

CATLINS COMMUNITY WEED MANAGEMENT PLAN

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Executive Summary

The Catlins Community Weed Management Plan aims to protect and enhance the environment of the Catlins region in New Zealand through a community-led approach. The plan focuses on the eradication and control of significant weeds that threaten local ecosystems and biodiversity, providing direction for priority control actions over the next decade. It defines weeds broadly and includes legal classifications for pest plants with associated management regulations. Weed control methodology, legislation, plant identification are defined and explained. Education and advocacy are outlined and encouraged to ensure that this programme succeeds and the Catlins area reduces its weed infestations.

Background

Purpose of the document

In 2021 Otago Regional Council (ORC) set up Catchment Action Plans (CAPs) for the management and conservation of an entire catchment or catchments.

The Catlins Catchment Action Plan (CAP) is a community-led plan to protect and enhance the Catlins environment. It sets the direction for taking actions to enhance the environment of the Otago part of The Catlins region. Weed Control is one of the priority strategies. The aim is to reduce the threat to the Catlins natural ecosystems and high value biodiversity sites by enhancing introduced weed control. This will be done by producing an integrated weed control plan for the Catlins which gives purpose and direction to priority control actions for the next decade.

Note: the term weeds is used as a generic term and will include pest plants.

Weeds: Any plant growing where it isn't wanted and causing a nuisance. These include common garden invaders that can be left alone, managed, or ignored depending on your preference.

Pest Plants: Legally classified weeds that pose a severe threat to the economy or environment. Many of these plants have legislation around them e.g. Regional Pest Management Plans and the Pest Plant Accord. For all pest plants in this document the legislation for each plant is noted in Appendix 1 and 2

Objectives

- To eradicate * where possible or control weeds having a significant effect at priority sites.
- To prevent the spread of potentially significant ** weeds into areas they are not currently found.
- To provide clear guidance and prioritisation for implementing future work, including control methods for weed species

Area that this document applies to

The Catlins Catchment Plan Area comprises an area in the south-eastern corner of the South Island of New Zealand. The site lies between Balclutha and Invercargill, straddling the boundary between the Otago and Southland regions. It is bounded to the north by the Koau Branch of the Clutha/Mata-au River and to the south by Waiparu head (on the Otago Southland boundary at Wallace beach). Inland the northern boundary extends to the source reaches of the Puerua, Ōwaka, Catlins and Tahakopa rivers. The marine boundary extends to the twelve nautical mile territorial sea limit (Figure one).

*Eradication: no adult plants present and less than 99% of the weed population remaining.

**Significant: any plant that has an impact on the environment, by smothering native vegetation, preventing regeneration of native species, spreading from the original population via seed or vegetative means, impacting on natural processes e.g. blocking waterways and impact of human health. Or native plant species which aren't native to the area that are hybridizing with local endemic species.



Figure one. The spatial boundary of The Catlins Catchment Action Plan

Who this document is for and why

Developing a Weed Management Plan for the Catlins will ensure that all community groups, Iwi and other interested parties within the Catlins know and understand the key weed species within the region, and the priority of control of weeds within different areas. This may differ area to area depending on the weed species and the impact that the weed is having on different ecosystems. It will also ensure that best practice is used for the control of weeds and that all legislation, Health and Safety and current best practices for weed control are adhered too.

Community and mana whenua engagement

In developing this plan many people, groups, including mana whenua, and government agencies were consulted around the weeds and visions for the future of the Catlins weeds. A significant community within the Catlins are already active and engaged with weed control and as many of these people as possible were contacted and asked to further contact others who may have been missed. Community feedback was received through in-person hui and kōrero (including site visits), phone conversations and emails. However, due to time constraints and life engagements, contributions were not always possible. Engagement needs to continue with all parties and should be incorporated into the plan as and when the discussions occur.

Term of document

This document is a living document. Any new weed species should be added as and when they are identified as a threat. An annual meeting should be undertaken to determine if the weed control is effective. Have there been significant decreases in weed species or populations? Is the priority of species still relevant? Have new weed species been encountered? New methodologies of control? Any other issues? This document should then be updated to reflect the discussion.

After 10 years a full review of the document/program should be undertaken.

Ecology of the Catlins

The Catlins is an area of land found at the southern end of the South Island of New Zealand. Bounded by the Clutha River to the North and the Matura River to the south. Much of the area hugs the coastline with a hinterland of low rolling hills and steeper ranges. With an impressive coastline with alternating beautiful sandy beaches and dramatic coastal cliffs, interspersed with intact estuaries.

The area is sparsely populated with several small townships with the largest being Ōwaka at the northern end near Balclutha. The largest land manager in the Catlins is the Department of Conservation which manages over 54,000 hectares of land.

Biodiversity values include coastal temperate forests, dune systems, coastal turfs, shrublands, beech forests, alpine regions, tussocklands, estuarine systems, river flats and swampland. Many of these areas supported threatened plant species. Several of the wetlands within the Catlins are listed as Significant Wetlands in the Clutha District plan for water

Fauna includes large numbers of migratory wading birds within the Catlins Lake and other estuaries, including the critically endangered kōtuku/white-faced heron. Wetlands support the critically endangered matuku hūrepo/Australasian bittern and threatened pūweto /spotless crane, koitareke/marsh crane and mātātā/ South Island fernbird. Within the beech forests a nationally significant population of the threatened bird mohua/yellowhead is found, along with wider spread other threatened species such as the kārearea/NZ falcon (eastern form), yellow-crowned kākārīki, and a rare mainland South Island population of red-crowned kākārīki. Critically endangered Pekapeka-tou-roa/Long tailed bats and threatened reptiles including mokopirirākau/Tautuku forest gecko and mokomoko/ Southland green skink are still found in some areas of the Catlins. The large expanses of rocky and sandy coastline provide habitat for pinnipeds including breeding endangered pakake/NZ sea lions. Additionally, many species of coastal and seabird frequent the coast with important breeding sites for the endangered hoiho/yellow-eyed penguin, threatened kororā/little-blue penguin and remnant mainland colonies of threatened tītī/sooty shearwater, whose burrowed seabird soil ecosystems are now critically endangered on mainland New Zealand.

When Europeans first colonised the Catlins in the mid 1880's the landscape was mostly intact. Subsequently they cleared, burned, milled and subdivided the land into farms and forestry plantations. Introducing many exotic plants to their home gardens and shelter belts.

Hokonui Rūnaka and Awarua Rūnaka are the mana whenua over the Catlins. The Catlins is an important site to Iwi as over time there have been transient villages at several sites, there were mainland mutton bird sites and pīkao was utilised for weaving purposes. Food was also taken from the rivers, wetlands and oceans. Unfortunately, due to land clearance and the presence of pest animals and weeds, this no longer occurs in some areas. Some intrinsically special areas eg Mokamoka (Catlins Lake), are recognised in the Ngāi Tahu settlement deeds.

The weather is coastal with strong southerly winds from the sub-Antarctic Islands, and up to 1300mm of rain annually. Temperature in the summer may reach 24 degrees Celsius with cooler temperatures in winter, as low as 8 degrees Celsius. Occasional frosts as low as minus 5 degrees Celsius with occasional light snow fall.

Legislation

The control of pest plants within any region in New Zealand is bound by the local councils Regional Pest Management Plan (RPMP) backed by the Biosecurity Act 193. There are limitations to what rules are set out per species of pests and what action can be taken. The weed species found in this plan are detailed in Appendix 1.

In addition, the New Zealand Weed Accord (NPPA) details over a 100 weed species which prevents the sale, distribution and propagation of these plants within New Zealand. If allowed to spread further, these weeds could seriously damage the New Zealand economy and environment.

The NPPA is a cooperative agreement between:

- the Ministry for Primary Industries (MPI)
- New Zealand Plant Producers Incorporated (NZPPI)
- unitary and regional councils
- Department of Conservation.

All plants on the Accord list are unwanted organisms under the Biosecurity Act 1993. This means they cannot be distributed or sold in New Zealand. Note, the NPPA is used alongside other pest management strategies.

Biosecurity Risks

Many pest weeds are spread by natural means such as wind, birds, water, machinery and humans. To minimize weed spread it is important that everyone is aware of seeds and fragments of plants such as tradescantia and willow when undertaking control work. It is important that all personal equipment including footwear, machinery and tools are cleaned before going into a new area.

Weed control at present

Control of weeds in the Catlins at present is undertaken by various people and community groups including but not limited to.

- Papatōwai Barberry Busters who work extensively throughout the community removing new seedlings from public and private land.
- Locals at Papatōwai and surrounds.
- South Otago Forest & Bird Branch
- Forest & Bird's Tautuku Restoration Project – blackberry and sycamore control within lower Fleming Wetland, Lenz Reserve. Mapping of sycamore and other weed spread in DOC Tautuku Bay Scenic Reserve. Small scale site focused gorse control in MacLennan Range Catlins Conservation Park for fauna biodiversity management purposes.
- The Department of Conservation undertakes some weed control within their reserves including control of spartina at Catlins lake and other estuaries in the Catlins.
- Volunteers control weeds at the Nugget Point Scenic Reserve (DOC). This has been ongoing since 2022.
- There are several private QE11 covenants in the Catlins. Some weed control occurs in these areas.
- The Papatōwai Forest Heritage Trust controls weeds in their local reserves including Shanks Bush and Findlater Reserve.
- Control of weeds along the roadside is undertaken by Clutha District Council (CDC) contractors to maintain visibility for road users and to meet legislative requirements under the RPMP. The weeds they spray are blackberry, broom, barberry, gorse, hawthorn, hemlock, Montpellier broom, old mans beard, ragwort, Spanish heath, toe toe, and wilding trees up to 2m. *Nasella tussock* is included in the contract although it is not known in the Catlins. It also includes priority weed species in the ORC Regional Pest Management Plan. If not included in the list above. Note, that the toe toe above is the native species *Austroderia toetoe*. CDC control plants on the roadside for safety reasons.

Known weeds in the Catlins

The Catlins has many weed species associated with townships, lifestyle blocks and farms. Many of these weed species have escaped and are now found colonising roadsides, reserves, stream banks and open areas. Due to the remoteness of some of these areas little is known about the weed species found here. A complete list of known weed species, their growth form, the ecosystem they grow in and a link to their identification can be found in Appendix 2.

The roads within the Catlins have significant weed populations which include cotoneaster, common barberry, Darwins barberry, holly, ragwort and Spanish heath. While control of these species is desired in some areas the practicalities of eradication will not be possible due to density and location of populations.

It has been noted that *gunnera* (*Gunnera tinctoria*) is beginning to be more frequent. This is a concern as the impact of this species on coastal turf ecosystems can be devastating and cause the local extinction of threatened plants. Once it spreads into cliff habitat control would be expensive and physically challenging to undertake.

Likewise, the numbers of sycamore wildings have increased within the Catlins. Trees will grow in dappled light, become structurally dominant, and they have seeds that are blown some distance.

It is important to understand the weed species and population densities within the Catlins to allow for an educated response on the prioritisation of weed control and the future funding needs. Understanding the wider context where the weeds occur helps to predict their likely spread and this will help prioritise actions. For example, weeds which can spread deep into established native forest could have a big impact in the Catlins because this is a widespread ecosystem. Weeds which can spread into coastal turf habitats would have a big impact on both the Catlins and also nationally because these ecosystems are naturally uncommon across the country but still occur within the Catlins area.

This section from North to South details what weed species are known in what areas and priority for control.

Estuarian, wetlands and river weeds are discussed after the townships.

Kākā Point

Kākā Point is a small township on the Catlins coast. To understand the extent of the weeds here a survey will need to be undertaken at all the properties and roadsides.

Known weeds include African daisy, broom, buddleia, cape honey flower, Chilean flame creeper, Chilean flame tree, cotoneaster, Darwin's barberry, echium, elderberry, escallonia, gorse, holly, ivy, montbretia, Peruvian lily, privet, reed sweet grass, ragwort, rowan, Spanish heath, sycamore, tree mallow and willow spp.

When a survey has been undertaken all weeds should be ranked and prioritised for control. This will include density at each site, density in Kākā Point, how the plant reproduces and impact on environment. Until this is undertaken weed control priorities should support community work that is being undertaken in the Catlins. Darwin's barberry, holly, cotoneaster, Spanish heath and sycamore that are not on private property should be controlled.

The dune system adjacent to the road is predominately marram with scattered lupins. Control of the lupins is recommended as they disrupt natural dune formation, increase soil nitrogen levels and provide habitat for other weed species. Any other exotic weed species encountered while undertaking this control work should be controlled.

Kākā Point - The Nuggets Road

The Nuggets Road is a high priority site as the main weed of concern in this area is box thorn. The only other known site is Waikawa which is in the Southland area of the Catlins. Boxthorn has spread from its original locations along the road and is now impacting on the dunes and has the potential to establish on the Nugget Point cliffs, an important biodiversity site for native flora and fauna, where control would be expensive and physically challenging.

The boxthorn plants in the dunes are hard to determine due to muehlenbeckia vines, marram grass and lupin. While an initial survey took place in 2025 which identified the distribution of several plants, it is suggested that a more comprehensive survey is carried out along the road, in the dunes

and across the adjacent farmland to determine the extent of the boxthorn. Figures two and three show all know locations of boxthorn in this area.

Gunnera has been found along this road. It has been removed. Surveillance is important to ensure it does not reestablish.

Priority of control should be eradication of the box thorn. This will be challenging as box thorn is hard to control. Control of the large plants will need to be done using machinery. As the plants are close to the road a traffic management plan will be required and will need to be submitted and supported by Clutha District Council Roading Unit. Boxthorn plants in the dunes and roadsides should be controlled using machinery or controlled depending on size by herbicide or cut and paste. Any branches cut from the plant **must** be placed in a heap and burnt, ensuring that all Fire and Emergency regulations are adhered to. Boxthorn is known to resprout from cut fragments left on the ground.

Other weeds noted along the roadside and in gardens include African daisy, agapanthus, angelica, blackberry, broom, *Coprosma repens*, cotoneaster, echium, elderberry, English ivy, escallonia, gorse, macrocarpa, montbretia, periwinkle, Pinus radiata, ragwort, spindleberry and tree mallow. Old mans beard was found in a garden in 2015 this was removed.

All these species have the potential to colonise the dune system along the road.

Most of these species are in low numbers. It is recommended that a conversation occurs with landowners and removal of all these species is undertaken. Any weeds noted in the dunes or the roadside should be removed.





Figure 2 and 3 : Boxthorn Nuggets Road from November 2025 field survey.

Nugget Point Lighthouse Scenic reserve

A survey has been conducted by volunteers within this reserve . Weeds observed include bedstraw, boom, English ivy, gorse, pampas grass and sowthistle. Figure 4.



Figure 4:Weeds of concern Nugget Point. Source: J and N Keith

Kākā Point to Ōwaka

In the paddock near Tunnel Hill Reserve Tree of heaven has colonised. This is a particular invasive species with wind born seeds that readily suckers from roots which produce toxins preventing other species growing underneath the tree. It is important that that these trees are removed as they are the only known population in the Catlins. A survey to determine the extent of the population will be required. The survey and any control work will require landowner permission.

Ōwaka township

Ōwaka is the main urban centre for the Catlins. Many of the houses have hedges and gardens comprising several weed species which have spread into the surrounding areas and roadsides.

To understand the extent of the weeds at Ōwaka a survey will need to be undertaken at all the properties and roadsides including the Department of Conservation reserve and Regional Council reserves. Undertaking the surveys will require landowner permission.

Known weeds include, blackberry, broom, buddleia, cherry laurel, cotoneaster, Darwin's barberry, echium, elderberry, escallonia, flowering current, gorse, hawthorn, holly, ivy, montbretia, pines, macrocarpa, rowan, sliver birch, Spanish heath, sycamore and Turks head lily.

When a survey has been undertaken all weeds should be ranked and prioritised for control. This will include density at each site, density in Ōwaka, how the plant reproduces and impact on environment. Until this is undertaken weed control priorities should support community work that is being undertaken in the Catlins. Darwins barberry, holly, cotoneaster, Spanish heath and sycamore that are not on private property should be controlled.

Katea Rd – Hunt Road

This valley has large patches of common barberry on roadsides and private land. These infestations are the largest populations of this species in the Catlins.

Catlins Highway – Ōwaka to Papatōwai

Spanish heath, Himalayan honeysuckle and Darwins barberry are common along this stretch of highway. At the Catlins River Bridge Spanish heath has spread from the farmland to the road verge, the creek edges adjacent to the road and into the mānuka wetland which isn't grazed. It is important that this is controlled before it becomes established. Along the road there are many mature barberry and cotoneaster. Of concern is the planting of non-native kowhai in the riparian plantings.

Rata Range Rocky Knoll, Catlins Conservation Park

Gorse from the surrounding forest has invaded the alpine plant areas. It is recommended that a survey is undertaken in conjunction with the Department of Conservation to understand the extent of the problem. Control of the gorse using herbicide would cause damage to the native plants and

open the area to more exotic plant invasions. It is recommended that a discussion is undertaken with the forestry company to discuss the release of gorse bio control agents in the forestry. This will reduce the vigour of the infestation with no damage to native vegetation. While biocontrol agents will never totally eradicate the weed species it will reduce the vigour of the plants.

Hina Hina Road

Weeds along the road include gunnera, lupins, thistles, ragwort. Gunnera is known at a couple of private residents and near the estuary. Priority of control is gunnera. All plants should be removed after a discussion with landowners if they don't want to remove plants the seed heads could be removed annually.

Hina Hina bridge to Pounaweia cycleway Californian skunk weed a new weed in the Catlins. Appeared after new gravel had been laid. This has been controlled by volunteers.

Pounaweia

Pounaweia sits between the estuaries of The Catlins and Ōwaka Rivers. It is estuarine and coastal forest with a small township of houses and campgrounds. To understand the extent of the weeds at Pounaweia a survey will need to be undertaken at all the properties and roadsides. Concern has been raised about weed dumping at the elbow. This site needs to be checked for weeds as some have grown. A sign could be erected to ensure no further dumping occurs.

Weeds present at Pounaweia include banana passionfruit, bittersweet, broom, Chilean flame creeper, chocolate vine, cotoneaster, Darwins barberry, elderberry, echium, gorse, holly, lupin, macrocarpa, mallow, montbretia, Peruvian lily, poplar, Spanish heath, sycamore and tutsan. Angelica has been observed in the estuary margins.

Once a survey has been undertaken then the weed species should be ranked for control. Until this is undertaken weed control priorities should support community work that is being undertaken in the Catlins. Darwin's barberry, cotoneaster, holly, Spanish heath and sycamore that are not on private property should be controlled.

Pūrākaunui Falls Road

Weeds include balm of gilead, Chilean flame creeper, cotoneaster, gunnera, Himalayan honeysuckle, Spanish heath. Priority of control is gunnera. When this has been eradicated control cotoneaster, and Spanish heath.

Below Greenwood Farmstay there is a large orange butterfly bush. It is important to discuss control of this plant with the owners as there are very few plants in the Catlins.

Of concern is the gunnera at the falls track and on Waikoata Road and private farmland.

MacLennan River

Adjacent to the river bridge on the south side of the Papatōwai Highway a large infestation of sycamore is currently being removed from a private bush area. This is being undertaken by Papatōwai Barberry Busters and associated volunteers. This will require ongoing checks to ensure no regrowth occurs. A survey for other infestations of sycamore and holly from here to McLennan township is recommended. All plants to be controlled. Using the MacLennan River as a line keep this area clear to prevent further infestations into Papatōwai.

Near Kahuika, macrocarpa wildings are becoming frequent along the highway. Some are large and will require a traffic management plan to remove them. Macrocarpa are also found on the west side of the road up Table Hill near the Matai Falls and near the Catlins River Bridge. At the top of Table Hill several holly trees have been observed on the forest edge and along the roadside.

MacLennan Township

A small historic township 2.5km from Papatōwai. Weeds include blackberry, broom, cherry, cherry laurel, Chilean flame tree, cotoneaster, Darwins barberry, holly, North Island hoheria, Spanish heath, sycamore and viburnum. On the road adjacent to the Douglas fir plantation juvenile plants have been found.

The last farm on Papatōwai Highway heading towards Ōwaka on the Catlins highway removed their holly hedge from the south side of the road. This has subsequently regrown and needs further work. Likewise, the hedge on the north side of the road needs removing. This property has several weed species that locals have removed. The wetland area to the south of this property has the potential to be invaded by holly. Survey of the wetland is recommended to determine the presence or not of holly and other weeds. Once this is undertaken prioritise the weeds for control.

Within the township Locals have controlled many of the weed species on private land and farmland. Including a massive cherry laurel near the Papatōwai Highway.

From here to the Papatōwai River Bridge at Centre Road it is important to keep the highway clear of Darwins barberry, Himalayan honeysuckle, holly, Spanish heath and sycamore to prevent reinvasion into Papatōwai.

Centre Road near Mouats Saddle Road to Papatōwai Highway

Four trees of Portugal laurel were noted planted adjacent to a whitebait stand. There is a large paddock of ribbon grass (*Phalaris arundinacea* var. *picta*). At present there is only two sites known of this species in the Catlins. It is recommended that talks are undertaken with the landowner to remove. Dense holly and the occasional Darwins barberry are found in the gullies and hillsides on the north side of the road. Due to the size of these infestations control is not recommended as it will require a helicopter. Discussions should be undertaken with the landowner, and the infestations should be delineated and a circle drawn around the main infestations and all plants outside the main infestations should be controlled. If money became available control of these large infestations would be desirable as they will always remain as a seed source.

Very few holly plants were observed on the estuary edge. It is recommended that these are controlled and any lupins found. Turks cap lily is beginning to establish here as well all plants should be controlled.

Papatōwai

Papatōwai is the gateway to the Tautuku and Chaslands area and is the second largest township in the Catlins. It is surrounded by significant old growth forest, regionally significant estuarine and freshwater values. Many of these areas have weeds which have escaped from gardens in the village and surrounding farms. Locals have been controlling weeds in the village and surrounding areas since the early 1990's. The weed infestations at Papatōwai have been much reduced due to this work. Many of the residents have allowed the work to be undertaken. However, some residents have strong ties to their plants, and these have not been controlled. It must be noted that these plants will always act as a seed source until removed.

Weeds within the Papatōwai area include agapanthus, aluminium plant, anemone clematis, arum lily, balm of Gilead, blackberry, broom, buddleia, buddleia globosa, cherry laurel, Chilean flame creeper, Chilean flame tree, common honeysuckle, *Coprosma robusta* and *grandiflora*, cotoneaster, crack willow, Darwins barberry, echium, escallonia, flowering current, gums, Himalayan honeysuckle, Mexican orange blossom, montbretia, North Island hoheria, North Island *Pseudopanax laetus*, ivy, Peruvian lily, pines, privet, ragwort, red hot poker, rowan, seleginella, silver birch, Spanish heath, St Johns Wort, stinking iris, sycamore, tree lupin, Turks head lily, viburnum, Virginia creeper and wild cherry. Note: climbing asparagus has been recorded in Papatōwai and has been controlled. In addition, old mans beard on the edge of the forest near the beach has been controlled and eradicated.

Several locals understand the weeds at Papatōwai and the priorities of weed control. It is very important to continue this work and to remove any new weed species observed. Given the low density of some plants these should be controlled first eg buddleia and common honeysuckle. Followed by cotoneaster, Darwins barberry, escallonia, holly, Spanish heath and sycamore. The Turks cap lilies that are just beginning to establish on the roadside should be controlled. The infestation of escallonia on the highway to the south of Papatōwai should be controlled.

Issues around the control of weeds at Papatōwai include, some property owners are hard to contact, land ownership changes and it can be difficult to locate new owners are challenges that are encountered when trying to undertake control of the weeds. In addition, gaining trust and approval for controlling weeds can take time but is vitally important. Engaging the community on the removal of all weeds within this area is imperative.

Lenz Reserve and DOC Tautuku Bay Reserve

This area is a historical mill settlement with walks and signage. The DOC Tautuku Bay Reserve and the Forest & Bird (F&B) Lenz Reserve are bisected by the Chaslands Highway. The DOC Reserve has a walkway to Lake Wilkie. The Lenz Reserve has walkways and the lower Fleming wetland large open areas.

The forest is an excellent example of forest succession from marsh to mature podocarp forest. Mātātā/South Island fernbirds are found in the wetland and shrub habitats at both sites.

F&B's Tautuku Restoration Project, which carries out native habitat and species conservation mahi across the 550ha Lenz Reserve and >4,000ha of surrounding public conservation land (PCL), has a management agreement with DOC for pest (animal and plant) control and species monitoring work on PCL. However, given the size of the weed issue, it would be prudent to work together to remove the holly and sycamores.

Lenz Reserve

The reserve is managed by the Lenz Reserve Management Committee, made up of representatives from three southern F&B Branch committees (South Otago, Dunedin and Invercargill branches). There are walking tracks, signage and historic logging machinery in the reserve. The regionally significant Fleming Wetland is within the reserve and is very vulnerable to invasion from exotic weeds, some of which are already well established in the downstream lower area of the wetland.

Weeds include broom, Californian thistle, blackberry, marsh thistle, Chilean flame creeper, sycamore (saplings) and ragwort.

The large open area closest to the road should be controlled using manual methods as the density is low. In all other areas the control of weeds will need to be completed using a motorbike with spray tank due to the density of the weeds.

DOC Tautuku Bay Reserve

The reserve is bisected by a driveway that culminates at a parking area with a walkway that goes to Lake Wilkie.

Weeds include sycamore, balm of Gilead, holly, rowan, broom, blackberry, Chilean flame creeper, Himalayan honeysuckle, holly, pussy willow, macrocarpa, gorse, gums, raspberry, Californian thistle, rose, ragwort, rowan, flowering quince and montbretia. In open areas along the track to the wetland blackberry, bittersweet, exotic grasses, ragwort and the occasional small gorse plant were present.

Sycamore has spread forming dense infestations all stages of growth from adult to seedlings were observed. The large areas of gums and macrocarpa are planted and have spread but not significantly.

Schools that utilise this area during school camps for an overnight stay need to find an alternative equally suitable site for them needs to be found first and potentially could be within the Lenz Reserve.

The historic roses within this area should be preserved as historic plants. There is no risk to them becoming weed issues.

The major concern in this area is the holly tree and the sycamores. The holly tree has multiple stems and one main leader. This plant will be a challenge to control. It cannot be controlled chemically and left to die due to Health and Safety issues as it is adjacent to the carpark and main track into the reserve. To effectively kill it the most practical method would be to use a large mulcher. Chainsaw each stem, paint the stump with gel and mulch the stem into a large pile adjacent to the holly. Some stems may be too large and will need to be taken off site and burnt. It is important that all stems are removed and painted with herbicide gel. Branches of holly can resprout if left on the ground. It is

important that in the first 12 months the stumps are inspected for regrowth and retreated if required. The mulch pile will also need to be checked and if anything is growing spray with herbicide.

The sycamores are found in the gullies adjacent to the road into the reserve, and across to the macrocarpa and gums, and east of the walking track towards Lake Wilkie. In 2004 F&B Tautuku Restoration project volunteers compiled a map showing infestations figure 5. Size range is very large old adults (the parent plants) to small seedlings. Under these large infestations very little other vegetation occurs. On the north side of the track, they are smaller and haven't yet colonised the entire area. The map below shows the known locations of sycamore within this reserve.

Control of the sycamores should begin on the North side of the reserve road. Then the area east of the walking track should be controlled to Lake Wilkie.

There are a several large trees adjacent to the road that will require total removal for health and safety concerns. All other trees can be drilled and poisoned, or chemically ring barked and left to die in situ. Smaller trees should be cut down and painted with herbicide gel. The blackberry on the east side of the track has lots of seedlings growing through it, this should be sprayed with herbicide and if any seedlings are not killed, they should be removed by hand.

An annual survey for regrowth and new seedlings of sycamore should be undertaken for at least 4 years after the last sycamore has been controlled. Given the size of the problem within this area a multiyear plan detailing the weed control work and restoration of the area should be developed, including species to plant, maintenance of plantings.

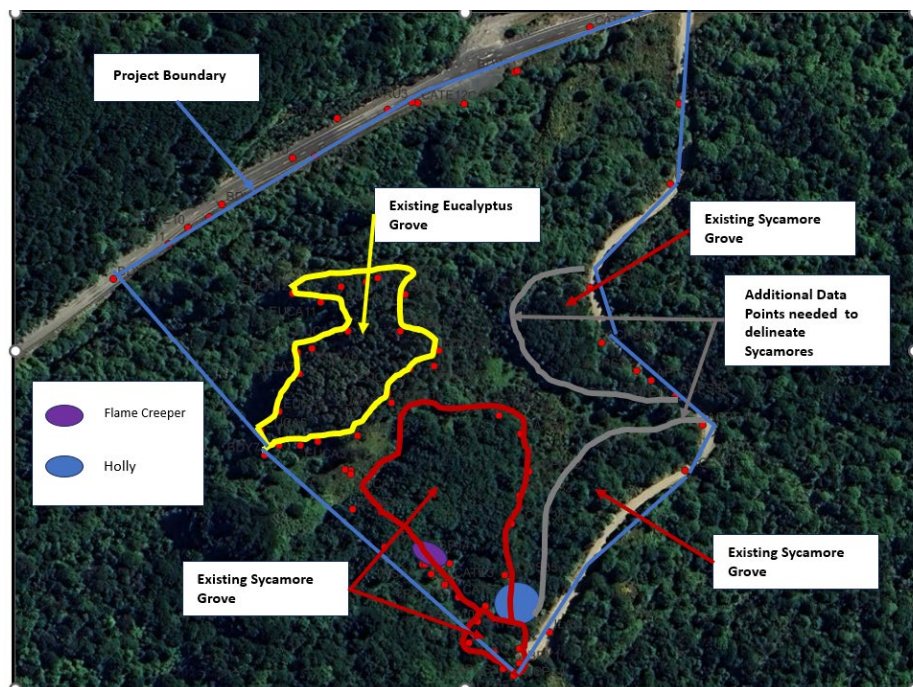


Figure five: Location of sycamore Department of Conservation reserve, Tautuku. Source: J and N Keith.

Note: Rowan is spreading into this area from the road into the Northwest corner.

Tahakopa Valley and Village

The boundary between Otago and Southland districts runs between this area. However, it is important that the weeds at Tahakopa settlement and roadsides are controlled as they will act as a seed source for the Catlins. This is a high priority site as several of the weeds here aren't found elsewhere in the Catlins. To understand the extent of the weeds at Tahakopa a survey will need to be undertaken at all the properties and roadsides.

Weeds include blackberry, broom, buddleia, cherry laurel, Chilean flame creeper, Chilean flame tree, cotoneaster, crack willow, Darwins barberry, elderberry, escallonia, flowering quince, giant hogweed (has been controlled), gorse, Japanese honeysuckle, marsh thistle, montbretia, silver birch, Tasmanian blackwood.

Priority of control is buddleia, Chilean flame tree, cherry laurel, escallonia, Japanese honeysuckle, silver birch and Tasmanian blackwood. These plants are in low numbers in the Catlins control will then reduce the spread to other areas. Once these species are controlled, Darwins barberry, cotoneaster, holly, Spanish heath and sycamore are the next priority.

Chaslands

One small cluster of Russell lupins has been observed on Rod Reserve at Chaslands along the highway. Control of these plants is important as very few populations are known in the Catlins.

Fleming River

Of concern is the anecdotal reporting of gunnera in this area near the beach. A survey to determine whether this species is present, and if so the prompt control of any plants found is high importance.

Wetlands, Rivers and Estuaries

The majority of the wetlands in the Catlins support blackberry, broom, Chilean flame creeper, Darwins barberry, gorse and pines on their margins and in drier areas. Of concern is the increase of silver birch and sycamore within these areas. Trees in wetlands alter the hydrology and structure of the wetlands and in time the wetland will cease to exist.

The main weed of concern for rivers in the Catlins is reed sweet grass and willows.

Reed sweet grass

Catlins River from the main highways to Surat Bay.

Catlins River adjacent to Tawanui Campground, controlled by the Department of Conservation.

Ōwaka River Ōwaka to Katea including the wetland alongside the Ōwaka Balclutha Highway near Ōwaka.

Puerua River near Ōwaka.

Tahakopa Catchment.

Silver birch

Tahakopa wetlands

Willows – grey

Many of the rivers in the Catlins have grey willow along their edges particularly near settlements and open areas.

Tahakopa near the bridge. Residents have raised concern about these infestations.

McClennan estuary two large trunks washed down from upstream. They resprouted and have been controlled.

If control of willows is to be undertaken in any rivers it is prudent to begin control in the headwaters of a catchment and work down towards the coast.

Willows crack

Tahakopa Village

Spartina is found within Catlins Lake and surrounding areas. This is controlled by the Department of Conservation.

Sycamore

Lower Fleming Wetland.

The control of weeds within wetlands and river edges requires different herbicides and is bound by legislation. Each site should be looked at individually and a plan drawn up for the control of weeds.

Priority of Control

The control of weed species in the Catlins is site dependent however there are several species found throughout the Catlins that will require a unified approach. This will then ensure that there will be no reinvasion from other areas. Several of these weed species are well established and will take some time to control. Others are just beginning to establish or only a few plants are known.

Priority	Species	Known Sites	Land Tenure
High			
	Black wattle	Tahakopa	
	Boxthorn	Kākā Point	Private, Road Reserve
	Buddleia	Papatōwai	Private
	Chilean flame tree	All known sites	Private, Road Reserve

	Common barberry	Katea/ Hunt Road	Private, Road Reserve
	Gunnera	Mc Clennan Falls, Hina Hina Road, Purakanui Falls area, Table Hill	Private, Road Reserve. DOC
	Honeysuckle common and Japanese	Papatōwai	Private, Road Reserve
	Macrocarpa	Kahuika, Slope Point	Private, Road Reserve
	North Island coprosma	Papatōwai	Private, Road Reserve
	North Island <i>Pseudopanax laetus</i>	Papatōwai	Private, Road Reserve
	Russell lupins	Chaslands	Road Reserve
	Tiger Lily	Papatōwai	Private, Road Reserve
	Tree of heaven	Near Tunnel Hill	Private
Medium	Darwins barberry	Throughout the Catlins	Private, Road Reserve, DOC
	Holly	Throughout the Catlins	Private, Road Reserve, DOC
	Sycamore	Throughout the Catlins	Private, Road Reserve, DOC

Weeds outside the management area

The Catlins is encompassed with intensive land use eg farming and forestry and larger urban settlements by Otago to the North and Southland to the South. Both regions have exotic plants that are currently not known in the Catlins. Habitat is present for these plants to establish, and many of them are of significant concern if they were to establish. Establishment would be accidental via vehicles, machinery, boots, wind or animals. It is therefore important to ensure people are aware of these weeds and to report them if encountered, or if they see other species they are not aware of.

Waikawa the closest town to Papatōwai (38km) has box thorn, gunnera, purple loosestrife, lesser knotweed, old mans beard and Japanese honeysuckle. These are being controlled by Environment Southland. Bomarea is known from a home garden at Waipapa. This has also been controlled by Environment Southland.

Other weeds of concern are boneseed, sea spurge and nassella tussock. Appendix 4 details these weeds.

Weed control

Weed control is site and weed specific depending on life cycle, height, width, species, growth form and impact on the environment at place. At each area it is recommended that a basic weed plan is drawn up detailing the weeds to be controlled, density of weeds, seed spread, seed viability, location of weeds at site, how does it spread, suckers or seeds, seed spread, seed viability, best time of year for control, methodology and herbicides. Having a site specific plan ensures that the work is carried out effectively, efficiently, the work is repeatable regardless of who is undertaking the work and if anything goes wrong there is a paper trail.

Appendix three details current best practice for controlling the weeds within the Catlins. For other control methods for all weeds the Weedbusters website has a comprehensive list of weeds detailing control methodology, species information and other resources for over 650 weeds

<https://www.weedbusters.org.nz/>.

It is very important that all personnel can identify the plants that they will be controlling.

Control methods

Appendix three details the most appropriate methodology and herbicide for all weeds found in the Catlins. This section describes how to undertake the control work.

Cut and Paste: Used on woody plants and vines. Using a saw, loppers or secateurs a plant is cut as low to the ground as possible then the stump is painted with herbicide gel.

<https://www.instagram.com/reel/DWdqzy7idnM/>

Chainsaw: Used on woody plants. Cut the plant as low to the ground as possible. Depending on the species herbicide gel may be required.

<https://www.instagram.com/reel/DWdqzy7idnM/>

Drill and Fill: Used on larger woody plants. A series of holes are drilled around the circumference of the tree. Herbicide is then injected into the holes.

<https://www.youtube.com/shorts/eJ9L-Q3gLfw>

Herbicide Knapsack: Concentrated herbicide is mixed with water and sprayed onto the plant/s. Can be used for spot spraying smaller quantities of weeds, or blanket spraying a larger infestation that can't be accessed by a vehicle.

Herbicide Vehicle: Concentrated herbicide is mixed with water into a tank on the vehicle and sprayed onto the plant/s. Used for larger areas of weeds.

Basal Spraying: Used on woody plants. Trees are sprayed using a high concentration herbicide. The spray must be sprayed around the circumference of the tree as low as possible.

<https://www.youtube.com/watch?v=KE2LVOHcn0k>

Herbicide Granules: Used on woody weeds. Granules/Prill's are place around the base of the tree or shrub.

<https://www.youtube.com/watch?v=Bg6qiRSxhTE>

Biocontrol: Uses living natural enemies—such as insects, predators, or pathogens—to manage and suppress pests, weeds, or diseases. It offers an eco-friendly, self-sustaining alternative to chemical solutions. In some cases, such as Chilean flame creeper there is no herbicides that will kill the vines without killing the plants (often natives) that it is climbing up. A biocontrol agent has been released as a trail in a few locations in Southland. If the agent works well, it is suggested that they are released in the Catlins when they become available. Likewise, the use of biological control agents for barberry should be considered when the agents become available.

Control may require an integrated approach by using several different methodologies at a site.

All care **Must** be taken to ensure that control is undertaken in the appropriate weather conditions to ensure no spray drift or damage to desirable species occurs.

The following table details the benefits and risks of the above application methods.

Method	Benefits	Environmental Risks	Human Risks	Other issues
Gels: cut and paste	Easily carried, Application to small areas, relatively safe formulations, no spray drift.	Gel blobs. Water contamination. Some gels contain persistent herbicides	Eye and Skin irritation. Herbicide concentrations may be higher than sprays.	Some shrubs may be too large for this method.
Drill and fill,	Easy method. Application area relatively small.	Sometimes high concentrations of	High concentration of herbicides	May require drilling equipment. Trees left to

	Can be used on large plants	herbicides are used per plant.	requires greater care.	stand and die. Not suitable in high public use areas.
Spot and knapsack spraying.	Better and more extensive coverage of herbicide on to weeds	Spray drift. Spray drip on to soil.	Exposure to high concentrations at time of preparation. Spray drift into eyes and onto skin. Breathing in spray mists	Carrying knapsack full of herbicides.
Basal Spraying	Better transport of some herbicides in plant. May require little equipment apart from spray pack, oil and herbicide	Basal sprays and their carriers eg biodiesel, diesel or oil have a detrimental effect on the environment and must be used with caution.	Carriers and Herbicides have health impacts which must be managed.	Specialised spray packs, every stem must be treated, by spraying. May cause damage to understory and equipment. Size limitations
Granules, (hexazinone),	Easily transported	Root absorbed herbicides, potential for spread to non- target plants and wider environment.	Herbicide concentration, but has benefit of more focused application	Granules can be blown or washed away by rain from the application site and have a negative impact on other vegetation

Herbicide Legislation

The use of herbicides is governed under approval by the Environmental Protection Agency (EPA), Te Mana Rauhi Taiao and Work Safe, Mahi Haumarua Aotearoa. EPA requires that herbicide users must

take all reasonable steps to ensure the substance does not have any significant adverse effect beyond the application area. Also, where an environmental exposure limit has been set for the herbicide, that the concentration of the herbicide in the environment does not exceed the environmental limits set for the herbicide. NZS 8409:2021 Management of Agrichemicals is the National Standard that all people controlling weeds must follow. It outlines the training requirements for each control technique, signage, record keeping, personal protective equipment and transport of herbicide <https://www.growsafe.co.nz/Growsafe/GrowSafe/AboutUs/NZS8409.aspx>.

All users of herbicides **Must** be suitably qualified, the minimum is Growsafe certification. They must be suitably competent in the use of herbicides and use the appropriate protective gear. They must have read the label on the herbicide and be aware of any controls outlined on the label.

A spray diary must be kept for all control applications of herbicides including gel. Growsafe New Zealand has a comprehensive template.

<https://www.growsafe.co.nz/Growsafe/GrowSafe/Rsrc/FormsAndTemplates/SprayDiary-Handheld-Template.aspx>

Prior to controlling any weeds on any property Landowner permission **MUST** be obtained.

Monitoring

It is important to monitor any weed control to determine the impact of the weed control on the weed – is the methodology and herbicide effective, has there been any off-target damage, has another weed replaced the plant you are controlling? What do you need to change if anything? Monitoring will track progress over time and determine if you are achieving your goal.

ORC have a draft monitoring plan for the Catchment Action Plan. They require two indicators to determine the effectiveness of the weed control.

1. Determine the size of the infestation: Measure by the most appropriate methodology the m². Calculate the percentage cover that the weeds occupy within this area.
2. Determine how much of this area by m² has been controlled.

It is also suggested that a photo-point from a fixed location showing the infestation is taken. This will show changes overtime.

Spray diaries are a legal requirement and will show over time they will show the amount of herbicide and time used at a site. While spray diaries are not a formal methodology of monitoring, they can indicate the decline or increase of a weed population.

Monitoring will feed into the annual report which will track progress and link back to the CAP objectives.

Advocacy and Education

It is important that the landowners within the Catlins are informed and kept abreast of what is happening regarding weed control. Advocacy has the effect of alerting and educating the public, land

occupiers and land users to the negative impacts of weeds. This may act as a catalyst for these persons to initiate weed control operations on their land or to act as weed detection agents.

Advocacy could be in the form of public meetings, newsletters via mail drop detailing what is happening and how to report weeds, newspaper articles. A website could be set up detailing what work has been undertaken, how to be involved, community workdays, how to report new weeds, how to donate money to assist the work, what plants to plant instead of exotic species and other education materials. A weed workshop could be undertaken by weed experts to help locals understand the key weed species. Articles in the local newspaper and monthly weed updates on the Catlins Facebook page. A plant me instead booklet could be produced.

Incentivising removal of weeds at private properties is known to be effective by replacing the removed plant with a native or replacing them with a garden voucher to the native plant nursery in Dunedin.

It has been suggested that a weed SWAT team is formed. This would be an effective tool for expediting control

Within the Catlins there are several forestry plantations. These plantations often harbour weeds under them and can be a source of new weeds to an area. Some of the weeds observed in forestry plantations are not typical farmland or forestry weeds but rather garden escapes spread by birds and wind. Or when farmland is converted to forestry and old homestead gardens and weeds spread from there. Around the edges broom and gorse are common also acting as a seed source to neighbouring properties. It is suggested that a conversation is undertaken with the plantation owners and weed control priorities are established.

The Catlins is a major tourism destination this group could be targeted for funding by putting up information boards at key spots with key points discussing the habitat and the weeds that are impacting these areas and a link to the website.

Discussion

The removal of weeds at a site is only the beginning and future work will need to be ongoing. Removing weeds from an area opens it and it becomes vulnerable to reinvasion of other weed species. Plants have seed soil banks with some with very long viability like mallow for up to 50 years.

It is important at all sites to consider replanting with the appropriate species for that area. If using herbicide to remove weeds, check the label, depending on the herbicide used new plantings may not be able to be planted for up to 6 months to prevent harming the new plants. Ongoing maintenance of the new plantings will be required for at least 3 years.

After control work has been undertaken it is important to revisit the site annually to determine has the work been effective? Have new plants grown? When very large areas are controlled, it would be prudent to consider replanting with native species and only proceed if rehabilitation is feasible and maintenance of plantings is supported. Surveillance should be carried out at for at least two years after the last remaining weed species was observed.

Climate change may have an impact on the weeds with the Catlins as the weather changes warmer/colder it will provide opportunities for new weed species to colonise areas where previously they

couldn't survive. In addition, some species may increase in numbers or decline as the climatic conditions change.

Surveillance needs to be ongoing, and people need to be vigilant and report new weeds when they encounter them.

References

Ministry for Primary Industries (2020) National Weed Accord

Otago Regional Council (2019) Regional Pest Management Plan

Acknowledgements

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Appendix 1 Weeds and rulings of plants within the Otago Regional Pest Management Strategy

Species	Ruling
Banana passionfruit <i>Passiflora tripartita</i> var <i>mollissima</i> P. <i>tripartita</i> var <i>azuayansis</i> P. <i>tarminiana</i> * P. <i>pinnatistipula</i> <i>Passiflora</i> x <i>rosea</i> P. <i>caerulea</i>	Site led
Bomarea <i>Bomarea caldasii</i> B. <i>multiflora</i>	Progressive containment
Boneseed <i>Chrysanthemoides monilifera</i>	Progressive containment
Broom <i>Cytisus scoparius</i> <i>Teline monspessulana</i>	Sustained control Occupiers outside the urban areas, and outside the Gorse and Broom Free Areas (none are in the Catlins) must destroy gorse and broom within 10 metres of a property boundary where the neighbouring property is clear of gorse and broom within 50 metres of that boundary.
Chilean flame creeper <i>Tropaeolum speciosum</i>	Site led
Contorta (lodgepole) pine <i>Pinus contorta</i>	Progressive containment
Corsican pine <i>Pinus nigra</i>	Progressive containment
Darwin's barberry <i>Berberis darwinii</i>	Site led
Gorse	Sustained control Occupiers outside the urban areas, and outside the Gorse and Broom Free Areas (none are in the Catlins) must destroy gorse and broom within 10 metres of a property boundary where the neighbouring property is clear of gorse and broom within 50 metres of that boundary.
Gunnera	Site led

<i>Gunnera tinctoria</i>	
Lagarosiphon* <i>Lagarosiphon major</i>	Site led
Larch (excl. sterile hybrids) <i>Larix decidua</i>	Progressive containment
Mountain pine and dwarf mountain pine <i>Pinus uncinata Pinus mugo</i>	Progressive containment
Nodding thistle <i>Carduus nutans</i>	Sustained control Occupiers outside the urban areas must destroy nodding thistle within 100metres of a property boundary where the neighbouring property is clear of nodding thistle within 100 metres of that boundary.
Old man's beard <i>Clematis vitalba</i>	Progressive control Occupiers must destroy all old man's beard on their land.
Ragwort <i>Senecio jacobaea</i>	Sustained control Occupiers outside the urban areas must destroy ragwort within 50 metres of a property boundary where the neighbouring property is clear of ragwort within 50 metres of that boundary.
Scots pine <i>Pinus sylvestris</i>	Progressive containment
Spartina	(i) No establishment of spartina at new sites. (ii) Eradication of spartina at existing sites within 10 years.
Sycamore <i>Acer pseudoplatanus</i>	Site led
Tradescantia <i>Tradescantia fluminensis</i>	Site led
Wilding conifers <i>Bishops pine Pinus muricata Contorta (lodgepole) pine* Pinus contorta Corsican pine Pinus nigra Douglas fir Pseudotsuga menziesii Larch Larix decidua Maritime pine Pinus pinaster Mountain pine and</i>	Progressive containment

<i>dwarf mountain pine Pinus mugo and P.uncinata Ponderosa pine Pinus ponderosa Radiata pine Pinus radiata Scots pine Pinus sylvestris</i>	
Wild Russell lupin <i>Lupinus polyphyllus</i>	Sustained control

Exclusion programme: 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 programme: 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 programme: 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 programme: 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.

Site-led pest programme: 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

Appendix 2 Table of weeds

The following abbreviations are used in the table below.

Ecosystem or area at risk (the main ecosystems threatened)

a (alpine)	above the natural treeline
f (forest)	woody vegetation more than 2 metres high
s (shrubland)	woody vegetation less than 2 metres high, or regenerating forest
g (grassland)	native grassland or herbfield (except alpine)
rv (riverbed)	open riverbed or recent alluvial surfaces
ri (riparian)	streamsides, riverbanks, or lakeshores
we (wetland)	freshwater wetland
w (waterbody)	lakes, ponds, or slow-moving water
e (estuarine)	estuarine systems
d (dune)	dunes or sandy areas
c (coastal)	other coastal areas apart from dunes
r (roadside)	roadsides, wasteland, urban areas, or forest margins

Scientific Name	Common Name	Growth form	Ecosystem at Risk	Location	Id Link	National Weed Accord
<i>Acacia melanoxylon</i>	Australian blackwood	Tree	f, s, g, r ,	Takopa	https://www.nzpcn.org.nz/flora/species/acacia-melanoxylon/	
<i>Angelica pachycarpa</i>	Angelica	Herb	rv, ri, s, d, c, r	Pounaweia	https://www.nzpcn.org.nz/flora/species/angelica-pachycarpa/	
<i>Acer pseudoplatanus</i>	Sycamore	Tree	f, s , ri , g , rv, r	Mimihau catchment	https://www.nzpcn.org.nz/flora/species/acer-pseudoplatanus/	
<i>Agapanthus orientalis</i>	Agapanthus	Herb	c, r		https://www.nzpcn.org.nz/flora/species/agapanthus-praecox-subsp-orientalis/	
<i>Akebia quinata</i>	Chocolate vine	Vine	f, s, r	Pounaweia	https://www.nzpcn.org.nz/flora/species/akebia-quinata/	
<i>Ailanthus altissima</i>	Tree of heaven	Tree	f, s, g, r ,		https://www.nzpcn.org.nz/flora/species/ailanthus-altissima/	Y
<i>Alstroemeria sp</i>	Peruvian lily	Herb	r, s,		https://www.nzpcn.org.nz/flora/species/alstroemeria-aurea/	
<i>Alnus glutinosa</i>	Alder	Tree	s, ri, f, g	Roadside highway Owaka to Catlins Lake	https://www.nzpcn.org.nz/flora/species/alnus-glutinosa/	
<i>Ammophila arenaria</i>	Marram grass	Grass	c, d	All dunes throughout Catlins	https://www.nzpcn.org.nz/flora/species/calamagrostis-arenaria/	

<i>Bambusa spp</i>	Bamboo	Grass	s		https://www.nzpcn.org.nz/flora/species/bambusa-glaucescens/	
<i>Berberis darwinii</i>	Darwin's barberry	Shrub	s, f, g, r	Roadside and gardens Papatōwai,	https://www.nzpcn.org.nz/flora/species/berberis-darwinii/	Y
<i>B.glaucocarpa</i>	Common Barberry	Shrub	s, g, r		https://www.nzpcn.org.nz/flora/species/berberis-glaucocarpa/	
<i>Betula pendula</i>	Silver birch	Tree	s, g, ri, we		https://www.nzpcn.org.nz/flora/species/betula-pendula/	
<i>Bomarea multiflora</i>	Bomarea	Vine	f; s	Garden	https://www.nzpcn.org.nz/flora/species/bomarea-multiflora/	Y
<i>Buddleja davidii</i>	Butterfly bush, summer lilac	Tree	g, r, ri	Roadsides and gardens Papatōwai	https://www.nzpcn.org.nz/flora/species/buddleja-davidii/	
<i>B. globosa</i>	Orange ball tree	Tree	g,r, ri		https://www.nzpcn.org.nz/flora/species/buddleja-globosa/	
<i>Carduus nutans</i>	Nodding thistles	Herb	g, r		https://www.nzpcn.org.nz/flora/species/carduus-nutans/	
<i>Cedronella canariensis</i>	Balm of Gilead	Herb	S,ri, r	Papatōwai	https://www.nzpcn.org.nz/flora/species/cedronella-canariensis/	
<i>Chaenomeles</i>	Flowering quince	Shrub	s, g, r	Tautuku	https://www.nzpcn.org.nz/flora/species/chaenomeles-speciosa/	
<i>Choisya ternata</i>	Mexican orange blossom	Shrub	s, g, r		https://www.nzpcn.org.nz/flora/species/choisya-ternata/	
<i>Cirsium arvense</i>	Californian thistle	Herb	a, g, d		https://www.nzpcn.org.nz/flora/species/cirsium-arvense/	
<i>C.palustre</i>	Marsh thistle	Herb	rv, we, r		https://www.nzpcn.org.nz/flora/species/cirsium-palustre/	

<i>Clematis montana</i>	Anemone clematis	Vine	f, s, r, g		https://www.nzpcn.org.nz/flora/species/clematis-montana/	
<i>C. vitalba</i>	Old Man's Beard	Vine	f, s, r, g, ri		https://www.nzpcn.org.nz/flora/species/clematis-vitalba/	Y
<i>Conium maculatum</i>	Hemlock	Herb	rv, r, g		https://www.nzpcn.org.nz/flora/species/conium-maculatum/	
<i>Coprosma grandiflora</i>	Large leaved coprosma	Shrub	s, g, r	Papatōwai	https://www.nzpcn.org.nz/flora/species/coprosma-grandifolia/ Note this species is a native plant that is not native to the area	
<i>Coprosma repens</i>	Taupata	Shrub	s, f, g, r	Clutha Riverside	https://www.nzpcn.org.nz/flora/species/coprosma-repens/ Note this species is a native plant that is not native to the area	
<i>Cortaderia jubata</i>	Purple pampas	Grass	s, g, r		https://www.nzpcn.org.nz/flora/species/cortaderia-jubata/	Y
<i>C. selloana</i>	Pampas	Grass	s, g, r	Roadsides, gardens, shelterbelts. More common in the northern Catlins declining as head South.	https://www.nzpcn.org.nz/flora/species/cortaderia-selloana/	Y
<i>Cotoneaster glaucophyllus</i> <i>C. franchetii</i>	Cotoneaster Khasia berry	Shrub	s, c, r, ri	Common throughout	https://www.nzpcn.org.nz/flora/species/cotoneaster-glaucophyllus/	

<i>C. simonsii</i>					https://www.nzpcn.org.nz/flora/species/cotoneaster-franchetii/ https://www.nzpcn.org.nz/flora/species/cotoneaster-simonsii/	Y
<i>Crataegus monogyna</i>	Hawthorn	Tree	s, g, r	Scattered throughout	https://www.nzpcn.org.nz/flora/species/crataegus-monogyna/	
<i>Crocsmia x crocosmiiflora</i>	Montbretia	Lily	ri, r	Roadsides everywhere, localised patches	https://www.nzpcn.org.nz/flora/species/cytisus-scoparius/	
<i>Cupressus macrocarpa</i>	Macrocarpa	Tree	s, g, r	Slope Point coastal cliffs, Tautuku beach	https://www.nzpcn.org.nz/flora/species/hesperocyparis-macrocarpa/	
<i>Cytisus scoparius</i>	Broom	Shrub	g, rv, r, a, s		https://www.nzpcn.org.nz/flora/species/cytisus-scoparius/	
<i>Dryopteris filix-mas</i>	Male fern	Fern	ri, s, f		https://www.nzpcn.org.nz/flora/species/dryopteris-filix-mas/	
<i>Echium pininana,</i>	Tree echium	Herb	d, c, r	All beach residential areas	https://www.nzpcn.org.nz/flora/species/echium-pininana/	
<i>Embothrium coccineum</i>	Chilean flame tree	Tree	s, g, r		https://www.nzpcn.org.nz/flora/species/embothrium-coccineum/	
<i>Erica lusitanica</i>	Spanish Heath	Shrub	s, g, r, we	Roadsides Papatōwai, Owaka	https://www.nzpcn.org.nz/flora/species/erica-lusitanica/	
<i>Escallonia</i>	Red claws	Shrub	s, g, r		https://www.nzpcn.org.nz/flora/species/escallonia-rubra-var-macrantha/	
<i>Eucalyptus spp</i>	Gum	Tree	s, ri, r			

<i>Fraxinus excelsior</i>	European ash	Tree	f, s, r		https://www.nzpcn.org.nz/flora/species/fraxinus-excelsior/	
<i>Glyceria maxima</i>	Reed sweetgrass	Aquatic	ri, w		https://www.nzpcn.org.nz/flora/species/glyceria-maxima/	
<i>Gunnera tinctoria</i>	Chilean rhubarb	Giant Herb	c, r, we		https://www.nzpcn.org.nz/flora/species/gunnera-tinctoria/	Y
<i>Hedera helix</i>	English Ivy	Vine	s, r		https://www.nzpcn.org.nz/flora/species/hedera-helix/	
<i>Heracleum mantegazzianum</i>	Giant hogweed	Herb	rv, d, , c, r,		https://www.nzpcn.org.nz/flora/species/heracleum-mantegazzianum/	
<i>Hoheria sexstylosa</i> , <i>Hoheria populnea</i>	North Island lacebark	Tree	f, s, ri		https://www.nzpcn.org.nz/flora/species/hoheria-sexstylosa/ https://www.nzpcn.org.nz/flora/species/hoheria-populnea/ Note this species is a native plant that is not native to the area	
<i>Hypericum androsaemum</i>	Tutsan	Shrub	f, r		https://www.nzpcn.org.nz/flora/species/hypericum-androsaemum/	Y
<i>Ilex aquifolium</i>	Holly	Tree	f, s, r	Roadsides, gardens and farmland Papatōwai, DOC reserve,	https://www.nzpcn.org.nz/flora/species/ilex-aquifolium/	
<i>Iris foetidissima</i>	Stinking iris	Herb	r, g, s		https://www.nzpcn.org.nz/flora/species/iris-foetidissima/	
<i>Lamium galeobdolon luteum</i>	Aluminium plant	Herb	f, s, r		https://www.nzpcn.org.nz/flora/species/lamium-galeobdolon/	Y
<i>Leycesteria formosa</i>	Himalayan honeysuckle	Shrub	c, r, ri		https://www.nzpcn.org.nz/flora/species/leycesteria-formosa/	
<i>Ligustrum lucidum</i>	Tree privet	Tree	r, s, ri		https://www.nzpcn.org.nz/flora/species/ligustrum-lucidum/	

<i>Lilium superbum</i>	Turkscap lily	Herb	r, g			
<i>Lonicera japonica</i>	Japanese honeysuckle	Vine	f, s, r		https://www.nzpcn.org.nz/flora/species/lonicera-japonica/	Y
<i>Lupinus arboreus</i>	Tree lupin	Shrub	rv, c, d, r , s, ri	Every dune along coast	https://www.nzpcn.org.nz/flora/species/lupinus-arboreus/	
<i>L. polyphyllus</i>	Russell lupin	Herb	rv, c, r,ri		https://www.nzpcn.org.nz/flora/species/lupinus-polyphyllus/	
<i>Leycesteria formosa</i>	Himalayan honeysuckle	Shrub	f, s, r	Roadside and farmland	https://www.nzpcn.org.nz/flora/species/leycesteria-formosa/	
<i>Lycium ferocissimum</i>	Boxthorn	Shrub	s, g, d,r		https://www.nzpcn.org.nz/flora/species/leycesteria-formosa/	
<i>Malva arborea</i>	Tree mallow	Shrub	d, r, c		https://www.nzpcn.org.nz/flora/species/malva-arborea/	
<i>Osteospermum sp</i>	African daisy	Herb	d, r, c	Gardens		
<i>Passiflora tripartita</i> var	Banana passionfruit	Vine	f, s, r	Pounawea	https://www.nzpcn.org.nz/flora/species/passiflora-tripartita-var-mollissima/	Y
<i>Phalaris arundinacea</i> var <i>picta</i>	Ribbon grass	Grass	g, r, ri			

<i>Pinus contorta</i>	Lodgepole pine	Tree	s, g, r, a		https://www.nzpcn.org.nz/flora/species/pinus-contorta/	Y
<i>P. mugo</i>	Mountain pine	Tree	s, g, r, a		https://www.nzpcn.org.nz/flora/species/pinus-mugo/	
<i>P. nigra ssp. larico</i>	Corsican pine	Tree	s, g, r, a		https://www.nzpcn.org.nz/flora/species/pinus-nigra-subsp-nigra/	
<i>P. ponderosa</i>	Western yellow pine	Tree	s, g, r, a		https://www.nzpcn.org.nz/flora/species/pinus-ponderosa/	
<i>P. radiata</i>	Radiata pine	Tree	s, g, r, a		https://www.nzpcn.org.nz/flora/species/pinus-radiata/	
<i>P. sylvestris</i>	Scotts pine	Tree	s, g, r, a		https://www.nzpcn.org.nz/flora/species/pinus-sylvestris/	
<i>Pseudopanax arborea</i> , <i>P. laetus</i>	North island Pseudopanax				https://www.nzpcn.org.nz/flora/species/pseudopanax-arboreus/ https://www.nzpcn.org.nz/flora/species/pseudopanax-laetus/ Note this species is a native plant that is not native to the area	
<i>Pseudotsuga menziesii</i>	Douglas fir	Tree	f, s, g, r, a		https://www.nzpcn.org.nz/flora/species/pseudotsuga-menziesii/	
<i>Prunus laurocerasus</i> ,	Cherry laurel	Tree	f, s, g, r,		https://www.nzpcn.org.nz/flora/species/prunus-laurocerasus/	
<i>Prunus spp.</i>	Cherries	Tree	s, r			
<i>Reed sweet grass</i>						
<i>Rhamnus alaternus</i>	Evergreen buckthorn	Shrub	c, d, g, r		https://www.nzpcn.org.nz/flora/species/rhamnus-alaternus/	Y

<i>Ribes uva-crispa</i>	Gooseberry	Shrub	g, s, r		https://www.nzpcn.org.nz/flora/species/ribes-uva-crispa/	
<i>Ribes sanguineum</i>	Flowering currant	Shrub	s, r	Extensive around Owaka on roadsides and large area off Hinahina Road from Settelment Hill	https://www.nzpcn.org.nz/flora/species/ribes-sanguineum/	
<i>Rosa rubiginosa</i>	Sweet briar	Shrub	g, ri, r ,s		https://www.nzpcn.org.nz/flora/species/rosa-rubiginosa/	
<i>Rubus fruticosus</i>	Blackberry	Shrub	s, g, r ,we		https://www.nzpcn.org.nz/flora/species/rubus-fruticosus-agg/	
<i>Salix cinerea</i>	Grey willow	Tree	ri, c, we,	Riparian forest	https://www.nzpcn.org.nz/flora/species/salix-cinerea/	Y
<i>S. fragilis</i>	Crack willow	Tree	ri, c, we		https://www.nzpcn.org.nz/flora/species/salix-fragilis-s-euxina/	Y
<i>Sambucus nigra</i>	Elderberry	Shrub	f, s, g, r		https://www.nzpcn.org.nz/flora/species/sambucus-nigra/	
<i>Sedum acre</i>	Stonecrop	Herb	c, r , g,a	Roadsides	https://www.nzpcn.org.nz/flora/species/sedum-acre/	
<i>Selaginella kraussiana</i>	Selaginella	Fern	ri, f, s, r		https://www.nzpcn.org.nz/flora/species/selaginella-kraussiana/	Y
<i>Senecio jacobea</i>	Ragwort	Herb	rv, g, r	Roadsides, paddocks, wasteland	https://www.nzpcn.org.nz/flora/species/jacobaea-vulgaris/	
<i>Solanum dulcamara</i>	Bittersweet	Vine	s, r		https://www.nzpcn.org.nz/flora/species/solanum-dulcamara/	
<i>Sonchus oleraceus</i>	Sow thistle	Herb	rv, g, r		https://www.nzpcn.org.nz/flora/species/sonchus-oleraceus/	

<i>Sorbus aucuparia</i>	Rowan	Tree	s, c, r	MacLennan, Papatōwai	https://www.nzpcn.org.nz/flora/species/sorbus-aucuparia-subsp-aucuparia/	
<i>Spartina spp</i>	Spartina	Aquatic	w		https://www.nzpcn.org.nz/flora/species/spartina-anglica/	
<i>Tropaeolum speciosum</i>	Chilean flame creeper	Vine	f, s, r	Widespread in gardens, forests, shrubland, roadsides	https://www.nzpcn.org.nz/flora/species/tropaeolum-speciosum/	Y
<i>Ulex europaeus</i>	Gorse	Shrub	g, rv, r , a, s,		https://www.nzpcn.org.nz/flora/species/ulex-europaeus/	
<i>Viburnum tinus</i> var. <i>tinus</i>		Tree		Gardens, planted as shelterbelt especially Katea	https://www.nzpcn.org.nz/flora/species/viburnum-tinus-var-tinus/	
<i>Zantedeschia aethiopica</i>	Arum lily	Herb	we, r,w		https://www.nzpcn.org.nz/flora/species/zantedeschia-aethiopica/	

Appendix 3 Control methodology for each of the weeds

Species	Control methodology
Bamboo	Cut and paste every stem with bamboo buster. There is no effective herbicide that kills the bamboo without killing everything else surrounding the plant.
Blackberry	Spray using Tordon at label rates Cut and paste plants using Picloram Gell if the use of herbicide spray is not permitted.
Boxthorn	Boxthorn is a challenge to control and may need several applications. Cut and paste plants using Picloram Weed Gell. Large infestations pull out with machinery. All material removed should be burnt as any stem that is left on the ground will resprout. It is important to check the controlled plants on an annual basis to ensure no regrowth has occurred.
Broom	Spray using Tordon at label rates Cut and paste plants using Picloram Gell if the use of herbicide spray is not permitted.
Buddleia both	Cut and paste plants using Picloram Weed Gell.
Chilean flame creeper	No Know control method at present
Cherry laurel	Cut and paste plants using Picloram Weed Gell. Large infestations pull out with machinery. All material removed should be burnt as any stem that is left on the ground will resprout. It is important to check the controlled plants on an annual basis to ensure no regrowth has occurred.

Echium	Cut and paste plants using Picloram Weed Gell. Larger infestations spray with Tordon at label rates It is important when cutting and pasting that heavy duty gloves are worn as plants have tiny needle like thorns
Gorse	Spray using Tordon at label rates Cut and paste plants using Picloram Gell if the use of herbicide spray is not permitted.
Holly	All plants less than 2metres cut down paste plants using Picloram Weed Gell. Large trees drill and fill. Drill holes 100mm apart 100 deep 45-degree angle inject straight Glyphosate into holes Ensure any cut material is hung up in trees or removed from site as it will resprout if left on the ground
Lupin	Spray using Tordon at label rates
Mallow	Spray using Tordon at label rates
Montbretia	Escort, Metsulfrun
Pampas	Gallant at pampas rates
Peruvian lily	Spray using Tordon at label rates
Pines including Douglas fir and macrocarpa	All plants less than 2metres cut down ensure there are no green needles are left. There is no need to gel the stump if this can't be guaranteed paste plants using Picloram Weed Gell. Large trees drill and fill. Drill holes 100mm apart 100 deep 45-degree angle inject straight Glyphosate into holes

Ragwort	Spray using Tordon at label rates
Selaginella	Spray plants with 100% Janolla or Weed Weapon extra strength.
Silver birch	In wetlands all plants less than 2metres in height cut and paste with Glyphosate gel. Glyphosate is approved for using in wetlands or stream edges. Large trees drill and fill. Drill holes 100mm apart 100 deep 45-degree angle inject straight Glyphosate into holes All other areas use Picloram Weed Gell.
Stinking iris, Arum lily, Agapanthus	Control with Versatile, (clopyralid - active ingredient) at label rates.
Stonecrop	Spray using Tordon at label rates. When spraying ensure a low pressure is used ny fragment s of plants that break of will resprout
Sycamore	In wetlands all plants less than 2metres in height cut and paste with Glyphosate gel. Glyphosate is approved for using in wetlands or stream edges. Large trees drill and fill. Drill holes 100mm apart 100 deep 45-degree angle inject straight Glyphosate into holes All other areas use Picloram Weed Gell.
Thistles	Spray using Tordon at label rates Cut and paste plants using Picloram Gell if the use of herbicide spray is not permitted.

Tiger lily	Pull plants out by hand.
Vines	Cut and paste plants using Picloram Weed Gell. Cut the vines as close to the ground as possible. Tie up vines if they touch the ground they will resprout.
Willow	In wetlands all plants less than 2metres in height cut and paste with Glyphosate gel. Glyphosate is approved for using in wetlands or stream edges. Large trees drill and fill. Drill holes 100mm apart 100 deep 45-degree angle inject straight Glyphosate into holes All other areas use Picloram Weed Gell.
Woody weeds	All plants less than 2metres cut down paste plants using Picloram Weed Gell. Large trees drill and fill. Drill holes 100mm apart 100 deep 45-degree angle inject straight Glyphosate into holes

Appendix 4 Surveillance weed species

Scientific Name	Common Name	Growth form	Ecosystem at Risk	Location	Id Link
<i>Bomarea multiflora</i>	Bomarea	Vine	f, s, g	Waikawa	https://www.nzpcn.org.nz/flora/species/bomarea-multiflora/
<i>Osteospermum - moniliferum</i> subsp <i>moniliferum</i>	Boneseed	Shrub	s, d, c		https://www.nzpcn.org.nz/flora/species/osteospermum-moniliferum-subsp-moniliferum/
<i>Persicaria campanulata</i>	Lesser knotweed	Herb	s, g	Waikawa	
<i>Nassella trichotoma</i>	Nassella tussock	Grass	s, g	Central Otago	https://www.nzpcn.org.nz/flora/species/nassella-trichotoma/
<i>Lythrum salicaria</i>	Purple loosestrife	Herb	s, g, r, w	Waikawa	https://www.nzpcn.org.nz/flora/species/lythrum-salicaria/
<i>Euphorbia paralias</i>	Sea spurge				https://www.nzpcn.org.nz/flora/species/euphorbia-paralias/ Note only known from a few sites on the West coast of the North Island. Highly invasive species. Notifiable plant.

