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9 November 2021

The Consents Manager
Environment Southland
Private Bag 90116
Invercargill 9840

Dear Sir,

Ewen Pirie for the Lake Waituna Control Association - application for a resource consent to open Waituna Lagoon to sea.

1. The application

On behalf of Ewen Pirie and the Lake Waituna Control Association (LWCA), please find enclosed an application for the following consents (* indicates the rule is under appeal):

1. a water permit to divert the water in Waituna Lagoon to the sea. The status of the activity is as follows:
   - Regional Water Plan, Rule 20(b) – **discretionary**;
   - proposed Southland Land & Water Plan, Rule 51(d)* – **discretionary**; and
   - Resource Management (National Environmental Standards for Freshwater) Regulations 2020, Clause 52(2), which only applies to Hansens Bay - **non-complying**;
2. a land use consent to disturb the bed of Waituna Lagoon. The status of the activity is as follows:
   - Regional Water Plan, Rule 47 – **discretionary**;
   - proposed Southland Water & Land Plan - either Rule 71(a) – **discretionary,** or **discretionary** under Section 87B(1)(a) of the Resource Management Act as an unclassified activity; and
   - Resource Management (National Environmental Standards for Freshwater) Regulations 2020, Clause 52(1) – **non-complying**; and
3. coastal permit to open Waituna Lagoon in order to divert and discharge water to the sea from the following locations:
   - the gravel barrier at Walker's Bay between NZTM 1262291E, 4831330N and 1261460E, 4831000N;

- the gravel barrier at Hansen's Bay between NZTM 1265305E, 4832570N and 1265405E, 4832605N;
- the gravel barrier on the coast opposite Waghorns Bridge between NZTM 1267033E, 4833144N and 1267421E, 4833249N; and
- the gravel barrier at the eastern end of the lagoon between NZTM 1267791E, 4833340N and 1268092E, 4833413N.

The lagoon opening activity is **discretionary** under the Regional Coastal Plan, Rule 7.4.2.2.

The statutory application form is attached as Appendix 1. Consent is sought for a term of 20 years. Information to support the term is provided later in Section 6.11 of this application.

The consents sought are to replace consents AUTH-20146407-01, AUTH-20146407-02 and AUTH-20146407-03, which are due to expire on 14 February 2022. **As the application is in the 3 – 6 month period before expiry, it is requested that the Council exercise its discretion under section 124 of the Resource Management Act to allow the existing consent to continue until a new one is granted.**

The three activities at each site are inextricably linked and one cannot happen without the other. However, in regard to the sites proposed, it is only one on each opening occasion, not multiple sites at once. Bundling the activities means the overall status of the application is non-complying, however, it is noted that the degree of non-compliance with the Resource Management (National Environmental Standards for Freshwater) Regulations 2020 (NES-F) is very minor. This point is discussed further in Section 7 below.

The main rule is Rule 7.4.2.2 of the Regional Coastal Plan (RCP). Because it is specific to the opening activity, all of the various activities that it comprises could arguably be considered to be included as part of it. The application under the rules in the Regional Water Plan (RWP) and the proposed Southland Water & Land Plan (PSWLP) is in the nature of a *pro forma* application, and included for completeness and certainty.

Walkers Bay is the most commonly used site and Hansens Bay has been used occasionally when conditions suit. The other two sites have been used historically but have not been used for many years. However, they are included because they provide options for further investigations into the best way to manage the hydrology of the lagoon. For example, one option that has been mentioned is re-closing the lagoon to avoid long open periods over summer. These sites are closer to the road access so heavy machinery would require less transporting along the fore-dune and may be more suitable for closing. These two additional sites are included but are not discussed further in this application. The effect of using them is much the same as the other sites.

Because it is only the proposed Hansens Bay opening site that is within the 100m setback of a wetland, the requirements of the NES-F only apply to that site. The other sites are more that 100m from any wetland (see Maps 3-5 in Appendix 2). It is noted also that while Waituna Lagoon is in the Waituna

Wetland Scientific Reserve, it is not part of the wetland or a wetland itself. The wetlands are most of the land that surrounds the lagoon on which there is vegetation that is typical of a wetland environment.

In regard to the disturbance of the bed of the Waituna Lagoon, the PSWLP has no "catch-all" rule for other bed disturbance activity. The disturbance is similar in nature to what is described in Rule 71, but there is no existing channel there at the time of opening. If Rule 71 is not applied, then the activity has no status under the Plan and is therefore classified under the provisions of the Act. However, regardless of what rule in either Plan or what provision of the Act is relied upon, the activity is discretionary.

The LWCA is seeking consents in the same terms as the current consents. While the group represents farmer interest in managing the lagoon, it is aware of its ecological and cultural significance, and of the lagoon health issues that threaten its integrity and mauri, which is of great importance to Ngāi Tahu. LWCA is also aware that a higher opening level is proposed by The Whakamana Te Waituna Trust (referred to as "The Trust"), but it has lodged this application to, firstly, enabled the existing consent to continue while this one is being processed, and secondly, to preserve its position in regard to the lagoon opening so that it can try to reach an agreement with other interests.

2. Supporting documents

The main reports about the Waituna Lagoon that are relevant to opening it to the sea and have been referenced for the preparation of this application, are as follows (unless noted otherwise, the reports are not appended but can be provided on request):

A. "Review of conditions for opening Waituna Lagoon – Supporting information" - prepared for the Whakamana Te Waituna Trust, July 2021 (copy attached as Appendix 6);

B. "Waituna Science Advisory Group – Maximum Lagoon Trigger Level" – September 2017 (copy attached as Appendix 5);

C. "Anthropogenic impacts on Waituna Lagoon: Reconstructing the environmental history" – Sarai Cosgrove, 2011;

D. "Waituna Lagoon level impacts on land drainage and inundation – Investigation stages 1 and 2"- prepared by NIWA for the Department of Conservation, February 2016;

E. "Waituna Lagoon Modelling: Developing quantitative assessments to assist with lagoon management"- ERI report number: 004, prepared by the Environmental Research Institute for Environment Southland, November 2004

F. "Ecological Guidelines for Waituna Lagoon" – prepared by the Lagoon Technical Group for Environment Southland, December 2013;

G. "Waituna Lagoon Mouth Closure – Summary Report"- prepared by Greg Larkin for Environment Southland, March 2013; and

H. "Social Assessment of the Waituna Catchment, Southland – anticipating the impacts of nutrient limits for farming systems" - prepared for DairyNZ, April 2015.

Where these reports are referred to and/or relied on, it will be noted. Other references were used as necessary, and these are recorded in footnotes.

3. Site Description

The Waituna Lagoon is part of the Waituna Wetland Scientific Reserve. It is a reserve of both national and international significance that was designated a Ramsar site in 1976 under the Convention on Wetlands of International Importance (referred to as the Ramsar Convention), and made a scientific reserve in 1983. While the lagoon itself is not a wetland, the extensive margins that are associated with it are significant natural wetlands.

The lagoon itself covers approximately 1,350 ha, and the wetlands an additional 2,200 ha. The Waituna system borders the wetlands of the Awarua Plains, an area that, in 2008, was also recognised under the Ramsar Convention.

The coastal water in Toetoes Bay is classified as People & Aquatic Life under the RCP, the standards for which are attached in Appendix 3.

The natural character and landscape values of this area are described as follows:

> *The dominant landscape elements in this reach are the extensive shingle beaches, gravel bars, dunelands and their associated native vegetation, and the adjoining peat bogs, lagoons, estuaries, salt marshes and tidal flats, most of which are largely unmodified. The lack of modification results in the area having very high natural character of a type not found elsewhere in the region.* [Section 3.10.3, Regional Coastal Plan]

The Waituna wetland, including the lagoon, is a Statutory Acknowledgement Area under the Ngāi Tahu Claims Settlement Act 1998. Historically, the area was a significant and reliable food source for various Māori settlements, both permanent and transitory, for some distance around it. The area is still a source of food but the changes over time and the threats to is mauri have had an impact. Most of the flora and fauna in the lagoon and its margins are regarded as taonga.

Aside from being a food source, the area has great cultural significance for Iwi due to their history and use of it. Schedule 73 of the Settlement Act summarises Ngāi Tahu's association with Waituna as follows:

> *The mauri of Waituna 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 area.*

Additional information about the lagoon is available in Sections 2.1 and 2.2 of Reference A, "Review of conditions for opening Waituna Lagoon – Supporting information" (see Appendix 6).

4. Description of the Activity

The openings recorded since 1972 are set out in the table in Appendix 4. It is 49 years of records but some information was missed in the late 1990's. The lagoon has been opened approximately 61 times since 1972 but the records are incomplete. Most openings, approximately 70%, have occurred at a water level of 2.2m or higher on the Waghorn's Road bridge. Only two have occurred when the level was less than 2.0m.

The duration of each opening varies significantly and is unpredictable. Just over 50% are less that 100 days and about 25% exceed 200 days. What is stated in some of the reports is that openings in late spring/early summer do tend to stay open over the whole of summer, which is an issue for macrophyte growth, a matter that is discussed later in this application.

On the current consent, the starting point for lagoon openings is 2.0m, which can be carried out during the winter months, or early in September if the lagoon has been at or above that level for 7 or more days continuously. Outside of that period, the minimum opening level is 2.2m and above. The current consent provides for openings at different levels for particular circumstances relating to ecological triggers.

Copies of the consents are attached in Appendix 8.

The lagoon is generally opened at least once per year, sometimes twice, and there have also been years where opening has not been required. The lagoon level depends on rainfall, particularly larger than normal events. The right sea conditions are required to carry out an opening, which can limit opening activity. The LWCA is aware of the water quality and ecological issues in the lagoon, and is amenable to consent conditions that address these issues in a way that takes into account the need for land drainage.

The openings are created using excavators (generally two in more recent times) that are "walked" down along the foreshore from the eastern end of the lagoon, starting from Talls Road. Depending on where the opening is to be made, the trip down can take approximately 2 hours. The machines go in early, open the cut and return the same day, a total of 6-7 hours. No storage of machinery and equipment is required, nor is there any refuelling or maintenance of the machines while on the foreshore.

The current consent held by the LWCA authorises opening the lagoon through the sand and gravel barrier to the sea at either Walkers or Hansens Bays. The main reason for the applicant to open the lagoon is to facilitate drainage on the farm properties adjoining the wetlands and lagoon. Openings are restricted as described above.

However, the consent also provides for openings to be made at 1.5m to protect the health of the lagoon. Such openings would be made on the advice of the Technical Advisory Group for the lagoon.

When sea conditions are suitable, the lagoon barrier is breached using excavators to start the outward flow to the sea. Once the outward flow starts, the opening is enlarged by that flow, transporting material from the barrier back to the sea. The conditions have to be suitable to sustain an opening for sufficient time for the lagoon to drain to the desired level.

The time that the lagoon stays open varies with the sea conditions, which can also relate to the time of year it is opened. Recorded opening durations[1] have varied significantly, with the longest on record being nearly 2.5 years (this result is an outlier – the next longest opening is less than 1 year), and the shortest being just over 1 month.

The closing process for the lagoon is documented in Reference F, "Waituna Lagoon Mouth Closure – Summary Report". The report concludes that "… the two most influential conditions required for Waituna Lagoon mouth closure are wind and tidal phase." Catchment rainfall also influences whether or not a closure occurs. About a week of the right conditions is required for a closure to be completed, though some over-topping of the newly re-formed barrier can occur until it is higher than the spring tides.

In regard to the opening location, there are some differences between Walkers Bay and Hansens Bay. The former, as can be seen Map 3 in Appendix 2, consists of a long spit, approximately 1 km of which has been identified as the area in which an opening can occur. Hansens Bay, however, only has a narrow stretch of less than 100m where the opening can be created.

Historically, Walkers Bay has been the preferred opening site so the effects of using the Hansens Bay site are less well known. While it did not recommend use of Hansens Bay, the Lagoon Technical Group, in Reference E, "Ecological Guidelines for Waituna Lagoon" (page 44), did not want to rule it out because it may result in better outcomes. It simply had not had the opportunity to study openings at that site, so recommended that further experimental openings be carried out to get more information, particularly in regard to opening duration and sediment flushing.

One difference that has been noted by the LWCA is that the lagoon does not drain down to as low a level when opened at Hansens Bay due to a bar in the lagoon restricting flow to it. The difference has not been properly measured but is estimated to be in the order of 0.5m. While that did not pose any particular problem for farmers, i.e. the level was still low enough that drainage was not impeded, it is potentially beneficial for macrophytes in the lagoon due to the greater depth of water retained.

Hansens Bay has therefore been included as a possible opening site so that can be investigated to see whether it is a better option in regard to lagoon health outcomes, and, if so, enable it to be used.

5. Assessment of Environmental Effects

The environmental effects to be considered are as follows:

- effects on overall health of the lagoon, as measured by the indicator targets for lagoon health;
- effects on the wetlands on the margin of the lagoon;
- cultural effects, in particular, any loss of mauri over the lagoon and wetland system;

[1] The record available only starts in 1972, i.e. about 50 years of record.

- effects on water quality, both in the lagoon and in the sea as a result of the discharge;
- landscape and natural character effects; and
- positive effects/benefits of opening the lagoon.

Environmental effects as a direct result of opening the lagoon can vary in regard to timing and significance, and can be both positive and adverse. For example, opening the lagoon is beneficial for flushing of nutrients and sediment, and for providing access for migratory fish species and others that use the lagoon for part of its life cycle. Conversely, allowing the lagoon to remain open for a prolonged period over the summer months can adversely effect macrophytes, particularly *Ruppia sp*., that are important for lagoon health.

Most of the critical parts of the effects assessment rely on the various reports on researching and monitoring of the lagoon, much of which has intensified over the last 10 years when concerns for the health of the lagoon meant that some remedial action had become more urgent. The reports relied upon are all a matter of public record.

5.1 Effects on water quality and the overall health of the lagoon

Opening level for lagoon health

Reference A identifies the two main risks to the ecological health of the lagoon. These are:

- poor water quality, largely due to high nutrient and sediment inputs from the wider catchment; and
- a hydrological regime that has been altered due to a history of opening the lagoon primarily for land drainage.

Opening the lagoon under most conditions would be expected to provide some benefit from the flushing of nutrients and sediment. However, the Trophic Level Index (TLI), used to assess the trophic status of the lagoon, has not improved significantly over the past few years (see Section 5.2, Figure 6 of Reference A). Total nitrogen is significantly lower when the lagoon is open. Total phosphorus is also lower, but not as significantly, perhaps due to its association with sediment that is harder to flush than dissolved nutrients.

The LWCA is seeking a consent with the same conditions as the current consent. The Association has considered the conditions recommended in the Reference A report. It supports the inclusion of conditions providing for lagoon openings under certain conditions to protect water quality in the lagoon and, partially, to enable fish passage. However, it does not support the recommendation that lagoon openings only occur at 2.5m and above "… to enhance ecological health and cultural values."

In 2017, the Waituna Science Advisory Group (SAG) was asked to "… *set a maximum level for managing the ecological health of the lagoon, noting that it can be opened at any level under that if the need arises e.g. to flush nutrients from the lagoon*." The report is Reference B in the list above and is attached as Appendix 5. In the time available, SAG provided an interim recommendation that the opening level should be 2.5m for ecological health.

However, it qualified that recommendation by saying:

> *"The models we used are simple models which illustrate some of the trade-offs and trends expected in relation to raising the trigger level. Some important knowledge gaps remain. Therefore, the SAGs recommendations (below) should be considered interim recommendations, and an adaptive management approach should be utilised when developing a long-term hydrological management plan for the lagoon, informed by good quality monitoring of the lagoons water quality, emergent and submerged plant communities, fish community and other important cultural and ecological values."*

The report stated that having a higher opening water level would potentially have some positive and negative effects on ecological matters. It gave no consideration to effects on drainage of the adjoining farm land, although that was addressed in Reference A.

The concerns that the applicant has in regard to using this report to set a higher opening level are as follows:

i. the report appears to regard the level of 2.5m as a maximum for managing adverse effects on *Ruppia* and other macrophytes, assuming that it would be opened at that point and levels would drop. However, that is not necessarily the case as the lagoon can only be opened in the right conditions. While the current trigger point is 2.0m/2.5m depending on timing, the applicant has not always been able to open the lagoon at that level and it has risen until the right conditions have occurred. The risk is that the lagoon will go higher than 2.5m before it can be opened;

ii. the report acknowledges that the models used are simple ones with some important knowledge gaps, so the recommendations made are interim. SAG also proposes that "… an adaptive management approach should be utilised when developing a long-term hydrological management plan for the lagoon". Setting the limit at the maximum does not provide any scope for adaptive management, particularly in regard to drainage issues.

    Retaining the existing limits enables both scientists and farmers to better understand the effects of a higher level on their respective interests. For landowners, they can assess whether they can manage a short period at a higher level, and also what the impact would be on soil and pasture health; and

iii. the main aim of the higher opening limit, based on Reference A, is to avoid having the lagoon open over the summer period due to the problems that can be caused for water quality and macrophyte health. No other means of either avoiding this happening, or of mitigating the effects if that did happen, appear to have been considered, e.g. alternative conditions or opening at a different location so that the lagoon does not drain completely[2].

This application is for a consent that authorises opening the lagoon when the water level is over 2.0m or 2.2m depending on when it is to be done. At that level, there is the opportunity to apply adaptive management to the interim hydrological management of the lagoon by:

- assessing different options for opening the lagoon in regard to location, water level and frequency; and
- carrying out further research into the effects in the lagoon and on the land when opened at higher levels, and ways those effects can be best mitigated.

Opening level to maintain water quality and avoid algal blooms

In Reference A, Section 6.5, a condition is recommended that provides for opening of the lagoon at any time when the water level is above 1.5m at the Waghorn's Road bridge to "… disrupt an actual or probable algal bloom in order to avoid a significant adverse ecological effect on the lagoon." A very similar condition is included in the current consent and inclusion of this version is agreed to by the applicant. While the condition does not place an obligation on the applicant to take such action, the LWCA supports actions of this type to protect the lagoon and would co-operate to the extent possible to enable it to happen.

The condition is therefore accepted.

Openings for fish passage

Section 6.4 of Reference A proposes the following condition to provide for fish passage:

> *(a) Notwithstanding conditions 4 and 6 of this consent, the lagoon may be opened to the sea to provide for passage for diadromous fish species when the water level in the lagoon is above 1.5 metres, as measured on the Waghorn's Road bridge gauge board, during the period 1 April to 30 November, provided that:*
>
> *(i) The lagoon has not been opened in the previous 24 months, and*
> *(ii) The Technical Advisory Group has considered the lagoon water quality and ecosystem health indicators listed in Appendix 1 and Appendix 2, and any other relevant scientific information, and has advised the consent holder and Consent*

[2] Note – LWCA does not know if that option will sufficiently mitigate the problem but it is worthy of consideration.

Authority (in writing) that opening the lagoon to the sea is recommended to enable fish passage.

The applicant would accept a condition of this type but is of the opinion that part (i) is too restrictive. It is likely to mean that the lagoon would have been closed over 2 migration cycles, which, amongst other things, is unlikely to sufficiently provide for the taonga species it is designed to protect. This particular issue is not of direct concern to the LWCA but it is one that its members have a wider interest in and believe it is important to address it.

The LWCA therefore proposes that the condition be amended to enable such openings to occur if the lagoon has not been opened in the previous year over the period when migration occurs.

5.2 Effects on coastal water quality

The discharge plume from the lagoon outlet into the sea depends on the water quality of the lagoon at that time. However, due to the natural tannin colouring of the lagoon water, there is normally a difference that is conspicuous and most significant immediately after opening. Over sometime, the plume becomes less conspicuous.

Attached in Appendix 7 is some photos showing the discharge from the lagoon, though none at the time of opening it. Images 1 and 2 are discharges under normal conditions and Image 3 is following rain in the catchment. For some context, Image 4 shows the effects of rainfall in the Mataura catchment on the discharge from the Mataura River.

In considering this issue, the following points are relevant:

- the coastline is described as a drift-aligned beach but with no clearly defined wave zone offshore. It has been described as follows (Reference G):

  "Waituna Beach in Toetoes Bay is a steep reflective coastline comprising gravel and mixed sand. The wave environment is slightly sheltered from the larger SW swells of Foveaux Strait. However, wave heights up to 2 - 3 metres are common, which can result in significant wave run up and overtopping of the Waituna Lagoon barrier. The Toetoes Bay area also has calm sea and wind conditions, especially in Easterly weather patterns."

  More detail is available in this report. The author notes that he has observed long-shore drift in both an easterly and westerly direction depending on wind and sea conditions. The direction of water movement will also vary, which will affect the direction of any plume;

- the discharge is freshwater that would, but for the presence of the lagoon, normally discharge into the coastal marine area. It is not dissimilar to the water entering coastal waters from other watercourses along the Southland coastline. Its water quality is monitored and it is known to include high levels of nutrients and bacteria, which is also not unlike water in other rivers and streams draining the developed parts of the Southland

plain. However, because much of the area that drains into the lagoon is peat land, the water is coloured by tannin;

- because of the intermittent nature of the discharge and opportunity for sediment to settle in the lagoon, it is likely that the first flush of water following opening will contain higher than normal levels of sediment. This effect will cause a short term plume of sediment but once that effect has dissipated, the plume is caused by the different colour of the discharge;
- the extent of the plume beyond the point of discharge on any given day will depend mostly on the sea conditions and the amount of mixing that is occurring from wave action and tidal current; and
- the offshore marine ecology in this area is not considered to be particularly sensitive given the nature of the beach and the seabed in the area immediately out from the shore. Freshwater discharges from rivers and streams are part of the coastal environment in Toetoe Bay, but it is acknowledged that the nature of this one is different due to the presence of the lagoon and the intermittent nature of the outflow.

Although there are still some gaps in the information about the extent and duration of the plume, and its potential impact on the marine environment, these same gaps exist for most, if not all, of the river and stream discharges along Southland's coastline. It is therefore considered that a more detailed analysis is not required to determine this application. The more critical issue is the management of water levels in the lagoon and the balancing of the ecological issues with the provision of drainage for the adjoining farm land.

In this environment, which is affected by discharges from Bluff Harbour in the west, the disposal of dredged material from the harbour, and the Mataura River in the east, the effect of the lagoon discharge on coastal water is assessed as minor. It is acknowledged that the information is limited but the discharge is land runoff that will eventually reach coastal water at some stage. This particular catchment is also the subject of a number of projects that are designed to reduce effects on Waituna Lagoon that will also have some benefit for the coastal discharge.

5.3 Effects on significant indigenous vegetation and significant habitats of indigenous species

The Waituna Lagoon is undoubtedly an area of significant indigenous vegetation and significant habitats of indigenous species. The ecological and cultural values associated with taonga species is documented in Reference A in Section 4 and Table 1. Table 1 lists the various ecological and cultural values and how they are impacted, either positively or adversely, by lagoon openings. The third column sets out the objectives of the opening regime in regard to these values.

Because of the importance and sensitivity of the lagoon, it is difficult to be precise about the significance of the effects on the lagoon from the openings proposed. Any artificial hydrological

management plan for the lagoon potentially has both positive and adverse effects regardless of whether it is manually opened or left closed.

The scientific reports generally support a managed opening regime but there are uncertainties and some conflict in how the openings should be managed in regard to water level in the lagoon and timing. The opening regime sought in this application, and the reasons for it, are set out in Section 5.1 above, the key ones being the further research that is still required to assess the effects of different management options and the ability to implement the adaptive management approach that is suggested by the Scientific Advisory Group.

On the information available, it is not possible to say with any certainty that the effect of opening the lagoon under the current regime on significant indigenous vegetation and significant habitats of indigenous species will only be minor. Similarly, it is not possible to state that those effects will only be minor at a higher opening level, or even if left to open naturally.

All that can be concluded from the information available is that a managed opening of the lagoon will have some positive effects on water quality and for fish species that migrate or rely on a lagoon/estuary for part of their lifecycle, but potentially significant effects on macrophyte growth and the wetlands on the lagoon margins if the duration of an opening is excessive. For the most part, effects will be minor but significant effects cannot be ruled out.

5.4 Effect on landscape and natural character

Openings of the lagoon require excavators to be present for one day. Within a short period of time, 1-2 days, the lagoon opening develops into a natural looking outlet to the sea, similar to other confluences of rivers and streams on the coast. In this area, there is only a small parcel of farm land located close to the coastline and the overall impression is one of naturalness.

The coastal landscape assessment in Appendix 4 of the Regional Coastal Plan (Landscape Unit 5) records a Naturalness Rating of 4+ (the highest rating is '5'). The assessment notes the following:

KEY LANDSCAPE ELEMENTS

- The extensive shingle beaches and gravel bars.
- Dunelands with associated native grasses.
- Coastal plains with peat bogs.
- Lagoon and river estuary with associated salt-marshes and mudflats.

DISTINCTIVE FEATURES

- The strong horizontal lines of all the natural features and elements.
- The diversity of "soft" coastal processes.
- The diversity of wildlife habitats.
- The high visual intrusion of all structures and exotic trees.

- The extreme isolation and remoteness qualities.
- Marginal farms encroaching on to peatlands.
- The contrast in water colour between the brackish freshwater and the azure blue of the sea.

The assessment also noted that one of the activities that could adversely affect the natural character is further drainage of the wetlands. This point is not in regard to opening the lagoon but rather, to do with draining wetlands to develop the land for other uses, primarily agriculture. No drainage to the extent that the naturalness rating may have changed since the RCP assessment was completed has been noted in the Awarua/Waituna wetlands. Since the introduction of the National Policy Statement for Freshwater Management, further drainage of significant wetlands is unlikely.

The effect on landscape and natural character from opening the lagoon is therefore assessed as minor when the lagoon is being opened but less than minor once the outlet has formed a more natural opening, generally within 1-2 days.

5.5 Effects on amenity values

The main effects on amenity values are in regard to effects on recreational users who are mainly fishermen and game bird hunters, but there are also ornithologists, kayakers and walkers using and enjoying the area.

The following information is taken from a social assessment report on the Waituna catchment (Reference H[3]). The report relies on existing information about the area and from interviews with key people. Two extracts from the report are as follows:

> "*The special ecological character of Waituna Lagoon and the Awarua wetland complex provides residents of the Catchment, and visitors to it, with the natural resource – base for a variety of outdoor recreation activities, both active and passive. The Concept Plan for Gorge Road and Districts identifies a number of them. They include angling for trout in the lagoon and creeks, surfcasting on the foreshore, shooting ducks, canoeing/kayaking on the lagoon, walking on tracks and foreshore, and ornithological (birdwatching) opportunities.*"

And:

> *"Waituna Lagoon is a highly valued recreational fishery, with brown trout the main target specie. It is different from other fisheries in New Zealand because of its "wind-swept" vegetation and offer of a remote wilderness fishing experience close to town. Among anglers, the lagoon has developed a reputation for large-size sea-run brown trout, although it is also known for a low catch rate. This rate, which is one of the lowest in the region, has now*

[3] Taylor, Nick; McClintock, Wayne and Mackay, Michael (2015). Social Assessment of the Waituna Catchment, Southland – anticipating the impacts of nutrient limits for farming systems. A report prepared for DairyNZ by Taylor Baines and Associates, Christchurch.

reached six hours per fish. A measure of the use of Waituna Lagoon for recreational fishing can be found in the New Zealand National Angling Survey administered by NIWA for Fish and Game New Zealand in 1994/95, 2001/2002 and 2007/2008. The 2008 national angling survey recorded that 1840 (plus or minus 410) trout fishers visit the Waituna Lagoon annually. This indicates that there has been an increase in angler days since the early to mid-1990s, from 1130 days (plus or minus 320) in the 1994/95 to the 2007/2008 total of 1840. Anglers are mainly from Invercargill, but some are tourists (e.g. from Australia). Trout catches from the creeks seem to have improved in recent years.

"Local fishermen who have long term knowledge of Waituna Lagoon consider that when it is open to the sea the ecosystem is healthier, trout have more feed and the flounder catch is better. Dependant on the time of opening, some whitebaiting is reported in the mouth of the lagoon and the main creeks flowing into it, but the nearby Mataura River and streams are a much more significant fishery.

"The lagoon is used for game bird hunting all around the shore. The view of Fish and Game is that the lagoon is locally and regionally significant for this type of activity, with the vast majority of shooters coming from Invercargill or other parts of Southland. Shooters believe the pattern of duck movements in the area have changed. Some families have had recreational baches near the lagoon for several generations. Drawing on research from the late 1980s it has been observed that "by 1971 when Waituna Lagoon and wetlands were designated as a Reserve for Wetland Management purposes by the Department of Lands and Survey (Ridell et al., 1988) there were approximately 34 huts on or near the borders of the lake for recreational users (Waghorn and Thomson, 1989)".

This information on recreational use is provided under the opening regime that existed up to that time, i.e. intermittent opening when lake levels reached a certain point, usually 2.0m or higher, and sea conditions were suitable. Granting this application for a further consent will not have any significant adverse effects on the existing recreational users but will be beneficial for some, particularly fishermen. There is no information to suggest opening of the lagoon would affect bird populations or species diversity, both of which are of interest to ornithologists and game bird hunters.

No information is readily available on recreational use prior to the lagoon being artificially opened, which has been happening since about 1908 (Reference C[4]). However, it is likely that recreational use increased after that date as the population increased and the recreational values of the area

[4] "Anthropogenic impacts on Waituna Lagoon: Reconstructing the environmental history" – Sarai Cosgrove, 2011. A dissertation submitted in partial fulfilment of the requirements for a Master of Science degree in Ecology at the University of Otago, Dunedin, New Zealand.

became more widely known. This recreational use developed alongside the use of the lagoon by Iwi as a significant source of mahinga kai, which has been happening well before European occupation.

Overall, the effect of lagoon openings on recreational amenity is assessed as less than minor or positive.

5.6 Effects on heritage or archaeological sites

Lake Waituna is a Statutory Acknowledgement Area for Ngāi Tahu. The lake's importance to Iwi for food gathering and customary usage is well documented, and has been referenced previously in this application. Iwi are part of the Waituna Catchment Group that was established by Environment Southland to develop plans and strategies for the ongoing management of the lagoon.

Historic Iwi camp sites and middens are known to be along the foreshore in this area. The Regional Coastal Plan identifies two archaeological sites along the foreshore bordering Waituna Lagoon, which are identified as "oven(s)/hangi stones" (ID no.s 1021 & 1022). The locations marked on Map 9B of the Plan do not appear to be at either Walkers or Hansens Bays, which are sandy areas vulnerable to coastal processes and possibly over-topping at high lagoon levels. Finding any sites in these two areas is unlikely but it would still be appropriate to include the Accidental Discovery Protocol on any consent granted for the lagoon openings.

The potential effects on heritage or archaeological sites is therefore assessed as less than minor.

5.7 The effect on sites or areas of significance to Tangata Whenua

The importance of the Waituna Lagoon and the wider area to Iwi has been addressed previously in this application. Iwi are part of The Trust, and have been involved with the recent work to improve the health of the lagoon and restore its mauri. Opening the lagoon does have some benefit to taonga species, but Iwi have an over-riding interest to ensure the mauri of the lagoon is restored, as currently it is considered to have been degraded. Iwi would prefer a natural regime if it can be done without compromising lagoon health.

The effects of lagoon openings at any level on cultural values are potentially significant but, as for effects on significant indigenous vegetation and significant habitats of indigenous species, effects can also be positive in regard to the benefits to taonga fish species.

5.8 Summary

Opening the lagoon to the sea has various effects that can be either beneficial, minor or more than minor. The level of the lagoon, the timing of the opening and the opening duration are the main influences on those effects but the degree that they do so, and the balance between the different effects, are still matters that are being assessed. It should also be noted that these effects are alongside effects on water quality from the streams discharging into the lagoon.

The dilemma is that opening the lagoon can have effects that are more than minor, but not opening it could have the same scale of effects. The reasons why this application is for openings at a minimum water level of 2.0m/2.2m have been stated in Section 5.1 above. A higher level may benefit some indicators of the lagoon's ecological health, but the significance of that benefit and of the potential adverse effects of a higher level are still to be fully assessed.

Adopting the worst case scenario, opening the lagoon may have effects that are more than minor, which is in recognition of the ecological significance of the lagoon and its associated wetland, and the fact that its overall health is at risk from other factors, namely, nutrients and sediment discharging into it. Due to that poor health, it means any effect that might otherwise have been only minor, may be more than minor.

For the most part, though, past lagoon openings have had effects that are minor. The biggest impact on lagoon health has been deteriorating water quality and sediment accumulation.

6. Consideration of statutory documents

The following documents are relevant to the consideration of this activity:

1. Resource Management Act 1991;
2. National Policy Statement for Freshwater Management 2020 (NPS-FM);
3. Resource Management (National Environmental Standards for Freshwater) Regulations 2020 (NES-F);
4. New Zealand Coastal Policy Statement 2010 (NZCPS);
5. Southland Regional Policy Statement 2017;
6. Regional Coastal Plan for Southland;
7. Regional Water Plan for Southland;
8. Proposed Southland Water & Land Plan;
9. Other documents:
    a. Te Tangi a Tauira;
    b. Southland Murihiku Conservation Management Strategy 2016.

6.1 Resource Management Act

Activity associated with Waituna Lagoon affects matters of national importance, primarily, sections 6(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; 6(c), the protection of areas of significant indigenous vegetation and significant habitats of indigenous fauna; and 6(e), the relationship of Maori and their culture and traditions with their ancestral lands, water, sites, waahi tapu, and other taonga.

The area may also be an outstanding natural landscape but a formal assessment has not been carried out. However, it is accepted that it is a highly natural landscape with a significant visual appeal.

Other matters in Section 7 that must given particular regard are parts (a), kaitiakitanga; (aa), the ethic of stewardship; (c), the maintenance and enhancement of amenity values; (d), the intrinsic value of ecosystems; (f), maintenance and enhancement of the quality of the environment; (g), any finite characteristics of natural and physical resources; and (h), the protection of the habitat of trout and salmon.

The various documents that follow have been formed to give effect to these matter and are discussed further in that context.

6.2 National Policy Statement for Freshwater Management 2020 (NPS-FM)

The NPS-FM adds objectives and policies that must be considered and applied to this application. The NPS-FM directs Council to make changes to its Regional Policy Statement and requires certain matters to be considered in regard to activities that may affect water and the environments it is found in, i.e. lakes, rivers, wetlands and ground. The objectives and policies in the NPS-FM apply to all activities now.

The natural inland wetlands, as defined in the NPS-FM, of relevance to this application are the fringing wetlands around the lagoon. The lagoon itself is not a wetland but, due to its frequent opening to the sea and the inflow of coastal water, it is also not "freshwater" as defined in the Resource Management Act.

Notwithstanding that point, the NPS-FM is considered relevant to the extent that management of the lagoon impacts on the fringing wetlands that are included within its provisions.

The restoration and management of the lagoon is directly relevant to the fundamental concept of Te Mana o te Wai and the six principles "… relating to the roles of tangata whenua and other New Zealanders in the management of freshwater …". The lagoon is known to be in poor health so restoration is a key goal for all concerned.

In regard to the objective in Clause 2.1 of the NPS-FM, part (a) is relevant, as much of the recent scientific research has been to enable good decision-making for the future management of the lagoon, and the improvement of its mauri and health.

Part (b) of Clause 2.1 is relevant to the extent that people's wellbeing is enhanced through activities associated with the lagoon, including food gathering and general recreation.

Part (c) is also very relevant in this case as the activity of opening the lagoon does provide for social and economic well-being, and general health and wellbeing. The economic wellbeing includes those

farming on the lagoon margins who are affected by management of the lagoon, and whose wellbeing is strongly linked to being able to farm that land.

Policy 1 is very relevant to the work of The Trust. Its work to enhance the lagoon's health will be ongoing for sometime. Activities long associated with the lagoon, including the managed opening regime currently in place, are still going on, but with changes where necessary. The authorised opening level increased from 2.0m to 2.2m in the late spring/summer period under the current consent. The LWCA seeks to retain the existing consented opening regime for lake level management based on the information currently available. Openings for other purposes, as have been provided for in the current consent, are supported by LWCA.

Policy 2 outlines involvement with tangata whenua, including decision making processes. Te Rūnanga o Ngāi Tahu and Te Ao Marama Inc will be affected parties to this application so will have the opportunity to be directly involved in the consent process. Any hydrological management of the lagoon should enable fluctuating water levels by avoiding extreme lows and highs for prolonged periods. This management should also ensure Policies 8 – 10 are complied with.

Policy 6 is relevant to lagoon openings as very low and very high lagoon water levels could result in changes to plant communities in the fringing wetlands. Prolonged low water levels, in particular, should be avoided.

Subpart 3 of the NPS-FM has specific requirements for wetlands and rivers. Clause 3.21(1) sets out an effects management hierarchy, with effects avoidance being the top priority and avoidance of the activity itself if options (b) to (e) are not available or appropriate. However, the complexity in this case is that no management regime addresses all issues, as each will have benefits and adverse effects.

The LWCA's reasons for applying to retain the existing opening regime are set out in Section 5.1 above. The Association accepts that that level may not be the final answer for lagoon management, but it considers it to be the most appropriate at this time. In terms of the effects management hierarchy, the management proposed in this application fits within part (d). A conservative assessment of the significance of the effects of opening the lagoon, at the level proposed, is that they may be more than minor (Section 5.8 above), but the provision for opening at other times provides the offsets to mitigate some of those effects.

Clause 3.22 has specific provisions for wetlands. Although the Waituna wetlands are a 'natural inland wetland' as defined in the NPS-FM, they have characteristics that are more akin to a coastal wetland. Even under a natural hydrological regime, when the lagoon will open naturally to the sea when high enough, the lagoon water levels will fluctuate due to tidal influence when open and rainfall when closed.

Under the manual opening regime, it is unclear if vegetation in the adjoining wetland has adapted and stabilised[5]. The report referenced noted that, "*Anecdotal evidence, air photographs, and comparisons of relative plant elevation limits all indicate that Leptocarpus rushland has increased in extent, in response to the lowered water regime and to increased sedimentation.*" It also noted that, "*It is not clear whether the present shore vegetation is yet in equilibrium with the current water regime, nor how it might further respond to ongoing inputs of sediment and nutrients from intensified agriculture in the catchments*."

A subsequent survey in 2013[6] tried to review the 1998 work but could not due to limitations in the original data. However, it did note that vegetation was moving down slope. Bythell noted that, "*If downward trend in species elevation range can be proven then lagoon levels should not be managed any lower than current levels*."

Both of the reports referenced refer to Waituna Lagoon as a shallow coastal lagoon/lake rather than an inland natural wetland. On the information available, it is not considered that this application is inconsistent with the policies in Clause 3.22. Management of the lagoon is still evolving and there are other issues, such as the flow of nutrients, bacteria and sediment into the lagoon, that are having a greater effect. The values of the adjoining wetland are not being compromised by the opening regime but are affected by it, as it would be by other regimes as well.

6.3 National Environmental Standards for Freshwater 2020 (NES-F)

The NES-F has rules applying to wetlands in Part 3, Subpart 1. The relevant part of the NES-F that applies is *Drainage of natural wetlands*, the requirements for which are set out in Clauses 52, 53 and 55.

The openings at Walkers Bay and the two eastern sites are more than 100m from any wetland area so they are not captured by the NES-F provisions, notwithstanding that opening the lagoon potentially results in a lowering of water levels in the adjoining wetlands (see Maps 3 & 5, Appendix 2).

Opening the lagoon at Hansens Bay does involve earthworks and the diversion of water from the lagoon at a point that is outside the natural wetland, but within 100m of it (see Map 4, Appendix 2). Under Clause 52, the activity is therefore non-complying and a consent is required under the NES-F.

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5 "Vegetation and water level regime at Waituna Lagoon, Southland" – P N Johnson and T R Partridge, 1998

6 "Monitoring changes in shoreline vegetation communities at Waituna Lagoon, Southland" – Jesse Bythell, Biosis, June 2013.

6.4 New Zealand Coastal Policy Statement 2012

The most relevant objectives and policies to this application are listed in Schedule 1, but there are only a few that are of significance to this application.

In regard to the objectives, Objectives 1 & 3 are of most relevance to the overall management of the lagoon, while the others are relevant but less important to determining this application. Objective 1 is very relevant to the work of the Trust. The only inconsistency is in the first bullet point in regard to "… natural biological and physical processes …" due to the manual opening of the lagoon, something that is considered to be necessary to manage sedimentation, water quality and fish migration.

Natural character (Objective 2) is important but, once the opening is established, it looks like part of a natural lagoon system. 'Natural character' is more than landscape but the only unnatural element occurs when there is an excavator opening a channel on the beach, which takes less than a day. The effect on natural character is considered to be minor when the opening is being created and less than minor once established.

Tangata whenua are part of the Trust and will be an affected party for the processing of this application, which is consistent with Objective 3 and Policy 2. Objectives 4 & 6 are noted and aspects of these have been considered elsewhere in this application.

Waituna Lagoon is part of the coastal environment (Policy 1(2)(c)) and it is subject to pressures from land use, mainly, sedimentation and the inflow of nutrients. The hydrological regime of the lagoon also impacts on overall health, and on the adjoining wetlands and farm lands. Policy 3 is an important consideration, particularly in regard to part (2)(b). Opening the lake requires consideration of various aspects, the effects on which may be adverse or positive.

The LWCA has applied for opening levels of 2.0 and 2.2m, depending on the time of year, and provision for openings under special circumstances, which it considers to be an appropriate opening regime at this time. The effect of openings only occurring at 2.5m, may be with some provision for special circumstances, has not been fully investigated and provides little scope for investigating the positive and negative effects at alternative levels. It is likely to have significant effects on the adjoining farm land. A level of 2.2m is considered to be sufficiently cautious approach to adopt. It is noted, however, that either approach will have both positive and adverse effects.

Policies 4 & 5 relate to integrated management where other cross-boundary issues may arise, and issues relating to land held for other purposes, which is relevant to the Waituna Lagoon and associated wetlands. Through the Trust, various bodies are represented and will be considered to be affected. However, there is no cross boundary issue in regard to resource management.

The only activity in the coastal marine area relevant to Policy 6(2) is the discharge to coastal water. To the extent there is economic benefit to the adjacent farms, the policy is relevant. However, the

work of the Trust and other bodies with responsibility for the Waituna Wetland Scientific Reserve is very relevant to Policies 11 & 21.

Part of that responsibility is in regard to the opening regime for the lagoon but to date there has not been a consensus on what that should be. The scientific knowledge base for the lagoon has increased over the last 5 – 10 years but there are stills gaps to be addressed. Improvement in the water quality entering the lagoon is still to be achieved to the extent necessary to be confident about the lagoon health. Policies 21 & 22 apply to water in the coastal environment, which is relevant to this issue. Opening the lagoon at appropriate times is an important tool for managing effects on water quality and sedimentation.

Policy 23 is specifically relevant to the discharge from the lagoon and its impact on coastal water. The water in the lagoon will always find its way to the coastal marine area but the indirect discharge through the lagoon barrier is likely to have less impact. However, that would mean that if the lagoon never opened, sediment would be retained in the lagoon and accelerate its eventual filling.

When first opened, the discharge does have a conspicuous effect that reduces over time, but is never completely gone. If the lagoon is open when the feeder streams are in flood, a visual plume is evident, which is no different to other coastal river discharges at that time.

Overall, there are some significant matters in the NZCPS to consider. Opening the lagoon at the level proposed is part of the ongoing lagoon management. It is not contrary to the NZCPS provisions but it is inconsistent with some parts.

6.5 Southland Regional Policy Statement 2017

The most relevant objectives and policies to this application are listed in Schedule 2. Some matters included are relevant to the wider management of the lagoon on which openings may have either an adverse or positive effect, e.g. water quality. There is significant overlap with the NZCPS so the discussion that follows focusses on provisions that are of most importance.

The matter of Iwi involvement in the management of Waituna Lagoon and the importance of it has already discussed in this application.

Water quality is an issue to do with lagoon openings for two reasons – firstly, to manage the water quality in the lagoon, particularly in regard to possible algal blooms and sediment removal; and secondly, the effects on coastal water of the discharge from the lagoon when opened. Both of these matters have been considered in Section 5 above.

Opening the lagoon can be beneficial in terms of lagoon water quality, though it does depend on timing, but adverse in terms of effects on coastal water quality. The latter is a 'first flush' effect that eventually settles down to being no different to other river discharges at the coast. Left to open

naturally, the discharge would still occur and have similar effects. The ongoing process of reducing nutrient losses via rivers and streams is beyond the scope of this application, but it is the only way there will eventually be an improvement in the discharge from the lagoon (see Objective 2 and Policies WQUAL.1 and WQUAL.2).

Objectives and policies relating to the beds of lakes and rivers are relevant to the disturbance of the lagoon bed when creating the opening but it is on the boundary between land and coastal water. The disturbance itself is mostly in the coastal marine area and the effects are considered to be less than minor.

The provisions relating to biodiversity are in recognition of the values of the lagoon and its associated wetland. Management of the lagoon is intended to protect and enhance those values. The timing of the lagoon opening is an issue and there is no consensus between all of the parties on this point, though it is generally agreed that lagoon openings are necessary to manage water quality and provide for migratory fish species.

Objective COAST.4 is very relevant to Waituna Lagoon as it refers to the 'coastal environment' but it is about natural character. There is a naturalness to the coastal landscape and it has very high values but it has not been formally assessed as outstanding. The wetland reserve area is important for ecological reasons, but, in protecting those values, natural character also benefits.

Policy COAST.5 seeks to "… avoid, remedy or mitigate effects of land-based … activities on coastal water quality and its ecosystems." The biggest influence on Toetoes Bay is the Mataura River. When open, the Waituna Lagoon will also affect the bay, and there is also some impact from the tidal flushing of Bluff Harbour and Awarua Bay, and the periodic discharge of dredge material from the harbour.

The beach along Toetoes Bay is described as very exposed, steep, gravel sand beach. The beach material is interchanged with material in the bay, which is part of the movement of sand/gravel through Foveaux Strait. The bay is mainly a relatively flat, featureless seabed until it gets out towards Ruapuke Island and the rock outcrops in that area. The ecology that exists on that part of the seabed is adapted to the inputs from the rivers and streams along that coast. It is noted that those freshwater discharges are high in nutrients, bacteria and sediment.

Objective LNF.2 and Policy LNF.3 address natural features and landscapes, which have been addressed in the assessment of effects above. The ongoing effect on these values is assessed as less than minor.

6.6 Regional Coastal Policy Statement for Southland

The most relevant objectives and policies to this application are listed in Schedule 3 and discussed below.

Objective 5.4.1.1 and Policies 5.4.1.1 and 5.4.1.3 are relevant to the Waituna Wetland Scientific Reserve. The area should be protected and significant adverse effects avoided. The effect of the fluctuating lagoon levels has been addressed. On the information available, the effect of opening the lagoon on the wetlands is assessed as minor but it is noted that changing hydrological patterns could have an effect that is more significant. No change in the pattern of openings is anticipated.

Objective 6.1.1 and Policies 6.1.4 and 6.1.4 are relevant to estuaries, which includes the lagoon when open. As an estuary, the lagoon has significant habitat values for various fish and bird species. As discussed previously, opening the lagoon has significant advantages for habitat values, including for water quality in the short term.

Objective 7.2.2.3 and associated policies relate to coastal water quality and ensuring it remains suitable for the purposes described. Rule 7.2.2.1 sets the standards for water classified as "People an Aquatic Life" that apply to Toetoes Bay. On first opening the lagoon, there is a flushing effect that can extend some distance along the shoreline. A similar effect can occur when the streams entering the lagoon are in flood and the lagoon is open, and an even larger effect occurs when the Mataura River is in flood. Mixing does occur but it has not been possible to define what an appropriate mixing zone should be for a discharge of this type into coastal water.

Apart from the initial flush on opening, the effect of a discharge from the lagoon is the same as that from any other estuary and is part of that environment, notwithstanding the fact that it did not open naturally. It is appropriate to apply Section 107(2) of the Act to the initial opening of the lagoon. There are special circumstances relating to the management of the lagoon and the effect is temporary.

Objective 7.4.2.1 and Policy 7.4.2.2 are directly relevant to this activity. When considering this application to open the lagoon to ease the effect of inundation on adjoining farmland, the status of the lagoon "… as a major part of the Waituna Wetlands Scientific Reserve …" has to be recognised. This application has done that.

Rule 7.4.2.2 specifically provides for the opening of the lagoon as a discretionary activity. There are other general rules relating to disturbance of the foreshore in the coastal marine area and discharges to coastal water, but those activities are encapsulated into this one rule. Those other rules also make the activity discretionary so there is no particular consequences in not applying them. However, it should be noted that the objectives and policies associated with those other rules should still be considered.

Overall, the application is not contrary to any of the other objectives and policies in the Regional Policy Statement, however, as has been noted, there are conflicting issues associated with opening the lagoon, so the activity is inconsistent with some of them. This inconsistency is not considered to be such that the application cannot be granted.

6.7 Regional Water Plan

The Regional Water Plan is still the operative plan for water in the Southland region and the relevant provisions are set out in Schedule 4.

The Proposed Southland Land & Water Plan (PSWLP) is working its way through the appeal process with some matters already decided. The RWP is also becoming increasingly dated due to the national policy statements and national environmental standards that are now in place since it became operative..

At this stage, more weight should be applied to the provisions of the PSWLP, although, in this case, there is little, if any, conflict or inconsistency between the two plans. The plan is relevant in regard to the diversion of water from a regionally significant wetland and for some disturbance of the lagoon bed. In regard to the former, the effects is indirect as the lagoon water level influences water levels in the adjoining wetland. No water is physically diverted from the wetlands but it could drain due to lagoon levels being low. Lagoon levels, however, fluctuate significantly and the wetlands have, to a certain extend, adapted to that regime.

The disturbance required to open the lagoon mainly occurs in the coastal marine area but there is a connection to the lagoon that is outside the coastal marine area. The disturbance required is very minor and remedied by natural processes.

The application is therefore not inconsistent with or contrary to the Regional Water Plan. Opening the lagoon is provided for in the Regional Coastal Plan so it is that Plan that carries the most weight for this activity.

6.8 Proposed Southland Water and Land Plan

The objectives and policies of the proposed Southland Water & Land Plan (PSWLP) that are most relevant to this application are provided in Schedule 5. This Plan has been updated to include policies from the NPS-FM (2020), which have been addressed in Section 6.2 above.

The Interpretation Statement and Objectives 1 and 2 are included to provide context. Objectives 3 and 4 also relevant across all activities.

Objective 6 requires water quality in the Waituna Lagoon to be maintained if it meets standards but if not, it needs to be improved. As has been stated, standards are not being met, but remedying this issue is beyond the scope of a consent to open the lagoon. The openings do have a role in managing water quality, but the problem comes from the water flowing into the lagoon.

Objective 9/9A is more relevant to takes for the use of water, but it also applies to Waituna Lagoon. Opening the lagoon does reduce the size of the water body. The opening has both positive and adverse effects but overall, in itself, it is not considered to be inconsistent with part (a). Leaving the

lagoon to open naturally is likely to have a significant effect on migratory fish species, cause the lagoon to be at risk of significant algal blooms, impact on macrophyte growth due to a lack of light penetration, and cause significant drainage issues for farm land in the vicinity of the lagoon. Conversely, leaving the lagoon open for too long risks effects on the *Ruppia* beds, and on water levels in the adjoining wetland, which may impact on the vegetation diversity and sensitive species. The appropriate opening level is therefore a compromise to try and achieve the best outcome.

Objectives 14, 15 and 17 are also relevant to the ecosystem health of the lagoon.

Consideration of Te Tangi a Tauira below gives effect to Policy 2, and Policy 3 follows on from Objective 15. Taonga species benefit from lagoon openings but as already noted, management of the lagoon has to balance competing objectives.

Policy 20 sets out the requirements for managing activities authorised by a water permit, which in this case, is diversion of water. There is no associated use of that water. The policy requires adverse effects on the matters in Part 1 to be avoided, remedied or mitigated – all sub-parts apart from (h) have some relevance to Waituna Lagoon. Parts 2 and 3 are not relevant.

Policy 28 applies to bed disturbance activities, but in this case, the area affected is very small and the disturbance effects are considered to be less than minor.

Policies 32 – 34 are relevant to management of wetlands, of which the lagoon openings are one part. The work of the Trust is attempting to reverse the decline in the health of the lagoon, which will also have some benefits for the adjoining wetlands. Policy 32 is relevant to both lakes and wetlands, and the protection of indigenous vegetation and significant habitats, whereas Policies 33 & 34 are more specific to wetlands. Policy 32 requires reduction in wetland areas by drainage to be prevented.

Policy 40 provides guidance on the matters to be considered when determining the term of a consent. These are addressed more fully in Section 6.11 below.

As noted, the application is generally consistent with the PSWLP but there are also some inconsistencies, though not to the extent of being contrary to it. The inconsistencies are in relation to meeting different objectives so the process is about managing those differences. Overall, it is considered that granting the application will be consistent with this Plan.

6.9 Te Tangi a Tauira

The key provisions of Te Tangi a Tauira are directed at maintaining wetlands and, where necessary, restoring them. Their value as mahinga kai communities is recognised and Iwi are involved in the work of the Trust to restore the mauri of Waituna Lagoon.

As noted previously, taonga species are a significant part of the ecology of the lagoon, some of which rely on migration to and from coastal water. To the extent that it is able to do so, the LWCA is providing for lake openings to also meet the needs of migratory fish species.

The application is therefore not inconsistent with Te Tangi a Tauira.

6.10 Southland Murihiku Conservation Management Strategy 2016 (CMS)

Under the CMS, the Waituna Lagoon is in the area known as "Awarua Place", information about which is set out in Section 2.8. The ecological importance of the area in general is described, as its importance to Ngāi Tahu for cultural reasons and as a source of mahinga kai.

The key policies require the area to be protected and enhanced to ensure criteria for which it was nominated under the Convention on Wetlands of International Importance especially as Waterfowl Habitat 1971 (also referred to as the Ramsar Convention) are maintained, and New Zealand's obligations under the Convention are met. The Department proposes to work with Ngāi Tahu and the community in order to ensure that happens.

There are no specific policies relating to managing lagoon levels or opening it to the sea, but the activity is noted in the CMS in Appendix 8 – Marine habitats and ecosystems in Southland Murihiku. The appendix lists the ecosystems and records their habitat type, significant values and pressures/threats. Lagoon openings are noted as a potential threat to *Ruppia* sp. but the other threats to the lagoon that have already been mentioned are included in the appendix.

Opening the lagoon is not inconsistent with the CMS as long as openings are managed to the benefit of the lagoon.

6.11 Consent term

In regard to each point to be considered under Policy 40 of the PSWLP, the following comment is provided to support a 20 year term:

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;*

   Comment: the LWCA acknowledges that there is uncertainty about how best to manage the lagoon, including in regard to lagoon openings. However, a longer term is unlikely to hinder the lagoon management as some level control will be necessary for the foreseeable future. The conditions that control lake openings can be amended by way of a review or an amendment application.

   The 5 year term for recent consents is not sufficient time for the effect of changes to lagoon management to become apparent and assessed. It is also noted that the lagoon

openings are not the main issue affecting the lagoon, rather it is nutrient and sediment discharges that are having the most detrimental effect. Lagoon openings are one mechanism for managing water quality under the current conditions.

It is therefore submitted that although there is uncertainty about how best to manage the lagoon, a short term consent is not necessary to address the management issues.

2. *relevant tangata whenua values and Ngāi Tahu indicators of health;*

Comment: currently, tangata whenua values and Ngāi Tahu indicators of health are not being met, which is why considerable effort is going into trying to restore the lagoon's health and mauri. Tangata Whenua are a significant part of that process through its involvement in the Trust.

The term of the consent for openings is not a significant issue in this work, but the openings are an important part of the management of the lagoon for both the applicant and the Trust, notwithstanding their different priorities. Again, openings will be required for the foreseeable future and any changes required to the consent conditions can be addressed through other processes rather than expiry of the consent.

3. *the duration sought by the applicant and reasons for the duration sought;*

Comment: the 20 year term sought is to provide the applicant with more certainty than has been provided by the previous short term consents. The consent process is onerous and costly. The affected landowners need the security of a longer term consent to manage the impact of impeded drainage due to high lagoon levels on farming operations. The insecurity of a shorter term has an impact on the value of their properties.

The LWCA recognises that there are issues in regard to the lagoon health and that further information may require changes to how lagoon levels are managed. They also believe that a short term consent is not necessary to make the changes that may be required. Openings are necessary for a number of purposes and will be required for sometime into the future. A short term consent is disruptive and incurs unnecessary cost, and there are alternative ways to amend the conditions if that is required.

The LWCA is continuing to apply for a consent for this activity in order to secure its interest in the lagoon management but also wishes to work with the Trust and others to restore the lagoon health.

4. *the permanence and economic life of any capital investment;*

   Comment: the capital investment is in regard to the land used for farming and it will be an ongoing land use until such time as a new owner decides to change it, or change is made by regulation. The investment in the land is significant and, properly managed, its economic life is indefinite.

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;*

   Comment: not relevant.

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*

   Comment: no compliance issues identified.

   In regard to good management practices for lagoon openings, there are no formal practices in place, and the best opening regime is still being developed. One reason for the opening level sought by the LWCA is to provide sufficient opportunity to trial different regimes.

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.*

   Comment: While the FMU sections of the Plan may help to improve the quality of the water entering the lagoon, they will not impact on the activity for which consent is sought. Openings are a tool to help manage water quality but not the cause of the water quality problems.

For the above reasons, the LWCA is applying for 20 year term for this consent, which is considered to be appropriate in these circumstances.

6.12 Consent conditions

No new conditions are put forward at this time. LWCA supports the conditions on the current consent.

6.13 Summary

Opening the lagoon provides benefits to landowners, migratory fish species and water quality but can potentially adversely effect *Ruppia* sp. and the adjoining wetland, particularly if it remains open too long. Openings are part of the management of the lagoon and will be necessary from time to

time. Overall, the activity is considered to be consistent with the relevant statutory documents but it needs to be managed.

7. Non Complying Activities – Section 104 (D)

Section 104D of the Resource Management Act places certain restrictions on the granting of consents for non-complying activities. The section states as follows:

> *104D Particular restrictions for non-complying activities*
>
> *(1) Despite any decision made for the purpose of notification in relation to adverse effects, a consent authority may grant a resource consent for a non-complying activity only if it is satisfied that either—*
>
> *(a) the adverse effects of the activity on the environment (other than any effect to which section 104(3)(a)(ii) applies) will be minor; or*
>
> *(b) the application is for an activity that will not be contrary to the objectives and policies of—*
>
> *(i) the relevant plan, if there is a plan but no proposed plan in respect of the activity; or*
>
> *(ii) the relevant proposed plan, if there is a proposed plan but no relevant plan in respect of the activity; or*
>
> *(iii) both the relevant plan and the relevant proposed plan, if there is both a plan and a proposed plan in respect of the activity.*
>
> *(2) To avoid doubt, section 104(2) applies to the determination of an application for a non-complying activity.*

For this application to be considered, it must pass at least one of the tests in section 104D(1).

The activity is non-complying due to the Hansens Bay opening site being within 100m of a wetland. The degree of non-compliance with the rule is very minor and all other aspects of the application are discretionary. The difference in adverse effects from using Hansens Bay rather than any of the other sites identified is considered to be less than minor.

The assessment of effects for this application has taken a very conservative approach due to the sensitivity of the lagoon and the concerns about its overall health. On the information available, it is likely that effects will be no more than minor, but there is a low probability that a significant adverse effect could occur under certain circumstances. However, any significant effect is most likely to be as a result of a combination of factors rather than just the opening of the lagoon.

It is therefore difficult to state with any certainty that the application passes the test in section 104D(1)(a).

In regard to the second test in section 104D(1)(b), the analysis of statutory documents shows that the application is not consistent with some provisions of the relevant plans, but it is not contrary to those provisions. "Contrary to" has a high threshold in order to be crossed, and it is more than just "inconsistent with". To be "contrary to", an activity must be "… opposed in its nature …"[7] to the plan provisions. It is submitted that this level is not reached for this activity.

It is therefore submitted that the application passes the second test in section 104D(1)(b), so the application can be granted.

8. Consultation

No consultation has been carried out in advance of submitting this application although there have been some ongoing discussion between members of the Trust, Environment Southland and the LWCA. There is no specific outcome to report at this time.

However, Iwi, Fish & Game New Zealand, Department of Conservation and the adjoining landowners are identified as affected parties. Others such as the Royal Forest & Bird Protection Society as well as some individuals may have a wider interest in ensuring that the values of the lagoon and associated wetlands be maintained.

9. Conclusion

Because of the current state of the lagoon and its sensitivity to changes, the overall effects of opening the lagoon have been assessed as potentially more than minor, notwithstanding the fact that some effects are assessed as minor, less than minor and positive. The potential for a significant effects from the lagoon openings is assessed as one of low probability but high potential impact. That assessment does not mean consent cannot be granted but it does mean that there are ongoing issues to be addressed.

To the extent that opening the lagoon has some benefit and fits in with the overall management goals, the activity is not inconsistent with the relevant statutory documents.

It is therefore submitted that a consent can be granted in the terms sought.

Yours faithfully,

John Engel
Bonisch Environmental

[7] From *NZ Rail Ltd v Marlborough DC* [1994] NZRMA 70 (HC).

Key Policies and Objectives from the Relevant Planning Documents

Schedule 1 - New Zealand Coastal Policy Statement 2010

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 4	To maintain and enhance the public open space qualities and recreation opportunities of the coastal environment by: • recognising that the coastal marine area is an extensive area of public space for the public to use and enjoy; • maintaining and enhancing public walking access to and along the coastal marine area without charge, and where there are exceptional reasons that mean this is not practicable providing alternative linking access close to the coastal marine area; and • recognising the potential for coastal processes, including those likely to be affected by climate change, to restrict access to the coastal environment and the need to ensure that public access is maintained even when the coastal marine area advances inland.
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 1 **Extent and characteristics of the coastal environment**	(1) Recognise that the extent and characteristics of the coastal environment vary from region to region and locality to locality; and the issues that arise may have different effects in different localities. (2) Recognise that the coastal environment includes: (a) the coastal marine area; (b) islands within the coastal marine area; (c) areas where coastal processes, influences or qualities are significant, including coastal lakes, lagoons, tidal estuaries, saltmarshes, coastal wetlands, and the margins of these; (d) areas at risk from coastal hazards; (e) coastal vegetation and the habitat of indigenous coastal species including migratory birds; (f) elements and features that contribute to the natural character, landscape, visual qualities or amenity values; (g) items of cultural and historic heritage in the coastal marine area or on the coast; (h) inter-related coastal marine and terrestrial systems, including the intertidal zone; and (i) physical resources and built facilities, including infrastructure, that have modified the coastal environment.
Policy 2 **The Treaty of Waitangi, tangata whenua and Māori heritage**	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 pūkenga2, 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 mātaitai 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 **Precautionary approach**	(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 **Integration**	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 5 **Land or waters managed or held under other Acts**	(1) Consider effects on land or waters in the coastal environment held or managed under: (a) the Conservation Act 1987 and any Act listed in the 1st Schedule to that Act; or (b) other Acts for conservation or protection purposes; and, having regard to the purposes for which the land or waters are held or managed: (c) avoid adverse effects of activities that are significant in relation to those purposes; and (d) otherwise avoid, remedy or mitigate adverse effects of activities in relation to those purposes. (2) Have regard to publicly notified proposals for statutory protection of land or waters in the coastal environment and the adverse effects of activities on the purposes of that proposed statutory protection.

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 papakāinga3, 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 **Indigenous biological diversity (biodiversity)**	To protect indigenous biological diversity in the coastal environment: (a) avoid adverse effects of activities on: (i) indigenous taxa that are listed as threatened5 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 13 **Preservation of natural character**	(1) To preserve the natural character of the coastal environment and to protect it from inappropriate subdivision, use, and development: (a) avoid adverse effects of activities on natural character in areas of the coastal environment with outstanding natural character; and (b) avoid significant adverse effects and avoid, remedy or mitigate other adverse effects of activities on natural character in all other areas of the coastal environment;

	including by: (c) assessing the natural character of the coastal environment of the region or district, by mapping or otherwise identifying at least areas of high natural character; and (d) ensuring that regional policy statements, and plans, identify areas where preserving natural character requires objectives, policies and rules, and include those provisions. (2) Recognise that natural character is not the same as natural features and landscapes or amenity values and may include matters such as: (a) natural elements, processes and patterns; (b) biophysical, ecological, geological and geomorphological aspects; (c) natural landforms such as headlands, peninsulas, cliffs, dunes, wetlands, reefs, freshwater springs and surf breaks; (d) the natural movement of water and sediment; (e) the natural darkness of the night sky; (f) places or areas that are wild or scenic; (g) a range of natural character from pristine to modified; and (h) experiential attributes, including the sounds and smell of the sea; and their context or setting.
Policy 15 **Natural features and natural landscapes**	To protect the natural features and natural landscapes (including seascapes) of the coastal environment from inappropriate subdivision, use, and development: (a) avoid adverse effects of activities on outstanding natural features and outstanding natural landscapes in the coastal environment; and (b) avoid significant adverse effects and avoid, remedy, or mitigate other adverse effects of activities on other natural features and natural landscapes in the coastal environment; including by: (c) identifying and assessing the natural features and natural landscapes of the coastal environment of the region or district, at minimum by land typing, soil characterisation and landscape characterisation and having regard to:

	(i) natural science factors, including geological, topographical, ecological and dynamic components; (ii) the presence of water including in seas, lakes, rivers and streams; (iii) legibility or expressiveness—how obviously the feature or landscape demonstrates its formative processes; (iv) aesthetic values including memorability and naturalness; (v) vegetation (native and exotic); (vi) transient values, including presence of wildlife or other values at certain times of the day or year; (vii) whether the values are shared and recognised; (viii) cultural and spiritual values for tangata whenua, identified by working, as far as practicable, in accordance with tikanga Māori; including their expression as cultural landscapes and features; (ix) historical and heritage associations; and (x) wild or scenic values; (d) ensuring that regional policy statements, and plans, map or otherwise identify areas where the protection of natural features and natural landscapes requires objectives, policies and rules; and (e) including the objectives, policies and rules required by (d) in plans.
Policy 21 **Enhancement of water quality**	Where the quality of water in the coastal environment has deteriorated so that it is having a significant adverse effect on ecosystems, natural habitats, or water based recreational activities, or is restricting existing uses, such as aquaculture, shellfish gathering, and cultural activities, give priority to improving that quality by: (a) identifying such areas of coastal water and water bodies and including them in plans; (b) including provisions in plans to address improving water quality in the areas identified above; (c) where practicable, restoring water quality to at least a state that can support such activities and ecosystems and natural habitats; (d) requiring that stock are excluded from the coastal marine area, adjoining intertidal areas and other water bodies and riparian margins in the coastal environment, within a prescribed time frame; and (e) engaging with tangata whenua to identify areas of coastal waters where they have particular interest, for

	example in cultural sites, wāhi tapu, other taonga, and values such as mauri, and remedying, or, where remediation is not practicable, mitigating adverse effects on these areas and values.
Policy 22 **Sedimentation**	(1) Assess and monitor sedimentation levels and impacts on the coastal environment. (2) Require that subdivision, use, or development will not result in a significant increase in sedimentation in the coastal marine area, or other coastal water. (3) Control the impacts of vegetation removal on sedimentation including the impacts of harvesting plantation forestry. (4) Reduce sediment loadings in runoff and in stormwater systems through controls on land use activities.
Policy 23 **Discharge of contaminants**	(1) In managing discharges to water in the coastal environment, have particular regard to: (a) the sensitivity of the receiving environment; (b) the nature of the contaminants to be discharged, the particular concentration of contaminants needed to achieve the required water quality in the receiving environment, and the risks if that concentration of contaminants is exceeded; and (c) the capacity of the receiving environment to assimilate the contaminants; and: (d) avoid significant adverse effects on ecosystems and habitats after reasonable mixing; (e) use the smallest mixing zone necessary to achieve the required water quality in the receiving environment; and (f) minimise adverse effects on the life-supporting capacity of water within a mixing zone. (2) …

Schedule 2 - Regional Policy Statement for Southland (RPS)

Objective TW.1 **Decision-making and partnerships with tangata whenua**	**The principles of the Treaty of Waitangi/Te Tiriti o Waitangi are taken into account in a** systematic way through effective partnerships between tangata whenua and local authorities, which provide the capacity for tangata whenua to be fully involved in council decision-making processes.
Objective TW.2 **Provision for iwi management plans**	All local authority resource management processes and decisions take into account iwi management plans.
Objective TW.3 **Tangata whenua spiritual values and customary resources**	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 **Sites of cultural significance**	Wāhi tapu, wāhi taonga and sites of significance are appropriately managed and protected.
Policy TW.1 **Treaty of Waitangi**	Consult with, and enhance tangata whenua involvement in local authority resource management decision-making processes, in a manner that is consistent with the principles of the Treaty of Waitangi/Te Tiriti o Waitangi.
Policy TW.3 **Iwi management plans**	Take iwi management plans into account within local authority resource management decision making processes.
Policy TW.4 **Decision making**	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. mātaitai, 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.
Objective WQUAL.1 **Water quality goals**	Water quality in the region: (a) safeguards the life-supporting capacity of water and related ecosystems; (b) safeguards the health of people and communities; (c) is maintained, or improved in accordance with freshwater objectives formulated under the National Policy Statement for Freshwater Management 2014; (d) is managed to meet the reasonably foreseeable social, economic and cultural needs of future generations.
Objective WQUAL.2 **Lowland water bodies**	Halt the decline, and improve water quality in lowland water bodies and coastal lakes, lagoons, tidal estuaries, salt marshes and coastal wetlands in accordance with freshwater objectives formulated in accordance with the National Policy Statement for Freshwater Management 2014.
Policy WQUAL.1 **Overall management of water quality**	(a) Identify values of surface water, groundwater, and water in coastal lakes, lagoons, tidal estuaries, salt marshes and coastal wetlands, and formulate freshwater objectives in accordance with the National Policy Statement for Freshwater Management 2014; and (b) Manage discharges and land use activities to maintain or improve water quality to ensure freshwater objectives in freshwater management units are met.
Policy WQUAL.2 **All waterbodies**	Maintain or improve water quality, having particular regard to the following contaminants: (a) nitrogen; (b) phosphorus; (c) sediment; (d) microbiological contaminants.

Policy WQUAL.3 **Wetlands and outstanding freshwater bodies**	Identify and protect the significant values of wetlands and outstanding freshwater bodies.
Policy WQUAL.7 **Social, economic and cultural benefits**	Recognise the social, economic and cultural benefits that may be derived from the use, development or protection of water resources.
Objective BRL.1 **Lake and river bed values**	All significant values of lakes and rivers are maintained and enhanced.
Policy BRL.2 **Existing uses of lake and river beds**	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 BRL.5 **Social, economic and cultural benefits**	Recognise the social, economic and cultural benefits that may be derived from the use, development or protection of river and lake beds.
Objective BIO.2 **Maintain and protect**	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**	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.2 **Protect significant areas**	Areas of significant indigenous vegetation and significant habitats of indigenous fauna in the Southland region will be protected and, where appropriate, enhanced. In giving effect to this policy, particular regard will be had to the following potential adverse effects: (i) fragmentation of, or reduction in the extent of, significant indigenous vegetation or significant habitats of indigenous fauna;

	(ii) fragmentation or disruption of connections and linkages between significant ecosystems or significant habitats of indigenous fauna; (iii) loss of, or damage to, buffering of significant ecosystems or significant habitats of indigenous fauna; (iv) loss or reduction of rare or threatened indigenous species populations or habitats.
Policy BIO.3 **Protect coastal indigenous biodiversity**	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 **Maintain indigenous biodiversity**	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.8 **Tangata whenua**	Recognise the role of tangata whenua as kaitiaki, by providing for: (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.
Objective COAST.3 **Coastal water quality and its ecosystems**	Coastal water quality and its ecosystems are maintained or enhanced.
Objective COAST.4 **Natural character**	The natural character of the coastal environment is restored, rehabilitated or preserved.
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: (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 **Protection of the coastal environment**	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.5 – **Management of effects on coastal water quality and ecosystems**	Avoid, remedy or mitigate adverse effects of land-based and marine activities on coastal water quality and its ecosystems.
Objective LNF.2 **Identification and management of locally distinctive and valued natural features and landscapes**	Southland's locally distinctive and valued natural features and landscapes are identified, and managed so that subdivision, use and development is consistent with their values.
Policy LNF.3 **Identify, assess and manage natural features and landscapes of cultural significance to tangata whenua**	To identify, assess and manage natural features and landscapes of cultural significance to tangata whenua as either outstanding natural features and landscapes or locally distinctive and valued natural features and landscapes, depending on the values associated with them.

Schedule 3 - Regional Coastal Plan for Southland

Objective 5.4.1.1 **Protection of areas of significant indigenous vegetation and significant habitats of indigenous fauna**	To protect areas of significant indigenous vegetation and significant habitats of indigenous fauna within the coastal marine area.
Policy 5.4.1.1 **Disturbance of areas of significant indigenous vegetation and significant habitats of indigenous fauna**	Avoid significant adverse effects of disturbance to areas of significant indigenous vegetation or significant habitats of indigenous fauna.
Policy 5.4.1.3 **Preserving habitats of distinctive communities**	To preserve the habitat of distinctive communities.
Objective 5.10.1 **Social, cultural and economic reliance on the coastal marine area**	To recognise the need for social and economic utilisation of the coastal marine area in a manner that enables people and communities to provide for their social, cultural and economic well-being and for their health and safety.
Policy 5.10.1 **Recognising the social, cultural and economic reliance on the coastal marine area**	Recognise the importance of the coastal marine area for social, cultural and economic activities.
Objective 6.1.1 **Maintain and enhance the natural values of estuarine areas**	To maintain and enhance the natural values of estuarine areas.
Policy 6.1.3 **Recognise and protect the values of estuaries**	To recognise and protect the values that estuaries provide.

Policy 6.1.4 **Protect the cumulative habitat value of Southland estuaries**	Protect the cumulative habitat value of the New River Estuary, Awarua Bay, Bluff Harbour, Jacobs River Estuary, Waituna Lagoon, Haldane Estuary, Waikawa Harbour and Toetoes Estuary complex to bird species.
Objective 7.2.2.1 **Maintenance of coastal water quality**	To maintain the quality of coastal waters in those areas where ambient water quality is suitable for: a contact recreation; b the growth of shellfish, the human consumption of which is not limited by pathogenic or chemical contamination; c the health and vitality of aquatic ecosystems; and d a fishery, including aquaculture, the produce of which is not limited for human consumption by pathogenic or chemical contamination: and except for the area described in Objective 7.2.2.3, to enhance the quality of coastal waters in areas where ambient water quality has been degraded, to a level which is suitable for: a contact recreation; b the growth of shellfish, the human consumption of which is not limited by pathogenic or chemical contamination; c the health and vitality of aquatic ecosystems; and d a fishery including aquaculture, the produce of which is not limited for human consumption by pathogenic or chemical contamination by the year 2020.
Policy 7.2.2.1 **Importance of fresh water**	Avoid, remedy or mitigate adverse effects on the coastal marine area from any human alteration to the quality and quantity of freshwater entering the coastal marine area.
Policy 7.2.2.3 **Water quality standards in areas not in Natural State**	Manage the coastal waters of Southland's coastal marine area which are not in their natural state (classified as NS) for the purposes of People and Aquatic Life (P & AL)
Rule 7.2.2.1 **People and Aquatic Life Water standards**	Waters being managed for the purposes of People and Aquatic Life (P & AL) must meet the following standards, after reasonable mixing of any contaminant or water within the receiving water and disregarding the effect of any natural perturbations that may affect the water body:

	1 the natural temperature of the water shall not be changed by more than 3° Celsius and the natural temperature of the water shall not exceed 25° Celsius; 2 any pH change and/or any discharge of a contaminant into water or water into water or onto the seabed shall not result in a loss of biological diversity or a change in community composition; 3 the concentration of dissolved oxygen shall exceed 80% of saturation concentration; 4 fish and other aquatic organisms shall not be rendered unsuitable for human consumption by the presence of contaminants; 5 there shall be no undesirable biological growths as a result of any discharge of a contaminant into the water; 6 aquatic life is not adversely affected by the taking of any physical, chemical or biological constituent from that water; 7 visual clarity shall not be diminished by more than 20 percent; 8 the water shall not be rendered unsuitable for bathing by the presence of contaminants; 9 the water shall not be altered in those characteristics which have a direct bearing upon cultural or spiritual values. Except as provided for elsewhere in this plan, the discharge of any contaminant into water or water into water being managed for the purposes of People and Aquatic Life (P & AL) is a restricted discretionary activity. Discretion will be restricted to the following: 1 the adverse effects of the discharge on any of the standards for water and seabed classified for the purpose of People and Aquatic Life; 2 the size of the zone of reasonable mixing; 3 the environmental effects and the practicality of alternative means of discharge, including discharge to land;

	4 monitoring requirements; 5 the General Principles and Policies in the New Zealand Coastal Policy Statement relevant to the discharges to coastal waters.
Policy 7.2.3.15 **Size of Zone of Reasonable Mixing**	Minimise the size of the area where the relevant water classification standards are breached.
Policy 7.2.3.2 **Determining the size of zones of reasonable mixing**	The area of any zone of reasonable mixing from any outfall or discharge activity shall be determined on a case by case basis.
Policy 7.3.2.1 **Adverse effects of the discharge of contaminants**	Avoid, remedy or mitigate the adverse effects of the discharge of contaminants into the coastal marine area of Southland.
Rule 7.3.2.110 **Application of Section 107(2) of the Resource Management Act**	Any discharge to the coastal marine area in respect of which the applicant may desire to rely on Section 107(2), shall be a discretionary activity.
Objective 7.4.1.1 **Taking, using, damming, or diversion of water**	To reduce the adverse effects of taking, using, damming or diversion of water within the coastal marine area.
Objective 7.4.2.1 **Opening and diversion of water**	Ensure that any opening or diversion of river mouths or lagoons within the coastal marine area is undertaken in a manner so as to avoid, remedy or mitigate any adverse environmental effects arising from such opening or diversion.
Policy 7.4.2.1 **Opening or diverting drains, ditches or small stream mouths where the effects on the natural environment and social and cultural values are minor**	Provide for the opening or diverting of drains, ditches or small stream mouths where the effects on the natural environment and social and cultural values are minor.
Policy 7.4.2.2 **The status of the Waituna Lagoon**	Recognise the status of the Waituna Lagoon as a major part of the Waituna Wetlands Scientific Reserve when considering its opening for the purpose of relieving adjoining land and infrastructure from the adverse effects of inundation.

Rule 7.4.2.2 **Opening of the Waituna Lagoon**	The opening of the Waituna Lagoon to the sea, is a discretionary activity.

Schedule 4 - Regional Water Plan for Southland

Objective 10 **Habitats and ecosystems**	To maintain or enhance the diversity and integrity of aquatic and riverine habitats and ecosystems.
Policy 38 **Adverse effects of activities**	Avoid, remedy or mitigate the adverse effects of activities on wetlands through an integrated management approach with the Southland territorial authorities.
Policy 39 **Promote best management practice**	Use non-regulatory methods to promote best management practice in relation to retaining or enhancing the natural values of wetlands.
Rule 20(c) **Minor diversions of water**	Notwithstanding any other rule in this Plan, the diversion of water from a Regionally Significant Wetland identified in Appendix B or any naturally occurring wetland is a discretionary activity.
Rule 47 **Bed disturbance activities not covered by, or not complying with, rules**	Any river, modified watercourse, stream, or lake bed disturbance activity that is not provided for by a rule in this Plan, or that does not meet the conditions set out by a rule, is a discretionary activity.

Schedule 5 – Proposed Southland Water & Land Plan

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 6	Water quality in each freshwater body, coastal lagoon and estuary will be: (a) maintained where the water quality is not degraded; and (b) improved where the water quality is degraded by human activities.
Objective 9/9A	The quantity of water in surface water bodies is managed so that:

	(a) the life-supporting capacity and aquatic ecosystem health, the values of outstanding natural features and landscapes, the natural character and the historic heritage values of waterbodies and their margins are safeguarded. (b) there is integration with the freshwater quality objectives (including the safeguarding of human health for recreation); and (c) provided that (a) and (b) are met, surface water is sustainably managed in accordance with Appendix K to support the reasonable needs of people and communities to provide for their economic, social and cultural wellbeing.
Objective 14	The range and diversity of indigenous ecosystem types 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.
Policy 2 **Take into account iwi management plans**	Any assessment of an activity covered by this Plan must: 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 **Ngāi Tahu ki Murihiku taonga species**	To manage activities that adversely affect taonga species, identified in Appendix M.
Policy 20 **Management of water resources**	Manage the taking, abstraction, use, damming or diversion of surface water and groundwater so as to: 1A. recognise that the use and development of Southland's land and water resources, including for primary production, can have positive effects

	including enabling people and communities to provide for their social, economic and cultural wellbeing; 1. avoid, 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; and (j) mātaitai, taiāpure and nohoanga; 2. NA 3. NA
Policy 28 **Structures and bed disturbance activities of rivers (including modified watercourses) and lakes**	Manage structures, bed disturbance activities and associated discharges in the beds and margins of lakes, rivers and modified watercourses, to avoid, remedy or mitigate adverse effects on: 1. water quality and quantity; 2. habitats, ecosystems and fish passage; 3. indigenous biological diversity; 5. the spiritual and cultural values and beliefs of the tangata whenua; 6. mātaitai and taiāpure; 7. public access (except in circumstances where public health and safety are at risk) and amenity values;

	8. natural character values and outstanding natural features; 9. river morphology and dynamics, including erosion and sedimentation; 10. flood risk; 11. infrastructural assets; 12. navigational safety; and 13. landscape values.
Policy 32 **Protect significant indigenous vegetation and habitats**	Protect significant indigenous vegetation and significant habitats of indigenous fauna associated with natural wetlands, lakes and rivers and their margins.
Policy 33 **Adverse effects on natural wetlands**	Prevent the reduction in area, function and quality of natural wetlands, including through drainage, discharges and vegetation removal.
Policy 34 **Restoration of existing wetlands, the creation of wetlands and riparian planting**	Recognise the importance of wetlands and indigenous biodiversity, particularly their potential to improve water quality, offset peak river flows and assist with flood control, through encouraging: 1. the maintenance and restoration of existing natural wetlands and the creation of new wetlands; and 2. the establishment of wetland areas and associated indigenous riparian plantings, including on-farm, in subdivisions, on industrial sites and for community sewerage schemes.
Policy 40 **Determining the term of resource consents**	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.
Rule 50(d) **Minor diversions of water**	Unless controlled by any other rule in this Plan, the diversion of water for the purpose of land drainage that does not meet Rules 51(a) to (c) is a discretionary activity.

Schedule 6 - Te Tangi a Tauira

Section 3.6.1 **General Policy for Southland's Coastal Environment**	
Policy 3.5.18.1	Avoid the direct or indirect drainage or modification of any existing wetland area.
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 3.6.2.1	Require that all decisions 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 within the coastal environment. 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 1998.
Policy 3.6.2.22	Support the protection and restoration of coastal wetland ecosystems.
Policy 3.6.7.6	Promote the establishment and restoration of coastal wetland and riparian areas to help address non-point source pollution in coastal areas.
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 3.6.13.7	Recognise for the importance of coastal wetland areas as mahinga kai communities and, where appropriate, expand or create new coastal wetland areas.

Appendix 1

Application Forms

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PART A

Application for Resource Consent

This application is made under Section 88 of the Resource Management Act 1991 (Form 9)

The purpose of this Part A form and the relevant Part B form(s) is to provide applications with guidance on information that is required under the Resource Management Act 1991. Please note that these forms are to act as a guide only, and Environment Southland reserves the right to request additional information.

To: Environment Southland
Private Bag 90116
Invercargill 9840

1. Applicant(s) Details

A resource consent can only be held by a legal organisation or fully named individual(s).

1.1. Applicant's name (*full name of proposed consent holder*). *Please complete either (a) OR (b) to whom consent is to be issued*

First Name Middle Name Surname

(a) Individual(s) Ewen Pirie, for the Lake Waituna Control Association

OR

(b) Registered company name

Company number

1.2. Applicant's address *[not consultant's address]*

(a) Individual(s)

Postal Address Oteramika, RD 5, Invercargill 9875

Email ewenpirie@gmail.com

Phone 03 239 5859 Mobile 027 434 6829 Fax

(b) Company

Contact Person

Postal Address

Email

Phone Mobile Fax

2. Consultant/ Agent details (if applicable)

Contact person: John Engel

Company: Bonisch

Postal Address: PO Box 1262, Invercargill 9840

Email: john@bonisch.nz

Phone: 03 218 2546 Mobile: 027 222 1874 Fax:

Note: *All correspondence during the consent process will be directed to this contact person, unless instructed otherwise. Final decision documents will be sent to the applicant.*

Are you the owner or occupier at the site? ☐ Yes ☑ No

If not, please complete the following information

Name of owner or occupier at the site (*if different from 1.1.*) Crown land

Address of the owner or occupier at the site (*if different from 1.2.*)

2 Site Details

Location of activity (*including street/road name, number, and locality*) Various - see attached application

Map Co-ordinates (NZTM 2000)

E N(NZTM 2000)

Legal description of property at site of activity (*refer to land title or rates notice*) Coastal marine area & section 29 Block VIII Oteramika Hd

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

See application, Appendix 2.

3. Consents required in relation to this proposal:

Please tick the box for the consent(s) you are applying for and complete the relevant Part B form(s) where available

Water

	Take and use surface water	✓	Divert water
	Take and use groundwater		Dam water

Land Use

	Bore/ Well		Effluent storage
	New or expanded dairy farming		Cultivation
	Intensive winter grazing		Gravel extraction
	Feed-pad, wintering pad, calving pad or silage pad	✓	Lakebed ~~Riverbed~~ activity
	Bridges and culverts		Tree planting

Discharge

	To air		To water
	To Land		

Coastal

	Whitebait stand		Structures/occupation of space
	Removal of natural materials		Disturb foreshore/seabed
	Discharge/deposit substances		Commercial surface water activity
✓	~~Reclaim~~/drain foreshore/~~seabed~~		Marine farming
	Other coastal activities		

What is the purpose of this application?

New resource consent	
Renew resource consent	✓
Variation of conditions according to S 127 RMA	
Certificate of compliance	

Are there any **current** or **expired** consents relating to this proposal? ✓ Yes ☐ No

If yes, please provide consent number(s) and description:

AUTH-20146407-01, AUTH-20146407-02 and AUTH-20146407-03 - a coastal permit to drain Waituna Lagoon to the sea; a water permit to divert water from Waituna Lagoon to the sea; and to discharge water from Waituna Lagoon to the sea, respectively.

Are any other consents required from Environment Southland or **other authorities**?

☐ Yes ✓ No

If yes, please state the relevant authority and the type of consent(s) required:

For what **purpose** is this consent(s) required: (e.g. discharge of effluent, gravel extraction etc.)

To periodically lower the water level in Waituna Lagoon to enable drainage of surrounding farm land and to assist in the management of the lagoon in regard to water quality and fish passage.

Pre application advise- Have you discussed this proposal with a council staff member?

☐ Yes ✓ No

If yes, please provide name of staff member if known

Any further comments you would like to advise us about this application?

No formal pre-application meeting has been held with Consents staff but there has been ongoing discussions between the applicant and Council staff.

5 Assessment of effects on the environment (AEE)

Please complete the applicable Part B form(s) for the proposed activities. For those activities where no Part B form is available, please attach a written statement that assesses the effects that your activities may have on the environment. An assessment of effects **must** include the following information:

(a) if it likely that the activity will result in any significant adverse effect on the environment, a description of any possible alternative locations or methods for undertaking the activity;
(b) an assessment of the actual or potential effect on the environment of the activity;
(c) if the activity includes the use of hazardous substances and installations, an assessment of any risks to the environment that are likely to arise from such use;
(d) if the activity includes the discharge of any contaminant, a description of—
(i) the nature of the discharge and the sensitivity of the receiving environment to adverse effects; and
(ii) any possible alternative methods of discharge, including discharge into any other receiving environment;
(e) a description of the mitigation measures (safeguards and contingency plans where relevant) to be undertaken to help or prevent or reduce the actual or potential effect;
(f) identification of the persons affected by the activity, any consultation undertaken, and any response to the views of any persons consulted;
(g) if the scale and significance of the activity's effects are such that monitoring is required, a description of how and by whom the effects will be monitored if the activity is approved;
(h) if the activity will, or is likely to, have adverse effects that are more than minor on the exercise of a protected customary right, a description of possible alternative locations or methods for the exercise of the activity (unless written approval for the activity is given by the protected customary rights group).

You should also include:

(a) an assessment of the activity against any relevant provisions of any relevant objectives, policies, or rules;
(b) any information specified to be included in the application in accordance with the relevant regional plan;
(c) for an application to replace an existing consent, an assessment of the value of the investment of the existing consent holder:

An assessment of effects **must** address the following matters:

(a) any effect on those in the neighbourhood and, where relevant, the wider community, including any social, economic, or cultural effects;
(b) any physical effect on the locality, including any landscape and visual effects;
(c) any effect on ecosystems, including effects on plants or animals and any physical disturbance of habitats in the vicinity;
(d) any effect on natural and physical resources having aesthetic, recreational, scientific, historical, spiritual, or cultural value, or other special value, for present or future generations;
(e) any discharge of contaminants into the environment, including any unreasonable emission of noise, and options for the treatment and disposal of contaminants;
(f) any risk to the neighbourhood, the wider community, or the environment through natural hazards or the use of hazardous substances or hazardous installations.

6 Affected Parties

Please attach written approval from parties who may be affected by your activity. *Written Approval of an Affected Party* forms are available on the Environment Southland website. During the processing of your application, Council may determine that additional approvals are required.

7 Site visit from the Consents Team

Consents staff are able to meet with you, visit your site and see what you are proposing to do. We find that this is beneficial to everyone involved. The cost of the visit will be included in the total cost of processing your consent. We find that applications that have an on-site visit are processed with less congestion and at a similar or lesser overall cost. We will contact you if we consider a site visit to be advantageous in processing your application.

8 How much will it cost to process my application?

Environment Southland's User Charges and Fees document is available at: www.es.govt.nz/fees-and-charges

When the consent has been processed you will receive an invoice for an additional fee, or for a refund.

User Charges

Please note that additional Annual User Charges will apply to all consents.

How to pay

Environment Southland accepts payment in the forms of cash, Eftpos, or electronic transfer. All electronic transfers must include the applicant's name and "consent application" as a reference. Please make electronic payments to: Environment Southland, 01-0961-0018998-00 or online at www.es.govt.nz/online-services/online-payments.

9 Checklist: Have you included the following?

✓	Payment of the required deposit *(see fee schedule)*	Arranged to be paid by online banking.
–	Written approval from all potentially affected parties *(forms available from the Environment Southland website)*	
✓	Site plan/location map/sketch of the proposed activity	
NA	A copy of the Certificate of Incorporation (*where applicant is a company*)	
✓	Part B form(s) specific to your activity and/or a separate assessment of environmental effects (AEE)	

Notes:

(a) If your application does not contain the necessary information and the appropriate fee, Environment Southland may return the application.

(b) Under S35 of the Resource Management Act 1991 your application will be publicly available information and subject to the relevant provisions of the Local Government Official Information and Meetings Act 1987.

Signature of applicant

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

I undertake to pay all actual and reasonable application processing costs incurred by Environment Southland.

Name (block capitals) _____

Signed _____ **Date** _____

(*Signature of applicant or person authorised to sign on behalf of applicant*)

Application for a Coastal Permit (PART B)

This application is made under Section 88 of the Resource Management Act 1991

environment SOUTHLAND REGIONAL COUNCIL
Te Taiao Tonga

A complete Part A form needs to be provided with this Part B form. The purpose of this Part B form is to provide applicants with guidance on information that is required under the Resource Management Act 1991. These forms are to act as a guide only and Environment Southland reserves the right to request additional information. **Please also refer to Chapter 18 of the Regional Coastal Plan for Southland, 2013.**

To: Environment Southland
Private Bag 90116
Invercargill 9840

1 What is this application for?

- [ ] The discharge of water to water
- [x] The discharge of contaminants to water
- [ ] Structures - erecting/placing, reconstructing, altering/extending, removing/demolishing
- [ ] Occupying space within the coastal marine area
- [ ] Removing sand, shingle, shell or other natural material
- [x] Disturbing the foreshore or seabed - excavating, drilling, tunnelling etc
- [ ] Discharging/depositing any substance in, on, or under the seabed or to coastal waters
- [ ] Commercial surface water activities
- [x] Reclaiming or draining the foreshore or seabed
- [ ] Marine farming
- [ ] Other activity carried out in, on, under or over the coastal marine area – please specify:

2 What duration of resource consent is sought? 20 years

3 Please describe how the activity will be carried out. For structures, you must include engineering diagrams showing the dimensions and position of the structures.

See attached application and assessment of environmental effects.

4 Please state the proposed date of commencement of the activity/works and the proposed date of completion.

The activity is existing and carried out periodically on an "as required" basis.

5 Details of the contractor (or any other person) who will undertake the activity works.

Contracting company name: NA

Contact person: _____

Phone number: _____

Existing Environment

6 Are any of the following features found within the existing environment of the proposed activity? Describe these features in the space below, along with details of the assessment undertaken to determine the presence of these features.

	Yes	No
(a) Signs of marine life (e.g. fish, mammals, native birds, shellfish, invertebrates)?	✓	
(b) Areas where food is gathered from (e.g. watercress, eels, wildfowl)?	✓	
(c) Wetlands, wildlife habitats or bird nesting habitats (e.g. swamp areas)?	✓	
(d) Other activities occurring in the area (e.g. commercial activity, fishing, swimming, boating)?	✓	
(e) Areas of particular aesthetic, cultural, heritage or scientific value (e.g. archaeological sites)?	✓	
(f) Waste discharges, water takes and/or monitoring sites?	✓	

See attached application and assessment of environmental effects.

Please attach photographs and a map or a coloured aerial photograph showing the following:

- the location(s) of your proposed activity;
- any nearby rivers, creeks, estuaries, drains or any other water body;
- the location of any wetland, estuary or wildlife habitats;
- the location of any other coastal activities or structures in proximity to the proposed activity;
- activities/structures occurring on adjacent land, along with the names of the adjacent landowners.

7. In addition to the above description of the existing environment, please describe the following:

- Is the beach aggrading or degrading (if applicable)? Are there any signs of shoreline erosion?
- What is the nature of the seabed (i.e. muddy, sandy, silty, rock etc)?
- In what way has the foreshore/seabed been altered as a result of other activities occurring in the area?

Please provide cross sections and any other supportive evidence as required.

Type text here

See attached application and assessment of environmental effects.

Assessment of Effects

8 How will the proposed activity affect the coastal environment in the short term? For example, how do the initial stages of the proposed activity (including, but not limited to, construction and sea bed disturbance) affect the coast, particularly in terms of coastal erosion and effects on ecosystems?

See attached application and assessment of environmental effects.

9 How will the proposed activity affect the coastal environment in the long term? For example, through the long-term occupation of the coast.

See attached application and assessment of environmental effects.

10 How will your activity effect any other users of the coastal area and/or activities occurring on adjoining land?

See attached application and assessment of environmental effects.

11 Are there any structures near to the proposed activity? If yes, will the proposed activity have any effect on these structures? Please provide specific details including the type of structure, owner of structure, distance from proposed activity, what effects the proposed activity will have on the stability/function of the structure.

No.

12 Pursuant to Schedule 4 of the Resource Management Act, 1991, there are a number of matters that must be addressed by an assessment of environmental effects. Please discuss what effects the proposed activity will have on the following:

(a) any effect on those in the neighbourhood and, where relevant, the wider community, including any social, economic, or cultural effects

For all of Question 12, see attached application and assessment of environmental effects.

(b) any physical effect on the locality, including any landscape and visual effects

(c) any effect on ecosystems, including effects on plants or animals and any physical disturbance of habitats in the vicinity

(d) any effect on natural and physical resources having aesthetic, recreational, scientific, historical, spiritual, or cultural value, or other special value, for present or future generations

(e) any discharge of contaminants into the environment, including any unreasonable emission of noise, and options for the treatment and disposal of contaminants

(f) any risk to the neighbourhood, the wider community, or the environment through natural hazards or the use of hazardous substances or hazardous installations

13 Please include a description of the monitoring or mitigation measures (including safeguards and contingency plans where relevant) to be undertaken to help avoid, remedy or mitigate the actual or potential effects on environmental features and values.

See attached application and assessment of environmental effects.

14 For construction works, please describe how you will minimise the release of silt, sediment, concrete and other contaminants into water.

See attached application and assessment of environmental effects.

15 Please include a description of any possible alternative locations or methods for undertaking the activity and why these alternatives have not been selected.

See attached application and assessment of environmental effects.

16 Please include evidence of any consultation undertaken for this application. This may include (but not be limited to) consultation with adjoining landowners, other consent holders in the immediate area, iwi (e.g. Te Rūnanga O Ngāi Tahu, Te Ao Marama Inc), government departments/ministries (e.g. DOC, Maritime NZ), territorial authorities, advisory bodies (e.g. Fiordland Marine Guardians), non-governmental organisations (e.g. Forest & Bird), industry representatives (e.g. CRA8 Management Committee and recreational associations).

Please note that in accordance with Schedule 4 of the RMA, you must provide an assessment of whether or not the proposed activity is contrary to any of the relevant provisions of the following documents.

(a) Regional Coastal Plan for Southland, 2013
(b) Southland Regional Policy Statement, 2017 (and any proposed/subsequent versions)
(c) New Zealand Coastal Policy Statement, 2010

Staff are able to advise whether this is required, as it is dependent on the location, scale and complexity of your proposal. We invite you to come in for a pre-application meeting with Environment Southland consents staff to discuss this. The first half hour of assistance on any application or proposal is free of charge, with subsequent assistance being charged according to the Environment Southland Fees and Charges schedule.

END OF FORM

Appendix 2

1. ***Locality & sitepPlans***
2. ***Openings sites with100m buffer boundaries***

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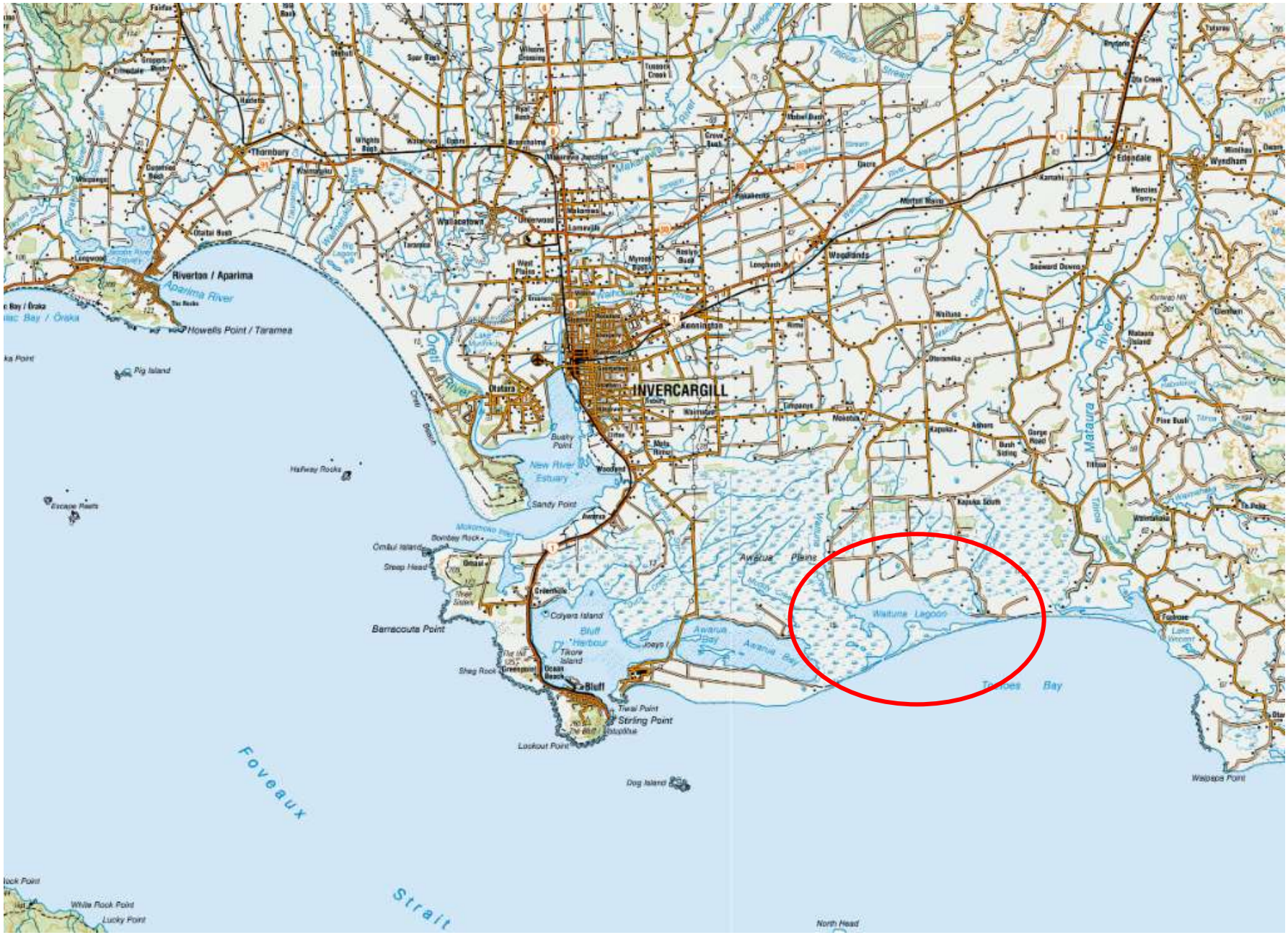
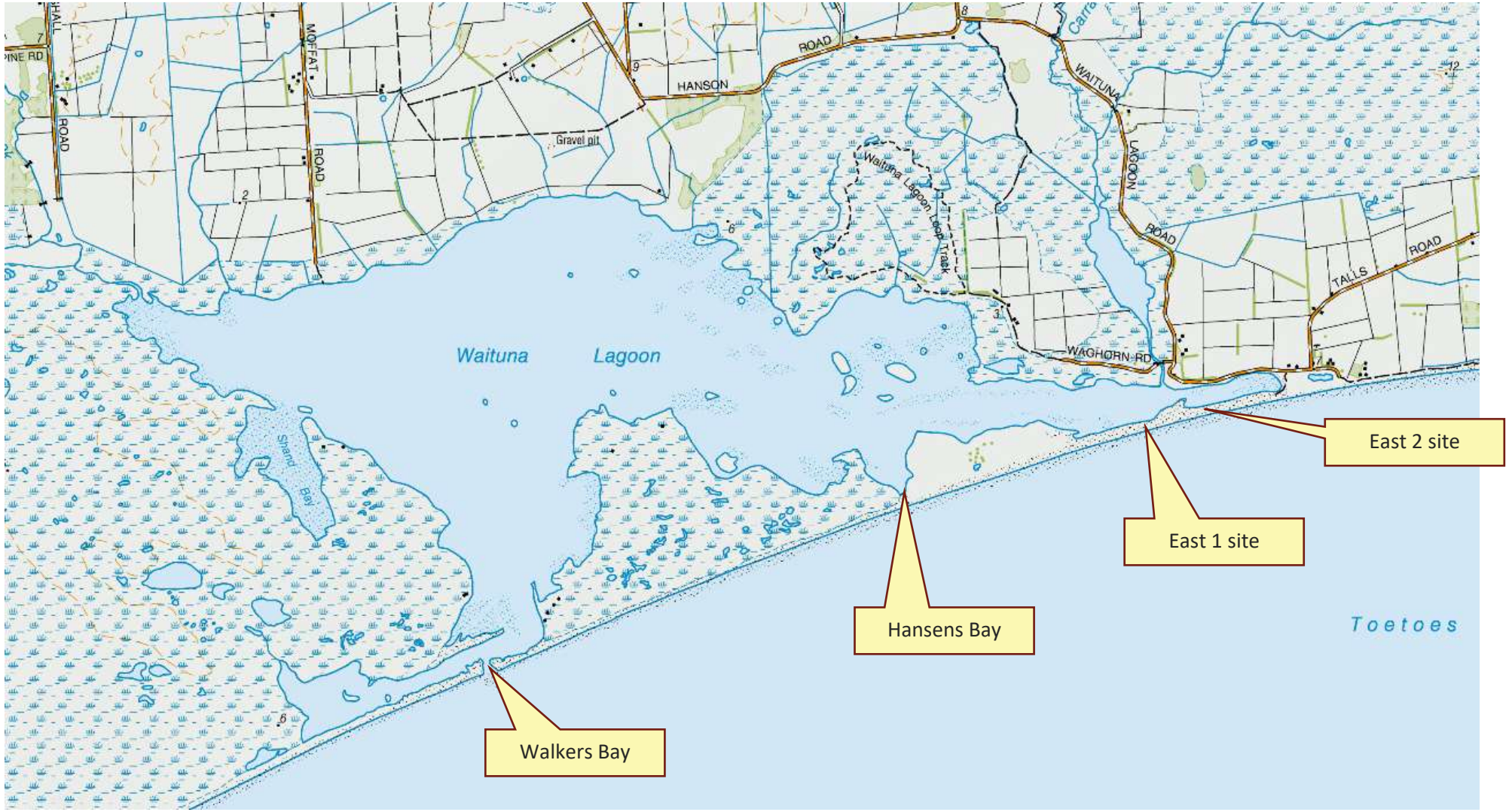
Map 1 - Location plan



Map 2 - Site plan



Map 3 Walkers Bay, showing 100m boundary from areas where the opening may occur. WB1 and WB2 are the points between which consent is sought, whereas WB1a and WB2a are points closest to the wetland from which the 100m boundary has been assessed.

Map 4 Hansens Bay, showing 100m boundary from areas where the opening may occur. HB1 and HB2 are the points between which consent is sought, whereas HB1a and HB2a are points closest to the wetland from which the 100m boundary has been assessed.

Map 5 Sites East 1 and East 2, showing 100m boundary from areas where the opening may occu. These sites, which have been used historically, have not been assessed on the ground. See Section 1 for further explanation.

Appendix 3

Standards for People & Aquatic Life classification

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Rule 7.2.2.11 - People and Aquatic Life Water Quality Standards

Waters being managed for the purposes of People and Aquatic Life (P & AL) must meet the following standards, after reasonable mixing of any contaminant or water within the receiving water and disregarding the effect of any natural perturbations that may affect the water body:

1. the natural temperature of the water shall not be changed by more than 3° Celsius and the natural temperature of the water shall not exceed 25°Celsius;
2. any pH change and/or any discharge of a contaminant into water or water into water or onto the seabed shall not result in a loss of biological diversity or a change in community composition;
3. the concentration of dissolved oxygen shall exceed 80% of saturation concentration;
4. fish and other aquatic organisms shall not be rendered unsuitable for human consumption by the presence of contaminants;
5. there shall be no undesirable biological growths as a result of any discharge of a contaminant into the water;
6. aquatic life is not adversely affected by the taking of any physical, chemical or biological constituent from that water;
7. visual clarity shall not be diminished by more than 20 percent;
8. the water shall not be rendered unsuitable for bathing by the presence of contaminants; and
9. the water shall not be altered in those characteristics which have a direct bearing upon cultural or spiritual values.

Appendix 4

Lagoon opening record

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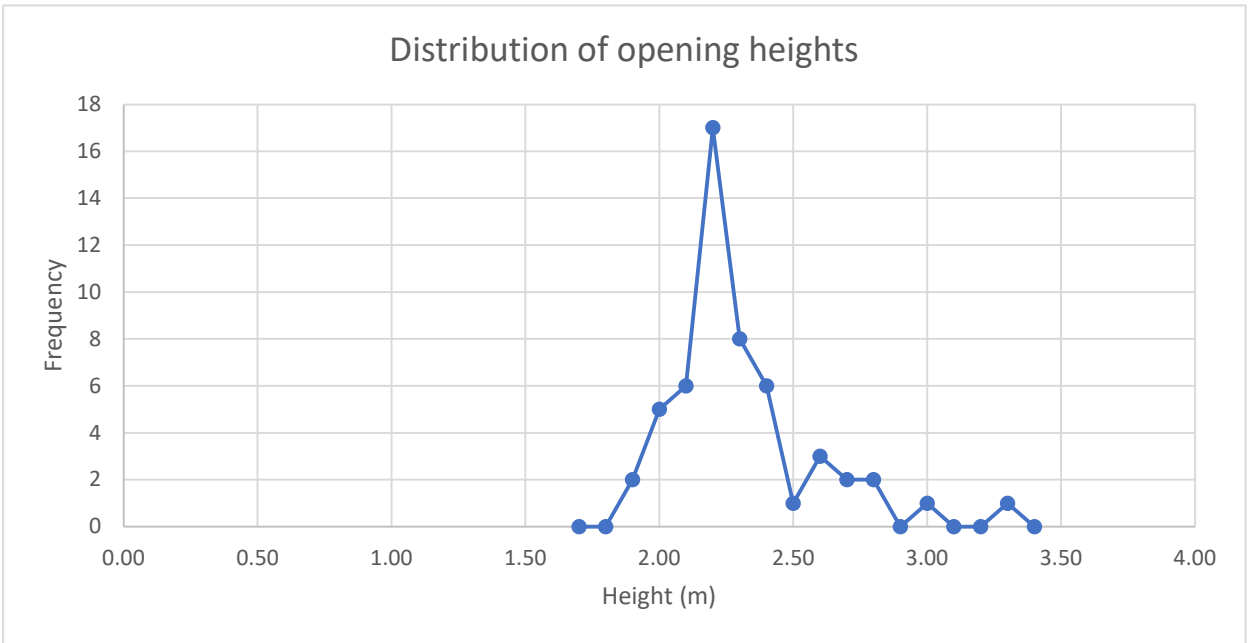
Date opened	Date closed	Level at opening (m)	Days open	Location
25/04/1972	31/05/1972	2.40	36	-
22/07/1972	8/08/1972	2.20	17	-
20/09/1972	10/10/1972	2.20	20	-
8/06/1973	9/06/1973	-	1	-
16/07/1974	-	-	-	-
17/07/1974	-	-	-	-
29/05/1975	19/06/1975	2.20	21	-
17/09/1975	-	1.90	-	-
26/07/1976	23/08/1976	2.40	28	-
12/05/1977	6/06/1977	2.00	25	-
7/10/1977	3/11/1977	2.00	27	-
14/08/1978	10/10/1978	2.20	57	-
24/02/1979	1/07/1979	1.85	127	-
26/09/1979	23/08/1980	2.20	178	-
22/06/1980	27/06/1980	2.20	5	-
27/08/1980	30/10/1980	2.60	64	-
24/07/1981	8/09/1981	2.15	46	-
21/10/1981	26/04/1982	2.00	187	-
2/07/1982	18/07/1982	2.10	16	-
13/09/1982	3/10/1982	2.20	20	-
3/01/1983	30/06/1983	2.20	178	-
5/09/1983	1/06/1984	2.10	270	-
4/10/1984	1/05/1985	2.02	209	-
26/07/1985	17/09/1985	2.35	53	-
16/05/1986	8/06/1986	2.30	23	-
14/08/1986	4/05/1987	2.65	263	-
5/08/1987	23/08/1987	2.35	18	-
19/05/1988	19/07/1988	2.75	61	-
20/09/1988	8/03/1989	2.30	169	-
24/06/1989	10/06/1990	2.60	351	-
23/02/1991	1/06/1991	2.50	98	-
21/10/1991	23/05/1992	2.22	215	-
10/08/1992	24/10/1992	2.70	75	-
5/07/1994	5/09/1994	3.25	62	-
12/07/1995	31/03/1996	3.00	263	-
4/07/1996	15/01/1997	-	195	-
2/07/1997	21/07/1997	-	19	-
20/12/1997	2/05/2000	-	864	-
14/10/2000	-	-	-	-
10/06/2002	8/08/2002	2.30	59	-
9/11/2002	4/05/2003	2.00	176	-
24/07/2003	1/04/2004	2.20	252	-
10/06/2004	15/07/2004	2.20	35	-
5/01/2005	2/04/2005	2.20	87	-
7/07/2005	2/06/2006	2.00	330	-
12/07/2007	21/08/2007	2.16	39	-
25/08/2008	5/10/2008	2.30	41	-
29/07/2009	4/10/2009	2.33	68	-
27/09/2010	31/03/2011	2.60	185	Walkers Bay
15/07/2011	17/08/2011	2.79	34	Hansens Bay
5/07/2012	24/07/2012	2.20	19	Walkers Bay
30/10/2012	18/06/2013	2.10	230	Walkers Bay
27/07/2013	7/08/2014	2.10	386	Walkers Bay

17/06/2015	3/06/2015	2.20	13	Walkers Bay
11/09/2015	17/10/2021	2.15	35	Walkers Bay
3/06/2016	6/01/2017	2.30	214	Walkers Bay
3/05/2018	3/10/2018	2.31	127	Walkers Bay
14/06/2019	29/06/2019	2.10	15	Walkers Bay
15/10/2019	18/05/2020	2.30	216	Walkers Bay
23/09/2020	24/03/2021	2.30	203	Walkers Bay
2/09/2021	-	2.16	-	Walkers Bay

Maximum	3.25	864
Minimum	1.85	1
Mean	2.29	125
Median	2.20	63

Height (m)	Frequency
1.70	0
1.80	0
1.90	2
2.00	5
2.10	6
2.20	17
2.30	8
2.40	6
2.50	1
2.60	3
2.70	2
2.80	2
2.90	0
3.00	1
3.10	0
3.20	0
3.30	1
3.40	0
	0



Appendix 5

Report – Waituna Science Advisory group – Maximum Lagoon Trigger Level – September 2017

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Waituna Science Advisory Group Maximum Lagoon Trigger Level

Sept. 2017

Marc Schallenberg, Otago University
Hugh Robertson, Dept. of Conservation

Brief: To set a maximum level for managing the ecological health of the lagoon, noting that it can be opened at any level under that if the need arises e.g. to flush nutrients from the lagoon

Key questions to answer:

1. What is your maximum recommended level for the lagoon if we can open **and** close it?
2. What is your maximum recommended level for the lagoon if we can **only** open it?

Revised: 6 September 2017

Response from the Waituna Science Advisory Group (SAG):

The SAG recommends an interim increase in the trigger level to 2.5 m a.s.l. This recommendation is valid for both Q1 (able to open and close lagoon) and Q2 (only able to open lagoon) Our assessment is based on the current knowledge of the lagoon.

How the interim recommendations were derived

Initially, the SAG had a tight, time 10-day frame within which to provide these recommendations (Dec. 9 to 19 2016). SAG members Marc Schallenberg, Hugh Robertson, Nick Ward, David Burger and Nicki Atkinson contributed to discussions via a web-based platform, while Katrina Robertson supported our work. The recommendations stated above have been supported by the SAG members who contributed to the discussion on the web-platform.

Subsequently (April-September 2017), the SAG undertook further research and analysis to verify its earlier recommendation.

Data sources used:

The analyses used to support the recommendations were carried out using bathymetry, LIDAR elevations, water levels and opening durations supplied by Environment Southland. Water clarity data and information on *Ruppia* depth distributions were obtained from Schallenberg & Tyrrell (2006), Robertson & Funnell (2012), Schallenberg unpubl. data, Gerbeaux (1993) and Sutherland et al. (2014). Data on the response of *Ruppia* to lagoon opening events since 2008 was also assessed, based on the annual macrophyte monitoring that is undertaken by NIWA (e.g. Sutherland et al. 2016). In addition, the Environment Southland hydrological model for the lagoon (developed and run for us by Chris Jenkins) was hindcast to estimate the likely duration and frequency of historical 'high water events' if the lagoon trigger level had been set to 2.5 m, 2.7 m and 3.0 m during the spring/summer period. As we have been asked to provide an interim trigger level, there has been no accounting for long term sea level rise in our analysis**.**

Key values considered:

The SAG derived a list of key values of Waituna Lagoon to be considered when deriving a trigger (maximum) water level for the lake, including fish migration, *Ruppia* and submerged macrophyte

community, fringing wetland emergent plant community, various habitats for threatened fish, bird and plant species, etc. While the analysis mainly focused on the health of the submerged and emergent plant communities with a view to maintaining and enhancing the ecological integrity of Waituna Lagoon, a number of other values were also quickly evaluated (refer Table A1). The SAG suggests that a fuller analysis of all key values (e.g., using multi-criteria decision analysis or similar) should be carried out in future with respect to developing a comprehensive hydrological management strategy and plan for Waituna Lagoon.

Lagoon water level effect on opening duration

The SAG was initially concerned that the lake level at opening could affect the opening duration and that, consequently, raising the trigger level might result in longer openings due to increased scouring of the gravel bar at the opening site. However, an analysis of the existing data showed no significant relationship between water level at opening and opening duration (Fig. 1). Therefore, it was assumed that raising the trigger level would not increase the risk of longer openings occurring. Thus, it was decided to focus the SAG's analysis on the potential direct impacts of raising the trigger level on submerged and emergent plant communities, and other values listed in Table A1.

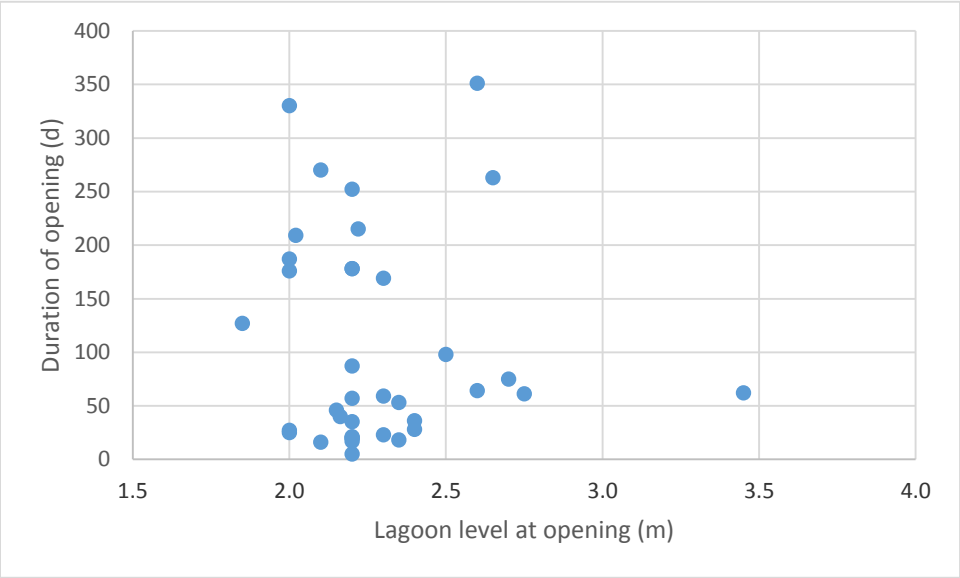

Figure 1. A biplot of water level at opening (measured at the Waghorn Rd. level gauge) and the duration of opening. Data from Environment Southland. Based on anecdotal evidence, it was expected that duration of opening would be positively correlated with lagoon level at opening. This was not supported by the data.

Relationship between water level and water clarity

In shallow lakes and lagoons, wind events increase wave energy and shear stresses at the sediment-water interface, resulting in wind-induced sediment resuspension, which reduces water clarity while the sediments remain in suspension (Hamilton & Mitchell 1996). Hypothetically, by raising the trigger level, the lake depth would episodically increase above its current maximum depth, reducing wind- and current-induced sediment resuspension at those times. By episodically reducing the shear stress on the lake bed, raising the level of the lake should to some extent increase the water clarity of the lake, however the hypothesised increase in clarity may or may not compensate for the effect of increasing water depth on the light climate experienced by macrophytes. To test whether higher lagoon levels increase water clarity, we compared Environment Southland's lake turbidity data from 2003 to 2015 at times when the lagoon was open (low water levels), filling (intermediate water levels) and full (high water levels). The data show no significant differences in turbidity (a rough

indicator of water clarity) when the lake was in any of those states (Fig. 2). Thus, there appears to be no effect of water level on turbidity, indicating no effect on sediment resuspension. This result is probably due to samples having been collected on generally calm days (e.g., the maximum recorded turbidity in the dataset is only 27 ntu), which may not reflect the turbidity conditions during strong wind events. Nevertheless, the data indicate that any increase in turbidity due to wind-induced resuspension is probably short-lived in the lake, with resuspended sediment rapidly settling out of the water column when winds, turbulence and currents decrease.

Acknowledging that the lack of effect of lagoon level on turbidity in the ES dataset is probably due to sampling bias (avoiding sampling during wind events) and acknowledging that raising the lagoon level would reduce shear on the sediment water interface, we were prepared to accept an increase in water clarity on the order of 5% (annually) as a result raising the trigger level to around 2.5 m.

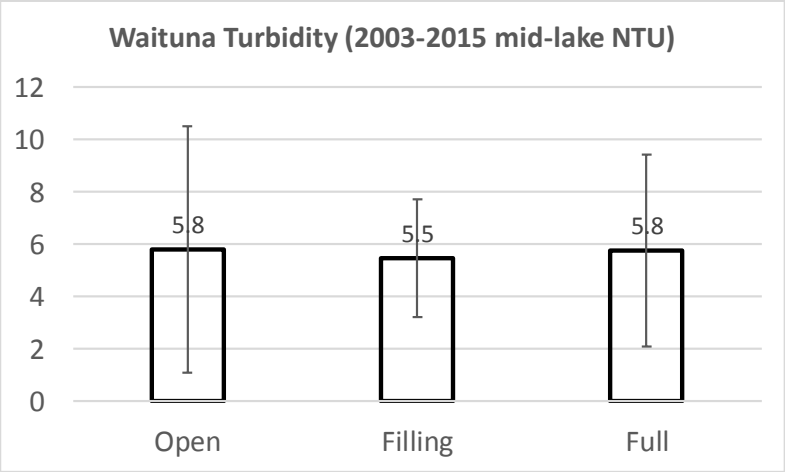

Figure 2. Comparison of average mid-lake turbidity measurements from 2003 to 2015 at times when the lake was open to the sea (low water levels), when it was filling (intermediate water levels), and when it was full (high water levels). Error bars = 1 standard deviation. There is no significant difference in turbidity that can be attributed to water levels during these three states. The numbers on the graph indicate the average turbidity values in each state. Data from Environment Southland.

Effects of trigger level at 2m

Up until February 2017, Waituna Lagoon operated under a resource consent with a maximum water level of 2.0 m.

Extensive monitoring of the aquatic macrophytes, water chemistry and water levels has occurred since 2008. A summary of information on lagoon ecology and the effect of spring-summer events on macrophyte abundance was described in the *Ecological Guidelines for Waituna Lagoon* (Waituna Lagoon Technical Group 2013) as well as recent monitoring reports by NIWA (e.g. Sutherland et al. 2016).

The graphic below (Fig 3) illustrates the relationship between the duration of opening events (days open) and the frequency of *Ruppia* occurrence at the monitoring sites (% of sites sampled where *Ruppia* was present). When the lagoon is open for prolonged periods the abundance of *Ruppia* and other macrophytes decreases, reducing the abundance of keystone species for maintaining lagoon health. It has been observed that low water levels instead enhance nuisance slime algae and can lead to marine sand intrusion.

The reduction in macrophyte abundance is due to a 30% loss in available habitat associated with lower water levels, competition with slime algae which prefer higher salinities, and suppressed growth and reproduction of *Ruppia* cause by high salinities. As such the Waituna Lagoon Technical Group guidelines for Waituna Lagoon recommended to minimise the risk of the lagoon being opened during spring and summer (Waituna Lagoon Technical Group 2013). This recommendation has been endorsed from the ongoing monitoring of aquatic plants (Sutherland et al. 2016), which concluded '*the ecological health objective target of > 30-60% macrophyte cover has been successfully achieved through the management of the lagoon openings, in particular, ensuring that the lagoon remained closed during the growing season*'.

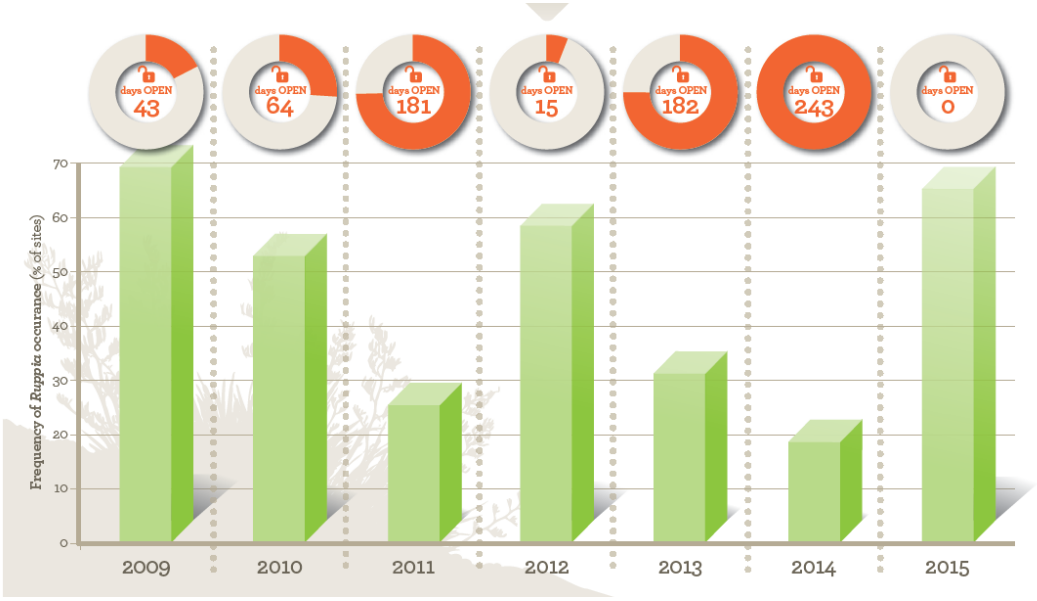

Figure 3. Percentage of *Ruppia* monitoring sites in which *Ruppia* occurred from 2009 to 2015. The numbers above the bars indicate the number of days per year that the lagoon was open to the sea, indicating that *Ruppia* occurrence at the sites declined markedly in years when the lagoon was open around half the time or more. Source: http://www.doc.govt.nz/Documents/conservation/land-and-freshwater/wetlands/arawai-kakariki-report-card-awarua-waituna-water.pdf

How raising the trigger level can provide a mechanism to reduce the frequency of spring-summer opening events

One mechanism to mitigate the risk associated with spring-summer opening events, is to increase the maximum water level when opening occurs. This would 'buy time' by allowing for water levels following storm/rainfall events to naturally recede via seepage through the gravel barrier bar and, therefore, preventing a spring-summer opening.

Figure 4 illustrates how a higher trigger level allowed for the lagoon to remain closed in the 2014-2015 summer, which subsequently led to macrophyte recovery. The duration of high water (>2m) was c. 12 days. In this instance, the lagoon did go above 2.2 m, but discussion between stakeholders led to the system remaining closed, and water naturally receding via seepage.

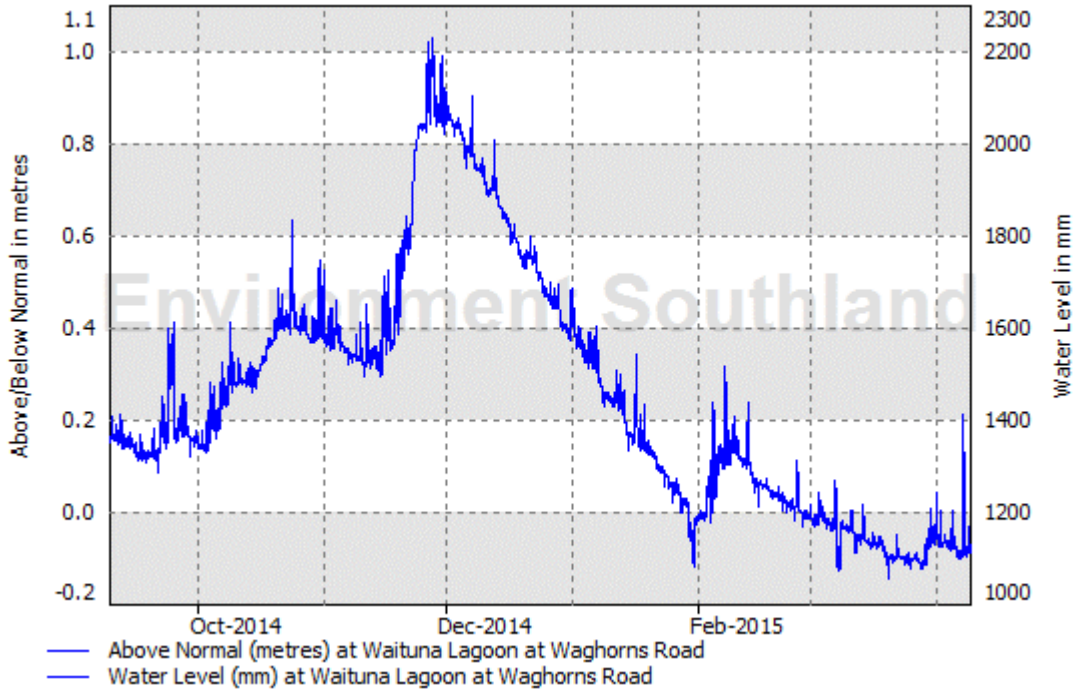

Figure 4. Waituna Lagoon water levels in spring and summer 2014/15, showing how lagoon levels receded via seepage when the lagoon wasn't opened at its trigger level of 2.0 m. Source: Environment Southland.

To explore the potential for the lagoon to resist opening at higher water levels, Environment Southland's Waituna Lagoon hydrological model (developed by Chris Jenkins) was used to hindcast the number and duration of water level events exceeding 2 m if higher trigger (2.5m, 2.7m, 3.0) levels had been applied (Table 1).

Table 1. Analysis of water level events exceeding 2.0 m, hindcast using Environment Southland's hydrological model. See Appendix 2 for model assumptions. Data from Chris Jenkins, Environment Southland.

	Annual average days above 2.0 m	**Annual average total events of 2.0 m**	**Average duration of events above 2.0 m (days)**	**Average number of spring openings per year**
Base Scenario Opened at 2.2 m	2.3	0.6	4.8	0.1
Scenario 1 Opened at 2.5 m	5.5	0.6	11.7	0.0
Scenario 2 Opened at 2.7 m	5.7	0.6	12.1	0.0
Scenario 3 Opened at 3.0 m	5.6	0.6	11.7	0.0

This analysis indicates, that as the maximum water level were increased to 2.5 m from the current trigger of 2.2 m, the total duration as well as the average event duration of events > 2.0 m would have roughly doubled, but the number of events wouldn't have increased. The average duration of

these events (above 2.0m) was between 5 and 12 days. Crucially, however, raising the trigger level to 2.5 m would have avoided spring openings, with almost no further change in the behaviour of the system. Therefore, raising the trigger level to 2.5 m would increase the ability to keep the lagoon closed during spring/summer (when desired), helping to maintain *Ruppia* and other macrophytes during the key germination and growth period. Raising the trigger level above 2.5 m up to 3.0 m would not have resulted in any further benefit in this regard.

Effects of raising the trigger level on submerged plant habitat

A trade off from increasing the maximum trigger level, and having water levels >2.0m for longer than c. 10-day periods is an increase in light limitation, notwithstanding the potential for improved water clarity due to less resuspension of sediments during wind events (refer above).

To explore the effect of lagoon water level on the extent of the euphotic zone (the zone of lagoon bed that receives enough light for plants to grow), we developed a simple model based on the bathymetry of the lagoon and its marginal area (Environment Southland data), water level and trigger levels, and the relationship between light penetration and depth for Waituna Lagoon (Schallenberg et al. 2010; Sutherland et al. 2016). The water of Waituna Lagoon has a strong baseline level of light attenuation with depth due to high concentrations of humic acids and it has episodes of even greater light attenuation due to suspended sediments in inflowing water and those resuspended from the lake bed by wind and currents. Consequently, raising the lake level (increasing its depth) will change the area of the lake bed receiving enough light to allow *Ruppia* and other macrophytes to grow – the extent of submerged plant light habitat. The zone of plant growth in lakes is known as the littoral zone and is bounded by the upper elevation of the water level, above which submerged macrophytes cannot grow due to desiccation, and the lower level of light penetration, below which plants don't receive enough light to grow (also known as the euphotic depth). These boundaries are not strict because some macrophytes and/or their propagules can survive periods of desiccation and darkness and plants grow toward light and can thus to some degree overcome darkness at depth.

Based on repeated macrophyte surveys in Waituna Lagoon, Sutherland et al. (2016) estimated euphotic depth in Waituna Lagoon to be the depth to which 10% of surface light can penetrate (roughly 1.27 m depth). We added another 5% on to the euphotic depth to roughly account for an hypothesised increase in water clarity as a result of increasing the water level (refer above) to derive a euphotic depth for our plant habitat model of 1.34 m. However, the 2016 survey (Sutherland et al. 2016) did indicate that *Ruppia megacarpa* was growing at some deeper depths, for example at 1.70m water depth (site 1-1) and 1.55m (site 4-3). At these sites *R. megacarpa* had >90% cover abundance and the plant height was >1m. During the survey period (25-29 January 2016) the water level in Waituna Lagoon was also only ~1.2m above sea level (i.e. lagoon wasn't temporarily deep at time of survey). This suggests that the euphotic depth represented by the 10% light level does not apply strictly to plants that have established a high canopy height, but probably does apply to short plants and also to plant regeneration from propagules on the lagoon bed.

Our model supports previous studies which showed that at the current trigger level, light attenuation in Waituna Lagoon is sufficient to reduce light below the light threshold for plant growth in the deeper areas of the lake bed (Schallenberg & Tyrrell 2006; Sutherland et al. 2016; Fig. 5), highlighting a potential risk to submerged macrophytes from raising the trigger level of the lake.

Our analysis shows that while raising the lake level increases the inundation area of the lake, providing more potential habitat, it also increases the dark zone (the zone below the euphotic depth; Fig. 5). While the potential habitat increases in absolute terms, the percentage of the bed of the lagoon that receives light decreases as the trigger level (and lagoon level) increases (Fig. 6).

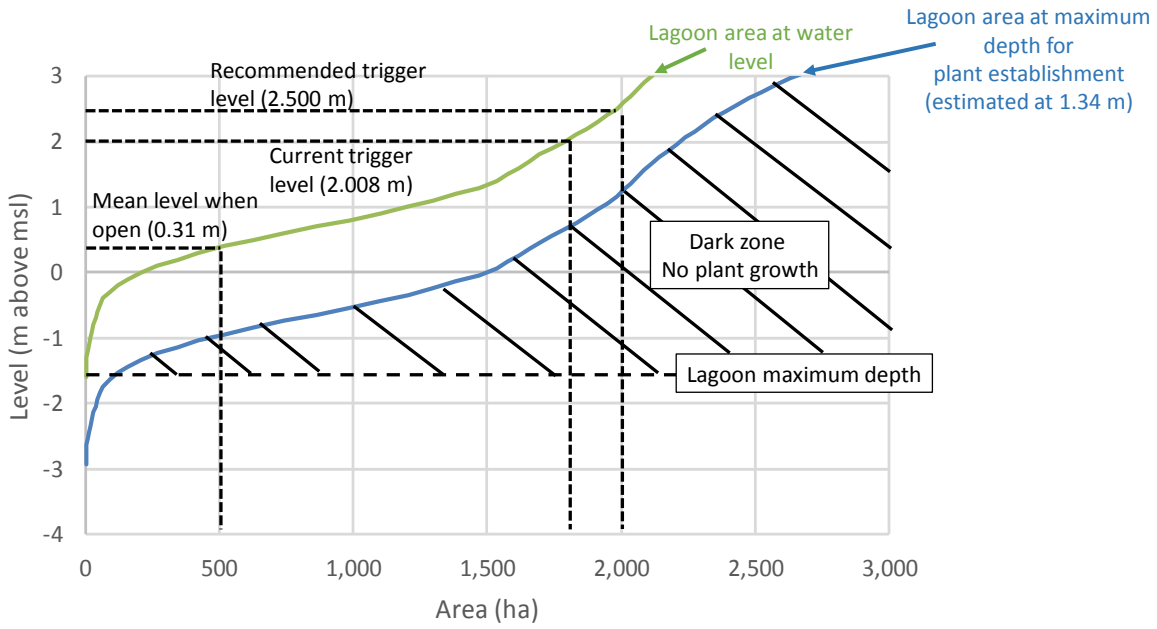

Figure 5. Change in plant habitat (growing area) with change in lagoon water level, showing the dark zone, which is deeper than the threshold for plant growth. The green line represents the lake water level and its corresponding area. The blue line represents the level of the lagoon bed at the threshold depth for plant growth, and its corresponding area. The mean lagoon level when open, the current and recommended trigger levels are also shown.

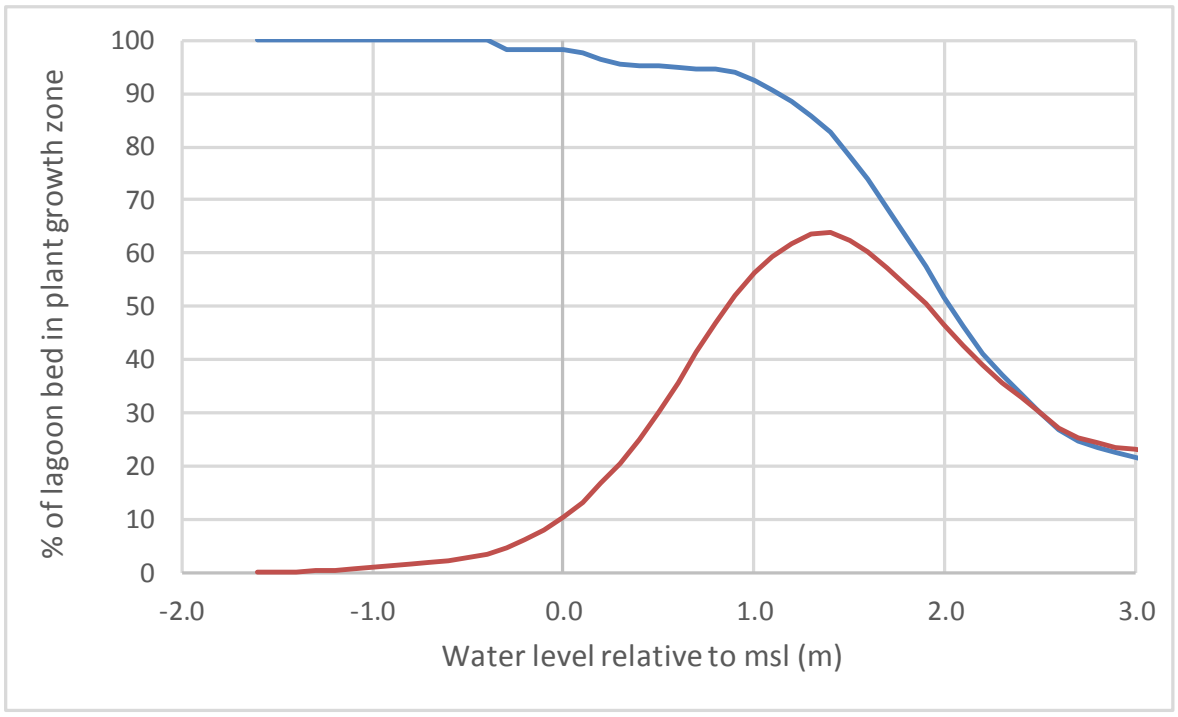

Figure 6. The change in the percentage of lagoon bed that is within the plant growth zone (see Fig. 5), as a function of water level. The blue line indicates the percentage of lagoon bed plant habitat at instantaneous water levels (indicated by the x-axis). The red line indicates the lagoon bed plant

habitat related to water level with habitat expressed as a percentage of a constant potential lagoon plant habitat area – in this example the area is the lagoon area at the trigger level of 2.5 m.

Our simple model of plant habitat (Fig. 6) shows that when the lagoon water level is equal to the current trigger level (2.008 m), around 50% of the wetted lake bed is within the euphotic zone and 50% is too dark to support plant germination or the growth of small plants (blue line). This percentage decreases to 30% of the lagoon bed as the water level increases to the recommended trigger value (2.50 m). This scenario would only reflect light conditions in the lagoon during rare excursions into the highest allowed water levels and would not reflect the annual average habitat availability. Nevertheless, Environment Southland's Waituna Lagoon Guidelines recommend maintaining a macrophyte coverage of 30-60% of the lagoon bed to safeguard the health of the lagoon. Therefore, the results of the model, although crude and subject to error, indicate that light limitation could impinge on lagoon health if the trigger level were to be set much above the recommended level of 2.5 m. The red line in Fig. 6 shows the percentage of the lagoon bed within the growth zone when the potential area for growth is equal to the lagoon area at a water level of 2.5 m. This shows that as the lagoon level declines below 2.5 m, potential macrophyte habitat is lost due to dewatering of progressively larger areas of the lagoon bed.

With our model (Fig 6), we have demonstrated the existence of trade-offs between the benefits to macrophytes of raising the trigger level and the degree to which plants in deeper parts of the lagoon may become light stressed as a result. The lagoon water level does appear to naturally sit at around 1.2-1.8m water depth (relative to sea level) when it is closed and so when the water level exceeds 2.0m, it is often only for relatively short periods (Fig. 7). Therefore, interpretations of the relationship between water level vs macrophyte cover in the lagoon that are based on our model should also account for the generally short duration of high water events, and the ability of tall plants to withstand a fluctuating light environment.

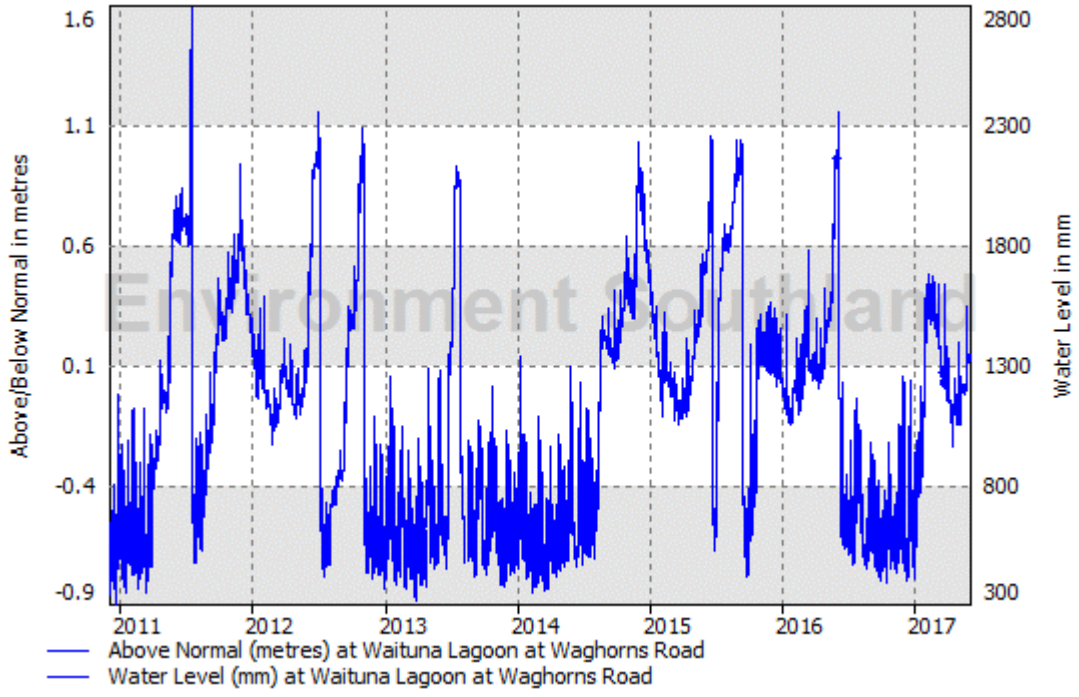

Figure 7. Water levels recorded at the mid-lagoon site from 2010 to 2017 showing the short duration of high water events (i.e. > 2.0 m), even when the lagoon wasn't opened (e.g., late 2011 and late 2014).

Effects of raising the trigger level on fringing wetlands

It is the SAG's view that the fringing wetland system would benefit from episodic inundation at levels >2.0m. For example, the inundation of low-lying rushland (Fig. 8) will promote the establishment of native wetland vegetation and promote habitat diversity. In support of this, a comparison of the vegetation changes between 1995 (Johnson/Partridge 1995) and 2012 (Wriggle 2012) shows that a number of species had shifted down-slope during this period (Bythell 2013). Both botanical ecologists Hugh Robertson and Brian Rance (DOC) concur with this finding and the utility of having a more flexible water regime, especially at higher water levels, to help rejuvenate valuable wetland ecology and reduce the abundance of non-native plant species. Consequently, the SAG recommends that increasing the trigger level to 2.5 m will provide for beneficial episodes of inundation and rejuvenation of valuable fringing wetland plant communities.

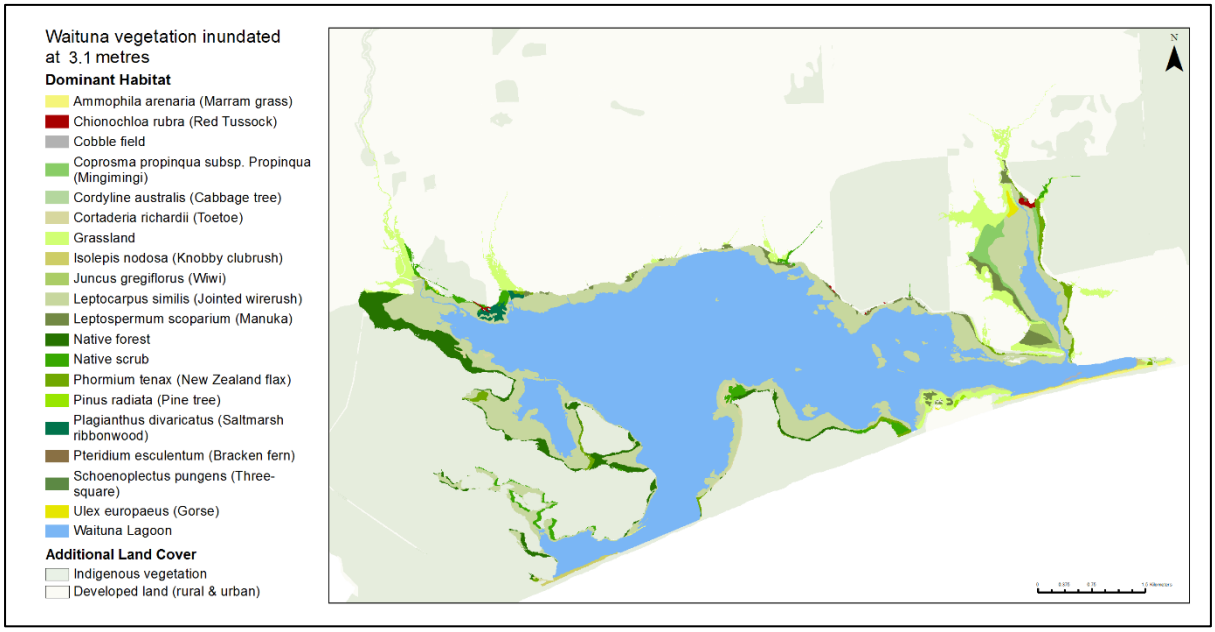

Figure 8. Fringing wetland habitats of Waituna Lagoon which would be flooded at a water level of 3.1 m a.s.l. Data are based on LIDAR surveys (Environment Southland) and a wetland vegetation survey (Wriggle 2012).

Summary

Summaries of trigger level considerations for Questions 1 and 2 were produced and these are shown in Table A1(Appendix 1).

The SAG concluded that raising the trigger level to 2.5 m was likely to benefit the submerged macrophyte community if the lagoon is not able to be closed. That is because in some seasons (spring-summer) prolonged opening events can have a detrimental effect of macrophyte growth and reproduction. A hydrological model used to hindcast hydrological inputs and outputs to the lagoon

showed that raising the trigger level to 2.5 m would have avoided the occurrence of any spring-summer openings. Assumptions of the hydrological model are presented in Appendix 2. A simple macrophyte habitat model based on light penetration to the lagoon bed indicated that while the area of the lagoon bed receiving enough light for macrophyte growth would increase at higher lagoon levels, the proportion of the lake bed receiving adequate light would be reduced to 30% at the trigger level of 2.5 m. However, this effect would be minor because the periods of light increased limitation would be relatively short, and this stress could be mitigated with a comprehensive hydrological management plan.

The SAG also concluded that allowing the trigger level to rise to 2.5 m would benefit the fringing wetland plant community.

The models we used are simple models which illustrate some of the trade-offs and trends expected in relation to raising the trigger level. Some important knowledge gaps remain. Therefore, the SAGs recommendations (below) should be considered interim recommendations, and an adaptive management approach should be utilised when developing a long-term hydrological management plan for the lagoon, informed by good quality monitoring of the lagoons water quality, emergent and submerged plant communities, fish community and other important cultural and ecological values.

Recommendations

The SAG recommends raising the lagoon level trigger value to 2.5 m to avoid spring-summer openings, which can be detrimental to the ecology of the macrophytes and the health of the lagoon. This new trigger level will also improve the health of the fringing wetland plant community.

The SAG also notes, however, that regular opening of the lagoon during winter is still likely to be required as a strategy to mitigate water quality impacts. Opening events may also be required in the event of prolonged algal blooms.

Careful monitoring of the macrophytes, macroalgae, phytoplankton and the fringing wetland plant community should continue so that any unforeseen consequences of the increase in the trigger value can be considered in an adaptive management approach to managing the lagoon health.

A comprehensive long-term hydrological management plan is needed for the lagoon. This should account for the effects of hydrological (including openings) management on the following indicators of lagoon health:

- Water column nutrient concentrations
- Algal/cyanobacteria blooms
- Light limitation or other stressors on macrophytes, especially *Ruppia* spp.
- *Ruppia* life history and related requirements for completion of its life cycle
- Fringing wetland health
- Fish migration
- Water fowl and wading birds (feeding and breeding habitats)
- Cultural values
- Recreational values

This study highlighted some knowledge gaps with regard to understanding how water level management affects the health of the lagoon. We recommend research be carried out on how water level management impacts on:

- the health of the fringing wetland,

- nutrient cycling and, especially across the sediment-water interface,
- turbidity of the lagoon.

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Appendix 1: Values and considerations taken into account in recommending raising the trigger level to 2.50 m.

Table A1. Summary of trigger level considerations in relation to Question 1 and 2 – "Is there an ideal maximum ecological water level".

Aim	Maximum	Discussion	Information needed
Preventing spring/summer openings during 'years of concern' to enable macrophyte regeneration	2.5m	Summer openings stress macrophytes and favor macroalgae. Ruppia benefits from closure and low salinity during the germination stage (spring)	No
Allowing the timing of opening events to benefit fish spawning and migration where possible	na	Issue for fish include timing of events and the maximum water level.	Relevant fish spawning and migration information
Managing a fluctuating water regime to support fringing wetlands – e.g. Oioi, turf plants	2.5m	LiDAR elevation models indicate that most wetland vegetation will be inundated when lagoon levels are ~2.3m. Irregular inundation at higher levels is positive for these systems. Also refer to the Blythell (2013) shoreline monitoring report.	Effects of water level management on fringing wetland plant communities
Providing a mechanism for excessive nutrients to be flushed to the ocean	>1.8m	Flushing of nutrients can occur above 1.8m when there is sufficient hydraulic gradient. The higher the water level the better the flushing when opened.	No
Providing a mechanism to disrupt a prolonged algal bloom	>1.5m	Ecological guidelines suggested that if needed an opening could occur at 1.5m to disrupt a prolonged algal bloom. A minimum height is needed for an effective opening, not a maximum.	No
Ensuring maximum water levels do not cause negative effects on aquatic/wetland plants (e.g. light limitation)	2.0m	Light limitation is likely to have an impact on submerged vegetation in deeper parts of the lagoon. D_{10} may be in order or 1.0-1.5m. Prolonged inundation (>20 days per annum) at higher water levels (e.g. >2.3m) may limit productivity. But because the gravel barrier is leaky – such prolonged events may be unlikely. Unknown potential positive effect of raised level on turbidity and light penetration.	Effects of water level on sediment resuspension and effects on light penetration and sedimentation onto macrophytes.
Recommendation based on these values	**2.5m**	**Note: a comprehensive water level management regime (plan) will be required to ensure the water level is optimised in any given year/event**	

Appendix 2: Assumptions of hydrological model (from Chris Jenkins, Environment Southland)

1. 39 years of record from the Waihopai River used for calibration. [Caveat: In the high event in 1994 where the Lagoon got to 3.25 MSL (Current Gauge board; 3.45 old board), there was more rainfall in the Waituna catchment than the Waihopai. The lagoon got to a maximum of 2.959 using the Waihopai data.]

2. The instant opening value of 2 MSL applied to the model does not reflect reality. Many times the lagoon rises above this, so the modelled days above 2.1 etc may not reflect reality.

3. The models use random closing criteria, so re-running these gives slightly different values each time. As some of the scenarios are very similar (Opening from 2.5 to 3 metres) there is little difference in the results as the lagoon didn't get above 2.5 metres in these models, so the summaries are almost the same.

4. The Lagoon actually got up to 2.8 MSL in July 2011. This was not reflected in the modelled results. With the winter opening criteria of 2 metres, this event would have been opened six days before the peak, so this is why the model results show lower peaks than what has resulted from past management.

5. Given these assumptions there is still some uncertaintly in the model outputs and this should be taken into consideration when using the model to develop a water level management plan.

Appendix 6

Report – Review of conditions for opening Waituna Lagoon – prepared for The Whakamana Te Waituna Trust – July 2021

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Review of conditions for opening Waituna Lagoon

Supporting Information

Prepared for The Whakamana Te Waituna Trust

July 2021

H Robertson, G Ryder, N Atkinson, N Ward, C Jenkins, M de Winton, M Schallenberg, R Holmes, J Kitson, D Whaanga, S Blair, D Murray

Table of Contents

1 Purpose

This report has been prepared for the Whakamana Te Waituna Trust and provides technical information to support the development of resource consent conditions for opening Waituna Lagoon to the sea. It presents the rationale for specific lagoon opening triggers aimed at maintaining and restoring the ecological and cultural health of the lagoon ecosystem.

The authors acknowledge that the management of lagoon water levels have impacts beyond the immediate lagoon ecosystem and have gone someway to assess the impact of an ecological based opening regime on land drainage and recreational uses in section 7.

2 Introduction

2.1. Waituna Lagoon

Waituna Lagoon is one of the best remaining examples of a natural coastal lagoon in New Zealand and is recognised for its diverse ecological characteristics and cultural values. The significance of the lagoon and its margins was recognised internationally in 1976 when it was designated a Ramsar Site and nationally by gaining Scientific Reserve status in 1983. The cultural significance to the local Ngāi Tahu people was recognised under a Statutory Acknowledgement with the Ngāi Tahu Claims Settlement Act 1998.

The lagoon and associated wetlands are identified by the Department of Conservation (DOC) as a priority ecosystem for the conservation of New Zealand's natural heritage, it is a focus catchment in the DOC/Fonterra Living Water programme and one of three wetland systems in DOC's Arawai Kākāriki wetland restoration programme. It is also highly valued for its aesthetic appeal, rich native biodiversity, waterfowl hunting, fishing, boating, bird watching, walking and scope for scientific study.

The lagoon covers an area of approximately 1350 hectares and is Southland's largest coastal lake. It is shallow, (water depth is usually <2m) and is usually isolated from the sea by a gravel bar. Prior to human management of the lagoon opening, the bar was breached and an opening to the sea was temporarily established when high lagoon water levels overtopped the barrier bar. When the lagoon was open to the sea it became estuarine and tidal for a time until certain conditions, likely related to neap tides, low inflows and calm wind and sea conditions closed the mouth.

With the advent of farming and land development the lagoon has been mechanically opened to the sea, typically with excavators, to facilitate land drainage. For the last 100 or so years the lagoon has been opened about once a year, usually when the lagoon water level exceeded 2.0m above sea level.

The history of intermittent opening and closing of the lagoon to the sea, alongside the high nutrient and sediment inputs from the catchment above, are features that have strongly influenced the lagoon's ecology and water quality. The fluctuations in water level and salinity have created a highly variable environment with associated high variability in species dominance and ecological community structure. Species alter their distribution and abundance in response to changes in water level, salinity, other environmental factors, and species interactions, creating an ecologically diverse and productive ecosystem, but one that is also at risk of being degraded by additional, anthropogenic stressors.

In 2013, concerns surrounding the state of Waituna Lagoon led to the publication of ecological guidelines to improve the management of the lagoon. These guidelines, which were developed by a Lagoon Technical Group (LTG 2013) described key attributes of the lagoon's ecosystem health in terms of macrophytes, slime/benthic algae, phytoplankton, sediment anoxia, water clarity, hydrology and nutrients.

It is recognised that the ecosystem health of Waituna Lagoon is maintained by submerged native aquatic plants known as Ruppia (two species: *R. megacarpa* and *R. polycarpa*), which are keystone species that help regulate water quality. However, the Ruppia-dominated plant community is vulnerable to a range of stressors including nutrient enrichment, water clarity, high salinity and frequent lagoon opening events.

***Figure 1**. Aerial photograph of Waituna Lagoon showing the encroachment of farmland developed and maintained by the drainage of wetland soils.*

The two main risks to the ecological health of the lagoon are:

- poor water quality largely due to high nutrient and sediment inputs from its catchment
- a hydrological regime that has been altered due to a history of opening the lagoon primarily for land drainage

2.2. Lagoon opening activity and short term consent

For the past ~100 years Waituna lagoon has been primarily opened to the sea for purpose of land drainage. The lagoon was mechanically opened so that water levels in the lagoon receded and allowed for the drainage of low-lying agricultural land surrounding the lagoon.

Prior to 2017, the water level threshold at which the lagoon was consented to be opened to the sea was ~2.0m ASL, although the specific water level when openings occurred varied, as the opening activity was also dependent on suitable wind and sea conditions.

With the increasing risk to ecological health recognised, a short-term (5 year) consent for opening Waituna Lagoon[1] came into effect in February 2017 (Appendix A). This short-term consent retained a primary focus on land drainage but included some provisions to open the lagoon to manage for poor water quality (e.g. opening to disrupt algal blooms) and established a higher opening threshold (2.2m ASL) during spring-summer months in effort to avoid frequent opening events during the early growing season for aquatic macrophytes. The expiry date for this consent is 14 February 2022.

The Department of Conservation, Awarua Runanga, Environment Southland and other agencies recognised that the short-term consent was an interim measure and jointly held aspirations to resolve the conflict between farming operations and higher water levels, thereby improving the long-term management of the lagoon opening.

In 2017 the Waituna Science Advisory Group established that higher water levels would be beneficial to ecology of the lagoon but that 2.5m ASL is the maximum water level that the lagoon should be allowed to reach if it were being managed for ecological values (WSAG, 2017).

In 2019/20 The Whakamana Te Waituna Trust[2] successfully facilitated purchasing most of the farm land affected by inundation at higher lagoon levels (figure 2, also see figure 11), thus, enabling an increase of the maximum allowed water level in the lagoon with the aim of maintaining and enhancing a broad range ecological and cultural values.

A method and rationale for determining which indicators should trigger lagoon opening are described in the following sections of this report.

***Figure 2**. Areas of farm land purchased as part of the Whakamana Te Waituna project (outlined in black/white) and areas of land affected by inundation at high lagoon levels that have not been purchased (outlined in pink/white).*

[1] Environment Southland Coastal Permit AUTH- 20146407-01.

[2] Whakamana Te Waituna Trust is made up of representatives from DOC and Fonterra (representing the Living Water Partnership), Environment Southland, Southland District Council, Awarua Runanga and two independent trustees.

3 Approach

In 2020-21, the Whakamana Te Waituna Trust initiated a work stream to develop an ecologically-based opening regime for Waituna Lagoon. This involved reviewing the current consent conditions for opening Waituna Lagoon to the sea and considering a broad range of ecological and cultural values associated with the lagoon.

As part of the review of conditions, an expert workshop was held in March 2021, involving representatives from NIWA, Cawthron Institute, Kitson Consulting (on behalf of Awarua Rūnanga), Environment Southland, University of Otago, DOC and Ryder Consulting. This group confirmed that the lagoon's water level, open/closed status and water quality remain key factors affecting many of its values. Many attributes of the lagoon and surrounding wetland ecosystem benefit from a closed lagoon (i.e., a freshwater state) while some attributes benefit from an open lagoon.

The technical review of the conditions for opening Waituna Lagoon (described in this report) involved four key steps. These were:

1. Identify Ecological and Cultural Values (section 4):
    - Reconfirm the suite of key ecological and cultural values that are affected by lagoon opening and, therefore, need to be considered in relation to any change in opening regime.

2. Review the Existing Consent Conditions (section 5):
    - Review the impact of the existing consent conditions and monitoring information on key ecological and cultural values of the lagoon.

3. Propose New Consent Conditions (section 6):
    - Conduct an integrated assessment of ecological and cultural values and identify conditions that will maintain or enhance the values identified.

4. Assess the Impact of Proposed Consent Conditions on other values (section 7):
    - Assess the impact of the Proposed Consent Conditions on other key values for the Waituna Community including on land drainage, trout fishing and duck hunting.

4 Ecological and cultural values

A clear understanding of the ecological and cultural values of Waituna Lagoon is fundamental to reviewing the conditions for lagoon opening to the sea. Previously, the ecological guidelines for Waituna Lagoon (LTG 2013), cultural mapping project (Kitson, pers. comm) and other forums and literature have described the lagoon's values.

To develop new consent conditions, a summary of ecological and cultural values for Waituna Lagoon was established through an iterative process based on both existing reports and discussions with experts knowledgeable in the lagoon's biodiversity and its relationship with local Ngāi Tahu people including whanau members from Awarua Rūnanga.

The ecological and cultural values defined in Table 1 relate to: *Water quality, Submerged macrophytes, Fish and bird populations, Fringing wetlands, Taonga species* and *Cultural significance.*

Once the values were defined, it was possible to identify how the different values are affected by anthropogenic pressures, particularly lagoon opening, and what an ideal opening regime would aim to achieve with respect to specific values (Table 1).

The expert group confirmed the importance of the Ruppia-dominated plant community as a key indicator of lagoon ecosystem health. *Ruppia megacarpa* and *R. polycarpa* are keystone species of the lagoon which are sensitive to water level, salinity, and nutrient state. While *Ruppia* spp. may not be recognised as a taonga, the status of Ruppia provides an indication of the lagoon condition, which relates to the health of many taonga species. Similarly, other ecological and cultural values such as the lagoon and catchment's fish community were identified as being sensitive to lagoon open/closed status. The open status allows for the migration of diadromous (require access to the sea to complete their life cycle) species such as īnanga and kanakana/lamprey. While the closed status allows for more successful rearing of giant kokopu (David et al. 2004, Hicks et al. in prep.) in the lagoon and the provision of productive rearing habitat for tuna/eel.

Sections 5-7 of this report provide further assessment of the benefits and risks of lagoon opening on the key values of the lagoon.

Aerial photograph of Waituna Lagoon at Walkers Bay opening site.

Table 1. *Ecological and cultural values of Waituna Lagoon and surrounding wetland.*

Value	Impacted by	Aims of an opening regime
Taonga species Iwi recognise a range of taonga species present in the Waituna wetland system, including (but not limited to); tuna (longfin and shortfin eels), kanakana (lamprey), inanga (whitebait), koura (freshwater crayfish), pātiki (flounder), smelt, kokopu (whitebait), kākahi (freshwater mussel). Around and within the fringes of the lagoon, taonga include swan, water fowl, pukeko, cabbage trees, flax, manuka and other plant species. Māori use local black mud (paru) for dyeing textiles.	• a closed lagoon prevents fish species migrations to and from the sea, including several taonga species • opening the lagoon may increase the presence of exotic species to the detriment of native species, and reduce food and habitat for taonga species • high salinity favours estuarine species over freshwater species	• to enhance taonga species • to maintain the lagoon as close to natural (unmanipulated) state as possible without compromising overall lagoon health
Cultural significance The values of the lagoon include (but are not limited to): aesthetic appeal, mahinga kai, safety of access, identity, landscape and connection to landscape and human health.	• prolonged opening may alter the identity, aesthetic appeal and connection to the lagoon ecosystem • *also refer to impacts on taonga species above*	• move towards a natural opening regime (if it can be done without compromising lagoon health)
Water quality Water quality of the lagoon supports a healthy aquatic ecosystem.	• high nutrients (concentrations in the water column and in lagoon bed sediments) • elevated water temperature • high inflows (increasing nutrient & sediment delivery) • fine sediments (deposited & suspended) • *E. coli* (affecting human contact, food gathering & cultural values) • openings and closings • water levels • activities in the catchment • extent and status of fringing wetlands	• provide a mechanism for excessive nutrients to be flushed to the ocean • provide a mechanism to disrupt prolonged algae blooms • provide a mechanism to maintain keystone macrophytes that regulate water quality • manage algae proliferations including cyanobacteria blooms and macroalgae • reduce level of faecal contamination • improve or maintain the health of fringing wetlands
Submerged macrophytes Sustain and enhance the population of submerged macrophytes including the keystone taxa, *Ruppia* spp. The	• poor water clarity which may be exacerbated under high water levels (light limitation of macrophyte growth) or low	• prevent frequent spring/summer opening to enable macrophyte regeneration

Value	Impacted by	Aims of an opening regime
macrophyte community also supports At-Risk *Ruppia megagcarpa*.	water levels (enhanced sediment resuspension) • low water levels resulting in loss of habitat • elevated salinity when the lagoon is opened • wave action and sediment resupension when the lagoon is shallow • macroalgae and phytoplankton dominance caused by high nutrient concentrations	• ensure maximum water levels do not exceed 2.5m (may cause negative effects on aquatic/wetland plants (due to light limitation) • provide a mechanism for excessive nutrients to be flushed to the ocean • prevent excessive salinity during key Ruppia growing period
Fish and invertebrate populations A diverse population of freshwater fish is present in the lagoon system, including a number of migratory species (refer above to taonga species) as well as marine wanderers such as kahawai. Invertebrates in the lagoon include benthic and pelagic species which likely play important roles in the lagoon's food web. Large invertebrates such as koura (freshwater crayfish) and kākahi (freshwater mussel) are also present in low numbers near the tributary inflows.	• a closed lagoon prohibits fish and invertebrate migration • low water levels may reduce or degrade spawning habitat • an open lagoon reduces food and habitat for freshwater species • poor water quality (including high nutrients and high turbidity, low dissolved oxygen and elevated water temperatures) negatively impact fish and invertebrates	• allow for the timing of opening events to benefit fish spawning and migration where possible • ensure that closures are sufficient in duration to provide food and habitat for multiple species, including for spawning • managing openings for water quality and Ruppia will also benefit fish and invertebrate populations
Bird populations The lagoon and associated wetland provides habitat for a broad range of bird species including many native and threatened species, including waterfowl.	• an open lagoon reduces habitat for wetland bird species and waterfowl in that it affects optimal feeding depths, but increases habitat for waders • a closed lagoon reduces habitat for migratory wading birds, while recognising estuarine habitat for waders is nearby	• provide for water levels that support wetland birds, although it is recognised that differing water levels will favour different bird species over others (e.g., waders vs swimmers, i.e., different functional groups) • provision of habitat for migratory wading birds
Fringing wetlands A diverse native plant community is present within the fringing wetlands surrounding the lagoon. These wetlands provide habitat to support indigenous fauna, including threatened species.	• low water levels and very high water levels can alter native plant communities, with some species/community-types benefiting at the expense of others • high water levels may protect from exotic plant invasion	• manage a fluctuating water regime to support fringing wetlands, e.g. oioi, turf plants • avoid prolonged periods of low water levels that de-water the fringing wetlands

5 Review of existing consent

In February 2017, a 5-year consent for opening Waituna Lagoon to the sea came into effect (Appendix A). The consent retained a primary focus on land drainage but included provisions to open the lagoon to manage for poor water quality (e.g., algal blooms). The consent also established a higher water level opening threshold during spring-summer months in effort to avoid frequent opening events during the germination and early growing season for aquatic macrophytes.

5.1. Water level variation

The 5-year consent has specific conditions providing for:

- A higher opening threshold in spring-summer (2.2m) in effort to reduce the frequency of opening events and decrease negative effects on aquatic plants
- The ability to open lagoon in spring-summer at 2.0m (not 2.2m) if there had been strong macrophyte growth in previous 3 years
- A lagoon opening threshold of 2.0m in winter (May-Sept)
- A lagoon opening threshold of 1.8m in winter, if it had not been open for 12 months
- Emergency opening at >1.5m in the event of prolonged algal blooms or poor water quality.

Water levels in Waituna Lagoon are continuously monitored by Environment Southland at the Waghorns Road/Bridge site. Review of the water level variation between 2015 and 2021 (Figure 3) indicates that there have been five opening events in the lagoon during this period, including four opening events since the commencement of the 5-year consent. There were no reported instances of a prolonged algal bloom requiring the provisions for emergency opening based on water quality to occur.

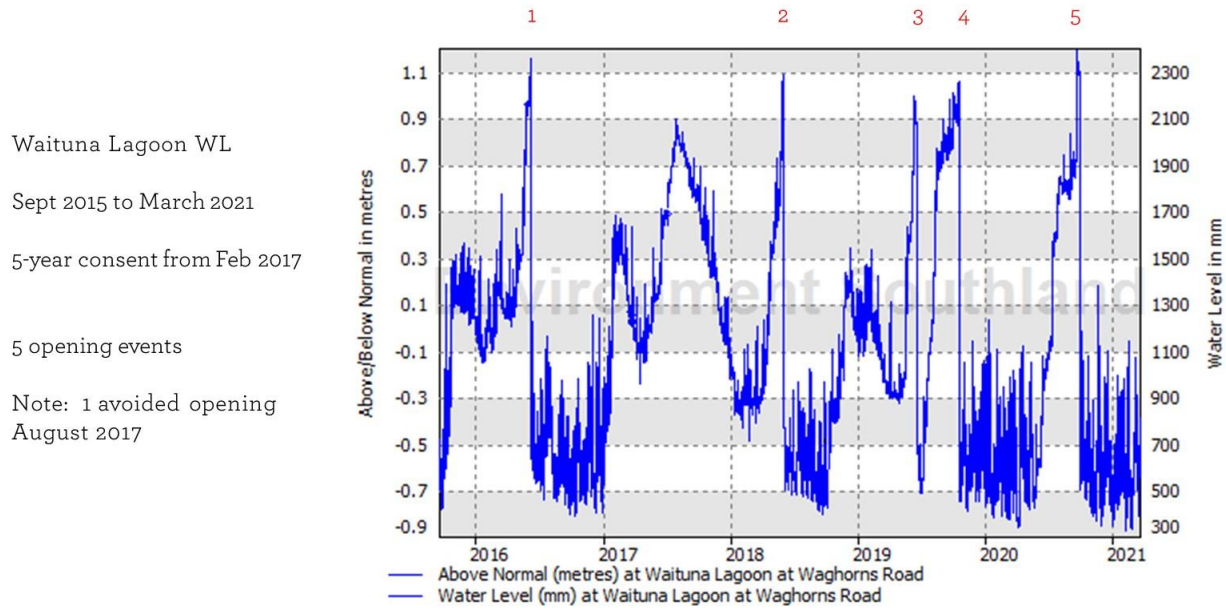

***Figure 3**. Water levels in Waituna Lagoon for the period September 2015 to March 2021*

Since February 2017, only one opening event above 2.0m was avoided due to water levels naturally receding (Figure 3). In this instance, however, the water levels were above 2.0m for several days

during the months of July and August 2017 (Figure 4) so the consent holder was able to open the lagoon in respect of the consent conditions for winter opening but, on this occasion, chose not to do so.

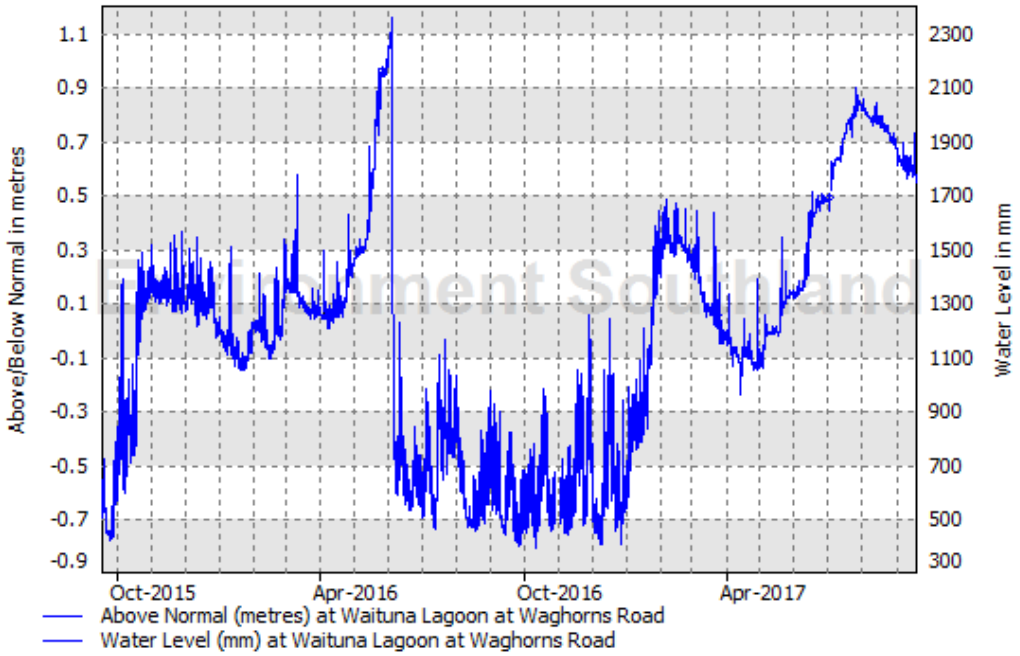

Figure 4. *Water levels in Waituna Lagoon for the period September 2015 to September 2017*

Notably, since February 2017, 50% of the opening events (2 of 4) resulted in the lagoon being opened during the spring/summer period (Figure 5). That is, <u>the 2017 changes to the water level thresholds for lagoon opening were not sufficient to prevent the consent conditions being triggered and opening events from occurring</u>.

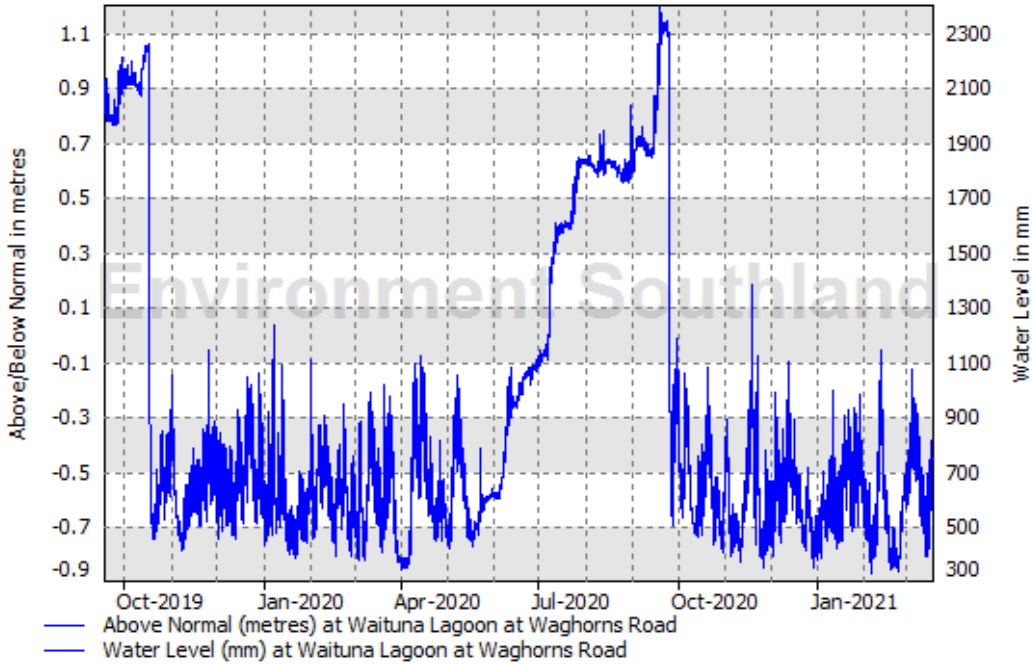

Figure 5. *Water levels in Waituna Lagoon for the period September 2019 to March 2021*

5.2. Response of lagoon ecosystem

Since the early 2000's, monitoring information on lagoon water quality, the submerged macrophyte population, macroalgae and fish populations in tributary streams has been collated. From this information the response of the lagoon ecosystem to open/closed conditions can be evaluated.

Water quality

Waituna Lagoon is affected by high nutrient loads coming from the catchment that may lead to an increase in phytoplankton blooms that decrease light attenuation through the water column. High nutrient loads can also stimulate macroalgae blooms. The 2013 ecological guidelines included targets relating to total nitrogen (TN), total phosphorus (TP) and chlorophyll-a concentrations in the lagoon's water column.

Since the adoption of the 5-year consent in 2017, there has not been a significant change in water quality in the lagoon, as is suggested by the lack of change in the trophic status of Waituna Lagoon over time (Figure 6).

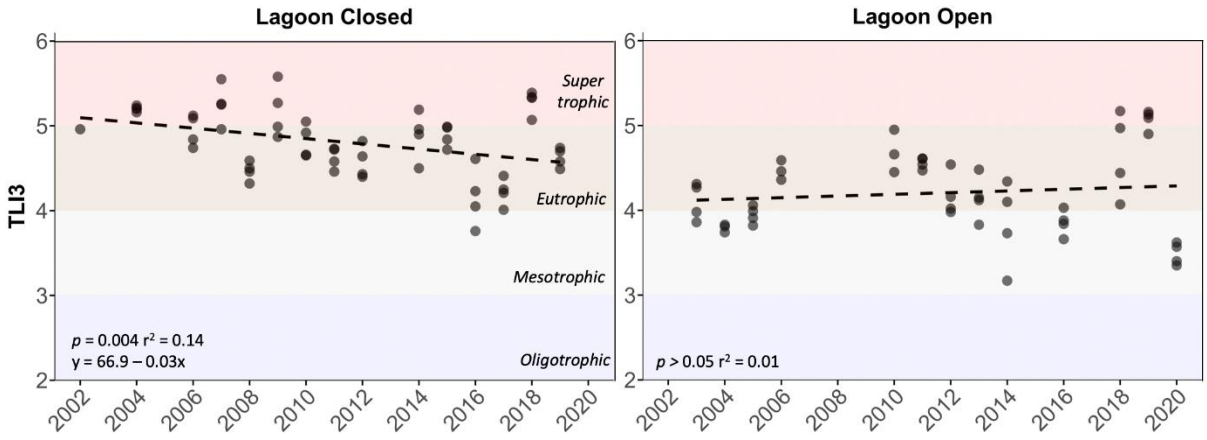

Figure 6. Lagoon-wide trophic status (TLI3) from 2001 to 2020 for when the lagoon is closed (left) and open (right). TLI3 is an index that uses chlorophyll-*a*, TN and TP concentrations, and known relationships to trophic status, to determine the trophic status of a lake.

The specific response of TN, TP and chlorophyll-*a*[3] (chl-a) to lagoon opening is shown in Figure 7. TN concentrations are typically lower when the lagoon is opened to the sea, while TP concentrations are not influenced. Long-term water quality monitoring suggests that dissolved reactive phosphorus, chl-a and turbidity are decreasing over time (when the lagoon is closed), indicating an improvement in these indicators of lagoon water quality (Appendix C, Environment Southland monitoring 2001-2020). However, this does not necessarily equate to an improvement in ecosystem health as other nutrient pools (e.g. sediment, epiphytes) are not measured.

Therefore, closing the lagoon more often may not necessarily result in poorer water quality conditions than have been observed in the past. Although it is recommended that a consent condition is included that enables the lagoon to be opened should water quality and ecosystem indicators reach levels for concern.

[3] An indicator of phytoplankton biomass.

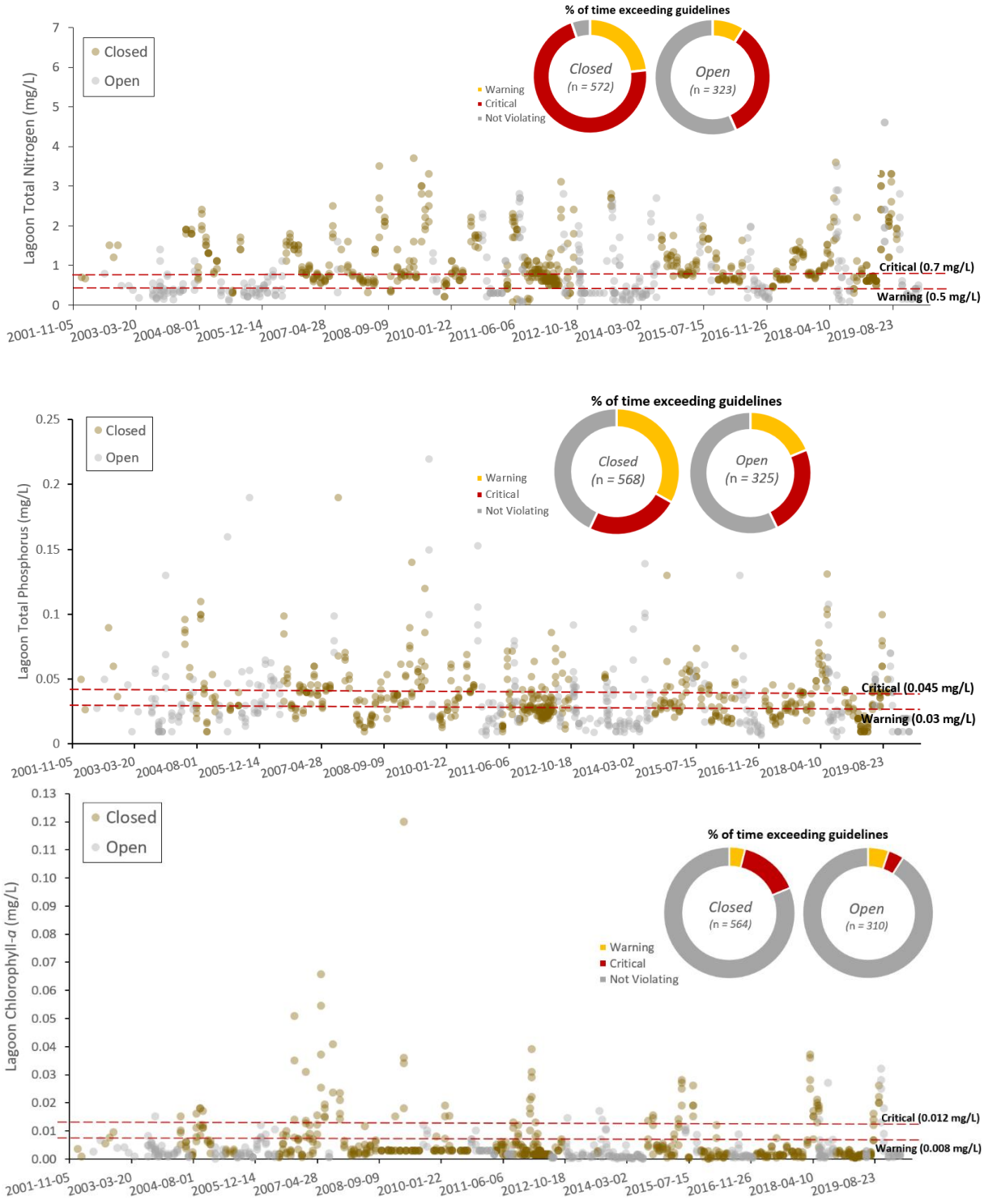

Figure 7. *The total nitrogen (TN), total phosphorus (TP) and chlorophyll-a, concentrations in Waituna Lagoon over time, relative to the 2013 recommendations for water quality.*

Submerged macrophytes and macroalgae

NIWA, on behalf of the Department of Conservation, undertakes annual assessments of the status of submerged macrophytes and macroalgae in Waituna Lagoon (de Winton & Elcock 2021). This monitoring examines whether the lagoon ecosystem is meeting its objectives in terms of lagoon

closure, macrophyte abundance and marcoalgae abundance (Table 2). Overall, six ecological targets are evaluated as outlined in Table 2, including achieving a lagoon-wide cover of 30-60% for *Ruppia* species.

***Table 2**. Summary of results for macrophyte/macroalgae targets since 2009 (de Winton & Elcock 2021). A tick indicates the target has been met, a cross indicates the target has not been met.*

Year	Lagoon closure	*Ruppia* cover	*Ruppia* biomass index	Macroalgae cover	*Ruppia* reproductive success	Status of *Ruppia megacarpa*	Targets met
2009	✓	✗	✗	✓	✗	✗	2
2010	✓	✗	✗	✓	✗	✓	3
2011	✗	✗	✗	✓	✗	✗	1
2012	✓	✗	✗	✓	✓	✗	3
2013	✗	✗	✗	✗	✗	✗	0
2014	✗	✗	✗	✓	✗	✗	1
2015	✓	✗	✓	✗	✓	✗	3
2016	✓	✓	✓	✗	✓	✗	4
2017	✗	✗	✗	✗	✗	✗	0
2018	✓	✗	✓	✓	✓	✓	5
2019	✓	✓	✓	✗	✓	✓	5
2020	✗	✗	✗	✗	✗	✓	1
2021	✗	✗	✗	✗	✗	✗	0

As summarised by NIWA (de Winton & Elcock 2021):

- In 2021, none of the six ecological targets for macrophytes and macroalgae were achieved for Waituna Lagoon;
    - The lagoon was open to the sea over the critical spring-summer period for *Ruppia* growth (for >3 months before monitoring) for the second consecutive year and this is likely responsible for the poor performance of submerged plants in 2021.
    - There has been a further large reduction in the distribution and abundance (biomass) of submerged plants (mainly *Ruppia* species) since reductions were recorded in the 2020 survey,
    - *Ruppia* (and other submerged plants) were not recorded from the south-western sector (approximately half the lagoon area),
    - In 2021, results measuring lagoon-wide *Ruppia* cover, biomass index and *Ruppia* reproductive success were only 1/10th of the ecological target,
    - *Ruppia megacarpa* was limited to only three sites, which was 1/3rd of the ecological target,

    - Macroalgae development exceeded the maximum acceptable threshold of <10% cover.

- Based on all six ecological targets:
    - 2021 is the third monitoring year that fails to achieve any targets, with 2013 and 2017 also not meeting any ecological targets.
    - Surveys that achieved only one or no targets were also years where when the target for lagoon closure (closed >3months before survey) was not met.
    - Current evidence indicates that having a closed lagoon for at least two consecutive growing seasons is important.

Since the commencement of the 5-year consent in 2017, the change in conditions to limit the spring-summer openings has only been partly successful. Five of the six ecological targets were achieved in 2018 and 2019 following a closed lagoon period, however the status of the macrophytes declined again in 2020 (Table 2) and 2021 *(de Winton & Elcock 2021)* in response to prolonged opening events. The abundance of macroalgae remained relatively high in 2020 and 2021 (target was not met), suggesting drivers other than mouth status (e.g. temperature, sediment and nutrients) are also important.

Ultimately, the increase of the lagoon opening threshold in 2017 (to 2.2m during spring/summer) has not prevented lagoon openings from occurring during the germination and early growing season. Furthermore, the two recent occurrences of spring/summer openings, in consecutive years, has negatively impacted *Ruppia* populations.

Fish populations

Waituna Lagoon and its catchment has relatively strong populations of indigenous and taonga fish species. Twelve freshwater fish species (excluding marine wanderers) have been recorded in the Waituna Lagoon catchment tributaries and within Waituna Lagoon itself. The catchment has no known introduced pest fish, with brown trout being the only introduced fish present. Waituna lagoon is known for its significant population of giant kokopu as well as other fish species including, common bullies, shortfin eel, longfin eel and flounder. Many of the species found within the Waituna Lagoon catchment are migratory (e.g. kanakana/lamprey, īnanga), meaning that at least one aspect of their life stage requires access to or from the sea or brackish water. As such, the timing of lagoon opening to the sea has substantial impacts on fish populations and fish community as a whole. On the one hand, fish such as giant kokopu are thought to benefit from the conditions created by prolong lagoon closures (especially during summer). On the other hand, migratory species such as kanakana/lamprey would temporarily disappear from the catchment if the lagoon stayed closed for more than four years. This is because four years is the period that juvenile kanakana/lamprey spend in freshwater after the adults migrate into the catchment from the sea to spawn.

Monitoring undertaken by the Cawthron Institute (Holmes 2019) examined the influence of recent (2014-2019) lagoon open and closed periods on the abudance of fish species in Waituna Creek. This study observed that:

- both īnanga and kanakana/lamprey abundance in Waituna Creek tends to increase with the number of days that the lagoon is open to the sea—either during the preceding spring for īnanga or the winter-spring period (three years previous) for lamprey/kanakana.

- Giant bullies also showed a positive (but weaker) correlation with increasing open days during summer (two years previous).
- No patterns were observed between eel density or biomass and lagoon opening duration.

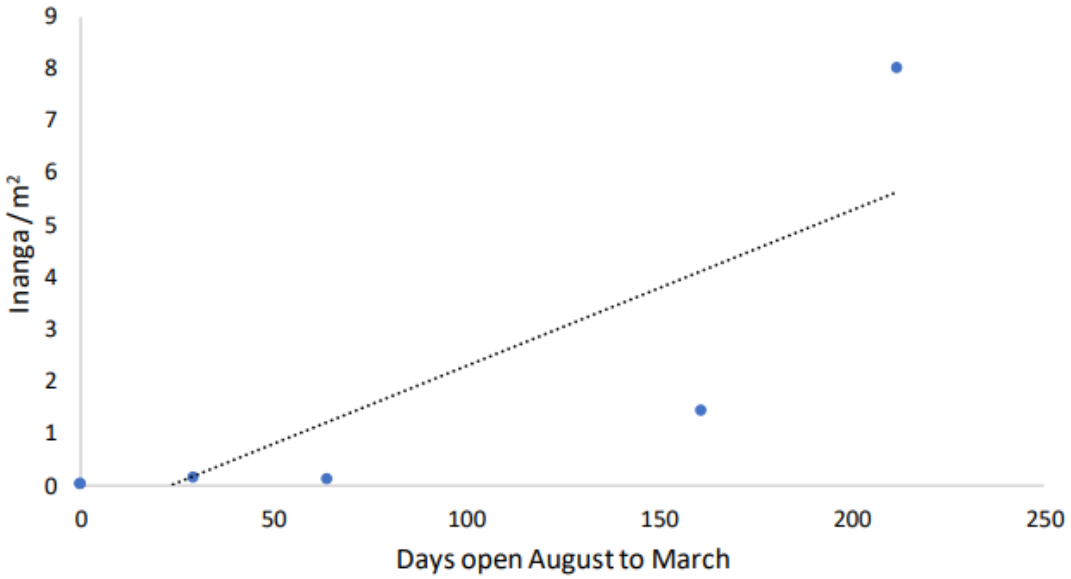

Figure 8. Average inanga density (fish/m²) from all sites during the annual March fish population sampling in Waituna creek (2014-2019) correlated against the number of days Waituna Lagoon was open to the sea from the preceding August to March (inclusive). From Holmes (2019)

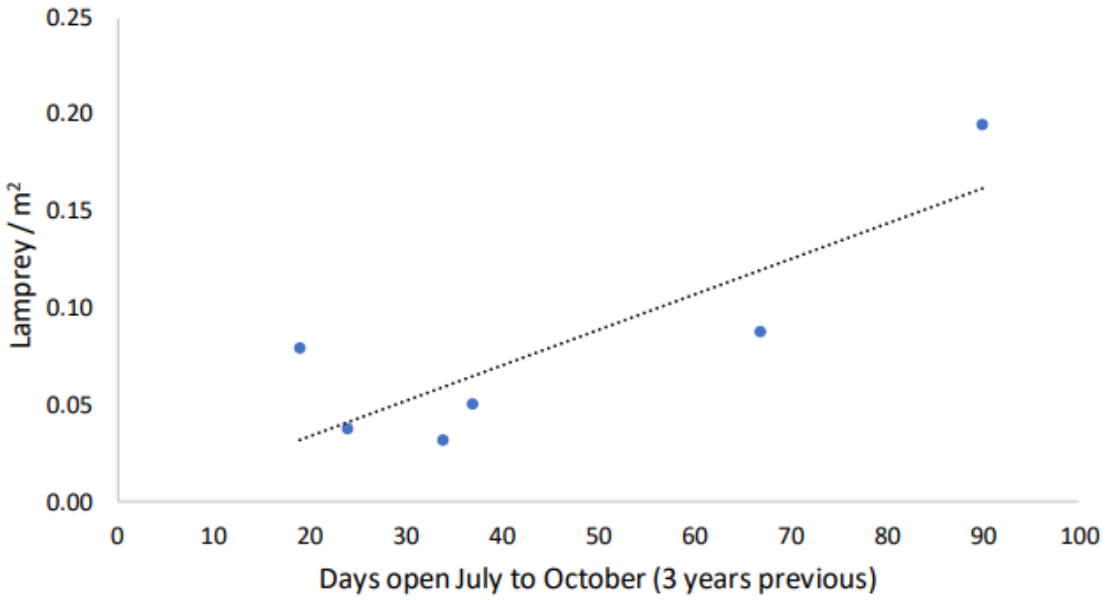

Figure 9. Average kanakana/lamprey density (fish/m²) from all sites during the annual March fish population sampling in Waituna Creek (2014-2019) correlated agaist the number of days Waituna Lagoon was open to the sea from July to October (inclusive) in the three years prior to the sampling date. From Holmes (2019)

Since February 2017, there have been regular periods when the lagoon was open during the winter-spring period which is critical migration period for most ocean migratory species in the Waituna

catchment (Table 3). This indicates that although the lagoon was not opened for the specific purpose of facilitating fish migration, opening events for other reasons may support ocean migratory fish populations.

Table 3.

Year (July-June)	**Lagoon open**	**# Months open**	**Season/s**	**Supported fish migration**
2017-2018	Yes	1	Winter 2018	Yes
2018-2019	Yes	3	Winter-Spring 2018	Yes
2019-2020	Yes	8	Spring-Winter 2019-20	Yes
2020-2021	Yes	6	Spring - Autumn 2020-21	Yes

It may be especially important to consider the frequency of lagoon openings required to support a healthy and persistent population of īnanga in the catchment. When īnanga migrate into the lagoon and catchment, they provide an abundant food supply for other species such as giant kōkopu, trout and tuna (Holmes, pers. comm), enabling the latter populations to flourish. The life cycle of īnanga is annual (with a very small proportion of fish spawning twice). However, considering other values, we recommend that the lagoon is opened during August to October at least every two years. This would allow a two-yearly pulse of īnanga to migrate into the lagoon and catchment and supply predators, such as longfin eel, with high numbers of forage fish. The August to October period also coincides with the upstream migration of adult kanakana/lamprey. Juvenile kanakana/lamprey rear in fresh water for up to four years, and so a limit of a two year closed period during the August to October ought to maintain continuous populations of lamprey within the catchment.

5.3. Issues for consideration

From the technical review of the existing consent, there are five key issues that are considered most important to address in developing conditions for the long-term management of Waituna Lagoon.

These five issues are:

- Incorporating conditions that reduce the frequency of spring/summer opening events. The 2.0m and 2.2m water level thresholds were not sufficient to prevent openings.
- Reviewing the mechanisms for lagoon openings to address poor water quality.
- Incorporating lagoon openings to facilitate fish migration, particularly if there are prolonged periods when the lagoon is closed
- Ensuring the proposed lagoon opening regime considers the benefits/risks to all ecological and cultural values, including the risks to surrounding wetlands
- Ensuring the proposed lagoon opening regime considers the potential impacts on land drainage.

6 Proposed new conditions

6.1. Long-term objective

Waituna Lagoon is a highly significant coastal lake ecosystem that supports a broad range of cultural, ecological, and recreational values. The lagoon forms part of the Waituna Wetlands Scientific Reserve, is designated under the Ramsar Convention, recognised under a Statutory

Acknowledgement with the Ngāi Tahu Claims Settlement Act 1998 and is important to local community.

As guided by the Whakamana Te Waituna project, the long-term objective for opening the Waituna Lagoon to the sea is to **maintain and restore the ecological health and cultural values of the lagoon ecosystem**.

6.2. Proposed amendments

To achieve the goals of the Whakamana Te Waituna project and implement management actions that support the long-term safeguarding of the lagoon, several amendments to the conditions for lagoon opening are proposed. These amendments address the specific issues outlined in section 5.3 of the review of the existing consent.

The proposed amendments to the conditions (triggers) for lagoon opening are presented in Appendix B. The key amendments include:

- An increase in the lagoon opening trigger level to 2.5m to enhance ecological health and cultural values
- Inclusion of new conditions to facilitate fish passage
- Refinement of the conditions providing for emergency lagoon opening in order to mitigate risks to water quality

A rationale for these proposed amendments is provided in sections 6.3 to 6.6.

6.3. Lagoon opening to enhance ecological health and cultural values

Review of the existing 5-year consent identified that the 2.0m/2.2m lagoon opening trigger levels did not prevent spring-summer opening events, and these events corresponded with poor health of submerged macrophytes.

Subsequently, the potential for a higher water level trigger to enhance the ecological and cultural values of Waituna Lagoon was considered.

In 2017, the Waituna Science Advisory Group (WSAG, 2017) investigated lagoon opening levels that support ecosystem health (Table 4), with a specific objective of recommending a maximum level for opening as well as retaining the option to open at lower levels to mitigate poor water quality (algal blooms)[4].

The 2017 review concluded that the health of the lagoon would benefit from higher water levels, but that 2.5m is a recommended maximum water level for the benefit of ecological values. The Whakamana Te Waituna Trust subsequently used a lagoon water level of 2.5m to identify where to purchase surrounding land to allow the lagoon to be managed for ecological reasons[5].

Table 4. *Summary of trigger level considerations*

Value/Driver	Maximum level (mASL)	Details
Preventing spring/summer openings during 'years of concern' to enable macrophyte regeneration	2.5m	Summer openings stress macrophytes and favour macroalgae. *Ruppia* benefits from closure and low salinity during key growth stage (spring/summer)

[4] Schallenberg, M. & Robertson, H. (2017). Report on the findings of the Waituna Science Advisory Group (SAG) into water levels in Waituna Lagoon for the management of the lagoon's ecological health.

[5] To date, three properties adjacent to the lagoon have been purchased though the Whakamana Te Waituna programme to ease the impact of high lagoon levels on farming operations.

Allowing the timing of opening events to benefit fish spawning and migration where possible	na	Issue for fish include timing of events and the maximum water level.
Managing a fluctuating water regime to support fringing wetlands – e.g. Oioi, turf plants	2.5m	LiDAR elevation models indicate that most wetland vegetation will be inundated when lagoon levels are ~2.3m. Irregular inundation at higher levels is positive for these systems.
Providing a mechanism for excessive nutrients to be flushed to the ocean	>1.8m	Flushing of nutrients can occur above 1.8m when there is sufficient hydraulic gradient. The higher the water level the better the flushing when opened.
Providing a mechanism to disrupt a prolonged algal bloom	>1.5m	Ecological guidelines suggested that if needed an opening could occur at 1.5m to disrupt a prolonged algal bloom. A minimum height is needed for an effective opening, not a maximum.
Ensuring maximum water levels do not cause negative effects on aquatic/wetland plants (e.g. light limitation)	2.0m*	Light limitation is likely to have an impact on submerged vegetation in deeper parts of the lagoon. Prolonged inundation (>20 days per annum) at higher water levels (e.g. >2.3m) may limit productivity. *Note: Because the gravel barrier is leaky – such prolonged events may be unlikely. Unknown potential positive effect of raised level on turbidity and light penetration.
Recommendation	**2.5 mASL**	

The proposed 2.5m opening trigger level, however, is based on some assumptions, specifically:

- that increasing the opening trigger level to 2.5m will reduce the frequency of opening events,
- the duration of high water levels will be limited (e.g. less than 20 days above 2.2m), and therefore periods of light limitation on submerged plants and inundation of ex-farmed soils will be minimal
- that opening events will still occur to support fish passage and ecological and cultural values that benefit from open lagoon conditions

To test these assumptions, the hydrological model of Waituna Lagoon developed by Chris Jenkins (Team Leader Hydrological Response, Environment Southland) was applied. This model uses a 48-year hydrological record to predict the number and duration of water level events exceeding specified levels.

A series of opening scenarios were examined by the model, including a base scenario (existing consent conditions), lagoon opening at 2.5m and other permutations to provide for fish passage. The specific scenarios assessed were:

- **First Scenario:** open when level is at 2.2 m or above for 7 consecutive days
- **Current consent:** open when level is at 2.0 m for the period May – 19 Sep, and open when level is at 2.2 m for the period 20 Sep – 30 Apr
- **Scenario A:** open when level is at 2.5 m or above for 7 consecutive days
- **Scenario B – option 1**: open when level is 2.5 m or above for 7 consecutive days; or if no opening in the previous year days open if the level exceeds 2 m (for fish passage)
- **Scenario B – option 2:** open when level is 2.5 m or above for 7 consecutive days; or if no opening in the previous year open if the level exceeds 1.5 m (for fish passage)
- **Scenario C – option 1**:
  open when level is 2.5 m or above for 7 consecutive days; or if no opening in the previous 2 years open if the level exceeds 2 m (for fish passage)

Scenario C – option 2

- open when level is 2.5 m or above for 7 consecutive days; or if no opening in the previous 2 years open if the level exceeds 1.5 m (for fish passage)

A summary of the model results is presented in Table 5. In broad terms, the analysis indicates that under the current consent conditions (2.0m/2.2m) lagoon openings are likely to occur about once every year (0.99 openings/year). If the opening trigger were raised to 2.2m (First Scenario) for the entire year, opening events would occur with a slightly lower frequency (0.86 openings/year). Whereas, if a trigger level of 2.5m were applied (Scenario A), this would result in lagoon openings decreasing substantially in frequency (0.41 openings/year).

The less frequent openings under Scenario A will support the Ruppia-dominated plant community and the overall ecological function of the coastal lake ecosystem, as it has been previously shown that Ruppia biomass and recruitment is adversely affected when the lagoon remains open over spring/summer when the plant is flowering, producing seeds and generally growing faster. Specifically, under Scenario A spring/summer openings are likely to occur almost half as frequently as they do now (0.13 vs 0.22).

Scenario A would result in approximately 35 more days per year when water level is above 2.0 m relative to the current situation, and the average duration of the period when the lagoon is above 2.0 m would be approximately 15 days longer for Scenario A relative to the current situation. Scenario A would result in 3.5 days above 2.4m per year, compared to 0.7 days for the current consent, indicating that the duration of high-water levels will remain limited. This indicates that periods of prolonged light limitation on submerged aquatic plants and macroalgae would not be expected to occur if the opening trigger level were raised to 2.5m.

Table 5. *Opening scenarios and probabilities of the lagoon opening and for how long based on historic data (modified table supplied by Chris Jenkins, Environment Southland).*

Scenario	Average Openings per Year	Average Num. Openings 19 Sep to 30 April	Annual average days above 2.0m	Annual average total # events of 2.0m	Average duration of events above 2.0m (days)	Annual average days above 2.2m	Annual average total events of 2.2m	Average duration of events above 2.2m (days)	Annual average days above 2.4m	Annual average total events of 2.4m	Average duration of events above 2.4m (days)
First Scenario (open at 2.2m)	**0.86**	**0.28**	18.49	1.68	11	1.99	0.91	2.2	0.47	0.11	4.27
Current consent Open at 2.0m May to 19 Sep and 2.2m 20 Sep to 30 April	**0.99**	**0.22**	15.47	1.59	9.73	2.35	0.92	2.55	0.74	0.15	4.93
Scenario A (open at 2.5 m)	**0.41**	**0.13**	51.68	2.08	24.85	20.87	1.46	14.3	3.54	0.71	4.99
Scenario B (open at 2.5m or, if not opened in previous year, open for fish passage) at levels above 2m	**0.70**	**0.18**	30.8	1.69	18.22	11.91	1.04	11.45	2.06	0.45	4.58
Scenario B (open at 2.5m or, if not opened in previous year, open for fish passage) at levels above 1.5m	**0.76**	**0.20**	32.82	1.48	22.17	12.71	0.98	13	2.27	0.48	4.7
Scenario C (open at 2.5m or, if not opened in previous 2 years, open for fish passage) at levels above 2m	**0.50**	**0.14**	43.36	1.97	22.01	16.9	1.26	13.4	2.64	0.61	4.33
Scenario C (open at 2.5m or, if not opened in previous 2 years, open for fish passage) at levels above 1.5m	**0.52**	**0.14**	44.73	1.91	23.4	17.87	1.25	14.3	2.86	0.62	4.6
Observed (2016-2021)	1	0.4	14.66	1.6	9.16	3.6	1.2	3	0	0	0

It is therefore recommended to amend the general conditions for lagoon opening as follows:

Lagoon Opening – general opening for ecological health, cultural values and land drainage.

4. (a) Regardless of the time of the year, the lagoon may be opened to the sea when the water level in the lagoon reaches 2.5 metres, as measured on the Waghorn's Road bridge gauge board, and remains at or above that level for at least 24 hours continuously.

6.4. Lagoon opening to promote fish passage

It is recognised that setting a single trigger level of 2.5m may not appropriately provide for all key ecological and cultural values of Waituna Lagoon. In particular, while Scenario A (2.5m) supports the long-term management of the macrophyte community and the natural functioning of the coastal lake ecosystem, it may not adequately support the migration of indigenous and taonga fish species. Consequently, further details around the opening conditions (triggers) are recommended.

Based on knowledge of lifecycles of indigenous and taonga fish species in Waituna Lagoon (Table 6), the key months for upstream and downstream migration were identified to show when lagoon openings would benefit multiple fish species and life-stages (Table 6). Thus, there are key times of the year, such as August-October, when an open lagoon would support the migration and recruitment of several fish species.

To examine whether it would be possible to reduce the frequency of spring/summer openings and provide for fish passage, four additional scenarios were examined through hydrological modelling. These scenarios consider an opening trigger of 2.5 m together with an option to open for fish passage if no opening had occurred in the previous 12 (Scenario B) or 24 months (Scenario C):

- **Scenario B – option 1**: open when level is 2.5 m or above for 7 consecutive days; or, if no opening in the previous year, open if the level exceeds 2 m (for fish passage)
- **Scenario B – option 2:** open when level is 2.5 m or above for 7 consecutive days; or, if no opening in the previous year, open if the level exceeds 1.5 m (for fish passage)
- **Scenario C – option 1**:
  open when level is 2.5 m or above for 7 consecutive days; or, if no opening in the previous 2 years, open if the level exceeds 2 m (for fish passage)
  Scenario C – option 2
- open when level is 2.5 m or above for 7 consecutive days; or, if no opening in the previous 2 years, open if the level exceeds 1.5 m (for fish passage)

As would be anticipated, Scenario B (open for fish passage after 12 months) results in a greater average number of spring/summer openings per year (0.18 - 0.20 openings/year) relative to Scenario A (0.13 spring/summer openings per year). Therefore, Scenario B would favour fish migration but would likely have detrimental effects on the macrophyte community and natural lake ecosystem function due to the high frequency of spring/summer lagoon opening.

However, under Scenario C (open for fish passage after 24 months) there would be only 0.14 spring/summer opening events per year - about the same frequency as Scenario A (0.13). Note that the average number of days when water levels are above 2.0m and average duration of events are broadly similar for Scenario A (2.5m only) and Scenario C (2.5m and fish passage).

Table 6. *Downstream and upstream migration periods for native fish in the Waituna Catchment (Smith 2014)*

Common name	**Upstream migration period**	**Peak upstream migration period**	**Downstream migration period**
Shortfin eel (glass eel)	July-December	August-November	March-September
Longfin eel (glass eel)	August-January	September-December	February-July
Giant kōkopu	October-January	November	?
Banded kōkopu	August-January	September-November	March-July
īnanga	May-December	August	March-September
Kanakana/lamprey	May-December	August-October	March-September
Common bully	December-April	December-April	September-January
Giant bully	December-April	December-April	September-December
Redfin bully	November-April	November-April	September-December
Common smelt	August-December	September-November	November-May
Black flounder	September-December	December-December	November-May

The preferred opening regime to benefit the migration of fish species and the overall health of the coastal lake ecosystem, consequently, is Scenario C (2.5m; open for fish passage after 24 months).

It is, therefore, recommended to include specific conditions for fish passage as follows:

Lagoon Opening for the purpose of providing fish passage

Z. (a) Notwithstanding conditions 4 and 6 of this consent, the lagoon may be opened to the sea to provide for passage for diadromous fish species when the water level in the lagoon is above 1.5 metres, as measured on the Waghorn's Road bridge gauge board, during the period 1 April to 30 November, provided that:

(i) The lagoon has not been opened in the previous 24 months, and

(ii) The Technical Advisory Group has considered the lagoon water quality and ecosystem health indicators listed in Appendix 1 and Appendix 2, and any other relevant scientific information, and has advised the consent holder and Consent Authority (in writing) that opening the lagoon to the sea is recommended to enable fish passage.

While lagoon opening every three years would have the least potential for spring/summer openings that adversely affect the Ruppia-dominated community, the 2-yearly cycle is proposed as a compromise to ensure life-cycles of important migratory fish and taonga species are protected, including īnanga and kanakana/lamprey, while minimising openings in spring/summer.

Ongoing monitoring of the status of fish populations, macrophytes and macroalgae will be critical. If monitoring indicates that opening the lagoon for fish passage every two years could potentially sustain the fish community, then the frequency of opening events for fish passage could be reduced. Alternatively, if fish populations are found to decline substantially then the conditions can be reviewed accordingly.

6.5. Lagoon opening to manage water quality

Review of Environment Southland water quality monitoring, and NIWA vegetation monitoring (de Winton 2019, 2020) shows that lagoon can be subject to periodic algal blooms, regardless of whether the lagoon is open or closed.

Water quality monitoring indicates that chlorophyll-*a*[6] concentrations have exceeded the warning trigger level (0.008 mg/L) 18% of the time within the past 5 years, and concentrations have exceeded the critical trigger level (0.012 mg/L) 15% of the time within the past 5 years when the lagoon has been closed (Figure 7). For persistent algal blooms, opening the lagoon to the sea provides a valuable mechanism to disrupt the bloom and decrease chlorophyll-*a* concentrations.

While chlorophyll-*a* concentrations in the lagoon have been trending downwards over the last 5-10 years (Appendix C, Environment Southland monitoring 2001-2020), retaining conditions for emergency opening of the lagoon to disrupt phytoplankton and cyanobacteria blooms remains important, and considering the complex nature water quality and algal interactions. The previous consent did not specifically include 'cyanobacteria' as a primary trigger for water quality and it is recommended this is amended in Appendix 1 because of the threat to human health and wildlife from cyanobacterial blooms.

It is therefore recommended to amend the conditions for water quality as follows:

Lagoon Opening in the case of poor water quality events

6. (a) Notwithstanding condition 4 of this consent, the lagoon may be opened to the sea at any time of the year when water level in the lagoon is above 1.5 metres, as measured on the Waghorn's Road bridge gauge board, provided that:

(i) One or both Water Quality (Primary) Indicators set out in Appendix 1 has reached its Critical Indicator Level, and

(ii) A Technical Advisory Group, convened jointly by Environment Southland, Te Ao Marama Inc. and the Department of Conservation, with scientific knowledge of coastal lagoon ecosystems, has considered the Primary Indicators in Appendix 1, and any other relevant scientific information, including additional indicators of Ecosystem Health set out in Appendix 2, and has advised the consent holder and Consent Authority in writing that opening the lagoon to the sea is advisable to disrupt an actual or probable algal bloom in order to avoid a significant adverse ecological effect on the lagoon.

Appendix 1

Water Quality or Ecosystem Health Indicator	***Critical Indicator Level***
Primary Indicators	
Chlorophyll-a	*a sustained visible algal bloom* over a period of 14 days or longer*
Cyano-bacteria	*≥ 500 cells/mL or ≥ 0.5 mm^3/L biovolume [of potentially toxin producing species].*
Interpretation	

[6] An indicator of phytoplankton biomass.

** A "visible algal bloom" shall be identified by:*

(i) A chlorophyll-a concentration of ≥ 0.012 mg/L (or other figure identified in writing by the Technical Advisory Group referred to in condition 6; and/or

(ii) The observations of an appropriately qualified person. These observations shall include the location and approximate scale and intensity of the visible algal bloom on each day of observation.

Appendix 2

Water Quality or Ecosystem Health Indicator	Critical Indicator Level
Secondary Indicators	
Total phosphorus concentration	sustained above ≥ 0.045 mg/L
Total nitrogen concentration	sustained above ≥ 1.000 mg/L
Tertiary Indicators**	
Nuisance epiphytes or benthic algae	>10% cover
Macrophytes	<20% cover
Ruppia megacarpa	Present at less than <20% of lagoon monitoring sites
Other indicators that may be considered	
Turbidity	
RPD (Redox Potential Discontinuity) – bottom sediments	
Bottom water dissolved oxygen concentration	
Aquatic and surrounding wetland life	
** Based on the results from annual surveys undertaken in late summer.	

6.6. Integrated assessment of ecological and cultural values

Development of proposed conditions for lagoon opening (section 7.2-7.5 above) was based on a subset of the ecological and cultural values of Waituna Lagoon, specifically: submerged macrophytes, fish/taonga species populations and water quality.

There may be concerns that the proposed regime will have negative consequences on other values at Waituna Lagoon, such as the fringing wetlands and bird populations. An integrated assessment of the predicted impact of the proposed changes to lagoon opening on all key values is summarised in Table 7. This indicates that, overall, the proposed conditions (Scenario C) will have a beneficial impact. Although for some values the proposed conditions will have a neutral impact (bird populations, water quality), it is not predicted that significant negative effects on the coastal ecosystem will occur.

Table 7. Multi-value assessment of the predicted impact of recommended conditions

Value	Impact of existing consent conditions	Predicted impact of recommended conditions (SCENARIO C)	Predicted change in value
Taonga species	Does not specifically provide for fish passage for taonga species. Opening events may or may not align with key migratory periods	Specific provisions for fish migration. Increased focus on monitoring	Improvement/Neutral
Cultural significance	Frequent opening events (>1x/year) not aligned with restoring ecosystem to more natural regime	Conditions specifically target a transition to a more natural state (longer freshwater phase)	Improvement
Water quality	Included provision for emergency opening to disrupt phytoplankton bloom	Conditions for emergency opening retained in case of poor water quality. Lagoon flushing will still occur (given conditions for fish passage)	Neutral
Submerged macrophytes	Spring/summer openings led to regular decline in abundance of submerged macrophytes	Conditions specifically target improved management of macrophytes due to higher (2.5m) opening trigger	Improvement
Fish and invertebrate populations	Does not specifically provide for fish passage. Opening events may or may not align with key migratory periods	Specific provisions for fish migration. Increased focus on monitoring	Improvement/Neutral
Bird populations	Conditions provide for both open and closed lagoon conditions that support broad range of bird species.	Conditions provide for both open and closed lagoon conditions that support broad range of bird species. Longer freshwater phase will benefit threatened species (Bittern) and waterfowl (incl. ducks). A reduction in the estuarine phase is not considered to have a significant impact on the bird species that favour an open lagoon due to the availability of other estuarine habitats in the area (e.g. New River estuary)	Neutral
Fringing wetlands	Fringing wetlands often dewatered for long periods when lagoon in open phase	Inundation at levels >2.2m. will enhance native wetland vegetation and promote habitat diversity	Improvement

For example, in terms of bird populations, different bird functional groups have different habitat preferences (Arctic migrant waders and overwintering waders –-> shoreline feeding; Swamp birds –-

> flooded reeds/rushes; Waterfowl and shags –-> open water). Given the contrasting habitat preferences, the open and closed status of the lagoon will have a varied effect on bird functional groups. As the proposed conditions for lagoon opening still include both closed (freshwater) and open (tidal) phases, the overall impact on bird populations was considered neutral.

In terms of the cultural significance of Waituna Lagoon (which incorporates the aesthetic appeal, mahinga kai, safety of access, identity, landscape and connection to landscape and human health), the overall purpose of proposed new conditions (Scenario C) is to return the lagoon to as natural state as possible. The predicted impact on the lagoon's cultural values is, therefore, also expected to be positive, while taking a holistic approach that considers the opportunities to enhance fish passage/mahinga kai and addressing poor water quality.

7 Impacts of proposed consent conditions on other values

7.1. Land drainage and road/track infrastructure

This review of the conditions for lagoon opening was focused on determining the optimal management approach to enhance the ecological and cultural values of Waituna Lagoon. As outlined in section 6 it is proposed to increase the trigger level for lagoon opening to 2.5mASL. That is, the lagoon opening (under Scenario C) will occur when water levels are at or above 2.5m for a period of 24 hours.

Recommendation of 2.5m as the opening trigger level considered the potential adverse effects on land drainage. A detailed investigation of the effects of lagoon water levels on land drainage was previously undertaken by NIWA (Walsh et al. 2016). This investigation used complex hydrological models, LiDAR elevation data, flow and level monitoring data, in combination with a channel roughness coefficient (to simulate a cleared or vegetated channel) to map the extent of land that is affected directly by inundation (figure 11), and impeded land drainage (figure 10), at different lagoon water levels. It should be noted that the area of land affected by direct inundation and impeded drainage is a function lagoon level, flow rate and plant growth in the creeks. The relative importance of these factors varies spatially with the most downstream parts of the creek strongly affected by lagoon level but further upstream the influence of flow rate and vegetation dominate. This is important to consider when interpreting figure 10 where the land drainage impacts furthest from the lagoon are caused by vegetation rather than lagoon level (Walsh et al. 2016).

The NIWA investigation supported the purchase of low-lying land by Whakamana Te Waituna. Land purchase specifically targeted agricultural land adjacent to Waituna, Moffat and Carran Creek with inundation or restricted drainage when lagoon water level is at 2.5m. Consequently, it is no longer necessary to maintain drainage to most of the agricultural lands that were vulnerable to inundation and impeded land drainage. However, under the recommended opening regime, some properties have residual areas with short-term restricted access or drainage limitations (figure 10).

A few small sections of roads and tracks on Waghorn Road are similarly affected by inundation at lagoon levels above 2.0m ASL (figure 12). When the lagoon water level is at approximately 2.0m ASL, Southland District Council estimates that about 300m of road/track is inundated. When the water level is at 2.5m ASL this increases slightly to approximately 400m of road/track being inundated. However it is important to note this limits access only to the Department of Conservation viewing platform and one of the properties purchased through the Whakamana Te Waitua project.

One property on the southern side of Waituna Lagoon between the lagoon and the sea is most easily accessed by a track through Conservation Land. Approximately 500m of this track is affected by inundation when lagoon levels get to about 2.2m. An unformed track exists on the seaward side of the Conservation Land (on the beach) that provides alternative and legal access.

A concern for road infrastructure, access to private land and agricultural land drainage may be that lagoon water levels will be high (>2.4m) for prolonged periods of time. However, the results from hydrological modelling (Table 5) indicate that under proposed lagoon opening (Scenario C) water levels will be >2.4 for approximately 2.6 days per year, and >2.2m for approximately 17 days per year.

Therefore, any residual effects on land drainage for low-lying properties not purchased by Whakamana Te Waituna are considered minor in both extent and frequency. Similarly, the duration of inundation on road infrastructure is relatively short-lived.

Figure 10. Land that is drainage-affected under mean flow conditions with a vegetated channel. Purchased land is outlined in black/white and land affected by inundation is outlined in pink/white. Left panel is Waituna Creek, middle panel is Moffat Creek and right panel is Currans Creek. NB channel vegetation is the dominant cause of impeded drainage furthest away from the lagoon as shown as 0.5m lagoon level (Walsh et al. 2016).

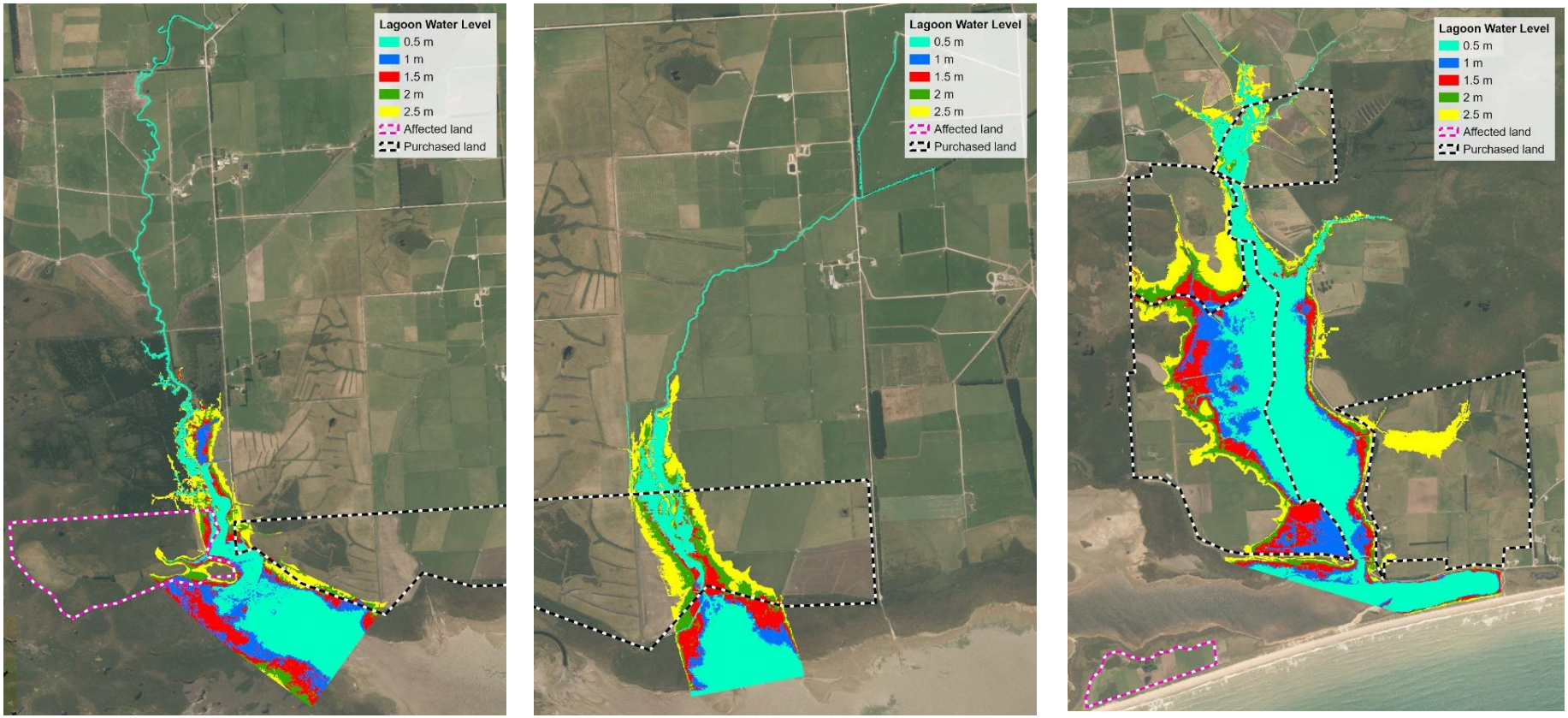

Figure 11. Extent of inundated land from Waituna creek (left), Moffat Creek (middle) and Curran Creek (right) at different lagoon levels, modelled under a scenario of mean flow and channel vegetated. Purchased properties outlined in black/white, land affected by inundation but not purchased outlined in pink/white. Walsh et al 2016

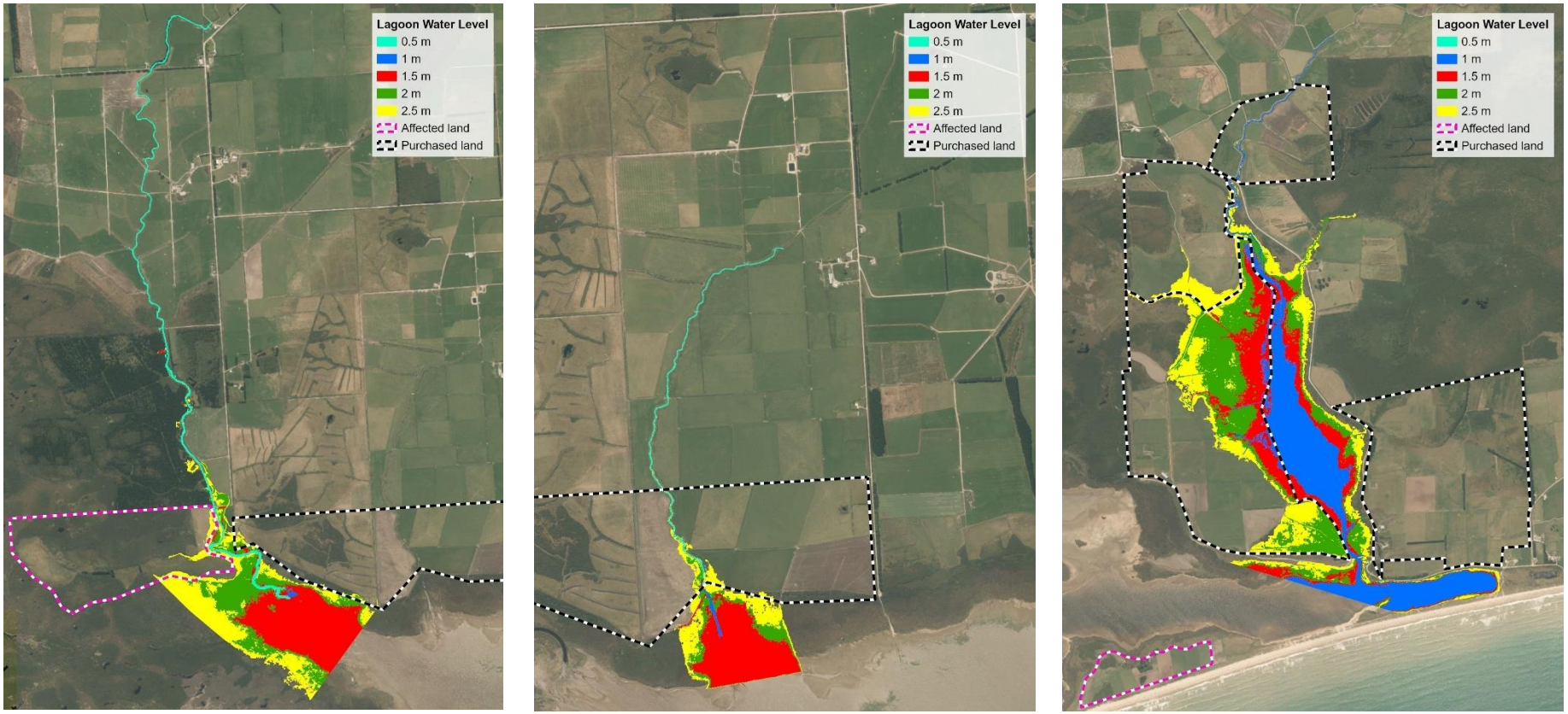

Figure 12 Extent of inundation of Waghorn road and Waghorn Road Bridge at different lagoon levels

7.2. Trout fishery

Waituna lagoon is highly valued regionally for its brown trout fishery and particularly for the opportunity to catch 'sea-run' trout when the lagoon is open. Anglers specifically target trout at the lagoon outlet when the lagoon opening coincides with upstream īnanga migration (whitebait run) which provides a feeding opportunity for trout.

Holmes (2019) observed no detectable pattern between brown trout density (or biomass) and lagoon open-closure status, stating that the effects of lagoon opening and closed status on trout populations may be indirect or subtle, likely though food web effects.

Inward migration of īnanga provides a significant pulse of food into the Waituna catchment, contributing in the order of 20% of total fish biomass in Waituna Creek during strong recruitment years. This addition of food into the wider ecosystem ultimately increases productivity of the whole system, including the brown trout population.

Compared to the status quo, the proposed consent conditions have specific provisions to ensure native fish, particularly īnanga, can regularly migrate into the lagoon and catchment, thereby ensuring the opportunity for catching sea run trout continues, at least during every two years. While opportunities to target sea-run fish will be reduced during years when the lagoon is closed, the resident trout population will likely benefit from closed lagoon conditions. The lagoon is highly productive when closed over the summer periods and the available foraging area for trout will be increased. This will likely provide good fishing conditions for anglers targeting trout around the lagoon edge and near tributary inflows.

In addition, optimising the lagoon for ecological health will protect the trout population by helping to maintain water quality and clarity. Overall, the impact of an ecologically-focused opening regime should protect and enhance the brown trout population and its fishery values.

7.3. Duck hunting

Waituna Lagoon and surrounding wetlands are highly valued for the opportunity for duck hunting.

The proposed lagoon opening conditions (Scenario C) outlined in this report will result in a reduced frequency of lagoon opening events, including a reduced likelihood of lagoon opening during the opening of the duck hunting season. Increased duration of freshwater conditions, with extensive open water areas that support a healthy lagoon ecosystem dominated by submerged macrophytes, will provide habitat and food resources for waterfowl (ducks, swans).

8 References

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9 Appendix A – Current consent to open Waituna Lagoon

Coastal Permit

Pursuant to Section 104B of the Resource Management Act 1991, a resource consent is hereby granted by the Southland Regional Council to **Lake Waituna Control Association,** care of **E R Pirie, 389 Kapuka North Road, RD 3, Wyndham 9893** from **14 February 2017**.

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 periodically open Lake Waituna to the sea

Location - site locality Walker's Bay and Hansen's Bay, Lake Waituna

- map reference Between NZTM 1262340E 48311370N and 1261460E 4831000N (Walker's Bay), and

about NZTM 1265350E 4832550N (Hansen's Bay)

Legal description at the site: Section 29 Block XIII Oteramika Hundred and Crown Land (seabed)

Expiry date: 14 February 2022

Schedule of Conditions

1. This consent authorises the opening of the Waituna Lagoon to the sea through the gravel barrier at either:

(a) Walker's Bay between NZTM 1,262,340E 4,831,360 N and 1,261,460E 4,831,000N; or

(b) Hansen's Bay, between NZTM 1,265,305E 4,832,570N and 1,265,405E 4,832,605N

2. Except as specified in Condition 6, the openings authorised by this resource consent shall be at the Walker's Bay site specified in Condition 1(a).

(i) Openings under Condition 6 may be at either the Walker's Bay or the Hansen's Bay sites, dependent upon the recommendation of the technical advisory group as described in Condition 6(b).

3. (a) Immediately prior to lagoon opening, the consent holder must notify the Consent Authority (email: escompliance@es.govt.nz), the Kaupapa Taiao Manager at Te Ao Marama Inc and Operations Manager (Murihiku) of the Department of Conservation about the proposed opening location. The notification shall be in writing and shall include:

(i) the current water level at the Waghorn's Road bridge gauge board[7]; and

(ii) note of the prevailing wind conditions (direction and strength)[8], and comment whether or not there is any reason to suspect that the water level is only temporarily raised at the gauge board by strong wind conditions; and

(iii) information to show compliance with the opening criteria specified in Conditions 4, 5 or 6.

Note: 'in writing' may be by email.

Lagoon Opening May to 19 September inclusive

4. (a) During the months from 1 May to, and including, 31 August the lagoon may be opened to the sea when water level in the lagoon reaches 2.0 metres, as measured on the Waghorn's Road bridge gauge board.

[7] Continuous water level readings are available at: http://www.es.govt.nz/rivers-and-rainfall/graph/?site=Waituna-Lagoon-at-Waghorns-Road&measurement=river level&start=12-May-2016&end=19-May-2016&owner=0

[8] Wind conditions at Invercargill airport can be viewed at: http://www.metservice.com/towns-cities/invercargill?gclid=CIuft6z1gM8CFQGavAod19kAsA#!/your-weather

(b) During the period 1 September to 19 September the lagoon may be opened to the sea when water level in the lagoon reaches 2.0 metres, as measured on the Waghorn's Road bridge gauge board once the lagoon has been above that level for 7 days out of a continuous period of ten days.

(c) During the month of July the lagoon may be opened when water level in the lagoon reaches 1.8 metres as measured on the Waghorn's Road bridge gauge board, if the lagoon has not been opened in the previous 12 month period.

Lagoon Opening 20 September to April inclusive

5. (a) During the months from 20 September to, and including, 30 April the lagoon may be opened to the sea when the water level in the lagoon reaches 2.2 metres, as measured on the Waghorn's Road bridge gauge board;

(b) During the months from 20 September to, and including, 30 April the lagoon may be opened to the sea when the water level exceeds 2.0 metres, as measured on the Waghorn's Road bridge gauge board, provided that:

(i) the lagoon has been above that level for 14 days out of a continuous period of twenty days; and

(ii) the mean aquatic plant (macrophyte) cover in the lagoon has exceeded 30 percent for the previous three years, as determined by annual summer surveys or monitoring by a suitably qualified person

Lagoon Opening in the case of poor water quality events

6. (a) Notwithstanding conditions 4-6 of this consent, the lagoon may be opened to the sea when water level in the lagoon is above 1.5 metres, as measured on the Waghorn's Road bridge gauge board, provided that:

a primary ecological trigger (outlined in Appendix 1) has been reached, and

a technical advisory group, convened jointly by Environment Southland, Te Ao Marama Inc and the Department of Conservation, with scientific knowledge of coastal lagoon ecosystems, has considered the secondary and tertiary indicators (Appendix 1), and any other relevant scientific information, and has advised the consent holder and Consent Authority in writing that opening the lagoon to the sea is advisable to disrupt an actual or probable algal bloom in order to avoid a significant adverse ecological effect on the lagoon,

(b) If the technical advisory group required by Condition 6(a)(ii) specifies a preference (in writing) for the opening to occur at one or the other of the locations specified in Condition 1, the opening in accordance with this condition shall only occur at that location.

(c) In the event that the lagoon is opened to the sea in accordance with condition 6(a), the consent holder shall notify the following parties that a primary ecological trigger has been reached and that opening the lagoon to the sea has been recommended. The notification shall include evidence that the ecological trigger has been reached and a copy of the written advice from the technical advisory group specified in condition 6(a):

Kaupapa Taiao Manager, Te Ao Marama Inc, PO Box 7078, South Invercargill 9844

Operations Manager, Murihiku District Office, Department of Conservation, PO Box 743, Invercargill 9840

The Manager, Fish & Game New Zealand, PO Box 159, Invercargill 9840

The Consent Authority

7. (a) With regard to the Primary indicator in Appendix 1, a "visible algal bloom" shall be identified by:

(i) ≥ 0.012 mg/l Chlorophyll *a* (or other figure identified in writing by the technical advisory group referred to in condition 6); and/or

(ii) The observations of an appropriately qualified person. These observations shall include the location and approximate scale and intensity of the visible algal bloom on each day of observation.

(b) These observations or readings are to be recorded and shall be made available to the Lagoon technical advisory group and the Consent Authority.

Responses to disturbance of artefacts or fuel spills

8. In the event of:

(a) the discovery, or suspected discovery, of a site of cultural importance (Waahi Taonga/Tapu), the consent holder shall immediately cease operations in that location and inform the local Iwi authority (Te Ao Marama Inc) and the Consent Authority Operations may recommence at a time as agreed upon in writing with the Consent Authority. The discovery of Koiwi (human skeletal remains) or Taonga or artefact material (e.g. pounamu/greenstone) would indicate a site of cultural importance. Appendix 2 to this consent outlines the process that is to be followed in the event of such a discovery.

(b) contamination of the lagoon or foreshore, such as with fuel or oil spilt from the digger during the lagoon opening, the consent holder shall remove the contaminants immediately from the site and notify, without undue delay, the Consent Authority (email: compliance@es.govt.nz or phone 03 211 5115) and the Area Manager (Murihiku) of the Department of Conservation.

Information Gathering Requirements

9. The consent holder shall record the following information:

(a) when and where the lagoon is opened to the sea;

(b) the water level in the lagoon at the time it was opened;

(c) information to show compliance with the opening criteria specified in Conditions 4, 5 or 6.

(d) when and at what gauge board level access across Carran Creek bridge was lost for stock and farm vehicles and when was this access re-established.

(e) how long the lagoon is open to the sea and when it closes (to the nearest week);

10. The consent holder shall provide the information specified in condition 9, to the Consent Authority and to the Operations Manager (Murihiku) of the Department of Conservation within one month of the opening of the lagoon to the sea, and without undue delay following closure of the channel to the sea.

Consent Review and Council Charges

11. 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 monitoring results, for the purposes of:

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;

ensuring the conditions of this consent are consistent with any National Environmental Standards Regulations, relevant plans and/or Policy Statement;

amending the monitoring programme to be undertaken; or

adding or adjusting compliance limits.

Note: Under s127 of the Resource Management Act the Consent Holder can apply for a change or cancellation of a resource consent condition (other than the consent duration) at any time during the consent period.

12. 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.

Meetings

13. The consent holder shall hold liaison meetings, at least once each year, to report and discuss available monitoring information regarding the following in Lake Waituna:

water level

water quality, particularly nutrients

algae, particularly chlorophyll a

macrophytes

fish

The consent holder shall invite the following to the liaison meetings:

representatives of each of the organisations in Section 3.1 of Appendix 3; and

each of the individuals (or their representatives) in Section 3.2 of Appendix 3

Any other person or group at the discretion of the applicant.

The consent holder shall record a summary of the attendees and discussion at each meeting, and report the summary to the consent authority within 20 working days of the meeting.

In the event that contact details for any of the individuals or organisations in Appendix 3 becomes outdated, and the consent holder has not been notified of updated contact details, the consent holder may omit invitation of that individual or organisation to the meeting.

for the **Southland Regional Council**

Vin Smith

Director of Policy, Planning & Regulatory Services

Appendix 1

Indicators

Primary Indicator	**Critical Trigger**
Chlorophyll *a*	a sustained visible algal bloom over a period of 14 days or longer
Secondary Indicators	Critical Indicator Levels
Total Phosphorus concentration	≥ 0.045 mg/l
Total Nitrogen concentration	≥ 0.700 mg/l
Tertiary Indicators	
Nuisance epiphytes or benthic algae	
Ruppia and other macrophytes	
RPD (Redox Potential Discontinuity) – bottom sediments	
Turbidity	
Bottom water dissolved oxygen concentration	
Aquatic and surrounding wetland life	
Algal blooms	

Appendix 2

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

Murihiku Marae, 408 Tramway Road, Invercargill

P O Box 7078, South Invercargill 9844

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/- Dr M Schmidt, Regional Archaeologist Otago/Southland

PO Box 5467, Dunedin 9058

Phone: (03) 470 2364 Mobile 027 240 8715 mschmidt@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 3

Contact details for persons identified in Condition 13

The following lists identify the organisations and persons to be invited to the liaison meetings.

The postal and email addresses are based on information in the submissions to the application but could become outdated during the term of the resource consent.

3.1 Organisations:

Te Runanga o Awarua, C/- Te Ao Marama Inc, PO Box 7078, South Invercargill 9844 dean.whaanga@teaomarama.maori.nz

Department of Conservation, Private Bag 4715, Christchurch Mail Centre 8140. Attn: G Deavoll gdeavoll@doc.govt.nz

Fish & Game New Zealand, P O Box 159, Invercargill 9840 zane@southlandfishgame.co.nz

Royal Forest & Bird Protection Society, PO Box 6230, Dunedin North 9059 s.maturin@forestandbird.org.nz

Waituna Affected Farmers, C/- J Crack, 108 Moffat Road, RD 5, Invercargill 9875 jo@farmnews.co.nz

Waituna Recreational Users Group, C/- B McNaughton, 502 Elles Road, Kingswell, Invercargill 9812 bevan@ocs.net.nz

Federated Farmers New Zealand, PO Box 176, Invercargill 9840. Attn: Tanith Robb trobb@fedfarm.org.nz

Dairy New Zealand, Private Bag 3221, Hamilton 3240 David.burger@dairynz.co.nz

Stagger Inn Hunting Group, C/- Craig Booth, 11 Judge Road, Tisbury, Invercargill 9812

3.2 Individuals:

S Carston, 5 /3 Fortuna Place, Gold Coast, Queensland, Australia ycats7@gmail.com

J & D Crack, 108 Moffat Road, RD 5, Mokotua, Invercargill 9875 jo@farmnews.co.nz

O Kelly, 433 Waituna Lagoon Road, RD 5, Invercargill 9875 oakelly@netspeed.nz

L McCallum, 1100 Wilsons Crossing Road, RD 1, Winton 9781 lloyd.kathy@xtra.co.nz

G McKenzie, 32 Bungalow Hill Road, RD 1, Riverton 9881 Graeme@orakafarms.co.nz

B J McNaughton, 502 Elles Road, Kingswell, Invercargill 9812 bevan@ocs.net.nz

R McNaughton, 168 Walker Road, RD 1, Woodlands, Invercargill 9871 roger@ocs.net.nz

A Owen, 275 Waimatuku Township Road, RD 4, Invercargill 9874 aowen444@gmail.com

L Paddon, 19 Manapouri Street, Invercargill 9812

J Pannett, 113 Chelmsford Street, Invercargill 9810 john.chick@xtra.co.nz

S Perriam, 904 Rimu Seaward Downs Road, RD 1, Waituna, Invercargill 9871 jane.shayne@woosh.co.nz

B Pirie, 206 Drakes Hill Road, RD 1, Invercargill 9871 drakeshillfarming@gmail.com

D J Simms, 54 Awatea Gardens, Wigram, Christchurch 8042 Don.simms@xtra.co.nz

R W Simms, 6 /58 Douglas Street, Frankton, Queenstown 9300 sue_raysimms@xtra.co.nz

S R Simms, 50A Bantry Street, Alexandra 9320

R van Gool, 90 Smiths' Way, RD 3, Cromwell 9383 towyn@vodafone.co.nz

M J Waghorn, 961 Waituna Lagoon Road, RD 5, Invercargill 9875 murraywaghorn@hotmail.com

R C Waghon, 837 Waituna Lagoon Road, RD 5, Invercargill 9875 rcwaghorn@gmail.com

J Watson, 2132 Winton Lorneville Highway, RD 6, Invercargill 9876 jim.watson@xtra.co.nz

C A Williams, 380 Waituna Lagoon Road, RD 5, Invercargill 9875 craig.heidi@farmside.co.nz

10 Appendix B – proposed amendments to consent conditions

Proposed Resource Consent conditions for opening Waituna Lagoon based on maximising ecological and cultural values

NOTE: Proposed amendments are shown in highlighted text

Details of Permit

Purpose for which permit is granted: To periodically open Lake Waituna to the sea

Location - site locality Walker's Bay and Hansen's Bay, Lake Waituna

- map reference Between NZTM 1262340E 48311370N and 1261460E 4831000N (Walker's Bay), and

about NZTM 1265350E 4832550N (Hansen's Bay)

Legal description at the site: Section 29 Block XIII Oteramika Hundred and Crown Land (seabed)

Expiry date: XXXX

Schedule of Conditions

Note: conditions 1 & 2 unchanged from existing consent

1. This consent authorises the opening of the Waituna Lagoon to the sea through the gravel barrier at either:

(a) Walker's Bay between NZTM 1,262,340E 4,831,360 N and 1,261,460E 4,831,000N; or

(b) Hansen's Bay, between NZTM 1,265,305E 4,832,570N and 1,265,405E 4,832,605N

2. (a) Except as specified in condition 6, the openings authorised by this resource consent shall be at the Walker's Bay site specified in condition 1(a).

(b) Openings under condition 6 may be at either the Walker's Bay or the Hansen's Bay sites, dependent upon the recommendation of the technical advisory group as described in condition 6(b).

3. (a) Immediately prior to any lagoon opening undertaken in relation to conditions 4, 5 and 6, the consent holder must notify:

Kaupapa Taiao Manager, Te Ao Marama Inc, PO Box 7078, South Invercargill 9844;

Operations Manager, Murihiku District Office, Department of Conservation, PO Box 743, Invercargill 9840;

The Manager, Fish & Game New Zealand, PO Box 159, Invercargill 9840;

Private landowners adjacent to Waituna Lagoon specified in Appendix 4;

The Consent Authority.

(b) The notification in condition 3(a) shall be in writing and shall include:

(i) the current water level at the Waghorn's Road bridge gauge board and average daily water levels for the previous seven days[9]; and

(ii) note of the prevailing wind conditions (direction and strength)[10], and comment whether or not there is any reason to suspect that the water level is only temporarily raised at the gauge board by strong wind conditions; and

(iii) any lagoon monitoring information necessary to show compliance with the opening criteria specified in conditions 4, 6 or Z.

Advice note: 'in writing' may be by email.

Lagoon Opening – general opening for ecological health and land drainage.

4. (a) Regardless of the time of the year, the lagoon may be opened to the sea when the water level in the lagoon reaches 2.5 metres, as measured on the Waghorn's Road bridge gauge board, and remains at or above that level for at least 24 hours continuously.

[4(b), 4(c), 5(a), 5(b) from existing consent deleted. Not considered necessary due to proposed amendments to 4(a)]

[9] Continuous water level readings are available at: http://www.es.govt.nz/rivers-and-rainfall/graph/?site=Waituna-Lagoon-at-Waghorns-Road&measurement=river level&start=12-May-2016&end=19-May-2016&owner=0[check web link]

[10] Wind conditions at Invercargill airport can be viewed at: http://www.metservice.com/towns-cities/invercargill?gclid=CIuft6z1gM8CFQGavAod19kAsA#!/your-weather [check web link]

Lagoon Opening in the case of poor water quality events

6. (a) Notwithstanding condition 4 of this consent, the lagoon may be opened to the sea at any time of the year when water level in the lagoon is above 1.5 metres, as measured on the Waghorn's Road bridge gauge board, provided that:

One or both Water Quality (Primary) Indicators set out in Appendix 1 has reached its Critical Indicator Level, and

A Technical Advisory Group, convened jointly by Environment Southland, Te Ao Marama Inc. and the Department of Conservation, with scientific knowledge of coastal lagoon ecosystems, has considered the Primary Indicators in Appendix 1, and any other relevant scientific information, including additional indicators of Ecosystem Health set out in Appendix 2, and has advised the consent holder and Consent Authority in writing that opening the lagoon to the sea is advisable to disrupt an actual or probable algal bloom in order to avoid a significant adverse ecological effect on the lagoon.

(b) If the Technical Advisory Group specifies a preference (in writing) for the opening to occur at one or the other of the locations specified in condition 1, the opening in accordance with this condition shall only occur at that location.

(c) In the event that the lagoon is opened to the sea in accordance with condition 6(a), the consent holder shall notify the ~~following~~ parties specified in condition 3(a) that a Water Quality Indicator has reached its Critical Indicator Level and that opening the lagoon to the sea has been recommended.

~~Kaupapa Taiao Manager, Te Ao Marama Inc, PO Box 7078, South Invercargill 9844;~~

~~Operations Manager, Murihiku District Office, Department of Conservation, PO Box 743, Invercargill 9840;~~

~~The Manager, Fish & Game New Zealand, PO Box 159, Invercargill 9840;~~

~~Private landowners adjacent to Waituna Lagoon;~~

~~The Consent Authority.~~

The notification shall include evidence that a Critical Indicator Level has been reached and a copy of the written advice from the Technical Advisory Group specified in condition 6(a):

[7(a), 7(b) from existing consent deleted. Content is covered in Appendix 1 and 2]

Lagoon Opening for the purpose of providing fish passage

Z. (a) Notwithstanding conditions 4 and 6 of this consent, the lagoon may be opened to the sea to provide for passage for diadromous fish species when the water level in the lagoon is above 1.5 metres, as measured on the Waghorn's Road bridge gauge board, during the period 1 April to 30 November, provided that:

The lagoon has not been opened in the previous 24 months, and

The Technical Advisory Group has considered the lagoon water quality and ecosystem health indicators listed in Appendix 1 and Appendix 2, and any other relevant scientific information, and has advised the consent holder and Consent Authority (in writing) that opening the lagoon to the sea is recommended to enable fish passage.

(b) If the Technical Advisory Group specifies a preference (in writing) for the opening to occur at one or the other of the locations specified in condition 1, the opening in accordance with this condition shall only occur at that location.

(c) In the event that the lagoon is opened to the sea in accordance with condition Z(a), the consent holder shall notify the parties specified in condition 3(a) that an opening of the lagoon to the sea to provide for fish passage has been recommended. The notification shall include evidence that the lagoon has not been open to the sea in the previous 24 months and a copy of the written advice from the Technical Advisory Group specified in condition Z(a)(ii)

Responses to disturbance of artefacts or fuel spills

Note: condition 8 unchanged from existing consent

8. In the event of:

(a) The discovery, or suspected discovery, of a site of cultural importance (Waahi Taonga/Tapu), the consent holder shall immediately cease operations in that location and inform the local Iwi authority (Te Ao Marama Inc) and the Consent Authority Operations may recommence at a time as agreed upon in writing with the Consent Authority. The discovery of Koiwi (human skeletal remains) or Taonga or artefact material (e.g. pounamu/greenstone) would indicate a site of cultural importance. Appendix 2 to this consent outlines the process that is to be followed in the event of such a discovery.

(b) Contamination of the lagoon or foreshore, such as with fuel or oil spilt from the digger during the lagoon opening, the consent holder shall remove the contaminants immediately from the site and notify, without undue delay, the Consent Authority (email: compliance@es.govt.nz or phone 03 211 5115) and the Area Manager (Murihiku) of the Department of Conservation.

Information Gathering Requirements

9. The consent holder shall monitor and record the following information:

(a) changes in the Primary, Secondary and Tertiary indicators of lagoon Water Quality and Ecosystem Health set out in Appendix 1 and Appendix 2.

(b) when and where the lagoon is opened to the sea;

(c) the water level in the lagoon at the time it was opened;

(d) information to show compliance with the opening criteria specified in conditions 4, 6 or Z;

~~when and at what gauge board level access across Carran Creek bridge was lost for stock and farm vehicles and when was this access re-established.~~

(e) how long the lagoon is open to the sea and when it closes (to the nearest week).

10. Information gathered under condition 9 shall be made available to the Technical Advisory Group and the Consent Authority.

Consent Review and Council Charges

Note: conditions 11-12 unchanged from existing consent

11. 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 monitoring results, for the purposes of:

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.

Ensuring the conditions of this consent are consistent with any National Environmental Standards Regulations, relevant plans and/or Policy Statement.

Amending the monitoring programme to be undertaken.

Adding or adjusting compliance limits.

Note: Under s127 of the Resource Management Act the Consent Holder can apply for a change or cancellation of a resource consent condition (other than the consent duration) at any time during the consent period.

12. 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.

Meetings

13. The consent holder shall hold liaison meetings, at least once each year, to report and discuss available monitoring information recorded in accordance with condition 9 ~~in Lake Waituna:~~

~~water level;~~

~~water quality, particularly nutrients;~~

~~algae, particularly chlorophyll a and cynaobacteria;~~

~~macrophytes;~~

~~fish.~~

The consent holder shall invite the following to the liaison meetings:

X

X

To be determined

The consent holder shall record a summary of the attendees and discussion at each meeting, and report the summary to the consent authority within 20 working days of the meeting.

In the event that contact details for any of the individuals or organisations in Appendix 4 becomes outdated, and the consent holder has not been notified of updated contact details, the consent holder may omit invitation of that individual or organisation to the meeting.

Appendix 1

Waituna Lagoon Water Quality - Primary Indicators

Water Quality or Ecosystem Health Indicator	Critical Indicator Level
Primary Indicators	
Chlorophyll-*a*	a sustained visible algal bloom* over a period of 14 days or longer
Cyano-bacteria	≥ 500 cells/mL or ≥ 0.5 mm^3/L biovolume *[of potentially toxin producing species].*
Interpretation * A "visible algal bloom" shall be identified by: (i) A chlorophyll-*a* concentration of ≥ 0.012 mg/L (or other figure identified in writing by the Technical Advisory Group referred to in condition 6; and/or (ii) The observations of an appropriately qualified person. These observations shall include the location and approximate scale and intensity of the visible algal bloom on each day of observation.	

Appendix 2

Waituna Lagoon Water Quality and Ecosystem Health – Additional Indicators

Water Quality or Ecosystem Health Indicator	Critical Indicator Level
Secondary Indicators	
Total Phosphorus concentration	≥ 0.045 mg/L
Total Nitrogen concentration	≥ 1.000 mg/L
Tertiary Indicators**	
Nuisance epiphytes or benthic algae	>10% cover
Macrophytes	<20% cover
Ruppia megacarpa	Present at less than <20% of lagoon monitoring sites

Other indicators that may be considered Turbidity RPD (Redox Potential Discontinuity) – bottom sediments Bottom water dissolved oxygen concentration Aquatic and surrounding wetland life	
** Based on the results from annual surveys undertaken in late summer.	

Appendix 3

Protocol in the event of a discovery, or suspected discovery, of a site of

cultural importance (Waahi Taonga/Tapu)

Note: Appendix 3 unchanged from existing consent

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.

Murihiku Marae, 408 Tramway Road, Invercargill

P O Box 7078, South Invercargill 9844

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/- Dr M Schmidt, Regional Archaeologist Otago/Southland

PO Box 5467, Dunedin 9058

Phone: (03) 470 2364 Mobile 027 240 8715 mschmidt@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 4

Contact details for persons identified in Condition 13

The following lists identify the organisations and persons to be invited to the liaison meetings.

The postal and email addresses are based on information in the submissions to the application but could become outdated during the term of the resource consent.

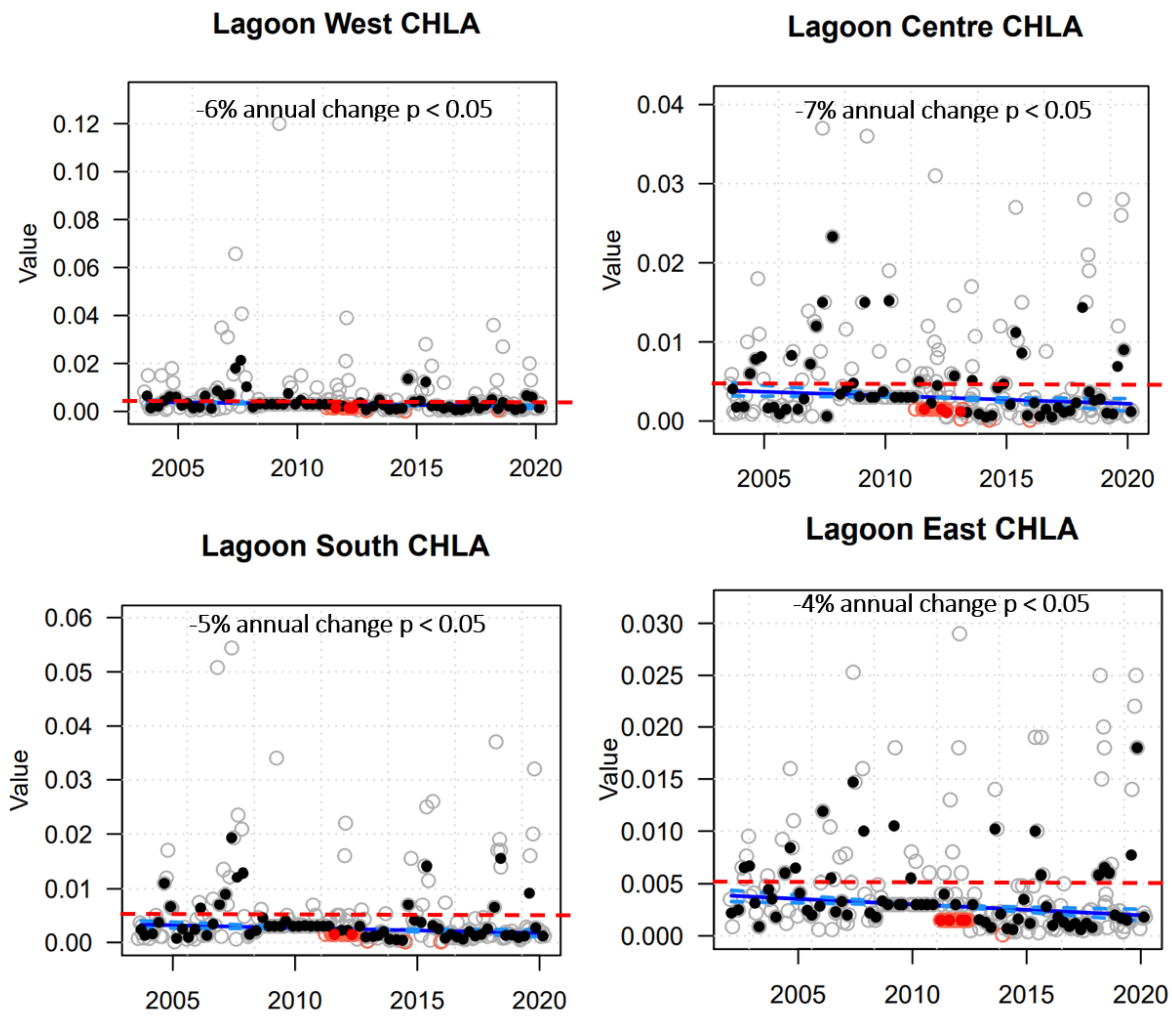
3.1 Organisations:

Note: list of organisation to be reviewed

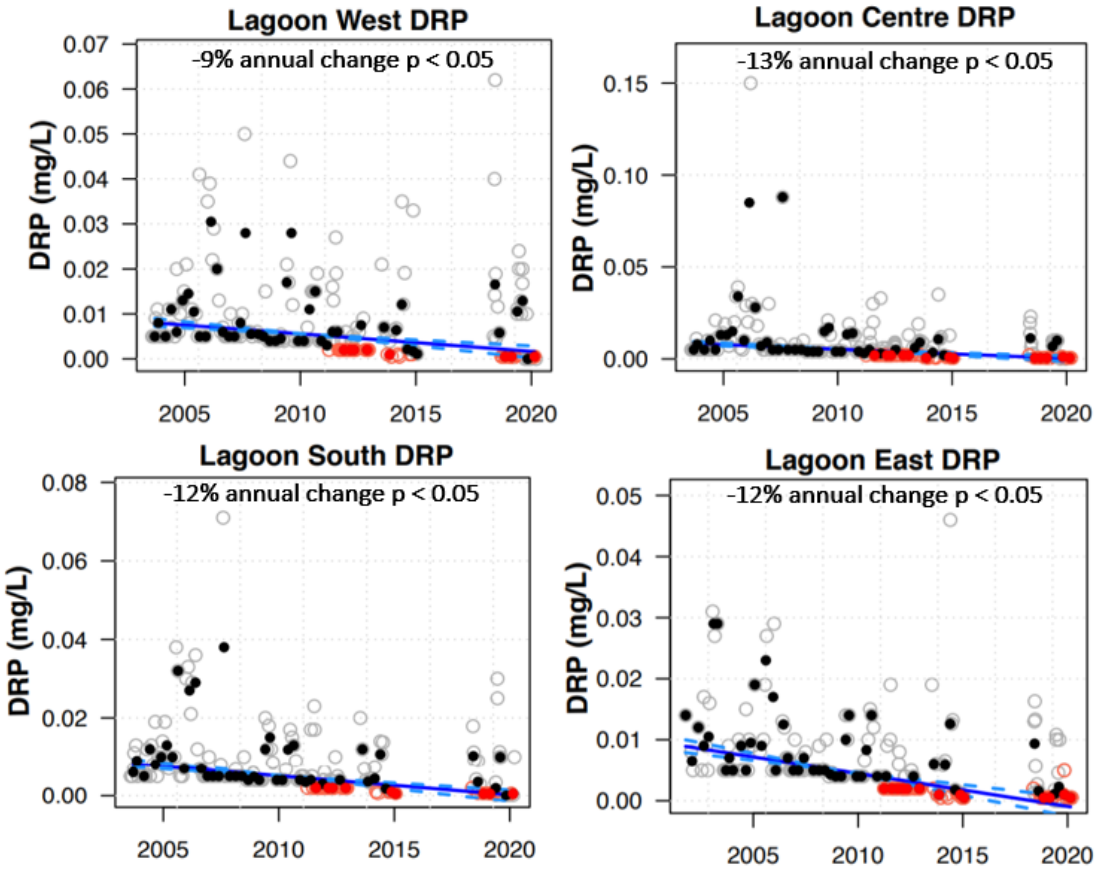
3.2 Individuals, including private landowners adjacent to Waituna Lagoon:

Note: list of individuals to be reviewed

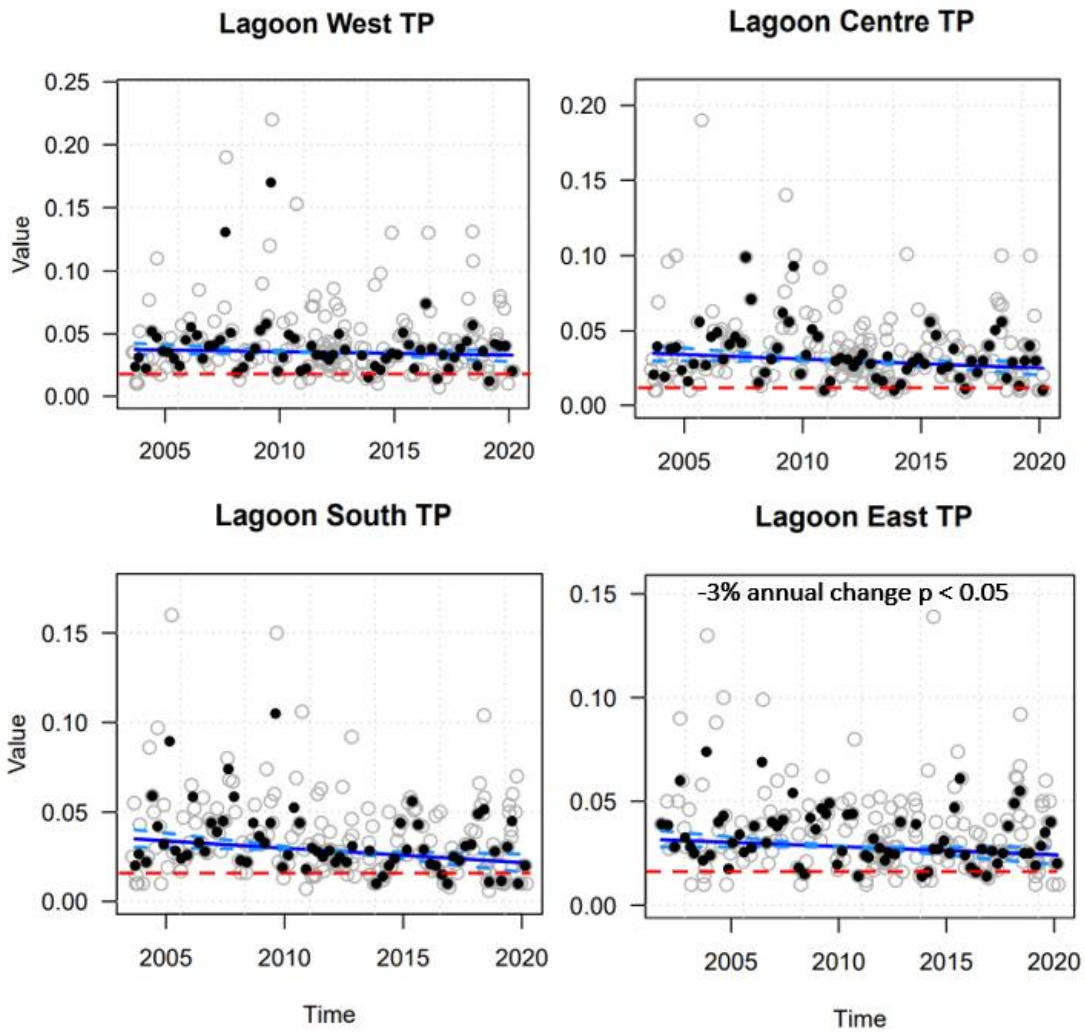
11 Appendix C – Water Quality Trends



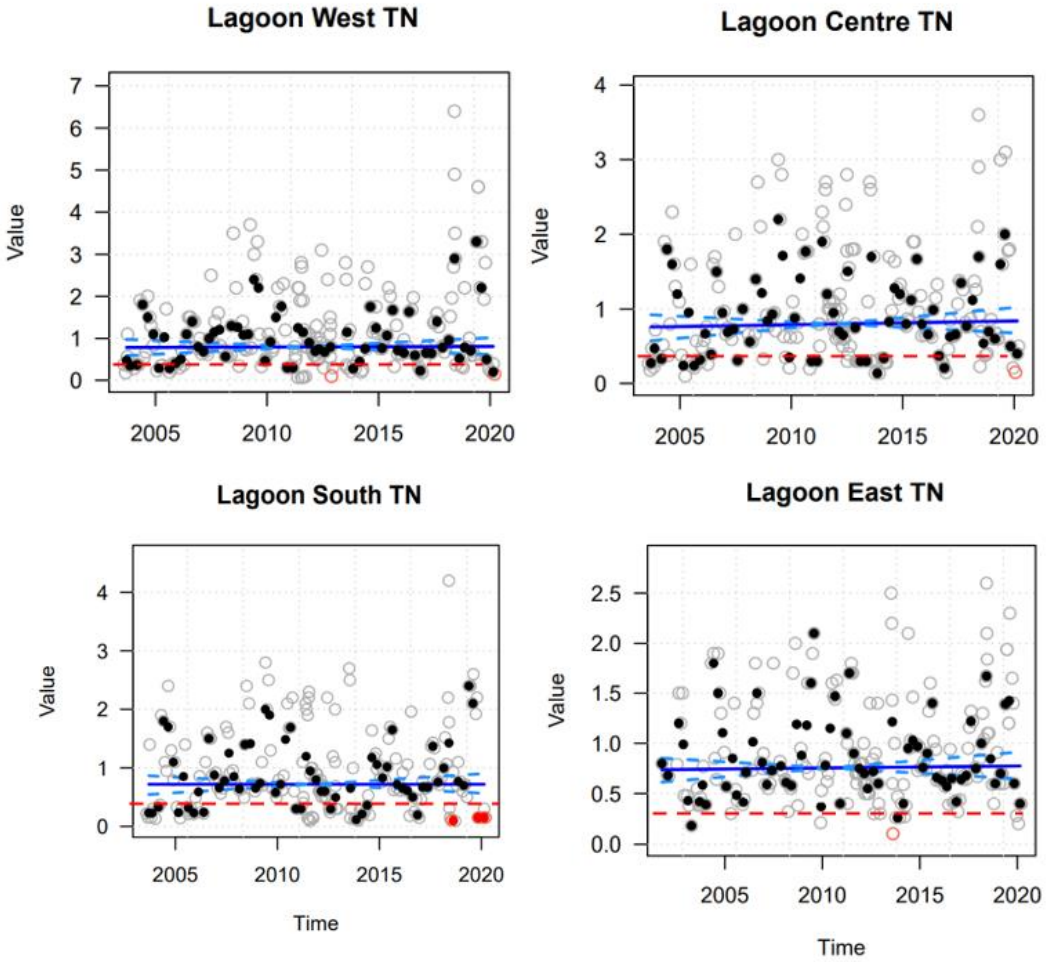
Long-term trends of chlorophyll-a (CHLA, mg/L) concentrations in Waituna Lagoon. All sites displayed a significant decreasing trend in chlorophyll-a concentrations. The LTG 2013 minimum threshold of 0.005 mg/L is noted with the red dashed line. Open circles denote raw data, closed circles denote quarterly medians used in the model, the blue line is the regression line with 95% confidence intervals.



DRP (mg/L) trend analysis results from Waituna Lagoon sites from 2001 to 2020. <u>All sites displayed a significant decreasing trend</u> (blue line). Closed circles represent the quarterly median value used in the trend analysis, open points represent the raw data, and red points represent censored values.



Total Phosphorous (mg/L) trend analysis results from Waituna Lagoon sites from 2001 to 2020. <u>The Lagoon East site displayed a significant decreasing trend</u> (blue line). Closed circles represent the quarterly median value used in the trend analysis, open points represent the raw data, and red points represent censored values. Note that the LTG 2013 guideline for TP is 0.02 mg/L (dashed red line).



Total Nitrogen (mg/L) trend analysis results from Waituna Lagoon sites from 2001 to 2020. No sites displayed a significant decreasing trend (blue line). Closed circles represent the quarterly median value used in the trend analysis, open points represent the raw data, and red points represent censored values. Note that the LTG 2013 guideline for TN is 0.337 mg/L (dashed red line).

Appendix 7

Images of lagoon opening

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Images of lagoon openings

Image 1 – 6 November 2021

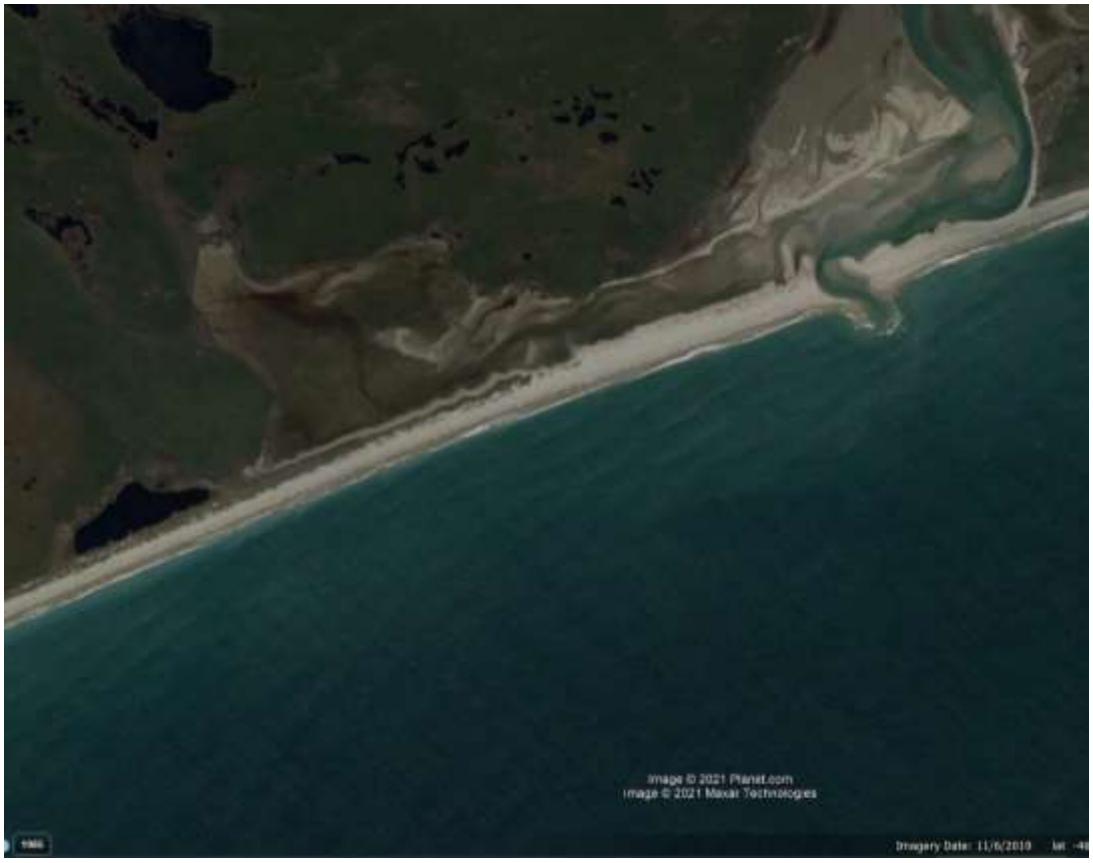


Image 2 – 14 November 2019

Image 3 – 29 November 2019. Approximately 28mm of rainfall recorded at that time.

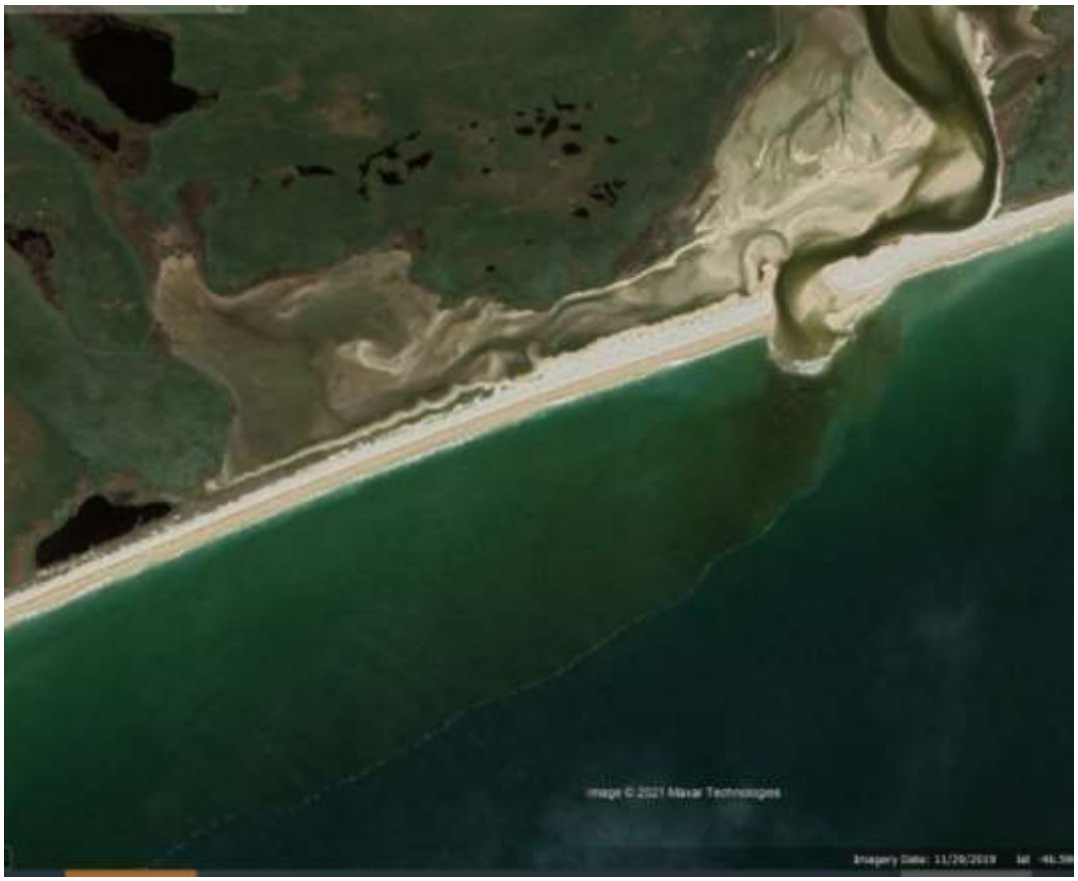
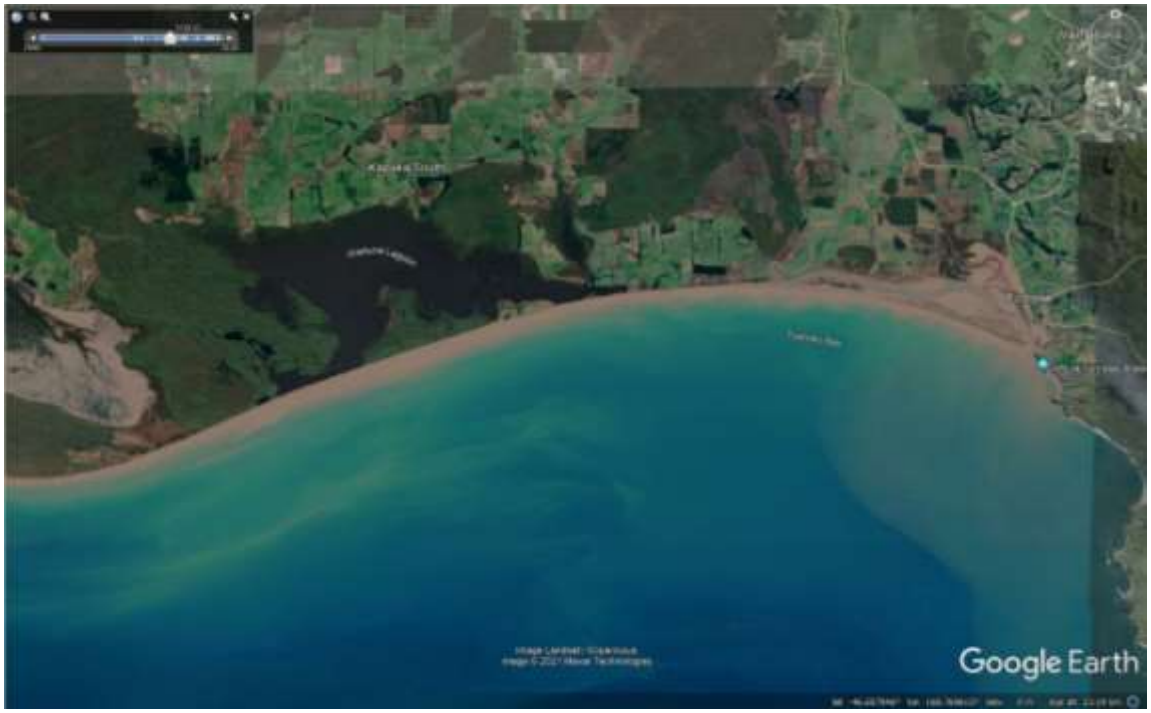


Image 4 – Matura River discharge following rain - 31 May 2010



Appendix 8

Current permits for lagoon openings:

1. ***Coastal permit AUTH-20146407-V1 – disturbance to foreshore***
2. ***Water permit AUTH-20146407-V1 – to divert the water***
3. ***Coastal permit AUTH-20146407-V3 – to discharge water***

bonisch

environment SOUTHLAND

AUTH- 20146407-01

To drain Waituna Lagoon to the sea

Cnr North Road and Price Street
(Private Bag 90116)
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 **Lake Waituna Control Association,** care of **E R Pirie, 389 Kapuka North Road, RD 3, Wyndham 9893** from **14 February 2017**.

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 periodically open Lake Waituna to the sea
Location	- site locality	Walker's Bay and Hansen's Bay, Lake Waituna
	- map reference	Between NZTM 1262340E 48311370N and 1261460E 4831000N (Walker's Bay), and about NZTM 1265350E 4832550N (Hansen's Bay)
Legal description at the site:		Section 29 Block XIII Oteramika Hundred and Crown Land (seabed)
Expiry date:		14 February 2022

Schedule of Conditions

1. This consent authorises the opening of the Waituna Lagoon to the sea through the gravel barrier at either:
   (a) Walker's Bay between NZTM 1,262,340E 4,831,360 N and 1,261,460E 4,831,000N; or
   (b) Hansen's Bay, between NZTM 1,265,305E 4,832,570N and 1,265,405E 4,832,605N

2. Except as specified in Condition 6, the openings authorised by this resource consent shall be at the Walker's Bay site specified in Condition 1(a).

(i) Openings under Condition 6 may be at either the Walker's Bay or the Hansen's Bay sites, dependent upon the recommendation of the technical advisory group as described in Condition 6(b).

3. (a) Immediately prior to lagoon opening, the consent holder must notify the Consent Authority (email: escompliance@es.govt.nz), the Kaupapa Taiao Manager at Te Ao Marama Inc and Operations Manager (Murihiku) of the Department of Conservation about the proposed opening location. The notification shall be in writing and shall include:

(i) the current water level at the Waghorn's Road bridge gauge board[1]; and

(ii) note of the prevailing wind conditions (direction and strength)[2], and comment whether or not there is any reason to suspect that the water level is only temporarily raised at the gauge board by strong wind conditions; and

(iii) information to show compliance with the opening criteria specified in Conditions 4, 5 or 6.

Note: 'in writing' may be by email.

Lagoon Opening May to 19 September inclusive

4. (a) During the months from 1 May to, and including, 31 August the lagoon may be opened to the sea when water level in the lagoon reaches 2.0 metres, as measured on the Waghorn's Road bridge gauge board.

(b) During the period 1 September to 19 September the lagoon may be opened to the sea when water level in the lagoon reaches 2.0 metres, as measured on the Waghorn's Road bridge gauge board once the lagoon has been above that level for 7 days out of a continuous period of ten days.

(c) During the month of July the lagoon may be opened when water level in the lagoon reaches 1.8 metres as measured on the Waghorn's Road bridge gauge board, if the lagoon has not been opened in the previous 12 month period.

Lagoon Opening 20 September to April inclusive

5. (a) During the months from 20 September to, and including, 30 April the lagoon may be opened to the sea when the water level in the lagoon reaches 2.2 metres, as measured on the Waghorn's Road bridge gauge board;

(b) During the months from 20 September to, and including, 30 April the lagoon may be opened to the sea when the water level exceeds 2.0 metres, as measured on the Waghorn's Road bridge gauge board, provided that:

(i) the lagoon has been above that level for 14 days out of a continuous period of twenty days; and

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[1] Continuous water level readings are available at: http://www.es.govt.nz/rivers-and-rainfall/graph/?site=Waituna-Lagoon-at-Waghorns-Road&measurement=river level&start=12-May-2016&end=19-May-2016&owner=0

[2] Wind conditions at Invercargill airport can be viewed at: http://www.metservice.com/towns-cities/invercargill?gclid=CIuft6z1gM8CFQGavAod19kAsA#!/your-weather

(ii) the mean aquatic plant (macrophyte) cover in the lagoon has exceeded 30 percent for the previous three years, as determined by annual summer surveys or monitoring by a suitably qualified person

Lagoon Opening in the case of poor water quality events

6. (a) Notwithstanding conditions 4-6 of this consent, the lagoon may be opened to the sea when water level in the lagoon is above 1.5 metres, as measured on the Waghorn's Road bridge gauge board, provided that:

(i) a primary ecological trigger (outlined in Appendix 1) has been reached, and
(ii) a technical advisory group, convened jointly by Environment Southland, Te Ao Marama Inc and the Department of Conservation, with scientific knowledge of coastal lagoon ecosystems, has considered the secondary and tertiary indicators (Appendix 1), and any other relevant scientific information, and has advised the consent holder and Consent Authority in writing that opening the lagoon to the sea is advisable to disrupt an actual or probable algal bloom in order to avoid a significant adverse ecological effect on the lagoon,

(b) If the technical advisory group required by Condition 6(a)(ii) specifies a preference (in writing) for the opening to occur at one or the other of the locations specified in Condition 1, the opening in accordance with this condition shall only occur at that location.

(c) In the event that the lagoon is opened to the sea in accordance with condition 6(a), the consent holder shall notify the following parties that a primary ecological trigger has been reached and that opening the lagoon to the sea has been recommended. The notification shall include evidence that the ecological trigger has been reached and a copy of the written advice from the technical advisory group specified in condition 6(a):

- Kaupapa Taiao Manager, Te Ao Marama Inc, PO Box 7078, South Invercargill 9844
- Operations Manager, Murihiku District Office, Department of Conservation, PO Box 743, Invercargill 9840
- The Manager, Fish & Game New Zealand, PO Box 159, Invercargill 9840
- The Consent Authority

7. (a) With regard to the Primary indicator in Appendix 1, a "visible algal bloom" shall be identified by:

(i) $\geq$ 0.012 mg/l Chlorophyll *a* (or other figure identified in writing by the technical advisory group referred to in condition 6); and/or
(ii) The observations of an appropriately qualified person. These observations shall include the location and approximate scale and intensity of the visible algal bloom on each day of observation.

(b) These observations or readings are to be recorded and shall be made available to the Lagoon technical advisory group and the Consent Authority.

Responses to disturbance of artefacts or fuel spills

8. In the event of:

(a) the discovery, or suspected discovery, of a site of cultural importance (Waahi Taonga/Tapu), the consent holder shall immediately cease operations in that location and inform the local Iwi authority (Te Ao Marama Inc) and the Consent Authority Operations may recommence at a time as agreed upon in writing with the Consent Authority. The discovery of Koiwi (human skeletal remains) or Taonga or artefact material (e.g. pounamu/greenstone) would indicate a site of cultural importance. Appendix 2 to this consent outlines the process that is to be followed in the event of such a discovery.

(b) contamination of the lagoon or foreshore, such as with fuel or oil spilt from the digger during the lagoon opening, the consent holder shall remove the contaminants immediately from the site and notify, without undue delay, the Consent Authority (email: compliance@es.govt.nz or phone 03 211 5115) and the Area Manager (Murihiku) of the Department of Conservation.

Information Gathering Requirements

9. The consent holder shall record the following information:

(a) when and where the lagoon is opened to the sea;
(b) the water level in the lagoon at the time it was opened;
(c) information to show compliance with the opening criteria specified in Conditions 4, 5 or 6.
(d) when and at what gauge board level access across Carran Creek bridge was lost for stock and farm vehicles and when was this access re-established.
(e) how long the lagoon is open to the sea and when it closes (to the nearest week);

10. The consent holder shall provide the information specified in condition 9, to the Consent Authority and to the Operations Manager (Murihiku) of the Department of Conservation within one month of the opening of the lagoon to the sea, and without undue delay following closure of the channel to the sea.

Consent Review and Council Charges

11. 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 monitoring results, 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;
(b) ensuring the conditions of this consent are consistent with any National Environmental Standards Regulations, relevant plans and/or Policy Statement;
(c) amending the monitoring programme to be undertaken; or
(d) adding or adjusting compliance limits.

Note: Under s127 of the Resource Management Act the Consent Holder can apply for a change or cancellation of a resource consent condition (other than the consent duration) at any time during the consent period.

12. 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.

Meetings

13. The consent holder shall hold liaison meetings, at least once each year, to report and discuss available monitoring information regarding the following in Lake Waituna:
    - water level
    - water quality, particularly nutrients
    - algae, particularly chlorophyll a
    - macrophytes
    - fish

    (a) The consent holder shall invite the following to the liaison meetings:
        (i) representatives of each of the organisations in Section 3.1 of Appendix 3; and

        (ii) each of the individuals (or their representatives) in Section 3.2 of Appendix 3

        (iii) Any other person or group at the discretion of the applicant.

    (b) The consent holder shall record a summary of the attendees and discussion at each meeting, and report the summary to the consent authority within 20 working days of the meeting.

    (c) In the event that contact details for any of the individuals or organisations in Appendix 3 becomes outdated, and the consent holder has not been notified of updated contact details, the consent holder may omit invitation of that individual or organisation to the meeting.

for the **Southland Regional Council**

Vin Smith
Director of Policy, Planning & Regulatory Services

Appendix 1
Indicators

Primary Indicator	**Critical Trigger**
Chlorophyll *a*	a sustained visible algal bloom over a period of 14 days or longer
Secondary Indicators	Critical Indicator Levels
Total Phosphorus concentration	≥ 0.045 mg/l
Total Nitrogen concentration	≥ 0.700 mg/l
Tertiary Indicators	
Nuisance epiphytes or benthic algae	
Ruppia and other macrophytes	
RPD (Redox Potential Discontinuity) – bottom sediments	
Turbidity	
Bottom water dissolved oxygen concentration	
Aquatic and surrounding wetland life	
Algal blooms	

Appendix 2
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
Murihiku Marae, 408 Tramway Road, Invercargill
P O Box 7078, South Invercargill 9844
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/- Dr M Schmidt, Regional Archaeologist
Otago/Southland
PO Box 5467, Dunedin 9058
Phone: (03) 470 2364 Mobile 027 240 8715 mschmidt@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 3
Contact details for persons identified in Condition 13

a) The following lists identify the organisations and persons to be invited to the liaison meetings.
b) The postal and email addresses are based on information in the submissions to the application but could become outdated during the term of the resource consent.

3.1 Organisations:

- Te Runanga o Awarua, C/- Te Ao Marama Inc, PO Box 7078, South Invercargill 9844 dean.whaanga@teaomarama.maori.nz
- Department of Conservation, Private Bag 4715, Christchurch Mail Centre 8140. Attn: G Deavoll gdeavoll@doc.govt.nz
- Fish & Game New Zealand, P O Box 159, Invercargill 9840 zane@southlandfishgame.co.nz
- Royal Forest & Bird Protection Society, PO Box 6230, Dunedin North 9059 s.maturin@forestandbird.org.nz
- Waituna Affected Farmers, C/- J Crack, 108 Moffat Road, RD 5, Invercargill 9875 jo@farmnews.co.nz
- Waituna Recreational Users Group, C/- B McNaughton, 502 Elles Road, Kingswell, Invercargill 9812 bevan@ocs.net.nz
- Federated Farmers New Zealand, PO Box 176, Invercargill 9840. Attn: Tanith Robb trobb@fedfarm.org.nz
- Dairy New Zealand, Private Bag 3221, Hamilton 3240 David.burger@dairynz.co.nz
- Stagger Inn Hunting Group, C/- Craig Booth, 11 Judge Road, Tisbury, Invercargill 9812

3.2 Individuals:

- S Carston, 5 /3 Fortuna Place, Gold Coast, Queensland, Australia ycats7@gmail.com
- J & D Crack, 108 Moffat Road, RD 5, Mokotua, Invercargill 9875 jo@farmnews.co.nz
- O Kelly, 433 Waituna Lagoon Road, RD 5, Invercargill 9875 oakelly@netspeed.nz
- L McCallum, 1100 Wilsons Crossing Road, RD 1, Winton 9781 lloyd.kathy@xtra.co.nz
- G McKenzie, 32 Bungalow Hill Road, RD 1, Riverton 9881 Graeme@orakafarms.co.nz
- B J McNaughton, 502 Elles Road, Kingswell, Invercargill 9812 bevan@ocs.net.nz
- R McNaughton, 168 Walker Road, RD 1, Woodlands, Invercargill 9871 roger@ocs.net.nz
- A Owen, 275 Waimatuku Township Road, RD 4, Invercargill 9874 aowen444@gmail.com
- L Paddon, 19 Manapouri Street, Invercargill 9812
- J Pannett, 113 Chelmsford Street, Invercargill 9810 john.chick@xtra.co.nz
- S Perriam, 904 Rimu Seaward Downs Road, RD 1, Waituna, Invercargill 9871 jane.shayne@woosh.co.nz
- B Pirie, 206 Drakes Hill Road, RD 1, Invercargill 9871 drakeshillfarming@woosh.co.nz
- D J Simms, 54 Awatea Gardens, Wigram, Christchurch 8042 Don.simms@xtra.co.nz
- R W Simms, 6 /58 Douglas Street, Frankton, Queenstown 9300 sue_raysimms@xtra.co.nz
- S R Simms, 50A Bantry Street, Alexandra 9320
- R van Gool, 90 Smiths' Way, RD 3, Cromwell 9383 towyn@vodafone.co.nz
- M J Waghorn, 961 Waituna Lagoon Road, RD 5, Invercargill 9875 murraywaghorn@hotmail.com
- R C Waghon, 837 Waituna Lagoon Road, RD 5, Invercargill 9875 rcwaghorn@gmail.com
- J Watson, 2132 Winton Lorneville Highway, RD 6, Invercargill 9876 jim.watson@xtra.co.nz
- C A Williams, 380 Waituna Lagoon Road, RD 5, Invercargill 9875 craig.heidi@farmside.co.nz

AUTH- 20146407-02

environment SOUTHLAND

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

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

Water Permit

Pursuant to Section 104B of the Resource Management Act 1991, a resource consent is hereby granted by the Southland Regional Council to **Lake Waituna Control Association,** care of **E R Pirie, 389 Kapuka North Road, RD 3, Wyndham 9893** from **14 February 2017**.

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 divert water from Lake Waituna and associated wetlands to the sea
Location	- site locality	Walker's Bay and Hansen's Bay, Lake Waituna
	- map reference	Between NZTM 1262340E 48311370N and 1261460E 4831000N (Walker's Bay), and about NZTM 1265350E 4832550N (Hansen's Bay)
Legal description at the site:		Section 29 Block XIII Oteramika Hundred
Expiry date:		14 February 2022

Schedule of Conditions

1. This consent authorises the diversion of water from the Waituna Lagoon and associated wetlands by opening the gravel barrier between the lake and the sea at either:
   (a) Walker's Bay between NZTM 1,262,340E 4,831,360 N and 1,261,460E 4,831,000N; or
   (b) Hansen's Bay, between NZTM 1,265,305E 4,832,570N and 1,265,405E 4,832,605N

2. This resource consent may only be exercised in conjunction and accordance with Resource Consent AUTH-20146407-01.

3. 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 monitoring results, 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;
   (b) ensuring the conditions of this consent are consistent with any National Environmental Standards Regulations, relevant plans and/or Policy Statement;
   (c) amending the monitoring programme to be undertaken; or
   (d) adding or adjusting compliance limits.

for the **Southland Regional Council**

Vin Smith
Director of Policy, Planning & Regulatory Services

AUTH- 20146407-03

environment SOUTHLAND

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(Private Bag 90116)
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 **Lake Waituna Control Association,** care of **E R Pirie, 389 Kapuka North Road, RD 3, Wyndham 9893** from **14 February 2017**.

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 periodically discharge water from Lake Waituna to the sea
Location	- site locality	Walker's Bay and Hansen's Bay, Lake Waituna
	- map reference	Between NZTM 1262340E 48311370N and 1261460E 4831000N (Walker's Bay), and about NZTM 1265350E 4832550N (Hansen's Bay)
Legal description at the site:		Section 29 Block XIII Oteramika Hundred
Expiry date:		14 February 2022

Schedule of Conditions

1. This consent authorises the periodic discharge of water from the Waituna Lagoon into the sea via openings in the gravel barrier at either:
   (a) Walker's Bay between NZTM 1,262,340E 4,831,360 N and 1,261,460E 4,831,000N; or
   (b) Hansen's Bay, between NZTM 1,265,305E 4,832,570N and 1,265,405E 4,832,605N

2. This resource consent may only be exercised in conjunction and accordance with Resource Consent AUTH-20146407-01.

3. 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 monitoring results, 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;
   (b) ensuring the conditions of this consent are consistent with any National Environmental Standards Regulations, relevant plans and/or Policy Statement;
   (c) amending the monitoring programme to be undertaken; or
   (d) adding or adjusting compliance limits.

for the **Southland Regional Council**

Vin Smith
Director of Policy, Planning & Regulatory Services