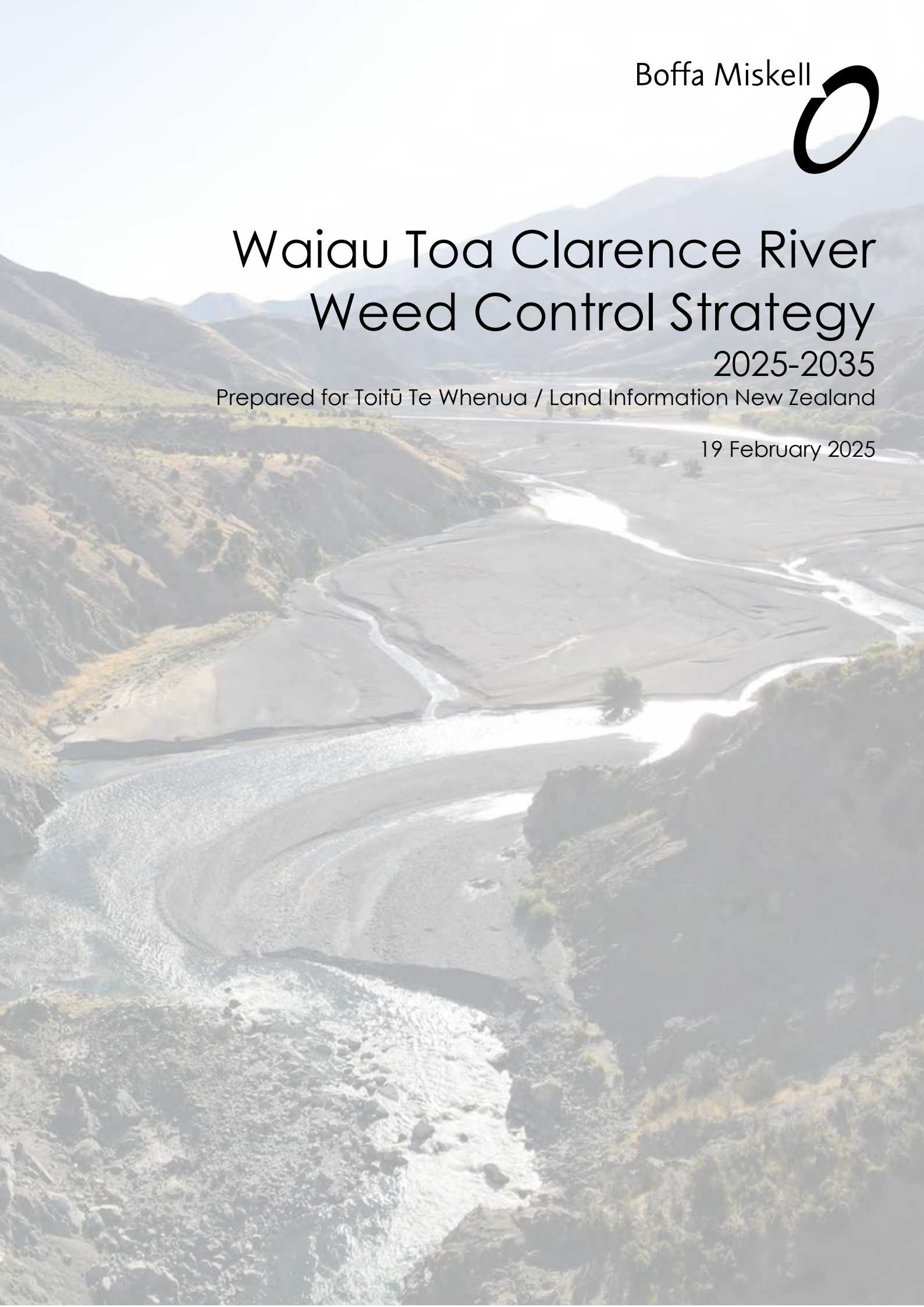
Boffa Miskell

Waiau Toa Clarence River Weed Control Strategy

2025-2035

Prepared for Toitū Te Whenua / Land Information New Zealand

19 February 2025



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Executive Summary

The Waiau Toa Clarence River Weed Control Strategy 2024 – 2034 (henceforth, 'the Strategy') outlines a comprehensive approach to managing invasive weed species within the Clarence River catchment, following a review of the 2019 Clarence / Waiau Toa Catchment Riverbed Weed Control Strategy (henceforth, '2019 Strategy'). It builds upon insights from the 2019 Strategy and provides updated objectives, timelines, and priorities to protect the river's ecosystem and biodiversity.

The Waiau Toa / Clarence River is one of New Zealand's naturally intact braided rivers, originating in the St James Range and flowing out to the coast north of Kaikōura. This 209-kilometre river supports a unique ecosystem, home to indigenous species, such as tarapirohe / black-fronted tern, pohowera / banded dotterel, and tōrea / South Island pied oystercatcher, as well as rare native plants adapted to the shifting river channels. Invasive plant species - including gorse, broom, tree lupin, and willow - pose a major threat to the river's ecological health, reducing available habitat, disrupting native plant growth, and altering sediment transport.

As part of this Strategy, a thorough survey of the riverbed was undertaken by raft, helicopter and by foot from October 2023 – April 2024. Results from the survey and subsequent mapping of weed species distribution and densities are accessible via the Boffa Miskell ArcGIS online Waiau Toa / Clarence River Map. Several of the weed records captured during the survey and now included in the map have already been shared with contractors for control in the 2024/25 season.

The priorities outlined in this Strategy, along with the field surveys conducted to develop it, are focused on managing ecological weeds that impact rivers, wetlands, and adjacent indigenous habitats, including river terraces and potential weed spread corridors such as roads and river access points. This Strategy specifically excludes wilding conifers and pasture weeds, as these are generally managed separately, or left unmanaged due to the minimal threat associated with the river itself.

1.0 Introduction

The Waiau Toa Clarence River Weed Control Strategy 2025 – 2035 (henceforth, the **Strategy**) provides a review of the 2019 'Clarence / Waiau Toa Catchment Riverbed Weed Control Strategy' (Harding, 2019; henceforth, **2019 Strategy**) and describes weed control works throughout the catchment since the 2019 Strategy's adoption. Following the review, this Strategy sets new objectives and priorities with approximate timeframes for planning weed management across the catchment.

1.2 Overview and Context

The Waiau Toa / Clarence River is a distinctive and largely intact braided river system that originates in the St James Range, above Lake Tennyson, and flows to its hāpua / river mouth on the coast, 30 kilometres north of Kaikōura. Winding through a dramatic mountainous landscape between the Inland and Seaward Kaikōura Ranges, the river spans 209 kilometres,

making it the seventh-longest river in Aotearoa New Zealand. The Waiau Toa / Clarence River supports a vital ecosystem that is home to several of New Zealand's threatened indigenous flora and fauna species and serves as an outstanding example of a globally rare, braided river system.

The river's dynamic, interweaving, channels, which travel across gravel beds, create a variety of habitats that support New Zealand's indigenous native flora and fauna. Braided river bird species, such as tarapirohe / black fronted tern (*Chliodonias albostriatus*), pohowera / banded dotterel (*Anarhynchus bicinctus*), tōrea / South Island pied oystercatcher (*Haematopus finschi*), depend on the open gravel areas for feeding and nesting. The riverbed also supports unique indigenous plant communities specially adapted to the dynamic process of the braided river ecosystem, including cushion plants and rare herbaceous species that grow on the gravel islands and terraces and rely on the ongoing exposure of fresh gravel.

The ecological health and unique structure of the Waiau Toa / Clarence River are increasingly under threat from invasive plant species. Invasive species like gorse (*Ulex europaeus*), broom (*Cytisus scoparius*), tree lupin (*Lupinus arboreus*), and various willow species (*Salix sp*.) to name a few, have spread throughout the river, forming dense infestations that outcompete native vegetation, disrupt natural water flow, and limit the dynamic channel movement essential to the health of braided river systems. These invasive plants cover the open gravel areas, reducing available habitat for threatened braided river bird species and alter sediment transport, which impacts the entire river ecosystem.

1.3 Key Stakeholders

In the context of the Waiau Toa / Clarence River Catchment, the following groups are considered key stakeholders:

- **Manawhenua** – The iwi and hapū connected to the Waiau Toa / Clarence River area include Ngāi Tahu and Ngāti Kurī. Ngāti Kurī, represented by Te Rūnanga o Kaikoura, hold manawhenua over the Waiau Toa / Clarence River as tangata whenua of the region. Te Rūnanga o Kaikōura is one of the eighteen rūnanga that make up Te Rūnanga o Ngāi Tahu.
- **Environment Canterbury (ECan)** – ECan sets the direction and rules regarding pest species in Canterbury. This is communicated via the Canterbury Regional Council Regional Pest Management Plan (**CRPMP**). Under Part 2 of the Biosecurity Act 1993, ECan is mandated to provide regional leadership in activities that prevent, reduce, or eliminate the effects of harmful species present in the Canterbury region. ECan are currently the co-project managers of the weed and predator control programme run on the Waiau Toa / Clarence River.
- **Marlborough District Council (MDC)** – MDC sets the direction and rules regarding biodiversity and pest management in Marlborough and is outlined within the Marlborough Regional Pest Management Plan (**MRPMP**). Approximately 70 kilometres of the Waiau Toa / Clarence River is located in the Marlborough Region, as well as major tributaries such as the Acheron River and the Dillion River.
- **Toitū Te Whenua | Land Information New Zealand (LINZ) –** The majority of the Waiau Toa / Clarence Riverbed is Crown Land administered by LINZ under the Land Act 1948. LINZ works collaboratively with ECan, MDC, DOC and landholders to undertake weed and predator control operations across the catchment.

- **Te Papa Atawhai | Department of Conservation (DOC) –** DOC plays a crucial role in the Waiau Toa / Clarence River management through weed, predator and ungulate control initiatives aimed at preserving native species and habitats on Public Conservation Land (**PCL**). DOC North Canterbury (Rangiora) cover the catchment above Lake Tennyson and true right of the Clarence from Tennyson to Winterburn Stream, including all of the St James. DOC South Marlborough (Renwick) cover the true left of the Clarence from Tennyson to Winterburn Stream then the catchment below this point. All of Molesworth is managed by DOC South Marlborough. DOC currently manage the Upper Clarence River predator control programme.
- **Landholders -** These include private freehold properties as well as large pastoral lease holders. Most properties contribute to weed control and efforts to protect biodiversity.

1.4 Management History

ECan is responsible for the management of the Canterbury region's water and are guided by the Canterbury Water Management Strategy (**CWMS**). The CWMS provides a collaborative and sustainable framework for the protection of this precious resource, with a key focus on braided rivers and preserving their natural character. The CWMS has specific outcomes associated with braided river health[1]. By 2040 the CWMS aims to achieve the following goals in relation to braided rivers generally:

- *Canterbury's braided rivers show the dynamic, braided nature typical of such rivers;*
- *All indigenous braided river-dependent species are showing positive trends in abundance and health; and*
- *Increased habitat area usable by all species of braided river indigenous birds.*

The CWMS outlines a cooperative way of working, where 'Water Zone Committees' were set up over the region to provide a localised approach to managing water assets within that zone. Following the establishment of the Kaikōura Water Zone Committee (henceforth, **Zone Committee**) the Waiau Toa / Clarence River Biodiversity Action Plan 2016-2021 (henceforth, **Action Plan**) was developed to initially help guide the committee, stakeholders, and landholders on weed management options for the catchment (Environment Canterbury, 2017). The Action Plan aimed to provide:

'An integrated approach to weed management, to protect the braided river habitat and biodiversity values on the Clarence / Waiau Toa'.

Initially, the Zone Committee injected $260,000 of ECan funding over five years into the programme, with $148,000 coming from the "Immediate Steps" fund. The project's primary focus was to create a collaborative weed control programme that enabled control operations to be undertaken regardless of land tenure, and protection of indigenous biodiversity within the catchment was the priority. As part of this funding, a weed control strategy was recommended by the Zone Committee, and the 2019 Strategy was consequently developed. The 2019 Strategy presented recommendations to ensure a strategic approach was applied to the management of weeds that threaten the function of the braided river system across four operational areas, and it provided a comprehensive dataset of braided river weeds including species, location, and density.

[1] Canterbury Water Management Strategy, https://www.ecan.govt.nz/your-region/plans-strategies-and-bylaws/canterbury-water-management-strategy/

The 2019 Strategy created an opportunity for further collaboration with other agencies and groups as well as an opportunity for an increase in funding due to the tangible objectives and priorities outlined for the catchment. LINZ had been controlling weeds along the Waiau Toa / Clarence River to meet the requirements of the CRPMP in previous years, at approximately $30,000 per year. Following the 2019 Strategy development and the Jobs for Nature funding boost, LINZ increased their commitment to weed control within the catchment (Table 1). ECan were able to gain extra funding (on top of initial Zone Committee Immediate Steps funding) and DOC, and MDC also increased contributions to the programme (Table 1). Funding between ECan and LINZ is currently pooled for management, providing efficiency in the delivery of the weed control programme throughout all four operational areas of the catchment.

*Table 1: Total programme spend on weed control in Waiau Toa Clarence River over past four seasons. *planned spend.*

	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25*
Programme Total (contributions from ECan, DOC, MDC and LINZ)	$78,965	$341,496	$132,428	$199,046	$240,660	$242,500

1.4.1 Clarence / Waiau Toa Catchment Riverbed Weed Control Strategy (Harding, 2019)

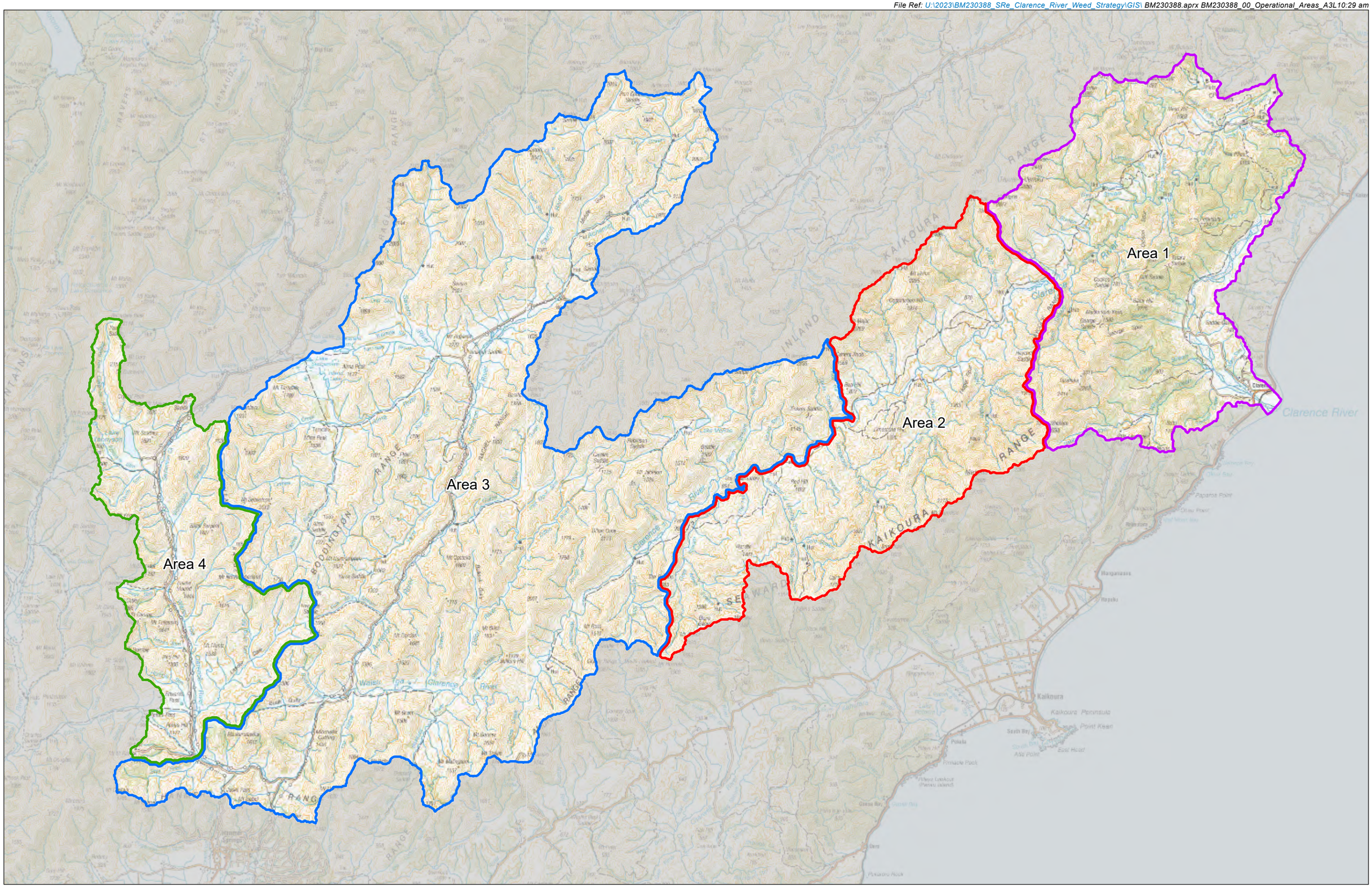
The 2019 Strategy presented the results of a Waiau Toa / Clarence River Catchment riverbed weed survey, provided priorities to be achieved over the life of the Strategy, and identified types of sensitive indigenous vegetation and habitat that should be protected from disturbance. The Strategy emphasised that control of identified weed species should occur in the upper tributaries of the river system rather than focusing on the downstream infestations – what is referred to as a 'top-down' approach. To date, the 2019 Strategy has been integral to weed control operations in the Waiau Toa / Clarence River, the preservation of the braided river habitat, and a crucial component in securing funding to advance weed control efforts. Progress against the priorities in the 2019 Strategy is closely monitored by LINZ, ECan and DOC project managers and is discussed with stakeholders at annual consultation meetings. Priority specific actions are incorporated into the annual operational plans, allowing for a systematic and coordinated approach.

1.5 Operational Area Descriptions

The total area covered by the Waiau Toa Clarence River Catchment (also referred to throughout as the **Management Area**) is c.330,453 ha. For the ease of defining objectives and priorities, this Strategy adopts the four operational areas defined in the 2016-2021 action plan and in the 2019 Strategy (Figure 1). These areas were established based on weed densities, land tenures, and accessibility (Environment Canterbury, 2017). Since 2016, there have been minor refinements, and the current **Operational Areas** are (downstream to upstream):

- Area 1: Dart Stream to the sea (60,694 ha)
- Area 2: Tytler Point to the Dart Stream (55,889 ha)
- Area 3: St James Homestead to Tytler Point (178,077 ha)
- Area 4: Lake Tennyson to St James Homestead (35,793 ha)

Figure 1: Waiau Toa / Clarence River Operational Areas for weed management.



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Data Sources: Topo map sourced from LINZ topo 250 map series

Projection: NZGD 2000 New Zealand Transverse Mercator

LEGEND

- Area 1
- Area 2
- Area 3
- Area 4

WAIAU TOA / CLARENCE RIVER CATCHMENT

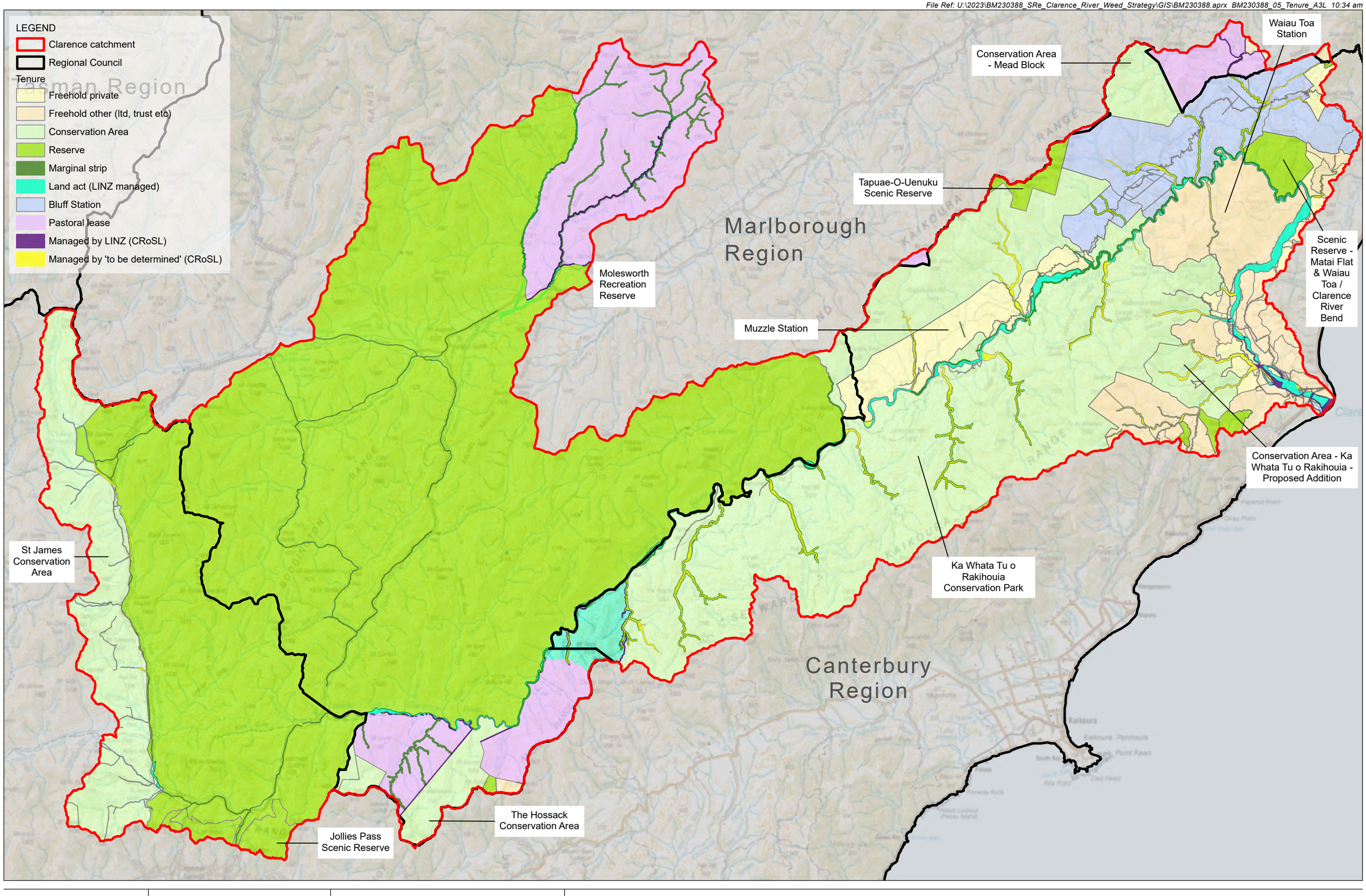
2024 Weed Strategy Operational Areas

Date: 14 August 2025 | Revision: 0

Plan prepared for Land Information New Zealand by Boffa Miskell Limited

Project Manager: Beth.Williamson@boffamiskell.co.nz | Drawn: LJa | Checked: BWi

Figure 2: Land tenure across the Waiau Toa / Clarence River Management Area



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Data Sources: Eagle Technology, Land Information New Zealand

Projection: NZGD 2000 New Zealand Transverse Mercator

WAIAU TOA CLARENCE RIVER OPERATIONAL PLAN

Waiau Toa / Clarence Catchment Tenure

Date: 14 August 2025 | Revision: 0

Plan prepared for Land Information New Zealand by Boffa Miskell Limited

Project Manager: Beth.Williamson@boffamiskell.co.nz | Drawn: LJa | Checked: BWi

1.6 Land Tenure

The Waiau Toa / Clarence River Management Area spans several large sub-catchments and many different land tenures (Table 2 and Figure 2). PCL, managed by DOC, is the largest land tenure type contained within the Management Area, followed by Crown Pastoral Lease, freehold land and LINZ-managed hydro parcels (riverbeds and lakes).

Table 2: Waiau Toa Clarence River management areas land tenure summary. Figures are approximate.

	Total area: 330,453 ha	
Land Tenure	**Hectares in Management Area**	**Percentage of total Management Area****
Public Conservation Land (PCL)	***255,613***	***77.35%***
Conservation Areas	91,190	27.6%
Other (Scenic Reserves, Molesworth Recreation Reserve etc)	163,190	49.38%
Marginal strips	1,233	0.37%
Crown Pastoral Lease	***29,688***	***8.98%***
Muller Station	15,965	4.83%
Hossack Station	4,197	1.27%
Cloudy Range Station	6,450	1.95%
Awapiri Station	2,766	0.84%
Middlehurst Station	230	0.07%
Camden Station	81	0.02%
Land Information New Zealand	***3,767***	***1.14%***
Riverbed*	3,646	1.1%
Other	121	0.04%
State Highway 73 and Road Parcels	1,483	***0.45%***
'To be determined' land status	***1,428***	***0.43%***
All Others (private freehold etc.)	***38,473***	***11.64%***

* Includes riverbed land parcels with a land manager status of 'To Be Determined.'

** Based on approximate Management Area size of 330,453 ha. This and all figures in the above table should be treated as indicative estimates.

1.7 Regulations

Appendix 1 outlines the resource management regulations at local, regional, and national levels relevant to the weed control programme. The Waiau Toa / Clarence River Management Area spans a substantial geographic area, encompassing parts of the Marlborough and Canterbury regions. Consequently, the weed control programme falls under the jurisdiction of two regional authorities: MDC and ECan. Resource management regulations are constantly being altered and updated, at national, regional and local levels. These changes are likely to affect the relevant regulations or matters required to be addressed when undertaking weed management activities. The information in Appendix 1 should therefore be used as a guide only, and any

specific regulatory requirements reassessed at the time weed management work is proposed to be undertaken.

2.0 Waiau Toa | Clarence River Values

2.2 Biophysical

2.2.1 Habitats and Vegetation

This section provides a summary of the habitats, vegetation types, and notable species of the area, with a focus on species occupying the river corridors and adjacent habitat areas[2].

The Waiau Toa / Clarence River flows through five Ecological Regions[3] (Spenser, Molesworth, Clarence, Inland Marlborough, Kaikoura), eight Ecological Districts (Lewis, Balaclava, Miromiro, Dillon, Tapuaenuku, George, Kekerengu, Aniseed) and across particularly large geologic and climatic gradients. Subsequently, the catchment encompasses a myriad of habitats and vegetation types, many of which are restricted in distribution, are at their distributional limits, or are rare within Aotearoa. The catchment is a national hotspot for locally endemic plant species.

Indigenous vegetation in the Waiau Toa / Clarence River catchment was significantly depleted by fires after human arrival (McGlone & Basher, 1995). Forest and scrub were likely replaced by tussockland, flaxland, and scattered shrublands. After European arrival, vegetation was depleted further by additional and more extensive burning, as well as grazing, with the area increasingly occupied by grassland, scabweed cushionfield and bare ground (Courtney & Arand, 1994). Mānuka clearance and willow planting were carried out along the river itself.

The wetlands within Area 4, particularly around Lake Tennyson and Sedgemere, are of national significance due to their hydrology and the vegetation communities they support, including numerous Threatened and At Risk species. They are some of the northern-most wetlands of their type in Aotearoa.

Much of the riverside vegetation in modified areas is depleted fescue tussock grassland with a high component of exotic species. Some areas are entirely dominated by exotic woody species such as broom. Some tributaries retain stands of tawhairauriki / mountain beech with tōtara[4]. Upper Deep Creek and the creek below Mt Malingson have remnants of broadleaved trees and shrubs. Shrublands, where dominated by indigenous species, have high indigenous diversity and support unusual species such as *Pittosporum anomalum,* and areas of flax-shrub-tussockland persist on some north-facing slopes. The Hossack River and other downstream tributaries have populations of the At Risk – Declining *Coprosma intertexta.*

[2] Information in this section is based on key sources including Conservation Resources Reports produced by DOC as part of tenure review processes (DOC 1997, 2003) and numerous Botany Division DSIR Reports from the Manaaki Whenua online library (Johnson, 1984; Park, 1976; Park & Walls, 1978; Williams, 1977, 1980, 1984, 1987). References to species threat statuses are based on their most recent NZTCS classification.

[3] Ecological Districts (ED's) are defined by unique and notable topographic, geological, climatic, soil, vegetative and human-induced modifications which result in a distinctive area. Closely related ED's are grouped into Ecological Regions (ER's) or a single very distinctive ED may also be an ER.

[4] Where ambiguous common plant names have been used without further detail (i.e. species name) the source of information did not specify the species and there are multiple possibilities for what the resource may have meant.

The middle Waiau Toa / Clarence River valley flows through variable terrain with river braids alternating with short gorges and is vegetated with low stature plants as a result of significant disturbance. Shrublands, snow tussock and silver tussock tussocklands, scabweed loamfields, wetlands, and pasture, are the most common vegetation types. Most of these vegetation types are dominated by exotic species such as briar rose (*Rosa rubiginosa*). Remnants of beech forest and tōtara remain in inaccessible areas and small tributaries.

Figure 3: Lake Sedgemere with dense raupō and Carex secta*, bordered by extensive grassland and wetland.*

Despite the obvious modifications, some of these areas still support populations of extremely rare and unusual plants. North facing dry slopes have high densities of the At Risk – Declining Leafless muehlenbeckia (*Muehlenbeckia ephedroides)* and the only remaining wild population of Slender button daisy (*Leptinella filiformis,* Threatened – Nationally Critical) is found along this section of the Waiau Toa / Clarence River. Within the riverbed, numerous populations of the Threatened – Nationally Endangered parahia / pygmy goosefoot (*Dysphania pusilla*) have been found growing in silted old river channels and banks, in areas particularly susceptible to invasion by weed species such as willow. The latter two species were previously thought to be extinct.

Figure 4: Leafless muehlenbeckia growing amongst rocky rubble below bluffs (Photo: Jason Butt, Environment Canterbury)

Figure 5 (left): A large plant of parahia / pygmy goosefoot (Dysphania pusilla) growing in sandy substrate on a riverside bank (Photo: Jason Butt, Environment Canterbury).

Figure 6 (right): Slender button daisy late in the growing season and largely dried up (Photo: Jason Butt, Environment Canterbury).

The middle section of the Waiau Toa / Clarence River includes extensive areas of limestone, and these areas support a number of rare and specialised plants. Some of these tributaries have significant gorges in their upper reaches which support diverse remnant vegetation, often in steep and inaccessible locations. Muzzle Stream has rock glaciers and moraine at its head, with areas of tawhairauriki / black beech forest, diverse tūmatakuru / matagouri shrublands, bristle tussock tussockland and tauhinu / snow tōtara shrublands, these vegetation types are also found in nearby tributaries such as Dee Stream and Branch Stream. The Marlborough endemic Forbes's willowherb (*Epilobium forbesii*) (At Risk – Naturally Uncommon) exists in the

Muzzle Stream valley. There is a large stand of regenerating Hectors Tree Daisy (*Olearia hectorii*) (Threatened – Nationally Endangered) in a tributary of the Ouse.

Extensive unimproved grassland covers areas between Muzzle Stream and Bluff Station, however, where scrub has been burnt and where there is higher soil moisture, exotic species such as browntop, sweet vernal and oxeye daisy dominate. Wetlands are uncommon along this section of the Waiau Toa / Clarence River, the largest wetland area in this section being in the head of Elliott Stream near Lake McRae.

The Waiau Toa / Clarence River becomes a more confined valley system in its lower reaches with steep mountains and riverbanks covered in large tracts of kānuka scrub and occasional forest remnants. The steep rocky riverbanks are sparsely vegetated due to a lack of substrate and high disturbance. Distinctive bluff species such as pink broom (*Carmichaelia glabrescens*) and coral sea shrub (*Helichrysum coralloides*) cling to crevices in these rock faces. In places where river gravels have accumulated in bends and along wider sections of the river valley there are indigenous shrublands and river gravel / silt species such as parahia / pygmy goosefoot.

The lower Waiau Toa / Clarence River has some excellent examples of remnant podocarp vegetation. Mataī Flat is a particularly notable site with an extensive area of mataī forest in an old river meander / alluvial flat. Various unusual species are present at this site, including kawakawa, tītoki, and fine-leaved parsley fern (*Botrychium biforme*). Woodbank, near the Waiau Toa / Clarence River mouth, sits on an alluvial terrace, and has a high number of remnant podocarp species as well as some rare and threatened species despite having been logged, grazed and burnt. Mataī, tītoki, ngaio, tōtara, mānatu / ribbonwood, maire, porokaiwhiri / pigeonwood, rōhutu (*Lophomyrtus obcordata*, Threatened – Nationally Critical), a button daisy / *Leptinella pusilla* (At Risk – Declining) and two species of rātā vine (both Threatened – Nationally Vulnerable) are all present.

2.2.2 Fauna

The Waiau Toa / Clarence River provides a wide variety of habitats for indigenous birds. Open habitats from the riverbed into the alpine, support the New Zealand karearea / falcon *(Falco novaeseelandiae)*, kea (*Nestor notabilis*) and pīhoihoi / pipit (*Anthus novaeseelandiae*), while more vegetated areas provide habitat for common indigenous forest and shrubland species such as titipounamu / rifleman (*Acanthisitta chloris)*, riroriro / grey warbler (*Gerygone igata)*, korimako / bellbird (*Anthornis melanura*), kakaruai / robin (*Petroica autralis),* pīpipi / brown creeper *(Mohoua novaseelandiae),* miromiro / tomtit *(Petroica macrocephala),* and pīwakawaka / fantail (*Rhipidura fuliginosa)*.

The braided sections of the upper and middle Waiau Toa / Clarence River and tributaries, including the Acheron and Saxton rivers, provide important breeding and foraging habitat for braided river birds such as tarapirohe / black fronted tern, pohowera / banded dotterel, tōrea / South Island pied oystercatcher, poaka / pied stilt, pīhoihoi, and increasingly black-fronted dotterels. Other birds typically found on or near waterbodies are also found along the Waiau Toa / Clarence River and include species such as pārera / grey duck (*Anas superciliosa)*, māpunga / black shag (*Phalacrocorax carbo)*, pūtangitangi / paradise shelduck (*Tadorna variegata)* and spur-winged plover (*Vanellus miles)*. Tarāpuka / black billed gulls (*Chroicocephalus bulleri)*, tarapirohe, tara / white-fronted terns (*Sterna striata)*, pohowera, tarāpunga / red billed gull (*Chroicocephalus novaehollandiae)* and pīhoihoi all nest at the river mouth.

More than ten lizard species have been found within the Waiau Toa / Clarence River Catchment. All these species are classified as nationally Threatened or At Risk except the Raukawa gecko (*Woodworthia maculata)* which is classified as Not Threatened. Indigenous lizards are found across a wide range of environments within the Waiau Toa / Clarence River catchment, ranging from sea level to well above 2000 m a.s.l. Most species are found in rocky habitats, extending from the riverbed to alpine screes and outcrops. River terraces provide important habitat for four of these species, Marlborough scree skink (*Oligosoma* aff. *waimatense* 'Marlborough', Threatened – Nationally Endangered), long toed skink (*Oligosoma longipes,* Threatened – Nationally Vulnerable), greywacke gecko (*Woodworthia* 'Southern Alps Northern', At Risk – Declining), and pygmy gecko (*Woodworthia* 'Pygmy', At Risk – Declining) although other species likely use these areas to bask and forage (see Figure 6).

Grassland habitats within the catchment are most likely to support Marlborough spotted skink (*Oligosoma elium,* Threatened – Nationally Endangered), South Marlborough grass skink, and Waiharakeke grass skink (*Oligosoma* aff*. polychroma*, Clade 3 and 2 respectively, both At Risk - Declining), with rough gecko (*Naultinus rudis,* Threatened – Nationally Endangered) found in shrubland and forest habitats, particularly scrubby regenerating areas.

Figure 7: Two lizards likely to be South Marlborough grass skinks, basking in the active riverbed of Limestone Stream (left) and foraging on a river terrace in Gore Stream (right).

Lizard species more restricted to rocky habitats include the At Risk – Declining Waitaha gecko (*Woodworthia cf. brunnea*), Minimac gecko (*Woodworthia '*Marlborough Mini'), and Kaikōura gecko (*Woodworthia* 'Kaikōura'*)*. Higher alpine rocky areas provide habitat for the black-eyed gecko (*Mokopirirakau kahutarae,* Threatened – Nationally Vulnerable).

Although there is little information on terrestrial invertebrates within the Waiau Toa / Clarence River catchment, there are numerous records and observations of interesting groups and species. This includes three species of giant weta, two speargrass weevils, and 11 species of butterfly, including kahu kura / red admiral, yellow admiral, blues, coppers, pepe pouri / black mountain ringlet and tussock butterflies. It is likely that many undescribed species of invertebrate are present.

Figure 8: A likely undescribed species of Boulder Copper (Lycaena sp.) on a stable riverbed terrace (left) and a blue butterfly (Zizina sp.) in the active riverbed (right), both in the Lower Waiau Toa / Clarence River gorge.

The Waiau Toa / Clarence River supports a diverse range of freshwater fish, both in the main stem and in the many tributaries which feed into it. Northern flathead galaxias (*Galaxias* "northern", Threatened – Nationally Vulnerable) are found above the gorge, along with numerous At Risk species including Canterbury galaxias (*Galaxias vulgaris)*, Torrentfish (*Cheimarrichthys fosteri)*, longfin eel (*Anguilla dieffenbachia)*, alpine galaxias (*Galaxias paucispondylus)*, kōaro (*Galaxias brevipinnis)*, and dwarf galaxias (*Galaxias* aff. *divergens* "northern"). Further into the headwaters of the Waiau Toa / Clarence River is the only location for the At Risk – Naturally Uncommon Tarndale bully (*Gobiomorphus alpinus)*, which is only found in a small number of subalpine tarns. The lower Waiau Toa / Clarence River also has many species of freshwater fish, most notably shortjaw kokōpu (*Galaxias postvectis,* Threatened – Nationally Vulnerable). All the above species are also present in the lower reaches, along with the nationally At Risk - Declining bluegill bully (*Gobiomorphus hubbsi)*.

The Waiau Toa / Clarence River was subjected to a widespread rabbit plague in the early 1900s. This had significant impacts on vegetation and farming practices, and while rabbits are still common, their numbers are no longer as high. Wild pigs, deer, hares, possums, chamois, mustelids, and goats are present, the latter extending into remote, inaccessible and ecologically important locations such as the limestone gorges found in Branch Stream and Mead Stream. Ducks, Canada geese, chukor, and Californian quail are recreationally hunted.

Brown trout and salmon are present in the Waiau Toa / Clarence River. Brown trout numbers are low, but specimens are typically very large, and fly fishing is popular, although much of the river is inaccessible for fishing.

2.3 Visual Landscape

The Waiau Toa / Clarence River valley, part of the Inland Kaikōura Ranges and Spenser Mountains, is a remote, wild landscape featuring unmodified mountain ridges, extensive scree

slopes, and dynamic braided river systems that constantly shift with river flows and storms. Snow, especially on Tāpuae-O-Uenuku, highlights the valley's rugged beauty in winter. Largely inaccessible due to its mountainous context, the valley offers a heightened sense of remoteness, with higher elevations providing views of the Kaikōura coastline and the Southern Alps. The river delta, near the highway and accessible by 4WD, is open and windswept, showcasing the coastline and landmarks like Patutu and Jacobs Ladder.

2.3.1 Geology and Geomorphology

Surrounded by steep sandstone mountain ranges, including the Spenser Mountains and the Inland and Seaward Kaikōura Ranges, the Waiau Toa / Clarence River is shaped by the Marlborough Fault system, which includes active faults such as the Hope, Clarence, Fowlers, and Awatere faults. These faults are recognized as geopreservation sites. The river delta, formed from greywacke gravels and boulders, is a classic cuspate delta and a regionally significant geopreservation site. Key landscape features in the area include the impressive limestone scarps of the Chalk Range, Tapuae-o-Uenuku (which has significance to mana whenua and one of many landscape features within Te Waipounamu associated with the Ārai-te-uru waka), the Waiau Toa / Clarence River gorge, Horrible Stream wetland, Tarndale Lakes, and Lake Tennyson, which is notable for being dammed by glacial moraine and also holds regional geopreservation significance.

2.4 Landscape Associations

2.4.1 Mana whenua

The iwi and hapū associated with the Waiau Toa / Clarence River area include Ngāi Tahu, Ngāti Kurī (Te Rūnanga o Kaikōura) and Rangitāne o Wairau. The Waiau Toa / Clarence River is of immense cultural significance to mana whenua. The river is considered the male counterpart to the female Waiau-Uwha river which extends from the upper extent of the Spenser Mountains to the river mouth north-east of Cheviot. Prior to European settlement, the Waiau Toa / Clarence River valley was one of the most populated areas of Te Waipounamu due to the abundance of food and resources present. This included birds such as kererū, weka, kākā, kiwi, tui, pāteke, parera, and pūtakitaki and, plants such as harakeke, raupō, taramea, pingao and tīkumu. The upper extent of the river also formed part of a traditional travel route between Hanmer Springs, Lake Tennyson, and the broader network within the Kā Tiritiri o te Moana / Southern Alps.

An additional feature of significance to mana whenua within the Waiau Toa / Clarence River area is Tāpuae-o-Uenuku. Tāpuae-o-Uenuku was a passenger on the Ārai-te-uru waka, famous for bringing kumara to Aotearoa. Upon the arrival of the waka, Tapuae-o-Uenuku explored the lands of Te Waipounamu near the Waiau Toa / Clarence River but failed to return to the waka by daylight. Consequently, they were turned into a mountain which remains one of the tallest mountain ranges in the Ka Whata Tu a Rakihouia / Clarence area.

The rohe of Ngāti Kurī stretches from Te Parinui o Whiti (White Bluffs) in the north to the Hurunui River in the south, and inland to the Main Divide. The Waiau Toa is a significant awa within their takiwā, symbolising the connection between the mountains and the sea. Their rohe centres around Kaikōura, including Takahanga Marae, and reflects a strong relationship with Te Tai o Marokura (Kaikōura coast) and the surrounding landscape. The rohe of Rangitāne o Wairau extends from the Waiau Toa in the south, through the Wairau Valley and Nelson Lakes,

north to Kaituna and the Marlborough Sounds, and west into Whakatū (Nelson). This area reflects their deep ancestral ties to both inland and coastal environments.

2.4.2 Pastoral history

Upon arrival of European settlers, the Waiau Toa / Clarence River valley became popular for pastoral farming. By 1857 sheep farmers had moved up the Clarence Valley and established farms (Department of Conservation, 2021a). Wool growing was prominent inland as the most fertile land for dairy, sheep and beef was closer to the coast (McAloon et al., 1998). There are still some remaining historic buildings associated with the historic land use including the Quail Flat Homestead and Black Spur Slab Hut.

2.4.3 Recreation

The Upper Clarence Valley is a part of the Ka Whata Tu o Rakihouia Conservation Park, the Molesworth Recreation Reserve, and the St James Conservation Area. Within these areas there are opportunities for tramping, mountain biking, rafting, kayaking, horse trekking, hunting, fishing, and four-wheel driving.

3.0 2019 Strategy Review

3.2 Purpose

Using priorities set in the 2019 Strategy, collaboration between LINZ, ECan, DOC, MDC, manawhenua, landholders, and the community has seen effective control of weeds within the catchment over the past five seasons. The 2019 Strategy is about to enter its sixth season of implementation. This project aims to complete a five-yearly review of control works within the Waiau Toa / Clarence River to investigate progress on priorities set in the 2019 Strategy, adjust priorities based on results, and outline any new incursions into the project area.

The following information summarises the purpose of the review:

- To assess progress towards the priorities of the 2019 Strategy.
- To survey and map the weed species that threaten biodiversity values within the Waiau Toa / Clarence River catchment, focusing on:
    - Weeds that are present on, or that may threaten, braided river habitats; and
- Weeds located away from riverbed or riverbed terraces but that have the potential to detrimentally impact landscape / biodiversity values generally
- To provide updated prioritised management actions for mid-term goals (up to 5 years) and longer-term goals (10 years) for biodiversity weeds in the catchment.
- To provide an overall updated ‘Waiau Toa / Clarence River Weed Control Strategy’ report that encapsulates the above and includes maps of weeds and their abundance recorded during the survey. The timeframe for this Strategy will be ten years.

This Strategy does not cover aquatic (lake) weeds. Further, it does not cover management of wilding conifer species as the control of these weeds is (at present) covered separately within the National Wilding Conifer Control Programme[5]. If wilding conifer management is returned to local land occupiers within the life of this Strategy, revision of this Strategy's objectives and priorities would be necessary. This is because the effective control of wilding conifers would be a higher priority than control of many weeds in this Strategy, in some areas.

[5] National Wilding Conifer Control Programme, https://www.wildingconifers.org.nz/national-programme/

3.3 2019 Priorities Review

A review of the 2019 Strategy was completed using previous data collected by contractors undertaking control, observations and data from landowners, and survey results from the 2024 survey. Table 3 outlines progress against the 2019 strategy priorities.

Table 3: Priorities to be achieved over the life of the Strategy as identified in the 2019 Strategy and progress towards achieving them.

	2019 Strategy Priorities	Operational Area	Weed Control Progress 2019 - 2024
Priorities for eradication			
1	Russell lupin at and adjacent to the upper Acheron trial planting site. (Area 3).	Area 3	Currently at three known sites on Muller Station, along the Acheron River:(1) at trial planting site on hillside between Acheron and Saxton River; (2) near Carters Yard; and (3) at trial planting site on hillside downstream of Junction Hut. Infestations well contained at all three sites. The first two sites have been controlled 1-2 times per annum since 2019. The third site was only brought to the attention of DOC in 2024 and has been controlled once.
2	False tamarisk from all parts of the catchment.	All areas	False tamarisk has been contained to Area 1 and 2, until 2023/24 when a small patch was found in Area 4, 1km downstream of the Timms Stream, and a small patch was found on Jacks Pass. Other observations in 2023/24 included: a single plant in Dee Stream, a historic infestation on the TL of the main steam near Silver Spring, two patches on the TR opposite and upstream of Silver Spring, scattered plants below the SH1 bridge, several plants at the hāpua on the large island, and an infestation just above the Wharekiri ford. Ongoing control by DOC has been occurring on an infestation at the confluence of the Waiau Toa / Clarence River and the Limestone Stream. There have also been previous observations at Horse Flat, lower Seymour stream and George Stream. Grazing pressure on the two TR patches appears to be limiting their spread.
3	Tree lupin from all sites above Clarence Bend.	Area 2,3,4	The most upstream infestation is in the lower Seymour Stream and has had multiple years of control. It also appears to be increasing between the gorge and Quail Flat. DOC, LINZ, and ECan have all contributed to containing the range of tree lupin.
4	Buddleia from all sites above Clarence Bend.	Area 1	Buddleia is contained to Area 1. Isolated patches were observed and controlled in the Branch Stream, Dee Stream, Mead Stream, and in the main riverbed, just upstream from Matai Flat. Buddleia is frequent below the Clarence Bend. Historically, buddleia has been observed in the Jam Stream (DOC), but it was not assessed the 2024 survey.

5	Alder, at Fowlers Hut and downriver to St James Homestead.	Area 3,4	The main infestation at Fowlers Hut was initially controlled in 2019 by DOC. Follow-up control was completed in 2022/23 and had a secondary follow-up treatment in 2023/24. Isolated plants were found and controlled between Fowlers Hut and Jollies Pass during the survey.
6	Poplar at Saxton River road-bridge.	Area 3	The main patch of poplar at this site appears to mitigate damage from floods, however the isolated poplar that are spreading are not yet controlled.
7	Broom and gorse from Clarence River catchment above St James Homestead.	Area 4	In 2023/24 isolated broom plants and small patches were found upstream of St James Homestead, including several plants at the Lake Tennyson campsite. Gorse is less frequent in this section; however, plants were found, including one plant under a pylon at the bottom of Island Saddle. Broom is increasing in the hills upstream of the St James, especially on the TR.
8	Broom and gorse from Acheron River catchment.	Area 3	Broom and gorse are in low numbers in the Acheron River catchment. Molesworth Station controls historic broom patches annually in McGuires Stream (infestation is along riverbed), Five Mile Stream (from the saddle downstream), Zig Zag Stream, Half Moon Stream, and Camp Stream (low numbers). Broom was observed in 2023/24 on the edge of the road 1km downstream of the Severn River Bridge. The 2023/24 survey did not survey the entire Acheron catchment for broom and gorse.
9	All willow species from Acheron River catchment, above Severn confluence.	Area 3	DOC, MDC and ECan have collaboratively controlled this section of riverbed in 2022/23 and follow up was completed in 2023/24. Follow up is planned in 2024/25.
10	All willow species from upper Clarence River catchment, above St James Homestead.	Area 4	ECan worked closely with Transpower in 2023/24 to control the large stand of willows in the upper catchment, between Fowlers Hut and Seymour Stream. Mature willows were also controlled down to St James Homestead including the infestation along Peter's Stream and wetlands. Young seedlings were found at the confluence of the Seymour Stream and in the main riverbed down to the St James Homestead.
11	Columbine from one site at Lake Tennyson.	Area 4	This was completed in 2019. A follow up inspection was undertaken in 2023/24 and no columbine was observed.
12	Spanish heath from lower Timms Stream.	Area 4	ECan has completed one year of control in the 2024/25 season on the outliers of the Spanish Heath in the Timms Stream. A considerable amount of future work is required. LINZ, ECan, and DOC Rangiora have had discussions about the best approach forward.
13	All willow species from remaining parts of Acheron River catchment.	Area 3	The collaborative efforts of DOC, MDC, and ECan have pushed to the Severn confluence as of 2024, and have controlled the open riverbed of the Alma. Further willow control is required in the upper tributaries.
14	Spearmint, from Alma River, Leader Dale, and Bunkers Stream/Bush Gully.	Area 3	Contractors have controlled spearmint where they have observed it, but it is not deemed a priority moving forward.

Priorities for Containment			
15	Broom, gorse and willow at important areas of open riverbed (including a riparian buffer), to protect breeding habitat of black-fronted tern.	Area 3, 4	Control activities to specifically clear river gravels of broom, gorse, and willow have occurred at selected areas in Area 3 and Area 1 around bird nesting islands. Exact locations are recommended by DOC or predator control contractors, based on river bird activities.
16	Spanish heath along Clarence River between Leader Dale and Styx River (east of Tophouse Road).	Area 4	ECan has completed two years of control on the scattered infestation of Spanish heath in this area. A considerable amount of future work is required. LINZ, ECan and DOC Rangiora have had discussions about the best approach forward.
17	Broom and gorse north of road, between St James Homestead and Acheron River.	Area 3	LINZ, ECan and Molesworth Station have worked collaboratively to contain broom to this area. More work is required.
18	Alder at Quail Flat.	Area 2	Further surveillance required.
19	Maintain wild animal populations at low densities.	All areas	DOC and station managers undertake wild animal management across the Management area. More work is required to maintain wild animal populations at low levels.
Priorities for Surveillance and monitoring			
20	Monitor all broom, gorse, Russell lupin and tree lupin control sites annually.	All areas	Accessible broom, gorse and tree lupin infestations are monitored annually by project managers, DOC, landholders and contractors on an ad hoc basis. DOC has monitored and controlled the Russell lupin site annually. Rafting trips to survey and control inaccessible areas in Area 1 and 2, have been undertaken for the last three years. More formal surveillance will be beneficial to the progress of this priority.
21	Monitor all other control sites regularly.	All areas	Accessible broom, gorse and tree lupin infestations are monitored annually by project managers, DOC, landholders and contractors on an ad hoc basis. DOC has monitored and controlled the Russell lupin site annually. Rafting trips to survey and control inaccessible areas in Area 1 and 2, have been undertaken for the last three years. More formal surveillance will be beneficial to the progress of this priority.
22	Monitor the spread and vigour of birdsfoot trefoil along Acheron River.	Area 3	Birdsfoot trefoil is no longer a priority species for monitoring in the current weed management plan due to its relatively low impact on native biodiversity in this area and the greater threat posed by other invasive species, which require more immediate control effort.

23	Monitor the spread of stonecrop and white stonecrop.	Area 1	Stonecrop is unfortunately no longer a priority for monitoring in the Management Area, as the potential by-kill of controlling this species outweighs the potential benefits.
24	Survey weed-free parts of the upper catchment regularly (especially vehicle tracks) to detect new infestations of existing and new weed species.	Area 3,4	Accessible areas are monitored annually by project managers, DOC, landholders and contractors on an ad hoc basis. More formal surveillance will be beneficial to the progress of this programme.
Priorities for Advocacy and Monitoring			
25	Encourage continued cooperation between agencies and land owners/occupiers.	All areas	LINZ and ECan host an annual consultation meeting to discuss the previous season's outcomes, and proposed operations for the upcoming season each year in May. Representatives from ECan, LINZ, DOC, Ngāti Kuri, community groups, Transpower and Hurunui District Council attend. Since 2019, an annual community hui has been held at Matariki Station, where the weed and predator control programme has been discussed. Feedback from the attendees is then incorporated into the programme, where feasible. Further collaboration between DOC, LINZ, ECan, MDC and landholders would add to the success and efficiencies of the control programme.
26	Investigate release of additional bio-control agents for the control of broom and gorse.	All areas	Broom biocontrol agents have been observed to be widespread throughout the catchment. In 2024/25, ECan as release a biocontrol for field horse tail in the lower catchment.
27	Investigate issues associated with eradication of willow from the upper catchment.	Area 4	Significant willow control has occurred in the catchment over the duration of this strategy. Project managers have been working closely with landowners and Transpower to progress with willow control in Area 4 and have had success with the control of isolated willow patches. DOC, MDC and ECan have been leading on the control of willow in Area 3. Further willow control with a collaborative approach is required.
28	Restrict spread of weeds by vehicles by erecting barriers to prevent vehicle access to	All areas	No barriers have been erected; however, educational signs were installed in Area 1 in 2024 to inform recreational users of the biodiversity value at the river mouth and encouraged minimal vehicle access.

	smaller valleys, and by better signage/advocacy.		
29	Liaise with Transpower to ensure weed seeds are not introduced during servicing of electricity pylons, and to ensure effective weed control occurs at pylon sites.	Area 3,4	A Transpower representative attends the annual consultation meeting held by ECan and LINZ where the annual programme is presented along with updates from stakeholders. There is potential to further collaborate with Transpower within the programme.
30	Investigate options for seeding or planting of native vegetation at broom control sites.	All areas	No progress towards this action has been achieved to date. Current funding streams focus on biosecurity and protection of biodiversity.
General Recommendations for Control of Riverbed Weeds			
31	All riverbed weed control should be undertaken by experienced operators who are well briefed on the nature and likely locations of sensitive native species and habitats.	All areas	Contractors who deliver control for LINZ are engaged by Boffa Miskell, which requires contractors to demonstrate that they are fully qualified, certified and capable of delivering control to a high quality, utilising best practice techniques. Boffa Miskell undertakes pre-start meetings and site inductions to ensure sensitive areas are communicated and contractors are using the correct methodologies and are equipped with suitable equipment. All contractors are granted access to ArcGIS Fieldmaps where sensitive areas are on offline maps and can be edited to include new sensitive areas.
32	Small, isolated infestations of all shrubby weed species (broom, gorse, tree lupin, Spanish heath, buddleia, alder) and Russell lupin should be controlled by ground-based methods, or helicopter-based wand spraying provided native species are not affected	All areas	Ground-based control efforts have been ongoing throughout the duration of the strategy, targeting small to medium infestations across priority areas. Helicopter-based control has been utilised in remote and/or inaccessible areas to the ground contractors. Intermittent post-treatment monitoring is undertaken to assess impact on native species. Refinements to application methods are continuously considered to ensure the best results are delivered.
33	Control of large dense infestations of broom or gorse (for riverbed weed control) should only occur	All areas	Helicopter-based control of dense areas of broom and gorse in the riverbed has occurred, with planned follow up treatment. Post-control site rehabilitation is not planned at this stage in the strategy.

	where required for the urgent protection of riverbed habitats, or where post-control site rehabilitation is proposed. Helicopter-based control may be appropriate, provided native species are not affected.		
34	Helicopter-based control of tall weed species such as crack willow and poplar, provided native species are not affected.	All areas	Aerial control of willow species has been undertaken in key sections of the riverbed throughout the duration of the strategy and is the preferred methodology. However, in select areas, ground-based control of small, isolated willows has also occurred and been effective. Quality of the herbicide application can affect efficacy of control. Project managers work closely with contractors to ensure the most effective herbicide is applied.

4.0 2024-2034 Waiau Toa Clarence Strategy

4.2 Survey methodology

Ground, aerial, and raft-based surveys were undertaken within the Waiau Toa / Clarence River management area between September 2023 and April 2024. The type of survey undertaken was determined by access, terrain and known weed densities. Each survey aimed to determine the locations, extent, and density of problem ecological weeds. The upper extent of weed infestations was a focus of the surveys for each tributary as well as reviewing previous control works in relation to the 2019 Strategy priorities.

Due to access, land tenure, and time constraints, some parts of the management area were omitted from the comprehensive survey. They are marked with an * in the list below.

4.2.1 Geographical Coverage

The key corridors that were planned to be surveyed are:

Area 1

- Waiau Toa Clarence River
- Dart Stream*
- Jam Stream*
- Branch Stream
- Bob Stream
- Dee Stream
- Limburn Stream*
- Mead Stream
- Gibson Stream*
- Ouse Stream (including Swale, Nidd and Wharf Streams)*
- Boundary Stream
- McLean Stream*
- George Stream*
- Miller Stream
- Wharekiri Stream*
- Stewart Creek*

Area 2:

- Waiau Toa Clarence River
- Gore Stream
- Seymour Stream
- Tytler Stream
- Limestone Stream
- Bluff River
- Fidget Stream*
- Muzzle Stream*

Area 3:

- Waiau Toa Clarence River
- Styx River
- Bush Gully
- Cat Creek*
- Severn River
- Saxton River

- Acheron River
- Yarra River
- Five Mile Stream
- Guide River
- Half Moon Stream
- Alma River*
- Crimea Creek*
- Tarndale Lakes*
- Dillon River
- Hossack River*
- Palmer Stream
- Gloster River
- Lake McRae

Area 4:

- Waiau Toa Clarence River above and below Lake Tennyson
- Lake Tennyson
- Island Pass Creek
- Nightingale Stream
- Pass Stream
- Timms Stream
- Leader Dale
- Edwards Pass

The areas of focus for the surveys were riverbeds (including large side tributaries) and adjacent habitats (particularly floodplains, terraces, and wetlands), regardless of land tenure. By necessity, this Strategy includes some discussion of weed infestations along road corridors, as these were generally able to be efficiently mapped during the survey and are an essential consideration when planning future management of weeds.

4.2.2 Weed Abundance

Weed species identified in the field were recorded as being present at specific locations or by mapping areas of their apparent extent.

Weed abundance profiles for mapped areas (polygons) are defined as the following[6]:

- Dominant: >50% coverage;
- Abundant: Large patches commonly found, weed forms prominent cover;
- Frequent: Small patches commonly found, or some consistent cover – but other species are much more prominent in terms of cover;
- Scarce: Individual plants or isolated small patches scattered across the area; and
- Very Scarce: Individuals so scarce they can practically be mapped where found.

Areas of a single weed plant (or small cluster of plants) were recorded as specific locations (points). Point data also captured whether or not weeds were controlled during the survey.

[6] This abundance profile is the same as was used for the Upper Waimakariri River (Boffa Miskell, 2022), the Upper Rakaia River (Boffa Miskell, 2023) the Rakitata River (Boffa Miskell , 2024) and the Dart/Rees River (Boffa Miskell, 2024) Strategy surveys.

4.2.3 Field Tools for Data Capture

Data was captured as points (a spot record for individual weeds/notable ecological values) and as polygons (areas of weeds/ecological values whether scattered or dense). Each data collection entry allowed for comments and a photo to be captured alongside. Photo attributed to waypoints or shapes are visible on the online maps only.

Weed and ecological data were collected during the surveys of key corridors (see above). Boffa Miskell, DOC and ECan staff captured weed data using the ArcGIS Field Maps application pre-populated with a standard set of weeds[7] (and a free text 'Other' option). Table 4 below shows weed attribute information collected using ArcGIS Field Maps. Weed species and habitat attributes were refined during the course of this work.

[7] The weed list in Table 4 (and underlying habitat list) has been refined based survey findings; it may not be the most efficient weed list in other river catchments.

Table 4: Refined weed data attributes for collection through ArcGIS Field Maps. Attributes for both polygon and point data are shown.

All GIS Records				***GIS Polygons***	***GIS Points***		
Weed species	**Underlying Habitat**	**Previous Control in Area**	**Comments**	**Abundance**	**Abundance**	**Survey Control**	**Control Method**
Apple	Riverbed (essentially bare gravels)	Yes	(free form)	Dominant	1 plant	Yes	Cut and paste glyphosate
Ash	Riverbed (stable areas with indigenous species)	No		Abundant	2-5 plants	No	Cut and paste glyphosate
Blackberry	Riverbed (other)	Unknown		Frequent	6+ plants		Cut only
Black alder	Riverbank/ stream bank			Scarce	Historic (previously killed)		Hand-pulled
Broom	Wetland			Very Scarce			Prills
Buddleia	Lake / lake edge						Other (free form)
Cotoneaster*	Indigenous shrubland / grassland						
Crack Willow	Indigenous forest						
Elder	Exotic forest						
False Tamarisk	Pasture						
Gorse	Roadside / Settlement						
Grey Willow	Other (free form)						
Old man's beard							
Poplar*							
Prunus sp.+							
Purple Willow*							
Rowan							
Russell Lupin							
Scotch Heather							
Silver Birch	* Includes several related species.						
Spanish Heath							
Stonecrop							
Sycamore							
Tree lucerne	+Prunus records include wild cherry and plum.						
Yellow Tree Lupin							
Other (free form)							

4.2.4 Supplementary Methods

Additional locations of weeds have been mapped based on previous surveys undertaken by Boffa Miskell, DOC and ECan staff and contractors on behalf of LINZ, by review of records available on the citizen science tool iNaturalist, and during recreational opportunities in the catchment that occurred separately to the formal survey. All observations were taken in the 2023/24 season (July 2023 – June 2024).

4.2.5 Post-Survey Data Management

Following the completion of weed surveys, GIS data has been reviewed for accuracy, consistency, and to extract weed information where species were not from the populated list (and were hence recorded as 'other'). Where multiple weed species are recorded as present in a single polygon, these will be separated into independent polygons for each species. A small number of additional known or readily apparent weed infestations or ecological features were mapped based on aerial imagery.

4.3 Weed Classification

For the purpose of the Strategy, weed species identified in the survey have been split into the following categories:

- **CRPMP / MRPMP weed**: weed species legally required to be controlled under the CRPMP and MRPMP (in Accordance with the Biosecurity Act 1993)[8]. Priority for control throughout all management areas. Landholder obligations apply.
- **Ecological weed**: weed species not listed in the CPRMP or MRPMP that are able to alter habitats for native flora and fauna via competition for resources or space, including ecosystem engineer (e.g., riverbed stabilising) species; weeds that are highly persistent and / or have a high rate of spread (CRPMP/ MRPMP weeds may also have these traits). Priority for control throughout all management areas. There are ecological benefits of control.
- **Other weeds / site-led** weeds that are:
    - Likely of low ecological concern, and impractical for control due to existing levels of spread; or
    - Likely of low ecological concern, and not currently widespread; or a priority for control only at specified sites in an operational area.

The results of the survey of weed distribution in each of the operational areas are displayed in Appendix 3: Weed Distribution Map. Species distribution is shown on individual maps per operational area. Weed species that have a minimal presence in the catchment, have been grouped in a single map.

[8] https://www.legislation.govt.nz/act/public/1993/0095/latest/DLM314623.html

4.3.1 CRPMP and MRPMP Weeds

The CRPMP and MRPMP regulates pest management across Canterbury and Marlborough. The pest management programmes defined in both RPMPs set rules for the control of pest species for land occupiers throughout the region. Management programmes can be aligned to a pest's infestation level and thus, provide an indication of the resource needed to control that pest (Figure 8). Management programmes are defined in Table 5.

Table 5: Management programmes defined in the Canterbury Regional Pest Management Plan 2018-2038 and Marlborough Regional Pest Management Plan 2018.

Management Programme	Characteristics
Exclusion	To prevent the establishment of the subject, or an organism being spread by the subject, that is present in New Zealand but not yet established in an area.
Eradication	To reduce the infestation level of the subject, or an organism being spread by the subject, to zero levels in an area in the short to medium term.
Progressive containment	To contain or reduce the geographic distribution of the subject, or an organism being spread by the subject, to an area over time.
Sustained control	To provide for ongoing control of the subject, or an organism being spread by the subject, to reduce its impacts on values and spread to other properties.
Protecting values in places (site-led) (ECan) ***Site-led pest programme (MDC)***	That the subject, or an organism being spread by the subject, that is capable of causing damage to a place, is excluded or eradicated from that place, or is contained, reduced, or controlled within the place to an extent that protects the values of that place.

Weed species identified within the management area that are presently regulated under the CRPMP and MRPMP are described in Table 6. These species have a high rate of spread within all environments, especially riverbeds, and have long seed viability. Each species is under a 'sustained control' management programme at the regional level, generally indicating infestation is widespread and entrenched within the region. However, for the purposes of this Strategy, priorities for the control of these species are based on weed attributes, feasibility of meaningful weed suppression / eradication and an expert assessment of likely control benefits (Figure 8).

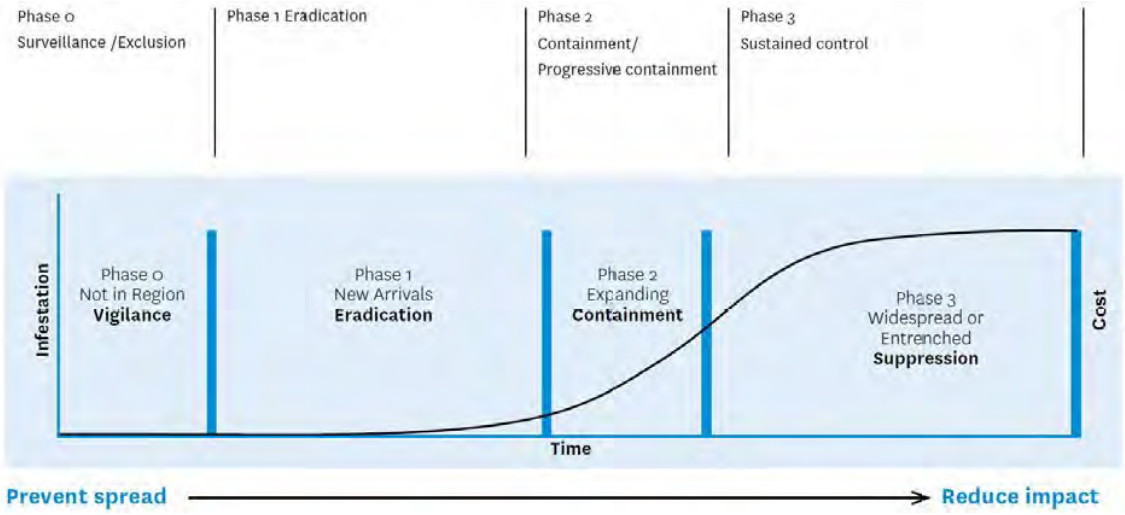

Figure 9: Pest management programmes defined in the CRPMP and the cost-benefit to controlling an infestation. Source: Canterbury Regional Pest Management Plan, 2018-2038.

Table 6: CRPMP/MRPMP management programmes for weed species within the Canterbury and Marlborough Regions (Environment Canterbury Regional Council, 2018), (Marlborough District Council , 2024))

Weed	CRPMP / MRPMP rule	Key habitat type / threat posed in Management Area / dispersal mode
Broom*: (scotch broom *Cytisus scoparius*)	Sustained control	Riverbeds, grasslands, shrublands, wetland margins, disturbed areas, transport corridors, farm paddocks, and sheep camps / forms dense infestations following disturbance, preventing regeneration of native species, persistent in grey scrub / heavy long-lived seeds are transported by water and stock.
Gorse (*Ulex europaeus*)	Sustained control	Riverbeds, grasslands, shrublands, wetland margins, disturbed areas, transport corridors, farm paddocks, and sheep camps / forms dense infestations following disturbance, preventing regeneration of native species, persistent in grey scrub / heavy long-lived seeds are transported by water and stock.
Wild Russell Lupin (*Lupinus polyphyllus*)	Sustained control (CRPMP), *No mention in MRPMP*	Riverbeds, riparian grasslands and shrublands, roadsides and transport corridors / rapidly dominates riverbed and wetland areas especially following disturbance / heavy long-lived seeds are transported by water and stock, often deliberately spread for supposed amenity value, sometimes used as fodder crop.

4.3.2 Ecological Weeds

There are many weed species present within the management area where control is not regulated under the CRPMP or MRPMP (Table 7). While some may be 'Organisms of Interest' under the RPMPs, no control is required. Their inclusion as priorities in this list is based on an expert assessment of the degree to which these species can invade and modify indigenous habitats. For example, poplars and willows can invade and dominate wetlands, and both stabilise riverbanks and constrain the width and flood capacity of the river floodplain. False tamarisk, a hardy and extremely deep-rooted species, can survive even in active river floodplains, reducing riverbed mobilisation and renewal of bare gravel habitats critical for specialised braided river flora and fauna.

Infestation levels vary for these weeds and can partly be explained by their mode of dispersal (e.g. wind, water, animals including humans). It should be noted that dispersal modes may vary even for closely related species; for example, grey and purple willow spreads aggressively from both seed and fragments (e.g. branches washed downstream), whereas crack willow spreads via fragments only.

*Table 7: Ecological weed species identified within the Management Area: weed species impacting on river and ecosystem function primarily in relation to native flora and fauna; high rate of spread. *Organism of Interest = poses a sufficient future risk to warrant being watch-listed for ongoing surveillance and control (Source: CRPMP).*

Weed	CRPMP / MRPMP rule	Key habitat type / threat posed / dispersal mode
Black alder (*Alnus glutinosa*)	No mention in CRPMP or MRPMP	Around Homesteads and huts / Riparian margins, wetlands, resists flooding / spreads via suckering, wind, and fragments.
Ash (*Fraxinus excelsior*)	Organism of Interest (CRPMP)	Around Homesteads and huts. River flats, forest, shrubland and disturbed sites / competes with native species for space and

	No mention in MRPMP	shades out natives / winged seeds dispersed by wind, birds, and mammals.
Barberry *(Berberis glaucocarpa*)	Organism of Interest No mention in MRPMP	Extremely hardy species tolerant of all but wet areas / overtops grey scrub displacing natives, difficult to kill / spreads readily via suckering and seeds transported by birds.
Blackberry (*Rubus fruticosus* agg.)	Organism of Interest (CRPMP) No mention in MRPMP	Transport corridors (spread by humans and birds), disturbed areas, grey scrub / overtops grey scrub displacing natives / spreads readily via suckering, fragments and seeds transported by birds.
Buddleia *(Buddleja davidii)*	Organism of Interest (CRPMP) No mention in MRPMP	Riverbeds, disturbed areas / displaces low-stature indigenous species / spreads via wind, water and soil movement.
Cotoneaster (*Cotoneaster* spp., several species including *C. microphylla* and C. *simonsonii*)	Organism of Interest (CRPMP) No mention in MRPMP	Tolerant of all but wet areas / forms dense infestations, displacing natives / spreads readily into shrublands with prolific highly viable seeds transported by birds.
European heather (*Calluna vulgaris***)**	No mention in CRPMP or MRPMP	Subalpine shrublands, tall tussocklands, grasslands, riverbeds, disturbed areas / forms dense stands, prevents native seedling establishment / long lived, spread by wind, soil and water.
False Tamarisk (*Myricaria germanica*)	Organism of Interest (CRPMP) No mention in MRPMP	Riverbeds and terraces / stabilises riverbeds with roots up to 10 metres deep, resisting displacement in floods / spreads over very long distances on wind and water.
Hawthorn (*Crataegus monogyna*)	Organism of Interest (CRPMP) No mention in MRPMP	Shrublands, regenerating forests, hedgerows / overtops grey scrub displacing natives, grows through the canopy / spreads readily with prolific highly viable seeds transported by birds.
Montpellier Broom *(Genista monspessulana)*	Sustained Control (CRPMP) No mention in MRPMP	River systems, shrublands, tussockland, regenerating forest / dominates low canopy habitats, increases nitrogen in soils / flowers within 2 years and seeds prolifically, spreads by explosive seed mechanism, machinery, soil and water movement.
Old Man's Beard (*Clematis vitalba*)	Sustained Control (CRPMP) No mention in MRPMP	Disturbed and open forest and forest margins, shrublands, riverbeds and cliffs / shades out indigenous scrub and trees / spreads via wind-dispersed seed
Poplars: (*Populus* spp., e.g., Lombardy poplar and silver poplar)	No mention in CRPMP or MRPMP	Riparian areas, wetlands, inhabited areas, hedgerows, riverbeds / overtops grey scrub and forest and suppresses understory species, establishes in and stabilises bare river gravels/ spreads via suckering and fragments, some types may spread by seed, and by deliberate planting.

Pampas Grass *(Cortaderia* spp.*)*	No mention in CRPMP or MRPMP	Transport corridors, hedgerows, disturbed areas, riverbeds / forms scattered and dense infestations, displacing natives, fixes sediment in braided rivers / spreads readily with prolific wind transported seeds.
Plums and Cherries: (*Prunus* spp. e.g., wild cherry, wild plum, cherry laurel)	No mention in CRPMP or MRPMP	Shrublands, regenerating forests, current or former building sites / overtops grey scrub and spreads through forest displacing natives / spreads readily with prolific highly viable seeds transported by birds or transported on water.
Rowan *(Sorbus aucuparia)*	Organism of Interest (CRPMP) No mention in MRPMP	Grasslands, shrublands, forests, riverbeds, inhabited areas / outcompetes natives and overtops shrublands / prolifically produces highly viable seed spread by birds.
Spanish Heath *(Erica lusitanica)*	Organism of Interest (CRPMP) No mention in MRPMP	Subalpine shrublands, tall tussocklands, grasslands, riverbeds, disturbed areas / forms dense stands, prevents native seedling establishment / long lived, spread by wind, soil and water.
Spindle Tree (*Euonymus europaeus*)	No mention in CRPMP or MRPMP	Shrublands, regenerating forests, plantation forests / persistent in grey scrub displacing natives / spreads readily by suckering and seeds transported by birds, often planted in gardens.
Tree Lupin (*Lupinus arboreus*)	Organism of Interest (CRPMP) No mention in MRPMP	Riverbeds, roadsides and transport corridors / rapidly dominates riverbed areas especially following disturbance, resists flooding / heavy long-lived seeds transported by water and stock.
Willows (*Salix* spp., e.g., crack willow, grey willow, purple (osier) willow)	No mention in CRPMP or MRPMP	Damp areas, recreational areas, often planted for riverbank stabilisation / rapidly dominates wetland and river margins, and within wetlands themselves, resists flooding / spreads via suckering, fragments transported on water, and seeds (grey and purple willow).

4.3.3 Other Weeds / Site-led Weeds

There is other weed species present within the Management Area that are not regulated under the CRPMP or MRPMP, nor are they likely to be particularly detrimental to ecological values relative to the Ecological Weeds listed above. Or, they may be beyond control in some areas but not others. These other weed species (Table 8) should be controlled at specific sites where their control does not distract from the main priorities.

Table 8: Other weeds / site led weed species identified within the Management Area. Ecological weeds considered impractical for control or priority for control only at specified locations throughout Management Area.

Weed	CRPMP / MRPMP rule	Key habitat type
Apple (*Malus domestica*)	No mention in CRPMP or MRPMP	Transport corridors and around buildings and walking tracks (spread by humans and birds)

Elder *(Sambucus nigra)*	No mention in CRPMP or MRPMP	Shrublands, regenerating forests and shady damp areas
Currants and Gooseberry (Ribes spp.)	No mention in CRPMP or MRPMP	Forest understory, shrublands, settled / frequently visited areas
Inkweed *(Phytolacca octandra)*	No mention in CRPMP or MRPMP	Disturbed forest and shrubland, tussockland, cliffs, riverbeds / competes for space and nutrients and inhibits native seedling establishment, toxic / spreads by birds, soil and water movement.

4.3.4 Surveillance / Exclusion Species

Priority surveillance weed species for the catchment are listed in Table 9 below. These species are considered likely to become problematic ecological weeds if they establish in the catchment or spread beyond existing known sites. In the Management Area, they should be treated as 'Exclusion' species (see Table 5 for definition).

Table 9: Additional weeds considered 'Exclusion' species for surveillance within the Waiau Toa Clarence River Management Area.

Weed	CRPMP / MRPMP rule	Key Habitat Type
California Poppy *(Eschscholzia californica)*	No mention in CRPMP or MRPMP	Riverbeds, disturbed areas
Heath Rush (*Juncus squarrosus*)	No mention in CRPMP or MRPMP	Wetlands, damp grasslands, lake edges
Himalayan Honeysuckle (*Leycesteria formosa*)	Organism of Interest (CRPMP) No mention in MRPMP	Shrublands, disturbed areas, riparian areas, forest lightwells, and shady, damp and frosty sites
Holly (*Ilex aquifolium*)	Organism of Interest (CRPMP) No mention in MRPMP	Shrublands, forest understory
Great Willowherb (*Epilobium hirsutum***)**	No mention in CRPMP or MRPMP	Wetlands, riverbanks, lake margins
Meadow Pea *(Lathyrus pratensis)*	No mention in CRPMP or MRPMP	Wetlands, seepages, inhabited areas

Wild Thyme *(Thymus vulgaris)*	Site led in CRPMP No mention in the MRPMP	Shrublands, grasslands, riverbeds, disturbed areas

4.3.5 Exotic Species Not Considered Weeds in this Strategy

Numerous other adventive (exotic) species are present in the Waiau Toa / Clarence River that have not been considered for control in this Strategy. These include:

- Wilding conifers,
- Sweet briar,
- Stonecrop,
- Foxglove,
- Ragwort,
- Lotus,
- Thistle species,
- Viper's bugloss,
- St John's wort,
- and woolly mullein (among others).

We note that a key consideration of this Strategy is prioritisation of limited resources and focus, in proportion to the potential ecological harm of a do-nothing scenario. For this reason, these species (although they are certainly ecologically undesirable) are not control priorities.

The majority of these species are predominantly short-lived herbaceous species that are typically spread by wind and can tolerate a very wide range of habitats. In general, they do not cause lasting habitat alteration or serious displacement of indigenous species, although they may certainly form localised impacts and / or visually prominent infestations, especially in areas of recent soil / ground movement (e.g., river margins, riverbeds, along tracks). These species have likely been present in the area for many decades, and their apparent spread or abundance likely fluctuates with time (e.g., flooding events may lead to short-term proliferation). They are all considered to be spread so widely that control would not be practical. In many, or all cases, the risks of native plant by-kill would be substantial if control using herbicide is attempted. Even more careful methods (hand pulling) would merely create new bare ground for establishment of the same weeds and consume resources on a vast scale.

What this practically means is that for this small number of undesirable exotic plant species, even where they are spreading into otherwise weed free areas, they are better tolerated than controlled, because control efforts would distract from much higher priorities in the catchment. As noted in the Parliamentary Commissioner for the Environment's 'Space Invaders' Report (2021), "*not every weed is a national priority, and resources will limit the number of weeds threatening our native ecosystems that can qualify for [control] treatment*."

Readers are reminded that this Strategy does not cover management of wilding conifer species because they are currently administered separately by the National Wilding Conifer Control Programme.

4.4 Operational Area Description / 2024 Survey Results

The key ecological values (that require protection) and critical actions for each operational area are summarised below. The critical actions provide a quick takeaway of the more detailed

survey priorities contained in Table 10. They are further divided into ‘Worthy challenges’ – i.e., multi-year and / or complex, resource intensive efforts, and ‘Quick wins’ – i.e., being uncomplicated actions that could be undertaken in a short space of time for rapid benefit. Note that when ‘weed’ is mentioned below it should be noted that this is only in relation to the CPRMP/MRPMP and ecological weeds described in the sections above.

Key actions of the overall programme are also identified in an overall priority table for the entire management area in Section 4.5.3.

4.4.1 Area 4 – Lake Tennyson to St James Homestead

The Waiau Toa / Clarence River valley remains a highly distinctive dry inland river valley with glacial and post glacial moraines and alluvial outwash terraces, broad river braid plains, and gorges. The upper reaches of the catchment (Area 4) are vegetated with an outstanding diversity of dryer climate and low-stature plants with some beech forest remnants. The lack of weeds in this area is notable and adds to the exceptionally high value of these habitats, despite modification by humans in the form of grazing and burning.

A noteworthy find during surveillance was a single gorse plant under a pylon, near Island Pass Creek (Figure 9). This was the most upstream observation of gorse and consequently was cut down and controlled with herbicide gel. There were three other clusters of two-five gorse plants between Lake Tennyson and Duncan’s Stream, which were all controlled using herbicide prills. Downstream from this point to Timms Stream, the density of gorse increased and multiple clusters of six+ plants were found. These plants have since been controlled using contractors engaged by LINZ in the programme.

Figure 10: Gorse found below a pylon near Island Pass Creek during on-foot surveillance in February 2024.

Broom distribution in Area 4 is mainly confined to the lower half, however, isolated plants were found near Lake Tennyson. Plants found in the riverbed between Lake Tennyson and Fowlers Hut were controlled using herbicide prills. During aerial surveillance, and discussion with Molesworth Station managers, it was recorded that there are several small patches of broom in the Five Mile, Big Bush Creek, and Little Bush Creek. Molesworth Station has been consistently controlling these patches for multiple years and have seen dramatic reductions in density (Cuffy, Molesworth Station, 2024, pers. comm). DOC undertakes annual broom control in the Styx River, as it is considered the most upstream infestation in the catchment, however, more extensive control is required to make a significant difference. Current control efforts are not sufficient or expansive enough to significantly reduce the infestation. Broom from St James is an ongoing threat to the upper Waiau Toa / Clarence River catchment. It is critical that it is progressively contained so more land is not invaded.

During surveillance at Lake Tennyson, heath rush (*Juncus squarrosus*) was identified (Jason Butt, ECan, *pers. comm*. 2024). Heath rush is a significant threat to low fertility and peat wetlands. Further surveillance is recommended to understand the extent of its distribution before a management plan is developed. This is currently the only record of heath rush in the Management Area. Contractors should be upskilled to identify and control this species, if encountered. Surveillance would require searching of wetlands and edges of waterbodies with low stature vegetation.

The Edwards and Peters Valleys are significantly threatened by Spanish Heath, with an outlier infestation in the Timms Stream. The programme has undertaken two years of control in the Timms Stream and in the lower Edwards Valley applying a progressive containment approach towards the main infestation on the hillslopes of the Edwards and Peter's Valleys. Two outlying plants were found in the riverbed opposite Fowlers Hut during surveillance (Figure 10). Following this discovery, a contractor has undertaken further surveillance and controlled the plants in this area. Spanish heath is of serious concern to the catchment as it can spread rapidly from small windblown seeds and establish across numerous habitat types. Continued surveillance of this infestation and overall eradication is strongly recommended, although feasibility of eradication requires further investigation.

Figure 11: Spanish heath recorded in the main steam of the riverbed, opposite Fowlers Hut, February 2024.

Although widespread, the low number of crack willow recorded in Area 4 is promising. Evidence of successful control of the patches upstream of Fowlers Hut, near the Edwards Pass access gate, and in the Peters Valley stream is visible. It is recommended that crack willow is eradicated from this area. There was no grey willow recorded. Two purple willow specimens and a small cluster of five were recorded in Area 4, which are the most upstream observations. Purple willow is of serious concern, as it can spread via seed but has historically been used for riverbank protection, compared to crack willow which only spreads via fragmentation. Wind dispersed seeds travel significant distances, giving purple willow the potential to rapidly colonize new areas in all directions. Reports suggest there have been unprecedented, extremely rapid spread in nearby catchments and elsewhere in Canterbury in very recent years. Eradication and vigilance are strongly recommended in the entire Management Area.

An area of false tamarisk was discovered on the true left of the Waiau Toa / Clarence River, upstream from the confluence with Leader Dale. These plants have since been controlled; however, it is recommended annual surveillance is undertaken to ensure that false tamarisk does not spread further into the catchment. If left unchecked, false tamarisk can form dense patches and in high densities will stabilize riverbed and influence river flow. False tamarisk also produces high numbers of small seeds which are dispersed by the wind. Given these characteristics, false tamarisk is a high priority for surveillance and eradication from the catchment.

It is evident that the historic patch of alder at Fowlers Hut has spread, with multiple plants being found in the lower half of Area 4. Control of the historic infestation occurred in 2019/20 and follow-up control was complete in 2023/24. Supplementary control has been undertaken in February 2025.

A small infestation of Heather (that had been previously identified) adjacent to the Edwards Valley access track was controlled in 2023/24 and follow-up control is scheduled for February 2025.

The area surrounding the St James Homestead hosts a range of exotic species including conifers, oaks, ash, silver birch, gooseberry, apple, plum, currants, cherry and poplar. While significant spread from most of these species is not evident yet (the wilding conifer species will be removed from the homestead in 2025 as part of the National Wilding Conifer Control Programme), it is recommended that this area is monitored for signs of spread annually.

Ecological values of Area 4 vulnerable to weeds:

- The upper reaches of the catchment include numerous tarns and wetlands. Adjacent to Lake Tennyson layers of peat have built up in old kettle holes resulting in highly vulnerable hydrological systems supporting similarly vulnerable and specialised plants. Another excellent wetland complex is present around Horrible Stream with extensive tall tussock cover, and many small lakes and wetlands are present around Tarndale and Lake Sedgemere.

- The tarns and kettle holes in Area 4 are some of the most northernmost of their type in Aotearoa / New Zealand, and it is likely that this is also the northernmost limit for many species specialised to these habitats. This includes *Pentapogon lacustris* (Threatened – Nationally Critical) in the Lake Tennyson wetlands.

- Gratiola (*Gratiola sexdentata*), a rare wetland herb in Canterbury, is present in wetlands in Area 4 and this is one of few known locations for this species within the region. The sedge, *Carex kaloides* (At Risk - Declining), grows around Island Lake and the Threatened - Nationally Critical Sedgemere woollyhead (*Craspedia* "tarn") is also known

from one ephemeral tarn in this area. Other highly threatened species known in this tarn include *Cardamine mutabilis* (Threatened – Nationally Critical), *Crassula multicaulis* (Threatened – Nationally Endangered), and *Myosotis brevis* (Threatened – Nationally Vulnerable).

- Intact alpine sequences from screes to riverbed including intact grasslands, lichen- and mossfields, herbfields and shrublands.

- Extensive bare river gravels relatively free of weeds, making them a crucial habitat for native cushion plants and river-nesting birds.

- Extensive low stature vegetation in low nutrient wetlands and drylands including Drosera herbfields are vulnerable to Spanish heath invasions.

- *Veronica cupressoides* and *Pittosporum patulum* are known in the Tennyson area both of which are Threatened – Nationally Endangered, and *Gunnera densiflora* (Threatened – Nationally Vulnerable) are found in the riverbed wetlands.

Critical actions in Area 4:

Worthy challenges

- Exclusion and surveillance of false tamarisk at historic control sites to ensure it does not take hold in this area.

- Eradication of heath rush at Lake Tennyson, if deemed feasible upon further surveillance.

- Progressive containment of Spanish Heath to the Edwards Valley.

- Eradication of broom and gorse from Area 4 (Lake Tennyson to St James Homestead) and continued surveillance.

- Eradication of crack willow from Area 4 (Lake Tennyson to St James Homestead).

Quick wins

- Follow-up control of alder at Fowlers Hut and focus on removal of all other individuals downstream.

- Control outliers of Spanish Heath to contain to Timms Stream and Edwards Valley infestations.

- Ensure all purple willow are controlled in Area 4 and surveillance is undertaken annually.

- Follow-up control of the heather control in the Edwards Valley and ensure the area is not reinvaded.

4.4.2 Area 3 – St James Homestead to Tytler Point

The upper middle section of the Waiau Toa / Clarence River (Area 3) is the largest operational area, and consequently has diverse topography and vegetation. Surveillance prioritised the main Waiau Toa / Clarence River, and historic infestations in the northern section of the area (Acheron, Alma, Yarra, Severn, Saxton, Dillon, Guide and tributaries). The northern section was primarily surveyed via helicopter and 4WD, with limited on-foot exploration. Many riverbeds in the northern section have low numbers of weeds e.g. the upper Severn River (Figure 11).

Figure 12: Virtually weed-free river flats with exceptional lichenfield, grassland, and shrubland in the upper Severn River Valley.

In order to discuss the weed survey results more clearly, Area 3 has been split into the following areas:

St James to the Acheron confluence

Broom infestations are well-established and vast throughout Area 3, however, within this part of Area 3, it is feasible to progressively contain broom to the hillslopes on the true right of the main riverbed. It would be prudent to ensure follow-up control of dense areas is scheduled in following seasons to avoid re-invasion. This stretch of river is important to river-nesting birds, specifically the black fronted tern. To ensure the nesting/feeding habitat remains clear of weeds, and there is less dense weed habitat to harbour predators, it is recommended control is undertaken in selective areas annually. Gorse is also frequent in this section of the main riverbed. It is recommended that a similar approach is taken towards gorse as broom, to clear bare gravels for river nesting birds.

The density of crack willow was recorded as scarce to very scarce, with several individuals scattered in the main riverbed (excluding the dense patch on the true left between Jacks and Jollies Pass, at Bush Gully and the Acheron Accommodation House). Three purple willow individuals were recorded in the riverbed between Jacks and Jollies Pass. There were also some unidentified willow trees in the patch of crack willow between Jacks and Jollies Pass.

One single Spanish heath plant was recorded in Area 3, on the edge of the Clarence Valley Road, Jacks Pass (Figure 12). It is prudent to stay vigilant for observations of Spanish heath in this area, especially in sections of broad weed control, due to its ability to colonise areas of low nutrients. There is uncertainty if Spanish heath will colonise bare river gravels, however it will

invade adjacent hill sides, and riverbed islands that have been stabilised by other vegetation. A small cluster of false tamarisk plants were also found and controlled at this location.

Figure 13: A single Spanish heath plant recorded on Clarence Valley Road, Jacks Pass. Photo: Heath Melville, ECan.

Acheron Confluence to Tytler Point

A notable record in this area is the most upstream observation of yellow tree lupin recorded at the confluence of the Seymour and the Waiau Toa / Clarence River. This is a historic infestation; however, it is scattered and in moderately low numbers. Eradication from Area 3 is recommended, with a progressive containment approach beginning towards the Clarence Bend.

Downstream of the Acheron River confluence, broom is abundant. Control should be only undertaken to protect biodiversity values. While not as abundant as broom, gorse is widespread through Area 3. Broom and gorse control should be considered in tributaries with low numbers of other weed species such as the Palmer Stream and Dillon River.

Below the Acheron confluence, willows (crack, grey and purple) are widespread but scattered. Purple and grey willow are in lower numbers, however, are a greater concern due to their ability to spread via seed. The section of riverbed between the Palmer Stream and Seymour Stream, including tributaries has low willow numbers. While numbers are still low, it is considered advantageous to control all willow species in this area. Scattered crack willow in the Half Moon and Dillon Rivers are also considered priorities for control. The willows around Lake McRae and in the surrounding area are not an immediate priority for control.

One pussy willow (*Salix reichardtii)* was observed at the confluence of the Hossack River and the Clarence riverbed. Individual tortured willow *(Salix matsudana)* and golden willow (*Salix vitellina)* were observed near the Gore Stream confluence. These willow species do not reproduce as they are clones, however, should be monitored as purple willow was originally believed to be a clone species.

An important discovery during surveillance was an infestation of field horsetail (*Equisetum arvense*) upstream from Tytler Point. Field horsetail is of concern as it forms a monoculture in wetlands and near waterbodies, excludes other vegetation, and prevents seedling establishment and recruitment. It is also toxic to stock and can alter nutrient cycles. Following this observation, ECan undertook a Biosecurity Initial Assessment (BIA)[9]. Further infestations were discovered in Area 1, near the river mouth, and on Bluff Station. The field horsetail weevil biocontrol agent has since been released at the river mouth site by ECan, with the hope that it will spread to other infestations. Success will be monitored.

Acheron River and tributaries

Broom and gorse are in low numbers in the Acheron River and tributaries. Molesworth Station controls historic broom patches annually in McGuires Stream (infestation is along riverbed), Five Mile Stream (from the saddle downstream), Zig Zag Stream, and Camp Stream (low numbers). Broom was observed in 2023/24 on the edge of the Acheron River. The 2023/24 survey did not survey the entire Acheron extensively for broom and gorse.

Crack willow was recorded in the Alma, Yarra, Saxton, Severn, and Acheron rivers. It is recommended that willows are progressively contained to the lower Acheron River, below the Severn confluence.

The poplars that have spread from the Saxton Road bridge stabilisation planting should be controlled and restricted from further spread.

Rowan trees were observed throughout Area 3 surveillance, however were not extensively recorded as they were rarely found in the riverbed. DOC Renwick is currently responsible for undertaking rowan control across the Molesworth Reactional Area. Rowan is a concern for the wider hill country in the Management Area, however it does not appear to pose a significant threat to riverbed areas.

Other naturalised weed species found in Area 3 include apple, currants, silver birch, blackberry, poplars, hawthorn, wattles and gooseberry. While these species do not pose a significant threat to riverbed communities, spread is possible and could be of concern. Monitoring is recommended.

Ecological values of Area 3 vulnerable to weeds:

- Intact alpine sequences from screes to riverbed including intact grasslands with threatened species such as the At Risk - Declining grassland orchid *(Pterostylis tanypoda)*, lichen- and mossfields, herbfields and shrublands.
- Extensive bare river gravels in the upper tributaries, particularly the Severn River, and in the main riverbed that are relatively free of weeds, making them a crucial habitat for native cushion plants and river nesting birds.
- Relatively weed free river terraces with diverse greyscrub and bluffscrub communities.
- Remnants of beech forest and diverse riparian shrublands with regionally endemic species such as Ewartia (*Ewartiothamnus sinclairii*).

[9] The Biosecurity Initial Assessment (BIA) is a prioritization tool used to evaluate the invasiveness of species. It considers factors like climate suitability, range, distribution, pathways, reproduction, biodiversity impact, and control methods, providing a score out of 30.

- Area 3 provides habitat for threatened species such as *Coprosma intertexta*, *Leptinella filiformis,*and *Dysphania pusilla.*

- *Muehlenbeckia epheroides* (At Risk – Declining) is found in Area 2 and 3, and the top section of Area 1.

Critical actions in Area 3:

Worthy challenges

- Progressively contain broom and gorse infestations to the South side of the road between St James Homestead and the Acheron River, and between the Palmer to Seymour.
- Eradicate all willow species from the Clarence riverbed and its tributaries, notably Bush Gully, above the confluence with the Acheron River.
- Eradicate all willow species in the Acheron River and its tributaries including the Alma, Severn, Yarra and Five Mile Stream.
- Eradicate all willow species in the Half Moon, Guide and Dillon rivers.
- Undertake regular surveillance of false tamarisk, Spanish heath, purple willow, and alder.
- Eradication of tree lupin in Area 3, progressively containing downstream, towards the Clarence Bend.
- Monitor spread of apple, currants, silver birch, blackberry, poplars, hawthorn, wattle and gooseberry.
- Monitor growth of field horsetail and implement control, if practical. Consider transfer of biocontrol agent from the river mouth site.

Quick wins

- Selective broom and gorse control in river-bird nesting areas in open riverbed areas below St James Homestead (until progressive containment is complete).
- Control all willow species between St James Homestead and the Acheron River confluence.
- Control spreading poplar at the Saxton Road Bridge.

4.4.3 Area 2 – Tytler Point to Dart Stream

As the most remote section of the Waiau Toa / Clarence River, Area 2 is defined by its rugged and dramatic topography. The river winds through a series of narrow gorges, flanked by steep

rocky slopes, with occasional terraces and floodplains breaking the terrain. Limestone outcrops are a prominent feature, forming striking cliffs and bluffs that support rare and specialized plant species. Large portions of Area 2 have a low density of weed species (Figure 13). However, its popularity among recreational users accessing it via the Clarence Reserve presents a constant risk of new incursions. Additionally, the area contains numerous historic homestead plantings associated with Muzzle Station and the Clarence Reserve, which further underscores the importance of the control programme's continued efforts to protect and enhance this unique environment.

Figure 14: Crack willow growing along the banks of Gore Stream, which is otherwise largely weed free. There is a vehicle track up the Gore Stream.

Tree lupin was recorded in varying densities across Area 2, but the infestation is not extensive across the entire area. The historic infestations in the Seymour Stream, Limestone Stream and the Waiau Toa / Clarence River between these streams are still present and are the priority for control. Tree lupin is continuously present in the riverbed between Dubious Stream and Tytler Point, at very scarce – scarce densities. It is recommended that the programme's efforts focus on progressively containing tree lupin toward the Clarence Bend, ultimately leading to its eradication from Area 2.

Purple and grey willow were predominantly recorded on the Clarence Reserve track and in Seymour Stream. Several grey willow seedlings were found in the main riverbed. Crack willow is prevalent throughout Area 2, however, to eradicate purple willow and grey willow from the catchment, it is most effective to control crack willow simultaneously. Varying willow species have been used for erosion control and track maintenance. Their spread should be monitored.

The distribution of gorse is very scarce - abundant with some sections free of gorse. Broom is more consistently present throughout Area 2, with some area with abundant density. Control

efforts should prioritise tributaries such as the Seymour Stream and Gore Stream to prevent the establishment of dense infestations. A couple of small patches of broom were also observed in The Fells, which have since been successfully controlled. The current control programme is actively targeting the broom in the Split Rock and Black Rock streams, aiming to rid these areas of broom. Additionally, landowners have reported a patch of broom in the upper Alfred Stream, which may require further investigation and management.

False tamarisk was recorded in the lower Limestone Stream. This is a historic infestation and is controlled by DOC annually. Continuation of this control to eradicate false tamarisk from the catchment is recommended.

Other naturalized weed species present in Area 2 include apple, eucalyptus, oaks, elder, elm, currants, mint, silver birch, blackberry, poplars, hawthorn, peach and gooseberry. Many of these species were found near settlements, roads or homesteads. While these species currently pose little threat to riverbed communities, they should be monitored closely, as some can spread through bird dispersal.

Ecological values of Area 2 vulnerable to weeds:

- Outstanding limestone geology supporting many regionally endemic and specialised species, many of which are Threatened or At Risk at a national scale.
- Eastern tributary valleys with raupō wetlands, podocarp remnants and extensive bluffs supporting specialised plants such as coral sea shrub (*Helichrysum coralloides*) and the At Risk – Declining, leafless pōhuehue.
- Open highly disturbed braided riverbed gravels that provide important breeding and foraging habitat for braided river birds.

Critical actions in Area 2:

Worthy challenges

- Eradicate tree lupin from Area 2 using a progressive containment approach towards the Clarence Bend.
- Monitor naturalised exotic species at Forbes Hut, Quail flat and near the Muzzle Station Homestead.
- Surveillance of false tamarisk in other parts of Area 2 to ensure there is no spread from historic infestations.
- Monitor riverbeds with vehicle tracks for new weed incursions.
- Sustained control of broom and gorse in the Waiau Toa / Clarence.

Quick wins

- Continue control of false tamarisk at the Limestone Stream infestation.
- Control of purple willow in Seymour Stream.
- Broom control in Split Rock Stream and Seymour Stream.

- Eradication of all willow species, starting control in tributaries such as Gore Stream and Palmer Stream.

4.4.4 Area 1 – Dart Stream to the sea

The area between Dart Stream and the sea along the Waiau Toa / Clarence River is marked by a blend of rugged landscapes and expansive coastal environments (Figure 14). As the river nears its mouth, the terrain becomes more open, transitioning from steep, beech covered hillsides to flatter river plains and coastal wetlands, that host native species such as raupo, but are also infested with weed species. The lower gorge, just before the Clarence Bend is an outstanding landscape in Area 1 and has a low density of weed species.

Figure 15: One of the limestone gorges at the head of Mead Stream, typical of the gorges found in tributaries along this stretch of the Waiau Toa / Clarence River.

False Tamarisk was recorded in three separate locations in Area 1 – Dee Stream, the true left opposite Shag Bend, and at the river mouth. Continued surveillance is recommended.

The Clarence Bend is a natural containment line with many of the weed species found in the lower section of Area 1, not present, or scarce above the Clarence Bend. For example, there are two individual areas of tree lupin above the Bend, while downstream, tree lupin is Abundant – dominant.

Grey willow was found in Mead Stream and Branch Stream. These isolated records are important and should be controlled as soon as possible. Purple willow is widespread below

Waiau Toa Station Homestead and has been used for erosion control in some areas. It is recommended for containment.

A large patch of pampas grass was recorded upstream from the SH1 bridge and further upstream in the lower gorge. It is recommended to contain pampas to the Wharekiri Stream.

Gorse, crack willow and broom are consistently scattered throughout Area 1.

Buddleia infestations are confined to Area 1, with the most upstream observation recorded in Branch Stream. Other isolated infestations are in Dee Stream and Mead Stream. Below the Clarence Bend, the density of buddleia increases to frequent becoming abundant at the river mouth. It is important to contain buddleia to the below the Clarence Bend as it's spread would be detrimental to the expansive areas of bare, river gravels further upstream.

Great willowherb was identified and controlled for the first time in the Waiau Toa as part of ECan's surveillance programme. The plant was found growing on a historic gravel extraction site in Area 1, marking a significant detection in this catchment.

Below the Clarence Bend, there is a wide variety of weed species (Figure 16). Notable species include hedge barberry, cotoneaster, sycamores, old man's beard, hawthorn, marram grass, poplars, prunus sp., and stonecrop. It is predicted that this area and these species will not be a priority for the control programme in the next 10 years, however, surveillance should be undertaken upstream to ensure their extent does not increase into areas of lower weed density, or new weed threats are detected early before they spread further into the catchment.

Figure 16: A wide variety of weed species choke the river braids of the Waiau Toa Clarence River. Photo is taken looking upstream from near the SH1 bridge.

Ecological values of Area 1 vulnerable to weeds:

- The lower Waiau Toa / Clarence River supports diverse ecosystems, including kānuka scrub, remnant podocarp forests, and indigenous shrublands.
- Outstanding limestone geology supporting many regionally endemic and specialised species, many of which are Threatened or At Risk at a national scale.
- The Nidd/Ouse Stream area supports a population of Hector's tree daisy (*Olearia hectorii)* which is Threatened – Nationally Endangered, and vulnerable to encroaching weeds. The steep, rocky riverbanks support distinctive bluff species like pink broom (*Carmichaelia glabrescens*) and coral sea shrub (*Helichrysum coralloides*).
- Indigenous shrublands and river gravel/silt species, such as parahia (pygmy goosefoot).
- Remnant podocarp vegetation, Mataī Flat in particular stands out as a significant site featuring an extensive mataī forest on an old river meander or alluvial flat.
- The lower reaches near the rivermouth are home to nesting bird species such as black billed gulls and white fronted terns.

Critical actions in Area 1:

Worthy challenges

- Progressively contain tree lupin to above the Clarence Bend.
- Contain buddleia downstream of the Clarence Bend.
- Contain purple willow and grey willow to below Waiau Toa Homestead.
- Contain pampas grass to the Wharekiri Stream.
- Increased surveillance of Great Willowherb, following observations from ECan.

Quick wins

- Follow-up control and survey of buddleia infestations in Dee, Mead and Branch Streams.
- Follow-up control of false tamarisk sites and further surveillance.
- Control the tree lupin sites above the Clarence Bend.
- Control grey willow in Mead Stream and Branch Stream.

4.5 Strategy Objectives and Priorities

4.5.1 Strategy Lifetime and Review

The Waiau Toa Clarence River Weed Control Strategy covers a review of the 2019 Strategy and outlines the management of CRPMP, MRPMP and ecological weed species on riverbeds and associated habitats in the Waiau Toa / Clarence River operational areas. The 2025 Strategy spans the financial years 1 July 2025 – 30 June 2035.

The Strategy is to be reviewed in the fifth season of implementation (2029 / 2030). Review should be based on thorough re-survey of weed extents and locations, to enable an assessment of plan success, and to identify where priorities need to be shifted.

4.5.2 Outcomes Sought

4.5.3 Key Actions

The objectives and priorities set out in the following sections seek to optimise the current approach to weed control within the Waiau Toa / Clarence River. These actions will support the efficient use of funds, stakeholder buy-in, strategic weed control and prevention of spread, and overall reduction in weed abundance within the Management Area.

1. Prevent New Infestations / Surveillance

Monitoring of control sites, monitoring the spread of species, and regular surveillance of high use areas, were all identified in the 2019 strategy as priorities. Regular monitoring should continue to be undertaken throughout the life of the Strategy. Ideally, monitoring could be undertaken annually in higher risk areas such as Area 4 and the northern section of Area 3, but also areas where recreational activity is high. There are several weeds not yet naturalised within the Management Area that may have major impacts on the current (and planned) control programme; see Table 9 for exclusion / surveillance species for the Waiau Toa / Clarence River Management Area, and the CRPMP and MRPMP for a full list of declared exclusion weeds in the Canterbury and Marlborough regions. Added pressure from climate change means that conditions are becoming increasingly favourable for weed species to colonise areas not previously susceptible to invasion. The incursion of new weed species would draw funding away from the priorities within this Strategy and would ultimately reduce the effectiveness of the programme.

2. Maintain and Ideally Increase Funding for Management Area

Coordinated weed management has led to substantial progress since 2014. However, the current level and the inconsistent nature of funding within the Waiau Toa / Clarence River Management Area (currently ~ $240,000 p/a) is insufficient to thoroughly achieve existing weed control priorities and the updated list of priorities provided below. Additional funding should be secured to ensure that the existing efficient and coordinated control programme can lock in existing gains and progress towards eradication in many places.

An increase in base funding for existing control areas is recommended as the existing funding is making progress but has not fully achieved some of the goals of the 2019 strategy. The main limiting factor in achievement of those goals is funding for surveillance. Contractor capacity has

also been an issue in some years; this can be addressed by seeking funding (where possible) over multiple years so that contractors can forecast and plan staffing levels accordingly.

While control of CRPMP and MRPMP species remains a priority, where possible, control efforts should also focus on the highest priority threats identified below. This approach would require coordination and collaboration with ECan and MDC as the RPMP regulatory agencies, and input from stakeholders and weed control / ecological experts. This is suggested because we consider strategic management of weeds (following the priority list below) to be a more cost-effective and beneficial approach compared to blanket RPMP compliance across the catchment, including in lower areas where RPMP weed control against a backdrop of non-CRPMP/MRPMP weeds may, ecologically speaking, achieve little.

3. Continue to Coordinate Management and Control Activities

Continued cooperation between agencies and landowners/occupiers is imperative to the success of the programme. The Management Area has benefitted from a coordinated approach to weed control, however over time, changes in staff and/or project managers have resulted in key information being lost. However, the management of weed control in the Waiau Toa / Clarence River has significantly improved in the past few years. With a more stable team and better communication, key information is now well-documented, and data is shared, leading to more effective and consistent weed control on the ground.

At the beginning of each control season, land managers and key stakeholders meet to discuss what control is planned within the catchment, including key species being controlled, method of control, approximate timing of control and planned budgets for each area. During the season, there is frequent communication between landowners and project managers, ensuring control operations run smoothly and all relevant parties are kept up to date. This coordinated approach has strengthened, resulting in positive outcomes for the area and a clearer path forward for ongoing management.

A ‘pooled funding’ approach is mostly adopted for the Waiau Toa / Clarence River weed control programme, with LINZ executing the majority of operations, and ECan and DOC undertaking specific actions that meet their obligations on land they manage, or to meet agency priorities. Working together has created efficiencies across the programme (e.g., contractors have one person to deal with instead of multiple agencies). It also allows the lead agency to coordinate work across land tenures, enabling targeted control of the worst infestations without being bound to their own boundaries. Land managers undertake their own weed control on areas adjacent to the river and in the hill country of the Management Area, however, efficiencies are created for the programme by sharing ferry costs or using the same ground contractor to save on travel costs.

While the approach to the Waiau Toa / Clarence River weed programme is positive, it is recommended that there are further communications between agencies to ensure progress is being recorded accordingly and further efficiencies being made.

4. Manage Other Weed Spread Vectors and Pathways

There are weed spread vectors and pathways that could be better managed to reduce weed dispersal into existing or new areas. The following recommendations are intended to provide general ‘best practice’ direction in relation to the following potential vectors:

- Earthworks and vegetation clearance especially with heavy machinery (road works, on-farm contractors, contractors on PCL, lines maintenance): vehicle / machinery washdown procedures and auditing of those procedures are encouraged for machinery being transported and used in areas within the Management Area. Follow-up weed control at least twice, for example,12 months and 24 months following any earthworks or vegetation clearance is strongly recommended.

- Transport (vehicles, trucks, helicopters): encourage vehicle washdown to reduce seed dispersal, especially for any travel off-road, travel between river sub-catchments, and travel into upper catchment areas. Presentations to 4WD clubs are encouraged to raise awareness and reduce the likelihood of weeds being spread from river to river. Providing signage at access points (on each road) with general 'clean check dry' messaging, and more specifically signage to identify key weed species and to encourage reporting of sightings by the public.

- People (contractor staff, farm staff, landholders): equipment quarantine / washdown procedures (ensuring e.g., boots, gear, accessories are mud / seed free before moving between areas, or ensuring equipment is only used in the same areas) and auditing of those procedures should be put in place for weed control workers in remote parts of the Management Area. Land managers are subject to District Plan rules that prevent (or require consent for) planting of many weed species, including weed trees that may have perceived value as shelterbelt and riverbank stabilisation species (willows, poplars etc.). Accordingly, agencies are encouraged to provide land managers with information on appropriate non-spreading species / cultivars or native species to plant instead.

- Stock: movement of stock from weed infested areas to clean areas presents a general weed spread risk. Ideally (and especially during seasonal periods when weed seed dispersal is occurring); stock would be excluded from weed infested areas until adequate control of that weed has taken place. Shearing sheep before moving them is an option to reduce seed dispersal to clean areas (although we acknowledge this is not always logistically possible). Buying in stock and feed from outside the Management Area also increases the probability of new weed incursions. It is important that land managers understand where stock and feed are coming from to reduce the likelihood of bringing in new weed species. Whilst stock often suppress palatable weed species, most of the weed species described in this report are not particularly palatable to stock.

- Wild animals may carry weed seeds some distance, particularly in their coats, before depositing them into new areas. Reducing populations of mobile wild animals (particularly ungulates and possums) can reduce the probability seed will be moved into areas that are not commonly surveyed or controlled. Southern black-backed gulls also move weed species throughout riverbed areas, particularly when using vegetation from weed species as nest-building material. Programmes to keep animal populations at low densities are an effective long-term strategy to reduce the spread of weed species.

5. Control Weeds Using the Most Appropriate Tool for the Area

Choosing the best control method for an area depends on a multitude of factors including weed species, infestation size, density and form, surrounding area, surrounding biodiversity, other land uses, ease of access, weather, budget, and health and safety. Risks to indigenous species from herbicide spraying, including from spray drift are serious where weeds occur among indigenous plants (or vice versa). Poor choice of control methods can lead to indigenous by-kill and create new 'weed-shaped holes' (Parliamentary Commissioner for the Environment, 2021) for the ongoing establishment of weeds.

Where indigenous biodiversity values may be threatened with by-kill from non-selective weed control methods (e.g., boom spraying), an expert assessment of the area and its surrounds should be undertaken prior to the commencement of control operations. Considering that protection of indigenous habitats is often the purpose of weed control, careful planning is needed. For indigenous habitats (especially on Crown land managed by DOC or LINZ) where no prior or specific information on ecological values within the control area is available to guide the selection of weed control methods (especially boom spraying), it is recommended that a suitably qualified and experienced ecologist in conjunction with the weed control project manager plans out the control activity to avoid or limit non-target effects to indigenous species.

For weeds within improved pastures where indigenous vegetation values are absent, boom spray may be an appropriate method. However, where weeds occur among indigenous habitats (e.g., shrublands, short tussock grassland, wetlands etc.), boom spray is generally only appropriate for dense, dense stands of weeds for the purpose of reducing seed source and / or for locations where post-control site rehabilitation is proposed. Boom sprayed areas are unlikely to recover / develop indigenous vegetation if left unmanaged post control.

Biocontrol agents (natural pathogens that suppress the growth of target weed species) are a useful method for suppression of dense weed infestations (e.g., in lower river areas), reducing or eliminating the need for herbicide use in some situations. Appropriately selected biocontrol agents pose no risk of by-kill of native species and can be used a as suppression tool where scarce weeds occur among indigenous vegetation (and where the benefits of herbicide control may not outweigh associated risks of by-kill). However, because biocontrol is usually not lethal it cannot be fully relied on in areas where weed eradication is the goal. Nevertheless, if spreading vigour can be reduced (via biocontrol) then control of scarce outliers becomes a lower priority.

6. Monitor Progress Over Time Against Strategy Priorities

A report of the control works against the objectives and priorities of this Strategy, listed below in Table 10 should be conducted annually and shared with stakeholders at the annual consultation meetings. A larger review and resurvey of weed extents / locations should occur in year five, with an overall review in year ten. The success of the programme is measurable over time. Emphasis should be put on monitoring control works against the priorities below to ensure targets are being met.

4.6 Control Priorities

The control priorities in the Waiau Toa / Clarence River are listed in Table 10. Because the level of future funding and weed growth is uncertain, control activities have been ranked as priority one, two or three. Despite this ranking approach, all actions listed are worthwhile.

A very high-level cost / benefit analysis takes into consideration the extent of weed infestation within the site, the cost of control and the benefit of controlling the weed/s to the surrounding area. Definitions for the high-level cost/benefit analysis are:

Cost:

- **$** = Low-cost inputs e.g., localised control, follow up limited to either a small area and / or only a few years (<10 years) post initial control.
- **$ $** = Moderate-cost inputs, e.g., greater initial effort and / or more substantial follow up.

- **$ $ $** = High-cost inputs, e.g., major initial costs and / or substantial follow-up required, potentially over many years or decades.

Benefit:

- ✔ ✔ ✔ = Significant benefits for ecosystem function and / or likely high chance of short to mid-term success. Existing impacts substantial but reversible and / or a threat at the Management Area level.

  Action benefits entire Operational Area or even the entire Management Area, or makes a local area fully weed free especially in areas that are a very high priority for protection (e.g., large examples of nationally important habitat types).

- ✔ ✔ = Significant benefits for ecosystem function and / or moderate chance of short to mid-term success (possible re-invasion due to weed dispersal mechanism, or because some areas of persistent seedbank / nearby infestations would remain). Existing impacts moderate but reversible and / or a threat at the Management Area level.

  Action benefits large proportion of Operational Area OR makes a local area fully or largely weed free especially in areas that are a high priority for protection (e.g., Public Conservation Land or important habitat types on private / leasehold / LINZ land). Action may not address all weeds in that area.

- ✔ = Benefits for ecosystem function and / or low chance of success (likely re-invasion due to weed dispersal mechanism, or because substantial areas of persistent seedbank / nearby large infestations would remain). Existing impacts considered low or so high the area is 'too far gone' (i.e., indigenous habitats are already modified), and / or the weed is a threat only at the local (e.g., sub-catchment) level.

  Likely only of local benefit, e.g., numerous other similar weeds that are a lesser priority for control would likely remain, or the action is of benefit to very well represented habitat types, or of benefit to exotic habitat types, especially on private / pastoral land areas.

Ranking: Priorities are ranked first by benefit (highest to lowest) then by cost (lowest to highest). Where equal cost-benefits apply, priorities are ranked based on the subjective opinion of the authors, generally weighted towards more upstream or higher ecological value areas.

Management Programme: Priorities below are assigned management programmes based on NPD terminology (e.g., eradication, sustained control etc.). The management programmes given below may differ from a pest's official management programme as designated under the CRPMP or MRPMP, and in many cases will apply to species with no management programme status in the CRPMP or MRPMP. The purpose of using this terminology is to indicate to stakeholders and weed control project managers the proposed objectives, approach and likely resource requirements to be allocated to a particular priority. This is intended to be specific to the Management Area and aims to achieve biodiversity benefits as well as CRPMP and MRPMP requirements.

Principles: The following principles should be followed when implementing the Strategy's control priorities listed below in Table 10:

- To effectively manage weed species, they must be controlled systematically, generally working from the highest known upstream infestation in a downstream direction.

- Weeds must be controlled before they set seed to ensure they do not spread further within an area. If weed species set seed, the seed-bank viability will be extended, and worse, weeds may be dispersed over a greater area. For some long-lived weeds, this means controlling new incursions at any time within a few years of their establishment

prior to them reaching maturity. For other weeds that may produce viable seed in year one or two, it means prompt control prior to seed set within that growing season.

- Because of the high cost of searching for scattered weeds, weed dispersal to new areas should be restricted as much as possible via surveillance and pathway management (see Section 5.3 Key Actions above). Search and destroy of scattered weeds is cheaper (in terms of relative area protected) compared to control of dense infestations.
- Continue to record and manage all survey and control activity (via GPS in the field, and GIS systems either in the field or during desktop data management) to ensure areas are not missed in subsequent years and planning is thorough.
- Search and destroy surveys are generally best conducted during peak flowering for that weed, particularly for species such as broom and gorse that are much more visible during this period. Deciduous weeds and heavily fruiting species are often more easily surveyed (but, depending on timing, are not always able to be controlled) in autumn or early winter.

Table 10: Control priorities for weed control in the Waiau Toa | Clarence River identified by Operational Area. Priorities are listed in order of importance (based predominantly on the high-level / Cost Benefit score) with proposed survey and control techniques outlined for each. A specific timeline for achieving each priority is not provided as this will depend on funding acquired each season.

Priority	Operational Area/s	Site within Operational Area	Management Programme	Weed Species	High-level Cost / Benefit	Explanation	Benefit of Control	Previous 2019 Priority
1	3	Acheron River	Eradication	Russell lupin	**$/✓✓✓**	Currently at three known sites on Muller Station, along Acheron River. Has been control 5+ years and has been contained to original planting site. Historically found in Duncan's Stream, upper clarence (Area 4).	Removal of upstream seed source potentially threatening entire downstream catchment. Protection of low density weeds upper catchment.	Yes
1	1,2,3,4	All areas	Eradication	False Tamarisk	**$/✓✓✓**	Found in very low numbers in all operational areas. False Tamarisk is of significant concern due to its ability to disperse seed via wind.	Prevents highly problematic wind dispersed weed from further establishing in the catchment.	Yes
1	4	Edwards Valley	Eradication	Heather	**$/✓✓✓**	Monitor previous control and adjacent area annually for the next three seasons to ensure no regrowth occurs.	Prevents highly problematic shrubland weed from establishing in the upper catchment and outcompeting indigenous vegetation.	No
1	4	Lake Tennyson and Williams Stream	Eradication / Site led	Heath rush, Meadow pea	**$/✓✓✓**	Further surveillance is required to understand extent and feasibility of control.	Limit spread to other wetlands in Area 4.	No
1	1	Above the Clarence Bend	Eradication	Buddleia	**$/✓✓✓**	Buddleia is only in isolated locations in Area 1 - Dee Stream, Mead Stream and Branch Stream. It is important to follow-up historic control and ensure there are no new infestations.	Protects tributaries with a low density of weed species, and the wider Management Area from further invasion of buddleia.	Yes
1	4	Lake Tennyson to St James Homestead	Eradication	Alder	**$/✓✓✓**	Isolated historic, controlled infestation at Fowlers Hut, individual plants found downstream to Jollies Pass. Has been controlled since 2019.	Prevents highly problematic shrubland weed from establishing in the upper catchment.	Yes

1	1,2,3	Above the Clarence Bend	Eradication	Tree lupin	**$$/✓✓✓**	The most upstream infestation of tree lupin is found in Area 3, at the confluence of the Seymour Stream and the Waiau Toa / Clarence River. Distribution downstream of tree lupin between the Seymour confluence and Dubious Stream is mostly scarce (Area 3), becoming frequent to dominant below Boundary Stream in the lower Waiau Toa / Clarence River braid plain in Area 1.	Prevents highly problematic weed from forming dense infestations.	Yes
1	3	Saxton River road bridge	Sustained Control	Poplar	**$$/✓✓✓**	Control young seedlings and investigate feasibility of controlling mature trees (seed source) at the bridge.	Protects upper catchment from further spread of poplar.	Yes
1	4	Lake Tennyson to St James Homestead	Eradication	Gorse, broom	**$$$/✓✓✓**	Scarce in the upper Waiau Toa / Clarence River. Progressively contain down towards St James Homestead.	Protection of upper catchment and important areas for braided river bird breeding and feeding.	Yes
1	4	Lake Tennyson to St James Homestead	Eradication	All willow species (crack, purple, grey)	**$$/✓✓✓**	Crack and purple willow are in low numbers in Area 4. Control has occurred the last two years and should continue annually for the next three years, to ensure control has been successful and outliers have not been missed.	Protects upper catchment and restricts purple willow from establishing a seed bank in Area 4.	Yes
1	3	Acheron River catchment	Eradication	Gorse, broom	**$$/✓✓✓**	Control isolated broom and gorse patches towards the confluence with the Waiau Toa / Clarence River. Work with Molesworth Station.	Restricts further spread of broom and gorse into upper catchment.	Yes
1	4	Timms Stream, Edwards Valley, Peters Valley.	Progressive containment	Spanish heath	**$$$/✓✓✓**	It is critical that the outlier infestation in the Timms Stream is controlled, and the main infestation is contained to the Edwards and Peters Valleys. It is recommended a containment zone is stipulated and mapped and agreed upon with agencies.	Prevents highly problematic shrubland weed from establishing in the upper catchment and outcompeting indigenous vegetation.	Yes
1	3	Above the Acheron confluence	Eradication	All willow species (crack, purple, grey)	**$$/✓✓✓**	The density of crack willow was recorded as scarce to very scarce in this area. Control crack willow from the Clarence riverbed and its tributaries, notably Bush Gully, above the confluence with the Acheron River. There were two purple willow plants recorded in Area.	Protects upper catchment from further spread of willow species.	No
1	3	Acheron River catchment	Eradication	All willow species (crack, purple, grey)	**$$/✓✓✓**	Continue current control towards the Severn Bridge. Once all willow is controlled above the bridge, the Severn River and Alma River should be controlled next, followed by the Yarra River, Guide River, and Five Mile Stream.	Protects upper catchment and braided river bird nesting sites from further spread of willow species.	Yes

1	3	Clarence River catchment	Eradication	All willow species (crack, purple, grey)	**$$/✓✓✓**	Crack willow is scattered in the Half Moon Stream and Dillon River.	Protects upper catchment from further spread of willow species.	Yes
1	1	All area	Containment	Pampas grass	**$$$/✓✓✓**	The current infestation spans from the Miller Stream down to the SH1 bridge. It is in Miller Stream and Wharekiri Streams. Contain this species to the Wharekiri Stream.	Eliminate a highly problematic species from taking hold in the Management Area. Expansion of the pampas grass infestation will be disastrous for the catchment.	No
1	3	Upstream of Tytler Point	Surveillance	Field horsetail	**$/✓✓✓**	Monitor spread of this species and ensure contractors are upskilled in ID so the programme can further understand distribution. Consider biocontrol agent for this site if it has been successful at the river mouth release site.	Prevents expansion of a problematic species from spreading to further wetlands in the Management Area.	No
1	1,2,3,4	Historic control sites	Surveillance	False tamarisk	**$/✓✓✓**	Monitor historic control sites and adjacent areas to ensure there is no regrowth or reinvasion. Follow-up control may be required in some areas.	Prevents highly problematic wind dispersed weed from further establishing in the catchment.	Yes
1	1	Below Waiau Toa Station	Progressive containment	Purple willow, grey willow	**$$$/✓✓✓**	Grey willow was found in Mead Stream and Branch Steam. These isolated records are important and should be controlled as soon as possible. Purple willow is widespread below Waiau Toa Station Homestead and has been used for erosion control in this area. Consultation regarding the stabilisation plantings is required before control is considered. All other plants above the Clarence Bend should be controlled.	Protects remote areas from further spread of willow species.	No
2	2	Split Rock and Seymour Stream	Progressive containment	Broom	**$$$/✓✓✓**	DOC currently undertakes control in this area. Further control is required to suppress broom in this area.	Reduces seed bank of broom in the Operational Area and reduces spread into the Waiau Toa / Clarence River.	No
2	3	St James Homestead - Acheron River	Progressive containment	Gorse, broom	**$$$/✓✓✓**	Control broom and gorse in the riverbed and riparian margin. Restrict broom and gorse infestations to their most dense infestation in the North side of Clarence Valley Road.	Protection of upper catchment and important areas for braided river bird breeding and feeding.	Yes
2	3	Waiau Toa /Clarence	Sustained control	Gorse, broom	**$$/✓✓✓**	Keep nesting and feeding sites free of weed species (predominantly gorse and broom, but not limited to).	Protection of upper catchment and important areas for braided	Yes

		River -River bird habitat					river bird breeding and feeding.	
3	2	All areas	Eradication	All willow species (crack, purple, grey)	**$$$/✓✓✓**	Focus initial efforts on streams with a low density of willow species, e.g. Gore Stream and Seymour Stream. Progress into controlling the larger stands in the Waiau Toa / Clarence Riverbed and on river margins.	Protects remote areas from further spread of willow species.	No
3	2	Tytler Point - Dart Stream	Sustained control	Broom, gorse	**$$$/✓✓✓**	Gorse and broom widespread through this Operational Area. Control should be considered in tributaries such as the Seymour Stream and Gore Stream to ensure they are kept free of dense infestations, and in areas where broom and gorse are scarce.	Reduces seed bank of broom in the Operational Area and reduces spread further downstream the Waiau Toa / Clarence River.	No
2	4	St James Homestead	Surveillance	Homestead plantings (oaks, ash, silver birch, gooseberry, apple, plum, currants, cherry and poplar)	**$/✓**	Monitor adjacent area annually for spread and work with DOC to consider the removal of high-risk species.	Reduces risk of spread of exotic species in the upper catchment.	No
3	2	Forbes Hut, Quail Flat, Muzzle Station Homestead and other settlement areas.	Surveillance	Apple, eucalyptus, oaks, elder, elm, currants, mint, silver birch, blackberry, poplars, hawthorn, peach, gooseberry	**$/✓**	Monitor adjacent area annually for spread and work with DOC and land managers to consider the removal of high-risk species. Consider options for containment for hawthorn as part of annual planning.	Reduces risk of spread of new exotic species in the catchment.	No
3	3	All area	Surveillance	Apple, currants, silver birch, blackberry, poplars, hawthorn, wattle, gooseberry.	**$/✓**	Monitor exotic species for increase spread rate or new invasions into areas previously free of these species. Consider options for containment for hawthorn as part of annual planning.	Prevents highly problematic weed from expanding current distribution.	No

4.7 Key Risks

There are several key risks to achieving the objectives and priorities set out in this plan:

1. Funding

Funding is key to the success of this Strategy. An increase in funding is required to meet all the objectives and priorities of this Strategy, and existing funding levels are critical to maintaining current areas of success. A reduction in funding for one or more years (from one or more agencies) would significantly affect the control programme, given the defined roles and responsibilities each agency holds in the programme. These interdependent roles mean that a shortfall in one area can disrupt the effectiveness and continuity of the entire programme. A reduction in funding would delay control in some areas and could lead to areas of currently scarce weeds becoming dominant. This would result in a 'one step forward, three steps backward' scenario whereby control of weeds within parts of the Management Area would be outcompeted by spreading infestations where control is unable to be carried out. This would reduce the effectiveness of the priority list and ultimately lead to the failure of this Strategy's objectives. To safeguard against these risks, it is vital that additional funding avenues are explored soon, and that sufficient funding is sustained.

2. New Weed Incursions / Management Obligations

The incursion of a new invasive weed species to the Management Area could significantly undermine the current programme. If deemed a high priority for control, this would draw funding and attention from current weed species, reducing the effectiveness of the programme. It is also possible that management of new pasture / production weed species may take precedence over existing or future ecological weed management (effectively reducing funding for ecological weed control), potentially undermining the ability to maintain ongoing control of current issues.

If wilding conifer management is returned to local land managers in future (rather than being managed through the national programme), revision of this Strategy would be necessary and additional funding for control would be required. Wilding conifers are a higher priority than many weeds in this Strategy.

3. Control Works Quality and Continuity

The use of qualified, accredited, and experienced weed control personnel using the right tools for the area is the key to successful weed control. All work needs to be recorded in a similar way (if using multiple contractors) to ensure consistency in data collection and reporting. It is vital to know where contractors (and farm employees) have undertaken control to effectively plan out subsequent seasons' control programmes. It is suggested that multiple contractors are employed to ensure risk is spread across the programme, i.e., if a key contractor fails to deliver or is unable to carry out a control works' programme, then this will be detrimental to the overall programme and key knowledge may be lost. It is important to ensure contractors document important information including the GPS location of individual plants where they are in very low abundance.

While employing a pool of multiple contractors is encouraged, rotation in and out of the 'pool' within or between seasons should be minimised. Time is needed to allow for the development of a consistent approach, to build relationships and trust with landholders, for the development of local knowledge, and to build skills (important for all field employees at all levels) in correctly

identifying weeds. Spraying (killing) of endangered indigenous species has occurred nationwide when new or poorly trained staff have been deployed in areas where visually similar native species and weeds occur (e.g., native vs. exotic brooms), with tragic results.

4. Climate Change

As noted previously in this report, changing climatic conditions may affect weed species' ability to invade new territory. This could affect weed management in many ways, including well-established weed species spreading more vigorously, or new weed species being able to survive in environments where they previously could not. It is important to monitor trends in weed progression to understand if a weed species is becoming more invasive, and to react to this quickly. Unfortunately, it is unlikely that the predicted changes in weather patterns and associated changes in river flows will adversely affect the persistence of the current suite of weed species (other than via short-term change, see below). From an operational perspective, changing weather patterns may constrain weather windows for control, especially where aerial spraying is used. Although this can be countered with robust planning and the ability to engage multiple contractors, it can make management of the programme more challenging.

It is predicted that climate change will more frequently produce larger floods. These can 're-set' huge areas of the braidplain to fresh bare gravels, meaning that the protection of the functioning indigenous communities in these older / more distant shrubland habitats will become even more important in future. This is because, as relatively more of the braidplain is mobilised by increased floods, the remaining vegetated areas become critical seed sources for the dynamic reestablishment of early pioneering indigenous plant communities on more stable surfaces. These form the mosaic of vegetation development that is a distinctive and important feature of braided river ecosystems. Whereas, when these braidplain vegetation communities become degraded by weeds, the tendency is for exotic rather than indigenous vegetation to re-establish. So, while large floods may cause a temporary improvement in the appearance of a bare gravel braidplain, indigenous habitats are at risk of continuing to progressively degrade without active weed control, including beyond the immediate riverbed.

5. Communication and collaboration breakdown

A potential risk to consider is the breakdown of communication and collaboration between stakeholders. The success of this strategy is contingent on consistent alignment across all agencies and stakeholders involved. Annual planning meetings play a critical role in ensuring that everyone remains informed and engaged. To further strengthen coordination, it would be beneficial to introduce a catchup during the season to assess progress and alignment. This should be scheduled at a time when updates could be given, and, where needed, planned works could be altered to redirect resources for the rest of the season.

5.0 Acknowledgements

Thank you to everyone who has helped shape and produce this Strategy:

- Toitū Te Whenua | Land Information New Zealand for driving this Strategy and ensuring the long-term protection of this special landscape.
- Landholders who provided valuable information on weed distribution, control history, accommodation and access during the survey:
    - Jim Ward and Ian Cuff (Cuffy), Molesworth Station
    - Guy and Fiona Redfern, Muzzle Station
    - Hamish Murray, Bluff Station
- Field surveyors outside Boffa Miskell: Justin Watson (previously DOC), Jason Butt (ECan), Heath Melville (previously ECan).
- Clarence River Rafting for an amazing raft survey, ongoing weed surveillance and control, and input into priorities.
- Rowan Hindmarsh-Walls and Pat Crowe at DOC Renwick for knowledge sharing.
- Contractors including Amuri Helicopters and Downer for providing high quality data, lots of dead weeds and always going above and beyond.
- Jodie Hoggard (ECan) for coordination of the Clarence Community hui and help whenever it is needed.
- All agencies, landholders and contractors currently controlling weeds in the Waiau Toa Clarence.

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Appendix 1: Regulatory Documentation

7.0 Regulations

7.2 Administrative Jurisdiction

Waiau Toa / Clarence River extends through a number of local authority administrative boundaries. The middle section of the river is managed by Marlborough (a combined district / regional (unitary) authority), and the lower and upper sections managed by Environment Canterbury. The river also extends through various territorial authority boundaries: the western and southernmost portion within the Hurunui District and the river mouth and Winterburn Stream within Kaikōura District.

7.3 National Level Documents

7.3.1 Biosecurity Act 1993

Regional councils have an obligation to prepare and monitor pest management plans under the Biosecurity Act 1993 for the control of identified pest plants and animals. The National Policy Direction for Pest Management 2015 (**NPD**)[10] was released by the Ministry for Primary Industries in 2015 to improve the alignment and consistency of pest management plans and programmes across New Zealand. The CRPMP and the MRPMP and related Biosecurity Operational Plans have been prepared in accordance with the guidelines.

7.3.2 National Policy Statement for Freshwater Management (NPS – FM) 2020/ National Policy Statement for Indigenous Biodiversity (NPS – IB) 2023

Biosecurity is defined in the National Policy Statement for Freshwater Management as '*activities to eliminate pests and unwanted organisms (as those terms are defined in the Biosecurity Act 1993*)'.

The NPS – FM broadly sets out priorities for the management of freshwater in a manner which gives effects to the concept of Te Mana o te Wai[11]. Exemptions for biosecurity activities are referred to in a specific policy relating to the loss of extent of natural inland wetlands.

[10] https://www.mpi.govt.nz/dmsdocument/9464-National-Policy-Direction-for-Pest-Management-2015

[11] Te Mana o te Wai is a concept that refers to the fundamental importance of water and recognises that protecting the health of freshwater protects the health and well-being of the wider environment. It protects the mauri of the wai. Te Mana o te Wai is about restoring and preserving the balance between the water, the wider environment, and the community. There is a hierarchy of obligations in Te Mana o te Wai that prioritises: (a) first, the health and well-being of water bodies and freshwater ecosystems (b) second, the health needs of people (such as drinking water) (c) third, the ability of people and communities to provide for their social, economic, and cultural well-being, now and in the future.

The NPS – IB applies to indigenous biodiversity in New Zealand. The objective of the NPS – IB is to maintain indigenous biodiversity across Aotearoa New Zealand so that there is no overall loss in indigenous biodiversity after 2023. Biosecurity and weed management are not specifically addressed as part of this strategy, but it is considered that weed management activities are consistent with the outcomes sought to be achieved by the NPS – IB.

7.3.3 National Environmental Standards – Freshwater

The NES-F regulates activities that pose risks to the health of freshwater and freshwater ecosystems. Each of New Zealand's regional councils are responsible for the consenting and consent monitoring associated with these regulations.

The Management Area contains natural inland wetlands. Activities within these wetlands, and within specified buffers of the wetlands, are subject to these regulations (which dictate requirements for resource consents to be obtained from the relevant regional council). In general:

- Regulation 38 – the clearance of vegetation (which includes removal by chemical means) and land disturbance within 10m of a wetland is permitted for biosecurity purposes if general conditions can be met. Specific information is also required to be provided to the relevant regional council prior to undertaking these activities,
- Regulation 39 (3A) – the taking of water[12] from or discharge of water into a wetland or within 100m of a wetland with a direct hydrological relationship requires resource consent. Pesticides mixed with water used within wetland areas may be subject to this regulation.

Clearance works and any associated activities, should be assessed against the relevant National Environmental Standard provisions prior to commencement, and may require resource consents to be sought from, or notification to, the relevant regional council.

7.2 Regional Level Documents

7.2.1 Regional Pest Management Plans

The NPD sets out definitions for management programmes which have specific, achievable goals (Table 5). The CRPMP and MRPMP utilise these definitions and sets out rules and regulations for pests throughout the region. Table 5 outlines the management objectives for weed species management throughout the Canterbury and Marlborough regions, as guided by the NPD.

It is important that this Strategy aligns with relevant regional and local strategies and plans, ensuring the direction of weed control in the Waiau Toa / Clarence River is consistent with higher-level priorities. Objectives within this Strategy are built around these management programme definitions, thus aligning with local, regional, and national pest plans to ensure correct prioritisation of control. This will guide funding and continued control within the catchment.

[12] For example, for the purpose of mixing with agrichemicals.

The RPMPs do not specifically identify the Waiau Toa Clarence River as the subject of any specific weed pest management programme.

7.2.2 Regional Plans

Regional Councils and unitary authorities are responsible for administering the Resource Management Act 1991 (RMA) in respect of activities affecting water, including water quality, quantity and the beds of lakes and rivers.

7.2.2.1 Canterbury Regional Land and Water Plan (L&WRP)

The Canterbury Land and Water Regional Plan contains provisions relevant to weed control. Policies within the Plan refer to weed/ pest control in the context of riparian vegetation clearance and activities within wetlands and ensuring that pests listed in the CRPMP are not introduced or planted in riparian areas, and controlled use of hazardous substances for pest management purposes.

These are covered by rules relating to vegetation clearance, works within riparian setbacks, the discharge of agrichemicals, and works within wetlands. The sub-regional rules (Section 6, Kaikōura) identify the Clarence River and its tributaries[13] as a high naturalness water body[14]. The outstanding and significant characteristics of the River and its tributaries listed in the Plan include high visual amenity value, scenic values, high degree of naturalness, outstanding natural features and landscapes, and high habitat value for brown trout, chinook salmon and habitats of threatened/ endangered indigenous birds and fish. A number of these values are specific to sections of the River. Objective 3.14 of the Plan requires that '*high naturalness waterbodies are hāpua and their margins are maintained in a healthy state or are improved where degraded*'.

Parts of the catchment area are also identified as erosion prone land.

The definition of vegetation clearance in the L&WRP excludes the removal of a species listed in the Biosecurity Register of Unwanted Organisms or the CRPMP, and exotic vegetation clearance by the DOC or LINZ for the purposes of pest management and maintenance of public access.

Other potentially applicable rules relate to:

- vegetation clearance in river and lake beds (for activities which are not exempt from this definition): Rule 5.163. Vegetation clearance is a permitted activity provided that listed conditions are met. Specific considerations apply to vegetation clearance in high naturalness waterbodies.
- wetlands: wetland enhancement and restoration are permitted provided conditions relating to water abstraction are met,
- vegetation clearance in riparian areas (within 5/10m of the bed of a river or lake or wetland boundary): Rule 5.167. Vegetation clearance is a permitted activity subject to conditions. Clause 7 requires that there is no reduction in the area or diversity of existing riparian vegetation in the riparian margins of the Waiau Toa / Clarence River,

[13] From the mouth of the Clarence River to the headwaters (where these lie within the Canterbury Region). The Plan limits the taking of water from the river.

[14] Other specified lakes are also identified as outstanding natural waterbodies. This list should be checked prior to undertaking weed management works.

unless this has been authorised by a resource consent and other specified conditions are met.

- vegetation clearance in erosion prone areas: Rule 5.170.
- discharge of agrichemicals: Rule 5.22. This is a permitted activity provided certain conditions are met.

Weed management works in the Management Area should be assessed against the relevant L&WP provisions prior to commencement.

7.2.2.2 Marlborough Unitary Plan

A portion of the Waiau Toa / Clarence River extends through Marlborough Region. This area is primarily zoned Open Space 3 (a zone for conservation purposes which applies to open space intended to be retained largely in its natural state), and in part adjoins areas zoned rural environment. A number of identified significant wetlands are located in close proximity to the river.

Policy provisions within the plan reference pests/ undesirable plants in the context of protection of indigenous biodiversity. The Plan includes a number of general statements referring to the inclusion of provisions which enable pest management activities as provided for in approved national or regional pest management plans.

Specific reference is made to pest management in method 8.M.9 '*the Council will consider the development of strategies to guide the management of invasive species threatening indigenous biodiversity in Marlborough. Such strategies can guide the use of a combination of regulatory and non-regulatory mechanisms. They will also recognise the role of Council under other statutes such as the Biosecurity Act 1993 to manage new and emerging threats, and other initiatives to manage the immediate threats from established species. An underlying principle will be the recognition of the important role that landowners play in this regard'*.

The area also includes a number of overlays: outstanding natural landscape/ features, riparian natural character, and steep erosion prone land. The river is located within Water Resource Unit 15 (Waiau - toa/ Clarence) classification: AE (aquatic ecosystem), FS (fish spawning), F (fisheries) and A (aesthetic).

Applicable rules include:

- vegetation clearance (Rule 2.7.16): non indigenous vegetation clearance required by a RPMP is a permitted activity, subject to meeting required standards (Rules 2.8, including 2.8.2 and Rule 2.9.14).
- discharge of an aquatic agrichemical into a waterbody (Rule 2.16.3): this is a permitted activity subject to conditions (including 2.17.2).
- non indigenous vegetation clearance (Rule 19.1) is a permitted activity within the Open Space 3 zone subject to compliance with conditions (Rule 19.3.4[15]). These standards include a requirement that vegetation clearance must not be in or within 30m of a river with a water resource unit with a Natural State classification (note: this classification does not apply to the Waiau – toa/ Clarence but may apply to other waterbodies within the catchment).

[15] A number of these standards do not apply in the case of clearance of species listed in the MRPMP or the Biosecurity NZ Register of Unwanted Organisms.

- agrichemical discharge into or onto land is a permitted activity within the Open Space 3 zone subject to meeting conditions (Rule 19.3.15)

Conditions for activities within the Open Space 3 zone also specifically exclude the planting of number of species including various types of pine and douglas fir.

7.3 District Plans

The provisions of the Marlborough Unitary Plan have been assessed in 7.2.2.2 above.

7.3.1 Kaikōura District Plan (2022)

Kaikoura District Council (KDC) is responsible for administering the RMA in respect of land use activities via the District Plan. The eastern section of the Waiau Toa Clarence River extends through Kaikōura District.

The objectives and policies framework make general reference to weed management activities. Policy ECO – P12 states to '*encourage the Canterbury Regional Council, as part of their approach to achieving integrated management of the natural and physical resources of the region, to maintain an effective strategy for the containment and eradication of undesirable plants and animal pests which, among other things, threaten areas of significant indigenous vegetation and significant habitats of indigenous fauna'*.

The river and surrounding area are subject to a variety of zonings and overlays (which potentially affect provisions appliable to weed management activities). These include identification as significant / outstanding landscape areas, and predominantly rural zonings.

The definition of vegetation clearance includes all methods of vegetation clearance and does not provide an exemption for activities undertaken in accordance with the RPMP.

Given the scale of the area through which the river extends, detailed consideration would need to be given to specific district plan provisions at the time any works are proposed. In general:

- district plan controls focus on the clearance of indigenous vegetation (Rule ECO – S2), and
- limits apply to the clearance of any vegetation within water bodies, within 20m of the margin of any wetland or 10m of the bed of any river, stream or lake (Rule ECO – S3).

Appendix 2: Weed Abundance Profile Comparisons

Weed Abundance

Waiau Toa | Clarence River (This study, also Upper Waimakariri River, Boffa Miskell 2022 **and** Upper Rakaia River 2023)			
Categories (mapped as polygons)	**Individuals (mapped as points)**	**Notes**	**Meaning**
Dominant	N/A	-	e.g. >50% coverage
Abundant		(includes 'Common')	Large patches commonly found, weed forms prominent cover
Frequent		(includes 'Occasional')	Small patches commonly found, or some consistent cover - but other species are much more prominent in terms of cover
Scarce		-	Individual plants or isolated small patches scattered across area
Very Scarce	1	-	Individuals so scarce they can practically be mapped where found
	2 to 5	-	
	6+	-	
	Historic	Previously controlled dead plant	
	N/A		

For the strategy maps, data is displayed via the following:

Points:

Points are displayed on the map through a range of sizes that relate to:

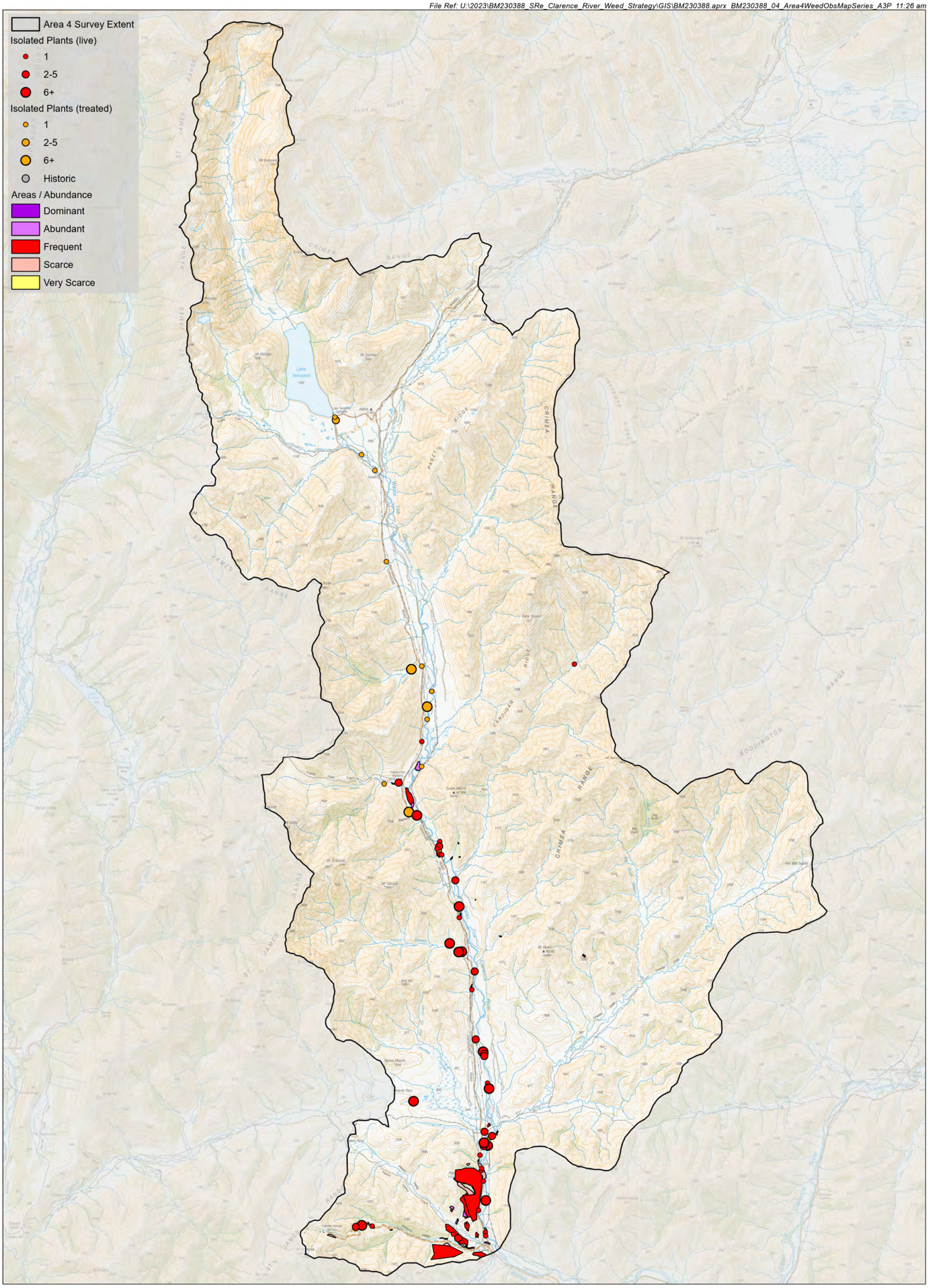
- Small – 1 plant
- Medium – 2-5 plants
- Large – 6+ plants
- Historic (controlled dead plant)

Polygons:

Polygons are displayed on the map via their abundance profiles:

- Dominant: >50% coverage;
- Abundant: Large patches commonly found, weed forms prominent cover;
- Frequent: Small patches commonly found, or some consistent cover – but other species are much more prominent in terms of cover;
- Scarce: Individual plants or isolated small patches scattered across the area; and
- Very Scarce: Individuals so scarce they can practically be mapped where found.

Appendix 3: Weed Distribution Maps



Boffa Miskell

www.boffamiskell.co.nz

0 2.5 km

1:105,000 @ A3

Data Sources: Topo map sourced from LINZ topo 50 map series.

Projection: NZGD 2000 New Zealand Transverse Mercator

WAIAU TOA CLARENCE RIVER OPERATIONAL PLAN

Area 4 Weed Observations - Broom

Date: 14 August 2025 | Revision: 0

Plan prepared for Land Information New Zealand by Boffa Miskell Limited

Project Manager: Sian.Reynolds@boffamiskell.co.nz | Drawn: LJa | Checked: BWi

Area 4 Survey Extent

Isolated Plants (live)
- 1
- 2-5
- 6+

Isolated Plants (treated)
- 1
- 2-5
- 6+
- Historic

Areas / Abundance
- Dominant
- Abundant
- Frequent
- Scarce
- Very Scarce

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0 2.5 km

1:105,000 @ A3

Data Sources: Topo map sourced from LINZ topo 50 map series.

Projection: NZGD 2000 New Zealand Transverse Mercator

WAIAU TOA CLARENCE RIVER OPERATIONAL PLAN

Area 4 Weed Observations - Crack Willow

Date: 14 August 2025 | Revision: 0

Plan prepared for Land Information New Zealand by Boffa Miskell Limited

Project Manager: Sian.Reynolds@boffamiskell.co.nz | Drawn: LJa | Checked: BWi

Area 4 Survey Extent

Isolated Plants (live)
- 1
- 2-5
- 6+

Isolated Plants (treated)
- 1
- 2-5
- 6+
- Historic

Areas / Abundance
- Dominant
- Abundant
- Frequent
- Scarce
- Very Scarce

Spanish Heath

Spanish Heath

Spanish Heath

Spanish Heath

Spanish Heath

Spanish Heath

Spanish Heath

Spanish Heath

Spanish Heath

Spanish Heath

Spanish Heath

False Tamarisk

False tamarisk

Spanish Heath

Spanish Heath

Spanish Heath

Spanish Heath

Spanish Heath

European Heather

Spanish Heath

Spanish Heath

Spanish Heath

Spanish Heath

Spanish Heath

Spanish Heath

Spanish Heath

Spanish Heath

Spanish Heath

Spanish Heath

Spanish Heath

Spanish Heath

Spanish Heath

False Tamarisk

Spanish Heath

Boffa Miskell

www.boffamiskell.co.nz

0 2.5 km

1:105,000 @ A3

Data Sources: Topo map sourced from LINZ topo 50 map series.

Projection: NZGD 2000 New Zealand Transverse Mercator

WAIAU TOA CLARENCE RIVER OPERATIONAL PLAN

Weed Observations - False Tamarisk, Spanish Heath and European Heather

Date: 14 August 2025 | Revision: 0

Plan prepared for Land Information New Zealand by Boffa Miskell Limited

Project Manager: Sian.Reynolds@boffamiskell.co.nz | Drawn: LJa | Checked: BWi

Area 4 Survey Extent

Isolated Plants (live)
- 1
- 2-5
- 6+

Isolated Plants (treated)
- 1
- 2-5
- 6+
- Historic

Areas / Abundance
- Dominant
- Abundant
- Frequent
- Scarce
- Very Scarce

Boffa Miskell

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0 2.5 km

1:105,000 @ A3

Data Sources: Topo map sourced from LINZ topo 50 map series.

Projection: NZGD 2000 New Zealand Transverse Mercator

WAIAU TOA CLARENCE RIVER OPERATIONAL PLAN

Area 4 Weed Observations - Gorse

Date: 14 August 2025 | Revision: 0

Plan prepared for Land Information New Zealand by Boffa Miskell Limited

Project Manager: Sian.Reynolds@boffamiskell.co.nz | Drawn: LJa | Checked: BWi

Area 4 Survey Extent

Isolated Plants (live)
- 1
- 2-5
- 6+

Isolated Plants (treated)
- 1
- 2-5
- 6+
- Historic

Areas / Abundance
- Dominant
- Abundant
- Frequent
- Scarce
- Very Scarce

Gooseberry
Apple
Poplar sp.
Poplar sp.
Alder
Alder
Apple
Alder
Poplar sp.
Alder
Alder
Alder
Alder
Other
Alder
Alder
Alder
Alder
Rowan
Other
Alder
Alder
Alder
Alder
Poplar sp.
Apple
Poplar sp.
Poplar sp.
Hawthorn
Hawthorn

Boffa Miskell

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0 2.5 km

1:105,000 @ A3

Data Sources: Topo map sourced from LINZ topo 50 map series.

Projection: NZGD 2000 New Zealand Transverse Mercator

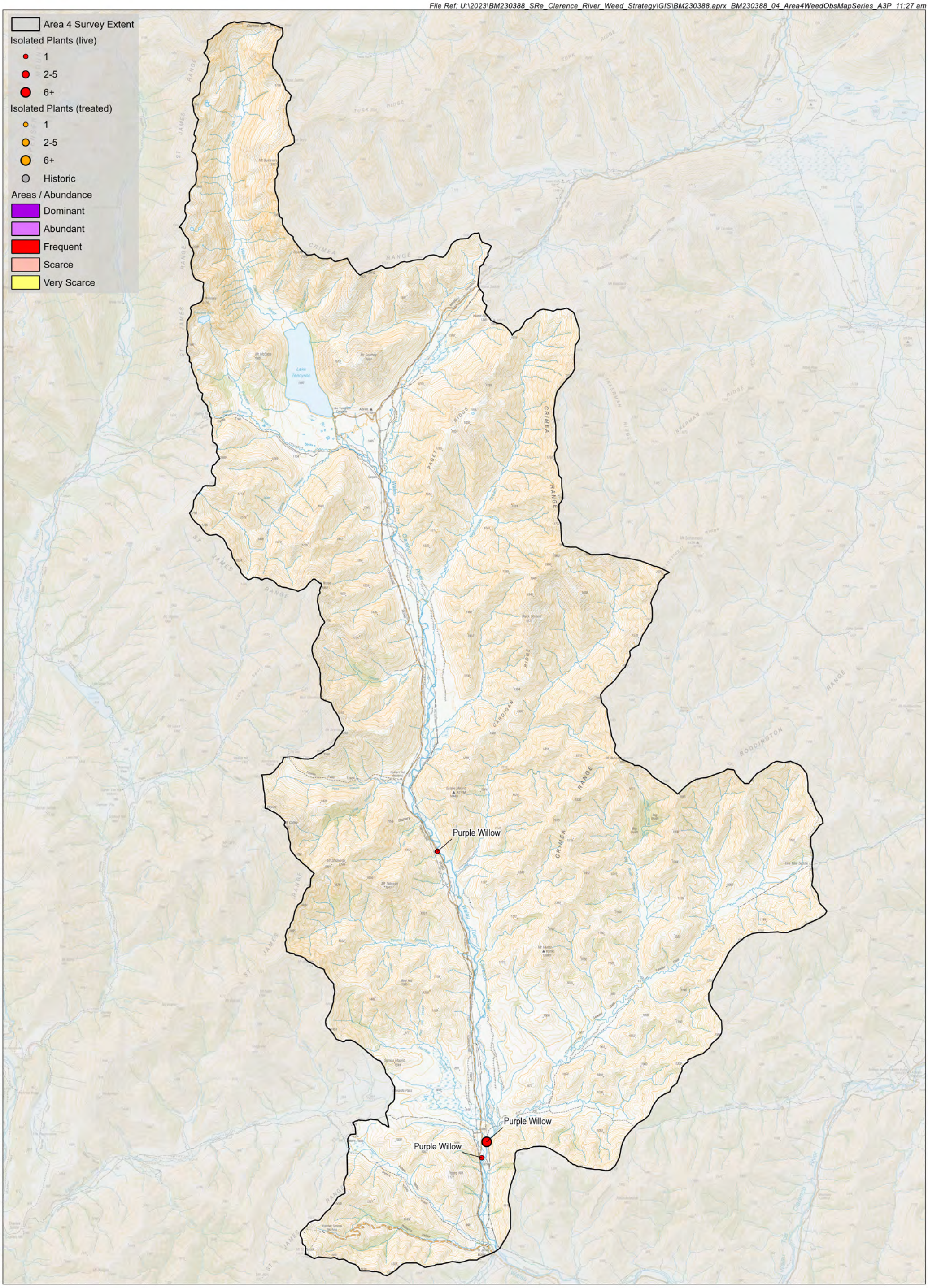
WAIAU TOA CLARENCE RIVER OPERATIONAL PLAN

Area 4 Weed Observations - Other Weed Species

Date: 14 August 2025 | Revision: 0

Plan prepared for Land Information New Zealand by Boffa Miskell Limited

Project Manager: Sian.Reynolds@boffamiskell.co.nz | Drawn: LJa | Checked: BWi



Boffa Miskell

www.boffamiskell.co.nz

0 2.5 km

1:105,000 @ A3

Data Sources: Topo map sourced from LINZ topo 50 map series.

Projection: NZGD 2000 New Zealand Transverse Mercator

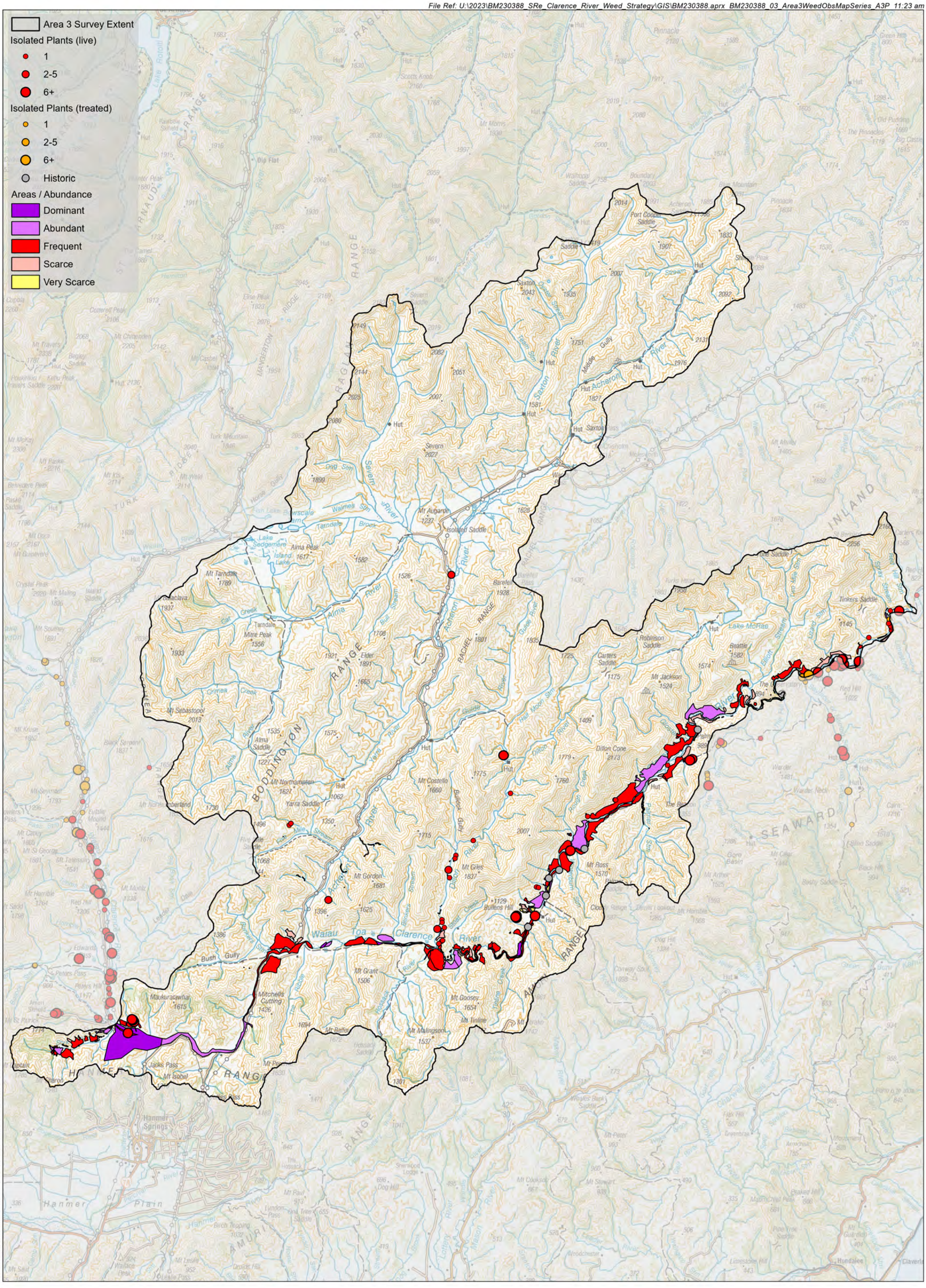
WAIAU TOA CLARENCE RIVER OPERATIONAL PLAN

Area 4 Weed Observations - Purple Willow and Grey Willow

Date: 14 August 2025 | Revision: 0

Plan prepared for Land Information New Zealand by Boffa Miskell Limited

Project Manager: Sian.Reynolds@boffamiskell.co.nz | Drawn: LJa | Checked: BWi



Boffa Miskell

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0 5 km

1:240,000 @ A3

Data Sources: Topo map sourced from LINZ topo 250 map series.

Projection: NZGD 2000 New Zealand Transverse Mercator

WAIAU TOA CLARENCE RIVER OPERATIONAL PLAN

Area 3 Weed Observations - Broom

Date: 14 August 2025 | Revision: 0

Plan prepared for Land Information New Zealand by Boffa Miskell Limited

Project Manager: Sian.Reynolds@boffamiskell.co.nz | Drawn: LJa | Checked: BWi

Area 3 Survey Extent

Isolated Plants (live)
- 1
- 2-5
- 6+

Isolated Plants (treated)
- 1
- 2-5
- 6+
- Historic

Areas / Abundance
- Dominant
- Abundant
- Frequent
- Scarce
- Very Scarce

Boffa Miskell

www.boffamiskell.co.nz

0 5 km

1:240,000 @ A3

Data Sources: Topo map sourced from LINZ topo 250 map series.

Projection: NZGD 2000 New Zealand Transverse Mercator

WAIAU TOA CLARENCE RIVER OPERATIONAL PLAN

Area 3 Weed Observations - Crack Willow

Date: 14 August 2025 | Revision: 0

Plan prepared for Land Information New Zealand by Boffa Miskell Limited

Project Manager: Sian.Reynolds@boffamiskell.co.nz | Drawn: LJa | Checked: BWi

Area 3 Survey Extent

Isolated Plants (live)
- 1
- 2-5
- 6+

Isolated Plants (treated)
- 1
- 2-5
- 6+
- Historic

Areas / Abundance
- Dominant
- Abundant
- Frequent
- Scarce
- Very Scarce

Boffa Miskell

www.boffamiskell.co.nz

0 5 km

1:240,000 @ A3

Data Sources: Topo map sourced from LINZ topo 250 map series.

Projection: NZGD 2000 New Zealand Transverse Mercator

WAIAU TOA CLARENCE RIVER OPERATIONAL PLAN

Area 3 Weed Observations - False Tamarisk and Spanish Heath

Date: 14 August 2025 | Revision: 0

Plan prepared for Land Information New Zealand by Boffa Miskell Limited

Project Manager: Sian.Reynolds@boffamiskell.co.nz | Drawn: LJa | Checked: BWi

Area 3 Survey Extent

Isolated Plants (live)
- 1
- 2-5
- 6+

Isolated Plants (treated)
- 1
- 2-5
- 6+
- Historic

Areas / Abundance
- Dominant
- Abundant
- Frequent
- Scarce
- Very Scarce

Boffa Miskell

www.boffamiskell.co.nz

0 5 km

1:240,000 @ A3

Data Sources: Topo map sourced from LINZ topo 250 map series.

Projection: NZGD 2000 New Zealand Transverse Mercator

WAIAU TOA CLARENCE RIVER OPERATIONAL PLAN

Area 3 Weed Observations - Gorse

Date: 14 August 2025 | Revision: 0

Plan prepared for Land Information New Zealand by Boffa Miskell Limited

Project Manager: Sian.Reynolds@boffamiskell.co.nz | Drawn: LJa | Checked: BWi

Area 3 Survey Extent

Isolated Plants (live)
- 1
- 2-5
- 6+

Isolated Plants (treated)
- 1
- 2-5
- 6+
- Historic

Areas / Abundance
- Dominant
- Abundant
- Frequent
- Scarce
- Very Scarce

Boffa Miskell

www.boffamiskell.co.nz

0 5 km

1:240,000 @ A3

Data Sources: Topo map sourced from LINZ topo 250 map series.

Projection: NZGD 2000 New Zealand Transverse Mercator

WAIAU TOA CLARENCE RIVER OPERATIONAL PLAN

Area 3 Weed Observations - Other Weed Species

Date: 14 August 2025 | Revision: 0

Plan prepared for Land Information New Zealand by Boffa Miskell Limited

Project Manager: Sian.Reynolds@boffamiskell.co.nz | Drawn: LJa | Checked: BWi

Area 3 Survey Extent

Isolated Plants (live)
- 1
- 2-5
- 6+

Isolated Plants (treated)
- 1
- 2-5
- 6+
- Historic

Areas / Abundance
- Dominant
- Abundant
- Frequent
- Scarce
- Very Scarce

Purple Willow
Grey Willow

Boffa Miskell

www.boffamiskell.co.nz

0 5 km

1:240,000 @ A3

Data Sources: Topo map sourced from LINZ topo 250 map series.

Projection: NZGD 2000 New Zealand Transverse Mercator

WAIAU TOA CLARENCE RIVER OPERATIONAL PLAN

Area 3 Weed Observations - Purple Willow and Grey Willow

Date: 14 August 2025 | Revision: 0

Plan prepared for Land Information New Zealand by Boffa Miskell Limited

Project Manager: Sian.Reynolds@boffamiskell.co.nz | Drawn: LJa | Checked: BWi

Area 3 Survey Extent

Isolated Plants (live)
- 1
- 2-5
- 6+

Isolated Plants (treated)
- 1
- 2-5
- 6+
- Historic

Areas / Abundance
- Dominant
- Abundant
- Frequent
- Scarce
- Very Scarce

Boffa Miskell

www.boffamiskell.co.nz

0 5 km

1:240,000 @ A3

Data Sources: Topo map sourced from LINZ topo 250 map series.

Projection: NZGD 2000 New Zealand Transverse Mercator

WAIAU TOA CLARENCE RIVER OPERATIONAL PLAN

Area 3 Weed Observations - Tree Lupin

Date: 14 August 2025 | Revision: 0

Plan prepared for Land Information New Zealand by Boffa Miskell Limited

Project Manager: Sian.Reynolds@boffamiskell.co.nz | Drawn: LJa | Checked: BWi

Area 2 Survey Extent

Isolated Plants (live)
- 1
- 2-5
- 6+

Isolated Plants (treated)
- 1
- 2-5
- 6+
- Historic

Areas / Abundance
- Dominant
- Abundant
- Frequent
- Scarce
- Very Scarce

Boffa Miskell

www.boffamiskell.co.nz

0 3 km

1:130,000 @ A3

Data Sources: Topo map sourced from LINZ topo 50 map series.

Projection: NZGD 2000 New Zealand Transverse Mercator

WAIAU TOA CLARENCE RIVER OPERATIONAL PLAN

Area 2 Weed Observations - Broom

Date: 14 August 2025 | Revision: 0

Plan prepared for Land Information New Zealand by Boffa Miskell Limited

Project Manager: Sian.Reynolds@boffamiskell.co.nz | Drawn: LJa | Checked: BWi

Area 2 Survey Extent

Isolated Plants (live)
- 1
- 2-5
- 6+

Isolated Plants (treated)
- 1
- 2-5
- 6+
- Historic

Areas / Abundance
- Dominant
- Abundant
- Frequent
- Scarce
- Very Scarce

Boffa Miskell

www.boffamiskell.co.nz

0 3 km

1:130,000 @ A3

Data Sources: Topo map sourced from LINZ topo 50 map series.

Projection: NZGD 2000 New Zealand Transverse Mercator

WAIAU TOA CLARENCE RIVER OPERATIONAL PLAN

Area 2 Weed Observations - Crack Willow

Date: 14 August 2025 | Revision: 0

Plan prepared for Land Information New Zealand by Boffa Miskell Limited

Project Manager: Sian.Reynolds@boffamiskell.co.nz | Drawn: LJa | Checked: BWi

Area 2 Survey Extent

Isolated Plants (live)
- 1
- 2-5
- 6+

Isolated Plants (treated)
- 1
- 2-5
- 6+
- Historic

Areas / Abundance
- Dominant
- Abundant
- Frequent
- Scarce
- Very Scarce

Boffa Miskell

www.boffamiskell.co.nz

0 3 km

1:130,000 @ A3

Data Sources: Topo map sourced from LINZ topo 50 map series.

Projection: NZGD 2000 New Zealand Transverse Mercator

WAIAU TOA CLARENCE RIVER OPERATIONAL PLAN

Area 2 Weed Observations - False Tamarisk

Date: 14 August 2025 | Revision: 0

Plan prepared for Land Information New Zealand by Boffa Miskell Limited

Project Manager: Sian.Reynolds@boffamiskell.co.nz | Drawn: LJa | Checked: BWi

Area 2 Survey Extent

Isolated Plants (live)
- 1
- 2-5
- 6+

Isolated Plants (treated)
- 1
- 2-5
- 6+
- Historic

Areas / Abundance
- Dominant
- Abundant
- Frequent
- Scarce
- Very Scarce

Boffa Miskell

www.boffamiskell.co.nz

0 3 km

1:130,000 @ A3

Data Sources: Topo map sourced from LINZ topo 50 map series.

Projection: NZGD 2000 New Zealand Transverse Mercator

WAIAU TOA CLARENCE RIVER OPERATIONAL PLAN

Area 2 Weed Observations - Gorse

Date: 14 August 2025 | Revision: 0

Plan prepared for Land Information New Zealand by Boffa Miskell Limited

Project Manager: Sian.Reynolds@boffamiskell.co.nz | Drawn: LJa | Checked: BWi

Area 2 Survey Extent

Isolated Plants (live)
- 1
- 2-5
- 6+

Isolated Plants (treated)
- 1
- 2-5
- 6+
- Historic

Areas / Abundance
- Dominant
- Abundant
- Frequent
- Scarce
- Very Scarce

Boffa Miskell

www.boffamiskell.co.nz

0 3 km

1:130,000 @ A3

Data Sources: Topo map sourced from LINZ topo 50 map series.

Projection: NZGD 2000 New Zealand Transverse Mercator

WAIAU TOA CLARENCE RIVER OPERATIONAL PLAN

Area 2 Weed Observations - Other Weed Species

Date: 14 August 2025 | Revision: 0

Plan prepared for Land Information New Zealand by Boffa Miskell Limited

Project Manager: Sian.Reynolds@boffamiskell.co.nz | Drawn: LJa | Checked: BWi

Area 2 Survey Extent

Isolated Plants (live)
- 1
- 2-5
- 6+

Isolated Plants (treated)
- 1
- 2-5
- 6+
- Historic

Areas / Abundance
- Dominant
- Abundant
- Frequent
- Scarce
- Very Scarce

Grey Willow
Purple Willow
Purple Willow
Grey Willow
Purple Willow
Purple Willow
Purple Willow
Purple Willow
Purple Willow
Purple Willow
Purple Willow
Purple Willow
Purple Willow
Purple Willow
Purple Willow
Purple Willow
Purple Willow
Purple Willow
Grey Willow
Grey Willow
Grey Willow
Grey Willow

Boffa Miskell

www.boffamiskell.co.nz

0 3 km

1:130,000 @ A3

Data Sources: Topo map sourced from LINZ topo 50 map series.

Projection: NZGD 2000 New Zealand Transverse Mercator

WAIAU TOA CLARENCE RIVER OPERATIONAL PLAN

Area 2 Weed Observations - Purple Willow and Grey Willow

Date: 14 August 2025 | Revision: 0

Plan prepared for Land Information New Zealand by Boffa Miskell Limited

Project Manager: Sian.Reynolds@boffamiskell.co.nz | Drawn: LJa | Checked: BWi

Area 2 Survey Extent

Isolated Plants (live)
- 1
- 2-5
- 6+

Isolated Plants (treated)
- 1
- 2-5
- 6+
- Historic

Areas / Abundance
- Dominant
- Abundant
- Frequent
- Scarce
- Very Scarce

Boffa Miskell

www.boffamiskell.co.nz

0 3 km

1:130,000 @ A3

Data Sources: Topo map sourced from LINZ topo 50 map series.

Projection: NZGD 2000 New Zealand Transverse Mercator

WAIAU TOA CLARENCE RIVER OPERATIONAL PLAN

Area 2 Weed Observations - Tree Lupin

Date: 14 August 2025 | Revision: 0

Plan prepared for Land Information New Zealand by Boffa Miskell Limited

Project Manager: Sian.Reynolds@boffamiskell.co.nz | Drawn: LJa | Checked: BWi

Area 1 Survey Extent

Isolated Plants (live)
- 1
- 2-5
- 6+

Isolated Plants (treated)
- 1
- 2-5
- 6+
- Historic

Areas / Abundance
- Dominant
- Abundant
- Frequent
- Scarce
- Very Scarce

Boffa Miskell

www.boffamiskell.co.nz

0 2.5 km

1:105,000 @ A3

Data Sources: Topo map sourced from LINZ topo 50 map series.

Projection: NZGD 2000 New Zealand Transverse Mercator

WAIAU TOA CLARENCE RIVER OPERATIONAL PLAN

Area 1 Weed Observations - Broom

Date: 14 August 2025 | Revision: 0

Plan prepared for Land Information New Zealand by Boffa Miskell Limited

Project Manager: Sian.Reynolds@boffamiskell.co.nz | Drawn: LJa | Checked: BWi

Area 1 Survey Extent

Isolated Plants (live)
- 1
- 2-5
- 6+

Isolated Plants (treated)
- 1
- 2-5
- 6+
- Historic

Areas / Abundance
- Dominant
- Abundant
- Frequent
- Scarce
- Very Scarce

Boffa Miskell

www.boffamiskell.co.nz

0 2.5 km

1:105,000 @ A3

Data Sources: Topo map sourced from LINZ topo 50 map series.

Projection: NZGD 2000 New Zealand Transverse Mercator

WAIAU TOA CLARENCE RIVER OPERATIONAL PLAN

Area 1 Weed Observations - Buddleia

Date: 14 August 2025 | Revision: 0

Plan prepared for Land Information New Zealand by Boffa Miskell Limited

Project Manager: Sian.Reynolds@boffamiskell.co.nz | Drawn: LJa | Checked: BWi

Area 1 Survey Extent

Isolated Plants (live)
- 1
- 2-5
- 6+

Isolated Plants (treated)
- 1
- 2-5
- 6+
- Historic

Areas / Abundance
- Dominant
- Abundant
- Frequent
- Scarce
- Very Scarce

Boffa Miskell

www.boffamiskell.co.nz

0 2.5 km

1:105,000 @ A3

Data Sources: Topo map sourced from LINZ topo 50 map series.

Projection: NZGD 2000 New Zealand Transverse Mercator

WAIAU TOA CLARENCE RIVER OPERATIONAL PLAN

Area 1 Weed Observations - Crack Willow

Date: 14 August 2025 | Revision: 0

Plan prepared for Land Information New Zealand by Boffa Miskell Limited

Project Manager: Sian.Reynolds@boffamiskell.co.nz | Drawn: LJa | Checked: BWi

Area 1 Survey Extent

Isolated Plants (live)
- 1
- 2-5
- 6+

Isolated Plants (treated)
- 1
- 2-5
- 6+
- Historic

Areas / Abundance
- Dominant
- Abundant
- Frequent
- Scarce
- Very Scarce

Boffa Miskell

www.boffamiskell.co.nz

0 2.5 km

1:105,000 @ A3

Data Sources: Topo map sourced from LINZ topo 50 map series.

Projection: NZGD 2000 New Zealand Transverse Mercator

WAIAU TOA CLARENCE RIVER OPERATIONAL PLAN

Area 1 Weed Observations - False Tamarisk

Date: 14 August 2025 | Revision: 0

Plan prepared for Land Information New Zealand by Boffa Miskell Limited

Project Manager: Sian.Reynolds@boffamiskell.co.nz | Drawn: LJa | Checked: BWi

Area 1 Survey Extent

Isolated Plants (live)
- 1
- 2-5
- 6+

Isolated Plants (treated)
- 1
- 2-5
- 6+
- Historic

Areas / Abundance
- Dominant
- Abundant
- Frequent
- Scarce
- Very Scarce

Boffa Miskell

www.boffamiskell.co.nz

0 2.5 km

1:105,000 @ A3

Data Sources: Topo map sourced from LINZ topo 50 map series.

Projection: NZGD 2000 New Zealand Transverse Mercator

WAIAU TOA CLARENCE RIVER OPERATIONAL PLAN

Area 1 Weed Observations - Gorse

Date: 14 August 2025 | Revision: 0

Plan prepared for Land Information New Zealand by Boffa Miskell Limited

Project Manager: Sian.Reynolds@boffamiskell.co.nz | Drawn: LJa | Checked: BWi

Area 1 Survey Extent

Isolated Plants (live)
- 1
- 2-5
- 6+

Isolated Plants (treated)
- 1
- 2-5
- 6+
- Historic

Areas / Abundance
- Dominant
- Abundant
- Frequent
- Scarce
- Very Scarce

Boffa Miskell

www.boffamiskell.co.nz

0 2.5 km

1:105,000 @ A3

Data Sources: Topo map sourced from LINZ topo 50 map series.

Projection: NZGD 2000 New Zealand Transverse Mercator

WAIAU TOA CLARENCE RIVER OPERATIONAL PLAN

Area 1 Weed Observations - Other Weed Species

Date: 14 August 2025 | Revision: 0

Plan prepared for Land Information New Zealand by Boffa Miskell Limited

Project Manager: Sian.Reynolds@boffamiskell.co.nz | Drawn: LJa | Checked: BWi

Area 1 Survey Extent

Isolated Plants (live)
- 1
- 2-5
- 6+

Isolated Plants (treated)
- 1
- 2-5
- 6+
- Historic

Areas / Abundance
- Dominant
- Abundant
- Frequent
- Scarce
- Very Scarce

Grey Willow
Grey Willow
Grey Willow
Grey Willow
Grey Willow
Grey Willow
Purple Willow
Purple Willow
Purple Willow
Purple Willow
Purple Willow
Purple Willow
Purple Willow
Purple Willow
Purple Willow
Purple Willow
Purple Willow
Purple Willow

Boffa Miskell

www.boffamiskell.co.nz

0 2.5 km

1:105,000 @ A3

Data Sources: Topo map sourced from LINZ topo 50 map series.

Projection: NZGD 2000 New Zealand Transverse Mercator

WAIAU TOA CLARENCE RIVER OPERATIONAL PLAN

Area 1 Weed Observations - Purple Willow and Grey Willow

Date: 14 August 2025 | Revision: 0

Plan prepared for Land Information New Zealand by Boffa Miskell Limited

Project Manager: Sian.Reynolds@boffamiskell.co.nz | Drawn: LJa | Checked: BWi

Area 1 Survey Extent

Isolated Plants (live)
- 1
- 2-5
- 6+

Isolated Plants (treated)
- 1
- 2-5
- 6+
- Historic

Areas / Abundance
- Dominant
- Abundant
- Frequent
- Scarce
- Very Scarce

Boffa Miskell

www.boffamiskell.co.nz

0 2.5 km

1:105,000 @ A3

Data Sources: Topo map sourced from LINZ topo 50 map series.

Projection: NZGD 2000 New Zealand Transverse Mercator

WAIAU TOA CLARENCE RIVER OPERATIONAL PLAN

Area 1 Weed Observations - Tree Lupin

Date: 14 August 2025 | Revision: 0

Plan prepared for Land Information New Zealand by Boffa Miskell Limited

Project Manager: Sian.Reynolds@boffamiskell.co.nz | Drawn: LJa | Checked: BWi