Ministry for the Environment
Manatū Mō Te Taiao

PROACTIVE RELEASE COVERSHEET

Minister	Hon David Parker	**Portfolio**	Environment
Name of package	Ō Tū Wharekai (Ashburton) lakes – Update and Options	**Date to be published**	04/12/2023

List of documents that have been proactively released		
Date	***Title***	***Author***
22 June 2021	Briefing: Ō Tū Wharekai (Ashburton) lakes – Update and Options	Ministry for the Environment

Information redacted **YES**

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Summary of reasons for redaction

Some information has been withheld from *Briefing: Ō Tū Wharekai (Ashburton) lakes – Update and Options* under Section 9(2)(a) of the Official Information Act to protect the privacy of natural persons, including that of deceased natural persons.

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BRIEFING NOTE

Ō Tū Wharekai (Ashburton) lakes – Update and Options

Date Submitted:	13 September 2021	Tracking #: BRF-487	
Security Level	In confidence	MfE Priority:	Not Urgent

	Action sought:	**Response by:**
Hon David PARKER, Minister for the Environment	Note and agree to the recommendations to address water quality issues in Ashburton Lakes	30 September 2021
CC Minister Allan	Note the information and recommendations	NA
CC Minister O'Connor	Note the information and recommendations	NA

Actions for Minister's Office Staff	**Return** the signed briefing to MfE
Number of appendices and attachments 2	Titles of appendices and attachments: 1. Maps and aerial photos of lakes 2. CLUES Nutrient Load Predictions for the Ashburton Basin Lakes – 2021 Cawthron report

Key contacts

Position	Name	Cell phone	1st contact
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Responsible Manager	Hamish More	s 9(2)(a)	
Director	Sara Clarke	s 9(2)(a)	✓

Ō Tū Wharekai (Ashburton) lakes

Key Messages

- The purpose of this briefing is to provide information on Ō Tū Wharekai. It sets out the current situation, and officials recommended next steps for your visibility.
- The Ō Tū Wharekai and surrounding wetlands are nationally significant, highly vulnerable and have significant cultural value. Action is needed now to prevent irreversible state-change in Ō Tū Wharekai.
- Many of the lakes are in a highly impacted state and are continuing to deteriorate. **Land use intensification and change is implicated as the main nutrient source**. This is linked to tenure review, including conversion of tussock land to grazing land, as well as a shift from extensive sheep farming to intensive beef farming on the flat land, and associated fodder cropping and winter grazing of beef cows.
- The Land and Water Regional Plan (LWRP) sets in-lake limits, and rules to meet these limits however many of the in-lake limits are failing to be met despite this planning framework being in place, and landowners farming within their consent conditions. Environment Canterbury has indicated that the plan's rules, in the form of the baseline nutrient limits, together with GMP have not been adequate to prevent the lakes' decline.
- The Ministry for the Environment (MfE) considers that the implementation of the regional rules, through Overseer use and lack of oversight from Environment Canterbury, may be contributing to the problem and this requires further investigation.
- Agencies led by Environment Canterbury and the Department of Conservation (DOC) together with rūnanga have been holding hui to set out actions needed to protect the lakes. **They have identified a required series of actions, including the need for action plans that set out steps to control high risk activities** and quantify the stocking number reductions required, along with immediate drafting of plan provisions and exploration of funding opportunities.
- The Ministry are engaging with Environment Canterbury and intend to engage with Ngāi Tahu on this issue. We believe you will need to engage directly with Ngai Tahu as a treaty partner, given the severity of the situation and the significance of the lakes to rūnanga, but will provide a briefing to you on this at the appropriate point.

Recommendations

We recommend that you:

a. **Note** that we will be engaging with Environment Canterbury and Ngāi Tahu and will brief you on our recommended approach to addressing nutrient reductions in the lakes once we have the information that we need.

Yes/No

b. **Note** that officials will carry out a wider investigation into the extent of the problem of highly over-allocated and/or degraded waterbodies in Canterbury resulting from inadequate LWR plans and long-term consents.

Yes/No

c. **Direct** officials to provide a 'lessons learnt' report using the Ashburton Lakes as a case study examining why the systems currently in place have failed to protect the lakes' water quality, including examining the regional plan nutrient limits and associated rules, consenting, farm planning system, and use of Overseer.

Yes/No

d. **Agree** that this briefing and appendices will be released proactively on the Ministry for the Environment's website within the next eight weeks**.**

Yes/No

Signature

Sara Clarke Manager – Delivery and Oversight, Policy Implementation	

Hon David PARKER, Minister for the Environment	
Date	

Purpose

1. You have requested that officials follow up on a recent news story titled *Urgent action needed to stop Ashburton lakes 'turning to sludge'*.[1]

2. This briefing provides an overview of the issues and the options available and makes recommendations for next steps.

Context

Cultural and ecological significance of the lakes

3. The high-country lakes and interconnected wetlands known as Ō Tū Wharekai have high cultural significance to Ngāi Tahu. There are a number of nohoanga (temporary settlements) associated with a seasonal trail linking mahinga kai sites. Recognition of the significance of the area is included in the Statutory Acknowledgement within the Ngāi Tahu Settlement Act.
4. Ō Tū Wharekai is one of the best examples of an intact, inter-montane wetland system remaining in New Zealand, and provides a habitat for nationally significant species. The lakes and surrounding wetlands are part of Arawai Kākāriki, DOC's flaghip wetland programme to research and restore five nationally significant sites[2].
5. It is important to note that the significant deterioration of the lakes was raised by Ngāi Tahu to Environment Canterbury in 2010 and again in 2018. Given the current Ngāi Tahu claim it would be imperative to engage directly with treaty partners.

Previous farming practices, land use and government interventions

6. For most of the past century, the lakes have been surrounded by high country leasehold land, farmed by runholders under pastoral leases. Over the past decades, the management of these leases has been impacted by a range of central and local government policies backed by industry directives, including economic incentives to increase productivity and farm output.

7. The process of tenure review involved the transfer of significant areas from pastoral lease to Crown management (typically to the Department of Conservation) and from pastoral lease to freehold. In many cases this has resulted in agricultural intensification on the areas of freehold property – without the previous constraints of the pastoral lease.

8. Within the basin, tenure review and Crown purchase of land has resulted in a significant increase in the area managed by DoC (predominantly steeper, high country), while there has been an intensification of a significant area of flat/easy country. There are currently

[1] https://www.stuff.co.nz/environment/125893890/urgent-action-needed-to-stop-ashburton-lakes-turning-to-sludge.

[2] https://www.doc.govt.nz/our-work/freshwater-restoration/arawai-kakariki-wetland-restoration/

two freehold properties in the basin (Mt Possession and Castleridge Stations) and two Crown lease properties (Mt Arrowsmith and Lake Heron Stations).

Current tenure and land use

9. There are four farms within the Ashburton Lakes area. Refer to the photos in Appendix 1 which show land tenure and maps which show the land cover in 2018.

10. The table in Appendix 2 shows that there has been very little change in the extent of different land use types since 2012. It should be noted that these broad land use class definitions don't reveal the intensity of land use and farm management practices that may have occurred.

11. There are areas of fodder cropping around the lakes. The land use maps don't appear to pick this up (other than 0.2 % of short-rotation cropping around Māori-front lake). Environment Canterbury is helping MfE with information on the extent of fodder cropping around the lakes.

Other factors influencing water quality

12. In addition to farming activities, a number of other factors have been identified as contributors to water quality. These include significant amenity uses, and waterfowl. The Lake Clearwater village[3] in particular attracts significant visitors, but lacks any sewage infrastructure. DOC managed lands have been attracting an increasing number of visitors, with the Ta Araroa trail passing through the area.

13. Lake variation is a further complication for their management. The topography, land use and ecology of each lake and catchment differs. It is not possible to apply a 'one-size-fits-all' solution across all catchments.

Environment Canterbury management framework

14. Environment Canterbury was first made aware of declining water quality in submissions to the Zone Committees in 2010. The establishment of nutrient-sensitive lake zones by Environment Canterbury in its Land and Water Regional Plan (operative in 2016) has been an important step towards recognising the importance of these waterbodies to the region and their sensitivity to land use change.

15. The Sensitive Lake Zones were included in the LWRP nutrient zone provisions (refer attached maps), with the intention of halting any increase in nutrients entering these lakes. The LWRP includes the following provisions for management of these lakes:

    - Water quality targets set for each lake
    - Farms with land in Sensitive Lake catchments required to farm under a consent
    - Consents require farms to emit annual nutrient losses no greater than those which occurred during the benchmark period 2009-2013 (as estimated by Overseer)

[3] The Clearwater Village is on land owned by Ashburton District Council, which leases land to ~200 individual hut leaseholders.

- Farms to operate at Good Management Practice (GMP) and be subject to audits.

16. However, following recent investigations, Environment Canterbury has identified a number of factors that together contribute to declines in lake water quality. Primarily, the requirements for farming were benchmarked to a period where significant intensification was already occurring. In addition, there are greater lags in nutrient flows than previously recognised. As a consequence, the introduction of nutrient loss limits and GMP requirements was insufficient to halt the decline in the lakes.

Consent and consent compliance status

17. Consents are required for farms in Ō Tū Wharekai because they fall within the Sensitive Lake zone. There is no irrigation in the area, and no dairying.

18. Consent status is as follows:

Station	Consent details	Expiry	Audit
Mount Possession station	Granted September 2018 for 7 years and	30 June 2025	1 independent farm audit (A Grade[4]) Next audit end 2021
Arrowsmith station	May 2016 for 15 years	May 2031	1 independent farm audit (A Grade) Next audit end 2022
Castleridge station	September 2016. 5-year period[5]	19 Sept. 2021. Application for renewal has been lodged	2 independent farm audits completed – A grades both times. Most recent audit completed July 2020
Lake Heron station	Applied for on 30 July 2018. Consent yet to be granted and is overdue.	NA	Council visits have confirmed farming activities are consistent with the requirements of the LWRP. Unable to determine if the property can meet overall nitrogen reductions required to meet GMP from 1 July 2020 as Overseer modelling has not been finalised.

19. Castleridge Station's land use consent is in the process of being renewed, and a consent application has been lodged for Lake Heron Station. Environment Canterbury has indicated to the applicants that they are required to give consideration to the Te Mana o Te Wai related components of the Essential Freshwater package released in Sept

[4] Environment Canterbury has established a Farm Environmental Plan Auditing system, whereby farms are graded A,B, C, D on the implementation of the Farm Plan.

[5] The applicant had the option of meeting pPC5 requirements by 1 July 2020 under a 15 year consent, or taking a 5 year consent under the previous rules. They opted for the later.

2020. Both the Castleridge and Lake Heron consents will need to demonstrate that they can improve water quality before they can be granted. The Council is trying to find an interim consenting solution that accounts for their operative plan, where Overseer is specifically referenced, and for the implications of the Overseer report. It is seeking a way of issuing consents that is allowed under the existing Plan without putting reliance on an Overseer N loss number.

20. Environment Canterbury has indicated that it is experiencing challenges with the use of Overseer, including auditing existing consents, as well as granting and renewing consents.

21. In the past two years, Environment Canterbury has also investigated compliance queries in the basin raised by third parties. MfE will check if there are any compliance issues relating to the National Environmental Standard for Freshwater 2020 (NES) and section 360 regulations.

Evidence of environmental degradation at Ō Tū Wharekai and reduction of nutrient inputs required

22. An independent report, the Cawthron report[6], completed this year, provides an estimate of the reduction needed in both in-lake nutrient concentrations and catchment nutrient loads (detailed in Table 5 of Kelly et al 2021). All monitored lakes in the Ashburton Lakes basin need reductions in algal biomass and in-lake Total Nitrogen concentrations to meet the LWRP objectives (outcomes) and limits. Four out of 8 lakes need reductions in in-lake Total Phosphorus concentrations to meet the plan limits.

23. Most of the Ashburton Lakes require major reductions in catchment nutrient loads to meet the LWRP plan objectives and limits. Of the lakes evaluated:

    - 80% require large Nitrogen load reductions
    - 33% require large or moderate Phosphorus load reductions
    - 100% need significant reductions in nutrient loads to meet algal biomass (chlorophyll a) plan objectives.

24. None of the lakes monitored in the Ashburton basin meet the plan objectives for the Trophic Level Index in the period between 2017 and 2021 (based on 5-year averages, Table 3).

25. Most lakes in the Ashburton basin continue to have increasing trends in in-lake Total Nitrogen concentrations and/or algal biomass (Table 1), and the frequency and magnitude of exceedance of LWRP objectives is increasing7.

26. There have been recent large increases in algal biomass in Lakes Clearwater and Heron alongside increasing nutrient trends (Figure 1 and 2, Table 1):

    - Lake Heron no longer meets the LWRP Total Nitrogen concentration limit based on the latest 5-year averages (2017-2021)

[6] Updating Clues nutrient load predictions for Ashburton Basin and Waimakiriri high-country lakes (report No. 3589) Cawthron, May 2021.

[7] Lakes Heron and Camp are classed as mesotrophic. Every other lake is already eutrophic, except for Denny which is supertrophic.

- The Lake Heron Total Phosphorus concentration limit was exceeded in the past 2 years, and the Total Nitrogen concentration limit exceeded in the past 4 years.
- Lake Heron and Lake Clearwater did not meet the NPS-FM national bottom line for algal biomass in 2020/2021.
- Conditions below the national bottom line indicate that lake ecosystems have undergone, or are at high risk of, a shift to a persistent, degraded state.

27. Urgent action is needed for Lake Clearwater in particular as there are indications that the lake may be 'tipping' (ie, transitioning from a clear macrophyte dominated state to a turbid algae dominated state).

Interventions to date

28. Interventions to date have included:
    a. 2019 jointly commissioned technical report[8] to determine the nutrient reductions needed to protect the Ashburton Lakes (Ō Tū Wharekai) and Waimakariri Lakes.
    b. In August 2019, papatipu rūnanga with a connection to Ō Tū Wharekai (through TeRūnanga o Ngāi Tahu) called a hui with statutory agencies.
    c. Following this hui Environment Canterbury initiated a programme of work including a series of meetings with each of the farmers in the basin, site visits and a review of science and modelling completed on the basin.
    d. Environment Canterbury report[9] to Tuia (a partnership between Environment Canterbury and Nga Runanga) states that:
        - there are no further statutory tools available to force change in farming land use in the immediate or short term and
        - a change in Plan is required to provide the mechanisms to dictate changes in farmland use
        - in the short term, Environment Canterbury needs to support voluntary changes in farming practices.
29. The Ō Tū Wharekai working group hui met on 26 July 2021 and the farmers joined the hui along with agencies. The farmers indicated if these limits were to be achieved through the reduction of livestock numbers, this would be difficult and solutions need to be economically sustainable.
30. As part of its broader strategy to increase oversight of crown leases, LINZ has been engaging with its leaseholders. The Crown Pastoral Reform Bill provide additional tools for management of these properties.
31. Farmers noted that they require specific information and a plan for how the catchment level information needs to be applied to each individual property, to allow them to understand how to make the changes necessary.

[8] Updating Clues nutrient load predictions for Ashburton Basin and Waimakiriri high-country lakes (report No. 3589) Cawthron, May 2021

[9] Te Rōpō Tuia report by Nick Daniels, Environment Canterbury on Ashburton Lakes, 2 July 2021

32. Ashburton District council has commissioned a report for off-site wastewater disposal at Lake Clearwater and has required all long drops and holding tanks to be removed by December 2021.

Advice and options section

Causes of degradation

33. There are multiple reasons contributing to the degradation of Ashburton lakes, these include:
    a. **Regulatory Framework** – the limits set in the regional plan that set a baseline nutrient rate from 2009-2013 and GMP to meet in-lake limits appear to have been insufficient. Questions remain as to whether the policy goals were insufficient and also failed to anticipate the load to come from previous intensification.
    b. **Approach to managing farms to nutrient limits** – The council has made it clear that the farmers are farming within their consents and within the parameters of their farm plan requirements (as established by the Overseer number). They received A grade audits, from independent auditors, indicating compliance. However, the planning controls and tools used to meet these plan limits appear to have contributed to the problem. Further investigation is required to understand the points of failure and gaps in the system.

       The approach the council is taking to manage farms to nutrient limits and good management practices may not support the achievement of significant catchment-wide reductions. The two main concerns are around how Overseer has been used, and the lack of visibility or oversight of the actions required on farm. The Ministry will look to understand more about this through engagement with Environment Canterbury.
    c. **Economic drivers** – There are strong economic drivers towards intensification in farming systems, and have been for many years.
    d. **Tenure review** – The tenure review enabled intensification. The retirement of some land areas higher up in the catchment has not balanced the effects caused by lower slope intensification.
    e. **Lack of oversight**– A lack of central leadership (including the Ministry for the Environment) on these issues. The Ministry's focus on implementation and delivery will help us to have a stronger role in regulatory stewardship and oversight of implementation of policies in the future.
    f. **Early warnings ignored** – Failure to respond and engage with rūnanga and DOC's early concerns. Concerns have been raised about the quality of the lakes since 2010.

Options for Ashburton Lakes

34. Officials next step is to engage with Environment Canterbury and Ngāi Tahu to investigate the feasibility of a number of options, including:
    a. The commissioning of a report providing a tailored catchment management plan for each lake.

b. Investigation of non-regulatory options such as land purchasing, funding of restoration work, sewage upgrades at Lake Clearwater and immediate in-lake remediation.
c. Consideration of regulatory options such as submissions on resource consents, calling in consents, consideration of the planning framework and the relativity of any enforcement options trough the Environment Court.
d. Working through the compliance with the new NES freshwater regulations, such as the stock exclusion regulations.

35. Officials will also engage with LINZ as The Crown Pastoral Reform Act may provide additional tools for management of these properties.

Implications for all high-country lakes

36. Land use intensification in the high country of the South Island is not unique to the Ashburton lakes and is being seen in other high-country lake and wetland systems. The CLUES report also looks at the Waimakariri Lakes and notes that they also require moderate or large nutrient load reductions to meet plan objectives. Lake nutrient load reductions may be needed in many high-country lakes across Canterbury.
37. Work to uncover the reasons behind the failure of the current set of interventions for the Ashburton lakes will provide valuable insights towards addressing these issues for other high-country lakes. MfE considers that a strategy for all high-country lakes is required.

Consultation and Collaboration

38. DOC and Environment Canterbury have provided information for this briefing note but have neither seen nor reviewed it. MfE is making it known, through appropriate channels, to Te Rūnanga o Ngai Tahu that a briefing is being provided.

Risks and mitigations

39. In the absence of urgent intervention there is a high risk that some of the lakes will move into a ‘flipped’ state, from which it will be difficult and very expensive to recover. Given the cultural significance of these lakes, the Ministry must engage directly with treaty partners.
40. If funding is provided to buy the surrounding land around the lakes this could be seen as precedent setting. However, this does not need to be the case given the national significance of the lakes and surrounding wetlands.

Legal issues

41. There are no legal issues with the proposals in this paper. Any regulatory options would need to be legally tested before they could be pursued.

Financial, regulatory and legislative implications

42. All implications are dependent on the options chosen to address this issue. The cost of the report to set out a plan is unknown but could be between $40,000 to $200,000.

Next Steps

43. MfE will engage with rūnanga and Environment Canterbury and we will provide you with a briefing regarding the next phase of work.

Appendix 1: Maps and aerial photos of Ashburton Lakes

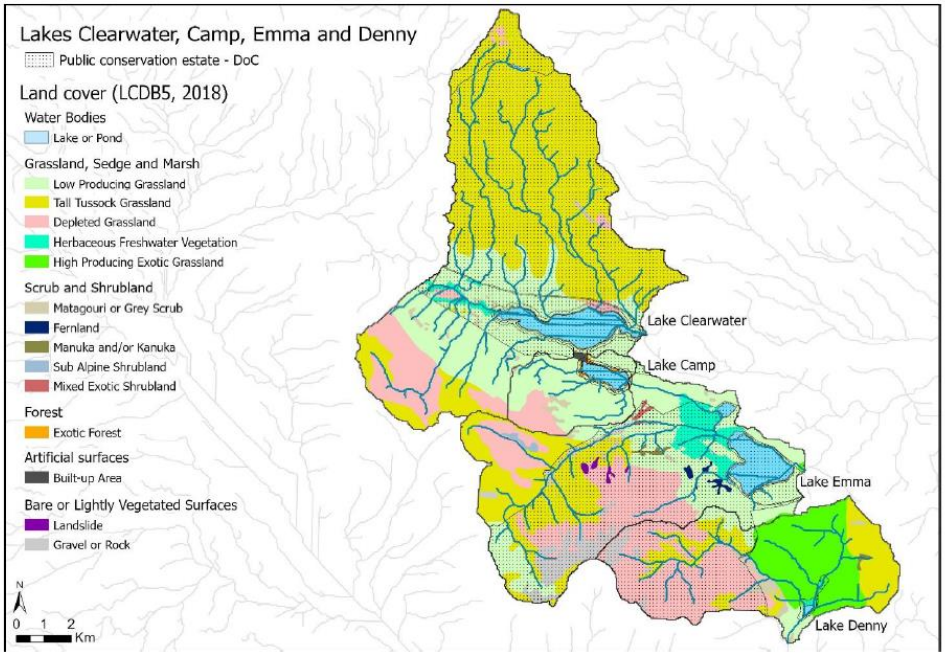


Figure 2. Lake catchment land-cover vegetation (Land Cover Database version 5.0) for four lakes in the Ashburton Basin, South Canterbury.

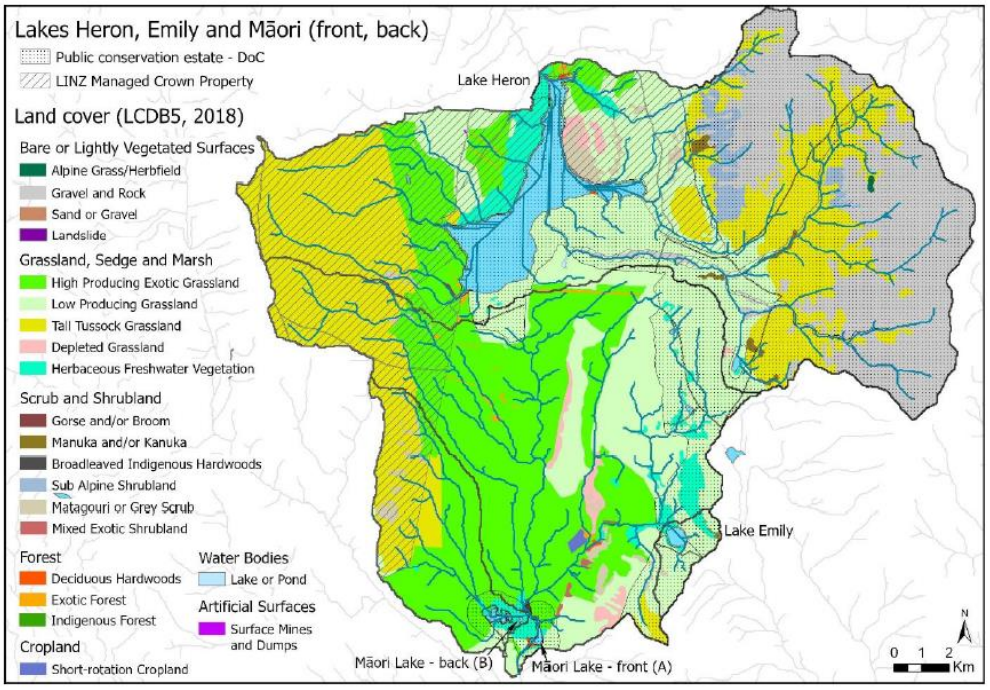
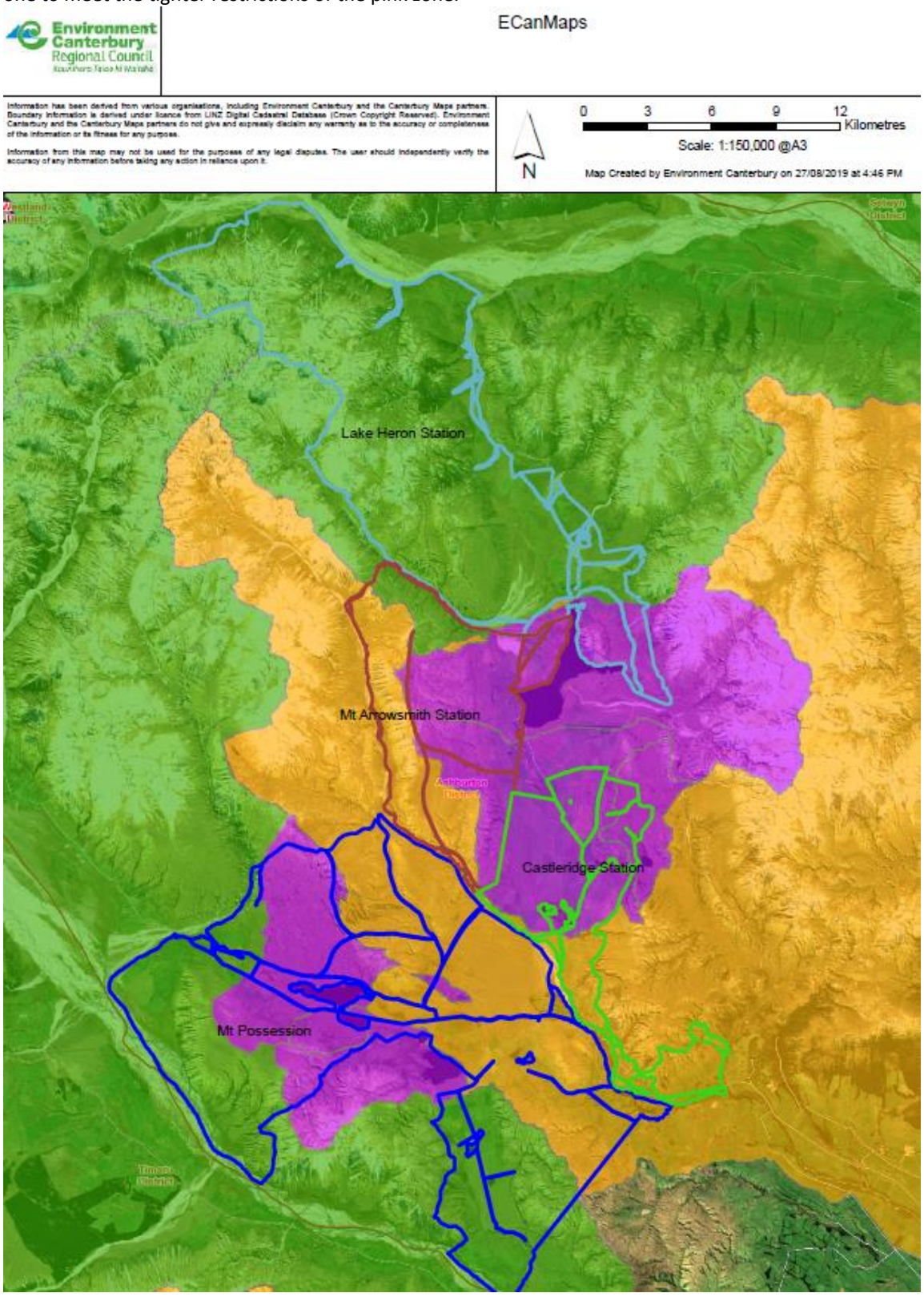


Figure 3. Lake catchment land-cover vegetation (Land Cover Database version 5.0) for four lakes in the Ashburton Basin, South Canterbury.

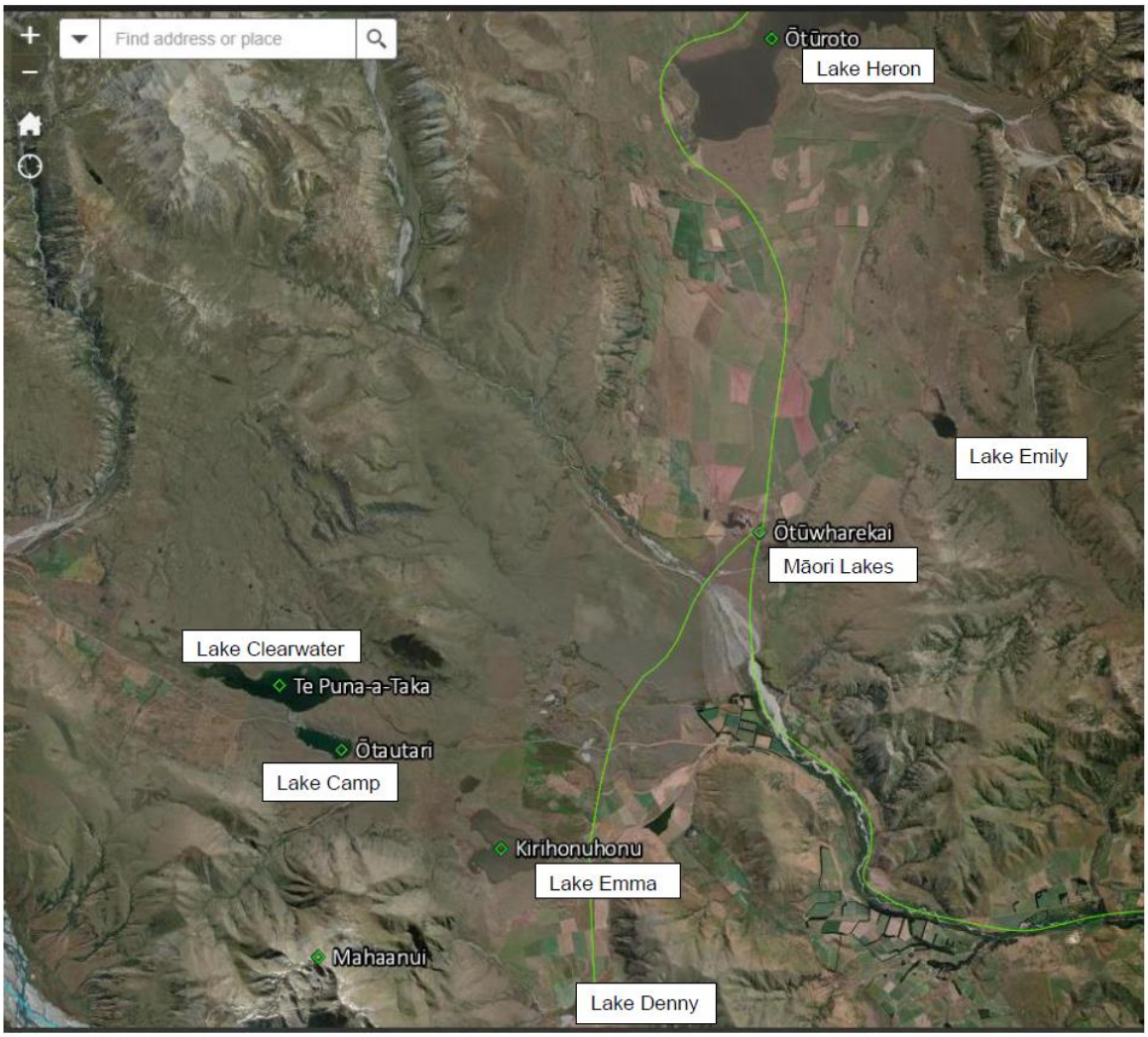
Land Tenure around the lakes

The coloured areas show the different zones around the lakes. The coloured lines are the property boundaries. Lake Heron station, for example would submit two Overseer files, one to meet the limits of the green zone and

one to meet the tighter restrictions of the pink zone.



Aerial Photo of the lakes showing intensification on the flats


Find address or place
Ōtūroto
Lake Heron
Lake Emily
Ōtūwharekai
Māori Lakes
Lake Clearwater
Te Puna-a-Taka
Ōtautari
Lake Camp
Kirihonuhonu
Lake Emma
Mahaanui
Lake Denny

Appendix 2: CLUES Nutrient Load Predictions for the Ashburton Basin Lakes – 2021 Cawthron report

Table 1. Proportional coverage (and percent change since 2012) in catchment production land cover for 13 Canterbury high-country Lakes in 2018 as reported in LCDB5 (Landcare Research 2018) and LCDB4 (Landcare Research 2014) and geospatial databases.

Lake	Exotic Forest (% change)	High-producing exotic grassland (% change)	Low-producing exotic grassland (% change)	Short-rotation cropland (% change)
Camp	1.4 (0)	0 (0)	72.6 (0)	0 (0)
Clearwater	0.1 (0)	0 (0)	26.8 (0)	0 (0)
Denny	0 (0)	32.1(0)	3.7 (0)	0 (0)
Emily	0 (0)	0 (0)	79.2 (0)	0 (0)
Emma	0.3 (0)	0.1 (0)	38.0 (0)	0 (0)
Grasmere	0.1 (-0.2)	6.5 (0)	33.0 (+0.2)	0 (0)
Hawdon	0 (0)	0 (0)	48.1 (0)	0 (0)
Heron	0.2 (0)	8.5 (+0.6)	20.7 (-0.6)	0 (0)
Lyndon	0 (0)	0 (0)	33.8 (0)	0 (0)
Maori-front	0.4 (0)	44.9 (0)	30.0 (+0.02)	0.2 (0)
Maori-back	0 (0)	0 (0)	2.0 (0)	0 (0)
Pearson	0 (0)	5.3 (0)	25.6 (0)	0 (0)
Sarah	0 (0)	0.01 (0)	60.9 (0)	0 (0)

Table 1: Long-term trends for the Ashburton Lakes (2007-2021)

Lake	Total Nitrogen	Total Phosphorus	Chlorophyll a
Heron	**Very likely increasing**		**Very likely increasing**
Māori-Front	**Very likely increasing**	**Likely decreasing**	
Māori-Back	**Likely increasing**		**Very likely increasing**
Emily		**Very likely increasing**	**Likely increasing**
Clearwater	**Very likely increasing**	**Very likely increasing**	**Very likely increasing**
Camp	**Very likely increasing**		**Very likely increasing**

Emma	**Likely increasing**	**Likely increasing**	**Very likely increasing**
Denny	**Likely increasing**		

Very likely >90% likelihood; likely 67-90%

Table 2: Reductions of in-lake concentrations (based on 2017-2021 averages) and catchment loads needed to meet LWRP objectives

Lake	TN in-lake reduction needed	TP in-lake reduction needed	Chla in-lake reduction needed	Estimated TN Load reduction*	Estimated TP Load reduction*
Heron	9%		81%	0-33%*	
Māori Front	45%		54%	>66%*	
Māori Back	34%	13%	63%	>66%*	
Emily	25%	29%	40%	>66%*	33-66%*
Clearwater	74%	55%	80%	ND* likely >66%**	>66%*
Camp	52%		37%	>66%*	
Emma	76%	70%	87%	ND*	
Denny	75%	91%	83%	ND* likely >66%**	

Kelly et al 2021, ND = not determined as outside regression model

** estimated based on 2017-2021 in-lake data only. Lakes Clearwater, Emma and Denny fall outside the regression model. Lake Emma is likely to be affected by internal loading processes. Lakes Clearwater and Denny likely have additional sources of nutrients in their catchments.

Table 3: Updated lake water quality assessments of the Ashburton lakes

Lake	TLI 2020/ 2021	LWRP assessment (ø 2017-2021)			NPS-FM Attribute State (2017-2021) (in µg/L)				Frequency of NPS-FM D-bands in all years 2017-2021			
		TLI (ø2017-2021)	Grade	LWRP met?	TN - MED	TP - MED	Chla - MED	Chla - MAX	TN	TP	Chla - MED	Chla - MAX
Heron	3.9	3.6	mesotrophic	NO	150	7	6.1	38			1	
Māori-Front	3.8	4.3	eutrophic	NO	620	8	1.8	137				2
Māori-Back	4.8	4.5	eutrophic	NO	410	16	4.3	80			1	1
Emily	4.1	4.4	eutrophic	NO	410	23	3.5	50				
Clearwater	5.4	4.3	eutrophic	NO	510	14	4.3	40	1		1	
Camp	3.6	3.4	mesotrophic	NO	330	7	2.8	6.6				

Emma	5.3	4.8	eutrophic	NO	620	26	10.8	48	1		3	
Denny	4.5	5.0	supertrophic	NO	530	49	8	140		3		

TLI = Trophic Level Index, TP = Total Phosphorus, TN = Total Nitrogen, Chla = chlorophyll a, MED = median, MAX = maximum. NPS band colour