent to or that may potentially impact on Statutory Acknowledgment areas, including Te Mimi o Tū Te Rakiwhānoa (Fiordland Coastal Marine Area) and Rakiura/ Te Ara a Kiwa (Stewart Island/ Foveaux Strait Coastal Marine Area), will require consultation with both Te Rūnanga o Ngāi Tahu, Ngāi Tahu ki Murihiku and Tangata Tiaki gazetted under the South Island Customary Fishing Regulations.
- Policy 3.6.3(4) Avoid the placement of structures in the coastal marine environment that will have significant affects on the foreshore and seabed, coastal water quality, mahinga kai, kaimoana, and will not be compatible with the coastal environment of adjacent lands.
- Policy 3.6.3(14) Avoid development on known tauranga waka, cultural, archaeological and mahinga kai sites.
- Policy 3.6.13(1) Avoid coastal activities that may disturb, and have a direct or indirect detrimental impact, on areas of significant vegetation and habitats. Direct impacts may be physical damage while indirect impacts may include effects arising from siltation, deposition or displacement over time.
- Policy 3.6.13(2) Advocate protection of species located in the coastal environments that are of cultural importance to ensure continued cultural well-being.
- Policy 3.6.13(5) Provide and recognise for the strong cultural links with coastal landscapes and biodiversity held by Ngāi Tahu ki Murihiku.
- Policy 3.6.13(6) Avoid changes to coastal landscapes and biodiversity which have detrimental impacts on Ngāi Tahu ki Murihiku relationships and associations with coastal land, water, wāhi tapu and wāhi taonga areas.
- Policy 3.6.13(7) Recognise for the importance of coastal wetland areas as mahinga kai communities and, where appropriate, expand or create new coastal wetland areas.
- Policy 3.6.13(10) Advocate for protection and methods of enhancement of threatened coastal species, particularly those of cultural significance.
- 3.6.14(4) Avoid compromising marine bird habitats as a result of inappropriate coastal land use, subdivision or development.

Commentary on Consent Durations (p139):

Ngāi Tahu ki Murihiku do not believe we should be granting consents for activities where we do not know what the effects may be over the long term. Anything over 25 years is essentially making decisions for the next generation.

We also need to ensure that consent duration recognises and provides for changes in technology, thus allowing us to continually improve the way we do things.

Indicators of Stream Health (p150):

- *Shape of the river*
- *Sediment in the water*
- *Water quality in the catchment*
- *Flow characteristics*
- *Flow variations*
- *Flood flows*
- *Sound of flow*
- *Movement of water*
- *Fish are safe to eat*
- *Uses of the river*
- *Safe to gather plants*
- *Indigenous vs. exotic species*
- *Natural river mouth environment*
- *Water quality*
- *Abundance and diversity of species*
- *Natural and extent of riparian vegetation*
- *Use of river margin*
- *Temperature*
- *Catchment land use*
- *Riverbank condition*
- *Water is safe to drink*
- *Clarity of the water*
- *Is the name of the river an indicator?*

Ngāi Tahu ki Murihiku Cultural Associations with the Matāura River statutory acknowledgement area:

Several important Ngāti Māmoe and Ngāi Tahu tūpuna²⁰ are associated with the Matāura River, including the Ngāti Māmoe rangatira Parapara Te Whenua, whose descendents traditionally used the resources of the river, and Kiritekateka, daughter of Parapara Te Whenua, who was captured by Ngāi Tahu at Te Anau.

Tuturau, once a Ngāi Tahu fishing village, was the site of the last inter-tribal Māori war, in 1836. Ngāi Tahu (under Tuhawaiki) repelled the challenge and threat from northern invaders thus the south was kept from passing into the hands of the northern tribes.

The Matāura was noted for its customary native fishery. Te Apa Nui (Matāura Falls) were particularly associated with the taking of

²⁰ Tūpuna: ancestors

kanakana. Inanga remains an important resource on the river. The estuary (known as Toetoe) is a particularly important customary food gathering location.

Matāura Falls are an important feature of the cultural landscape of this river.

There is a freshwater mātaītai reserve on the Matāura River (first in New Zealand), recognising the importance of the river in terms of customary food gathering.

Comment

- 3.9.4 Policy 3.5.11(2) prioritises river management. Similar to Te Mana o Te Wai, this prioritises sustaining the mauri of the water body, health and safety needs for people, cultural values, and indigenous fauna above provision for economic activities. In the context of this application, which means a greater weighting to adverse effects on the mauri of the river, cultural values and uses, and instream fauna, than on the positive effects, which are largely associated with providing for economic land uses.
- 3.9.5 Policy 3.5.10(5) and Policy 3.6.1(1) require that consideration of activities occur along the river system and catchment to the sea. That has relevance for an activity that is sited at the coastal marine area boundary and has effects in both the coastal and freshwater environments. Policy 3.6.1(1) specifically refers to policy instruments not compartmentalising the natural environment, which is a risk when regional plan provisions are divided between the freshwater and coastal environments.
- 3.9.6 Policy 3.5.11(3) requires that management of the river take into account that the Titiroa Stream has its own mauri and mana, and its own set of associated values and uses. Policy 3.5.10(3) is to protect and enhance the mauri of freshwater resources. Therefore an activity that negatively impacts on the mauri of the river would conflict with that policy. The submission by Te Ao Marama Inc refers to the structures being detrimental to the mauri, health and well-being of the Titiroa Stream and its freshwater ecosystem.
- 3.9.7 Policy 3.5.10(1) requires that the role of Ngāi Tahu ki Murihiku as kaitiaki must be given effect to in water management.
- 3.9.8 Policy 3.5.11(7) requires that the cultural importance of particular rivers (such as indicated by a statutory acknowledgement, and by the information in Te Tangi a Taura that outlines some of the cultural associations) must be reflected in the weighting given to Ngāi Tahu submissions on consent applications. In this case the proposed activity occurs within the statutory acknowledgement area for the Matāura River, and the submission by Te Ao Marama Inc opposes the application, as summarised earlier in the report.
- 3.9.9 Policy 3.5.11(10) and Policy 3.5.20(6) are to ensure that indigenous fish species have uninhibited passage from the river to the sea. The applicant’s fish survey report concluded that the tidegates were not impeding migration of fish and eels. However, the statistical significance test result for fish numbers indicated that there is an effect. Further information may be provided at the hearing, but based on the information to hand the tidegate operation appears to conflict with these policies.

- 3.9.10 Policy 3.5.16(4), Policy 3.6.3(4), Policy 3.6.3(14) and Policy 3.6.13(7) refer to the importance of areas for mahinga kai and seek to avoid adverse effects on mahinga kai. If the tidegates are found to interfere with fish passage and the availability of inanga and tuna upstream, and the effect could not be adequately avoided, remedied or mitigated, the proposed activity would conflict with these policies.
- 3.9.11 Policy 3.5.20(5) is to avoid impacting on freshwater fishery values as a result of diversion or any activity in the bed of a river. That is clearly applicable to the consideration of this application.
- 3.9.12 Policy 3.5.11(16) and Policy 3.5.16(2) are supportive of measures to restore mahinga kai, ecological and cultural values.
- 3.9.13 Policy 3.6(13)(6) is to avoid changes to coastal landscapes and biodiversity that have adverse effects on Ngāi Tahu ki Murihiku relationships and associations with coastal water and land. Given the legal status of the tidegates, further authorisation may be regarded as a change, even though the tidegate operation has physically affected the lower river since the mid-1980s. Therefore an adverse effect on Ngāi Tahu ki Murihiku associations with the river and estuary, such as by adverse effects on mahinga kai, would conflict with this policy.
- 3.9.14 Te Tangi a Tauria lists indicators of instream health. As noted earlier in the discussion about Policy 2 of the pSWLP, the indicators include the flow characteristics, the abundance and diversity of species, and the uses of the river. The tidegates alter the flow characteristics of the river, the value of the area for mahinga kai is recognised in the statutory acknowledgement, and the applicant is proposing to enhance spawning habitat to offset the effects of the tidegates on the abundance of inanga.
- 3.9.15 There is a statement in Te Tangi a Tauria about consent durations. Firstly, terms should not exceed 25 years as that would make decisions for subsequent generations. Secondly changes in technology and methods should have an effect on consent durations. This is consistent with past guidance from the Ministry for the Environment²¹ that, where there better mitigation systems available, or an activity has been subject to technological changes and more are likely to occur, a shorter duration may be appropriate.

Environment Southland’s Leasehold Land Management Policy

- 3.9.16 I consider that Environment Southland’s Leasehold Land Management Policy²² is a matter that is relevant and reasonably necessary to the determination of the application, as much of the land upstream that benefits from the inundation and drainage protection afforded by the tidegates is owned by ES and leased out. A decision on the further operation of the tidegates would therefore affect the leaseholders and the use of the leasehold land. A copy of the policy is included in the appendices.
- 3.9.17 As mentioned earlier, the leases are for periods of three years²³.

²¹ Resource Consent Durations and Reviews, 2001, Ministry for the Environment.

²² ES document reference A658715

²³ Pers. comment Environment Southland’s Property Officer.

- 3.9.18 The Policy is periodically reviewed by the Council’s Regional Services Committee. I understand this occurred in a public meeting and that the policy is a publicly available document.
- 3.9.19 The Leasehold Land Management Policy sets a number of objectives for the Council’s leased land, including:
- 3.9.19.1 the primary use of the leasehold land is for flood management and all other uses will be subservient to this use.
 - 3.9.19.2 the leasehold land represents a significant resource for the benefit of the community of Southland. Council may consider a range of uses that meet the various objectives of Council.
 - 3.9.19.3 without compromising other objectives and acknowledging that most of the leasehold land is flood prone, Council will seek to maximise the operating surplus from the portfolio.
 - 3.9.19.4 the leasehold land is operated in a manner that supports the environmental sustainability of the property, complies with good management practice to reduce contaminant loss, and protects and enhances biodiversity.

4. Conclusion

4.1 Points of clarification

- 4.1.1 During this report I have identified the following matters which either the applicant or submitter may be able to clarify at the hearing:
- (a) Information about the extent and value of beneficial effects of the tidegates.
 - (b) Information about how much private land (not held by ES) benefits or is protected by the tidegates, and whether that could still occur if the tidegates only closed at higher tidal water levels.
 - (c) Whether widening the channel, with or without another gate, could reduce velocities to assist with fish passage;
 - (d) How the legal status of the tidegates and weir affects the consideration of this application.
 - (e) Information to demonstrate that adverse effects on river values have been or will be avoided, remedied or mitigated (including offsets) in accordance with section 3.24 of the NPSFM.
- 4.1.2 While not directly points of clarification, the following information may be helpful for the commissioner in determining if sufficiently certain conditions can be imposed:
- (a) A mitigations plan, with defined works and timeframes
 - (b) A monitoring plan, to provide more information on the effects of the activity and the effectiveness of the mitigations.

4.2 Overall view

- 4.2.1 In my opinion, and based on the information available at present, I consider that the application should be declined.
- 4.2.1.1 I am aware that my view above may not seem practical given that the absence of the tidegates would have a significant impact on the upstream landowners and leaseholders. But that is the point; the need for the structure and its beneficial effects are not well assessed.
- 4.2.1.2 More supporting information, particularly around beneficial effects, mitigation of adverse effects, and addressing impacts on cultural and spiritual values, is needed to approve the application. I expect that the applicant will provide that information prior to the hearing.
- 4.2.2 Based on the information provided to date, the tidegates have adverse effects on cultural and spiritual values, fish passage, inanga spawning, and water chemistry (particularly the extent of the saltwater wedge).
- 4.2.3 The beneficial effects of the tidegates are poorly defined. I acknowledge that the gates have beneficial effects on drainage and flood protection upstream for landowners and leaseholders, but the extent of affected area and the value of that benefit is not well described.
- 4.2.3.1 It may have been helpful to have information on the beneficial effects of the tidal gates if they functioned at differing water levels, but Section 4.1 of the Mitigation Options report determined that would be ineffective to mitigate effects on inanga spawning which was linked to high spring tide levels.
- 4.2.4 It is unclear whether the tidegates need to close at relatively low tidal levels. If there are periods when the gates close but without having a beneficial effect on land drainage, then there is an adverse effect on fish passage for hours each day, making the fish more exposed to predation. It potentially also affects other instream values, such as if the closure of the gates truncates the extent of the salt wedge.
- 4.2.4.1 It is likely that it would be costly to enhance the tidegates to provide for more controlled closures. No information is available on such costs, but even if it was, it could not be weighed against the beneficial effects of the tidegates, or the costs of changing land use in upstream areas, without more information.
- 4.2.5 The submitters, both for and against the application, provide helpful information about the positive and negative effects of the tidegates. The submitters each have an interest in the operation of the tidegates that goes beyond their status as a submitter, whether that is associated with particular species, customary and traditional associations with the area, or as a landowner or leaseholder. Those interests add to the weight of their views and observations.
- 4.2.6 With regard to direction given by the planning documents, it’s mixed. Due to the location of the tidegates at the margin of the coastal marine area, and having effects in both the coastal and freshwater environments, there are large number of planning provisions that apply. The application is supported by or consistent with some policies, and opposed or conflicting with

other policies. Therefore it is possible to find policy direction for approving or refusing the application.

4.2.7 The strongest and most directly supportive objectives and policies are:

Southland Regional Policy Statement:

- Objective COAST.2 Infrastructure, ports, energy projects, aquaculture, mineral extraction activities, subdivision, use and development in the coastal environment are provided for and able to expand, where appropriate, while managing the adverse effects of those activities.

- Policy COAST.4 Recognise and make provision for nationally significant, regionally significant or critical infrastructure that has a functional, operational or technical need to be located within the coastal environment, and appropriate port, aquaculture, mineral extraction activities and energy projects that must be located within the coastal environment.

- Objective INF.1 Southland’s regionally significant, nationally significant and critical infrastructure is secure, operates efficiently, and is appropriately integrated with land use activities and the environment.

- Policy INF.1 Recognise the benefits to be derived from, and make provision for, the development, maintenance, upgrade and ongoing operation of regionally significant, nationally significant and critical infrastructure and associated activities.

Regional Coastal Plan for Southland:

- Objective 11.2.2 To recognise the social, economic, cultural and safety benefits of structures in the coastal marine area.

- Policy 11.4.4 Provide for the continuance, and enhancement of existing facilities and infrastructure in the coastal marine area that:
 - a enables the public use and enjoyment of the coastal environment;
 - b facilitates or contributes to the social and economic values of the region;
 - c facilitates or contributes to safe use of the coastal area while avoiding wherever practicable, remedying or mitigating any adverse effects on the environment.

Proposed Southland Water & Land Plan:

- Objective 9B The importance of Southland’s regionally and nationally significant infrastructure is recognised and its sustainable and effective development, operation, maintenance and upgrading enabled.

- Policy 26A Recognise and provide for the effective development, operation, maintenance and upgrading of regionally significant, nationally significant and critical infrastructure in a way that avoids where

practicable, or otherwise remedies or mitigates, adverse effects on the environment.

- 4.2.8 The support derives from a definition in the Southland Regional Policy Statement that flood and drainage infrastructure managed by the Council are strategic facilities, which in turn makes them critical infrastructure and regionally significant infrastructure.
- 4.2.8.1 There is no similar definition of strategic facilities in the proposed Southland Water & Land Plan or Regional Coastal Plan for Southland. The pSWLP refers to critical infrastructure including strategic infrastructure, but it is not defined. In a circumstance where there is a lack of clarity it is appropriate to refer the next higher level in the hierarchy of policy documents which, in this case, provides a definition.
- 4.2.8.2 The tidegates were legally installed and were legally in place and operating when the provisions of the RPS and RCP became operative, so would have been envisioned to be a strategic facility for the purposes of those documents. However, while the infrastructure policies are generally supportive, they have to be weighed up alongside the effects on the environment and the opposing policies.
- 4.2.9 As discussed earlier, even where a policy, such as COAST.4 or INF.1 of the Regional Policy Statement appear to provide unqualified support, the explanation or an associated objective or policy clarifies that adverse effects must be addressed while enabling the structure.
- 4.2.10 Many of the policies that the application conflicts with, or is inconsistent with, hinge on a particular adverse effect that the applicant may be able to demonstrate is avoided or adequately mitigated or remedied, particularly fish passage, indigenous biodiversity values, and ecosystem values, which in turn are linked with impacts on mahinga kai and cultural associations. That may help, for example, with Objectives 5, 14, 15 and 19, and Policies 2(2), 3 and 20(1)(a) of the proposed Southland Water & Land Plan and Objectives 5.4.1.2, 7.4.1.1, 7.4.3.1 and 12.1.2, Policies 5.4.1.2 and 7.4.3.1 of the Coastal Plan for Southland, and Policies 3.5.11(10), 3.5.20(5) and 3.5.20(6) of Te Tangi a Tauria.
- 4.2.11 Even if improved information demonstrates that the tidegates are not significantly impacting fish passage, and that adverse effects on spawning of inanga can be offset by enhancing habitat, the applicant still needs to address effects on cultural and spiritual values to address Objectives 2 and 4 and Policies 1 and 20(1)(e) of the pSWLP, Objectives 5.6.1 and Policies 5.6.1 and 5.6.5 of the RCP and Policies 3.5.10(8), 3.5.11(2), 3.5.11(3), 3.5.17(7), 3.6.3(14) and 3.6.13(6) of Te Tangi a Tauria.
- 4.2.11.1 As noted earlier, Policy 5.6.5 of the RCP is particularly strong, as it requires that we ‘protect’ the traditional, spiritual, historical and cultural characteristics of significance to Māori, and it states that this protection is a national priority.
- 4.2.11.2 As mentioned, there is some need to consider higher level documents because of the relative ages of the RCP and the NZCPS and RPS.
- 4.2.11.2.1 Policy WQUAN.1 of the RPS is to maintain instream values that derive from flows and levels of water. It’s difficult to see how the tidegate operation, which is designed to affect flows and levels of water, can be consistent with that policy.

- 4.2.11.2.2 Policy COAST.2 of the RPS requires protection of indigenous biodiversity, ecological and cultural values when making provision for subdivision, use and development.
- 4.2.12 I consider that the tidegates interfere with water flow and fish passage, and therefore cause the loss or reduction in river values, such as values associated with ecosystems, biodiversity, mahinga kai and cultural and spiritual values.
- 4.2.12.1 Earlier in this report I referred to the provisions of the NPSFM regarding loss of river values. See paragraphs 3.5.10 and 3.5.11. This was only partly carried through to the pSWLP in Policy 28A, but is missing many of the NPSFM requirements. Therefore it is necessary to refer back to the NPSFM for guidance on the application of Policy 28A of the pSWLP.
- 4.2.12.2 Based on the current information I do not consider that the applicant has demonstrated that it has applied the effects management hierarchy and complied with the requirements of s3.24 of the NPSFM.
- 4.2.13 There are a number of provisions that provide for consideration across the divide between the freshwater environment and the coastal marine area, such as Policy 39A of the pSWLP and Policy 3.6.1(1) of Te Tangi a Tauria.
- 4.2.13.1 Similar to 4.2.11.2, I note that, Policy WQUAN.8 of the RPS requires integration of land use and water quantity wherever possible.
- 4.2.13.2 These provisions assist with consideration of the beneficial effects of the activity in terms of drainage and flood protection for land upstream of the tidegates.
- 4.2.14 Submitters have suggested that the applicant should consider repurposing its land that is benefited by the tidegates, rather than pursuing the consent. There are a range of policies that support integrated management, such as Policy 39A of the pSWLP, Policy 3 of the NPSFM, Policy 4 of the NZCPS and WQUAN.8 of the RPS. The application does not address whether the potential to repurpose low-lying land was considered, which may have assisted in understanding the benefits of the proposal (for example, to understand the cost or other consequences of repurposing). In any event, a consent authority does not have the power to impose conditions requiring an applicant to retire land.
- 4.2.15 The applicant’s past conduct with regard to compliance with the conditions of the previous consent, and continuing to operate without consent, are not legitimate factors when considering whether or not to approve the application. The past record can be taken into account when considering consent duration and conditions if the application is approved²⁴.

²⁴ Walker v Manukau City Council, ENC Auckland C213/99, Page 6 and Gulf District Plan Association Inc v Auckland City Council, ENC Auckland A101/2003, paras 95-97

- 4.2.16 A related matter is the prolonged consent application process while the activity has occurred without authorisation.
- 4.2.16.1 The previous consent expired on 29 October 2020 and this application was lodged on 8 March 2021. By the time a decision is reached it will have been about three and a half years since the application was lodged, and the tidegates will have been in place and operating without authorisation for nearly four years.
- 4.2.16.2 Some of the process delay arose from Covid, and related illness to key personnel contracted to provide supporting information. There were also delays around availability and aligning work (such as the fish surveys) with appropriate seasons flows and tidal conditions, and carrying out consultation with affected parties, particularly Te Ao Marama Inc. Ideally that work should largely have occurred prior to the application being lodged.
- 4.2.16.3 There were also following notification. I understand that the applicant has utilised that period to gather further information in response to the submissions, and I expect that it will be provided prior to the hearing.
- 4.2.17 There are potentially significant impacts whichever way the application is decided. If the application is declined, the ability of the landowners and leaseholders upstream to maintain agricultural production is likely to be significantly affected. If the application is approved, there are likely to be ongoing adverse effects on fish passage, river values and cultural and spiritual values.
- 4.2.17.1 The offsetting proposed by the applicant to address effects on inanga spawning habitat may go some way to reducing adverse effects on the environment and policy conflicts. The question for the decision maker is whether that offsetting is sufficient to approve the application, even for a short duration.

4.3 Consent Duration

- 4.3.1 If the application is approved, I recommend a consent duration of no more than five years.
- 4.3.2 Policy 40 of the pSWLP provides direction on the factors to be taken into account when determining consent duration.
- 4.3.2.1 At this time I consider that there is a degree of uncertainty around the effects of the activity. The information supporting the assessment of effects could be stronger (including in terms of beneficial effects), and the mitigations proposed have not been determined in line with the requirements of the NPSFM. In most cases a shorter term is an appropriate way of balancing uncertainty. But for an existing activity it could be used to force the gathering of information through consent conditions to reduce that uncertainty for a probably future application.
- 4.3.2.2 Based on the provisions of Te Tangi a Tauira and the submission by Te Ao Marama Inc., the proposal appears to be inconsistent with tangata whenua values and indicators of stream health. That would suggest, if the application was not to be declined, a shorter-term duration would be more consistent with tangata whenua

values. Once again, the purpose would be to ensure that the applicant addressed the effect before applying for another consent.

- 4.3.2.3 The applicant is seeking a duration of 15 years²⁵. No specific reason is given for the requested duration. However it is likely related to the structure as part of a long-term flood control scheme.
- 4.3.2.4 The tidegates have been in place since 1986 (38 years), so are long-term structures. In terms of economic life, no information has been provided. Generally a cost-benefit analysis assigns little or no value after 25 years, so the tidegates have probably continued long after the economic costs that were assessed when they were installed have reduced to zero. Depreciation may also have been taken into account. However the structures are maintained and operational so will have an asset value.
- 4.3.2.5 All the consents associated with the tidegates (occupation, damming and diverting) should have common consent expiry dates.
- 4.3.2.6 The applicant’s past conduct is a valid consideration for consent duration (including under Policy 40 of the pSWLP) as it relates to weighing up risk and uncertainty. In this case the applicant did not carry out the fish survey required by the previous consent until almost four years after the specified date (and after the expiry of the consent), and the tidegates have been operating without authorisation since 2020. These factors suggest support for a shorter-term consent.
- 4.3.2.7 In terms of the development of the FMU sections of the pSWLP, the Council’s Progressive Implementation Programme²⁶ states they freshwater objectives and limits will occur by 31 December 2025. I understand that may be affected by the signals from the government around changes to the NPSFM, but 31 December 2025 is the currently documented timeframe. There is potential for the damming and diversion by the tidegates to be affected by the FMU limits that may apply on water quantity. If significant reappraisal of the tidegate effects was required in response to the FMU process, it may exceed the ability of a review under s128. Factoring that alongside the 3-year lease periods, a five-year duration would appear to provide for both the FMU process and the Council’s commitments to leaseholders.
- 4.3.2.8 Policy 40 allows consideration of other factors. I have not identified any such factors, but if they arise it should be remembered that the consent duration is neither a reward nor a penalty. For example, I mentioned shorter durations in response to uncertainties or past conduct as a way of balancing risk or uncertainty while providing an opportunity to obtain further information to reduce that uncertainty. Also, once approved, the consent duration cannot be extended or

²⁵ 15 years is shown on page 1 of the application details. 20 years is stated on page 2. I have assumed the 15-year term to be correct as it is stated three times.

²⁶

<https://waterandland.es.govt.nz/repository/libraries/id:1tkqd22dp17q9stkk8gh/hierarchy/PWL%20documents/2018%2010%2030%20Revised%20Progressive%20Implementation%20Programme.pdf>

shortened by a review or amendment and a consent can only be cancelled under very limited circumstances.

- 4.3.3 Having considered Policy 40, and the factors discussed above, if the application is approved then a five-year consent period is appropriate.

4.4 Conditions

4.4.1 I recommend that the consent conditions include:

- 4.4.1.1 Implementation of the mitigation measures (including offsetting) proposed by the applicant.
- 4.4.1.2 Monitoring the effectiveness of the mitigation measures, particularly with regard to enhancement of inanga spawning habitat.
- 4.4.1.3 Requirement for a Riparian Management Plan.
- 4.4.1.4 Monitoring of the effects of the tidegates on fish passage every two years.
- 4.4.1.5 Monitoring of dissolved oxygen and temperature along the river during summer low flows to determine if the tidegates adversely affect water quality.
- 4.4.1.6 Maintenance of signage or symbol to warn small vessels of the presence of a channel barrier.

5. Information about this report

5.1 Status and purpose of this report

5.1.1 This report has been prepared under Section 42A of the Resource Management Act 1991 (RMA) to assist in the hearing of the application made by Southland District Council to amend the conditions of seven resource consents. Section 42A allows local authorities to require the preparation of such a report on an application for resource consent and allows the consent authority to consider the report at any hearing.

5.1.2 The purpose of the report is to assist the Hearing Panel in making a decision on the application.

5.2 About the author

5.2.1 My name is Stephen West. I am a Principal Consents Officer employed by the Southland Regional Council. I have been employed by the Council as a consents officer since 1993. Prior to that I worked as a technician in the Hydrology section of the Southland Catchment Board and Southland Regional Council.

5.2.2 I hold the qualifications of New Zealand Certificate of Engineering (Civil) and Bachelor of Arts (Geography and Environmental Studies) degree.

5.2.3 I have been involved with the application since it was lodged and received by Council.

5.2.3 I have visited the site of the tidegates at times during the course of my work since the mid-1980s. While the application has been in progress, I inspected the tidegates on 16 March 2022, and again on 21 July 2022, which was during a flood event.

5.3 Information relied on in preparation of this report

5.3.1 In preparation of this report I have had regard to the following documents:

- The resource consent application;
- Further information provided in response to a s92 request;
- The Titiroa Tide Gates Mitigation Options Report, November 2022
- The submissions;
- Resource Management Act 1991;
- The New Zealand Coastal Policy Statement
- The National Policy Statement for Freshwater Management 2020;
- Regional Policy Statement 2017;
- Regional Coastal Plan
- Proposed Southland Water and Land Plan;
- Te Tangi a Tauria (Iwi Management Plan) 2008;
- Environment Southland’s Leasehold Land Management Policy
- Environment Southland’s Progressive Implementation Programme for implementation of the NPSFM



Stephen West
Principal Consents Officer



Reviewed and Approved for release
Lacey Bragg
Consents Manager

RECOMMENDATIONS IN COUNCIL REPORTS ARE NOT TO BE CONSTRUED
AS COUNCIL POLICY UNLESS ADOPTED BY COUNCIL



Consents Hearing 30 August 2024

**Environment Southland's Catchment
Operations Division - APP-20211135**

Appendices

Appendix 1

APPLICATION DOCUMENTS

PAID
- 8 MAR 2021
ENVIRONMENT
SOUTHLAND

\$1500 CR

APPLICANT: Catchment Management Division of Southland Regional Council

TITIROA TIDE GATES AND WEIR INFRASTRUCTURE

RESOURCE CONSENT APPLICATION TO
OCCUPY THE COASTAL MARINE AREA WITH A
TIDE GATE AND A WEIR STRUCTURE AND TO
DAM AND DIVERT WATER

8 MARCH 2021

FINAL



TITIROA STREAM TIDE GATES

RESOURCE CONSENT APPLICATION TO DAM & DIVERT WATER, AND OCCUPY CMA

Catchment Management Division of Southland Regional Council

WSP

Invercargill

65 Arena Avenue



PO Box 647

Invercargill 9810, New Zealand

+64 3 211 3580

wsp.com/nz

REV	DATE	DETAILS
3	8/3/ 21	Final

	NAME	DATE	SIGNATURE
Prepared by:	Luke McSoriley	8/3/21	
Reviewed by:	Shane Roberts	8/3/21	

This report ('Report') has been prepared by WSP exclusively for the Southland Regional Council ('Client') in relation to resource consent application to dam and divert water, and occupy the Coastal Marine Area ('Purpose') and in accordance with Short form Agreement with the Client dated 6 October 2020. The findings in this Report are based on and are subject to the assumptions specified in the Report and documents contained on ES File S135-033. WSP accepts no liability whatsoever for any reliance on or use of this Report, in whole or in part, for any use or purpose other than the Purpose or any use or reliance on the Report by any third party.



Our ref: VQ423.54_006SO

8 March 2021

Bruce Halligan
Acting Consents Manager
Environment Southland
Private Bag 90116
Invercargill 9810

Dear Bruce

RESOURCE CONSENT APPLICATION FOR CONTINUED OCCUPATION OF THE COASTAL MARINE AREA ASSOCIATED WITH TITIROA TIDE GATE INFRASTRUCTURE AND DAM AND DIVERT WATER

Please find attached a resource consent application from the Catchment Management Division of Southland Regional Council (the applicant).

The applicant is applying to Southland Regional Council to replace a coastal permit (AUTH-204122) for occupation of the coastal marine area by a tide gate structure and a weir structure and diversion of water.

The tide gate structure is located in a diversion of the Titiroa Stream upstream of the Tokanui-Gorge Road Highway Bridge. The weir is located across the original Titiroa Stream channel. The purpose of the Titiroa Stream tide gate and weir infrastructure is to ensure the on-going drainage capability and prevent flooding of the surrounding low-lying farmland. Tide gate and weir structures have been present at the site since 1917.

Coastal Permit (AUTH-204122) expired on 29 October 2020 and WSP were engaged to assist with this application on 6 October 2020. A survey of native fish species was required under condition 2 of the AUTH-204122 but was not completed.

As a fish survey could only be undertaken in summer lodgement of a replacement application could not occur prior to the expiry date. The fish survey was completed in January 2021 and an assessment of fish passage is included in this application.

Please feel free to contact me if you have any questions.

Luke McSoriley
Work Group Manager – Planning

WSP
Invercargill
65 Arena Avenue
PO Box 647
Invercargill 9810, New Zealand
+64 3 211 3580
wsp.com/nz





Application for Resource Consent under Section 88 of the Resource Management Act 1991 (RMA)

TO: Southland Regional Council
Private Bag 90116
INVERCARGILL 9840

PART A

Applicant Details:

Catchment Management Division of Southland Regional Council
Private Bag 90116
INVERCARGILL 9810
Phone: 03 2115115

Consultant Details (Address for Service):

WSP NZ Ltd
PO BOX 647
INVERCARGILL 9840
ATTENTION: Luke McSoriley
Ph: 027 269 1644
Email: luke.mcsoriley@wsp.com.nz

Consents Applied For:

PERMIT	ACTIVITY	DURATION
Coastal Permit	Occupation of crown land in the coastal marine area by a weir structure	15 years
Coastal Permit	Occupation of land in the coastal marine area by a tide gate structure	15 years
Coastal Permit	Damming and diversion of water	15 years

1. Are there any current or expired resource consents relating to this proposal?

Yes. AUTH-204122 approved 29 October 2015 for a coastal permit to dam and divert water, and to occupy the coastal marine area, with tide-gates and a weir expired on 29 October 2020 (refer Appendix D).

2. Are any other consents required from Environment Southland or other authorities?

NONE

3. For what purpose is this consent(s) required:

Damming and diversion of water in the Titiroa Stream to prevent flooding and allow drainage of the established low-lying farmland upstream of the Dam.

4. Location of proposed activity:

ADDRESS: Upstream of the Tokanui-Gorge Road Highway Bridge



LEGAL DESCRIPTION: Section 1 SO 11258 and Part Lot 1 DP 11173
Statute: River Control Purposes NZ Gazette 1983 p 2020.
MAP REFERENCE (NZTM): 1276640E, 4836895N

5. The name and address of the owner/occupier: (if other than the applicant)

OWNER: Southland Regional Council
OCCUPIER NAME: Mataura Rating District c/- Catchment Management Division
PHONE: +64 3 211 5115
ADDRESS: Private Bag 90116, Invercargill 9810

6. Please attach a map or a coloured aerial photograph, showing at a minimum, the location of the proposed activities.

Refer attached report and appendices.

7. Assessment of Environmental Effects

Refer attached report and appendices.

8. Affected Parties

Refer attached report and appendices.

9. Correspondence from Council when using a consultant.

Correspondence about the application shall be directed to the consultant and copied to the applicant via email to ES Catchment Manager – paddy.haynes@es.govt.nz

10. Site Visits by Consents Officer.

The site is a Riverbed adjacent to public road. Consents Staff may visit the site at any time, but there is no specific request for an on-site meeting, unless Consents staff deem necessary.

OTHER:

11. Costs/Deposit

Deposit paid upon submission to Council.

12. Checklist

PAYMENT	Deposit paid upon submission to Council.
WITTEN APPROVAL	See Appendices.
SITE PLAN/LOCALITY PLAN/PLANS	See Appendices.
CERTIFICATE OF INCORPORATION	N/A
PART B FORMS	As Follows:

PART B

a) What is the application for?

Refer attached report and appendices.

b) What duration of resource consent is sought?

20 Years.

c) What is the name of the water body within which these works will take place?

Costal Marine Area limit in the Titiroa Stream.

d) Please describe how the works will be carried out.:

Refer attached report and appendices.

e) Is any damming or diversion of water required as part of the proposed works?

Yes. Refer attached report and appendices.

f) Please state the proposed date of commencement and completion of works and describe the hours of operation.

Refer attached report and appendices.

g) Describe these features found within the existing environment of the proposed activity along with details of the assessment undertaken to determine the presence of these features.

Refer attached report and appendices.

h) Please provide details on the river form, aggradation or degradation, riverbank erosion, course change by the river and any other work carried out on this stretch of the River?

Refer attached report and appendices.

i) How will the proposed works/structures alter river flows during flood or low flow events?

Refer attached report and appendices.

j) How will the proposed works affect river form? How will the proposed works affect the overall river catchment? Please consider the downstream effects of the proposed works on the river form and behaviour.

Refer attached report and appendices.

k) Are there any structures in/over/next to the water body in the vicinity of the proposed works?

Refer attached report and appendices.

l) Assessment of environmental effects.

Refer attached report and appendices.

m) Monitoring or mitigation measures

Refer attached report and appendices.

n) Minimise the release of silt, sediment, concrete and other contaminants into water.

Refer attached report and appendices.

o) Description of any possible alternative locations or methods for undertaking the activity

Refer attached report and appendices.

p) Evidence of any consultation undertaken for this application.

Refer attached report and appendices.

DECLARATION

I/we hereby certify that to the best of my/our knowledge and belief, the information given in this application is true and correct.

I/we undertake to pay all actual and reasonable application processing costs incurred by the Southland Regional Council.

Paddy Haynes

(person authorised to sign on behalf of applicant)

Designation Catchment Manager, ES

Date 8th March 2021

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1 INTRODUCTION

1.1 PURPOSE OF THIS REPORT

This document comprises an application to Southland Regional Council for resource consent to maintain the diversion and damming of the Titiroa Stream via tide control gates and an earth dam weir. This application has been prepared in accordance with Section 88 of the Resource Management Act 1991 (RMA) and provides a description of the activity with an assessment of the actual and potential effects on the environment, as required by the Fourth Schedule of the RMA.

1.2 BACKGROUND

Southland Regional Council (Environment Southland) via its Catchment Management Division helps communities reduce the risk of flooding and erosion to their properties by carrying out river and drainage works within river catchment rating districts. As part of this work Environment Southland aims to manage and protect the integrity of its assets including stop banks, detention dams, bridges, culverts and tide gate structures. These structures assist in controlling flooding and protecting Southland communities.

1.3 SITE AND ENVIRONMENTAL SETTING

The Titiroa Stream is located on the eastern bank of the lower Mataura River floodplain and predominantly flows through pastureland and remnants of native bush. The tidal gates and weir are located 160m upstream of the Gorge Road Highway, 30km southeast of Invercargill and approximately 4km north of the Fortrose settlement on the Toetoes Estuary. The Stream originates east of Pine Bush, in the Forest Range of the Catlins approximately 15km from the site. The Titiroa Stream has a catchment area of approximately 223 km².

Titiroa Stream is 20-30m wide in the immediate reaches up and downstream of the Gorge Road Highway bridge. It is tidal at this location and lined with Whitebait huts downstream of the road bridge, white baiting also occurs upstream of the road Bridge. The Stream flows through relatively flat productive farmland to the west and south with the farmland rising up to a riverine terrace to the east. The Estuary is considered to have a large riverine component relative to its area as it is also outlet to the Mataura River.

Titiroa Stream is part of the Coastal Catlins surface water management zone, covering four coastal catchments including the westernmost Titiroa Stream and in its lower extent, is part of the Lower Mataura Groundwater Zone under the Proposed Southland Water and Land Plan (pSWLP). The Coastal Plan for Southland (the Coastal Plan) Map 9b shows the tide-gate in its current position.

Titiroa River is subject to esplanade mechanisms ER64 (reserve requirement) under the Operative Southland District Plan (shown [District Plan Map 42A](#)). The site is in the Rural Zone of the SDC District Plan. It is identified as subject to Natural Hazard Overlay (NHO) for flooding, and at the northern extent of the Coastal Environment Overlay, under the District Plan.

The ecosystem values are identified in the RWPS Appendix G as Lowland soft-bed classified waterways, and within the pSWLP Appendix E as being within the Mataura Freshwater Management Unit (FMU).



FIGURE 1: LOCALITY PLAN (SOURCE: TOPOMAPS)



PHOTO 1: VIEW UPSTREAM OF TITIROA STREAM FROM GORGE ROAD HIGHWAY BRIDGE



PHOTO 2: VIEW OF THE TIDAL GATES LOOKING UPSTREAM

1.4 TITIROA WETLAND RESERVE

Environment Southland owns large landholdings adjacent the Titiroa Stream as detailed in Figure 2 below.

Environment Southland manages these land holdings for the joint purposes of nature conservation and flood protection. Areas set back from the Titiroa Stream and its margins are leased and grazed for rural land use purposes. These landholdings have 'reserve' status within the Environment Southland's leasehold land management framework. Management of this areas has altered over time to reflect a conservation focus, for example through fencing to exclude stock from the stream margins.

A High Value Area (HVA) Assessment has been completed for the Titiroa Wetland Reserve and is included in this application as Appendix D

The purpose of the HVA assessment programme is to identify, define, describe, rank and record sites containing indigenous biodiversity values. HVA reports provide the landowner with information about the presence, condition and relative value of indigenous biodiversity on your land. The information provided in this report aims to:

- a) Promote the benefits of protecting and enhancing indigenous biodiversity values to landowners and the community in general;
- b) Assist landowners to make decisions about voluntarily seeking legal protection for biodiversity values on their land;
- c) Help assess the state of the indigenous biodiversity at local, regional and national level.

An HVA for the Titiroa Wetland Reserve notes:

"This site is of outstanding importance for its diversity of habitats and for the diversity and abundance of wildlife that it supports (fish, marsh inhabiting birds, as well as estuarine birds such as terns and waders, including migratory ones)".

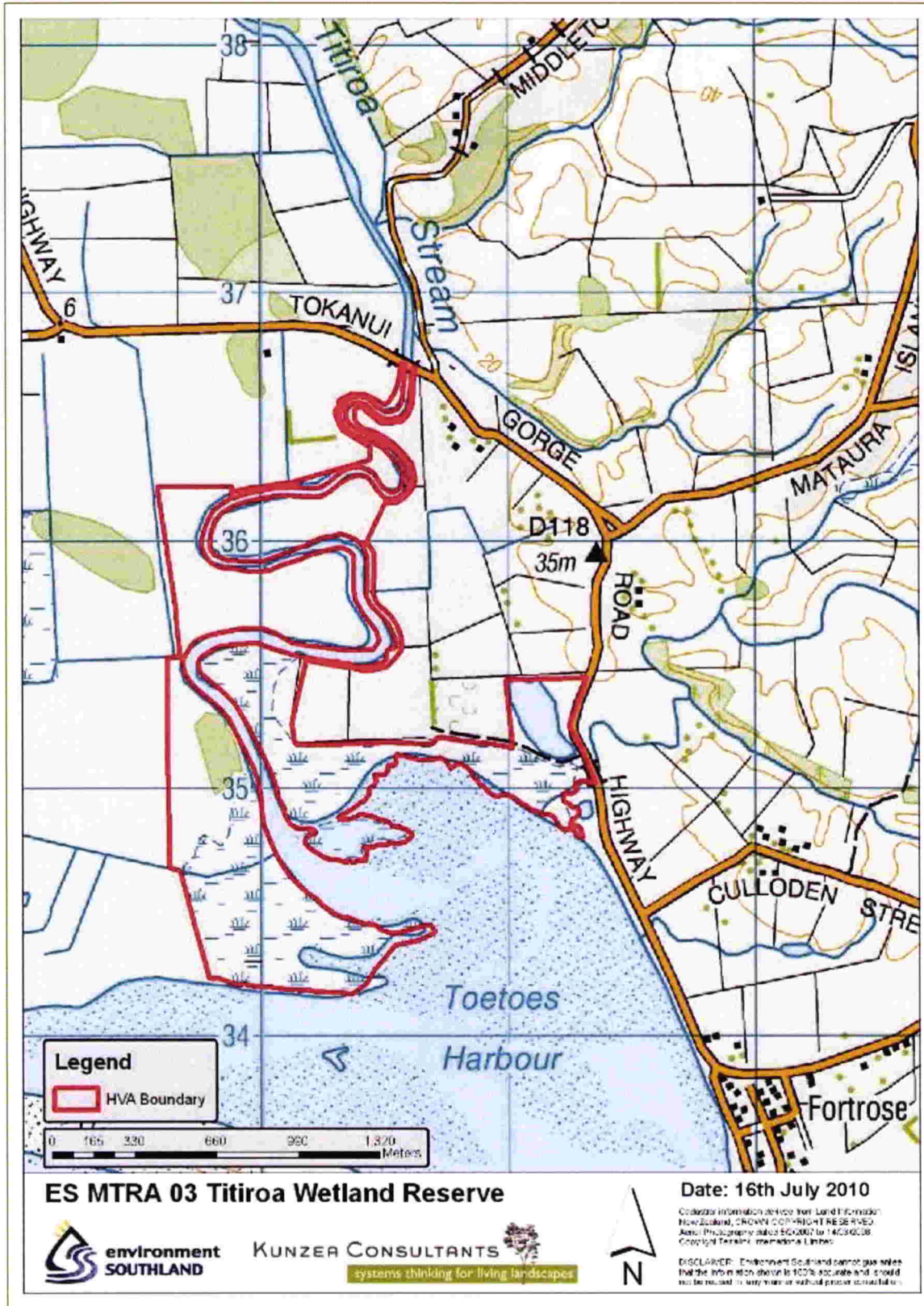


FIGURE 2: TITIROA WETLAND RESERVE

2 PROPOSAL

2.1 EXISTING WEIR AND TIDE GATES

The application relates to existing drainage and flood control infrastructure. The existing earthen embankment weir was constructed across the original Titiroa Stream channel to divert the flow of the stream into a diversion channel to the east. The tide gates are located in the diversion channel and are designed to prevent incoming tides from flowing further upstream. The gates close on an incoming tide as water flowing upstream pushes against them. They then open on the outgoing tide as the flow of the river reverts downstream.

The weir is located in the bed of the Titiroa Stream on Crown land and the tide gates are located in the diversion channel on land owned by the applicant. All the tide gate and weir infrastructure is located within the Coastal Marine Area. The purpose of the Titiroa Stream tide gates is to ensure the on-going drainage capability and prevent flooding of the surrounding low-lying farmland. The gates purpose is to prevent tidal inflow which impacts on land drainage. The tide gates influence approximately 11,500 hectares of improved pasture alongside the Titiroa Stream. There has been some form of tide gates in this location since 1917 when they were constructed by the Public Works Department. The tide-gates "lock structure" in place today was constructed in 1988. It maintains an invert level of 1.2m below mean sea level (msl) with a rock-armoured weir constructed to a height of 1.4m amsl to divert the flow through a diversion channel and lock gates. There are three gates, each 2.040m wide by 2.320m high hung vertically with a sill level of 0.7m below msl. The top of the gates are 1.56m amsl and are opened by the tidal flow and Titiroa Stream at least 50% of the time. During flood events the structure may be completely submerged and can be overtopped when storm surge and high tides coincide.

2.2 ACTIVITY

This application seeks a replacement coastal permit for continuation of the existing occupation of the coastal marine area by the tide gates and weir structure. No change in occupation area or extent of the tide gates or weir is proposed by way of this application. As noted above no upgrades, maintenance or changes are proposed to the existing tide-gates or weir. The tidal gates are aging and there will be a need for maintenance works in the future. Maintenance and repair of the structure is permitted by Rule 11.4.1 of the Regional Coastal Plan, subject to conditions.

Reconstruction of the structure is also a permitted activity under Rule 11.4.2 of the Coastal Plan, subject to conditions. Photograph 2 above details the tide gate structure at high tide with its gates shut.

2.3 COASTAL MARINE AREA

In relation to the Titiroa River the boundary of the coastal marine area for the Southland Region is described in Appendix 2 of the Regional Coastal Plan. Schedule 1 of Appendix 2 details the landward boundary of the CMA co-ordinates of the boundary are provided (NZMS260 F47 863988) and it is described as being on the 'Upper side of tidegate pipes'. The tide-gates are located at or downstream of this point and an existing coastal permit was in place for the structure. The site is within the Coastal Marine Area (CMA) and as such the relevant regional plan is the RCP.

3 ACTIVITY STATUS

3.1 REGIONAL COASTAL PLAN FOR SOUTHLAND 2013

Exclusive or preferential occupation of Crown land in the coastal marine area is a discretionary activity under Rule 9.1.1 of the Coastal Plan. The existing weir structure is located on Crown land and is located downstream of the CMA boundary. As a result, occupation of the coastal marine area by the weir structure is a discretionary activity under Rule 9.1.1 of the Coastal Plan. We note that the tide gates are not located on Crown land as they are located on land owned by the Southland Regional Council. As such rule 9.1.1 is not applicable to the tide gates. Under Part 3 Section 12 (2) (a) of the RMA 1991 no person may occupy any part of the common marine and coastal area unless expressly allowed by a national environmental standard, a rule in a regional plan or a resource consent. The proposed activity (tide gate) is not expressly allowed by a national environmental standard, a rule in a regional plan or a resource consent.

Section 14 (2) of the RMA 1991 states that no person may dam or divert of water (other than open coastal water) within the coastal marine unless allowed (under subsection 3) by a national environmental standard or a rule in a regional plan or a resource consent none of which currently apply to the activity. Under Section 87B (1) (a) an application for a resource consent for an activity must, with the necessary modifications, be treated as an application for a resource consent for a discretionary activity if Part 3 requires a resource consent to be obtained for the activity and there is no plan or proposed plan, or no relevant rule in a plan or proposed plan. The occupation of the tide gate structure within the coastal marine area and the damming and diversion of water are therefore to be considered as a discretionary activity under Sections 12, 14 and 87B of the Resource Management Act. Overall, the application is therefore considered to be a discretionary activity.

3.2 TIDE GATES AND WEIR AS INFRASTRUCTURE

The Southland Regional Policy Statement (SRPS) definition of Strategic Facilities includes flood and drainage infrastructure managed by the Southland Regional Council. The SRPS definition of Critical infrastructure states:

“Infrastructure that provides services which, if interrupted, would have a significant effect on the wellbeing and health and safety of people and communities and would require reinstatement, and includes all strategic facilities”.

The SRPS definition of Regionally Significant Infrastructure states:

“Infrastructure in the region which contributes to the wellbeing and health and safety of the people and communities of the region, and includes all critical infrastructure”.

The tide gates are flood and drainage infrastructure managed by the Southland Regional Council and as such are a Strategic Facility under the SRPS. The tide gates are also defined as Critical infrastructure and Regionally Significant Infrastructure under the SRPS. The RMA definition of infrastructure includes ‘drainage systems’ and the weir and tide gates are considered to be structures consistent with this definition. The status of the tide gates as infrastructure is noted here as the SRPS and the regional plans that are required to give effect to the RPS all include objectives and policies recognizing the importance of infrastructure. The relevant infrastructure related objectives and policies are discussed further below.

4 ASSESSMENT OF ENVIRONMENTAL EFFECTS

Section 88 of the RMA requires the applicant to assess any actual or potential effects that the activity may have on the environment. Clause 6 of the Fourth Schedule details that information required to be included in the assessment. The proposed activity is a discretionary activity under the Coastal Plan. This assessment of environmental effects has been provided in such detail as corresponds with the scale and significance of the effects that the activity may have on the environment.

4.1 EFFECTS ON STREAM MORPHOLOGY AND DYNAMICS

When the tide gate and weir were originally constructed, and the diversion channel was formed around 1917 there were adverse effects on stream morphology and dynamics. The original stream channel has been blocked by the weir, a diversion channel has been formed and the tidal gates constructed to restrict incoming tidal waters from flowing further upstream. These effects are on-going and are a direct outcome of the design of the flood and drainage infrastructure. The purpose of the Titiroa Stream tide gates and weir is to ensure the on-going drainage capability upstream and prevent flooding of the surrounding low-lying farmland.

This application does not propose any changes to the existing structures and continued occupation of CMA will not give rise to any additional adverse effects on the Titiroa Stream. The tide gate and weir are existing structures and form part of the existing physical environment and must be managed sustainably. These structures are having an ongoing adverse effect on the Titiroa Stream and its natural tidal processes. These adverse effects need to be balanced against the positive drainage and flood protection effects discussed below in Section 4.8.

4.2 LANDSCAPE, VISUAL AMENITY EFFECTS

The application site is not identified as being within either an area of Outstanding Landscapes or Natural Features or a Visual Amenity Landscape in the Southland District Plan. It is identified as being located within the Coastal Overlay in the District Plan and is located in the CMA.

When the tide gate and weir were originally constructed, and the diversion channel was formed the landscape was altered and there were visual effects associated with these works. The tide gate and weir are existing structures and form part of the existing physical environment. No changes are proposed to the weir or tide gate structures. The tide gates and weir are not overly prominent or visible and have only a localised visual effect. This application does not propose any changes to the existing structures and as such the proposed activity will not give rise to any adverse landscape or visual amenity effects.

4.3 EFFECTS ON WATER QUALITY

This application does not propose any changes to the existing tide gate and weir structures and continued occupation of the CMA is not anticipated to give rise to any adverse water quality effects.

4.4 ECOLOGY

The recently lapsed Coastal Permit (AUTH-204122) for the tide gates and weir was processed on a limited notification basis in 2015. The Department Conservation submitted and initially opposed the application in part because the tide gates potentially reduced the ability of fish to migrate from the coast up the Titiroa Stream.

Subsequently following mediation, the Coastal permit was granted for a term of 5 years (less than the duration requested) with a condition requiring monitoring investigations to assess effects on native fish. The monitoring required included a comparison of native fish upstream and downstream of the tide gates and an assessment of flow downstream of the tide gates to determine if water velocities are impacting native fish species.

4.4.1 FISH PASSAGE

The applicant engaged Pattle Delamore Partners (PDP) who completed a comparative fish survey both upstream and downstream of the tide gates. PDP also provided an assessment of the flow profiles immediately downstream of the tide gate structure. The purpose of the Assessment was to determine if the tide gate structure is posing a barrier to fish movement. The PDP Assessment is attached as Appendix B.

The PDP Assessment notes that all four migratory species of native fish recorded in the investigation were found both upstream and downstream of the tide gates with both upstream and downstream fish having a similar size range. This suggests that fish migration is not impeded by the tide gates and the presence of large eels upstream of the gates suggests that migration has not been impeded over many years.

PDP conclude that the tide gates have only a minor effect on fish migration and water velocity through the gates should not present too great a barrier to most migrating fish.

4.4.2 INANGA SPAWNING

PDP also provide an assessment of the effects of the tide gates on the spawning of inanga in the Titiroa River. They conclude that the tide gates probably have a significant and detrimental effect on spawning migrations of inanga in the Titiroa Stream. They note that it may be possible to mitigate these effects by restoring and /or enhancing inanga spawning habitat nearby.

As noted above at Section 4.1 the original stream channel has been blocked by the weir, a diversion channel has been formed and the tidal gates constructed to restrict incoming tidal waters from flowing further upstream. These effects are on-going and are a direct outcome of the design of the flood and drainage infrastructure. The purpose of the Titiroa Stream tide gates and weir is to ensure the on-going drainage capability upstream and prevent flooding of the surrounding low-lying farmland. This application does not propose any changes to the existing structures and continued occupation of CMA will not give rise to any additional adverse effects on the Titiroa Stream.

The tide gate and weir are existing structures and form part of the existing physical environment and must be managed sustainably. These structures are having an ongoing adverse effect on the Titiroa Stream and its natural tidal processes and this includes likely effect on inanga spawning. These adverse effects need to be balanced against the positive drainage and flood protection effects discussed below in Section 4.7. The PDP Assessment suggest mitigation focussed on enhancement and restoration of spawning habitat and this is discussed further below in Section 6.1.

4.5 EFFECTS ON PUBLIC ACCESS

The Titiroa River is large enough in this area to be navigable by small boats. It is unlikely that such boats would pass through the gate structure, but they could be carried around it. The tide gate and weir are existing structures and form part of the existing physical environment. This application does not propose any changes to the existing structure and the proposed activity will not give rise to any adverse effects on public access other than those that arose when the tide gates were originally constructed over 100 years ago.

4.6 HISTORIC HERITAGE

There are no known sites of historic heritage identified shown on the relevant Southland District Plan Planning Maps. There are no known sites of historic heritage identified shown on the relevant map (9b) in the Coastal Plan near the application site. Irrespective no physical works are proposed as part of this application and as such the activity is not likely to give rise to any adverse effects on historic heritage. The activity is not likely to give rise to any significant adverse on historic heritage.

4.7 CULTURAL

The application site is not within a Statutory Acknowledgement area. Ngāi Tahu ki Murihiku have a spiritual and historical association with Southland's coastal environment. The fish survey has also identified the presence of native fish species that are mahinga kai resources. As noted above the occupation of the CMA and the function of the tide gates and weir are having ongoing effects associated with the Titiroa Stream given their function to restrict tidal waters moving upstream. The tide gates are having only a minor effect on fish migration but may impact on inanga spawning. Consultation with iwi through Te Ao Marama Inc is proposed and they have been identified as an affected party. This consultation will assist in terms of determining the cultural values, interests and associations with the site and activity and any potential cultural effects.

4.8 DRAINAGE AND FLOOD PROTECTION

The purpose of the tide gates and weir is to block tidal inflow further up the Titiroa in order to reduce flooding and improve drainage of low-lying farmland upstream of the gates. The tide gates influence approximately 11,500 hectares of improved pasture alongside the Titiroa Stream. The activity has positive social and economic effects through drainage and flood protection.

4.9 CONCLUSION

The activity is having ongoing adverse effects on natural tidal processes in the Titiroa Stream and is also likely to be having an adverse effect on inanga spawning. These effects are on-going and are directly related to the function of the tide gate infrastructure. The purpose of the Titiroa Stream tide gates and weir is to ensure the on-going drainage capability upstream and prevent flooding of the surrounding low-lying farmland.

5 ASSESSMENT OF ALTERNATIVES

The following alternatives were considered:

1. Do nothing; or
2. Remove infrastructure; or
3. Retain infrastructure.

Maintaining and improving flood protection infrastructure is an important function of the Catchment Division of Environment Southland. This infrastructure has specifically been designed, operates and is maintained to protect people and property from tidal flows.

The intermittent flow control with the tide gates, their continued occupation in the diversion channel and the occupation of the tide gates and weir in the CMA is considered necessary to ensure ES Catchment Division meets its obligations in the Mataura River Rating District.

The tide gates and weir protect upstream farmland from flooding and drainage issues and allow a large land area to be productively farmed.

A do-nothing approach would see the existing infrastructure deteriorate and land drainage fail. Removal of the infrastructure would result in drainage and flood issues upstream and a loss of productive farmland.

The AEE detailed in this application demonstrates that the tide gates and weir are having ongoing adverse effects. However, these effects are associated with the function of the infrastructure which is to specifically prevent tidal flows past the tide gates and these effects link back to construction of the infrastructure over 100 years ago. The tide gates and weir are also having positive environmental, social and economic effects in regard to drainage and flood management. As a result, alternative options 1 and 2 are not considered appropriate and retention of the existing infrastructure is considered the most appropriate option.

6 MITIGATION

6.1 DOWNSTREAM LAND MANAGEMENT

The PDP Assessment concludes that tide gates probably have a significant and detrimental effect on spawning migrations of inanga in the Titiroa Stream. They note that it may be possible to mitigate these effects by restoring and /or enhancing inanga spawning habitat nearby.

Environment Southland via its Catchment Management Division owns and manages a significant land area adjoining the Titiroa Stream adjacent and downstream of the tide gates. The area has been identified as the Lower Titiroa Wetland Reserve and is managed with a conservation management focus.

As part of the ongoing management of the Lower Titiroa Wetland Reserve 110 hectares of land adjoining the Titiroa Stream has been fenced and stock grazing prevented. These riparian areas are being managed to enable restoration and enhancement of the stream margins. Marginal grasses and rushes which the PDP Assessment notes as important for inanga spawning are being protected through this management approach.

The applicant's management of the Lower Titiroa Wetland Reserve is consistent with restoration and enhancement of inanga spawning habitat and mitigation of the effects of the tide gate infrastructure.

6.2 PROPOSED CONDITIONS

No physical works are proposed as part of this application and as such there is limited need for conditions of consent.

#	CONDITION
1	The consent holder shall at all times during the term of this consent maintain the structures in good repair, appearance and condition.
2	Monitoring condition (standard wording).
3	Review condition (standard wording).
4	The Titiroa Wetland Reserve shall be managed in a manner that maintains and enhances inanga habitat.

7 STATUTORY ASSESSMENT

Clause 2 of the Fourth Schedule of the Act requires an assessment of the activity against any relevant provision of a document referred to in Section 104(1)(b). As the application relates to an existing activity within the CMA the Regional Water Plans and NPS and NES for Freshwater are not relevant considerations.

7.1 NEW ZEALAND COASTAL POLICY STATEMENT 2010

The New Zealand Coastal Policy Statement 2010 (the NZCPS) sets out to achieve the purpose of the Act in relation to the coastal environment, identifying and promoting the sustainable management of the coastal environment and its characteristics, qualities and uses. Relevant objectives and policies are discussed below.

Objective 1 - To safeguard the integrity, form, functioning and resilience of the coastal environment and sustain its ecosystems, including marine and intertidal areas, estuaries, dunes and land, by:

- *maintaining or enhancing natural biological and physical processes in the coastal environment and recognising their dynamic, complex and interdependent nature;*
- *protecting representative or significant natural ecosystems and sites of biological importance and maintaining the diversity of New Zealand's indigenous coastal flora and fauna; and*
- *maintaining coastal water quality, and enhancing it where it has deteriorated from what would otherwise be its natural condition, with significant adverse effects on ecology and habitat, because of discharges associated with human activity.*

The activity is having ongoing adverse effects on natural tidal processes in the Titiroa Stream and is also likely to be having an adverse effect on inanga spawning. These effects are on-going and are directly related to the function and purpose of the tide gate infrastructure. The purpose of the Titiroa Stream tide gates and weir is to ensure the on-going drainage capability upstream and prevent flooding of the surrounding low-lying farmland. Natural biological and physical processes in the coastal environment associated natural tidal processes have been altered by the tide gates structures since they were originally constructed. The applicant through management of the Titiroa Wetland Reserve is protecting representative or significant natural ecosystems and sites of biological importance and maintaining the diversity of New Zealand's indigenous coastal flora and fauna. The activity is not likely to be having an adverse effect on coastal water quality. The activity is considered partly contrary to Objective 1.

Objective 6: To enable people and communities to provide for their social, economic, and cultural wellbeing and their health and safety, through subdivision, use, and development, recognising that:

- *the protection of the values of the coastal environment does not preclude use and development in appropriate places and forms, and within appropriate limits;*
- *some uses and developments which depend upon the use of natural and physical resources in the coastal environment are important to the social, economic and cultural wellbeing of people and communities;*

- *functionally some uses and developments can only be located on the coast or in the coastal marine area;*
- *the coastal environment contains renewable energy resources of significant value;*
- *the protection of habitats of living marine resources contributes to the social, economic and cultural wellbeing of people and communities;*
- *the potential to protect, use, and develop natural and physical resources in the coastal marine area should not be compromised by activities on land;*
- *the proportion of the coastal marine area under any formal protection is small and therefore management under the Act is an important means by which the natural resources of the coastal marine area can be protected; and*
- *historic heritage in the coastal environment is extensive but not fully known, and vulnerable to loss or damage from inappropriate subdivision, use, and development.*

The activity is consistent Objective 6 in that it is enabling people and communities to provide for their social and economic wellbeing.

Policy 6: Activities in the coastal environment

1. In relation to the coastal environment:

- a. recognise that the provision of infrastructure, the supply and transport of energy including the generation and transmission of electricity, and the extraction of minerals are activities important to the social, economic and cultural well-being of people and communities;*
- b. consider the rate at which built development and the associated public infrastructure should be enabled to provide for the reasonably foreseeable needs of population growth without compromising the other values of the coastal environment;*
- c. encourage the consolidation of existing coastal settlements and urban areas where this will contribute to the avoidance or mitigation of sprawling or sporadic patterns of settlement and urban growth;*
- d. recognise tangata whenua needs for papakāinga, marae and associated developments and make appropriate provision for them;*
- e. consider where and how built development on land should be controlled so that it does not compromise activities of national or regional importance that have a functional need to locate and operate in the coastal marine area;*
- f. consider where development that maintains the character of the existing built environment should be encouraged, and where development resulting in a change in character would be acceptable;*
- g. take into account the potential of renewable resources in the coastal environment, such as energy from wind, waves, currents and tides, to meet the reasonably foreseeable needs of future generations;*
- h. consider how adverse visual impacts of development can be avoided in areas sensitive to such effects, such as headlands and prominent ridgelines, and as far as practicable and reasonable apply controls or conditions to avoid those effects;*

- i. set back development from the coastal marine area and other water bodies, where practicable and reasonable, to protect the natural character, open space, public access and amenity values of the coastal environment; and*
- j. where appropriate, buffer areas and sites of significant indigenous biological diversity, or historic heritage value.*

2. Additionally, in relation to the coastal marine area:

- a. recognise potential contributions to the social, economic and cultural wellbeing of people and communities from use and development of the coastal marine area, including the potential for renewable marine energy to contribute to meeting the energy needs of future generations;*
- b. recognise the need to maintain and enhance the public open space and recreation qualities and values of the coastal marine area;*
- c. recognise that there are activities that have a functional need to be located in the coastal marine area, and provide for those activities in appropriate places;*
- d. recognise that activities that do not have a functional need for location in the coastal marine area generally should not be located there; and*
- e. promote the efficient use of occupied space, including by:*
 - i. requiring that structures be made available for public or multiple use wherever reasonable and practicable;*
 - ii. requiring the removal of any abandoned or redundant structure that has no heritage, amenity or reuse value; and*
 - iii. considering whether consent conditions should be applied to ensure that space occupied for an activity is used for that purpose effectively and without unreasonable delay.*

In regard to the coastal environment this policy seeks to recognise that the provision of infrastructure such as the tide gates and weir are activities important to the social, economic and cultural well-being of people and communities (Policy 6 (1) (a)). The infrastructure has a functional need to be located and operate in the coastal marine area (Policy 6 (1) (e)). Policy 6 (2) (c) in regard to the coastal marine area seeks to recognise that there are activities that have a functional need to be located in the coastal marine area, and that those activities are provided for in appropriate places. The activity is considered consistent with Policy 6.

The proposed activity considered partly contrary to Objective 1 and consistent with Objective 6 and Policy 6 of the NZCPS.

7.2 NATIONAL ENVIRONMENTAL STANDARDS

No National Environmental Standards are considered directly relevant to the activity.

7.3 SOUTHLAND REGIONAL POLICY STATEMENT 2017

The Southland Regional Policy Statement 2017 (SRPS) is a relevant consideration. Objectives and policies relevant to the activity are listed and discussed below.

Tangata Whenua

Objective TW.2 - Provision for iwi management plans: All local authority resource management processes and decisions take into account iwi management plans.

Coast

Objective COAST.2 - Activities in the coastal environment: Infrastructure, ports, energy projects, aquaculture, mineral extraction activities, subdivision, use and development in the coastal environment are provided for and able to expand, where appropriate, while managing the adverse effects of those activities on public access and natural character.

Objective COAST.3 - Coastal water quality and its ecosystems: Coastal water quality and its ecosystems are maintained or enhanced.

Policy COAST.2 - Management of activities in the coastal environment: Ensure adequate measures or methods are utilised within the coastal environment when making provision for subdivision, use and development to:

- i. protect indigenous biodiversity, historic heritage, natural character, and natural features and landscape values historic heritage;*
- ii. maintain or enhance amenity, social, intrinsic, ecological and cultural values, landscapes of cultural significance to tangata whenua and coastal dune systems;*
- iii. maintain or enhance public access; and*
- iv. avoid or mitigate the impacts of natural hazards, including predicted sea level rise and climate change.*

Policy COAST.4 - Infrastructure, port, aquaculture and energy projects: Recognise and provide for infrastructure, port, aquaculture and energy projects that must be located within the coastal environment.

Policy COAST.5 - Management of effects on coastal water quality and ecosystems: Avoid, remedy or mitigate adverse effects of land-based activities on coastal water quality and its ecosystems.

Infrastructure /Transport

Objective INF.1 - Southland's infrastructure: Southland's regional, national and critical infrastructure is secure, operates efficiently, and is integrated with land use and the environment.

Policy INF.1 - Regional, national and critical infrastructure - Recognise the benefits to be derived from, and make provision for, the development, maintenance, upgrade and ongoing operation of regionally significant, nationally significant and critical infrastructure and associated activities.

In regard to Objective TW.2 consultation with iwi through Te Ao Marama Inc is proposed and the relevant provision of the iwi management plan are discussed below.

Objective INF.1 requires critical infrastructure such as the tide gates and weir to operate efficiently and be integrated with land use and the environment. Policy INF.1 seeks recognition for the benefits to be derived from infrastructure and to make provision for the ongoing operation of regionally significant, and critical infrastructure such as the tide gates and weir. The activity is considered consistent with Objective INF.1 and Policy INF.1.

Policy COAST.2 relates to management of activities in the coastal environment and seeks to ensure adequate measures to protect indigenous biodiversity and maintain or enhance ecological and cultural values. As outlined above the activity is having on-going adverse effects and mitigation is promoted through management of the Titiroa Wetland Reserve. This policy also seeks to avoid or

mitigate the impacts of natural hazards and one of the functions of the tide gates is to drainage management and prevention of flooding.

There is a functional need for structures associated with the activity to be in the coastal environment and coastal marine area. The tide gates and weir are regionally significant infrastructure that has a functional need to be located in the CMA and the activity is considered consistent with Policy COAST.4.

In regard to Policy COAST.5 as outlined above there are ongoing effects associated with the infrastructure. However, these effects are being mitigated via the applicant's management of the Titiroa Wetland Reserve and as such the activity is considered consistent with Policy COAST.5. Overall, on balance when considering all relevant provisions, the proposed activity is not considered contrary to the relevant policies of the Regional Policy Statement for Southland.

7.4 REGIONAL COASTAL PLAN FOR SOUTHLAND 2013

The Regional Coastal Plan for Southland (the Coastal Plan) became fully operative in March 2013. The relevant policies and objectives of the Coastal Plan are listed and discussed below.

Objective 11.2.2 - Social, economic and safety benefits: To recognise the social, economic, cultural and safety benefits of structures in the coastal marine area.

Policy 11.2.10 - Soundness and safety: Any structure in the coastal marine area is to be designed, constructed, and maintained in a manner which ensures that its soundness and safety is not compromised by its use, corrosion, the action of marine organisms, or fluvial or coastal processes.

Policy 11.2.16 - Natural character, amenity, landscape, seascape and open space values: Avoid, remedy or mitigate the adverse effects of structures on the natural character, amenity, landscape, seascape and open space values of the coastal marine area.

Policy 11.2.17 - Structures and activities to be compatible with their surrounding environment: Encourage structures and activities, including reclamations, to be located, finished, and be of a form, profile, extent and alignment that is not incompatible with the visual amenity, natural character and physical landscape of the area in which it is located.

Policy 11.3.1 - Existing structures providing public benefit: Authorise existing structures, and their occupation of the coastal marine area, subject to safety standards, that provide public benefit.

Objective 11.6.1 - Adverse effects of new or changing activities: To ensure that new or changing activities on structures do not result in adverse effects.

Policy 11.6.1 - New and Changing Activities on Existing Structures including Structures on Structures: Consider new and changing activities on existing structures, including structures on structures, on the same basis as new activities or new structures.

Objective 11.2.2 aims to recognise the social, economic, cultural and safety benefits of structures in the coastal marine area. As outlined above the tide gates and weir have social and economic benefits through drainage management and control of tidal processes. In regard to Policy 11.2.10 no works are proposed as part of this application. In regard to Policy 11.2.16 and Policy 11.2.17, no physical works are proposed, the structures form part of the physical environment, have been present for over 100 years and as outlines above are no have any significant adverse effects on landscape or amenity values.

Policy 11.3.1 seeks to authorise existing structures, and their occupation of the coastal marine area, subject to safety standards, that provide public benefit. Objective 11.6.1 and Policy 11.6.1 relate only to new or changing activities and are not considered relevant.

The activity is considered consistent with the relevant provisions of the RCP.

7.5 TE TANGI AU TAUIRA – IWI MANAGEMENT PLAN

The relevant objectives and policies of Te Tangi Au Tauira the Ngai Tahu ki Murihiku Natural Resources and Environmental Iwi Management Plan are as follows:

Section 3.6 Te Ākau Tai Tonga – Southland's Coastal Environment

3.6.1.1 Ensure the land, water and biodiversity at the interface of Southland's coastal environment are managed in an integrated way through careful planning and policy instruments which avoid compartmentalising the natural environment.

3.6.2.2 Ensure consistency with the policies as outlined in the New Zealand Coastal Policy Statement, with respect to protection, development and use of Southland's Coastal Environment.

3.6.2.8 Require that an assessment of environmental effects includes and assessment of the cultural effects and potential cumulative effects on the natural character of the coastal environment.

3.6.3 Structures in the Coastal Marine Area

3.6.3.1 Any activity within, adjacent to or that may potentially impact on Statutory Acknowledgment areas, including Te Mimi o Tū Te Rakiwhānoa (Fiordland Coastal Marine Area) and Rakiura/ Te Ara a Kiwa (Stewart Island/Foveaux Strait Coastal Marine Area), will require consultation with both Te Rūnanga o Ngāi Tahu, Ngāi Tahu ki Murihiku and Tangata Tiaki gazetted under the South Island Customary and Fishing Regulations 1998.

3.6.3.5 Ensure that structures in the coastal environment are soundly constructed, are compatible with the natural character of the surrounding coastal environment and adjacent lands and do not have adverse effects on other people using the coast area. This includes appropriate placement of moorings and anchorages.

3.6.3.16 Encourage owners and other stakeholders to maintain existing coastal structures in a reasonable and safe condition.

3.6.4 Coastal Access

3.6.4.4 Work with stakeholders, local government agencies and others whom have an interest in the coastal environment to promote and provide information relating to values associated with the area and the need to respect the environment through promotion of responsible tourism.

3.6.7 Coastal Water Quality

18. Avoid inappropriate location and design of infrastructure e.g. outfalls and pipelines which may pose a threat to water quality. Encourage agencies and developers to adopt best practice when undertaking coastal protection so as to avoid any unnecessary discharge to coastal waters.

3.6.13 Coastal Ecosystems

3.6.13.1. Avoid coastal activities that may disturb, and have a direct or indirect detrimental impact, on areas of significant vegetation and habitats. Direct impacts may be physical

damage while indirect impacts may include effects arising from siltation, deposition or displacement over time.

Section 3.7 Ngā Moutere o Murihiku - Offshore Islands

3.7.1 Retention of Natural Vegetation, Habitat and Fauna

3.7.1.7 Encourage continued joint management arrangements and programmes between Ngāi Tahu ki Murihiku and Ngāi Tahu ki Murihiku and the Department of Conservation, Te Papa Atawhai with respect to vegetation clearance, restoration and enhancement.

3.7.5 Tourism

3.7.5.5. Ensure consultation with respect to access within areas of interest (including conservation estate) occurs with local rūnunga.

The application relates to existing infrastructure activity and no physical changes to the infrastructure are proposed. There is a functional need for structures associated with the activity to be in the coastal environment and coastal marine area.

The activity is having ongoing adverse effects on natural tidal processes in the Titiroa Stream and is also likely to be having an adverse effect on inanga spawning. These effects are on-going and are directly related to the function of the tide gate infrastructure. The purpose of the Titiroa Stream tide gates and weir is to ensure the on-going drainage capability upstream and prevent flooding of the surrounding low-lying farmland. As such these adverse effects need to be balanced against the positive flood protection effects and related economic and social benefits.

Overall, it is promoted that the works are consistent with the relevant policies of Te Tangi Au Taurira – The Cry of the People - Ngai Tahu ki Murihiku Natural Resources and Environmental Iwi Management Plan.

7.6 MARINE AND COASTAL AREA (TAKUTAI MOANA) ACT

Environment Southland website ([Customary Marine Title](#)) signals four Customary Marine Title applications for coastal waters in Southland have been lodged with the High Court. One application pertains to all of the Coastal waters along the Southland coastline. The contact for this application is identified as:

Te Runanga o Ngāi Tahu on behalf of Ngāi Tahu Whānui

Rachel Brown

Bell Gully

PO Box 1291

Wellington 6140

rachael.brown@bellgully.com

TRONT have been contacted and their views have been sought on the application. If or when a response is received it will be provided to the Council.

8 CONSULTATION

8.1 AFFECTED PERSONS

Written approvals have been sought from the following persons:

1. Te Ao Marama Incorporated;
2. Department of Conservation;
3. Fish & Game Southland.

At the time of lodgement, the applicant was still consulting with these persons. Written approvals will be provided if or when obtained.

8.2 NOTIFICATION

Notification of an application lies at the discretion of the consent authority.

Section 95A sets out that an application must be notified if the activity will have or is likely to have adverse effects on the environment that are more than minor; if the applicant requests it; or it is required by a rule or national environmental standard.

As outlined above the activity is having on-going effects. The ongoing adverse effects of the structures need to be balanced against the positive flood protection effects and related economic and social benefits. The applicant is promoting mitigation of adverse effects on inanga spawning through ongoing management of the Titiroa Wetland Reserve.

The applicant does not request public notification, the Coastal Plan does not require it and no National Environmental Standards are applicable. Therefore, the RMA does not require that the application be publicly notified.

If a consent authority decides not to publicly notify an application, Section 95B requires that they determine if there are any persons affected by the activity. As outlined above the applicant has identified persons whom written approval will be sought.

9 RESOURCE MANAGEMENT ACT 1991

9.1 THE PURPOSE OF THE RMA

Section 5 of the RMA 1991 states sets out the Purpose of the Act which is to promote the sustainable management of natural and physical resources. It requires activities to be managed so that adverse effects on the environment are avoided, remedied or mitigated.

The tide gates and weir are part of the existing physical environment and must be sustainably managed. The activity is having ongoing adverse effects on natural tidal processes in the Titiroa Stream and is also likely to be having an adverse effect on inanga spawning. These effects are ongoing and are directly related to the function and purpose of the infrastructure. The purpose of the Titiroa Stream tide gates and weir is to ensure the on-going drainage capability upstream and prevent flooding of the surrounding low-lying farmland. As such the ongoing adverse effects of the structures need to be balanced against the positive flood protection effects and related economic and social benefits. The applicant is promoting mitigation of adverse effects on inanga spawning through ongoing management of the Titiroa Wetland Reserve.

The activity is considered consistent with the purpose of the RMA 1991.

9.2 SECTION 6

Section 6 sets out the Matters of National and the following matters are considered relevant to this application:

- (a) *the preservation of the natural character of the coastal environment (including the coastal marine area), wetlands, and lakes and rivers and their margins, and the protection of them from inappropriate subdivision, use, and development:*
- (b) *the protection of outstanding natural features and landscapes from inappropriate subdivision, use, and development:*
- (c) *the protection of areas of significant indigenous vegetation and significant habitats of indigenous fauna:*
- (d) *the maintenance and enhancement of public access to and along the coastal marine area, lakes, and rivers:*
- (e) *the relationship of Maori and their culture and traditions with their ancestral lands, water, sites, waahi tapu, and other taonga:*
- (f) *the protection of historic heritage from inappropriate subdivision, use, and development:*
- (g) *the protection of protected customary rights:*
- (h) *the management of significant risks from natural hazards.*

In regard to (a), (b) (d) no physical works are proposed and the tide gates and weir are existing infrastructure which has been present in the location for some time. Matters (f) and (g) are not considered directly relevant. The activity is consistent with (h) 'the management of significant risks from natural hazards' given its purpose in controlling drainage and tidal flooding. Regarding (c) the activity through mitigation and ongoing management of the Titiroa Wetland reserve is consistent with protection of significant habitats of indigenous fauna.

9.3 SECTION 7

Section 7 of the RMA sets out those “other matters” that Council is to have particular regard to are:

- *Kaitiakitanga (a);*
- *The ethic of stewardship (aa);*
- *The efficient use and development of natural and physical resources(b);*
- *The maintenance and enhancement of amenity values (c);*
- *Intrinsic values of ecosystems (d);*
- *Maintenance and enhancement of the quality of the environment (f).*
- *Any finite characteristics of natural and physical resources (g).*

The activity is consistent with efficient use of physical resources and no physical works are proposed. The activity is considered consistent with Section 7 of the Act.

9.4 SECTION 8

Section 8 of the RMA requires all persons exercising functions under the Act to take into account the principles of the Treaty of Waitangi. Consultation with Iwi will be undertaken with a copy of the application supplied to provide the opportunity to consider the activity as a potentially affected party. The Titiroa Stream itself is not listed as a statutory acknowledgement under the Ngai Tahu Claims Settlement Act 1998 (NTCSA 1998). As noted above Ngāi Tahu ki Murihiku have a spiritual and historical association with Southland’s coastal environment.

10 SECTION 104

Section 104(1) outlines the following matters, which are relevant to Council's consideration of the application:

"When considering an application for a resource consent and any submissions received, the consent authority must, subject to Part 2, have regard to-

(a) any actual and potential effects on the environment of allowing the activity; and

(b) any relevant provisions of-

(i) a national environmental standard:

(ii) other regulations:

(iii) a national policy statement:

(iv) a New Zealand coastal policy statement:

(v) a regional policy statement or proposed regional policy statement:

(vi) a plan or proposed plan; and

(c) any other matter the consent authority considers relevant and reasonably necessary to determine the application".

These matters have been considered and are discussed above.

In regard to Section 104 (1) (ab) the applicant is promoting mitigation associated with management of the Titiroa Wetland Reserve as a measure for the purpose of ensuring positive effects on the environment to offset or compensate for adverse effects on the environment associated with the tide gates and weir.

11 CONCLUSION

The activity is having ongoing adverse effects on natural tidal processes in the Titiroa Stream and is also likely to be having an adverse effect on inanga spawning. These effects are on-going and are directly related to the function of the tide gate infrastructure.

The purpose of the Titiroa Stream tide gates and weir is to ensure the on-going drainage capability upstream and prevent flooding of the surrounding low-lying farmland. The adverse effects of the activity need to be balanced against the positive flood protection effects and related economic and social benefits.

As mitigation of the effects on inanga spawning the applicant is actively managing a large area of land downstream of the tide gates and weir. The Titiroa Wetland Reserve is being managed to maintain and enhance the margins of the stream and inanga spawning habitat.

The activity has been assessed against the objectives and policies of the relevant Plans. Overall, on balance when considering all relevant provisions, the proposed activity is not considered contrary to the relevant policies of the NZCPS, the Regional Policy Statement for Southland or the Regional Coastal Plan for Southland.

APPENDIX A

RECORD OF TITLE



**RECORD OF TITLE
UNDER LAND TRANSFER ACT 2017
FREEHOLD
Search Copy**




R. W. Muir
Registrar-General
of Land

Identifier **SL9A/593**
Land Registration District **Southland**
Date Issued 17 February 1989

Prior References

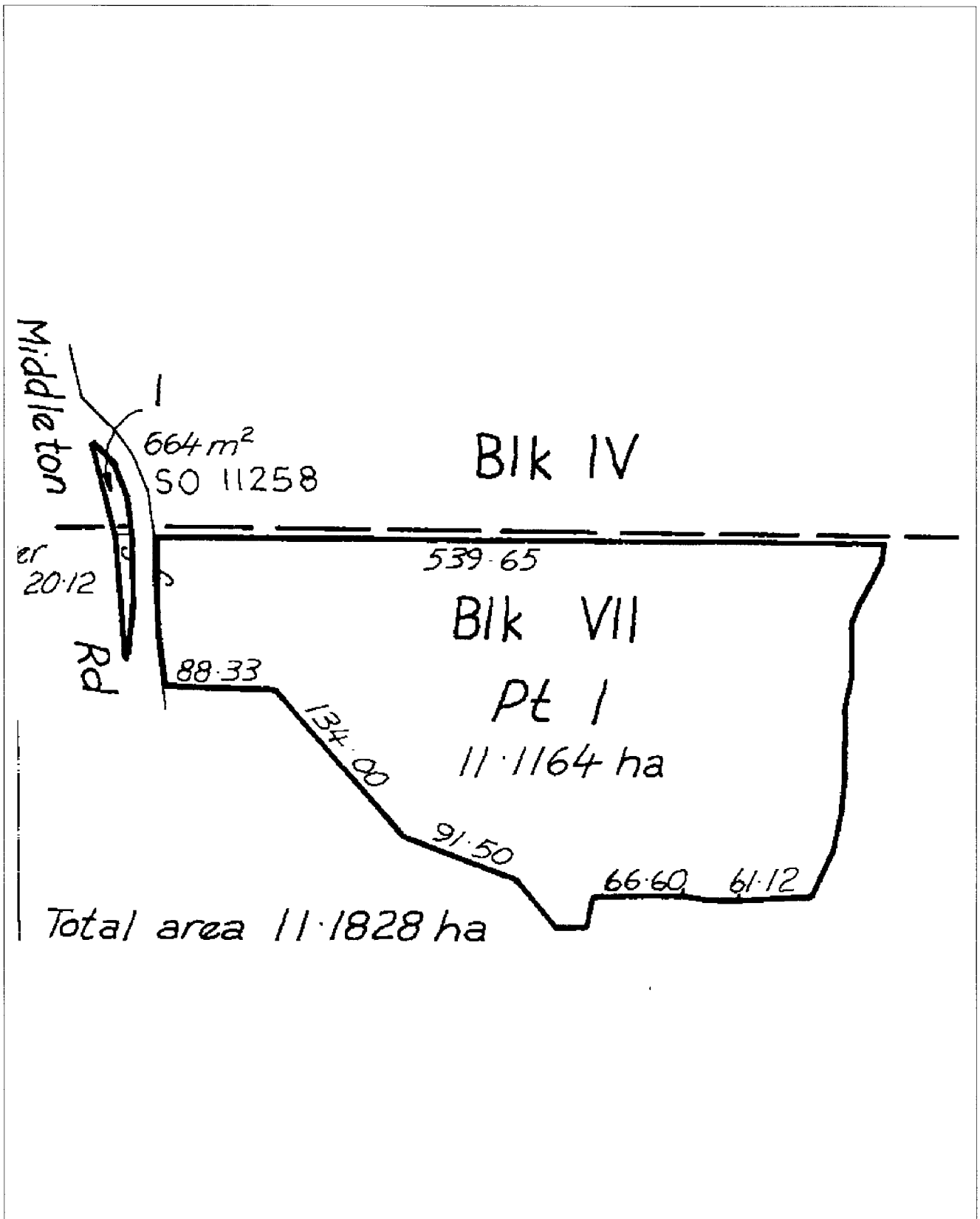
GN 159660.1 SL7B/203

Estate Fee Simple
Area 11.1828 hectares more or less
Legal Description Section 1 Survey Office Plan 11258 and Part
Lot 1 Deposited Plan 11173
Purpose River control

Registered Owners

Southland Regional Council

Interests



APPENDIX B

PDP FISH SURVEY AND VELOCITY PROFILES



4 February 2021

Dave Conner
Team Leader Catchment
Environment Southland
Cnr North Road & Price Street
Waikiwi
INVERCARGILL 98011

Dear Dave

TITIROA RIVER TIDE GATES FISH SURVEY & VELOCITY PROFILES

1.0 Introduction

Pattle Delamore Partners (PDP) was engaged by Environment Southland (ES) to undertake a comparative fish survey, both upstream and downstream of the tide gates located in the lower Titiroa River, as well as an assessment of the flow profiles immediately downstream of the tide gate structure. The purpose of this assessment is to determine if the tide gate structure is posing a barrier to fish movement.

1.1 Background

It is understood that ES previously held a coastal permit (Permit No. 204122), now expired, which authorised the occupation of the coastal marine area (CMA), and to dam tidal waters, with a tide gate structure (see Photo 1, attached). The conditions of the coastal permit required two monitoring investigations to be undertaken:

1. A comparison of native fish communities in sites upstream and downstream of the floodgate structure using the methods outlined in the New Zealand Freshwater Fish Sampling Protocols by Joy *et al.* (2013) and Hicks (2013).
2. An assessment of the flow profile immediately downstream of the tide gate structure to determine whether water velocities exceed the swimming speeds of native fish species in the area.

The Titiroa River is located on the eastern bank of the lower Maitai River floodplain and predominately flows through pastureland and some remnants of native bush. The location of the tide gate structure is approximately 200m upstream of the Tokonui-Gorge Road Highway and approximately 6.5km upstream from the Fortrose Estuary, as shown in Figure 1. The Titiroa River channel immediately downstream of the tide gate is approximately 8m wide.

2.0 Fish Community Assessment

2.1 Methodology

The Titiroa River in the vicinity of the floodgate structure is not suitable for standard sampling using electric fishing techniques due to the depth and the likely high conductivity of the water; therefore, fish communities upstream and downstream of the structure were assessed using baited fyke nets and baited Gee minnow traps set overnight.

Six fyke nets and six Gee minnow traps were set upstream and downstream of the structure (refer to Figure 2). Nets and traps were set from the banks of the waterway in the remnant channel parallel to the tidegate channel, as outlined in Figure 2.

The two parts of the channel are separated by a rock bund and, although the area available was relatively small, these two areas provided an excellent “side by side” comparison between upstream and downstream communities. This was primarily because they were of similar area and were static (non-flowing) habitats. The upstream area was shallower with deep sediment and dense instream macrophyte beds. The water depth here fluctuated with the operation of the gates, with Titiroa Stream flows backing up when the gates were closed and lowering when the gates were opened. The downstream area was generally deeper with less sediment and little instream macrophyte growth. The water level in this section fluctuated with the tides. Salinity was not measured as part of this investigation.

All nets and traps were baited with small, perforated tins of fish-flavoured cat food, and deployed late in the afternoon of 11 January 2021. Nets and traps were recovered the following morning (i.e., a soak time of about 18 hours). All captured fish were identified, counted, and estimates of their length were recorded. All fish were released back into the water close to where they had been caught.

2.2 Results

Longfin eel (*Anguilla dieffenbachii*), shortfin eel (*A. australis*), inanga (*Galaxias maculatus*), and common bully (*Gobiomorphus cotidianus*) were caught both downstream and upstream of the tidegate structure, while redfin perch (*Perca fluviatilis*) were only caught downstream (Table 1).

Many of the small fish (e.g., inanga and juvenile perch) observed in the fyke nets had clearly been consumed by larger fish (eels) caught in the same net and subsequently regurgitated. There is little doubt that counts of small fish were therefore conservative, i.e., many had been consumed and only some regurgitated.

Table 1: Summary of Fish Survey Results

Species	Longfin eel		Shortfin eel		Inanga		Common bully		Redfin perch	
	Number	Size (mm)	Number	Size (mm)	Number	Size (mm)	Number	Size (mm)	Number	Size (mm)
Upstream of tide gates										
Fyke 1	8	250-550								
Fyke2	10	300-600			1	65	1	65		
Fyke3	25	250-500			3	65-80	1	65		
Fyke4			1	550	1	65				
Fyke5	15	200-500	2	300	12	65-80				
Fyke6	8	300-500			2	65-80				
GM1					3	65-80				
GM2					3	65-80				
GM3					2	65-80	9	45-80		
GM4							1	65		
GM5					1	65	1	65		
GM6*										
Total	66	200-600	3	300-550	28	65-80	13	45-80	0	0
Downstream of tide gate										
Fyke 1	90	200-600			50	65-120			1	20
Fyke2	15	120-600	4	250-350	15	65-120	2	45-80		

Table 1: Summary of Fish Survey Results

Species	Longfin eel		Shortfin eel		Inanga		Common bully		Redfin perch	
	Number	Size (mm)	Number	Size (mm)	Number	Size (mm)	Number	Size (mm)	Number	Size (mm)
Fyke3	18	200-600			15	65-120			12	20-30
Fyke4	30	150-400	20	150-400	100	65-120	10	45-75	20	20-30
Fyke5	21	150-450	2	300-400	80	65-120	5	45-80	15	20-30
Fyke6	16	400-600	1	250	10	65-120	2	45-80	2	20-30
GM1	1	150			6	65-80				
GM2					1	70	1	50	1	25
GM3							3	45-80		
GM4					24	65-120	3	45-80	3	20-30
GM5	1	150			2	65-80	3	45-80	4	20-30
GM6*										
Total	192	150-600	27	150-400	303	65-120	29	45-80	58	20-30

Notes:

* =no catch

3.0 Flow Profile Assessment

Flow assessments on the Titiroa River were conducted at or near normal flow conditions, as estimated using real time data from both the Mokoreta and Waikawa Rivers, derived from the ES website.

From observing the operation of the tidegates on 11 and 12 January 2021, the Titiroa Stream discharged through the tidegates in the following pattern:

- ∴ On arrival the gates were closed and remained closed after peak high tide and did not open until the water level downstream of the gates fell to a level less than that of that upstream. The gates opened at 4:36pm approximately 121 minutes after high tide.
- ∴ Discharge from the stream through the gates was moderate when the gates first opened but built up as the water level downstream of the gates fell with the ebbing tide. Water velocity downstream of the tidegates appeared to peak at approximately 140 minutes after opening.
- ∴ As the water level upstream of the tidegates lowered, the discharge and water velocity through the tidegates decreased. When the tide had ebbed completely and had begun to rise once more, there was a brief period when no flow was discernible through the gates.
- ∴ As the tide rose, the water level downstream of the tidegates increased, and when the tidal water level just exceeded the water level in the stream the tidegates closed and blocked discharge from the stream. This occurred approximately 140 minutes after low tide. The gates remained closed while the tide continued to rise, and water from the Titiroa Stream built up behind the gates.

The duration of each tide gate opening depends on the height of the tide and the flow and water level of Titiroa Stream upstream of the gates. During our field work visit, the tide gates were open for approximately 380 minutes, i.e., about 51% of the 12.5 hour tidal cycle.

To determine whether water velocities exceed the swimming speeds of native fish species known to be present in the area, the fastest water speeds were targeted. Water velocities were measured over a 40-minute period from when the gates opened.

Assessment of the flow profile was undertaken approximately 2m downstream of the Titiroa tidegate structure using a River Surveyor S5. The maximum water velocity recorded was 1.328 m/s (note this is not a water velocity that is consistent throughout the water column). The average water velocity calculated throughout a series of transects across the Titiroa Stream was 0.3559m/s.

4.0 Discussion

All four native migratory species recorded in this investigation were found both upstream and downstream of the tidegates, and the size range of migratory fish upstream of the gates was similar to that downstream. This suggests that fish migration is not impeded by the tidegates, and the presence of large eels (probably more than 10 years old) upstream of the tidegates suggests that migration has not been impeded over many years.

The differences in overall numbers of fish caught upstream and downstream of the tidegates most likely reflects habitat suitability differences between the two areas surveyed. The presence of redfin perch downstream of the tidegates has little relevance to an assessment of the tidegates with respect to fish migration, as perch are an introduced species and do not migrate as part of their normal life-cycle.

Our conclusion is that the Titiroa River tidegates have only a minor effect on fish migration in general; the gates are open for approximately half of the time, and the water velocity through the gates should not present too great a barrier to most migrating fish. During each tidal cycle there are sustained periods when flow through the gates is essentially just “normal” river flow, as well as a period on the rising tide

when there is virtually no downstream flow. Even during the period when water velocity is greatest, native fish may well be able to migrate upstream by swimming near the bottom of the water column.

However, it is likely that the presence of the tidegates prevents or delays the spawning of inanga in the Titiroa River. Inanga are the main whitebait species around New Zealand and spawn amongst marginal grasses and rushes in areas close to the upstream limit of salt water penetration (the "salt wedge") at the very peak of high spring tides during Autumn. Fertilised eggs remain among the damp vegetation but out of the water until a later high spring tide, when they are re-inundated, hatch, and are washed downstream to the sea (about six months later they migrate back into the rivers as whitebait). Investigation of the limits of the salt wedge in the Titiroa Stream concluded that the salt wedge did not penetrate as far upstream as the tide gates (James Dare *pers. comm.*), meaning that inanga spawning would occur downstream of the gates. During autumn maturing (ripe) inanga congregate in shoals upstream, then move downstream to spawn in migrations that coincide with full and/or new moon and very high spring tides, and the presence and operation of the Titiroa tidegates means that inanga in the river upstream of the tidegates may be prevented or delayed from migrating down to the spawning areas.

Overall, the Titiroa tidegates probably have a significant and detrimental effect on spawning migrations of inanga in the Titiroa River, and there is little chance that this can be remediated by modifying the tidegates or altering their operation; the gates are designed specifically to prevent tidal water inundating land upstream of the tidegate structure. It may be possible to mitigate the effects of the tidegates on Inanga spawning by restoring and/or enhancing Inanga spawning habitat in other nearby environments. PDP recommend that ES consult with Department of Conservation (DoC) on suitable locations for this enhancement.

5.0 Limitations

This report has been prepared by Pattle Delamore Partners Limited (PDP) on the basis of information provided by Environment Southland. PDP has not independently verified the provided information and has relied upon it being accurate and sufficient for use by PDP in preparing the report. PDP accepts no responsibility for errors or omissions in, or the currency or sufficiency of, the provided information.

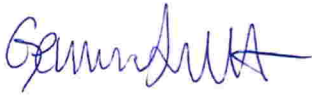
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Yours faithfully

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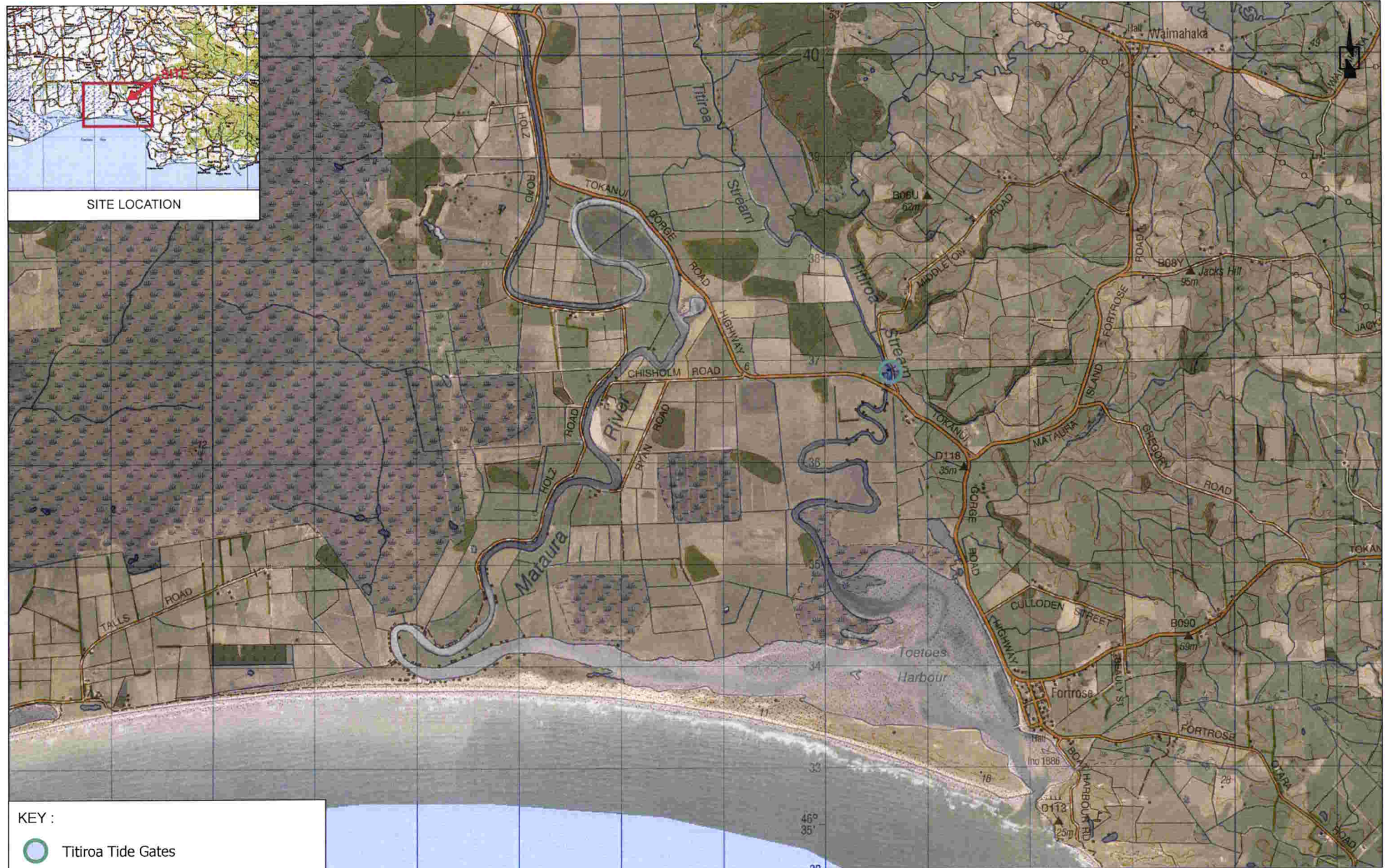
Technical Director – Water Infrastructure



Photo 1: Titiroa Tide Gate Structure Opening, view upstream.




Photo 2: Eels Captured in Fyke Net



KEY :
 Titiroa Tide Gates

SOURCE:
 1. AERIAL IMAGERY LINZ

FIGURE 1: TITIROA TIDE GATES LOCATION

SCALE : 1:50,000 (A4)

 KM



KEY :
Sampling Sites
● Downstream Sites
● Upstream Sites

SOURCE:
1. AERIAL IMAGERY: LINZ

FIGURE 2: SAMPLING SITES



APPENDIX C

HIGH VALUE AREA ASSESSMENT

High Value Area assessment report



Site name: Lower Titiroa Wetland Reserve
HVA site ID: ES MTRA 03

Survey Dates: 21st/22nd April and 27th/28th May 2010

Survey Completed by: Robin Mitchell (Kunzea Consultants Ltd.)

Note: Environment Southland is the brand name of Southland Regional Council

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Purpose

The purpose of the High Value Areas (HVA) assessment programme is to identify, define, describe, rank and record sites containing indigenous biodiversity values.

This report provides you, the landowner with information about the presence, condition and relative value of indigenous biodiversity on your land. The information provided in this report aims to:

- Promote the benefits of protecting and enhancing indigenous biodiversity values to landowners and the community in general;
- Assist landowners to make decisions about voluntarily seeking legal protection for biodiversity values on their land;
- Help assess the state of the indigenous biodiversity at local, regional and national level.

Background

Since the arrival of Polynesian settlers to New Zealand about 750 years ago, and later that of European settlers, there has been substantial pressure on the indigenous flora and fauna of our country. The main changes that have occurred are deforestation, draining of wetlands, and the modification of tussock grasslands. For example, the national extent of indigenous forest cover has been reduced from 85% in pre-polynesian times to approximately 23% today, and 90% of wetlands have been lost over the same time period. The introduction of pest plants and animals has added to the pressure on our native biodiversity and the proper functioning of ecosystems; they also threaten the productivity of pasture, crops and forestry¹. Now, it is in the lowlands, where the land is most productive and valuable, where many of our rarest ecosystems and species are found. This makes the fragments of native ecosystems that have been kept by private landowners of a very high value.

In the vicinity of Waituna, as a consequence of Maori fires, much of the lowland forest was removed and replaced by manuka scrub or red tussockland. European settlement and associated agricultural development further reduced the extent of forest and also reduced wetland extent through extensive drainage works, replacing them both largely with pasture. Marginal areas often retain a degree of naturalness even though they are modified by weeds, partial drainage, stock grazing and other agricultural activity.

Legal Description

The land parcels in which the HVA is found are:

- Part sections 1, 5, 8, 9, 10, 18, 19 and 21 Block VII, Toetoes SD.
- Section 7 Block VII, Toetoes SD.
- Lots 1, 3, 4, 6 and 7 DP 11228.
- *Note that the island in Toetoes Harbour that sits just at the mouth of the Titiroa Stream on the true left is part of the reserve but does not have a parcel number and has not been included within the reserve on the ES GIS system either.*

¹ Ministry for the Environment, *State of New Zealand's Environment*. Report released 2007.

Location and Access

- The HVA is located on either side of the lower Titiroa Stream and also includes parts of the edges of Toetoes Harbour;
- Access to the HVA is gained in three points; either from the bridge over Titiroa stream, or by following the east fork of Ryan Road to its end and keeping walking, or by following the track in the SE corner of the reserve that leaves the Tokanui-Gorge Road Highway;
- NZTM 2000 grid reference for the bush fragment in the centre-west of the reserve: E 1275788; N 4835267.

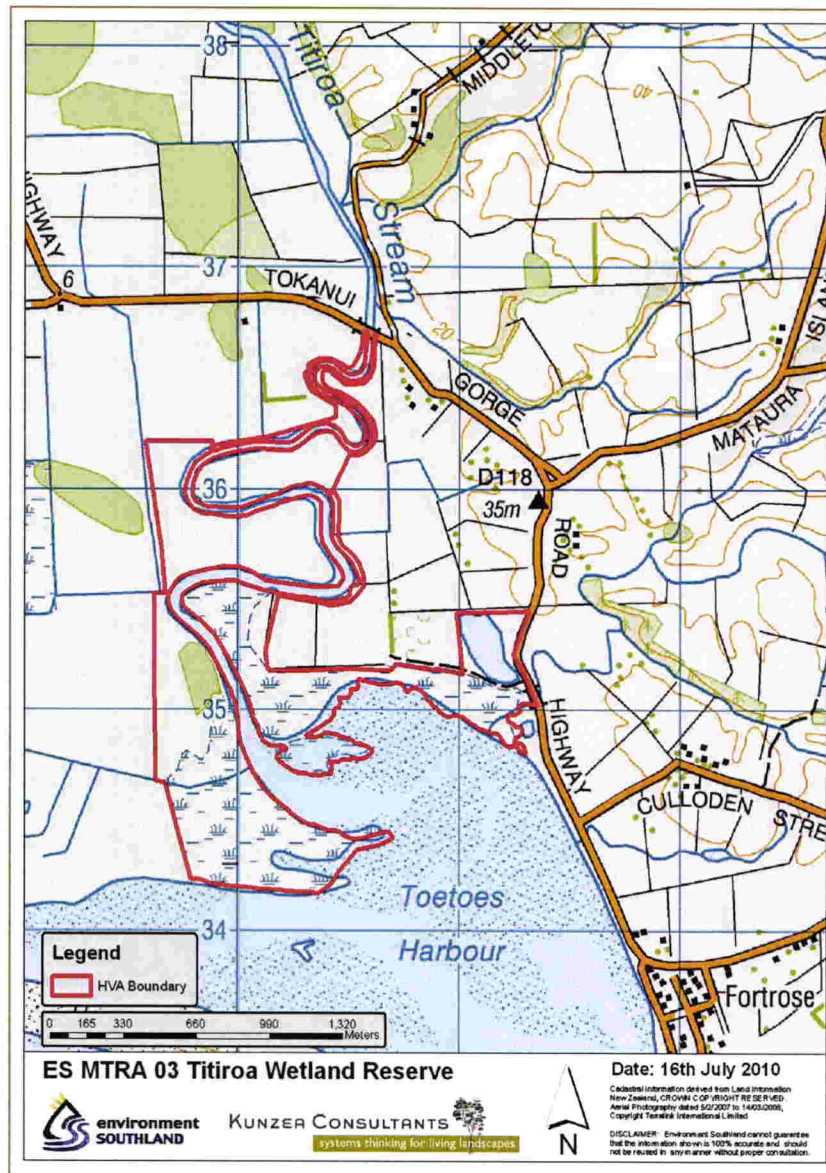


Figure 1: LINZ ‘Topo50’ series topographical map showing the HVA location. Note that the parts of the reserve along the margins of Toetoes Harbour are part of the internationally important ‘RAMSAR²’ designated Awarua wetland site.

² Ramsar wetlands refer to those wetlands that are recognised as internationally important by being designated under the Ramsar intergovernmental convention on wetlands (1971) that takes its name from the Iranian place where the treaty was signed. The treaty embodies the commitments of its 160 member countries to maintain the ecological character of their wetlands of international importance. New Zealand has 6 Ramsar sites that total 55,000 ha.

General Habitat Description

Figure one above shows the HVA boundary overlaid onto LINZ Topo50 series topographical maps. Note that this boundary represents the area surveyed that lies between the grazing land on the landward side and the high tide mark on the river or estuary side. This boundary may disagree slightly with the existing boundary in the ES GIS database, but it is accurate in terms of the land area that is actually managed as a reserve; i.e. that which is fenced off from the adjacent farmland.

See appendix one for a map showing approximate boundaries of the six vegetation units identified within the HVA overlaid onto aerial imagery. Appendix three displays the photographs that illustrate the diversity of habitat types within the HVA.

Part of the site has been previously surveyed by Geoff Walls in 2002 as part of his Southland Conservancy-wide wetland survey. His survey was limited to the south-western part of the HVA and was very brief. Nonetheless, he identified that the surveyed area was worthy of protection to be included with the wildlife reserve which protected the estuarine area on the opposite side of the Titiroa Stream mouth at the time.

River Catchment

The HVA drains directly into either the lower Titiroa Stream, or, Toetoes Harbour.

Ecological District (ED)³

The HVA is situated in the Waituna ED.

New Zealand is divided into 85 ecological regions and 268 ecological districts. An ecological district is a part of New Zealand where geological, topographical, and climatic factors, as well as biological features and processes all interrelate to produce a characteristic landscape and range of biological communities. The ecological district framework (McEwen, 1987⁴) has been widely used by ecologists as the basis for organising ecological research and environmental management initiatives.

The Waituna ED is the southern-most ecological district in mainland New Zealand. The Waituna ED is a small flat area characterised by a low coastal relief and a climate that is cool, cloudy and windy with a rainfall of 1000-1200mm per annum. The soils are largely poorly drained and deep acid peat on flatter parts with strongly leached soils on surrounding gently undulating areas, as well as small areas of alluvial soils, coastal dunes and sand flats. Accordingly, it contains proportionately more wetland than any other ecological district.

The pre-human vegetation cover of the district has been postulated to have been dominated by a mosaic of mostly lowland rushland-tussockland-shrubland, with large expanses of lowland kererupodocarp-hardwood forest localised to more favourable sites. Today, the native vegetation is concentrated nearer to the coast and is dominated by wire rush-tangle fern peat bogs and regenerating manuka shrubland. Some patches of other habitats persist, including flax and red tussock swamps, as well as several variants of lowland podocarp-hardwood forest. Truly coastal ecosystems such as estuarine salt marsh, sand-dune and gravel beach were naturally limited in their distribution and survive relatively intact.

³ For more information, navigate to: <http://www.mfe.govt.nz/publications/ser/metadata/env-class/page11.html>

⁴ McEwen, W. M. (editor), 1987. *Ecological regions and districts of New Zealand*. Third revised edition in four 1:5000,000 maps with one booklet to accompany each map. New Zealand Biological Resources Centre Publication No. 5 (in four parts). Department of Conservation, Wellington.

Land Environment New Zealand (LENZ)⁵

Land environments provide an indication of potential ecosystem character at any given place in New Zealand. The LENZ classification system is recently derived from many years of research and compliments the ecological districts and regions system described above. It is based on computer modeling of a range of climatic, substrate and landform attributes to classify a series of unique land environments. Individual land environments can occur over a substantial area depending on the local variability of defining factors such as climate. This report quotes the 'level four' land environment, of which there are 500 nationally, giving more localized information than the ecological district type does.

The level four LENZ environment prevailing where this HVA occurs is L5.1b. The L5.1b environment is a sub- category of the southern lowlands; occurring on flat, low elevation floodplains along rivers in Southland, such as the Oreti and Mataura. Climatically, the environment is characterised by cool temperatures, low solar radiation, moderate vapour pressure deficits, low monthly water balance ratios, and low annual water deficits. Soils are recent, imperfectly drained and mainly of high fertility from fine deposits (both windblown & river-transported) derived from erosion of greywacke rocks. Dominant historic ecosystems of this land environment would have been mostly marshes and swamps populated by sedges, rushes and grasses with patches of floodplain podocarp-hardwood forests and mixed shrublands.

The LENZ map shows a significant area of the SW of the HVA to be classified as L3.1a. This land environment is associated with peat soils and because during my survey I did only encountered a much smaller area of peat based soils (associated with unit 2) within the reserve I have made the assumption that this is a mapping error owing to lack of ground-truthing information.

Ecosystem types

This ecosystem types of this HVA are **estuarine salt marsh, riparian marsh, flax swamp and floodplain forest**. This high diversity of ecosystems in a relatively small area is a key feature that contributes to the value of this reserve.

Vegetation type – 'units'

Each vegetation type represents a recognisable plant community, or species assemblage that is called a 'unit'. In reality, the vegetation units defined here are a classification of the range of subtle variation amongst the plant communities in existence at the site; as such, their boundaries are approximate because for the most part no sudden boundaries exist, and, because small patches of some habitats exist within others that are too small to be mapped.

The syntax of the names listed below has particular meaning and follows the conventions of the 'Atkinson system' that is the standard for naming mapped vegetation types in New Zealand⁶. Areas are approximate. A brief description of the structural variation within each vegetation unit follows its name.

- **Unit 1:** Kamahi - [kahikatea] / (black mapou) - (totara) Forest. (8 ha)

This area of regenerating forest occurs in remarkably close proximity to the estuarine zone of the lower Titiroa stream. It is regenerating all around its periphery and the areas of scrub (unit 5) to its

⁵ For detailed information on LENZ classifications, navigate to:
http://www.landcareresearch.co.nz/databases/LENZ/products_techguide.asp.

⁶ The 'Atkinson system' is published in Volume 23 of the New Zealand Journal of Botany, 1985 (pages 361-378), and is downloadable from: <http://www.royalsociety.org.nz/publish/nzjb>.

west will probably one day become incorporated into a larger area of regenerating forest that will grade into the flaxland (unit 2) that occupies the wetter area to the south-west.

The stature of the forest is low with the average canopy height being around 10 metres, and die-back due to wind exposure of a historically higher canopy is apparent. The canopy achieves around 60% cover, with kamahi being the most common species, totara/kahikatea being subdominant and rimu/matai also being significant components. The sub-canopy is dense and diverse with good representation of all the canopy species, as well as a good diversity of coprosma species (including the threatened *Coprosma pedicellata*); miro and kohuhu are also common. The ground layer achieves around 50% cover and is dominated by the kiokio and hounds tongue ferns as well as the hook sedge. Good regeneration of canopy species is evident in the ground layer, but possum damage is evident in the sub-canopy.

➤ **Unit 2:** [Cabbage tree]- [toe toe] / lowland flax Flaxland (3 ha)

The flaxland occupies a swampy area that appears to have a peaty substrate (all the other units in this HVA have a mineral soil substrate). Flax creates a canopy of between 50 and 70% cover with a few individuals of cabbage tree, toe toe, gorse (<1% cover) and mingimingi being conspicuous minor components that together make up around 5% of the total canopy cover. In spaces between the flax clumps are patches of rushes (*Juncus edgariae*), a few shrubs of kohuhu and swamp coprosma, as well as the swamp kiokio fern. Most of the inter-clump space has a ground layer comprised of pasture grasses and cutty grass with occasional patches of moss and standing water.

This area would appear to have been continuous with the extensive flaxland to the west that is outside of the reserve area and is now separated from this unit by an access way defined by two parallel drains.

➤ **Unit 3:** Reflexed salt grass / [slender club rush] – [remuremu] – [shore cotula] Grassland (8 ha)

The grassland tends to occupy on areas of better drained substrate (gravel and sand based rather than soft estuarine mud) where they occur on the edges of the Toetoes Harbour. This habitat grades into unit 4 below and the two often form a complex pattern in areas of the harbour edge.

The unit is not species diverse; it is dominated by the exotic reflexed salt grass but there are some patches of coastal turf remaining. The turf is dominated by shore cotula with slender club rush and remuremu also being common species.

➤ **Unit 4:** [saltmarsh ribbonwood] / [holy grass] - oioi Rushland (55 ha)

This unit contains a range of subtly different species assemblages which are all characterised by the abundant presence of oioi (*Leptocarpus similis*) and close proximity to tidal saline waters. In areas around or below the high tide mark, there are extensive fringe areas covered almost entirely by dense oioi clumps, particularly on the eastern side of the Titiroa Stream mouth. In the upper tidal zone, patches of the salt marsh ribbonwood shrub are also common, as are patches of holygrass (together comprising an average of around 20% canopy cover throughout this zone).

As the tidal influence reduces, the abundance of salt marsh ribbonwood decreases and mingimingi tends to accompany or replace it as the main shrub species; flax is also an occasional component. Occasionally, on slightly raised ground, there are patches where the shrub diversity increases to include some kohuhu, manuka and lancewood. In transitional areas around the edges of unit 4 zones, where it grades into unit 6 sedgeland, gorse becomes an apparent component (achieving up to 5% cover in places but normally occasional at less than 1% cover) and patches of *Juncus* species, cutty grass and exotic pasture are interspersed with the matrix of oioi.

➤ **Unit 5:** mingimingi - manuka / (kohuhu) - (cutty grass) Scrub (1.5 ha)

The three small scrub areas all occur in proximity to floodplain forest patches and their species composition suggests affinity to the forest ecosystem. It is likely that these areas have the potential to regenerate into podocarp-hardwood floodplain forest (similar to that of unit 1) in the long-term.

An unbounded 'recce' plot was measured in the northern most fragment of scrub (in the O'Neil block) which showed the canopy to average 4 metres in height and be dominated by mingimingi and manuka. Other species in the canopy included kohuhu, lancewood and weeping mapou. The ground layer reflects the regenerating nature of this unit as it is a mixture of cutty grass patches (10% cover overall) and litter with young individuals of forest species such as broadleaf. Interestingly, forest birds such as fantails were already being attracted to this area.

Unit 6: [mingimingi] / cutty grass – (holy grass) Sedgeland (30 ha)

This unit has the highest abundance of exotic species and occupies areas of marshy land with mineral substrate that does not receive water with a significant saline component. It occurs either adjacent to the river above the estuarine zone, or, as a transitional habitat between farmland and more intact habitats with less cover of exotic plant species such as units 1 and 4.

It is comprised of a variety of species assemblages that grade into each other in complex patterns. The broad assemblage that covers most of the area is a cutty grass dominated sedge sward (comprising between 30 and 60% cover) accompanied by grasses such as holy grass, creeping bent and yorkshire fog (together comprising between 20 and 40% cover) with exotic herbs such as birdsfoot treefoil and buttercup making up most of the balance of cover. In localised areas different components of this broad assemblage become locally dominant; notably holy grass and rank pasture grasses. There are also frequent patches where rushes of the *Juncus* genus (mostly the native *edgariae*, but also the exotic *procernis* species) increase in abundance, largely replacing cutty grass. In places the mingimingi shrub becomes a conspicuous component, achieving up to 20% cover in localised patches. Gorse infestations are a localised issue throughout this unit and the upper 300 metre stretch of river edge has a serious infestation of reed sweet grass.

The area surrounding the lake at the eastern part of the HVA is mostly rank pasture. Gorse achieves 5% cover in this zone and cattle have access throughout it.

Size and Shape - edge effects

The dimensions of size and shape of a native vegetation fragment can strongly influence both its current and future habitat states. This is because these dimensions largely determine a fragments' resilience to external influences that are collectively called edge effects (e.g. drying and weed invasion from peripheral drained land).

Edge effects can make the environmental conditions within the peripheral zone of a native habitat fragment unsuitable for many of the 'desirable' species (i.e. those representative of a good quality example of the ecosystem type) which are able to flourish within a less disturbed 'core' zone. Therefore, edge effects often artificially create two or more distinct zones within a fragment. If a fragment is small and/or narrow enough, then no core zone will exist at all, and any mature habitat still existing will not be able to persist into the future.

Owing to the convoluted shape of this HVA, the edge effects are high. The main edge effect of concern is that of weed invasion (gorse in particular) - either from the marginal areas of the reserve that have lower value habitats recently retired from rough-grazing land, or, from existing farmed areas. Fortunately, in comparison to the edges on the landward sides, the estuarine edges have a positive effect because they create conditions that are unfavourable to many invasive species.

Adjacent Land use

Low intensity stock grazing is the predominant surrounding land use. The river is very popular with white-baiters, and much of the reserve, including the estuarine zone, is used for duck-shooting.

Landscape context – ecological connectivity

The diversity and abundance of species able to be present and to persist within any fragment of native habitat is partially dependent on some form of 'ecological connectivity' with other nearby sites which share similar environmental conditions.

The level of connectivity required to allow the areas of scrub to succeed to forest exists because of the forest fragments persisting in the O'Neil and Walsh blocks. These are the southern-most part of a chain of forest fragments strung along the lower Mataura River floodplain area and its immediate environs. Several other significant forest areas exist around the eastern and northern edges of the Toetoes Conservation Area.

In terms of its capacity to attract shorebirds, the estuary area benefits from its proximity to other estuarine areas along the South Coast.

There is enormous opportunity to enhance the connectivity of this reserve to other adjacent areas of native habitat on the floodplain in order to restore the sequence from peat bog through to estuarine salt marsh – see management recommendations.

Ownership and Management

This HVA is part of the ES leasehold land that is managed for the joint purposes of productive farmland, nature conservation, and, as flood protection for other areas of the Mataura floodplain.

The northern parts of the reserve (those dominated by unit 6) were extensively grazed by cattle until the year 2000 when stock were excluded. Other areas of the reserve have had limited ingress by cattle but were never considered 'productive areas'. Fire was frequently used as a clearance tool in the area until approximately 80 years ago and would have had an impact on peripheral parts of the reserve, particularly on the western (windward) side.

The entire area is now managed for nature conservation, as well as the recreational/cultural activities of white-baiting and duck-shooting. Recently the white-baiting has attracted a financial interest and the associated increase in activity could cause conflict with the nature conservation aims.

Current Protection

This HVA as an entire unit has no legally-binding protected status as a nature reserve under either the Reserves Act, or, the Conservation Act. Instead, it has 'reserve' status within the ES leasehold land management framework; as such it is not saleable. However, the harbour edges have international protected status under the RAMSAR convention (see boundary illustrated in Appendix one).

Significance of the Habitat in District and National Contexts

Significance within the ecological district – site evaluation criteria

Qualitative significance definition within the RMA

Section 6(c) of the Resource Management Act 1991 requires that areas of '*significant*' indigenous vegetation, or habitats for indigenous fauna, should be protected.

Significance was not defined either qualitatively or quantitatively in the Act; its definition has evolved since 1991 through case law and ecological practice. Whaley et al. (1995)⁷ lists the following nine criteria by which to decide if a natural area is significant:

1. Representativeness;
2. Diversity and pattern;
3. Rarity and special features;
4. Naturalness and intactness;
5. Size and shape;
6. Inherent ecological viability and long-term sustainability;
7. Buffering/surrounding landscape/connectivity;
8. Threat and fragility (threat processes and agents, effects of proposed modification);
9. Management input (nature and scale/intervention necessary/restoration potential).

In my opinion, Whaley et al.'s list is the one which most fully meets the conceptual and practical requirements of a robust definition of significance. In appendix five, I have provided brief definitions for each of these criteria which attempt to represent the majority view of practising ecologists in New Zealand, as I perceive it. Nevertheless, the precise qualitative definition of significance for natural areas in New Zealand is currently a matter of wide, and sometimes deeply divided, debate.

Application of quantitative significance assessment method in use by ES for wetland sites

Environment Southland's 'wetland evaluation card' assesses all of the nine criteria listed above, based upon information recorded in the HVA survey forms (part 1 - general and part 2 - wetland specific) and in the 'wetland record sheet'. The wetland evaluation card's output is a numerical score for each of three information categories. Together, these three scores summarise a site's significance (i.e. its ecological value or importance) in the context of its ecological district.

The advantages of this system are that it gives a quick guide to absolute site value, and, if other sites have been surveyed and assessed using the same method, these scores can be used to directly compare and rank the relative importance among such sites. It should be noted that direct comparison is not always reliable if the sites being compared are within different ecological districts.

⁷ Whaley, K. J., Clarkson, B. D., & Leathwick, J. R. 1995. *Assessment of criteria used to determine 'significance' of natural areas in relation to section 6(c) of the Resource Management Act (1991)*. p. 34 in Landcare Research Contract Report LC9596/021.

The three summary categories are listed below, along with; the criteria from the list above which they each assess, their maximum scores and score meaning, as well as the actual score (in bold) for this HVA:

- Representative assessment:
 - Criterion 1 & parts of criteria 4, 5 & 7;
 - Max. score of 8 (meaning a very highly representative and good quality example).
 - **This HVA score: 7**

- Ecological quality assessment:
 - Criteria 2, 3, 4, 5, 6 & 7;
 - Max. score of 45 (meaning very high total ecological quality).
 - **This HVA score: 40**

- Management assessment:
 - Criteria 8 & 9;
 - Max score of 14 (meaning good output per dollar spent).
 - **This HVA score: 11**

Note, these are by far the highest scores that I have assigned to any wetland HVA so far surveyed. This site is of outstanding importance for its diversity of habitats and for the diversity and abundance of wildlife that it supports (fish, marsh inhabiting birds, as well as estuarine birds such as terns and waders, including migratory ones).

Representative value within the ecological district

Representativeness (criterion one from the list above) is often considered by New Zealand ecologists to be the most important single criterion for any assessment of site importance. This is based on the notion that a reserve system should contain the full range of natural ecosystems historically characteristic of an area. Representativeness alone does not take into account the condition of a site, or its level of modification.

Precise figures for former extent and currently protected extent are not available within the Southland Protection Strategy⁸ for all of the vegetation types present in this HVA, so representative value is difficult to assess. In addition to this, if the vegetation types within the HVA are fitted into the broad habitat classes given in the Southland Protection Strategy, then representative values from low (for the freshwater rushlands – unit 6) to very high (for the lowland forest – unit 1) result. In my opinion, considering the fact that nowhere else in the district does such a variety of habitats exist within such close proximity so as to preserve natural vegetation sequences the site as a whole deserves a **representative value classification within the Waituna ecological district of very high**.

Representative value at the national scale

The Threatened Environment Classification⁹ (TEC) was developed by Landcare Research to classify the whole of New Zealand in terms of where areas of rare and poorly protected indigenous ecosystems are most likely to occur. Each TEC category relates to an approximate percentage of how much indigenous vegetation cover remains within each land environment and how much of it is protected.

Under the TEC, the HVA is classified as within a Category 2 (i.e. chronically threatened), because between only 10% and 20% of the indigenous vegetation in this environment remains and what

⁸ Southland Protection Strategy, 1999. A report to the Nature Heritage Fund Committee by M. A. Harding.

⁹ Threatened Environment Classification: Guide for Users (Version 1.1, August 2007), Landcare Research New Zealand Ltd 2007.

remains is sparsely distributed in the landscape. As a result of this level and pattern of habitat loss, the risks of species loss is severe and any further habitat loss will greatly exacerbate these risks.

Furthermore, all remaining wetlands in the Waituna ecological district provide important opportunities for wetland protection in a national context, to help redress and compensate for New Zealand having lost at least 90% of all its original wetland ecosystems. This extremely high rate of wetland loss nationally is why all remaining wetlands are also classified as a national priority for protection (number two) within the national statement of priorities for protection of biodiversity on private land (MfE 2007)¹⁰.

Ecological Features and Values

In summary, this HVA has a wealth of ecological features and is highly valuable. Its value is high for three main reasons:

- The estuarine zone forms part of one of the five most important wading bird habitats in New Zealand; it is also known to be important habitat for rare and vulnerable fish fauna.
- The HVA as a whole has a very high ecological diversity comprised of both floodplain and estuarine ecosystems with many intact ecological gradients between the vegetation units described.
- The HVA has habitats suitable for supporting several threatened and rare species. The *Coprosma pedicellata* shrub was observed in unit 1 and the grass *Deschampsia caespitosa* is expected to be present, as are the marsh and spotless crakes.

State of the Habitat

In summary, the state of the habitat is good.

The plant community condition is variable among the units, with unit 6 being the poorest as it is recovering from historic grazing and has a serious (but limited extent) reed sweet grass infestation. Other units are in good condition with threat weed invasions being limited to mostly sparse infestations of gorse at the edges and the reflexed salt grass that has replaced areas of coastal herbaceous turf. The forest of unit one is clearly reduced from its former extent (presumably by fire, grazing and wind damage) but it appears not to have suffered logging, and despite reasonably high possum populations, it is recovering well.

FAUNA

This site has been included within the RAMSAR wetlands list because of the estuarine habitat that it protects which provides feeding and breeding grounds for significant numbers of many shore-bird species, including migratory waders.

During the survey, a high diversity of land and shore birds were observed including: eastern bar-tailed godwit (a late-staying migrant), royal spoonbill, white heron, oystercatcher, pukeko, kingfisher, bellbird, kereru, silver eye, fantail, harrier hawk and terns. A good population of fernbirds was confirmed to be present also. The habitat was confirmed to be suitable for marsh crake and Australasian bittern; it is

¹⁰ Ministry for the Environment, 2007. *Protecting our Places: A Statement of National Priorities for Protecting Rare and Threatened Biodiversity on Private Land*. Wellington.

also suitable for many other migratory birds such as the turnstone, red-necked stint and pacific golden plover, but the survey was made after these species would have left on their northerly migration.

The estuarine and brackish waters of the estuary and lower river are known to be important habitats for the maintenance of fish populations for a variety of native species; furthermore, rare or vulnerable species such as giant kokopu, banded kokopu and lamprey are likely to be present but no fish survey was undertaken.

IDENTIFIED THREATS

Hydrological regime integrity

Because the hydrological regime is dominated by the fluctuations associated with the sea tides and river floods, its integrity remains high. Without the artificial drainage network that surrounds the HVA, its constituent habitats would undoubtedly spread further into the floodplain, but this drainage does not unduly affect the remaining wetlands protected by the HVA reserve.

Weeds

Weeds are defined as troublesome or unattractive plants growing in an undesired area¹¹. Weeds in New Zealand have major economic and ecological impacts and cost millions of dollars annually to control. In natural ecosystems they may cause irreversible damage to the habitats they invade by smothering or displacing indigenous vegetation¹².

Table 1 provides information on the abundance and location of weeds present in the HVA that are considered a threat.

Common Name	Scientific Name	Comments
Broom	<i>Cytisus scoparius</i>	Occasional patches at edges.
Gorse	<i>Ulex europeaus</i>	Serious infestations occur to the west of unit 1 and in unit 6 to the east of the southern fragment of bush in the O’Neil block. It is also slowly encroaching into unit 4 from the east on the opposite side of the river from unit 1 bush. There is a source population of concern alongside the main highway at the eastern extremity of the reserve, and along the track that travels west from this point.
Reed sweet grass	<i>Glyceria fluitans</i>	Dominates where it becomes established. Very difficult to control but its spread south into higher value habitats will be limited by salinity.
Tree lupin	<i>Lupinus arboreus</i>	Occurs around the southern side of the lake and outwards from there. Should be monitored.

Table 1: Weed species identified that are a threat to the HVA.

Gorse is the biggest threat to habitats of high value so it should be controlled wherever it is present within the HVA, both where it forms extensive patches and where it is only occasional at present. Re-invasion risk is high from non-reserve areas not actively managed as farmland in the area west of unit 1.

Reed sweet grass reduces habitat quality for invertebrates and fish and should ideally be removed but it is very persistent. A practical goal is to limit its spread along the river-banks southwards from its current extent. Eradication would require major works with diggers.

¹¹ Weeds, www.dictionary.reference.com

¹² Weeds, www.landcareresearch.co.nz

Pest animals

Pest animals can be defined as species that have been introduced to New Zealand and that have a negative impact on native plants and animals and/or production areas. The major threats to our terrestrial flora and fauna come from possums, rats, mustelids (stoats, ferrets, weasels) and ungulates (deer, goats, pigs)¹³.

No pest animal control currently occurs at the site. Control of rats and mustelids would increase the populations of native birds such as fernbirds. Control of possums in unit one would speed regeneration there but the efficacy of control inside the bush alone would have to be questioned since the source population in the surrounding landscape will be high.

Grazing/fencing

Many natural areas in Southland are located on or near areas accessible to stock. When stock have access to an area they damage the vegetation by selectively grazing palatable species, thereby preventing regeneration. Other side effects can include pugging of the soil, and changes in the water quality of wetland and riparian areas.

The HVA is fenced on all sides, except for the eastern most area of unit 4 between the stream and the north-south running drain approximately 100m to the west of this stream. This situation should be remedied.

Cattle sign was also seen in the southern most area of unit 6 and its adjacent area of unit 4; presumably they had come through the gate somehow that exists in the western reserve boundary fence here.

Other threats

Vehicle tracks were observed crossing the estuary to an elaborate maimai that exists on the eastern side of the salt marsh island in the north-eastern part of the harbour. Vehicles disturb wildlife and can easily destroy the nests of ground nesting shore birds. Vehicle access is not necessary to facilitate the harbour's use for duck-shooting and should be prevented and discouraged.

Management Recommendations

ES has committed itself to managing this HVA, among others, for its natural values. Many positive steps have already been taken, however, owing to the reserves' very high values it deserves more action.

Some key recommended actions for the future follow:

- Attempt to educate of the surrounding lessees as to the high values of this area (this may help prevent further incursions of cattle into sensitive salt marsh areas);
- Fence to exclude stock from the far eastern part of the reserve (see grazing/fencing section above);
- Develop the eastern part of the reserve adjacent to the highway as a picnic area and bird-watching site, ideas could include:
 - Installing a hide and environmental interpretation of the estuary and its birdlife – there are many interesting stories to tell about the trans-global migrations of the birds that feed there in summer;

¹³ Pest animals, www.doc.govt.nz

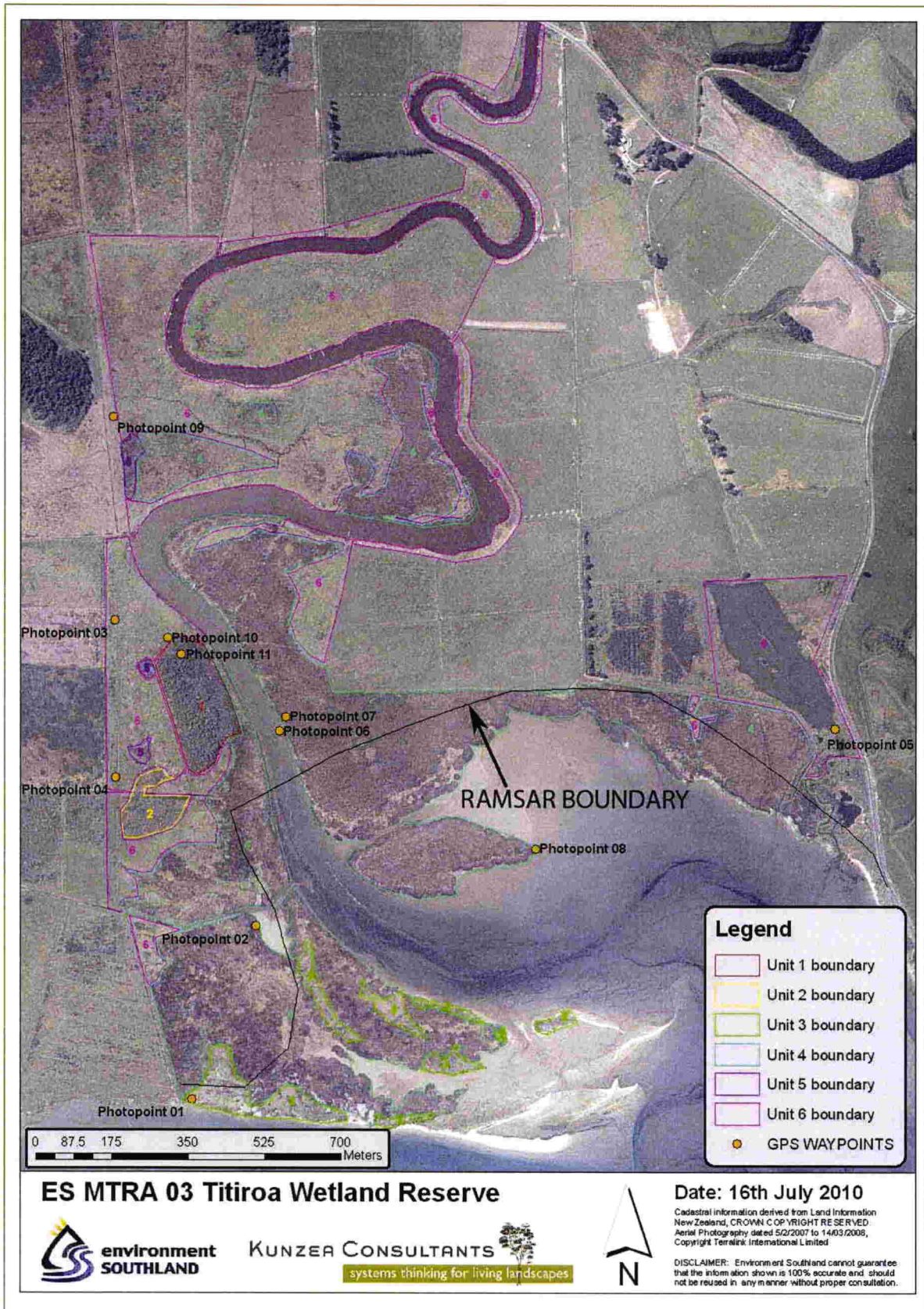
- Restore/beautify the lake area to act as a picnic site;
- Encourage local enthusiasts to start monitoring the bird populations;
- Control localised serious infestations of gorse around the periphery by helicopter and manually in sensitive wetland habitats (see notes in table 1 above);
- Control reed sweet grass so as to at least limit its spread southwards
- Fill in drains within the reserve that serve no purpose for farmland improvement (those immediately west and north of unit 1, as well as through the middle of unit 2) in order to restore natural hydrology;
- Instigate legal protection of the remainder of the reserve not already protected by RAMSAR status;
- Consider expanding the reserve in two areas in order to create linkages with other nearby reserves:
 - Link with O’Neil bush (south block);
 - Link with Walsh bush by incorporating the flaxland in between (currently classed by ES as ‘potential wetland’).

Conclusion

This HVA is of outstandingly high ecological, scenic and cultural/recreational value; it is certainly the highest value of any of the reserves that ES manages in its floodplain leasehold lands. Accordingly, it deserves to receive its fair share of any management resources available. The values increase in a southerly direction as one approaches the estuarine zone and its adjacent floodplain.

An opportunity exists to harness the scenic and wildlife values of the reserve for the enjoyment of a greater number of Southlanders and tourists alike by developing environmental interpretation and bird watching facilities. The potential exists to expand the reserve to the west in order to further increase the ecological values conserved by connecting together close-by areas of existing reserve that are currently isolated from each other.

Appendix 1: Aerial photograph of the HVA with photo-point locations and HVA unit boundaries highlighted



N.B. Refer to appendix two for photo-point coordinates. Selected photographs are presented in appendix three.

Appendix 2: GPS waypoint list for HVA survey photos (coordinates are in NZTM 2000 format)

GPS Waypoint ID	Full size Jpeg file number	Photo number in report	Photo angle (magnetic bearing)	Easting	Northing
Photo-point 1	1316	1	062	1275814	4834247
Photo-point 2	1317	2	064	1275961	4834644
Photo-point 3	1318	-	126	1275637	4835345
Photo-point 4	1320	3	043	1275638	4834983
Photo-point 5	1367	-	305	1277286	4835098
Photo-point 6	1368	4	118	1276014	4835091
Photo-point 6	1369	-	215	1276014	4835091
Photo-point 6	1370	5	295	1276014	4835091
Photo-point 7	1371	6	090	1276028	4835123
Photo-point 8	1373	-	258	1276600	4834822
Photo-point 9	1374	7	096	1275632	4835809
Photo-point 10	1375	8	128	1275757	4835304
Photo-point 11	1376	9	220	1275788	4835267

Appendix 3: Photo numbers 1 to 9 (see appendix two for corresponding photo-point IDs, GPS coordinates and bearings)



Photo 1: unit one grassland dominated by exotic reflexed salt grass with small patches of native turf. Unit 4 oioi rushland can be seen behind.



Photo 2: Looking across an estuarine mud section separating two sections of unit 4 rushland.



Photo 3: Photo showing the transition between unit 6 sedgeland/rushland and unit 1 forest with regenerating scrub flanking the forest.



Photo 4: Here a shrubby (salt marsh ribbonwood) section of unit 4 shrubland can be seen behind a narrow fringe of oioi at the edge of the lower Titiroa Stream.



Photo 5: This photo looking up the lower Titiroa Stream at high tide (with O'Neils bush, southern block, on the skyline) captures the wild beauty of this section of the river. The reserve has very high aesthetic values.

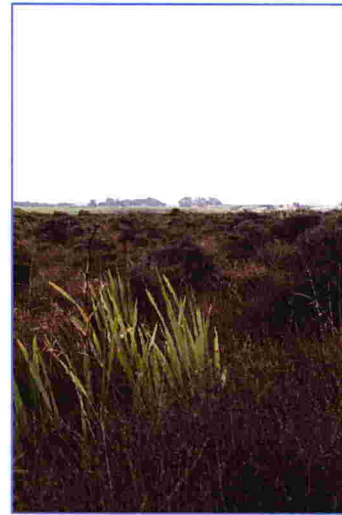


Photo 6: This photo represents the highest shrub density seen in unit 4. The saltmarsh ribbonwood is replaced by mingimingi as salinity reduces further away from the camera.



Photo 7: Unit 6 sedgeland (with high abundance of holy grass in this spot) grades into unit 5 scrub on the skyline.



Photo 8: The northern edge of unit one displays vigorous regeneration of shrubs and trees that are invading the adjacent unit 6 zone seen in the foreground.



Photo 9: This shot from the interior of unit 1 illustrates the vigour and diversity of the understory.

Appendix 4: HVA site vascular plant species list

Species Name	Common Name	Life form
<i>Asplenium flaccidum</i>	hanging spleenwort	Fern
<i>Blechnum discolor</i>	crown fern	Fern
<i>Blechnum minus</i>	swamp kiokio	Fern
<i>Blechnum procerum</i>	small kiokio	Fern
<i>Histiopteris incisa</i>	water fern	Fern
<i>Hypolepis ambigua</i>	pigfern	Fern
<i>Microsorium pustulatum</i>	hounds tongue fern	Fern
<i>Polystichum vestitum</i>	prickly shield fern	Fern
<i>Pteridium esculentum</i>	bracken	Fern
<i>Carpodetus serratus</i>	marbleleaf	Tree/Shrub
<i>Coprosma foetidissima</i>	stinkwood	Tree/Shrub
<i>Coprosma lucida</i>	glossy karamu	Tree/Shrub
<i>Coprosma pedicellata</i>	a coprosma	Tree/Shrub
<i>Coprosma propinqua</i>	mingimingi	Tree/Shrub
<i>Coprosma rotundifolia</i>	a coprosma	Tree/Shrub
<i>Coprosma tenuifolia</i>	swamp coprosma	Tree/Shrub
* <i>Cytisus scoparius</i>	broom	Tree/Shrub
<i>Dacrycarpus dacrydioides</i>	kahikatea	Tree/Shrub
<i>Griselinia littoralis</i>	broadleaf	Tree/Shrub
<i>Hebe salicifolia</i>	koromiko	Tree/Shrub
<i>Leptospermum scoparium</i>	manuka	Tree/Shrub
* <i>Lupinus arboreus</i>	tree lupin	Tree/Shrub
<i>Melictytus lanceolatus</i>	narrow-leaved mahoe	Tree/Shrub
<i>Neomyrtus pedunculata</i>	rohu	Tree/Shrub
<i>Pittosporum tenuifolium</i>	kohuhu/black mapou	Tree/Shrub
<i>Plagianthus divaricata</i>	saltmarsh ribbonwood	Tree/Shrub
<i>Podocarpus hallii</i>	lowland totara	Tree/Shrub
<i>Prumnopitys ferruginea</i>	miro	Tree/Shrub
<i>Prumnopitys taxifolia</i>	matai	Tree/Shrub
<i>Pseudopanax colensoi</i>	three finger	Tree/Shrub
<i>Pseudopanax crassifolius</i>	lancewood	Tree/Shrub
<i>Raukawa simplex</i>	haumakāroa	Tree/Shrub
<i>Weinmannia racemosa</i>	kamahi	Tree/Shrub
* <i>Ulex europaeus</i>	gorse	Tree/Shrub
<i>Muehlenbeckia axillaris</i>	creeping pohuehue	Climber/vine
<i>Muehlenbeckia australis</i>	pohuehue	Climber/vine
<i>Muehlenbeckia complexa</i>	a vine	Climber/vine
<i>Parsonsia heterophylla</i>	native jasmine	Climber/vine
* <i>Rubus fruticosus</i>	blackberry	Climber/vine
* <i>Cerastium fontanum</i>	mouse ear chickweed	Herb
<i>Centella uniflora</i>	centella	Herb
<i>Epilobium pedunculare</i>	a willow herb	Herb
* <i>Galium palustre</i>	marsh bedstraw	Herb
* <i>Hypochoeris radicata</i>	catsear	Herb
<i>Leptinella dioica</i>	shore cotula	Herb
* <i>Lotus pedunculare</i>	birdsfoot trefoil	Herb
* <i>Ranunculus flammula</i>	spearwort	Herb
* <i>Ranunculus repens</i>	buttercup	Herb
* <i>Rumex crispus</i>	curled dock	Herb
<i>Schizaelema cockaynei</i>	a herb	Herb
<i>Selliera radicans</i>	remuremu	Herb
<i>Tetragonia tetragonioides</i>	new zealand spinach	Herb
* <i>Juncus articulatus</i>	jointed rush	Rush

<i>Species Name</i>	<i>Common Name</i>	<i>Life form</i>
<i>Juncus edgariae</i>	a native rush	Rush
* <i>Juncus procerus</i>	a giant rush	Rush
<i>Leptocarpus similis</i>	jointed wire rush / oioi	Rush
<i>Carex coriacea</i>	cutty grass	Sedge
<i>Carex secta</i>	pedicelled sedge	Sedge
<i>Carex virgata</i>	a sedge	Sedge
<i>Isolepis aucklandica</i>	a dwarf sedge	Sedge
<i>Isolepis cernua</i>	slender clubrush	Sedge
<i>Ucinia uncinata</i>	hook sedge	Sedge
* <i>Agrostis stolonifera</i>	creeping bent	Grass
* <i>Glyceria fluitans</i>	reed sweet grass	Grass
<i>Hierochloa redolens</i>	holy grass	Grass
* <i>Holcus lanatus</i>	yorkshire fog	Grass
<i>Poa cita</i>	silver tussock	Grass
* <i>Puccinellia distans</i>	reflexed salt grass	Grass
<i>Astelia fragrans</i>	a bush lily	Other monocots
<i>Cordyline australis</i>	cabbage tree	Other monocots
<i>Cortaderia richardii</i>	toetoe	Other monocots
<i>Phormium tenax</i>	lowland flax	Other monocots
<i>Zostera novaezelandica</i>	seagrass/eelgrass	Other monocots
<i>Sphagnum cristatum</i>	common moss	non-vascular plant

Note: This species list has been compiled from plants observed during the HVA field survey. The survey focused on identifying common, indicator and threatened species, so it is not a complete list for the site. Given the size and habitat diversity of the site, I would expect that an exhaustive survey would probably add 20-30% to the species diversity listed here. ‘*’ denotes an exotic species.

Appendix 5: Explanation of criteria for significance evaluation.

1. **Representativeness:** the degree to which vegetation is representative of that which formerly existed. Includes evaluation of natural areas of the same type within the ecological district with higher value placed on the best examples; so, if few examples exist of a given type then poor quality sites can be rated highly.
2. **Diversity/pattern:** the number of species of native vascular plants and animals, and the number of vegetation/habitat types, contained in an area.
3. **Rarity/special feature:** *Rarity* is the degree to which vegetation and habitat types that were formerly common are now reduced in extent, or are naturally rare, or support native species (plants or animals) that are uncommon, in decline or threatened with extinction within an ecological district/sub district, ecological region or nationally. *Special features* allows for features such as high breeding abundances of common species, or, intact ecological sequences to be taken into account.
4. **Naturalness/intactness:** the combined degree of absence of; disturbance and damage by human activity, the activity of introduced animals, or, exotic and pest plants.
5. **Size and shape:** the size of an area of vegetation or habitat and the degree to which its shape influences the viability of the site.
6. **Viability/sustainability:** the degree to which existing natural habitat or vegetation is capable of maintaining or recovering its structure and composition; either in the absence of additional management, or, with a restoration programme if feasible.
7. **Buffering/surrounding landscape/connectivity:** the extent to which an indigenous natural area is buffered from surrounding modifying influences and its connectivity with other natural areas. It also considers the degree to which an area of native habitat or vegetation links other such areas or contributes to the ecological significance of the immediate vicinity.
8. **Threats and fragility:** *Threats* are factors could disturb the natural equilibrium of ecosystem functioning in the natural area while *fragility* measures its intrinsic vulnerability to environmental change taking into account other factors above.
9. **Management input:** an assessment of the human effort that is required to maintain the inherent natural viability of a natural area. For example, weed control, fencing or replanting that is required.

APPENDIX D

COASTAL PERMIT AUTH-204122



**environment
SOUTHLAND**

Te Taiaro Tonga

AUTH-204122

Cnr North Road and Price Street
(Private Bag 90116
DX YX20175)
Invercargill

Telephone (03) 211 5115
Fax No. (03) 211 5252
Southland Freephone No. 0800 76 88 45

Coastal Permit

Pursuant to Section 104B of the Resource Management Act 1991, a resource consent is hereby granted by the Southland Regional Council to **Catchment Management Division of the Southland Regional Council of Private Bag 90116, Invercargill 9840** from **29 October 2015**.

Please read this Consent carefully, and ensure that any staff or contractors carrying out activities under this Consent on your behalf are aware of all the conditions of the Consent.

Details of Permit

Purpose for which permit is granted:	To occupy the coastal marine area and to dam tidal waters with a tidegate structure
Location - site locality	Upstream of the Tokanui-Gorge Road Highway bridge
- map reference	NZTM2000 1276640E 4836895N
- catchment	Titiroa River
Legal description of land at the site:	Section 1 SO 11258 and Part Lot 1 DP 11173
Expiry date:	29 October 2020

Schedule of Conditions

1. This consent authorises occupation of the coastal marine area and the damming of tidal waters with a tidegate structure, as described in the application for resource consent dated 24 August 2006.
2. By 30 June 2017 the consent holder shall undertake (or otherwise obtain) a survey of native fish species upstream and downstream of the tidegate structure to determine if the structure is impeding spawning and migration of native fish species and, if so, the scale of effect on spawning and migration. The survey shall be carried out by a suitably qualified person and shall include, but is not limited to:


- a. Comparison of fish communities in comparable sites upstream and downstream of the structure using the methods outlined in the New Zealand Freshwater Fish Sampling Protocols¹.
- b. Assessment of the flow profile immediately downstream of the tidegate structure to determine whether water velocities exceed the swimming speeds of native fish species in the area.
- c. A salinity survey of the Titiroa River to determine the upstream extent of the saltwater wedge, and whether the tidegates affect spawning of inanga.

For the purposes of this condition, a suitably qualified person shall be a qualified ichthyologist, marine biologist, environmental scientist or organisation that has expertise in completing surveys of aquatic environments.

3. A copy of the survey required by Condition 2 shall be forwarded to the Consent Authority, and to the Department of Conservation (Murihiku District) by 31 July 2017.
4. The consent holder shall:
 - a. at all times during the term of this consent maintain the structure in good repair, appearance and condition.
Note: Rule 11.4.1 of the Regional Coastal Plan permits maintenance and repair of structures, subject to conditions.
 - b. notify the Consent Authority (escompliance@es.govt.nz), of any alteration to the structure which is carried out without resource consent pursuant to a permitted activity rule in an operative regional plan.
Note: Rule 11.4.2 of the Regional Coastal Plan permits alteration of structures, subject to conditions. Alterations not specifically permitted by a regional rule, regulations or legislation will require resource consent.
5. In consideration of the right to occupy Crown Land in the coastal marine area for the activity specified above, the consent holder shall, each year, pay to the Consent Authority the appropriate coastal occupation charge specified in the Regional Coastal Plan. Each financial year, commencing 1 July, the charge shall be adjusted for inflation in accordance with the Consumer Price Index. The sum payable in the first year of this consent (or the proportion thereof for which the consent is current) is \$88.40 plus GST, and shall be payable in advance on invoice. The revenue from this charge shall be used only for the purpose of promoting the sustainable management of the coastal marine area.
6. The Consent Authority may, in accordance with Sections 128 and 129 of the Resource Management Act 1991, serve notice on the consent holder of its intention to review the conditions of this consent during the period 1 February to 30 September each year, or within two months of any enforcement action being taken by the Consent Authority in relation to the exercise of this consent, or on receiving the fish survey report as specified in Conditions 2 and 3, for the purposes of:
 - (a) determining whether the conditions of this consent are adequate to deal with any adverse effect on the environment which may arise from the exercise of the consent and which it is appropriate to deal with at a later stage;
 - (b) ensuring the conditions of this consent are consistent with any National Environmental Standards Regulations, relevant plans and/or the Environment Southland Regional Policy Statement

¹ Joy, David & Lake (2013). New Zealand Freshwater Fish Sampling Protocols (p64)

for the Southland Regional Council



H Lennox
Consents Manager

Notes:

1. *If you require a replacement permit upon the expiry date of this permit, any new application should be lodged at least six months prior to the expiry date of this permit. Applying at least six months before the expiry date may enable you to continue to exercise this permit until a decision is made, and any appeals are resolved, on the replacement application.*

2. *For Condition 3, the postal address of the Department of Conservation (Murihiku District) is:*

*Department of Conservation
Murihiku District
P O Box 743
Invercargill 9840*

Appendix 2

Further Information Response s92(1) 11 November 2022

11 November 2022

Stephen West
Environment Southland
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APP-20211135 Titiroa Tide Gates Resource Consent Application – Response to RFI

6-VQ423.54

Dear Stephen

Thank you for your e-mails of 19th and 25th March 2021 requesting further information relating to this application under s92(1) of the RMA 1991. A response to your questions is detailed below.

1. The following is a response to RFI questions 1, 2, 3, 4, 5, 6 and additional RFI question B. Additional assessments have now been completed assessing these matters. This includes assessments on the effects of the tide gate on fish passage and an assessment of options for mitigation of effects on inanga spawning.

The applicant has undertaken a fish survey and PDP completed an initial Assessment which was included in the resource consent application. The Assessment concluded that the tide gates have only a minor effect on fish migration. The Assessment also noted that the tide gates were likely having an adverse effect on spawning migrations of inanga in the Titiroa River. It identified the possibility of mitigating this adverse effect via habitat restoration / enhancement nearby. The applicant then commissioned an investigation into these mitigation options. The Titiroa Tide Gate – Mitigation Options Assessment is attached. It recommends the following to mitigate the adverse effects on inanga spawning:

- Enhancement of more than 6.9 ha of suitable inanga spawning habitat;
 - A Riparian Management Plan to enhance values in the unnamed tributary of the Titiroa Stream, below the tide gates; and,
 - Protection and pest animal and plant control of the coastal inland wetlands located downstream of the tide gates.
2. Question 5 raised the possibility of a change to whitebait fishing regulations. The applicant has no ability to implement such a change as they have no regulatory authority in relation to management of the whitebait fishery. We note that the Department of Conservation implemented a partial restriction on recreational whitebaiting upstream of the tide gates for the 2022 season (refer attached public notice).
 3. In response to question 8 the land above and below the tidegates forms the Lower Maitai Floodway (refer to attached map). The Floodway forms part of the Maitai Catchment Control Scheme (the Scheme). The Scheme is an integrated river management and flood control works programme completed in 1991. In large flood events the Floodway holds flood water and prevents flooding of adjoining areas.

Most of the land within the Lower Maitaura Floodway was purchased by the Southland Catchment Board between 1974 and 1985. Two major land blocks were not able to be purchased at the time. Two other smaller blocks of land within the floodway were also excluded. These properties remain privately owned and form the only private land protected by the tide gates within the Lower Maitaura Floodway.

In terms of the land that the Catchment Board purchased long term leases were offered to the original landowners or tendered at the time of purchase. Leases remain in place for these blocks. Income from the leases is used for ongoing capital works to maintain the Scheme. The function of the tidegates in protecting these areas from flooding is integral to the design, functioning and funding of the Maitaura Catchment Control Scheme.

In response your question it is not only the applicant that benefits from the tidegates. As noted above the tidegates and the Floodway form part of the Maitaura Catchment Control Scheme which provides flood protection to the wider area. Private landowners and lease holders within the Floodway benefit from tidegates through ongoing use of the land. The tidegates and ongoing use of the land within the Floodway also have wider community benefits in terms of river management and flood control and the funding of these activities.

4. In response to question 7 as noted above the tidegates form part of the Lower Maitaura Catchment Control Scheme. The construction of the scheme resulted in significant changes to the Titiroa Stream and catchment through construction of stop banks, formation of the floodway, upgrade of the tide gates and related works. The physical environment has been altered significantly for flood drainage and flood protection purposes. The current application is specific to the tide gates. The question appears to refer to effects associated with the development of the Maitaura Catchment Control Scheme and its ongoing function in avoiding adverse effects associated with flood events.
5. In terms of additional RFI question B the applicant is not aware of any issues associated with sedimentation above the tide gates or any significant changes to stream morphology. The tide gate structure only impedes the flow of the stream during high tide (to stop flooding of upgradient land). The frequent opening of the tide gate enables the stream and any sediment within it to flow downstream at all other times. As noted above the tidegates form part of the Maitaura Catchment Control Scheme and are managed in a manner consistent with its flood control purpose. The applicant does not have to remove sediment at the tidegates as part of any maintenance activity.

The applicant's intention is to now meet with stakeholders that were consulted earlier in the process to discuss the mitigation options recommended in the latest PDP report.



Regards

Luke McSoriley
Work Group Manager - Planning

Public Notices



Department of Conservation
Te Papa Atawhai

PARTIAL RESTRICTION TO WHITEBAITING ON TITIROA RIVER

The Dept. of Conservation is advising the Southland public, specifically those that enjoy recreational whitebaiting, that Back Pegs have been placed on the upstream side of the Titiroa Bridge on the Gorge Road Tokonui Highway. This now puts in place a restriction on any whitebaiting occurring upstream of these back-pegs. This has primarily been done to assist preservation efforts for the whitebait travelling up the Titiroa River. The recreational whitebaiting community have been advocating for this to occur over several seasons.

DOC has no plans to install Back Pegs on any other Southland waterways for this 2022 whitebaiting season but this may well be considered for following seasons.

Regulation 13 of the Whitebait Fishing Regulations 2021 give DOC the ability to place Back Pegs on any waterway.

Regulation 13 - Fishing in non-tidal waters prohibited

- (1) The Director-General may place a back-peg to indicate the upstream fishing limit for any river, stream, estuary, or channel.
- (2) If a back-peg has been placed, a person must not fish for whitebait upstream of the back-peg.
- (3) If a back-peg has not been placed, a person must not fish for whitebait outside of the portion of a river, stream, estuary, or channel where the water level fluctuates with the tide.
- (4) A person who contravenes this regulation commits an infringement offence and is liable to
 - (a) an infringement fee of \$400; or
 - (b) a fine imposed by a court not exceeding \$800.

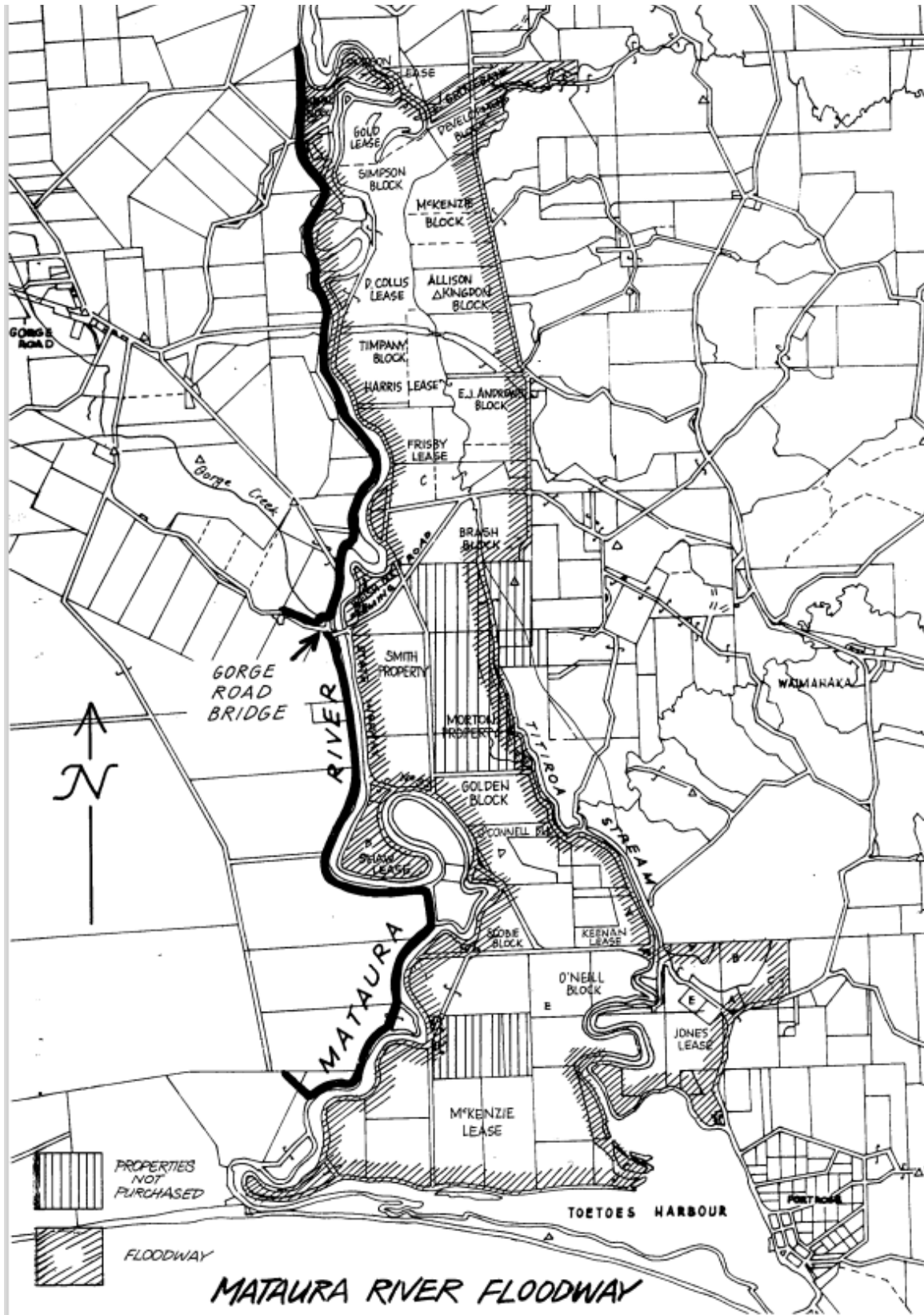
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Appendix 3

Titiroa Tide Gate Mitigation Options report

Titiroa Tide Gate - Mitigation Options

✦ Prepared for

Environment Southland

✦ November 2022



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Limitations:

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Executive Summary

In response to a request for further information as part of the re-consenting process for the tide gate structure located on the Titiroa Stream a range of assessments were conducted to satisfy the following question: is the tide gate structure impeding spawning and migration of native fish species and, if so, what is the scale of effect on spawning and migration. This report provides an overview of the effects of the tide gate structure, both actual and potential, and provides a range of quantified mitigation options as a result of its impact.

A fish survey conducted in 2021 to satisfy consent conditions identified that the tide gate had only a minor effect of fish migration up and downstream of the tide gate due to its intermittent closing (to mitigate coastal flooding of upgradient land) and otherwise open state, but that the structure likely prevents the spawning of inanga due to their spawning occurring at spring high tides (at a time when the tide gates are closed).

This investigation included a range of field surveys in the vicinity of the tide gate structure, in order to provide quantitative mitigation options for potential lost inanga spawning habitat. Investigations included an updated salinity survey, which identified the upstream extent of the saltwater wedge which reaches approximately 160 m upstream of the tide gate structure, whereas previous surveys had concluded the salt wedge was confined to downstream of the tide gate.

A hydraulic model was developed, along with geomorphological evidence, which predicted the upstream water inundation extent to be as far upstream as Fleming Road if the tide gate was not present. This is approximately 6 km upstream from the tide gate, with a reasonable degree of certainty. This distance identified the potential lost spawning habitat to be mapped. Habitat mapping assessments conducted upstream of the tide gate defined areas of current suitable spawning habitat deemed lost, which quantified as a total of 1.38 ha. A 1:5 enhancement ratio was used, which results in a total enhancement area for mitigation options of 6.3ha.

The newly identified salt wedge extent has limited mitigation options due to the high salinity levels downstream of the tide gate, therefore a range of recommended options have been proposed for further discussion with stakeholders.

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1.0 Introduction

Pattle Delamore Partners (PDP) were engaged by Environment Southland (ES) to undertake an investigation into quantitative mitigation options for the Titiroa tide gate structure, as a result of detrimental impacts to inanga spawning. A Section 92 request for further information as part of the re-consenting process requested further investigation to satisfy the questions; if the structure is impeding spawning and migration of native fish species and, if so, the scale of effect on spawning and migration.

1.1 Background

ES have previously held a coastal permit (Permit No. 204122), which expired 29 October 2020, which authorised the occupation of the coastal marine area (CMA), and to dam tidal waters, with a tide gate structure. This structure is known as the Titiroa tide gate.

The conditions of the coastal permit required the following investigations to be undertaken:

1. A comparison of native fish communities in sites upstream and downstream of the tide gate structure using the methods outlined in the New Zealand Freshwater Fish Sampling Protocols by Joy *et al.* (2013) and Hicks (2013);
2. An assessment of the flow profile immediately downstream of the tide gate structure to determine whether water velocities exceed the swimming speeds of native fish species in the area; and,
3. A salinity survey of the Titiroa Stream to determine the upstream extent of the saltwater wedge (saltwater/freshwater mixing zone), and whether the tide gate affects spawning of inanga.

In November 2020, Pattle Delamore Partners (PDP) was engaged to undertake a fish survey and a flow/velocity profile survey (tasks 1 and 2 above). The results from this investigation concluded that while the structure is not impeding fish passage upstream and downstream of the gates, it is likely that the presence of the tide gate prevents or delays the spawning of inanga in the Titiroa Stream, (PDP 2021). A map showing the location of the Titiroa Stream, the tide gate structure, and surrounding environmental features is provided in Figure 1.



MATAURA RIVER

Tokanui-Gorge Road Highway

TITIROA TIDE GATE

TITIROA STREAM

FORTROSE ESTUARY



0 250 500
METRES
SCALE: 1:25,000 (A3)

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FIGURE 1: TITIROA STREAM AND SURROUNDING FEATURES

PROJECT
TITIROA TIDE GATE MITIGATION

The scope of this investigation was to undertake a range of field surveys in the vicinity of the tide gate structure, in order to provide quantitative mitigation options for inanga spawning habitat. The investigation was tailored to be conducted during spring high tides, during summer when freshwater baseflows are lowest, to accurately assess current and potential inanga spawning options.

To do this, the following investigations were undertaken:

- ∴ Modelling of water inundation extent as a result of the tidal cycle if the tide gates were not present;
- ∴ Measure the current upstream salinity extent to determine current inanga spawning habitat limitations;
- ∴ Map potential (low, moderate, high) spawning area in length along both Titiroa streambanks upstream of the tide gate;
- ∴ Using the above investigations, quantify (in length and area) the amount of potential inanga spawning habitat lost due to the tide gate being present (i.e., suitable habitat between the observed and predicted limit of tidally influenced water level fluctuation);
- ∴ Determine the level of inanga spawning activity currently occurring between the tide gates and the upstream limit of observed tidally influenced water level variation; and,
- ∴ Identify suitable locations downstream of the tide gates where mitigation could be provided and propose suitable mitigation options.

1.2 Inanga Spawning

In New Zealand, the term “whitebait” refers to the juveniles of five galaxiid species. The most common of these five species is inanga (*Galaxias maculatus*) (McDowall 1990; Taylor 2002; Hickford and Schiel 2011). Inanga are considered taonga, and are traditionally valued by Maori as kai, during both the juvenile and adult life stages.

Inanga are diadromous, meaning they migrate between salt and freshwater as part of their life cycles. Juvenile inanga migrate upstream in spring (the migration that whitebaiters target), then over summer they mature in freshwater habitats before mature inanga migrate back downstream in autumn to spawn among riparian vegetation that is flooded by spring tides (Richardson and Taylor 2002).

1.2.1 Spawning Habitat

Inanga reproduction is synchronous with the spring tidal cycle. Spawning takes place in flooded riparian margins during high spring tides, usually between late summer and early winter (Hicks et al. 2010). Typically, this spawning occurs at the upstream extent of a salt wedge (penetration of salt water). Female inanga will deposit between 1,500-3,000 eggs at a time, just below the high spring tide water level (Hickford and Schiel 2011), therefore the fertilised eggs become stranded and develop aerially as the tide recedes (Benzie 1968; Richardson and Taylor 2002). The eggs are protected from desiccation by humidity between the plant stems where they were laid and within the root mat structure. As such, presence of root mats is important in inanga spawning habitats.

Eggs are small, between 0.8-1.2 mm in diameter, and will hatch when the riparian vegetation within which they were laid is inundated again on the next set of high spring tides. Larvae are washed out to sea, where they develop into juveniles for approximately six months, following this they return to freshwater and migrate upstream as 'whitebait'. Ideal inanga spawning areas include gently sloping riverbank (rather than a steep edge or vertical bank), so that more accessible bank area is available for inanga to lay their eggs on during the spring high tide. Also required is suitable bank vegetation, with tall thick grass for eggs to be laid in the root mat, and plants rising from the water for inanga to hide amongst until high tide takes them up the bank.

Environmental factors being equal, inanga are known to spawn in the same locations every year, consistently utilising the same habitat. Therefore, once spawning habitat locations are known they can be prioritised for management and enhancement. However, if an inanga spawning reach is unmanaged or unknown, these small, localised areas can be subject to multiple stressors, potentially resulting in the loss of habitat and thus breeding potential (Taylor and Marshall 2016).

1.2.2 Threats to Inanga Spawning Grounds

Threats to inanga and their spawning grounds include, but are not limited to:

- ✦ Predation on inanga by introduced species (i.e., trout);
- ✦ Damage to spawning habitat by farm stock;
- ✦ Man-made changes to natural bank form;
- ✦ In urban settings, mowing of vegetation on the banks during the spawning season;
- ✦ Excessive sediment on banks smothering the vegetation;
- ✦ Instream barriers that prevent, or inhibit, inanga accessing spawning areas; and,
- ✦ Water pollution.

1.2.3 Factors Influencing Spawning Success

- ∴ Access;

Although inanga are relatively strong swimmers, they generally do not penetrate great distances inland or climb obstacles such as waterfalls or swift rapids. Accordingly, tide gates may, and perched culverts certainly will, pose fish passage issues for this species.

- ∴ Cover;

Shelter is an essential feature of good-quality inanga streams. Most whitebait species utilise cover from undercut banks or riparian vegetation, as refuge from predators or high flows.

- ∴ Spawning vegetation (humidity & temperature);

Inanga eggs lack a waterproof shell, making them prone to desiccation. Therefore, they require shaded, high humidity areas. Spawning vegetation provides this shading and humidity when eggs are embedded within, or close to, the root matrix.

- ∴ Salinity; and,

The upstream extent of the saltwater wedge provides an interface for inanga spawning in any given waterway. High salinity (i.e., about half saltwater) waters limit fertilisation success deeming them unsuitable for inanga spawning.

- ∴ Tidal Inundation and Egg Hatching

Inanga spawn about 30 min after the highest point of the spring tide, and as their eggs tend to lose some stickiness, they disperse along and down the bank. Therefore, some eggs can experience tidal inundation on lower tides (Taylor and Marshall 2016).

Egg hatching will only occur after full egg development and requires re-inundation by water (Benzie (1968b)). Benzie's (1968b) research depicts the 21 developmental stages can take as little as 10 days from the eggs being laid at a controlled temperature of 17 degrees. The development rate of eggs is temperature labile. For example, the total development time of eggs at a constant 4°C took 31 days to develop. If inanga eggs are re-inundated (e.g., by floodwater) before they are fully developed, they will not hatch, but after development any inundation of water (from the next cycle of spring tides or from a flood) will result in hatching occurring (Benzie 1968b).

In the Titiroa Stream some suitable and accessible habitat for inanga spawning presumably existed prior to the installation of the tide gates, and this habitat was successfully used for spawning. Although spawning habitat still exists, the changes to stream flow patterns caused by the tide gates may have a detrimental effect on successful inanga spawning; in the hours before spawning occurs, and even on previous high tides in the spring tide sequence, inanga shoals from upstream migrate downstream on the high spring tide until they detect the upstream limit of the saltwater wedge (Eldon et al 1989, Taylor and Kelly 2001). Spawning occurs just after the peak of high water level in suitable habitat close to the upstream limit of the saltwater wedge. Tide gates may not physically block or delay fish passage for long; however, changes to the penetration of the salt water upstream may confuse the salinity “cues” that inanga use to coordinate their spawning behaviour.

2.0 Methodology

Methodology of the range of investigations completed at the Titiroa tide gate to inform potential inanga spawning and native fish migration impacts is provided in the subsections below.

All tidal references during the report are made in daylight savings time (i.e., NZDT), references to tide times have been taken from Bluff and Waikawa as well as the National Institute of Water and Atmospheric Research (NIWA) “tide forecaster” to predict tide times at the mouth of the Titiroa Stream.

2.1 Salinity Survey

Previous salinity surveys of the Titiroa Stream carried out by Dare and van der Hurk (n.d) had determined the extent of the saltwater wedge (saltwater penetration upstream) to be located downstream of the tide gate structure. An updated salinity survey was considered necessary due to the time since the last surveys and clarification of the tidal delay from the mouth to the tide gate structure.

PDP conducted a salinity survey during the maximum high spring tide under baseflow conditions to identify the upstream extent of the salt wedge. The survey was completed using a kayak to access the middle of the channel and a handheld YSI with 2-meter-long cable was used to measure the conductivity (used as a proxy for salinity) of the water at the bed and surface.

Starting downstream of the Titiroa tide gate, at site S1 (refer to Figure 2), measurements were recorded. Dependant on the results, conductivity readings were progressed upstream until there was no more salt recorded, or conductivity readings dropped below 600 -700 micro siemens. Global positioning system (GPS) waypoints and unique sample numbers were used to record location and conductivity readings.

2.2 Existing Water Level Variation Upstream of the Tide Gates

As the tide gates close, the flow of the Titiroa Stream is dammed, causing water levels to rise upstream of the gates. A survey was undertaken to determine the distance upstream that water level fluctuations occur during a maximum high spring tide. This data was collected to determine the potential upstream extent of tidally influenced water level fluctuation under existing conditions. Both the existing and modelled extent of tidally influenced inundation upstream of the gates, informs where the habitat mapping will be undertaken.

To identify the upstream extent of inundation (flow backing up) within existing situation, water level measurements were recorded before the gates were due to open, when maximum inundation occurs. Incrementally marked pegs (with 5 mm measurements) were staked into the bed of the Titiroa Stream to measure the rise or fall of water level over time. The water level drop was recorded once the gates were open. The wooden pegs allowed the water level to be visible once it dropped.

2.3 Hydraulic Model

A 2D hydraulic model was constructed to predict the inundation extent for the scenario in which the Titiroa tide gates were removed, in order to understand the extent of potential inanga spawning area which is not available due to the tide gate presence. This upstream extent was then used for spawning suitability surveys (section 2.6 and 3.4).

2.3.1 Digital Terrain Model/Bathymetry

Given the absence of LIDAR, the terrain surface was constructed from Real time kinematic survey (RTK) which captured elevation data. Whilst this is suitable for the purposes of this assessment, it would be beneficial to update the terrain surface of the model with LIDAR when it becomes available.

On the 2nd of February 2022 a RTK was used to survey terrain/bathymetry from Wybrow trig point near the Tokonui Gorge Road Highway, the RTK was used to capture:

- ∴ Data for both the true left and true right bottom of bank, top of bank and high tide contour for the Titiroa Stream (upstream of the tide gates);
- ∴ Intermediary points between the top of bank and the high tide contour were also recorded; and,
- ∴ Detailed channel cross section data was captured for the secondary channel (containing the tide gates) both upstream and downstream of the tide gate.

The model bathymetry/terrain was constructed from the RTK survey using a Triangular Irregular Network (TIN) to interpolate intermediary elevations which were converted to a raster with a one metre resolution.

It should be noted updating with the ES LIDAR dataset will improve the accuracy of this model (and any predictions made by the model).

2.3.2 Boundary Conditions

The model required upstream (Titiroa Stream flow) and downstream (tidal level) boundary conditions.

Two pressure transducers were installed for a period of a fortnight, one upstream and one downstream of the tide gates. The capture period included a spring tide and was adjusted for barometric pressures (using on site data captured with a barometer).

The base flow of the Titiroa Stream was obtained by analysing recorded stage data obtained from the upstream transducer. When the tide gates are closed, the upstream stage increases which represents the contribution of base flow over time. The upstream stage was converted to a volume from which the base flow could be determined.

The tidal boundary (spring tide) was obtained from the downstream pressure transducer. This was transferred to the same vertical datum that the RTK survey data was captured in.

2.3.3 Roughness

A Manning's roughness value of 0.025 was employed to represent the roughness of the Titiroa Stream.

The hydraulic model assists in determining the upstream extent of tidal inundation within the area that will be surveyed for habitat suitability for inanga to spawn (section 2.6).

2.4 Habitat Mapping

2.4.1 Tributaries

Nine tributaries of the Titiroa Stream downstream of the tide gates were assessed for their existing values, involving a mixture of physiochemical water quality measurements (dissolved oxygen, conductivity, temperature, pH) and high-level physical habitat assessments (rapid habitat assessment (RHA)). RHA's were used to produce a reach habitat quality score. The score is generated from ten assessed parameters which cover the following: sediment, invertebrate habitat diversity and abundance, fish cover diversity and abundance, hydraulic heterogeneity, bank erosion (both left and right) and vegetation, riparian width, and shade. From each parameter a condition category is given out of 100. Ascertaining the existing values of these drains assists with habitat enhancement and mitigation options in the future.

2.4.2 Main Stem

Aquatic Ecology Limited (AEL) conducted habitat mapping surveys in the main stem of the Titiroa Stream, from the tide gates to Fleming Road (the upstream limit of tidally influenced water level fluctuation determined in Section 2).

The habitat mapping survey focused on assessing the tidally influenced area of the stream bank using expert judgement for suitable slope, microclimate, aspect and identifying plant species present. Access to the channel edges to conduct the survey was achieved by boat. Habitat was categorised as suitable for spawning between the following categories, unknown, not suitable, or low, moderate, and high suitability. The classed areas have been digitised and only the moderate and high classes are combined to quantify the potential length/area of suitable inanga spawning habitat (i.e., to quantify lost habitat) and the amount of mitigation required.

The tidally influenced area of stream bank is determined by slope, the steeper the bank the less area is affected by the tidal fluctuation and therefore less habitat is available for spawning. The terrain survey (seen in methodology 2.4.1) included data for both the true left and true right bottom of bank, top of bank and high tide contour for the Titiroa Stream (upstream of the tide gates). These data points have been used to calculate an area for the purposes of quantitative mitigation options.

2.5 Inanga Spawning Surveys

Spawning surveys were undertaken during the inanga spawning season, which is generally in the autumn months (March to May). Dates were chosen to work in with the tidal phases to obtain the most reliable spawning activity. Two dates were identified either the 7th-8th March or 19th-20th of April. The spawning survey was conducted in the same manner as the habitat survey. Where habitat was identified as being moderate or highly suitable, then investigations amongst the grass and plant species for eggs was conducted.

2.6 Fishing Surveys

To supplement the 2021 fishing survey and address questions raised by Department of Conservation (DoC), Te Ao Marama Incorporated (TAMI) and Fish & Game, an additional fishing survey using unbaited Fyke nets and Gee Minnow traps was undertaken upstream and downstream of the tide gates. Nets and traps were set approximately 200 m upstream and downstream of the tide gates to provide comparable reaches away from the tide gate structure in similar habitat types. Nets and traps were left to soak overnight before lifting the nets to process the catch. Fish were identified to species level where possible, measured and returned to the Titiroa Stream at the location they were caught.

3.0 Results

3.1 Salinity Survey

Previous salt wedge surveys (Dare & van der Hurk, n.d) determined the salt wedge was located downstream of the tide gate; however, it was considered that this survey may not have accounted for tide travel time to the tide gate structure, therefore an updated saltwater wedge survey was conducted to confirm the accuracy of these assessments.

The salinity survey was completed on the spring tide that occurred on the 1st of February 2022. The predicted peak (at the Titiroa Stream mouth) was 2:59 pm; however, the peak time at the Titiroa tide gate was observed at 4:15 pm. All monitoring sites and results can be seen in Table 1 and Figure 2, below.

Starting at the most downstream site S1 the conductivity readings were 5,422 µS/cm on the surface and 39,440 µS/cm at the bed. At Site 10 (the most upstream point, 158 m upstream of the tide gates) conductivity was 11,500 µS/cm on the bed and 510 µS/cm on the surface.

The two most upstream sites (Site 8 and 11), located approximately 180 m upstream of the tide gate structure, defined the extent of the wedge, where bed readings dropped to 508 µS/cm and 467 µS/cm, respectively. The extent of the saltwedge has therefore been determined as located 158 m upstream of the tide gate structure.

Table 1: Conductivity of Bed and Surface of Titiroa Stream			
Site	Time	Electrical Conductivity Surface (µS/cm)	Electrical Conductivity Bed (µS/cm)
1	3:06	5,422	39,440
2	3:11	1,961	38,100
3	3:19	4,040	14,970
4	3:24	2,500	13,676
5	3:38	670	11,401
6	3:41	610	11,524
7	3:44	382	13,089
8	3:48	480	508
9	3:51	517	13,344
10	3:54	510	11,500
11	3:55	480	467



KEY :

- SALINITY SURVEY POINT
- ▲ NEW SALTWATER WEDGE
- ▲ PREVIOUS SALTWATER WEDGE
- WATERWAYS



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FIGURE 2: SALINITY INVESTIGATION

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 TITIROA TIDE GATE MITIGATION



3.2 Water Level Variation Upstream of the Tide Gates

On the 3rd of February 2022, before the tide gates were due to open, pegs (with incremental marks) were staked into the bed of the Titiroa Stream upstream of the gates to observe water level fluctuation caused by the gate damming the Titiroa Stream. Once the gates opened the water level drop was recorded. This field work was carried out during a prolonged period of low rainfall and low flow conditions were recorded at nearby flow sites, (ES, 2022a).

The extent of water inundation was recorded 2.5 km upstream of the tide gates (at Site OB5). The water level drop observed at Site OB5 was approximately 3-5 mm(+/-3 mm), in comparison, Site Peg 1, located 579 m upstream of the gates recorded a water level drop of 30-35 mm(+/-3 mm). Some water surface disturbance could not be avoided (e.g., wake of birds landing, and fish jumping).

The water level fluctuation is of interest in determining the upstream extent of tidally influenced water level fluctuation under existing conditions.

3.3 Hydraulic Model

It should be noted that the predictions made by the hydraulic model are indicative only. If and when the ES LIDAR dataset becomes available, the uncertainty associated with the model predictions could be refined substantially by implementing the LIDAR dataset.

The hydraulic model established the water inundation extent as far upstream as Fleming Road, approximately 6 km upstream from the tide gate with a reasonable degree of certainty.

The maximum inundation extent is likely between Fleming Road and Gray Road (a further 1.7 km upstream of Fleming Road). However, determining the exact upstream inundation extent will require LIDAR data.

The model results were ground-truthed by examining the geomorphology of the Titiroa Stream. The base flow of the Titiroa stream was estimated at 150 to 300 L/s. This estimate was derived by transposing the water level increase (measured by the transducer) when the tide gates were closed and converting this water level to a volume and finally flow.

Given a baseflow of 150 to 300 L/s, aerial imagery suggests that historically, the section of stream to Fleming Road has been tidal as evidenced by the wide meandering nature of the watercourse. Upstream of Fleming Road, the Titiroa Stream appears more incised although still relatively wide relative to the calculated base flow. Upstream of Grays Road, the stream narrows significantly, suggesting that historically, this section of stream has not been tidally influenced.

In conclusion, both the hydraulic model and available geomorphological evidence suggest that the section of stream between Fleming Road and the tidal gates has historically been subject to tidal inundation. The tidal extent likely reaches to some location between Fleming and Gray Roads and is unlikely to reach upstream of Gray Road. For the purposes of this survey Fleming Road has been used as the upper limit of tidal inundation.

3.4 Habitat Mapping

3.4.1 Mainstem

The hydraulic model along with geomorphological evidence predicts tidal inundation as far up the Titiroa Stream as Fleming Road. AEL conducted habitat mapping surveys on both banks of the main stem of the Titiroa Stream, from the tide gates to Fleming Road, located approximately 6km upstream.

Results of the habitat mapping (Figure 3) rate the current state of the tidally influenced area (stream banks) suitable for inanga spawning into five suitability categories: unidentified, not suitable, low, moderate, and high suitability. Habitat was categorised using the parameters specified in the methodology section of this report (section 2.5.2). The two highest categories (moderate and high) were combined to quantify suitable habitat currently present. Over the total 6 km distance of stream bank assessed, 1.8 km and 0.15 km of moderate and high suitability, respectively was mapped. Combined, this is calculated as 1.95 km of potential lost habitat.

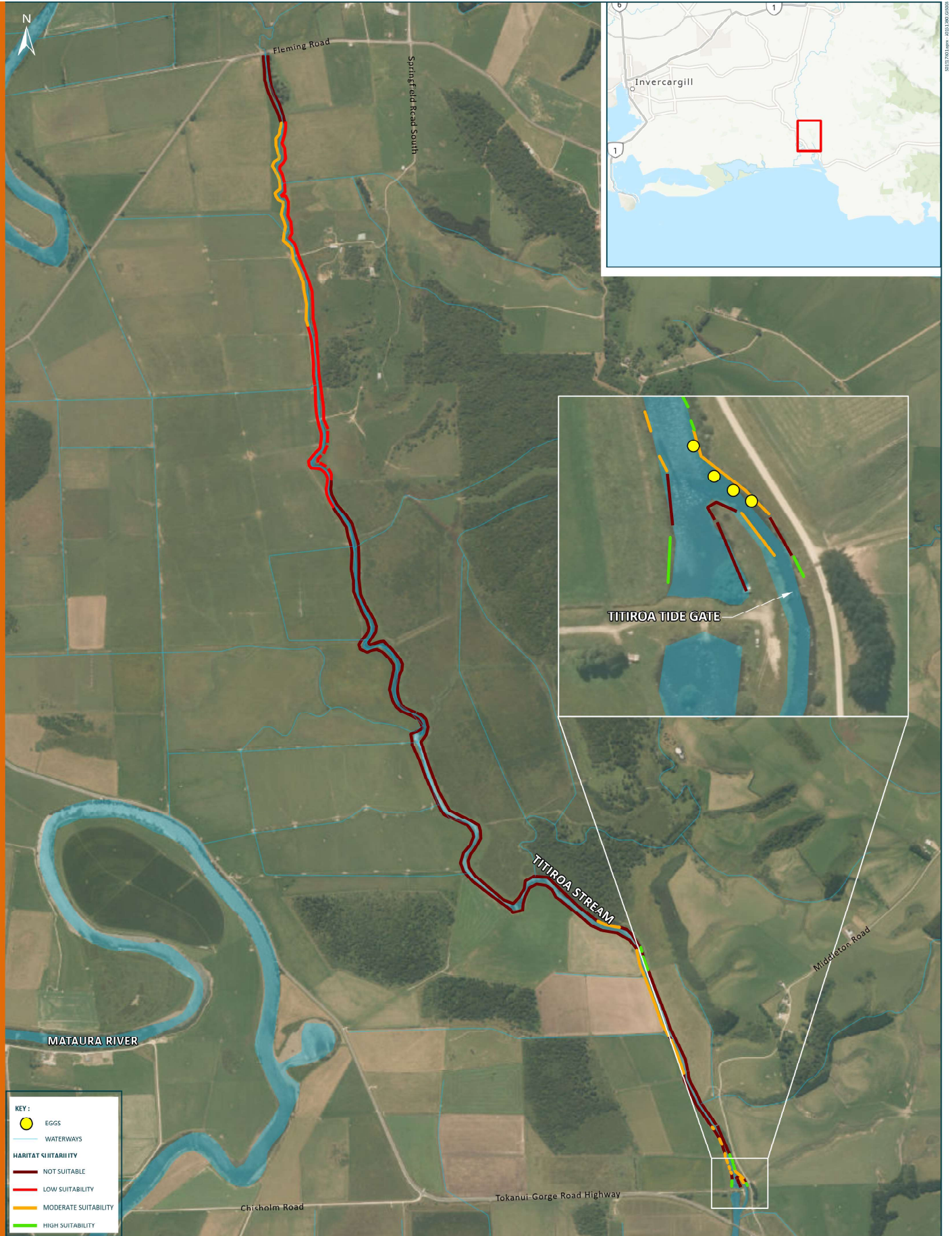
Data points from the terrain survey identified the bottom and top of the true left and right stream banks, with the width of the tidally influenced bank (slope of the bank) ranging from 3.3 m to 8.6 m). The calculated 1.95 km of stream bank is extended over the width of the slope making a total area of 1.38 ha. These areas, shown in light and dark green in Figure 3 were located on the true left and right banks near the tide gates, with multiple longer stretches of suitable habitat further upstream near the predicted tidal inundation extent, near Fleming Road (see Figure 3).

While the tidal inundation extent may be modelled with reasonable certainty, it remains unknown where the original extent of saltwater wedge would have been if the original channel was operational. Geomorphological features such as the width of the stream channel suggest it is unlikely the saltwater wedge would extent as far as Fleming Road, and therefore conducting habitat suitability survey to this extent forms a conservative estimate of habitat loss.

In addition to mapping the current habitat quality for inanga spawning, AEL recorded areas with potential for mitigation options (e.g., unsuitable microclimate that could be enhanced/modified) found in suitable locations.

Observations of importance within the habitat mapping assessment include the presence of a dominant saline environment with estuarine crabs and brackish vegetation found 220 m downstream of the tide gates. This finding is consistent with the new saltwater wedge extent, as well as Hicks, et al (2013) research that high salinity levels found downstream of the gates severely limits the available inanga spawning area.

Other observations include the privately owned land on the true left bank from the tide gates upstream for approximately 1 km are currently not fenced to exclude stock from the bank of the Titiroa Stream. The unnamed tributary that confluent the Titiroa Stream about 240 m upstream of the tide gates also has no stock exclusion.



KEY :

- EGGS
- WATERWAYS

HABITAT SUITABILITY

- NOT SUITABLE
- LOW SUITABILITY
- MODERATE SUITABILITY
- HIGH SUITABILITY

0 180 360
METRES
SCALE - 1:115,000 (A3)

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FIGURE
FIGURE 3: HABITAT MAPPING

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3.4.2 Tributaries

Identifying potential areas for mitigation and enhancement brings focus to tributaries that are connected to the Titiroa Stream immediately downstream of the tide gates. Nine sites were selected for rapid habitat assessments (RHA). The RHA's were carried out on the 8th of March 2022 during a prolonged and widespread dry period. Summary water quality and habitat data is provided in Table 2 and site locations are shown in Figure 4. Using the RHA was a fast and consistent method to capture a broad physical habitat structure, for the purpose of using these tributaries as potential enhancement areas for spawning habitat.

The assessments were conducted during mid-to-low tide, which was evident at the last the last two, Sites 8 and 9, which recorded much lower conductivity readings at low tide. Sites 8 and 9 are located on the same tributary and while Site 9 is fully influenced by the tide, a perched culvert (under the road), restricts full tidal influence at Site 8.

Four out of the nine sites were dry leaving sites 1, 3, 7, 8 and 9 having the most water. A local source informed that most drains (not specified which) have flaps attached at their outlet, preventing tidal or flood waters from backing up or re-entering the drainage network, which may explain some of the tributaries being dry.

The general habitat quality scores of all the tributaries assessed were low apart from Site 9 which scored high in riparian shade, buffer width and invertebrate habitat abundance and diversity. It is noted that all tributaries are fenced from livestock, the vegetation in the riparian buffer at Site 5 appears to have been chemically sprayed. The channel shape at sites 7 and 8 are near vertical banks. Sediment had been piled adjacent to the tributary at Site 1, from recent clearing activity.

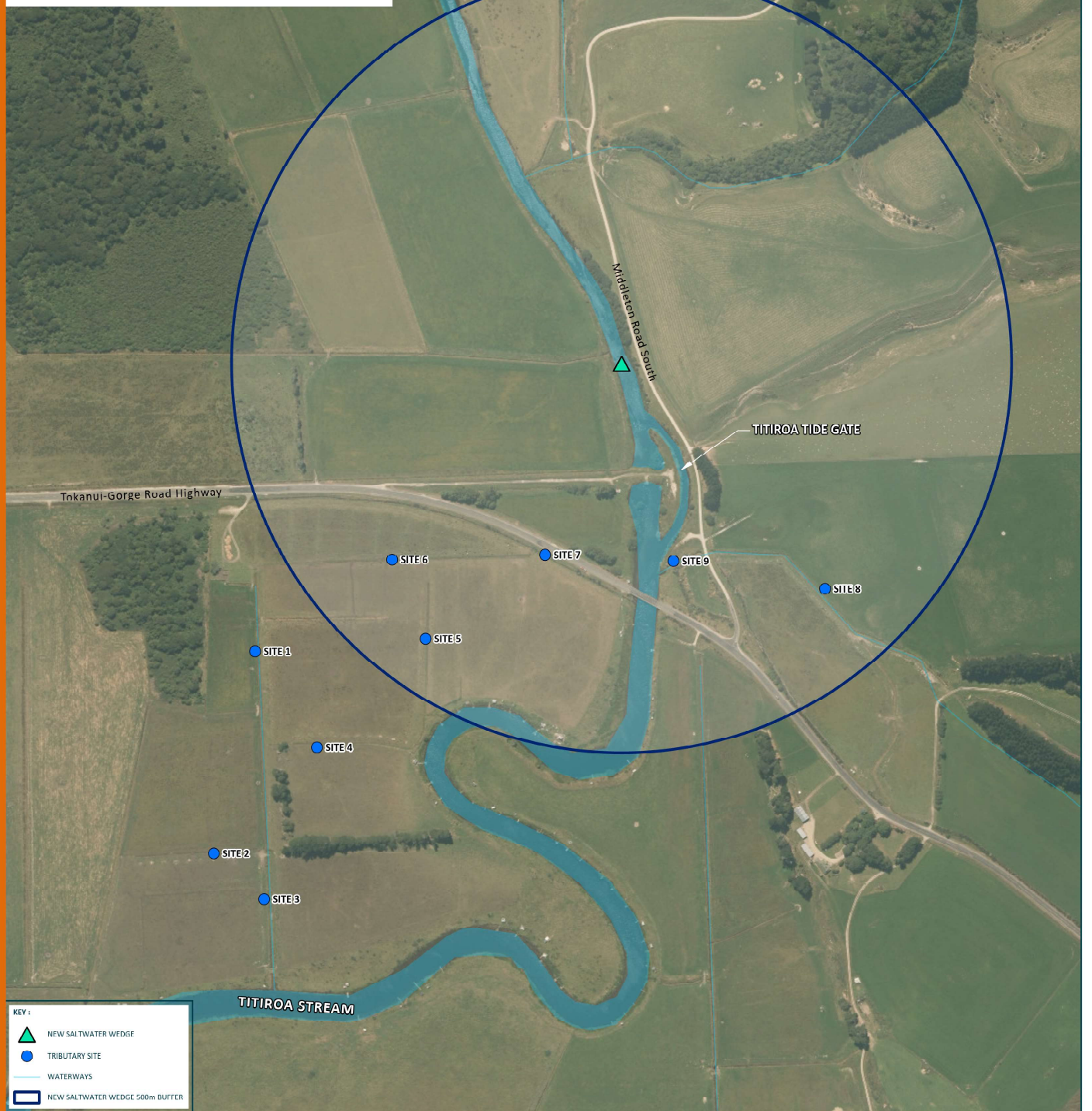
While Inanga are not considered sensitive to pollutants, toxicity experiments undertaken by Taylor (2002) show inanga preferences (consistent with the Australia New Zealand Guidelines (ANZG) Default Guideline Values (DGV) include water temperature <23°C, which was achieved at all tributary sites. Sites 1, 3 and 7 were below the acceptable pH range of 7 to 9.5 and Sites 8 and 9 were within. Acceptable dissolved oxygen (DO) concentrations are >4.5mg/L, which Sites 1 and 3 also did not meet.

To summarise, Sites 8 and 9 (in their current state), appear appropriate for targeted inanga spawning enhancement as a mitigation option; however, the current state of drain outlets to the Titiroa Stream and potential presence of tide flaps is unknown at this stage. If more tidal water could be diverted into Sites 1, 3 and 7 it is likely that DO concentrations could be improved. It is noted the low pH readings could be associated with the Jacobstown soil type, known for its moderate to low pH levels.

Tributaries located upstream of the tides gates have been observed in less detail (as they are not a focus for mitigation), however some habitat enhancement could be beneficial. The unnamed tributary that confluences the Titiroa Stream 240 m upstream from the tide gates has been observed to have reasonable freshwater flow/input as opposed to the tributary that enters immediately upstream of the tide gates.

Table 2: Water Habitat Quality of Drains downstream of the tide gates

Site	Field Water Quality							Rapid Habitat Assessment (score/100)
	Temp (°C)	Dissolved Oxygen (mg/L)	Dissolved Oxygen (% sat)	Conductivity (µS/cm)	pH	ORP	Turbidity (NTU)	
1	15.1	0.8	8.0	7,158	6.1 9	-118.2	7.2	31
2	-	-	-	-	-	-	-	-
3	15.5	2.18	23.2	16,563	6.7 2	-43.1	8.9	30
4	-	-	-	-	-	-	-	-
5	-	-	-	-	-	-	-	-
6	-	-	-	-	-	-	-	-
7	17.3	4.76	52.8	18,667	6.3 7	24.3	12.1	34
8	13.2	10.14	96.17	196	7.1 5	41.0	5.4	26
9	14.5	9.92	97.5	538	7.1 3	25.4	6.9	60
Notes: Sites 2,4,5 and 6 were dry.								



KEY :

- NEW SALTWATER WEDGE
- TRIBUTARY SITE
- WATERWAYS
- NEW SALTWATER WEDGE 500m BUFFER



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FIGURE 4: MITIGATION OPTIONS

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TITIROA TIDE GATE MITIGATION

3.5 Inanga Spawning

Using the newly determined saltwater wedge (see section 3.1), located 158 m upstream of the tide gate structure, enabled the inanga spawning survey on the next spring tide (8th March 2022). AEL surveyed all suitable habitat for Inanga spawning activity, from the tide gates to Fleming Road. Inanga eggs were found in four locations in close proximity to one another, situated on the true left bank where the altered channel meets the original Titiroa Stream channel. The eggs were located in two out of the twenty-three sections of stream bank identified as suitable spawning habitat and were within the expected 500 m radius of the new saltwater wedge. Inanga egg locations are shown in Figure 3.

3.6 Fishing

The fish survey in March 2022, completed by AEL, included a total of four Fyke nets and four Gee minnow traps set up and down stream of the tide gates, in a similar manner to the February 2021 survey, but in varying locations. The traps were set approximately 200 m up and downstream of the tide gates, and soak times varied from 17 hours to 18 hours, between both the 2021 and 2022 surveys, respectively. Summary results from the fish surveys carried out in February 2021 and March 2022 are provided in Table 3, fishing site locations are shown in Figure 5.

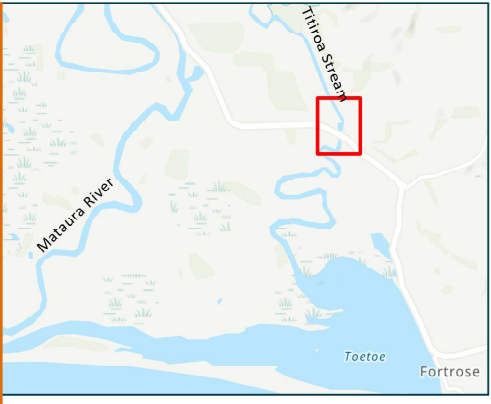
Statistical analysis has been performed to test the alternative hypothesis, that the presence of the tide gate affects the numbers of inanga upstream. Results from both datasets (2021 and 2022) have been fitted to a t-test with a total of 20 data points. The mean number of inanga caught upstream is 2.2, versus downstream 24.4, the P-value of 0.016 provides strong evidence there is a significant decrease in numbers upstream compared to downstream. However, without undertaking something such as a Before-After-Control-Impact (BACI) study it cannot be determined if such differences in fish abundance between upstream and downstream are due to the presence of the tide gates, or simply reflect habitat preferences between the two areas (e.g., more estuarine habitat downstream).

Schools of inanga were frequently observed while carrying out field work along the banks of the Titiroa Stream, both up and downstream of the tide gates. Schools of inanga observed on the downstream side of the gates when it has been closed at high tide. Larger eel activity has been observed upstream of the tide gates and in backwaters of Titiroa Stream.

It is noted that the tide gate structure only impedes fish passage when it is closed, which is only during high tide (to stop flooding of upgradient land). Therefore, while the tide gate will interfere with inanga spawning migration as it is linked to spring high tides, the frequent opening of the tide gate (daily) enables the migration of other fish species along the length of the Titiroa Stream.

Table 3: Fish Survey Summary					
Common name	Species name	January 2021		March 2022	
		U/S	D/S	U/S	D/S
Longfin Eel ¹	<i>Anguilla dieffenbachii</i>	66	192	21	66
Shortfin Eel ¹	<i>Anguilla australis</i>	3	27	17	39
Inanga ¹	<i>Galaxias maculatus</i>	28	303	16	200
Common Bully	<i>Gobiomorphus cotidianus</i>	13	29	27	117
Redfin Perch	<i>Perca fluviatilis</i>	0	58	2	0
Giant Kokopu ¹	<i>Galaxias argenteus</i>	0	0	1	0
Redfin Bully	<i>Gobiomorphus huttoni</i>	0	0	10	0
Triplefin	<i>Forsterygion lapillum</i>	0	0	0	28

Notes:
¹Migratory Species



KEY :

- FISHING SITE (2021)
- FISHING SITE (2022)
- WATERWAYS



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FIGURE 5: FISHING LOCATIONS

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TITIROA TIDE GATE MITIGATION

4.0 Mitigation Options

As adverse effects have been determined to inanga spawning within the Titiroa Stream as a result of the tide gate presence, options to avoid, remedy or mitigate have been investigated, with recommendations provided.

There is no way to avoid the effects of the activity without removing the tide gate structure and giving back the land to full tidal inundation and flooding. We understand that ES do not wish to remove this structure as it is providing flood control to upgradient land. An alternate option is to remove the current tide gate structure and replace it with a fish friendly tide gate, this option would improve migration opportunities for most species; however, as there is migration opportunity already when the tide gate is open, and the primary effect is on inanga spawning, this option would not mitigate that effect. A discussion of this option is provided below for consideration.

Quantitative mitigation of potential lost Inanga spawning habitat within the Titiroa Stream due to the presence of the tide gate has been measured as 1.38 ha of riparian land. The riparian land was determined by inputting data into QGIS to calculate the area of bank. The terrain survey points, which identified the bank slope were digitized as well as the lengths of suitable inanga spawning habitat, these individual areas have been quantified as the riparian area lost to inanga spawning. However, this potential may be limited by the size of the inanga spawning population.

The following sections are provided as options for potential mitigation for the effect of lost inanga spawning habitat as a result of the tide gate. An overview of the proposed mitigation options is provided in Figure 6.

4.1 Installation of Fish Friendly Tide Gates

Fish friendly tide gates (FFTGs) have been used in some New Zealand tidal systems to limit the adverse ecological impacts of tide gates. In Canterbury, FFTGs were installed at the three stream mouths along around the Avon-Heathcote Estuary / Ihutai after the existing structures were damaged following the Canterbury earthquake series of 2010 and 2011¹. The FFTG, designed by ATS Environmental incorporate a counterweight and double hinge design to delay gate closure on an incoming tide, which provides a longer window of opportunity for fish to migrate upstream (Burrell 2018). This option should be considered as a potential mitigation option for Inanga spawning, as it would enable a greater period of time for movement. It is recognised that this may not be a suitable option for the Titiroa Stream as the Titiroa tide gate structure is different in design and catchment flows, and peak inanga spawning (the activity in which mitigation is required) occurs at spring high tide, which would be held back even by FFTGs.

¹ <https://www.ccc.govt.nz/assets/Documents/Environment/Water/Monitoring-Reports/2018-reports/Avoca-Fish-Friendly-Tide-Gates-and-Salt-Marsh-Ecology-Report.PDF>

4.2 Upstream of Tide Gate Mitigation Options

Enhancing habitat in the mainstem and/or tributaries of the Titiroa Stream upstream of the tide gate comes with the risk that if inanga don't migrate downstream past the gates to spawn, suitable re-submersion for hatching is not guaranteed. While there are suitable areas for spawning habitat enhancement, there is no guarantee this mitigation would be successful due to limitations in water level fluctuation.

AEL have defined suitable locations for inanga spawning, that currently have unsuitable microclimates. Remedying microclimates would include such activities as bank restructuring (increase in slope/area), restricting stock access to allow for bank stability and vegetation growth, as well as riparian planting. These options would create suitable spawning habitat upstream of the tide gate. The riparian area upstream of the tide gates that is owned by ES (within the 500 m radius of the new saltwater wedge), that could achieve habitat suitability with enhancement, includes the stream banks of the mainstem from the tide gate to the northern limit of the 500 m radius (located 240 m upstream of an unnamed tributary), but does not include privately owned unnamed tributary on the true left bank.

The proposed riparian area for enhancement is shown in Figure 6 and represents the true left and right banks of the mainstem Titiroa Stream, an area of 12.4 ha, it is recommended the proposed area follow the enhancement guidelines outlined in Richardson and Taylor (2004).

However, as explained above, due to the location being upstream there is uncertainty that eggs would hatch due to re-submergence on the spring tide, the enhancement in this area cannot be used as direct mitigation; however, it would improve the current conditions, which would result in betterment. For example, reducing the bank angle would optimise the potential spawning area, because the tide gates, in their present form, minimize tidal level fluctuations.

4.3 Downstream of Tide Gate Mitigation Options

Previous investigations conducted by (Hicks 2013) into potential inanga spawning areas in Southland rivers highlights the limited spawning habitat available within the Titiroa and that in the unnamed tributary which enters the Titiroa Stream immediately downstream of the tide gate, as "high priority for enhancement as it may be the only major freshwater-tidal area in the Titiroa system".

In order to provide mitigation options to enhance inanga spawning in the Titiroa catchment, a focus was put on enhancing potential spawning habitat downstream of the tide gate, but also within the 500 m radius of the newly determined salt wedge. Within these areas the following habitat enhancement options were considered, starting with targeted inanga spawning enhancement and moving towards broader habitat enhancement, and are further discussed in the subsections below:

- ∴ Creation of inanga spawning ‘islands’ downstream of the tide gates;
- ∴ Tributary inanga spawning and habitat enhancement; and,
- ∴ Enhancement of coastal wetland habitat downstream of the tide gates.

A 1:5 enhancement ratio is recommended as direct mitigation for the loss of inanga spawning habitat as a result of the Titiroa tide gates. This results in a riparian area to enhance of 6.9 ha. As there is limited area available on the mainstem of the Titiroa Stream as a result of the salt wedge location and the tide gate, this enhancement is proposed to be split across multiple habitat types, as discussed in the subsections below and summarized in Table 4.

The undertaking of mitigation and enhancement actions would be staggered over a 5-year time period, to allow for the works to be budgeted for by the regional council. A recommended hierarchy of actions for future discussions will allow for achieving the best outcomes.

Table 4: Mitigation Options Summary	
Habitat Type	Area
Titiroa Stream (upstream of gates); mainstem	12.4 ha
Spawning Mitigation ‘islands’	2.4 ha
Tributary spawning & habitat enhancement	5.3 ha
Coastal wetland enhancement	1217.2 ha
Total Area	1237.3 ha



KEY:

	WATERWAYS
	TRIBUTARY SPAWNING AND HABITAT ENHANCEMENT
	COASTAL WETLAND
	TITIROA STREAM (UPSTREAM ENHANCEMENT)

0 100 200
METRES

SCALE: 1:10,000 (A3)

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FIGURE
FIGURE 6: PROPOSED MITIGATION AREAS

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TITIROA TIDE GATE MITIGATION

4.3.1 Mainstem Inanga Spawning Habitat Enhancement

As discussed in section 4.2, upstream of the tide gate is not considered ideal habitat for inanga spawning due to the low amplitude of water level fluctuations; however, the salt wedge is now known to penetrate well upstream of the tide gate and this is the only location where eggs were observed in the spawning survey. Therefore, immediately upstream of the tide gate, within 500 m of the salt wedge, 12.4 ha of current low quality or unsuitable spawning habitat is proposed to be enhanced following the enhancement guidelines outlines in Richardson and Taylor (2004).

Habitat enhancement will include shaping of banks to provide a suitable slope and riparian planting and maintenance of suitable eco-sourced riparian species for inanga spawning.

Downstream of the tide gate the water is considered too saline within the mainstem for effective spawning, therefore no mitigation is proposed on the mainstem downstream of the tide gate.

4.3.2 Creation of Inanga Spawning 'Islands' Downstream of the Tide Gate

Due to the lack of suitable habitat for enhancement downstream of the tide gate as a result of high salinity, which limits fertilization success (Hicks et al 2010), the creation of spawning 'islands' is proposed within the land blocks immediately downstream of the tide gate, on the true right bank. These drains/tributaries (assessed as site 5, 6 and 7 in Figure 4) are discharging to the Titiroa Stream; however, many are thought to have structures limiting saltwater ingress. Removal or retrofitting of these smaller barriers would enable the creation of multiple new salt wedges, where the tidal inundation moves up the drain to mix with freshwater. These drains would also require battering to enhance the stream bank slope area as well as planting and maintaining suitable eco-sourced riparian species for inanga spawning.

This ingress could be limited though either the retrofitting of FFTGs (i.e. the installation of counterweights as discussed in section 4.1) or the creation of earthen bunds at upgradient locations to mitigate potential tidal flooding.

The proposed tributaries for enhancement are shown in Figure 6 and represent an area of 2.46 ha.

Another option within this area is the creation of induced 'springs' within the floodplain habitat downstream of the tide gate, this could be achieved through drilling bores or digging holes to release shallow groundwater, which could be directed along channels to the Titiroa Stream to provide a connection with saline water. The channel could be contoured to provide ideal spawning habitat; however, this option would involve consenting requirements related to the use of groundwater, which may not be viable. It is therefore considered that enhancement of the existing freshwater drains is the best option to mitigate inanga spawning in this system.

4.3.3 Tributary spawning & habitat enhancement

As discussed in Hicks (2013) there is limited spawning habitat available downstream of the tide gate due to highly saline conditions. Hicks (2013) identifies the unnamed tributary that enters the Titiroa Stream immediately downstream of the tide gate on the true right side, as “high priority as it may be the only major freshwater-tidal area in the Titiroa system”.

We therefore propose enhancement of this tributary, not just for inanga spawning, but for native fish habitat as well. The land surrounding this tributary is owned by ES and leased, the enhancement will include discussing proposed work within lease agreement, confirming good fish passage (e.g., no tidal flap gates or culverts), and confirming the extent the saltwater wedge penetrates upstream. If no barriers are located on the outlet, the unnamed tributary can be enhanced through creating a sloped riparian buffer, fencing to exclude stock, riparian planting to provide shade, temperature control and humidity, and instream habitat enhancement (removal of sediment, installation of instream habitat – boulders, logs etc.). The stream has a narrow riparian buffer already fenced along its length, with well vegetated headwaters, therefore targeted restoration of the lower reaches (approximately 450 m reach) will improve the values of this sub-catchment, which has access to the lower Titiroa Stream (confluence is below the tide gates).

These enhancement options are expected to result in improved inanga spawning habitat and increased water quality, with the aim to meet regional and national water quality guidelines, and provide enhanced rearing habitat for native fish, including juvenile - adult inanga.

An area of 5.33 ha is proposed for the unnamed tributary (immediately downstream of the tide gates) enhancement.

4.3.4 Coastal Wetland Enhancement

Inanga spawning restoration is limited as a result of the highly saline conditions downstream of the tide gate. Therefore, additional recommended mitigation is in the form of a commitment by ES to enhance and protect the coastal wetland habitat in the lower Titiroa Stream. This area has historically been managed as grazed agricultural land; however, this area was recognized as a High Value Area (HVA) in an ES survey (Mitchell 2010) and is now recognized as natural coastal wetlands, with protection under the National Policy Statement – Freshwater Management (2020). While this wetland area now requires stock exclusion and no adverse impacts, additional enhancement through surveys of pest animals and plants within the area, followed up by trapping/predator control program and management of pest plants is recommended to ensure this high value ecosystem is protected.

4.4 Monitoring

To confirm that the chosen mitigation strategy is successful, monitoring of the determined inanga spawning habitat is proposed for five years. This would include:

- ∴ Habitat suitability surveys;
- ∴ Spawning survey; and,
- ∴ Spawning success surveys once a year.

There is some evidence that variation in tidal amplitude, in low-gradient streams, will induce inanga to spawn in suitable vegetation further upstream and downstream, (Taylor, 2002 - NZ database). There is high potential to increase successful spawning habitat by increasing and improving spawning habitat area in conjunction with their adaptability. Monitored results from spawning and hatching surveys can improve knowledge for further enhancement of the mitigation options, and an action plan outlining next steps and timeframes should be required.

5.0 Summary

A range of surveys were undertaken to further understand the adverse effects of the Titiroa tide gate on native fish populations, with a focus on inanga spawning. These surveys included fish communities upstream and downstream of the tide gates, an updated salt wedge survey, upstream tidal inundation assessments (if the tide gates were not present), suitable spawning habitat surveys upstream of the tide gates, inanga spawning/egg surveys, and the identification of suitable habitat for potential mitigation enhancement.

The results of the fish surveys show populations of inanga are present in the Titiroa Stream in the vicinity of the tide gate, with higher numbers located downstream of the tide gate compared to upstream. Surveys showed the area of suitable spawning habitat upstream of the gate is limited, and the number of suitable spawning sites found with eggs during a spawning survey was limited to four. The newly determined saltwater wedge extent (located 158 m upstream of the tide gates) and inanga eggs found in four locations near this extent, identifies the need for habitat enhancement and protection within this 500 m radius.

Lost inanga spawning area within the lower Titiroa Stream (as a result of the tide gate structure) was calculated as 1.38 ha of riparian land (determined by calculating the length of suitable inanga spawning habitat within the modelled extent of tidal inundation if the tide gates were not present). A 1:5 enhancement ratio was applied to enhance habitat downstream, which totals an inanga spawning habitat area of 6.9 ha. Mitigation has been focused above the tide gate within the Titiroa Stream mainstem, where previous spawning was observed, and within freshwater tributaries and drains downstream of the tide gate, where improvements can be made to increase the suitability of habitat available.

Due to the limitations of inanga spawning habitat at this site, it is also proposed that additional enhancement to the Titiroa Stream and its tributaries for native fish habitat and protection and enhancement of the coastal wetlands located downstream of the tide gates is also undertaken as mitigation for the adverse impacts to native fish.

The Titiroa tide gate was installed in 1917 to protect upgradient land from flooding due to tidal ingress. When the gates are closed a fish passage barrier is created for inanga during spawning, which is linked to high tide cycles. As the gates are open during most of the tidal cycle, the gates are not considered to pose a fish passage barrier to other native fish species. To mitigate the adverse effects on inanga spawning, the following mitigations are proposed and shown in Figure 6:

- ∴ Enhancement of more than 6.9 ha of suitable inanga spawning habitat;
- ∴ A Riparian Management Plan to enhance values in the unnamed tributary of the Titiroa Stream, below the tide gates; and,
- ∴ Protection and pest animal and plant control of the coastal inland wetlands located downstream of the tide gates.

While this investigation has focused specifically on mitigation for inanga spawning and improving/restoring potential inanga spawning habitat, more general stream habitat improvement in the area will likely benefit not only inanga, but other biota, water quality and amenity values.

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Appendix A: Site Photographs



Photograph 1: (Waypoint (WP) 031 High Suitability)



Photograph 2: (WP 052 High Suitability, wide, sloping bank offering plenty of habitat)



Photograph 3: (WP 025 Unsuitable –Grass)



Photograph 4: (WP 050 Unsuitable – Steep Banks)



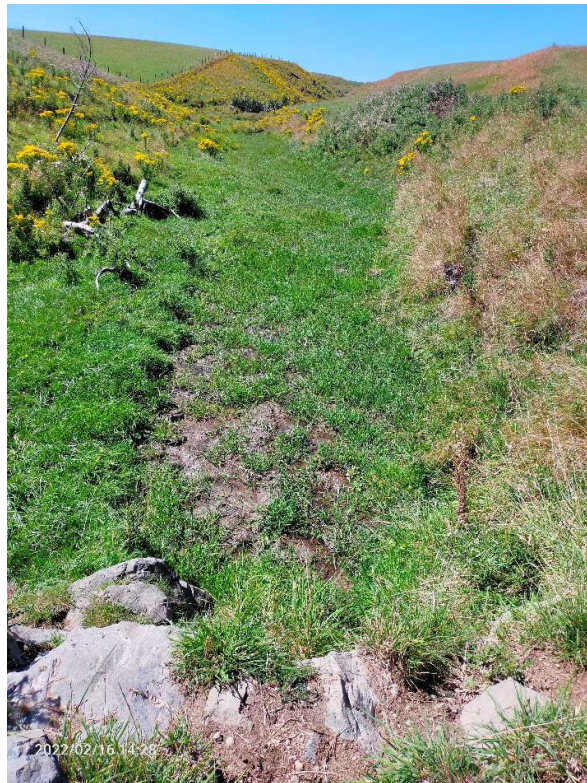
Photograph 5: (WP 088 Eggs present in root mat)



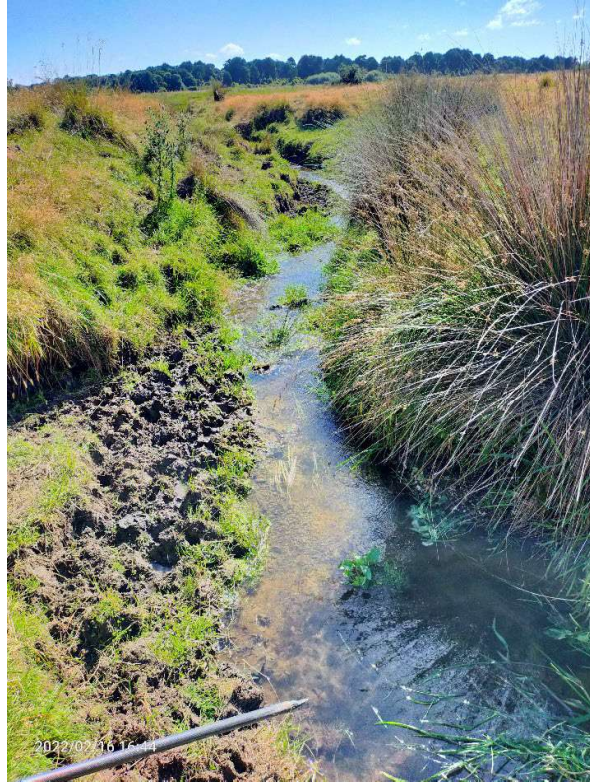
Photograph 6: (WP 022 Eggs present on shelf, well drained)



Photograph 7: (WP 034 Unsuitable, example of vertical bank)



Photograph 8: (looking upstream of tributary on TLB immediately upstream of the tidegates)



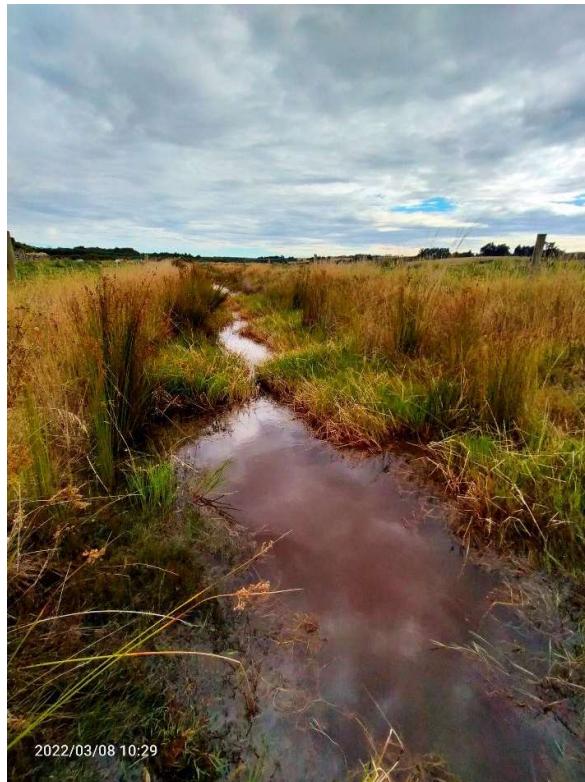
Photograph 9: (Tributary on TLB, 240m upstream of tide gates)



Photograph 10: (confluence of tributary 240 upstream of tide gates, with no stock exclusion and pugged banks)



Photograph 11: Tributary Site 1 (Downstream)



Photograph 12: Tributary Site 1 (Upstream)



Photograph 13: Tributary Site 2 (Downstream)



Photograph 14: Tributary Site 2 (Upstream)



Photograph 15: Tributary Site 3 (Downstream)



Photograph 16: Tributary Site 3 (Upstream)



Photograph 17: Tributary Site 4 (Downstream)



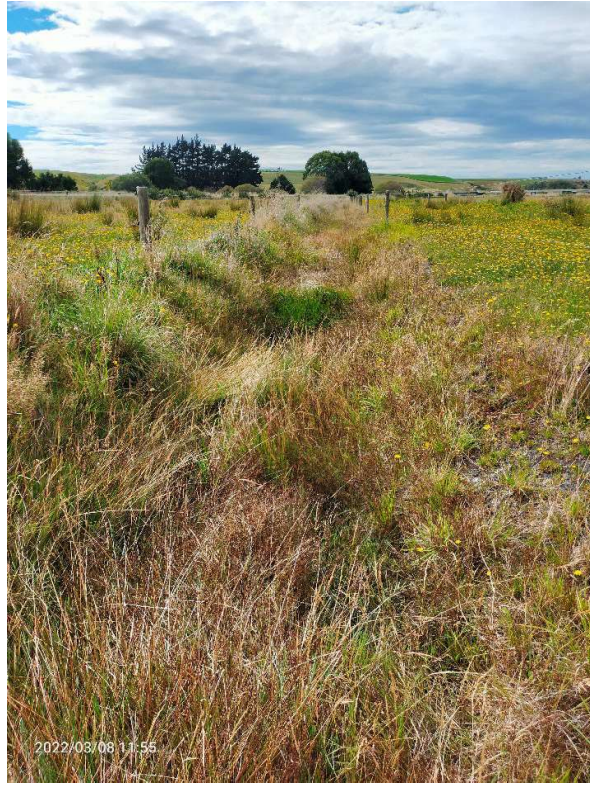
Photograph 18: Tributary Site 4 (Upstream)



Photograph 19: Tributary Site 5 (downstream)



Photograph 20: Tributary Site 5 (Upstream)



Photograph 21: Site 6 (Downstream)



Photograph 22: Tributary Site 6 (Upstream)



Photograph 23: Tributary Site 7 (downstream)



Photograph 24: Tributary Site 7 (upstream)



Photograph 25: Tributary Site 8 (downstream)



Photograph 26: Tributary Site 8 (upstream)



Photograph 27: Tributary Site 9 (downstream)



Photograph 28: Tributary Site 9 (upstream)



Photograph 29: Titiroa Tide Gates closed

Appendix 4

Titiroa Tide gate Positive Effects June 2023

Titiroa Tide/Flood Gate Positive Effects

The Titiroa tide/flood gates are situated in Cell 7 in the Lower Mataura Catchment Control Scheme. Cell 7 is at the bottom end of the Matura catchment where the Mataura River flows into the sea.

It was identified that this cell 7 would be addressed first in the scheme acknowledging that high country rainfall and flood peaks appeared to be increasing in the catchment.

The Titiroa tide/flood gates are an integral part of the Lower Mataura Flood Protection Scheme. These gates provide both flood and tide protection with a land purchase area estimated 3,100 hectares in the Lower Mataura Floodway. The additional benefit is in the drainage that they provide for the area. Without these gates, the 10 percent internal rate of return on the government investment would not have been achieved. The economics and social impact of the Food Protection Scheme should be considered as a whole package and if any one component is removed, then a complete reevaluation should be considered.

To date, the benefits to the Mataura Catchment has been good in the form of financial gains, QE II trust in the floodway, wet lands established in the floodway, habitat encasement, drainage upgrade and farm fencing realignment for greater farm efficiency. The stopbanks on the right bank of the Mataura River has provided good protection against flood waters since the installation in 1988.

If these gates were to be removed or retired, the government investment in this project would show a lower internal rate of return and justification would be required for this action.

The area has been defined in the initial flood protection proposal in 1976 in the "Mataura Catchment Control Scheme Job No 617 - Phase 1" document that was present to Government and the "Mataura Catchment Scheme Economic Review March 1987 by R N Forbes" validates the project.

A complete Summary of the Works are documented in the Mataura Catchment Control Scheme Job 617 Phase 1 Works, May 1991.

Colin Young

Technical Advisor

Bachelor of Engineering, CMEngNZ (Retired)

References:

Mataura Catchment Control Scheme phase 1 1991-Complete Summary, Southland Catchment Board

Mataura Catchment Control Scheme Job No 617 - Phase 1 - November 1976, Southland Catchment Board

Mataura Catchment Scheme Economic Review March 1987 by R N Forbes, Ministry of Agriculture and Fisheries- Palmerston North

Appendix 5

SUBMISSIONS

Form 13: Submission on application concerning resource consent

Resource Management Act 1991

To: Southland Regional Council

Name of submitter: Penny Nelson, Director-General of Conservation / Tumuaki Ahurei
(the **Director-General**)

This is a submission on an application from Catchment Management Division, Southland Regional Council (the **Applicant**) for a resource consent.

Description of activity: Seek consent to authorise the following activities at Titiroa tide gates, adjacent to Middleton Road South, Fortrose:

- Occupy part of the coastal marine area with a tide gate structure
- Occupy part of the coastal marine area with a weir structure
- Dam and divert water

The tide gates operate by opening when there is positive downstream flow and shutting when tidal flow reverses. The purpose is to prevent high tides from raising water level beyond the gates, which would inundate a wider area. The tide gates are part of the wider Maitara Catchment Control Scheme designed to reduce flood damage of land.

Trade competition: I am not a trade competitor for the purposes of section 308B of the Resource Management Act 1991

My submission relates to: The whole application

My submission is: I oppose the application.

The Director-General's interest in the Application

1. The Director-General of Conservation (the **Director-General**) has all the powers reasonably necessary to enable the Department of Conservation (**DOC**) to perform its functions.¹ The Conservation Act 1987 (the **CA**) sets out DOC's functions which include (amongst other things) management of land and natural and historic resources for conservation purposes,

¹ Refer section 53 Conservation Act 1987

preservation so far as is practicable of all indigenous freshwater fisheries, protection of recreational freshwater fisheries and freshwater fish habitats and advocacy for the conservation of natural resources and historic heritage.² Section 2 of the CA defines ‘conservation’ to mean *‘the preservation and protection of natural and historic resources for the purpose of maintaining their intrinsic values, providing for their appreciation and recreational enjoyment by the public, and safeguarding the options of future generation’*.

2. DOC is also the authority responsible for administering Conservation Act 1987, the Wildlife Act 1953 and the Freshwater Fisheries Regulations 1983.

Reasons for the Director-General’s submission

3. The New Zealand Fish Passage Guidelines state that “[a]ll tide and flood gates are considered barriers to fish passage.”³ The existing floodgate uses an outdated passive design which prevents fish passage. When the gate is closed, no fish can pass. This has adverse effects on fish population and habitat in the Titiroa Stream. The proposal to consent this structure without modification will result in further loss of freshwater species.
4. The application documents refer to positive social and economic effects through drainage and flood protection. However, there is no modelling or other adequate assessment to demonstrate that the passive tidal gates are needed. Even if the tidal gates are needed, there is no modelling or other adequate assessment in the application documents to demonstrate that the gates need to close on every incoming tide.
5. The passive existing gates close on every incoming tide as water flowing upstream pushes against them. The New Zealand Fish Passage Guidelines refer to design features that can be used to lower the impact on fish passage. For example, automatic electric or hydraulically powered gates that operate the gate only when water levels reach a critical elevation.⁴ The application documents do not assess the option of upgrading the design of the structure to avoid and mitigate adverse effects. The application documents do not provide the level of detail required by clause 6 of Schedule 4 of the Resource Management Act 1991.
6. I consider that the site contains **significant values** and that the Application does not contain enough information on the extent of significant values within the site. The application focuses on the effects on inanga with little information provided on the effects of the floodgates on other freshwater species in particular migratory species.

² Conservation Act 1987, section 6.

³ New Zealand Fish Passage Guidelines Version 1.2 December 2022, at paragraph 4.5 on page 70.

⁴ New Zealand Fish Passage Guidelines Version 1.2 December 2022, at paragraph 4.5 on pages 70 and 71.

7. There are no alternative designs proposed in the application to mitigate these effects, rather the applicant is seeking to offset effects by restoring and enhancing other inanga spawning habitats along Titiroa Stream.
8. I am not convinced that alternatives have been given sufficient consideration. The proposal to consent this structure without modification will result in further loss of inanga and potentially other freshwater species.
9. The proposal to renew the application without modification of the floodgate structure will continue to create **significant risk** to environments and native species.
10. I am not convinced that the assessment of effects is adequate or that the Proposal is consistent with the relevant provisions of the plan.
11. Without being limited to such matters, the Director-General notes the following with respect to the Application:
 - a. There is limited assessment of effects of the floodgate on freshwater species other than Inanga.
 - b. The habitat restoration proposed does not adequately offset the effects of the tidal gates on freshwater species.
 - c. The existing floodgates are not consistent with the New Zealand Fish Passage Guidelines.
12. The decisions sought in my submission are required to ensure that, the decision-maker:
 - a. recognises and provides for the matters of national importance listed in Section 6 of the Resource Management Act 1991 (the **Act**); and
 - b. has particular regard to the intrinsic values of ecosystems as required in Section 7(d) of the Act.
 - c. has particular regard to the NZCPS 2010 and the NPSFM 2020 in relation to providing passage for freshwater migratory species.
13. The Applicant has provided insufficient information and I am concerned that the proposal does not adequately identify how the proposal will avoid, remedy, or mitigate potential adverse effects or, how the proposal will achieve Objective 1, Policy 3, Policy 5 and Policy 11 of the New Zealand Coastal Policy Statement 2010.
14. The Director-General's concerns have been identified following a review of the information that has been provided to date. The Director-General's submission relates to the whole Application. Additional and/or more specific concerns with respect to the Application may be identified once more adequate information has been made available to the Director-General.

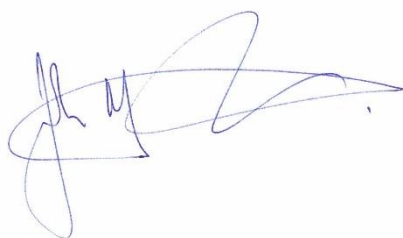
15. Without being limited to such matters, the Director-General notes the following with respect to the Application:

Freshwater indigenous biodiversity

16. The Director-General is concerned that the Application does not adequately address the actual or potential effects on freshwater indigenous biodiversity. This is because the Director-General considers that the AEE does not adequately identify potential effects on these values. There has not been adequate assessment of the ecological values of the receiving environment.
17. The Application includes an ecological assessment, but it does not adequately assess the effects of the floodgates on migratory species other than inanga.
18. The Application relies on habitat restoration to offset the effects rather than avoiding the effects by providing fish passage.
19. Section 6(c) of the Act requires that all persons exercising functions and powers under it shall recognise and provide for the protection of areas of significant indigenous vegetation and significant habitats of indigenous fauna. As the Application does not provide sufficient information to assess the ecological values of the site, it fails to give effect to Section 6(c) of the Act.
20. Section 7(d) of the Act requires that all persons exercising functions and powers under it shall have particular regard to the intrinsic value of ecosystems. The failure of the Application to assess potential effects on freshwater indigenous biodiversity means that the applicant is not giving effect to Section 7.
21. Policy 11(a) of the New Zealand Coastal Policy Statement requires that adverse effects on at risk species (which includes inanga) are avoided.

I do wish to be heard in support of my submission.

If others make a similar submission, I will consider presenting a joint case with them at a hearing.



John McCarroll

Director/Manager Operations

Murihiku Region

Acting pursuant to delegated authority on behalf of Penny Nelson, Director-General of Conservation

Date: 11 September 2023

Note: A copy of the Instrument of Delegation may be inspected at the Director-General's office at Conservation House Whare Kaupapa Atawhai, 18/32 Manners Street, Wellington 6011

Address for service:

Attn: Amy Young, Planner

ayoung@doc.govt.nz

027 225 3171

Department of Conservation

PO Box 5244, Dunedin, 9054

Submission on a Publicly Notified Application for Resource Consent

To: Environment Southland
Private Bag 90116
Invercargill 9840

Attention: Stephen West – Principal Consents Officer

Name of submitter: Fish & Game New Zealand – Southland Region (Fish & Game)
PO Box 159
Invercargill 9825

Name of applicant: Environment Southland – Catchment Management Division (the applicant)

Application: APP-20211135

Description of activity: Consent of 15 years duration to:

- Occupy part of the coastal marine area with a tide gate structure;
- Occupy part of the coastal marine area with a weir structure; and
- Dam and divert water.

Activity location: Titiroa River, approximately 185m upstream of Tokanui – Gorge Road Highway bridge and approximately 5km upstream from Toetoes (Fortrose) Estuary.

The position of the tide gates is within the coastal marine area (CMA) boundary. Freshwater is diverted from the bed of the Titiroa River via a diversion channel commencing upstream of the CMA boundary. Damming of water occurs both within and outside the CMA boundary.

Our submission relates to: The whole application.

Our submission is: Fish & Game oppose the application.

Our reasons for comments are:

Fish and Game is responsible for the management of sports fish and game birds within the Southland region. The location of the proposed activities is the Titiroa River bed located approximately 185m upstream of Tokanui – Gorge Road Highway bridge.

The Titiroa Stream has the following recognized sports fish and game values, including recreational hunting and fishing opportunities:

1. It is a significant habitat of indigenous and introduced birds, including game species that are actively hunted during the annual game bird hunting season.

2. The Titiroa River supports a lowland brown trout fishery, which is open for fishing between 1 October – 30 April annually. Anglers are permitted to catch 2 brown trout per day and to fish with fly, spin, and bait. The Titiroa River provides fishing opportunities for inexperienced and experienced anglers alike.
3. The Titiroa River is a very popular river to fish for whitebait. Numerous whitebaiting huts and stands line the banks of the Titiroa River downstream of the tide gates.

The New Zealand whitebait fishery is comprised predominantly of five diadromous galaxiid species, Inanga (*Galaxias maculatus*), Kōaro (*G. brevipinnis*), Banded kōkopu (*G. brevipinnis*), Giant kōkopu (*G. argenteus*) and Shortjaw kōkopu (*G. postvectis*). In recent years, four out of the five whitebait species have been listed as ‘declining’ or ‘threatened’ in large part due to increased stressors such as habitat degradation.

4. The Toetoes (Fortrose) Estuary is a medium-sized, “shallow short residence tidal river estuary” situated at the mouth of the Maitua and Titiroa Rivers. Toetoes estuary is a sensitive receiving environment, which is a highly valued and significant habitat. Toetoes Estuary is popular for fishing, shellfish collection, duck hunting, boating / kayaking, bathing, and bird study. Great diversity of wildlife is associated with the Toetoes Estuary, including waterfowl, and other bird species such as heron, gulls, oyster-catcher, and dotterels.

Position on the Application:

Fish & Game oppose the application for the following reasons:

1. The environment

The application seeks a coastal permit for continuation of the existing occupation and use of the tide gates and diversion channel. No upgrades, maintenance or changes are proposed to the existing tide-gates or diversion channel.

The application provides that: *“There has been some form of tide gates in this location since 1917 when they were constructed by the Public Works Department. The tide-gates ‘lock structure’ in place today was constructed in 1988.”*

The application does not address how the effects of the tide gates and diversion channel should be assessed. To be clear, Fish & Game considers that applicants damming and diversion activities associated with the tide gates and diversion channel do not form part of the existing environment, irrespective of their use since 1988, for the following reasons:

- a. Damming and diversion consents under the Resource Management Act 1991 (‘the RMA’) are not permanent and do not carry existing use right protections. In a re-consenting process, new consents are granted rather than renewals. It should not be assumed that the applicant’s expired consent, which was subject to a finite 5-year term, i.e., time limited, that expired on 29 October 2020 will be renewed or renewed on the same conditions.¹

¹ *Ngāti Rangī Trust v Manawatu-Whanganui Regional Council* [2016] NZHC 2948; and *Environmental and Resource Management Law* (LexisNexis) – Chapter 8 - Water at [8.33].

- b. The environment (for the purpose of assessing effects) should be considered as if the damming and diversion activities under the applicants expired consent have been discontinued and that the application is for a new damming and diversion activities. Assessing the application as if the previously authorised damming and diversion activities is not part of the environment allows a more thorough assessment of effects.

In relation to whether it is not feasible to assess the existing environment as excluding the applicant's damming and diversion activities, Fish & Game submits that this is a matter for the Applicant to establish. Fish & Game anticipates that the applicant may argue that:

- a. The environment, including the Titiroa River upstream and downstream of the tide gates, is modified and has been for some years;
- b. The damming and diversion are established activities; and
- c. Applicable planning documents promote the protection of coastal infrastructure.

If so, Fish & Game submits that:

- a. To analyse the existing environment as excluding the applicants damming and diversion activities is feasible;
- b. The factors set out above were not considered by the High Court to be particularly compelling in *Ngāti Rangī Trust v Manawatu-Whanganui Regional Council* [2016] NZHC 2948 in circumstances where the hydro-generation activity had been occurring for approximately 100 years. Further, historical aerial photographs set out in **Appendix 1** of this submission do not substantiate that there has been some form of tide gates at the location continually since 1917; and
- c. The tide gates and diversion channel are currently operating without consent in circumstances where s 124 of the RMA does not apply to the damming and diversion activities.

Fish & Game submits that the RMA requires the following steps to be undertaken when assessing the application:

- a. Identification of the environment;
- b. Identification of the actual and potential effects, including cumulative effects, on the environment;
- c. Assessment of those effects; and
- d. Identification of whether measures are available or necessary to avoid, remedy or mitigate those effects.

The decision whether to grant consent follows. The matter should not be approached on the basis that mitigations from the current level of effects, including on fish passage, associated with the applicants damming and diversion activities are simply considered. The RMA

requires an assessment of the application as if the applicants damming and diversion activities are not currently occurring.

2. Effects on fish fauna

The Freshwater Fisheries database² and Wilderlab environmental DNA (eDNA) database³ provides that the following indigenous fish species have been identified in the Titiroa River / catchment.

Table 1 – Indigenous fish species in the Titiroa River / catchment

Common name	Scientific name	Threat classification (2017) ⁴
Diadromous species		
Shortfin eel	<i>Anguilla australis</i>	Not threatened
Inanga	<i>Galaxias maculatus</i>	At Risk - Declining
Common bully	<i>Gobiomorphus cotidianus</i>	Not threatened
Redfin bully	<i>Cobiomorphus cotidianus</i>	Not threatened
Common smelt	<i>Retropinna</i>	Not threatened
Kōaro	<i>Galaxia brevipinnis</i>	Not threatened
Longfin eel	<i>Anguilla dieffenbachia</i>	At risk - Declining
Non-diadromous species		
Unidentified flounder	-	-
Gollum galaxias	<i>Galaxias gollumoides</i>	Threatened – Nationally vulnerable

All the above indigenous fish species identified in the Titiroa River are Taonga Species recognised in Appendix M of the pSWLP.

In addition, the Freshwater Fisheries database provides that brown trout have been identified in the Titiroa River.⁵

Table 2 – Introduced and naturalised species in the Titiroa River

Common name	Scientific name	Threat classification (2017)
Non-diadromous species		
Brown trout ⁶	<i>Salmo trutta</i>	Introduced and naturalised

² <https://nzffdms.niwa.co.nz/search>.

³ <https://www.wilderlab.co.nz/explore>. Sample 529540 and 529535.

⁴ *New Zealand Threat Classification Series 7 - Conservation status of New Zealand freshwater fish*, New Zealand Department of Conservation – New Zealand Threat Series Classification 24 (2017).

⁵ <https://nzffdms.niwa.co.nz/search>.

⁶ Brown trout move extensively within fresh water, and some have a marine phase to their life cycle.

In addition, the fish survey undertaken on behalf of the applicant identified Redfin perch (*Perca fluviatilis*) in the Titiroa Stream. Redfin perch is classified as “Introduced and naturalised”.⁷

The diadromous species identified in the Titiroa River migrate between freshwater and the ocean as part of their life cycle. This behaviour makes them vulnerable to harm from habitat degradation or inaccessibility, especially when they migrate up or down the Titiroa River to and from the ocean or move a lot within freshwater. Brown trout also move within freshwater, and some have an estuarine or marine phase to their life cycle.

Research recognises that fish passage associated with tidal gates is affected by three interrelated factors:

- a. The area of the tide gates that is open;
- b. Water velocity through the tide gate openings; and
- c. The amount of time the tide gates are open.

Fish & Game is concerned that the application does not provide an adequate assessment of the fish passage effects of the tide gates for the following reasons:

- a. The survey design is constrained, insofar as capture of fish (via fyke nets and Gee minnow traps) was carried out in the still water environment immediately upstream and downstream of the dam wall in the bed of the Titiroa River. No comparative analysis has been undertaken of fish communities located further up and downstream of the tidal gates, including habitat diversity / quality and fish species that would be expected to be normally present or migrating through it.
- b. No analysis, such as catch per unit effort, has been undertaken of the numbers of fish captured immediately upstream and downstream of the tide gates to statistically quantify the difference. Instead, a fish species presence / absence assessment is used. The statement that *“The differences in overall numbers of fish caught upstream and downstream of the tide gates most likely reflects habitat suitability differences between the two areas surveyed”* is unsubstantiated and does not address the following matters:
 - i. The upstream and downstream survey areas (located immediately upstream and downstream of the dam wall located perpendicular to the diversion channel) appear almost identical, but for the presence of the tide gates and diversion channel. No description is provided of what the habitat differences between the two sites are and suitability thereof for fish species.
 - ii. The upstream and downstream capture sites used are geographically located very close together. Most capture sites are located within 50m of each other, none exceed 100m.
- c. The fish passage assessment documents average (0.3559m/s) and maximum (1.328m/s) water velocity through the tide gates, but does not discuss in detail, the

⁷New Zealand Threat Classification Series 7 - Conservation status of New Zealand freshwater fish.

implications of it, particularly for indigenous fish species (including juveniles and weak swimmers). Research shows that:

- i. A fish must first exceed the water velocity before it can make any headway upstream.
- ii. Fish swimming ability increases with size. Because indigenous New Zealand fish species migrate upstream at a small size (juveniles), they have a lower swimming ability than larger sized species considered weak swimmers.
- iii. Fish use different parts of the water column at different life stages. This calls into the question the statement that: *“Even during the period when water velocity is greatest, native fish may well be able to migrate upstream by swimming near the bottom of the water column.”*

Table D-1 ‘*Summary of fish swimming data for NZ species*’ of the New Zealand Fish Passage Guidelines shows that some indigenous fish (depending on size / age class and swimming mode) have swimming speeds that would be challenged by an average water velocity of 0.3559m/s, including: Inanga, Common bully, Banded kōkopu, Smelt, and Shortfin eel. For context, a literature review by NIWA found that the mean sustained swimming velocity for New Zealand juvenile indigenous fish species was 0.20–0.32m/s⁸, i.e., less than the measure average water velocity.

3. Effects on water quality

The application does not include an assessment of the effects of the tidal gates on water quality in the Titiroa Stream.

4. Necessity

For fish habitat and passage, the science is clear that it is best to not use tide gates, nor is any tide gate entirely fish friendly – they all have some impact on fish passage.⁹ Commentary accompanying the New Zealand Fish Passage Guidelines (2018) provides that: *“It is extremely challenging to provide effective fish passage at tide and flood gates, thus installation of new gates is strongly discouraged. Where no suitable alternative is feasible, there are several design features that can be used to lower the potential impacts on fish passage.”*¹⁰ In short, the best option for eliminating all interference with fish passage is removal of the tidal gates, dam wall, and diversion channel.

The Titiroa tidal gates have a passive gate design with three side hinged gates. This means a positive head differential on the downstream side (i.e., higher water level) will close the gates and dam water. Conversely, a positive head difference on the upstream side will cause the gates to open and release water downstream. When the tidal gates are closed, no fish can pass.

⁸ *Fish Passage Assessment of the Maitai River North Branch Dam and South Branch Weir*. Cawthron Institute Report No. 2601 for Nelson City Council (September 2014).

⁹ *Ecological Effects of Tide Gate Upgrade or Removal: A Literature Review and Knowledge Synthesis*. Institute for Natural Resource – Report to Oregon Watershed Enhancement Board. Institute for Natural Resource, Oregon State University (2018).

¹⁰ New Zealand Fish Passage Guidelines, p. 70.

Fish & Game acknowledge that water tables and inundation within parts of the Titiroa catchment are likely to be influenced by water levels, including tidal fluctuations, in the Titiroa River given its very low-lying nature. However, the extent of this effect is not adequately described in the application. For example, the application does not map the area of land impacted by different water levels in the Titiroa River and in what circumstances these water levels occur to enable more robust decision-making regarding water level regimes and the necessity for the Titiroa tide gates. Conversely, the passive (non-mechanical) design of the tide gates means that they are continually operational, i.e., open and close, irrespective of necessity for water level control purposes.

Fish & Game submits that mapping should be undertaken to determine the spatial extent of inundated land for a range of water levels to predict areas of drainage affected land and to inform whether the tide gates are necessary and if so, under what circumstances. Similar work was undertaken in the Waituna Lagoon catchment to inform decision making regarding lagoon openings.¹¹

5. Mitigation

The original application provides that mitigation is proposed in the form of ongoing management of the Lower Titiroa Wetland Reserve (being 110ha of land adjoining the Titiroa River), through fencing and stock exclusion to protect marginal grasses and rushes, which are important for Inanga spawning.

The applicant has subsequently filed a report dated November 2022, which suggests mitigation options upstream and downstream of the tide gates to address adverse impacts on Inanga spawning.

In response:

- a. The Lower Titiroa Wetland Reserve forms part of the wider wetland complex associated with Toetoes Estuary and the Lower Mataura River, which is recognised as regionally significant wetland in Southland in Appendix B of the Regional Water Plan for Southland 2010 and Appendix A of the proposed Southland Water and Land Plan and as a Ramsar Wetland of International Importance.

The original mitigation proposal is inadequate and simply reflects minimum stock exclusion requirements under the proposed Southland Water and Land Plan and the Resource Management (Stock Exclusion) Regulations 2020 in relation to rivers and wetlands.

- b. It is unclear whether the report dated November 2022 forms part of the application and if so, what aspects of the suggested mitigations the applicant proposes, when they will be achieved, and how the effectiveness of them will be monitored. There is nothing binding to say these mitigation options will go ahead – for example, no accompanying mitigation plan has been prepared nor is it clear what strategic planning, including financial planning and consenting analysis, the applicant has undertaken to ensure meaningful and timely delivery.

¹¹ See: *Waituna Lagoon level impacts on land drainage and inundation Investigation - stages 1 and 2*, NIWA Client Report DOC16501 prepared for Department of Conservation, February 2016.

Any mitigation or offsets should be assessed for consistency with the RMA and the principles of offsetting (including measurability, net gain in environmental outcome, links to the effects of the activity, and duration. This information is required, and the actions must be consistent with legislative and policy directions.

- c. The success of the mitigation option upstream of the tidal gates is dependent on sufficient juvenile Inanga being able to successfully navigate the tidal gates and reach reproductive maturity. Conversely, the fish passage assessment suggests the tidal gates are having an adverse on upstream movement of Inanga due to closing of the gates and water velocity through the gates when open.
- d. The mitigation option downstream of the tidal gates poses ecological challenges because:
 - i. It is unclear if the unnamed tributary provides suitable habitat for Inanga through their life stages from incubation to maturity and if not, whether juveniles can access suitable alternative habitat upstream or downstream; and
 - ii. An inspection of the unnamed tributary from the roadside on 7 September 2023 and accompanying inspection of aerial images shows that it is extensively modified and exhibits very little natural character in the area where mitigation is proposed. Specifically:
 - The channel form is highly incised and straightened. Tidal fluctuations affect water levels in the lower reaches. Instream habitat is very homogeneous immediately upstream and downstream of Middleton Road, including very little habitat variability, such as run-riffle-pool sequences.
 - Limited instream gravel was observed in the reach immediately upstream and downstream of Middleton Road. The reach upstream of Middleton Road has been the subject of periodic bed excavation / riparian disturbance associated with drainage maintenance – deposited spoil was observed running parallel to the true left bank.
 - Fish passage to the unnamed tributary upstream of Middleton Road is currently comprised by a perched culvert on the downstream side and elevated water velocity due to narrow culvert width relative to channel width. The culvert, which is approximately 10m long, has been retrofitted with spate rope, although the efficacy of this appears questionable due to its degraded state, elevated water velocity, and height above water level.

An assessment is required to establish that juvenile Inanga can access the unnamed tributary.

Photographs of the unnamed tributary are set out in **Appendix 2** of this submission.

6. Omissions

The application does not address the following relevant documents / matters:

- a. The New Zealand Fish Passage Guidelines (2018) for structures up to 4m.

This guidance document sets out recommended practice for the design of instream infrastructure to provide for fish passage. The intent of these guidelines is to set the foundation for the improvement of fish passage management in New Zealand, including in relation to existing structures, such as the tidal gates.

- b. Approvals required under the Freshwater Fisheries Regulations 1983.

The application provides that the tide gates and diversion structure were constructed in 1988, i.e., after the Freshwater Fisheries Regulations came into effect on 1 January 1984. Case law¹² provides that consideration of the issue of fish passage under the RMA incorporates considerations set out in the Freshwater Fisheries Regulations and the Conservation Act. Confirmation is required regarding what, if any, approvals the applicant has obtained from the Director-General under Part 6 of the Freshwater Fisheries Regulations for the tidal gates and diversion channel, including for provision of fish passage.

- c. Consents required under the proposed Southland Water and Land Plan (pSWLP), including for the proposed mitigation activities.

Mapping of the CMA boundary neatly coincides with the geographical location of the tide gates, however, depending on the tidal cycle the tidal gates and diversion channel operate to intermittently:

- i. Divert and temporarily dam saline water within the CMA; and
ii. Divert and dam freshwater beyond the upper limit of the CMA.

The application does not address diversion and damming consent requirements under Rules 49 (Abstraction, diversion, and use of surface water), 55A (General conditions for activities in river and lake beds) and 60 (Dams and weirs) of the pSWLP.

- d. Resource Management (National Environmental Standards for Freshwater) Regulations 2020.
e. The National Policy Statement for Freshwater (2020) (NPS-FM).

The vision for freshwater management has changed. Relevant matters in the NPS-FM include:

¹² *Re Auckland Regional Council* — [2002] NZRMA 241.

- i. The hierarchy of obligations under Te Mana o te Wai, which priorities the health and well-being of the Titiroa River (including all life within it) – to do so, fish need to be able to move freely between and within freshwater ecosystems of the Titiroa River.
 - ii. The ki uta ki tai approach to fish passage remediation, which recognises that fish migrate in both directions: from the mountains to the sea and back.
 - iii. Sections 3.15 and 3.26 of the NPS-FM, which require Environment Southland to produce an action plan for fish passage for the Southland FMU's, including the Maitua FMU. The action plan must (among other things) evaluate risks that instream structures, such as the Titiroa tidal gates, present as a barrier to fish passage, and prioritise structures for remediation.
- f. The Final Regional Forum Report¹³ to Environment Southland and Te Ao Mārama making the following recommendations (among other things) to achieve freshwater outcomes in Southland:
- i. Environment Southland repurposes, where appropriate, its own land for increased ecosystem services that align with FMU Hauora objectives.
 - ii. Environment Southland role-models land repurposing for increased ecosystem services, sharing information, knowledge, and insights from land repurposing projects to inspire and inform other regional landowners and managers to initiate land re-purposing initiatives.

Environment Southland owns a large area of low lying / inundation prone land (estimated at approximately 3,100ha) located between the lower Titiroa and Maitua Rivers that is potentially available for repurposing. The Regional Coastal Plan for Southland (2013) recognises that *“The low swampy land between the Maitua River and Titiroa Stream is located on the Maitua Floodway and is inundated to a greater or lesser degree on a regular basis.”* The application does contemplate repurposing any of this land to increase ecosystem services aligned with FMU Hauora objectives for the Maitua FMU. This is a major omission because:

- i. Research commissioned by Environment Southland shows significant reductions in total loads of nutrients (nitrogen and phosphorus)¹⁴ and E.coli¹⁵ are required in the Maitua FMU to achieve the the National Objectives Framework (NOF) national bottom lines in the NPS-FM 2020 .

¹³ *Achieving the Community's Aspirations for Freshwater*. Regional Forum Recommendations Report to Environment Southland and Te Ao Mārama Inc. Board (June 2022).

¹⁴ Snelder, T. *Assessment of Nutrient Load Reductions to Achieve Freshwater Objectives in the Rivers, Lakes and Estuaries of Southland Including Uncertainties - To inform the Southland Regional Forum process*. Report prepared by Land Water People for Environment Southland (November 2021).

¹⁵ Snelder, T. and Fraser, C. *Assessment of Escherichia coli Load Reductions to Achieve Draft Freshwater Objectives in the Rivers of Southland Murihiku - To inform the Southland Regional Forum process*. Report prepared by Land Water People for Environment Southland (August 2021).

- ii. Toetoes Estuary is showing signs of eutrophication (nutrient enrichment) and excess macroalgae growth due to large amounts of nutrients and sediment reaching the estuary.¹⁶
 - iii. Recent findings of the Environment Court on the pSWLP, including mapping of water quality degradation, show that large parts of the Maitua FMU, including Toetoes Estuary, are degraded with respect to suspended sediment, DIN, DRP, E-coli, and MCI.
- g. Climate change predictions for Southland and what this means for management of the lower Maitua FMU, including the Titiroa River catchment.

Climate change advice by NIWA to Environment Southland¹⁷ provides (among other things) that:

- i. Average annual rainfall is project to increase slightly and the number of heavy rain days, particularly during winter and spring, is projected to increase throughout the Southland region;
- ii. Floods are expected to become larger everywhere in Southland; and
- iii. Changes in sea level-rise are expected to be between 0.2-0.3 m by 2040 and increasing to 0.4-0.9 m by 2090. Putting aside storm events, those changes will result in an increasing percentage of normal high tides exceeding the present-day design for coastal infrastructure. Coastal flooding will increase steadily under all scenarios, with increasing incidents of pure tidal flooding (i.e., on sunny days).

The area of land owned by Environment Southland, which the application seeks to protect and preserve for pastoral farming, was strategically acquired by it due to its low-lying nature, drainage difficulties, and vulnerability to periodic inundation through flooding and tidal fluctuations. Discussion / debate needs to be had around the reality of the ongoing challenges, desirability, and economic cost to protect this inherently vulnerable land versus strategic repurposing it for increased ecosystem services that align with FMU Hauora objectives.

7. Alternatives

Fish & Game considers the application does not provide an adequate consideration of alternatives to the proposed damming and diversion activities, including:

- a. Full removal of the tide gates and dame, including infilling of the diversion channel.
- b. Installation of 'active' tide gates if inundation control is demonstrated to be required under specific circumstances, i.e., necessary.

¹⁶ Stevens, L.M. *Fortrose (Toetoes) Estuary 2018: Broad Scale Habitat Mapping*. Report prepared by Wriggle Coastal Management for Environment Southland (2018).

¹⁷ *Southland Climate Change Impact Assessment*. NIWA Client Report No: 2018120CH prepared for Environment Southland, Invercargill City Council, Southland District Council and Gore District Council (August 2018).

Active gate designs using automatic electric or hydraulically powered gates that only operate when water levels reach a critical elevation can significantly reduce impact on fish movements and upstream physical habitat. The New Zealand Fish Passage Guidelines provide that use of active gate designs is best practice.

- c. Installation of a 'self-regulating' or 'fish friendly' gate design if inundation control is demonstrated to be required. 'Self-regulating' or 'fish friendly' gates hold the gate open for a longer period compared to a passive gate design.

8. Review

The proposed consent conditions do not provide for any utilization of reviews. Fish & Game considers a consent of this nature if granted should be subject to a rigorous review process, i.e., bi-annual, or yearly reviews, including reporting on progress and effectiveness of any mitigation, given the importance of it to offset the effects of the damming and diversion activities.

9. Consent duration

The applicant seeks a 15-year consent duration. Fish & Game considers that this is too long for the following reasons:

- a. The applicant has not complied with the terms of its previous consent. Further, the tide gates are currently operating without a consent in circumstances where s 124 of the RMA does not apply. Specifically:
 - i. The applicant was granted a consent of 5-years duration on 29 October 2015, which expired on 29 October 2020. The applicant was required by 30 June 2017 to undertake a fish survey upstream and downstream to determine if the tide gates were impeding spawning and migration of indigenous fish and if so, the scale of the effect. The applicant did not undertake a fish survey as required – no explanation is provided for this failure.
 - ii. An application for a replacement consent was not submitted by the applicant until 8 March 2021, i.e., after its consent expired on 29 October 2020. This means that:
 - rights of continuance are unavailable to the applicant under s 124 of the RMA; and
 - the tide gates have been operating without resource consent since 30 October 2020.
- b. There are significant cultural and recreational values associated with the Mataura FMU, including the Titiroa River and Toetoes Estuary. The Mataura FMU is in a degraded state – there is a substantial gap between current state and the desired environmental outcomes.

Continued operation of the tidal gates will not result in any improvement in fish passage nor is there any proposal to remove the tide gates.

- c. No monitoring is proposed to:
 - i. Evaluate with whether the tide gates are providing fish passage over the life of the structure, including after significant natural events;
 - ii. Check the structure is in good condition and functioning as intended or maintenance is required; or
 - iii. To determine the success or otherwise of the proposed Inanga spawning habitat restoration.
- d. Sections 3.15 and 3.26 of the NPS-FM require Environment Southland to produce an action plan for fish passage within the Maitava FMU. Granting a 15-year consent for operation of the tide gates, which pose a barrier to fish passage, has the potential to undermine implementation of the action plan.
- e. No explanation is provided as to why a 15-year consent duration is required.

Planning assessment:

As presented, the adverse effects of the proposed damming and diversion activities are not adequately avoided, remedied, or mitigated. Proposed consent conditions do not provide for an improvement in fish passage. The application is contrary to:

1. The purpose of sustainable management defined in Part 2 of the RMA. Consent conditions proposed by the applicant do not:
 - a. Safeguard the life-supporting capacity of water and ecosystems; or
 - b. Avoid, remedy, or mitigate adverse effects.
2. Matters of national importance outlined in s 6 of the RMA, including: 6(a) and (c).
3. Other matters outlined in s 7 of the RMA, including: 7 (a), (aa), (d), (f) and (h) of the RMA.
4. The objectives and policies of the New Zealand Coastal Policy Statement (2010), including:
 - a. Objectives 1 and 5; and
 - b. Policies 1, 3, 5, 11 (including Policy 11(a)(i)) and (b)(iv), 13, and 14.
5. The objectives and policies of the Regional Coastal Plan for Southland (2013), including:
 - a. Outcome 7.4.1.1;
 - b. Objective 7.4.3.1; and
 - c. Policy 7.4.3.1.
6. The objectives and policies of the Southland Regional Policy Statement (2017), including:

- a. Issue BRL. 1, Issue BIO. 1 and .2, and COAST. 4;
 - b. Objectives BRL. 1, BIO. 1, .2, and .3, and COAST. 1 and .3; and
 - c. Policies BRL. 1, BIO. 1, .2, .3, .4, .5, and .9, and COAST. 1, and .2.
7. The objectives and policies of the National Policy Statement for Freshwater (2020), including:
- a. The fundamental objective of Te Mana o te Wai and hierarchy of obligations that firstly prioritises the health and well-being of waterbodies and freshwater ecosystems;
 - b. Policies 1, 3, 4, 5, 9, and 10;
 - c. Sections 3.5 (integrated management - ki uta ki tai), 3.8(3)(c), 3.15 and 3.26 (fish passage);
 - d. The effects management hierarchy; and
 - e. Appendix 1A – Compulsory values – Threatened Species.
8. The objectives and policies of the pSWLP, including:
- a. Objectives 1 and 2, (including the accompanying interpretation statement), 14, 15, 17, 18 and 19; and
 - b. Policies 3, 20, 26A, 28, 32, 37, 40, and 41.

Decision that Fish & Game wish the Council to make:

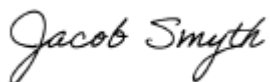
That the application be declined.

Fish & Game wish to be heard in support of its submission at a hearing if needed.

Fish & Game wish to be involved in any pre-hearing meeting that may be held for this application.

If others make a similar submission, Fish & Game will consider presenting a joint case with them at a hearing.

Fish & Game has served a copy of its submission via e-mail on the applicant.



Jacob Smyth
Resource Management Officer
Fish & Game New Zealand – Southland Region

Date: Monday, 11 September 2023

Cc: Environment Southland – Catchment Management Division

C/- WSP
PO Box 647
Invercargill 9810

Attention: Luke McSoriley – Work Group Manager - Planning

Sent via e-mail: luke.mcsoriley@wsp.com

Appendix 1 – Aerial images of the Titiroa River



Image 1 – Date taken: 15 / 03 / 1951. Source: Retro Lens, NZ.



Image 2 – Date taken: 01 / 03 / 1962. Source: Retro Lens, NZ.



Image 3 – Date taken: 31 / 03 / 1968. Source: Retro Lens, NZ.



Image 4 – Date taken: 11 / 04 / 1983. Source: Retro Lens, NZ.



Image 5 – Date taken: 17 / 10 / 1985. Source: Retro Lens, NZ.



Image 6 – Date taken: 17 / 10 / 1985. Source: Retro Lens, NZ.

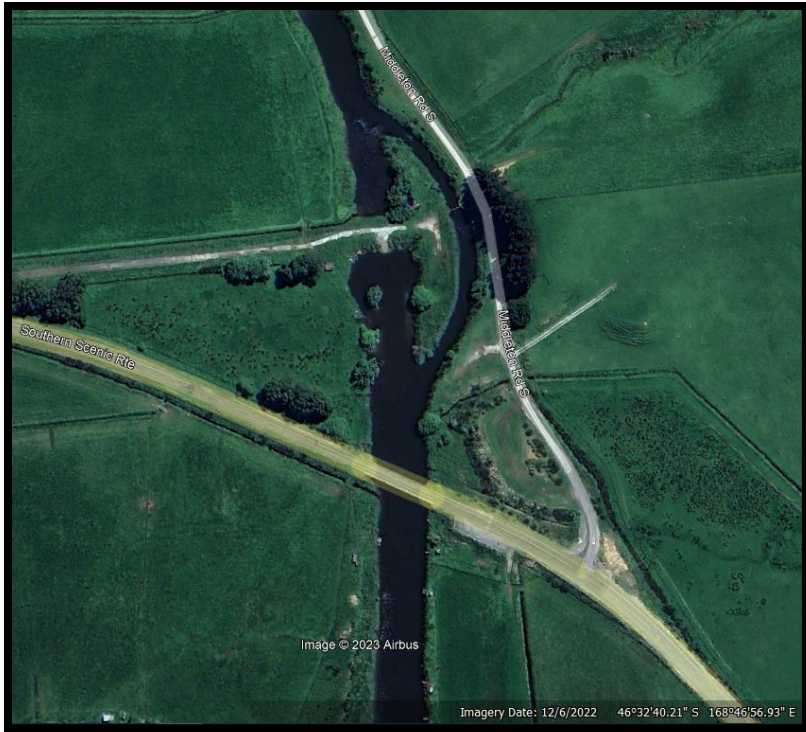


Image 7 – Date taken: 12 / 06 / 2022. Source: Google Earth.

Appendix 2 – Images of unnamed tributary - Titiroa River



Image 1 – Aerial image of unnamed tributary – Titiroa River. Date taken: 12 / 06 / 2022. Source: Google Earth.



Image 2 – Perched culvert on downstream side of unnamed tributary at Middleton Road. Date taken: 10 / 09 / 2023. Source: Jacob Smyth.



Image 3 – Culvert on upstream side of unnamed tributary at Middleton Road. Date taken: 10 / 09 / 2023. Source: Jacob Smyth.



Image 4 – Unnamed tributary upstream of Middleton Road. Date taken: 10 / 09 / 2023. Source: Jacob Smyth.



Image 5 – Upstream side of unnamed tributary at Middleton Road. Date taken: 10 / 09 / 2023.
Source: Jacob Smyth.

Submission on Titiroa Locks Gates

I farm as a lease on Environment land. 444 hectares between the Mataura River and Titiroa Stream. Almost all of our drains drain into the Titiroa Stream.

When I came here 40 years ago it was a run-down farm which was very wet with a lot of rushes and gorse. I have drained the farm with novaflow which has made it a viable proposition. Before the locks were put in it was uneconomic to drain land because it stayed wet all the time. I am not sure why there are objectives to consent renewal as there are hundreds of eels in the Titiroa and Waimahaka Streams.

For the las 40 years there have always been commercial eelers catching eels in the creeks and streams, except for the last 2years as there is no market for them now. They always caught trout too but let them go.

Something I have noticed this year, while there were not many whitebait caught on the Titiroa last season, since then, every month there have been very good runs, even in the ditches. Our neighbours have seen and commented on this also.

January through to September, these are all good breeding times and as for the fish there are plenty of trout being caught in the Titiroa and Waimahaka Streams.

Depending on how much local rain there has been the gates are open for more than half the day.

The first locks were put in in 1918 and were seen to be very effective at protecting the land. They were damaged after a big flood about the late 1960's. The new locks are a part of the Mataura River scheme and were partly paid for by tax payers and rate payers and you just can't remove them There are also three private farms that would be badly affected – K Morton, P Golden and A Holms

All of our ditches and creeks have been fenced off and adult whitebait live in these creeks all year round.

Thirty years ago I fenced off a lot of ground on the Titiroa and Mataura (below the bridge) for habitat and this has been very effective. This was done for Environment Southland and this year a lot of the low land has been retired by Environment Southland on the Titiroa and Mataura.

The whole environment of the Mataura River and Titiroa Stream is modified, rightly or wrongly.

I would like to be notified of objectors submissions before court and why they are objecting. I would also like to be heard at the court hearing.

I have included some photos that I took on the 1st August 2023, and a little bit of history of the old locks from "A History of Fortrose" by Joan MacIntosh.

Yours faithfully



Les Frisby

253 Fleming Road

RD5

Invercargill 9875

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if flood
gates wernt
There all
this ground
on left
would be
flooded
aswell



Big Tide
1st August
2023

Titirua Stream
on night

Taken just
over Titirua
Bridge.



bridge

Flooded ground with tide 1st August 2023
before bridge on right



Big tide
1st August
2023

Water gaining
over locks

out the sections to be affected by the Titiroa drainage scheme and a rating struck for classes of land, a, b, and c, affected by the scheme.

The owners of land receiving most immediate and direct benefit were charged 3/5½ pence per acre.

Those likely to receive lesser benefit were rated 1/4d per acre, and class C, those likely to receive only an indirect benefit were charged 6½d. per acre. This rating was to continue for the period of the £2500 loan raised and was expected to last 36 years or until the loan was fully paid off. It did not affect many Fortrose farmers, but those further up country.

In 1920 the Southland County Council erected a bridge over the Titiroa stream which replaced the one built by local people and washed away in earlier floods. This wooden bridge was just above the Lock gates where the old ford had been. It remained in use, an awkward approach from the East side, until the new high concrete one was completed on May 2, 1967. The Mataura River was bridged in 1927-28 by the Southland County Council.

At present, the Southland Catchment Board have an estimated outline plan for the whole of the Mataura Catchment area set at seven million dollars. The Lower Mataura area will be affected by the stop banking and clearing of willows far inland, for it will send flood waters down more rapidly etc. and to try to compensate the few farmers who would be affected by this proposal, the Catchment Board offered to buy these farms at present day value. The farmers sold, and the farms are now leased on the understanding that this leased land is not protected from flood.

The right bank of the Mataura is to be stopbanked to throw the force of the floods to spread over the lower areas between the Mataura and Titiroa. The new 1967 bridge over the Titiroa was designed to fit in with the total flood protection scheme. In the future, it is planned to rebuild lock gates to the side where they are now and leave the natural river channel. A recent flood breached the old lock and it has not yet been mended.

THE SALEYARDS

The first cattle yards in Fortrose which were occasionally used for public auctions were built and owned by Bruntons. They were situated about where Jim Stirling's home was. These early yards were known locally as "The Public Pound" and probably straying stock were driven in to be claimed.

Very little is really known of them, but some early reports in 1879 tell of a sale of stock and effects from the Estate of Mr S. R. Dickson (3000 acres of the Sinclair Run) which Mr W. G. Rich had bought for £5 an acre. The day was fine and attendance of buyers very good. Keen competition was encountered and after the sheep were sold, the sundries

A History of Fortrose

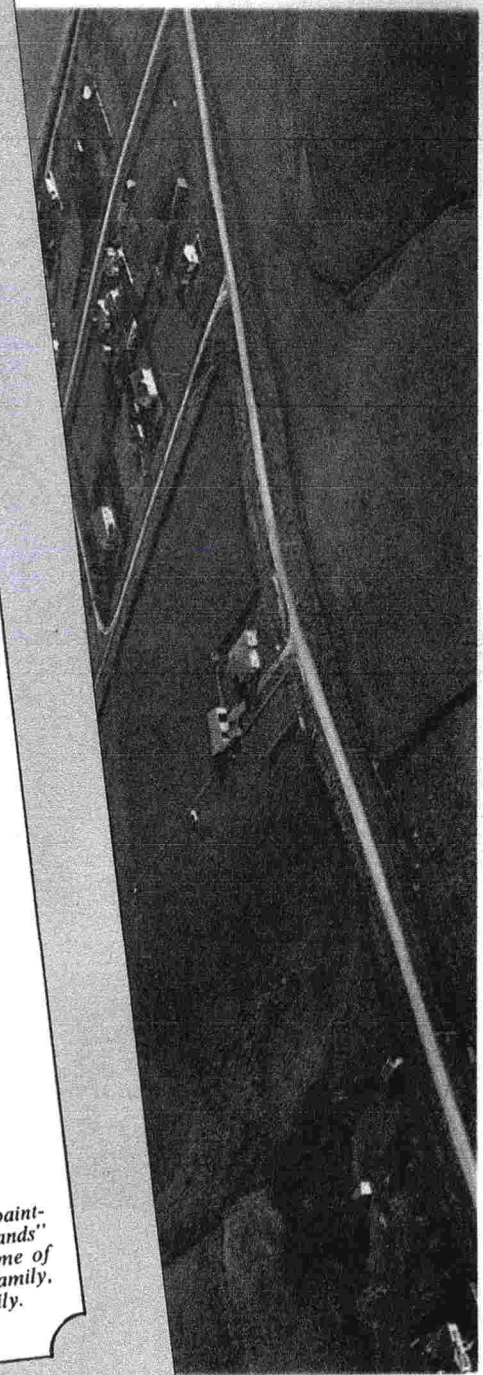
Joan MacIntosh

When a local committee formed to organise the 100th celebrations of the Fortrose school approached Joan MacIntosh to write a Centennial book for them, they had no idea how much history was connected with this southern region.

When given the official go-ahead in February 1974, the author unfolded a fascinating account of the settlement from 1834 to the present day. Because people are such a vital part of any district history, Joan MacIntosh undertook the time consuming task of researching the families of Fortrose, and an extensive and absorbing section is included here.

The book is well illustrated with old photographs of people, places and events, including colour plates. With authentic anecdote reliving the details of development, of societies, of local boards and general affairs, the story of Fortrose becomes and intensely interesting book for all readers.

COVER: A vivid water colour painting (1890) of the "Rocklands" home steading, Fortrose, home of Major Wm. Brunton and family, then George J. Fox and family.



Aerial view of Fortrose showing entrance to harbour. Whites Aviation Photo.

to and fro with considerable violence for five minutes, but no damage was done.

It was the flooding that occurred with uncontrollable ferocity that caused the damage and loss to the community. In the 1880's there came one of the first to be experienced which later became called, "the old Man flood." Heavy rain up country swelled the Maitara and the waters kept rising as they were joined by the tributary rivers, then heavy local rain had the same effect on all creeks and little rivers that poured into the Lower Maitara and the Titiroa which also received the waters of the Waimahaka stream. Mostly stock was lost and pasture land rendered useless for some time.

In August 1891 there was a report that a terrible gale blew on Sunday accompanied by a fall of snow and the snow continued to fall until Tuesday. The mail coach to Wyndham experienced great difficulty getting through the six inch depth of snow. Flooding was prevalent then too, and to mark the roadway, the surfacemen had put long poles along the submerged roads so that drivers could keep to the crown and travel with reasonable safety.

The most dramatic flood was the 1913 one. There were more settlers at this time of course and more stock and farmlands. The flood came up very quickly without warning. On the Western side of the Maitara river lived the Lobb family. They had just made a deal for selling 90 head of cattle for £15 a head and the animals were standing marooned on the banks. A boat load of people evacuating because of the flooding (the Stevens) were talking aloud as they rowed down the river, and the cattle rushed towards them and went into the current and were carried out to sea where most were drowned. There was another large bullock which came swimming down the Titiroa and landed at Chisholms place . . . after the flood subsided, it found its own way back home!

Some Davis family members, lived up the Maitara River and when the 1913 flood was at its height old Charlie decided he'd better go and fetch the marooned ones. He rowed a skiff across the Titiroa River and pulled it along a ditch line to the Maitara River where he got John Chisholm's boat. He found his brother and sister sitting on the kitchen table with the household pig. He loaded them into the boat (I'm not sure about the pig) and rowed all the way out to the estuary and pulled the boat up on the shore. Just as he did so, the whole of the back fell out of the old boat. As mentioned before, the Davis's were expert boatmen and this extraordinary rowing feat by Charlie was but one example of the skill they displayed.

The sawmill along the Titiroa, Robinson's, suffered the most from the floods. Tramlines washed out in long sections, timber floated away and anything moveable in the mill was swirled away. Whole haystacks

and sheds floated into the estuary and out to sea, one haystack having a solitary hen standing atop!

Four years or so later, another disastrous flood covered the lower Maitara farmlands. At this time, the Lock was being built across the Titiroa river to control tidal peak water backing up, and a group of workmen were in the hut by the high bank (it's still there today). They were having "an evening" when one chap went outside and stepped into water up to his knees. He came back in with the comment, "It's raining like hell out there . . . might be another flood."

Everyone laughed, there'd never be another flood like the 1913 one, so the talk and drinking carried on. Another man stepped outside and went up to his armpits in water. Evacuation was desperate . . . they climbed up on to the roof and by holding to tree branches they swung up the bank and to the safety of the higher ground in the darkness. There was another flood, almost as bad as the 1913. Again, much stock was lost and the sawmill suffered again.

In the daylight hours some of the farmers stood upon the higher parts surrounded by acres and acres of water flooded pastures and a theory was fostered that by making two canal cuts through the two unflooded areas between the Titiroa and Maitara rivers, the flood waters could be directed straight through to the estuary and so prevent further disaster such as they surveyed. Unfortunately, they did not realize that the fall they'd achieve with an undertaking like this would be less than eight feet, and with two tides a day, little would be gained.

Flooding is a most frustrating experience for those affected and even in the 1970s a local plan was made to blast through the "Narrows" and let the flood waters out to the open sea with explosives. But the same problem was soon apparent, the rate of fall would be so minute against tide and the enormous bank up of water.

Minor flooding often occurred after heavy rain, but not to the extent of the big floods mentioned here. Another big one happened in 1937 when a vast area was under water for several days and the Seaward Bush Branch Line railway train did not travel until the line was checked. Fortrose area was virtually cut off at peak floods like these, but people are always versatile and survive the small deprivations like a daily paper, mail, bread etc.

The Catchment Board for this river area was established in 1946 and earlier anything that was done to alleviate the flooding and drainage was attended to by the Public Works or the Southland County Council.

The Titiroa Cut Off Drain which goes through Graham Simpson's was made in 1915 and the Public Works Department designed and built the Lock on the Titiroa in 1918. Mr Hislop had the contract for the building of the Lock and a lot of men were employed on this project. In January, 1917 a resolution passed at the Southland County Council set

Philip Golden
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Invercargill. 9875
Phone 0274 369743

29 August 2023

To whom it may concern

This submission is regarding application APP-20211135 Titiroa Tide Gates.

I am in full support of the application as I have been farming my property which boundaries the Titiroa Stream for 45 years and have lived on this property for 59 years.

The changes that occurred when the tide gates were installed on the Titiroa Stream are huge in that any of my land above the tidal structure remains accessible and farmable because of no tidal water inundating it. I own 8ha of bush and tussock land up stream of the tide gates that 9 years ago I fenced off as a wetland.

In July 2022 I had Wildland Consultants commissioned to do a Biodiversity and Ecological Survey on this block of land. This study highlighted the existence of a number of native species including the South Island Fern Bird which are at risk and declining in numbers. The South Island Fern Bird spends 80% of its time on the ground only flying short distances, I fear that letting this area return to tidal land will be to the detriment of this special bird. The bush area that they live in is very low lying with a lot of natural channels intersecting the entire area, that without the tide gate structure will be inundated by tidal water.

I have also in conjunction with Environment Southland investigated creating a pond wetland area in the tussock block draining into my existing creek, without the tide gate structure this project will not be worth pursuing as the ponds will become tidal and not drain.

As a final point it is important to note that the tide gate structure when built actually replaced an existing tide gate structure that was damaged in a flood.

I hope the Council consider my thoughts and opinions and keep the tide gate structure in place.

Yours sincerely



Philip Golden



Leigh Golden



SUBMISSION FORM

Submission on a Notified or Limited Notified Application for a Resource Consent

To: The Chief Executive
Environment Southland
Private Bag 90116
DX YX20175
Invercargill

I: Alexander Hunter Holms

(Name(s))

of: 28 Holms Road Waimahaka

(Address)

at: 032469877 _____
(Phone) (Fax) (E-mail)

Wish to ~~SUPPORT~~ / **OPPOSE** / submit a ~~NEUTRAL~~ submission on (circle one) the application of:

Name: _____

And/or Organisation: _____

Application Number: 20211135 Location: _____

My reasons for my submission are: (State the nature of your submission and give clear reasons. Continue on attached pages if necessary)

See attached Pages

I wish the Council to make the following decision *(Give precise details, including the nature of any conditions sought)*

I, am/am not (choose one) a trade competitor* of the applicant (for the purposes of Section 308B of the Resource Management Act 1991).

**If trade competitor chosen, please complete the next statement, otherwise leave blank*

I, am/am not (choose one) directly affected by an effect as a result of the proposed activity in the application that:

- (a) adversely affects the environment; and
- (b) does not relate to trade competition or the effects of trade competition.

I, do ~~do not~~ (choose one) wish to be heard in support of my submission.

I, do ~~do not~~ (choose one) wish to be involved in any pre-hearing meeting that may be held for this application.

I have served a copy of my submission on the applicant. Yes No

Signed *W. Holms* Date 6th Sept 27

If you have any queries about this form or its purpose, please contact the Consents Division of Environment Southland (03) 211 5115 or 0800 76 88 45.

Notes:

1. This submission will become publicly available information.
2. The person making this submission must send a copy to the applicant as soon as reasonably practicable after serving Environment Southland.
3. A list of all submissions received will be provided to the applicant.
4. Please be aware that third parties may request a copy of submissions received and that request is subject to the Local Government Official Information and Meetings Act 1987.

- ⑤ These rivers were alive with fish pre tidegates Namely
Kokopu (Maori trout)
Shrimp
Whitebait
Smelt
Longfin eel
Shortfin eel
Flounder
Koura (freshwater Crayfish)
Yellow eyed mullet
Brown trout
Lamprey
Perch

All these species have been caught by me in these rivers
Pre tidegates

I have also observed whitebait spawning in one of my
drains that feed into the Waimahaka river approximately
1½ miles up river from the tidegates in March pre tidegates
Commercial eeling should be banned in these rivers also.

- ⑥ There is a large Shag rookery in the Matais on the Waimahaka
river. At nesting time they used to source feed for their young in
this area.

Now you see them flying to the Mataura river, Waituna
Lagoon, Fortrose estuary etc. to feed their young.

- ⑦ Since the tidegates were installed water quality has deteriorated.
It has become more brackish almost semi stagnant
Before with the flood & ebb tides flushing the rivers this
water was kept clean.
Also there is a serious silting in these rivers because
there is no flushing effect now

Environment Southland this situation is a total
disaster and I hold you totally responsible for it
Get your own house in order and set an example to the
farmers who have been penalised by your Winter Grazing
regime

Signed. Alex Holmes

① The Holms family farm a 900 acre property known as Waimahaka, and have done so over 5 generations of ownership for 149 years

Our property is the largest privately owned affected by this scheme.

Having lived beside these 2 rivers all my life I have a vast practical knowledge of them.

② Points of interest:

- 1 Titiroa tide gates and the locks are the same thing
- 2 My reference to the Titiroa and Waimahaka rivers means the part of these rivers from above the Tidegates to the upper reaches of the original tide zone only

3 The Southland Catchment Board and Environment Southland are the same identity.

③ Many years ago I was talking to a local identity about the old locks that were built just after WW1. He told me that they were never successful.

Built of hardwood with top hinged gates they were prone to blockage by rafts of weed and logs etc from floods. They fell into a state of disrepair.

④ I was approached by a Catchment Board employee informing me that they were going to build a new set of tidegates in 1986.

I disagreed with the whole concept, informing him a better idea would be for landowners affected by the tides to build small maybe 1m high tidebanks on the lower parts of the riverbanks and install steel flapper gates on any drains that feed into these rivers.

This idea was ignored.

This system would not have affected these rivers like the tidegates have.

1. The Holms family farm a 900acre property known as Waimahaka, and have done so over 5 generations of ownership for 149 years. Our property is the largest privately owned affected by this scheme. Having lived beside these 2 rivers all my life I have a vast practical knowledge of them.
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5. These rivers were alive with fish pre tide gates namely:
 - Kokopu (Māori trout)
 - Shrimp
 - Whitebait
 - Smelt
 - Longfin eel
 - Shortfin eel
 - Flounder
 - Koura (freshwater Crayfish)
 - Yellow eyed mullet
 - Brown trout
 - Lamprey
 - Perch

All these species have been caught by me in these rivers pre tide gates. I have also observed whitebait spawning in one of my drains that feed into the Waimahaka river approximately 1 ½ miles up river from the tide gates in March pre tide gates. Commercial eeling should be banned in these rivers also.

6. There is a large shag rookery in the matais on the Waimahaka river. At nesting time they used to source feed for their young in this area. Now you see them flying to the Mataura river, Waituna Lagoon, Fortrose estuary etc. to feed their young.
7. Since the tide gates were installed water quality has deteriorated. It has become more brackish almost semi stagnant. Before with the flood & ebb tides flushing the rivers this water was kept clean. Also there is a serious silting in these rivers because there is no flushing effect now.

Environment Southland this situation is a total disaster and I hold you totally responsible for it. Get your own house in order and set an example to the farmers who have been penalised by your Winter Grazing regime.

Signed Alex Holms



Submission on Titiroa Locks Gates

I have a farm on the lower Titiroa Stream. About 160ha is on flat ground which would be badly affected by tidal flooding if the gates were gone.

My father bought the farm in 1961 and we have paid for the locks in our taxes and rates over the years and to remove them is a waste of money and time. All of our creeks and streams have been fenced off in recent years.

These locks are all part of the Maitara River Scheme.

We go fishing on our part of the Titiroa Stream and do very well. Every year we see a lot of whitebait up our stream.

Commercial eelers come in every year and do well, except for the past 2 years when the factory at Kennington stopped working. I understand iwi bought it.

Yours faithfully

A handwritten signature in blue ink, appearing to read "Kerry P Morton".

Kerry P Morton

77 Springfield Road

No 5 RD

Invercargill 9875



SUBMISSION FORM

Submission on a Notified or Limited Notified Application for a Resource Consent



To: The Chief Executive
Environment Southland
Private Bag 90116
DX YX20175
Invercargill

I: Roger McNaughton — Southland Recreational Whitebaiters Assn
(Name(s))

of: 168 Walker Rd Woodlands, RD 1 Invercargill
(Address)

at: 0274369510 (Phone) — (Fax) roger.mcnaughtonnz@gmail.com (E-mail)

Wish to SUPPORT / OPPOSE / submit a NEUTRAL submission on (circle one) the application of:

Name: _____

And/or Organisation: Environment Southland

Application Number: APP 202111351 Location: Titiroa flood gates

My reasons for my submission are: (State the nature of your submission and give clear reasons. Continue on attached pages if necessary)

[Empty box for reasons]

I wish the Council to make the following decision (*Give precise details, including the nature of any conditions sought*)

I, am/am not (*choose one*) a trade competitor* of the applicant (for the purposes of Section 308B of the Resource Management Act 1991).

**If trade competitor chosen, please complete the next statement, otherwise leave blank*

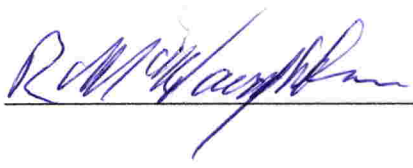
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- (b) does not relate to trade competition or the effects of trade competition.

I, do/do not (*choose one*) wish to be heard in support of my submission.

I, do/do not (*choose one*) wish to be involved in any pre-hearing meeting that may be held for this application.

I have served a copy of my submission on the applicant. Yes No

Signed  Date 6/9/2023

If you have any queries about this form or its purpose, please contact the Consents Division of Environment Southland (03) 211 5115 or 0800 76 88 45.

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Titiroa flood gate consent application

Southland Recreational Whitebaiters Assn.
President Roger McNaughton
Woodlands RD 1 Invercargill.
Cell phone 0274369510
email roger.mcnaughtonnz@gmail.com

Environment Southland
Consent Application APP 202111351
Titiroa tide gates

Thank you for the opportunity to make comment on the above consent application. The Southland Recreational Whitebaiters Assn. is involved in representing its members in whitebaiting issues. This representation includes promoting responsible use of the whitebaiting resource.

We note in the application that there was a structure in 1917 to control flooding upstream.

Also noted is the area of 1.38 ha that is lost habitat for spawning because of the present control structure.

Our members have identified that the habitats below the present gates has greatly improved over the time since the fencing of both sides of the river was put in place. Stock were once a major cause of riparian damage.

These riparian areas often flood with high tide conditions.

Would these areas still flood if the gates were removed ?

We have been unable to find any information on what would be the water levels and changes if the tide gates were removed.

Our Associations concern for many years was the entrapment of whitebait in the area above the road bridge when the gates were closed. The fish were easy prey as they had nowhere to go. Up to thirteen nets could be seen in this area.

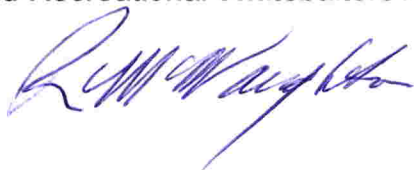
Finally, last year with our full support the Department of Conservation under new fishing regulations were able to put back pegs in place at the road bridge therefore making it illegal to fish upstream of the bridge.

This we believe will make a huge difference to the amount of whitebait moving upstream through the gates when they open.

The Southland Recreational Whitebaiters Assn. therefore SUPPORTS the consent application APP 202111351.

We have not forwarded this document to any other party.

Roger McNaughton,
President
Southland Recreational Whitebaiters Assn.



6/9/2023

Titiroa flood gate consent application

Southland Recreational Whitebaiters Assn.
President Roger McNaughton
Woodlands RD 1 Invercargill.
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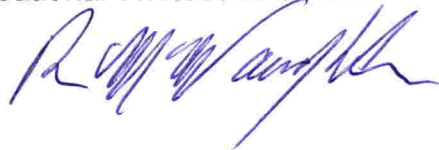
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Roger McNaughton,
President
Southland Recreational Whitebaiters Assn.



6/9/2023

11 September 2023

Consents Manager
Environment Southland
Private Bag 90116,
Invercargill 9810

Tēnā Koe,

RE: Submission on Resource consent application – APP-20211135

Please find attached a submission lodged, on behalf of Ngā Rūnanga on Resource Consent applications to occupy part of the coastal marine area with a tide gate structure, occupy part of the coastal marine area with a weir structure and to dam and divert water by ES Catchment Management Division at Titiroa tide gates, Titiroa River, about 185 metres upstream of the Tokanui Gorge Road Highway Bridge.

We trust the information contained within the submission is sufficient; however, should you wish to discuss any aspect further, please do not hesitate to contact me.

Nāhaku noa nā,



Kamaea Wi Repa
Te Ao Marama Inc.
Kaitohutohu Taiao

To: Environment Southland
Private Bay 90116
Invercargill

1. This is a submission on the application **APP-20211135** to occupy part of the Coastal Marine Area with a tide gate structure, occupy part of the Coastal Marine Area with a weir structure and to dam and divert water at Titiroa tide gates.
2. Ngā Rūnanga submission relates to the applications in their entirety (**Appendix A**). Ngā Rūnanga is **OPPOSED** to the granting of the applications.
3. Ngā Rūnanga does wish TO BE HEARD in support of its submission.
4. Ngā Rūnanga is not a trade competitor for the purposes of section 308B of the Resource Management Act 1991.
5. A copy of this submission has been sent to the applicant.

Signed for and on behalf of Ngā Rūnanga.



Kamaea Wi Repa
77 Don Street,
Invercargill
9810

11/09/2023

Introduction

1. This submission is made on behalf of Ngā Rūnanga.

Papatipu Rūnanga

2. The Te Rūnanga o Ngāi Tahu Act 1996 (the TRoNT Act) and the Ngāi Tahu Claims Settlement Act 1998 (the Settlement Act) give recognition to the status of Papatipu Rūnanga as kaitiaki and mana whenua of the natural resources within their takiwā boundaries.
3. The consent application proposals relate to a Coastal Permit that is within the takiwā of Awarua Rūnanga

General Position and Reasons for the Submission

4. Te Tangi a Tauri, 2008, states that:

The intrinsic values of Southland's coastal environment provide a strong spiritual and cultural connection for Ngāi Tahu ki Murihiku. O Te Wai not only includes the freshwater elements of water but extends to include O Te Moana – the sea, and the inherent connection between these two waters. Upstream effects in our river catchments influence the life supporting capacity of our estuarine systems and waters of our seaward coastal environment. From the mountains to the sea, the ocean waters are the end of the line and the upstream cumulative effects of upstream activities is reflected in the health of the waterway when it reaches the sea.

5. Ngāi Tahu is supportive of development within its takiwā, provided activities are undertaken in a way that respects the environment where the activity is to be undertaken and do not adversely affect Ngāi Tahu cultural values, customs and their traditional relationship with land and water.
6. The rohe (area) that the application is within is a significant cultural landscape to Ngāi Tahu because of historical and contemporary associations. These associations include (but are not limited to) the formation of landscape, wāhi ingoa (place names), mahinga kai, kaimoana, wāhi tapū, Māori land, Mātaitai, and archaeological sites.
7. The Titiroa Stream discharges to Toetoe estuary which is recognised for its significance to mana whenua within the Statutory Acknowledgement of the Rakiura/Foveaux Straight Coastal Marine

Area ¹. The Titiroa stream is an area known for mahinga kai, in conjunction with Toetoe estuary and the neighbouring Matura awa. These waterbodies have cultural, spiritual, historic, and traditional associations recognised by the Crown within Statutory Acknowledgements (See **Appendix B**) under the Ngāi Tahu Claims Settlement Act, 1998.

8. Awarua Rūnanga, as kaitiaki, are responsible for protecting the mana and mauri of the environment that the application is within.
9. Ngā Rūnanga **opposes** the application for the following reasons:
 - The applicant has not provided for Ngāi Tahu values, rights, and interests.
 - The structures are detrimental to the mauri, the health and well-being of Titiroa Stream and its freshwater ecosystems.
 - The structures adversely impact threatened indigenous species and their habitats that are taonga.
 - The structures prohibit fish passage and have detrimental effects on inanga spawning.
 - The fish survey is inadequate and failed to consider all taonga species known to the area e.g., kanakana.
 - The application fails to provide reliable data to clarify the effectiveness of the structure, nor quantifies at what water levels land is affected and what land is affected by inundation.
 - The application fails to consider climate change and the impacts of rising sea levels or increased flood flows on the area.
 - The application fails to provide clarity on the mitigations proposed. Improving habitat does not improve migration for taonga species.
 - The application is contrary to Te Tangi a Tauira, 2008, the Iwi Management Plan for the takiwā (see **Appendix C** for relevant kaupapa).
 - The application is inconsistent with relevant planning documents.
 - The activities are currently occurring unlawfully due to the expiry of previous consents held and that the applicant is unable to rely on Section 124 of the RMA.

¹ Schedule 104 of the Ngāi Tahu Claims Settlement Act 1998, Statutory Acknowledgement for Rakiura/Te Ara a Kiwa (Rakiura/Foveaux Strait Coastal Marine Area)

- We consider that the applicant requires additional resource consent for the damming and diversion of water from the natural bed of Titiroa Stream into the diversion channel upstream of the coastal marine area boundary (see **Appendix D**). In accordance with Section 91(1) of the Resource Management Act (RMA) the processing of this application should not proceed to a hearing until application is lodged for damming and diversion in accordance with the requirements of the proposed regional plan. Consequently, the proposal requires assessment under the National Policy Statement for Freshwater Management 2020.

Decision Sought

10. Ngā Rūnanga seek that:

- The application is declined.
- All structures are removed to provide for fish passage and to restore ki uta ki tai, the natural flows of the wai.
- The surrounding land parcels owned by Environment Southland is retired and a management plan implemented to restore the land to wetlands which would provide better long-term flood management for the wider area.

Schedule 104

Statutory acknowledgement for Rakiura/Te Ara a Kiwa (Rakiura/Foveaux Strait Coastal Marine Area)*Statutory area*

The statutory area to which this statutory acknowledgement applies is Rakiura/Te Ara a Kiwa (Rakiura/Foveaux Strait Coastal Marine Area), the Coastal Marine Area of the Hokonui and Awarua constituencies of the Southland region, as shown on SO 11505 and 11508, Southland Land District, as shown on Allocation Plan NT 505 (SO 19901).

Preamble

Under section 313, the Crown acknowledges Te Rūnanga o Ngāi Tahu's statement of Ngāi Tahu's cultural, spiritual, historic, and traditional association to Rakiura/Te Ara a Kiwa as set out below.

Ngāi Tahu association with Rakiura/Te Ara a Kiwa

Generally the formation of the coastline of Te Wai Pounamu relates to the tradition of Te Waka o Aoraki, which foundered on a submerged reef, leaving its occupants, Aoraki and his brothers to turn to stone. They are manifested now in the highest peaks of the Kā Tititiri o Te Moana (the Southern Alps). The bays, inlets, estuaries and fiords which stud the coast are all the creations of Tū Te Rakiwhānoa, who took on the job of making the island suitable for human habitation.

The naming of various features along the coastline reflects the succession of explorers and iwi (tribes) who travelled around the coastline at various times. The first of these was Māui, who fished up the North Island, and is said to have circumnavigated Te Wai Pounamu. In some accounts the island is called Te Waka o Māui in recognition of his discovery of the new lands. A number of coastal place names are attributed to Māui, particularly on the southern coast. Māui is said to have sojourned at Ōmaui (at the mouth of the New River Estuary) for a year, during which time he claimed the South Island for himself. It is said that in order to keep his waka from drifting away he reached into the sea and pulled up a stone to be used as an anchor, which he named Te Puka o Te Waka o Māui (Rakiura or Stewart Island).

The great explorer Rakaihautu travelled overland along the coast, identifying the key places and resources. He also left many place names on prominent coastal features. When Rakaihautu's southward exploration of the island reached Te Ara a Kiwa, he followed the coastline eastwards before heading for the east coast of Otago.

Particular stretches of the coastline also have their own traditions. Foveaux Strait is known as Te Ara a Kiwa (the pathway of Kiwa), the name relating to the time when Kiwa became tired of having to cross the land isthmus which then joined Murihiku (Southland) with Rakiura (Stewart Island). Kiwa requested the obedient Kewa (whale) to chew through the isthmus and create a waterway so Kiwa could cross to and fro by waka. This Kewa did, and the crumbs that fell from his mouth are the islands in Foveaux Strait, Solander Island being Te Niho a Kewa, a loose tooth that fell from the mouth of Kewa.

The waka Takitimu, captained by the northern rangatira (chief) Tamatea, travelled around much of Te Wai Pounamu coast, eventually breaking its back at the mouth of the Waiau River in Murihiku. Many place names on the coast can be traced back to this voyage, including Monkey Island near Ōrepuki which is known as Te-Punga (or Puka)-a-Takitimu. While sailing past the cliffs at Ōmaui it is said that Tamatea felt a desire to go ashore and inspect the inland, and so he turned to the helmsman and gave the order "Tārere ki whenua uta" ("swing towards the mainland"), but before they got to the shore he

countermanded the order and sailed on. Subsequently the whole area from Ōmaui to Bluff was given the name of Te Takiwā o Tārere ki Whenua Uta. In olden days when people from the Bluff went visiting they were customarily welcomed on to the hosts' marae with the call, "haere mai koutou te iwi tārere ki whenua uta". One of the whare at Te Rau Aroha marae in Bluff is also named "Tārere ki Whenua uta" in memory of this event.

The Takitimu's voyage through the Strait came to an end and when the waka was overcome by three huge waves, named Ō-te-wao, Ō-roko and Ō-kaka, finally coming to rest on a reef near the mouth of the Waiau (Waimeha). According to this tradition, the three waves continued on across the low lying lands of Murihiku, ending up as permanent features of the landscape.

For Ngāi Tahu, traditions such as these represent the links between the cosmological world of the gods and present generations. These histories reinforce tribal identity and solidarity, and continuity between generations, and document the events which shaped the environment of Te Wai Pounamu and Ngāi Tahu as an iwi.

Because of its attractiveness as a place to establish permanent settlements, including pā (fortified settlements), the coastal area was visited and occupied by Waitaha, Ngāti Mamoe and Ngāi Tahu in succession, who through conflict and alliance, have merged in the whakapapa (genealogy) of Ngāi Tahu Whānui. Battle sites, urupā and landscape features bearing the names of tūpuna (ancestors) record this history. Prominent headlands, in particular, were favoured for their defensive qualities and became the headquarters for a succession of rangatira and their followers.

The results of the struggles, alliances and marriages arising out of these migrations were the eventual emergence of a stable, organised and united series of hapū located at permanent or semi-permanent settlements along the coast, with an intricate network of mahinga kai (food gathering) rights and networks that relied to a large extent on coastal resources.

Mokamoka (Mokomoko or Mokemoke) was one such settlement, in a shallow inlet off the Invercargill estuary. It was here that Waitai was killed, the first Ngāi Tahu to venture this far south, well out of the range of his own people, then resident at Taumutu. This settlement was sustained by mahinga kai taken from the estuary and adjoining coastline, including shellfish and pātiki (flounder).

Ōue, at the mouth of the Ōreti River (New River Estuary), opposite Ōmaui, was one of the principal settlements in Murihiku. Honekai who was a principal chief of Murihiku in his time was resident at this settlement in the early 1820s, at the time of the sealers. In 1850 there were said to still be 40 people living at the kaik at Ōmaui under the chief Mauhe. Honekai's brother, Pukarehu, was a man who led a very quiet life, and so was little known. He is remembered, however, in the small knob in the hills above Ōmaui which bears his name. When he passed away he was interred in the sandhills at the south end of the Ōreti Beach opposite Ōmaui. Ōue is said to have got its name from a man Māui left to look after his interests there until his return. It was also here that the coastal track to Riverton began. From Ōue to the beach the track was called Te Ara Pakipaki, then, when it reached the beach, it was called Mā Te Aweawe, finally, at the Riverton end, it was known as Mate a Waewae.

After the death of Honekai, and as a consequence of inter-hapū and inter-tribal hostilities in the Canterbury region, many inhabitants of Ōue and other coastal villages on Foveaux Strait relocated to Ruapuke Island, which became the Ngāi Tahu stronghold in the south. The rangatira Pahi and Tupai were among the first to settle on the island. Pahi had previously had one of the larger and oldest pā in Murihiku at Pahi (Pahia), where 40 to 50 whare (houses) were reported in 1828. The Treaty of Waitangi was signed at Ruapuke Island by Tuhawaiki and others. No battles however occurred here, the pā Pā-

raki-ao was never fully completed, due to the realisation that Te Rauparaha could not reach this far south.

Other important villages along the coast included: Te Wae Wae (Waiau), Taunoa (Ōrepuki), Kawakaputaputa (Wakaputa), Ōraka (Colac Bay), Aparima (Riverton—named Aparima after the daughter of the noted southern rangatira Hekeia, to whom he bequeathed all of the land which his eye could see as he stood on a spot at Ōtaitai, just north of Riverton), Turangiteuaru, Awarua (Bluff), Te Whera, Toe Toe (mouth of the Maitara River) and Waikawa.

Rarotoka (Centre Island) was a safe haven at times of strife for the villages on the mainland opposite (Pahi, Ōraka and Aparima). Numerous artefacts and historical accounts attest to Rarotoka as having a significant place in the Ngāi Tahu history associated with Murihiku.

Rakiura also plays a prominent part in southern history, the “Neck” being a particularly favoured spot. Names associated with the area include: Kōrako-wahine (on the western side of the peninsula), Whare-tātara (a rock), Hupokeka (Bullers Point) and Pukuheke (the point on which the lighthouse stands). Te Wera had two pā built in the area called Kaiarohaki, the one on the mainland was called Tounoa, and across the tidal strip was Kā-Turi-o-Whako.

A permanent settlement was located at Port Pegasus, at the south-eastern end of Rakiura, where numerous middens and cave dwellings remain. Permanent settlement also occurred on the eastern side of Rakiura, from the Kaik near the Neck, south to Tikotaitahi (or Tikotatahi) Bay. A pā was also established at Port Adventure.

Mahinga kai was available through access from the coastal settlements to Te Whaka-a-te-Wera (Paterson Inlet), Lords River and, particularly for waterfowl, to Toi Toi wetland. In addition, the tītī islands off the northeastern coast of the island, and at the mouth of Kōpeka River and the sea fishery ensured a sound base for permanent and semi-permanent settlement, from which nohoanga operated.

Te Ara a Kiwa, the estuaries, beaches and reefs off the mainland and islands all offered a bounty of mahinga kai, with Rakiura and the tītī islands being renowned for their rich resources of bird life, shellfish and wet fish. The area offered a wide range of kaimoana (sea food), including tuaki (cockles), paua, mussels, toheroa, tio (oysters), pūpū (mudsnails), cod, groper, barracuda, octopus, pātiki (flounders), seaweed, kina, kōura (crayfish) and conger eel. Estuarine areas provided freshwater fisheries, including tuna (eels), inaka (whitebait), waikōura (freshwater crayfish), kōkopu and kanakana (lamprey). Marine mammals were harvested for whale meat and seal pups. Many reefs along the coast are known by name and are customary fishing grounds, many sand banks, channels, currents and depths are also known for their kaimoana.

A range of bird life in the coastal area also contributed to the diversity of mahinga kai resources available, including tītī, seabirds such as shags and gulls, sea bird eggs, waterfowl, and forest birds such as kiwi, kākā, kākāpō, weka, kukupa and tieke. A variety of plant resources were also taken in the coastal area, including raupō, fern root, tī kōūka (cabbage tree), tutu juice and kōrari juice. Harakeke (flax) was an important resource, required for the everyday tasks of carrying and cooking kai. Black mud (paru) was gathered at Ocean Beach for use as dye. Tōtara bark was important for wrapping pōhā in, to allow safe transport of the tītī harvest. Pōhā were made from bull kelp gathered around the rocky coast. The numerous tītī islands are an important part of the Ngāi Tahu southern economy, with Taukihepa (Te Kanawera) being the largest. Tītī were and are traded as far north as the North Island. The “Hakuai” is a bird with a fearsome reputation associated with the islands. No one has ever seen this bird, which appears at night, but it once regularly signalled the end to a birding season by its appearance at night. Known for its distinctive spine-chilling call, the hakuai was a kaitiaki that could not be ignored. At the far

western edge of Foveaux Strait is Solander Island (Hau-tere), an impressive rock pinnacle rising hundreds of feet out of the sea, on which fishing and tītī gathering occurred.

The coast was also a major highway and trade route, particularly in areas where travel by land was difficult. Foveaux Strait was a principal thoroughfare, with travel to and from Rakiura a regular activity. There was also regular travel between the islands Ruapuke, Rarotoka and other points.

The tītī season still involves a large movement across the Strait to the islands, in addition large flotillas of Ngāi Tahu once came south from as far afield as Kaikōura to exercise their mutton-birding rights.

Whenua Hou (Codfish Island) and the Ruggedy Islands were important staging posts for the movement of birders to the tītī islands off the south-west coast of Rakiura. Whenua Hou had everything that the birders required: shelter, proximity to the tītī islands, kai moana, manu (birds) and ngahere (bush). From Whenua Hou, the birders would camp at Miniti (Ernest Island), at the end of Mason Bay, where the waka-hunua (double-hulled canoes, or canoes with outriggers) were able to moor safely, ready for the final movement to the various tītī islands. Waka-hunua were an important means of transport on the dangerous and treacherous waters of Foveaux Strait and the Rakiura coast. After dropping birders and stores on the tītī islands the waka hunua generally returned immediately to Aparima and other tauranga waka along the mainland of Foveaux Strait, due to the paucity of safe anchorages among the tītī islands.

Travel by sea between settlements and hapū was common, with a variety of different forms of waka, including the southern waka hunua (double-hulled canoe) and, post-contact, whale boats plying the waters continuously. Hence tauranga waka occur up and down the coast, including spots at Pahi, Ōraka and Aparima, and wherever a tauranga waka is located there is also likely to be a nohoanga (settlement), fishing ground, kaimoana resource, rimurapa (bull kelp - used to make the pōhā, in which tītī were and still are preserved) and the sea trail linked to a land trail or mahinga kai resource.

Knowledge of these areas continues to be held by whānau and hapū and is regarded as a taonga. The traditional mobile lifestyle of the people led to their dependence on the resources of the coast.

The New River Estuary contains wāhi tapu, as do many of the coastal dunes and estuarine complexes for the length of the Foveaux Strait. Many urupā are located on islands and prominent headlands overlooking the Strait and the surrounding lands and mountains. The rangatira Te Wera, of Huriawa fame, is buried at Taramea (Howells Point), near Riverton. There are two particularly important urupā in Colac Bay, as well as an old quarry site (Tihaka). From Colac Bay to Wakapatu, the coastal sandhills are full of middens and ovens, considered to be linked to the significant mahinga kai gathering undertaken in Lake George (Uruwera). Urupā are the resting places of Ngāi Tahu tūpuna and, as such, are the focus for whānau traditions. These are places holding the memories, traditions, victories and defeats of Ngāi Tahu tūpuna, and are frequently protected in secret locations.

The mauri of the coastal area represent the essence that binds the physical and spiritual elements of all things together, generating and upholding all life. All elements of the natural environment possess a life force, and all forms of life are related. Mauri is a critical element of the spiritual relationship of Ngāi Tahu Whānui with the coastal area.

Schedule 42 Statutory acknowledgement for Mataura River

Statutory area

The statutory area to which this statutory acknowledgement applies is the river known as Mataura, the location of which is shown on Allocation Plan MD 125 (SO 12264).

Preamble

Under section 206, the Crown acknowledges Te Rūnanga o Ngāi Tahu's statement of Ngāi Tahu's cultural, spiritual, historic, and traditional association to the Mataura River, as set out below.

Ngāi Tahu association with the Mataura River

The area of the Mataura River above the Mataura Falls was traditionally used by the descendants of the Ngāti Mamoe chief, Parapara Te Whenua. The descendants of Parapara Te Whenua incorporate the lines of Ngāti Kurī from which the Mamaru family of Moeraki descend. Another famous tupuna associated with the river was Kiritekateka, the daughter of Parapara Te Whenua. Kiritekateka was captured by Ngāi Tahu at Te Anau and her descendants make up the lines of many of the Ngāi Tahu families at Ōtākou.

For Ngāi Tahu, histories such as these reinforce tribal identity and solidarity, and continuity between generations, and document the events which shaped the environment of Te Wai Pounamu and Ngāi Tahu as an iwi.

The Mataura was an important mahinga kai, noted for its indigenous fishery. The Mataura Falls were particularly associated with the taking of kanakana (lamprey). The tūpuna had considerable knowledge of whakapapa, traditional trails and tauranga waka, places for gathering kai and other taonga, ways in which to use the resources of Mataura, the relationship of people with the river and their dependence on it, and tikanga for the proper and sustainable utilisation of resources. All of these values remain important to Ngāi Tahu today.

The mauri of the Mataura represents the essence that binds the physical and spiritual elements of all things together, generating and upholding all life. All elements of the natural environment possess a life force, and all forms of life are related. Mauri is a critical element of the spiritual relationship of Ngāi Tahu Whānui with the river.

Te Tangi a Tauira, 2008 assessment

Section 1.2 Ki Uta Ki Tai

Ki Uta Ki Tai is based on the idea that if the realms of Tawhirimatea (god of the winds), Tāne Mahuta (god of all living things), Papatūānuku (mother earth) and Tangaroa (god of the sea) are sustained then the people will be sustained. The kaupapa reflects the knowledge that resources are connected, from the mountains to the sea, and must be managed as such. Furthermore the kaupapa reflects that we belong to the environment and are only borrowing the resources from our generations that are yet to come. It is considered our duty to leave the environment in as good or even better condition than received from our tūpuna. The historical practices were established by our tūpuna and must be passed on to ngā uri kei te heke mai, the generations to come.

Kete of Knowledge

The central component of the Māori perspective on the environment is the recognition of Mauri, the life principal in all objects, animate and inanimate. The presence of Mauri in all things entrusts people to appreciate and respect that resource. In this way, overuse, depletion or desecration of natural resources is not an accepted practice. Tikanga regulate activities concerning the conservation and sustainable use of natural resources in order to protect the Mauri.

Section 1.12 Environmental Outcomes

- To ensure environmental outcomes accommodate for cultural and traditional spiritual values held by Ngāi Tahu ki Murihiku
- That integrated management of natural and physical resources is encouraged
- To ensure the protection, restoration and enhancement of the productivity and life supporting capacity of mahinga kai, indigenous biodiversity, air, water, land, natural habitats and ecosystems, and all other natural resources valued by Ngāi Tahu ki Murihiku

3.1 Climate Change

From an environmental and spiritual perspective, Māori see the world as a unified whole, where all elements, including tangata whenua, are connected. Emphasis is placed on maintaining the balance of cultural and spiritual values in the environment while using resources for commercial and social purposes. The changes brought on by a warming climate caused by human interference directly affect this balance.

3.1.2.9 Climate Change – Economy and Industry

Enable Mātauranga, traditional Māori knowledge to be used in collaboration with western based science with respect to formation of climate change policy and response.

3.1.3.6 *Climate Change – Influences of Climate Change on Society and Health*

Ensure that it is understood that cultural order comes from the natural environment and that lack of respect, honour and protection of this natural order compromises Māori culture, well-being and spiritual health.

O te Wai – General Water Policy

Water is a taonga, or treasure of the people. It is the kaitiaki responsibility of tangata whenua to ensure that this taonga is available for future generations in as good as, if not better quality. Water has the spiritual qualities of mauri and wairua. The continued well-being of these qualities is dependent on the physical health of the water. Water is the lifeblood of Papatūānuku, and must be protected. We need to understand that we cannot live without water and that the effects on water quality have a cumulative effect on mahinga kai and other resources.

Water is often seen as a commodity, and is thus subject to competing use demands. An understanding of the significance and value of water to Ngāi Tahu ki Murihiku and other stakeholders, is necessary to ensure that cultural and ecological values associated with water are recognised and provided for alongside consumptive uses.

3.5.10.1

The role of Ngāi Tahu ki Murihiku as kaitiaki of freshwater must be given effect to in freshwater policy, planning and management.

3.5.10.3

Protect and enhance the mauri, or life supporting capacity, of freshwater resources throughout Murihiku.

3.5.10.5

Promote the management of freshwater according to the principle of ki uta ki tai, and thus the flow of water from the source to the sea.

3.5.10.8

Protect and enhance the customary relationship of Ngāi Tahu ki Murihiku with freshwater resources.

3.5.11 *Rivers*

Several major river catchments are located on the Southland Plains, including the Aparima, Ōreti, Matāura, and Waiau. These rivers flow from ki uta ki tai, from mountain to sea, and are connected to numerous tributaries, wetlands and waipuna, as well as the groundwater that nourishes the catchment from below. They are part of Ngāi Tahu ki Murihiku history and identity. While the last 165 years have resulted in significant changes to these rivers, their importance has not diminished. Many of the waterways of the Southland plains have specific cultural associations. They are known for an abundance of mahinga kai, used for a specific purpose, or associated with a specific ceremony or ritual. Waterways may be considered wāhi tapu (i.e. associated with urupā or with an activity or occurrence considered tapu), or wāhi taonga (general site of cultural significance).

The Ōreti, Waiau, Aparima, Matāura, Pomahaka and Mata-au / Clutha are Statutory Acknowledgement areas under the NTCSA 1998 (Schedules 50, 69, 15, 42, 52 and 40), providing for the special association of Ngāi Tahu with the rivers. The tūpuna had considerable knowledge of whakapapa, traditional trails and tauranga waka, places for gathering kai and other taonga, ways in which to use the resources of Southland rivers, the relationship of people with the river and their dependence on it, and tikanga for the proper and sustainable utilisation of resources. All of these values remain important to Ngāi Tahu ki Murihiku today.

3.5.11.2 Rivers

Promote river management that adopts the priorities established in the Te Rūnanga o Ngāi Tahu Freshwater Policy 1997. The priorities are:

- Priority 1: Sustain the mauri of the waterbodies within the catchment.
- Priority 2: Meet the basic health and safety needs of humans (drinking water).
- Priority 3: Protect cultural values and uses.
- Priority 4: Protect other instream values (indigenous flora and fauna).
- Priority 5: Meet the health and safety needs of humans (sanitation).
- Priority 6: Provide water for stock.
- Priority 7: Provide for economic activities including abstractive uses.
- Priority 8: Provide for other uses.

3.5.11.4 Rivers

Management of our rivers must take into account that each waterway has its own mauri, guarded by separate spiritual guardians, its own mana, and its own set of associated values and uses.

3.5.11.10 Rivers

Ensure that all native fish species have uninhibited passage from the river to the sea at all times, through ensuring continuity of flow ki uta ki tai.

3.5.11.16 Rivers

Prioritise the restoration of those waterbodies of high cultural value, both in terms of ecological restoration and in terms of restoring cultural landscapes.

3.5.15.11 Activities in the Beds and Margins of Rivers

Require that placement of culverts or other flood works in the beds or margins of waterways is such that the passage of native fish and other stream life is not impeded.

3.5.16 Mahinga Kai

Mahinga kai was, and is, central to the Ngāi Tahu ki Murihiku way of life. The collection and processing of mahinga kai is an important social and economic activity. Tangata whenua aspirations and expectations for mahinga kai are a common kaupapa throughout this plan. Mahinga kai is about mahi

ngā kai – it is about places, ways of doing things, and resources that sustain the people. The loss of mahinga kai is attributed to habitat degradation, resource depletion, legislative barriers that impede access, changes in land tenure that affect ability to access resources and the introduction of predators that have severely reduced the traditional foods of Ngāi Tahu.

3.5.16.2 *Mahinga Kai*

Work towards the restoration of key mahinga kai areas and species, and the tikanga associated with managing those places and species.

3.5.16.4 *Mahinga Kai*

Consider the actual and potential effects of proposed activities on mahinga kai places, species and activities when assessing applications for resource consent.

3.5.17 *Ngā Pononga a Tāne a Tangaroa – Biodiversity*

Tāne and Tangaroa are the two atua who are responsible for all living things in the environment, or biodiversity. The protection of indigenous biodiversity is an important value for Ngāi Tahu ki Murihiku. Indigenous species, and the habitats that support them, must be protected for future generations. In many parts of the takiwā, where land use is dominated by agriculture and forestry, the impact of human activity on indigenous species has been significant.

An important focus for Ngāi Tahu ki Murihiku is finding ways to protect, maintain and improve habitat for all biodiversity, be it in water, riparian margins, native bush or wetlands.

3.5.17.1 *Ngā Pononga a Tāne a Tangaroa – Biodiversity*

Use planning, policy and resource consent processes to promote the protection and, where necessary, enhancement of native biodiversity of Murihiku, specifically:

- a. enhancement and restoration of degraded areas

3.5.17.3 *Ngā Pononga a Tāne a Tangaroa – Biodiversity*

For Ngāi Tahu ki Murihiku, all species are taonga, whether weta, snail or kiwi, and the effects of an activity on species must consider all species equally.

3.5.17.3 *Ngā Pononga a Tāne a Tangaroa – Biodiversity*

Make full use of the knowledge of tangata whenua with regards to indigenous biodiversity, and the value of such knowledge in understanding how to protect and enhance biodiversity.

3.5.20 *Freshwater Fisheries*

Fish are of great cultural, social and economic significance to Ngāi Tahu ki Murihiku. Fish from Murihiku rivers formed an essential part of the Ngāi Tahu economy prior to the Treaty. The importance of such

fisheries remains today. However, issues such as poor waterway health and private land ownership often impede the ability of tangata whenua to access and use customary fisheries. Culturally important species found in Murihiku rivers include tuna, inanga, kanakana, kōura, kōkopu and parakaki.

3.5.20.1 Freshwater Fisheries

All Ngāi Tahu Whānui, current and future generations, must have the capacity to access, use and protect native fisheries, and the history and traditions that are part of customary use of such fisheries, as guaranteed by the Treaty of Waitangi.

3.5.20.2 Freshwater Fisheries

Advocate for the protection, restoration and enhancement of waterways, riparian margins, and wetlands as a means of protecting and enhancing freshwater fishery values.

3.5.20.5 Freshwater Fisheries

Avoid compromising freshwater fishery values as a result of diversion, extraction or other competing use for water, or as a result of any activity in the bed or margin of a lake or river.

3.5.20.6 Freshwater Fisheries

Ensure that all native fish species have uninhibited passage from the river to the sea at all times, through ensuring continuity of flow ki uta ki tai.

3.6.1.1 General Policy for Southland's Coastal Environment

Ensure the land, water and biodiversity at the interface of Southland's coastal environment are managed in an integrated water through careful planning and policy instruments which avoid compartmentalising the natural environment.

3.6.2.1 Coastal Land Use and Development

Require that all decision related to coastal land use and development activities within Southland's coastal environment recognise and give effect to the spiritual and historical association of Ngāi Tahu ki Murihiku with the coastal environment.

3.6.2.2 Coastal Land Use and Development

Ensure consistency with the policies outlined in the New Zealand Coastal Policy Statement, with respect to protection, development and use of Southland's Coastal Environment.

3.6.2.15 Coastal Land Use and Development

Avoid adverse effects on mahinga kai resources and places and other areas of high cultural significance as a result of coastal protection works.

3.6.2.22 *Coastal Land Use and Development*

Support the protection and restoration of coastal wetland ecosystems.

3.6.3.4 *Structures in the Coastal Marine Area*

Avoid the placement of structures in the coastal marine environment that will have significant affects on the foreshore and seabed, coastal water quality, mahinga kai, kaimoana, and will not be compatible with the coastal environment of adjacent lands.

3.6.3.14 *Structures in the Coastal Marine Area*

Avoid development on known tauranga waka, cultural, archaeological and mahinga kai sites.

O te Wai Coastal Environment

The intrinsic values of Southland's coastal environment provide a strong spiritual and cultural connection for Ngāi Tahu ki Murihiku. O Te Wai not only includes the freshwater elements of water but extends to include O Te Moana – the sea, and the inherent connection between these two waters.

Ngāi Tahu hold water in the highest esteem because the welfare of the life that it contains determines the welfare of the people reliant on that resource (Te Whakatau Kaupapa o Murihiku 1997, p.36). The knowledge gained by local Māori in respect to harvesting methods and the understanding of breeding cycles, migration times and feeding habits of species are imperative in understanding how to manage, enhance and protect our coastal resources.

This section identifies the connection between freshwater and seawater and extends to include issues relating to management of the seaward coastal environment.

Mahinga Kai and Biodiversity Coastal Environment

For Ngāi Tahu, fish were and continue to be of great cultural, social and economic significance. The collection and processing of mahinga kai includes the places, ways of doing things and the resources that sustain cultural well-being. Traditional foods and their maintenance are essential to continued health and well-being.

3.6.13.2 *Coastal Ecosystems*

Advocate protection of species located in the coastal environments that are of cultural importance to ensure continued well-being.

3.6.13.5 *Coastal Ecosystems*

Provide and recognise for the strong cultural links with coastal landscapes and biodiversity held by Ngāi Tahu ki Murihiku.

3.6.13.6 *Coastal Ecosystems*

Avoid changes to coastal landscapes and biodiversity which have detrimental impacts on Ngāi Tahu ki Murihiku relationships and associations with coastal land, water, wāhi tapu and wāhi taonga areas.

3.6.13.7 *Coastal Ecosystems*

Recognise for the importance of coastal wetland areas as mahinga kai communities and, where appropriate, expand or create new coastal wetland areas.

3.6.13.10 *Coastal Ecosystems*

Advocate for protection and methods of enhancement of threatened coastal species, particularly those of cultural significance.

Activities upstream of and within the Coastal Marine Area



Appendix 6

Policy – Leasehold Land Management Policy



Policy – Leasehold Land Management Policy

This Leasehold Land Management policy is to set out the objectives and requirements for the management of Council’s leasehold land portfolio and the surpluses and reserves generated from the portfolio.

NB: This policy replaces former policies entitled:

- Leasehold Land Management Policy
- Use of Surplus Land Income Policy

1. Contents

1. Contents
2. Objectives – Leasehold Land Management
3. Requirements – Leasehold Land Management
4. Objectives – Surpluses/Reserves
5. Review

Policy No.	Policy Sponsor	Approval Date and Date of Next Scheduled Review	Approved By	MORF Reference	Related Standards
B19.4	Executive	Approved – February 1994 Reviewed – 1999 Reviewed - 2005 Reviewed – 11 April 2007 Reviewed – 30 July 2021 Reviewed – 1 June 2022	Council	A658715	<ul style="list-style-type: none"> ▪ Council’s Financial Strategy ▪ Council’s Revenue & Finance Policy



2. Objectives – Leasehold Land Management

The objectives for managing the portfolio are to ensure that:

- the primary use of the leasehold land is for flood management and all other uses will be subservient to this use;
- the leasehold land represents a significant resource for the benefit of the community of Southland. Council may consider a range of uses that meet the various objectives of Council;
- without compromising other objectives and acknowledging that most of the leasehold land is flood prone, Council will seek to maximise the operating surplus from the portfolio. The leasehold land portfolio generates surplus funds that are available to support approved activity that benefits the specific catchment.
- the leasehold land is operated in a manner that supports the environmental sustainability of the property, complies with good management practice to reduce contaminant loss, and protects and enhances biodiversity;
- Council's operation of the leasehold land portfolio is managed in a professional, commercial and transparent manner;
- Council is a good landlord in all regulatory aspects and in all moral aspects where tenancy regulations do not apply;
- Council acknowledges good lessees, with proven track records, by considering extended lease terms;
- all health and safety requirements are managed to a standard that, as a minimum, are in accordance with the law.
- Council maintains insurance policies to protect Council from the financial consequence of damage to its assets, caused by natural disasters including floods;
- where insurance is not possible Council will seek to maintain reserves, from prior year surpluses, to cover the maximum probable loss relating to a natural disaster, including floods. The reserve amount maintained is termed the Reserves Minimum Holding, (which is calculated from an estimate of the maximum probable loss of the uninsured fencing and water schemes within each catchment area).

3. Requirements – Leasehold Land Management

Council will maintain an operating manual that sets out the operational aspects of the management of the leasehold land portfolio, to achieve the above objectives.

The operating manual will include the following:

- background of the property purchases
- property management guidelines
- lease operating guidelines


- financial management guidelines
- risk management strategy
- surplus/reserve application process
- reporting requirements.

4. Objective – Surpluses/Reserves

The surpluses generated from operations are held in leasehold land reserves and are to be managed in the following way:

The surpluses/reserves are for the following purposes:

- (1) to fund natural disaster damage repairs (and/or insurance excesses) for the leasehold land assets. A minimum holding will be managed within the reserves that equates to the maximum probable loss resulting from a disaster. For clarification, the reserve will generally not be used to fund general catchment disaster repairs, such as repairs to flood banks and other infrastructure, as Council has insurance and disaster reserves for this purpose.
- (2) to fund approved capital works and major maintenance programmes for existing leasehold land and buildings.
- (3) to fund approved activities that are consistent with the objectives of the leasehold land management. The funded activities will be within the catchment the leasehold land is situated. These activities include:
 - (a) additional land purchases
 - (b) new flood protection schemes
 - (c) improvements and major maintenance to existing flood protection schemes
 - (d) preventative flood management and river protection work
 - (e) biodiversity initiatives
 - (f) other land management activities that address water quality, including riparian planting and fencing.
 - (g) approved grants and contributions applied for by groups within the catchments.
 - (h) Any other approved Council initiatives which meet the principles relating to the surpluses/reserves.
- (4) while it is accepted that leasehold reserves will generally be used within the catchment where the funds were raised, the Reserves funds belong to Council. Council will consult with the liaison catchment committees where Council has identified an initiative where collaborative funding from one or more both within and outside the immediate catchment area would be beneficial. However, the final decision on the attribution of Reserve funds rests with Council. When considering the use of the funds, Council will consider the following principles:
 - at Council's discretion, any reserves held above the minimum holding and leasehold land capital works and major maintenance programmes will be considered available reserves and available for use.
 - the available reserves will be available to fund Council approved activities in the catchment within which they were generated.

- 
- In approving activities Council will consider the principles within its Revenue and Finance Policy and generally not fund activities where there are clearly identified beneficiaries or exacerbators and therefore other user pays funding sources available.
 - the surpluses are generated from the land and should be used to fund activity on the land or other catchment based enhancements.
 - the use of the available reserves will be considered expenditure and will generally not require repayment.
 - the available reserves may fully fund, partly fund or service loans relating to any approved initiative or activities.

5. Review

This policy will be reviewed as deemed appropriate by the Regional Services Committee in consultation with the Catchment Liaison Committee Chairs, or at least once every three years.

Appendix 7

Draft consent conditions

Coastal Permit

Under Section 104B of the Resource Management Act 1991, a resource consent is granted by the Southland Regional Council to **ES Catchment Management Division - Southland Regional Council of Private Bag 90116, Invercargill 9840** from **Date Consent Granted**.

Please read this Consent carefully, and ensure that any staff or contractors carrying out activities under this Consent on your behalf are aware of all the conditions of the Consent.

Details of Permit

Purpose for which permit is granted:	To occupy part of the Coastal Marine Area with a weir and tide gates.
Location	- site locality - map reference
	Titiroa Stream, adjacent to Middleton Road South, Fortrose NZTM2000 1,276,640 4,836,895 (tidegates) NZTM2000 1,276,590 4,836,885 (weir)
Legal description at the site:	Section 1 SO 11258, Part Lot 1 DP 11173, Road Reserve and Riverbed

Expiry date: **30 August 2029**

Conditions

- This consent authorises:
 - the occupation of the Coastal Marine Area with a weir structure and a tide gate structure, as shown in Appendix 2, approximately 155 metres north of the Tokanui Gorge Road Highway bridge over the Titiroa Stream; and
 - The damming and diversion of water by the weir and tide gate structures.
- The consent holder shall, by 31 December 2025, enhance inanga spawning habitat in the vicinity of the tidegates as follows:
 - All inanga spawning habitat enhancement shall follow the enhancement guidelines in 'A guide to restoring inanga habitat'¹

¹ Richardson, J., & Taylor, M. J. (2002). A guide to restoring inanga habitat. NIWA Science and Technology Series No. 50 (Vol. 2002).

- (b) The consent holder shall enhance approximately 12.4 ha of currently low quality or unsuitable spawning habitat upstream of the tidegates, within 500 metres of the salt wedge. The enhancement shall include:
 - (i) shaping of banks to provide a suitable slope and riparian planting and maintenance of suitable eco-sourced riparian species for inanga spawning
- (c) The consent holder shall provide approximately 2.46 ha of enhanced spawning area within the drains on the applicant's property downstream of the tide gate (but excluding areas of natural wetlands) as described in the Mitigation Options report². The works shall include:
 - (i) removal or reduction of barriers to coastal waters moving up the drains
 - (ii) battering to enhance the stream bank slope area; and
 - (iii) planting and maintaining suitable eco-sourced riparian species for inanga spawning
- (d) The consent holder shall enhance both inanga spawning habitat and indigenous fish habitat along approximately 450 metres of the tributary of the Titiroa Stream that joins the Titiroa Stream on the left bank, about 145 metres downstream of the tidegates. The works shall include:
 - (i) As far as practicable removing, or otherwise reducing or mitigating, barriers to fish passage
 - (ii) Confirming the extent the saltwater wedge penetrates upstream along the tributary
 - (iii) Creating a sloped riparian buffer,
 - (iv) Fencing to exclude stock,
 - (v) Riparian planting to provide shade, temperature control and humidity, and
 - (vi) Instream habitat enhancement (removal of sediment, installation of instream habitat – boulders, logs etc.).
- 3. (a) The consent holder shall enhance and protect the coastal wetland habitat on its property in the lower Titiroa Stream catchment by:
 - (i) Excluding stock from the wetland;
 - (ii) Surveys of pest animals and plants in the wetland at least once every two years;
 - (iii) Trapping/predator control program, and
 - (iv) Management of pest plants
- (b) For the purposes of this condition:
 - (i) The lower Titiroa Stream catchment is downstream of the Tokanui Gorge Road Highway bridge.
 - (ii) The coastal wetland areas to be enhanced are as identified in 'High Value Area assessment report, Site name: Lower Titiroa Wetland Reserve. HVA site ID ES MTRA03' (2010), R. Mitchell, Kunzea Consultants Ltd³.
- 4. The consent holder shall prepare, and thereafter operate in accordance with, a Riparian Management Plan for the enhanced inanga spawning habitat areas. The plan shall provide for the ongoing maintenance of the enhanced areas for the purposes of providing inanga spawning habitat, and include exclusion of stock, and management of pest animals and plants.

https://niwa.co.nz/sites/default/files/a_guide_to_restoring_inanga_habitat.pdf

² Environment Southland electronic filing reference A851628

³ Appendix C of the resource consent application document A639979

- (a) A copy of the Riparian Management Plan shall be provided to the Consent Authority (email: escompliance@es.govt.nz) within one calendar month of completion of the inanga spawning habitat enhancement works. Thereafter, if there is an amendment to the plan, the updated plan shall be provided to the Consent Authority within 10 working days.
- 5. The consent holder shall monitor the effectiveness of the inanga spawning enhancement by monitoring:
 - (a) Inanga spawning habitat surveys of the enhanced areas every five years
 - (b) Inanga spawning surveys of the enhanced areas every five years
 - (c) Inanga spawning success surveys of the enhanced areas once each year.

This monitoring was suggested in the Mitigation Options report but further information is required to flesh out this condition.

- 6. The consent holder shall monitor effects of the tidegates on fish passage by conducting fish surveys every two years.
 - (a) These surveys shall be consistent with the survey described in Section 3.6 of the Mitigation Options report⁴ with regard to technique and locations and, as far as practicable, flow and seasonal conditions.
 - (b) The consent holder shall report the results of each survey to the Consent Authority (email: escompliance@es.govt.nz) by 1 July of that year.
 - (c) The report shall include statistical analysis of whether the tidegates are affecting fish populations upstream compared to downstream, and provide comment on the ecological significance of any difference.
- 7. The consent holder shall monitor dissolved oxygen concentrations, salinity and water temperatures in the Titiroa Stream upstream and downstream of the tidegates and weir.
 - (a) The monitoring period shall not be less than 14 continuous days.
 - (b) The monitoring is subject to the following:
 - (i) the monitoring shall occur during either summer 2024/25 or summer 2025/26, unless repetition is required under (iii) during summer 2026/27. For the purposes of this condition, summer is the period 1 December to 28 February.
 - (ii) the flow in the Mokoreta River at Environment Southland's McKays Road monitoring site shall be at or below 3,000 litres per second when the monitoring commences.
(Note: this is approximately the Q₈₀ flow for the Mokoreta River and it will be indicative of similar low flow conditions in the Titiroa Stream)
 - (iii) In the event that flow in the Mokoreta River at Environment Southland's McKays Road monitoring site rises above 5,950 litres per second (5.95 cumecs), the monitoring shall be suspended and a further period of monitoring shall be carried out in accordance with these conditions. The Consent Holder shall notify the Consent Authority in writing (email: escompliance@es.govt.nz) if a further period of monitoring is to occur.
(Note: 5.9.5 cumecs is median flow in the Mokoreta River at McKays Road)
 - (c) The monitoring shall occur at locations approximately:

⁴ Environment Southland electronic filing reference A851628

- (i) In the Titiroa Stream 20 metres either side of the weir
 - (ii) In the tidegate channel at the inlet and outlet to the Titiroa Stream
 - (iii) In the Titiroa Stream 120 metres upstream and downstream of the weir.
 - (d) Dissolved oxygen concentration, salinity and water temperature shall be determined by field measurements using equipment that has been calibrated to ensure accuracy.
 - (e) Measurements at each location shall be taken and recorded at least once every fifteen minutes.
 - (f) The consent holder shall, by 1 July 2026 (or 1 July 2027 if Condition (b)(iii) applies), provide a report to the Consent Authority (email: escompliance@es.govt.nz) on the water quality monitoring that summarises the results and includes graphs showing comparisons at each site across the monitoring period.
 - (i) In the event that the monitoring demonstrates that there is an adverse effect on dissolved oxygen concentrations that may impact on species present in the stream, the report shall include an assessment of measures to avoid or mitigate the adverse effect.
8. Within 50 working days of the commencement of this resource consent the consent holder shall install, or otherwise have in place, and maintain barrier signage or symbols on the upstream side of the weir to indicate the presence of a barrier to navigation.
- (a) The symbol or signage shall be brightly coloured and include reflective elements, and shall be visible from at least 50 metres upstream during daylight hours.
9. The consent holder shall:
- (a) at all times during the term of this consent maintain the structures in good repair, appearance and condition.
Note: Rule 11.4.1 of the Regional Coastal Plan permits maintenance and repair of structures, subject to conditions.
 - (b) notify the Consent Authority (escompliance@es.govt.nz), of any alteration to the structure which is carried out without resource consent pursuant to a permitted activity rule in an operative regional plan.
Note: Rule 11.4.2 of the Regional Coastal Plan permits alteration of structures, subject to conditions. Alterations not specifically permitted by a regional rule, regulations or legislation will require resource consent.
10. In the event of a discovery, or suspected discovery, of a site of cultural importance (Waahi Taonga/tapu), the Consent Holder shall immediately cease operations in that location and follow the process outlined in Appendix 1 to this consent. Operations may recommence at a time as agreed upon in writing with the Consent Authority.
11. Prior to the expiry (including the expiry date) or cancellation of this consent, the Consent Holder shall, if required by the Consent Authority to do so, remove the structure entirely from the site and restore the site to its original condition, unless the Consent Holder has lodged a resource consent application with the Consent Authority to replace this resource consent.
12. The Consent Holder shall, each year, pay to the Consent Authority a coastal occupation charge. The sum payable in the first year of this consent (or the proportion thereof for which the consent is current) is \$1,004.35 plus GST, and shall be payable in advance on invoice.

Advice Note: A coastal occupation charge applies to this permit. The appropriate coastal occupation charge is in accordance with the Regional Coastal Plan for Southland, 2013, or any subsequent publication, and is adjusted for inflation in accordance with the Consumer Price Index each financial year, commencing 1 July, through the Annual Plan or the Long-Term Plan.

The coastal occupation charge covers occupation of the coastal marine area by a weir of approximately 700 m² and a tidegate structure of approximately 18 m².

13. The Consent Authority may, in accordance with Sections 128 and 129 of the Resource Management Act 1991, serve notice on the Consent Holder of its intention to review the conditions of this consent during the period 1 February to 30 September each year, or within two months of any enforcement action being taken by the Consent Authority in relation to the exercise of this consent, for the purposes of:
- (a) determining whether the conditions of this permit are adequate to deal with any adverse effect on the environment, including cumulative effects, which may arise from the exercise of the permit, and which it is appropriate to deal with at a later stage, or which become evident after the date of commencement of the permit; or
 - (b) ensuring the conditions of this consent are consistent with any National Environmental Standards Regulations, relevant plans and/or Policy Statement; or
 - (c) amending the monitoring programme to be undertaken; or
 - (d) adding or adjusting compliance limits; or
 - (e) requiring the Consent Holder to adopt the best practicable option to remove or reduce any adverse effect on the environment arising as a result of the exercise of this permit.

for the **Southland Regional Council**

Lacey Bragg
Consents Manager

Notes

1. *Consent may be required to maintain, repair, remove, extend, demolish, alter or upgrade any structure. Please contact the Consent Authority (ph. (03) 211 5115, or email esconsents@es.govt.nz) for advice on any consent requirements.*
2. *Neither the issuing of this consent nor anything contained in it shall affect the liability of the Consent Holder for any injury caused by the structure to any vessel or person through any default or neglect of the Consent Holder.*
3. *The granting of this consent does not absolve the Consent Holder from the responsibility to obtain any approval, permit, licence, concession or consent from any other body.*
4. *In accordance with Section 126 of the Resource Management Act, 1991, this consent may be cancelled by the Consent Authority if not exercised for a continuous period of 5 years or more.*
5. *The Consent Holder shall pay an annual administration and monitoring charge to the Consent Authority, collected in accordance with Section 36 of the Resource Management Act, 1991. This charge may include the costs of inspecting the site.*

Appendix 1 Protocol in the event of a discovery, or suspected discovery, of a site of cultural importance (Waahi Taonga/Tapu)

1. Kōiwi tangata accidental discovery

If Kōiwi tangata (human skeletal remains) are discovered, then work shall stop immediately and the New Zealand Police, Heritage New Zealand (details below) and Te Ao Marama Inc (Ngai Tahu (Murihiku) Resource Management Consultants) shall be advised. Contact details for Te Ao Marama Inc are as follows:

Te Ao Marama Inc
Suite 3, 98 Yarrow Street,
Invercargill 9810
Phone: (03) 931 1242

Te Ao Marama Inc will arrange a site inspection by the appropriate Tangata Whenua and their advisers, including statutory agencies, who will determine how the situation will need to be managed in accordance with tikanga māori.

2. Archaeological Sites

Archaeological sites are protected under the Heritage New Zealand Pouhere Taonga Act (2014), and approval is required from Heritage New Zealand before archaeological sites can be modified, damaged or destroyed.

Not all archaeological sites are known or recorded precisely. Where an archaeological site is inadvertently disturbed or discovered, further disturbance must cease until approval to continue is obtained from Heritage New Zealand. As stated above, the New Zealand Police and Te Ao Marama Inc also need to be advised if the discovery includes kōiwi tangata /human remains.

Heritage New Zealand c/o Regional Archaeologist Otago/Southland
PO Box 5467, Dunedin
Phone: (03) 477 9871 Mobile 027 240 8715 infodeepsouth@heritage.org.nz

3. Taonga or artefact accidental discovery

If taonga or artefact material (e.g. pounamu/greenstone artefacts) other than kōiwi tangata is discovered, disturbance of the site shall cease immediately and Southland Museum and Te Ao Marama Inc. shall be notified of the discovery by the finder or site archaeologist in accordance with the Protected Objects Act 1975. All taonga tuturu are important for their cultural, historical and technical value and are the property of the Crown until ownership is resolved.

4. In-situ (natural state) pounamu/greenstone accidental discovery

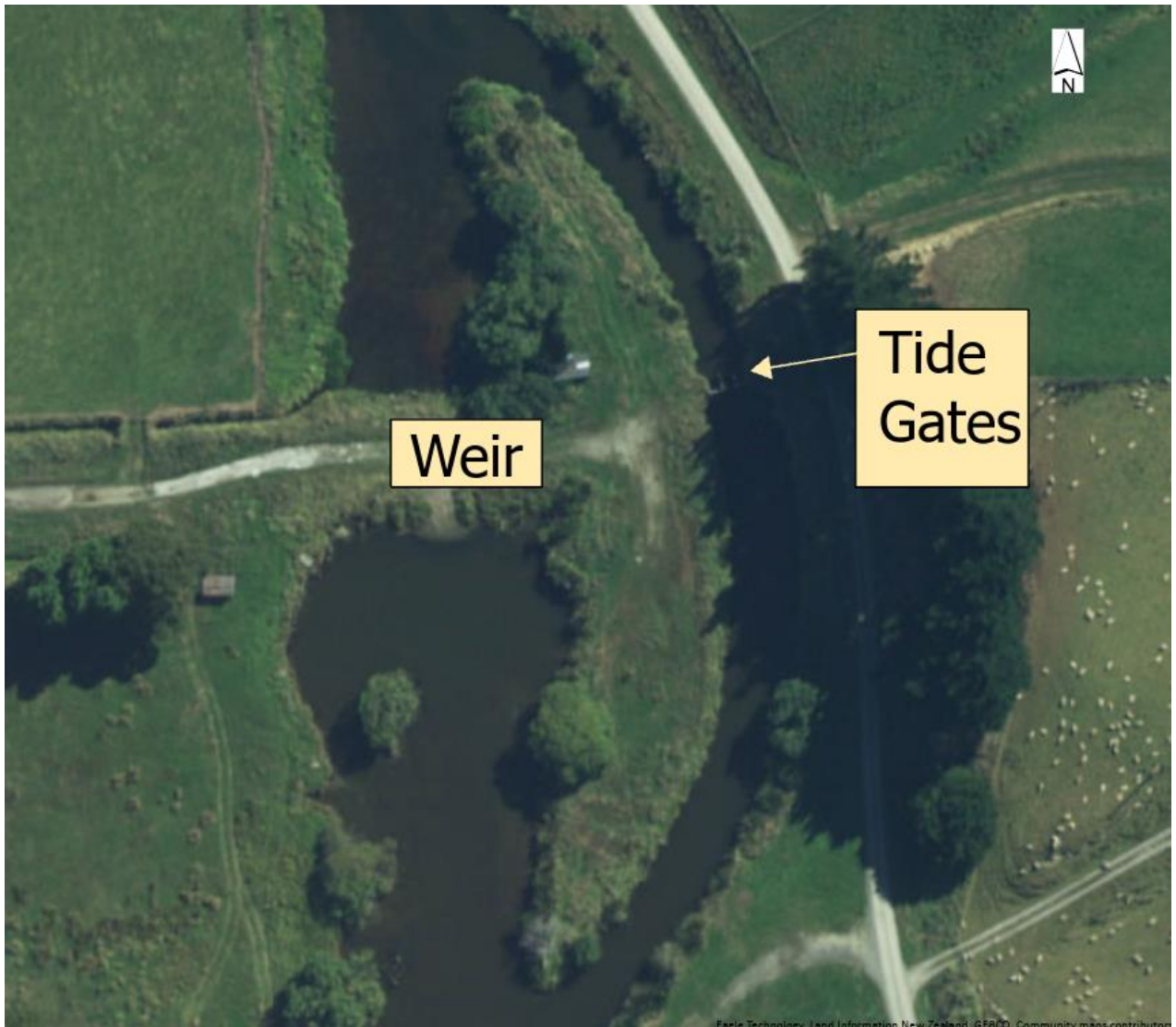
Pursuant to the Ngai Tahu (Pounamu Vesting) Act 1997, all natural state pounamu/greenstone in the Ngai Tahu tribal area is owned by Te Runanga o Ngai Tahu. Ngai Tahu Pounamu Management Plans provide for the following measures:

- any *in-situ* (natural state) pounamu/greenstone accidentally discovered should be reported to Te Runanga o Ngai Tahu staff as soon as is reasonably practicable. Te Runanga o Ngai Tahu staff will in turn contact the appropriate Kaitiaki Papatipu Runanga;
- in the event that the finder considers the pounamu is at immediate risk of loss such as erosion, animal damage to the site or theft, the pounamu/greenstone should be carefully covered over and/or relocated to the nearest safe ground.

The find should then be notified immediately to the Programme Leader – Ohanga, at Te Rūnanga o Ngāi Tahu. Their details are as follows:

Te Rūnanga o Ngāi Tahu, c/o Programme Leader - Ohanga
Te Whare o Te Wai Pounamu
15 Show Place, P O Box 13-046, Otautahi/Christchurch 8021
Phone: (03) 366 4344 Web: www.ngaitahu.iwi.nz

Appendix 2: Identification of Weir and Tide Gate structures



Appendix 3: Tributary sites referenced in the Titiroa Tide Gate - Mitigation Options Report 2002

