



The Styx

Pūrākaunui

K McCoombs

Greenspace Unit
Christchurch City Council

May 1999

Report: 1999/1
CCCECO99-09

Weeds at Brooklands Lagoon



CHRISTCHURCH
CITY COUNCIL - PARKS & WATERWAYS



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Executive Summary

Valuable salt marsh at Brooklands Lagoon is being invaded by weeds, including gorse, Spanish heath and pines. Weed control at this site needs urgent attention.

Brooklands Lagoon has very high wildlife and botanical values and is identified in the City Plan as an Ecological Heritage Site. Several invasive weed species are threatening the high ecological values of Brooklands Lagoon by significantly altering the habitat.

The current level of input into weed control is not enough to either halt or reverse the spread of weeds into valuable salt marsh habitat.

There are several pieces of legislation, as well as policies in the City Plan and the Christchurch Beaches and Coastal Parks Management Plan, relevant to this area. They require the control of certain plant species as well as the preservation of native flora and fauna (see Appendix 1).

Increased funding is required to enable purchase of labour and materials. Prompt action will minimise the size of the task and will minimise the loss of habitat. Resources spent at this stage will reduce the total resources required to bring the problem back to a manageable level.

It is recommended that additional funding of \$15 000 be sought initially. This would enable the council to employ two staff under the Taskforce Green / ACE scheme, to concentrate full-time (for 6 months) on weed control. A proposed schedule of work is outlined.

The cost of achieving weed control at Brooklands Lagoon will never be cheaper than it is now.

1 Background

Brooklands Lagoon is an ecologically valuable salt marsh and dune system, in the north-eastern corner of Christchurch. It is listed in the City Plan as an Ecological Heritage Site. The area is also recognised by the Canterbury Regional Council in their Regional Coastal Environment Plan as an Area of Significant Conservation Value.

Over the last few years, there has been a noticeable increase in the amount and number of weeds present in the area. In 1988 the gorse around the lagoon was described as “only present in small quantities and thus should be easily controlled” (Innes, Lilley, Mattar 1987). The only other weeds specifically mentioned were pines and tree lupin. The recent hot summers may well have contributed to the increase in weed plants.

The increased problems with weeds may also be related to the infilling and consequent drying out that is occurring within parts of the Lagoon. Areas that were previously salt marsh are now marsh fringe and therefore more prone to weed invasions.

The main weed species currently present are¹ (alphabetically):

1.	blackberry	6.	nodding thistle
2.	broom	7.	radiata pine
3.	coast wattle	8.	silver poplar
4.	gorse	9.	Spanish heath
5.	grey willow	10.	sweet briar

These particular species are a problem because of the effect that they have on other vegetation, such as changing the composition or structure of the habitat and suppressing regeneration of other species. They also tend to reproduce and/or spread quite rapidly. In addition, they can be difficult (and/or expensive) to control.

¹ Some other weed species present that may need attention in the future are boneseed, crack willow, hemlock, Lombardy poplar, old man’s beard and tree lupin.

2 Weed Details

DoC (1997) has graded all of these species on a range of their characteristics. All of them are considered serious environmental weeds.

The benefits of achieving weed control for the Brooklands Lagoon area include:

- Retention of existing, very high, ecological values – including habitat for plants and animals
- Compliance with requirements under various Acts and the fulfilment of various Council policies (see Appendix 1)
- Reduced seed sources of weeds for locations nearby

2.1 blackberry

blackberry	<i>Rubus fruticosus</i> agg.
Comments:	Local patches are established.
Pest Status ²	Surveillance Plant Pest – no spread or propagation allowed.
Impact:	Sprawling growth eliminates other species. The dense layering of leaves shades out other species.
Proposed Action:	<ol style="list-style-type: none"> 1. Eradicate small infestations to reduce future problems. 2. Prevent larger populations from spreading
Method(s):	<p>Spray with Roundup.</p> <p>When in amongst desirable species, grubbing/mechanical removal may be necessary. This will need to be done carefully so that the ground is not disturbed too much, as disturbed ground favours weed growth.</p>



Blackberry leaves

² Pest management status in the Canterbury Regional Council “Regional Pest Management Strategy (1998)”

2.2 broom



Left: broom flowers
Right: Leaves and ribbed stem

broom	<i>Cytisus scoparius</i>
Comments:	Local patches established.
Pest Status: below.	Containment Control Plant Pest. The rules related to broom are detailed
Impact:	Broom can spread rapidly. It shades out low growing species. Broom also increases nutrient status of the soil (because it is a nitrogen fixer), which will tend to favour other exotic species.
Proposed Action:	<ol style="list-style-type: none"> 1. Eradicate infestations less than 50 m² 2. Restrict areas greater than 50 m² from spreading 3. Clear 10 m strip along boundaries 4. Introduce biological control agents 5. Progressively reduce the size of broom infested areas
Method(s):	<p>Cut or spray. Any cutting will require follow-up spraying.</p> <p>Biological control agents could be used to assist control in the long term.</p> <p>Planting of native shrubby species (ngaio, akekake, Coprosmas, Pittosporums, broadleaf) to counteract the long-lived seed bank.</p>

Canterbury Regional Pest Management Strategy (1998) rules relating to broom:

Rule 6.3

Land occupiers shall eradicate broom infestations that cover up to 50 square metres in area and are greater than 5 metres from other broom infestations exceeding 50 square metres in area on the land that they occupy.

This rule shall not require the eradication of broom in a hedge.

A breach of this rule creates an offence under Section 154(r) of the Biosecurity Act 1993.

Rule 6.4

Land occupiers shall eradicate broom infestations on the land that they occupy within 10 metres of any adjoining property occupied by another land occupier where that adjoining property is clear of, or being cleared of, broom infestations within 10 metres of the boundary between the properties.

This rule shall not require the eradication of broom in a hedge, provided that the tops and sides of the broom in the hedge are trimmed each year after flowering but before seed set to minimise seeding.

A breach of this rule creates an offence under Section 154(r) of the Biosecurity Act 1993.

Canterbury Regional Pest Management Strategy (1998)



Broom flowers

2.3 coast wattle

coast wattle	<i>Acacia sophorae</i>
Comments:	One trial patch of this species has been planted in the past.
Pest Status:	Coast wattle is an Australian species that stabilises dunes but in some situations will invade salt marsh.
Impact:	Shades out low growing salt marsh species
Proposed Action:	Eradicate
Method(s):	Cut and paint stumps

2.4 nodding thistle

nodding thistle	<i>Carduus nutans</i>
Comments:	This is only a problem in the Seafield Park area.
Pest Status:	Containment Control Plant Pest. The rules related to nodding thistle are detailed below.
Impact:	Can form dense stands, which is detrimental to livestock. Produces large numbers of viable seeds, which survive for up to 90 years.
Proposed Action:	<ol style="list-style-type: none"> 1. Eradicate plants within 40 m of any waterway or boundary (preferably before they seed). 2. Introduce biological control agents. 3. Reduce the size of the area infested by nodding thistle.
Method(s):	Spray with Roundup or remove by grubbing.

Canterbury Regional Pest Management Strategy (1998) rules relating to nodding thistle

Rule 6.7


Land occupiers shall eradicate nodding thistle infestations:

(i) on the land that they occupy within 40 metres of irrigation or stockwater races; and

(ii) on the land that they occupy within 40 metres of any adjoining property occupied by another land occupier where that adjoining property is clear of, or being cleared of, nodding thistle within 40 metres of the boundary between the properties.

A breach of this rule creates an offence under Section 154(r) of the Biosecurity Act 1993.

2.5 gorse

<p>gorse</p> <p>Comments:</p> <p>Pest Status:</p> <p>Impact:</p> <p>Proposed Action:</p> <p>Method(s):</p> <p><i>Gorse flower</i></p> 	<p><i>Ulex europaeus</i></p> <p>Abundant on the Lagoon margin.</p> <p>Gorse is used as a nursery crop for native plants in some situations, but the low growing salt marsh plants will not survive below its canopy.</p> <p>Containment Control Plant Pest. The rules related to gorse are detailed below.</p> <p>Gorse can form dense thickets to the exclusion of other species, including low growing salt marsh plants.</p> <p>The seeds are very long-lived (50 years).</p> <ol style="list-style-type: none"> 1. Eradicate infestations less than 50 m2 2. Restrict areas greater than 50 m2 from spreading 3. Clear 10 m strip along boundaries 4. Introduce biological control agents 5. Target some larger areas for eradication – the scale of the infestation means some areas may need to be left in the meantime <p>Spray plants.</p> <p>In sites along the edge of low growing salt marsh, replant cleared areas with native trees and shrubs such as ngaio, akekake, Coprosmas, Pittosporums and broadleaf.</p> <p>Introduce biological control agents as part of a long-term strategy for gorse control.</p>
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Canterbury Regional Pest Management Strategy (1998) rules relating to gorse

Rule 6.1

Land occupiers shall eradicate gorse infestations that cover up to 50 square metres in area and are greater than 5 metres from other gorse infestations exceeding 50 square metres in area on the land that they occupy.

This rule shall not require the eradication of gorse in a hedge.

A breach of this rule creates an offence under Section 154(r) of the Biosecurity Act 1993.

Rule 6.2

Land occupiers shall eradicate gorse infestations on the land that they occupy within 10 metres of any adjoining property occupied by another land occupier where that adjoining property is clear of, or being cleared of, gorse infestations within 10 metres of the boundary between the properties.

This rule shall not require the eradication of gorse in a hedge, provided that the tops and sides of the gorse in the hedge are trimmed each year after flowering but before seed set to minimise seeding.

A breach of this rule creates an offence under Section 154(r) of the Biosecurity Act 1993.

Canterbury Regional Pest Management Strategy (1998)



Gorse invading

2.6 grey willow

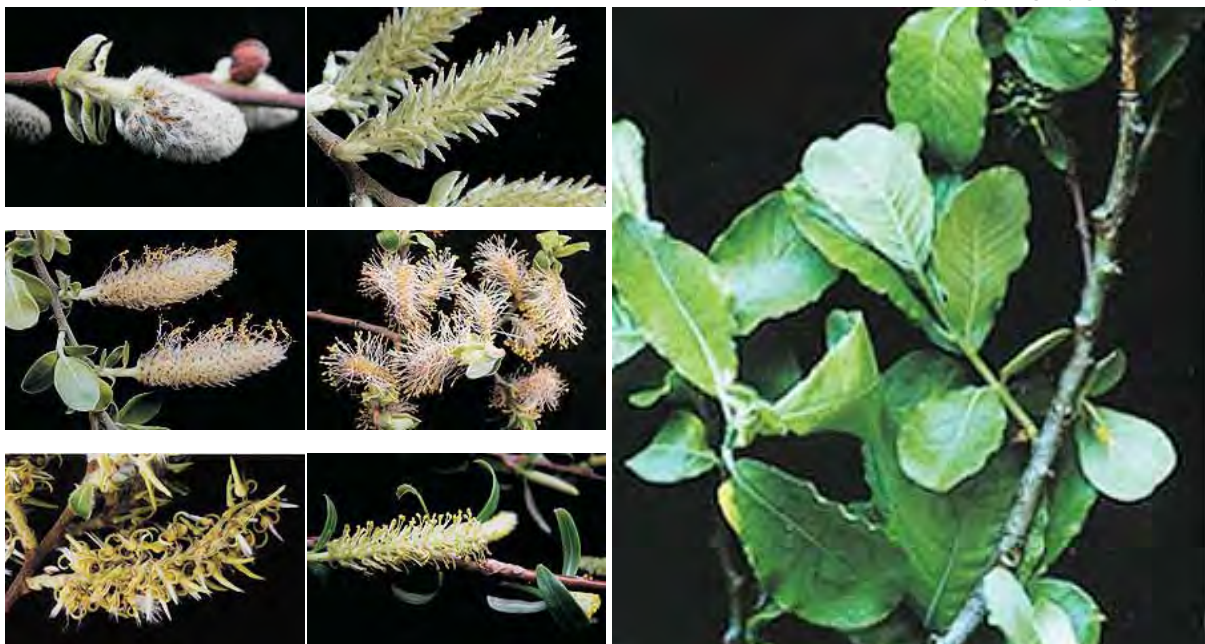
Right: male grey willow
- yellow anthers may be present (close-up of anthers)
Below: female catkins



grey willow	<i>Salix cinerea</i>
Comments:	Scattered throughout – but has the potential to be a major problem (as has occurred in Travis Wetland and Styx Mill Wetland). The timing of willow control is critical – herbicide treatment is most effective late summer to autumn.
Pest Status:	None, but known to be a significant problem in wetlands nearby. Of the species in this report, grey willow ranks as the worst in the assessment system used by DoC for environmental weeds.
Impact:	Grey willow can spread prolifically in wetlands. It can also block waterways.
Proposed Action:	1. Remove female plants since they provide the seed source for spread. 2. Remove male plants.
Method(s):	Cut and treat. Investigate possible biological control with willow sawfly. <i>Take particular care to remove all material, as cuttings will grow.</i>

Small images clockwise from top left: male catkin of grey willow - early in the flowering period, female catkin of grey willow - early in the flowering period, male catkins of grey willow - mid-flowering, male catkin of crack willow - mid-flowering. note the different leaves, female catkin of grey willow - later in the flowering period, male catkin of grey willow - later in the flowering period.

Below: adult foliage of grey willow



2.7 pine

<p>pine</p> <p>Comments:</p> <p>Pest Status:</p> <p>Impact:</p> <p>Proposed Action:</p> <p>Method(s):</p>	<p><i>Pinus radiata</i></p> <p>All along the spit and spreading into the salt marsh. Some pines may need to be retained to provide stability of the spit.</p> <p>None, but pine are spreading rapidly at this site.</p> <p>Spreads rapidly and shades all vegetation below.</p> <ol style="list-style-type: none"> 1. Remove seedlings that have spread into salt marsh , while they are still relatively easy to eradicate. 2. Remove older plants to reduce seed sources AND continue to remove seedlings. In particular, clear a 25 m strip away from the salt marsh border. <p>Cut and remove.</p> <p>For some sites, pine removal may need to be accompanied by planting of native trees and shrubs such as ngaio, akeake, Coprosmas, Pittosporums and broadleaf.</p>
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Pine invading saltmarsh along the Lagoon/Spit margin

2.8 silver poplar

silver poplar	<i>Populus alba</i>
Comments:	The largest area of silver poplar is between Spencer Park and the foreshore. So long as suckering is contained, the size of the infested area should not increase.
Pest Status:	None.
Impact:	Can form dense stands and prevent the growth of other species below.
Proposed Action:	1. Control suckers, to prevent plants from spreading. 2. Remove plants and replant site with more appropriate species.
Method(s):	Cut and treat stumps with Roundup. Remove all plant material.



Silver poplar leaves



2.9 spanish heath

<p>Spanish heath</p>	<p><i>Erica lusitanica</i></p>
<p>Comments:</p>	<p>There are two known patches. This plant appears to be in the early stages of becoming established so eradication should be achievable.</p>
<p>Pest Status:</p>	<p>Surveillance Plant Pest– no spread or propagation allowed.</p>
<p>Impact:</p>	<p>Forms dense colonies that exclude other species. Spreading rapidly.</p>
<p>Proposed Action:</p>	<p>Attempt eradication - target as high priority before it becomes widely established.</p>
<p>Method(s):</p>	<p>Cut stumps and paint with Roundup. A seed bank may mean that planting of shrubs will also be required.</p>

Spanish heath captions needed



2.10 sweet brier



Sweet brier

sweet brier	<i>Rosa rubiginosa</i>
Comments:	Occasional plants scattered throughout. May be more widespread but is not very noticeable except when flowering (November to January).
Pest Status:	Surveillance Plant Pest– no spread or propagation allowed.
Impact:	Difficult to eradicate once established.
Proposed Action:	Eradicate as seen – most obvious when flowering (November to January).
Method(s):	Cut and paint stump with Roundup.

Sweet brier



3 Summary of Weed Distributions

Not every weed is present throughout all of Brooklands Lagoon. The distribution is shown in Table 1. The management units are detailed on page 14.

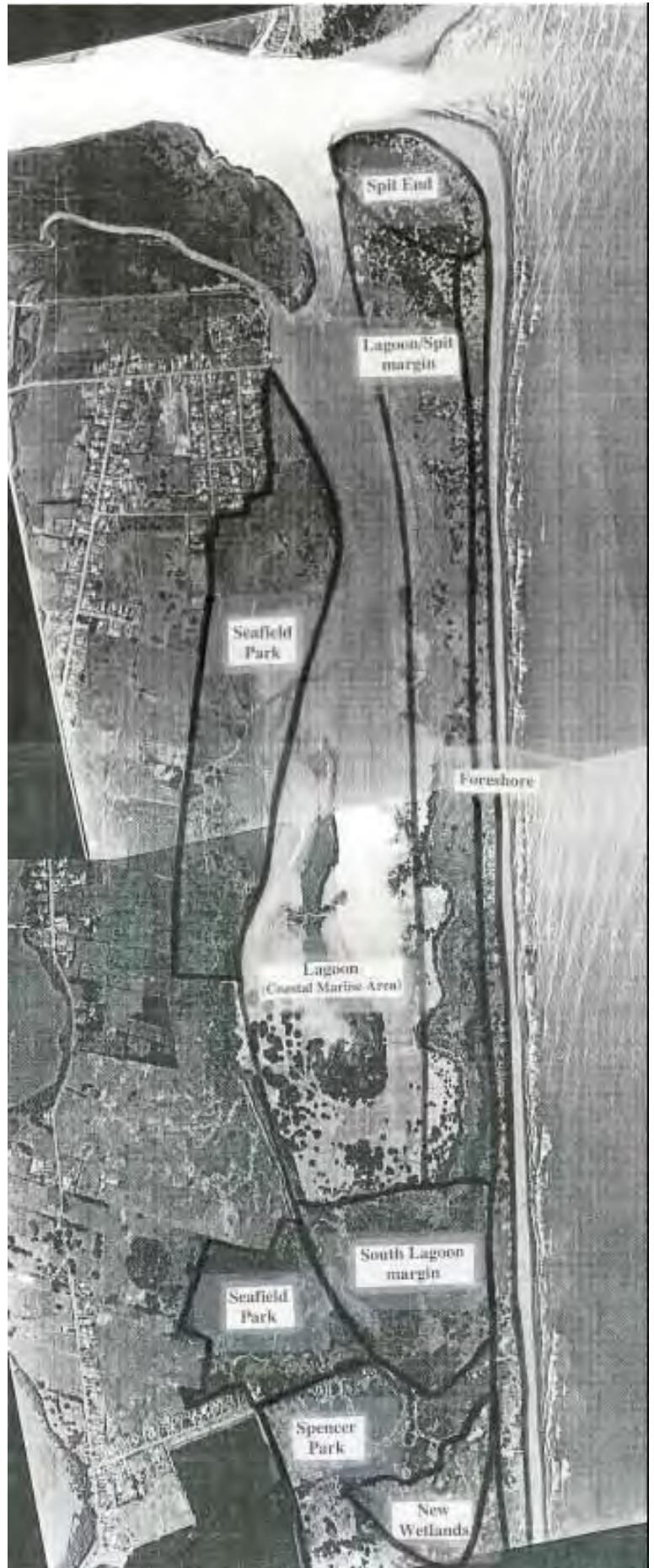
Table 1. Location of weeds species within the management units.

	black berry	broom	coast wattle	gorse	grey willow	nodding thistle	pine	silver poplar	Spanish heath	sweet briar
Spit End							³			
Lagoon/Spit margin										
South Lagoon margin										
Seafield Park										
Spencer Park										
Foreshore										
New Wetlands										

³ Some pines will be retained for stability

Map showing the various management units within the Brooklands Lagoon site. See Table 1 to determine which weeds are present within each unit.

NB. The track forms the margin between the foreshore and lagoon margin along the spit.



4 Recent Weed Control

An outline of the weed control work that has been carried out in the last few years is described below (supplied by Arthur Adcock):

4.1 1997/98 year

\$200	Roundup used for spraying for <i>willow</i> re-growth (small plants only) and for painting onto stumps of felled trees. Spencer Park staff used for labour.
\$10 000	<p>Work Ops staff contracted to carry out spraying. <i>Blackberry</i> south of the picnic area, <i>willows</i> near the new wetland area and <i>gorse</i> at Seafield Park were sprayed.</p> <p>Felling and mulching of <i>pin</i>es on Brooklands Spit. This required a total of three weeks labour from PD gangs, Taskforce Green staff and about four Spencer Park staff (who are able to use chain saws).</p> <p>Effort was concentrated on large trees and about six were removed.</p>

4.2 1998/99 year

\$600	<p>Roundup used to spray <i>willow</i>, <i>blackberry</i>, and <i>gorse</i> near wetlands – south picnic area and Seafield park. (The spraying was of similar areas to those that Works Ops sprayed the year before). Used about 160 hrs worth of Taskforce Green staff time.</p> <p>Cutting <i>pin</i>es on Brooklands Spit. Used three weeks labour of PD gangs, Taskforce Green and Spencer Park staff.</p> <p>Effort was spent mainly on smaller trees and 100's were removed from a strip of lagoon margin about 300 m long.</p> <p>(Currently pine removal is concentrated on removing trees that are spreading into the salt marsh. The track along Brooklands Spit is used as a guideline and pines to the west of it are removed.)</p> <p>Cutting <i>Spanish heath</i> from one patch in the south end of Lagoon. This used three days Taskforce Green staff labour and 1 day with 6 PD staff.</p>
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5 Issues

The current level of action is not even containing the existing weed populations, let alone reducing them. There are several factors limiting what is being achieved:

5.1 Funds

Money is needed to buy materials such as chemicals and chainsaws. But the most expensive component of weed control is the labour, as discussed below.

5.2 Labour

Permanent park staff are unable to spend enough time on weed control to reduce the problem to a manageable level. Periodic detention personnel are sometimes available, but they still require supervision and there are significant restrictions on what they are allowed to do (for example they are not allowed to use vehicles or machinery).

Staff have also been employed through government schemes such as Task Force Green, although not to work exclusively on weed control.

5.3 Disposal of Material

Weed control activities produce large volumes of plant material, which then need to be removed. Many of the areas with these weeds are not easily accessible and removing material from the site is quite problematic.

Burning has been used to remove pine material, but this limits the time when weed control can be carried out.

6 Strategy

6.1 Funds

Additional funding needs to be allocated by the Council, for the purpose of weed control at this site. This report is intended to justify the allocation of additional funds.

Additional sources of funding could also be investigated, such as community boards and ‘outside’ sources such as Lotto.

6.2 Labour

There are several ways that the level of effort going into weed control activities could be increased.

Option One

Volunteer labour could be used to supplement staff efforts. This would not be sufficient to make serious progress at this stage. Supervision would also be required and the existing staff are already busy.

Option Two Recommended

To make significant progress, two **Taskforce Green** or ACE staff could be employed for 6 months. Including materials, (e.g. chainsaws) the total cost is likely to be about **\$15 000**.

This would provide us with two staff concentrating full-time on weed control, and fully equipped to do so. We would probably need to employ staff for more than one 6-month period to get the problem back under control.

A variation of this option is that we could employ some Community Task Force staff, who work for 20 hours per week. This is cheaper but less effective because of the smaller number of hours they are available and the larger amount of organisation required.

6.3 Disposal of Material

The two methods used in the past were using a chipper and burning. Removal of material for firewood is not feasible because of the difficulty of access.

On previous occasions a chipper has been hired for 2 weeks (at ~\$800/wk) and the resulting material was then used for mulch and tracks.

Plant material has also been burnt, but there are restrictions on the time of year when this can be done.

It is recommended that application is made for a **resource consent** that would allow the council to burn material at any time over winter, for the Brooklands site. This would cost about \$600-\$800 and be a very cost-effective way to remove the material.

7 Proposed Work Schedule

7.1 Phase One

1. Carry out urgent weed control of Spanish heath
2. Apply for funding to employ two Taskforce Green staff to concentrate full-time of weed control
3. Investigate alternative sources of funding
4. Apply for resource consent for burning
5. In consultation with CRC, initiate a biological control program for gorse, broom and nodding thistle

7.2 Phase Two (once funding and staff are available)

Not all of the work can be done immediately, so it needs to be decided which areas and which species should be worked on first. The factors considered were:

- The Council has a statutory obligation to control certain species (broom, gorse, nodding thistle)
- Some species are more aggressive (eg grey willow)
- Some areas are more vulnerable (Lagoon/Spit margin and South Lagoon margin)

Considering these factors, the following order is recommended:

1. Eradicate Spanish heath (South Lagoon margin).
2. Control nodding thistle (Seafield Park).
3. Control gorse on the Lagoon/Spit Margin and on the South Lagoon margin.
4. Control broom (South Lagoon margin, Seafield Park, Spencer Park).
5. Control gorse in Seafield Park, Spencer Park, New Wetlands and Foreshore.
6. Remove pines on Lagoon/Spit Margin and on the South Lagoon margin.
7. Remove female grey willow in the South Lagoon margin.
8. Remove female grey willow in Seafield Park, Spencer Park and the New Wetlands.
9. Control blackberry (South Lagoon margin, Seafield Park, Spencer Park).
10. Eradicate coast wattle (South Lagoon margin).
11. Remove sweet brier as seen (South Lagoon margin).
12. Remove pines on Foreshore and New Wetlands.
13. Remove male grey willow (South Lagoon margin, Seafield Park, Spencer Park).
14. Remove silver poplar (Seafield Park, Spencer Park, Foreshore).

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Acknowledgements

Thank you to Arthur Adcock, Kay Holder and Colin Meurk, who all contributed to this report.

Appendix 1

Legislation and council policies relevant to weed control in the Brooklands Lagoon area:

Reserves Act

17. Recreation Reserves

- (b) *Where scenic historic, archaeological, biological, geological or other scientific features or indigenous flora or fauna or wildlife are present of the reserve, those features or that flora or fauna or wildlife shall be managed and protected to the extent compatible with the principal or primary purpose of the reserve*

Resource Management Act (1991)

6. *Matters of national importance -*

In achieving the purpose of this Act, all persons exercising functions and powers under it, in relation to managing the use, development, and protection of natural and physical resources, shall recognise and provide for the following matters of national importance:

- (a) *The preservation of the natural character of the coastal environment (including the coastal marine area), wetlands, and lakes and rivers and their margins, and the protection of them from inappropriate subdivision, use, and development:*
- (c) *The protection of areas of significant indigenous vegetation and significant habitats of indigenous fauna:*

Biosecurity Act (1993)

The Regional Pest Management Strategy was prepared under this act. Some specific rules from the strategy, which are enforceable under the Biosecurity Act, are included elsewhere in this report (see broom, gorse and nodding thistle sections).

Christchurch Beaches & Coastal Parks Management Plan (1995)

“5.17 Exotic plant weeds and pests shall be controlled and progressively eradicated”

“1996/97 - pine trees removed”

Proposed City Plan:

Brooklands Lagoon is shown in Volume 2, Section 2 (Natural Environment) of the City Plan as one of the city’s *“outstanding natural features and landscapes”*

Objective 2.4 The protection and enhancement of key elements and processes comprising the City’s natural environment.

Policy 2.4.1 *To protect ecological heritage areas and the flora and fauna dependent on them*

Policy 2.4.3 *To promote environmental enhancement and rehabilitation of natural areas.*

Policy 2.4.4 *To maintain and enhance the integrity and diversity of natural ecosystems and habitats within the City.*

