

Tabled at Hearing on 16 November 2015

IN THE MATTER OF

The Resource Management Act 1991

AND

IN THE MATTER OF

Proposed Plan Change 3 to the
partially Operative Canterbury Land
and Water Regional Plan

STATEMENT OF EVIDENCE OF HERBERT ROSS FAMILTON

FOR THE DIRECTOR-GENERAL OF CONSERVATION

Dated 25 SEPTEMBER 2015

Director-General of Conservation

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INTRODUCTION

- 1 My name is Herbert Ross Familton. I have been employed by the Department of Conservation (DOC) in the position of Resource Management Planner since 21 May 2012. I am appearing here today to present planning evidence for the Variation 3 hearings in support of the Director-General of Conservation's (Director-General) submission on the partially operative Canterbury Land and Water Regional Plan (CLWRP).
- 2 In my current role I am responsible for providing information, advice and analysis on resource management issues for plan and consent hearings and appeals at a national level as part of my job within the Department's Operations group based in Christchurch.
- 3 I hold a Bachelor of Arts Degree with Honours in Geography (1983) and a Masters in Regional and Resource Planning (1985) from the University of Otago. I have thirty years experience in the area of natural resources planning. I became a full member of the New Zealand Planning Institute (NZPI) in 1993.
- 4 Prior to my current employment with DOC, I was employed by the Auckland Council as a Senior then Principal Specialist (Air) from 2011 to 2012. In that role, I was responsible for policy work and drafting related to the agrichemical provisions of the air sections of Auckland Council's Unitary plan. I was employed by Environment Canterbury as a Senior Resource Management Planner in the Policy Planning team from 2010 to 2011 in the Air Quality area. From 2006 to 2009, I worked in the ECan Planning section on water resources planning, focusing on the Waipara, Hurunui, and Waiau catchments.
- 5 Prior to the 2006 period, DOC and the Department of Lands and Survey employed me in a number of planning roles. I was the lead DOC official for the whole of Government submission that advised the Attorney-General for the Waitaki Catchment Water Allocation plan in 2005/2006. I processed consent applications for restricted coastal activities for the Minister of Conservation from 1997- 2006 in the Southern Regional Office of DOC.
- 6 I have prepared planning evidence for the Director-General on the Proposed Hurunui River Regional Plan and the Proposed Canterbury Land and Water Regional Plan. I am therefore familiar with the Land and Water Plan framework for water resource planning under the Resource Management Act in Canterbury.

- 7 I rowed at the Waihao Box on Saturdays when I trained for rowing with the Oamaru Rowing Club in the early 1980s and I have recently visited Wainono Lagoon and vicinity on an inspection trip with DOC staff.
- 8 The data, facts, information and assumptions I have considered in forming my opinions are set out in the part of the evidence in which I express my opinions. I have not omitted to consider material facts known to me that might alter or detract from the opinions expressed.
- 9 I have read the Environment Court's Code of Conduct for expert witnesses and I agree to comply with it. My qualifications as an expert are set out above. I confirm that the issues in the brief of evidence above are within my area of expertise.
- 10 The literature or other material which I have used or relied upon in support of my opinions is listed in Appendix 2. Appendix 3 lists the terms used in my evidence.

SCOPE OF EVIDENCE

- 11 My evidence will give a planning perspective focusing solely on two matters raised and relief sought in the Director-General's submission. They are:
 - provisions for Canterbury Mudfish, and
 - the regime for consenting Wainono Lagoon augmentation in rule 15.5.24
- 12 I also intend to comment on the Council officer's section 42A report, and the conclusions reached in that report regarding the relief sought by the Director-General. References to sections and page numbers throughout this evidence are to the sections and page numbers contained in the section 42A report unless indicated otherwise.
- 13 I have prepared some suggested amendments to Plan Change 3 which address the matters raised in the Director-General's submission (DOC submission), and which are discussed in my evidence. Those suggested amendments are attached as Appendix 1 to my evidence.
- 14 Where I have not directly addressed a point in this evidence, it is because I rely on the planning rationale and justifications offered in the DOC submission and/or further submission, or I concur with the Council's section 42A report.

OVERVIEW

- 15 Plan Change 3 introduces a regime to address water quality and quantity limits and targets in the Waitaki and South Canterbury Catchments of the Canterbury Region. The plan change is needed in order to implement Policy 4.9 of the Canterbury Land and Water Plan, Appendix 2 of the Canterbury Regional Policy Statement (RPS), Objective CA1 and Policies CA1-CA4 of the National Policy Statement for Freshwater Management (2014), and the New Zealand Coastal Policy Statement (2010).
- 16 Of particular interest to the Director General are:
- the absence of specific provisions for Canterbury mudfish; and
 - the regime for consenting any proposed augmentation of Wainono Lagoon, and associated effects on conservation areas managed by DOC.

CANTERBURY MUDFISH

- 17 DOC's submission sought the following relief:
- a) Inclusion in the plan of a bullet point statement, to reflect the ZIP addendum recommendation that acknowledges the need to "identify and protect remnant Canterbury mudfish populations"; and
- b) inclusion of a new discretionary rule as follows:

"The use of land within 3 meters of the bed and banks of the river, stream, creek or drain for the purposes of planting or removal of vegetation or disturbance of the bed between the upstream and downstream sites listed in schedule X (enclosed), is a discretionary activity".

- 18 In response to DOC's submission, the Reporting Officer's conclusions are:

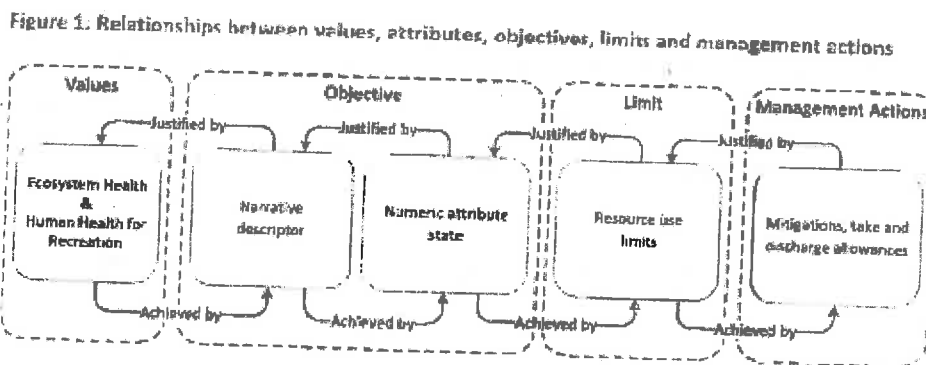
"While the protection of areas of significant indigenous vegetation and significant habitats of indigenous fauna is a matter of national importance it is not a key action that is specifically addressed by PC3. Rather, the policies and rules contained within sections 4 and 5 of the LWRP and section 15A of PC3 require consideration of these habitats when undertaking activities in waterways. It is also noted that Section 6 of the RMA enables the balancing of these values in the decision making process." (Section 8.25 Page 92)

And, at paragraph 13.33, page 284 *“the regional provisions and higher order instruments provide guidance to ensure effects on such species are appropriately considered when making decisions on applications for resource consents.”*

- 19 The Officer recommended that no amendments to the plan are made to accommodate the relief sought by the Director-General.

COMMENT

- 20 In response to the Officer’s reference to section 6 of the Resource Management Act enabling the balancing of values, I note that section 6(c) provides that recognising and providing for the habitat of threatened indigenous fauna is a matter of national importance, but that section does not refer to any balancing in decisions regarding those matters. Any balancing occurs through the application of section 5(2).
- 21 It is my opinion that the introductory sections of a Resource Management Plan should establish the context for the policy framework to come, in order to ensure that the sustainable management purpose of Part II can be achieved. Thus, it is desirable for the plan to include a clear description of the values and the critical characteristics that the plan aims to provide for. It is my experience that without a full description of values in a plan, one cannot establish suitable objectives, limits and targets, and methods. The concept is illustrated in the following diagram produced by the Ministry for the Environment: MfE Figure 1 page 6 (2014):



(Adapted from Environment Canterbury, 2012.)

- 22 This rational planning framework provides the basis for critical management issues to be addressed. In my opinion, to give effect to Part II of the Act, a well constructed plan should acknowledge species types or communities to be provided for, along with their habitat, including water quantity and water quality objectives and limits.

- 23 Constructed in the above manner, a plan can establish a decision-making framework, and provide sufficient background to ensure that the objectives, policies and methods are correctly focused to meet the desired objective. In the case of PC3, I consider that inclusion of additional text as requested by the Director-General would provide valuable guidance for the development of appropriate policies and methods, and for their implementation.
- 24 There is policy provision in the Regional Policy Statement (RPS) for Canterbury mudfish. Policy 10.3.2 is: *"To preserve the natural character of river and lake beds and their margins and protect them from inappropriate subdivision, use and development, and where appropriate to maintain and/or enhance areas of river and lake beds and their margins and riparian zones where:... (7) Riparian zones provide spawning or other significant habitats for at risk or threatened species, such as inanga or Canterbury mudfish."*
- 25 The associated method 1 states that ECan *"may include methods in regional plans to preserve the natural character of river and lake beds and to protect them from inappropriate subdivision, use and development and to maintain and enhance river and lake bed values as appropriate"*.
- 26 With the release of Omnibus Plan Change 4 with regard to inanga/ whitebait habitat, the inanga component of Policy 10.3.2 (7) is addressed. However, no schedule or other specific method (other than a general matter of discretion under a rule) is currently provided to ensure Canterbury mudfish habitat is maintained or enhanced.
- 27 Inclusion of a reference to Canterbury mudfish would give effect to Objective 9.2.1 of the RPS: *"the decline in the quality and quantity of Canterbury's ecosystems and indigenous biodiversity is halted and their life supporting capacity and mauri safeguarded"*, and to Objective 9.2.3 RPS which states that *"... significant habitats of indigenous fauna are identified and protected"*. The recent case of *Appealing Wanaka v Queenstown Lakes District Council* NZ ENV C 139 discussed the requirement under section 67 (3) of the Act for policy direction in higher order instruments to be given effect in plans.
- 28 I have considered whether the provisions of the Land and Water plan and/or the conditions of consents granted for the Hunter Downs Irrigation scheme (HDI) give effect to section 6 (c) of the Act and Objectives 9.2.1 and 9.2.3 and Policy 10.3.2 (7) of the RPS with regard to significant habitats of Canterbury Mudfish.

- 29 The Land And Water Regional Plan has a Schedule 17 that identifies significant salmon and inanga/ whitebait spawning sites, which is a key tool for managing fish habitats. This schedule specifically identifies the spawning habitat of salmon and four inanga spawning sites on Banks Peninsula. The plan permits activities that are not located in any of these sites, (5.136-7,8, 5.140-141, 5.148, 5.151-152, 5.163, 5.167-168) or, in the case of rule 5.71, specifies a prohibited activity for the sites.
- 30 The recently notified plan change 4 (Omnibus plan change) does introduce a Canterbury wide schedule to protect spawning habitat for inanga/whitebait. This rule is a new addition which sets a time limitation (1 January to 1 June inclusive) for habitat modification. This time period is the period when inclusion on schedule 17 triggers the consequential rules.
- 31 Canterbury mudfish are not included in schedule 17, nor have their significant habitats been identified. The planning implications of this include the possibility that the habitat of Canterbury mudfish may well be able to be modified under any of the permitted activity rules referred to above (5.136-8, 5.140-141, 5.148, 5.151-152, 5.163, 5.167-168).
- 32 The Land and Water plan has matters of discretion regarding indigenous biodiversity and significant habitats of indigenous fauna. However, in my opinion the difficulty with those provisions is that they do not give effect to RPS Objective 9.2.3 if the plan does not identify where such sites are. As a result, consequences such as those discussed by Dr Dunn in his evidence are likely, where mudfish habitat can be modified and significant habitats may be lost, some perhaps completely unwittingly. This situation, in my opinion, is inconsistent with RPS Objective 9.2.1 of halting the decline in the quality and quantity of Canterbury's ecosystems and indigenous biodiversity.
- 33 My conclusion is that, in the absence of specific provisions, the plan does not give effect to Part 6 (c) or to RPS Objectives 9.2.1 and 9.2.3 and Policy 10.3.2 (7) and cannot be relied upon to protect the significant habitat of Canterbury mudfish.
- 34 I am aware that there are consent conditions in the HDI consent which require farmers who sign a water supply agreement for irrigation water from the scheme to:
- Contribute to a Scheme Enhancement Fund under condition 15 Scheme Management plan, which could, amongst other actions, permanently protect areas of mudfish habitat, and
 - Require a Scheme Pre-Commissioning Monitoring plan-including Canterbury mudfish-Condition 30 (e), and
 - Prepare Farm Management Plans which include mudfish survey under condition 20 (e)

35 While I accept that these conditions will definitely protect mudfish habitat, I consider that relying on the HDI consents as a complete tool for the protection of significant habitats of Canterbury mudfish has two key risks:

- (a) Firstly, Landowners may deliberately or unintentionally clear areas of mudfish habitat prior to signing a water supply agreement with the irrigation company. I am aware of this behaviour occurring with the implementation of the Central Plains irrigation scheme and also in the Manuherikia catchment in Central Otago. And Dr Dunn's evidence includes photographs illustrating the recent clearance of an area of Canterbury mudfish habitat in the Wainono catchment.
- (b) Secondly, a rule that only addresses HDI irrigators means that the rules will not apply across the whole catchment and will only affect HDI irrigators. Other landholders who do not sign up to HDI are not required to adhere to these conditions. Furthermore, if HDI is not built, or is only partially built, then the HDI Mudfish consent requirements will not apply.

36 In my opinion, the HDI consent rules will be only partially effective at protecting significant habitat of Canterbury mudfish in the South Coastal Canterbury area.

37 Based on the above discussion, I consider that amendments to the Section 15 text are required. I do not, however, recommend adopting the exact wording requested in the Director-General's submission, particularly the need for a full discretionary rule, but instead recommend a modified version of the relief sought drawing on evidence presented by Dr Dunn. Specifically, I recommend amendments to:

- acknowledge the presence of 'threatened' species, particularly the Canterbury mudfish, in a bullet point in section 15; and
- provide for a restricted discretionary rule for the disturbance of Canterbury mudfish habitat in the area; and
- restrict the matters of discretion to those that are directly relevant; and
- limit notification to Ngai Tahu and DOC, which both have statutory roles with regards to Canterbury mudfish.

38 I attach my recommended changes in Appendix 1.

WAINONO LAGOON AUGMENTATION

- 39 DOC sought to add the following two conditions and one matter of discretion for the restricted discretionary activity rule 15.5.24:

Condition 7

"The turbidity of the discharge does not exceed 6 NTUs where the water enters the lagoon at median or lower Waihao River flows"

Condition 8

"The wetland is not located on land managed by the Department of Conservation and does not have any significant adverse effects on land managed by the Department."

New matter of discretion 10:

10. "Rate and volume of the discharge."
(or to like effect)

- 40 The ECan Officer's report in section 11.69 page 210 has accepted the DG's proposed condition on turbidity and rate and volume of discharge.
- 41 The proposed condition 8 (on not locating the wetland on land managed by the Department) was not accepted. I accept and agree with the officer's recommendation for the reasons stated in the officer's report.
- 42 It is clear that without intervention, water quality in Wainono Lagoon will continue to deteriorate. That is not an acceptable management option as further water quality degradation is inconsistent with the National Policy Statement for Freshwater Management (NPSFM).
- 43 DOC has submitted in support of the proposed provisions for augmentation of the lagoon. However, augmentation is clearly an "end of pipe" water management tool which seeks to dilute nutrients at the very bottom of the catchment. It is likely to alleviate symptoms of poor water quality in the catchment but cannot address the causes of water pollution at source. In the long term, to effectively address the issue of contamination in the Wainono catchment, reduction in the levels of contamination are required at source, and I note that some tools to achieve this are included in plan change 3.
- 44 Most of Wainono Lagoon is on Public Conservation Land managed by the Department of Conservation under the Conservation Act 1987. There is also a small wildlife refuge (under

section 14 Wildlife Act 1953) on the north side of the Lagoon. Under the Conservation Act, Wainono Lagoon must be managed so that its natural resources are protected.

- 45 The operative Conservation Management Strategy (CMS), at 4.6.3, seeks to “*maintain or enhance the natural values of coastal lagoons*”. As the CMS is a management strategy prepared under the Conservation Act, Council must have regard to it under section 66(2)(c)(i) of the RMA when changing a regional plan.
- 46 The operative Canterbury RPS has objectives to:
- 7.2.1 safeguard the mauri and life supporting capacity of freshwater;
 - 7.2.2 maintain and improve freshwater where it has been degraded;
 - 7.2.3 demonstrate integrated management of freshwater (Ki Uta Ki Tai) from the mountains to the seas.
- 47 Policy 9.3.5(4) of the RPS encourages the formation of created wetlands that contribute to the restoration of indigenous biodiversity.
- 48 The RPS objectives are quite similar to those in the CMS. In particular CMS 4.6.3 is similar to RPS 7.2.2.
- 49 The Council officer’s report has addressed the relevant NZ Coastal Policy Statement (NZCPS) policies. The NZCPS applies because Wainono Lagoon is in the coastal environment, as discussed by Dr Gerbeaux in his evidence.
- 50 Under the NZCPS, significant adverse effects on the coastal environment, such as an increased sediment or contamination load, should be avoided. Where land or waters in the Coastal Environment are held under other Acts, Policy 5 of the NZCPS requires the avoidance of adverse effects of activities that are significant in the relation to the purposes for which the land, and otherwise, avoidance, remediation or mitigation of adverse effects in relation to those purposes.
- 51 Policy 21 NZCPS is also very relevant, in that priority is to be given to improving water quality by (inter alia):
- b) including provisions in plans to address improving water quality; and*
 - c) where practicable, restoring water quality to at least a state that can support such activities and ecosystems and natural habitats.*
- 52 The provisions proposed in section 10.14, p109 are intended to address water quality.

- 53 Dr Gerbaux' and Dr Schallenburg discuss in their evidence the benefits of enabling *ruppia* (macrophyte) beds to flourish, by controlling sediment inputs which cause smothering and poor water clarity, and Dr Gerbeaux has noted the significance of inorganic suspensoids and their effect on water clarity.
- 54 Based on that evidence it is critical, in my opinion, to the success of augmentation to ensure that non turbid water is used to augment the Lagoon. Therefore, to ensure rule 15.5.24 is successful, I support the Officers recommendation to include a NTU or suspended sediment condition in Rule 15.5.24. That requirement will better enable a 20% increase in macrophyte beds as outlined in the table 15(b) Freshwater outcomes to be achieved.
- 55 The evidence of Dr Gerbeaux supports the proposition that wetlands are effective nutrient removal tools. I am aware that the effectiveness of wetlands to remove contaminants was also argued by the DG in Variation 2 of the PWLRP. This "wetland scrubbing" evidence supports the establishment of the wetland as being more effective in the lower parts of the catchment, which is the situation for the proposed restricted discretionary rule 15.5.24 in Plan Change 3. The evidence also supports a constant rate of wetland discharge. I therefore support the addition of rate and volume as matters of discretion in rule 15.5.24 discretion matter number 10.
- 56 Dr Schallenburg's and Dr Gerbaux' evidence discuss the modelling study which underpins the proposition to improve water quality through augmentation. They identify multiple sources of uncertainty in the modelling.
- 57 One of the principles of the CWMS, to which ECan must have particular regard, is to take a cautious approach when information is uncertain. In my opinion, the degree of uncertainty associated with the effects of augmentation means a cautious approach is appropriate. I would therefore recommend the Commissioners consider the need for a cautious approach in setting the planning regime for augmentation and associated provisions, particularly in relation to the release of the flexibility caps one year after augmentation has occurred. While I support the concept of a flexible cap after seeing the results of the Hurunui-Waiiau Regional Water Allocation Regional Plan process, I consider the timing of the flexibility cap allocation and its relation to augmentation may still need addressing.

58 If the plan uses a 3 year average TLI as an appropriate RMA objective or outcome, then a three year (or longer period) following augmentation may be a more appropriate, cautionary approach, for the release of the flexibility cap. As the rules of this plan change have immediate effect, then presumably any changes in TLI consequent on the plan change will not be apparent for three more years.

59 I note the Table 15 (m) states that the Freshwater outcomes in table 15 (b) must also be met. However, any effects of augmentation on the three year TLI figure will not be known until three years after the augmentation. As I understand it, TLI is a three year measure (see Marc Schallenburg's evidence in paragraph 13 of page 4 of this evidence). However, without more solid evidence on this matter, I can make no further recommendation to the Hearing Commissioners on this matter.

Consequential Amendment

60 The Council officer's s42a report has addressed the issue of turbidity in proposed rule 15.5.24. In my opinion, a consequential policy amendment is also required to ensure that the policy drives the rule (as section 68 (1) (b) RMA requires the rules to be driven by the objectives and policies of the plan).

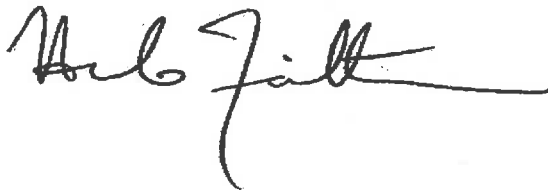
61 As the quality (in terms of turbidity) of water augmenting the Lagoon is quite critical to achieving the outcome sought in Table 15 (b) (20% macrophyte cover) a consequential policy change is required to make clear that *non turbid* water is required for the rule to work well in achieving improved water quality in Wainono Lagoon.

62 I attach my recommended changes in Appendix 1.

CONCLUSIONS

63 In summary:

- (i) the proposed provisions do not give effect to Part 6 (c) or to RPS Objectives 9.2.1 and 9.2.3 and Policy 10.3.2 (7) with regard to the protection of the significant habitat of Canterbury mudfish, and the significant habitats of Canterbury mudfish are not scheduled in schedule 17 of the Land and Water Plan.
- (ii) While the Land and Water Regional plan has matters of discretion regarding indigenous biodiversity and significant habitats of indigenous fauna in various general rules, those provisions do not give effect to RPS Objective 9.2.3 of identifying the habitat area (location) of these sites. This means it will be difficult for landowners and consent investigating officers to know if a Canterbury mudfish site is involved when resource consents are sought.
- (iii) HDI's resource consent conditions, intended to protect the significant habitats of Canterbury mudfish, have at least two sources of risk of not being effective in the South Coastal Canterbury area. A revised bullet point and amended restricted discretionary rule is proposed to address this issue.
- (iv) The augmentation of Wainono Lagoon, by a wetland, has a scientific basis that with the addition of a turbidity rule and a rate and volume condition should enable a sustainable outcome for the management by improving water quality longer term, through increasing macrophyte beds and decreasing the Lagoon TLI. The proposed rule requires a consequential change to Policy 15.4.14 to ensure the rule is driven by the Policy. The modelling basis for the augmentation still has multiple sources of uncertainty, and the timing of the flexible cap may therefore need to be considered further.



Herbert Ross Familton

25th September 2015

APPENDIX 1: Recommended Changes to Plan Change 3

1. Add a bullet point to the list of bullet points above section 15.1.

- *"Identification and protection of significant habitats of Canterbury mudfish populations"*

2. Include the following proposed rule, (or a rule to like effect) as follows:

15.5.43 *The use of land within 3 meters of the bed and banks of the river, stream, creek or drain for the purposes of planting or removal of vegetation or disturbance of the bed between the upstream and downstream sites listed in schedule X (See below), is a restricted discretionary activity.*

Schedule X. Schedule of known Canterbury mudfish (*Neochanna burrowsius*) habitats in the South Canterbury Coast sub-regional area.

Catchment	Waterbody	Downstream	Upstream
Horseshoe Bend Stream	Springbank Stream	CA19 544 615	CA19 539 630
Horseshoe Bend Stream	Horseshoe Bend Stream	CA19 542 600	CA19 485 610
Makikihi River	Teschemakers Creek	CA19 482 584	CA19 440 634
Geaney's Creek	Geaney's Creek	CA19 538 548	CA19 449 554
Waihao River	Wallaces Stream	CA19 486 537	CA19 485 536
Waihao River	Wainono Lagoon	CA19 537 496	CA19 537 496
Waihao River	Hook River tributary	CA19 463 513	CA19 451 520
Waihao River	Waituna Stream	CA19 526 478	CA18 423 489
Waihao River	Waituna Stream tributary	CA19 502 471	CA19 466 474
Waihao River	Maytown Ponds	CB19 465 460	CA19 457 463
Waihao River	Deep Creek	CB18 435 421	CB18 401 387
Waihao River	Buchanans Creek	CB19 518 398	CB19 511 395
Morven Drain	Sinclairs Creek	CB19 526 368	CB19 515 367
Morven Drain	Sinclairs Creek	CB19 491 368	CB19 489 369
Morven Drain	Broad Gully Stream	CB19 486 352	CB19 483 353
Morven Drain	Dog Kennel Stream	CB19 450 312	CB18 429 314

The exercise of discretion is restricted to the following matters:

- Effects on Canterbury Mudfish Habitat
- Adverse effects on sites or areas of wahi tapu, wahi taonga or mahinga kai.
- Effects on aquatic ecosystems

Notification is limited to Te Runanga O Ngai Tahu and Department of Conservation.

3. To Policy 15.4.14, add the words "non-turbid" water, so the first two lines of the policy reads:
"Improve water quality in Wainono Lagoon by enabling the discharge of non-turbid water to the lagoon through a constructed wetland, provided:"

Appendix 2 : Literature

- i. The Resource Management Act 1991
- ii. the National Policy Statement on Freshwater
- iii. The New Zealand Coastal Policy Statement
- iv. A draft guide to Attributes in Appendix 2 of the National Policy Statement for Freshwater Management 2014. Ministry for the Environment, Wellington. (2015)
- v. The second and third report of the Land and Water Forum April and October 2012, Wellington, NZ.
- vi. The Parliamentary Commissioners report "Growing for Good" (2006)
- vii. Water Quality in New Zealand: Landuse and Nutrient Pollution. (November 2013). Parliamentary Commissioner for the Environment, Wellington .
- viii. The National Biodiversity Strategy
- ix. The Canterbury Regional Policy Statement (2013)
- x. The Canterbury Conservation Management Strategy
- xi. South Coastal Canterbury ZIP addendum (2014). Environment Canterbury, MacKenzie District, and Waitaki District Councils, Christchurch (2014)
- xii. Eutrophication: policies, Actions and Strategies to Address Nutrient Pollution. Mindy Selman and Suzi Greenhalgh (September 2009) World Resources Institute Policy Note : Water Quality, eutrophication and Hypoxia No.3, Washington DC.
- xiii. Assessment of Strategies to Mitigate the Impact or Loss of Contaminants from Agricultural Land to Fresh Waters (2013), Report prepared for MfE, R.W. McDowell, B Wilcock, and D.P Hamilton. AgResearch, NIWA and Environmental Research Institute, University of Waikato. AgResearch (2013)
- xiv. A Building Block Model for Stream restoration, (1992) R.C Petersen, LBM Petersen and J. Lacoursiere, River Conservation and Management, John Wiley and Sons
- xv. The expert witness and sponsor evidence from: Dr Nicholas Dunn, Andrew Grant, David Winterburn, Dr Philippe Gerbeaux, and Dr Marc Schallenburg (Department of Conservation)
- xvi. The ECan section 42A report R15/107, dated September 2015. Environment Canterbury 2015
- xvii. The ECan section 32 report, dated 16 April 2015. Environment Canterbury 2015

Appendix 3: Terms used in Evidence

CMS	Conservation Management Strategy
CWMS	Canterbury Water Management Strategy
ECan	Canterbury Regional Council
ECan Act	Environment Canterbury (Temporary Commissioners and Improved Water Management Act) 2010
DG	Director-General of Conservation
DOC	Department of Conservation
DA	Discretionary Activity
HDI	Hunter Downs Irrigation Scheme Ltd
NIWA	National Institute for Water and Atmosphere
NPS FW	National Policy Statement Freshwater Management 2011
PA	Permitted Activity
PCE	Parliamentary Commissioner for the Environment
CLWRP	Partially operative Land and Water Regional Plan (ECan 2015)
NZCPS	New Zealand Coastal Policy Statement
PCE	Parliamentary Commissioner for the Environment
PC3	Plan Change 3-Land and Water Regional Plan (ECan 2015)
RMA	Resource Management Act
RPS	Canterbury Regional Policy Statement (January 2013)
TLI	Trophic Level Index
ZIP	Zone Implementation plan (2014 South Canterbury ZIP addendum)

