Arthurs Seat Escarpment Project

Urban Fringe Weed Management Initiative

Final Report & Recommendations

July 2014

SEEDS

Contents

1. Overview of Works

The Arthurs Seat Urban Fringe Weed Management Initiative has been implemented over a four year time frame and has resulted in a weed control works area covering approximately 92 hectares of the park. There has been significant reduction in targeted weed species in all areas that have been treated with a healthy recruitment of indigenous species. There are no mature individuals of the targeted weed species within the areas worked (92Ha). Programmed follow up is required to maintain the (now) high quality of these areas. The predominant threat to these areas is the continuous recruitment of Boneseed (*Chrysanthemoides monilifera*), there are several areas that have consistent high density level of juvenile Boneseed. Asparagus Fern and Bridal Creeper should be considered as a similar threat in the areas mapped and these areas will require close monitoring and follow up treatment to eradicate these species entirely. Other weed species targeted can be considered less of an immediate threat than Boneseed, Asparagus Fern and Bridal Creeper. However, all target species will require monitoring and treatment as required during any future works to maintain current vegetation quality.

1.1 Woody Weeds & Scramblers

The main targets for this project include the following woody weed species: Sallow Wattle (Acacia longifolia), Boneseed (Chrysanthemoides monilifera), Sweet Pittosporum (Pittosporum undulatum) and Coastal Tea Tree (Leptospermum laevigatum). The main scramblers and vines targeted include: Bluebell Creeper (Billardiera Heterophylla), Blackberry (Rubus Fruiticosus), Asparagus Fern (Asparagus Scandens), English Ivy (Hedera Helix) and Bridal Creeper (Asparagus asparagoides). All problem areas for all target species have been mapped using GPS for future treatment and monitoring. Map #

1.2 Ground Flora Weeds

Ground flora weed treatment was restricted to the edge of walking and vehicle tracks throughout the park. Sweet Vernal, Cocksfoot, Briza, Ehrharta, Annual Veldt, Panic Veldt, Yorkshire Fog. These areas have been treated on a semi regular basis over the entire project. There is a requirement for further attention to these areas as they are exposed to more seed than other areas within the park. There has been a significant reduction in these target species, however they continue to recruit along these tracks.

1.3 Community Support

There has been a good commitment to the park from several community groups which has assisted greatly in maintaining high quality areas. There is an annual “Friends Group Day” organised by Parks Vic which often attracts over 35 volunteers from various groups. Also there has been assistance from a group studying for a Certificate III in Conservation and Land Management at Franklyn Scholar. This group has assisted in several different areas and have aided in increasing the works area substantially. Without this outside help there would be less area treated and more weeds dropping seed in the high quality areas of the park. All areas worked by volunteers have been mapped and provided in this report.

1.4 Emergent Weeds

During the course of the project crews have been discovering and treating any and all weeds including any that have not been previously seen/treated within the park. New emergent weeds include any that have appeared in areas where the culprit has not been seen or treated before including specified target species. Emergent weeds that have been treated include Watsonia, Ragwort, Rambling Dock, Bridal Creeper, Gorse, Pampas, Thistle, Asparagus Fern, Boneseed, Spanish Heath, Berry Heath, Cedronella, Agapanthus, Blackberry and English Ivy. All emergent weeds have been mapped and in some cases physically tagged for future reference, monitoring and treatment. All except one Blackberry infestation outside the usual works areas have been treated, this single infestation has been mapped for future works.

2. Completed Works Maps

2010-2011 works area for Waterfall Gully

Mapping in this first year was shown to be incorrect, new methods were employed in subsequent years to ensure accuracy**.** Whilst the higher quality, low weed density areas were targeted first many areas treated were dense with mature and juvenile target species. The primary techniques used were hand weeding, cut and paint, frill and fill and felling where appropriate.

Waterfall Gully works area 2011-2012

These areas were dense with all target species and this was the first run for treatment in these areas. The quicker areas with low weed density and flat terrain where treated in the first year so these steeper and more dense areas were slower to work. Follow up was done in each of the following years. The overall quality in these areas was quite low initially.

Waterfall Gully works area 2012-2013

The third years work and focus comprised of following up the first two years work. Once this was completed additional works were conducted, extending the treatment areas from edges. There were many isolated but dense populations of juvenile Boneseed throughout the entire site which slowed crews down. Overall weed populations were greatly reduced with very few mature individuals needing treatment.

Waterfall Gully works area 2013-2014

In the final year of this project it was determined that crews would follow up on all previous years works. Having better vegetation quality and an increased area to cover within the allocated time frame it was decided that crews should run wider lines and concentrate on mature individuals. Any dense populations of juvenile Boneseed were treated wherever possible by using selective herbicide, this allowed for greater area to be covered and treated. Blackberry was also treated with chemical where appropriate.

Cook Street works area 2010-2011

Both north and east mapped areas of Cook Street were treated in this year, the vegetation quality in the east side was very low with dense populations of all target species. The ground crew pushed the works out onto the Forgotten Spur to the edge of extremely steep terrain.

Cook Street works area for 2011-2012

Initial treatment was completed along the edge of the Two Bays Walking Track, this area was dense with all target species. Some areas received follow up from precious works and overall quality was improved. Two untreated sections along the Cook St Track were treated to consolidate friends group plots and increase buffer zones for the well maintained plots along this track.

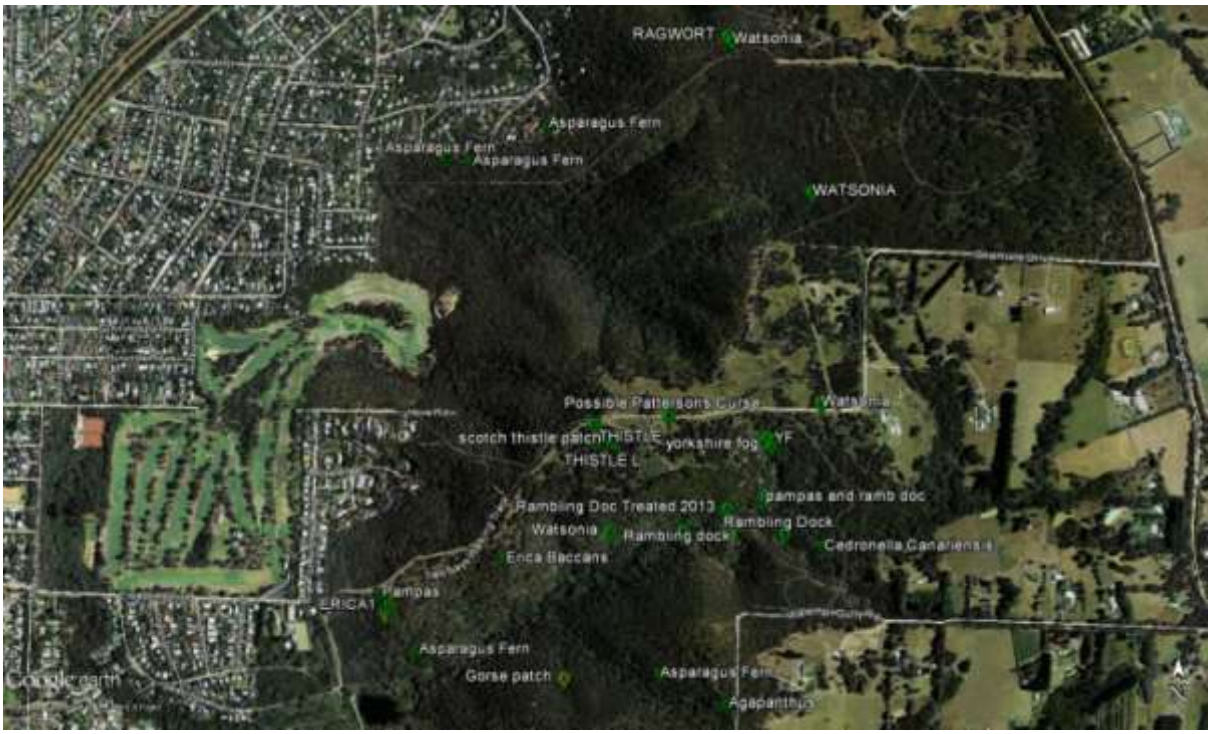
Cook Street works area 2012-2013

Follow up treatment along the Two Bays Walking Track was completed in this year. An extension of initial treatment on the Forgotten Spur was also done with extra budget at the end of the financial year. The Spur area(top right) is quite steep and mapping such areas is problematic and does not show total area effectively. Further consolidation of the Cook Street Friends group plots was also completed to the edge of plot 5. Weed density in all these areas was quite high which meant slow progress.

Cook Street works area 2013-2014

The final year of the project it saw follow up completed on all previous years works. Generally the vegetation quality has improved however Asparagus Fern proved to be an issue across many of the areas worked. This weed was prioritised, mapped and treated prior to treating all other weeds. This meant using more time than expected on treating these areas. The focus once again was to ensure that there were no mature individuals of any of the target species within these areas. Once treatment of the woody weeds was completed extra budget was used with the assistance of volunteers to further consolidate the friends group plots pushing works down towards the gully. Parks provided further budget to follow up on the Asparagus Fern treatment in these areas in May/June 2014.

Mapped and treated emergent weeds



GPS waypoints for all discovered emergent weeds across the entire works area, these targets have all been treated and monitored. Future monitoring and treatment is recommended however we have seen major improvements on these populations with some being totally eradicated.

3. Future Management Recommendations

It is recommended that mapped problem areas are prioritised before approaching other areas. Check and treat all mapped infestations of emergent weeds using maps and GPS waypoints provided.

The majority of weeds can be "rested" for up to 18 months after initial treatment, as they will not reach reproduction stage in their life cycle in this time frame. Monitoring is essential. No mature individuals exist within the works area/s treated to date and it is recommended that for the full potential of this project to be realised that no weeds be allowed to reach reproduction stage. Currently the only recruitment of weeds is coming from the soil seed bank and animal dispersal. The benefits of works conducted through this project will be fully utilised to maintain a management priority of 'no reproducing individuals'. It is essential to use the window of opportunity that the life cycles of dominant weeds present to work other areas that need attention.

Areas that need attention are all those that encroach upon worked zones, if the boundary of any zone is largely infested there should be a priority to monitor and create a buffer zone.

Specific target species should be prioritised and timed appropriately. The following are recommendations to provide quality outcomes from future works.

Boneseed: Germinates in Autumn and is most active during in Spring through Summer. Selective herbicide application for juveniles is most effective from late August through to late November; however hand weeding and cut and paint for mature individuals can be employed year round.

Asparagus Fern: Should be targeted in late Winter\Early Spring. The areas requiring monitoring and treatment are GPS mapped and in many cases individuals have been physically tagged. Map included below.

Blackberry: Can be effectively targeted in Late Spring up until early Autumn. The problem areas for this species have been GPS mapped and all new infestations should also be mapped and included in any future works plan. Map included below.

Sallow Wattle, Sweet Pittosporum, Karamu, Coastal Tea Tree and Sollya: These species can be targeted all year round in cleaner areas and can be included in budgets allocated for any of the above Target Species. In any overly infested areas it is best practice to ensure treatment prior to seed drop. Priority should be to remove all mature individuals prior to flowering.

Ehrharta erecta (Panic Veldt Grass) is a perennial grass that is observed to produce seed all year round. As such it requires programmed regular treatment runs throughout the year. Seed can survive in soil for approximately 3 years so requires follow up for germinates at regular intervals throughout August-March especially following rains.

Ehrharta longiflora(Annual Veldt Grass), is an annual grass which requires treatment during early spring at 3-5 blade stage with Fusilade or if later with Glyphosate, seed will survive up to 3 years in soil and needs follow up on consecutive years for this period after initial treatment. Sensitive areas should be handweeded wherever practicable.

Briza minor and maxima (Quaking Grass) are annual grasses and have taken hold along several track and path edges throughout the site and needs careful planning to reduce its spread. A slashing schedule needs to be implemented for successful outcomes. Slashing should be timed for maximum effect and be completed before September for maximum results. This process needs to be maintained for up to 4 years for effective reduction. Using Fusilade during Late August/Early September has proven effective in reducing individuals across much of the site.

Anthoxanthum odoratum (Sweet Vernal): Allopathic, perennial grass. Should be sprayed, burnt and/or hand weeded in early winter for a minimum of 2 seasons. In sensitive areas it is possible to use Fusilade during early growth which will reduce off-target damage.

Dactylis glomerata (Cocksfoot) Perennial Grass: Herbicide control of this target species is problematic without regular follow up every 8 weeks till there are no remaining individuals. Considering the sparse infestation levels it is considerably easy to hand weed during any spray run associated with any other GFW species. All mapped areas of known infestations should be maintained and updated regularly to ensure proper control of this species.

Holcus lanatus (Yorkshire Fog Grass): Perennial grass, best spraying period is in autumn although hand weeding is preferred considering the low numbers of this species present and also to reduce requirement for follow up treatment. Slashing can be employed to inhibit seed drop but will not kill healthy individuals.

All ground flora weeds need treatment to be timed effectively to ensure reduction and eventual eradication of target species, the majority of these species can be targeted effectively from late July to October, however, some need treatment in late July / early August. The vehicle tracks and walking paths require appropriately scheduled treatment and rigorous follow up as these areas are where the majority of the problem species are colonising and setting seed. Knapsack spraying is preferred along tracks and paths, using selective herbicide where possible and appropriate, however non selective herbicide is necessary for dense infestations where little or no indigenous ground flora exists.

Future Management Recommendations

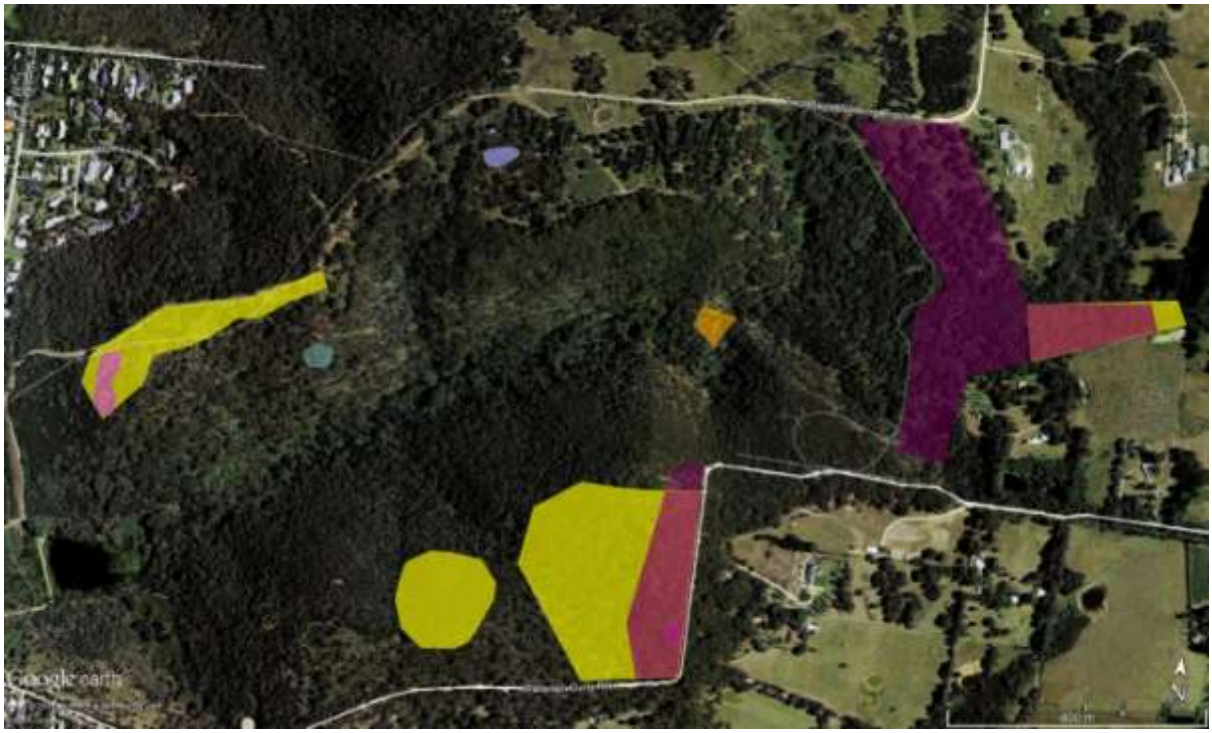
Site Location	**Management Activity**	**Programmed Timing**	**Outcomes**	**Estimated Budget Required**
Waterfall Gully North - Area between Seamists Drive Track and creekline.	*Follow Up Woody Weeds:* Sweet Pittosporum, Boneseed Sallow Wattle. Techniques: Cut/paint, Frill/Fill, Handweed and Felling.	This area has not been treated in approximately 9 months; parts of this map could be rested for up to 9 months. All woody weeds can be targeted year round. Certain areas considered to have Boneseed recruitment issues will require close monitoring and a treatment run using selective herbicide between August and late November. Map included.	Maintain 100% of treated areas to prevent the establishment of mature seed producing individuals.	Difficult to estimate as it is determined by the density of the infestations.
Waterfall Gully South- Area between creekline and Waterfall Gully road.	*Woody Weeds:* Sweet Pittosporum, Boneseed Sallow Wattle. Techniques: Cut/paint, Frill/Fill, Handweed and Felling.	This area was last treated approximately 6 months ago and is generally very good quality with low density weed presence and can also be rested, although there are some problem areas that will require monitoring and treatment as required generally for Boneseed recruitment areas. Treating Boneseed recruitment early means it can be quickly sprayed with selective herbicide and thus prevents future costly treatment. Map included.	Maintain 100% of treated areas to prevent the establishment of mature seed producing individuals	Difficult to estimate as it is determined by the density of the infestations.
Waterfall Gully North & South + Cook St – Blackberry infestation areas as mapped (see map)	*Blackberry – knapsack spraying*	Chemical treatment of Blackberry should be scheduled between October and March. For best results two runs per season should be scheduled. All other control methods are appropriate at all times. It is advisable to schedule this work for next two years and after that it should just be a site visit to check.	Follow up treatment of 100% of Blackberries in mapped locations to achieve longterm Blackberry eradication.	40-60Hrs if infestations stay at current levels.

Waterfall Gully North & South + Cook St – Ground Flora Weed Control along track edges	*Ground Flora Weed Control* – Spraying and appropriate schedule for slashing.	Requires an annual commitment to these works in order to achieve control of weeds present and prevent further spread. For Ground Flora Weed Control to be effective works need to be programmed annually for 3-4 years. May not be a priority	Containment and control of Ground Flora Weeds on track edges to prevent spread.	40-80 Hours to ensure follow up is available to ground crews.
Waterfall Gully North & South + Cook St – Emergent weed locations as found on map	*Emergent Weeds* - Watsonia, Ragwort, Rambling Dock, Bridal Creeper, Gorse, Pampas, Thistle, Asparagus Fern, Boneseed, Spanish Heath, Berry Heath, Cedronella, Agapanthus, Blackberry and English Ivy.	All mapped infestations require monitoring and treatment as required. Mapped locations of all treated areas is provided below. It is worthwhile monitoring these locations for next three years to ensure these potential emergent weeds are eradicated from the park and do not reproduce.	Maintain 100% of treated areas to prevent the establishment of mature seed producing individuals.	Mapping and monitoring of mapped infestations are done while crews work through an area. Treatment depends on species and location. To be done separate to other works would require 40-80hrs
Across entire works area- Scramblers and Vines	*S&V:* Blackberry, Sollya, Asparagus Fern. Cut/Paint, Handweed, Knapsack.	Scramblers and vines other than Asparagus Fern are best treated while treating other species as they are found commonly whilst doing a woody weed run. If woody weed runs are not occurring two scheduled runs would be ideal where infestations are heaviest to prevent individuals reaching reproduction stage.	Maintain 100% of treated areas to prevent the establishment of mature seed producing individuals	100 Hours for current mapped areas more if further infestations are discovered.

Cook St East -Area between Cook Street vehicle track and Seamists Dve vehicle track. This area includes the Forgotten Spur.	*Woody Weeds*: Sweet Pittosporum, Boneseed Sallow Wattle and Coastal Tea Tree. Techniques: Cut/paint, Frill/Fill, Handweed and Felling. S&V: Blackberry, Sollya, Asparagus Fern.	There are areas on the forgotten spur that will require follow up for all target species as it has only had initial treatment. Boneseed recruitment on the spur is prolific. Suggestions for future works would be to use selective herbicide for juvenile Boneseed which should be scheduled between August and November of this year. Other areas have improved greatly during this project, monitoring and maintenance for all targets should be regular to maintain high quality of work to date. Problem areas have been mapped and provided below.	Maintain 100% of treated areas to prevent the establishment of mature seed producing individuals	Follow up treatment on the Forgotten Spur would be dependent on recruitment of boneseed.
Cook St North - Area including all friends group plots along the cook Street Vehicle track down to the edge of the gully and beyond.	*Woody Weeds*: Sweet Pittosporum, Boneseed Sallow Wattle. Techniques: Cut/paint, Frill/Fill, Handweed and Felling. *S&V*: Blackberry, Sollya, Asparagus Fern. Cut/Paint, Handweed, Knapsack.	This area has been well maintained by community groups and has regular working bees that will help to prevent most target weeds from becoming established in this area. The predominant threat will be asparagus fern. Regular monitoring and treatment for this target should be a goal as community groups generally do not use herbicide which is essential in controlling this weed. Regular maintenance and monitoring for other weed species can be achieved while treating Asparagus Fern.	Maintain 100% of treated areas to prevent the establishment of mature seed producing individuals	Once again this is problematic as proven by the Asparagus Fern infestations in this last year, 2 complete runs were required: one for woody weeds and another for Asparagus Fern. The Asparagus Fern also received follow up treatment. That is 3 complete runs for one year.

4. Future Management Recommendations Maps

Waterfall Gully Problem Areas



This map shows areas known to have issues with Boneseed recruitment in yellow, Blackberry in purple, Heath species in pink and grey, Watsonia in white, Thistles in blue and Rambling Dock in orange. Although there are other species listed on the emergent weeds list these will require close monitoring to maintain the quality in these areas.

Cook Street Problem Areas

Asparagus Fern Treatment Area in green, this area requires monitoring and follow up on previous spray runs within 12 months. Blackberry shown in purple has been untreated in this financial year and will also require monitoring and treating if budgets allow. This zone in purple is not within the normal works area but has been treated in previous years and therefore has improved vegetation quality.

Boneseed Problem Areas Cook Street

Yellow areas are showing boneseed recruitment problem areas. Selective herbicide to control Boneseed in the areas indicated is recommended to speed up treatment time. Due to its seeds longevity in soil this will need to be ongoing.

Emergent Weeds Map

Waypoints for established locations of emergent weeds over the entire site are shown here. All of these have been treated and require monitoring and further treatment where necessary.

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