

M A Brophy
Compliance Monitoring Programme
Annual Report
2012-2013

Technical Report 2013-70

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Executive summary

MA Brophy's property, located on the corner of Mid Parihaka Road and Wiremu Road, Pungarehu, contains an area of regionally significant protected wetland covering approximately 3.15 ha. The wetland is protected by a Queen Elizabeth II National Trust Open Space Covenant (Ref: 5/6/067).

In order to increase the area of useable land available for farming purposes, MA Brophy (Brophy) applied for resource consent to drain and back-fill two man-made ponds in the vicinity of the wetland, and to excavate two unnamed tributaries of the Waitotoroa Stream for land improvement purposes. Resource consent 6503-1, authorising the proposed activities, was granted by the Taranaki Regional Council (the Council) on 23 June 2006. The consent includes a number of special conditions, setting out specific requirements with which the consent holder must comply.

This report for the period July 2012 - June 2013 describes the monitoring programme implemented by the Council to assess the impact of the exercising of consent 6530-1 on the wetland. The monitoring programme implemented for the year under review included three general site inspections, wetland water level monitoring, and a baseline wetland condition assessment.

The monitoring carried out indicates that the water levels within the wetland remained consistent across the monitoring period, and demonstrated little seasonal variation. The baseline wetland condition assessment indicated the wetland to be in "Fair" condition.

There were no Unauthorised Incident/s (UI/s) recorded in respect of this consent holder during the period under review. However, some consent condition requirements have been noted for follow up during the forthcoming monitoring period.

During the year, the consent holder demonstrated a 'good' level of environmental performance and compliance with resource consent 6503-1.

For reference, in the 2012-2013 year, 35% of consent holders in Taranaki monitored through tailored compliance monitoring programmes achieved a high level of environmental performance and compliance with their consents, while another 59% demonstrated a good level of environmental performance and compliance with their consents.

This report includes recommendations to be implemented during the 2013-2014 monitoring period.

Table of contents

	Page
1. Introduction	1
1.1 Compliance monitoring programme reports and the Resource Management Act 1991	1
1.1.1 Introduction	1
1.1.2 Structure of this report	1
1.1.3 The Resource Management Act (1991) and monitoring	1
1.1.4 Evaluation of environmental performance	2
1.2 Background	3
1.2.1 Regionally significant protected wetland QEII Covenant 5/06/067	3
1.3 Resource consent	4
1.4 Monitoring programme	7
1.4.1 Introduction	7
1.4.2 Programme liaison and management	7
1.4.3 Site inspections	7
1.4.4 Groundwater level monitoring	7
1.4.5 Baseline wetland condition assessment	7
2. Results	8
2.1 Site inspections	8
2.2 Groundwater level monitoring	8
2.3 Baseline wetland condition assessment	10
3. Investigations, interventions and incidents	13
4. Discussion	14
4.1 Environmental effects of exercise of consent	14
4.2 Evaluation of performance	14
4.3 Alterations to the monitoring programme for 2013-2014	15
4.4 Exercise of optional review of consent	16
5. Recommendations	17
Glossary of common terms and abbreviations	18
Bibliography	19
Appendix I Consent exercised in 2012-2013 period	
Appendix II Wetland condition assessment field sheet	

List of tables

Table 1	Groundwater level measurements (2012-2013)	9
Table 2	Baseline wetland condition assessment	10
Table 3	Summary of performance for consent 6503-1 (2012-2013)	15

List of figures

Figure 1	Boundary of Brophy property (red) and wetland area (blue)	6
Figure 2	Location of groundwater piezometers	8
Figure 3	Static water level measurements from piezometers and total daily rainfall values	9

List of photos

Photo 1	Brophy wetland area	4
Photo 2	Excavated outflow drain	5

1. Introduction

1.1 Compliance monitoring programme reports and the Resource Management Act 1991

1.1.1 Introduction

This report is the Annual Report for the period July 2012- June 2013 by the Taranaki Regional Council (the Council) describing the monitoring programme associated with the resource consent held by MA Brophy (Brophy) for land improvement works in the vicinity of regionally significant protected wetland. The consent holder operates a farm located on corner of Mid Parihaka Road and Wiremu Road, Pungarehu. The wetland is also located within this property.

This report covers the results and findings of the monitoring programme implemented by the Council in respect of the consent held by Brophy for land improvement works. This is the first Annual Report to be prepared by the Council in relation to the monitoring of this consent and the potential effects of the activity on the wetland.

1.1.2 Structure of this report

The following report comprises four sections as follows:

- Section 1 of this report is a background section. It sets out general information about compliance monitoring under the Resource Management Act (the Act) and the Council's obligations and general approach to monitoring sites through annual programmes. Also included are details of the resource consent held by Brophy for land improvement works in the vicinity of the wetland area, a description of the activities and operations conducted within the site, and the nature of the monitoring programme in place for the period under review.
- Section 2 presents the results of monitoring during the period under review, including scientific and technical data.
- Section 3 discusses the results, their interpretations, and their significance for the environment.
- Section 4 presents recommendations to be implemented in the 2013-2014 monitoring year.

A glossary of common abbreviations and technical terms, a bibliography and appendices are presented at the end of the report.

1.1.3 The Resource Management Act (1991) and monitoring

The Act primarily addresses environmental 'effects' which are defined as positive or adverse, temporary or permanent, past, present or future, or cumulative. Effects may arise in relation to:

- (a) the neighbourhood or the wider community around an activity, and may include cultural and socio-economic effects;

- (b) physical effects on the locality, including landscape, amenity and visual effects;
- (c) ecosystems, including effects on plants, animals, or habitats, whether aquatic or terrestrial;
- (d) natural and physical resources having special significance (e.g., recreational, cultural, or aesthetic); and
- (e) risks to the neighbourhood or environment.

In drafting and reviewing conditions on consents, and in implementing monitoring programmes, the Council is recognising the comprehensive meaning of 'effects' inasmuch as is appropriate for each activity. Monitoring programmes are not only based on existing consent conditions, but also on the obligations of the Act to assess the effects of the exercise of consents. In accordance with section 35 of the Act, the Council undertakes compliance monitoring for consents and rules in regional plans; and maintains an overview of performance of resource users against regional plans and consents. Compliance monitoring, (covering both activity and impact), also enables the Council to continuously assess its own performance in resource management as well as that of resource users, particularly consent holders. It also enables the Council to continually re-evaluate its approach to resource management, and ultimately, through the refinement of methods, and considered responsible resource utilisation, to move closer to achieving sustainable development of the regions resources.

1.1.4 Evaluation of environmental performance

Besides discussing the various details of the performance and extent of compliance by the consent holder(s) during the period under review, this report also assigns an overall rating. The categories used by the Council, and their interpretation, are as follows:

- a **high** level of environmental performance and compliance indicates that essentially there were no adverse environmental effects to be concerned about, and no, or inconsequential (such as data supplied after a deadline) non-compliance with conditions.
- a **good** level of environmental performance and compliance indicates that adverse environmental effects of activities during the monitoring period were negligible or minor at most, or, the Council did not record any verified unauthorised incidents involving significant environmental impacts and was not obliged to issue any abatement notices or infringement notices, or, there were perhaps some items noted on inspection notices for attention but these items were not urgent nor critical, and follow-up inspections showed they have been dealt with, and any inconsequential non compliances with conditions were resolved positively, co-operatively, and quickly.
- **improvement desirable (environmental) or improvement desirable (administrative compliance)** (as appropriate) indicates that the Council may have been obliged to record a verified unauthorised incident involving measurable environmental impacts, and/or, there were measurable environmental effects arising from activities and intervention by Council staff was required and there were matters that required urgent intervention, took some time to resolve, or remained unresolved at the end of the period under review, and/or, there were

on-going issues around meeting resource consent conditions even in the absence of environmental effects. Abatement notices may have been issued.

- **poor performance (environmental) or poor performance (administrative compliance)** indicates generally that the Council was obliged to record a verified unauthorised incident involving significant environmental impacts, or there were material failings to comply with resource consent conditions that required significant intervention by the Council even in the absence of environmental effects. Typically there were grounds for either a prosecution or an infringement notice.

For reference, in the 2012-2013 year, 35% of consent holders in Taranaki monitored through tailored compliance monitoring programmes achieved a high level of environmental performance and compliance with their consents, while another 59% demonstrated a good level of environmental performance and compliance with their consents.

1.2 Background

The Act defines a wetland as "*...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*".

Prior to European settlement much of the Taranaki landscape was covered in wetlands, but since that time 98.5% of these areas have been drained or filled for agricultural production and urban development, leaving the region with a relative scarcity of wetland habitats. Due to their scarcity, the remaining wetlands have a heightened ecological value.

Outside the Egmont National Park, most of the remaining wetlands within Taranaki are small and surrounded by farmland. With the increasing intensification of land use in Taranaki, wetlands are continuing to be lost to land drainage and development or are being adversely affected by land management practices. Many wetlands are unfenced and grazed by livestock.

Wetlands are critically important to the conservation of a wide variety of native and valued introduced species. As wetlands continue to be lost and degraded or otherwise affected due to agricultural and urban activities, those flora and fauna species that depend on them for their survival will also decline and, some species may eventually disappear from areas due to a lack of habitat.

Wetlands are also valued for reasons other than their rarity. They perform important hydrological functions by storing water and regulating water flows during heavy rains, and off setting low flows during dry periods. They also provide ecological linkages with terrestrial and other aquatic ecosystems.

1.2.1 Regionally significant protected wetland QEII Covenant 5/06/067

The drainage activities permitted by consent 6503-1 have occurred immediately adjacent to a regionally significant protected wetland. The wetland is protected by a Queen Elizabeth II National Trust (QEII Trust) Open Space Covenant (Ref: 5/6/067), which covers an area of approximately 3.15 ha.



Photo 1 Brophy wetland area

The provisions of the Regional Fresh Water Plan for Taranaki (RFP) mean that the drainage of any part of the wetland area contained within the boundary of the QEII Covenant area is prohibited.

1.3 Resource consent

The primary concern in processing resource consents under the Act is to ensure that adverse effects on the environment are avoided, remedied or mitigated.

Resource Consent 6503-1, *“to drain and fill-in two man-made ponds in the vicinity of a regionally significant protected wetland and to excavate two unnamed tributaries of the Waitotoroa Stream for land improvement purposes,”* was granted on 23 June 2006. All resource consents are issued by the Council under Section 87(e) of the Act.

As part of the application process for consent 6503-1, the applicant obtained written approval from parties whom the Council considered may be adversely affected by the activity in accordance with section 94(2) of the Act. These parties included:

- Department of Conservation;
- Fish & Game New Zealand;
- Queen Elizabeth II Trust; and
- Te Parihaka Papakainga Trust.

The earth works associated with the draining and backfilling of the man-made ponds, and the excavation of the two unnamed tributaries, commenced on 12 December 2007.



Photo 2 Excavated outflow drain

The consent was issued with 14 special conditions, as summarised below:

- Special condition 1 requires the best practicable option to be adopted when exercising the consent;
- Special condition 2 requires the exercise of the consent to be in accordance with the application;
- Special conditions 3 and 5 refer to notification requirements prior to works;
- Special condition 4 sets specific time frames for when the consent can be exercised;
- Special condition 6 refers to the setting of base levels for the outflows;
- Special condition 7 sets out the requirement for the base levels of the outflows to be surveyed;
- Special condition 8 prohibits deepening the outflow to greater than the surveyed base level;

- Special condition 9 requires fencing and riparian planting of the outflows once excavation has been completed;
- Special conditions 10 and 11 relate to the protection of fish passage and the adjacent regionally significant protected wetland;
- Special condition 12 outlines obligations of monitoring costs;
- Special condition 13 details the consent lapse; and
- Special condition 14 contains review provisions.

Provided that consent 6503-1 is exercised in accordance with the special conditions attached to it, it is considered that the adverse effects on the environment from the activity will be no more than minor.

The Council waived its option to review consent 6503-1 in June 2007 and June 2013, as it was deemed that the consent conditions were adequate to deal with the potential adverse effects of the activity. There are no further optional reviews for consent 6503-1 before its expiry on 1 June 2019.

Figure 1 shows the location of the property at which the consent is held. A copy of the consent certificate is included in Appendix I of this report.

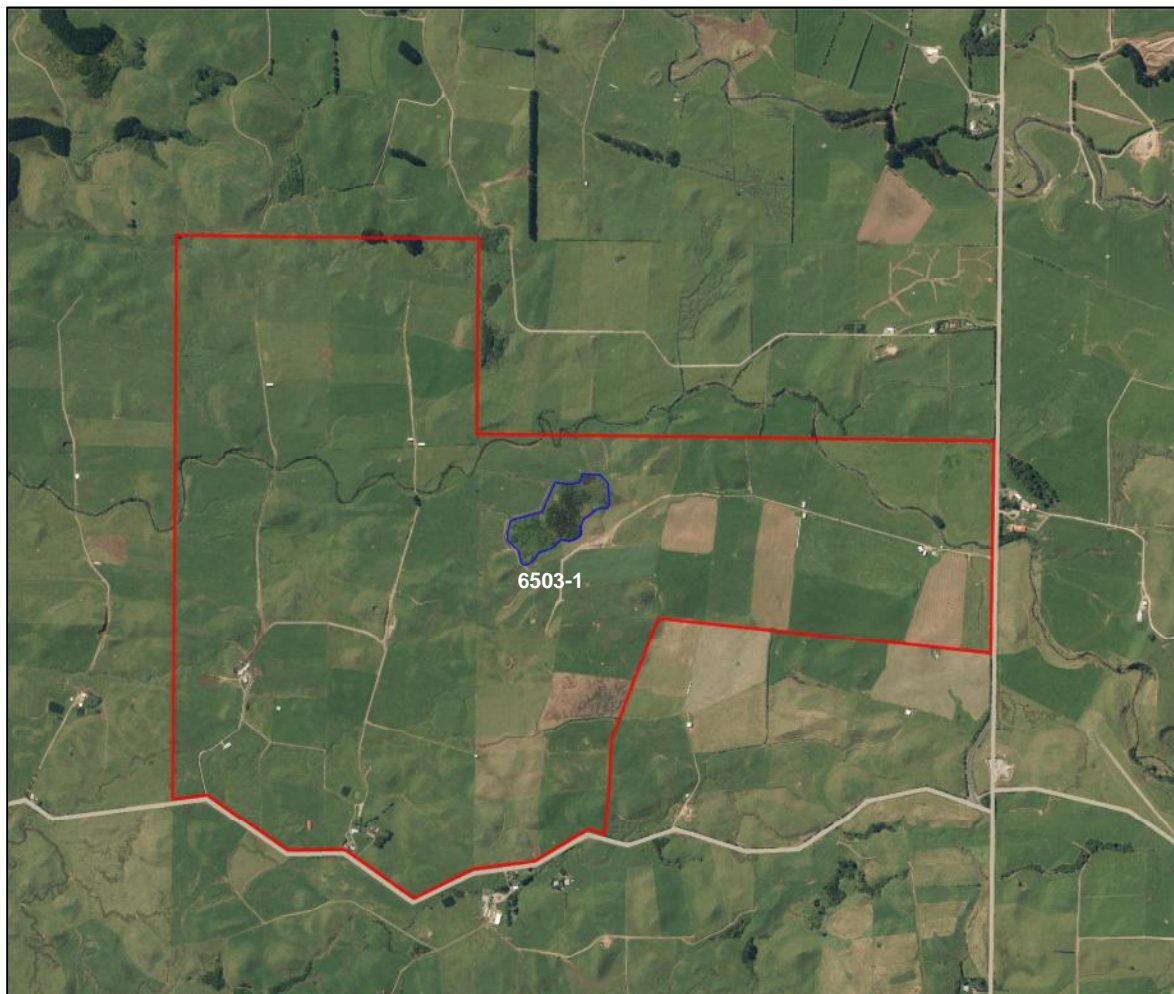


Figure 1 Boundary of Brophy property (red) and wetland area (blue)

1.4 Monitoring programme

1.4.1 Introduction

Section 35 of the Act sets obligations upon the Council to gather information, monitor, and conduct research on the effects arising from consented activities within the Taranaki region and report upon these.

To perform its statutory obligations, the Council may be required to take and record measurements of physical and chemical parameters, take samples for analysis, carry out surveys and inspections, conduct investigations and seek information from consent holders.

The monitoring programme implemented by the Council in relation to consent 6503-1 consisted of four main components.

1.4.2 Programme liaison and management

There is generally a significant investment of time and resources by the Council in ongoing liaison with resource consent holders over consent conditions and their interpretation and application:

- in discussion over monitoring requirements
- preparation for any reviews
- renewals
- new consents
- advice on the Council's environmental management strategies and content of regional plans and
- consultation on associated matters.

1.4.3 Site inspections

The site was visited three times during the 2012-2013 monitoring period. Routine inspections included undertaking a general visual assessment of the wetland and surrounding area, including the previously back-filled and excavated areas.

1.4.4 Groundwater level monitoring

During inspection visits, water level measurements were obtained from piezometers installed within the wetland boundary.

1.4.5 Baseline wetland condition assessment

A baseline wetland condition assessment was carried out during the period under review. The wetland assessment involves 'scoring' key indicators of wetland condition. The sum of the indicator scores is used to classify the overall condition of the wetland. The assessment can identify key areas of wetland health that require further monitoring or protection, and to track any changes in wetland condition over time.

2. Results

2.1 Site inspections

During the period under review, the Council carried out three routine inspections of the wetland and surrounding site area. Inspections were undertaken on 14 September 2012, 16 January 2013 and 24 May 2013. No environmental or consent compliance issues were identified during inspection visits.

2.2 Groundwater level monitoring

During the initial site works carried out in December 2007, three piezometers were installed in order to monitor wetland water levels. Two piezometers were installed within the wetland boundary, and one outside the wetlands south-western boundary. During the site visit on 4 September 2012, only the two piezometers within the wetland area were able to be located (GND2110 and GND2111). The above ground section of the piezometer located outside the wetland area (GND2112) appears to have been destroyed by stock or farm machinery, making it impossible to locate. At this stage, there is no requirement for GND2112 to be replaced. The locations of the two accessible piezometers, and the approximate location of GND2112, are illustrated in Figure 2.



Figure 2 Location of groundwater piezometers

Groundwater level measurements were taken from the two accessible piezometers during inspection visits. The results of the monitoring are detailed in Table 1.

The water level measurement data is plotted with daily rainfall values in Figure 3. Rainfall values have been taken from the Stony River rainfall station at Mangatete Bridge, located approximately 6.5 km north of the Brophy site. Total annual rainfall at the Brophy site is estimated to be in the region of 2,000 mm.

Table 1 Groundwater level measurements (2012-2013)

Date	Season	GND2110 Static water level (mbTOC*)	GND2111 Static water level (mbTOC*)
14 September 2012	Spring	0.630	0.380
16 January 2013	Summer	0.530	0.374
24 May 2013	Autumn	0.520	0.336

* mbTOC = metres below top of casing

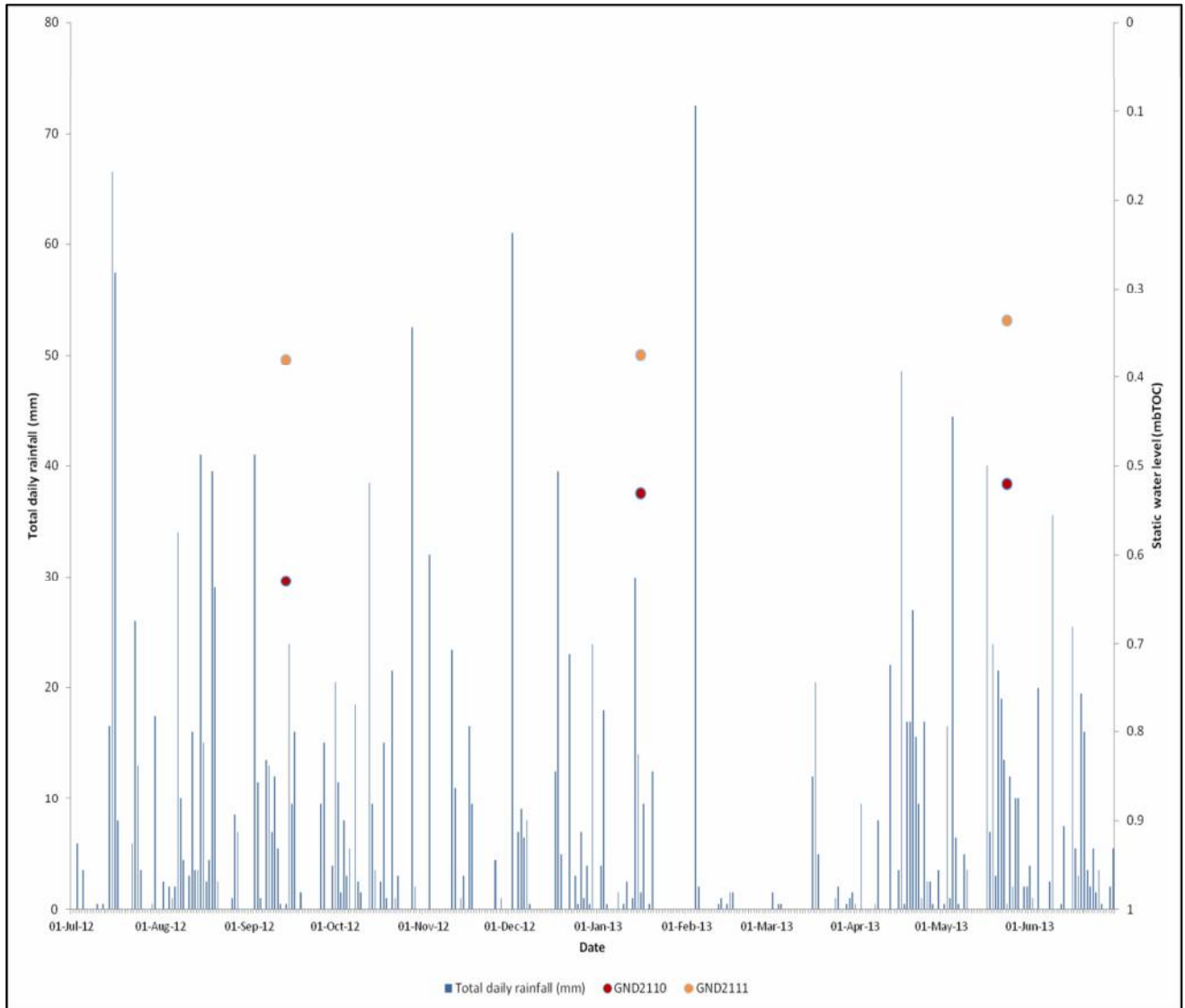


Figure 3 Static water level measurements from piezometers and total daily rainfall values

2.3 Baseline wetland condition assessment

A baseline wetland condition assessment was conducted on 4 September 2012. The wetland was assigned a score of 15.1 out of a possible 25 points. This score represents a wetland in “Fair” condition. The categories and scores used to assess the condition of the wetland are detailed in Table 2. The field sheet for the assessment, which includes site observation notes and photographs, is included in Appendix II.

Table 2 Baseline wetland condition assessment

Theme	Indicator	Score	Mean score
1.0. Hydrological integrity	1.1. Water table depth	0) Original wetland is totally artificially drained/flooded	3.0
		1) 75-99% of wetland is artificially drained/flooded	
		2) 50-74% of wetland is artificially drained/flooded	
		3) 25-54% of wetland is artificially drained/flooded	
		4) 1-24% of wetland is artificially drained/flooded	
	5) No artificial drainage/flooding		
	1.2. Dry-land plant invasion within wetland (area covered by water)	0) All species within wetland are dry-land plant species	
		1) > 75% cover by dry-land plant species	
		2) 50-74% cover by dry-land plant species	
		3) 25-49% cover by dry-land plant species	
4) < 25% cover by dry-land plant species			
5) no/virtually no dry-land plant invasion			
2.0. Physicochemical parameters	2.1. Fire damage within wetland	0) Above ground vegetation completely destroyed	2.8
		1) >75% of vegetation removed by recent fires	
		2) 51-74% of vegetation removed by recent fires or >75% recovering from older fires	
		3) 25-49% of wetland vegetation removed by recent fire or 50-74% recovering from older fires	
		4) <25% of wetland vegetation removed or vegetation virtually recovered from older fires	
	5) No evidence of fire damage		
	2.2. Buffer vegetation (area not under water, i.e., where land and water meet)	0) 0% with native buffer >10m wide or <26% with native buffer 3-10m wide or <50% with native buffer <3m wide	
		1) 1-25% with native buffer >10m wide or 26-49% with native buffer 3-10m wide or 50-75% with native buffer 1-3m wide	
		2) 26-49% with native buffer >10m or 50-74% with native buffer 5-10m wide or 75-99% with native buffer 3-10m	
		3) 50-74% with native buffer >10m or 74-99% with native buffer 3-10m or 100% with native buffer 1-3m wide.	
		4) 75-99% with native buffer >10m or 100% w. buffer 5-10m wide	
	5) 100% with buffer>10 m wide		
	2.3. Catchment land use: urban/ industrial	0) 100% of catchment in urban/industrial land use	
		1) 75-99% of catchment in urban/industrial land use	
		2) 50-74% of catchment in urban/industrial land use	
		3) 25-59% of catchment in urban/industrial land use	
4) 1-24% of catchment in urban/industrial land use			
5) 0% of catchment in urban/industrial land use			
2.4. Catchment land use: agriculture	0) 100% of catchment in agricultural/silvicultural land use		
	1) 75-99% of catchment in agricultural/silvicultural land use		
	2) 50-75% of catchment in agricultural/silvicultural land use		
	3) 25-50% of catchment in agricultural/silvicultural land use		

Theme	Indicator	Score	Mean score
		4) 1-25% of catchment in agricultural/silvicultural land use	
		5) 0% of catchment in agricultural/ silvicultural land use	
	2.5. Riparian planting	0) No streams are fenced/have riparian vegetation	
		1) Most streams unfenced with no riparian vegetation	
		2) Most streams are fenced but not planted/vegetated	
		3) Some streams fenced with riparian vegetation	
		4) Most streams fenced with sparse/ young riparian vegetation	
		5) Most streams fenced with well established riparian vegetation	
	2.6. Sediment input	0) Recent earthworks or freshly dug drains &/or severe erosion* in catchment, widespread burial of vegetation by sediment, water v. turbid.	
		1) Recent earthworks or excavation &/or severe erosion* in catchment, some sediment deposits or burial of vegetation by sediment, water moderately turbid.	
		2) Moderate erosion evident, water slightly turbid. Sediment deposits /vegetation burial minimal.	
		3) Some erosion* evident, water clear-slightly turbid, sediment deposits non-existent - minimal	
		4) Minor erosion* evident, water is clear, no sediment deposits or burial of vegetation evident.	
5) No sources of sediment/erosion* evident in catchment, water is clear, no sediment deposits are visible.			
3.0. Ecosystem intactness	3.1. Size	0) 100% of original wetland lost or almost lost but remnants entirely modified	2.7
		1) > 75% of original wetland area lost	
		2) 50-75% of original wetland area lost	
		3) 25-50% of original wetland extent lost	
		4) 1-25% of original wetland area lost	
		5) No loss of wetland area: original wetland area intact	
	3.2. Fish access	0) There is no inflow or outflow from the wetland or these are completely blocked by culverts/structures	
		1) 75-99% of connection(s) blocked	
		2) 50-75% of connection(s) blocked	
		3) 25-50% of connection(s) blocked	
		4) 1-25% of connection(s) blocked	
	5) There are inputs & outputs that are not impeded		
	3.3. Vegetation clearance/damage	0) All wetland vegetation lost due to clearance/damage	
		1) 75-99% of vegetation lost due to clearance/damage	
		2) 50-75% of vegetation lost due to clearance/damage	
3) 25-50% of vegetation lost due to clearance/damage			
4) 1-25% of vegetation lost due to clearance/damage			
5) No vegetation lost due to clearance damage			
4.0. Browsing, predation & harvesting	4.1. Stock damage	0) No fencing, stock in wetland, browsing/pugging severe	3.3
		1) No fencing, stock in wetland, browsing/pugging moderate	
		2) Partially fenced, some stock access, browsing/pugging	
		3) Fenced but fence in poor condition, some stock access & light trampling/ browsing mainly around edge.	
		4) Wetland fully fenced but fence needs some maintenance	
		5) Wetland securely fenced/no evidence of stock access	
	4.2. Introduced predator impacts on wildlife	0) No predator control –signs highly visible	
		1) No/ineffective control – signs visible	
		2) Control intermittent or does not include all predators	
		3) Pulsed or intensive predator control with no buffer	

Theme	Indicator	Score	Mean score
		4) Intensive predator control including a buffer zone	
		5) No/virtually no predator access	
	4.3. Harvesting	0) All wetland character lost due to harvesting activity	
		1) >75% affected by harvesting	
		2) 50-75% affected by harvesting or >75% recovering	
		3) 20-40% affected or 50-70% recovering from harvesting	
		4) <20% affected by harvesting or light affects throughout	
		5) No harvesting evident	
5.0. Native plant dominance	5.1. Canopy	0) 100% canopy of introduced species	3.3
		1) 75-99% canopy cover of intro' species	
		2) 50-74% canopy cover of intro' species	
		3) 25-49% canopy cover of intro' species	
		4) 1-25% canopy cover of intro' species	
		5) No introduced species evident in canopy	
	5.2. Understory vegetation	0) 100% cover of introduced species in understory	
		1) 75-99% cover of intro' species in understory	
		2) 50-74% cover of intro' species in understory	
		3) 25-49% cover of intro' species in understory	
		4) 1-25% cover of intro' species in understory	
		5) No introduced species evident in understory	
	5.3. Buffer	0) 100% cover of introduced species in buffer	
		1) 75-99% cover of intro' species in buffer	
		2) 50-74% cover of intro' species in buffer	
		3) 25-49% cover of intro' species in buffer	
		4) 1-25% cover of intro' species in buffer	
		5) No introduced species evident in buffer	
Mean wetland condition index: 15.1/25 = "Fair" Condition			

3. Investigations, interventions and incidents

The monitoring programme for the year was based on what was considered to be an appropriate level of monitoring, review of data, and liaison with the consent holder. During the year matters may arise which require additional activity by the Council e.g. provision of advice and information, or investigation of potential or actual courses of non-compliance or failure to maintain good practices. A pro-active approach that in the first instance avoids issues occurring is favoured.

The Council operates and maintains a register of all complaints or reported and discovered excursions from acceptable limits and practices, including non-compliance with consents, which may damage the environment. The Unauthorised Incident Register (UIR) includes events where the consent holder concerned has itself notified the Council. The register contains details of any investigation and corrective action taken.

Complaints may be alleged to be associated with a particular site. If there is potentially an issue of legal liability, the Council must be able to prove by investigation that the identified consent holder is indeed the source of the incident (or that the allegation cannot be proven).

In the 2012-2013 period, it was not necessary for the Council to undertake significant additional investigations and interventions, or record incidents, in association with the conditions of consent 6503-1 or provisions in Regional Plans.

During the compilation of this report, it was discovered that the Council does not hold records of the base levels of outflow drains 1 and 2. Condition 7 of consent 6503-1 required this information to be submitted within one month of the completion of the excavation works being carried out. The base levels of the outflow drains are required to assess compliance with condition 8 of the consent, which states that the base level of outflow drains 1 and 2 cannot be excavated below the surveyed level. The consent requirement for the survey data has been discussed with the consent holder, and it has been agreed that the survey will be conducted out as soon as practicably possible. A recommendation to this effect is included in Section 5 of this report.

4. Discussion

4.1 Environmental effects of exercise of consent

Consent 6503-1 authorised the draining and back-filling of two man-made ponds in the vicinity of a regional significant wetland, and the excavation of two unnamed tributaries of the Waitotoroa Stream for land improvement purposes. The works authorised by the consent were carried out in December 2007.

The most significant potential adverse environment effect arising as a result of excavation of a waterway adjacent to a wetland is the lowering of the water table, the draining of the wetland, and resultant loss of habitat for wetland flora and fauna.

The monitoring programme implemented by the Council during the period under review was designed to assess the on-going response of the wetland to the land drainage and improvement works, and to ensure the mitigation measures included in the consent conditions are ensuring that any effects on the wetland are less than minor.

The baseline wetland condition assessment carried out during the period under review indicates that there is evidence of drying around the wetland margins. While the swamp forest area of the wetland appears to be in relatively good condition (with relatively healthy areas of swamp maire and kahikatea), the raupo and flax reedland areas around the wetland edges appear to be slowly drying out and are being replaced by invasive rank grasses, blackberry, Japanese honeysuckle and bracken.

The monitoring of water levels within the wetland does however indicate that water levels were relatively stable over the 2012-2013 monitoring period. Water levels also showed little response to seasonal variation in rainfall volumes. Wetland water levels will continue to be monitored during the forthcoming 2013-2014 period enabling more definitive trends to be identified. Regular wetland condition assessments will also be carried out for comparison against baseline results.

No complaints were received from the public with regard to any of the consent holders activities during the period under review, and no incidents were recorded by the Council.

4.2 Evaluation of performance

A tabular summary of the consent holder's compliance record for the year under review is set out in Table 3.

During the year, the Consent holder demonstrated a **'good'** level of environmental performance and compliance with the resource consent exercised. The criteria associated with a **'good'** level of performance are outlined in Section 1.1.4 as follows:

"a **'good'** level of environmental performance and administrative compliance (i.e. adverse environmental effects of activities during the year negligible or minor at most, items of concern resolved positively, co-operatively, and quickly, no UI's or abatement notices, perhaps some items noted on inspection notices for attention but these items not urgent nor critical, and follow-up shows they have been dealt with)."

Table 3 Summary of performance for consent 6503-1 (2012-2013)

Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Adopt best practice option to prevent effects on the adjacent wetland	Assessment of consent holder records and environmental performance	Yes
2. Exercise consent in accordance with consent application	Assessment of consent holder records	Yes
3. Notification prior to, and on completion of removal of dams 1 and 2	Receipt of notification	Yes
4. Removal of dams and drainage of reservoirs shall not take place between 1 May and 31 December	Date works undertaken	No*
5. Notification prior to, and on completion of the excavation of outflows 1 and 2	Receipt of notification	Yes
6. Level of the base of outflows 1 and 2 shall not be lower than the level agreed upon with TRC	Base levels of outfalls agreed and excavation to this level only	Yes
7. Level of the base of outflow 1 and 2 to be surveyed within 1 month of excavation	Receipt of survey information	No**
8. Base level of outflow 1 and 2 shall not be below the surveyed level	Measurement with reference to survey information	N/A***
9. Outflow 1 and 2 shall be fenced and planted in accordance with Riparian plan number CP155	Riparian plan signed off by Land Management Officer	Yes
10. Shall not restrict the passage of fish	Visual inspection	Yes
11. Shall not have significant adverse effect on adjacent regionally significant protected wetland	Regular visual inspections and water level monitoring	Yes
12. Monitoring of consent at the Consent Holders expense	Payment of monitoring charges	Yes
13. Consent lapse clause	Receive notice of exercise of consent	Yes
14. Consent review clause	N/A	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent		Good

* Site works commenced on 12 December 2007

** Survey to be carried out in the 2013-2014 monitoring period

*** No survey data available – cannot be assessed

4.3 Alterations to the monitoring programme for 2013-2014

In designing and implementing the monitoring programmes for Land use consents in the region, the Taranaki Regional Council has taken into account the extent of information made available by previous authorities, its relevance under the Act, the obligations of the Act in terms of monitoring effects, and subsequently reporting to the regional community, the scope of assessments required at the time of renewal of permits, and the need to maintain a sound understanding of processes within Taranaki that impact upon the environment.

It is proposed that the range of monitoring carried out in the 2012-2013 period be continued in the 2013-2014 period. A recommendation to this effect is included in Section 5 of this report.

4.4 Exercise of optional review of consent

There are no further reviews provided for prior to the expiry of consent 6503-1 on 1 June 2019.

5. Recommendations

1. THAT the range of monitoring carried out during the 2012-2013 period in relation to the consent 6503-1 be continued during the 2013-2014 monitoring period.
2. THAT the base levels of outflow 1 and outflow 2 be surveyed as soon as practicably possible, and the data submitted to the Council.

Glossary of common terms and abbreviations

The following abbreviations and terms may have been used within this report:

Incident	An event that is alleged or is found to have occurred that may have actual or potential environmental consequences or may involve non-compliance with a consent or rule in a regional plan. Registration of an incident by the Council does not automatically mean such an outcome had actually occurred.
Intervention	Action/s taken by Council to instruct or direct actions be taken to avoid or reduce the likelihood of an incident occurring.
Investigation	Action taken by Council to establish what were the circumstances/events surrounding an incident including any allegations of an incident.
Piezometer	A piezometer is either a device used to measure static liquid pressure in a system by measuring the height to which a column of the liquid rises against gravity, or a device which measures the pressure (more precisely, the piezometric head) of groundwater at a specific point.
QEII Covenant	A QEII open space covenant is a legally binding protection agreement, which is registered on the title of the land. It is voluntary but once in place binds the current and all subsequent landowners
Resource consent	Refer Section 87 of the RMA. Resource consents include land use consents (refer Sections 9 and 13 of the RMA), coastal permits (Sections 12, 14 and 15), water permits (Section 14) and discharge permits (Section 15).
RFWP	Regional Fresh Water Plan for Taranaki
The Act	Resource Management Act 1991 and subsequent amendments.
TRC	Taranaki Regional Council (the Council).
UI	Unauthorised Incident.
UIR	Unauthorised Incident Register – contains a list of events recorded by the Council on the basis that they may have the potential or actual environmental consequences that may represent a breach of a consent or provision in a Regional Plan.

Bibliography

Taranaki Regional Council (2006). *Officer report 6503-1*. Taranaki Regional Council, New Zealand. Document number 3242.

Taranaki Regional Council (2012). Brophy's QEII wetland baseline condition assessment. Taranaki Regional Council, New Zealand. Document number 1097407.

Taranaki Regional Council. 2013. *Wetlands and drainage*. Retrieved from <http://www.trc.govt.nz/wetlands-and-drainage>, October 2013.

Appendix I

Consent exercised in 2012-2013 period



Land Use Consent
Pursuant to the Resource Management Act 1991
a resource consent is hereby granted by the
Taranaki Regional Council

CHIEF EXECUTIVE
PRIVATE BAG 713
47 CLOTEN ROAD
STRATFORD
NEW ZEALAND
PHONE: 06-765 7127
FAX: 06-765 5097
www.trc.govt.nz

Please quote our file number
on all correspondence

**Name of
Consent Holder:** MA Brophy
7 Byron Place
NEW PLYMOUTH

**Consent Granted
Date:** 23 June 2006

Conditions of Consent

Consent Granted: To drain and fill-in two man-made ponds in the vicinity of a regionally significant protected wetland and to excavate two unnamed tributaries of the Waitotoroa Stream for land improvement purposes at or about GR: P20:867-129

Expiry Date: 1 June 2019

Review Date(s): June 2007, June 2013

Site Location: Cnr of Mid Parihaka Road & Wiremu Road, Pungarehu

Legal Description: Pt Lot 1 DP 12954 Blk XIV Cape SD

Catchment: Waitotoroa

*For General, Standard and Special conditions
pertaining to this consent please see reverse side of this document*

General conditions

- a) On receipt of a requirement from the Chief Executive, Taranaki Regional Council the consent holder shall, within the time specified in the requirement, supply the information required relating to the exercise of this consent.
- b) Unless it is otherwise specified in the conditions of this consent, compliance with any monitoring requirement imposed by this consent must be at the consent holder's own expense.
- c) The consent holder shall pay to the Council all required administrative charges fixed by the Council pursuant to section 36 in relation to:
 - i) the administration, monitoring and supervision of this consent; and
 - ii) charges authorised by regulations.

Special conditions


1. The consent holder shall at all times adopt the best practicable option, as defined in section 2 of the Resource Management Act 1991, to prevent or minimise any adverse effects on the environment, including on the adjacent wetland, from the exercise of this consent.
2. The exercise of this consent shall be undertaken generally in accordance with the documentation submitted in support of application 3437. In the case of any contradiction between the documentation submitted in support of application 3437 and the conditions of this consent, the conditions of this consent shall prevail.
3. The consent holder shall notify the Chief Executive, Taranaki Regional Council, in writing at least two working days prior to the removal of Dams 1 and 2 and upon completion of the activity.
4. Removal of Dams 1 and 2 and drainage of Reservoirs 1 and 2 shall not take place between 1 May and 31 December in any given year.
5. The consent holder shall notify the Chief Executive, Taranaki Regional Council, in writing at least two working days prior to the excavation of Outflows #1 and #2 and upon completion of the activity.
6. During and following excavation, the level of the base of Outflows #1 and #2 shall not be lower than the level agreed to by the Chief Executive, Taranaki Regional Council.
7. Within one month of the level as determined under special condition 6 of this consent having been reached, the consent holder shall survey the base level of excavation in Outflow #1 and Outflow #2 at a point immediately below the wetland, and reference the levels to a benchmark. The surveyed levels shall be recorded against this consent for monitoring purposes.

Consent 6503-1

8. The base level of Outflow #1 and/or Outflow #2 immediately below the wetland shall not be below the surveyed level as determined under special condition 7 of this consent.
9. Within one month following the completion of the excavation of Outflow #1 and #2 the consent holder shall fence the riparian margin of each channel. The consent holder will plant one side of each channel in accordance with the Council's riparian plan number CP155 and to a standard approved in writing by the Chief Executive, within two years of the date of the grant of this consent.
10. The exercise of this consent shall not restrict the passage of fish.
11. The exercise of this consent shall not have a significant adverse effect on the adjacent regionally significant wetland in the opinion of the Chief Executive, Taranaki Regional Council.
12. This consent shall be subject to monitoring by the Taranaki Regional Council. Monitoring and enforcement in relation to this consent shall be undertaken at the consent holder's expense.
13. This consent shall lapse on the expiry of five years after the date of issue of this consent, unless the consent is given effect to before the end of that period or the Taranaki Regional Council fixes a longer period pursuant to section 125(1)(b) of the Resource Management Act 1991.
14. In accordance with section 128 and section 129 of the Resource Management Act 1991, the Taranaki Regional Council may serve notice of its intention to review, amend, delete or add to the conditions of this resource consent by giving notice of review during the month of June 2007 and/or June 2013, for the purpose of ensuring that the conditions are adequate to deal with any adverse effects on the environment arising from the exercise of this resource consent, which were either not foreseen at the time the application was considered or which it was not appropriate to deal with at the time.

Signed at Stratford on 23 June 2006

For and on behalf of
Taranaki Regional Council


Director-Resource Management

Appendix II

Wetland condition assessment field sheet

WETLAND CONDITION ASSESSMENT FIELD SHEET (adapted from Clarkson *et al* 2004)

Blank template is Frodo 741060



Wetland name:	Brophy's QEII wetland, Off Parihaka Road, QEII 5/06/067	Site References: BD No: Farmplan No: FRODO No. (this document):	BD/1210 70155 and 90894 1097407
Date:	14/09/2012	GPS: Grid Reference:	E 676822 N 651129
Region: Catchment:	Egmont ecological district Waitoteroa	Altitude: Size:	220 m.a.s.l 3.99 Ha.
Field team:	Rebecca Martin	Landowner:	Maureen Brophy, David Patrick Brophy

Theme	Indicator	Score	Specify/Comment	Mean score															
1.0. Hydrological integrity	1.1. Water table depth	0) Original wetland is totally artificially drained/flooded 1) 75-99% of wetland is artificially drained/flooded 2) 50-74% of wetland is artificially drained/flooded 3) 25-54% of wetland is artificially drained/flooded 4) 1-24% of wetland is artificially drained/flooded 5) No artificial drainage/flooding Note: Look for culverts/damns /perimeter drains/stop banks/tide gates etc. Consider number/size/depth of drains? How much water they contain? How fast is it flowing?	3 Large, deep drains run alongside outer edge of wetland, definite encroachment of blackberry, rank grasses and other invasive dry-land species as areas dry out <table border="1"> <thead> <tr> <th colspan="3">Groundwater Level Monitoring</th> </tr> <tr> <th></th> <th>14.09.12</th> <th>16.01.13</th> </tr> </thead> <tbody> <tr> <td>GND2110</td> <td>63 cm</td> <td>53 cm</td> </tr> <tr> <td>GND2111</td> <td>38 cm</td> <td>37.4 cm</td> </tr> <tr> <td>GND2112</td> <td colspan="2">Unable to locate</td> </tr> </tbody> </table>	Groundwater Level Monitoring				14.09.12	16.01.13	GND2110	63 cm	53 cm	GND2111	38 cm	37.4 cm	GND2112	Unable to locate		3
	Groundwater Level Monitoring																		
	14.09.12	16.01.13																	
GND2110	63 cm	53 cm																	
GND2111	38 cm	37.4 cm																	
GND2112	Unable to locate																		
1.2. Dry-land plant invasion within wetland (area covered by water)	0) All species within wetland are dry-land plant species 1) > 75% cover by dry-land plant species 2) 50-74% cover by dry-land plant species 3) 25-49% cover by dry-land plant species 4) < 25% cover by dry-land plant species 5) no/virtually no dry-land plant invasion	3 Wetland edges show significant incursion by blackberry and pasture grasses due to proximity to pasture and large drains																	

Theme	Indicator	Score	Specify/Comment	Mean score
2.0. Physico-chemical parameters	2.1. Fire damage within wetland	0) Above ground vegetation completely destroyed 1) >75% of vegetation removed by recent fires 2) 51-74% of vegetation removed by recent fires or >75% recovering from older fires 3) 25-49% of wetland vegetation removed by recent fire or 50-74% recovering from older fires 4) <25% of wetland vegetation removed or vegetation virtually recovered from older fires 5) No evidence of fire damage	5	
	2.2. Buffer vegetation (area not under water, i.e., where land and water meet)	0) 0% with native buffer >10m wide or <26% with native buffer 3-10m wide or <50% with native buffer <3m wide 1) 1-25% with native buffer >10m wide or 26-49% with native buffer 3-10m wide or 50-75% with native buffer 1-3m wide 2) 26-49% with native buffer >10m or 50-74% with native buffer 5-10m wide or 75-99% with native buffer 3-10m 3) 50-74% with native buffer >10m or 74-99% with native buffer 3-10m or 100% with native buffer 1-3m wide. 4) 75-99% with native buffer >10m or 100% w. buffer 5-10m wide 5) 100% with buffer >10 m wide	2	Note that much of the wetland is actually swamp forest. The area scored for this buffer category only applies to open body of water/pond area at NE corner of QEII'ed area
	2.3. Catchment land use: urban/ industrial	0) 100% of catchment in urban/industrial land use 1) 75-99% of catchment in urban/industrial land use 2) 50-74% of catchment in urban/industrial land use 3) 25-59% of catchment in urban/industrial land use 4) 1-24% of catchment in urban/industrial land use 5) 0% of catchment in urban/industrial land use	5	
	2.4. Catchment land use: agriculture	0) 100% of catchment in agricultural/silvicultural land use 1) 75-99% of catchment in agricultural/silvicultural land use 2) 50-75% of catchment in agricultural/silvicultural land use 3) 25-50% of catchment in agricultural/silvicultural land use 4) 1-25% of catchment in agricultural/silvicultural land use 5) 0% of catchment in agricultural/ silvicultural land use	0	
	2.5. Riparian planting <u>Note:</u> don't score this for wetlands that are not stream fed.	0) No streams are fenced/have riparian vegetation 1) Most streams unfenced with no riparian vegetation 2) Most streams are fenced but not planted/vegetated 3) Some streams fenced with riparian vegetation 4) Most streams fenced with sparse/ young riparian vegetation 5) Most streams fenced with well established riparian vegetation	1	Streams below wetland have riparian planting & fencing, but those feeding wetland do not
	2.6. Sediment input <u>*Note:</u> consider erosion of riparian margins, adjacent hill slopes wetland banks	0) Recent earthworks or freshly dug drains &/or severe erosion* in catchment, widespread burial of vegetation by sediment, water v. turbid. 1) Recent earthworks or excavation &/or severe erosion* in catchment, some sediment deposits or burial of vegetation by sediment, water moderately turbid. 2) Moderate erosion evident, water slightly turbid. Sediment deposits /vegetation burial minimal. 3) Some erosion* evident, water clear-slightly turbid, sediment deposits non-existent - minimal 4) Minor erosion* evident, water is clear, no sediment deposits or burial of vegetation evident. 5) No sources of sediment/erosion* evident in catchment, water is clear, no sediment deposits are visible.	4	Some erosion due to pugging and run-off from adjacent paddocks

2.8

Theme	Indicator	Score	Specify/Comment	Mean score
3.0. Ecosystem intactness	3.1. Size	0) 100% of original wetland lost or almost lost but remnants entirely modified 1) > 75% of original wetland area lost 2) 50-75% of original wetland area lost 3) 25-50% of original wetland extent lost 4) 1-25% of original wetland area lost 5) No loss of wetland area: original wetland area intact	3 Edges of wetland being invaded by blackberry and pasture grasses	2.7
	3.2. Fish access	0) There is no inflow or outflow from the wetland or these are completely blocked by culverts/structures 1) 75-99% of connection(s) blocked 2) 50-75% of connection(s) blocked 3) 25-50% of connection(s) blocked 4) 1-25% of connection(s) blocked 5) There are inputs & outputs that are not impeded	2 Possible access for elvers	
	3.3. Vegetation clearance/damage	0) All wetland vegetation lost due to clearance/damage 1) 75-99% of vegetation lost due to clearance/damage 2) 50-75% of vegetation lost due to clearance/damage 3) 25-50% of vegetation lost due to clearance/damage 4) 1-25% of vegetation lost due to clearance/damage 5) No vegetation lost due to clearance damage	3	

Theme	Indicator	Score	Specify/Comment	Mean score
4.0. Browsing, predation & harvesting	4.1. Stock damage	0) No fencing, stock in wetland, browsing/pugging severe 1) No fencing, stock in wetland, browsing/pugging moderate 2) Partially fenced, some stock access, browsing/pugging 3) Fenced but fence in poor condition, some stock access & light trampling/browsing mainly around edge. 4) Wetland fully fenced but fence needs some maintenance 5) Wetland securely fenced/no evidence of stock access	4 Some areas of wetland not included in QEII boundary. Consider extending covenant boundaries to include these areas.	3.3
	4.2. Introduced predator impacts on wildlife	0) No predator control – signs highly visible 1) No/ineffective control – signs visible 2) Control intermittent or does not include all predators 3) Pulsed or intensive predator control with no buffer 4) Intensive predator control including a buffer zone 5) No/virtually no predator access	1	
	4.3. Harvesting	0) All wetland character lost due to harvesting activity 1) >75% affected by harvesting 2) 50-75% affected by harvesting or >75% recovering 3) 20-40% affected or 50-70% recovering from harvesting 4) <20% affected by harvesting or light affects throughout 5) No harvesting evident	5	

Theme	Indicator	Score	Specify/Comment	Mean score
5.0. Native plant dominance	5.1. Canopy	0) 100% canopy of introduced species 1) 75-99% canopy cover of intro' species 2) 50-74% canopy cover of intro' species 3) 25-49% canopy cover of intro' species 4) 1-25% canopy cover of intro' species 5) No introduced species evident in canopy	4 Majority of wetland is swamp forest. However, edge areas being invaded by blackberry, Japanese honeysuckle and pasture grass.	3.3
	5.2. Understorey vegetation	0) 100% cover of introduced species in understorey 1) 75-99% cover of intro' species in understorey 2) 50-74% cover of intro' species in understorey 3) 25-49% cover of intro' species in understorey 4) 1-25% cover of intro' species in understorey 5) No introduced species evident in understorey	4 See above comment re: pasture grass/blackberry	
	5.3. Buffer	0) 100% cover of introduced species in buffer 1) 75-99% cover of intro' species in buffer 2) 50-74% cover of intro' species in buffer 3) 25-49% cover of intro' species in buffer 4) 1-25% cover of intro' species in buffer 5) No introduced species evident in buffer	2 See above comment re: pasture grass/blackberry	
Mean wetland condition index (out of 25):				
15.1/25 = "Fair" Condition				

Habitats and threatened species present

Flora: The plant list above was compiled from a brief survey on the 14 September 2012 and will be incomplete. While the swamp forest area of the wetland appears to be in relatively good condition (with relatively healthy areas of swamp maire and kahikatea), the raupo and flax reedland areas around the wetland edges appear to be slowly drying out and are being replaced by invasive rank grasses, blackberry, Japanese honeysuckle and bracken.

A priority action would be to investigate and discuss possible remediation measures to halt this drainage with the landowner. If the drainage issue is addressed, the Biodiversity Team could provide advice and technical support for wetland restoration work, which would focus on enhancement planting and weed control. Any future planting should be of native vegetation that will benefit the wetland bird and reptile species (toetoe, carex and flax). Additionally, future planting could include threatened, at risk or regionally rare species (within their known natural range) or their known hosts to add value to the site (kirks tree daisy, small flowered mistletoe (and hosts) etc). The regional council holds a current collection permit and can help with the collection and propagation of these plants to ensure genetic integrity is maintained.

Fauna:

Birds: Although this wetland area is small, it still offers varied areas of habitat for a variety of bird species in an area mainly devoid of remaining natural habitats. The wetland areas make up part of an increasingly rarer habitat type on the Ring Plain and provide important habitat corridor links between these areas. The wetland ecosystem is also a suitable habitat for notable birds such as the spotless crane (At Risk, Relict) and North Island fernbird (At Risk, Declining). Small forest birds are also present (fantail, grey warbler) and the food source plants such as flax are likely to attract any tui, NZ pigeon and bellbirds that may be in the area.

Reptiles: There is adequate habitat for terrestrial and arboreal reptiles at this KNE. Leaf litter is established, overgrown rank areas of ground cover are present and there is also a substantial amount of tree canopy and foliage present, e.g., flax, raupo, etc. Further survey work would be required to ascertain presence/absence of notable species.

Freshwater Fish: This site provides suitable habitat for mudfish and other native fish species. However, as is the case for reptiles, further survey work would be required to ascertain presence/absence of native fish species. In the future, this site could be suitable for the possible re-introduction of "At Risk" fish such as the brown mudfish,

if these species were found to be present in the same catchment and if the drainage issues surrounding the site were remediated. The large drains surrounding the lower edges of the wetland would significantly restrict access for native fish, and are causing some areas of the wetland to dry out. However, this barrier might be beneficial if mudfish were present or introduced to limit predator access such as eels.

Invertebrates: Invertebrate surveys are labour intensive and beyond the scope of this project. The KNE will contain a reasonably diverse terrestrial and aquatic invertebrate fauna. There are no known significant threatened invertebrates in this area at present.

Management recommendations			
Action:	Priority ¹	Specify/comment:	
Drainage	H	Investigate the possibility of halting/remediating drainage works around wetland area and allowing wetland to revert to it's natural state, with enhancement planting and weed control programmes put in place only if current drainage has been stopped. Biodiversity team to investigate the possibility of including propagation and re-introduction of threatened, at risk or regionally rare species within their known range (eg. small flowered mistletoe, kirks tree daisy, mudfish etc) only if current drainage has been stopped.	
Legal protection	L	Legally protected with QEII covenant. No further protection required	
Fencing	L	Wetland securely fenced and stock-proof. Maintain as required.	
Planting	M	The wetland habitats will benefit from an ongoing planting programme using eco-sourced native plant species within their known natural range only if current drainage has been stopped. LMO to discuss suitable options with landowner and Biodiversity Team.	
Plant pest control	M/H	Weeds such as blackberry and Japanese honeysuckle will become a greater problem over time. An ongoing weed control programme would be desirable. LMO to discuss suitable options with landowner and Inspectorate/Biodiversity Team.	
Animal pest control	Possums	M	Part of the self help programme. Assist only if required.
	Predators	M	There is no evidence of a predator control programme in place at present. Ongoing, effective predator control around the wetland would be extremely beneficial to breeding birds and reptiles. Consult with landowner regarding resourcing and interest, and assist if needed.
Flora/fauna survey	M	Biodiversity team to conduct further bird and reptile surveys to establish presence/absence of notable species. This will assist in confirming the presence/absence of threatened/at risk species, and suitability for possible transfer and releases of suitable species should the current drainage regime be stopped.	
Ecological monitoring	M	Continue to conduct condition assessments when due on the TRC monitoring programme to monitor status of the wetland and provide ongoing recommendations.	
Education/advocacy	L	No opportunities identified.	
Other	M	LMO to investigate possibility of extending regionally significant wetland boundary and/or QEII covenant to include the seepage areas feeding the wetland on the northern and eastern boundaries of the ecosystem. These areas are an important source of water and nutrients into the wetland area and would benefit from enhancement planting and fencing – Biodiversity Team can advise on suitable areas for possible inclusion if landowner were amenable to this.	

¹ Priority level: H= high, M = medium, L = low

Exotic Fauna			
Common name	Seen/heard ?	Abundance score*	Comment
Blackbird	S/H	C	This list was compiled during a short site visit on 14 Sept 2012 and will be incomplete
Chaffinch	S/H	C	
Ship rat	S	C	
Magpie	S/H	C	
Mallard duck	S/H	C	
Song thrush	S/H	C	
Hare	S	C	

* Abundance score: R= rare, O=occasional, C= common, A=Abundant

Exotic flora		
Scientific name	Common name	Comments
<i>Rubus fruticosus</i>	Blackberry	This list was compiled during a short site visit on 14 Sept 2012 and will be incomplete
<i>Gunnera tinctoria</i>	Gunnera	
	Pasture grasses (several spp.)	
<i>Lonicera japonica</i>	Japanese honeysuckle	
<i>Ulex europaeus</i>	Gorse	

Native Fauna			
Common name	Seen/heard ?	Abundance score*	Comment
Fantail	S/H	C	This list was compiled during a short site visit on 14 Sept 2012 and will be incomplete
Grey warbler	S/H	C	
Pukeko	S/H	C	
Silvereye	S/H	C	
Tui	S/H	O	
Welcome swallow	S/H	C	

* Abundance score: R= rare, O=occasional, C= common, A=Abundant

Native flora (Note: This list was compiled during a short site visit on 14 Sept 2012 and will be incomplete) (P) = Planted through TRC riparian planting programme			
Scientific name	Common Name	Scientific name	Common Name
<i>Asplenium bulbiferum</i>	Hen & chicken fern		
<i>Asplenium flaccidum</i>	Drooping spleenwort		
<i>Asplenium oblongifolium</i>	Shining spleenwort		
<i>Asplenium polyodon</i>	Sickle spleenwort		
<i>Blechnum discolor</i>	Crown fern		
<i>Blechnum novaezelandiae</i>	Kiokio		
<i>Clematis paniculata</i>	NZ clematis		
<i>Coprosma grandifolia</i>	Kanono		
<i>Coprosma rotundifolia</i>	Round-leaved coprosma		
<i>Cordyline australis</i>	Cabbage tree		
<i>Cortaderia fulvida</i>	Toetoe		
<i>Cyathea medullaris</i>	Mamaku ponga		
<i>Dacrycarpus dacrydioides</i>	Kahikatea		
<i>Dicksonia squarrosa</i>	Wheki ponga		
<i>Freycinetia baueriana</i> subsp. <i>banksii</i>	Kiekie		
<i>Geniostoma rupestre</i> var. <i>ligustrifolium</i>	Hangehange		
<i>Kinghtia excels</i>	Rewarewa		
<i>Laurelia novae-zelandiae</i>	Pukatea		
<i>Leptospermum scoparium</i>	Manuka		
<i>Metrosiders perforata</i>	White rata		
<i>Microsorium pustulatum</i> subsp. <i>pustulatum</i>	Houndstongue fern		
<i>Muehlenbeckia australis</i>	Pohuehue		
<i>Pseudopanax crassifolius</i>	Lancewood		
<i>Pteridium esculentum</i>	Bracken fern		
<i>Pyrrosia eleagnifolia</i>	Leatherleaf fern		
<i>Ripogonum scandens</i>	Supplejack		
<i>Rubus</i> sp.	Bush lawyer		
<i>Schefflera digitata</i>	Pate		
<i>Solanum aviculare</i>	Poroporo		
<i>Syzygium maire</i>	Swamp maire		
<i>Typha orientalis</i>	Raupo		

Photo points & site photos					
#	GPS	Focal length	Photo ref.	Inclination*	Photo description
1	E676738 N651156	50mm		Looking SW	Rank grass, blackberry and Japanese honeysuckle along boundary fence
2	E676784 N651168	50mm		Looking S	Raupo in background & rank grass encroachment in foreground at boundary fence
3	E676908 N651156	50mm		Looking N	Invasive weed encroachment in foreground, raupo in mid-ground and swamp maire canopy in background from boundary fence
4	E676950 N651104	50mm		Looking W and N	2 photos of Regionally Significant Wetland area showing raupo wetland and forest canopy, including decent sized stands of swamp maire, from hilltop above wetland
		50mm	Site photo 1	-	Dense understorey of palatable species and wet pools on forest floor
		50mm	Site photo 2	-	Deep drains surrounding wetland
			Site photo 3	-	Pool created at northern end of wetland by bunding of drains

Site diagram/aerial photos showing photo point locations:



Figure 1: Aerial photograph of wetland with photopoint locations marked in red

Photos (including reference numbers if not a photo-point):



Photopoint 1 Rank grass, blackberry and Japanese honeysuckle along boundary fence, looking SW



Photopoint 2 Raupo in background & rank grass encroachment in foreground at boundary fence, looking S



Photopoint 3 Invasive weed encroachment in foreground, raupo in mid-ground and swamp maire canopy in background from boundary fence, looking N



Photopoint 4 Regionally Significant Wetland area showing raupo wetland and forest canopy, including healthy

stands of swamp maire, looking W from hilltop above wetland



Photopoint 4 Regionally Significant Wetland area showing raupo wetland and forest canopy, including decent sized stands of swamp maire, looking N from hilltop above wetland



Site photo 1 Dense understorey of palatable species and wet pools on forest floor



Site photo 2 Deep drains surrounding wetland (approx. 2m deep), causing some areas to dry out and allowing encroachment of invasive dry-land species



Site photo 3 Pool created at northern end of wetland by bunding of drains (along right hand side of pond in this photo)