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# Subject: Waimakariri Land and Water Solutions Programme: Biodiversity Solutions Assessment

# 1 Key findings

Key issues for/threats to achieving the Waimakariri Water Zone Committee and community goal of protecting and enhancing indigenous biodiversity (Priroity Outcome 5) are habitat loss and the impacts of introduced species.

The Waimakariri Water Zone Committee (WWZC) Zone Implementation Programme Addendum (ZIPA) recommendations 2.1-2.13 explicity relate to the protection and enhancement of indigenous biodiversity. To summarise, they seek an integrated catchment management approach to biodiversity management with agencies, Ngaī Tūāhuriri, landowners and stakeholders working together. The Canterbury Biodiversity Strategy approach is endorsed with implementation sought at a zone-wide scale. The need for mapping of key habitats and species distributions within the Zone, identifying priorities and setting clear targets are recognised, as is the need for further investigations and monitoring in areas such as the Ashley Estuary (Te Aka Aka).

Additonal recommendations relating to protection/enhancement of biodiversity and health of aquatic (including wetland) ecosystems are contained within 'Improving Stream Health' recommendations 1.7 – 1.28, 'Reducing Nitrate' recommendations 3.1-3.25 and 'Managing Water Quantity' recommendations 4.1-4.16 and 5.1-5.7.

The 'Improving Stream Health' recommendations placed emphasis on the need for measures to protect biodiversity and ecosystem health by avoiding or minimising contaminant losses to receiving waterbodies (including wetlands – e.g. Rec 1.24). Regulatory measures, such as strengthening LWRP rules around stock exclusion from waterways and springheads, were included in the recommendations. Similarly, a planning/regulatory approach was included within recommendations relating to 'Reducing nitrates' and 'Managing water quantity' outcomes.

By contrast, recommendations targeted at 'Protecting and enhancing indigenous biodiversity' listed only non-regulatory measures such as provision of incentives and advisory services, and working with willing landowners. The Community Outcome of protecting and enhancing indigenous biodiversity will not, in my opinion, be achieved by relying largely or solely on non-regulatory measures such as those in ZIPA recommendations 2.1-2.13. More focused and coordinated implementation of both Regional and District Council planning and regulatory functions will also be required.

# 2 Introduction

The ZIPA provides recommendations to guide both the sub-region plan change to section 8 (Waimakariri) of the Canterbury Land and Water Regional Plan (LWRP), and actions to be advanced within the Waimakariri Water Zone and the Waimakariri District Plan. The ZIPA defines nine Community Outcomes identified by the committee and community. Each outcome is supported by a narrative which provides some guidance on the expectations of the WWZC associated with each outcome. Outcome 5 defines the committee's goals for indigenous biodiversity in the zone as follows:

## Outcome 5 – Indigenous biodiversity in the zone is protected and improved

*Narrative:* Protect and improve the indigenous biodiversity, habitat or ecosystems. Plant and animal pest species are managed or eliminated.

A number of other ZIPA Community Outcomes and their associated narratives also relate to health of indigenous ecosystems and protection/improvement of indigenous biodiversity:

Outcome 1 – The water quality and quantity of spring-fed streams supports maintains or improves mahinga kai gathering and diverse aquatic life

Outcome 2 – The Ashley River / Rakahuri is safe for contact recreation, has improved river habitat, fish passage and customary use; and has flows that support natural coastal processes

Outcome 3 – The Waimakariri River as a receiving environment is a healthy habitat for freshwater and coastal species, and is protected and managed as an outstanding natural landscape and recreation resource

Outcome 7 – Optimal water and nutrient management is common practice

# 3 Current State and Current Pathways of indigenous biodiversity in the Waimakariri zone

A Waimkariri Zone biodiversity current state memo was drafted in 2016. The memo provided a Zonewide overview that described the current state (i.e. distribution and extent) of habitats or ecosystems and their constituent biodiversity.

The Zone was mapped to show current distribution and extent of habitats of 'high', 'moderate' and 'low' value for indigenous biodiversity. The mapping was done as a desk-top Geographic Information Systems (GIS) exercise. It drew on and collated existing information from national and regional GIS datasets as well as other existing biodiversity information, such as Conservation Resources Reports produced as part of the Crown Pastoral Lease tenure review process. The existing information was cross-checked against recent aerial imagery and corrected/updated where necessary. Finally, the map was reviewed by Department of Conservation staff and other ecologists who are familiar with the Zone.

As for the rest of Canterbury, there has been substantial loss of indigenous biodiversity from Waimakariri Zone since human settlement. This has primarily occurred through the loss and modification of habitat by deforestation, burning, drainage, cultivation and other development, and new species introductions. Continuing habitat loss and modification, and the impacts of animal and plant pests remain the principal threats to indigenous biodiversity today.

The greatest rate of loss of indigenous habitat and biodiversity have occurred in lowland and coastal environments (<400m) where development has been most intensive. Over most of these areas, >90% of original cover has gone. Lowland forests, shrublands and indigenous grasslands have been reduced to small, scattered fragments, and these remnants are still threatened by changing land use, browsing pressure, edge effects, weeds and pests. Freshwater and coastal wetlands have been drained and reclaimed; remaining wetlands are under threat from catchment land use intensification, grazing, recreational impacts and coastal erosion. These coastal-lowland elevation environments, where there has been the greatest loss of indigenous vegetation and habitat, also represent the parts of the region where remaining indigenous biodiversity is at the greatest risk of further loss.

In heavily modified low plains environments where little intact native vegetation cover remains, 'seminatural' mixed native-exotic and even largely exotic vegetation cover, such as riparian willow forest, now provide the best and most extensive remaining habitats for native flora and fauna. A very substantial example of this was the Eyrewell Forest pine plantation which supported large populations of native shrub and groundcover plants, native birds, lizards and invertebrates including the threatened endemic Canterbury Plains ground beetle (*Holcaspis brevicula*) (Brockerhoff *et al.* 2008). Most of the former Eyrewell Forest has now been converted to irrigated dairy and dairy support farm land, and these biodiversity values have been lost.

For montane environments (400-800 m) the loss of indigenous cover has not been as great as in the lowland and coastal areas, and extensive areas of native forest, native shrublands, tussock grasslands and some important ecological corridors persist. However some parts of the frontal hill country, and especially the Lees Valley inland basin, are currently experiencing rapid rates of land use change and intensification, further reducing remaining area of habitats such as red tussock wetlands and dry shrubland.

The Zone's high country and alpine environments (>800m) largely remain in indigenous cover, such as beech forest and tussock grassland vegetation, but grazing by introduced animals is having an impact. Pests such as possums, pigs, deer and goats pose a threat to both old-growth forest remnants and regenerating forest across the Zone, while mammalian predators decimate native wildlife.

Comparison of the Freshwater Ecosystems of New Zealand (FENZ) historic and current freshwater wetland layer for Waimakariri Zone showed a 95% reduction in wetland extent, from 22,164 ha *c*. 1840 to 1,026 ha in 2000. While there are some accuracy limitations with the FENZ current wetland layer and it does underestimate remaining wetland extent, proportion of freshwater wetland habitat loss across the Zone as a whole since European settlement is still likely to exceed 90%.

The rate of wetland loss in Waimakariri Zone, and elsewhere in the region, has slowed compared to the massive reduction of the late 19<sup>th</sup>-early 20<sup>th</sup> century, but continues. While most of the past wetland loss was from the low plains, more recent (post 1990) wetland reduction has occurred in the foothills and Lees Valley associated with land use intensification in these parts of the Zone (Pompei and Grove 2010). The conversion, in 2008, of a large nationally-significant wetland area at Mounseys Rd west of Oxford into dairy farm was disastrous, in particular, for what had been one of the largest known populations of endangered Canterbury mudfish. Over the last few years though, there has also been some examples of increased extent of lowland-coastal wetland habitats, for example associated with Pegasus Town development and post-earthquake shifts in bed levels and hydrology along the lower Waimakariri River.

A comparison of area of Land Cover Database (LCDB) classes across the Zone over the period 1996-2012 showed a net reduction in extent of a number of ' high biodiversity value' habitats: Indigenous forest (reduced by 78 ha); Broadleaved Indigenous hardwood scrub (reduced by 115 ha); kanuka (reduced by 87 ha); herbaceous freshwater wetland vegetation (reduced by 32 ha). There was also substantial reduction in extent of 'moderate biodiversity value' habitats, especially gorse and/or broom (down by 836 ha) and 'low producing grassland' (down by 2077 ha). The 1996-2012 LCDB showed a corresponding increase in 'low biodiversity value' habitats': high producing exotic grassland (up 1762 ha); orchard, vineyard, crop (up 300 ha); built-up area (389 ha).

Current Pathways is the term we've used for business as usual. Under this scenario, indigenous biodiversity in the Zones will continue to decline from:

- 1. Habitat loss and degradation as a result of further land use change/intensification. This includes direct loss/destruction of habitats from development, and degradation of surrounding or remaining habitats from a range of 'edge effects' and wider adverse environmental impacts.
- 2. Attritional/cumumlative habitat degradation and biodiversity loss from existing land uses.
- 3. Impacts of weeds and pests.

## 4 **ZIPA** recommendations

The ZIPA inludes a set of statutory and non-statutory actions recommended by the WWZC in order to acheive their Community Outcomes. I have summarised those relating to protection and improvement of indigenous biodiversity, habitats and ecosystems below. Statutory recommendations have been included in regard to aquatic ecology whereas the protecting and enhancing indigenous biodiversity recommendations are non-statutory.

#### 4.1 Statutory recommendations

Recommendations – Improving stream health

- Rec 1.15 That Environment Canterbury strengthen the LWRP rules on stock exclusion to exclude intensively farmed stock from: all springheads that permanently or intermittently contain water; and all open drains and other artificial watercourses with surface water that discharge into a stream, river or lake.
- Rec 1.16 That Environment Canterbury strengthen the LWRP rules on stock exclusion to exclude non-intensively farmed cattle and deer on the plains from: all waterways and their tributaries; all springheads that permanently or intermittently contain water; and all open drains and other artificial watercourses with surface water that discharge into a stream, river or lake.

#### *Recommendations – Reducing nitrates*

Rec 3.1 That Environment Canterbury reflect in the Waimakariri section of the LWRP a staged approach to reduce nitrate losses over time in the Waimakariri Water Zone (other

recommendations in this section follow on from, and provide more detail as to how this might be achieved).

Rec 3.18 That Environment Canterbury reflect in the Waimakariri section of the LWRP the nitrate limits in the streams and rivers of the Waimakariri Water Management Zone as set out in Tables 3.3 and 3.4.

Recommendations – Managing Surface Water Quantity

- Rec 4.1 In over-allocated Surface Water Allocation zones, that Environment Canterbury uses the methods set out in Rec 4.2 to reduce and where possible eliminate the overallocation by 2032.
- Rec 4.3 That Environment Canterbury applies LWRP requirements for partial restrictions and requires that pro-rata restircitons be applied to all surface water takes, and stream depleting ground water takes which require a minimum flow in the zone.
- Rec 4.5 That Environment Canterbury remove B allocation blocks from all spring-fed rivers unless further investigations indicate that sustainable B blocks can be sustainable B blocks can be supported.
- Rec 4.6 That Environment Canterbury extend existing SWAZ and/or introduce new SWAZ to ensure that there are no gaps in the environmental flow regime which manages the Waimakariri Water Zone.
- Rec 4.7 In currently under-allocated catchments, than Environment Canterbury cap the allocation at the currently allocated amount, so no further surface water can be allocated.
- Rec 4.11a That Environment Canterbury ensure the Plan Change to section 8 of the LWRP (Waimakariri) includes policies and rules that adequately provide for augmentation of water bodies, including the Cust River, for environmental benefit.
- Rec 4.16 That Environment Canterbury adopt the minimum flow and allocation recommendations in Table 4.5.

Recommendations – Managing ground water quantity

- Rec 5.1-5.6 These propose caps on ground water allocation for Kowai, Ashley, Loburn,Cust, Eyre and the proposed Lees Valley ground water allocation zones.
- Rec 5.7 That Environment Canterbury extend the Groundwater Allocation Zone boundaries further inland, to the edge of the surface water catchment boundary.

#### 4.2 Non-statutory recommendations

As noted above, all of the ZIPA 'Protecting and enhancing Indigenous Biodiversity' recommendations are 'non statutory' in their wording. That is, they propose a range of actions such as around education, voluntary actions, monitoring etc., but make no recommendations for new or strengthenedRegional / District Plan provisions. The recommendations include agency collaboration, developing a 'Waimakariri Biodiversity Action Plan', mapping indigenous habitats, identifying priority sites for management actions, setting targets, working with willing landowners, developing strategies to incentivise biodiversity protection and enhancement projects and establishing biodiversity advisory services. I have listed some of the recommendations below:

- Rec. 1.9 That Environment Canterbury work with Ngaī Tūāhuriri and Department of Conservation to identify the types of activities and controls needed to protect the aquatic habitat of the threatened Canterbury mudfish and amend plan provisions to ensure protection at key sites.
- Rec 1.10 That Environment Canterbury work with Ngaī Tūāhuriri and Department of Conservation to identify the locations and types of activities and controls needed to protect the habitat of important [freshwater aquatic] indigenous species.
- Rec 1.24 That Environment Canterbury and the Waimakariri District Council recognise the Upper Ahley River / Rakahuri catchment, including Lees Valley, for its high natural landscape and ecosystem values, and protect its waterways from degradation by: avoiding increased contaminant losses to waterways; and preventing the removal or degradation of any existing wetlands.

Some of the ZIPA recommendations, such as those relating to mapping indigenous habitats and sites supporting threatened plant and animal species, will in my opinion require statutory backing to achieve. This may come, for example, through a Biodiversity National Policy Statement (NPS) directive requiring all TAs to identify and map and Significant Natural Areas in their districts.

There are also a number of similar non-statutory recommendations in the 'Improving Stream Health' section of the ZIPA which will contribute to protection and improvement of indigenous biodiversity, together with statutory recommendations.

## 5 Solutions assessment

## 5.1 Overview

The RMA requires councils to protect significant ecological values (Sec 6c) and to maintain indigenous biodiversity (Sec 31). 'Protection' in relation to indigenous biodiversity is a broad term that has many facets. It therefore requires a similarly broad and multi-facted response, incorporating both regulatory and non-regulatory measures, to achive maintenance and protection of biodiversity in the widest sense.

It is helpful to clearly distinguish between 'protection' in the sense of preventing further loss (i.e. 'maintaining' indigenous biodiversity and ecosystems); and 'protection' in the sense of addressing threats from current land use practices and/or weeds and pests.

The need to 'prevent further loss' is recognised as a necessary first step and 'fundamental priority principle' in the Canterbury Biodiversity Strategy (2008), which is referenced and endorsed in the ZIPA. But when economic drivers for land use intensification are strong, mechanisms to prevent further biodiversity loss must necessarily have a strong planning and regulatory impetus. Relying on the altruism of individual landowners or developers to prevent further loss, maintain indigenous biodiversity and 'protect', even in this narrow sense, significant ecological values is highly unlikely to achieve the WWZC Community Outcomes relating to biodiversity. While some individual landowners may be motivated to prevent habitat loss and protect/enhance biodiversity on their properties, in the absence of regulatory 'bottom lines' there is no guarantee that 'voluntary protection' would continue under new owners. My experience is that most biodiversity loss on private land through habitat destruction is associated with a change in owner or manager.

However, protection in its widest sense goes beyond regulatory measures (such as indigenous vegetation clearance rules). While rules can be used to maintain extent (or quantity) of habitats and ecosystems, protecting or improving ecological health of (or quality) of habitats and their constituent biodiversity requires other measures such as the advisory services and incentives as recommended in the ZIPA. Protection in this wider sense - for example by changing unsympathetic management practices which are nevertheless permitted or 'existing uses', carrying out weed and pest control, and even habitat restoration - requires a greater level of effort and resourcing. Nonetheless, effective, ecologically sound regulation remains the necessary first step in maintaining existing habitats, and retaining opportunities for better protection in the future.

## 5.2 Assessment of ZIPA recommendations

I understand that ZIPA recommendations 1.9 and 1.10 are being addressed via region-wide rules under an Omnibus Plan Change to the LWRP. These rules will include:

- A new definition of indigenous freshwater species habitat (see table below)
- Including habitat on Planning Maps
- A suite of new and amended policies and rules

Indigenous freshwater species habitat	<ul> <li>means the area of habitat for the freshwater indigenous species listed below and shown as 'Indigenous freshwater species habitat' on the Planning Maps:</li> <li>1. <u>Giant kōkopu/Taiwharu (<i>Galaxias argenteus</i>)</u></li> <li>2. Lowland longjaw galaxias (Waitaki) (<i>Galaxias cobitinis</i>)</li> <li>3. <u>Canterbury mudfish/Kōwaro (<i>Neochanna burrowsius</i>)</u></li> <li>4. <u>Bignose galaxias (<i>Galaxias macronasus</i>)</u></li> <li>5. <u>Upland longjaw galaxias (<i>Galaxias prognathus</i>)</u></li> <li>6. <u>Upland longjaw galaxias (Waitaki) (<i>Galaxias prognathus</i>)</u></li> <li>7. <u>Shortjaw kōkopu (<i>Galaxias postvectis</i>)</u></li> <li>8. <u>Northern flathead galaxias (Species N (undescribed))</u></li> <li>9. <u>Lamprey/Kanakana (<i>Geotria australis</i>)</u></li> <li>10. <u>Freshwater crayfish/Kekewai (<i>Paranephrops zealandicus</i>)</u></li> <li>11. <u>Freshwater mussel/Kākahi (<i>Echyridella menziesi</i>)</u></li> </ul>
	11. <u>Freshwater mussel/Kākahi (<i>Echyridella menziesi</i>)</u>

Progress towards rec 1.24 could potentially be made through improvements in implementation of exising LWRP rules, such as refinements in auditing of Farm Environment Plans to provide a greater focus on biodiversity outcomes. However, I consider that additional controls on catchment land use activities will ultimately be required to protect Lees Valley waterways from contaminants, including non-point source nutrient loads such as dissolved nitrates; and strengthening of provisions to prevent wetland degradation and removal.

Recommendations 2.1 to 2.14 are 'non-statutory' and will not lead to strengthening of the District and Regional Plan provisions for the maintenance and protection of indigenous biodiversity. Therefore the extent to which they will protect and improve indigenous biodiversity is uncertain and may be negligible unless significant resources are committed to these recommended actions.

I also consider that some of the actions contained within Rec 2.3, especially those relating to identifying and mapping indigenous habitats, vegetation and priority sites for protection, will require statutory support if they are to be carried out across the whole Zone. Because this is a national-scale issue, an NPS directive would be the most appropriate delivery mechanism for this.

Whilst the various non-statutory recommendaitons listed in the 'Improving Stream Health' and "Protecting and Enhancing Indigenous Biodiversity' sections of the ZIPA could potentially achieve some localised biodiversity improvements, I consider that stronger regulatory controls together with sufficient resourcing of rule implementation and compliance monitoring would be required to achieve Community Outcome 5 over the wider Zone. With appropriate regulatory baselines to secure habitats, the nonregulatory actions recommended in the ZIPA will be better-placed to deliver improved protection and enhancement of biodiversity in the wider sense.

The various statutory/planning-based recommendations to reduce nitrates and manage surface- and groundwater quantity should, if successfully implemented, also contribute to improved stream health and the protection and enhancement of indigenous aquatic biodiversity.

# 6 Conclusions

In order to achieve Community Outcome 5 (Indigenous biodiversity in the zone is protected and improved), both District and Regional Plans need the ability to regulate the land use activities that have the potential to adversely impact on the ecosystem health and indigenous biodiversity of terrestrial, wetland and aquatic habitats. The ZIPA includes a number of recommendations to improve/strengthen LWRP provisions which will, if implemented, improve the health of aquatic and some wetland ecosystems. However, no equivalent recommendations are offered to improve/strengthen District Plan provisions in relation to terrestrial ecosystems and biodiversity. Without these necessary statutory 'bottom lines', it is unlikely that Community Outcome 5 will be achieved on anything other than a very localised scale.

An effective planning/regulatory framework for indigenous biodiversity would be an improvement on the 'current state' in the sense that it would stop further loss or degradation of habitats necessary for maintenance of indigenous biodiversity, and is a necessary first step. But protection and improvement of indigenous biodiversity in the fuller sense, and as sought in Community Outcome 5, will of course also require implementing a range of non-statutory actions such as recommended in the ZIPA. Funding to implement these non-staturory recommendations has not yet been sought or allocated.

My assessment therefore is that without an improved/more comprehensive statutory basis to prevent further loss or degradation of remaining habitats supporting indigenous biodiversity, Outcome 5 will not be achieved.

A combination of improved planning/regulatory framework plus substantial new funding to implement the ZIPA's non-statutory recommendations is required to deliver Community Outcome 5.

Reviewed by:	Jason Butt, Principal Biodiversity Advisor	12 June, 2019
Approved for release:	Tim Davie, Chief Scientist	13, June, 2019