2.3 Coromandel Area

2.3.1 Hikutaia

A new infestation of approximately half a hectare was confirmed on a farm at Hikutaia in March. Two different herbicides were used to compare effectiveness of control-metsulfuron/glyphosate mix and TAG™. No alligator weed was apparent over winter but by October 2006 the infestation appeared to be back to its initial density.

Figure 11: Before treatment and after treatment of alligator weed at Hikutaia

2.4 Hamilton Area

The number of alligator weed sites in Hamilton city is increasing and is exacerbated by subdivision activities such as the movement of soil and aggregates. A number of sites have been declared Restricted Places to ensure the weed is not spread from high risk sites to new areas. PPC's for Hamilton city are responsible for ensuring compliance of RP conditions. Student Ben Parry has been available for dedicated spraying and surveillance of alligator weed and made a significant contribution to reducing alligator weed infestations in the city. With the large amount of work involved in managing and controlling alligator weed in the city and Ben no longer available after May the Biosecurity Group has now contracted the spray control and surveillance of alligator weed to Turf Works Ltd.

2.4.1 Restricted Places

2.4.1.1 Somerset Heights

Discovered in September 2004, the Somerset Heights infestation is in a storm-water pond constructed for the new subdivision. The site is a 'Restricted Place' (RP) and control is carried out under a separate resource consent which expires this year. Drainage of the pond and planting of wetland plants was carried out by the developers. Restricted place conditions to allow this work were advised and monitored by Gail Cole. A comprehensive herbicide spray regime was carried out over the 2005/2006 season with Environment Waikato student Ben Parry visiting the site and carrying out control at least monthly. This infestation is now down to very low levels with only two small plants found in October2006.

Figure 12: Somerset 2004 (top) and 2006 (bottom)

2.4.1.2 Hutchinson Rd sand quarry (site 11)

Alligator weed was discovered at the Perry sand quarry during a routine inspection in July 2004. Because of the high risk of spread of alligator weed from this site due to the commercial activities it was declared an RP. Alligator weed is scattered throughout the site and some is in ponds and therefore subject to resource consent for spray. Effectiveness of herbicide may be reduced at this site due to silt covering a significant amount of alligator weed.

Alligator weed was treated once at this site in 2005/2006 year. Three hectares was aerially controlled using metsulfuron in May 2006 in anticipation of receiving approval to change current consent to include aerial herbicide application at this site and the Perrys River Road site. Aerial application is considered the most effective method at these sites due to access difficulties. Strong opposition to aerial application was received by an adjacent land owner resulting in withdrawal of the change to resource consent. Ground treatment was also carried out on the berm and around the wash down area. A post spray inspection was carried out by Gail Cole in June. Good control was reported for terrestrial weed and foliage of aquatic weed, however stems under the water surface appear to remain viable.

2.4.1.3 Hamilton Organic Recycling Centre.

This site is under RP notice due to commercial activity and the area of alligator weed is fenced off to prevent disturbance. Herbicide spraying was carried out March 2006 and September 2006.

2.4.1.4 Perry Waste - River Road. (site 10).

Alligator weed was discovered at this site in 2005 and was placed under RP notice. The landfill is due to finish operation at the end of 2006 at which time it will be rehabilitated. Aerial treatment of 2.25 hectares using metsulfuron was carried out in May as part of the Hutchinson Road operation. No further aerial treatments will be used due to opposition from neighbours.

2.4.1.5 Resolution and Wairere Drives.

There are several scattered sites of alligator weed along Resolution and Wairere Drives. The area is subject to RP notice conditions. Several applications of herbicide have been carried out by Ben Parry and Turf Works. Due to ongoing development and soil movement monitoring requirements of the site are high.

2.4.1.6 Residential Properties

Alligator weed in residential areas such as Canaandale Place, Makepeace Place, Toi Toi Place and Whatawhata Road is present in lawns, gardens and road verges. In previous years occupiers have been supplied with premixed herbicide in spray bottles and have treated the alligator weed themselves. With more stringent rules for herbicide use it was decided in 2005 to discontinue this practice. Turf Works have been contracted to carry out the control and surveillance of these sites. Letters were sent to all occupiers advising them of the change in practice. Turf Works provides a monthly diary of activity for these and other sites. At the time of this report many properties were still to be surveyed and control to be carried out.

2.4.2 New Sites - Hamilton

2.4.2.1 Il Villaggio.

Alligator weed was discovered in the stormwater runoff pond at the new Il Villaggio development on Thomas Road in November 2005. Runoff flows into the tributary of the Kirikiriroa Stream a small distance from the Somerset pond outlet. Further inspection found extensive alligator weed throughout the development and in the neighbouring Kluesken property. Il Villaggio was declared a RP and a Resource Consent obtained for the application of metsulfuron on alligator weed in the pond.

Ben Parry carried out considerable herbicide spaying at this site and no alligator weed is visible in the pond and only small amounts in outlet. Excellent control of alligator weed in lawns has been achieved, however it continues to appear throughout areas still being developed. Control and surveillance is now being carried out by Turf Works. Tordon brushkiller is now being used on alligator weed in lawn areas in an effort to reduce adverse effects of spraying on grasses. Some physical removal of vegetation has also been carried out by Turf Works around the pond and the outlet to ensure alligator weed does not spread into the Kirikiriroa Stream.

Figure 13: Alligator weed discovered at Il Villaggio 2005

Figure 14: Il Villaggio November 2006

2.4.2.2 Kluesken's/Hamilton City Council.

Infestation is related to the Il Villaggio site and most probably came about from soil being pushed onto property during development of Il Villaggio. This 6.7 hectare property, planted in maize, was surveyed and alligator weed found in approximately 1 hectare adjacent Il Villaggio. The entire property has been declared a RP and the alligator weed has been fenced off. Ben Parry carried out extensive weed spraying, applying several applications of metsulfuron and the alligator weed is now down to very low levels. Activity on the site is being monitored by Gail Cole to ensure no spread of alligator weed off the site.

Originally in private ownership, the property now belongs to Hamilton City Council (HCC) who purchased the property and intend to develop it as a park.

Figure 15: Restricted Place Kluesken's, now HCC owned

2.4.2.3 San Clemento Way, San Marco Way, Harrowfield Drive.

Substantial infestations were found at San Clemento Place and San Marco Way as a result of tracking soil movement related to the new Matangi infestations. A new infestation was found at Harrowfield Drive during routine surveillance by Ben Parry. Because many of the properties are still being landscaped or developed there is a high risk of further spread of alligator weed. Landowners have therefore been issued with notices under Section 122 (c) of the Biosecurity Act 1993 advising of restrictions in soil and vegetation movement and machinery hygiene practices that must be adhered to. Turf Works is carrying out herbicide at these sites while monitoring Section 122 issues are managed by BPPC Gail Cole.

2.5 Surveillance

Surveillance in Hamilton city was carried out over summer/autumn of 2005/2006 by student Ben Parry. Areas surveyed include the Kirikiriroa Stream, Somerset, Resolution Drive, Wairere Drive, Canaandale, Thomas Road maize paddock, Il Villaggio. Turf Works are now responsible for carrying out surveillance in the city. Winter surveillance has been found to be largely inefficient as alligator weed is often dormant, especially in lawns. More comprehensive surveillance is planned for the 2006/2006 summer and autumn.

Paddocks adjacent to Lake Whangape were surveyed by Phil Mabin, Ben Parry and Wendy Mead in October 2005. Phil Mabin carried out annual surveillance of the Waipa River by boat and found no alligator weed. Phil Mabin also carried out annual surveillance of the Waikato River from Ohinewai to the delta finding 50 sites of alligator

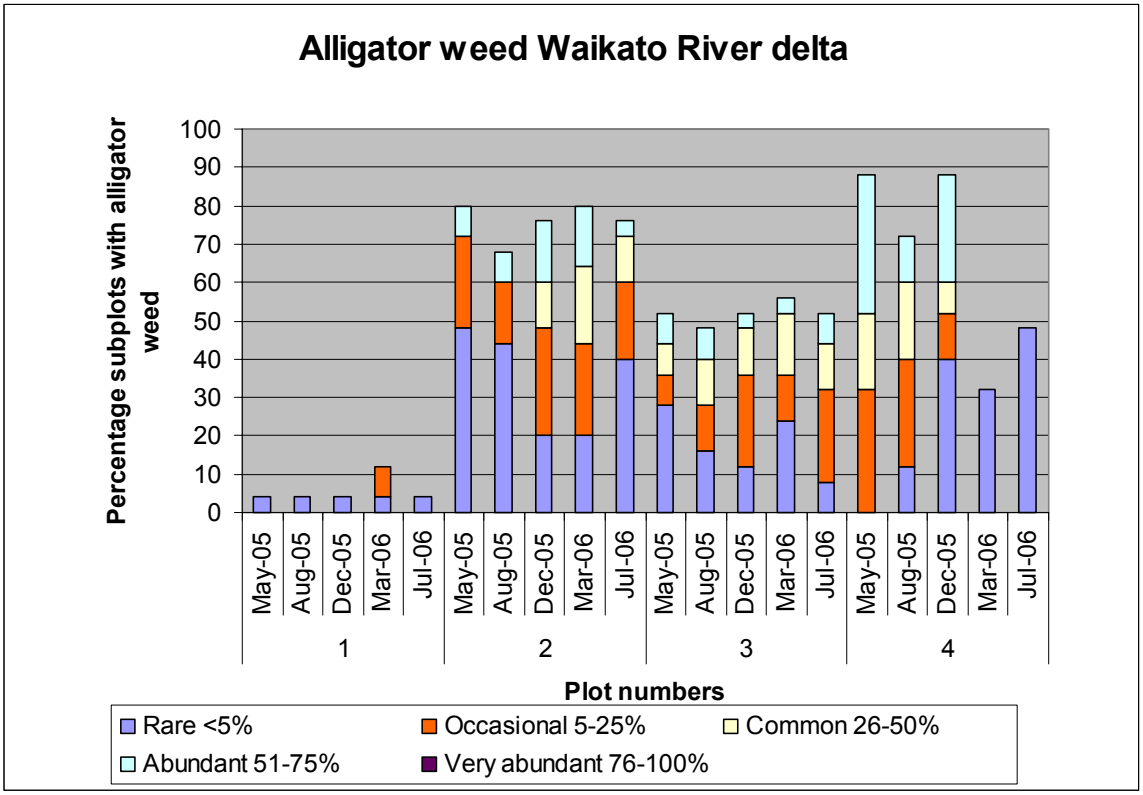
weed, and from Mercer to Ohinewai. Kariotahi Beach was surveyed in April 2006 – no new sites were found.

A comprehensive foot survey of the Lorimer farm at Te Rore was carried out by BPPC's and Biosecurity staff. Scattered alligator weed was found in several paddocks and has been mapped by Chris Hale (see page 9)

2.5.1 Monitoring

Waikato River Delta. Monitoring Plots were set up in the delta in May 2005 to assess the effects of control on alligator weed and other vegetation. The four plots can be monitored in a day by two people provided tidal conditions allow access. The plots were monitored in December, March and July/August. Vegetation is recorded according to species in five abundance classes determined by percentage cover.

Graph 1 shows alligator weed abundance at the four plots.



Graph 1: Alligator weed percentage cover

Plot 1 is dominated by dense *Apium* which appears to keep the small amount of alligator weed at low levels. Herbicide has not been applied at this site as yet and the decrease in alligator weed seen from March to July is probably seasonal. Dense *Apium* is probably suppressing alligator weed at this site.

Plot 2 vegetation is diverse and dominated by *Apium* and *Glyceria*. Plot 2 was treated by airboat once in the previous season but has not received control in the 2005/2006 season. *Apium* appears to be becoming more dominate and may be helping suppress alligator weed.

Plot 3 has received no herbicide in the last two seasons. Vegetation is a mix dominated by alligator weed and willow weed. Percentage cover of alligator weed has increased slightly but appears to be held in check by competition from willow weed.

Plot 4 was extensively treated in the previous season. Aerial control in November 2005 was followed up by spot spraying in January, February, and March. Another aerial application was carried out in August 2006. Extensive control has resulted in a

significant decrease in alligator weed. Very small amounts of alligator will however recover rapidly in the delta conditions and further treatment is expected to be necessary for eradication.

Table 1 shows a summary of the vegetation results

Plot 1	Dominant species in subplots			No. species		Alligator weed	
	Species	Subplots	Abundance	Exotic	Native	No. Subplots	Abundance
May 05	Apium	All	75-100%	4	1	1/25	<5%
August	Apium	All	75-100%	2	1	1/25	<5%
Dec	Apium	All	75-100%	2	1	1/25	<5%
March 06	Apium	All	75-100%	4	1	3/25	5-25%
August	Apium	All	75-100%	2	1	1/25	<5%

Plot 1 May 2005

August 2006

Plot 2	Dominant Species			No. species		Alligator weed	
	Species	Subplots	Abundance	Exotic	Native	No. Subplots	Abundance
May 05	Willow weed	22/25	25-75%	9	2	20/25	5-25%
	Glyceria	14/25	50-100%				
August	None			7	1	17/25	<5%
Dec	Apium	24/25	25-50%	13	2	22/25	25-50%
	Alligator weed	22/25	25-50%				
March 06	Apium	23/25	25-50%	12	2	22/25	25-50%
	Alligator weed	22/25	25-50%				
August	Apium	25/25	20-75%	10	2	19/25	5-25%

Plot 2 May 2005

August 2006

Plot 3	Dominant Species			No. species		Alligator weed	
	Species	Subplots	Abundance	Exotic	Native	No. Subplots	Abundance
May	Willow weed	All	25-50%	4	1	15/25	5-25%
	Rush*	23/25	25-50%				
August	Willow weed	24/25	25-50%	3	1	14/25	5-50%
	Rush*	20/25	5-25%				
Dec	Willow weed	All	25-75%	4	1	16/25	5-50%
March 06	Willow weed	All	50-75%	4	1	17/25	5-50%
August	Willow weed	All	25-75%	4	1	14/25	5-50%

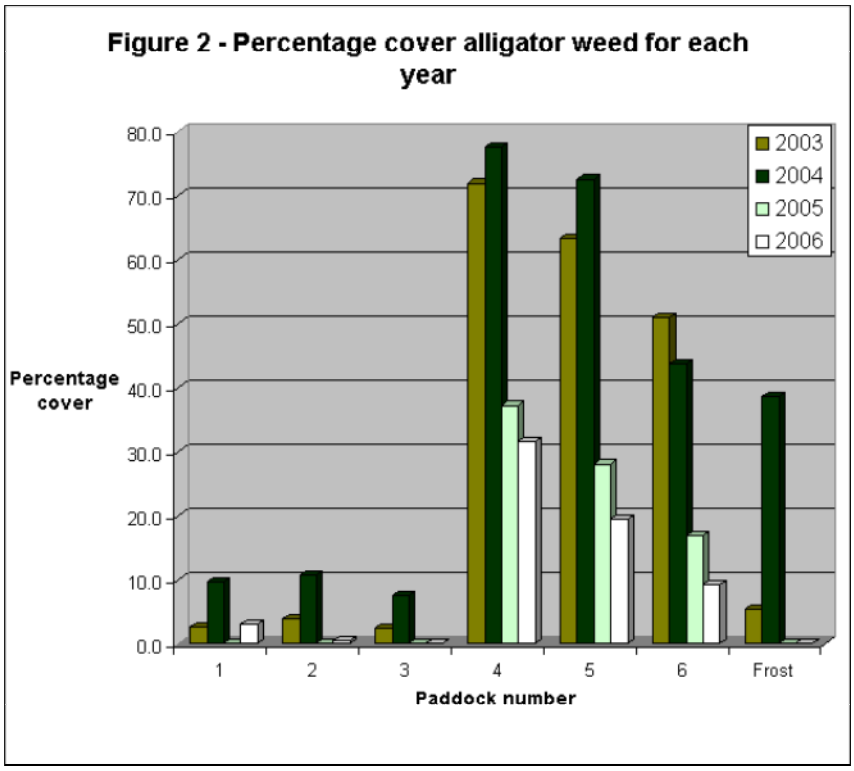
Plot 4	Dominant Species			No. species		Alligator weed	
	Species	Subplots	Abundance	Exotic	Native	No. Subplots	Abundance
May	Alligator weed	All	25-50%	5	3	All	25-50%
	Willow weed	All	5-25%				
	Apium	22/25	5-25%				
August	Alligator weed	20/25	25-50%	4	2	20/25	25-50%
Dec	None			7	3	22/25	<5%
March 06	None			3	2	8/25	<5%
August	None			5	2	12/25	<5%

Plot 4 May 2005

August 2005

Orongo. Monitoring has been carried out by BPPC's at the Orongo site since 2003. Transects record percentage cover of alligator weed.

In November 2005 Tordon brushkiller was applied to alligator weed by knapsack in paddock 5 and all other paddocks were treated with escort. Boom spraying with Tordon Brushkiller was carried out in all paddocks in January 2006, and again in April. The results of treatments since 2003 are summarised in Graph 2 and show a significant reduction in percentage cover of alligator weed.



Graph 2: Alligator weed at Orongo

Graph by Heidi Pene and Chris Hale

Cambridge. Chris Hale and Heidi Pene have carried out monitoring of alligator weed at the Hill property in Cambridge since it was discovered in March 2005. Five grid plots have been established randomly on the site. Presence and absence as well as density is recorded for each grid within the plot. Density is taken as: low - <50% cover and high >50% cover within each grid. The plots are photographed from a photo-point each time the plots are measured. The results are recorded in an excel spreadsheet like the example shown below. Dark green denotes high density, light green is low density and

white is absent. This is then used to produce graphs showing the density of alligator weed within each plot.

Plot 1

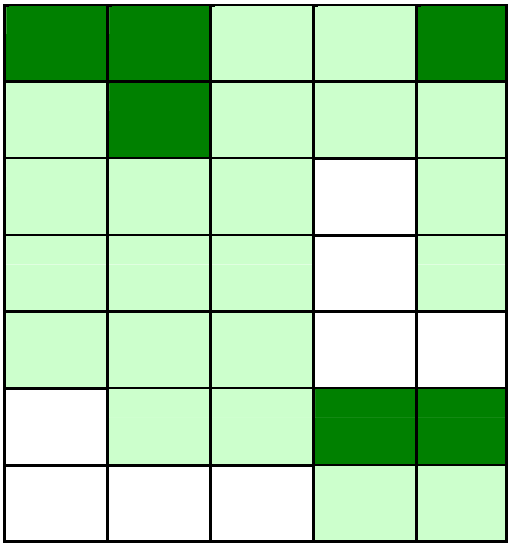


Figure 16: Frame used for measuring plots

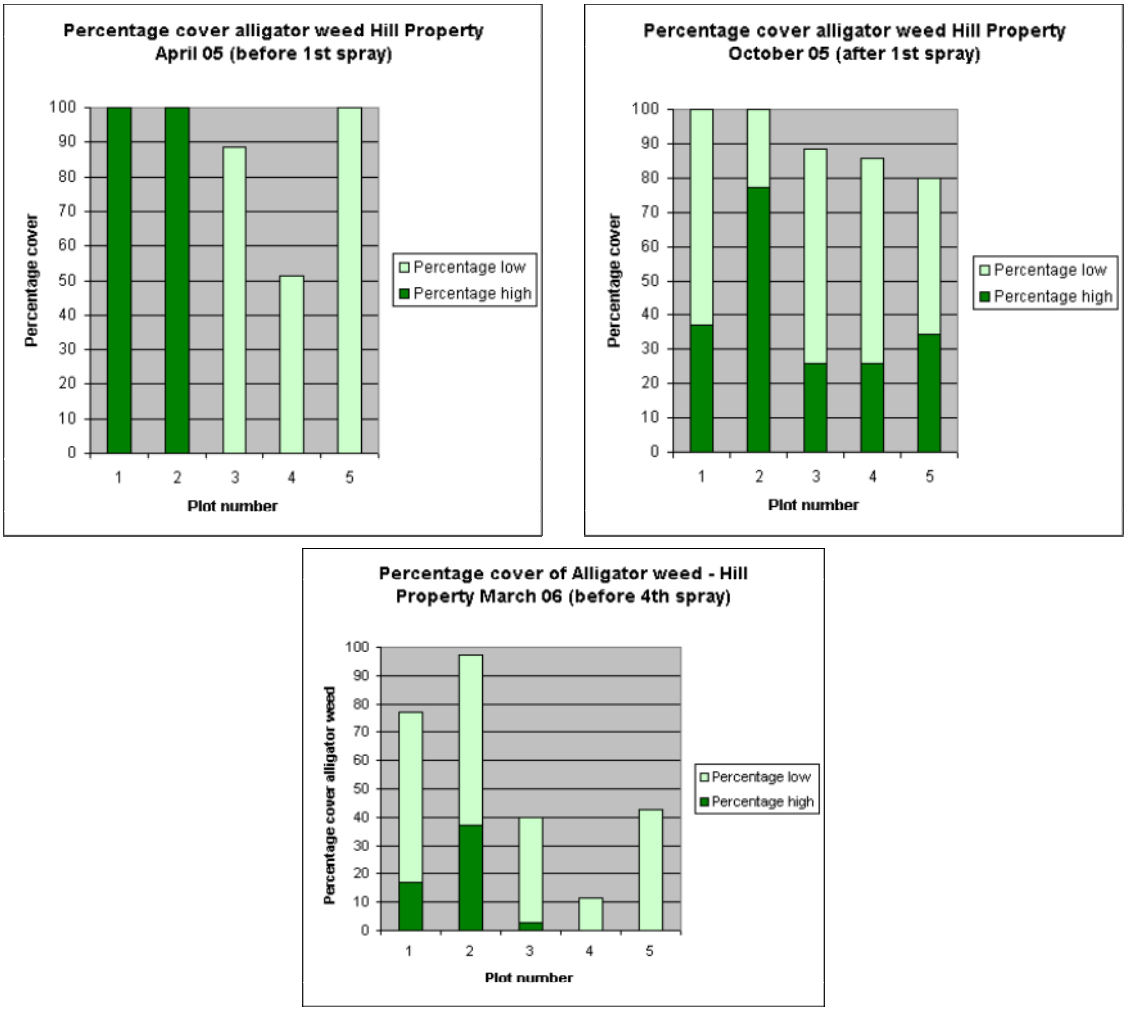


Figure 17: Alligator weed measurements on Hill property

Graphs by Heidi Pene and Chris Hale

2.6 Alligator Weed Awareness

Increasing public awareness has once again resulted in the reporting of many suspected alligator weed infestations. Several new confirmed infestations have come about due to media coverage and advertising. Peter Russell, Chris Hale and John Mather from Environment Bay of Plenty spoke at a FAR Maize Conference fielday in January 2006. Gail Cole and Wendy Mead have spoken with valuers who are concerned at possible valuation affects of Restricted Place notices and the restrictions on subdivision activities where alligator weed is present. Wendy Mead spoke to contractors at a workshop. BPPC's continue to maintain good communication with HCC staff to ensure the risk of alligator weed spread in the city by field staff activity is reduced and that suspected new sites are reported.

2.7 Resource Consent Notifications

Twice a year all landowners/occupiers adjacent the Waikato River from Ohinewai to the Port and adjacent Lake Whangape and Whangape Stream are sent information about the alligator weed control programme and are asked if they want individual notification of herbicide spraying. A register of those requesting individual notification is kept and notification is carried out by telephone by Biosecurity staff.

Public notices are placed in local newspapers prior to herbicide spraying advising of intention to spray, and notices are maintained at boat ramps.

One complaint was received in the 2005/2006 year from a Mr Pryor, strongly objecting to aerial spraying of Perry's Sand Quarry. Details are in EW doc 1090634 and 1085682.

This report will be sent to:

- Group Manager, Resource Use Group, Waikato Regional Council
- Huakina Development Trust
- Waikato Raupatu Lands Trust
- Horahora Marae
- Department of Conservation
- Auckland/Waikato Fish and Game Council
- Onewhero/Tuakau Community Board
- Waikato Conservation Board
- Aka Aka/Otaua Land Drainage Subcommittee

2.8 Alligator Weed Control Programme 2006/2007

The control programme will continue during 2006/2007. Under Resource Consent number 112000 application of metsulfuron-methyl (Escort or equivalent) for the control of alligator weed in the Waikato River catchment and other North Waikato locations will be undertaken in the following areas:

Site 1	Waikato River Delta	
Site 2	Waikato River between NZMS 260	R12:741-342 and S14:060-850
Site 3	Albie Philips Reserve, Port Waikato	
Site 4	Kariotahi Beach, West Coast	
Site 5	Waikaretu Stream, West Coast	
Site 6	Tuakau Oxidation ponds	
Site 7	Ake ake Drainage Area	
Site 8	Lake Whangape	
Site 9	Whangape Stream	
Site 10	Perry Waste	
Site 11	Perry Sand Quarry	
Site 12	Te Rore	
Site 13	Waikeria	

The concentration of herbicide will not exceed 15 grams of metsulfuron-methyl and 100 millilitres of Pulse to 100 litres of water. The herbicide will not be discharged at a rate that exceeds the practical limits necessary to enable total coverage of alligator weed at each location.

The spraying shall be undertaken by way of hand spray application system, or other such system, except at the Delta area of the Waikato River (Site 1), Lake Whangape (Site 9) and Te Rore (Site 12) where aerial spraying may be undertaken by helicopter provided low drift nozzles are used. All discharges associated with this consent shall cease once wind conditions exceed 10 kilometres per hour for terrestrial or land based activities, and 5 kilometres per hour for aerial activities.

The discharge shall be undertaken in such a way that no significant adverse effect of off target drift shall occur beyond the boundaries of the target area being sprayed.

It is planned to carry out aerial spraying at the delta over areas aerially sprayed in the 2005/2006 season plus another approximately 20 hectares. Two applications are planned. This will be followed up by spot spaying as necessary by airboat.

It is planned to carry out aerial spraying of the Te Rore site followed by land based spray application as necessary.

All other control work carried out in the 2005/2006 will be followed up as necessary in the 2006/2007 season.

2.9 Alligator Weed Management

An increase in the number of alligator weed sites in the last couple of years has resulted in an increase in resources needed to manage it, both in the terms of control cost and in BPPC and Biosecurity staff time. The increase in number of RP's, particularly in Hamilton city, can be very demanding on BPPC time. The optimum time to carry out surveillance and control work for alligator weed also corresponds with peak times for plant pest enquiries, complaints and property inspections, placing further demands on BPPC and Biosecurity staff. In an effort to reduce demand in BPPC time Turf Works have been contracted to carry out the management of direct control and surveillance for smaller residential sites in Hamilton City and in the Waipa/Waikato East area. Turf Works submit a monthly report on work done and Biosecurity staff or BPPC enter details in the BIS database.

Good control of alligator weed has been achieved at sites where extensive control work has been carried out, e.g. Somerset Heights, Orongo, Cambridge and some delta sites. A few smaller sites have no alligator weed visible - Waterford Birthing Centre, Waikeria, Pukekawa - however monitoring will need to continue to ensure eradication. It appears that treating infestations only once in a season does not reduce alligator weed at all, and may even increase alligator weed density b=through the removal of competing vegetation. More efficient use of resources may be achieved if such sites are not treated at all for a season, allowing staff and resources to be directed to more intensive treatment at other sites - providing these are low priority sites where there is minimal risk of spread to new areas. Some infestations, such as some on delta islands, appear to be held in check by competing vegetation and could be given lower priority for treatment in the short term.

To achieve significant reductions in alligator weed in priority sites ongoing comprehensive control work is needed if eradication is to be achieved. Priority sites are those where there is the greatest risk of spread of alligator weed to new sites. The delta, Lake Whangape, the Waikato River, Te Rore, Cambridge, HORC, Perry's sand quarry and Hamilton city sites where development work or landscaping is still being carried out can be considered priority sites.