

Maintaining indigenous freshwater biodiversity in the Taranaki region

Review of the regional fresh water and soil plans for Taranaki

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Executive summary

This working paper entitled *Maintaining Indigenous Freshwater Biodiversity in the Taranaki Region* addresses the use, development and protection of indigenous freshwater biodiversity, including wetlands, in the Taranaki region. The paper is one of a suite of documents contributing to the Taranaki Regional Council's (the Council) review of the *Regional Fresh Water Plan for Taranaki* (the Freshwater Plan) and the *Regional Soil Plan for Taranaki* (the Soil Plan).

The focus of this paper is on freshwater habitats (this includes wetlands, rivers, streams and lakes), rather than individual species or genetic diversity. This paper examines issues relating to the use, development and protection of indigenous freshwater biodiversity and proposes some recommendations to be considered as part of the review of the Freshwater Plan. Key findings and recommendations outlined in this paper are as follows:

- ❖ Taranaki has 286 primary river catchments and over 530 named rivers. Most catchments are relatively small. There are also 10 lakes in Taranaki with an area greater than eight hectares and over 1,500 mapped wetlands covering almost 3,300 hectares.
- ❖ Taranaki's rivers and streams provide freshwater habitat for at least 18 of New Zealand's 27 indigenous fish species. A special feature of Taranaki's indigenous freshwater fish is that 15 of the 18 known species have a marine or estuarine stage in their lifecycle and migrate to and from the sea.
- ❖ Several streams and rivers are known to be inanga spawning sites and or are home to threatened species.
- ❖ Taranaki has a range of freshwater habitats that support a diverse range of indigenous plants, birds, fish, and invertebrates. For example, fish species such as inanga prefer lowland streams that provide gentle flowing and well-vegetated habitats, koaro prefer the cascading rocky habitats found up in the forest of the Egmont National Park, while other fish species such as shortfinned eels prefer slow flowing streams, ponds and lakes.
- ❖ State of the environment monitoring of the ecological health of waterways confirms that the life-supporting capacity, ecosystem processes and indigenous species associated with Taranaki's larger rivers and streams are broadly being maintained.
- ❖ Under the *National Policy Statement for Freshwater Management* regional councils are required to protect values associated with wetlands. Wetlands are nationally identified to be an 'acutely threatened' habitat type with only 10% of the original wetlands remaining – in Taranaki only 8.1% of original wetlands remain.
- ❖ Wetlands and small lowland streams are habitat types particularly vulnerable to modification and, in some cases, loss. Surveys undertaken for the Taranaki region show that in the first six years of the current Freshwater Plan, the region lost 59 wetlands (122 hectares). This figure is likely to have increased since then due to on-going drainage and clearance.
- ❖ One of the inherent difficulties in managing freshwater biodiversity in Taranaki and across New Zealand is the patchy information and absence of complete and reliable spatial information about its current state and trends, particularly in relation to species where information is limited to specific sites and ecological surveys.
- ❖ The current Freshwater Plan has largely been effective in maintaining freshwater indigenous biodiversity values. The exception to this is a small but nevertheless significant on going loss in ecological values associated with wetlands and small streams. Therefore some changes are proposed to more explicitly identify and address indigenous biodiversity values (with a particular focus on rare and threatened freshwater habitats) in a revised Plan. The proposed changes include:
 - explicitly identifying issues, objectives and policies for managing freshwater indigenous biodiversity values in the revised Plan, including the setting of an objective to maintain

- freshwater biodiversity across the region, and within sites of significance
- policy criteria for identifying 'significant' freshwater biodiversity that is aligned with the RPS and national directives
 - policy setting out a hierarchy of considerations to protect significant freshwater biodiversity
 - a freshwater biodiversity offset policy
 - policies and methods promoting targeted assistance to land owners protecting biodiversity values associated with significant freshwater habitat sites
 - a descriptive schedule for assessing and identifying significant freshwater habitats
 - broadening the application of rules to better protect wetlands (plus other freshwater habitats) with regionally significant values (not just those listed in the Plan's appendices).
- ❖ The paper represents a starting point for consulting with key stakeholders to obtain their early input into the development of revised Plan provisions that set out future directions for the maintenance of indigenous freshwater biodiversity values in the Taranaki region.

Preface

This working paper entitled *Maintaining Indigenous Freshwater Biodiversity in the Taranaki Region* addresses the use, development and protection of indigenous freshwater biodiversity, including wetlands, in the Taranaki region. The paper is one of a suite of documents contributing to the Taranaki Regional Council's (the Council) review of the *Regional Fresh Water Plan for Taranaki* (the Freshwater Plan) and the *Regional Soil Plan for Taranaki* (the Soil Plan).

Freshwater biodiversity describes the variety of all biological life dependent on fresh water. It includes native habitats, animals and plants many of which are unique to this part of the world and many of which are threatened with extinction. Besides contributing to natural, intrinsic, cultural and recreational values, natural freshwater ecosystems also provide important ecological services such as carbon storage, and air and water purification.

The Ministry for the Environment report, *The State of New Zealand's Environment 2007*, concluded that biodiversity decline is New Zealand's most pervasive environmental issue. As in other parts of New Zealand, a broad range of activities have the potential to contribute to the loss or degradation of freshwater biodiversity in the Taranaki region. Over the last 150 years, land drainage, reclamation and clearance has substantially modified and converted the landscape to productive agricultural land. Taranaki is one of the most intensively farmed regions in New Zealand and contributes significantly to the local and national economy. However, in developing the land, almost 92% of Taranaki's wetlands have been drained or lost. Those remnant wetlands that remain are now of national and regional significance because of their scarcity. Other land and water use practices such as stream realignments, the loss of riparian margins, the construction of barriers to fish passage, water takes, and discharges from point or non point sources to land or water may also adversely impact on freshwater biodiversity in the region.

Nationally, through the *National Policy Statement (NPS) for Freshwater Management* and the *Proposed NPS for Biodiversity* there is an expectation that the decline in wetlands will be arrested and the life-supporting capacity, ecosystem processes and indigenous species associated with freshwater will be safeguarded.

Each year, the Council considers a large number of consents for activities that potentially can have significant adverse effects on biodiversity. Under the Resource Management Act 1991, the Council must consider the consequences of all effects on indigenous biodiversity, not simply the significance of a species or habitat. However, the Council, through the *Regional Policy Statement for Taranaki*, recognises that some habitats and areas are more highly valued or vulnerable than others and warrant a more targeted approach. For those habitats and areas deemed to have regionally significant indigenous biodiversity values, added weight (in accordance with regional policies and rules) should be given to the maintenance and enhancement of their values.

The freshwater and soil plans were adopted in 2001. Ten years on the Council is required to carry out a full review of the freshwater and soil plans. This paper therefore examines the state of, and pressures on, freshwater biodiversity in the region and canvases the policy options to ensure freshwater biodiversity is maintained and, where necessary, enhanced in the region.

A stocktake of freshwater biodiversity in Taranaki notes the extent to which our rivers, streams, lakes and wetlands provide essential habitat for a wide variety of indigenous plants and animals. In Taranaki, 38 indigenous plant, bird, fish and invertebrate species have been identified as reliant on waterways and their margins and which are identified to be nationally threatened, or at risk of extinction, or are regionally distinctive. As a matter of law, the maintenance of existing areas inhabited by these species is a matter of national and regional priority.

This paper confirms that the Freshwater Plan has been largely effective and efficient in maintaining indigenous biodiversity across the region. In particular, state of the environment monitoring confirms that the life-supporting capacity, ecosystem processes and indigenous species associated with Taranaki's larger rivers and streams are broadly being maintained across the region. Notwithstanding that the paper also identifies that some freshwater systems such as wetlands need added protection to arrest the small but incremental loss of nationally and regionally significant indigenous biodiversity values. Consequently a number of changes are proposed from the current Plan that will build on the results achieved to date. The proposed changes include:

- explicitly identify issues, objectives and policies for managing freshwater indigenous biodiversity values in the revised Plan, including the setting of an objective to maintain freshwater biodiversity in the region
- policy criteria for identifying 'significant' biodiversity that is aligned with the RPS and national directives
- policy setting out a hierarchy of considerations to protect significant freshwater biodiversity
- a biodiversity offset policy
- policies and methods promoting targeted assistance to land owners protecting biodiversity values associated with significant freshwater habitat sites
- a descriptive schedule for assessing and identifying significant freshwater habitats
- broadening the application of rules relating to wetlands to better protect wetlands (plus other freshwater habitats) with regionally significant values (not just those listed in the Plan's appendices).

This paper is a starting point for consulting with stakeholders on possible changes to the Freshwater Plan. I am confident that through early engagement and discussion Taranaki can develop practicable solutions that reflect local environmental conditions, best industry practice, and sound science. In so doing, we will not only give effect to new national policy requirements, we will also ensure Taranaki remains at the forefront of environmental management.

David MacLeod
Chair
Taranaki Regional Council

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1. Introduction

1.1 Purpose

The purpose of this working paper is to set out future directions for the use, development and protection of indigenous (native) freshwater biodiversity in the Taranaki region.

This paper contributes to the Taranaki Regional Council's (the Council) review of the *Regional Fresh Water Plan for Taranaki* (the Freshwater Plan) and the *Regional Soil Plan for Taranaki* (the Soil Plan).

1.2 Background

Freshwater biodiversity describes the variety of all biological life dependent on fresh water.

Indigenous biodiversity is a major element of New Zealand's distinctive landscape and identity. Taranaki has varied freshwater habitats such as rivers, streams, wetlands and lakes and their riparian margins. Together they provide essential habitat for often unique indigenous plants and animals in the region. A high percentage of New Zealand's species are endemic (only found in New Zealand), which makes them both special and highly vulnerable.

Taranaki rivers, streams, wetlands and lakes, and their riparian margins include 38 indigenous plant, bird, fish and invertebrate species that have been nationally classified as 'threatened' or 'at risk' of extinction (as determined by the New Zealand Threat Classification System and lists), or which are considered to be regionally distinctive.

Taranaki rivers, streams, lakes and wetlands provide other important ecosystem services such as flood mitigation, nutrient cycling and carbon sequestration. They are also important in their own right for its natural character, ecological, amenity and recreational values, and the cultural and spiritual values or customary uses by tangata whenua.¹

¹ Water forms an important part of the cultural and spiritual values of Maori who have a kaitiaki or guardianship role in relation to water.

The decline of indigenous biodiversity has been identified by the Ministry for the Environment as the biggest environmental protection challenge in New Zealand today.²

A broad range of activities have the potential to contribute to the loss or degradation of indigenous freshwater biodiversity in the Taranaki region. Over the last 150 years, land drainage, reclamation and clearance has substantially modified and converted the landscape to productive agricultural land. Taranaki is one of the most intensively farmed regions in New Zealand and contributes significantly to the local and national economy. However, in developing the land, almost 92% of Taranaki's wetlands have been drained or lost. The impacts of other land and water use practices such as the loss of riparian margins, the construction of barriers to fish passage, water takes, and discharges from point or non point sources to land or water have also contributed to the loss or degradation of indigenous freshwater biodiversity in the region.

Nationally, through the *National Policy Statement (NPS) for Freshwater Management* and the *Proposed NPS for Biodiversity* there is a requirement for councils to safeguard the life-supporting capacity, ecosystem processes and indigenous species associated with freshwater and arrest the decline in wetlands.

The freshwater and soil plans were adopted in 2001. Ten years on the Council is required to carry out a full review of the freshwater and soil plans. This paper therefore examines the state of, and pressures on, freshwater biodiversity in the region and canvases the policy options to ensure indigenous freshwater biodiversity is maintained and, where necessary, enhanced in the region.

The paper represents a starting point for consulting with key stakeholders and to obtaining their early input into the development of revised Plan provisions relating to indigenous freshwater biodiversity.

² Ministry for the Environment, 1997.

1.3 Scope

Of note the term 'biodiversity' generally refers to both introduced and indigenous species and habitats. However, for the purposes of this paper, unless the context indicates otherwise, biodiversity refers to indigenous species and associated habitats.

The scope of this paper also focuses on freshwater habitats (this includes wetlands and rivers and streams and their riparian margins), rather than individual species or genetic diversity. While there is clearly some overlap between habitat management and species management (refer Figure 1), species management is specifically the responsibility of other agencies under other legislation such as the Wildlife Act 1953 and the Conservation Act 1987.

The paper does not address indigenous biodiversity matters within the coastal marine area (such matters are covered by the *Regional Coastal Plan for Taranaki*) or the control of land use to maintain terrestrial (land) indigenous biodiversity (which is the responsibility of the three territorial authorities).

1.4 Structure

The working paper has eight sections.

Section 1 introduced the working paper, including its purpose, background, scope and structure.

Section 2 provides an overview of the statutory and planning context for the Council to permit, control or prohibit activities that may impact on freshwater biodiversity.

Section 3 provides an outline of human induced activities that may contribute to the loss or decline in freshwater biodiversity.

Section 4 provides a brief overview of the state of freshwater biodiversity in the region.

Section 5 reviews the Council's experiences in the implementation of the Freshwater Plan, including the efficiency and effectiveness of current management programmes.

Section 6 outlines broader policy considerations that have been taken into account in the review of Freshwater Plan provisions relating to indigenous freshwater biodiversity.

Section 7 outlines the preferred approach proposed to be adopted in a revised Freshwater Plan addressing indigenous freshwater biodiversity values, including proposed changes to the Freshwater Plan.

Section 8 sets out the summary and conclusions for this paper.

A definition of terms and an explanation of acronyms used in this paper and appendices are presented at the back of this paper.

Relationship between habitat loss and species loss

The loss of habitat is a forerunner to species extinction.

Figure 1³ shows that with initial decreases in habitat area (upper right hand curve), the rate of species loss is relatively small (e.g. typically the large-bodied, space demanding, host dependent, narrow ranged and or habitat specialist biota, which are more vulnerable).

However, as habitat area is progressively reduced the susceptibility to loss of species increases exponentially – particularly below 20% and 10%.

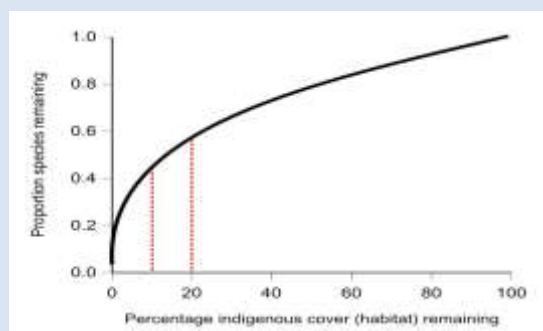


Figure 1: Impact of declining habitat area on species loss

³ Ministry for the Environment, April 2007.

2. Statutory and planning context

This section sets out the statutory and planning context for the Council to managing indigenous freshwater biodiversity in the Taranaki region.

2.1 The Resource Management Act

The Resource Management Act 1991 (RMA) is the principal statute for the management of natural and physical resources. The purpose of the RMA is to promote sustainable management of natural and physical resources. Because almost all forms of resource use affect indigenous biodiversity, the RMA has a key role in managing New Zealand's biodiversity.

Section 6(a) of the RMA requires the Council, when carrying out its functions under the Act, to recognise and provide for the preservation of the natural character of wetlands and the protection of them from inappropriate use and development, as a matter of national importance.

Section 6(c) of the RMA similarly requires the Council, when carrying out its functions under the Act, to recognise and provide for the protection of areas of significant indigenous vegetation and significant habitats of indigenous fauna. Although commonly section 6(c) is discussed in relation to terrestrial resources, river environments can provide indigenous habitats for indigenous fauna and may also contain areas of significant indigenous vegetation.

Section 7 of the RMA also requires the Council to have regard to the role of Māori as kaitiaki. Māori have a number of particular interests in biodiversity. The first is that principles from traditional Māori knowledge (mātauranga Māori) may be usefully applied in the management of biodiversity. Some areas and habitats may also be of particular significance to Māori due to continuing Māori ownership, historical association or perhaps because of the resources they provide for traditional cultural practices.

The Council is responsible for promoting the sustainable management of natural and physical resources, including wetlands, in the Taranaki region. This responsibility is set out in section 30 [regional council functions] of the RMA.

In 2003, amendments to the RMA provided regional and district councils with much more explicit responsibilities for biodiversity. Under section 30(1)(ga) of the amended RMA, regional councils have the specific function of establishing, implementing and reviewing objectives, policies and methods to maintain indigenous biodiversity. This is the only function within the Act that has an objective embedded within it ("maintain").

Furthermore, under section 30 of the RMA, the Council, amongst other things, has the following additional functions:

- the control of the use of land for the purpose of:
 - soil conservation
 - the maintenance and enhancement of water quality
 - the maintenance and enhancement of ecosystems in water bodies
- the control of the taking, use, damming and diversion of water, and the control of the quantity, level and flow of water in any waterbody
- the control of discharges of contaminants into or onto land, air, or water and discharges of water into water
- the establishment of regional rules for the taking or use of water, and to allocate the capacity of water to assimilate a discharge of a contaminant.

The RMA provides for a hierarchy of policies and plans and other statutory powers to enable central and local government to carry out their functions. These include national policy statements, national environmental standards, regional policy statements, regional plans, and district plans.

2.2 The National Policy Statement on Freshwater Management

Across New Zealand, freshwater resources are coming under increasing pressure. Subsequently, the Government promulgated the *National Policy Statement on Freshwater Management 2011* (the NPS), which came into effect on 1 July 2011.

The NPS sets out objectives and policies that direct local government to manage water in an integrated and sustainable way, while providing for economic growth within set water quantity and quality limits.

Local authorities must give effect to relevant provisions of the NPS in their planning documents and resource consent authorities must have regard to relevant provisions when considering consent applications.

The NPS contains four objectives relating to the management of freshwater biodiversity that regional councils must give effect to. The objectives of the NPS relating to freshwater biodiversity are:

- "A1. To safeguard the life-supporting capacity, ecosystem processes and indigenous species including their associated ecosystems of fresh water, in sustainably managing the use and development of land, and the discharges of contaminants
- A2. The overall quality of fresh water within a region is to be maintained or improved while:
- (a) protecting the quality of outstanding freshwater bodies
- (b) protecting the significant values of wetlands.⁴
- ..B1 To safeguard the life-supporting capacity, ecosystem processes and indigenous species including their associated ecosystems of freshwater, in sustainably managing the taking, using, damming or diverting of fresh water
- B4. To protect the significant values of wetlands."

Under Policies A1 and B1 of the NPS regional councils must also have regard to the

⁴ It is the values rather than the wetland itself that objectives A2 and B4 seek to protect. The rarity of wetlands nationally does not necessarily make all wetlands significant.

connection between water bodies in establishing freshwater objectives and limits. Those connections may be physical (e.g. a lake and its adjacent wetlands), or through water movements (e.g. a wetland or aquifer that is partially recharged by the river), or through biodiversity movements (e.g. eels may access a lagoon through movement over the barrier between it and the adjacent sea or river).

2.3 Proposed National Policy Statement on Indigenous Biodiversity

The *Proposed National Policy Statement on Indigenous Biodiversity* was released on January 2011 for public submissions.

The *Proposed NPS on Indigenous Biodiversity* is intended to give clearer direction to local authorities on how they are to manage indigenous biodiversity under the RMA.

While the *Proposed NPS on Indigenous Biodiversity* does not cover fresh water, there are some important features worthy of note. In particular, the NPS:

- identifies a minimum list of matters that qualify as significant indigenous vegetation and significant habitats of indigenous fauna, including wetlands
- introduces the concept and the aim of "no net loss" of significant indigenous biodiversity
- applies an "avoid, remedy, mitigate" hierarchy, and introduces principles to be applied when considering a biodiversity offset
- requires that, within five years after the approval of the NPS, regional and district plans identify significant biodiversity areas (including by way of maps) and include certain biodiversity criteria set out in the NPS.

Policies 1 and 2 of the *Proposed NPS on Indigenous Biodiversity* are particularly relevant to this paper and read as follows:

"POLICY 1

For the purpose of this national policy statement, an area of significant indigenous vegetation or a significant habitat of indigenous fauna is an area or

habitat whose protection is important for the maintenance of indigenous biological diversity.

POLICY 2

In considering the effects of any matter, local authorities shall, in addition to any area of significant indigenous vegetation or a significant habitat of indigenous fauna identified in, or by, provisions of any relevant regional policy statement, or regional or district plan, regard the following as significant indigenous vegetation or significant habitat of indigenous fauna:

- (a) *the naturally uncommon ecosystem types listed in Schedule One*
- (b) *indigenous vegetation or habitats associated with sand dunes*
- (c) *indigenous vegetation or habitats associated with wetlands*
- (d) *land environments, defined by Land Environments of New Zealand at Level IV (2003), that have 20 per cent or less remaining in indigenous vegetation cover*
- (e) *habitats of threatened and at risk species."*

Note the Proposed NPS for Indigenous Biodiversity has no legal force until promulgated. Submissions on the Proposed NPS closed on 2 May 2011. The Government has subsequently noted its intention to wait for the release of the Waitangi Tribunal Report on Wai 262 (known as the flora and fauna claim) before finalising the NPS.

2.4 The Regional Policy Statement for Taranaki

The *Regional Policy Statement for Taranaki 2010* (the RPS) sets out broad objectives and policies for the Taranaki region to promote integrated management in the region. Both regional and district plans must give effect to the RPS.

The RPS, amongst other things, identifies maintaining and enhancing indigenous biodiversity, the management of adverse effects of land use on the natural character of wetlands, and avoiding the cumulative modification, degradation and loss of wetland habitats, as issues of regional significance.

The RPS includes policies and methods of implementation to achieve that objective. Of particular relevance are BIO policies 3 and 4, which seek to protect under-represented habitats of terrestrial and aquatic indigenous flora and fauna.

"BIO POLICY 3: Ecosystems, habitats and areas with significant indigenous biodiversity values

Priority will be given to the protection, enhancement or restoration of terrestrial, freshwater and marine ecosystems, habitats and areas that have significant indigenous biodiversity values.

BIO POLICY 4: Identifying significant indigenous biodiversity values

When identifying ecosystems, habitats and areas with significant indigenous biodiversity values, matters to be considered will include:

- (a) *the presence of rare or distinctive indigenous flora and fauna species; or*
- (b) *the representativeness of an area; or*
- (c) *the ecological context of an area.*

Once identified as significant, consideration should be given to the sustainability of the area to continue to be significant in future when deciding on what action (if any) should reasonably and practicably be taken to protect the values of the area."

Also of relevance are WET policies 1 and 2, which relate to protecting and promoting wetlands and Policy LDD Policy 1 relating to managing land drainage activities.

"WET POLICY 1: Protection of wetlands

The protection of wetlands in the Taranaki region from inappropriate subdivision, use and development will be promoted.

WET POLICY 2: Promotion of wetlands

The enhancement and creation of wetland areas will be encouraged, where appropriate.

LDD POLICY 1: Sustainable land drainage practices

The land production and land management benefits of land drainage and associated diversions of water will be recognised and provided for while avoiding, remedying or mitigating any adverse effects of these activities on:

- (a) *the natural character of rivers, lakes and wetlands and their margins;*
- (b) *the water quality, hydrology and ecological and amenity values of any waterbodies including indigenous biodiversity values, fishery values and the habitat of trout;*
- (c) *the relationship of tangata whenua with the water body, particularly with taonga;*
- (d) *the frequency and magnitude of natural hazards such as flooding and erosion; and*
- (e) *other water users;*
- (f) *the areal extent of wetland habitats; and*
- (g) *the protection of historic heritage."*

2.5 The Freshwater Plan

The Council's freshwater management responsibilities are primarily addressed through the Freshwater Plan. This Plan became operative on 8 October 2001.

The Freshwater Plan contains objectives, policies and methods, including rules to address activities that may impact on freshwater biodiversity, e.g. use of river and lake beds, discharges to water and drainage of wetlands. For example, Policy 6.6.6 of the Plan requires disturbances to river and lake beds to "*...be timed, and/or carried out in a manner and location, that will avoid, remedy or mitigate any adverse effects on seasonal fish migration or spawning, including the disturbance of:*

- (a) *gravel bedded rivers on the ring plain between May and October;*
- (b) *lower river and estuarine areas between March and June.*
- (c) *lower river and estuarine areas between mid-August and end-November."*

Other policies also require instream structures to provide for the unrestricted passage of fish or the installation of suitable fish pass facilities. When conditions of 'permitted activity' rules cannot be met, resource consents are required and mitigation measures considered. The removal or decommissioning of unused structures is promoted unless for ecological, historical or other reasons the structure should remain.

The Freshwater Plan contains a schedule of twenty nine protected wetlands in Taranaki, twenty significant unprotected wetlands and eleven wetlands under 5 hectares that contain nationally or regionally rare, threatened or uncommon indigenous flora or fauna. Rules 80-87 of the current Plan protect these scheduled wetlands from activities involving land drainage and reclamation, the diversion of water, the discharge of contaminants and the planting and introduction of vegetation. Pursuant to the Plan activities impacting on the scheduled wetlands are either a 'discretionary activity' (for which a resource consent must be obtained) or a 'prohibited activity' (for which no resource consent would be granted).

Pursuant to rules 77 and 78 of the current Freshwater Plan the land drainage of wetlands under five hectares (and which are not listed in

the schedule of regionally significant wetlands) is a permitted activity. The significance of wetlands over 5 hectares is recognised through the rule that requires any drainage of such wetlands to be considered as a discretionary activity (rule 79).

All resource consents for uses of river and lake beds, or for activities in regionally significant wetlands, are assessed against policies in the Freshwater Plan. This includes an assessment of natural, ecological and amenity values, and the relationship of tangata whenua to the water body. Also considered are the costs and benefits of the use to the community and possible mitigation measures - including appropriate timing of the works and provision of fish passage.

Appendix I of the Freshwater Plan sets out a schedule of rivers and streams of high value. Appendix II and III of the Freshwater Plan sets out a schedule of regionally significant wetlands in the Taranaki region.

2.6 Biodiversity Strategy

In May 2008, the Council significantly increased its biodiversity focus when it adopted the *Biodiversity Strategy: An Operational Strategy to Guide the Biodiversity Actions of the Council* (the Biodiversity Strategy).

The Biodiversity Strategy is a non-statutory strategy. It identifies four priorities for the Council in relation to biodiversity, these being:

- focus on sites with regionally significant biodiversity values, i.e. Key Native Ecosystems (KNEs), particularly privately owned sites
- enhance the biodiversity component/focus of existing Council programmes such as the riparian management programme, education and advice
- work with others to build community capacity and support for community based biodiversity projects, particularly on iconic projects lead by others in the community
- develop biodiversity monitoring and information systems to ensure management decisions are based on sound scientific information.

KNEs include sites on the Council's inventory of regionally significant wetlands plus other terrestrial habitat types determined to be regionally significant in terms of policy criteria set out in the RPS.

The Council has, for some time, been directly involved in biodiversity activities through the RMA, e.g. the development and implementation of the RPS, regional plans, and the processing of resource consents. However, the Biodiversity Strategy establishes an overarching framework that includes other significant non-RMA programmes that promote biodiversity outcomes.

2.7 Case law

Since the enactment of the RMA in 1991, the Courts have developed considerable case law on the development of regional and district plans and the application of RMA provisions relating to indigenous biodiversity.

In *Minister of Conservation v Gisborne District Council* (A16/2000), the Environment Court held that individual economic wellbeing and private ownership rights to clear indigenous vegetation were outweighed by the national importance of the protection of such an area of indigenous biodiversity.

In the decision *Minister of Conservation v Western Bay of Plenty District Council* (A71/2001) the Environment Court determined that for a district council the context of 'significant' is the district. In the case of Western Bay of Plenty there was an incomplete schedule of significant areas. The Judge concluded that the most appropriate way to address s6(c) was to expand that schedule. The schedule was to be part of a suite of provisions including incentives already introduced by the district council.

In *Royal Forest and Bird Protection Society Inc and others v Central Otago District Council* (A128/2004) the Environment Court observed that a non-regulatory approach had not been effective, especially in lowland and montane areas. Decline was continuing. While the district council had a schedule this was primarily of areas already protected. As it seemed unlikely that there would be a survey to develop a more complete schedule a rule

would be needed to address s6(c). Incentives should be pursued but on their own they would be inadequate.

More recently, there has been the Environment Court decisions relating to significant wetlands in the West Coast Regional Council's *Regional Land and Riverbed Management Plan* and the *Regional Land and Water Plan* and biodiversity in Horizons Regional Council's *One Plan*.

Environment Court's interim decision on the One Plan

On 31 August 2012, the Environment Court released its interim decision on the Horizons Regional Council's *One Plan*.

The Environment Court has determined that all rare and threatened habitats should be regarded as significant under the RMA and so should be given a high degree of protection, regardless of the ecological condition of those threatened habitats. It was the Court's view that, given the state of indigenous biodiversity, there is a clear and immediate need for regulation.

The Environment Court further agreed with the approach adopted in the *Proposed One Plan* that there should be a hierarchy of steps for avoiding, remedying or mitigating adverse effects on those habitats. Where possible, any further effects on them should be avoided. If complete avoidance is not possible but the proposed development or activity is important enough, steps should be taken to remedy or mitigate the adverse effects on the habitat or, possibly, the adverse effects could be offset by activities or improvements made elsewhere.

The approach adopted by Horizon's Regional Council, and confirmed by the Environment Court's decision, is consistent with national directives set out in the *Proposed NPS for Indigenous Biodiversity*.

Of note, this Council has already adopted the prioritisation approach in BIO policies 3 and 4 of its RPS.

3. Human induced pressures on indigenous freshwater biodiversity

This section provides a broad overview of human induced threats to and pressures on habitats of indigenous freshwater biodiversity and which lie within the Council's jurisdictional responsibilities for freshwater management.⁵

3.1 Discharges to and taking of water

Freshwater biodiversity may be impacted by discharges to water. Eutrophication from sewage and effluent and fertilizer runoff from farms and industry can remove large quantities of oxygen from the water, meaning indigenous aquatic species will either die or move away. Cattle entering streams is a major invasion of aquatic habitats and contributes to bank erosion and siltation of streams as well as pollution from faeces.

Discharges to rivers and streams – whether through cumulative direct (point source) or indirect (diffuse source) discharges to water – potentially impact on the wider hydrological and ecological functioning of that waterway. This, in turn, may result in the instream ecological values being lost or significantly degraded overtime.

Where there is reduced freshwater quality, there is often a reduction in the diversity and abundance of species (particularly macroinvertebrate species and communities) that would otherwise inhabit that stretch of water.

Reduced flows in some rivers, and therefore water allocation decisions, may also limit freshwater biodiversity.

As a general rule, indigenous fish species generally do not require the higher water flows preferred by introduced sport fish such as trout. Notwithstanding that, any reduction in flows may reduce the diversity and

availability of some instream habitat types preferred by some species. Different species have different habitat preferences, e.g. deep pools, shallow riffle areas, to areas of faster running water.

3.2 Barriers to fish passage

Freshwater fish occupy complexes of connected habitats between or through which they often need to pass at two or more life history phases. Most of Taranaki's indigenous freshwater fish spend part of their life cycle at sea and part in fresh water. Where dams impede fish passage, species diversity is lower above dams, even when the effects of elevation and distance from the sea are considered.

Structures that impede water flows such as dams, culverts, fords and weirs often have an impact on freshwater habitat and sometimes can significantly impact on connectivity, fish passage, and or limit access to critical habitats such as spawning area. In 2001, the Council identified 108 major dams, weirs and other barriers to fish passage in Taranaki (both consented and unconsented). In 2001, 61 of those structures were assessed as requiring works or investigations to provide better fish passage. By 2009, through the consents process and other remedial action the Council had reduced the number of fish barriers to 59 structures.⁶

When a stream is piped, there can also be a number of factors which restrict fish passage. Gaining access to the pipe can be the first barrier, with the possibility of the outlet of the pipe having a free overhang (perched). However, once fish have entered the culvert, there is the question of water speed and depth, both of which can reduce or prevent fish passage, especially if the pipe is long, and doesn't contain rest areas and refugia (McDowall 1990). Similar effects are possible at

⁵ The commercial harvesting of indigenous species, e.g. eeling is managed by the Ministry of Primary Industries under the Quota Management System.

⁶ The Department of Conservation also has a role in managing and conserving freshwater fisheries, including the maintenance of free passage for freshwater fish under the Freshwater Fisheries regulations 1983.

access culverts when they are not installed or maintained properly (Boubee *et al.* 1999). For some species (such as kokopu) perched culverts and other barriers to fish migration prevent upstream or downstream migration to spawning grounds.

The review of the fish data suggests that fewer fish species live in smaller streams which could be a reflection of the fact that streams narrower than two metres are more likely to be culverted (instead of bridged) and therefore more likely to have barriers to fish passage.



Fish passes allow fish to migrate past the structure like this one on the Wairau Stream

3.3 Clearance and disturbance of riparian vegetation

Livestock accessing waterways can result in increased levels of sediment and faecal contamination. Stock can also cause riverbank erosion and eat and trample riverbank vegetation used for riparian management purposes. This, in turn, can have negative impacts on the indigenous flora and fauna that inhabit the waterways and their margins.

Appropriately 40% of the rivers and streams traversing the intensively farmed ring plain are unfenced and or require re-vegetation along the riparian margins. Many wetlands are also unfenced and grazed by livestock.

The clearance of much of the original riparian cover over the last 160 years has also significantly reduced the role of riparian vegetation in relation to freshwater biodiversity, e.g. through the provision of habitat, the shading of waterways, and the filtering and trapping of contaminants arising

from the adjacent land use activities and being discharged to water.

Grazing, especially in conjunction with pugging by cattle, can adversely affect the natural character, ecological, physical, cultural, intrinsic, amenity and biodiversity values of the waterways. Near the coast, the clearance and disturbance of riparian vegetation has had significant impact on inanga spawning areas⁷ and whitebait stocks. Riparian disturbance and grazing can also significantly reduce the size and condition of wetlands over time.

Habitat fragmentation and changes in land use can significantly affect freshwater fish populations by both reducing total habitat area and changing its configuration. Species that remain within habitat fragments are exposed to sub-optimal conditions. As a result of disproportionate 'edge effects', fish habitat can be reduced over a much greater distance than the length of stream that has been directly affected (by, for example, vegetation clearance). This can cause a decline in adult stocks and restrict fish distributions.

3.4 Instream works and small stream modifications

Instream channel works and small stream modifications have been an essential part of land development in Taranaki. Over the years many waterbodies, have been substantially modified to improve pasture productivity and farm operations (e.g. reduce meanders, align with paddock boundaries and improve farm access).

Channel works, such as deepening and straightening of a watercourse to improve soil drainage, and simplify fencing and paddock management, typically increase stream gradient and reduce stream length and habitat diversity (Williamson *et al.* 1992). These practices have been applied extensively in both lowland and gently rolling country (Bowler 1980). The increased capability of straightened channels to erode sediment has sometimes led to extreme habitat degradation with marked impacts on benthic invertebrates (e.g. Quinn *et al.* 1992b).

⁷ Eggs are laid in particular types of riparian vegetation that are exposed to spring tides.

Small streams in particular are at risk of modification⁸ and, in some cases, loss. Since the enactment of the Freshwater Plan there has been a significant increase in small stream modifications (refer section 5.2.2. below).

The increased rates of modification threaten the ecological and hydrological significance of small streams. The most obvious effect of stream modification is habitat destruction or modification.⁹ For streams that have been piped, the effect is the total loss of habitat for instream and stream bank flora and fauna. However, habitat loss can also extend further up the catchment above the piping (or culvert) if fish passage is restricted.

The straightening and realignment of small streams can also reduce the diversity of instream habitat available to fish by altering the hydraulic characteristics of the waterway. Straightened channels increase the rate of downstream flow, resulting in more enlarged and incised channels and the accelerated erosion of the stream bed and banks. They may also contribute to reduced base flows in downstream catchments and exacerbate flooding problems.



Example of a realigned stream

⁸ Small stream modification encompasses a diverse range of activities, including the realignment, piping and culverting of a stream.

⁹ Restriction of fish passage when a stream is re-channelled or straightened is rarely an issue, as although there is often an increase in water speed, there is usually enough variation in flow across such a channel to allow for fish passage.

3.5 Land drainage

Wetlands¹⁰ occur where the water table is at or near the surface of the land, or where the land is covered by water, either permanently or temporarily.

Historically, wetlands were seen as potential farmland. Consequently, land drainage was often seen as an essential part of land development that had the positive effect of extending pastoralism and increasing the productivity of the land. It has been a significant factor in Taranaki becoming a highly productive agricultural region.

However, as previously noted, the large-scale conversion of wetlands to farmland has resulted in wetlands being nationally identified as an acutely threatened ecosystem.

In comparison with historical rates, the current rate of land drainage is much reduced. Most land drainage now involves improvements to existing systems or is carried out for maintenance purposes. Typical examples of current land drainage activities in Taranaki include the realignment of natural surface run-off and the ring draining of natural ground depressions. In addition to open surface drainage systems, extensive use is made of subsoil drainage pipe systems to lower groundwater levels and improve pasture yields.

Notwithstanding that, land drainage continues to contribute to the decline in both the condition and the areal extent of remnant wetlands in Taranaki, the reduction of habitat available for wetland species, and the removal of floodplain connections.

The photographs overleaf provide typical examples of land development activities resulting in the loss of wetlands.

¹⁰ Section 2 of the RMA defines 'wetland' as "...permanently or intermittently wet areas, shallow water, or land/water margins that support a natural ecosystem of plants and animals that are adapted to living in wet conditions".



Small wetland (3.8 hectares) in the Oeo catchment, south Taranaki, converted to pasture between 2001 and 2007



Larger wetland (about 5 hectares) in the Kaupokonui catchment, south Taranaki, converted to pasture between 2001 and 2007

3.6 Invasive plants and animals

Invasive plant and animal species also have a significant effect on freshwater biodiversity. Aquatic weeds such as *Egeria*, *Lagarisophon major* and hornwort may smother some water bodies, displace native freshwater species by competing with them for a place to live, and disrupt ecosystem structures and functioning.

People often accidentally spread freshwater weeds. Weed fragments can get caught on boats, trailers, water skis and fishing equipment, allowing them to be transported from one waterway to another. Even the smallest weed fragment can be enough to start a new infestation in a waterway.

The introduction and, often deliberate release of pest fish species such as koi carp, catfish, mosquito fish (*Gambusia affinis*), and perch may also impact on freshwater biodiversity values. Pest fish can prey on, compete with and displace indigenous aquatic plants and fish species, modifying their habitat and reducing food sources.

4. Indigenous freshwater biodiversity in Taranaki

The Taranaki region, despite its modest size (3% of New Zealand's total land area), contains a diversity of freshwater habitats - rivers, streams, small wet gullies, lakes, mountain tarns, lowland wetlands and freshwater life - micro-organisms, algae, invertebrates, fish and birds. This section provides an overview of the state of indigenous freshwater biodiversity in the region.

4.1 Rivers, streams and lakes

Taranaki has 286 primary river catchments and over 530 named rivers. There are also 10 lakes in Taranaki with an area greater than eight hectares.

Most catchments are relatively small but collectively it is estimated that there are 20,000 kilometres of rivers and streams in Taranaki. Small streams¹¹ (first or second order streams that comprise the headwaters and upper reaches of catchments) make up 75% of all streams in Taranaki (based on the River Environment Classification).

Taranaki has a diverse range of rivers and streams, which are broadly categorised by the River Environment Classification as 'mountain fed', 'hill country' and 'low-elevation' systems (Figure 2).

Mountain fed rivers have their headwaters in the Egmont National Park, while hill country river systems largely drain the eastern hill country and lower reaches of Mount Taranaki.

The low-elevation rivers and streams draining the ring plain often meander in deeply incised channels. This is a result of centuries of erosion, which has resulted in a stable river channel. A meandering stream includes the most diverse range of habitat types - deep pools, shallow riffle areas, to areas of faster running water.

¹¹ A stream with no tributaries is considered a first order stream. A stream segment downstream of the confluence of two first order streams is a second order stream.



Figure 2: Taranaki river environments

Most indigenous freshwater fish prefer small stream habitats (McDowell, 2000; NIWA, 2008). Many small streams therefore provide habitat for threatened, at risk and regionally distinctive species. Small streams can also play a wider ecological role, such as spawning sites for lamprey, or a refuge for aquatic species from large floods in the main stem rivers. For example, a fish survey in an unnamed tributary of the Waiwhakaiho River, immediately after a large flood, found over 50 red fin bullies taking refuge in a 70-metre reach¹². Also recorded were three adult eels that sought shelter while migrating downstream to spawn at sea. A later survey undertaken during normal flows recorded much lower fish abundance.

Near the coast, most Taranaki rivers and streams provide important habitat for inanga spawning while their riparian margins are also important areas for nesting and foraging of migrating and wading birds.

¹² Taranaki Regional Council unpublished data.

Table 1 below identifies rivers and streams that provide significant inanga spawning habitat. A series of maps identifying the stretches of rivers and streams containing significant inanga spawning habitat is presented in **Appendix II** of this paper.¹³

Table 1: Significant inanga spawning habitats

Significant inanga spawning habitat		
2 kms upstream from the river mouth	1 km upstream from the river mouth	500m upstream from the river mouth
Tongaporutu Mimi Urenui Onaero Waitara Patea Waitotara.	Hutiwai Waiongana Mangaoraka Waiwhakaiho Tangahoe Manawapou.	Remaining waterbodies, including Oakura and Timaru rivers and other ring plain streams. ¹⁴

Approximately 813 km (11%) of the 7,330 kilometres draining Mount Taranaki and the ring plain lies in the Egmont National Park. These stretches are therefore formally protected and retain their original riparian vegetation. In the eastern hill country, the majority of the total length of waterways lies in catchments that retain their original riparian vegetation.

However, the ring plain is one of the world's most intensive dairy farming areas. The total length of rivers and streams traversing the ring plain is 6,517 kilometres. With up to 60% of ring plain rivers and streams lacking any form of riparian vegetation. In the absence of riparian vegetation, waterways are more vulnerable to erosion and flooding, they lack shade, which, in turn, increases instream water temperatures, and they are more vulnerable to pollution caused by runoff of animal waste and fertilisers.

The Council's Macroinvertebrate Community Index (MCI) describes the state of and trends in the ecological health of Taranaki rivers. MCI data confirms that the ecological condition of

¹³ Most significant inanga spawning habitats are likely to be addressed in the 'Regional Coastal Plan for Taranaki' but activities upstream and which are likely to be addressed in the revised Freshwater Plan may still need to take into account their impacts on these habitats.

¹⁴ Ring plain rivers and streams are typically much steeper as they enter the ocean and therefore do not have such a large area affected by tidal flow or providing habitat for spawning whitebait.

Taranaki rivers and streams is good overall.¹⁵ However, higher ecological health is generally found in the higher elevation area with declining ecological health occurring downstream in the low elevation pasture areas (Figure 3).

MCI data confirms a 40-50 unit decline in the index downstream along the length of ring plain catchments. In lower catchments, stream biological health is 'fair' and may fall to 'poor' in some catchments. Contributing to the progressive declines in MCI values are the impacts of adjacent land use on freshwater quality (from point and diffuse sources). Other contributing factors include natural changes in altitude, stream morphology and a reduction in riparian shading.

Notwithstanding the above, the latest MCI results are overall very encouraging. In 2010/2011, 55 of the 57 representative sites had MCI scores similar to or better than historical medians for each of those sites. This confirms that the life-supporting capacity, ecosystem processes and indigenous species associated with Taranaki's larger rivers and streams are broadly being maintained across the region.

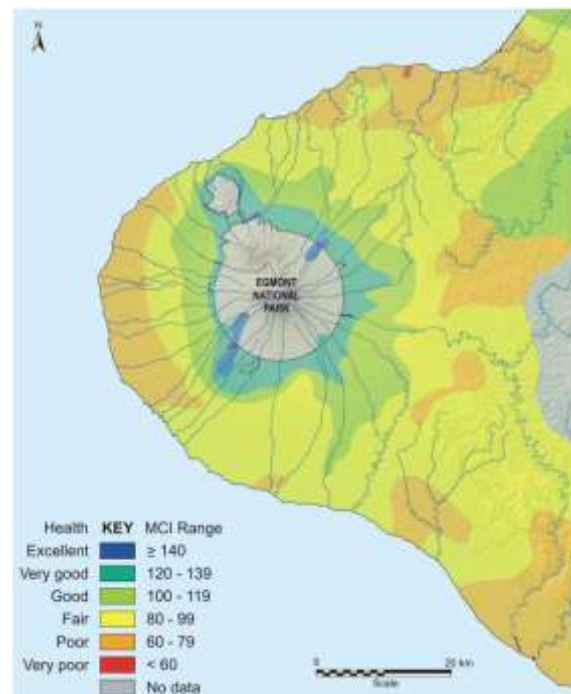


Figure 3: Ecological stream health for Taranaki rivers and streams as measured by MCI values

¹⁵ MCI monitoring is carried out at 57 representative sites on 25 of Taranaki's larger rivers and streams twice a year.

4.2 Wetlands

Wetlands in Taranaki range from those in pristine condition surrounded by national park to small remnant wetlands that are subject to restoration by some landowners, but drainage, habitat modification, and land reclamation by others. Wetlands can be either natural or artificially created.

Taranaki's high rainfall encourages wet soils, and because of its varied landforms there are many types of wetland. They come in many different forms, including streams, swamps, bogs, lakes, lagoons, estuaries, mudflats and flood plains.¹⁶ Wetland can be further categorised by their vegetative cover:

- *rushes and sedges* - common in a generally pastoral landscape and in situations where drainage is impeded and soils moisture is at field capacity for much of the year. It comprises rushes, mainly of the genus *Juncus*, and sedges mainly of the genus *Carex*, but possibly also including *Scirpus* and *Baumea*
- *herbaceous* - commonly called swamps and bogs, it is dominated by herbaceous vegetation, with or without intervening patches of open water. The water table is above, at, or just below the substrate surface for most of the year
- *forest/woodland* - swamp forest and swamp woodland is characterised by a perennially high water table and climax canopy species adapted to wetland conditions, e.g., kahikatea and swamp maire
- *ponds* comprising open water of greater than 80% unit area.

Wetlands provide exceptional habitats for a huge range of indigenous plants and animals. Many of these plants and animals have specially adapted to living in wet places. For example, wetland plants include 47 species of rush and 72 species of native sedge. Wetlands also support the greatest concentrations of bird life of any habitat in New Zealand and support far more species than a comparable forest area. Migratory species depend on chains of suitable

¹⁶ It is not always easy to classify a wetland – typically one type will merge into another. Often there is a mixture of swamp and pools, with patches of bog and marsh. Some wetlands dry out in summer. Others change over time as they fill with sediment or become eroded.

wetlands. The survival of threatened species such as the Australasian bittern, brown teal, fernbird, and spotless crane relies on Taranaki's remnant wetlands.

As elsewhere in New Zealand, wetlands are a habitat type that has been much depleted from historical time. Ausseil *et al*, (2008) estimated the pre-historic extent of wetlands in New Zealand to be 2.4 million ha or almost 9% of the mainland land area. The extent remaining nationally is now estimated to be just 10% of that figure (249,776 hectares).

In Taranaki, the pre-historic extent of wetlands was estimated to be 40,278 hectares. However, over time the areal extent of wetlands has declined and the current extent of wetlands is estimated to be 1,157 wetlands (over 0.5 hectares) covering 3,273 hectare or 8.1% of their original extent.¹⁷

Figure 4 below shows the mapped wetland extent in Taranaki.

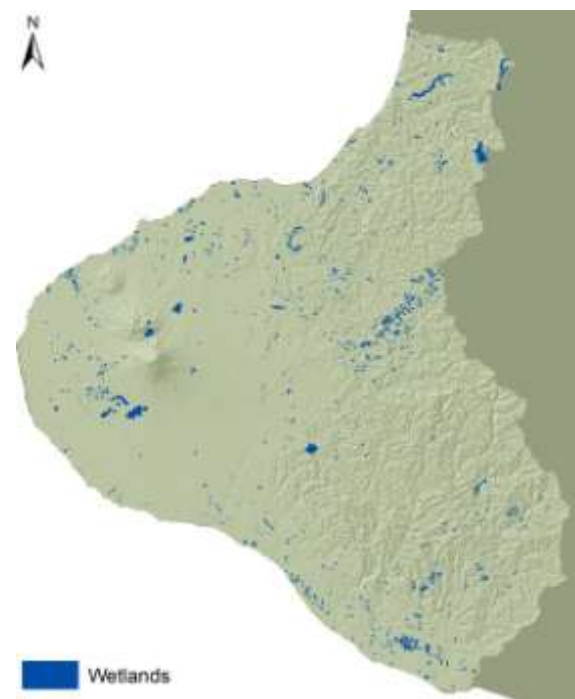


Figure 4: Extent of wetlands in Taranaki

Table 2 overleaf details the change in wetland extent from pre-historic time to the present, including how Taranaki compares with New Zealand and the rest of the North Island. It

¹⁷ For further information, refer to section 5.2.1 of this paper.

shows wetlands to be an ‘acutely threatened’ habitat type (i.e. less than 10% of that habitat type remains).

Table 2: Wetland extent from pre-historic times to the present

Area unit	Pre-historic extent (ha)	Current extent (ha)	% of current national extent	% of pre-historic extent
New Zealand	2,471,080 ¹	249,776 ¹	100% ¹	10.1% ¹
North Island	1,323,871 ¹	64,479 ¹	25.8% ¹	4.9% ¹
Taranaki	40,278 ¹	3,273	1.3%	8.1%

¹ Figure sourced from Ausseil, *et al.* 2008.

4.3 Indigenous freshwater fish and invertebrates

Taranaki rivers, streams and wetlands support a diverse range of aquatic life including indigenous fish and freshwater invertebrate species. The adjacent riparian margins may also support and provide habitat to other indigenous species, including threatened plants, birds and other fauna.

Eighteen of New Zealand’s 29 indigenous fish species are known to be present in Taranaki.¹⁸ They include two species of eels, five species of bullies, and six species of the whitebait (galaxiid) family. Other species include torrentfish, lamprey, common smelt, mullet and mudfish.

A special feature of Taranaki’s indigenous freshwater fish is that 15 of the 18 known species are diadromous – in other words, they have a marine or estuarine stage in their lifecycle and migrate to and from the sea.

While the greatest variety of indigenous fish is generally found in the lowest reaches of rivers and streams, the entire stream length provides important habitat for different species. For example, fish species such as inanga are more likely to be found in lowland streams that provide gentle flowing and well-vegetated habitats (see Figure 5 on page 17, which shows

where they are predicted to be found and where they have actually been found).

On the other hand, kōaro, a whitebait species, prefers the cascading rocky habitats found further up the catchment and the forested cover provided by the Egmont National Park (illustrated in Figure 6 on page 17).

Waterways also provide habitat for a large diversity of freshwater invertebrates such as true flies, caddisflies and crustaceans. The number, type and diversity of species found in a waterbody are an indicator of the ecological health of the wetland, river or stream. Ring plain streams draining the Egmont National Park tend to have higher species diversity than those from lowland coastal streams, and also hill country streams, but have a similar diversity to those ring plain streams rising outside of the national park.

The Council’s MCI monitoring shows that ring plain streams contain the greatest diversity in terms of the number of different types of caddisflies, crustaceans, stone flies and mayflies (Table 3 on page 17). This reflects the different habitat types found in such streams. The number of taxa recorded for streams within the Egmont National Park is slightly higher than recorded for streams arising outside the National Park (138 taxa compared to 123 taxa).

Interestingly, the largest freshwater invertebrate found in Taranaki, the freshwater crayfish or kōura, is more frequently found in lowland ring plain streams that do not rise in the Egmont National Park, i.e. they tend to occur in the smaller streams. Kōura, which are nationally listed as ‘At Risk’, are therefore particularly vulnerable to small stream modifications and are decreasing in those areas affected by stream modifications.

Table 4 on page 17 shows the number of times kōura have been found during the Council’s biomonitoring programmes.

A system has been developed for classifying indigenous species according to the threat of them becoming extinct in New Zealand. In Taranaki there are 31 plant, bird fish and invertebrate species that reside or are dependant upon freshwater habitats, including

¹⁸ One third of New Zealand’s 29 identified species of indigenous freshwater fish is threatened.

wetlands, and which are listed as nationally 'threatened' or 'at risk'.

There are a further seven indigenous freshwater species that though not threatened or at risk are nevertheless considered to be regionally distinctive and also worthy of protection.

The following 38 threatened, at risk or regionally distinctive species have been recorded as present in Taranaki rivers, streams, wetlands and margins:

Animals	Plants
Grey duck	New Zealand hazel
Australasian bittern	Swamp hood orchid
Blue duck	<i>Amphibromus fluitans</i>
New Zealand dabchick	Tussock sedge
Bluegill bully	Dwarf musk
Brown mudfish	<i>Leptinella tenella</i>
Freshwater crayfish (kōaro)	Stout water milfoil
Freshwater mussel	Mud buttercup
Giant kokopu	Swamp leek orchid
Inanga	Kohurangi
Koaro	Jointed twig rush
Lamprey	Pakihi sedge / peat bog sedge
Longfinned eel	Kohurangi
North Island fernbird	Swamp millet
Redfin bully	Saltmarsh ribbonwood
Short jawed kokopu	Bladderwort
Torrentfish	
Brown teal	
Goldstripe gecko	
Spotless crane	
Black shag	
Tadpole shrimp	

Appendix III of this paper identifies Taranaki's threatened, at risk or regionally distinctive indigenous freshwater species, including their status under the New Zealand threat classification and the adequacy of their protection in the region.

For the 38 indigenous freshwater species that are threatened, at risk or regionally distinctive, 14 species (37%) are considered to be adequately protected in Taranaki in terms of their population size, number of populations and or being secured in an area(s) that is formally protected and or actively managed (e.g. invasive plant and animal control).¹⁹

Currently, 12 species (32%) are not considered to have adequate protection, while for 12 mainly plant species (32%) there is insufficient information on their local range and abundance to determine whether they are adequately secure or not in Taranaki.



Department of Conservation monitoring shows small populations of the threatened brown mudfish in the Ngaere swampland and remnant wetlands in south Taranaki



Kōaro, one of the whitebait species present in Taranaki - the decline in whitebait is directly related to massive reductions in freshwater habitat

¹⁹ *The Taranaki Biodiversity Forum Accord, 2012.*

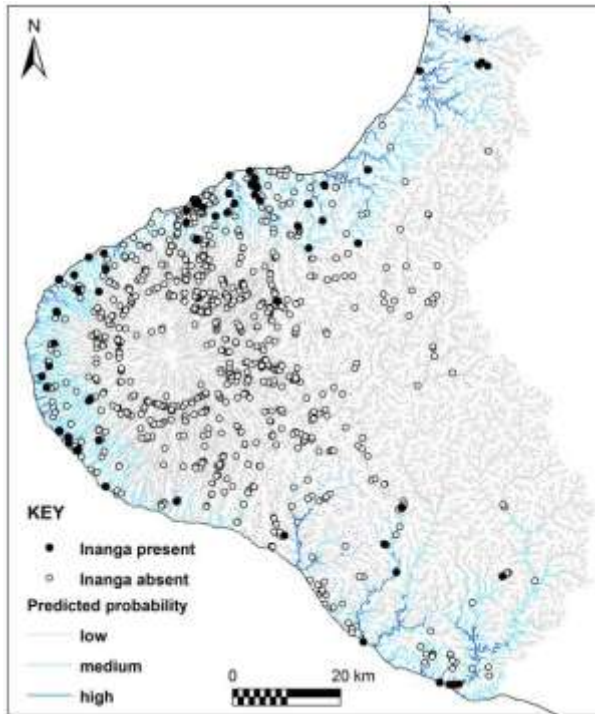


Figure 5: Predicted and actual distribution of inanga

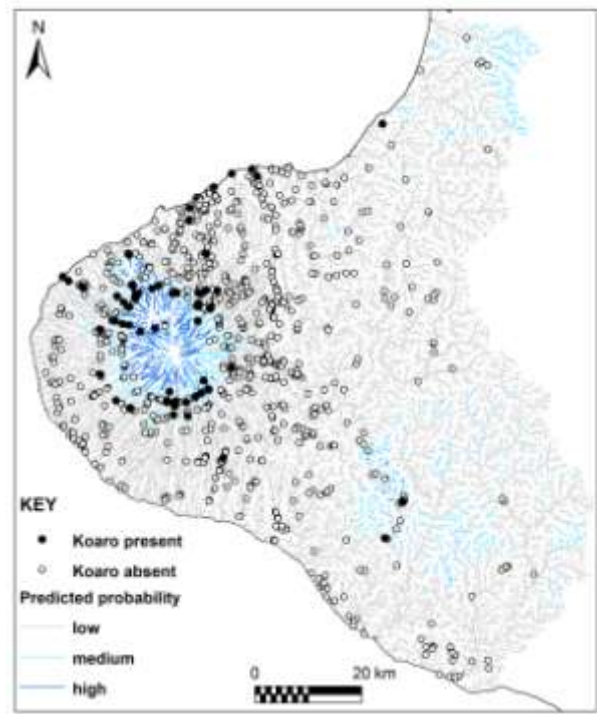


Figure 6: Predicted and actual distribution of kōaro

Table 3: Number of freshwater invertebrate taxa recorded from Taranaki streams by habitat type (reference sites only)

	Large east hill country streams	Lowland coastal streams	Ring plain streams in National Park	Ring plain streams rising outside National Park	Small (lowland) hill country
No. of taxa recorded	111	100	138	123	118
Maximum no. of taxa per site	35	28	40	37	35
Median no. of taxa per site	15	16	22	22	18

Table 4: Frequency of reference sites that kōura have been recorded in by habitat type

	Large east hill country streams	Lowland coastal streams	Ring plain streams in National Park	Ring plain streams rising outside National Park	Small (lowland) hill country
Total no. of samples	247	231	1,832	572	436
No. of samples with kōura	5	23	49	143	88
% of samples with kōura	2	10	3	25	20

5. Review of the Council's management approach and programmes

This section provides an overview of the efficiency and effectiveness of the Council's current management approach for responding to and managing impacts on indigenous freshwater biodiversity in the Taranaki region.

5.1 Interim review of the efficiency and effectiveness of the Freshwater Plan

In June 2008, the Council completed an interim review on the effectiveness and efficiency of the Freshwater Plan. The review examined trends, issues and experiences (including state of the environment monitoring and other relevant studies) associated with the implementation of the Freshwater Plan.

As part of the interim review, the Council prepared a report entitled *Effectiveness and Efficiency of the Regional Fresh Water Plan for Taranaki*. That report did not identify any deficiencies in the Freshwater Plan that warranted urgent remedy. Notwithstanding that, two freshwater biodiversity issues were highlighted during the interim review as requiring further investigation prior to the Plan being reviewed. These issues related to:

- small stream modification
- wetland extent.

As part of the interim review, the Council distributed the report to key stakeholders and sought their views on the conclusions reached. Feedback on the report was received from Federated Farmers, the Taranaki / Whanganui Conservation Board, the Department of Conservation, and Taranaki Fish and Game.

Most stakeholders were generally satisfied with the implementation of the Freshwater Plan and the conclusions and recommendations presented in the report. However the Department of Conservation and Fish and Game identified concerns with the adequacy of the Freshwater Plan in protecting aspects of freshwater biodiversity.

In relation to wetlands, the Department of Conservation noted that Rule 77 permits the diversion of water from a wetland less than 5 hectares if not listed in Appendix III of the Plan.

The Department of Conservation further noted from the report that a proportion of consents did not include specific consent conditions relating to fish passage and retaining 2/3 habitat at mean annual low flow (MALF). In relation to water take consents, the Department expressed concern that Policy 6.1.4 of the Freshwater Plan does not clearly recognise the significance of smaller streams for indigenous fish diversity and the requirement for higher flows than the two-thirds MALF rule of thumb adopted under the policy.

Fish and Game noted that the RPS and Biodiversity Strategy talk about identifying rivers and streams with significant or outstanding biodiversity values, and recommended that a review of Appendix 1A of the Freshwater Plan occur as part of the full review.

In terms of wetlands, Fish and Game highlighted that "non-regionally significant" wetlands comprise the bulk of Taranaki's remaining wetlands and most are small and vulnerable to degradation and drainage.

In terms of effects of piping and straightening of streams, Fish and Game raised concern with the increased rate of modification (piping and straightening) of small streams occurring in Taranaki and their cumulative effects.

Both the Department of Conservation and Fish and Game supported further investigation into the extent of stream modification and wetlands in the region. As outlined in sections 5.2.1 and 5.2.2 below the Council undertook to investigate these issues and address them as part of the full review of the Freshwater Plan.

5.2 Council studies and investigations

5.2.1 Wetland studies and investigations

In 1996, as part of the development of policies for the current Freshwater Plan, the Council undertook a project to develop an inventory of all wetlands in the Taranaki region with the aim of providing a baseline that would enable the Council to monitor the effectiveness of its plans and policies to protect wetlands. The 1996 study was based upon the 1994 aerial photography and identified 717 wetlands.

In 2009, the Council re-surveyed the 717 wetlands, using aerial photos flown in 2007. The 2009 study highlighted methodology limitations associated with using the 1996 inventory as a baseline. The original study failed to identify many wetlands or accurately determine size. However, the 2009 study did identify at least 63 (8.8%) of the original 717 wetlands had disappeared.

Since the 1996 study was completed, the quality of the Council's aerial photography had improved. There were also significant advances in the resolution and affordability of satellite imagery and computer based search and delineation techniques. Consequently, in 2010, following the interim review of the Freshwater Plan, the Council commissioned Landcare Research to map and calculate the extent (number and area) of remaining wetlands (over 0.5 hectares)²⁰ in Taranaki as at 2001 and 2007 by wetland system, bioclimatic zone, ecological district and territorial authority.²¹

Key findings from the 2010 study²² were:

- in 2001, Taranaki had 1,216 wetlands covering 3,395 hectares
- in the six years following the adoption of the Freshwater Plan (i.e. 2001 to 2007), there was a net loss of 59 wetlands and the cumulative loss of 122 hectares
- as at 2007, Taranaki had 1,157 wetland covering 3,273 hectares (Table 5 below).

²⁰ Resolution of satellite imagery and aerial photography prohibited accurate identification and delineation of wetlands under 0.5 hectares.

²¹ Based upon the Council's 2001 and 2007 aerial photography for the region.

²² Landcare Research, 2010.

Table 5: Wetland number and hectares by territorial authority, 2001 to 2007

	2001		2007	
	No	Ha	No	Ha
New Plymouth district	399	1,235	381	1,188
Stratford district	286	473	275	453
South Taranaki district	531	1,686	501	1,631
Total	1,216	3,395	1,157	3,273

The 2010 study highlighted that some types of wetlands are more vulnerable to land use pressures than others (refer Table 6 overleaf).

Palustrine wetlands, particularly rushes and sedges, are the most likely wetland type to be drained. In 2001, palustrine wetlands comprising of rushes and sedges covered 333 hectares. By 2007, the areal extent of such wetlands was reduced to 251 hectares (a 25% decrease), which suggests that these wetlands are generally regarded by land owners as a lower grade of wetland (or not wetlands at all).

In contrast, palustrine/herbaceous wetlands seem more secure but still experienced a 4% loss over the same period. The only category to show a gain (albeit small) over the period is Open Water, reflecting the appeal to landowners of constructed wetlands in the form of ponds and small lakes for ecological restoration, amenity or recreational purposes.

The 2010 study also largely confirmed the Council's state of the environment report, which highlighted the on-going loss of wetlands from land use and development. The study noted that most Taranaki wetlands are small with 79% of wetlands being less than six hectares. The loss of 59 wetlands covering a relatively modest, but nevertheless still significant, 122 hectares highlights the vulnerability of smaller wetlands.

Assuming similar trends post-2007, by 2013 the region may have lost in the order of 120 wetlands and 250 hectares over the life of the Freshwater Plan. This represents a small but incremental loss of over 7% of an already acutely threatened habitat type.

Table 6: Wetland extent by system and category, 2001 to 2007

Wetland system	Category	2001 (ha)	2007 (ha)
Lacustrine	Rushes & sedges	3.7*	-*
	Herbaceous	35.8	35.8
	Forest/woodland	-	-
	Open water	273.7*	277.4*
Estuarine	Rushes & sedges	-	-
	Herbaceous	35.8	36.0
	Forest/woodland	-	-
	Open water	1.2	1.2
Palustrine	Rushes & sedges	332.9	251.4
	Herbaceous	1,298.5	1,253.7
	Forest/woodland	1,271.5	1,267.7
	Open water	141.8	149.5

* A post-2001 excavation of a depression vegetated with rushes and sedges resulted in an open water pond by 2007.

5.2.2 Council studies and investigations on small stream modifications

In 2010, in response to issues raised by during the interim review of the Freshwater Plan (refer section 5.1 above), the Council undertook a preliminary study of small stream modifications in Taranaki. The study involved the review of consenting information and investigated aerial photographs between 2001 and 2007 to determine the extent of stream modifications occurring in the region.

The study confirmed the increasing modification of intact and unmodified small streams in Taranaki. From a comparison of aerial photographs flown in 2001 and 2007, it was estimated that approximately 89 kilometres of streams on the ring plain were piped in the six years between these dates – only 17 kilometres (or 19%) of which were consented. Similarly 10 kilometres of streams were realigned in the same period, of which three kilometres was consented (30%). This indicates that a significant amount of stream modification work is being allowed as either a permitted activity, or possibly has been undertaken illegally.

The report²³ on that study conservatively estimated that 734 kilometres of Taranaki streams have been historically modified over time. Of particular concern most of these modifications (90%) involved the piping of streams, where the length of stream lost has almost doubled in this six year period alone.

It is estimated that the total length of streams in Taranaki equates to 20,000 kilometres, of which 75% are first or second order streams. It is important to consider this total when drawing conclusions as to the effects of small stream modifications in Taranaki.

The 2010 report recommended that the provisions of the Freshwater Plan be reviewed to balance the use, development and protection of small streams. Therefore, in 2012, as part of the review of the Freshwater Plan, the Council investigated and prepared a report identifying possible changes to a revised Freshwater Plan relating to small stream modifications.

The report²⁴ from the 2012 study recommended relatively minor but nevertheless important amendments to the current policy framework to ensure that revised policies and rules differentiate between the differing small stream modification activities (i.e. realignment, piping and culverting) and other instream works and their associated effects. At that time Council noted that wider related issues relating to land drainage, wetlands and biodiversity would be addressed separately (i.e. via this paper).

5.2.3 Study on the biodiversity benefits of riparian management

Over the 2007/2008 summer period a research project was undertaken in Taranaki to investigate whether and to what extent riparian management has impacted on native terrestrial biodiversity values.

The biodiversity values, as measured by the richness and abundance of plant and bird species was measured and compared in different types of riparian margins. Sites included riparian margins that were still grazed, some that had just been fenced, margins with medium aged plantings (4 – 8

²³ Taranaki Regional Council, 2010.

²⁴ Taranaki Regional Council, 2012.

years), margins that had been planted 8-12 years ago and margins with remnant or naturally regenerated vegetation 20+years old.

The preliminary results documented in the paper *Riparian management in Taranaki – A success for native biodiversity?* indicate that:

- riparian planting leads to an increase in native plant species richness overtime – a trend that is particularly notable for fern species (as these are not typically planted)
- the use by native and introduced birds of grazed and un-vegetated fenced riparian margins tends to be very low
- planted or vegetated margins both have significantly higher abundances of native bird than grazed and un-vegetated margins
- as planted riparian vegetation ages, there is an increase in abundance and richness of native bird species
- native bird abundances and plant diversity in older plantings (8-12 years) are likely to continue to increase.

Overall the study indicates that the planting of riparian margins via the Taranaki Riparian Management Programme is creating new habitat for native plant and bird species where none existed previously and is contributing to improved biodiversity outcomes for the region.



Riparian vegetation provides essential wildlife corridors from the sea to Mount Taranaki, while also improving instream habitats

5.3 Efficiency and effectiveness of Council programmes

In the preparation of this paper it is timely to update information relating to the delivery of Council programmes relating to freshwater biodiversity. Set out below is a summary of the Council's key regulatory and non regulatory programmes that contribute to the maintenance and enhancement of freshwater biodiversity.

5.3.1 Regulatory and compliance programmes

As outlined in section 2.5 above, the Freshwater Plan contains objectives, policies and methods, including rules to address issues that relate to freshwater biodiversity.

Specific policies and rules apply relating to the uses of river and lake beds, water quality, water allocation, land drainage and the protection of wetlands.

The Freshwater Plan contains policies that require instream structures to provide for the unrestricted passage of fish or the installation of suitable fish pass facilities. When conditions of the rules cannot be met, resource consents are required and mitigation measures considered. The removal or decommissioning of unused structures is promoted unless for ecological, historical or other reasons the structure should remain.

All resource consents for uses of river and lake beds, or for activities in regionally significant wetlands, are assessed against policies in the Freshwater Plan. This includes an assessment of natural, ecological and amenity values, and the relationship of tangata whenua to the water body. Also considered are the costs and benefits of the use to the community and possible mitigation measures - including appropriate timing of the works and provision of fish passage.

As previously noted the interim review of the Freshwater Plan noted that the Plan had been largely efficient and effective. There are relatively few catchments fully allocated, water quality is overall good with positive trends and there has been considerable progress in the protection of significant wetlands and the removal of barriers to fish passage. Over the duration of the Freshwater

Plan, the Council has, on average, processed around 440 resource consents per annum.

The interim review also highlighted concerns around increased stream modification and land drainage activities occurring in the region. Figure 7 shows the number of consents issued per annum for instream works, including land drainage between 2001 and 2007.

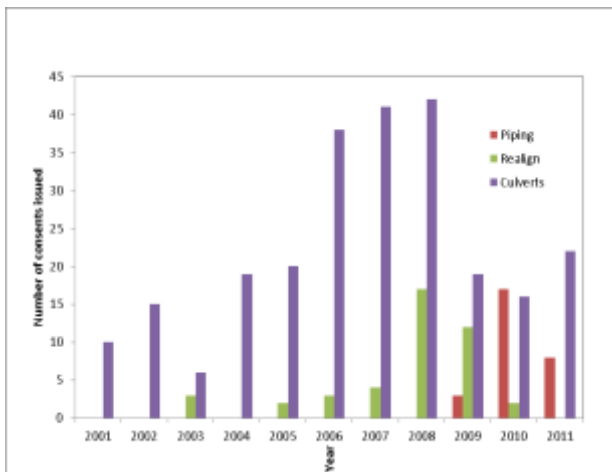


Figure 7: Number of consents issued per annum for stream modifications

Each year the Council investigates and responds to 500 and 600 unauthorised incidents relating to its functions under the RMA – many of which, to some extent, impact on biodiversity values, e.g. discharge of contaminants to land and water, land drainage and culverting. Examples of enforcement action undertaken by the Council, over the life of the Freshwater Plan, include:

- in 2000, after the public notification of the Freshwater Plan but prior to its adoption, illegal land clearance and drainage in a significant wetland resulting in 80% of the wetland being destroyed. The responsible parties were prosecuted under section 15 of the RMA
- in 2009, the Council successfully obtained an enforcement order to remediate illegal land clearance and drainage activities in a significant wetland (Alfred Road wetland)
- in 2010, the Council successfully prosecuted a hydrocarbon company for illegal sediment discharges to water
- in 2011, the Council issued three infringement notices relating to stock grazing to or standing in the water.

5.3.2 Effectiveness of the significant wetland programme

Following the adoption of the freshwater Plan, the Council prepared an Inventory of wetlands that identified, mapped and provided information on 77 regionally significant wetlands. These comprised of wetlands identified in Appendix II and III of the Plan plus some additional wetlands identified as regionally significant because of their size (over five hectares) and or the presence of rare or uncommon indigenous species.

Together the 77 regionally significant wetlands (Figure 8) cover 2,843 hectares, which represents around 87% of the 3,273 hectares of wetlands in Taranaki mapped by Landcare Research in 2010.²⁵

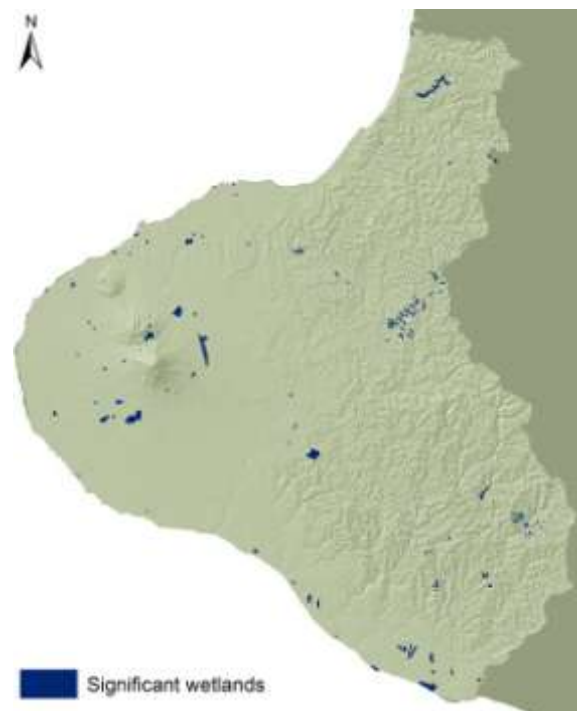


Figure 8: Significant wetlands in Taranaki

²⁵ Based upon the Council's GIS layer for regionally significant wetlands as at 30 January 2013. Of note the actual extent of wetlands in Taranaki is likely to be higher than that indicated in the Landcare Research study, which measured wetlands >0.5ha.

Of the 77 wetlands or groups of wetlands identified as significant a subgroup of 49 were identified as having no 'formal protection'²⁶ in 2001 when the Freshwater Plan was adopted. Where possible, the Council advocates for the protection of these wetlands through its significant wetland programme. Through the wetland programme, the Council supports and works with land occupiers to protect and enhance these wetlands. Council support ranges from advisory to the provision of plants, and financial assistance (Environmental Enhancement Grant).

The formal protection status of the full 77 regionally significant wetlands is set out in Table 7. In 2001, when the Freshwater Plan became operative, 28 (or 36%) regionally significant wetlands were identified as protected in full or in part. As at 30 June 2012, 54 regionally significant wetlands are protected in full or in part. This represents 70% of the regionally significant wetlands.

In many cases obtaining the formal protection of the regionally significant wetlands involves liaising with more than one land owner because of multiple ownerships associated with some wetlands. It is therefore not uncommon for only part of a wetland to be formally protected, due to differing views of the land owners.

Table 7: Protection status of the regionally significant wetlands

Formal protection status	As at 30 June 2001	As at 30 June 2012
Formally protected – whole of wetland	21	31
Formally protected – part of wetland	7	23
No formal protection	49	22
Wetland destroyed*	1	1
Total	77	77

* Refers to Norfolk Road Wetland which was largely destroyed in 2000 after the public notification of the Freshwater Plan but prior to its adoption.

²⁶ Formal protection refers to where land has been set aside for conservation purposes, e.g. the site lies in the conservation estate, is a reserve, or has a covenant or caveat on the title protecting ecological values associated with the land.

Active versus passive protection

Many private landowners have formally (legally) protected remnant wetlands on their land through covenants.

However, probably of more importance is the active protection or management by landowners to 'protect' biodiversity values on those sites. Such work includes undertaking invasive plant and animal control, the fencing of remnants wetlands and waterways to exclude stock, and the planting of indigenous plants.

Through the Council's wetland and Key Native Ecosystem programmes the Council works with land occupiers to support their efforts, to encourage formal (legal) protection and to maintain and in some cases enhance the ecological condition of their wetland.

5.3.3 Effectiveness of the Key Native Ecosystem Programme

In 2006, as part of the development of the RPS, the Council prepared an Inventory of KNEs.²⁷ KNEs include the Council's significant wetlands plus other wetlands and terrestrial habitat types determined to be regionally significant pursuant to policy criteria set out in the RPS.

Following the development of the Biodiversity Strategy in 2008, the Council has implemented its KNE Programme, which involves targeted support and assistance for privately owned KNEs.

Management actions necessary to protect KNEs will vary from site to site. Accordingly, the Council provides a property planning service targeting KNEs on privately owned land. Out of its biodiversity planning work, the Council provides significant resources to support plan holders' efforts to maintain and enhance the biodiversity values of these sites.

Council support may involve a suite of works such as invasive plant and animal control, ecological restoration, enhancement planting, and fencing, plus financial assistance.

²⁷ As at 30 June 2012, there are 165 KNEs covering 117,896 hectares in the Taranaki region. Of these, 111 KNEs are privately owned (in full or in part). Privately owned land makes up 9,706 hectares of the KNEs.

Typically the Council, through the biodiversity plan, agrees to undertake initial works, with the plan holder assuming responsibility for an increasing share of the on going maintenance. The Council frequently organises care groups to assist the plan holder with the on going implementation of the plans.

Table 8 provides an overview of the state of KNEs including their management. Figure 9 shows the location of KNEs for which Council has prepared biodiversity plans to date and which are being actively managed. Since the adoption of the Biodiversity Strategy in 2008, 44 biodiversity plans have been prepared covering 1,657 hectares. This represents 39.6% of the 111 privately owned KNEs. The Council’s target is to prepare 10 new biodiversity plans each year for KNE’s.

Table 8: State of KNEs 2008 to 2012

Indicator	30 June 2008		30 June 2012	
	No.	Ha.	No.	Ha.
Total KNEs	154	117,102	165	117,896
Privately owned KNEs (in whole or part)	99	9,693	111	9,706
KNEs with a biodiversity plan	0	0	44	1,657
KNEs formally protected	102	111,073	114	111,744

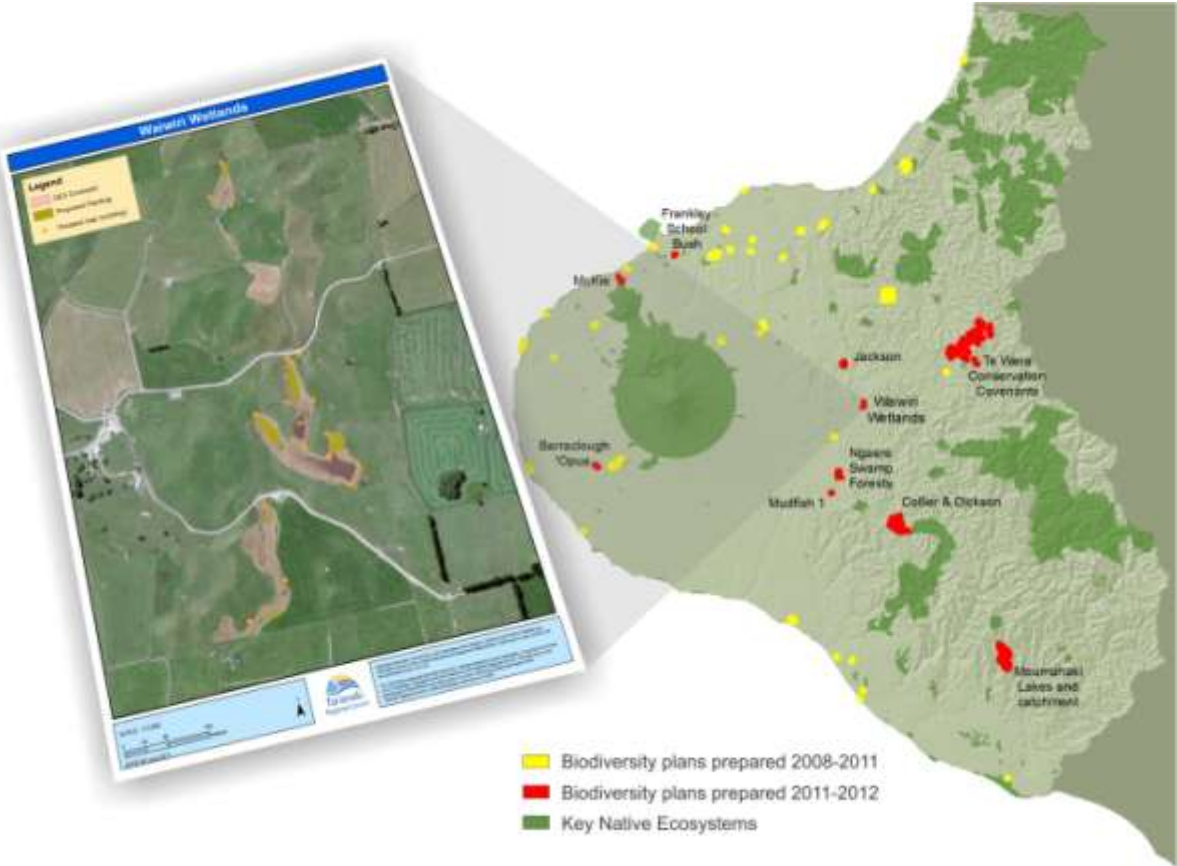


Figure 9: Biodiversity plans prepared for KNEs as at 30 June 2012

5.3.4 Effectiveness of the Riparian Management Programme

The Taranaki Riparian Management Programme is the largest enhancement planting scheme on privately owned land in New Zealand.²⁸ This voluntary programme, which is unique to Taranaki in terms of its sheer scale and its effectiveness, began in 1993. The programme involves farmers, with the support of Council, fencing and replanting riparian margins on Taranaki's most intensively farmed land (e.g. the ring plain).

The purpose of the fencing and planting is to exclude livestock from waterways, including small streams and wetlands, and to intercept and reduce runoff reaching water. However, clearly there are biodiversity spinoffs arising from the maintenance and enhancement of riparian and the receiving waters habitats.

As at 30 June 2012, the Council has prepared 2,390 riparian plans with planting and fencing recommendations covering 95% of dairy farms and most of the ring plain and coastal terraces (Figure 10).

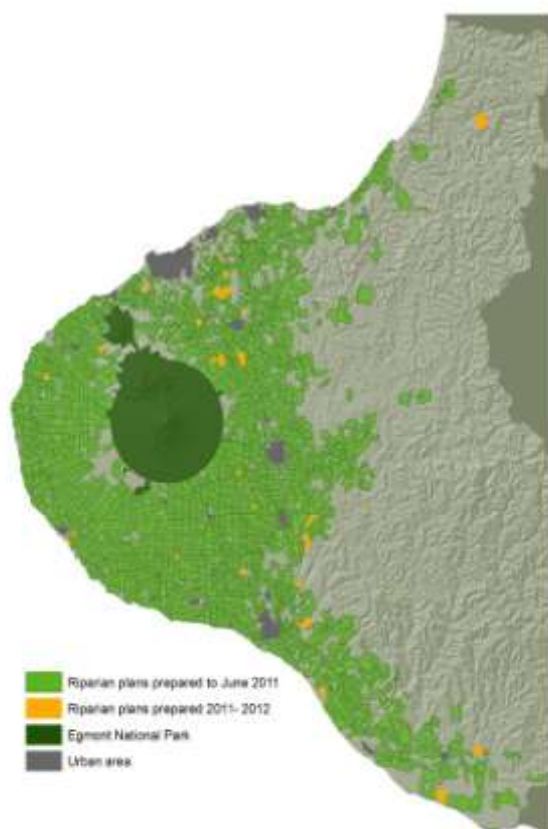


Figure 10: Riparian plans, as at 30 June 2012

²⁸ Taranaki Regional Council, November 2011.

The Council's riparian planning phase is now largely completed and the focus of the Taranaki Riparian Management Programme is on the implementation of recommendations in the plans.

The implementation of fencing and planting recommendations in riparian plans has gathered momentum in recent times. Since 1996, the Council's plant production schemes have supplied over 2.5 million plants to plan holders. This represents the largest enhancement planting scheme in New Zealand (Figure 11).

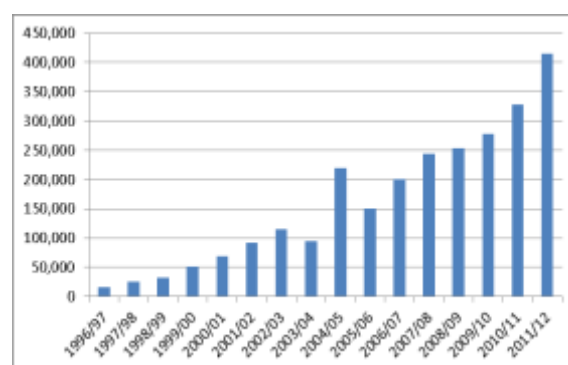


Figure 11: Number of native riparian plants supplied per annum

Since 2002, riparian plan holders have fenced 2,306 kilometres of stream bank and planted 1,155 kilometres of stream bank.²⁹

If the fencing and planting in place at the time of plan preparation is taken into account, it means that so far almost 9,444 kilometres of stream banks are fenced (74% of the total covered by a riparian plan) and almost 5,940 kilometres of stream banks are now protected by either existing or newly planted vegetation. This is 60% of the total length identified as relevant for planting.

Together, the 2,390 riparian plans have identified over 5,638 kilometres of stream bank requiring fencing and 5,037 kilometres of stream bank requiring planting. Under the current non-regulatory approach, farmers have voluntarily completed 41% of their riparian plan recommendations relating to new fencing and 23% of the recommendations relating to new plantings as at 30 June 2012 (Table 9).

²⁹ Since 2002 the Council has adopted and applied GIS mapping to monitor and record information on the implementation of riparian plans based upon annual property visits.

Table 9: Riparian plan implementation – at a glance (as at 30 June 2012)

	Recommended fencing		Recommended planting	
	Km	%	Km	%
Works completed	2,306	41%	1,155	23%
Works left to be done	3,332	59%	3,882	77%
Target*	5,638	100%	5,037	100%

* Total amount of works recommended in the 2,390 riparian plans as being required to fence or plant riparian margins

5.3.5 Effectiveness of other Council assistance and support

The Council continues to provide financial assistance to environment projects through the environmental enhancement grant plus administers and services the Taranaki Tree Trust.

Over the duration of the Freshwater Plan, the Council has provided financial assistance to the order of \$1.1 million to support a broad range of small to large environmental projects across the region– most of these projects related to the freshwater environment. Of particular note, is financial assistance for promoting the restoration and protection of wetlands (fencing, planting, and weed and pest control), the removal of barriers to fish passage, and to protect whitebait spawning and habitat areas on the Tongaporutu and Hutuwai rivers and their tributaries.

In 2011/2012, the Council, through its environmental enhancement grants, spent almost \$200,000 on a suite of works involving pest and weed control, fencing and or enhancement planting on 24 KNEs, seven regionally significant wetlands (these being Barrett Lagoon, Lake Waiau, Spence Road Ponds, Ngere Swamp Forest, Puketoro Wetlands, Pipiriki, and Toko Wetland), three other remnant wetlands (Tongaporutu, Mimi Estuary, Baldock) and two riparian demonstration sites.

Over the life of the Freshwater Plan the Council has, through its environmental enhancement grant, donated \$30,000 to \$40,000 per annum to the Taranaki Tree Trust.

The Taranaki Tree Trust is a charitable trust dedicated to the protection and enhancement of the region’s ecosystems and landscapes. The Trust provides financially support for planting projects which meet the Government’s national priorities for protecting rare and threatened native biodiversity. Funding is not available for these projects from any other source. The Trust also continues to support amenity planting which enhances community areas.

6. Review of other policy considerations

This section outlines other policy considerations to be taken into account by the Council in giving effect to its responsibilities for indigenous freshwater biodiversity.

6.1 Alignment with national, industry and local policies

Since the Freshwater Plan became operative, district plans prepared by the local territorial authorities have included significant natural areas within their plans and included vegetation clearance rules relating to these areas. Some of these sites are also scheduled wetlands identified in the Plan.

Council experiences in relation to its compliance and enforcement activities have highlighted areas of jurisdictional overlap. The interim review of the Freshwater Plan recommended that there needs to be clearer definition of wetlands versus wet forest and an examination of the best way to safeguard these significant biodiversity areas from the threats from both vegetation clearance and drainage in a coordinated manner.

Subsequent national policy development in the form of the *NPS for Freshwater Management* and the *Proposed NPS for Indigenous Biodiversity* (refer section 2 above) re-emphasise the protection of remnant wetlands and introduces concepts such as no net loss that are not currently present in the Freshwater Plan.

The latest Environment Court decision on the *Proposed One Plan* also supported the no net loss concept and policies encapsulating a hierarchy of steps for avoiding, remedying or mitigating adverse effects on those habitats.

More recently, the dairy industry through the *Sustainable Dairying Water Accord*³⁰ has made it mandatory for suppliers to fence to exclude stock from rivers and streams over 1 metre wide and 30 centimetres deep that permanently contain water, all lakes, and wetlands (if they are identified in regional plans as being significant).

6.2 Information gaps

One of the inherent difficulties in managing freshwater biodiversity in Taranaki and across New Zealand is the absence of complete, reliable and relevant information about its current state and trends.

While there may be some ecological surveys, they generally relate to specific sites or study objectives, are patchy in their availability and scope, and often use differing methodologies. This all makes it difficult to draw generic conclusions and or apply regionally.

Despite this, there is general acceptance that New Zealand's indigenous biodiversity is in serious national decline. The Council maintains inventories of significant sites which include wetlands, rivers and streams listed in the Freshwater Plan, coastal areas of local or regional significance listed in the RPS, and KNEs identified on the Council's Biodiversity Database. However, the areas identified do not represent an exhaustive list. Many sites with ecological values of regional significance are not identified or mapped.

Wetlands are more readily identifiable as significant because the habitat type itself is rare. However, values associated with other aquatic habitat types are not so readily identifiable. One of problems in determining appropriate management responses, as highlighted in the Biodiversity Accord, was the lack of information on the instream (aquatic) values such as the distribution and abundance of threatened, at risk and regionally distinctive species.

There is certainly a lack of state of the environment monitoring information on fish populations in many of the small stream 'types' in Taranaki (i.e. farm drains, streams with riparian planting in agricultural catchments, small headwater streams with intact riparian areas).

Furthermore, while the loss of an entire ecosystem such as a wetland is relatively easily quantified, it is much harder to quantify loss in

³⁰ Dairy Environment Leadership Group, 2013.

the area or condition of some freshwater habitats such as small streams.

6.3 Is a precautionary approach warranted?

Section 32(4)(b) of the RMA requires an evaluation to take into account the risk of acting or not acting if there is uncertain or insufficient information about the subject matter of policies.

In its decisions on the *Proposed One Plan*, the Environment Court agreed that a precautionary approach was warranted to protect scarce and irreplaceable natural resources such as wetlands.

The Environment Court noted that the protection of rare and threatened habitats is warranted for the following reasons:

- the highly vulnerable status of rare and threatened habitats and the declining state of remaining biodiversity in the region
- disturbance of rare habitats is very likely to cause local extinction of indigenous species, or of ecosystem type, because these habitats are spatially highly limited, meaning that species that rely on them are unable to move into adjoining suitable habitat
- the scarcity of wetlands and other threatened habitats, which have less than 20% of the original extent of the habitat remaining, will show a sharp decline in the number of species likely to survive if more original habitat is lost, based on the species-area curve (refer Figure 1 on page 2). Even very small losses of habitat below the 20% threshold can significantly impact on species' ability to survive.
- it reflects the Government's policy direction as stated in the *Statement of National Priorities for Protecting Rare and Threatened Native Biodiversity on Private Land* (MfE, 2007).

The risk of not acting is that freshwater biodiversity is likely to continue to decline in some freshwater habitats such as wetlands and small streams. Conversely, the primary risks of acting relate to the potential to restrict resource activities that might impact on those values.

6.4 Targeted versus broad scale management approach

Across New Zealand, there has been considerable debate as to what constitutes an appropriate balance between use and development on the one hand, and the protection of scarce and critical resources on the other.

Imposing restrictions and controls on resource use to protect all elements of indigenous biodiversity, regardless of whether they need that protection or not, risks imposing excessive and unnecessary costs on resource users. In more recent policy development, regulatory bottom lines have been set that focus on the significance of habitat, and their constituent parts, due to their vulnerability, rarity and scarcity.

One way regional councils have sought to manage finite resources is to identify and rigorously prioritise what needs to be protected in a schedule. However, this is itself a complex matter in which significant costs may be incurred to identify and map the areas to be protected.

The advantages of identifying specific sites in the Freshwater Plan as significant are increased certainty and clarity in the application of the Plan's policies and rules.

The disadvantages is that the number of sites with known/confirmed values is limited by the amount of information available (refer section 6.2 above). Consequently the number of sites able to be identified in a Plan as regionally significant is likely to be under representative of the actual number of sites. There is therefore a substantial risk that sites with significant ecological values but for which there was no or insufficient information on those values would be 'missed' from the schedule and would be vulnerable to inappropriate use and development.

In Taranaki there has been a small but significant loss in the number and extent of wetlands in Taranaki – particularly those under six hectares and which were not identified in the Freshwater Plan.

6.5 Should 'condition' or size be a criterion for significance?

Across New Zealand, the regulatory approach to wetland protection has traditionally focused on the condition and size of the site.

Often freshwater habitats may be in a degraded state and there are questions as to whether ecological processes are still functioning. Making a site's condition a prerequisite for significance, raises several issues:

- first, given the rarity of some habitats, policies and rules to protect them – even those in a degraded state – will often be appropriate purely because they are the last remaining ecosystems of their type in a landscape
- second, it would undermine the proper consideration of the values of these habitats during the resource consent process. For example, a continuing perception is that only pristine ecosystems are important or significant for biodiversity. This fails to recognise that a high proportion of New Zealand's most threatened species survive only in depleted and highly modified ecosystems, therefore protection of highly modified habitats is essential to prevent the extinction of many species.³¹

Recent case law in relating to the Horizons Regional Council's *Proposed One Plan* suggests that condition and sustainability issues should be dealt with at the resource consent stage when considering effects (including cumulative effects) and the other matters required under section 104 of the RMA.

Remnant wetlands also come in a range of sizes – some are very large but most are very small. For most regional councils, in balancing appropriate use, development and protection, the large wetlands have gained significantly more protection than smaller wetlands.

Currently, in addition to the scheduled wetlands identified in the Freshwater Plan, the Council has standards, terms and conditions that no wetland over five hectares will be drained (Rule 77). Wetlands over five hectares represent only 8% of the total number of

³¹ Norton and Roper-Lindsay 2005.

Taranaki wetlands identified by Landcare Research³² yet represent almost 70% of the areal extent of wetlands in the region. Alternatively, the Horizon's Regional Council's Proposed One Plan has rules protecting wetlands over 0.1 hectares identified as 'threatened' or 0.05 hectares for wetlands identified as 'naturally uncommon'.

While larger wetlands might naturally appear to be more important in terms of species richness and abundance, small isolated wetlands also play a significant role in the maintenance of biodiversity yet generally receive less protection. An important question for the review of the Freshwater Plan is what threshold (size) is appropriate for applying rules that restrict or prohibit activities impacting upon wetlands and whether other methods such as the riparian and wetland/KNE programmes can be used to address those wetlands not specifically covered by the rules.

6.6 Biodiversity offsets

Over the last decade there has been considerable interest in the concept of making biodiversity offsets available to consent applicants wishing to undertake activities in areas having biodiversity value.

Currently, the Department of Conservation, is leading the drafting of guidance on the application of biodiversity offsetting in New Zealand – the Business and Biodiversity Offsets Programme (BBOP) – which is consistent with international best practice.³³

The *Proposed NPS on Indigenous Biodiversity* adopted the following definition of biodiversity offsets (based upon the BBOP) as:

"... measurable conservation outcomes resulting from actions which are designed to compensate for more than minor residual adverse effects on biodiversity, where those effects arise from an activity after appropriate prevention and mitigation measures have been taken. The goal of biodiversity offsets is to achieve no net loss and preferably a net gain of biodiversity on the ground with respect to

³² Landcare Research, 2010.

³³ Biodiversity offsetting was recently applied by the Environment Court in the *MainPower NZ Ltd v Hurunui District Council* [2011] NZEnvC 384.

species composition, habitat structure and ecosystem functions.”

There are a set of BBOP principles establishing a framework for designing and implementing biodiversity offsets and verifying their success (and criteria and indicators). Of particular relevance is adherence to the mitigation hierarchy: A biodiversity offset is a commitment to compensate for significant residual adverse impacts on biodiversity identified after appropriate avoidance, minimisation and on-site rehabilitation measures have been taken according to the mitigation hierarchy.

Pursuant to BBOP, biodiversity offsets are the option of last resort. They are not a subset of remediation or mitigation. Without adherence to BBOP principles, there is a risk that offsetting can become a mechanism to legitimise and facilitate destruction of important ecological areas. It is extremely important that conservation principles should guide the assessment of biodiversity offsets

6.7 Key findings

In summary, key findings from sections 4 and 5 of this working paper, that should be taken into account when determining future directions for indigenous freshwater biodiversity in Taranaki are:

- the Freshwater Plan has been generally effective and efficient in maintaining the life supporting capacity of freshwater and associated biodiversity values
- the Council has significant regulatory and non regulatory programmes demonstrably contributing to the maintenance and enhancement of freshwater biodiversity in the region
- examples of enhancement include the fencing and planting of riparian margins across intensively farmed land to protect waterways, including small streams and wetlands
- notwithstanding the above, Council monitoring and studies confirm the on going modification and, in some cases, loss of specific types of habitats, i.e. wetlands (particularly those under six hectares) and small streams
- balancing the use, development and protection of freshwater biodiversity is restricted by a lack of information, particularly in relation to habitats for threatened species.

7. Where to from here for the management of indigenous freshwater biodiversity?

This section presents a proposed approach for the future management of indigenous freshwater biodiversity, including proposed changes to the Freshwater Plan.

7.1 Preferred approach

Having regard to the matters outlined in sections 2 to 6 of this paper, it is proposed that the revised Freshwater Plan include stand alone objectives and policies that address the issue of maintaining indigenous freshwater biodiversity values.

As a stand alone issue, a policy framework can be developed that better targets freshwater habitats and areas with regionally significant indigenous biodiversity values (i.e. significant habitats). The objectives and policies addressing indigenous freshwater biodiversity values will support and be additional to any more general objectives, policies and rules addressing specific resource use (e.g. water takes, discharges to water, streambed modifications, and land drainage).

In many cases, resource use activities will not significantly impact on freshwater indigenous biodiversity values and, in such cases, the additional and specific biodiversity objectives and policies are not triggered. In such cases, general standards, conditions and terms in rules apply to protect the broad elements of the environment such as maintaining the life supporting capacity of water. However, in circumstances, where activities may impact on freshwater habitats and areas where the community has identified there to be significant indigenous biodiversity values, added objectives and policies will be triggered and will inform decision making on any avoidance, mitigation and remediation measures.

In terms of the overall management approach encapsulated in the revised Freshwater Plan, it is proposed that the Council build on existing regulatory and non regulatory programmes to halt the decline in freshwater biodiversity. This will involve fine-tuning existing policies and

rules to maintain and, where possible, enhance those aspects of freshwater biodiversity particularly vulnerable and threatened by human induced activities – particularly in relation to wetlands and habitats of threatened or distinctive indigenous flora and fauna.

A focus solely on a regulatory approach might protect the areal extent of some habitats but is likely to be insufficient for maintaining their condition. Success in halting the decline of biodiversity depends largely on active management to address threats other than resource use, (e.g. invasive plants and animals, enhanced fish passage, restoration of buffers and connectivity etc). Public support and assistance continues to be appropriate in recognition of the public good and to fairly apportion the costs of active management.

Section 7.2 below discusses the specific changes proposed in the revised Freshwater Plan relating to indigenous biodiversity.

7.2 Key proposed changes to the Freshwater and Soil Plan

Set out below are the key elements proposed for a revised Freshwater and Soil Plan relating to indigenous freshwater biodiversity in the region. They include:

- identify the loss of indigenous freshwater biodiversity habitats in the region as a stand alone issue in the revised Plan with supporting objective to maintain such habitats
- inclusion and alignment of policy criteria for identifying significance with equivalent policy in the RPS
- inclusion of policy setting out a hierarchy of considerations to maintain significant indigenous freshwater biodiversity
- inclusion of a biodiversity offset policy
- inclusion of freshwater quality and ecological flow objectives, limits and targets

- amend rules so that activities likely to have more than minor adverse effects on freshwater habitats and areas with high indigenous biodiversity values are considered as a non-complying activity
- amend rules to protect wetlands over two hectares
- inclusion of new rules promoting the planting and fencing of riparian margins, including small streams and wetlands
- development of a descriptive schedule for identifying and assessing the 'significance' of freshwater habitat types and the application of policies and rules
- development of a schedule of known significant indigenous freshwater biodiversity habitat sites.

7.2.1 Objective to maintain indigenous freshwater biodiversity values

It is proposed that the revised Freshwater and Soil Plan explicitly identify the loss of indigenous freshwater biodiversity habitats in the region as a stand alone issue in the revised Plan with a supporting objective to maintain such habitats.

The proposed objective is similar to that already broadly addressing natural, ecological and amenity values in section 3 of the current Freshwater Plan. However, as previously noted, it is proposed to separately and more explicitly address indigenous biodiversity values from other elements covered in this section of the Plan (e.g. natural, amenity, scenic, recreational values).

Giving effect to the objective of maintaining indigenous freshwater biodiversity values will generally involve an 'over and unders' approach across the region in the protection of those values. In some localities, and for some activities, there may be a loss (unders) which is compensated in another locality (overs).

Where specific indigenous freshwater biodiversity values are not particularly vulnerable or at risk from resource use, maintaining those values through the general provisions of the revised Freshwater and Soil Plan should be sufficient. However, maintaining values associated with freshwater habitats and areas that are particularly

threatened or vulnerable is much more problematic and warrants a targeted policy/management response to ensure no net loss in the extent and condition of those areas.

7.2.2 Policy identifying significant indigenous freshwater habitat

As previous noted a targeted approach is sought for freshwater habitats and areas that are identified to have indigenous biodiversity values of regional significance. In some cases such habitats will be clearly identifiable in the revised Freshwater Plan (and or supporting documentation). However, this will not always be the case given the gaps in knowledge that exist in relation to freshwater biodiversity. It is therefore proposed the revised Plan include policy criteria for identifying significant indigenous freshwater biodiversity habitats.

The intent of the proposed policy is to clarify the matters/values for determining and identifying 'significant' freshwater areas and habitats and, therefore, whether their protection is a matter of national importance under section 6(c) of the RMA and or regional significance - particularly when considering the effect of any resource consent application (including a request for a change or cancellation of conditions of consent).

The proposed policy provides some assurance that significant indigenous biodiversity values will receive recognition when significant freshwater habitats and areas might be at risk, even in the absence of such sites being identified in a schedule or mapped.

Conversely the proposed policy would also ensure that the policy and regulatory framework in other parts of the Freshwater Plan is not unduly onerous for resource users where freshwater habitats are not considered to have significant indigenous biodiversity values in accordance with the proposed criteria.

An example what a proposed policy might look like, including the criteria for identifying freshwater habitats and areas with significant indigenous biodiversity values, is presented below. The key underpinning concepts contained in the criterion relate to:

- rarity and distinctiveness -riparian or aquatic habitat containing indigenous

species nationally classified as 'threatened' or 'at risk' and not secure in the region, or which are considered to be regionally 'distinctive' (not nationally threatened but nevertheless significant in the regional context)³⁴

- representativeness – the desirability of maintaining representativeness (i.e. the full range of what once existed), including habitat types that are naturally uncommon or which are now much reduced in relation to their original extent, e.g. wetlands
- ecological context – the importance of the habitat/site for indigenous species in relation to connectivity, important breeding areas, seasonal food sources or migratory path, e.g. inanga spawning habitats .

The criteria are already familiar and widely accepted ecological concepts that are currently provided for in the RPS.

Policy XYZ: Criteria for assessing the significant freshwater habitats

In considering the effects of any activity, the Taranaki Regional Council shall regard freshwater habitats and areas to have significant indigenous biodiversity values, where:

- (a) *the habitat supports indigenous species classed as nationally threatened or regionally distinctive; or*
- (b) *the habitat is a naturally rare and uncommon ecosystem type or is representative of an indigenous habitat type that is under-represented (as listed in Schedule XYZ of the Plan);³⁵ or*
- (c) *the habitat is regionally important in terms of its ecological context.*

7.2.3 Policy hierarchy to ensure no net loss in significant freshwater habitats

It is proposed that the revised Freshwater and Soil Plan contain a policy to ensure no net loss

³⁴ Consideration was also given to including species nationally identified as 'at risk' species. However, some at risk species such as long finned eels are relatively widespread and secure in the region. Therefore at risk species will only be captured by this criterion when they are also considered to be regionally distinctive. Refer **Appendix III** of this paper.

³⁵ Refer section 7.2.9 and **Appendix V** of this paper.

in freshwater habitats and areas with significant indigenous biodiversity values arising from the use and development of fresh water.

The proposed policy would be applied when assessing resource consents that involve any more than minor adverse effects on significant indigenous freshwater habitats such as inanga spawning sites, wetlands, whitebait migration habitats and riparian and aquatic habitats that support threatened or regionally distinctive species. The policy involves a hierarchy of considerations whereby:

- any more than minor adverse effects on that habitat's representativeness, rarity and distinctiveness, or ecological context are avoided
- where any more than minor adverse effects cannot reasonably be avoided, they are remedied or mitigated at the point where the adverse effect occurs
- where any more than minor adverse effects cannot reasonably be avoided, remedied or mitigated, they are offset to result in a net indigenous biological diversity gain.

The proposed policy would also give effect to a precautionary approach to ensure there is sufficient information to ensure no net loss. This means that consent applications for activities that could potentially impact upon significant indigenous freshwater habitats would only be granted subject to adequate information via an Ecological Impact Assessment undertaken by a suitably qualified expert:³⁶

- confirming the ecological values of the site (or lack of) prior to any consented activities being carried out; and
- identifying appropriate avoidance, mitigation and remediation measures to ensure no net loss of regionally significant biodiversity values after any consented activities.

An example of what a proposed policy might look like to ensure no net loss in significant indigenous freshwater habitats is as follows:

³⁶ A 'suitably qualified expert' could be a consultant ecologist or Council staff with the appropriate experience and expertise.

Policy XYZ: Activities in or impacting on significant freshwater habitats

- (a) Freshwater habitats with significant indigenous biodiversity values are identified in accordance with schedules XYZ of the Plan
- (b) Freshwater habitats with significant indigenous biodiversity values shall be protected by not allowing the taking, use and diversion of water, or discharges onto or into land where it would reach water, or discharge to water unless:
 - (i) there will be less than minor adverse effects on the habitat's rarity and distinctiveness, representativeness, or ecological context;
 - (ii) more than minor adverse effects are avoided as far as is practicable, or otherwise remedied or mitigated; or
 - (iii) more than minor adverse effects which cannot be reasonably avoided, remedied or mitigated are offset to result in a net indigenous biodiversity benefit.

7.2.4 Biodiversity offset policy

It is proposed that the revised Freshwater and Soil Plan contain a policy addressing the application of any biodiversity offsets.

Biodiversity offsets are a relatively new concept in New Zealand and there is a risk that key concepts and principles could be inconsistently applied. Policy would therefore be useful to guide decision making in relation to the application of biodiversity offsets. It is suggested that an offset should:

- (i) provide for a net indigenous biodiversity gain within the same habitat type, or where that habitat is not an area of significant indigenous vegetation or a significant habitat of indigenous fauna, provide for that gain in a rare or threatened habitat type, and
- (ii) reasonably demonstrate that a net indigenous biodiversity gain has been achieved using methodology that is appropriate and commensurate to the scale and intensity of the residual adverse effect.³⁷

³⁷ As the option of last resort, a biodiversity offset should achieve conservation outcomes above and beyond results that would have occurred if the offset had not taken place.

7.2.5 Review of freshwater quality and ecological flow objectives, limits and targets

The current Freshwater Plan includes largely descriptive freshwater quality and quantity objectives and limits. However the *NPS for Freshwater Management* requires the revised Plan to include numeric limits and targets to ensure freshwater quality and quantity objectives are met.

The setting of freshwater objectives for water bodies will require consultation with the broader community as part of the Plan review. The freshwater objective describes the environmental state and outcome sought for the water body (or part of a water body) to enable community values and wishes to be achieved. The development of freshwater objectives therefore encompasses two steps:

1. determining the desired community outcomes, e.g. maintenance of indigenous biodiversity values
2. determining what environmental state is needed for those outcomes to be achieved.

The Council is undertaking technical investigations and will consult, to the extent practicable, to establish numeric limits and targets necessary to meet different freshwater objectives for different water bodies, including those freshwater habitats and areas with high indigenous biodiversity values, and ensure they are relevant to Taranaki, including parameters and indicators.

In determining freshwater limits and targets to be included in a revised Freshwater and Soil Plan, the investigations will identify the framework, indicators and parameters that will allow the Council to set the specific quantifiable amount necessary to allow a freshwater objective to be met.

In brief, the limits and targets proposed in the revised Plan will be seeking to establish the ecological flows and the water quality standards for maintaining or enhancing the ecological health of aquatic ecosystems and their values.

In relation to 'over-allocated' water bodies where freshwater limits or objectives can not

currently be met, the Council will set targets.³⁸ The target forms part of a staged work programme set out in the revised Freshwater and Soil Plan for the Council to work towards achieving the limits necessary to achieve the objective.

As part of this exercise the Council will necessarily need to review existing schedules (and supporting policy framework) of high natural, ecological and amenity values of rivers and streams and regionally significant wetlands identified in appendices I to III of the Freshwater Plan so that the key values and the limits or targets needed to safeguard those values are explicitly identified.

7.2.6 Amend regulatory framework protecting freshwater biodiversity

It is proposed that rules supporting the protection of freshwater habitats (e.g. aquatic/instream life, wetlands) be amended to explicitly address those activities likely to have more than minor adverse effects on biodiversity values.

Of note, the Freshwater Plan already contains rules that include standards, terms and conditions that allow appropriate use and development and which generally protect the life supporting capacity of water and associated ecological values.³⁹ However, some fine-tuning and other consequential changes to existing rules are considered appropriate such as:

- deleting general standards, terms and conditions of relevant rules relating to ensuring activities have “...no significant adverse effects on aquatic life or instream life” (which has proven to be problematic in its interpretation and application)
- replacing the policy intent of the aforementioned standard, term and

condition with more explicit stand alone policies and rules that focus on the freshwater habitats and areas with significant indigenous biodiversity values (refer to earlier discussion in section 7.2.1 above)

- broaden the scope of the regulatory framework to capture not only the 60 wetlands identified in appendices II and III of the Freshwater Plan but also other freshwater habitats and areas that potentially have significant indigenous biodiversity values (refer to discussion in section 7.2.9 below and **appendices V and VI** of this paper)
- amend standards, terms and conditions in rules to ensure that any effects on indigenous freshwater biodiversity comply with water quality and quantity limits set to safeguard those values (refer to earlier discussion in section 7.2.5 above)
- amend standards, terms and conditions in rules to ensure that any effects on freshwater habitats and areas with significant indigenous biodiversity values do not result in a net biodiversity loss (refer to earlier discussion in section 7.2.3 above)
- amend relevant rules supporting the protection of wetlands and other freshwater habitat types – currently a suite of permitted, controlled, discretionary and prohibited activities – to a non complying activity (refer sections 7.2.7 and 7.2.8 below)
- ensure activities impacting upon freshwater habitats and areas with significant indigenous biodiversity values are appropriately considered via the resource consent process and that measures are adopted to avoid, mitigate or remedy any net loss (refer to earlier discussion in sections 7.2.3 and 7.2.4 above).

³⁸ Target is a limit that must be met at a defined time in the future. This meaning only applies in the context of over-allocation as defined in the NPS for Freshwater Management.

³⁹ For most activities the revised Freshwater Plan is ‘business as usual’. Even for activities impacting on significant freshwater habitats there may be no additional controls on resource use. For example, discharges to water or abstractions of water will not necessarily have a significant impact on native fishery values so long as those activities do not derogate from any limits or targets set for that catchment (refer section 7.2.5 above).

7.2.7 Amend rules to protect wetlands over two hectares

In relation to wetlands over two hectares (wetlands under two hectares are addressed in section 7.2.8 below), two significant changes are proposed.

1. amend the rules to target the protection of wetlands over two hectares (instead of five)
2. resource consent relating to wetlands over two hectares (plus smaller wetlands identified as providing habitat for threatened and distinctive species) will be processed as a non-complying activity instead of a discretionary activity.

The proposal that activities having more than minor adverse effects on wetlands (and other freshwater habitats and areas with high indigenous biodiversity values) be addressed via a 'non complying' activity rule is consistent with the Environment Court ruling on the biodiversity provisions of the *Proposed One Plan*, which noted the following:

- there are few activities affecting rare and threatened habitats which would have minor adverse effects
- non-complying status sends a strong signal
- the greater discretion afforded to a decision-maker under a discretionary activity rule is inadequate to ensure biodiversity is maintained in the region
- non-complying activity status results in a more focussed examination of the biodiversity objectives and policies and is not just one of a number of plan provisions to have regard to
- the need for some caution comes with the need to be satisfied that the proposal is not contrary to the objectives and policies of the Plan
- it would be clear to a decision-maker whether or not a proposal was contrary to the direction set by the provisions. A proposal would only meet the objectives and policies if it can demonstrate that it is designed to take reasonable measures to, first, avoid more than minor adverse effects, and, second, take reasonable measures to remedy or mitigate these effects and finally offset residual effects.

It is further proposed that the revised Freshwater and Soil Plan include amended rules that no wetlands over two hectares be drained (the equivalent provision in the current Plan is limited to wetlands over five hectares).

The benefit of the Freshwater Plan adopting a lower size threshold is that a greater number and areal extent of wetlands are accorded regulatory protection. Amending the rules to target the regulatory protection of wetlands over two hectares will cover a minimum of 81% of the areal extent of all wetlands mapped in Taranaki (refer section 7.2.8 below). This represents an increase from 70% under the current five hectare rule). In so doing Taranaki is well positioned to protect the representativeness value of wetlands.⁴⁰

The implications of that change, however, are increased administration and compliance costs. However, they are substantially less than other options for reducing the size threshold for wetlands, e.g. the Horizons Regional Council's *Proposed One Plan* captures wetlands as small as 0.05 hectares. **Appendix VII** of this paper presents a brief discussion of the relative benefits and costs for adopting different size threshold for regional rules addressing the protection of wetlands.

7.2.8 Other rules addressing the protection of other habitat types with regionally significant values

In addition to the two hectare rule that protects 81% of wetlands, it is proposed that the revised Freshwater and Soil Plan also address the protection of other freshwater habitats and areas with significant indigenous biodiversity values. It is proposed that the revised Plan include rules that address:

- (a) rivers, streams, lakes and wetlands, including wetlands below two hectares, which provide habitat for threatened and regionally distinctive species (to be safeguarded via non complying rules)

⁴⁰ The size threshold only relates to wetlands identified as being significant for being an indigenous habitat type that is under-represented nationally. Other wetlands may also be identified as significant for providing habitat that supports indigenous species classed as nationally threatened or regionally distinctive or for its ecological context.

- (b) other wetlands below two hectares on intensively farmed land (to be safeguarded by proposed rules requiring the fencing and planting of riparian margins by 1 July 2020)
- (c) small stream habitats traversing intensively farmed land, including inanga spawning habitats (to be safeguarded by proposed rules requiring the fencing and planting of riparian margins by 1 July 2020).

Of note, proposals that the revised Freshwater Plan include rules to ensure intensive pastoral farmers have retired and planted their riparian margins by 1 July 2020, or obtained a resource consent addressing such matters, have been proposed in a separate paper *Managing diffuse source discharges to land and water in the Taranaki region*.

Non regulatory methods

Note, where freshwater areas, sites and habitats have been identified as having high indigenous biodiversity values (either via the Plan or subsequent resource consenting process) it is proposed that these sites also become the focus of the Council's non regulatory approach, i.e. its wetland and KNE programmes.

Both the wetland and the KNE programmes involve the provision of a property planning service, plus significant advisory and or financial support to land occupiers for site specific actions such as fencing, pest and weed control and ecological restoration to enhance the condition of wetlands and other significant freshwater habitats.

7.2.9 Include schedules to identify and or assess significance of freshwater habitat types

Significant freshwater habitats are likely to cover a combination of aquatic, riparian, wetland and wet forest habitats. To assist the Council and resource users to identify habitat types captured by the 'significance criteria' and proposed policy⁴¹ it is proposed that the revised Freshwater and Soil Plan include:

- a schedule identifying known/mapped aquatic habitats with high indigenous biodiversity value.⁴²
- a schedule for assessing wetland habitats not identified in a schedule or mapped but nevertheless are of a type that trigger the significance criteria.

This schedule would include water bodies (e.g. catchments and or their stretches), including wetlands, which support indigenous species classed as threatened or regionally distinctive or which are regionally important in terms of their ecological context (e.g. inanga spawning or whitebait migration)

This schedule would descriptively identify riparian margins, wet forest, wetlands and lakes which are habitat types considered under-represented (naturally uncommon or threatened) in the region and or which are important for their ecological context.

A descriptive schedule ensures all important habitats would be captured by the Freshwater Plan, and enables a regulatory framework to apply, even where current information is incomplete or lacking. It therefore avoids the considerable cost required to field survey and individually assess often fragmented sites, places and habitats that are of size, number or type that makes them difficult to identify in a schedule or maps.

⁴¹ Works or activities in the aforementioned schedules identifying/describing freshwater ecosystems, habitats and areas with high indigenous biodiversity values, that do not have less than minor adverse effects, would trigger the requirement for a precautionary approach through the consenting process.

⁴² That is through previous surveys, monitoring or through predictive modelling using national spatial datasets that involve a comparison between former and current extent of habitat types to determine which freshwater habitats are significant.

Appendix V of this paper sets out as an example the draft descriptive schedule identifying freshwater habitat types with high indigenous biodiversity values in Taranaki. The schedule of nine ecologically defined wetland habitat types were identified using national spatial databases, statistical modelling programmes, expert opinion and observational data. The schedule would not list (or provide geographical reference at the site scale) areas or discrete sites.

Appendix VI of this paper sets out as an example of a preliminary draft schedule water bodies (e.g. catchments and or their stretches), including wetlands, which support indigenous species classed as threatened or regionally distinctive or which are regionally important in terms of their ecological context (e.g. inanga spawning or whitebait migration).

Note, Appendix VI is a preliminary list only to demonstrate the concept. It is incomplete and will require substantially more investigation and consultation before its content is finalised.

How the descriptive schedule would be applied

Adopting a descriptive schedule encapsulate a more precautionary approach and a shift from relying solely on schedules in the Freshwater Plan that identify a small number of known wetlands deemed to be significant. The approach recognises that:

- gaps in information and knowledge which means there is a significant risk of some significant sites not being identified at the time of preparing a regional plan
- mapping and identifying important sites in plans invariably produces an incomplete list of areas of significant indigenous vegetation or significant habitat of indigenous fauna as the Council does not hold comprehensive information on every aspect or patch of indigenous biodiversity in the region
- the mapping and identification of important sites for listing in plans regardless is an extremely time consuming and resource hungry approach
- employing assessment methods rather than mapping can be cost-effectively implemented in the absence of exhaustive knowledge at the property scale.

Descriptions relating to wetland habitat types in the proposed descriptive schedule would necessarily need to be quite broad and, as a consequence, risk being unnecessarily prescriptive. To ensure that any given site does indeed contain the ecological values of significance and that the Plan is not being unnecessarily prescriptive, it is proposed that in relation to specific habitat types, the schedule sets out criteria that:

- a site must contain, including thresholds (e.g. size) and attributes for it to be considered significant and making a major contribution to indigenous biodiversity
- a site must not contain. This involves a second tier of assessment of significance to ensure the 'values' warrant protect, i.e. provide for exclusions such as planted vegetation or wet pasture.

8. Summary and conclusion

Since the *Regional Fresh Water Plan for Taranaki* was made operative in 2001 there have been significant changes in terms of national directives to manage, amongst other things, freshwater biodiversity.

This working paper entitled *Maintaining Indigenous Freshwater Biodiversity in the Taranaki Region* addresses the use, development and protection of freshwater biodiversity, including wetlands, in the Taranaki region. The paper is one of a suite of documents contributing to the Taranaki Regional Council's (the Council) review of the *Regional Fresh Water Plan for Taranaki* (the Freshwater Plan) and the *Regional Soil Plan for Taranaki* (the Soil Plan).

A principal finding of the 1997 New Zealand State of the Environment report was that biodiversity loss was New Zealand's "...most pervasive environmental issue".

In Taranaki, as in other parts of the New Zealand, there are significant pressures on indigenous freshwater biodiversity. Notwithstanding that, Council's state of the environment monitoring largely confirms that Taranaki is generally maintaining and enhancing the life supporting capacity of freshwater systems. The exception to the rule is largely around ecological values associated with wetlands and some smaller streams.

Over the last one hundred and fifty years, Taranaki, as in other parts of New Zealand, has experienced a disproportionate loss of its wetlands. The cumulative effects of land drainage and reclamation over time mean that only 8% of Taranaki's original wetlands remain. Over the life of the Freshwater Plan, Taranaki has experienced a small but nevertheless significant on-going loss of wetlands. Many small streams are also being modified and with increasing intensification it is likely that some habitats important for threatened or regionally distinctive indigenous biodiversity species are being irreparably lost.

With this in mind, changes to the freshwater and soil plans are proposed to target those habitats or sites with high indigenous

biodiversity values (due to their scarcity or vulnerability).

The proposed changes include:

- explicitly identify issues, objectives and policies for managing freshwater indigenous biodiversity values in the revised Plan, including the setting of an objective to maintain freshwater biodiversity in the region
- policy criteria for identifying 'significant' biodiversity that is aligned with the RPS and national directives
- policy setting out a hierarchy of considerations to protect significant freshwater biodiversity
- a biodiversity offset policy
- policies and methods promoting targeted assistance to land owners protecting biodiversity values associated with significant freshwater habitat sites
- broadening the application of rules relating to wetlands to target the protection of all wetlands (plus other freshwater habitats) with regionally significant values (not just those listed in the Plan's appendices)
- requirement that activities likely to have more than minor adverse effects on freshwater habitats and areas with high indigenous biodiversity values be a non-complying activity
- a descriptive schedule for assessing and identifying habitat types captured by the 'significance criteria' and related policy.

The aforementioned changes will build on the results achieved to date. In so doing it will give effect to national directives relating to the protection of biodiversity while also allowing for appropriate resource use and development.

This paper is a starting point for consulting with stakeholders on possible changes to the Freshwater Plan. The Council looks forward to canvassing these matters with stakeholders and obtaining their views and input prior to publicly notifying a revised Plan for public submissions.

Definitions and acronyms

At risk species, means a species facing a longer-term risk of extinction in the wild (either because of severely reduced or naturally small population size or because the population is declining but buffered by either a large total population or a slow rate of decline) as identified in the New Zealand Threat Classification System lists.

Biodiversity has the same meaning as biological diversity as included in the RMA.

Biodiversity values mean those attributes of an ecosystem that determine an area or habitat's importance for the maintenance of biodiversity nationally. Biodiversity values include species composition, habitat structure and ecosystem functions.

Biodiversity offset means measurable conservation outcomes resulting from actions which are designed to compensate for more than minor residual adverse effects on biodiversity, where those effects arise from an activity after appropriate prevention and mitigation measures have been taken. The goal of biodiversity offsets is to achieve no net loss and preferably a net gain of biodiversity on the ground with respect to species composition, habitat structure and ecosystem function.

Biological diversity means the variability among living organisms, and the ecological complexes of which they are a part, including diversity within species, between species, and of ecosystems.

Catchment refers to the entire area from which a stream or river receives its water. When it rains, the water flows naturally over and through the soil to the lowest point on the land, forming into springs, wetlands, and small streams that feed into larger streams and rivers as they run downhill. Eventually, all the streams and rivers in a catchment join and have the same outlet to the sea. Natural features such as ridges and hills form the boundaries of a catchment.

Community means a group of organisms growing or living together in a given area.

Controlled activity means an activity which:

- (a) is provided for, as a controlled activity, by a rule in a plan or proposed plan; and
- (b) complies with standards and terms specified in a plan or proposed plan for such activities; and
- (c) is assessed according to matters the consent authority has reserved control over in the plan or proposed plan; and
- (d) is allowed only if a resource consent is obtained in respect of that activity.

Council refers to the Taranaki Regional Council.

Customary use means, according to tikanga, the extractive use of indigenous plants or animals by tangata whenua for traditional uses including food gathering, carving, weaving, and rongoa (traditional medicine).

Diadromous refers to organisms that have a marine or estuarine stage in their lifecycle and migrate to and from the sea.

Discharge includes emit, deposit and allow to escape.

Discretionary activity means an activity:

- (a) which is provided for, as a discretionary activity by a rule in a plan or proposed plan; and
- (b) which is allowed only if a resource consent is obtained in respect of that activity; and
- (c) which may have standards and terms specified in a plan or proposed plan; and
- (d) in respect of which the consent authority may restrict the exercise of its discretion to those matters specified in a plan or proposed plan for that activity.

Divaricating plants refers to small-leaved shrubs and low-growing trees with densely interlaced wiry, highly tensile stems.

Drainage refers to the movement of excess water (including effluent water) through the soil body.

Ecological flows refer to the flows and water levels required in a water body to provide for the ecological function of the flora and fauna present within that water body and its margins.

Ecosystem means an ecological community together with its environment, functioning as a unit; an interacting system of living parts and non-living parts such as sunlight, air, water, minerals and nutrients.

Environmental values refer to the values that reflect the community's aspirations for the water in its region, and the level of water quality desired. They can include ecological function and biodiversity, natural character, natural features and landscape, cultural and spiritual values, scenic and amenity values, contact recreation, and mauri (life force) and mahinga kai (customary places where food is collected or produced).

Fresh water means all water except coastal water and geothermal water.

Habitat means the area or environment where an organism or ecological community lives or occurs naturally for some or all of its life cycle or as part of its seasonal feeding or breeding pattern.

Indigenous species means a species or genetic variant found naturally in New Zealand, including migrant species visiting New Zealand on a regular or irregular basis.

Indigenous vegetation means any local indigenous plant community through the course of its growth or succession consisting primarily of native species and habitats normally associated with that vegetation type, soil or ecosystem or having the potential to develop these characteristics. It includes vegetation with these characteristics that has been regenerated with human assistance following disturbance or as mitigation for another activity, but excludes plantations and vegetation that have been established for commercial harvesting.

Land environment means a region or area classified under the Land Environments of New Zealand system.

Maintenance means 'no net loss' as achieved by the protection of existing areas and habitats and/or the restoration and enhancement of areas and habitats as may be required through biodiversity off-sets or other initiatives.

MCI refers to the Macroinvertebrate Community Index.

Minimise means to reduce the duration, intensity and/or extent of adverse effects.

Montane means growing or living in a mountainous region.

Non-complying activity* means an activity which:

- (a) is provided for, as a non-complying activity, by a rule in a plan or proposed plan; or
- (b) contravenes a rule in a plan or proposed plan;
 - and is allowed only if a resource consent is obtained in respect of the activity.

No net loss means no overall reduction in:

- (a) the diversity of (or within) species
- (b) species' population sizes (taking into account natural fluctuation), and long-term viability
- (c) area occupied and natural range inhabited by species
- (d) range and ecological health and functioning of assemblages of species, community types and ecosystems.

NPS refers to the *National Policy Statement - Freshwater Management 2011*.

Outstanding, in relation to "outstanding freshwater bodies" means out of the ordinary on a regional basis.

Outstanding freshwater bodies are those waterbodies with outstanding values, including ecological, landscape, recreational and spiritual values.

Permitted activity means an activity allowed by a regional plan without a resource consent if it complies in all respects with any conditions specified in the plan.

Point source discharge means a discharge that occurs at an identifiable location.

Prohibited activity means an activity which a plan expressly prohibits and describes an activity for which no resource consent shall be granted.

Provisions means objectives, policies, methods, rules or ancillary information (such as criteria) included within a regional policy statement or district or regional plan.

Public conservation land refers to land administered by the Department of Conservation for whatever purpose. It excludes land administered under conservation legislation by other parties.

Rare habitat means, for the purposes of this report, an area identified as a historically rare or naturally uncommon ecosystem.

Regionally distinctive, in relation to indigenous flora and fauna species, refers to an indigenous species at its national distributional limit, only occurs in or is relatively confined to Taranaki, and or although common in Taranaki, is relatively confined in the region.

Resource consent means a permit to carry out an activity that would otherwise contravene the Resource Management Act 1991. Requirements included as part of the resource consent are known as resource consent conditions.

Restoration and enhancement means the active intervention and management of degraded biotic communities, landforms and landscapes in order to restore biological character, ecological and physical processes.

Riparian management means the collection of activities and practices that can be applied to the riparian margin in order to improve the natural characteristics and functioning of the whole riparian zone (which includes the waterway itself as well as the riparian margins).

Riparian margin means a strip of land of varying width adjacent to a waterway and which contributes or may contribute to the maintenance and enhancement of the natural functioning, quality and character of the waterway and its margins.

River or stream refers to a continually or intermittently flowing body of fresh water. This includes a stream and modified watercourse. It does not include any artificial watercourse (such as an irrigation canal, a water supply race, a hydroelectric canal, or a farm drain).

RMA refers to the Resource Management Act 1991.

RPS refers to the *Regional Policy Statement for Taranaki 2010*.

State of the environment –refers to a type of environmental monitoring and reporting that provides a snapshot of information about the environment and how it is changing over time.

Stream culverting involves passing a stream through a pipe that conveys water beneath a crossing which supports a path, road or track. Stream culverting excludes the piping of a stream.

Stream piping refers to enclosing a stream in a pipe that exceeds twenty five metres in length.

Stream realignment involves diverting water from its natural course through an open channel and discharging the water back into the same water body.

Surface water refers to water in all its physical forms that is on the ground, flowing or not, but excludes coastal water and geothermal water.

Threatened species means a species facing a very high risk of extinction in the wild and includes nationally critical, nationally endangered and nationally vulnerable species as identified in the New Zealand Threat Classification System lists.

Water –

- (a) means water in all its physical forms whether flowing or not and whether over or under the ground:
- (b) includes fresh water, coastal water, and geothermal water:
- (c) does not include water in any form while in any pipe, tank, or cistern.

Water body means fresh water or geothermal water in a river, lake, stream, pond, wetland, or aquifer, or any part thereof, that is not located within the coastal marine area.

Water quality refers to the physical, chemical and biological characteristics of water that affect its ability to sustain environmental values and uses.

Wetland includes permanently or intermittently wet areas, shallow water, and land water margins that support a natural ecosystem of plants and animals that are adapted to wet conditions.

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Appendix I: Relevant regional rules relating to land drainage and wetlands

Activity	Rule	Standards/Terms/Conditions	Classification	Notification	Control/Discretion	Policy Reference
Diversion of water for the purpose of land drainage (except as provided for in Rules 80 to 87)	77	<ul style="list-style-type: none"> • Area of land drained shall be no greater than 10 ha; • No wetland over 5 ha is to be drained;⁴³ • Drainage shall not cause flooding of downstream or adjacent properties; • No significant erosion, scour or deposition shall result from the diversion or associated discharge; • Drainage channels are of no greater than 300mm in diameter; or • Drainage channels are no greater than 4m² in cross-sectional area; • There shall be no significant adverse effects on aquatic life or instream habitat; • No wetland listed in Appendix III is to be drained. 	Permitted			
Construction, use and maintenance of drainage channels associated with permitted land drainage activities (provided for in Rule 77)	78	<ul style="list-style-type: none"> • Drainage channel shall be being constructed or maintained for the purpose of carrying out drainage activities permitted under Rule 77; • Activity shall not cause significant adverse effects on aquatic life or stream habitat; • Disturbance of any channel shall be the minimum necessary to carry out the required works; • Activity shall not cause flooding of downstream or adjacent properties. 	Permitted			
Land drainage activities (excluding drainage of wetlands listed in Appendix II) which are not provided for in Rules 77-78 or do not meet the conditions of Rules 77-78	79		Discretionary	May be non-notified		3.1.2, 3.1.3, 3.1.4, 3.1.5, 3.1.6, 3.1.7, 3.2.1, 3.2.2, 3.2.3, 4.1.1, 4.1.2, 4.1.3, 4.1.4, 4.1.5, 4.1.6, 5.1.1, 5A.2.1, 5A.2.2, 5A.2.3, 6.7.1, 6.8.1, 6.8.2, 6.8.4
Diversion of water from a regionally significant wetland listed in Appendix IIB	80		Discretionary			3.1.7, 3.2.1, 3.2.2, 3.2.3, 4.1.1, 4.1.2, 4.1.3, 4.1.4, 4.1.5, 4.1.6, 5.1.1, 5A.2.1, 5A.2.2, 5A.2.3, 6.7.1, 6.8.2, 6.8.4
Drainage or reclamation of a regionally significant wetland listed in Appendix IIB	81		Discretionary			3.1.7, 3.2.1, 3.2.2, 3.2.3, 4.1.1, 4.1.2, 4.1.3, 4.1.4, 4.1.5, 4.1.6, 5.1.1, 5A.2.1, 5A.2.2, 5A.2.3, 6.7.1, 6.8.2, 6.8.4

⁴³ For the purpose of this condition, the term 'wetland' does not include artificially created wetlands or wet pasture comprising exotic grasses or juncus rushes.

Activity	Rule	Standards/Terms/Conditions	Classification	Notification	Control/Discretion	Policy Reference
Planting and introduction of vegetation in a regionally significant wetland listed in Appendix IIB for the purposes of land drainage	82		Discretionary			3.1.7, 3.2.1, 3.2.2, 3.2.3, 4.1.1, 4.1.2, 4.1.3, 4.1.4, 4.1.5, 4.1.6, 5.1.1, 5A.2.1, 5A.2.2, 5A.2.3, 6.7.1, 6.8.2, 6.8.4
Discharge of contaminants or into a regionally significant wetland listed in Appendix IIB	83		Discretionary			3.1.7, 3.2.1, 3.2.2, 3.2.3, 4.1.1, 4.1.2, 4.1.3, 4.1.4, 4.1.5, 4.1.6, 5.1.1, 5A.1.1, 5A.1.2, 5A.1.3, 6.2.1, 6.2.2, 6.2.3, 6.2.4, 6.8.2, 6.8.4
Diversion of water from a regionally significant wetland listed in Appendix IIA	84		Prohibited			
Drainage or reclamation of a regionally significant wetland listed in Appendix IIA	85		Prohibited			
Planting and introduction of vegetation in a regionally significant wetland listed in Appendix IIA for the purposes of land drainage	86		Prohibited			
Discharge of contaminants or water into a regionally significant wetland listed in Appendix IIA	87		Prohibited			

Appendix II: Maps of significant inanga spawning sites in Taranaki

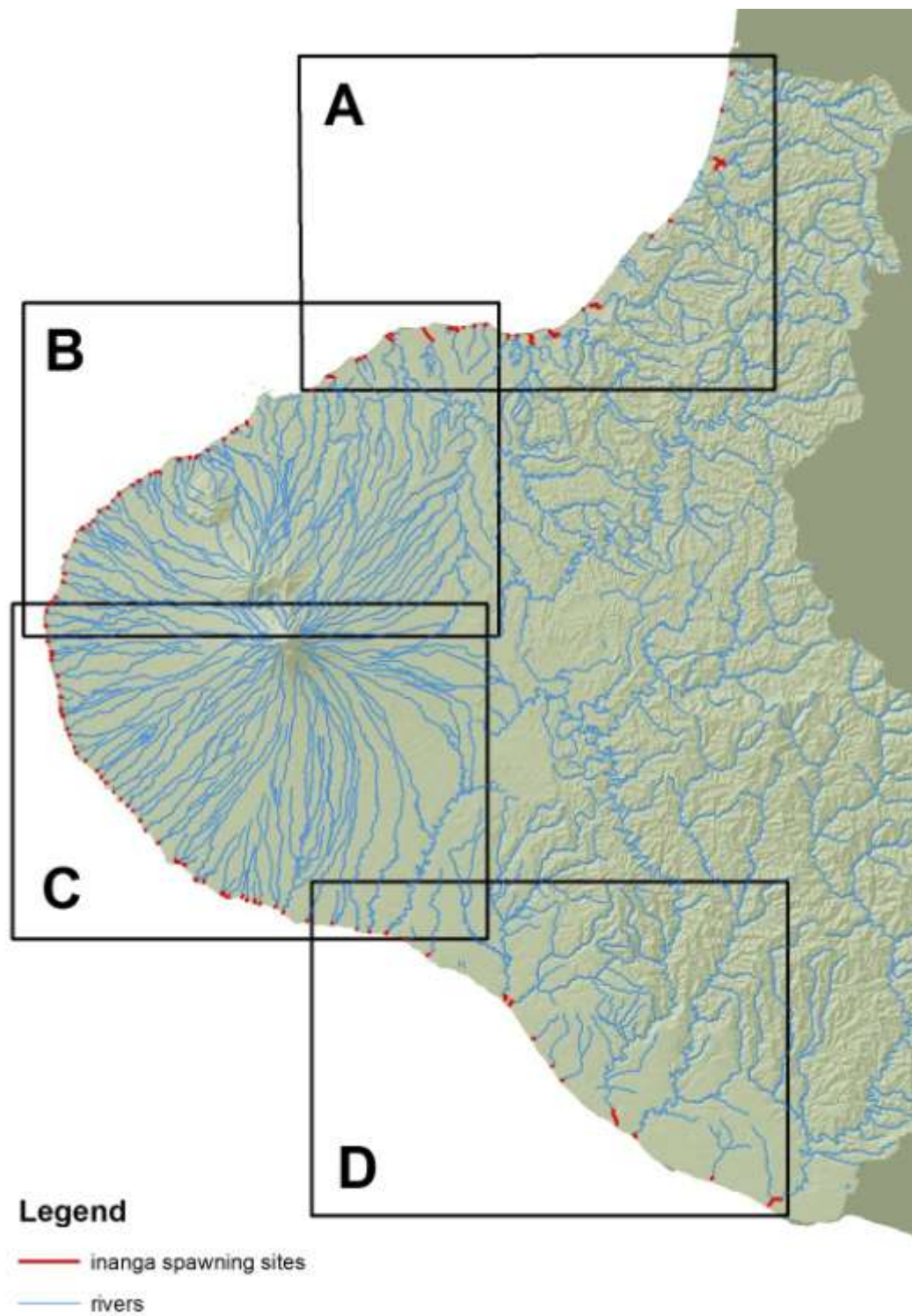




Figure 12: Overview of maps showing inanga spawning sites in Taranaki

Legend

-  inanga spawning sites
-  rivers

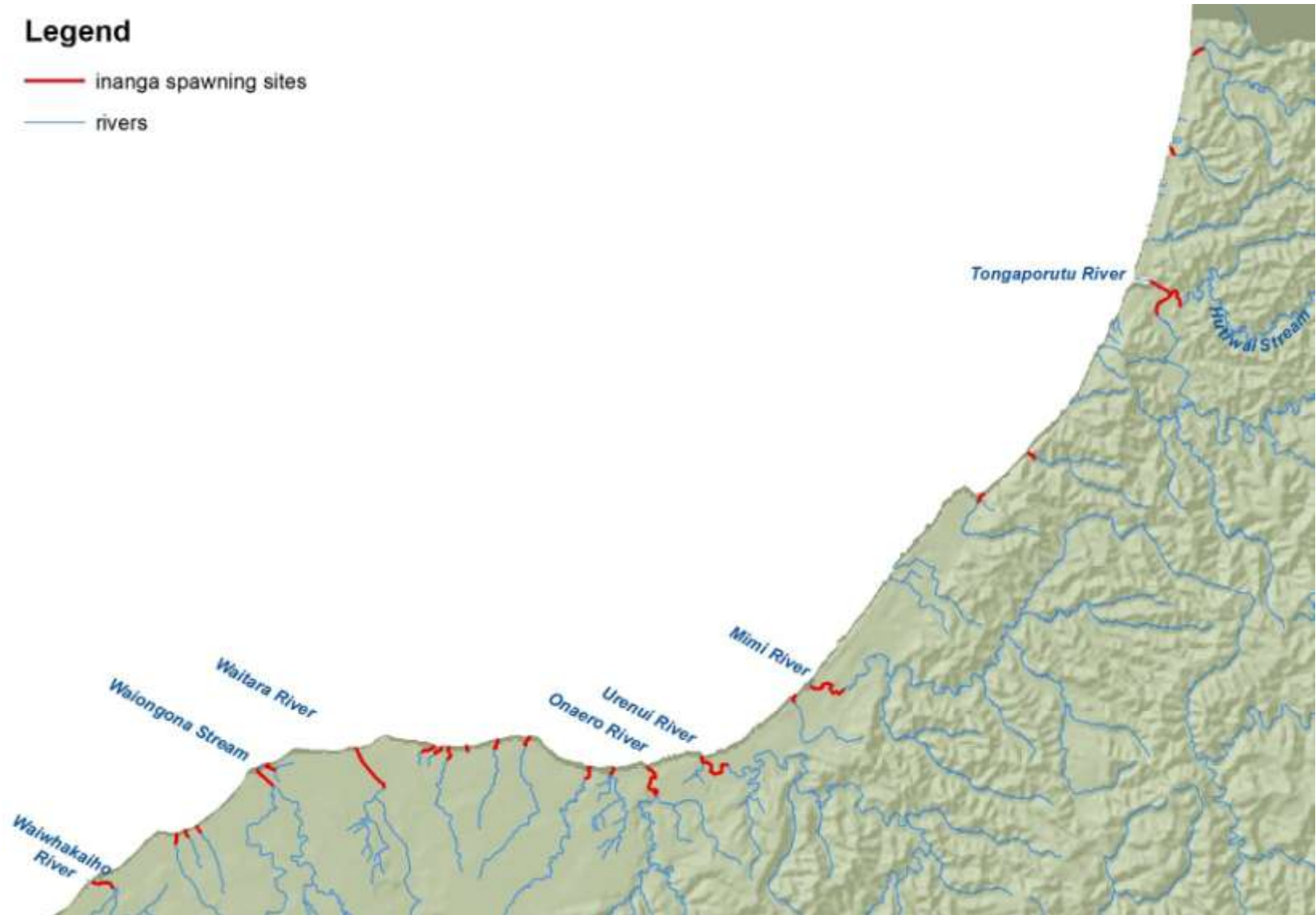


Figure 13: Inanga spawning sites in north Taranaki (Map A)

Legend

- inanga spawning sites
- rivers

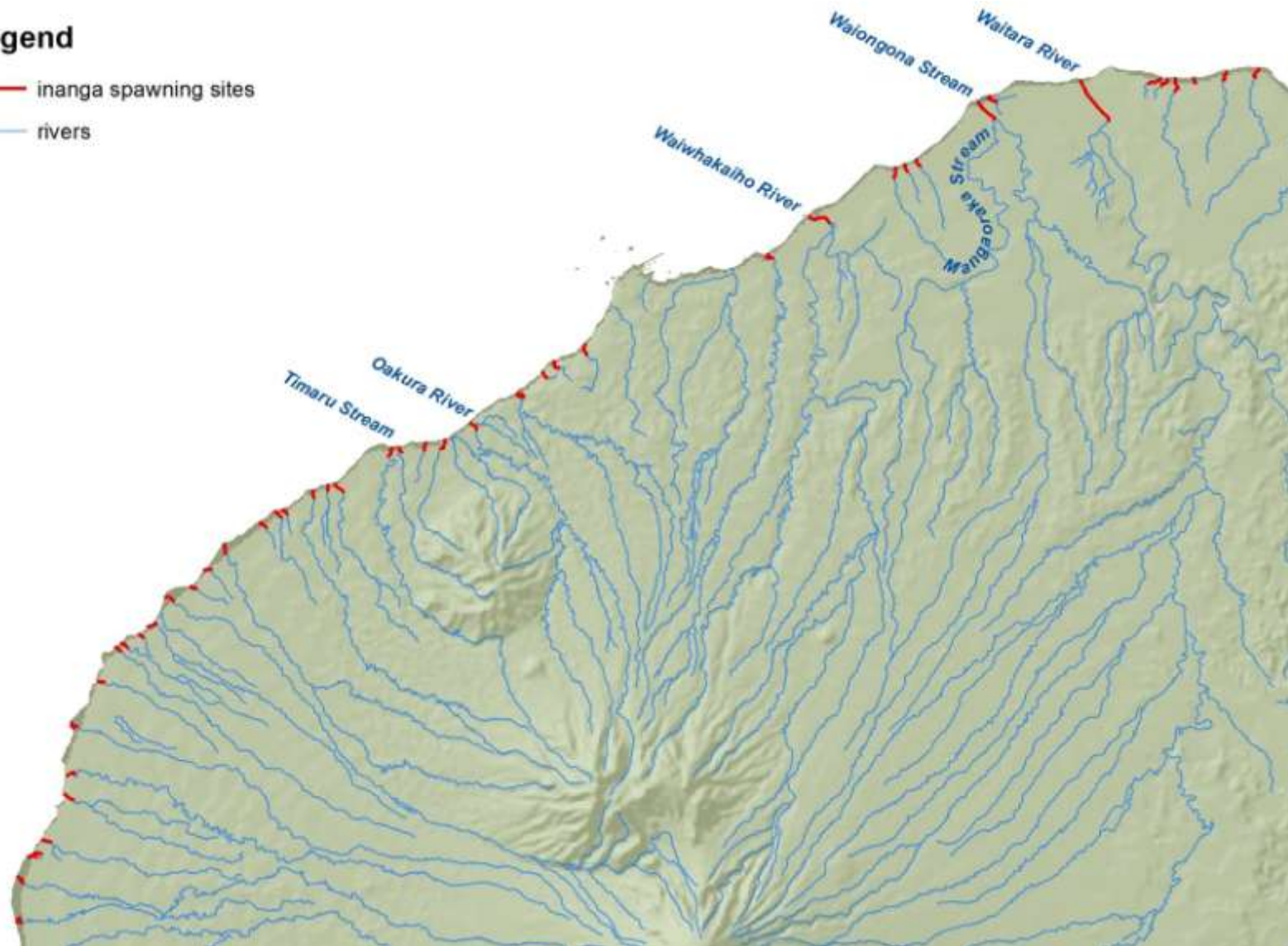


Figure 14: Inanga spawning sites in north Taranaki (Map B)

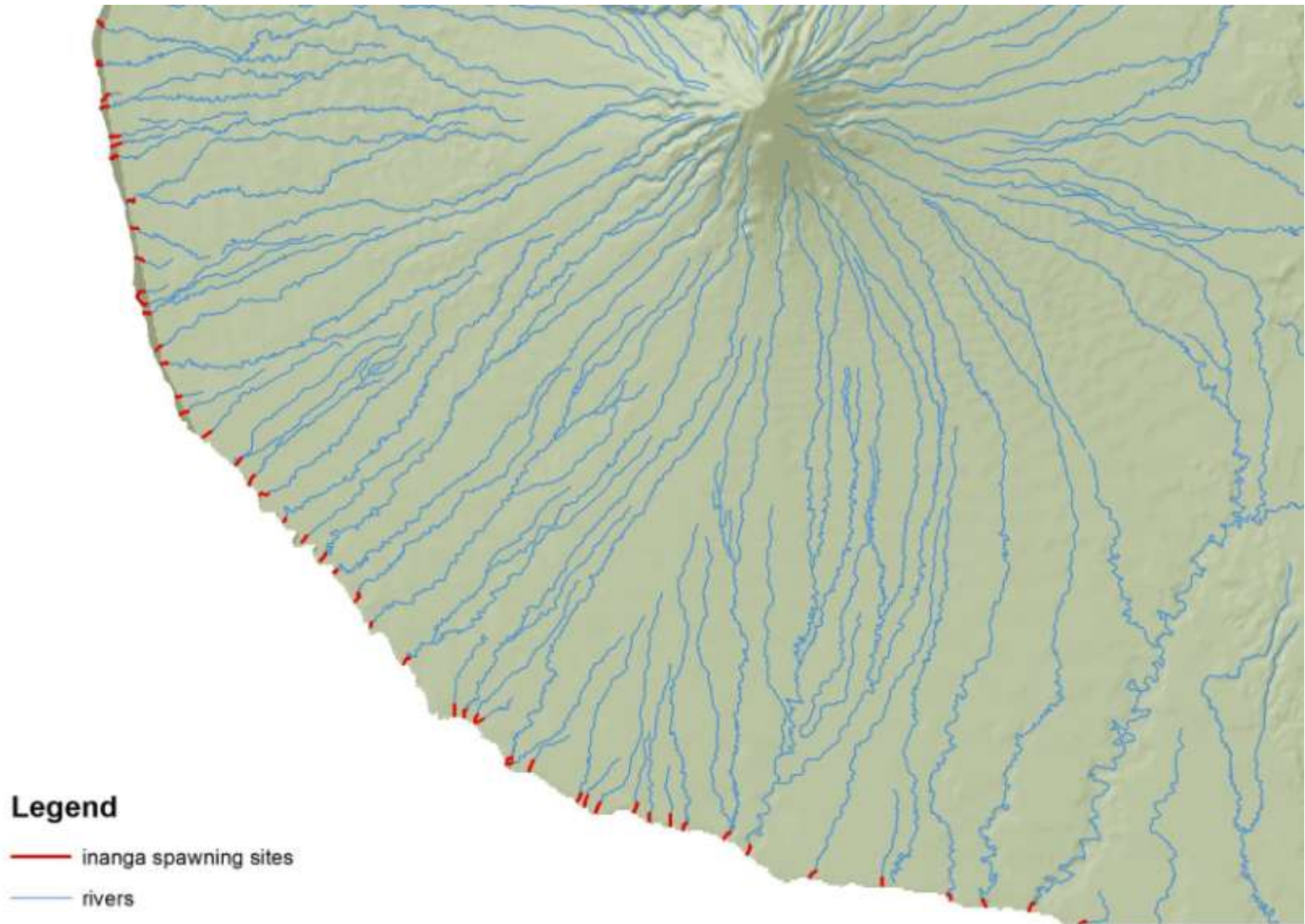


Figure 15: Inanga spawning sites in south Taranaki (Map C)



Figure 16: Inanga spawning sites in south Taranaki (Map D)

Appendix III: Threatened, at risk or regionally distinctive freshwater species in Taranaki

Set out in tables 10 and 11 below are indigenous animal and plant species known to: be present in Taranaki; that reside in aquatic, wetland and or riparian habitats; and which are identified in the New Zealand Threat Classification System lists as ‘threatened’ or ‘at risk’, or which are recognised by the Council as ‘regionally distinctive’ (and as documented in the Taranaki Biodiversity Forum Accord).

Table 10: Threatened, at risk or regionally distinctive freshwater animal species in Taranaki

Threat classification*		Indigenous animal species		Adequacy of current protection (and distribution)
		Common name	Scientific name	
Threatened	Nationally critical	Grey duck	<i>Anas superciliosa superciliosa</i>	Adequate – Taranaki wide
	Nationally endangered	Australasian bittern	<i>Botaurus poiciloptilus</i>	Poor – prefers raupo wetlands Taranaki wide
	Nationally vulnerable	Blue duck	<i>Hymenolaimus malachorhynchus</i>	Poor – in and adjacent to Egmont National Park
		New Zealand dabchick	<i>Poliiocephalus rufopectus</i>	Poor – open water ponds Taranaki wide
At risk	Declining	Bluegill bully	<i>Gobiomorphus hubbsi</i>	Poor – very few records for taranaki
		Brown mudfish*	<i>Neochanna apoda</i>	Adequate – patchy distribution at a number of key sites
		Freshwater crayfish (kōura)	<i>Paranephrops planifrons</i>	Adequate
		Freshwater mussel	<i>Hyridella menziesii</i>	Poor – patchy distribution, prefers lowland rivers & streams
		Giant kokopu	<i>Galaxias argenteus</i>	Adequate – widespread < 400 m altitude
		Inanga	<i>Galaxias maculatus</i>	Adequate – Taranaki wide up lowland streams up to 250 m altitude
		Koaro	<i>Galaxias brevipinnisus</i>	Adequate – Taranaki wide, prefers clean mountain streams <1000 m altitude
		Lamprey*	<i>Geotria australis</i>	Unknown – Taranaki wide
		Longfinned eel	<i>Anguilla dieffenbachii</i>	Adequate – widespread throughout Taranaki
		North Island fernbird*	<i>Bowdleria punctata vealeae</i>	Adequate – Egmont National Park & eastern hill country bush, wetlands & riparian margins
		Redfin bully	<i>Gobiomorphus huttoni</i>	Adequate – widespread throughout Taranaki
		Short jawed kokopu*	<i>Galaxias postvectis</i>	Adequate – Taranaki wide, prefers wide clean stable streams < 650 m altitude
		Torrentfish	<i>Cheimarrichthys fosteri</i>	Unknown – Taranaki wide, low elevations, particularly affected by fish barriers
		Recovering	Brown teal	<i>Anas chlorotis "North Island"</i>
	Relict	Goldstripe gecko*	<i>Hoplodactylus chrysosireticus</i>	Poor – patchy distribution Taranaki wide
		Spotless crane*	<i>Porzana tabuensis plumbea</i>	Poor
	Naturally uncommon	Black shag	<i>Phalacrocorax carbo novaehollandiae</i>	Adequate – Taranaki wide, prefers coastal and inland wetlands & streams
Regionally distinctive (but not threatened or at risk)	Tadpole shrimp	<i>Lepidurus apus</i>	Poor - only known to be present at the Patea wetland	

* Also considered to meet the ‘distinctiveness’ criterion of Policy 4 in section 9.1 of the RPS – refer section 2.4 of this paper.

Table 11: Threatened, at risk or regionally distinctive freshwater plant species in Taranaki

Threat classification*		Threatened freshwater indigenous species		Adequacy of current protection (at some sites)
		Common name	Scientific name	
Threatened	Nationally critical	New Zealand hazel	<i>Pomaderris apetala subsp. maritima</i>	Adequate – northern wetlands & riparian margins
		Swamp hood orchid	<i>Pterostylis micromega (Hook f.)</i>	Poor – very limited distribution
	Nationally endangered		<i>Amphibromus fluitans</i>	Unknown – patchy distribution
		Tussock sedge	<i>Schoenus carsei</i>	Unknown - ?
	Nationally vulnerable	Dwarf musk	<i>Mazus novaezeelandiae subsp.</i>	Unknown - ?
At risk	Declining		<i>Leptinella tenella</i>	Unknown - ?
		Stout water milfoil	<i>Myriophyllum robustum</i>	Adequate – one site in Egmont National Park
		Mud buttercup	<i>Ranunculus limosella</i>	Poor – one site at Julian's Pond
	Recovering	None applicable		
	Relict	Swamp leek orchid	<i>Prasophyllum hectorii</i>	Unknown - ?
	Naturally uncommon	Kohurangi	<i>Brachyglottis turneri*</i>	Poor – patchy distribution
Regionally distinctive (but not threatened or at risk)	Jointed twig rush	<i>Baumea articulata</i>	Unknown - ?	
	Pakihi sedge / peat bog sedge	<i>Baumea teretifolia</i>	Unknown – ?	
	Kohurangi	<i>Brachyglottis turneri</i>	Poor – patchy distribution	
	Swamp millet	<i>Isachne globosa</i>	Unknown - ?	
	Saltmarsh ribbonwood	<i>Plagianthus divaricatus</i>	Unknown – known site in Waitara River Scenic Reserve	
	Bladderwort	<i>Utricularia dichotoma</i>	Unknown - ?	

* Also considered to meet the 'distinctiveness' criterion of Policy 4 in section 9.1 of the RPS – refer section 2.4 of this paper.

Appendix IV: Naturally uncommon ecosystems

Table 12: Naturally uncommon ecosystems

Tentative 'common' name	Definition (ie, diagnostic classifiers) and notes	Vegetation structure
Coastal systems		
Dune deflation hollow	Raw/sand/depression/excessive drainage/coastal	Open land
Shell barrier beaches	Raw/shells/plain/coastal	Grassland, herbfield
Coastal turf	Raw/atmospheric salinity/coastal, extreme exposure	Open land, herbfield
Stony beach ridges	Raw-recent/gravel-cobbles/beach ridge/coastal	Scrub, shrubland, open land
Shingle beaches	Raw-recent/gravel-cobbles/beach/ coastal	Open land
Coastal rock stacks	Raw/silicic-intermediate and mafic bedrock/tor/coastal	Open land, herbfield, lichenfield, shrubland
Coastal cliffs on calcareous rock	Raw/calcareous rock/cliffs/coastal	Open land, lichenfield, herbfield, scrub, shrubland, tussockland
Ultramafic sea cliffs	Raw/ultramafic/cliffs/coastal	Scrub, herbfield, lichenfield, open land
Coastal cliffs: quartzose, acidic and basic	raw/quartzose, acidic or basic rock/cliffs/coastal	open land, lichenfield, herbfield, scrub, shrubland tussockland
Marine mammal influenced sites	Seabirds and marine mammals-trampling and grazing/coastal	Open land – forest
Inland and alpine systems with raw or recent soils		
Screes of calcareous rock	Raw/calcareous/gravel-cobbles/talus/ (excessive drainage – near permanently saturated; inland-alpine)	Open land
Recent lava flows (<1000 years)	Raw/silicic-intermediate (volcanic)/ boulders-bedrock (numerous landforms)	Scrub, shrubland, treeland, forest, herbfield, mossfield, open land
Old tephra (>500 years) plains (= frost flats)	Silicic-intermediate (volcanic)/ depression/seasonally fluctuating water table/inland, >200 frost days year	Shrubland, scrub, tussockland
Frost hollows	Terrace/>200 frosts per annum	Shrubland, scrub
Cliffs, scarps and tors of mafic rock	Raw/mafic/cliff, scarp and tor/inland-alpine	Open land, herbfield, tussockland, shrubland
Calcareous cliffs, scarps and tors	Raw/calcareous/cliff, scarp and tor/ inland-alpine	Open land, herbfield, tussockland, shrubland
Inland outwash gravels	Raw-recent/silicic/sand-boulders/ plain/inland	Open land, herbfield, treeland
Braided riverbeds	Raw-recent/ sand-boulders/plain/ periodically flooded (see Johnson and Gerbeaux, 2004, p56)	Open land, herbfield
Sandstone erosion pavement	Raw/quartzose sandstone/bedrock/ hillslope, hillcrest	Open land
Recent volcanic debris landforms: dunes	Raw/acidic rock (volcanics)/sand/dune	Open land
Recent volcanic debris landforms: lava flows, boulderfields, debris flows and tephra	Raw/acidic rock (volcanics)/silt-sand-gravel-cobbles-boulders-bedrock-talus	Scrub, shrubland, treeland, forest, herbfield, mossfield, lichenfield, open land

Tentative 'common' name	Definition (ie, diagnostic classifiers) and notes	Vegetation structure
Cliffs, scarps and tors: quartzose to acidic	Raw/quartzose or acidic rock/bedrock/cliff, scarp and tor/inland-alpine	Open land, herbfield, tussockland, shrubland
Ultrabasic landforms (incl. hills, cliffs, screes, boulderfields)	Ultrabasic rock/inland	Open land, lichenfield, herbfield, tussockland, shrubland, forest (very limited extent)
Boulderfields of selected rock types (acidic and calcareous)	Raw/acidic or calcareous rock/boulders/talus	Open land, lichenfield, shrubland
Limestone erosion pavements	Raw/limestone/bedrock/hillslope, hillcrest/(alpine)	Open land
Other inland systems		
Inland saline (salt pans)	Groundwater salinity/semi arid/depression (see also Johnson and Gerbeaux, 2004, pp 20, 22)	Herbfield, grassland
Leached terraces	Overmature/sand-gravel/terrace-plain/inland	Open land, herbfield, shrubland
Cloud forest	High cloud cover (<1500 sunshine hours and >200 rain days per annum)/inland	Forest
Geothermal systems		
Heated ground (dry)	Geothermal-excessive heat	Open land, mossfield, shrubland, scrub
Hydrothermally altered ground (now cool)	Geothermal-acid soils, toxic elements	Open land, shrubland, scrub
Acid rain systems	Geothermal-acid rain	Open land, scrub, treeland, forest
Fumeroles	Geothermal-superheated steam/acid rain/depression	Open land, shrubland
Geothermal streamsides	Geothermal-excessive heat/near permanently saturated (but water table not high)	
Subterranean or semi-subterranean		
Sinkholes	Raw/limestone, marble, dolomite/doline	Open land, shrubland, tussockland, flaxland
Cave entrances	Raw/limestone, marble, dolomite/cave entrance	Open land, herbfield

Appendix V: Descriptive schedule for identifying significant wetlands based upon the representativeness criterion

As outlined in section 7.2.7 above, it is proposed that the Freshwater Plan include a descriptive schedule as a tool for identifying and assessing the ‘significance’ of wetland habitats and the application of relevant policies and rules. Set out below is an example of what the descriptive schedule might look like, including the assessment criteria to assist the Council and resource users to identify significant wetlands in Taranaki based upon the representativeness criterion.

SCHEDULE XYZ OF THE PLAN: SIGNIFICANT WETLAND HABITAT TYPES

Preamble

A significant wetland habitat based upon the representativeness criterion is an area of vegetation or physical substrate which:

- (a) is a habitat type identified in Table 13 as being “Naturally Uncommon”, “Threatened” or “At-risk”,
- (b) meets at least one of the criteria described in Table 14 for the relevant habitat type, and
- (c) is not excluded by any of the criteria in Table 15.

Do I need a resource consent?

YES	If the area of vegetation or physical substrate is determined to be habitat type classified as “Naturally Uncommon”, “Threatened” or “At-risk” in Table 13 AND it meets any of the criteria in Table 14 AND it is not excluded by any of the criteria in Table 15.
NO	If: <ul style="list-style-type: none"> • the area of vegetation or physical substrate is determined to be habitat type that is not classified in Table 13; or • the area of vegetation or physical substrate is determined to be habitat type classified as “Rare”, “Threatened” or “At-risk” in 13 but does not meet any of the criteria in Table 14, or • the area of vegetation or physical substrate meets any of the criteria in Table 15.

Interpreting Table 13

Table 13 describes characteristics of habitat types as they are expressed at the regional scale. The “Habitat Type” column is a label only and is not intended as a habitat description.

The “Definition” column defines the meaning of the habitat type set out in the “Habitat Type” column.

The “Classification” column categories habitat types into ‘naturally uncommon’, ‘threatened’ or ‘at risk’. ‘Naturally uncommon’ habitat types refer to those originally (pre-human) rare in the landscape and remain so (refer Appendix IV above). ‘Threatened’ habitat types refer to those that have been reduced to 20% or less of their former extent. ‘At risk’ habitats refer to those that have been reduced to 20% to 30% of their former extent. Both ‘threatened’ and ‘at risk’ habitat types are considered highly representative of the former biodiversity pattern.

The “Further Description” column is to assist Plan users and is not definitive. Patches of any given wetland habitat type may not exhibit all elements considered characteristic of that habitat type. Some species listed may not be present, or be present in different abundances than indicated. Other species not listed can also be present. Sites of the same habitat type can exhibit differences from each other. Further, there may be differences in predicted composition and actual composition on the ground, particularly as a result of site modification and pest impacts.

Unless otherwise stated, the wetland habitat types in Table 13 comprise vegetation that is indigenous.

Table 13: Potentially significant wetland habitats – habitat types identified as threatened, rare or naturally uncommon in Taranaki

Habitat type	Definition (i.e. diagnostic classifiers) and notes	Classification	Further description
Riparian and wet forest habitats			
Wet forest supporting divaricating plant species	Indigenous forest, treeland, or scrub on alluvial terraces or floodplains in areas prone to summer drought and water-logging and frost during winter OR Indigenous forest, treeland, or scrub on freely draining shingle fans, river terraces and sand dunes	At risk	This habitat type supports threatened or regionally uncommon divaricating plant species. This habitat type may be the result of disturbance (naturally or human induced), contain exotic species and indigenous divaricating species, or be found in association with another habitat type (e.g. podocarp-broadleaf forest).
Wetland habitat types			
Dune slack wetland	Dune slack wetlands support low growing indigenous herbfield and occur in topographically low sites where wind has eroded hollows or depressions in raw sand, or where water is permanently or seasonally ponded.	Naturally uncommon	Dune slack wetlands are found close to the sea on sand country, and can comprise a mosaic of indigenous vegetation and bare sand. Exotic species are frequently present.
Ephemeral wetlands	Ephemeral wetlands support indigenous turf (<3 cm tall) species, indigenous rushland and indigenous scrub, are most frequently found in depressions lacking a surface outlet, and are characterised by a marked seasonal ponding and drying.	Naturally uncommon	Ephemeral wetlands are of moderate fertility, neutral pH and fed by groundwater or an adjacent water body. Seasonal variations in rainfall and evaporation result in seasonal variation in water level. Ephemeral wetlands may experience complete drying in summer months or dry years. Ephemeral wetlands are found on sand country (although they also occur elsewhere), and may comprise a mosaic of indigenous vegetation and bare sand. Fluctuations between aquatic and terrestrial plant species often occur and exotic species are frequently present.
Bog and fen wetland	Bog wetlands support indigenous mosses, lichens, cushion plants, sedges, grasses, restiads, ferns, shrubs and trees and are formed on peat with rainwater the only source of water. Fen wetlands support indigenous restiads, sedges, ferns, tall herbs, tussock grasses and scrub and are on predominantly peat. Fen wetlands receive inputs from groundwater and nutrients from adjacent mineral soils.	Threatened	Bog wetlands can be found on relatively level or gently sloping ground including hill crests, basins, terraces and within other wetland classes. Bog wetlands are nutrient poor, poorly drained and aerated, and usually acid. The water table is often close to or just above the ground surface. Fen wetlands can be found on slight slopes (e.g. fans), toes of hillsides, or on level ground without much accumulation of peat. Fen wetlands can grade into swamp wetland. Fen wetlands are of low to moderate acidity and fertility and the water table is usually close to or just below the surface. Bog wetlands and fen wetlands are often found in association with each other and are dominated by indigenous species, but exotic species can also be present.
Pakihi wetland	Pakihi wetlands support indigenous restiads, sedges, fernland, shrubland and heathland. Pakihi wetlands are rain-fed systems on mineral or peat, or mature, skeletal soils.	Naturally uncommon	Pakihi wetlands can be found on level to rolling or sloping land in areas of high rainfall. Pakihi wetlands are of very low fertility and low pH and are frequently saturated, but can be seasonally dry. Pakihi wetlands are often found in association with bog and fen wetlands. Exotic species can also be present.

Habitat type	Definition (i.e. diagnostic classifiers) and notes	Classification	Further description
Seepage and spring wetland	<p>Seepage wetlands support indigenous sedgeland, cushionfield, mossfield or scrub, occur on slopes, and are fed by groundwater.</p> <p>A spring wetland occurs at the point that an underground stream emerges at a point source.</p>	Naturally uncommon	<p>Seepage and spring wetlands can be found at the point of change of slopes and places where the water table is raised. Seepage wetlands are often also fed by surface water including where groundwater has percolated to the surface. Substrates (ranging from raw or well-developed mineral soil to peat), nutrient levels and pH vary from site to site.</p> <p>Seepage and spring wetlands are often small and can occur as isolated systems or in association with other wetland types. The volume of water within a seepage system is less than that within a spring system. Seepage and spring wetlands are dominated by indigenous species but exotic species can also be present.</p>
Swamp and marsh wetland	<p>Swamp and marsh wetlands support indigenous sedges, rushes, reeds, flaxland, tall herbs, herbfield, shrubs, scrub and forest.</p> <p>Swamp wetlands are generally of high fertility, receiving nutrients and sediment from surface run-off and groundwater.</p> <p>Marsh wetlands are mineral wetlands with good to moderate drainage that are mainly groundwater or surface water fed and characterised by fluctuation of the water table.</p>	Threatened	<p>Substrates within swamp and marsh wetlands are generally a combination of peat and mineral substrates. Standing water and surface channels are often present, with the water table either permanently, or periodically, above much of the ground surface.</p> <p>Swamp and marsh wetlands can usually be found on plains, valley floors and basins. Marsh wetlands can be differentiated from swamp wetlands by having better drainage, generally a lower water table and usually a more mineral substrate and higher pH. Exotic species are frequently present in both wetland types.</p>
Saltmarsh wetland	<p>Saltmarsh wetlands support herbfield, rushland and scrub, form within areas of tidal intertidal zones, and are fed from groundwater and estuary waters. Saltmarsh wetlands occur in association with mudflats.</p>	Threatened	<p>Water within a saltmarsh wetland can be saline or brackish. Substrates are typically mineral.</p> <p>Saltmarsh wetland can comprise a mosaic of indigenous species and bare substrate (mudflats). Exotic species can be present. In some places the mudflats can be extensive and are characteristic of estuarine wetland systems.</p>
Lakes and lagoons and their margins	<p>Lakes and lagoons support indigenous aquatic plants (emergent, floating, submerged or rafted), and indigenous rushes, reeds, sedges, sedgeland, flaxland, reedland turf (< 3 cm tall), herbfield, scrub and shrubs on the margins. Indigenous terrestrial vegetation (such as scrub, shrub species, shrubland, treeland and forest) can also be found in association with lake and lagoon margins.</p> <p>Lakes are areas of standing (non flowing) water. Lagoons are shallow lakes, connected to, or independent of, a river, lake or the sea.</p>	Threatened	<p>Lakes and lagoons in the region are associated with dune, river, and volcanic landforms and include dune lakes, ox-bow lakes and tarns.</p> <p>Lakes and lagoons can exist in isolation, be entirely within, or have elements of, other wetland habitat types. Exotic species (aquatic, wetland or terrestrial) may also be present.</p>

Table 14: Assessment criteria for confirming the values of potentially significant wetland habitat types identified as threatened, rare or naturally uncommon in Taranaki

An area of any habitat type described in Table 13 must also meet at least one of the following criteria that apply to the relevant habitat type before it qualifies as a significant freshwater habitat for the purposes of this Plan

Riparian and wet forest habitat types classified as at risk

1. Areas of continuous indigenous vegetation where the habitat must cover at least 2.0 ha where:
 - (a) it supports indigenous understorey vegetation, or
 - (b) it is present within a gully system.

Or

2. An area of woody vegetation of any size or species composition (including exotic vegetation) up to the top of the river bank adjacent to an area identified as being a Site of Significance – aquatic biodiversity.

Or

3. Areas of indigenous vegetation that have been established for the purpose of habitat manipulation including habitat creation, restoration and buffering, where such an area covers at least 2.0 ha as a discrete site.

Or

Wetland habitat types classified as threatened

4. Areas of naturally occurring or artificially created indigenous wetland habitat covering at least 2.0 ha.

Or

5. Areas of indigenous vegetation that have been established in the course of wetland habitat restoration.

Or

Wetland habitat types classified as naturally uncommon

6. Habitat type that is classified as Naturally Uncommon that covers at least 2.0 ha.

Or

7. Areas of indigenous habitat created at some time in the course of dune habitat restoration (including dune stabilisation).

Table 15: E Assessment criteria for confirming values are not of regional significance

If an area of any habitat type described in Table 14 meets any of the following criteria it must not be significant freshwater habitat for the purposes of this Plan.

Riparian and wet forest habitat types classified as at-risk

1. Areas of indigenous tree species planted for the purposes of timber harvest.

Or

2. Indigenous vegetation planted for landscaping, horticultural, shelter belts, gardening or amenity purposes and which are not requirements of a regional rule or resource consent authorised by the Taranaki Regional Council.

Or

Wetland habitat types classified as threatened or naturally uncommon

3. Damp gully heads, or paddocks subject to regular ponding, dominated by pasture or exotic species in association with wetland sedge and rush species.

Or

4. Ditches or drains supporting raupo, flax or other wetland species (e.g. *Carex sp.*, *Isolepis sp.*), or populations of these species in drains or slumps associated with road reserves or rail corridors.

Or

5. Areas of wetland habitat specifically designed, installed and maintained for any of the following purposes:

- (a) stock watering (including stock ponds), or
- (b) water storage for the purposes of fire fighting or irrigation (including old gravel pits), or
- (c) holding of animal effluent (including pond or barrier ditch systems), or
- (d) wastewater treatment, or
- (e) sediment control, or
- (f) any hydroelectric power generation scheme, or
- (g) water retention and storage for the purposes of public water supplies or flood protection.

Or

6. Areas of wetland habitat maintained in relation to the implementation of any resource consent conditions or agreements relating to the operation of any hydroelectric power scheme currently lawfully established.

Or

7. Open water and associated vegetation created for landscaping purposes or amenity values where the planted vegetation is predominately exotic, or includes assemblages of species not naturally found in association with each other, on the particular landform, or at the geographical location of the created site.

Appendix VI: Sites of significance – biodiversity

Table 16: Sites of significance in Taranaki –biodiversity

Water management Zone	Sub-zone	Site	Locality description	Species
			From the confluence with a tributary at approx.. NZMS To approx.. NZMS to source	Lamprey
			At approx.. NZMS	Brown mudfish
		Maitahi wetland*	P19:935325	Spotless crane, Australasian bittern

Appendix VII: Costs and benefits of regulatory options for protecting wetlands

The proposal

In relation to wetlands, two significant changes are proposed in section 7.2.7 of this paper. They are:

1. amend the rules to target the protection of wetlands two hectares or over (instead of five)
2. resource consent relating to wetlands two hectares or over (plus smaller wetlands identified as providing habitat for threatened and distinctive species) will be processed as a non-complying activity instead of a discretionary activity.

Set out below is a desktop evaluation of the implications of setting different size thresholds for wetlands in a regional rule. The evaluation provides an indication of the benefits and costs of protecting wetlands based upon their size threshold, including diminishing returns.

Baseline information

Baseline information for this desktop evaluation was based upon the dataset provided by Landcare Research for its 2010 study (refer section 5.2.1 above). Table 17 below shows the number and areal extent of wetlands by the individual size classes. From this table, cumulative totals to determine what areal extent and number of wetlands would be captured by a rule can be generated by totalling all the classes above a nominated size threshold.

Table 17: Potential size thresholds for the application of rules addressing individual wetlands

Potential size threshold classes for wetlands	Number of wetlands		Areal extent (hectares) of wetlands	
	No. of sites	% of total no. of sites	Areal extent (ha)	% of total ha. of sites
<0.5 ha	295	28%	106.4	3%
0.5-1.0 ha	354	33%	253.8	11%
1.0-1.5 ha	125	12%	151.1	4%
1.5-2.0 ha	70	6%	123	4%
2.0-2.5 ha	45	4%	101.7	3%
2.5-3.0 ha	34	3%	93	3%
3.0-3.5 ha	17	2%	55.8	2%
3.5-4.0 ha	18	2%	68	2%
4.0-4.5 ha	7	1%	29.7	1%
4.5-5.0 ha	7	1%	33	1%
>5.0 ha	88	8%	2321.1	69%
Total	1,060*	100%	3,336.6	100%

* This total is different from the 1,157 identified in the 2010 study undertaken by Landcare Research as, for the purposes of this evaluation, individual polygons adjacent to other polygons were merged.

Benefits

The benefits of rules that control resource use in wetlands is that it imposes a consenting and compliance regime to ensure that representativeness values associated with those wetlands are safeguarded. It is essentially a default position with increased certainty and clarity around what wetlands are to be protected because of their representativeness value, i.e. the wetlands identified as being significant for being an indigenous habitat type that is under-represented nationally.

Costs

Administration costs

Administration costs are the costs incurred by Council to implement the regulatory and non-regulatory methods of the Plan.

The Council's administrative costs associated with the regulatory provisions of any wetland rule relate primarily to the consenting process and includes the provision of advice, responding to enquiries, assisting with impact assessments, and the processing and consideration of resource consent applications. Costs associated with compliance monitoring and the enforcement of rules and resource consents are also incurred by the Council.

As noted in section 7.2.7 of this paper, the administrative costs associated with the regulatory provisions of any rule controlling activities with actual or potential impacts on wetlands can be significant and are likely to exponentially increase depending upon the number of wetlands covered by the standard, terms and conditions of the rule.

Compliance costs

Compliance costs are the costs incurred by land occupiers to comply with rules relating to the protection of wetlands. The compliance costs may be twofold:

1. direct costs to obtain a consent and or comply with standard, terms and conditions of a rule and resource consent. Typically consenting costs associated with land drainage or stream realignments would be in the order of \$1,500 to \$1,800
2. lost opportunity costs, which is the cost to a resource user from not being able to realise the potential productive value of the land by converting a wetland to other land uses.⁴⁴

Scenarios for the benefits and costs of adopting different size thresholds

Figure 17 below outlines, in relation to specific size thresholds, the relative benefits and costs anticipated from the application of rules addressing individual wetlands.

The Freshwater Plan currently has rules protecting wetlands over **five hectares**. Based upon the Landcare Research, there are only 88 wetlands greater than five hectares (representing 8% of all wetlands). However, they cover 69.6% of the areal extent of all wetlands mapped in Taranaki. As only 88 wetlands are affected, this option imposes the least administration cost on Council and the least compliance costs on resource users. However, of the options considered, it captures the least amount of wetlands.

There are many lower size thresholds that the Council could consider for inclusion in a rule that would capture a greater number and areal extent of wetlands. For example if rules were to target the protection of wetlands over two hectares, the number of wetlands covered and protected by the rule increases to 216 wetlands (representing 20.4% of all wetlands). However they cover 81.0% of the areal extent of all wetlands mapped in Taranaki. This scenario captures an addition 128 wetlands, so while

⁴⁴ For most land occupiers, the costs of drainage are likely to outweigh the benefits of increased pasture productivity. In a Council report 'Small stream modification in Taranaki' it was estimated that 200 metres of piping could cost from \$5,000 to \$20,000, excluding the cost of consents. Notwithstanding any-increase in pasture productivity it is likely to take many years for that work to realise a financial benefit.

it imposes added administration cost on Council and added compliance costs on resource users it significantly adds to the total area of wetlands protected.

Other scenarios for adopting a lower size threshold for wetlands (e.g. the Horizons Regional Council’s *Proposed One Plan* captures wetlands as small as 0.05 hectares) capture additional wetlands. This scenario continues to see an increase in the number and areal extent of wetlands. However, the likely regulatory costs increase exponentially as small wetlands are captured by any rule for not much increase in the areal extent of wetlands covered.

Of the scenarios considered, the option of rules targeting **wetlands two or more hectares** is preferred. The benefit of the Freshwater Plan adopting a lower size threshold is that a minimum of 81% of the areal extent of wetlands in Taranaki are accorded regulatory protection (compared with 70% under the current rules).⁴⁵ In so doing Taranaki is well positioned to protect the representativeness value of wetlands.⁴⁶

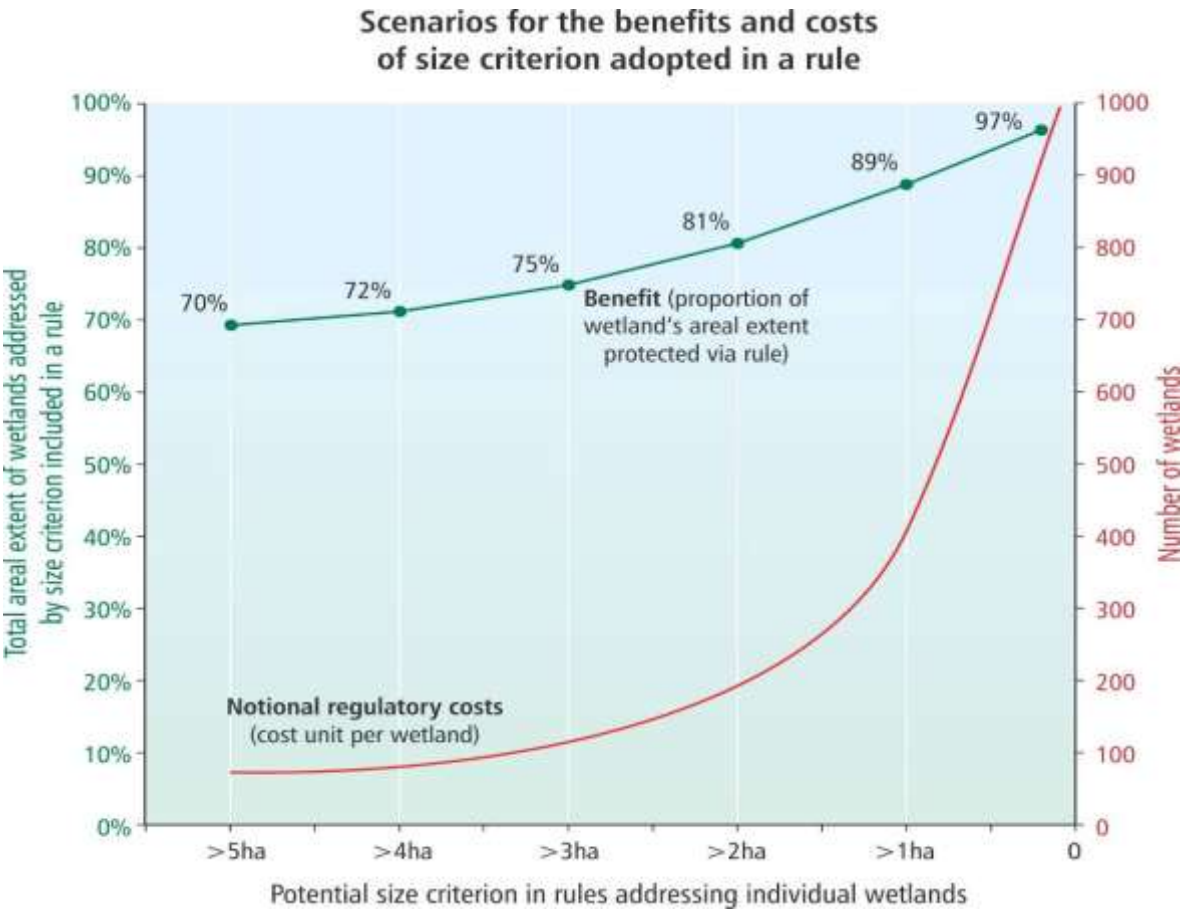


Figure 17: Scenarios for the benefits and costs of adopting different size thresholds in a rule

⁴⁵ It is anticipated that the 'real' figure of wetlands protected by a revised regulatory framework would be much higher through other proposed changes to the Freshwater Plan that capture wetlands below two hectares, which provide habitat for threatened and regionally distinctive species or which lie on intensively farmed land and must be fenced and planted by 1 July 2020.

⁴⁶ The size threshold is targeting the value of wetlands as an indigenous habitat type that is under-represented nationally. Other wetlands may also be identified as significant for providing habitat that supports indigenous species classed as nationally threatened or regionally distinctive or for their ecological context.

Assumptions

Wetlands identified as significant are based upon the representativeness criterion only. These are wetlands identified as being significant for being an indigenous habitat type that is under-represented nationally. Other wetlands may also be identified as significant for providing habitat that supports indigenous species classed as nationally threatened or regionally distinctive or for its ecological context.

The number and percentage of wetlands covered by potential size thresholds is likely to be an under estimate of wetlands protected by regional rules as other smaller sites that provide habitat for threatened and regionally distinctive species would be protected by other standards, terms and conditions in regional rules.

Consent processing, inspectorial and enforcement costs associated administering any rule relating to the protection of wetlands are unlikely to differ significantly regardless of the size of a wetland (i.e. the cost of a consent application for 0.5 hectares wetland is likely to be similar to that for a five hectare wetland).

Wetlands not captured by a rule's size threshold are able to be addressed by other rules and avenues such as the Riparian Management Programme and non regulatory wetland and KNE programmes.

