



Rivers Section

HANDBOOK FOR SPRAYING

*For Resource Consents CRC222040, CRC222041
and CRC222043*

March 2024

CONTENTS

1. INTRODUCTION

2. QUALIFICATIONS REQUIRED

3. AGRICHEMICAL AND ADJUVANT SELECTION

4. MANAGING SPRAY DRIFT RISK

5. JOB MANAGEMENT PROCESSES

Before commencing the job

Before leaving the depot

On the job

After completion of the job

6. SAMPLING REQUIREMENTS

7. MANAGING HEALTH AND SAFETY RISKS

8. SENSITIVE SITES PROTECTION

Bees and Pollinators

Native Plants

Wetlands – restoration, maintenance and biosecurity

Fish spawning habitats

9. EMERGENCY RESPONSE

Spill Response Plan

Emergency contact numbers

APPENDICIES

Appendix 1 CRC222040

Appendix 2 CRC222041

Appendix 3 CRC222043

Appendix 4 Daily record keeping and reporting requirements (to be added upon finalisation)

1. INTRODUCTION

This Spray Handbook is a tool available to assist in consent compliance and good practice for use of agrichemicals across the Canterbury Region. It summarises key decision-making criteria relevant to planning and completing agrichemical spray programmes, combined legislative bottom lines, consent conditions and best practice to help minimise the risk of harm arising from the use of agrichemicals.

It has been prepared for use by Rivers Section staff carrying out spraying to control vegetation growing in riverbeds and drains.

The contents of this handbook must be understood by all people carrying out spray operations prior to carrying out the work as they are responsible for meeting all the relevant requirements. A copy of this handbook must be carried in all vehicles and machinery involved in spraying.

Note: A separate Spray Handbook has been developed for Contracted spraying, and includes controls specifically for Aerial Spraying.

Spraying is authorised by resource consents CRC222040, CRC222041 and CRC222043. These consents set out the minimum requirements for carrying out spraying and specify that spraying must be carried out in accordance with this Handbook.

The Handbook is split up into the main stages of the job – Preparation, Before Leaving the Depot, On the Job and After the Job. It sets out work practices for how spraying must be conducted to comply with our resource consents and to avoid environmental harm. It also covers topics such as sampling, health effects and the conditions of our Resource Consents.

The use of sprays must be carefully considered, and only used where it is the best practicable option for controlling weedy vegetation. All of the substances we are authorised to use are toxic to the aquatic environment, with some toxic to terrestrial and soil life as well, so need to be extremely carefully managed.

Work Types

In general, there are three main locations sprays are used for flood protection and drainage maintenance:

Fairway Spraying:

Spraying is carried out to control the growth of woody and herbaceous weeds including willow, broom, alder, lupine and gorse in the 'active' part of the river channel, the "fairway", which carries baseflows and the fast flowing water during floods. Controlling this vegetation ensures that the flood carrying capacity of the river is not reduced, or that vegetated islands do not redirect flows toward river banks causing erosion and damage to land, and flood protection structures and plantings on the river berms. Vegetated islands can "lock up" gravel and prevent natural braiding from occurring which impacts on the natural character and habitat value of braided rivers.

Berm spraying:

Old Mans Beard and other weed species such as blackberry, gorse and broom, are sprayed in the berm vegetation, as these noxious weeds smother and kill flood protection vegetation. Berm spraying also includes maintenance spraying of stopbanks and tracks. Stopbanks need to be kept clear of woody weeds, as the roots of those weeds penetrate into the stopbank potentially causing weaknesses in the stopbank. Tracks are maintained to ensure that there is easy access through the river berms for our operational works, inspections and flood response. These tracks also provide community access to river beds.

Drain Spraying:

Vegetation control in drainage schemes is necessary as weed growth restricts water flow causing water levels in the drain and adjacent groundwater levels to rise, impeding drainage and ultimately causing localised flooding. The target vegetation on the banks of such waterways are the introduced woody plants such as gorse, broom and sprouting willow. Within the waterways, the target vegetation are emergent introduced species such as monkey musk, water twitch and water cress, which thrive in the nutrient rich drain environment. We do not control submerged weed with herbicides. Also sprayed are plants such as dock and rank grass growth in dry drains. The first preference is to only spray dry drains, however this is not always possible.

Spraying may be carried out by knapsack, truck or tractor mounted hand held spray guns. Our contractors carry out aerial spraying via helicopters or UAV's.

The spray methodology will be determined taking into account site characteristics, size of the spray job, accessibility and practicality.

Authority to carry out spraying

The three resource consents held by Environment Canterbury to deliver spraying (attached in Appendix 1-3):

- CRC222040 when discharging agrichemicals to land where it may enter water or directly to water
- CRC222041 when discharging agrichemicals into the CMA
- CRC222043 when discharging agrichemicals from helicopter and UAV.

2. QUALIFICATIONS REQUIRED

All persons handling, mixing and applying herbicides on behalf of Environment Canterbury must be suitability qualified and experienced.

Under the EPA Hazardous Property Controls Notice, substances that are very ecotoxic to the aquatic and terrestrial environment (class 9.1A, 9.2A, 9.3A and 9.4A) are required to be under the control a “Qualified Person/Contractor”. “Under the control of” means either being *applied by* a qualified person or *under the direct or indirect supervision* of a qualified person as appropriate based on the skills and experience of the applicator and the nature of the task.

As a minimum our staff must hold a Growsafe Standard Certificate. Those staff undergoing training to reach this level of Certificate must hold a Growsafe Basic Certificate and be under the direct supervision of a Growsafe Standard certification holder.

The following table sets out the qualifications required for Ecan Staff for different ground-based application methods:

Application Method	Growsafe Certification	Alternative
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Motorised application equipment (not handheld) eg Boom	Growsafe Standard	or US 21563 and one of US23620, US27216, US23617, US6239, US6236, US6242
Motorised application equipment – handheld with a tank capacity of more than 30L eg Gun-spraying	Growsafe Standard	(or US21563 and one of: US27216, US6237, US6238
Motorised application equipment- handheld within 30m of water or sensitive habitat eg Motorised knapsack, gun-spraying, near water or sensitive habitat	Growsafe Standard	or US 21563 and one of: US27216, US6237 and US6238
All applications in to water eg spraying aquatic weeds	Growsafe Standard and US6240	or US21563 and US6240

Taken from Table 2 from the Hazardous Properties Control Notice 2017

3. AGRICHEMICAL AND ADJUVANT SELECTION

The following criteria must be applied to selecting herbicide and adjuvant formulations:

- Only formulations of glyphosate and triclopyr are currently permitted.
- Formulations which have the lower environmental and safety hazard classification and can achieve the desired outcome should be selected
- Only 'aquatic approved' herbicides may be used in spray operations where the target plants are emergent macrophytes.
- Confirm the herbicide and adjuvant selection with Environmental Advisor prior to use

- Review of the hazard classification, EPA and label requirements to allow for discharge in and near water. If the herbicide and/or adjuvant is not allowed to be discharged to water, suitable setbacks and drift mitigation measures must be employed as set out in this spray handbook and the Job Sheet.

Risk assessment for selecting adjuvants

Spray adjuvants are additional substances that can be added into a spray mixture to improve the efficacy of the spraying operation. They can assist in reducing the amount of active chemical required for an operation, and help to improve the rate of kill in the target plants allowing for long term control of weed infestations. Generally, adjuvants utilised include:

- **Penetrants**, which improve the ability for the herbicide to enter into the plant leaf, especially on waxy or woody plants (eg Pulse, Organosilicone, Kwicken)
- **Surfactants**, which lower the surface tension of water allowing droplets of spray to spread out widely on the plant leaf rather than remaining as a small droplet which increases uptake into the plant (eg Ezi Cover adjuvant oil)
- **Drift reducers**, which modify the spray droplets to make them less likely to drift, often used in aerial spray applications (eg Li1000)

Some spray adjuvants are not classified as hazardous substances, others have individual approvals and controls and a large number are approved by the EPA under the Additives, Process Chemicals and Raw Materials (Subsidiary Hazard) Group Standard 2020 (HSR002503).

It is therefore important to understand what adjuvant is appropriate for the spray job and the restrictions on the use of that adjuvant by checking the safety data sheet for your chosen substance.

Key factors for selecting your adjuvant:

- It must be compatible and/or recommended to be combined with the main herbicide(s) in your mix
- Compare the hazard classifications for the adjuvants and select the adjuvant that has the lower hazard class (or those that are not hazardous) but is still appropriate for your intended use (eg

- selecting an adjuvant appropriate for killing woody weeds – a penetrant)
- Avoid choosing adjuvants that specify they must not be applied over water where there is a risk of discharges directly over or drift could enter water

Some adjuvants available for use:

- *Organosilicone: 9.1B (harmful to the aquatic environment chronic category 2)*
- *Kwicken: Not classified as a hazardous substance*
- *EziCover: Not classified as a hazardous substance*
- *Pulse: 9.1B (harmful to the aquatic environment chronic category 2)*
- *Li-1000: 9.1C (harmful to the aquatic environment chronic category 3)*

4. MANAGING SPRAY DRIFT RISK

Applicators of herbicides are required to take all reasonable steps to ensure the substance they are applying does not cause any significant adverse effects beyond the target application area.

Spray drift has the potential to cause significant adverse effects on surrounding non-target plants, animals, water quality and river bed users.

Managing risk of drift in accordance with **Appendix H of NZ8409: 2021** is taking all reasonable steps. Key drift control measures included in this standard to be deployed with all operations include:

- Adjust application equipment (eg droplet size, height of release and pressure at pump) to suit weather conditions at the time of spraying (eg wind speed and direction)
- Prior to application, during on-site risk assessments, identify any sensitive areas located near your target site. Note any extra sites on Job Sheets/Spray Diaries and note a confirmation you have done this check.
- Factor in the Drift Hazard (as determined by Table H1 in NZ Standard) when deciding to proceed with spraying or not.
- Only spray under favourable wind speeds and directions (consider the impacts of inversions or anabatic/katabatic winds)
- Use buffer zones to protect sensitive sites.

5. JOB MANAGEMENT PROCESSES

This section of the Spray Handbook details the checks and steps that must be taken throughout the planning and delivery of spray jobs to ensure best practice is adhered to and compliance with resource consents is met.

BEFORE COMMENCING THE JOB – Job set up checks by the Engineer

1. Ensure that spraying is the best option to be used for weed control, consider mechanical or hand clearance of weeds where possible (if those methods are likely to cause less potential harm than spraying).
2. PLAN – create a job sheet for the spraying that takes into account both the environmental and health and safety matters set out below. Maps of spray target areas need to show the locations of key features such as schools and preschools, camp grounds, organic farms, bee hive sites and water intakes that spray operations need to avoid.
3. Get advice early from the Environmental Advisors and the Land Ecology team. These teams may need to do site visits to assess on site values to inform their advice so allow for plenty of lead in time.
4. Identify any **community and papakāinga drinking water supply** points located within **250m** of the proposed spray zone and any drinking water protection zones. *Note: A publicly or privately owned drinking water supply (via surface water, infiltration gallery or shallow well) is defined as one that serves more than 25 people per year for at least 60 days per year.*
5. Identify the location of any surface water abstraction points used for irrigation, stockwater or any other use (other than human drinking water) and apply **25m** set back to those abstraction points
6. Identify any **groundwater wells that are less than 20m deep** (screen depth at or less than 20m below ground level) that are used for abstracting groundwater that are within:
 - a. 250m for aerial operations

- b. 50 for ground operations

Apply set no-spray setbacks to those wells. Note: this does not apply to monitoring wells.

7. Identify the location of any **beehives** near the spray area. Apply a 50m setback to those hive sites.
8. Identify the location of any known **wetlands**. Follow wetland protocols set out in this Spray Handbook for setbacks
9. Identify the location of any **preschools and schools** within 250m of spray area, apply no spray zones for aerial applications within 250m of schools.
10. At least **10 Days prior to any agrichemical discharge** operations we must notify the following parties:
 - a. Canterbury Hub of Apiculture NZ
 - b. The New Zealand American Foul Brood Agency
 - c. Any known local bee keepers who may be operating hives in the proposed spray area.
 - d. Fish and Game Council for the areas where spraying may occur
 - e. Papatipu Rūnanga within whose rohe spraying may occur
 - f. Any known organic farms

Adapt spray programme to incorporate feedback received from these parties as far as reasonably practicable.

11. Prior to any aerial spray operation public notices must be advertised online and in the local newspaper(s).
12. Ensure that spraying is not planned to be undertaken on **public holidays, or weekends before or after a public holiday**
13. Check the long-range weather forecast for suitability of spray conditions. Make sure wet or windy weather delays are accounted for.
14. Consider the time of day that spraying is carried out to avoid the amount of possible spray drift and impacts on pollinating insects.

15. Avoid spraying drains with water in them as far as practicable, consider other clearing methods or delay the spraying if the drain normally dries up.
16. For fairway spraying within the bird nesting season, assess whether or not there is potential for nesting activity to be occurring. Organise bird surveys as required.
17. Check if water quality sampling is required for your spray job and ensure this is set out clearly on your job sheet – *see Sampling Requirements for further details*.
18. Identify potential sources of water for mixing chemical and organise alternative water supply if water cannot be extracted from the waterway.
19. Check that that the chemicals (including the herbicide and any adjuvants) to be used are currently approved for use under the Hazardous Substances and New Organisms Act and any subsequent replacement or legislation (including the Health and Safety at work (Hazardous Substances) Regulations 2017) and specify the required mixing rates for the application, and any special conditions of approval that operators on site must be aware of.

BEFORE LEAVING THE DEPOT – Area Supervisor and operators checks

1. Check safety equipment for condition and fit. PPE required for spraying includes overalls, gumboots, gloves, eye protection and respiratory protection.
2. Ensure that clean fresh water and soap is carried on the spray vehicle for hand washing.
3. Plan your route so that vehicles and machinery discharging herbicides do not enter river channels containing flowing water within 250m upstream of any community water supply point, or do travel on land within 25m of any community water supply draw-off point.

4. Check that the necessary number of signs warning of spraying are on the spray vehicle. The signs must state that spraying is in progress, proposed duration of the spraying including starting and finishing dates, whether it is aerial or ground-based spraying, active herbicide chemical and surfactant (if any) being used. They must be capable of being read at a distance of five metres.
5. Check the most recent weather forecast and consider the time of day that spraying is carried out to avoid the amount of possible spray drift and impacts on pollinating insects. Ensure you have an anemometer (wind meter)
6. If needed, make sure you have something that can be used to rope off or demarcate the site to create a work zone that public can be excluded from.
7. Check that the quantity of chemicals carried will be sufficient for the day's spraying and no more than needed for the day. Ensure that vehicle loading and transportation of hazardous substance requirements are met (note this means transporting NO MORE than 250L or KG of chemical – both diluted and concentrated).
8. Check that the chemical containers are closed and not leaking on the vehicle. Ensure that they are stowed/secured on the vehicle so that there is no chance of them falling off or moving around.
9. Check calibration of equipment and check back flow prevention is in place and fully functional on the pump.
10. Make sure you have your spray diary book, with enough pages left in it to complete each day's operation.

ON THE JOB - operators

1. Check that the specification for the work outlined on your Job Sheet and the relevant consent conditions are understood by all members of the spraying team. Highlight any sensitive areas that have been mapped that must be avoided with spray or spray vehicles. The required setbacks are set out below in case any un-mapped sensitive sites are found during the spray operation.

2. Check that all members of the spraying team know what to do in the event of spills - what to do on site and who to report the spill to (see emergency response section of this Handbook) and for first aid and medical assistance. Check that the spill kit is fully stocked and ready for use.
3. Prior to spraying commencing, erect and maintain signs where people normally obtain access to the spray area. Block off public access if necessary, to avoid harm to public or staff on site.
4. Do not apply any herbicide within **25m** of any community water supply draw off point when spraying to ground by ground-based application methods.
5. For drain spraying where spray may enter water, do not spray:
 - a. within **25 metres** upstream of an intake for a water supply that is used for irrigation or stockwater; or
 - b. within **250 metres** upstream of an intake for a water supply that is used for domestic or private water supply purposes; or
6. Triclopyr must not be sprayed directly onto water or over areas where the water table is very shallow (less than 1m). Apply Triclopyr to bankside vegetation and margins only.
7. Assess spray area for the presence of native plants. Avoid spraying native vegetation. See the Native Plant section of this Handbook for further information.
2. Do not spray riparian vegetation within inanga spawning habitat (check Job Sheet for any inanga spawning location) during the months January - June.
3. When spot spraying banks, direct spray away from water. Avoid blanket spraying banks to reduce erosion and scour risk.
4. Ensure that all mixing of spray chemicals and cleaning of spray equipment is undertaken at least 10m away from any surface waterbody, well, stormwater system and areas of shallow groundwater

to ensure that spillage does not discharge into any surface waterbody. Use secondary spill containment or drip trays at mixing/loading sites if mixing is occurring within a drinking water protection zone.

5. A spill kit suitable for absorbing and managing spills of the substance you are using must be kept readily available at all times during the spray operation.
6. Ensure that the filling of tanks when diluting concentrated herbicides is carried out in a manner that prevents back-flow.
7. Do not discharge surfactant onto plants in flower if there are large numbers of bees foraging on those plants.
8. Do not spray within 50m of any beehive.
9. Be aware that nesting activity can still be occurring in braided rivers even if there is extensive weed growth. Do not spray within 50 metres of any beehive or of any individual bird nesting or rearing its young on the bed or bank of the watercourse. No spraying within 100m of colonies of nesting birds.
10. Continually monitor wind conditions throughout the spray operation and cease spraying when wind speeds exceed 15kph OR sooner if spray is starting to drift beyond the target area. Keep records of your wind readings in daily spray logs.
11. In addition to monitoring wind conditions, take steps to minimise spray drift as set out in the spray drift management section of this handbook below.
12. The operator in charge for each spraying unit must fill out the daily work in progress log book. The log book must be kept up to date and present with the operator for inspection at any time. The information to be recorded shall include:
 - Operators names
 - Start and finish time of application
 - Detailed description of the area sprayed

- Target plants
 - Chemical and additives used (including manufacturer's name), mixing rate, and locations where mixing was carried out
 - Method of application
 - Wind speed and direction observations
 - Weather conditions, including any rain
 - Any sensitive sites or receptors encountered (eg any beehives, previously unknown water takes, organic farms).
20. Follow manufacturer's recommendations for stand-down periods between spraying and forecast rain. In general do not spray when vegetation is wet from rain or when rain is forecast to fall in the area being sprayed within:
- 2 hours for glyphosate with surfactant
 - 6 hours for glyphosate without surfactant
 - 1 hour for triclopyr with surfactant
 - 3 hours for triclopyr without surfactant.
17. Triple rinse spray containers back at the depot and tip rinsing's into the spray tank or a knapsack. Do not tip rinsing's into the stormwater network, into a waterbody or onto the ground. Old containers to be returned to the depot for recycling.
18. No off label use of herbicides are permitted. **NOTE:** this does not include drill and inject techniques, which is technically an off label method but it is an acceptable industry standard practice.

AFTER COMPLETION OF THE JOB

1. Ensure that the log book of the day's spraying activities is completed if not already done. Hand copies of the log book need to be kept at the depot.
2. Put triple rinsed empty containers in the designated storage area for recycling.
3. Ensure that all safety equipment is cleaned and maintained.

4. Carry out any maintenance on the spray equipment.
5. Wash any spray drift off the spray vehicle/ trailer/ tractor.
6. Replace used overalls (disposable) or put them in for washing (cotton).

6. SAMPLING REQUIREMENTS

The Job Sheet will specify if water quality sampling is required for specific spray jobs. Please check if you need to sample for your site BEFORE you start spraying.

Glyphosate samples are collected in the small plastic bottles and Triclopyr samples are taken in the large brown bottles. Refer to the Rivers Team sampling guidance for good practice to follow when collecting the samples.

Samples need to be kept cool and sent to the Lab for processing as soon as possible. Samples are processed by Hills Laboratories, they are located at 1/17 Print Place, Middleton, Christchurch.

The following notes apply over the whole region:

Each year, samples of receiving waters must be taken from at least **12 locations** where there has been Agrichemical discharge to an area of greater than 0.5ha.

The samples shall:

- a) Be from at **least six sites** within the **drainage network water courses**
- b) Be from at **least six sites** within **rivers**

Each of the 12 samples is known as a 'sampling event'

Sampling must be completed as follows for each sampling event:

- a) One sample shall be taken from the spray reach immediately prior to spraying occurring - this is "Sample 1"
- b) One sample shall be taken within 25m downstream of the spray reach immediately after spraying has completed – this is "Sample 2"

c) One sample shall be taken from the same location as “Sample 2”, but after 2 hours of spray completion. This is “Sample 3”.

Sample 1 does not need to be sent to the lab straight away. Send sample 2 and 3 to the lab as soon as possible. Sample 1 only needs to be analysed if sample 2 or 3 is showing elevated levels of herbicide residues. You will be told when sample 1 needs to be tested or disposed of.

To ensure we are undertaking sampling in accordance with consent requirements and obtain a representative picture of the effects of spraying, sampling has been split geographically as follows:

FOR RIVER SPRAYING of areas greater than 0.5ha:

TWO waterways must be sampled in the South Engineering patch;
TWO waterways must be sampled in the Central Engineering patch;
TWO waterways must be sampled in the Northern Engineering patch.

FOR DRAIN SPRAYING of areas greater than 0.5ha:

TWO waterways must be sampled in the South Engineering patch;
TWO waterways must be sampled in the Central Engineering patch;
TWO waterways must be sampled in the Northern Engineering patch.

7. MANAGING HEALTH AND SAFETY RISKS

Both the individuals carrying out spraying and Environment Canterbury have responsibilities to ensure that the risks associated with the use of agrichemical are managed. Environment Canterbury has procedures and plans in place to ensure the risk of harm from agrichemical use is minimized as far as reasonably practicable.

This includes the provision of information about the risks of the chemicals being used (via safety data sheets and job plans), emergency response plans, provision of training and the provision of appropriate personal protective equipment.

Workers applying agrichemicals are responsible for ensuring that they manage the risks to their own health and safety and that of their colleagues by applying agrichemicals in accordance with good practice and the manufacturers recommendations.

The 2021 New Zealand Standard for Agrichemical Discharge (NZS 8409: 2021) sets the benchmark for the safe management of agrichemicals. All users are expected to be familiar with this standard and execute spray operations in accordance with its requirements.

Mandatory PPE Requirements

The Safety Data Sheet for each chemical will specify the Personal Protective Equipment (PPE) that must be used to prevent exposure to the chemical through skin contact, ingestion and inhalation. **It is not optional to wear the specified PPE.**

Typical PPE includes: Gumboots/water proof work boots, protective overalls (cotton or disposable) with tight fitting hood and cuffs, fitted respirators, chemical resistant gloves and safety goggles or full face visors. The greatest risk of exposure is during mixing when concentrated chemical is being handled, however workers are at risk of long term chronic exposure to chemicals if the appropriate steps are not taken to manage that risk.

If overalls have been covered with spray if possible, take these off before getting into vehicles to minimise chances of the chemical absorbing into seat covers and the interior of the vehicle. Seat covers should also be routinely washed in the spray vehicles. Wash protective clothing daily after work.

Do not eat, drink or smoke while using chemicals. Remove protective clothing and wash hands and face thoroughly before meals and after work.

It is expected that the management of risks to workers and the public is identified in your Site Specific Safety Plan.

8. SENSITIVE SITES PROTECTION

This section of the Spray Handbook addresses the most ecologically sensitive or at risk sites in rivers. The Environmental Plan for your job sets out the full requirements that must be followed, please refer to the Enviro Plan before works start.

Protecting bees and pollinators

Bees and other pollinating insects are critical to life on Earth and the productivity of New Zealand's agriculture and horticulture industry. Agrichemicals can have major impacts including bee death, contaminated honey and reduced pollination.

Surfactants we add to the herbicide to increase its effectiveness will cause bee deaths if bees come in to contact with either spray drift or visit flowers that have recently been sprayed. The surfactant works on the bees body like it does the plant leaf, essentially causing the bee to suffocate. Be aware that the most spray additives *do not* have label warnings about the effects on bees.

It is important that we have steps in place to protect these pollinators when spraying.

As such it is critical we do not spray within 50m of bee hives to reduce the risk of spray drift affecting large numbers of bees. We must also not spray plants in flower when there are bees foraging. These are both consent requirements and not negotiable.

Other good practices that should be followed:

- Time spraying to avoid the warmer parts of the day – bees are less active during cooler mornings so less chance of bees being out foraging.
- Carry out spray operations after December, beekeepers typically move their hives out of the river berms and into farmland later in summer.
- Do not spray when wind speeds increase the risk of spray drifting

Native Plant ID and protection

Braided Rivers and the mosaic of habitats that surround them, including wetlands, springs, and small rivers host a variety of native plant species. Given the extensive modification of these systems through landuse change, agricultural encroachment and flood protection schemes, what remaining vegetation there is left is likely to be rare and significant. This native

vegetation and the areas it is persisting in also represent rare and highly valued habitat for native animals and insects.

It is critical we are identifying areas of native plants and putting measures in place to prevent them being damaged or destroyed.

Some key steps you can take:

- Refer to your job sheet to locate any no spray zones to protect known areas of native plants. Do not apply any spray in these areas.
- Be highly conscious of what other plants there are surrounding your spray target areas, avoid anything you aren't sure of or is a native plant.
- Be very targeted in your application, make sure you are only spraying the target weeds.
- Avoid spraying over open gravel or sparsely vegetated areas around target islands.
- The Rivers Section Environmental Guide has more detail about what plants to look out for.

Wetlands – restoration, maintenance and biosecurity

Wetlands are valuable for their ability to treat water, provide refuge for animals, being rich in biodiversity, provide natural flood protection, natural character and cultural values. Wetlands are intrinsically linked to all waterbodies within Canterbury and may be permanent or ephemeral, large or small, and of high and low ecological value. Our agrichemical weed maintenance operations may interact with wetlands within the margins or active channels of dynamic braiding rivers or within the small watercourses now managed as drainage districts, often over historic wetlands and may hold remnant wetland values of those areas.

In 2020 the government released specific legislation to ensure there is no further loss or extent of natural inland wetlands, that their values are protected, and their restoration is promoted. These rules cover all wet areas that have plant and animals adapted to living in that wet environment, therefore these rules apply to a wider area than what may typically be considered a wetlands.

Herbicide weed management can be both an important tool to restore and maintain wetlands, but can create a significant risk to those wetlands if not undertaken correctly.

If in doubt, do not spray in, or within 10 metres of a wetland

Step 1: The first step in protecting, maintaining or restoring wetlands, is to identify when spray operations may occur within a wetland, or within 10 metres of a wetland. Before commencing a job:

- Check ECan maps wetland layer for any recorded wetlands within the spray area. Not all wetlands are currently mapped;
- Discuss the proposed spray program with ECan Ecology team to discuss the likely extent of unknown wetlands in the area, and whether any ground truthing is required;
- Record potential wetland areas identified in any pre-works scoping and seek the guidance of ECan Ecology team or Rivers Senior Environmental Advisors.

Step 2: If wetlands are likely to be within the spray area, at the job-planning stage:

- Exclude those areas from aerial spray operations; OR
- Seek guidance from the ECan Ecology team on whether spraying within the wetland (and within 10m) should be avoided, or if they advise that spraying weeds in the wetland would be beneficial, seek their advice on how that should be managed.
- When planning jobs in and near wetlands you must first attempt to avoid any loss to wetland values or extent; if avoidance is not possible, then impacts shall be minimised.

Step 3: if the decision, with the support of the Rivers Senior Environmental Advisors, is to continue with herbicide based weed control within 10 metres of wetlands, specifically address the agreed works program within those identified wetlands. certain records must be taken prior to works starting.

Step 4: During works ensure the following:

- machinery must sit outside of a wetland, unless it is necessary for the machinery to enter the natural inland wetland to achieve the purpose of the activity and approval is provided by the Senior Environmental Advisors (who will ensure compliance with the NES-F).
- During and after the activity, erosion and sediment control measures must be applied and maintained at the site of the activity to minimise adverse effects of sediment on natural inland wetlands.
- That the vegetation clearance does not form new pathways or other accessways to the wetland.
- That the activity is undertaken only for as long as necessary to achieve its purpose.
- Indigenous vegetation is avoided as far as practicable.

Fish spawning habitats

Refer to your job sheet to determine if there are any protected fish spawning habitats in your spray area, and follow the instructions on your Environmental Plan.

Spawning areas may include salmon or inanga spawning habitat, or habitat utilized by other rare or threatened native fish species.

9. EMERGENCY RESPONSE

In the event of an accident or emergency, immediately inform the Overseer or Contractor in Charge. If required, the appropriate official emergency services must be alerted and/or summoned immediately.

1. Spill

Everything possible must be done to contain spillage and prevent any herbicide from entering waterways, ponds, lakes, drainage systems or the sea. If the spill is near drinking water supply intake, you must notify the owner

and the operator of the supply immediately. Follow the procedures outlined in the Spill Response Plan.

2. Drift

In the event of any spray drift incident beyond the target area immediately notify all potentially affected parties. These at minimum shall include affected landowners, the relevant territorial authority, Environment Canterbury, the Medical Officer of Health, the relevant local Rūnanga within whose takiwā the incident occurred when areas for mahinga kai are in the area, the Department of Conservation district office, and MPI. See telephone list below

If stock are at risk, the owner should be contacted directly to take appropriate measures. If the Overseer or Contractor in Charge cannot make immediate contact, staff should act promptly to prevent stock losses by moving them away from affected areas.

3. Human contact

NOTE: refer to the substances Safety Data Sheet for the most up to date procedures for treating exposure to chemicals.

First Aid measures for Glyphosate

Never give fluids or induce vomiting if patient is unconscious or is having convulsions.

Ingestion: Do not induce vomiting. Call a physician. The decision of whether to induce vomiting or not should be made by a physician.

Eye Contact: Flush eyes thoroughly with water for several minutes. Remove contact lenses after initial 1-2 minutes and continue flushing for several additional minutes. If effects occur, consult a physician.

Skin Contact: Remove contaminated clothing immediately, wash skin area with soap and water, and launder clothing before reuse or dispose of properly.

Inhalation: Remove to fresh air. Consult a physician

First Aid measures for Triclopyr

Eyes: Irrigate with flowing water immediately and continuously for 15 minutes. Consult medical personnel.

Skin: Wash off in flowing water or shower.

Ingestion: Do not induce vomiting. Give large amounts of water or milk if available and transport to medical facility. Do not give anything by mouth to an unconscious person.

Inhalation: Remove to fresh air if effects occur. Consult a physician.

Agrichemical Spill Response Plan

PURPOSE:

To manage and contain accidental spills agrichemicals or any other hazardous substances.

This plan outlines how to safely identify and contain hazardous substances spills, procedures for cleaning up and disposing of contaminated material and reporting of spills in accordance with the Defences Against Water Code of Practice and the NZS8409: 2021.

This response plan does not apply to inside the chemical stores at the depots as these have spill procedures specific to the site. A spill report should still be completed for spills at the chemical store.

PROCEDURE:

Assess the risk

- Know the chemical/substances that you are using – use inventory sheets to keep track of stock, and make sure all containers are clearly labelled.
- Make sure you have up to date Safety Data Sheets (SDS) available to you at all times.
- Identify the areas that could be affected by a spill – both the immediately surrounding area and downstream should a spill enter a waterway.

Reduce the risk

- Store chemicals and mix chemicals on site in a position where they are unable to enter surface water or ground water if they are spilled.
- Follow the manufactures instructions for safe handling and mixing of agrichemicals

- Do not tip spray container rinsing's onto the ground or into any drainage network. Rinsing's must be tipped back into the main spray tank.

Fuels and oils

- Refuelling of mobile plant associated with spraying should be done outside of the river bed on an impermeable base, however if this is not possible a drip try must be used.
- For non-mobile plant, refuelling must be done with a drip try or other spill-containment installed.
- Conduct regular maintenance checks on all vehicles and machinery to minimise the chances of fuel or oil leaks or hose blow outs.
- Have a spill kit available on site, which can be used to contain and clean up spills of chemicals, fuels and other hazardous substances.
 - A spill kit contains equipment used to clean up a spill such as a shovel, broom, drain covers, sandbags, booms and absorbent material. All spills need to be handled with compatible materials.
 - The kit should also contain equipment for storing and disposing of spilled material such as safe containers, bags, and drums.

Response plan for hazardous substances spills.

This spill response plan must be given and explained to all staff. It is important to have regular training and practice runs on spill response to ensure that you know what you are doing should a real spill occur.

Step 1: Health and Safety

Yours and your work colleague's safety is the number one priority during a spill response. Do not attempt to clean up a spill of hazardous material if you do not have the correct personal protective equipment on. PPE that must be used includes items such as gloves, protective clothing, appropriate footwear, respirators and eye protection. Similarly if it is a major spill, contact the appropriate agency for response (see emergency contacts below).

Step 2: Identify the substance spilt

Determine what the spilt substance is – fuel, oil, agrichemical etc. This then determines how the spill is dealt with as different substances react differently. Consult the SDS sheet for the substance for guidance.

Step 3: Stop the spill

If safe to do so, stop any further material from leaking – for example rolling chemical drums around so that the hole is at the top, turn off the tap or valve, plug the leak.

Step 4: Contain the spilt material

Aim to control the spread of the spill as quickly as possible to minimise the affected area. Ensure that it is safe to undertake the following actions before doing so. Also ensure that people are not walking through the spill and spreading it on their footwear.

Agrichemical

If the chemical has been spilled on the ground and is in a granulated form, immediately attend to clean up or temporarily cover the spill with plastic to stop it blowing around with the wind. The spill and any contaminated ground must be scooped up and placed in a disposal container and disposed of at the appropriate facility. If the granules have been spilt into a water body, if possible attempt to scoop out the granules before they can become fully diluted.

If the chemical is in a liquid form, there is little that can be done to contain chemical spill into the waterway. Minimise the effect of the spill by stopping the material getting into the water as quickly as possible. If the liquid chemical has been spilt onto the ground, the material and any contaminated ground must be scooped up and placed in a suitable container and disposed of at an appropriate facility.

Hydrocarbons (fuel, oil)

Substances such as diesel and oil will float on top of the water surface, to prevent the spread of the spill downstream in a water body an absorbent boom should be used to contain the spill and absorbent pads can be used to mop up the spill. If the oil or fuel has been spilt on the ground, the ground (dirt, gravels, sand, and any vegetation) must be scooped up and placed in a suitable container and disposed of at the appropriate facility.

Step 5: dispose of contaminated material

All spilled material and any contaminated material associated with the clean up of the spill must be disposed of at the appropriate facility, in most instances this will need to be at landfill.

Step 6: record and report details of the incident

Please use the Hazardous Substance spill record sheet (Attachment 1) to record the details of the incident.

Incidents of hazardous substance spillages into water bodies must be reported to the Incident Response Hotline at 0800 76 55 88 or ecinfo@ecan.govt.nz. The Incident Response team are trained in the clean up of hazardous substances spills, so are a useful resource for guidance on how to manage a spill.

Step 7: Restock your spill kit

Make sure any equipment used during the clean up of a spill is restocked in the spill kit.

Step 8: Review

Review the incident and see how the incident could be avoided in future and make sure the findings of the review are implemented. This should also be recorded on the Hazardous Substances spill record sheet.

Contact details:

For a serious spill, contact the **Fire Service 111** and the **Incident Response Hotline 0800 76 55 88**

EMERGENCY TELEPHONE NUMBERS

Environment Canterbury	
Manager Rivers – David Aires	027 549 7716
Environmental Advisors	Mel 0275629969, Jules 0273520832
Incident Response Hotline	03 366 4663 or 0800 76 55 88
National Poisons Hotline	0800 764 766
District Councils	
Kaikoura	03 319 5026
Hurunui	03 314 8816
Waimakariri	03 3118900
Christchurch	03 941 8999

Selwyn	03 347 2800
Ashburton	03 307 7700
Waimate	03 689 8079
Timaru	03 687 7200
MacKenzie	03 685 0910
Waitaki	03 433 0300
Medical Officer of Health for Canterbury	
Christchurch and Timaru	03 364 1777
Rūnanga	
Kaikoura	03 3196523
Tuarhuriri	03 3135543
Taumutu	03 3712660
Arowhenua	03 6159646
Waiaho	03 6894726
Moreaki	03 439 4816
Koukourarata	03 365 3281
Onuku	03 381 2082
Wairewa	03 377 1513
Rapaki	03 328 9415
MPI	
MPI	0800 008333 or 04 894 0100
Department of Conservation	
Mahaanui	03 341 9100
Aoraki	03 435 1819
Raukapuka	03 693 1010
Twizel	03 435 0802
Waimakariri	03 313 0820
South Marlborough	03 572 9100
DOC Hotline	0800 362 468

APPENDIX 1

CRC222040 CONSENT CONDITIONS

APPENDIX 2

CRC222041 CONSENT CONDITIONS

APPENDIX 3

CRC222043 CONSENT CONDITIONS

APPENDIX 4 Daily record keeping and reporting requirements



Environment Canterbury Rivers Section

**HANDBOOK FOR SPRAYING:
FOR CONTRACTORS**

*In accordance with Resource Consents
CRC222040, CRC222041 and CRC222043*

March 2024

CONTENTS

1. INTRODUCTION

2. QUALIFICATIONS REQUIRED

3. AGRICHEMICAL AND ADJUVANT SELECTION

4. MANAGING SPRAY DRIFT RISK

5. JOB MANAGEMENT PROCESSES

Before commencing the job

Before leaving the depot

On the job

After completion of the job

6. SAMPLING REQUIREMENTS

7. MANAGING HEALTH AND SAFETY RISKS

8. SENSITIVE SITES PROTECTION

Bees and Pollinators

Native Plants

Wetlands – restoration, maintenance and biosecurity

Fish spawning habitats

9. EMERGENCY RESPONSE

Spill Response Plan

Emergency contact numbers

APPENDICES

Appendix 1 CRC222040

Appendix 2 CRC222041

Appendix 3 CRC222043

Appendix 4 Daily record keeping and reporting requirements (to be added upon finalisation)

Appendix 5 Aerial discharge buffer zone schematic

1. INTRODUCTION

This Spray Handbook is a tool available to assist in consent compliance and good practice for use of agrichemicals across the Canterbury Region. It summarises key decision making criteria relevant to planning and completing agrichemical spray programmes, legislative bottom lines, consent conditions and best practice to help minimise the risk of harm arising from the use of agrichemicals.

It has been prepared for use by the Rivers Section contractors carrying out spraying to control vegetation growing in riverbeds and drains on behalf of Environment Canterbury.

The contents of this handbook must be understood by all people carrying out spray operations (including ground crew for aerial applications) prior to carrying out the work as they are responsible for meeting all the relevant requirements. A copy of this handbook must be carried in all vehicles and machinery involved in spraying.

Spraying is authorised by resource consents CRC222040, CRC222041 and CRC222043. These consents set out the minimum requirements for carrying out spraying and specify that spraying must be carried out in accordance with this Handbook.

The Handbook is split up into the main stages of the job – Preparation for the Job, On the Job and After the Job. It sets out work practices for how spraying must be conducted to comply with resource consents and to avoid environmental harm. It also covers topics such as sampling, health and safety and contains the conditions of our Resource Consents.

The use of sprays must be carefully considered, and only used where it is the best practicable option for controlling weedy vegetation. All of the substances we are authorised to use are toxic to the aquatic environment, with some toxic to terrestrial and soil life as well, so need to be extremely carefully managed.

Work Types

In general, there are three main locations sprays are used for flood protection and drainage maintenance:

Fairway Spraying:

Spraying is carried out to control the growth of woody and herbaceous weeds including willow, broom, alder, lupine and gorse in the 'active' part of the river channel, the "fairway", which carries baseflows and the fast flowing water during floods. Controlling this vegetation ensures that the flood carrying capacity of the river is not reduced, or that vegetated islands do not redirect flows toward river banks causing erosion and damage to land, and flood protection structures and plantings on the river berms. Vegetated islands can "lock up" gravel and prevent natural braiding from occurring which impacts on the natural character and habitat value of braided rivers.

Berm spraying:

Old Mans Beard and other weed species such as blackberry, gorse and broom, are sprayed in the berm vegetation, as these noxious weeds smother and kill flood protection vegetation. Berm spraying also includes maintenance spraying of stopbanks and tracks. Stopbanks need to be kept clear of woody weeds, as the roots of those weeds penetrate into the stopbank potentially causing weaknesses in the stopbank. Tracks are maintained to ensure that there is easy access through the river berms for our operational works, inspections and flood response. These tracks also provide community access to river beds.

Drain Spraying:

Vegetation control in drainage schemes is necessary as weed growth restricts water flow causing water levels in the drain and adjacent groundwater levels to rise, impeding drainage and ultimately causing localised flooding. The target vegetation on the banks of such waterways are the introduced woody plants such as gorse, broom and sprouting willow. Within the waterways, the target vegetation are emergent introduced species such as monkey musk, water twitch and water cress, which thrive in the nutrient rich drain environment. We do not control submerged weed with herbicides. Also sprayed are plants such as dock and rank grass growth in dry drains. The first preference is to only spray dry drains, however this is not always possible.

Spraying may be carried out by knapsack, truck or tractor mounted hand held spray guns. Our contractors carry out aerial spraying via helicopters or UAV's. The spray methodology will be determined taking into account site characteristics, size of the spray job, accessibility and practicality.

Contractors must provide ECan with regular updates about fairway spraying progress as we may need to carry out water quality sampling. Therefore we need to know when spraying is due to commence, and when it will be completed as we must sample immediately prior to and after spraying.

Authority to carry out spraying

The three resource consents held by Environment Canterbury to deliver spraying (attached in Appendix 1-3):

- CRC222040 when discharging agrichemicals to land where it may enter water or directly to water
- CRC222041 when discharging agrichemicals into the CMA
- CRC222043 when discharging agrichemicals from helicopter and UAV.

2. QUALIFICATIONS REQUIRED

All persons handling, mixing and applying herbicides on behalf of Environment Canterbury must be suitability qualified and experienced.

Under the EPA Hazardous Property Controls Notice, substances that are very ecotoxic to the aquatic and terrestrial environment (class 9.1A, 9.2A, 9.3A and 9.4A) are required to be under the control of a "Qualified Person/Contractor". "Under the control of" means either being *applied by* a qualified person or *under the direct or indirect supervision* of a qualified person as appropriate based on the skills and experience of the applicator and the nature of the task.

All Environment Canterbury Contractors must hold a Registered Chemical Applicator qualification. Further qualification requirements for aerial operations are set out below.

The following table sets out the qualifications required for contractors for different application methods and areas:

Application Method	Growsafe Certification	Alternative
Ground-based application to land using mechanical equipment (not handheld)	Growsafe Registered Chemical Application (RCA) with relevant strand	Rural Contractors NZ RCS Accreditation with relevant strand
Motorised application equipment – handheld with a tank capacity of more than 30L eg Gun-spraying	Growsafe Registered Chemical Application (RCA) with relevant strand; OR	National Certificate in Agrichemical Application with relevant strand; OR US21563 and one of: US27216; US6237; US6238
Motorised application equipment- handheld, more than 30L capacity, within 30m of water or sensitive habitat	Growsafe Registered Chemical Applicator (RCA) with relevant strand; OR Growsafe Standard or US21563	Rural Contractors NZ RCS Accreditation with relevant strand National Certificate in Agrichemical Application with relevant strand; OR US27216, 6237, 6238
All applications in to water eg spraying aquatic weeds	Growsafe Registered Chemical Applicator (RCA) with aquatic strand	Rural Contractors NZ RCS Accreditation with aquatic strand
All other ground based application with capacity of less than 30L and not near water or sensitive habitat	Growsafe Standard or US21563	US21563 and US27215

Taken from Table 1 from the Hazardous Properties Control Notice 2017

For aerial spraying, under the Civil Aviation Rules (Civil Aviation Act 1990), the application of agrichemical by aircraft requires the pilot to hold a Pilot Chemical Rating issued by the CAA. Note: This rating requires refresher

Groundcrew supporting aerial agrichemical application should hold a Groundcrew Certificate or equivalent.

For UAV/drone spraying, under the Civil Aviation Rules the application of agrichemicals by a UAV requires the applicator to be certified under Part 102 and have an endorsement (privilege) for agriculture. This is issued by the Civil Aviation Authority (CAA).

3. AGRICHEMICAL AND ADJUVANT SELECTION

Refer to your Statement of Work for the preferred chemicals and adjuvants to be used for your Contract. Where this is not specified, the following criteria must be applied to selecting herbicide and adjuvant formulations:

- Only formulations of glyphosate and triclopyr are currently permitted.
- Formulations which have the lower environmental and safety hazard classification and can achieve the desired outcome should be selected
- Only 'aquatic approved' herbicides may be used in spray operations where the target plants are emergent macrophytes.
- Confirm the herbicide and adjuvant selection with Contract manager prior to purchase.
- Review of the hazard classification, EPA and label requirements to allow for discharge in and near water. If the herbicide and/or adjuvant is not allowed to be discharged to water, suitable setbacks and drift mitigation measures must be employed as set out in this spray handbook and your SOW

Risk assessment for selecting adjuvants

Spray adjuvants are additional substances that can be added into a spray mixture to improve the efficacy of the spraying operation. They can assist in reducing the amount of active chemical required for an operation, and help

to improve the rate of kill in the target plants allowing for long term control of weed infestations. Generally, adjuvants utilised include:

- **Penetrants**, which improve the ability for the herbicide to enter into the plant leaf, especially on waxy or woody plants (eg Pulse, Organosilicone, Kwicken)
- **Surfactants**, which lower the surface tension of water allowing droplets of spray to spread out widely on the plant leaf rather than remaining as a small droplet which increases uptake into the plant (eg Ezi Cover adjuvant oil)
- **Drift reducers**, which modify the spray droplets to make them less likely to drift, often used in aerial spray applications (eg Li1000)

Some spray adjuvants are not classified as hazardous substances, others have individual approvals and controls and a large number are approved by the EPA under the Additives, Process Chemicals and Raw Materials (Subsidiary Hazard) Group Standard 2020 (HSR002503).

It is therefore important to understand what adjuvant is appropriate for the spray job and the restrictions on the use of that adjuvant by checking the safety data sheet for your chosen substance.

Key factors for selecting your adjuvant:

- It must be compatible and/or recommended to be combined with the main herbicide(s) in your mix
- Compare the hazard classifications for the adjuvants and select the adjuvant that has the lower hazard class (or those that are not hazardous) but is still appropriate for your intended use (eg selecting an adjuvant appropriate for killing woody weeds – a penetrant)
- Avoid choosing adjuvants that specify they must not be applied over water where there is a risk of discharges directly over or drift could enter water

Some adjuvants available for use:

- *Organosilicone: 9.1B (harmful to the aquatic environment chronic category 2)*
- *Kwicken: Not classified as a hazardous substance*

- *EziCover: Not classified as a hazardous substance*
- *Pulse: 9.1B (harmful to the aquatic environment chronic category 2)*
- *Li-1000: 9.1C (harmful to the aquatic environment chronic category 3)*

4. MANAGING SPRAY DRIFT RISK

Applicators of herbicides are required to take all reasonable steps to ensure the substance they are applying does not cause any significant adverse effects beyond the target application area.

Spray drift has the potential to cause significant adverse effects on surrounding non-target plants, animals, water quality and river bed users.

Managing risk of drift in accordance with **Appendix H of NZ8409: 2021** is taking all reasonable steps. Key drift control measures included in this standard to be deployed with all operations include:

- Adjust application equipment (eg droplet size, height of release and pressure at pump) to suit weather conditions at the time of spraying (eg wind speed and direction)
- Prior to application, during on-site risk assessments, identify any sensitive areas located near your target site. Note any extra sites on Job Sheets/Spray Diaries and note a confirmation you have done this check.
- Factor in the Drift Hazard (as determined by Table H1 in NZ Standard) when deciding to proceed with spraying or not.
- Only spray under favourable wind speeds and directions (consider the impacts of inversions or anabatic/katabatic winds)
- Use buffer zones to protect sensitive sites .
- Consider the use of approved and appropriate spray drift adjuvants.
- When undertaking Helicopter spraying, refer to Attachment 5 the schematic created from the “Buffer zone estimation to minimize water exposure from aerial spraying with glyphosate or triclopyr” (Scion, 2023 technical guide to consent application) to make informed decisions on discharge parameters to minimize risk of spray drift.

5. JOB MANAGEMENT PROCESSES

This section of the Spray Handbook details the checks and steps that must be taken throughout the planning and delivery of spray jobs to ensure best practice is adhered to and compliance with resource consents is met.

BEFORE COMMENCING THE JOB

1. Prior to engaging any contractors to complete spray operations, Environment Canterbury staff are responsible for scoping the area to be sprayed and to identify any sensitive areas and areas to be avoided. These may include irrigation or stockwater intakes water intakes, community and papakāinga drinking water supply points and protection zones, dwellings, schools and preschools, beehives, organic farms, amenity and recreational areas and mahinga kai areas. These will be mapped and communicated to the contractor in the Statement of Works. The contractor must avoid spraying in these areas as directed.
2. ECan staff will be responsible for notifying all parties prior to spraying occurring and will erect warning signage at typical entry points into the area to be sprayed. Contractor to confirm that this has been done prior to commencing spraying.
3. Check that the specification for the work (including no-spray areas) and the relevant consent conditions are understood by all members of the spraying team.
4. Check that that the chemicals to be used are currently approved for use under the Hazardous Substances and New Organisms Act and any subsequent replacement or legislation (including the Health and Safety at work (Hazardous Substances) Regulations 2017 and are permitted to be used under our Resource Consents. Remember, your herbicide and adjuvant selection needs to be approved by the contract manager.
5. Confirm that river flow and weather conditions are favourable for carrying out spraying. This includes:
 - a. There is a low risk of rain
 - b. Wind conditions are light and the risk of spray drift is minimal

- c. River flows are low enough to allow separation between flowing water and areas to be sprayed
- 6. Check that all members of the spraying team know what to do in the event of spills - what to do on site and who to report the spill to (see emergency response chapter of this handbook) and for first aid and medical assistance.
- 7. Check all personal safety equipment for condition and fit and ensure staff are wearing the appropriate PPE for the task they are carrying out. Minimum mandatory requirements for handling or mixing, and application are specified in the Safety Data Sheet for the substances being used. In general, the PPE required includes:
 - a. Overalls with a tight fitting hood and cuffs
 - b. Eye protection and face shield (if specified in the SDS)
 - c. Chemical resistant gloves
 - d. Respiratory protection
 - e. Gumboots or waterproof workboots.
- 8. Check calibration of equipment and check back flow prevention is in place and fully functional on any devices used to pump water for mixing chemical. Backflow must be in accordance with Australian Standard/New Zealand Standard 2845.1:2022 'Water supply – Backflow prevention devices, Part 1: Materials, design and performance requirements'

ON THE JOB

- 1. Plan your route so that vehicles and machinery discharging herbicides do not enter river channels containing flowing water within 250m upstream of any community water supply draw-off point, or do not pass within 25m of any community water supply draw-off point.

2. Do not aerially apply any herbicide within 250m of any community water supply draw off point, schools or dwellings. Check Statement of Work for their location + exclusion zones.
3. Do not apply any herbicide within 25m of any community water supply draw off point by ground-based application methods. Check Statement of Work for their location + exclusion zones.
4. For drain spraying where spray may enter water, do not spray:
 - within 25 metres upstream of an intake for a water supply that is not used for domestic or community water supply purposes; or
 - within 250 metres upstream of an intake for a water supply that is used for domestic or private water supply purposes; or
5. Triclopyr must not be sprayed directly onto water or over areas where the water table is very shallow (less than 1m). Apply Triclopyr to bankside vegetation and margins only.
6. Assess spray area for the presence of native plants. Avoid spraying native vegetation. See the Native Plant section of this Handbook for further information
7. Do not spray bank side vegetation within inanga spawning habitat (check Statement of Work for any inanga spawning location) during the months January - June
8. When spot spraying banks, direct spray away from water. Avoid blanket spraying banks to reduce erosion and scour risk.
9. Ensure that all mixing of spray chemicals and cleaning of spray equipment is undertaken at least 10m away from any surface waterbody, well, stormwater system and areas of shallow groundwater to ensure that spillage does not discharge into any surface waterbody. Use secondary spill containment or drip trays at mixing/loading sites if mixing is occurring within a drinking water protection zone.

10. A spill kit suitable for absorbing and managing spills of the substance you are using must be kept readily available at all times during the spray operation.
11. Ensure that the filling of tanks when diluting concentrated herbicides is carried out in a manner that prevents back-flow.
12. Do not discharge adjuvants onto plants in flower if there are large numbers of bees foraging on those plants.
13. Do not spray within 50 metres of any beehive
14. Be aware that bird nesting activity can still be occurring in braided rivers even if there is extensive weed growth. Do not spray within 50 metres of any beehive or of any individual bird nesting or rearing its young on the bed or bank of the watercourse. No spraying within 100m of colonies of nesting birds. **NOTE:** bird nesting season is 1 September to 1 February
15. Continually monitor wind conditions throughout the spray operation and cease spraying when wind speeds exceed 15kph OR sooner if spray is starting to drift beyond the target area. Keep records of your wind readings in daily spray logs
16. In addition to monitoring wind conditions, take steps to minimise spray drift as set out in the spray drift management section of this handbook below.
17. An accurate record of each spray operation must be kept and provided to Environment Canterbury upon completion of spraying. The information to be recorded and reported shall include:
 - Operators names
 - Start and finish time of application
 - Detailed description of the area sprayed
 - Target plants
 - Chemical and additives used (including manufacturer's name), mixing rate, and locations where mixing was carried out
 - Method of application

- Wind speed and direction observations
 - Weather conditions, including any rain
 - Any sensitive sites or receptors encountered (eg any beehives, previously unknown water takes, organic farms).
 - GPS tracks of spray path
16. Follow manufacturer's recommendations for stand-down periods between spraying and forecast rain. In general do not spray when vegetation is wet from rain or when rain is forecast to fall in the area being sprayed within:
- 2 hours for glyphosate with adjuvant
 - 6 hours for glyphosate without adjuvant
 - 1 hour for triclopyr with adjuvant
 - 3 hours for triclopyr without adjuvant
18. Triple rinse spray containers back at the depot and tip rinsing's into the spray tank or a knapsack. Do not tip rinsing's into the stormwater network, into a waterbody or onto the ground. Do not dispose of any unwanted concentrated or diluted chemical within the river bed or berms. Dispose of all empty containers at an appropriate facility.
17. No off label use of herbicides are permitted. **NOTE:** this does not include drill and inject techniques, which is technically an off label method but it is an acceptable industry standard practice.

AFTER COMPLETION OF THE JOB

Ensure all information required about the operation as per reporting requirements on your Statement of Work is collated and provided to Environment Canterbury. Supply to the Area Engineer or Contract Manager

6. SAMPLING REQUIREMENTS

Environment Canterbury staff will organize the water quality sampling. Water quality testing allows us to monitor whether herbicides are entering the

water, and at what concentration. These results need to be provided to CRC for consent compliance. It is important that you keep us informed with spray timing so we can carry out this sampling.

We are testing to determine if herbicide residues are detected in water as a result of spraying. The limits that are set by our Resource Consents are:

0.1mg/l of glyphosate

0.01mg/l of triclopyr

Should sampling detect any residues at levels higher than this, we will conduct an investigation into the potential cause of this exceedance and will implement an improvement plan as required. You will be required to participate in any investigation involving your operation.

7. MANAGING HEALTH AND SAFETY RISKS

Both our Contractors and Environment Canterbury have responsibilities to ensure that the risks associated with the use of agrichemical are managed.

Environment Canterbury has procedures and plans in place to ensure the risk of harm from agrichemical use is minimized as far as reasonably practicable. This includes the provision of information about the risks of the chemicals being used (via safety data sheets and job plans), emergency response plans, provision of training and the provision of appropriate personal protective equipment.

Workers applying agrichemicals are responsible for ensuring that they manage the risks to their own health and safety and that of their colleagues by applying agrichemicals in accordance with good practice and the manufacturers recommendations.

The 2021 New Zealand Standard for Agrichemical Discharge (NZS 8409: 2021) sets the benchmark for the safe management of agrichemicals. All users are expected to be familiar with this standard and execute spray operations in accordance with its requirements.

Mandatory PPE Requirements

The Safety Data Sheet for each chemical will specify the Personal Protective Equipment (PPE) that must be used to prevent exposure to the chemical through skin contact, ingestion and inhalation. **It is not optional to wear the specified PPE.**

Typical PPE includes: Gumboots/water proof work boots, protective overalls (cotton or disposable) with tight fitting hood and cuffs, fitted respirators, chemical resistant gloves and safety goggles or full face visors. The greatest risk of exposure is during mixing when concentrated chemical is being handled, however workers are at risk of long term chronic exposure to chemicals if the appropriate steps are not taken to manage that risk.

Do not eat, drink or smoke while using chemicals. Remove protective clothing and wash hands and face thoroughly before meals and after work. Wash protective clothing daily after work.

It is expected that the management of risks to workers and the public is identified in your Site Specific Safety Plan.

8. SENSITIVE SITES PROTECTION

This section of the Spray Handbook addresses the most ecologically sensitive or at risk sites in rivers. The Environmental Plan for your job sets out the full requirements that must be followed, please refer to the Enviro Plan before works start.

Protecting bees and pollinators

Bees and other pollinating insects are critical to life on Earth and the productivity of New Zealand's agriculture and horticulture industry. Agrichemicals can have major impacts including bee death, contaminated honey, reduced pollination.

Surfactants we add to the herbicide to increase its effectiveness will cause bee deaths if bees come in to contact with either spray drift or visit flowers that have recently been sprayed. The surfactant works on the bees body like

it does the plant leaf, essentially causing the bee to suffocate. Be aware that the most spray additives *do not* have label warnings about the effects on bees.

It is important that we have steps in place to protect these pollinators when spraying.

As such it is critical we do not spray within 50m of bee hives to reduce the risk of spray drift affecting large numbers of bees. We must also not spray plants in flower when there are bees foraging. These are both consent requirements and not negotiable.

Other good practices that should be followed:

- Time spraying to avoid the warmer parts of the day – bees are less active during cooler mornings so less chance of bees being out foraging.
- Carry out spray operations after December, beekeepers typically move their hives out of the river berms and into farmland later in summer.
- Do not spray when wind speeds increase the risk of spray drifting

Native Plant ID and protection

Braided Rivers and the mosaic of habitats that surround them, including wetlands, springs, and small rivers host a variety of native plant species. Given the extensive modification of these systems through landuse change, agricultural encroachment and flood protection schemes, what remaining vegetation there is left is likely to be rare and significant. This native vegetation and the areas it is persisting in also represent rare and highly valued habitat for native animals and insects.

It is critical we are identifying areas of native plants and putting measures in place to prevent them being damaged or destroyed.

Some key steps you can take:

- Refer to your Statement of Works to locate any no spray zones to protect known areas of native plants. Do not apply any spray in these areas.
- Be highly conscious of what other plants there are surrounding your spray target areas, avoid anything you aren't sure of or is a native plant.
- Be very targeted in your application, make sure you are only spraying the target weeds.
- Avoid spraying over open gravel or sparsely vegetated areas around target islands.

Wetlands – restoration, maintenance and biosecurity

Wetlands are valuable for their ability to treat water, provide refuge for animals, being rich in biodiversity, provide natural flood protection, natural character and cultural values. Wetlands are intrinsically linked to all waterbodies within Canterbury and may be permanent or ephemeral, large or small, and of high and low ecological value. Our agrichemical weed maintenance operations may interact with wetlands within the margins or active channels of dynamic braiding rivers or within the small watercourses now managed as drainage districts, often over historic wetlands and may hold remnant wetland values of those areas.

In 2020 the government released specific legislation to ensure there is no further loss or extent of natural inland wetlands, that their values are protected, and their restoration is promoted. These rules cover all wet areas that have plant and animals adapted to living in that wet environment, therefore these rules apply to a wider area than what may typically be considered a wetlands.

Herbicide weed management can be both an important tool to restore and maintain wetlands, but can create a significant risk to those wetlands if not undertaken correctly.

If in doubt, do not spray in, or within 10 metres of a wetland

Step 1: The first step in protecting, maintaining or restoring wetlands, is to identify when spray operations may occur within a wetland, or within 10 metres of a wetland. Before commencing a job:

- Check ECan maps wetland layer for any recorded wetlands within the spray area. Not all wetlands are currently mapped;
- Discuss the proposed spray program with ECan Ecology team to discuss the likely extent of unknown wetlands in the area, and whether any ground truthing is required;
- Record potential wetland areas identified in any pre-works scoping and seek the guidance of ECan Ecology team or Rivers Senior Environmental Advisors.

Step 2: If wetlands are likely to be within the spray area, at the job-planning stage:

- Exclude those areas from aerial spray operations; OR

- Seek guidance from the ECan Ecology team on whether spraying within the wetland (and within 10m) should be avoided, or if they advise that spraying weeds in the wetland would be beneficial, seek their advice on how that should be managed. When planning jobs in and near wetlands you must first attempt to avoid any loss to wetland values or extent; if avoidance is not possible, then impacts shall be minimised.

Step 3: if the decision, with the support of the Rivers Senior Environmental Advisors, is to continue with herbicide based weed control within 10 metres of wetlands, specifically address the agreed works program within those identified wetlands. certain records must be taken prior to works starting.

Step 4: During works ensure the following:

- machinery must sit outside of a wetland, unless it is necessary for the machinery to enter the natural inland wetland to achieve the purpose of the activity and approval is provided by the Senior Environmental Advisors (who will ensure compliance with the NES-F).
- During and after the activity, erosion and sediment control measures must be applied and maintained at the site of the activity to minimise adverse effects of sediment on natural inland wetlands.
- That the vegetation clearance does not form new pathways or other accessways to the wetland.
- That the activity is undertaken only for as long as necessary to achieve its purpose.
- Indigenous vegetation is avoided as far as practicable.

Fish spawning habitats

Refer to your Statement of Works to determine if there are any protected fish spawning habitats in your spray area, and follow the instructions on your Environmental Plan.

Spawning areas may include salmon or inanga spawning habitat, or habitat utilized by other rare or threatened native fish species.

9. EMERGENCY RESPONSE

In the event of an accident or emergency, immediately inform the Overseer or Contractor in Charge. If required, the appropriate official emergency services must be alerted and/or summoned immediately.

1. Spill

Everything possible must be done to contain spillage and prevent any herbicide from entering waterways, ponds, lakes, drainage systems or the sea. If the spill is near drinking water supply intake, you must notify the owner and the operator of the supply immediately. Follow the procedures outlined in the Spill Response Plan.

2. Drift

In the event of any spray drift incident beyond the target area immediately notify all potentially affected parties. These at minimum shall include affected landowners, the relevant territorial authority, Environment Canterbury, the Medical Officer of Health, the relevant local Rūnanga within whose takiwā the incident occurred when areas for mahinga kai are in the area, the Department of Conservation area office, and MPI. See telephone list below.

If stock are at risk, the owner should be contacted directly to take appropriate measures. If the Overseer or Contractor in Charge cannot make immediate contact, staff should act promptly to prevent stock losses by moving them away from affected areas.

3. Human contact

NOTE: refer to the substances Safety Data Sheet for the most up to date procedures for treating exposure to chemicals.

First Aid measures for Glyphosate

Never give fluids or induce vomiting if patient is unconscious or is having convulsions.

Ingestion: Do not induce vomiting. Call a physician. The decision of whether to induce vomiting or not should be made by a physician.

Eye Contact: Flush eyes thoroughly with water for several minutes. Remove contact lenses after initial 1-2 minutes and continue flushing for several additional minutes. If effects occur, consult a physician.

Skin Contact: Remove contaminated clothing immediately, wash skin area with soap and water, and launder clothing before reuse or dispose of properly.

Inhalation: Remove to fresh air. Consult a physician

First Aid measures for Triclopyr

Eyes: Irrigate with flowing water immediately and continuously for 15 minutes. Consult medical personnel.

Skin: Wash off in flowing water or shower.

Ingestion: Do not induce vomiting. Give large amounts of water or milk if available and transport to medical facility. Do not give anything by mouth to an unconscious person.

Inhalation: Remove to fresh air if effects occur. Consult a physician.

Agrichemical Spill Response Plan

PURPOSE:

To manage and contain accidental spills agrichemicals or any other hazardous substances.

This plan outlines how to safely identify and contain hazardous substances spills, procedures for cleaning up and disposing of contaminated material and reporting of spills in accordance with the Defences Against Water Code of Practice and the NZS8409:2021

This response plan does not apply to inside the chemical stores at the depots as these have spill procedures specific to the site. A spill report should still be completed for spills at the chemical store.

PROCEDURE:

Assess the risk

- Know the chemical/substances that you are using – use inventory sheets to keep track of stock, and make sure all containers are clearly labelled.
- Make sure you have up to date Safety Data Sheets (SDS) available to you at all times.

- Identify the areas that could be affected by a spill – both the immediately surrounding area and downstream should a spill enter a waterway.

Reduce the risk

- Store chemicals and mix chemicals on site in a position where they are unable to enter surface water or ground water if they are spilled.
- Follow the manufactures instructions for safe handling and mixing of agrichemicals
- Do not tip spray container rinsing's onto the ground or into any drainage network. Rinsing's must be tipped back into the main spray tank.

Fuels and oils

- Refuelling of mobile plant associated with spraying should be done outside of the river bed on an impermeable base, however if this is not possible a drip try must be used.
- For non-mobile plant, refuelling must be done with a drip try or other spill-containment installed.
- Conduct regular maintenance checks on all vehicles and machinery to minimise the chances of fuel or oil leaks or hose blow outs.
- Have a spill kit available on site, which can be used to contain and clean up spills of chemicals, fuels and other hazardous substances.
 - A spill kit contains equipment used to clean up a spill such as a shovel, broom, drain covers, sandbags, booms and absorbent material. All spills need to be handled with compatible materials.
 - The kit should also contain equipment for storing and disposing of spilled material such as safe containers, bags, and drums.

Response plan for hazardous substances spills.

This spill response plan must be given and explained to all staff. It is important to have regular training and practice runs on spill response to ensure that you know what you are doing should a real spill occur.

Step 1: Health and Safety

Yours and your work colleague's safety is the number one priority during a spill response. Do not attempt to clean up a spill of hazardous material if you do not have the correct personal protective equipment on. PPE that must be used includes items such as gloves, protective clothing, appropriate footwear, respirators and eye protection. Similarly if it is a major spill, contact the appropriate agency for response (see emergency contacts below).

Step 2: Identify the substance spilt

Determine what the spilt substance is – fuel, oil, agrichemical etc. This then determines how the spill is dealt with as different substances react differently. Consult the SDS sheet for the substance for guidance.

Step 3: Stop the spill

If safe to do so, stop any further material from leaking – for example rolling chemical drums around so that the hole is at the top, turn off the tap or valve, plug the leak.

Step 4: Contain the spilt material

Aim to control the spread of the spill as quickly as possible to minimise the affected area. Ensure that it is safe to undertake the following actions before doing so. Also ensure that people are not walking through the spill and spreading it on their footwear.

Agrichemical

If the chemical has been spilled on the ground and is in a granulated form, immediately attend to clean up or temporarily cover the spill with plastic to stop it blowing around with the wind. The spill and any contaminated ground must be scooped up and placed in a disposal container and disposed of at the appropriate facility. If the granules have been spilt into a water body, if possible attempt to scoop out the granules before they can become fully diluted.

If the chemical is in a liquid form, there is little that can be done to contain chemical spilt into the waterway. Minimise the effect of the spill by stopping the material getting into the water as quickly as possible. If the liquid chemical has been spilt onto the ground, the material and any contaminated ground

must be scooped up and placed in a suitable container and disposed of at an appropriate facility.

Hydrocarbons (fuel, oil)

Substances such as diesel and oil will float on top of the water surface, to prevent the spread of the spill downstream in a water body an absorbent boom should be used to contain the spill and absorbent pads can be used to mop up the spill. If the oil or fuel has been spilt on the ground, the ground (dirt, gravels, sand, and any vegetation) must be scooped up and placed in a suitable container and disposed of at the appropriate facility.

Step 5: dispose of contaminated material

All spilled material and any contaminated material associated with the clean up of the spill must be disposed of at the appropriate facility, in most instances this will need to be at landfill.

Step 6: record and report details of the incident

Please use the Hazardous Substance spill record sheet (Attachment 1) to record the details of the incident.

Incidents of hazardous substance spillages into water bodies must be reported to the Incident Response Hotline at 0800 76 55 88 or ecinfo@ecan.govt.nz. The Incident Response team are trained in the clean up of hazardous substances spills, so are a useful resource for guidance on how to manage a spill.

Step 7: Restock your spill kit

Make sure any equipment used during the clean up of a spill is restocked in the spill kit.

Step 8: Review

Review the incident, and see how the incident could be avoided in future and make sure the findings of the review are implemented. This should also be recorded on the Hazardous Substances spill record sheet.

Contact details:

For a serious spill, contact the **Fire Service 111** and the **Incident Response Hotline 0800 76 55 88**

EMERGENCY TELEPHONE NUMBERS

Environment Canterbury	
Manager Rivers - David Aires	027 549 7716
Environmental Advisors	Mel 0275629969, Jules 0273520832
Incident Response Hotline	03 366 4663 or 0800 76 55 88
Poisons Hotline	0800 764 766
District Councils	
Kaikoura	03 319 5026
Hurunui	03 314 8816
Waimakariri	03 3118900
Christchurch	03 941 8999
Selwyn	03 347 2800
Ashburton	03 307 7700
Waimate	03 689 8079
Timaru	03 687 7200
MacKenzie	03 685 0910
Waitaki	03 433 0300
Medical Officer of Health for Canterbury	
Christchurch and Timaru	03 364 1777
Rūnanga	
Kaikoura	03 3196523
Tuarhuriri	03 3135543
Taumutu	03 3712660
Arowhenua	03 6159646
Waiaho	03 6894726
Moreaki	03 439 4816
Koukourarata	03 365 3281
Onuku	03 381 2082
Wairewa	03 377 1513
Rapaki	03 328 9415
MPI	
MPI	0800 008333 or 04 894 0100
Department of Conservation	
Mahaanui	03 341 9100
Aoraki	03 435 1819
Raukapuka	03 693 1010
Twizel	03 435 0802
Waimakariri	03 313 0820
South Marlborough	03 572 9100
DOC Hotline	0800 362 468

APPENDIX 1 CRC222040 Consent Conditions

APPENDIX 2 CRC222041 Consent Conditions

APPENDIX 3 CRC222043 Consent Conditions

APPENDIX 4: Record Keeping Requirements

APPENDIX 5: SCION spray drift buffer schematic

This decision tree is not intended to set absolute boundaries, given the number of variables that can influence drift extent. They do however, add direction and information, and relative scale of risk, that can be incorporated into site specific mitigation planning.

