



**ARGENTINE ANT MONITORING AND CONTROL  
GREAT BARRIER ISLAND  
2015-2016 SEASON**



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## 1. Introduction

The program to eradicate Argentine ants from Great Barrier Island was initiated in 2007. This report details work undertaken by Envirokiwi in the ninth season of the program. It also details work undertaken to eradicate Darwin ants from the Mohunga Peninsula, their only known location on Great Barrier Island.

Teams of up to 5 staff were employed in the field to monitor for target species at identified infestation sites and to follow up with any treatment required. This season, only the Ocean View Road and Rosalie Bay Road sites were scheduled for full monitoring. However, after initial surveillance of some historical and new areas, delimitation monitoring took place in a number of additional sites. The Mulberry Grove, Blind bay Road and Mason Road sites were treated only this season with no prior monitoring. Subsequently, some historical areas within the Mulberry grove area were monitored before the secondary treatments were carried out.

Planned monitoring included:

- Kaitoke-Ocean View Road
- Rosalie bay Road
- Historical sites within Mulberry grove area

Delimitation monitoring included:

- Medlands – Sandhills Road
- Okupu – Driftwood Lodge sites
- Thomas Road – G. Medland’s property, surrounding paddocks and The Lane
- Kaitoke – Gray Road

## 2. Summary

Envirokiwi began monitoring for Argentine ants at the Ocean View Road and Rosalie Bay Road sites in early October 2015. Treatments commenced shortly after this for all sites with the intention of some receiving a third and final treatment in January 2016. Approximately 633.75 hours were spent monitoring within 11 sites covering a total of 47ha. 712.5 hours were spent treating all Argentine and Darwin ant infestations across 9 sites (10 sub sites within Mulberry Grove) covering a total of 34.3ha

This season one new site with Argentine ants was identified in Kaitoke (Gray Road). In addition, Argentine ants were found within the Medlands area at a historic site where it was believed they had been eradicated (Sandhills Road). Continued efforts of monitoring took place here to find the extent of these new infestations before the appropriate treatment could commence.

The Mulberry Grove, Mason Road, Okupu, Mohunga (Darwin ants) and Blind Bay Road sites did not receive monitoring prior to treatments. This was based on results showing a very consistent pattern of infestation locations from season to season. After the first round of treatments in mulberry Grove a small amount of monitoring took place in some historical sites to help ensure nothing was missed. The only sites that received planned monitoring were Ocean View road and a delimitation of the Rosalie bay road site.

Argentine ant numbers were again high as they were in the last two seasons at the Ocean View Road, Kaitoke site. This season however, the infestation was concentrated in the open area between the large drain to the north and the properties boundaries on that side of the road. Only a small number of pottles placed within the properties (nth side of road) resulted in finds. no ants were found in the Blackwell paddock or pines or in any properties on the southern side of the road. Extensions were carried out to determine a delimitation and led to further spread of the new infested area.

While numbers were far lower in the Rosalie Bay Road site relative to last year, it too needed extensions to be carried out beyond its boundary in order to locate the extent of the small infestation.

A small site located on the opposite side of the road to the larger Okupu treatment site was monitored this season. The site was centered around the Driftwood Lodge property.

Six historical sites within the mulberry Grove area were monitored prior to the second round of treatments starting. Only one of these sites contained Argentine ants. This was a small infestation located opposite the school. This site was added to the designated treatment sites and treated accordingly (Figure 5).

Sandhills Road (Medlands) has historically had argentine ants. What was believed to be all but eradicated proved to be very much re-established this season after some extensive delimitation monitoring.

Gray Road – surveillance from the Kaitoke bridge to the Coles equipment yard brought about the discovery of a very large infestation. Centered within the Scrap Metal center, the infestation spreads through residential properties here and across the road in to the Golf

course. Once delimitation monitoring was complete the necessary treatments were carried out.

Treatment for Argentine ants occurred three times at the Ocean View Road, Blind Bay Road, Mulberry Grove and Rosalie Bay Road sites. Masons Road, Sandhills and Gray Road received two treatments. Treatment for Darwin ants occurred twice at Mohunga. Treatment involved placing Xtinguish toxic paste out in the infested area directly upon the ground and pottles containing the toxic paste were placed strategically around the infestation. This season saw the use of ant droids in areas of dense bush and areas hard to get to on foot.

Favorable weather windows were targeted for both monitoring and treatment. Envirokiwi consulted with biosecurity to gain consensus before any monitoring and treatments were carried out. Sunny and hot days were avoided and post rain events were targeted.

### **3. Method**

#### **3.1 Monitoring for Argentine and Darwin Ants**

Plastic 25 ml containers or pottles with paste attractive to Argentine ants, were placed on the ground throughout the area monitored and collected the next day to assess contents. The method used to prepare pottles, place in and retrieve from the field was based on that recommended by Chris Green, Department of Conservation.

Brian Shield and his Argentine ant dog supported the program with monitoring in some areas not covered by Envirokiwi and in some areas covered by Envirokiwi to provide an additional tool to provide assurance of results.

##### **3.1.1 Pottle preparation and care**

Pottles were prepared at Okiwi for placement in the field. After the success of last season, the team used the simple method of having holes in the pottles and paste was placed on the screw caps in order to stop using the mesh and cut down on waste as well as preparation time. Approximately one to two centimeter of ant paste was placed in each clean screw cap using a caulking gun. A pottle was then applied. Pottles were kept cool either in a fridge or with chilly pads in a chilly bin and were transported to site in chilly bins with chilly pads.

##### **3.1.2 Product use**

Xtinguish monitoring paste supplied by Flybusters was used. Each canister of monitoring paste filled approximately 500-600 screw caps. Approximately 26 canisters of monitoring paste were used this season.

##### **3.1.3 Locations for monitoring**

Traditionally all areas where Argentine ants have been found within the last three years, and approximately a 20m buffer were monitored. This season only sites at Ocean View Road, Rosalie Bay Road and some sites within the Mulberry Grove area received conventional monitoring (see 3.1.4 pottle placement in field). The Sandhills, Gray Road, Thomas Road and Okupu sites all received delimitation monitoring. Here, the focus is put on finding the extent of an infested area rather than a full monitor to establish exact locations of Ants within an area already known to contain ants.

### **3.1.4 Pottle placement in the field**

Conventional monitoring involves pottles placed in a 3m x 3m grid pattern over the whole of the monitoring area excluding buildings and sealed/hard surfaces. Teams of up to five people worked together in a line to ensure regular placement and each placement was marked with flagging tape. Pottles were left for approximately 24 hours i.e. placed out one day and recovered the next.

Wherever possible, pottles were placed out of direct sunlight and on or close to the ground, e.g. placed through muehlenbeckia and Kikuyu grass. A GPS was used to record the track of the middle person in each team.

**Delimitation monitoring** – This method allows for the team to quickly ascertain the extent of an infestation without monitoring areas they know ants have been established. The team will focus on delimitation lines around the circumference of an infestation. The 3m x 3m grid pattern is still used but pottles are placed in the field and then retrieved on the same day. Treatment would often take place on the same day if up take is noted to be high and weather conditions are optimum.

### **3.1.5 Pottle collection and assessment**

When collecting pottles, a tape was carried so that any pottle with inconclusive contents quickly had the tape placed over the pottle holes and the contents more carefully assessed. Sites where a pottle was collected with Argentine (or Darwin at Mohunga) ants was marked and a record was made of the line number, pottle number within that line, approximate number of ants within the pottle and the GPS reading for that point. Target ants were shaken from the pottle prior to the pottle being placed in the collection bag.

### **3.1.6 The Monitored Sites (Planned and delimitation)**

Figure 1 shows the locations of the sites monitored for Argentine and Darwin ants on Great Barrier Island this season

**Figure 1 Location of monitored sites**



Key:

- Planned monitoring
- Delimitation monitoring

### **3.1.6.1 Kaitoke (Ocean View)**

Kaitoke is a coastal site on the Eastern side of Great Barrier Island. It includes a residential road with properties that are dry and sandy with typical coastal garden vegetation- sparse lawn, various daisy type plants, acacia, pine and banksias trees etc. It also includes dunes with Meuhlenbekia, rushes, sedges and pampas, pine hedgerows sparse kikuyu pasture and rank kikuyu grass, a DOC reserve of Manuka, Kanuka scrub land and the edges of a swamp drain. The area monitored was approximately 10.3ha (Figure 2).

### **3.1.6.2 Rosalie Bay Road**

This is the second year of work occurring at this site after last season the infestation was found to be spreading from a historical site within the Mulberry Grove area. The site consists

of Manuka/Kanuka bush, grassland- rank and cropped, residential houses and gardens. The area is approximately 2ha (Figure 3).

### **3.1.6.3 Okupu – Driftwood lodge**

This season a small residential house area was to be monitored. These were left out in the field for four hours before being checked. Unfortunately, Argentine ants were identified around the house and beneath some large Pohutakawa in the beach carpark area. The site was extended slightly and Argentine ants were also discovered along a road edge/fence line directly opposite the known infestation controlled by AC. The site consists of Manuka bush, grassland – rank and cropped, residential houses and gardens (Figure 4).

### **3.1.6.4 Mulberry Grove – historical sites**

No formal monitoring took place within the Mulberry Grove site this season, the focus was on treating all areas where ants were located in the previous season. However, some sites that have historically held infestations but were not to be treated this year (after a number of years of no finds) were monitored. This helped to ensure the right areas had been chosen to be treated. The sites consist of residential properties with gardens and lawns and rank vegetation of predominantly kikuyu and various shrubs and trees between (Figure 5).

### **3.1.6.5 Thomas Road**

The treatment of the Thomas Road site was again this year carried out by AC. The residential properties here and the southern side of The Lane were all monitored by Envirokiwi including the paddock on the opposite side of Medland Road. This was initially to establish a delimitation of the treatment area and resulted in finding some new, small, isolated infestations. The site consists of residential properties with gardens and lawns (some gardens extremely dense and steep), rank and cropped vegetation as well as Manuka/Kanuka bush and various tree species. A combined total of 7.6ha was monitored this season (figure 6).

### **3.1.6.6 Sandhills Road**

Argentine Ants were located in a single property by Auckland Council. The site consists of residential properties with gardens and lawns, paddocks, fence lines, dense Muehlenbeckia, large Macrocarpa and Norfolk pine trees as well as some wet, undrained areas. A total of 4.5ha were monitored here (figure 7).

### **3.1.6.7 Gray Road**

Like Sandhills, Auckland Council notified the team at Envirokiwi that argentine ants had been found outside the Scrap Metal yard on Gray Road, Kaitoke. The team set out to determine the spread of the infestation and soon discovered a very large, active site. The search soon included surrounding properties on both sides of the road and deep in to Pine forest. This site consists of residential properties and gardens, a links golf course, an old mill site, a sand quarry, large swamp area, Pine forest and dense Manuka/Kanuka bush. A total of 9ha were monitored here (Figure 8).

## **3.2 Control Treatment for Argentine and Darwin Ants**

Control treatment occurred as soon as possible after Argentine ants had been identified. Toxic Xtinguish bait (active ingredient in the bait is Fipronil at 0.01%) was placed directly onto the ground in areas where Argentine ants had been identified. Bait was placed at 1m x 1m spacing over all ground within a treatment area and included a buffer of at least 10 meters around the location of pottles with Argentine ants. In multi infestation sites, the buffer can be larger than 10m as sites were often adjacent to each other and any area in between was also treated. Additionally, pottles with toxic bait prepared similarly to the non-toxic monitoring pottles or empty canisters with residual paste were placed close to the site of the find. These were left in situ for at least a week then retrieved. Approximately two weeks after the initial treatment a second treatment was applied at all Argentine ant sites. Treatment timing was less weather dependent when using pottles than when just placing paste directly on the ground and it is expected that bait was available to Argentine ants over a longer period of time in the field because it was protected to an extent from adverse weather conditions and also from larger animals unable to access it in the pottle.

### **3.2.1 Ant Droids**

In some areas, the vegetation is too dense for ground applications to be carried out. Ant Droids are used here as they can be thrown in to areas from a distance and reach the ground in desired areas un able to be reached. Cardboard tubes approximately 1cm in diameter and 1m in length are filled with toxic paste before being frozen. These are then cut in to 1cm or less sized 'Droids' which are used in the field while frozen to ensure longevity.

### **3.3 Surveillance**

Surveillance was undertaken by Brian Shields and his ant dog and a surveillance team from Envirokiwi. Various sites were monitored both visually and with the aid of pottles. These sites ranged from contractor's yards to busy public locations as well as in response to private queries from members of the public who think they might have an Argentine ant infestation. A full report on this work is provided separately.

### **3.4 Records**

The area monitored was recorded using GPS. The middle person in a team carried the GPS. Arc Explorer has been used to present the data. Records were kept of the number of containers placed and retrieved each day at each site and the quantity of paste used.

The location of any pottle with Argentine ants was recorded with GPS to allow treatment at that site. As a backup, the pottle number within the monitor line and the line number within the monitoring site were recorded. Flagging tape was often left in the field with this information also. In situations where extremely high numbers of pottles contained ants, waypoints were used to represent a number of pottles in an area as this can be very time consuming in the field when every find is marked. all pottles with finds was recorded for data purposes however.

## **4 Monitoring Results**

### **4.1 Argentine ants**

Approximately 15523 pottles were placed out over 17 days. Of these, 99.26% were recovered and 399 or 2.6% contained Argentine ants.

Table one records how many pottles were placed at each site and the percentage with Argentine ants collected from each site. Approximately 0.73% of pottles placed out were not

recovered. This can only be assumed is due to interference from animals or weather conditions such as strong winds removing marker tags as well as human error.

**Table 1**  
**Number of pottles placed in field and percentage returned with Argentine ants**

<b>Location</b>	<b>No of pottles out</b>	<b>No of pottles retrieved with Argentine ants</b>	<b>Percentage of pottles with A ants</b>
Kaitoke/Ocean View	6790	196	2.88
Mulberry Grove – Historical sites	719	2	0.28
Rosalie bay Road	725	1	0.14
Gray Road	1686	40	2.37
Sandhills Road	4202	131	3.12
Thomas Road sites	1023	19	1.85
Okupu sites	378	10	2.64

In addition to the pottles retrieved containing Argentine ants, a number were collected without anything inside, including bait. When this occurred a visual search of the immediate area was made to determine the potential cause for the missing paste. Around some empty pottles, different species of ants were identified and no Argentine ants so these locations were not treated.

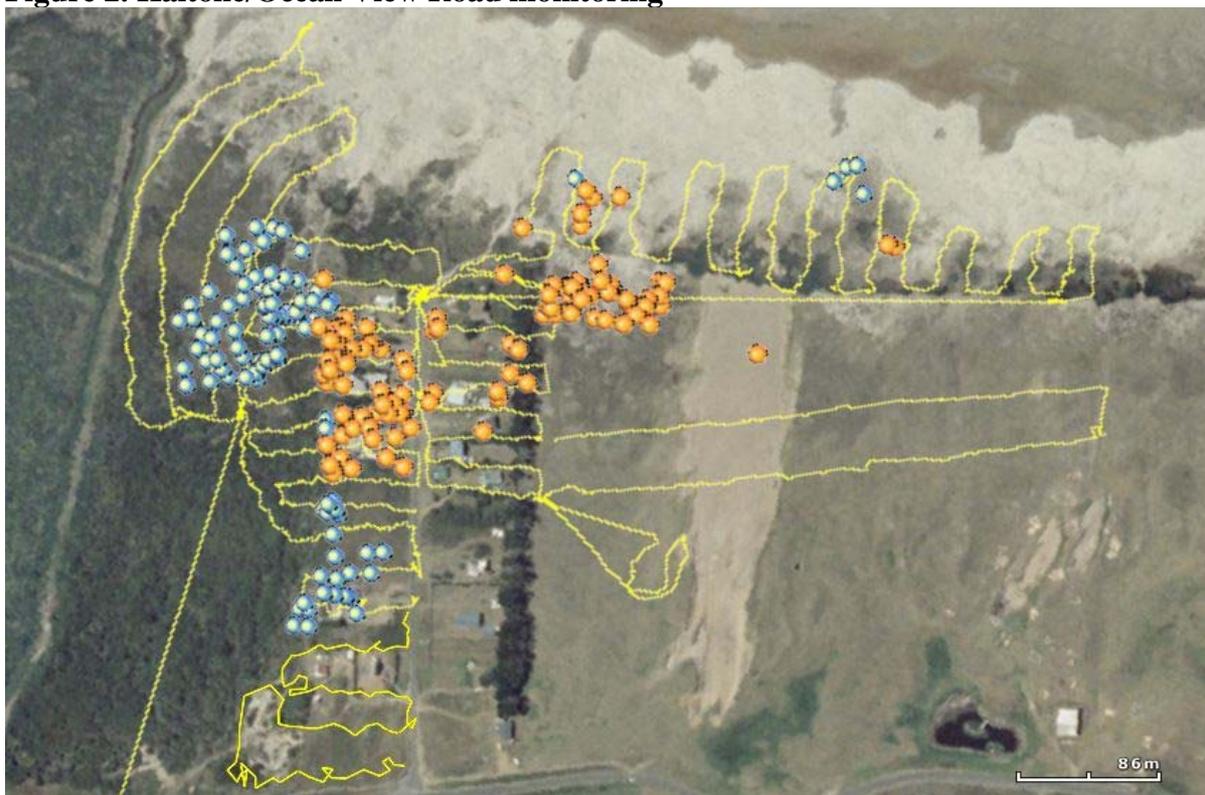
Figures 2-8 show the monitored areas and where Argentine ants were found during 2015/2016 monitoring.

The dates for field work, an approximate number of hours spent for each site and approximate number of Xtinguish bait canisters (325g) used for each site are recorded in Table 2.

#### **4.1.1 Kaitoke/Ocean View**

Argentine ants were mostly found in new locations to previous years that in some areas bordered previous infestations (see Figure 2). In contrast to last season, no Argentine ants were found in any of the properties on the southern side of the road or the paddock and pines directly behind the dunes. Additionally, no Argentine ants were found on either side of the main Hector Sanderson Road as shown in Figure 2. The main infestation was located in the flat area to the north between a large drain and properties. Ants were also located in the un-occupied properties between the Cox and Coles properties. A large number of pottles within the open area between the drain and properties were found to be empty upon retrieval. Given the high number of argentine ants in this area, it was also included in the treatment. In total 10.3ha were monitored and a total of 6790 pottles were used.

**Figure 2. Kaitoke/Ocean View Road monitoring**



Key:

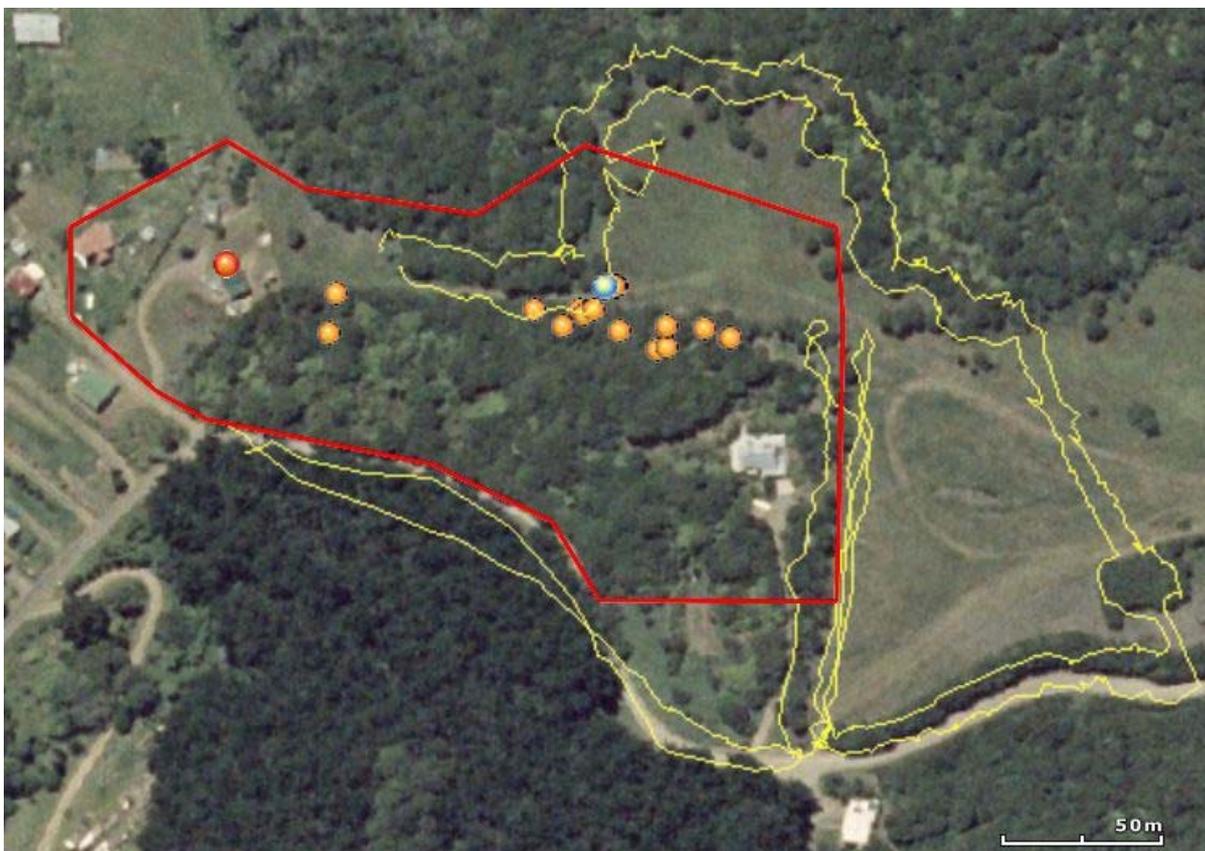
-  Team track/monitoring lines
-  Positive argentine ant find
-  November 2014 positive finds (previous season)

NB: Treatment areas are not included in this map. Please see Figure 9 for treatment areas within the Ocean View road site.

#### 4.1.2 Rosalie Bay Road

The Rosalie Bay Road site was monitored in order to establish a delimitation of the infestation found last season. Given a treatment area had already been allocated (as per all the Mulberry grove sites) this was to ensure the infestation did not spread in to the surrounding paddocks and residential properties prior to treatment. Only one pottle placed in the field returned with a positive ID. This was in the same area that Argentine ants were found in the previous season. A member of the City Parks team discovered Argentine ants in the residential property to the west of the area (red waypoint in figure 3). This area was included in the treatment zone due to its close proximity to the work carried out by the Envirokiwi team. In total 2ha were monitored and a total of 725 pottles were used. Discussion of treatment here has been grouped with the Mulberry Grove sites in 5.1.4.

**Figure 3 Rosalie bay Road**



**Key:**

-  Team track/monitoring
-  Argentine ant finds
-  Argentine ant finds (2014/2015)
-  Argentine ant finds by City Parks
-  Treatment area

#### 4.1.3 Okupu – Driftwood Lodge

The existing treatment site in the Okupu area backs on to Blind Bay Road. Driftwood Lodge was a known Argentine ant site, Envirokiwi carried out monitoring of the surrounding area to establish the full extent of the infestation. The majority of finds were located from the bus stop and along the road edge/bush margin up the road approximately 50m. A total of 1ha was monitored and 378 pottles used.

**Figure 4. Okupu – Driftwood Lodge**



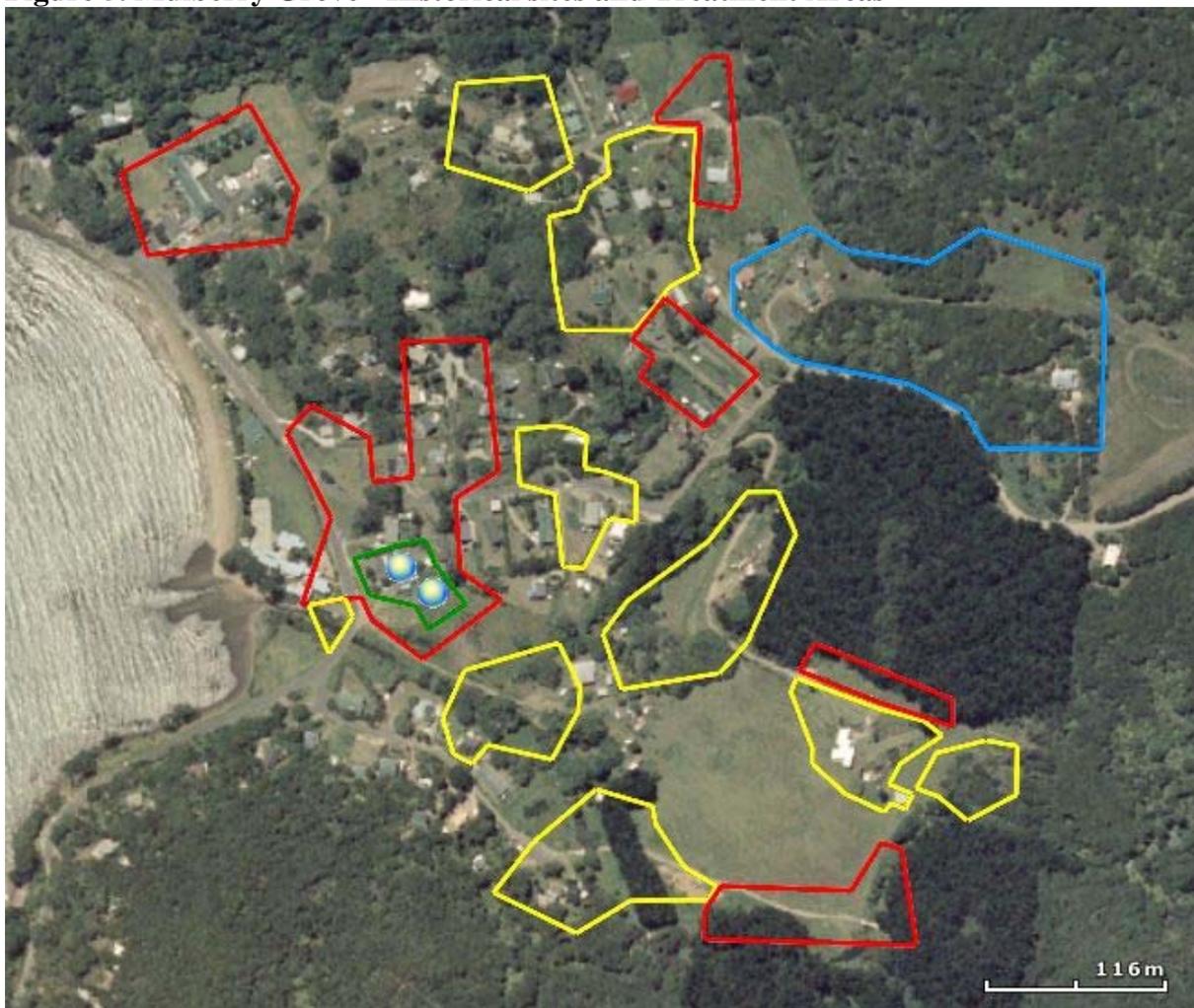
**Key:**

-  Area monitored
-  Existing treatment area
-  Argentine ant finds

#### 4.1.4 Mulberry Grove

This season treatment within Mulberry Grove took place in all areas where Argentine ants were located in the previous season. Nine isolated sites were allocated for treatment. Where ants had not been picked up in the previous season but had a history of occurrence from earlier seasons, monitoring was carried out. Six sites were monitored and as a result Argentine ants were located within the largest of the isolated sites (opposite the school). This site was treated accordingly and added to the list of treatments. None of the other five sites proved to have Argentine ant infestations. Approx. 3.4Ha of this site was monitored and a total of 719 pottles were used. See figure 5.

**Figure 5. Mulberry Grove - Historical sites and Treatment Areas**



Key:

-  Positive Argentine Ant find
-  Historical site that received monitoring
-  New treatment area based on monitoring finds
-  Treatment areas (based on previous seasons results)
-  Rosalie bay Road treatment area

#### 4.1.5 Thomas Road Monitoring areas and Treatments

This season the Envirokiwi team carried out monitoring in areas around the allocated treatment done by Auckland Council. Four new sites were found as a result of this monitoring. The paddock to the east of Medland Road had one small infestation running along a fence line while the properties on Thomas Road were clear. One small infestation was found within the first property on The Lane. George Medlands property contained a dense infestation over the entire property. A small infestation was located in the western paddock also where ants had been found or close to in previous seasons. A total of 8.8ha were monitored and 1023 pottles used here.

**Figure 6. Thomas Road monitoring sites & treatment areas**



Key:

-  Team track/monitoring lines
-  Monitoring areas
-  Treatment area (AC)
-  Positive Argentine ant find
-  Treatment areas after monitoring
-  Areas where Ant Droids were used

#### 4.1.6 Sandhills Road – Medlands

Auckland Council notified Envirokiwi of a positive Argentine ant ID within a property on Sandhills Road. The initial work carried out here was to establish a delimitation of the area. Once it was evident that the infestation was far larger than first anticipated, a larger scale monitoring operation took place. Argentine ants seemed to be concentrated in dense *muehlenbeckia* and residential gardens. They were also noted travelling along fence lines between properties. The densest of the infestations was found within the *Macrocarpas* in the paddock behind the campground. Ants here were seen travelling 100m+ along a fence line and crossing water ways using tree fall and fences. A total of 12.7ha were monitored and 4202 pottles used here (Figure 7).

**Figure 7.**



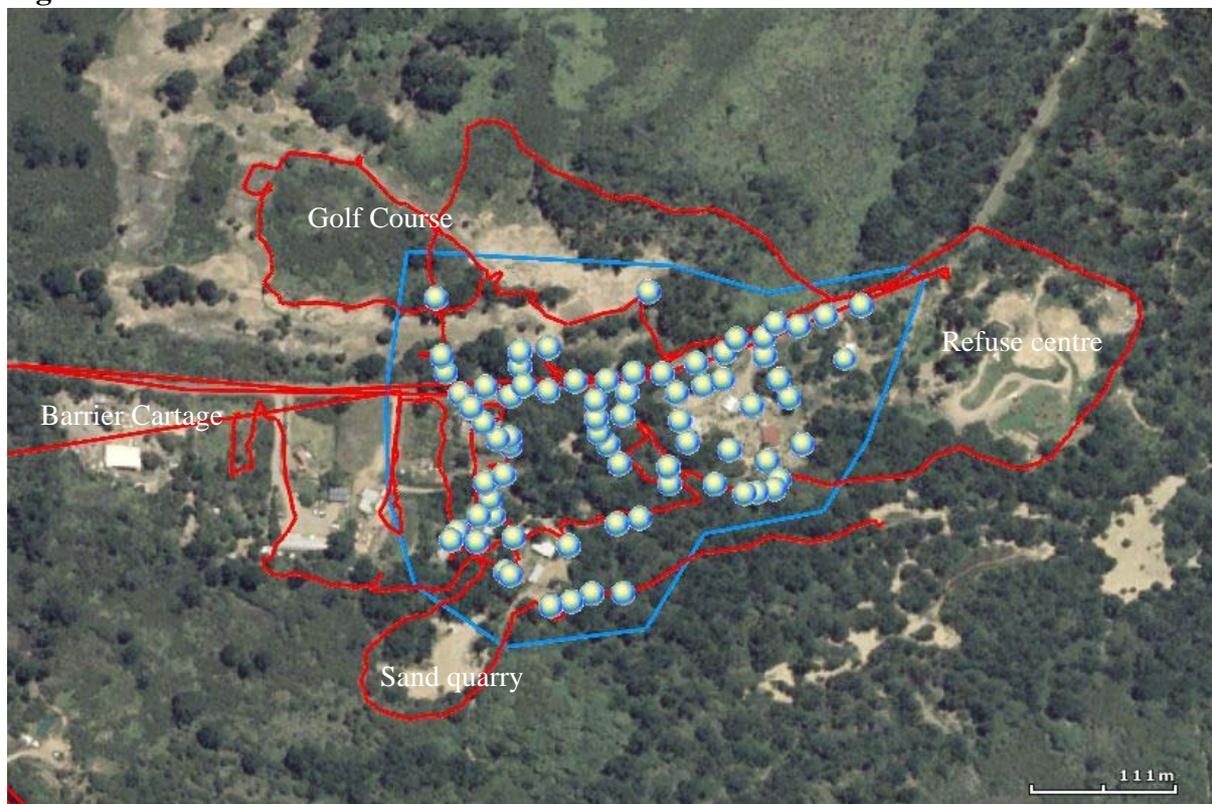
**Key:**

-  Team monitoring lines
-  Area known to have small infestation prior to monitoring
-  Positive argentine ant find

#### 4.1.7 Gray Road – Scrap metal yard and Golf course

Like the Sandhills Road site, Auckland Council notified Envirokiwi of a positive Argentine ant ID on Gray Road, directly outside the scrap metal yard. An initial monitor of the stretch of road from the Kaitoke bridge to the Coles Equipment yard showed that the spread of the infestation was much greater than first thought and entered into land on both sides of the road. Surveillance had taken place recently at Coles Equipment, Barrier Cartage and the Refuse Center which all bordered the infestation. All sites proved to be clear after surveillance so monitoring within these sites was not necessary, only perimeters were checked here. Figure 8 shows the spread of the infestation which centered around the scrap metal yard and directly across the road in the car park of the golf course. Approximately 9ha was monitored and 1686 pottles used here.

**Figure 8.**



**Key:**

- Team monitoring
- Positive argentine ant find
- Treatment area

## 5 Treatment for Control

### 5.1 Treatment sites

Table two lists the field work dates and the resources used for each site. The hours include time spent cleaning and filling pottles as well as travel time. The table also includes all extension work that was carried out to establish infestation areas within or outside these allocated sites. Weather for most treatments was fine; there was the occasional light shower during some treatments.

#### 5.1.1 Ocean View Road - Kaitoke

Given the size and nature of the area that required treating, more than one method was applied. Figure 9 helps to show where these methods were used. The areas with RED zones received a 1m x 1m ground application of Xtinguish as they contained current infestations or were the site of an extremely dense infestation in previous seasons. The 1m x 1m grid was continued through the properties of the north side of Ocean View. This was deemed necessary given the infestation here last season and its connectivity with the new sites to the south and north. It was also applied to the dense *Muehlenbeckia* site within the paddock where an Argentine ant stronghold has been identified in previous seasons. A larger buffer zone was applied to these zones (20m to 50m) to suit the abundance of vegetation/habitat. Blue Zones represent areas where a 3m x 3m ground application was applied. These areas represent zones of moderate concern given they contained Infestations in previous seasons. Green Zone – Here Ant Droids were used to help boost and extend the buffer applied to very thick bush where ground application became difficult. The use of toxic pottles placed around areas where ants were located was utilized on the first treatment. These are useful as they help guarantee up-take should there be a change in weather conditions or other impacts. These were left in the field and collected when the second treatment was taking place. Approx. 300 toxic pottles were used in the first treatment. For the second and third treatments, the team left used canisters containing residual paste (approximately twice that of a toxic pottle) in the field as this was thought to be a good way to use all the paste within the tubes. These were also collected upon the follow up treatment and replaced. See figure 9.

#### 5.1.2 Mulberry Grove & Rosalie Bay Road

Within the Mulberry Grove area, nine initial sites were allocated for treatments based on the previous seasons results. These were all scheduled for three ground applications and canisters to be left in the field between treatments. When treatments commenced, monitoring of other areas of concern (historical sites) also took place. One of these areas proved to contain Argentine ants (property opposite the school) this area was quickly quantified in size and added to the treatment site list. See Figure 5 for the distribution of these sites. When the ground application took place the team carried out visual hand searches for any signs of ant activity as well as applying large (20-30m) buffers. While large numbers of non-target ant species were discovered, no Argentine ant infestations were discovered within the allocated treatment areas.

The Rosalie Bay Road site was treated at the same time as the Mulberry Grove sites because of its close proximity. In what is relatively easy terrain to grid, all areas were covered well via ground application. Like the Mulberry Grove sites, no Argentine ant activity was seen during treatment (Figure 5). A combined total of 199 Xtinguish ant bait tubes were used across these sites.

### **5.1.3 Okupu – driftwood lodge**

Like the Thomas Road site, Okupu has a known infestation that was scheduled for treatment only. This was carried out Auckland Council with the help of Envirokiwi Staff. Envirokiwi also carried out a small amount of monitoring as explained in 4.1.3 and Figure 4. Here, additional infestations were added to the treatment plan for Okupu. These were found on the road edge (opposite the known Okupu infestation) above the bus stop and centered around Driftwood lodge. In total the three sites received two treatments with 48 tubes of toxic bait used.

### **5.1.4 Thomas Road, Medlands**

Envirokiwi monitored areas of concern in close proximity to the known infestation in the Thomas Road site. As explained in 4.1.5, the team had four infestations to treat after this monitoring had finished. Encouragingly, there were no ants identified within the Thomas Road residential properties that were heavily infested the previous season. Of the four sites (Figure 6), the George Medland property was the largest of the infestations. The entire property seemed to have Argentine ant activity and a number of trails picked up. This site also required the use of Ant Droids where ground application proved too tricky due to steep slopes and small cliffs covered in thick vines and various bush cover. The remaining sites included a small infestation in the paddock to the east of the Thomas road properties, the base of a flame tree on the first property on The Lane, and a fence line in the middle of the opposite paddock (west). All three sites received ground application only and canisters with residual paste left in the field.

AC with the help of Envirokiwi staff carried out the treatments within the known infestation at Thomas Road. along with the new infestations discovered after monitoring, these were all grouped in to the same treatment program. In total, 148 tubes of Xtinguish ant bait were used within this site. This includes the tubes required to make Ant Droids for the George Medland Site.

### **5.1.5 Sandhills Road**

Once monitoring had finished and the extent of the infestation realized, two treatments were carried out at the Sandhills site. The treatment zones can be grouped in to two main areas. The first being the residential houses starting from the campground end (south) heading north approx. 500m. Some of the properties along this stretch of road did not require treatment as they did not show signs of argentine ants from the monitoring results and had good populations of non-target species. However, the majority of properties here received two ground applications. The second treatment area runs along the large drain in the paddock behind the campground. The infestation appears to be coming from a dense area of *Macrocarpas* and various bush cover to the south. From here the ants are traveling along a fence which runs parallel to the drain. Large trees have fallen from either side of the drain providing access to the opposite side and the fence also provides an easy crossing of the water passage. A large treatment starting within the dense bush and running on either side of the fence/drain took place. The small infestation located in the middle of this paddock was included with this application. In total 127.5 tubes of Xtinguish ant bait were used. See Figure 12.

### **5.1.6 Gray Road**

Argentine ants had been located at a site along Gray Road, Claris. This was the entrance to the temporary scrap metal yard. Delimitation monitoring showed the infestation spread some distance from this site and across the road. The concentration of the infestation seems to be at the Scrap metal yard and in the carpark area of the golf course. Approx. 8.6ha were treated

with a total of 153 tubes of Ant bait used for ground application over two treatments. See figure 8.

### **5.1.7 Blind Bay Road**

This season the team based its treatment area for the Blind Bay Roadside on the previous year's finds. Not all zones within the treatment area received a 1m x 1m grid ground application. This was due to a high number of dogs on chains, a mobile pig pen and heavily mowed open grass areas. Because of these factors, leaving toxic pottles out for the two-week period was not the preferred technique. However, upon the discovery of Argentine ants around a small garden, empty canisters with residual paste were left out in strategic places that were not going to be disturbed.

Within the X-Road Back Packer property all structures were treated and any gardens given the close proximity to the previous seasons find. In total an area of 2ha was treated with 26 toxic canisters used over three treatments (figure 10).

### **5.1.8 Masons Road**

This season the Mason road site was treated by Auckland Council and Envirokiwi in a combined effort. Three treatments were carried out. Approximately 0.23ha was treated and took place around the house, along fence lines and within the Manuka bush to the west of the property.

A total of 8 Xtinguish ant bait canisters were used at this site.

AC conducted a visual hand search during the first treatment before conducting a treatment.

### **5.1.9 Mohunga**

At Mohunga, treatment for Darwin ants was undertaken similarly to that for Argentine ants and occurred throughout the garden area, lawn areas, around dwellings and into the gorse on the western boundary. Approximately 2ha was treated. This was based on results from previous seasons and a delimitation line that was monitored while the first treatment was carried out. The delimitation line was done with toxic pottles left in the field for 4hours before retrieval. No Darwin ants were discovered. This meant the team could have confidence in the area that they had allocated for treatment.

The Mohunga site remains challenging as it occurs in a coastal south west facing valley, bounded by regenerating bush on three sides and Oyster Bay on the south western side. It consists of well-maintained gardens including fruit trees, vegetable and ornamental plantings as well as a chicken yard. It also includes a thin strip of coastal zone of mainly *Meuhlenbeckia* or gorse, Manuka/Kanuka shrub land and a predominantly gorse hillside. A small stream runs along the eastern boundary. Monitoring pathways were cut into the gorse across a few seasons ago and are used for treatments also. These require re-cutting each season (Figure 11).

## **5.2 Totals**

Across all 9 sites, a total of 1003 canisters or 326 kg of toxic paste was used to treat Argentine and Darwin ants on Great Barrier Island this season.

**Figure 9 - Ocean View Road treatment areas**



Key:

- Argentine and waypoints October 2015
- Argentine ant waypoints from previous season
- 1m x 1m treatment grid – Xtinguish canister ground application
- 3m x 3m treatment grid – Xtinguish canister ground application
- Ant Droid application

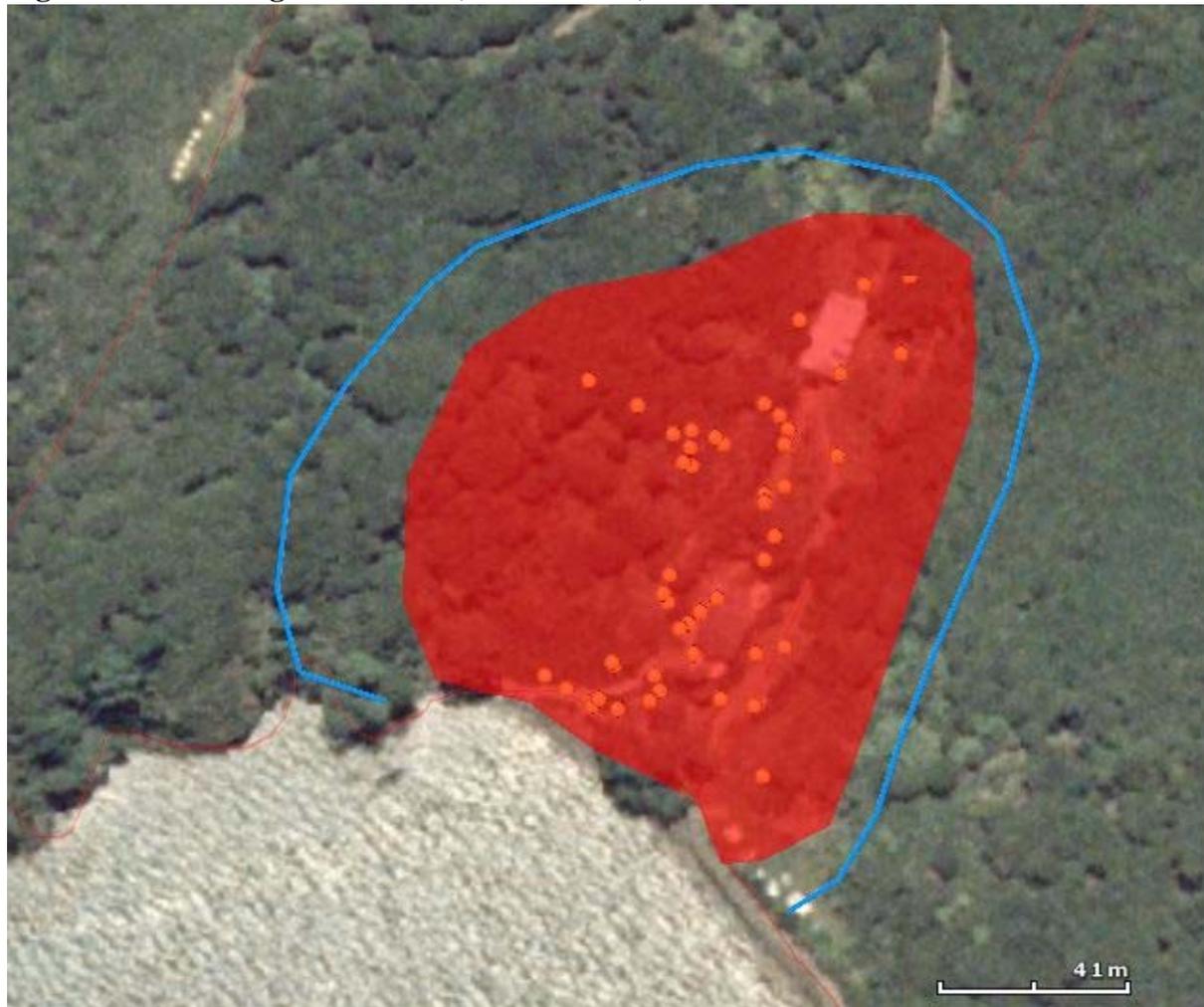
**Figure 10 – Blind Bay Road treatment**



**Key:**

- Treatment area
- Argentine Ant infestation

**Figure 11 – Mohunga treatment (Darwin Ants)**



**Key:**

- Treatment area
- Delimitation monitoring line
- Previous season finds

Figure 12 – Sandhills treatment areas



Key:

-  Argentine ant waypoint
-  Infestation located by Auckland Council
-  Treatment areas

Table 2 Field work dates and resources used for each site

Site	Monitored	Tubes of 325g paste used	Hours monitoring	Treatment 1	Treatment 2	Treatment 3	Tubes of 325g toxic paste used	Hours treating
<b>Blind Bay</b>	N/A	0	0	16/10/2015	05/11/2015	24/02/2016	26	33.75
<b>Kaitoke</b>	1 <sup>st</sup> , 2 <sup>nd</sup> , 6 <sup>th</sup> , 7 <sup>th</sup> /10/2015	8.5	230.75	12 <sup>th</sup> & 13 <sup>th</sup> /10/2015	30/10/2015	15/02/2016	180	36.25
<b>Mulberry Grove</b>	9 <sup>th</sup> , 10 <sup>th</sup> & 12 <sup>th</sup> /02/2016 (historical sites)	1.5	51.5	20 <sup>th</sup> & 23 <sup>Road</sup> /10/2015	17/11/2015	9 <sup>th</sup> & 10/02/2016	199	239.25
Rosalie Bay Road	10/02/2015	1.5	Inc. above	20/10/2015	17/11/2015	10/02/2016		
<b>Mason Road</b>	N/A	0	0	15/10/2015	13/11/2015		8	4
<b>Mohunga</b>	N/A	0	0	13/11/2015	26/11/2015		22.5	44
<b>Okupu</b>	N/A	0	0	13/02/2016	04/03/2016		48	44
Driftwood lodge	14/03/2016	2	30	16/03/2016	29/04/2016			
<b>Sandhills</b>	28/01/2016 – 16/2/16	3.5	109	03/03/2016	21/03/2016		127.5	96.25
<b>Gray Road</b>	12, 15, 20/04/2016	5	130.25	22/04/2016	6 & 9/05/2016		153	147.25
<b>Thomas Road</b>	N/A	0	0	13/10/2015	13/11/2015		148	67.75
George Medlands Paddocks The Lane	14/03/2016	4	82.25	29/03/2016	15/04/2016			
<b>Totals</b>		<b>26</b>	<b>633.75</b>				<b>912</b>	<b>712.5</b>

## 6 Discussion

The Argentine ant eradication project on Great Barrier Island has been operating for nine consecutive years. Each new season has areas allocated or reduced based on results from the previous seasons. For example, monitoring stops after Argentine ants have not been found for at least three consecutive seasons/years. This season monitoring commenced in the month of October as weather proved favorable and a similar start was made at this time last season. This showed high activity in the Ocean View Road site and certainly not too early for treatments to start here.

The introduction of a 'Treatment only' method within a number of traditional sites with no formal monitoring took place. This proved to be a very time efficient way to conduct work within an allocated area as monitoring is a time consuming exercise. Without the knowledge gained by prior monitoring, the team carefully identified areas that have consistently and recently shown signs of Argentine ant activity and treated accordingly. Large buffers were applied to these areas to decrease the chance of missing any outlying infestations that may have moved from the previous seasons location. Until monitoring is re-introduced to these sites, the true effectiveness of this method cannot be measured. The team were often uncomfortable applying large quantities of toxic bait to areas where no Argentine ant activity had been noted.

As mentioned in the body of the report, two large sites (Gray Road and Sandhills Road) were located this year and required a large amount of monitoring followed by treatments due to their well-established infestations. Both sites required a large amount of time and resources as just finding the extent of each infestation proved to be a massive task. The Gray Road site maybe a result of a scrap metal collection depot where large amounts of metal waste and cars have been compiled from various Island locations for a number of years. The infestation spread from here could be attributed to the optimal habitat in this area. A pine forest situated on sand with very hot summer conditions mimics that of both the Ocean View Road site and the Sandhills sites.

The reason for the large resurgence at the Sandhills site is likely due to this area being deemed free of infestations in the 2014 & 2015 seasons. During this time, minimal monitoring was carried out. It is also possible that monitoring carried out in the 2013 season did not pick up all activity and as a result an infestation has been allowed to spread over the course of two years. As noted in last season's report, the potential connectivity between this site and the Thomas Road site cannot be ruled out either as there are many pathways such as farm fences, road edges, and high neighbor interaction that connect these two sites.

Table three records how many pottles have been put out at each site each year and the percentage retrieved with Argentine ants. Given the lack of monitoring this season, the table doesn't offer comparison other than the Ocean View Road site where results show a consistent infestation. Interestingly, high densities are shown within Medlands compared to relatively low densities prior to the two year resting period.

The team maintains a strict control regime of treating as soon as possible after the target ants have been located, placing toxic paste out in pottles as well as on the ground and having the two treatments occur only two weeks apart. Weather conditions are required to be optimal before any treatments take place regardless of

the two-week period extending. Like last season, the previous winter was particularly mild and dry followed by a warm spring and summer, resulting in the potential for ant colonies to be established much earlier than previous seasons. Treatments were carried out as late as May this season and activity was still high. This suggests that within the right habitat and favorable weather, colonies may re-establish or spread over these mild winters despite treatment efforts in the earlier summer months. The Ocean View Road site is a good example of this. Despite a number of seasons where concentrated efforts have been placed on isolated infestations, the density of Argentine ants here remain high. While the infestations do appear to be reduced and often eradicated from an area, every season shows a resurgence or relocation of infestations in another area. After two consecutive seasons where monitoring started in Spring, both noted very high activity where monitoring was almost unnecessary other than to find the extent of an infestation (Table 3). This suggests the ants are well and truly established and recovered from the previous season.

It should be noted that upon all treatments where Argentine/Darwin ants were located via monitoring or visual searching, uptake of the toxic bait was noted. Where the target species could not be visually located in sites that did not receive monitoring, treatments only took place if non-target ant species were seen to be present and active. as it was then assumed Argentine ants would also be active. However, as often discussed within the team, this can also be an indication that Argentine ants are not present in an area as they will typically dominate most habitats they occupy.

**Table 3**  
**Number of pottles placed in field and percentage returned with Argentine ants**

Location	No of pottles 2011	No of pottles 2012	No of pottles 2013	No of pottles 2014	No of pottles 2015	No of pottles 2016	% with ants 2011	% with ants 2012	% with ants 2013	% with ants 2014	% with ants 2015	% with ants 2016
Mohunga	159	0	500	300	350	N/A	0	-	11.5	5.00	14.8	N/A
Medlands-	9104	8993	6265	N/A	N/A	4202	0.4	0.43	0	N/A	N/A	3.12
Ocean View	14321	14013	13861	9227	4913	6790	1.3	0.08	0.06	0.64	2.9	2.88
Mulberry Grove	14865	18950	18871	20513	27093	719	1.7	0.71	0.40	0.74	0.28	0.28
Mason Road/Rivendel		2090	2287	2709	120	N/A		1.91	0.09	0	5.8	N/A
Blind Bay	0	0	0	3861	1614	N/A				0.34	0.18	N/A
Gray Road						1686						2.37

## 7 Conclusion & recommendations

With a reduced amount of monitoring undertaken this season, the team found they quickly carried out all tasks allocated for the 2015/2016 summer period. However, the inclusion of two large, heavily infested sites carried this work later in to the year than planned. As mentioned in the discussion, treating only in an area is a good way to minimize time in the field and perhaps allow for extra work to be carried out in other areas. However, without the confidence of both visual and pottle monitoring results, it is impossible to ensure maximum effectiveness of treatments.

Moving forward it is recommended that all areas which did not receive monitoring last season should be monitored. This will both locate any missed infestations and provide good feedback on the effectiveness of the treat only method.

It is important that the Ocean View Road site continues to be monitored in the traditional way prior to treatment as it is used as a 'control' for comparisons with other sites. The collection of data here and methods used have been recorded consistently for a number of seasons showing massive shifts in infestation locations from year to year.

The high activity rates seen in the Autumn/winter months open up the potential for work to be carried out between the summer seasons. Surveillance carried out could give the team a 'heads up' on activity and possibly treatment before formal monitoring starts in spring. Because of their locations, the Ocean View Road, Sandhills, and Gray Road sites are all potential winter surveillance sites.