



March 2009

**APPLICATION FOR RESOURCE  
CONSENTS AND ASSESSMENT OF  
EFFECTS ON THE ENVIRONMENT**

**1080 Application for Pest  
Control within the Canterbury  
Region**

**Submitted to:**  
Environment Canterbury  
PO Box 345  
Christchurch

**REPORT**



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**Report Number:** 077813110

**Distribution:**

Environment Canterbury





## Table of Contents

<b>PART A – RESOURCE CONSENT APPLICATION FORM</b> .....	<b>6</b>
<b>PART B – SUPPORTING INFORMATION</b> .....	<b>9</b>
<b>1.0 INTRODUCTION</b> .....	<b>2</b>
1.1 Background.....	2
1.2 Report Scope .....	2
1.3 Resource Consent Requirements .....	3
<b>2.0 DESCRIPTION OF THE ACTIVITY</b> .....	<b>3</b>
2.1 Properties of 1080.....	3
2.2 Methods of 1080 Application .....	3
2.2.1 1080 Bait .....	3
2.2.2 Application of 1080.....	4
2.3 Indicative Pest Control Areas.....	4
2.3.1 Introduction.....	4
2.3.2 Rabbit prone areas.....	4
2.3.3 Wallaby prone areas.....	4
2.3.4 Possum control areas.....	4
<b>3.0 LEGISLATIVE BACKGROUND</b> .....	<b>5</b>
3.1 ERMA reassessment of 1080 .....	5
3.2 Other regulations.....	5
<b>4.0 CONSENT REQUIREMENTS</b> .....	<b>6</b>
4.1 The Resource Management Act 1991.....	6
4.2 Discharge to Air.....	6
4.2.1 Transitional Regional Plans.....	6
4.2.2 Proposed Natural Resources Regional Plan – Chapter 3: Air Quality .....	6
4.3 Discharge to Land in the Bed of a Waterway (via Ground Control Methods) .....	7



# 1080 APPLICATION FOR PEST CONTROL WITHIN THE CANTERBURY REGION

4.3.1	Transitional Regional Plans.....	7
4.3.2	Proposed Natural Resources Regional Plan – Chapter 4: Water Quality.....	7
4.3.3	The Waimakariri River Regional Plan.....	7
4.4	Discharge to Water (via Aerial Application).....	7
4.4.1	Transitional Regional Plans.....	7
4.4.2	Proposed Natural Resources Regional Plan – Chapter 4: Water Quality.....	8
4.4.3	The Waimakariri River Regional Plan.....	8
4.4.4	The Opihi River Regional Plan .....	8
4.5	Summary of Consent Requirements .....	8
<b>5.0</b>	<b>CONSULTATION .....</b>	<b>9</b>
<b>6.0</b>	<b>DESCRIPTION OF THE ENVIRONMENT.....</b>	<b>11</b>
6.1	Introduction .....	11
6.2	Clarence River .....	11
6.2.1	Catchment description.....	11
6.2.2	Terrestrial and aquatic ecosystem values .....	11
6.2.3	Cultural values.....	12
6.3	Conway River.....	12
6.3.1	Catchment description.....	12
6.3.2	Terrestrial and aquatic ecosystem values .....	12
6.3.3	Cultural values.....	12
6.4	Hurunui River .....	12
6.4.1	Catchment description.....	12
6.4.2	Terrestrial and aquatic ecosystem values .....	13
6.4.3	Cultural values.....	13
6.5	Ashley River.....	13
6.5.1	Catchment description.....	13
6.5.2	Terrestrial and aquatic ecosystem values .....	13



## 1080 APPLICATION FOR PEST CONTROL WITHIN THE CANTERBURY REGION

6.5.3	Cultural values.....	14
6.6	Waimakariri River.....	14
6.6.1	Catchment description.....	14
6.6.2	Terrestrial and aquatic ecosystem values .....	14
6.6.3	Cultural values.....	14
6.7	Rakaia River.....	15
6.7.1	Catchment description.....	15
6.7.2	Terrestrial and aquatic ecosystem values .....	15
6.7.3	Cultural values.....	15
6.8	Rangitata River .....	15
6.8.1	Catchment description.....	15
6.8.2	Terrestrial and aquatic ecosystem values .....	16
6.8.3	Cultural values.....	16
6.9	Waitaki River.....	16
6.9.1	Catchment description.....	16
6.9.2	Terrestrial and aquatic ecosystem values .....	16
6.9.3	Cultural values.....	17
6.10	DOC administered land.....	17
6.11	Kea habitat.....	17
6.12	Community water supplies from surface waters.....	18
<b>7.0</b>	<b>ASSESSMENT OF ACTUAL AND POTENTIAL EFFECTS.....</b>	<b>19</b>
7.1	Introduction .....	19
7.2	Toxicity of 1080 to Terrestrial Species .....	19
7.3	Effects on Fish and Aquatic Invertebrates.....	20
7.4	Effects on Waterfowl .....	21
7.5	Effects on Human Health .....	22
7.6	Cultural Effects.....	23



# 1080 APPLICATION FOR PEST CONTROL WITHIN THE CANTERBURY REGION

7.7	Effects on Terrestrial Fauna .....	24
7.7.1	Native species .....	24
7.7.2	Birds .....	24
7.7.3	Effects on dogs.....	25
7.7.4	Effects on other non-target terrestrial animals.....	26
7.8	Positive Effects.....	26
<b>8.0</b>	<b>CONSIDERATION OF ALTERNATIVES .....</b>	<b>26</b>
<b>9.0</b>	<b>STATUTORY ASSESSMENT .....</b>	<b>28</b>
9.1	Resource Management Act 1991 .....	28
9.1.1	Overview .....	28
9.1.2	Purpose of the RMA (s5) .....	28
9.1.3	Section 6: Matters of National Importance.....	28
9.1.4	Section 7: Other Matters.....	29
9.1.5	Section 8: Principles of the Treaty of Waitangi .....	29
9.1.6	Section 104: Consideration of Applications .....	29
9.1.7	Section 107: Restrictions on granting of certain discharge permits .....	30
9.2	Relevant Planning Documents – Objectives and Policies .....	30
9.2.1	Regional Policy Statement .....	30
9.2.2	Proposed Natural Resources Regional Plan .....	31
9.2.3	Waimakariri River Regional Plan.....	31
9.2.4	Opihi River Regional Plan .....	32
9.3	Other Matters - Conservation Orders.....	33
9.3.1	National Water Conservation Order (Rakaia River) 1998.....	33
9.3.2	National Water Conservation Order (Ahuriri River) 1990.....	33
9.3.3	Water Conservation Order (Rangitata River) 2006.....	34
<b>10.0</b>	<b>SUMMARY AND CONCLUSIONS.....</b>	<b>34</b>
<b>11.0</b>	<b>SUGGESTED CONSENT CONDITIONS .....</b>	<b>35</b>



# 1080 APPLICATION FOR PEST CONTROL WITHIN THE CANTERBURY REGION

<b>12.0 REFERENCES</b> .....	<b>39</b>
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## **TABLES**

Table 1: Summary of responses from consulted parties.....	9
Table 2: Acute oral toxicity of 1080 to terrestrial species (Nate New Zealand).....	19

## **FIGURES**

Figure 1: Major waterways in Canterbury. ....	11
Figure 2: Kea population distribution in the South Island.....	17
Figure 3: Location of community water supplies from surface waters and infiltration galleries in Canterbury. ....	18

## **APPENDICES**

### **Appendix A**

Rule Assessment

### **Appendix B**

Consultation Materials

### **Appendix C**

CIA and Outcomes Report



## 1080 APPLICATION FOR PEST CONTROL WITHIN THE CANTERBURY REGION

### PART A – RESOURCE CONSENT APPLICATION FORM



## 1080 APPLICATION FOR PEST CONTROL WITHIN THE CANTERBURY REGION

### APPLICATION FOR RESOURCE CONSENT UNDER SECTION 88 OF THE RESOURCE MANAGEMENT ACT 1991

To: Consents Section  
Environment Canterbury  
PO Box 345  
Christchurch

We: Biosecurity Section  
Environment Canterbury  
PO Box 345  
Christchurch

Apply for the following resource consent:

A discharge permit to discharge contaminants to water, and onto land in circumstances where contaminants may enter water.

**1. The names and address of the owner and occupier (other than the applicant) of land to which the application relates are as follows:**

All landowners within the Canterbury Region.

**2. The location of the proposed activity is as follows:**

All land within the Canterbury Region.

**3. Additional resource consents:**

No other resource consents are required.

**4. Effects on the environment:**

Attached, in accordance with the Fourth Schedule of the Resource Management Act 1991, is an assessment of effects on the environment in the detail that corresponds with the scale and significance of the effects that the proposed activity may have on the environment.

**5. Other information:**

No other information is required to be included in this application.

Signature: .....

Signature of the applicant (or person authorised to sign on behalf of the applicant)

Dated this \_\_\_\_\_ day of \_\_\_\_\_ 2009





## 1080 APPLICATION FOR PEST CONTROL WITHIN THE CANTERBURY REGION

**Address for service of documents and fees/charges for the application:**

Ray Maw  
Environment Canterbury  
PO Box 345  
Christchurch



## 1080 APPLICATION FOR PEST CONTROL WITHIN THE CANTERBURY REGION

### PART B – SUPPORTING INFORMATION



## Summary

Resource consent is sought by Environment Canterbury (ECan) to discharge 1080 to land and water in the Canterbury region for the control of possums, rabbits and wallabies. Resource consent is required for situations where 1080 could enter water. The consent is sought for a duration of fifteen years.

The potential adverse effects of using 1080 are acknowledged. However in some cases the use of 1080 is considered necessary to ensure effective pest control. Mitigation measures are proposed to avoid or mitigate adverse effects as far as possible. The assessment of effects focuses on the potential effects of 1080 entering water, as this is the reason for the resource consent requirement, but terrestrial effects are also considered. ECan carried out consultation with a number of parties throughout 2008 and early 2009 and additional mitigation has been proposed as a result of this consultation. While the potential adverse effects are acknowledged, control of possums, rabbits and wallabies will have positive effects on native flora and fauna, and on the farming sector in areas of the region where rabbit and possum numbers are high.

In addition to resource consent conditions, the use of 1080 in New Zealand is controlled by other regulations. All 1080 discharges on land managed by the Department of Conservation (DOC) are subject to DOC permits, and Ministry of Health approval is required for the use of 1080 in public areas and areas near community water supplies. In many of these cases, the DOC or MOH approvals will place more site-specific constraints on the discharge of 1080, which must also be complied with in addition to the resource consent conditions.

It is considered that the proposed use of 1080 is consistent with the purpose and principles of the Resource Management Act 1991, and the relevant objectives and policies of Canterbury's Proposed Natural Resource Regional Plan and Regional Policy Statement.

This resource consent application covers the Canterbury Region, and there is likely to be public interest in the proposed use of 1080. Therefore it is requested that this resource consent application be publicly notified to allow for public participation in the application process.



## 1.0 INTRODUCTION

### 1.1 Background

This report is an Assessment of Effects on the Environment (AEE) to accompany a resource consent application to discharge sodium fluoroacetate (1080) within the Canterbury region. The proposed 1080 application is for the control of rabbits, possums and wallabies and the Biosecurity Section of Environment Canterbury is the applicant. Possums, rabbits and wallabies are all recognised pest animals on ECan's Pest Containment Control Programme.

This is not a new activity, and pest control using 1080 has been carried out in the Canterbury region for a number of years. The necessary resource consents have been held and exercised by a number of different parties including landowners and contractors. However, ECan propose to achieve a more consistent and effective approach to 1080 application by seeking a region wide resource consent. While individual contractors could still seek their own resource consent for the discharge of 1080, it is anticipated that many will choose to discharge 1080 under the ECan consent, if granted. Prior to discharging 1080 under the consent, contractors would be required to pass ECan's certification process for 1080 application.

Under the Biosecurity Act 1993 regional councils can address pest management issues in the region. The Canterbury Regional Pest Management Strategy (2005) (RPMS) provides the framework for ECan to undertake the management or eradication of specified pest animals and plants in the Canterbury region. Possums, rabbits and wallabies are part of the containment control programme in the RPMS. Possums predate on vegetation and native animals, particularly native birds, and carry bovine tuberculosis (Tb) which they can spread to cattle and deer. Bovine Tb is one of New Zealand's most serious animal health problems and a national eradication programme has been in place for bovine Tb since the 1970s (ERMA 2007). Rabbits can graze extensive areas of farmland and become a significant pest for farmers. Wallabies can have a significant impact on vegetation such as tussock grasslands.

1080 was first approved for use in New Zealand in the 1960s to control a number of introduced pests that were having a severe effect on New Zealand's environment and agricultural production. 1080 is used mainly to target possums but also kills other pests, such as rats and stoats, which can attack native birds. 1080 is also considered to be an important method of rabbit and wallaby population control.

The use of 1080 in New Zealand was reassessed by the Environmental Risk Management Authority (ERMA) in 2007, and tighter controls were imposed on the use of 1080, particularly the aerial application of 1080. The ERMA decision and new controls have been taken into account for this consent application.

### 1.2 Report Scope

This report describes the proposed 1080 discharge, summarises consultation carried out in relation to this application, and provides an assessment of the potential effects on the environment and details proposed consent conditions to avoid or mitigate adverse effects as far as possible. The assessment of effects focuses on the potential effects of 1080 entering water, as the consent requirement is triggered by the possibility of 1080 entering water. The potential for less direct effects including effects on non-target land-based animals are also considered in this report given the high public interest in these effects.

The report accompanies an application for a resource consent to discharge 1080 at any location within the Canterbury region. While existing locations targeted for 1080 applications have been identified in this report, other sites within Canterbury may also be treated under this consent, should the need arise.



## 1.3 Resource Consent Requirements

ECan seeks a discharge permit to:

- Discharge sodium fluoroacetate (1080) to land and water via aerial application in circumstances where contaminants may enter water throughout the Canterbury region.
- Discharge sodium fluoroacetate (1080) to land within the bed of a river, lake or artificial watercourse (via ground control methods such as hand application or a bait layer), throughout the Canterbury region.

Resource consent is required for these situations due to the possibility of 1080 entering waterways. It is noted that the application of 1080 through ground control methods does not require resource consent where there is no risk of 1080 entering a waterway. Therefore, for ground-control 1080 discharges, this resource consent application is limited to the discharge of 1080 onto land in the beds of waterways.

A duration of fifteen years is requested for the consent. This is to allow for the return period for 1080 applications which is usually five years for possums and seven years for rabbits. A second application is sometimes necessary to ensure effective control or eradication of the pest.

## 2.0 DESCRIPTION OF THE ACTIVITY

### 2.1 Properties of 1080

Sodium fluoroacetate, also called 1080, is a manufactured chemical compound containing at least 90% sodium monofluoroacetate as the active ingredient. It acts by interfering with energy metabolism, causing death by nervous system failure. It is lethal to many animals if sufficient quantities are consumed.

As noted by ERMA (2007), 1080 is manufactured in the United States and New Zealand currently accounts for around 80% of the global consumption of 1080. This is mainly due to its effectiveness in eradicating possums, the absence in New Zealand of large populations of native land mammals susceptible to 1080, and the inaccessibility of New Zealand's bush areas.

1080 dissolves rapidly in water and in wet environments with 1080 residues disappearing in one to four weeks. In dry or cold climates it can take several months for 1080 to break down (ERMA 2007).

### 2.2 Methods of 1080 Application

#### 2.2.1 1080 Bait

ECan proposes to use 1080 bait in the form of manufactured pellets, or carrot or oat bait coated with liquid 1080. Baits are coloured blue or green to make them less visually appealing to birds.

1080 will be discharged aurally by helicopter or fixed wing aeroplane. For ground control operations 1080 will either be hand broadcast to land or applied with a bait layer.

Application rates vary depending on the pest, and level of infestation. The maximum allowable application rate of 1080 for aerial operations is 30 grams per hectare (g/ha) in accordance with ERMA controls. For bait with a 0.15% concentration of 1080, this equates to a bait application rate of 20 kg of bait per hectare.

Typical bait application rates in Canterbury are usually much lower than this, and at present typical bait application rates are 3 kg of bait/ha (equates to 4.5 g/ha of 1080) for possum control, and 4 kg of bait/ha (6 g/ha of 1080) for rabbit control. However, application rates do vary depending on the level of infestation and area to be controlled.



### 2.2.2 Application of 1080

The resource consent will only be used by contractors certified by ECan. The contractors could be working on behalf of private landowners required to carry out pest control, or on behalf of ECan in situations where ECan becomes involved to ensure a coordinated approach to pest control over a large area and/or number of properties. Through the certification process ECan verifies that the contractors can meet ECan's standards for effectively and accurately applying 1080. This includes an actual field test of 1080 application, verifying the hopper sowing design, and checking the aircraft navigational equipment used. In addition, all contractors applying 1080 via aerial application must be a licensed aerial operator.

## 2.3 Indicative Pest Control Areas

### 2.3.1 Introduction

This section is intended to give an indication of the areas where 1080 has been used in the past, or is likely to be used in the future for possum, rabbit and wallaby control. However it is indicative only and this consent application is not restricted to these areas, but includes all areas within the Canterbury region where pest control may be necessary.

### 2.3.2 Rabbit prone areas

Rabbits occur in many parts of the Canterbury region, but are present in large numbers in the Mackenzie and Waitaki districts. They tend to favour habitat below an altitude of 1000 metres with free draining soils, sunny aspect and rainfall below 1000 millimetres per year (ECan, 2005).

### 2.3.3 Wallaby prone areas

Bennett's wallaby are present in the South Canterbury hill country. They are present in a variety of habitat such as tussock grasslands and forests.

### 2.3.4 Possum control areas

Possums can occur throughout the region, and aerial application of 1080 could occur throughout the Canterbury region in rugged, inaccessible areas where ground control methods are difficult and impractical.



### 3.0 LEGISLATIVE BACKGROUND

#### 3.1 ERMA reassessment of 1080

1080 was first approved for use in New Zealand in the 1960's. 1080 was subsequently transferred to the Hazardous Substances and New Organisms Act (1996) in 2004 and 2005, with similar restrictions to those under previous legislation. In March 2002, ERMA decided that there were grounds for reassessment of 1080, and the Animal Health Board and Department of Conservation (DOC) submitted an application for the reassessment of the use of sodium fluoroacetate (1080) in New Zealand.

In August 2007 the ERMA Committee issued their decision approving the continued use of sodium fluoroacetate (1080) in New Zealand. The ERMA Committee considered that the use of 1080 was necessary to manage the threat of possums to native plants and birds and to control the spread of bovine tuberculosis. While the focus of the ERMA assessment was the use of 1080 to eradicate possums, its use to control other pests such as rabbits, rats and stoats was also acknowledged.

A total of 1406 submissions were received on the 1080 application, indicating the high level of public interest in the use of 1080 in New Zealand. Many of these submissions were against the use of 1080, or requested tighter controls.

The 1080 reassessment process involved a number of reports, including the application submitted by DOC and the Animal Health Board (AHB), and the subsequent decision released by ERMA. The decision also provided a summary of the submissions received both in support and against the use of 1080. These documents provide an up-to-date assessment of the properties, application and effects of 1080 in New Zealand, and the information in these reports has been used extensively in this application document, given that the purpose of this document is to assess the effects of the use of 1080 in the Canterbury region.

In its decision, the ERMA Committee concluded that ground based operations using 1080 pose a relatively low risk to the environment and indigenous biodiversity. The ERMA Committee did consider that 'improvements are needed to ensure that aerial applications are carried out at a consistently high standard.' Tighter controls were placed on the aerial application of 1080 as a result. These included new requirements to notify the public of aerial operations and the establishment of a watch list requiring monitoring and reporting of all aerial operations. The ERMA Committee concluded that the adverse effects associated with both aerial and ground-based control can be adequately managed with the controls and recommended improvements to the overall management of 1080 use.

#### 3.2 Other regulations

In addition to meeting ERMA regulations, DOC approval is required for the use of 1080 on land managed by DOC, and Ministry of Health approval is required for areas where water supplies or public health may be at risk.



## 4.0 CONSENT REQUIREMENTS

### 4.1 The Resource Management Act 1991

Under section 15 (1) of the Resource Management Act 1991 (the RMA or Act) no person may discharge any contaminant to water or onto land in circumstances which may result in contaminants entering water unless the discharge is expressly allowed by a rule in a regional plan and in any relevant proposed regional plan, resource consent, or regulations. Therefore resource consent will be required for the application of 1080 in circumstances where it could enter water unless the discharge is authorised by the relevant operative and proposed regional plans. It is noted that the discharge of 1080 to land in circumstances where it will not enter water does not require consent under any section of the Act.

Under section 15 (2) of the Act no person may discharge a contaminant to air in a manner that contravenes a rule in a regional plan or proposed regional plan unless the discharge is expressly allowed by a resource consent or allowed by regulations. Therefore resource consent will be required for the discharge of 1080 to air if the discharge contravenes any rules in the relevant operative and proposed regional plans.

The relevant plans for Canterbury are the Transitional Regional Plan (TRP), the Waimakariri River Regional Plan (WRRP) the Opihi River Regional Plan (ORRP) and Proposed Natural Resources Regional Plan (PNRRP). The relevant rules in these plans are considered below for the discharge of 1080 to air, land and water.

### 4.2 Discharge to Air

#### 4.2.1 Transitional Regional Plans

There is a TRP for Canterbury (excluding the Kaikoura District) and a separate TRP for the Nelson-Marlborough Region which applies to the Kaikoura District. There are no rules in either of these plans relating to the discharge of 1080 to air. Therefore resource consent is not required<sup>1</sup> under the TRP for the discharge of 1080 to air.

#### 4.2.2 Proposed Natural Resources Regional Plan – Chapter 3: Air Quality

Chapter 3 of the PNRRP deals with air quality and was notified in June 2002. Decisions on submissions to Chapters 1 to 3 of the PNRRP were released on 19 September 2007 but the plan is not yet operative at the time of writing this report.

Rule AQL72 of Chapter 3 of the PNRRP permits the aerial application of agrichemicals, including 1080, subject to conditions. A full assessment of the activity against the conditions of Rule AQL72 is provided in Appendix A. The proposed discharge of 1080 to air can comply with all of the conditions of Rule AQL72. Therefore resource consent is not required for the discharge to air as it does not contravene the relevant rule.

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<sup>1</sup> Under section 15 (2) of the Act.





### 4.3 Discharge to Land in the Bed of a Waterway (via Ground Control Methods)

#### 4.3.1 Transitional Regional Plans

The TRP for the Canterbury Region and the TRP for the Nelson Marlborough Region including the Kaikoura District do not contain rules that specifically relate to the discharge of 1080 to land in circumstances where contaminants may enter water. Therefore resource consent will be required<sup>2</sup>. In accordance with section 77C of the Act, activities which are not expressly authorised by a rule in a plan are treated as **discretionary** activities.

#### 4.3.2 Proposed Natural Resources Regional Plan – Chapter 4: Water Quality

Chapter 4 of the PNRRP deals with water quality and was notified in July 2004. Decisions on this chapter have not yet been released. Rule WQL16 of Chapter 4 of the PNRRP permits the discharge of an agrichemical, including 1080, into or over water, or onto land where it may enter water in a surface waterbody. This rule is applicable to all areas of Canterbury except where the discharge to a river or to land adjacent to a surface water body is covered by the Waimakariri River Regional Plan (WRRP)<sup>3</sup>. There is an applicable rule in the WRRP. Therefore the WRRP rule is applicable to the discharge of 1080 in the Waimakariri River catchment, and Rule WQL16 of the PNRRP is applicable to all other areas of Canterbury.

The discharge of 1080 to land is assessed against Rule WQL16 of Chapter 4 of the PNRRP in Appendix A. As detailed in Appendix A, all of the conditions of the permitted activity rule can be met in relation to the discharge of 1080 to land in the beds of waterways. Therefore the discharge of 1080 to land adjacent to waterbodies in all areas of Canterbury, with the exception of the Waimakariri River catchment, is considered to be a **permitted** activity.

#### 4.3.3 The Waimakariri River Regional Plan

The WRRP became operative in October 2004. Rule 6.1 of the WRRP deals with the discharge of contaminants onto land in circumstances which may result in contaminants entering surface waterbodies. Activities which can meet the water quality standards are classed as discretionary activities. If 1080 does enter water it is unlikely to affect the water quality standards outlined in the rule for the different classes of waterbodies. Therefore the discharge of 1080 to land adjacent to waterbodies within the Waimakariri River catchment is considered to be a **discretionary** activity.

### 4.4 Discharge to Water (via Aerial Application)

#### 4.4.1 Transitional Regional Plans

The TRP for the Canterbury Region and the TRP for the Nelson Marlborough Region including the Kaikoura District do not contain rules that specifically relate to the discharge of 1080 to water. Therefore resource consent will be required<sup>4</sup> and the activity is treated as **discretionary**<sup>5</sup>.

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<sup>2</sup> Under section 15 (1) of the Act.

<sup>3</sup> The Ophi River Regional Plan does not deal with this activity.

<sup>4</sup> Under section 15 (1) of the Act.

<sup>5</sup> Under Section 77C of the Act.



### 4.4.2 Proposed Natural Resources Regional Plan – Chapter 4: Water Quality

Rule WQL16 of Chapter 4 of the PNRRP permits the discharge of an agrichemical, including 1080, into or over water, or onto land where it may enter water in a surface waterbody. This rule is applicable to all areas of Canterbury except where the discharge to surface water is covered by the Opihi River Regional Plan (ORRP) or WRRP. There are relevant rules in the ORRP and WRRP and therefore Rule WQL16 of the PNRRP is applicable to all areas of Canterbury other than the Waimakariri and Opihi River catchments.

The discharge of 1080 to land and water is assessed against Rule WQL16 in Appendix A. As detailed in the table, conditions 1(a) and 3 (a) cannot be met for the aerial application of 1080 in areas where it may enter water. Therefore resource consent is required to discharge 1080 to water, in all areas of Canterbury, with the exception of the Waimakariri River and the Opihi River catchments, and the activity is a **discretionary** activity under Rule WQL56 of the PNRRP.

### 4.4.3 The Waimakariri River Regional Plan

The WRRP became operative in October 2004. Rule 6.1 of the WRRP deals with the discharge of contaminants into surface water bodies in the Waimakariri River Catchment, or onto or into land within 20 metres of a surface water body, or onto land in circumstances which may result in contaminants entering surface waterbodies. Activities which can meet the water quality standards are classed as discretionary activities.

If 1080 does enter water as a result of the proposed activity it is unlikely to affect the water quality standards outlined in the rule for the different classes of waterbodies. Therefore the discharge of 1080 to land adjacent to waterbodies within the Waimakariri River catchment is considered to be a **discretionary** activity.

### 4.4.4 The Opihi River Regional Plan

The ORRP became operative in 2000. Rule 1 of the ORRP deals with the discharge of contaminants into the Opihi River or its tributaries, or onto land where contaminants may enter water. Activities which can meet the water quality standards outlined in the rule are discretionary activities.

If 1080 does enter water as a result of the proposed activity it is unlikely to affect the water quality standards outlined in the rule (which are similar to those in the WRRP). Therefore the discharge of 1080 to water or to land adjacent to waterbodies within the Opihi River catchment is considered to be a **discretionary** activity.

## 4.5 Summary of Consent Requirements

In summary:

- **The discharge of 1080 to air** does not require resource consent.
- **The discharge of 1080 to land in the bed of a waterway** complies with the relevant rules in the PNRRP and WRRP, but is not expressly authorised under the TRP. Resource consent is therefore required pursuant to the TRP for the discharge of 1080 to land in the beds of waterways, and the activity is a discretionary activity.
- **The discharge of 1080 via aerial application where 1080 could enter water** requires resource consent as a discretionary activity under the TRP, PNRRP (Chapter 4), WRRP and ORRP.

Therefore overall the discharge of 1080 to land and water within the Canterbury region requires resource consent as a **discretionary** activity.



## 5.0 CONSULTATION

ECan carried out consultation with parties that it identified as having an interest in the proposed discharge of 1080. Initially letters were sent out to the following parties in May 2008 informing them of the proposed resource consent application and offering consultation meetings:

- All district councils in the Canterbury Region.
- Te Rūnanga O Ngāi Tahu and the Papatipu Rūnanga for the Canterbury region.
- Fish and Game New Zealand (Fish and Game).
- Federated Farmers of NZ.
- New Zealand Deerstalkers Association.
- Royal Forest & Bird Protection Society.

A full mailing list and copy of the letter are included in Appendix B. Given the level of interest that was expected from hunting groups, a second letter and e-mail was sent to the North and South Canterbury branches of the New Zealand Deerstalkers Association. A copy of this letter is also included in Appendix B.

Where requested, meetings were then held with some parties. All responses and outcomes of the consultation are detailed in Table 1 below.

**Table 1: Summary of responses from consulted parties.**

Consulted party	Response/Outcome
Selwyn District Council	Requested more information about protection for community supply intakes. A buffer zone around community supply intakes are now proposed, and details of the proposed buffer zone was sent to Selwyn District Council.
Timaru District Council	Requested more information about protection for community supply intakes. A buffer zone around community supply intakes are now proposed, and details of the proposed buffer zone was sent to Timaru District Council.
Kaikoura District Council	Invited ECan to present to Kaikoura District Councillors. The presentation about the proposed discharge was given at a Council meeting on 17 September 2008. All correspondence included in Appendix B.
Department of Conservation	A DOC representative met with ECan and Golder representatives and a written response was provided by DOC in August 2008 stating that they support the application. A copy of the response is provided in Appendix B.
Community and Public Health	A meeting was held in July 2008 with Mr Lew Graham and potential consent conditions were discussed.



## 1080 APPLICATION FOR PEST CONTROL WITHIN THE CANTERBURY REGION

Fish and Game	A meeting was held with Fish and Game representatives on 18 July 2008, followed by several discussions. A letter of approval was provided, and is included in Appendix B.
Te Rūnanga O Ngāi Tahu	Meetings were held with representatives of Te Rūnanga O Ngāi Tahu who were also appointed to speak on behalf of all Papatipu Runanga for the region. A Cultural Impact Assessment was prepared and is attached as Appendix C. Further consultation occurred and the outcomes are detailed in an 'Outcomes Report' prepared by Dyanna Jolly on behalf of Te Rūnanga O Ngāi Tahu. This is included in Appendix C. As outlined in Section 4 of the CIA, Te Rūnanga O Ngāi Tahu now support the resource consent application.
North Canterbury Branch of the New Zealand Deerstalkers Association	Phone call between Jacqui Todd (Golder) and the local secretary (Mr David Hodder). Mr Hodder indicated that they had no comment to make on the resource consent application.
South Canterbury Branch of the New Zealand Deer Stalkers Association.	Informed ECan via e-mail that they are opposed to any resource consent application to use 1080.



## 6.0 DESCRIPTION OF THE ENVIRONMENT

### 6.1 Introduction

Canterbury extends from, and includes much of, the Clarence River catchment in the north to the Waitaki River in the south, and from the east coast to the Southern Alps in the west (Canterbury Regional Council 1998). The major waterways in the Canterbury region are shown in Figure 1 and described below.

The consent application is for the use of 1080 in areas which may be adjacent to or over waterways within Canterbury. While this application does not cover the discharge of 1080 to land in other areas where there is no risk of 1080 entering water, given that these discharges do not require resource consent under the Act, consultation has highlighted a number of land-based concerns. In recognition of public interest in the application of 1080 in all areas, a description is provided of some terrestrial habitats of concern to the public.

*Figure 1: Major waterways in Canterbury.*

### 6.2 Clarence River

#### 6.2.1 Catchment description

The Clarence River is located in the Kaikoura District. The Kaikoura area is characterised by a distinctive rocky sea coast in close proximity to high mountains, resulting in short, swiftly flowing rivers. The Clarence River is a glacial river and is approximately 200 km long. The river rises on the eastern slopes of the Spenser Mountains and drains Lake Tennyson before converging with the Acheron River. It then flows in a north-easterly direction along a fault, separating the Inward Kaikoura Range from the Seaward Kaikoura Range before flowing into the sea about 50 km north of Kaikoura (McLintock 1966).

The headwaters of the Clarence River are considered to have outstanding natural features and landscapes. The area is characterised by a native forest mountain landscape with high clarity waters in the river and Lake Tennyson and thus has a high degree of naturalness (Daly 2004).

Downstream of the Acheron River confluence the natural landscape is considered to be moderate to high with dramatic bluffs and rock forms in fast-flowing gorge sections of the river. The lower reaches of the river have moderately low, unremarkable natural values and a moderate to low degree of naturalness (Daly 2004).

#### 6.2.2 Terrestrial and aquatic ecosystem values

The Clarence River catchment has been reported to have one threatened plant species (*Gunnera densiflora*). Other notable plant species present include an uncommon pillwort *Pilularia novazelandiae* and a forget-me-not *Myosotis minutiflora* (Daly 2004).

Two threatened bird species (banded dotterel and black-fronted terns) inhabit the river. The river provides feeding, roosting and breeding habitat for open-water divers, deep and shallow waders, gulls and terns. Birds mostly use the braided river habitat but the numbers are low due to the unstable riverbed and distance from the sea. Lake McRae is significant for the threatened southern crested grebe (Daly 2004).

Reported aquatic invertebrate species present in the river system include mayflies, stoneflies, net-winged midges, scorpion flies, toebiter, caddisflies and sandflies (Daly 2004).

A number of native fish species have been reported in the Clarence River catchment including upland bully, koaro, dwarf galaxias, longfin eel, bluegilled bully, inanga and torrentfish. Of these, longfin eel and dwarf galaxias are considered threatened species as their populations are in gradual decline (Hitchmough et al. 2007).



### 6.2.3 Cultural values

The lower reaches of the Clarence River are of traditional significance and there is a pa site south of the river delta which has been settled since the moa hunting period. The river is an important mahinga kai source to Ngati Kuri for indigenous fish species (eels, inanga, kokopu), plants for eating, weaving or medicinal purposes and birds and their eggs. There is also evidence of kumara gardens in the lower reaches dating back over 900 years (Daly 2004).

## 6.3 Conway River

### 6.3.1 Catchment description

The Conway River is a short river that drains hill country south of the Kaikoura ranges and enters the sea at Conway Flat. In its upper reaches the natural landscape is described as generally of moderately significant value. With increasing distance downstream the natural values decline to low or unremarkable value (Daly 2004).

### 6.3.2 Terrestrial and aquatic ecosystem values

The lower braided section of the river provides feeding, roosting and breeding habitat for deep and shallow water waders, gulls and terns. Two threatened species, banded dotterel and black-fronted tern, have also been reported (Daly 2004).

Typical aquatic invertebrate species recorded in the Conway River catchment include mayfly, toebiter, elmids beetles, caddisflies and craneflies. Native fish species recorded in the catchment include Canterbury galaxias, torrentfish, common and upland bully, inanga, black flounder, longfin eel and shortfin eel (Daly 2004).

The upper river is not considered as a valuable habitat for brown trout however the gorge reach, below the confluence with Spey Stream, provides high-value habitat for resident and sea-run migratory brown trout. The lower reaches of the river are not suited to brown trout as the river is prone to flooding and a changing river course in this area.

### 6.3.3 Cultural values

The Conway River/Tutae Putaputa is a Statutory Acknowledgement Area. The river is a mahinga kai gathering place and the river mouth is known as a moa hunter occupation site. There are numerous urupa and wahi tapu associated with the river, particularly in the vicinity of the pa Pariwhakatu (Daly 2004).

## 6.4 Hurunui River

### 6.4.1 Catchment description

The Hurunui is one of the most diverse river catchments in Canterbury, ranging from bush-fringed lakes, steep, rocky headwaters and gorges to braided shingle riverbeds, and supports an equally diverse range of habitats and native biodiversity. The catchment is approximately 2,600 km<sup>2</sup>. The river rises in the Southern Alps and flows in an easterly direction towards the Pacific Ocean. In the river's headwaters there are several lakes, damned by glacial moraines, the largest of which is Lake Sumner.



### 6.4.2 Terrestrial and aquatic ecosystem values

The Hurunui catchment contains several endangered native plant species, and surrounding beech forest supports a healthy population of native birds such as kiwi, endangered mohua (yellowhead) and critically endangered orange-fronted parakeet (kakariki).

The Hurunui River is ranked as of national to international significance for threatened bird species. Threatened species found in the catchment include blue duck, banded dotterel, black-fronted tern and crested grebe (Mosley 2002).

Twenty-nine fish species have been identified in the catchment, including 25 native species and six threatened fish species, and the catchment has been identified as having national importance for aquatic biodiversity. It is also an important recreational fishery for brown trout and salmon (Todd 2007).

### 6.4.3 Cultural values

The Hurunui River is a Statutory Acknowledgement area. As a mahinga kai gathering place the river was traditionally important for tuna (eel) and inanga although populations are now depleted. Lake Sumner/Hoka Kura is used by North Canterbury Ngai Tahu as a mahinga kai gathering place.

There are two known archaeological sites associated with a tributary of the Hurunui River, the Mandamus River, where artefacts have been found. Artefacts have also been found in Maori Gully, a section of the greenstone trail to the west coast.

## 6.5 Ashley River

### 6.5.1 Catchment description

The Ashley River flows from its headwaters in the Puketeraki Range, through Lees Valley and the Ashley Gorge before crossing the Canterbury Plains to the North of Rangiora before reaching the coast at Waikuku. Over its approximately 95 km length the river falls around 1,000m. The catchment area at the coast is 1,340 km<sup>2</sup> (ECan 2006).

### 6.5.2 Terrestrial and aquatic ecosystem values

The Ashley River is considered important for river birds and has been rated as outstanding. Nesting areas on the braided riverbed of the Ashley River upstream of the gorge have been recorded for a number of threatened bird species, including wrybill, banded dotterel, black fronted terns and pied stilts (Daly 2004). It is designated as Wrybill breeding protection area. The lower Ashley River downstream of the gorge contains a high species diversity of river birds.

Typical aquatic invertebrate species recorded in the Ashley River catchment include mayfly, toebiter, elm mid beetles and caddisflies. Native fish species recorded in the catchment include torrentfish, common upland and bluegilled bully, Canterbury galaxias, longfin and shortfin eel, inanga and black flounder (Daly 2004).

The upper Ashley River provides medium value habitat for sea-run spawning Chinook salmon and low value habitat for resident brown trout, with the exception of the Townsend River tributary which is a high value habitat for brown trout and sea-run spawning Chinook salmon (Daly 2004). The majority of the river provides medium-low value habitat for trout and salmon.



### 6.5.3 Cultural values

The Ashley River is a mahinga kai gathering place and the Ashley River mouth area is a place of Tauranga waka landing associated with Kaiapoi Pa. A number of reaches of the river are of importance to Ngai Tuahuriri for longfinned eels, kokopu and inanga (Daly 2004).

## 6.6 Waimakariri River

### 6.6.1 Catchment description

The Waimakariri River is one of the largest braided rivers in New Zealand. It rises in the Southern Alps in the Arthur's Pass National Park where 90% of the river's flow is derived from alpine precipitation. The river emerges from a 25 km gorge on to the Canterbury Plains where it flows to the sea in a wide, braided riverbed. The catchment covers over 3,500 km<sup>2</sup>.

Mean flow in the river is 124 m<sup>3</sup>/s although flood flows can exceed 4,000 m<sup>3</sup>/s. The Waimakariri River presents a major flood hazard to Christchurch, and therefore an extensive system of flood protection works has been constructed on the lower river. The Waimakariri River is a sought after location for recreational pursuits including jet boating, rafting and canoeing among others.

### 6.6.2 Terrestrial and aquatic ecosystem values

The headwaters of the Waimakariri River are reported to have significant to outstanding natural values. Downstream of the gorge to the coastal marine area the natural values decline to moderate to moderately low value.

Vegetation in the river plain comprises typical braided river, fan herb field, cushion-field and river gravel species. Several threatened plant species have been recorded in the catchment (2004).

The Waimakariri River, and associated tributaries and lakes, have high species diversity and numbers of native birds, and almost all species characteristic of braided rivers are present. The river provides important breeding habitat for threatened species including blue duck/whio, wrybill/ngatu-parore, banded dotterel, southern crested grebe, black-fronted tern and Australasian bittern.

The indigenous aquatic invertebrate fauna of the river system is highly diverse and mayfly, stoneflies, caddisflies, elmids beetles and midge larvae are among the most abundant species. Native fish species reported for the Waimakariri River include alpine and Canterbury galaxias, upland bully, koaro, long-finned eel, torrentfish and lamprey. The threatened Canterbury mudfish has been found in the Eyre River, a tributary of the Waimakariri River. A number of diadromous species including black flounder and Stokells smelt are also present in the lower reaches of the river. The Waimakariri River also supports a highly valued salmon and trout fishery.

### 6.6.3 Cultural values

The rivers and lakes in the Waimakariri River catchment are of significance to Ngai Tahu, particularly the lower plains tributaries, as a mahinga kai source. Some water bodies in the upper catchment were important for resourcing Ngai Tahu expeditions to the West Coast and are of historical significance to Ngai Tahu.

Statutory Acknowledgement Areas in the catchment include the Kowai River, Castle Hill/Kura Tawhiti (tributary of the Thomas River) and Lake Pearson/Moanarua.





## 6.7 Rakaia River

### 6.7.1 Catchment description

The Rakaia River is the largest braided river in New Zealand. It has a total catchment area of 2,910 km<sup>2</sup>, 91% of which is above the gorge. Its main tributaries are fed from the snowfields of the Southern Alps. For most of its course it consists of large shingle flats and fast flowing rapids and runs. Downstream of the gorge the river spreads across a wide area, which is encroached upon by broom and lupin.

The Rakaia River and its tributaries are recognised as an outstanding natural characteristic in the form of a braided river and as providing outstanding wildlife habitat, outstanding fisheries and outstanding recreation, angling and jet boating features. These characteristics are protected by the National Water Conservation (Rakaia River) Order 1988 which is described further in Section 9 of this report.

### 6.7.2 Terrestrial and aquatic ecosystem values

Similar to the Waimakariri River, the Rakaia River has a high degree of naturalness in its upper reaches but the landscape values decline below the gorge where natural values are described as unremarkable (Daly 2004). The river vegetation is typical of that found in a braided river environment, and several threatened native plant species are present (Daly 2004).

The Rakaia River and its tributaries have highly valued native bird habitat for a diverse range of species, some of which are listed on DOC's threatened species list. Threatened species recorded in the catchment include wrybill, banded dotterel, black-fronted terns, Australasian bittern and Marsh crane.

Aquatic invertebrate species diversity and abundance is greater above the gorge compared with the Plains section of the river. In the lower reaches of the river this is due to the flood-prone nature of the river and the duration of low flows needed for invertebrate populations to re-establish. Threatened native fish species recorded in the Rakaia River catchment include the threatened long-jaw galaxias, long-fin eel, and lamprey. Other notable species include upland and common bullies, koaro and torrentfish.

The Rakaia River is highly valued as a salmon and trout fishery. The river supports extensive regions of both spawning and adult salmonid habitat.

### 6.7.3 Cultural values

The Rakaia River is traditionally important as a mahinga kai gathering place for tuna (eel) and inanga (whitebait) as well as other fish species. Bird eggs and plant materials are also gathered. Lake Coleridge/Whakamata and the Ashburton Lakes (including Lake Heron) are designated Statutory Acknowledgement Areas.

## 6.8 Rangitata River

### 6.8.1 Catchment description

The Rangitata River is one of the major river systems in South Canterbury. The river flows for around 105 km from the confluence of the Havelock and Clyde Rivers to the ocean. The Havelock and Clyde Rivers have their headwaters on the Main Divide of the Southern Alps. The catchment consists of a large inland basin and a relatively narrow lower catchment from the gorge to the sea with an area of approximately 1,800 km<sup>2</sup>. Through the gorge, about 15 km in length and 44 km from the sea, the river is a single thread with a well-developed meandering pattern. For the remainder the river displays a braided river morphology.



### 6.8.2 Terrestrial and aquatic ecosystem values

Natural features and landscape values range from outstanding in the headwater reaches to moderate in the upper mainstem and lower tributary reaches. Downstream of the gorge, natural values decline to moderately low or unremarkable. The river is listed as a nationally important river which 'may have outstanding characteristics' (Daly 2004).

The river and tributaries are bordered by predominantly native vegetation, particularly tussock grassland, matagouri shrubland and patches of beech forest. The river provides feeding and roosting habitat for deep and shallow water wading birds. Threatened bird species recorded in the river include blue duck/whio, wrybill/ngutu-parore, banded dotterel and black-fronted tern. The river has regional significance for wildlife (Daly 2004).

The aquatic invertebrate fauna is similar to the Waimakariri and Rakaia Rivers in that species diversity and abundance is greater above the gorge, compared with the Plains section of the river. Mayfly, stoneflies, caddisflies, elmin beetle and midges are abundant throughout the river system.

The Rangitata Gorge is a barrier to native migratory fish species although rare occurrences of long-fin eel have been reported. Upland bully, alpine, Canterbury and upland long-jaw galaxias are present. Downstream of the gorge torrentfish and blue-gilled bully are the most prevalent species. Diadromous species have been recorded near to the coast (Daly 2004).

The upper reaches of the river provide unstable, flood-prone habitat generally not suited to salmonids. The gorge and lower reaches, however, have high value habitat for sea-run migratory Chinook salmon and brown trout.

### 6.8.3 Cultural values

The Rangitata River is a major mahinga kai resource for Ngai Tahu. A wide range of plant, fish and bird species are listed in Daly (2004). The Rangitata River is a designated Statutory Acknowledgement Area.

## 6.9 Waitaki River

### 6.9.1 Catchment description

Aoraki/Mt Cook and the mountains of the Southern Alps dominate the Waitaki catchment. The Waitaki River is fed predominantly by water flowing from the main divide mountains through Lakes Ohau, Pukaki and Tekapo and the Ahuriri River. The Waitaki River reaches widths of up to one kilometre before meeting the Pacific Ocean north of Oamaru (Waitaki Catchment Water Allocation Board 2006).

Of the catchment's 12,000 km<sup>2</sup>, about a quarter is classified as public reserves and protected areas. This land, administered by the Department of Conservation, is mostly upstream of Lakes Tekapo, Pukaki and Ohau, or in the Ahuriri catchment, or in the mountain ranges (Waitaki Catchment Water Allocation Board 2006).

### 6.9.2 Terrestrial and aquatic ecosystem values

The upper catchment provides habitat for 30 species of native bird ranging from free-flying mountain species (kea) to smaller forest and scrub birds and braided river bird species. Braided rivers provide habitat for more than 80 bird species. The braided riverbeds and deltas of the upper catchment are the primary breeding habitat for the black stilt, one of New Zealand's rarest birds. A range of game birds is found on the ponds and wetlands associated with the main stem of the river (Waitaki Catchment Water Allocation Board 2006).



The catchment contains a diverse range of terrestrial and aquatic invertebrate species. The indigenous robust grasshopper, which lives on dry river terraces, is nationally endangered and is found only in the Waitaki catchment (Waitaki Catchment Water Allocation Board 2006).

Twenty four species of native fish are known in the catchment. Of these, six threatened species (Canterbury mudfish, lowland and upland long-jawed galaxias, big-nosed galaxias, long-finned eel and lamprey) are present. Brown and rainbow trout occur throughout the catchment while Chinook salmon are found only below the Waitaki Dam (Waitaki Catchment Water Allocation Board 2006).

### 6.9.3 Cultural values

Aoraki/Mt Cook and the Waitaki River are the ancestral mountain and river of Ngai Tahu. The river is a symbol of permanence and source of spiritual meaning to tangata whenua. Cultural anchors associated with the catchment include sites linked to creation traditions, burial sites and areas where important historical events have occurred (Waitaki Catchment Water Allocation Board 2006).

The following areas in the catchment are designated Statutory Acknowledgement Areas:

- Lake Tekapo.
- Lake McGregor.
- Lake Alexandrina.
- Lake Pukaki.
- Lake Ohau.
- Lake Ruataniwha.
- Ahuriri River.
- Lake Benmore.
- Lake Aviemore.
- Waitaki River.
- Hakataramea River.

### 6.10 DOC administered land

DOC administers large areas of land in the Canterbury region including national parks, conservation parks and scenic reserves. Much of this land is at least partly publicly accessible either directly (e.g., picnic areas) or via walking tracks. The areas of DOC administered land in Canterbury are mapped on DOC's website ([www.doc.govt.nz](http://www.doc.govt.nz)). These areas are of note because any 1080 applied to DOC administered land also requires a separate permit from DOC.

### 6.11 Kea habitat

Concerns have been expressed about the effects on Kea (*Nestor notabilis*), and these effects are discussed further in the Assessment of Environmental Effects section of this report.

The current population of kea, as recorded by the New Zealand Ornithological Society, is shown in Figure 2

*Figure 2: Kea population distribution in the South Island.*



### 6.12 Community water supplies from surface waters

While the majority of Canterbury's public water supplies are sourced from groundwater, there are also a number of surface water and galleried intakes (indirect takes from surface waters) that supply water to mostly smaller, often isolated, rural communities. ECan's PNRRP lists details of community drinking water supplies from surface waters (Table WQL21 of the PNRRP) and infiltration galleries (Table WQL 22 of the PNRRP). The locations of the 56 surface water intakes and 13 infiltration galleries are plotted in Figure 3. While a number of the intakes are located in areas such as the plains, foothills and Banks Peninsula where it is unlikely that 1080 would be applied, there are a number of intakes in mountainous regions e.g., Arthurs Pass, where 1080 application could occur.

*Figure 3: Location of community water supplies from surface waters and infiltration galleries in Canterbury.*



## 7.0 ASSESSMENT OF ACTUAL AND POTENTIAL EFFECTS

### 7.1 Introduction

This report relates to an application for a resource consent which is required for situations where 1080 may enter water. Therefore the assessment of effects focuses on the effects of 1080 entering water. It is noted that the application of 1080 via ground control methods where there is no risk of 1080 entering water does not require consent, as discussed in Section 4 of this report. However, consideration has still been given to the effects on non-target terrestrial species which are susceptible to 1080 as ECan acknowledges that there are public concerns about these effects.

### 7.2 Toxicity of 1080 to Terrestrial Species

The toxicity of 1080 to various terrestrial species has been taken into account when assessing the actual and potential effects of 1080. The following table (Table 2) was provided in the application for the reassessment of 1080 (DOC and AHB 2006) and is reproduced here to provide an indication of the susceptibility of different species to 1080.

In order to assess the toxicity data it is useful to consider the amount of 1080 in each pellet. Bait types and sizes vary, but 8 g pellets are typically used in Canterbury. With a concentration of 0.15% of 1080, an 8 g pellet will therefore contain 0.012 g (12 mg) of 1080.

**Table 2: Acute oral toxicity of 1080 to terrestrial species (Nate New Zealand)**

Mammals		
Species	LD50 <sup>6</sup> (mg/kg)	Reference
Bennett's wallaby ( <i>Macropus rufogriseus</i> )	0.21	Munday (1978)
Dama/ Tammar wallaby ( <i>M. eugenii</i> )	0.27	Munday (1978)
Brushtail possum ( <i>Trichosurus vulpecula</i> )	0.79	Bell (1972)
Dog ( <i>Canis familiaris</i> )	0.06	Chenoweth (1949)
Cat ( <i>Felis domesticus</i> )	0.35	Eason and Frampton (1991)
Ferret ( <i>Mustela putorius</i> )	1.41	Tucker and Crabtree (1970)
Rabbit ( <i>Oryctolagus cuniculus</i> )	0.35	McIlroy (1982)
House mouse ( <i>Mus musculus</i> )	8.3	McIlroy (1982b)
Rat (wild) ( <i>Rattus norvegicus</i> )	0.22-3.0	Chenoweth (1949)

<sup>6</sup> The LD<sub>50</sub> is the median lethal dose.



## 1080 APPLICATION FOR PEST CONTROL WITHIN THE CANTERBURY REGION

Cattle ( <i>Bos taurus</i> )	0.39	Robison (1970)
Deer (not specified)	0.50	Rammell and Fleming (1978)
Horse ( <i>Equus caballus</i> )	0.32-01.0	Atzert (1971)
Pig ( <i>Sus scrofa</i> )	0.40	Atzert (1971)
Sheep ( <i>Ovis aries</i> )	0.25-0.64	Atzert (1971)
Goat ( <i>Capra hircus</i> )	0.3-0.7	Atzert (1971)
Short-tailed bat ( <i>Mystacine tuberculata</i> )	0.15 (estimate)	Lloyd and McQueen (2000)
Species	LD <sub>50</sub> (mg/kg)	Reference
Mallard duck ( <i>Anas platyrhynchos</i> )	4.8	Hudson et al. (1972)
Pacific black duck ( <i>Anas superciliosa</i> )	10.0	McIlroy (1984)
Common pigeon ( <i>Columba livia</i> )	4.250	Tucker and Crabtree (1970)
Chicken ( <i>Gallus gallus</i> )	7.0-8.0	Cottral et al. (1947)
Chukar partridge ( <i>Alectoris chukar</i> )	3.51	Tucker and Crabtree (1970)
Ring-necked pheasant ( <i>Phasianus colchinus</i> )	6.46	Tucker and Crabtree (1970)
California quail ( <i>Callipepla californica</i> )	4.60	Tucker and Crabtree (1970)
European goldfinch ( <i>Carduelis carduelis</i> )	3.5 approx	McIlroy (1984)
Australian magpie ( <i>Gymnorhina tibicen</i> )	9.9	McIlroy (1984)
Weka ( <i>Gallirallus australis greyi</i> )	8.0	McIntosh et al. (1966)
Silvereye ( <i>Zosterops lateralis</i> )	9.25 approx	McIlroy (1984)

### 7.3 Effects on Fish and Aquatic Invertebrates

The discharge of 1080 to water could expose fish and aquatic invertebrates to 1080.

When rain is forecast, or rivers are likely to flood, 1080 is not discharged into the bed of waterways as this significantly reduces the efficacy of the operation. Therefore it is considered unlikely that the ground-control operations will result in 1080 entering water.

However, some 1080 could enter water as a result of aerial application. All practicable measures will be undertaken to avoid this and minimise the concentrations of 1080 to water. The key mitigation proposed is buffer distances around waterways. 1080 will not be discharged within the following distances of waterways:



## 1080 APPLICATION FOR PEST CONTROL WITHIN THE CANTERBURY REGION

- No aerial discharge of pesticides within 100 m within 30 metres of any flowing or standing water body in excess of three metres wide and 100 millimetres deep.
- No ground application of pesticides within 20 m of any flowing or standing water in excess of three metres wide and 100 millimetres deep.

In addition, the use of Differential Global Positioning Systems (DGPS) in aircraft allow for more accurate application of 1080 to the targeted area. New methods are being investigated to provide greater control over bait spreading. This, combined with reduced application rates, significantly reduces the amount of 1080 likely to enter waterways.

Should 1080 bait be discharged into waterways, it is noted that 1080 breaks down rapidly in water. As stated in the application for the reassessment of 1080, sodium fluoroacetate is considered to be rapidly degraded in natural aquatic environments and does not bioaccumulate (DOC and AHB 2006). Water quality sampling after 1080 operations in New Zealand have shown no detectable 1080 in most cases, and where 1080 was detected it was in negligible concentrations. In the reassessment application, DOC and ADH also provided information to show that fish are relatively resistant to 1080 compared to mammals.

Having considered the information submitted as part of the 1080 reassessment process, the ERMA Committee made the following conclusions in their decision:

- Reductions in bait sowing rates from levels of 30 kg bait/ha in the 1970's to current average rates of 2-5 kg bait/ha have led to a reduction in the amount of baits likely to enter waterbodies.
- Water samples rarely contain measurable 1080 residues. There have been no 1080 residues recorded at concentrations likely to be toxic to aquatic organisms.
- Any potential exposure of aquatic organisms to 1080 would be short term and episodic given that repeated treatment of 1080 occurs on average at 5-6 yearly intervals.
- 1080 is not bioaccumulative (i.e. does not accumulate in an organism).
- Organisms do take up 1080 from water, but the bait deposits 1080 in water in such low concentrations that organisms can metabolise and/or excrete the substance over a short time period.
- In general terms, 1080 is not highly toxic to fish and aquatic invertebrates.
- Algae are particularly sensitive to 1080 but can rapidly re-colonise after 1080 exposure.
- The requirement to leave a buffer zone around waterways could affect the efficiency of a 1080 operation, leaving untreated areas for possum to re-invade from.

Overall, it was concluded that *'operating in accordance with best practice with respect to sowing rates and application technology should ensure that the risk to aquatic species remains very small.'*

In summary, the risks to aquatic ecosystems are considered minimal given that the concentrations of 1080 entering water are likely to be negligible, and that aquatic organisms, including fish, are not known to be particularly susceptible to 1080. It is considered that measures can be put in place to minimise the amount of 1080 entering waterways, and therefore adverse effects on aquatic ecosystems are considered to be minor.

### 7.4 Effects on Waterfowl

The information in Table 2 shows that waterfowl, such as ducks, are relatively resistant to 1080 compared to the target pest species. Therefore, when applied at rates targeted to animals of higher susceptibility to 1080, the discharge of 1080 at the proposed application rates is unlikely to have a significant effect on waterfowl. In addition, any bait entering water will be diluted further reducing the toxicity to waterfowl. Therefore it is considered unlikely that waterfowl will be significantly affected by the proposed 1080 discharges.



### 7.5 Effects on Human Health

Humans could be affected by the discharge of 1080 through direct exposure to 1080, ingestion of meat from sub-lethally poisoned animals or the consumption of contaminated water. Of greatest concern to submitters involved in the ERMA reassessment of 1080 process appeared to be the risk of humans consuming contaminated water.

Direct exposure to 1080 as a result of aerial operation is considered unlikely given the appearance of the bait, and given that aerial operations for possum control are carried out in rugged, inaccessible areas, and rabbit control operations are carried out on private farmland with prior knowledge and approval by the landowner. 1080 is not usually discharged aurally in residential or public areas, although some aerial applications do occur near public facilities such as tracks and huts. Notification procedures such as signage and direct notification to landowners should minimise the risk of people consuming 1080 bait. The use of improved aircraft guidance procedures also minimises the risk of 1080 being discharged outside of the intended control areas.

The risk of the consumption of meat is considered minor given that domestic stock are removed from 1080 control areas and not returned until sampling indicates that 1080 no longer poses a risk to stock. Signage in other 1080 control areas, such as hunting areas, will also alert people to the risk of 1080 contamination of animals such as deer and wild pigs. DOC and the AHB presented evidence in the 1080 reassessment application to show that 1080 is metabolised within five days and therefore human exposure through consumption of sub-lethally affected meat will only occur if the meat is consumed within a relatively short time. Food products such as meat and dairy are subject to strict controls put in place by the New Zealand Food Safety Authority (NZFSA) which addresses the risk of 1080 poisoning through the consumption of such foods.

The third risk to humans is through consumption of contaminated water, and a wide range of submissions were received on this for the ERMA 1080 reassessment process. Water could become contaminated through direct discharge of bait to streams, accidental spillage, or contamination from animal carcasses poisoned with 1080. Consent conditions are proposed to minimise the risk of 1080 entering drinking water, including a 100 m buffer around all bore and community drinking water supplies, and buffers around all waterways greater than 3 m wide and 100 mm deep.

In addition, ERMA noted that there are extensive controls in place to protect community drinking water supplies. District Councils, who are responsible for maintaining these community water supplies, will be consulted at the time should 1080 be applied in their district. Similarly, separate approval is required from the Medical Officer of Health for the application of 1080 in areas where community water supplies from surface waters are present. In addition to ERMA controls and any resource consent conditions, the applicator must obtain permission from the Medical Officer of Health for any 1080 operations near public water supplies. ERMA concluded that the controls in place, coupled with dilution, mean that the health risk is very low. They did note that private water supplies, such as abstractions from streams, are less controlled. Adequate identification of such abstractions and notification to potentially affected parties is important in these situations to minimise the risk.

It is noted that the concentration of 1080 in water will be rapidly diluted, and coupled with controls on application rates, this will reduce the risk of 1080 entering water in concentrations likely to adversely affect humans. This, in addition to adequate identification of water abstraction points, and signage and notification, should ensure that human health is not put at risk as a result of the proposed discharges of 1080.

In summary, it is considered that the risks to human health can be adequately managed by the proposed conditions and ERMA controls.





### 7.6 Cultural Effects

The discharge of 1080 in circumstances where it may enter water could result in adverse effects on cultural values, both tangible and intangible. ECan recognised that Ngāi Tahu and Papatipu Rūnanga are potentially adversely affected parties to the proposal, and carried out consultation with these parties before lodging the application for resource consent. Papatipu Rūnanga agreed that Ngāi Tahu representatives could act on their behalf.

The consultation process included the preparation of a Cultural Impact Assessment (CIA) and an Outcomes Report detailing the outcomes of the consultation. Both reports are included in Appendix C. The CIA identified the following issues to be of particular importance to Ngāi Tahu and Papatipu Rūnanga:

- The need to recognise Ngāi Tahu and ngā Papatipu Rūnanga as affected parties.
- Impacts on cultural values as a result of 1080 entering water.
- Protecting local, site specific values under a region-wide consent.
- Benefits of a global consent.
- Cultural monitoring.
- Non-target impacts.
- That a global consent may result in the increased use of 1080.
- That a global consent may result in the loss of ability for Ngāi Tahu to oppose a particular 1080 operation.

The consultation focussed on mitigation measures which aimed to minimise the risk of 1080 entering water, protect local site specific values and provide for cultural monitoring and on-going consultation with Ngāi Tahu and Papatipu Rūnanga to ensure that they still have input into each 1080 operation. In particular it is noted that, as a result of the consultation with Ngāi Tahu, ECan proposed larger buffer distances around waterways. For aerial application of 1080 near waterways, Ngāi Tahu agreed to a smaller buffer distance than originally requested, based on the understanding that pilots fly an additional 15 to 20 metres from the required buffer distance to ensure full compliance with the buffer zone (i.e. for the proposed 30 m buffer distance from larger waterways, the pilot will fly 45 to 50 m from the waterway to ensure that there is no risk of any pellets being dropped within the 30 m buffer). In addition to the conditions originally proposed by ECan, the following conditions are now proposed to address cultural concerns:

- No aerial discharge of 1080 within:
  - 100 m of any dwelling or any hut on a designated walking track.
  - 100 m of any bore or community drinking water supply intake.
  - 10 m of a formed public road.
  - 30 m of any flowing or standing water body greater than 3 m wide and 100 mm deep.
- No ground application of 1080 within 20 m of any flowing or standing water body greater than 3 m wide and 100 mm deep.



## 1080 APPLICATION FOR PEST CONTROL WITHIN THE CANTERBURY REGION

- All practicable measures will be undertaken to avoid the discharge of 1080 into all other waterways.
- Notification to the appropriate Papatipu Rūnanga at least 20 working days prior to the discharge in the rohé of that Rūnanga.
- ECan to facilitate an annual meeting each year to discuss 1080 operations for the previous year, proposed 1080 operations for the following year, and any monitoring results or studies that have been carried out into the effects of 1080.
- Cultural monitoring (where a Rūnanga representative is given the opportunity to visit the discharge area after a 1080 operation).
- Analysis of any native bird deaths in the discharge area after a 1080 operation if it is suspected that the death was caused by 1080 poisoning.

These conditions have been included in the proposed conditions detailed later in this report. As a result of the consultation, it is now stated in the Outcomes Report that Ngāi Tahu support the resource consent application.

### 7.7 Effects on Terrestrial Fauna

#### 7.7.1 Native species

During the ERMA reassessment process concern was expressed about the potential effects on other native species such as native bats, reptiles and invertebrates.

The ERMA Committee reviewed the available information on other native species, such as bats and invertebrates, and concluded that the risk was low, given the controls on the use of 1080 and adherence to recommended best practice. Reptiles and amphibians were found to be among the least sensitive animals to 1080, although the difficulties in testing these native species were acknowledged. Conclusions are therefore difficult, and the monitoring of impacts on frog populations has been limited. However the ERMA Committee noted that the reduced application rates, and minimum size requirement for carrot bait would reduce the likelihood of lizards and frogs consuming the bait. Overall the ERMA Committee concluded that the recommended controls, coupled with adherence to best practice, would adequately manage the risks to lizards and frogs.

The applicant agrees with the conclusions made by ERMA and considers that the risk to other native species such as bats, invertebrates and lizards and frogs is low. The risk can be minimised by adhering to the recommended best practice, and using screened carrot bait of a minimum size. Application rates will be in accordance with recommended rates at all times.

#### 7.7.2 Birds

Birds are more resistant to 1080 than possums as shown in Table 2. However, birds can still consume lethal doses of 1080 and have been found dead after 1080 operations. Of particular concern are the potential effects on ground dwelling native birds likely to encounter bait, effects on upland game birds (a concern expressed by Fish and Game) and effects on kea, after kea deaths were recorded in a 1080 operation in New Zealand in 2008.

Mitigation measures can be put in place to minimise the risks to birds. The size and colour of bait affects the likelihood of birds eating the bait, and therefore bait is dyed blue or green, and must be of a minimum size and screened to remove small pieces (called chaff). Cut apple bait is thought to be particularly attractive to birds, and no cut-apple bait will be used by ECan. These measures, combined with a reduced rate of application, minimise the risks to birds.



## 1080 APPLICATION FOR PEST CONTROL WITHIN THE CANTERBURY REGION

In 2008 seven kea died at Fox Glacier as a result of 1080 poisoning. The kea were part of a DOC research programme which involved fitting radio transmitters to 29 West Coast kea, 17 of which were in the Fox Glacier area. Seven of these kea were found dead due to 1080 poisoning after the 1080 operation. This was a higher number than expected and is of concern. ECan and Golder representatives have discussed this issue with DOC staff. At the time of writing this report, DOC, the Animal Health Board and the Kea Conservation Trust are carrying out further research into the effects on kea. The research is focussing on forested mountain areas where there are likely to be larger populations of kea which could be adversely affected by 1080. Research will be carried out in the spring and winter of 2009, and ECan will seek regular updates on this research, particularly if ECan 1080 operations in forested mountain areas are proposed. As part of this research, additional mitigation measures, such as the addition of bird repellent to the bait, are being investigated.

Fish and Game initially expressed concern about the potential effects of 1080 on upland game birds, as detailed in its letter of 23 June 2008, included in Appendix B. There is limited information about the effects on upland game birds, but available toxicity data suggests that they are not as susceptible to 1080 as other animals (with an estimated LD 50 of 7.3 mg/kg (Eisler, 1995)).

Overall, the effects on birds are considered by ECan to be positive given the reduced predation rates and competition for food as a result of possum control. Possums are known to raid birds' nests and eat eggs and chicks. They also compete with birds for food and destroy native trees. Kokako, kaka and other hole-nesting birds are particularly vulnerable (ERMA 2007).

In their decision on the reassessment of 1080, ERMA concluded that:

- Studies summarised by DOC and the AHB suggest that bird populations are not adversely affected by well conducted 1080 operations.
- Predation is likely to have a greater effect on birds than 1080, as demonstrated on off-shore islands where 1080 has been used to eradicate pests and bird populations are thriving.
- The key to managing the risk to birds is to ensure that the operations are carried out in accordance with best practice. The current best practice was incorporated into the controls set by ERMA through the reassessment process.

Overall the ERMA Committee concluded that the controls and recommendations for adoption of best practice will reduce the risks to bird populations to acceptable levels.

All 1080 operations carried out by ECan will be in accordance with the ERMA regulations and current best practice. Application rates will be in accordance with recommended rates, and carrot baits will be of the recommended size and dyed blue or green. Given the mitigation measures proposed and available information on the effects on birds, ECan consider that the potential effects on birds will be minor. However, continued awareness of the research on the effects on birds is important to ensure that all possible mitigation measures are used to minimise the impacts on birds. A condition is proposed requiring the applicant to investigate any native bird death that occurs within a discharge area if the death is suspected to have been caused by 1080. Overall a positive effect on bird populations is expected if predators such as possums are controlled.

### 7.7.3 Effects on dogs

Dogs are particularly susceptible to 1080 (ten times more susceptible than possums) and there is no antidote if a dog consumes 1080. While the focus of this application is the effect of 1080 entering water, the risk to dogs is acknowledged for large aerial operations. ECan proposes to take all possible measures to minimise the exposure of dogs to 1080. Measures proposed include signage at access points to 1080 operations to ensure that dog owners are aware of the risks, notices in local newspapers, and notification to all landowners within and adjoining 1080 control areas, in accordance with ERMA controls.

Therefore, the effect of 1080 is acknowledged, and it is proposed to manage this by ensuring as far as possible that dogs are not exposed to 1080 as a result of the proposed discharges.



### 7.7.4 Effects on other non-target terrestrial animals

Other terrestrial animals which could be exposed to 1080 include domestic stock. The risks to domestic stock are minimised by the removal of all stock from within the control area prior to an operation, and the use of GPS equipment to avoid overflying control area boundaries.

Other non-target terrestrial species such as deer, feral pigs, chamois, mustelids, cats, rats, ferrets and stoats could be exposed to 1080. In many cases, these animals are considered pests (for example rats, ferrets and stoats) and therefore there may be positive effects on native animals due to reduced predation and competition for food. Deer are also susceptible to 1080. While deer are considered in some cases to be a pest, the effects of 1080 on deer are of concern to hunters. Information was sent to hunting groups as part of the consultation carried out prior to lodging this consent application. The hunting groups did not engage in consultation at this stage of the process, but did express concern about the proposed use of 1080. It is expected that further consultation and discussion about the concerns of hunters will occur during the public notification process for this resource consent application.

For other animals, the risks will be minimised by the controls on application rates, and overall, ECan considers that the effects on non-target terrestrial species will be minor. It is also noted that such effects could occur as a result of ground-control operations which do not require consent.

## 7.8 Positive Effects

There are a number of positive effects as a result of the proposed use of 1080 to control possums, rabbits and wallabies. While not the targeted species, other pests such as rats, ferrets and stoats will also be reduced, having a positive impact on the native animals on which they predate.

Possums are a major pest because they carry bovine tuberculosis (Tb), can destroy native vegetation, and predate on native animals, particularly native birds. The spread of bovine Tb to cattle and deer would have serious economic consequences for New Zealand, and it is estimated that it could cost the country up to \$5 billion over 10 years if bovine Tb is not controlled (ERMA 2007). Possums predate on vulnerable ground dwelling native birds, attacking eggs and chicks. They have a preference for tall native trees such as rata and totara, and can kill trees entirely. In some cases they have caused the complete collapse of forest canopy in an area within 15-20 years (ERMA 2007). Therefore the control of possums will have a positive effect on native birds and vegetation and help avoid the spread of bovine Tb which would have a serious impact on New Zealand's farming economy.

Rabbits can graze farmland, stripping paddocks of vegetation, reducing soil organic matter and leaving the land vulnerable to soil erosion. They are considered to be a major pest in Canterbury and can affect the viability of farming operations. Therefore a reduction in rabbit numbers as a result of the proposed use of 1080 will have a positive effect on farming in the region.

Bennett's wallaby are present in South Canterbury hill country. At high densities wallabies can have significant environmental impact, such as preventing regeneration of native bush, depletion of forest understory and damage to tall tussock grasslands (ECan 2005). Therefore the control of wallabies will have a positive impact, particularly on native vegetation.

## 8.0 CONSIDERATION OF ALTERNATIVES

1080 is considered to be the most effective method of pest control for rabbits, possums and wallabies in large areas where the entire area needs to be treated or where access for ground control methods is difficult. Wherever possible, ground control of 1080 will be carried out in preference to aerial control. Trapping and shooting of pests are also viable methods in some areas which are small and easily accessible. However, aerial control is considered to be the only effective option for possum control in rugged, inaccessible areas where it will be difficult to effectively cover the entire area using ground control methods. It is essential to apply 1080 across the entire area and avoid leaving uncontrolled areas for the pests to re-establish in.



## 1080 APPLICATION FOR PEST CONTROL WITHIN THE CANTERBURY REGION

Therefore, for steep or bush clad areas that are difficult to access, aerial discharge of 1080 is required to ensure the efficacy of the operation.

For rabbit control, aerial control is sometimes considered necessary to ensure that the operation is effective. This is due to the high mobility of rabbits and the need to cover as large an area as possible in a short timeframe. If too small an area is covered, rabbits from the surrounding areas can re-invade the treated area, making the 1080 operation ineffective. To ensure the success of a 1080 operation, and to reduce the frequency of 1080 operations needed in an area in the future, it is essential to cover a large area in a short timeframe and control as many rabbits as possible within that area. This can only be achieved through the aerial discharge of 1080. One large effective aerial operation may have fewer adverse effects than several repeated but less effective ground control operations in an area.



## 9.0 STATUTORY ASSESSMENT

### 9.1 Resource Management Act 1991

#### 9.1.1 Overview

Part 2 of the RMA contains sections 5 to 8, which define the purpose and principles of the RMA and Part 6 addresses matters related to resource consents in sections 104-107. The relevant provisions of these sections are outlined below.

#### 9.1.2 Purpose of the RMA (s5)

Section 5 outlines the purpose of the RMA which is achieved by the guidance provided by the principles of the RMA (section 6, 7 and 8) and states:

- “(1) The purpose of this Act is to promote the sustainable management of natural and physical resources.*
- (2) In this Act, “sustainable management” means managing the use, development, and protection of natural and physical resources in a way, or at a rate, which enables people and communities to provide for their social, economic, and cultural wellbeing and for their health and safety while –*
- (a) Sustaining the potential of natural and physical resources (excluding minerals) to meet the reasonably foreseeable needs of future generations; and*
  - (b) Safeguarding the life-supporting capacity of air, water, soil, and ecosystems; and*
  - (c) Avoiding, remedying, or mitigating any adverse effects of activities on the environment.”*

The use of 1080 for pest control is consistent with the purpose of the Act, and it is considered that the control measures to be undertaken during the proposed 1080 operations will ensure that the activity is consistent with the purpose of the Act, and that any adverse effects will be avoided or mitigated as far as possible.

#### 9.1.3 Section 6: Matters of National Importance

Section 6 outlines matters of national importance that are to be recognised and provided for in achieving the purpose of the RMA. Matters requiring consideration for these applications include:

- (a) The preservation of the natural character of the coastal environment (including the coastal marine wetland area), wetlands, and lakes and rivers and their margins, and the protection of them from inappropriate subdivision, use, and development:*
- (c) The protection of significant indigenous vegetation and significant habitats of indigenous fauna:*
- (e) The relationship of Maori and their culture and traditions with their ancestral lands, water, sites, waahi tapu, and other taonga.*

One of the purposes of the proposed discharges is to protect and enhance areas of significant indigenous vegetation and significant habitats of indigenous fauna by reducing the number of pests in these areas that prey on indigenous fauna and eat the flora. It is considered that a reduction in pest numbers will help preserve the natural character of Canterbury's lakes and rivers and their margins. Consultation has occurred



with Ngāi Tahu and conditions are proposed to address potential effects on cultural values. Therefore it is considered that the relevant matters of section 6 have been recognised and provided for.

### 9.1.4 Section 7: Other Matters

Section 7 outlines other matters that ECan shall have particular regard to. Matters requiring consideration for this application include:

- (d) *Intrinsic values of ecosystems:*
- (f) *Maintenance and enhancement of the quality of the environment:*

It is considered that the discharge of 1080 will help to enhance the quality of the environment, and support ecosystems, by reducing pests and allowing native flora and fauna to improve and increase respectively.

### 9.1.5 Section 8: Principles of the Treaty of Waitangi

The RMA states in section 8 that:

*“In achieving the purpose of this Act, all persons exercising functions and powers under it, in relation to managing the use, development, and protection of natural and physical resources, shall take into account the principles of the Treaty of Waitangi (Te Tiriti o Waitangi).”*

Consultation was carried out with Ngāi Tahu and Papatipu Rūnanga to ensure that the principles of the Treaty of Waitangi have been taken into account.

### 9.1.6 Section 104: Consideration of Applications

Section 104 outlines matters that the consent authority shall have regard to when considering an application. Section 104 (1) states:

*“(1) When considering an application for a resource consent and any submissions received, the consent authority must, subject to Part 2, have regard to –*

*(a) any actual and potential effects on the environment of allowing the activity; and*

*(b) any relevant provisions of –*

*(i) a national policy statement;*

*(ii) a New Zealand coastal policy statement;*

*(iii) a regional policy statement or proposed regional policy statement;*

*(iv) a plan or proposed plan; and -*

*(c) any other matter the consent authority considers relevant and reasonably necessary to determine the application.”*

The actual and potential effects have been discussed earlier in this report, and possible consent conditions have been proposed in Section 11 to ensure that mitigation measures are implemented to avoid or mitigate adverse effects. The relevant regional policy statements and plans are considered below. There are three conservation orders for rivers within Canterbury and these are considered to be ‘other matters’ which are relevant to the application under section 104 (1) (c) and these are also discussed below.



### 9.1.7 Section 107: Restrictions on granting of certain discharge permits

Under section 107, the consent authority shall not grant a discharge permit allowing the discharge of a contaminant or water into water; or to land where it may enter water:

*“If after reasonable mixing, the contaminant or water discharged (either by itself or in combination with the same, similar, or other contaminants or water), is likely to give rise to all or any of the following effects in the receiving waters:*

- c) The production of any conspicuous oil or grease films, scums or foams, or floatable or suspended materials:*
- d) Any conspicuous change in the colour or visual clarity:*
- e) Any emission of objectionable odour:*
- f) The rendering of freshwater unsuitable for consumption by farm animals:*
- g) Any significant adverse effects on aquatic life.”*

The discharge of 1080 will not give rise to any of the effects listed in c) to g). The effects referred to in c), d) and e) are unlikely to occur at all, and mitigation measures are proposed to avoid the effects referred to in f) and g).

## 9.2 Relevant Planning Documents – Objectives and Policies

The Regional Policy Statement for Canterbury, the Proposed Natural Resources Regional Plan, Waimakariri River Regional Plan and Opihi River Regional Plan contain objectives and policies relevant to the proposed discharges.

### 9.2.1 Regional Policy Statement

The Regional Policy Statement (RPS) became operative on 26 June 1998. The sections of the RPS relating to the discharge of 1080 are Chapter 9: Water and Chapter 17: Hazardous Substances. The relevant objectives and policies from these chapters are summarised and assessed below.

#### Chapter 9 - Water Quality

Objective 3 seeks to enable people to benefit from the use of water while safeguarding a number of values such as drinking water and mahinga kai, life supporting capacity, aquatic ecosystems, natural character, and amenity value. Policy 9 seeks to manage point and non-point source discharges to meet Objective 3. Under the Policy 9 the adverse effects of discharges on existing water quality should be avoided, remedied or mitigated.

It is considered that the proposed mitigation will ensure that adverse effects on water quality are mitigated, such that the discharges will be consistent with Objective 3 and Policy 9 of Chapter 9.

#### Chapter 17 - Hazardous Substances

Objective 1 seeks to “Prevent or mitigate the adverse effects on the environment from the storage, use, disposal and transportation of hazardous substances”.

To support Objective 1, Policy 4 states that “Discharges of hazardous substances should only be authorised when adverse environmental effects are prevented or mitigated”.





1080 is classified as a hazardous substance, and is subject to ERMA controls as discussed in this report. It is considered that the proposed discharges of 1080 can be carried out in a way that ensures that potential adverse effects are mitigated to the extent that effects are minor. This is considered to be consistent with the intention of Objective 1 and Policy 4 of Chapter 17.

### 9.2.2 Proposed Natural Resources Regional Plan

Chapter 4 of the PNRRP deals with water quality and contains objectives and policies relevant to the discharge of 1080 and surface waterways. These objectives and policies are summarised and assessed below.

Objective WQL1.1 sets water quality outcomes for rivers and lakes. It seeks, where possible, to maintain or improve river water quality.

Policy WQL2 (Prevent the discharge of certain contaminants to surface water) seeks to avoid significant adverse effects on water quality by prohibiting certain discharges. Policy WQL2(4) seeks to the following:

*"Prohibiting the discharge of a hazardous substance to surface water, or onto land where a hazardous substance may enter surface water, except where the discharge is necessary to control vegetation or animal pests, or it is required for the installation and maintenance of structures in a river or lake bed, and provided the following requirements are met:*

- (a) the hazardous substance is of low toxicity to aquatic organisms, other than to the target organism, and the substance is not persistent in the aquatic environment; and*
- (b) the hazardous substance is used or applied in accordance with:
  - i) the manufacturer's instruction,, or any relevant code or practice and*
  - ii) any requirements for the use of the substance laid down by the Environmental Risk Management Authority; and*
  - iii) conditions of a regional rule or a resource consent; and**
- (c) any person applying hazardous substances for the commercial use has appropriate training and qualifications.*

The use of 1080 is considered necessary to control animal pests, and as such, is provided for under Section 4 of Policy WQL2. The 1080 will be used in accordance with the manufacturer's instructions, will comply with the conditions of any resource consent granted and those applying 1080 will have the appropriate training and qualifications. Mitigation measures are proposed to minimise the risk of 1080 entering water. Therefore the proposal is considered to be consistent with the relevant provisions of Objective WQL1 and Policy WQL2.

### 9.2.3 Waimakariri River Regional Plan

The Waimakariri River Regional Plan (WRRP) became operative on 23 October 2004. The purpose of the WRRP is to *"promote the sustainable management of rivers, lakes and hydraulically connected groundwater, and river and lake beds in the Waimakariri River Catchment; to maintain and enhance the environment; and to achieve integrated management of these resources."*

Chapter 6: Water Quality, contains objectives and policies relevant to the discharge of 1080. These objectives and policies are summarised and assessed below.



Objective 6.1 seeks to:

*“Enable present and future generations to gain cultural, social, recreational, economic, health and other benefits from the rivers, lakes and wetlands in the Waimakariri River Catchment while:*

- (a) safeguarding their existing value for efficiently providing sources of drinking water for people and their animals;*
- (b) safeguarding the life-supporting capacity of the water, including its associated: aquatic ecosystems, significant habitats of indigenous fauna, and areas of significant indigenous vegetation;*
- (c) safeguarding their existing value for providing mahinga kai for Tangata Whenua;*
- (d) protecting wahi tapu and other wahi taonga of value to Tangata whenua;*
- (e) preserving the natural character of rivers, lakes and wetlands and protecting them from inappropriate use and development;*
- (f) protecting outstanding natural features and landscapes from inappropriate use and development;*
- (g) maintaining and enhancing amenity values; and*
- (h) protecting the significant habitat of trout and salmon.”*

Policy 6.1 seeks to control the discharge of contaminants into surface water bodies in the Waimakariri River Catchment to protect the natural state of the water and to ensure it is safe for drinking water for animals.

Consent conditions are proposed in Section 11 of this report to minimise the risk of 1080 entering waterways. If 1080 does enter waterways within the Waimakariri River Catchment, the small volume of 1080 and quick dilution will ensure the quality of the water is not compromised, and therefore the discharge is considered to be consistent with Objective 6.1.

### 9.2.4 Opihi River Regional Plan

The relevant provisions of the Opihi River Regional Plan (ORRP) to this application became operative on 16 October 2000.

Chapter 6: Surface Water Quality, contains objectives and policies relevant to the discharge of 1080. These objectives and policies are summarised and assessed below.

Objective 1 seeks to, *“Enable present and future generations to gain cultural, social, recreational, economic and other benefits from the water quality of the Opihi River, its lagoon and its tributaries through the enhancement of water quality and the elimination of discharges of human sewage while:*

- (a) Safeguarding their existing value for efficiently providing sources of drinking water for people;*
- (b) Safeguarding: the life supporting capacity of the water, including its associated: aquatic ecosystems, significant habitats of indigenous fauna, and areas of significant indigenous vegetation;*
- (c) Safeguarding their existing value for providing mahika kai for Takata Whenua;*



- (d) *Protecting wahi tapu and other wahi taonga of value to Takata Whenua;*
- (e) *Preserving the natural character of lakes, and rivers, and their margins and protecting them from inappropriate use and development.*
- (f) *Protecting habitat of trout and salmon; and*
- (g) *Maintaining, and where appropriate enhancing, amenity values.*

Policy 1 seeks to set and maintain high water quality standards to achieve the objectives set out in Objective 1.

Buffer distances are proposed around waterways to minimise the risk of 1080 entering water. If 1080 does enter bodies within the Opihi River Catchment, the small volume of 1080 and quick dilution will ensure the quality of the water is not compromised, and therefore the discharge is considered to be consistent with Objective 6.1 and Policy 1.

### 9.3 Other Matters - Conservation Orders

There are four conservation orders within the Canterbury region for the Rakaia River, Rangitata River, Ahuriri River and Lake Ellesmere. There will be no discharge near Lake Ellesmere and therefore the Conservation Order for the lake has not been considered further in this report. The relevant provisions of the other conservation orders are considered below.

#### 9.3.1 National Water Conservation Order (Rakaia River) 1998

This Conservation Order provides for the Rakaia River and its tributaries in recognition of its outstanding national characteristic in the form of a braided river and outstanding wildlife habitat, outstanding fisheries, and recreational, angling and jetboating features.

Under Clause 9 (2) of the Order, discharge permits shall not be granted if certain standards will be breached after reasonable mixing. The following two standards are relevant to the proposed discharges.

*'(9) (2) (b) (iii) the waters shall not be tainted so as to make them unpalatable, nor contain toxic substances to the extent that they are unsafe for consumption by humans or by farm animals, nor shall they emit objectionable odours;*

*(9) (2) (b) (iv) There shall be no destruction of natural aquatic life by reasons of a concentration of toxic substances.'*

As detailed in the assessment of effects section of this report, the discharge of 1080 will not be discharged at rates that would render the water unpalatable or unsafe for consumption. Aquatic species are relatively tolerant to 1080 and the 1080 will be discharged at relatively low application rates. Therefore it will not be present in concentrations which could destroy aquatic life. Therefore the discharges should not contravene the Conservation Order for the Rakaia River.

#### 9.3.2 National Water Conservation Order (Ahuriri River) 1990

This Conservation Order recognises the outstanding wildlife habitat, outstanding fisheries and outstanding angling features of the Ahuriri River and tributaries. Under the Order, discharge permits shall not be granted if certain standards will be breached after reasonable mixing. The following two standards are relevant to the proposed discharges.



*'(2) (b) (i) the waters shall not be tainted so as to make them unpalatable, nor shall they contain toxic substances to the extent that they are unsafe for consumption by humans or by farm animals, nor shall they emit objectionable odours;*

*(2) (b) (ii) There shall be no destruction of natural aquatic life by reasons of a concentration of toxic substances.'*

These clauses are similar to those for the Rakaia River Conservation Order, and as discussed above for the Rakaia River, the discharges are not expected to result in adverse effects which breach the relevant provisions of the Ahuriri River Conservation Order.

### 9.3.3 Water Conservation Order (Rangitata River) 2006

This conservation order recognises the following outstanding characteristics and features of the Rangitata River and tributaries:

- (a) Amenity and intrinsic values;*
- (b) Habitat for terrestrial and aquatic organisms;*
- (c) Fishery values;*
- (d) Wild, scenic and other natural characteristics;*
- (e) Scientific and ecological values;*
- (f) Recreational, historical, spiritual or cultural characteristics;*
- (g) Significance in accordance with tikanga Maori.*

Clause 11 of the Order places restrictions on alteration of water quality and specifies that discharge permits can be granted if certain standards are met. Of relevance to the discharge of 1080 are:

*'(c) aquatic organisms shall not be rendered unsuitable for human consumption through the accumulation of contaminants and/or*

*(d) the water is not made unsuitable for contact recreation by*

*(i) the presence of contaminants.'*

As discussed above, the discharge will not give rise to these effects and therefore the granting of this consent does not conflict with the provisions of the Rangitata River Conservation Order.

## 10.0 SUMMARY AND CONCLUSIONS

The use of 1080 for pest control in the Canterbury region is considered to be the only effective option in some areas where ground control methods are not possible. In addition, 1080 may be used on land within the beds of waterways using ground control methods. For both applications, it is considered that adequate controls can be put in place to ensure that the effects of 1080 on aquatic and terrestrial fauna, and on people and communities are avoided or mitigated. It is considered that proposed use of 1080 is consistent with the purpose and principles of the RMA, and the relevant provisions of regional plans and policy statements.



### 11.0 SUGGESTED CONSENT CONDITIONS

The following provides suggested consent conditions to ensure that mitigation measures proposed in this application are implemented and that any adverse effects on the environment are avoided or mitigated. In particular, the suggested conditions take into account the outcomes of consultation undertaken prior to lodgement of this application.

#### General

- (1) The discharge shall be only the pesticide sodium monofluoroacetate, referred to as 1080 poison, applied as pellets, or carrot or cereal bait.
- (2) The application rate and concentration of the pesticide shall not exceed the label recommendation for the product.
- (3) All loading of pesticide shall occur on a dry site away from any flowing or standing water.
- (4) There shall be no aerial discharge of pesticides within:
  - (a) 100 metres of any dwelling or any hut on a designated walking track.
  - (b) 100 metres of any bore or community drinking water supply intake.
  - (c) 10 metres of a formed public road.
  - (d) 30 metres of any flowing or standing water body in excess of three metres wide and 100 millimetres deep, unless Condition (4)(b) applies.
- (5) There shall be no ground application of pesticides within 20 metres of any flowing or standing water in excess of three metres wide and 100 millimetres deep.
- (6) All practicable measures shall be undertaken to avoid discharging pesticides into flowing or standing water.

#### Notification

- (7) The occupiers, owners and lawful administrators of all properties adjoining land onto which the discharge will occur shall be given at least 24 hours prior notice of the proposed discharge.
- (8)
  - (a) At least two days prior to the discharge, warning signs shall be erected at every place where people normally obtain access to the discharge area.
  - (b) The warning notices shall be inspected at regular intervals, and shall be repaired and/or replaced within 24 hours of discovery or notification of damage or theft.
  - (c) The notices shall state:
    - (i) The nature of the operation;
    - (ii) The type of pesticides to be applied;



## 1080 APPLICATION FOR PEST CONTROL WITHIN THE CANTERBURY REGION

- (iii) The bait the pesticides will be applied in;
  - (iv) The date the pesticides are scheduled to be discharged;
  - (v) The area over which the bait will be discharged; and
  - (vi) A contact name and telephone number for enquiries.
- (d) The notices shall:
- (i) Include advice warning the public not to take animals into the discharge area;
  - (ii) Be capable of being read from a public area at a distance of at least five metres from the sign; and
  - (iii) Include a description or photograph of the baits.
- (e) The notices shall be maintained:
- (i) Until all poisoned bait and carcasses have completely broken down, or
  - (ii) For a minimum period of four months following every discharge event;
- whichever is the longer period of time.
- (9) The Canterbury Regional Council shall be notified at least two working days prior to the proposed discharge.
- (10)
- (a) The Consent Holder shall advertise its aerial poisoning programme in the public notices of the Christchurch Press and any other relevant local newspaper for that area at least 10 working days, but not more than 25 working days, in advance of the aerial operation.
- The advertisement shall identify:
- (i) The nature of the discharge operation;
  - (ii) The area to which the application relates;
  - (iii) The type of pesticide to be used;
  - (iv) The type of bait to be used, e.g. carrots, cereal;
  - (v) The date the poisoned bait are scheduled to be discharged; and
  - (vi) A contact name and telephone number for enquiries
- (b) The Consent Holder shall provide a copy of the advertisement to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, prior to the discharge occurring.



## 1080 APPLICATION FOR PEST CONTROL WITHIN THE CANTERBURY REGION

### Consultation

- (11) Prior to any discharge being undertaken in a specific area, the Consent Holder shall notify the Papatipu Rūnanga whose rohé it is of the proposed operation at least 20 working days prior to the commencement of discharge.
- (12) The Consent Holder shall, at least once per year, give Te Rūnanga o Ngāi Tahu representatives the opportunity to attend an annual meeting to discuss:
  - (i) A summary and review of 1080 operations which have occurred in the previous year.
  - (ii) 1080 operations proposed for the following year.
  - (iii) The results of any monitoring or studies carried out on the effects of 1080.
- (13) At each meeting Te Rūnanga o Ngāi Tahu shall be given the opportunity to give a presentation about cultural issues relating to the discharge of 1080 to any persons discharging 1080 under this consent.

### Operations

- (14)
  - (a) The pilot shall hold a commercial pilot's licence and a Growsafe Pilots Agrichemical Rating.
  - (b) Aircraft used to discharge the pesticides shall be guided by differential satellite GPS navigation and the pilot competent in the use of the system.
  - (c) The boundaries of the discharge area, including exclusion zones and separation distances, shall be indicated to the pilot by the Consent Holder.
  - (d) The flight paths of the aircraft used to discharge the pesticides shall be recorded by the GPS navigation system and this record shall be maintained for 12 months following the completion of the operation and made available to Canterbury Regional Council upon request.
  - (e) In the event of baits falling outside the discharge area, all suspected locations shall be physically checked for baits and any baits found outside the discharge area shall be removed.
- (15) For each 1080 operation a copy of the resource consent shall be given to the person responsible for that 1080 operation prior to the discharge commencing.
- (16) The consent holder shall keep records of the application rate and concentration of all pesticide discharged, and this shall be made available to Environment Canterbury upon request.

### Monitoring

- (17) The Consent Holder shall facilitate cultural monitoring by ensuring that:
  - (a) Where requested by Te Rūnanga o Ngāi Tahu or Papatipu Rūnanga, the Consent Holder shall provide an opportunity for a representative of the appropriate Papatipu Rūnanga to visit the discharge area after the aerial discharge of 1080 to view the results of the operation (referred to as 'cultural monitoring').
  - (b) A report on the cultural monitoring shall be provided to the Canterbury Regional Council upon request.



## 1080 APPLICATION FOR PEST CONTROL WITHIN THE CANTERBURY REGION

- (18) Where a native bird or game bird death has occurred in the discharge area and is suspected to have been caused by 1080 poisoning, and the carcass is made available to the Consent Holder, the Consent Holder shall:
- (a) Have the carcass analysed for cause of death using the most appropriate scientifically recognised and current method by a laboratory that is certified for that method of analysis by an appropriate independent accreditation authority; and
  - (b) Provide the results of the analysis to the Canterbury Regional Council, Fish and Game New Zealand, Te Rūnanga o Ngāi Tahu, and the Papatipu Rūnanga for that area within 10 working days of receipt of the results.

### Review

- (19) The Canterbury Regional Council may, once per year, on any of the last five working days of October, serve notice of its intention to review the conditions of this consent for the purposes of:
- (a) Dealing with any adverse effect on the environment which may arise from the exercise of this consent and which it is appropriate to deal with at a later stage; or
  - (b) Requiring the adoption of the best practicable option to remove or reduce any adverse effect on the environment.





### 12.0 REFERENCES

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## 1080 APPLICATION FOR PEST CONTROL WITHIN THE CANTERBURY REGION

Report Signature Page

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# 1080 APPLICATION FOR PEST CONTROL WITHIN THE CANTERBURY REGION



# APPENDIX A

## Rule Assessment



# APPENDIX B

## Consultation Materials



# APPENDIX C

## CIA and Outcomes Report

At Golder Associates we strive to be the most respected global group of companies specializing in ground engineering and environmental services. Employee owned since our formation in 1960, we have created a unique culture with pride in ownership, resulting in long-term organizational stability. Golder professionals take the time to build an understanding of client needs and of the specific environments in which they operate. We continue to expand our technical capabilities and have experienced steady growth with employees now operating from offices located throughout Africa, Asia, Australasia, Europe, North America and South America.

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