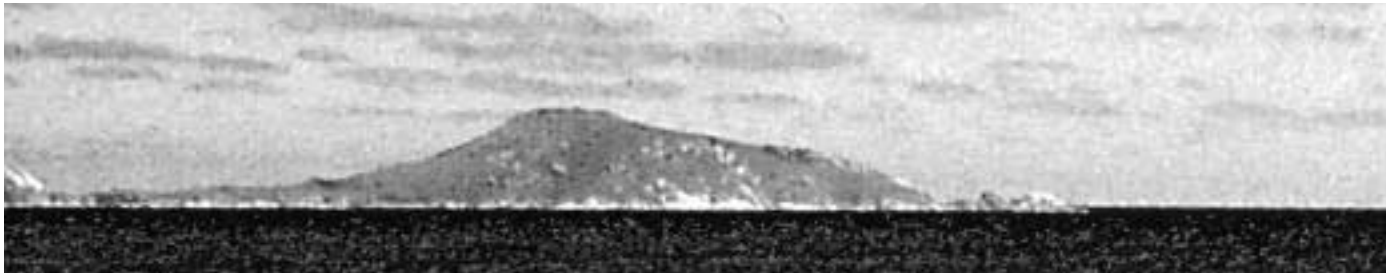


Coastal Weed

TREATMENTS HANDBOOK



PRODUCED BY GREENING AUSTRALIA VICTORIA
WITH THE ASSISTANCE OF COAST ACTION / COASTCARE



communities caring for our coast

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COASTAL WEED TREATMENTS HANDBOOK

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INTRODUCTION

Environmental weeds are plants which degrade or threaten the quality of indigenous environments. They come in all shapes and forms of plant life. Some environmental weeds are even native plants which have become a problem by invading habitats beyond their natural range. For example, Sweet Pittosporum (*Pittosporum undulatum*) is an indigenous plant of East Gippsland, but a very damaging weed of coastal vegetation around Port Phillip Bay. This handbook has been developed to assist people and groups who care for local indigenous environments along the Victorian coastline, in their weed management activities. It describes and suggests a range of practical techniques that have proven successful in the management of environmental weeds.

WHAT THIS HANDBOOK ISN'T

This handbook is not a coastal weed management handbook. Successful environmental weed management relies on an integrated approach of mapping, environmental assessment, budgeting, resource planning, scheduling and finally, the selection of appropriate weed treatments. It is not the aim for this handbook to cover all of these issues. What this Coastal Weed Treatments Handbook does, is to provide descriptions of appropriate treatments for coastal weeds.

Similarly, it is not the aim of this handbook to encourage people to simply go out and kill weeds. Unplanned weeding is often ineffectual in the long term or may even worsen the environmental management issues for a site. For example, herbicide spraying of larger weed colonies can encourage a greater diversity of weeds to colonise that area post-spraying, making future weed management more complicated. Similarly, exposing soil surfaces by weed removal may contribute to other site management problems such as soil degradation or erosion. A sudden loss of weeds may even destroy the only remaining habitat for fauna.

HOW TO USE THIS HANDBOOK

It is recommended that this handbook be used to assist individuals and volunteer groups in planning and implementing appropriate weed treatments, for the management of coastal areas. If working on public land, permission from the land management organisation/committee is required before any on-ground activities take place. Coastal land management organisations may also be an important source of technical and site information which may influence the approach adopted in treating coastal weeds. Other information and assistance should also be sought from local experts/experienced operators and other environmental management organisations such as the Department of Natural Resources and Environment (NRE), Parks Victoria, local government and Greening Australia.

Information in this handbook can be accessed in a variety of ways:

- 1. LOOK UP A WEED BY NAME** in the index at the back (Common or Botanical Name)
- 2. FIND A WEED TREATMENT APPROPRIATE FOR A PARTICULAR FORM OF WEED**
Weed forms (e.g. tree or grass) are listed under *Coastal Weeds and their Treatments*, in the *Table of Contents* at the front.

- 3. FIND DETAILS OF A PARTICULAR WEED TREATMENT** as listed under *Non-chemical Weed Treatments* or *Chemical Weed Treatments*, in the *Table of Contents* at the front.
- 4. IDENTIFY VARIOUS DO'S AND DON'TS** as described in case studies listed within *Coastal Weeds & their Treatments* (pages 18-29).

Weed Control Basics



WHAT IS A WEED?

Weeds are plants which are growing where they are not wanted. The definition of what makes a plant a weed is therefore, to a large extent, a matter of opinion. The location will be a major determining factor. For instance, a patch of Freesias may be completely appropriate in a garden of a suburban home, but not so in a local coastal dune system. In much the same way, weeds are grouped into categories defined by the area or issue that they affect e.g. *Environmental Weeds* or *Agricultural Weeds*. However, there are certain plants which government bodies, on a local, state or federal level, have classified as weed species (ie. unwanted plants) in particular areas. In these cases it has been assessed that the potential damage caused by the plant (either economically or environmentally or both) is great enough to warrant public action to reduce its population in that area. Weeds declared by the Victorian Government under legislation are termed *Noxious Weeds*.

What is an Environmental Weed?

An Environmental Weed is a plant which does not occur naturally in a particular environment. It is therefore considered as unwanted and destructive to the ecology of that environment. An Environmental Weed can also be a Noxious Weed and/or an Agricultural Weed.

What is an Agricultural Weed?

An Agricultural Weed is a plant which reduces or threatens agricultural production. In this situation the Agricultural Weed competes with the desirable agricultural crop for the limited resources available for plant growth; or decreases the quality of the crop; or decreases the carrying capacity of the land; or decreases the health or stock quality grazing on that land. An Agricultural Weed can also be a Noxious Weed and/or an Environmental Weed.

Noxious Weed Categories Explained

The *Catchment and Land Protection Act (1994)*, now defines four different categories of Noxious Weeds relevant to Victoria. The consequence of Noxious Weed classifications is the definition of who is responsible for the management of particular weed species occurring on different land. The classifications and responsibilities of management are defined as follows:

RESTRICTED WEEDS

currently no weeds are placed in this category

STATE PROHIBITED WEEDS

responsibility of eradication from all land rests with the State

REGIONALLY PROHIBITED WEEDS

responsibility of eradication rests with the public or private owner of the land, and with the State on undeclared roadsides

REGIONALLY CONTROLLED WEEDS

prevention of growth and spread rests with the public or private owner of the land, including adjoining undeclared roadsides

FORMS OF WEEDS

This handbook makes reference to approximately 46 weeds that have been selected through public consultation and discussions with professionals involved with weed management in coastal areas. It does not encompass all weeds along the Victorian coast-line, but identifies major weeds of the seven Coast Action Zones in Victoria (refer to map, p.31) and includes some weeds that have potential to become serious problems.

For the purpose of this handbook, weeds have been divided into six different categories based on the form and size of the weed. The six categories are:



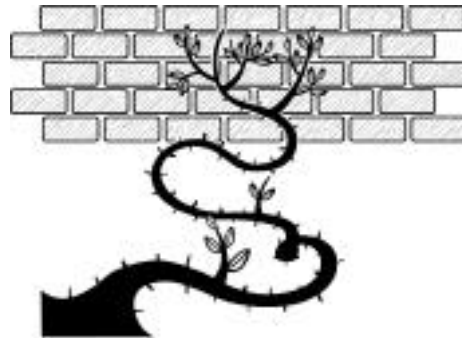
Woody Trees & Tall Shrubs —
any plant greater than approximately two metres high with a woody stem
e.g. Sweet Pittosporum (*Pittosporum undulatum*)



Grasses —
non-woody plants,
typically low growing with narrow leaves
e.g. Kikuyu (*Pennisetum clandestinum*)



Small, Woody Shrubs —
any plant less than approximately two metres high with a woody stem
e.g. Boneseed (*Chrysanthemoides monilifera* ssp. *monilifera*)



Vines & Scramblers —
weak stemmed plants which rely on other plants or objects for support
e.g. Bridal Creeper (*Asparagus asparagoides*)



Herbaceous Plants —
non-woody plants usually with broad leaves which are soft and flexible
e.g. Paterson's Curse (*Echium plantagineum*)



Bulbs, Tubers & Rhizomes —
plants with underground parts from which re-growth can occur
e.g. Bulbil Watsonia/Bugle Lily (*Watsonia meriana*)

Note: It is possible for a single plant species to fall into two or more of the above categories. For the purpose of this handbook, weeds have been grouped according to their features which determine the most appropriate treatment techniques.

WEED TREATMENTS VS. WEED MANAGEMENT

In general, weed management has tended to be very localised and targeted towards attempting to control individual weed species. More often than not weed treatment programs represent an attempt to control the spread of infestations which have become out of control.

The long term outcome of adopting such a 'boom and bust' approach is often failure. Whilst some programs may have had some limited success in containing the spread of particular weeds in the short term, they often lead to an on-going, kill then re-infestation cycle with no long term benefit to the environment. Alternatively, killing or removing one target weed species may lead to the infestation of one or more different species, perhaps more difficult to manage e.g. replacement of woody weeds with smothering ground cover species such as Soursob (*Oxalis pes-caprae*).

Successful weed management in the long term involves weed treatments that form part of a researched, planned, monitored and maintained, weed management program.

This handbook provides information to identify what options are available for the treatment of weeds in coastal areas, as part of a planned weed management program. It should not be used on its own as a guide to managing weeds.

KEY PRINCIPLES TO SUCCESSFUL WEED TREATMENT

The long term success of any weed treatment relies upon three simple principles:

- ♣ Minimise disturbance during weed treatment
- ♣ Replace the space occupied by weed species with desirable plants
- ♣ Follow up monitoring & treatments

Disturbance

Weeds are essentially opportunistic plants. If the opportunity arises for them to grow, they are usually good at out-competing local plants. Soil disturbance, increased light levels and removal of vegetation, all represent opportunities for weeds to establish. Minimising such disturbance during weed treatments or other management activities will reduce the opportunities for weeds.

Replacing the Space

To build upon the concept of minimising opportunities for weeds, a revegetation step should be incorporated into weed treatment activities. If a space is available, an opportunity exists for a weed to fill that space. Long term success in treating weeds will only be achieved if a desirable plant is encouraged to fill the space in the environment which has been created by the removal of a treated weed species. If this revegetation step is not included in your weed treatment activities, it is likely that you will be performing repeat weed treatments upon the same area, far into the foreseeable future.

Replacing the space created by weed treatments can be achieved by planting or seed sowing of indigenous species, or by altering site conditions to favour the natural regeneration of indigenous plants over weed species ie. give the indigenous plants the competitive edge over the weeds. How to best achieve this replacement of weeds with indigenous plants will vary from site to site, and various methods may achieve long term success. It is recommended that

careful thought be given to this in the planning of revegetation projects, with professional assistance sought if required. Advice on revegetation techniques can be obtained by contacting Greening Australia Victoria (9457 3024) or Coast Action/Coastcare Regional Facilitators (refer to back cover).

Follow Up Monitoring & Treatments

No matter how thorough or effective weed treatment activities have been, follow up work will always be required. New weeds will grow from seeds previously dormant in the topsoil. Other weeds may establish from new seeds brought to the site by wind, animal, bird or human activity and still other weeds will re-grow from existing weeds which were overlooked during treatment, or on which the treatment was unsuccessful. It is recommended that two to three follow up treatment days be scheduled over the first six months following initial weed treatment and revegetation activities. Beyond this, continuing site monitoring will determine the need for any further weed treatments on an 'as needs basis'.

Remember: The Key Principles to the long term success of Weed Treatments are:

remember

- ♣ MINIMISE DISTURBANCE DURING WEED TREATMENT
- ♣ REPLACE THE SPACE OCCUPIED BY WEED SPECIES WITH DESIRABLE PLANTS
- ♣ FOLLOW UP MONITORING & TREATMENTS

CLEANING UP AFTERWARDS

Once weeds have been treated, there is often the issue of how to keep the revegetation site clear of branches, foliage, vegetative weed parts (such as rhizomes and bulbs) and weed fruits containing ripe seed. Small amounts of foliage can often remain on site to decompose. Sometimes the dying foliage of treated weeds can provide a useful mulch layer to deter weed seed germination in the short term and protect light coastal soils from wind and water erosion. Larger branches may need to be removed if they are smothering indigenous plants. The practicalities of using a small garden mulcher to chip branches on site (which could then be used to mulch subsequent planting) should be considered.

Bulbs and rhizomes, etc. lifted during HAND REMOVAL will of course need to be removed from the site or else regrowth will occur. Once removed, these can be sealed within black plastic bags and left in the sun to rot. After six months or so, the dead plant material can be safely buried or composted without fear of regrowth.

Weed seeds can be harder to kill. It is most important to remove weed seeds and fruits from the coastal revegetation site, but equally as important to keep them containerised so they are not dispersed. A plastic bag treatment as previously described can be useful, but weed seeds may tolerate temperatures more than 65 degrees celsius before death. A hot composting process can be successfully employed to generate the temperatures required to kill all weed seeds. However, if in doubt, burning or disposing of the weed seed bags through the rubbish collection system will be the safest approach.



Non-Chemical Weed Treatments



Mulching around a Coast Banksia (*Banksia integrifolia*), using a combination of newspaper and wood chip mulch.



WEED MAT OR JUTE MAT 700 GSM²
WEEDS
SOIL



ORGANIC CHIP MULCH, 5-10CM THICK
NEWSPAPER, 4-10 SHEETS THICK
SOIL



ORGANIC CHIP MULCH, 10-15CM THICK
DEAD WEEDS (E.G. VIA HERBICIDE APPLICATION)
SOIL

Three good mulching combinations.

MULCHING/SMOTHERING



MULCHING/SMOTHERING involves placing a layer of material on the ground surface through which weeds struggle to penetrate. Weed seeds are denied access to light and as a result may be unable to germinate. Similarly, emerging weed seedlings or regrowth from vegetative parts will not be able to penetrate the mulch to reach the surface. Without light, plants will be smothered and die.

MULCHING/SMOTHERING also helps to preserve soil moisture, benefiting desirable plants still growing in the mulched area. Many different materials can be used as mulch. Newspaper, scrap carpet, street tree prunings, and commercially produced plastic sheet or organic fibre matting, all have their place for different situations and purposes. Around individual plants, bark or wood chips, newspaper or matting can be used. For larger areas fibre matting or *Weed Mat*[®] is a good option, with combinations of materials often being an advantage in the long term (refer to diagrams for successful combinations of layers and recommended mulching depths).

Care should be taken with organic chip mulches as they are frequently contaminated with weed seeds. Similarly, many weeds can grow through a layer of chip mulch. In such circumstances a pre-mulching herbicide application is recommended to kill weeds before smothering. A great benefit of organic mulches however, is that they gradually decompose in the environment and may contribute to soil quality.



HAND REMOVAL



HAND REMOVAL is often the simplest and most effective technique to remove weedy vegetation. In general the aim should be to remove all plant parts capable of regrowth, with as minimal disturbance to the soil as possible. For plants with crowns or rhizomes, cut into the soil around and below the root mass, with a sturdy knife (a mattock can be used for larger woody plants). The above ground plant can then be pulled.

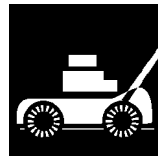
For flat weeds with a tuberous taproot such as daisies (pictured below), cut down into the soil alongside the plant, loosen the plant in the soil and then gently pull upwards. The taproot must be kept intact as regrowth can occur from broken portions. Smaller seedlings without taproots can be hand-pulled by grasping the plant as low to the ground as possible to prevent breakage.

It should be recognised that **HAND REMOVAL** does not prevent the growth of new weed seedlings and should therefore be done before the plants get the opportunity to flower and produce seed. It should also be noted that many weeds may be either poisonous or contain substances which are skin irritants e.g. Bluebell Creeper (*Sollya heterophylla*). Gloves should always be worn as a precautionary measure and a First Aid Kit present at the work site.



Hand removal of Gazania (*Gazania* sp.). The tuberous taproot is removed after the soil is loosened.

SLASHING



SLASHING is effective at two levels as a weed treatment. Firstly slashing can be used to remove the flowering heads of certain weeds before any ripened fruit is formed. Without fertilised flowers, no new seed is produced for that season, thereby restricting the spread of weed populations. This proves particularly effective with annual and biennial weeds, especially grasses.

Secondly, repeated **SLASHING** of the above ground foliage of bulb-like, perennial weeds is an effective measure to greatly reduce weed vigour, reduce flowering and may gradually kill the adult weeds as well. This method exhausts the weed's underground food reserves so that the plant eventually 'starves to death', no longer having the required energy to produce next season's bulb, corm or tuber. Several years of **SLASHING** may be required to kill bulb-like weeds.

SLASHING can also be used to encourage new and active growth in weed species as a pre-treatment to a **FOLIAR SPRAY** with herbicide. Such a combination of treatments often makes the herbicide application more effective due to the more absorptive nature of new growth.

Note: Some woody weeds e.g. Gorse (*Ulex europaeus*) may not only survive but thrive under a **SLASHING** regime. Such species can flower and fruit successfully using limbs close to the ground so that a prostrate mat of weed vegetation develops.



Continued slashing of Angled Onion (*Allium triquetrum*) removes flowers and weakens underground bulbs.

TOPPING



TOPPING involves cutting the trunk and stems of woody weeds, as close to ground level as possible. It should be emphasised however, that this technique is only successful in killing weeds unable to re-shoot from either the trunk sections or roots systems, remaining in the soil after treatment.

This technique is also recognised as an effective way to reduce flowering and fruit development of woody weeds, much in the same way as **SLASHING** can be used for herbaceous plants. **TOPPING** of woody weeds early in their flowering season, will have a short-term effect of reducing the amount of weed seeds produced that year.



Topping of Coast Tea-tree (*Leptospermum laevigatum*) is an effective treatment as it rarely reshoots from its trunk base or roots.

SOLARISATION



SOLARISATION is a technique that utilises the heat from the Sun to 'cook' weeds and weed seeds. It usually involves a transparent or black plastic sheet to cover the ground surface, which is sealed air tight by burying the edges of the sheet (pictured below). Temperatures generated underneath the plastic will typically rise above 60 degrees celsius on a warm summer day. Prolonged exposure of four weeks or more, to these sorts of temperatures will kill most plants and weed seeds.

Note: If black plastic is used, the exclusion of light to plant material will also serve to kill existing weeds.



The edges of plastic sheet used for solarisation need to be well sealed by burying in a trench. Weights placed upon the plastic help prevent wind from moving the sheet.

RINGBARKING



RINGBARKING is a method which successfully kills many woody plants. A ring of bark, two to 5 cm wide, is removed from around the trunk of the weed tree by chipping with an axe or tomahawk. By doing this, the internal water & nutrient transport system of the weed tree is severed, so that the plant dies.

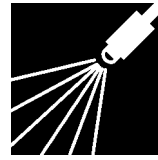


Ringbarking of Pine Trees (*Pinus radiata*) will kill these woody weeds. Bark must be totally removed down to the sapwood of the trunk for the treatment to be effective.

Chemical Weed Treatments



FOLIAR SPRAY



A FOLIAR SPRAY application of herbicide is one of the most commonly used weed treatment techniques. Spray equipment appropriate for coastal bush regeneration include knapsack sprayers with a maximum capacity of 15 litres.

The diluted herbicide is applied as fine droplets onto the surface of foliage to achieve good coverage but not so heavily that it drips from the weed's leaves. Herbicides must be applied at the appropriate rate as specified on the herbicide label and the applicator must take all the required safety precautions. Both *translocated (systemic)* and *contact herbicides* are appropriate for foliar spray applications (refer to *Types of Herbicides*, p.17).

It should be noted that herbicides are usually very effective at killing weeds but of course do not prevent weeds from reinvading the same area. As with all other weed treatments, revegetation and follow up should be planned for long term success.

Note: The most effective timing for foliar spray applications will vary in line with regional climate and growth patterns. Seek local advice.



Keep spray nozzle close to the ground during foliar spray treatments, to minimise spray drift.

CUT & PAINT



CUT & PAINT is a technique appropriate to treat smaller, woody weeds. It involves cutting off the foliage structure of the weed from low on its central trunk and then quickly applying *translocated (systemic) herbicide* to the cut surface of the stump. It is extremely important to apply the herbicide as quickly as possible (within 10 seconds), as the plant's internal transport system breaks down on exposure to air and will decrease the uptake of herbicide by the plant.

A variation of this technique where the amount of weed foliage makes working difficult, involves a staggered pruning sequence. The bulk of the top vegetation is removed and disposed of first, so that at least 50 cm of trunk and foliage remains present. Within a two hour time limit, recut the stump & foliage as low to the ground as possible and immediately paint the freshly cut stump with herbicide.



Diagram illustrating how translocated (systemic) herbicides can move internally throughout a weed to kill all above and below ground plant parts.



- 1** Long-handled loppers (or a bow saw) easily cut through woody branches.
- 2** Painting of translocated (systemic) herbicide must occur within 10 seconds of each cut.



SCRAPE & PAINT



SCRAPE & PAINT is a variation on the CUT & PAINT technique, which is much more appropriate and effective in the treatment of larger, more woody, vine-like weeds. The outside bark of a twining vine is scraped with a knife to remove the outer bark. The exposed inner tissue is immediately painted with a *translocated (systemic) herbicide* at the dilution rate identified on the label. The internal transport system of the plant moves the herbicide to all above and below ground plant parts and effectively kills the weed. A scrape should be located within approximately one metre of the base of the vine. Multiple scrapes can be applied to larger vine systems.



Diagram illustrating how translocated (systemic) herbicides move from the scraped section of vine, to kill all above and below ground parts of woody vine-like weeds.



1 The scrape & paint technique is successful in killing woody vines such as English Ivy (*Hedera helix*)



2 Painting of translocated (systemic) herbicide must occur within 10 seconds of making scrapes for the technique to be effective.

FRILLING



FRILLING is a similar technique to RINGBARKING with a couple of important differences. 'Chips' or 'frills' are made into the trunk of a woody weed with an axe or tomahawk, with care taken not to remove an entire ring of bark. Herbicide needs to be applied immediately as each frill is made. The process here is that the herbicide is taken directly into the plant's internal water & nutrient transport system and circulated around the plant to kill all plant parts. The plant's transport system must be functional for this method to work and hence care should be taken so that the plant is not ringbarked. Only *translocated (systemic) herbicides* should be used at label concentration. Exposure of the weed tree's under-bark to air, quickly reduces the efficiency of the plant's internal transport system and the absorption of the herbicide. It is therefore important to apply herbicide as quickly as possible to each newly made frill for this treatment to be effective.

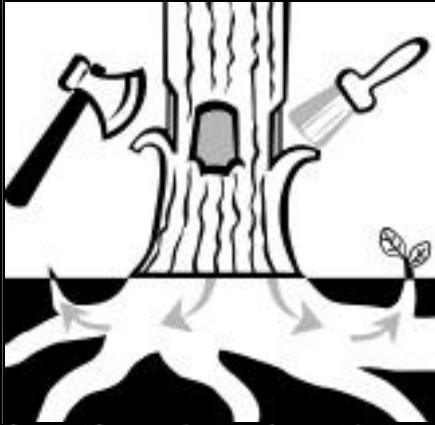


Diagram illustrating how translocated (systemic) herbicide is circulated internally by the plant from the applied frill to all above and below ground plant parts.



- 1 Frilling can be effective in treating larger, woody weeds such as Mirror Bush (*Coprosma repens*).
- 2 Herbicide injector guns (pictured) or a paintbrush can be used to apply translocated (systemic) herbicide into freshly made frills.



Using Chemicals

The use of chemicals in the treatment of weeds should be approached with care. In cases where other treatments such as HAND REMOVAL are considered appropriate, using chemicals should be selected only if viewed to have greater benefits in relation to site practicalities, treatment effectiveness, costs, etc. If it is decided that a chemical treatment is best for a given situation, it is strongly recommended that two separate courses be completed before any chemical handling takes place:

FARM CHEMICAL USERS COURSE & FIRST AID COURSE (MIN. LEVEL 2)

The Farm Chemical Users Course is offered across Victoria by most Agricultural and Horticultural Colleges and TAFE Institutes as well as a range of community, private and vocational training providers. The cost of the course includes the provision of a manual which is a useful reference on chemicals and herbicide use in its own right. The First Aid Course (Level 2) is offered by a range of training providers, including the *St. John's Ambulance Association*, and provides beneficial training in the basics of many aspects of First Aid.

note

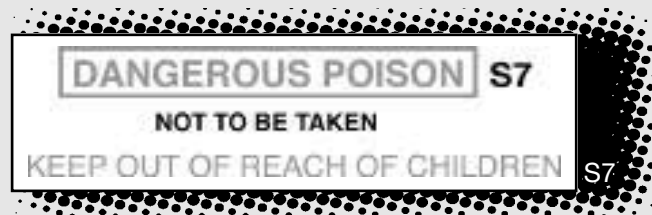
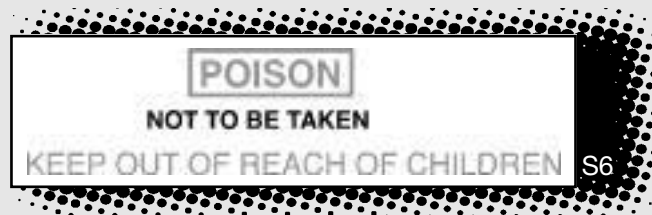
IT MUST BE RECOGNISED THAT HERBICIDES (CHEMICALS USED TO KILL PLANTS) ARE POISONS AND SHOULD BE TREATED WITH DUE CARE.

LEGAL REQUIREMENTS

Almost all chemicals used in agriculture/horticulture are required to be registered by the *National Registration Authority for Agricultural and Veterinary Chemicals*. All legislation regarding agricultural chemicals registered under this authority is directly applicable to the bush regenerator, as it encompasses chemicals used in the treatment of environmental weeds.

The approved labels of each registered chemical include instructions for proper use. Additional information to that on the label is provided on a Material Safety Data Sheet (MSDS), available on request from chemical retailers/wholesalers. MSDS's provide extra details on the use, restrictions and safety procedures for the chemical product. It is a legal requirement for the user of an agricultural chemical to have read the relevant MSDS and to have a copy present at the application site and at any storage area of the chemical.

Chemical labels and MSDS's provide important information on how to use the chemical so that it works effectively and is safe for the user and the environment. Any variation of use from the specific instructions described on the label or MSDS is classified as an *off-label use*. Victorian law allows certain off-label use of registered chemicals without the need for a special permit but all aspects of such off-label use are the sole responsibility of the



user. It is the user (not the manufacturer) who will be held responsible for any detrimental effects that occur as a result of that chemical's off-label use, including harmful residues, environmental or agricultural damage, occupational health & safety issues and animal welfare.

note

IT SHOULD ALSO BE EMPHASISED THAT MOST VOLUNTEER GROUPS TREATING COASTAL WEEDS ARE CARRYING OUT ACTIVITIES ON PUBLIC LAND. IN SUCH CIRCUMSTANCES, THE LAND MANAGEMENT ORGANISATION MAY REQUIRE FURTHER PERMITS BEFORE ALLOWING THE USE OF CHEMICALS TO TAKE PLACE. IN ANY CASE, PERMISSION FROM THE LAND MANAGER SHOULD ALWAYS BE ATTAINED BEFORE ANY WEED TREATMENT ACTIVITIES OCCUR.

CHEMICAL SCHEDULING

An extremely important part of any chemical label is the *signal heading*. Signal Headings always appear at the top of the label and indicate the product's level of hazard to humans. Typically, herbicides range from *Schedule 4 (S4)* with a relatively low hazard rating, to *Schedule 7 (S7)* with an *Extremely Hazardous* rating and labelled as a *Dangerous Poison*. (Refer to the signal headings illustrated above, indicating differently scheduled chemicals from S5 to S7)

An Agricultural Chemical User Permit (ACUP) is required for any chemical with a Schedule 7 rating – these include chemicals containing *MCPA ester, 2,4-D, Paraquat, Atrazine and Triclopyr esters*. An Agricultural Chemical User Permit can be obtained from offices of the *Department of Natural Resources and Environment*.

To qualify for a permit you need to have successfully completed a Farm Chemical User's Course or equivalent.

Be aware: The schedule of a chemical in no way indicates the potential level of hazard of that product to the environment e.g. a *Schedule 4* herbicide is relatively safe to use in respect to human health, but may be extremely hazardous to the environment or parts thereof.

CHEMICAL CONTROL AREA'S (CCA'S)

There are eight specific areas in Victoria which are designated Chemical Control Areas (CCA's). In these CCA's some agricultural chemicals (e.g. MCPA's or 2,4-D esters), cannot be applied by any method while other chemicals cannot be applied by specific modes of application (e.g. by aerial spraying or mister). CCA's also have different times of the year when they are operative. For more information on CCA's, ACUP's or chemical information in general, contact:

**DEPARTMENT OF NATURAL
RESOURCES AND ENVIRONMENT,
Chemical Information Line on 03 9412 4527.**

CHEMICAL HANDLING

Various issues arise when handling and applying chemicals for weed treatment in coastal areas. Details on specific aspects in chemical handling are identified and demonstrated within the Farm Chemical Users Course. This course should be completed by anybody considering the use of chemicals in weed treatment, or by anyone interested in finding out more information about chemicals. The following is a brief introduction into some of the issues which should be considered when undertaking chemical weed treatments.

SIGNAGE & MARKER DYES

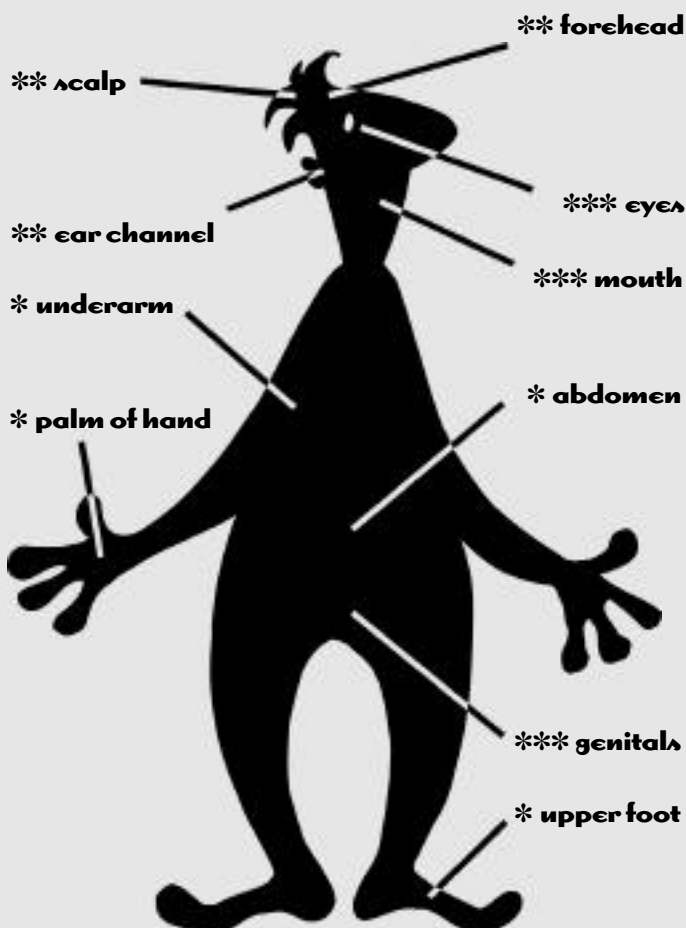
Signage is particularly important in regards to chemical weed treatments on public land. For the benefit of the general public and other group members, warning signs should be placed to identify the area where chemical treatment is being, or has been, undertaken and only removed after the safety period indicated on the Material Safety Data Sheet. Warning signage should stay in place to restrict access to the treated area for a minimum of 24 hours. More permanent signs should be placed at entry points to the treated area to state the weed species treated, the chemical used and the date of application.

note

SIGNAGE IS PARTICULARLY IMPORTANT WHEN TREATING WEEDS THAT MAY BE USED OR CONSUMED BY HUMANS E.G. BLACKBERRIES.

Mixing a coloured, chemical marker dye with the herbicide, is another method of visually informing the public where herbicide has been applied. Marker dyes are also extremely useful during application, particularly when treating larger areas, to identify which plants have been treated. In most situations the increased efficiency for the applicator more than outweighs the added cost of the dye.

Be warned: Some chemical marker dyes e.g. *Red-eye Dye*® are hazardous chemicals in their own right with schedule ratings from S5 to S6. Vegetable based dyes e.g. *Kiwi Highlight*® are a less hazardous option.



AREAS OF THE BODY
VULNERABLE TO
CHEMICALS * sensitive
 ** absorptive
 *** extremely absorptive

PROTECTIVE CLOTHING

Protective clothing and a face shield, should always be worn as recommended on the label, when mixing and applying chemicals (refer to pictures here and overleaf). It should be understood that chemicals are in their most hazardous, concentrated form during initial mixing or decanting. Leather gloves or boots offer little protection as they are absorbent in nature. PVC gloves, rubber boots, water-proof overalls, a washable hat and a respirator should be standard equipment. Refer to the chemical label or Material Safety Data Sheet for specific clothing requirements.



PROTECTIVE CLOTHING SHOULD INCLUDE THE FOLLOWING:

- RESPIRATOR
- GOGGLES
- CHEMICAL SPRAY SUIT
- PVC GLOVES (TUCKED IN!)
- PVC BOOTS (SPRAY SUIT LEGS OVER THE TOP)
- HAT/HOOD

CONTAINERS

Agricultural chemicals should never be stored in containers other than their original chemical container with appropriate labelling and hazard warnings. Similarly, chemicals should not be placed into recycled containers for use during application e.g. old jam jars, drink bottles or shoe polish dispensers. Apart from the obvious safety risks involved, contamination of the chemical product may affect its performance.

If applicator containers are used to take the chemical into the work area e.g. for the CUT & PAINT technique (refer to *Chemical Weed Treatments*), then new containers should be used and clearly labelled as *herbicide only*, with the name of the herbicide clearly identified. Once such a container is marked, then it should only be used for that designated herbicide. Do not use the same container for different herbicides on different days.

It is also recommended to only use containers which are designed to hold and/or administer herbicide. Often, hand-held pump sprays leak from the trigger. This is acceptable in the case of applying household cleaners etc. but is not appropriate for administering concentrated herbicide mixtures in the field. Manufactured, chemical sprayers have triggers and nozzles which are designed to minimise drips, leaks and spillage.

SPRAY DRIFT

It is an offence to cause damage to plants and stock outside the coastal reserve/environment as a consequence of using agricultural chemicals. The coastal bush regenerator has a legal obligation to avoid *non-target damage* caused by spray drift. Damage and loss of income incurred by non-target damage is the responsibility of the herbicide applicator. Non-target damage not only relates to plants and animals outside the target area of the coastal bush regenerator but also to those indigenous species adjacent to and surrounding the targeted weeds on site.

To avoid the likelihood of spray drift occurring, chemical spraying should not take place in winds greater than 15 km/hr, or when conditions are hot, dry and dusty. Surprisingly, significant spray drift can also occur in very still conditions as herbicide droplets (mist) stay airborne for longer periods.

note

CHEMICAL SPRAYING SHOULD NEVER TAKE PLACE AROUND PEOPLE PERFORMING OTHER ACTIVITIES ON SITE E.G. PLANTING, MULCHING, HAND WEEDING ETC.

Types of Herbicide

There are many different types of agricultural chemicals e.g. *insecticides, fungicides, miticides* and *herbicides*. Each has different functions and will act upon plant and animal life in different ways. The agricultural chemicals designed to kill plant life are termed herbicides.

There are several main groups of herbicides which are categorised according to how their active ingredient works to kill plants. Not all will be suitable for all types of chemical weed treatment and not all will be effective in killing a particular weed species.

CONTACT HERBICIDES

e.g. *diquat*

Contact herbicides kill only those parts of the plant which they touch. Good coverage of the plant and growing points can nevertheless kill the whole plant. However, underground regenerative parts like bulbs and rhizomes, will not be affected by a FOLIAR SPRAY of this type of herbicide.

TRANSLOCATED (SYSTEMIC) HERBICIDES

e.g. *glyphosate*

Translocated (Systemic) herbicides are taken into the internal tissues of susceptible plants and circulated within to effectively kill all above and below ground plant parts. Translocated herbicide applied to the leaf surface of an actively growing, susceptible weed will thereby kill its leaves and stems as well as its roots, rhizomes or bulbs.

SELECTIVE HERBICIDES

e.g. *2,4-D, MCPA*

Selective herbicides will affect only certain plants. For example, some will kill *monocotyledons* (narrow leaved plants including grasses) while others only affect *dicotyledons* (broad leaf species). Such herbicides are useful in situations where weeds which the herbicide selectively kills are growing next to certain indigenous plants on which the herbicide has no effect.

RESIDUAL HERBICIDES

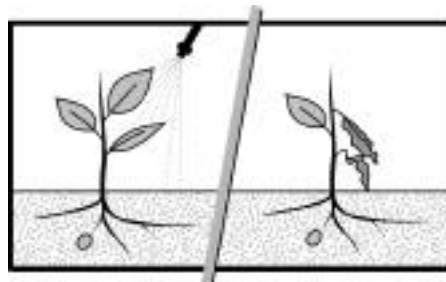
e.g. *imazine*

Residual herbicides remain active in the soil for longer periods and are absorbed into plants via the root system. Typically, residual herbicides are applied to prevent weed seed germination for a number of months after some form of disturbance has occurred. Different residual herbicides may last from a matter of months to years, depending on the type, the quantity applied and prevailing environmental conditions including soil type, rainfall and temperature.

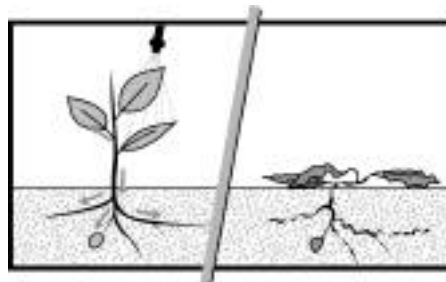
Certain residual herbicides are also selective in nature and can be a very useful tool for revegetation, but can equally cause long term detrimental effects if used inappropriately.

Warning

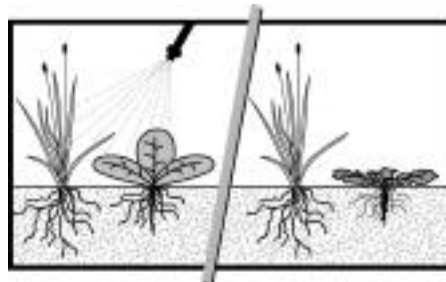
THE USE OF RESIDUAL HERBICIDES IS NOT RECOMMENDED FOR VOLUNTEER COASTAL REGENERATORS UNLESS THEY HAVE SIGNIFICANT EXPERIENCE AND KNOWLEDGE IN THE USE OF HERBICIDES IN THE COASTAL ENVIRONMENT.



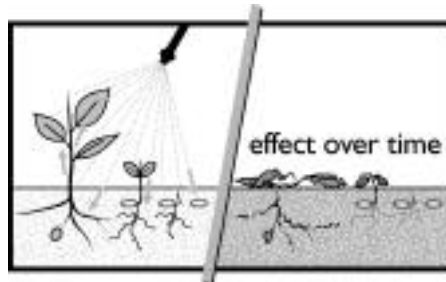
The effects of contact herbicide.



The effects of translocated herbicide.



The effects of selective herbicide.



The effects of residual herbicide.

Woody Trees & Tall Shrubs

Any plant greater than approximately two metres high with a woody stem.

CASE STUDY

PORT FAIRY COAST ACTION & MCLOUGHLINE'S BEACH PROGRESS ASSOCIATION – Italian Buckthorn (*Rhamnus alaternus*) & Boxthorn (*Lycium ferocissimum*) TREATMENTS – Hand Removal, Cut & Paint

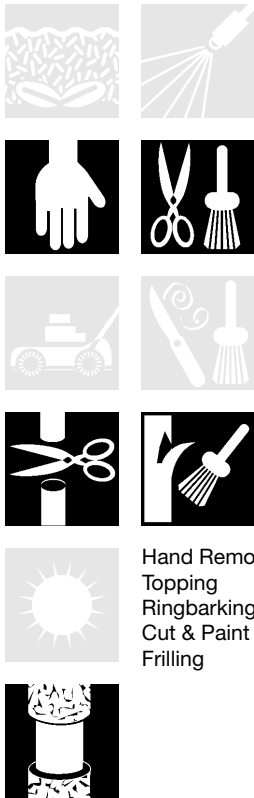
The Port Fairy Coast Action group has carried out an intensive weed treatment program on Italian Buckthorn (*Rhamnus alaternus*) involving both HAND REMOVAL and CUT & PAINT techniques.

Smaller plants were removed by hand, with care taken not to damage any adjacent, indigenous plants or ground flora (mosses and mulch). A mulch layer of leaf litter was then applied to cover the surface of any exposed ground. Pliers were used to extract larger roots which were pulled out horizontally to minimise surface soil disturbance, as described in the Bradley Weeding Method (refer to *Glossary*).

Larger plants (with a trunk diameter of greater than 40 mm) were cut and painted with a systemic herbicide – *glyphosate*. The removed spiny branches of each Boxthorn being cut, were used resourcefully by the group to block off informal walking tracks through the revegetation area. Uncontrolled pedestrian traffic often damages the regeneration of indigenous species and can contribute to soil erosion.


























The underground, woody lignotuber produced by Italian Buckthorn at the base of stems, makes the TOPPING weed treatment ineffectual. In fact, TOPPING of plants capable of re-sprouting from underground parts, has been noted to promote the size of the plant's lignotuber in proportion

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Hand Removal
Topping
Ringbarking
Cut & Paint
Frilling

EXAMPLE SPECIES

Common Name	Botanical Name	Suggested Treatments			
Boxthorn	<i>Lycium ferocissimum</i>	 all year	 spring and summer		
Cape Wattle	<i>Paraserianthes lophantha</i>	 all year	 all year		
Coast Tea-tree <small>Coast Tea-tree is regarded as an environmental weed in some areas of coastal heathland but is indigenous to other coastal environments.</small>	<i>Leptospermum laevigatum</i>	 all year	 all year	 spring and summer	 spring and summer
Cotoneaster	<i>Cotoneaster</i> spp.	 all year	 spring and summer	 spring and summer	
Italian Buckthorn	<i>Rhamnus alaternus</i>	 all year	 spring and summer	 spring and summer	
Mirror bush	<i>Coprosma repens</i>	 all year	 spring and summer	 spring and summer	
Radiata Pine	<i>Pinus radiata</i>	 all year	 all year		
Sweet Pittosporum	<i>Pittosporum undulatum</i>	 all year	 spring and summer	 spring and summer	
Weeping Willow <small>Hand removal of Willow is only effective if all root and branch segments are removed from the site.</small>	<i>Salix babylonica</i>	 all year	 spring and summer	 spring and summer	

Note: Ringbarking is not an effective treatment against those trees capable of regrowth from underground plant parts (root parts, lignotubers, etc.). Notable species which display this ability are Willows, Sweet Pittosporum, Italian Buckthorn and Mirror Bush.

with the above ground size of the shrub. During **HAND REMOVAL**, the group observed that the lignotubers were regularly positioned at a right-angle to the main trunk of the Buckthorn bush and that the size of each lignotuber was at least the same size as the diameter of the plant's trunk. If these lignotubers were not removed or poisoned, re-growth from the plants' dormant buds occurred.

Importantly, the Port Fairy Coast Action group emphasised the need for follow-up activities for their program to succeed. Follow-up methods adopted by the group involved **HAND REMOVAL** of any seedlings emerging within native vegetation, while areas of heavier weed infestations were mulched over and then planted with indigenous plants.

Planted areas were then followed-up with further hand weeding by newer group members and volunteers. In this way, planted areas were used as a training ground to develop weed and indigenous plant recognition skills before less experienced people participated in activities amongst the existing remnant bushland. A lot of damage can potentially be done to regenerating native vegetation, by well-meaning, enthusiastic but inexperienced weeders!



Above: A lignotuber of Italian Buckthorn (*Rhamnus alaternus*) which has been removed from the soil.

Below left: Lignotuber of Italian Buckthorn branching at an angle to the main stem.

SOME GENERAL LESSONS LEARNT BY THE PORT FAIRY COAST ACTION GROUP FROM THEIR EXPERIENCE WITH TREATING ITALIAN BUCKTHORN INCLUDE:

- ♣ Topping (ie. cutting without poisoning) of Italian Buckthorn, as with Mirror Bush and Boxthorn, does not kill these weeds. Each of these species will re-sprout from underground parts or cut stumps, to grow again in the future.
- ♣ Even cutting and painting is never totally successful and will require follow up treatment.
- ♣ Weeding activities should always take place before fruit development adds new weed seeds to the soil.
- ♣ Hand removal of weed seedlings and larger bushes, is easier in winter when the soil is moist and soft.

A similar experience has been identified by McLoughlins Beach Progress Association from their treatment of Boxthorn (*Lycium ferocissimum*). The McLoughlins Beach group also adopted a combination of **HAND REMOVAL** and **CUT & PAINT** techniques. Again, post treatment monitoring was considered vital for the success of the weed treatment, to remove any new seedling growth and to treat any regrowth from cut & painted stumps.

The experiences of both groups sends a clear message for long term success when treating weeds, regardless of the method adopted: **You must do follow up!**





Hand Removal
Topping
Cut & Paint

Small, Woody Shrubs

Any plant less than approximately two metres high with a woody stem.

CASE STUDY

LAKE TYERS COAST ACTION & FRIENDS OF WALKERVILLE COAST ACTION.

Boneseed (*Chrysanthemoides monilifera* ssp. *monilifera*)

TREATMENTS – Hand Removal, Topping, Cut & Paint

















Lake Tyers Coast Action group is undertaking weed treatments of various species in the field and is planning larger revegetation projects for the future. The group recognises the importance of vegetation replacement as part of successful, long term weed management and to this end, have applied for grant funding to develop an indigenous plant nursery. With co-operation from Parks Victoria and the local Toorloo Arm Primary School, the group is developing a hands-on educational program for primary school students. Planned activities include local plant identification, indigenous seed collection, plant propagation and plant establishment in revegetation sites. The group views the program as an invaluable method of incorporating practical revegetation work, while fostering positive attitudes and active participation of the local community in caring for their indigenous, coastal vegetation.

The main area where work is planned is a coastal cliff face, approximately 4 km long and over 30 metres high, which backs on to residential development. There are numerous infestations of Boneseed (*Chrysanthemoides monilifera* ssp. *monilifera*), Blackberry (*Rubus fruticosus*) and Cape Ivy (*Delairea odorata*) as well as a significant erosion risk posed by the cracking, sandstone-based soil. Any exposed soil surface presents an opportunity for both wind and rain erosion to take place, with the consequent environmental degradation and risk to public safety.

The first action to be taken by the group in their new project, is to identify manageable work areas targeted for weeding and replanting, in a co-ordinated progression along the coastal strip. Smaller seedlings of Boneseed will be hand pulled, while larger plants are to be topped during the flowering season to prevent seeding in the short term, without killing or disturbing the root systems which are currently stabilising the cliff face. A progressive, long term removal and re-planting program forms an appropriate strategy for such an erosion-prone situation.

...continued on next page

EXAMPLE SPECIES

Common Name	Botanical Name	Suggested Treatments		
Apple of Sodom	<i>Solanum linnaeanum</i>	 all year	 spring	
Boneseed	<i>Chrysanthemoides monilifera</i> ssp. <i>monilifera</i>	 all year	 spring	
Broom	<i>Genista</i> spp. and <i>Cytisus</i> spp.	 all year	 all year	
Gorse (Furse)	<i>Ulex europaeus</i>	 all year	 spring	
Polygala/Myrtle-leaf/Milkwort <small>Topping is usually as effective as cut & paint in killing Polygala.</small>	<i>Polygala myrtifolia</i>	 all year	 all year	 spring
Sallow Wattle <small>Topping is usually as effective as cut & paint in killing Sallow Wattle.</small>	<i>Acacia longifolia</i>	 all year	 all year	 spring
Spanish Heath	<i>Erica lusitanica</i>	 all year	 spring	

Note: Hand removal of woody shrubs can be performed at any time but ideal timing is usually when the weed begins flowering, making plants easier to spot, but before seed formation.

Note: Cut & paint is most effective when plants are actively growing, usually during spring.

☘ **Note:** Boneseed plants usually produce four main roots which grow just beneath the soil surface at right angles to each other. This regular root system shape make roots easy to break with a simple levering action in the 4 different directions, after which the base of the plant can be pulled upward with minimal effort and soil disturbance.

The Friends of Walkerville Coast Action group identify another key point in successfully treating weeds - "the need for monitoring and follow-up". An outbreak of Boneseed has been successfully treated using a combination of **HAND REMOVAL** and **CUT & PAINT** with glyphosate. What is emphasised by the group is the need for continuing, post-treatment monitoring, to deal with any regrowth from **CUT & PAINT** treatments and the new seedlings which will always be a threat until the native vegetation is re-established over weeded ground. A hint the group passes on is that Boneseed is more easily spotted when in flower, but be quick with any treatment before it has the opportunity to set seed.

After three years of follow-up, Boneseed has been all but eliminated from the site.



Above: Hand Removal of Boneseed
(*Chrysanthemoides monillifera* ssp. *monillifera*)

Below: Erosion-prone, coastal cliff face –
Lake Tyers Coast Action.

Bottom: Boneseed flowers.





Mulching/Smothering
Hand Removal
Slashing
Solarisation
Foliar Spray



Herbaceous Plants

Non-woody plants usually with broad leaves which are soft and flexible.

CASE STUDY

BREAMLEA COAST ACTION & FAIRHAVEN FORESHORE COMMITTEE OF MANAGEMENT Sea Spurge (*Euphorbia paralias*) TREATMENTS – Hand Removal, Slashing

Breamlea Coast Action group has undertaken an intensive weed treatment program on Sea Spurge (*Euphorbia paralias*) for the last three years. Significantly, the group has now moved from a situation of working to contain the spread of weed infestation, to one of reducing the area affected. Currently, about 60% of the 70m x 20m treated zone, is now relatively clear of Sea Spurge, with a reduced density of weeds in the remaining area. The local indigenous plants are now starting to dominate.




































The treatment program developed by the Breamlea Coast Action group, focuses on breaking the seeding cycle of the weed. (See blue box on facing page)

SLASHING of the infestation was carried out in 1996. Although the seeding cycle was broken, very dense regrowth of weeds occurred. For the Breamlea situation, SLASHING has proved to be a questionable option so the group has persisted with HAND REMOVAL and revegetation planting. However, in many situations where Sea Spurge has colonised, the weed itself is performing a useful role in dune stabilisation.

The Fairhaven Foreshore Committee of Management, further westward along the coastline from Breamlea, has recognised this valuable function of the Sea Spurge in their coastal environment. For their situation, the Committee of Management has incorporated a SLASHING regime (using a whipper-snipper) to reduce the seeding of Sea Spurge, with a staggered HAND REMOVAL and revegetation planting program.

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EXAMPLE SPECIES

Common Name	Botanical Name	Suggested Treatments				
Agapanthus <i>For slashing, repeated treatments will be required to have an effect. For foliar spraying slash first, then spray regrowth.</i>	<i>Agapanthus praecox ssp. orientalis</i>	 all year	 all year	 spring		
Angled Pigface <i>For slashing, repeated treatments will be required to have an effect.</i>	<i>Carpobrotus aequilaterus</i>	 all year	 all year	 all year	 spring and summer	
Gazania <i>For slashing, repeated treatments will be required to have an effect. For foliar spraying slash first, then spray regrowth.</i>	<i>Gazania spp.</i>	 all year	 all year	 all year	 spring and summer	 spring
Hemlock <i>Hemlock is a very poisonous plant. Take great caution when dealing with it.</i>	<i>Conium maculatum</i>	 all year	 all year	 spring and summer	 spring	
Pampas Grass <i>For foliar spraying, slash or burn first, then spray regrowth.</i>	<i>Cortaderia selloana</i>	 all year	 spring			
Paterson's Curse	<i>Echium plantagineum</i>	 all year	 all year	 spring and summer	 winter and spring	
Sea Spurge <i>Slashing used only to reduce seed set.</i>	<i>Euphorbia paralias</i>	 all year	 all year	 spring	 spring and summer	
St. John's Wort	<i>Hypericum perforatum</i>	 all year	 all year	 spring and summer	 spring	
Sweet Valerian <i>For slashing, repeated treatments will be required to have an effect.</i>	<i>Centranthus ruber</i>	 all year	 all year	 all year	 spring and summer	 spring

♣ **Note:** Strong rubber gloves are required when handling Sea Spurge as it contains a milky sap which is toxic and causes skin irritation.

As always, establishment of desirable plants to replace the space previously occupied by weeds has been a vital component to Breamlea's success. The indigenous species planted by the group as part of their treatment program include Bidgee Widgee (*Acaena novae-zelandiae*), indigenous Pigface (*Carpobrotus rossii*) and various tussock grasses.

When the Breamlea group began treating Sea Spurge they did not realise that the weed had two seed-ing seasons per year. A single effort to remove flowering plants was not having any significant effect upon the spread of the infestation. The group now schedules two intensive weeding efforts per year, in February/March and then in August/September, to synchronise with the weed's flowering cycle.

Breamlea Coast Action's treatment program for Sea Spurge thereby emphasises an important rule at the heart of many successful weed treatment programs: Know the weed's lifecycle and break it **and** understand the weed's biology and attack its weaknesses.



Above: Hand removal of Sea Spurge (*Euphorbia paralias*)

Below left: Close-up of Sea Spurge showing toxic, milky sap.

TREATMENT PROGRAM DEVELOPED BY THE BREAMLEA COAST ACTION GROUP

- ♣ **February/March** (first Sunday of each month; 6 to 8 people for 2 to 3 hours)
Hand removal of as many mature plants as possible, being careful to remove the roots as well.
- ♣ **April to June** (2 to 3 people for 2 hours, fortnightly during this period)
Working from the perimeter towards the centre of the infestation, hand removal of as many plants (both mature and small) overlooked during the February/March clean up. Also check for any fresh outbreaks in adjacent areas.
- ♣ **August/September** (first Sunday of each month; 6 to 8 people for 2 to 3 hours)
Hand removal of as many mature plants as possible, being careful to remove the roots as well.
- ♣ **October/November** (On an as-needs basis)
Reinforce work already done during the year on a needs basis. Make plans for planting of areas left barren (indigenous species are grown from locally collected seeds).



Breamlea Coast Action would like to acknowledge the support of Coast Action and the technical advice of Mark Trengrove (Geelong Indigenous Nursery) and Graham Stockton (West Coast Indigenous Nursery) in the treatment of Sea Spurge.

Sea Spurge has now increased its distribution and is likely to occur anywhere along the Victorian Coastline. Since its milky sap is toxic, a health and safety issue exists with its existence on public beaches. Keep an eye out for it and treat any small infestations before they become larger.



Mulching/Smothering
Solarisation
Foliar Spray



Grasses

Non-woody plants, typically low growing with narrow leaves

CASE STUDY

SOUTHERN PENINSULA INDIGENOUS FLORA & FAUNA ASSOCIATION INC. (SPIFFA) Kikuyu (*Pennisetum clandestinum*) and other grasses
TREATMENTS – Mulching/Smothering, Hand Removal

The Chinaman's Creek area is being managed by the Southern Peninsula Indigenous Flora & Fauna Association Inc. (SPIFFA) as a Coast Action/Coastcare project. This group has had great success with the treatment of various grasses and ground hugging plants utilising the MULCHING/SMOTHERING technique. Chinaman's Creek is a permanent creek of the Mornington Peninsula which enters Port Phillip Bay at Rosebud. The natural course of the creek was altered in the early 1900's when a cut was made through the secondary dune system, to better drain the Tootgarook Swamp and to link other drains that cut into the swamp area. Although still performing the function of a drain, Chinaman's Creek has now been developed into a more naturalistic creek environment of importance to the local ecology.

Where Chinaman's Creek cuts across the foreshore, many weeds are found. Kikuyu, Buffalo Grass, Panic Veldt Grass, Sow Thistle, Dolichos Pea, Bridal Creeper/Smilax and Cape Ivy, are all common. These foreign weeds have been smothering the indigenous Coastal Banksia Shrubland and contributing to the death of many mature trees.

THE GREATEST ISSUES FACED BY SPIFFA ARE:
















- ♣ removal of weeds with as little damage to the remaining indigenous plants;
- ♣ to re-establish the diversity of understorey for this coastal habitat; and
- ♣ to minimise the erosive disturbance to the banks of the creek

In 1993 SPIFFA commenced a revegetation program on the east bank of the creek. A strip approximately 10 to 15 metres wide is now well established. In July 1996 the group decided to extend the revegetated area along the creek and was successful in attaining a Coast Action/Coastcare grant to assist the new project.

As a first action, the group identified a manageable work area of about 800 square metres, which could be handled by six to 10 group members working half a day per month. The group then embarked on a staged HAND REMOVAL and SMOTHERING program of weed treatment before actively planting out the site. Grassy weeds were hand weeded from around indigenous plants and larger patches smothered with a heavy layer of moist newspaper (12 pages or more thick) topped with another 8 to 10cm layer of chipped, street tree prunings, donated by the local

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EXAMPLE SPECIES

Common Name	Botanical Name	Suggested Treatments		
Buffalo Grass	<i>Stenotaphrum secundatum</i>	 all year	 spring and summer	 spring and autumn
Couch Grass	<i>Cynodon dactylon</i>	 all year	 spring and summer	 spring and autumn
Kikuyu	<i>Pennisetum clandestinum</i>	 all year	 spring and summer	 spring and autumn
Lesser Quaking Grass	<i>Briza minor</i>	 all year	 spring and summer	 spring and autumn
Panic Veldt Grass	<i>Ehrharta erecta</i>	 all year	 spring and summer	 spring and autumn

Note: Treatments for grasses should be carried out before seed formation - usually late spring/early summer.

council and the foreshore committee. Desirable indigenous species were then planted through this mulch layer over the next 12 months. For new work planned by the group, composted mulch will be sourced from Enviro-Mulch Pty Ltd. This company sells three different grades of mulch costing \$10, \$12 or \$18 per cubic metre.

SPIFFA is deservedly proud of its efforts. The weedscape has been transformed into a reasonably diverse, native plant community. However, as emphasised by group members, the work is still continuing. Regular maintenance weeding occurs to not only prevent germinating weed seeds re-establishing themselves in the mulch layer but to also prevent grasses with rhizomes (e.g. Kikuyu), creeping in from the edges. In hindsight, group members have discussed the merit of a thicker mulch layer around the perimeter of the revegetation area incorporated with a weed free, one metre wide boundary around the area, to deal with the encroaching grasses. As with other coastal revegetation areas, there are desirable, grassed (Kikuyu) picnic areas adjacent to the native vegetation. This 'weed front' will require continued monitoring and maintenance to preserve the integrity of the restored native plant community.

SPIFFA would like to acknowledge Coast Action/Coastcare in providing a grant to help finance the Chinaman's Creek Revegetation Project, and for providing technical support and advice on coastal weed treatment issues. The group has now embarked on a stage three extended work zone that will include a dune revegetation area as well as further weeding, mulching, planting, fencing, signage and landscaping.

SPIFFA has several members who are experienced and/or well qualified in the environmental area. Members have attended Greening Australia training courses on weed & indigenous species identification, weed management, plant propagation and other relevant topics. Such knowledge and training is considered most important by the group to ensure volunteers can perform revegetation activities of high quality.



Above: Newly planted indigenous plants within a weeded and freshly mulched area of Chinaman's Creek.

Left: Coast Banksias (*Banksia integrifolia*) are declining in health due to environmental degradation including weed infestations.

Below: Buffalo Grass (*Sterotaphrum secundatum*) is a vigorously grassy weed growing along Chinaman's Creek.





Mulching/Smothering
Hand Removal
Foliar Spray
Scrape & Paint

Vines & Scramblers

Weak stemmed plants which rely on other plants or objects for support.

CASE STUDY























CANNON'S CREEK COAST ACTION – Bluebell Creeper (*Sollya heterophylla*) TREATMENTS – Hand Removal, Cut & Paint

The Cannon's Creek Coast Action group has gained valuable experience in weed treatments for vines & scramblers, through their treatment of Bluebell Creeper (*Sollya heterophylla*). Over a 12 month period, the group has been progressively treating more than 17 acres of established Bluebell Creeper infestation, which was smothering the local Coastal Manna Gum Heathy Woodland. After experimenting with HAND REMOVAL, CUT & PAINT and the physical removal of large vines using a tractor, the group has concluded that HAND REMOVAL, though initially very time consuming and labour intensive, has proven the most successful treatment for their situation.

Areas where appropriately timed HAND REMOVAL has taken place, has required significantly less follow up treatment of Bluebell Creeper re-growth from root segments and seedlings. The tractor removal was used in areas where no healthy indigenous understorey plants remained, so that the large weed mass could be mechanically dragged out of the site, piled up then burnt. A far greater area could be treated quickly by this method, but much of the weed's roots were left behind, from which regrowth occurred. Careful, follow-up HAND REMOVAL of the remaining root systems was then required.

...continued on next page

EXAMPLE SPECIES

Common Name	Botanical Name	Suggested Treatments			
Blackberry	<i>Rubus fruticosus</i>	 all year	 spring and summer		
Bluebell Creeper	<i>Sollya heretophylla</i>	 all year	 all year	 spring and summer	
Bridal Creeper/Smilax	<i>Asparagus asparagoides</i>	 all year	 all year	 spring and summer	
Cape Ivy	<i>Delairea odorata</i>	 all year	 all year	 spring and summer	 spring and summer
Dolichos Pea	<i>Dipogon lignosus</i>	 all year	 all year	 spring and summer	
English Ivy	<i>Hedera helix</i>	 all year	 all year	 spring and summer	
Honeysuckle	<i>Lonicera japonica</i>	 all year	 spring and summer		
Morning Glory	<i>Ipomoea indica</i>	 all year	 all year	 spring and summer	
Periwinkle	<i>Vinca major</i>	 all year	 all year	 spring and summer	
Wandering Jew	<i>Tradescantia albiflora</i>	 all year	 all year	 spring and summer	

Note: Treatments involving systemic herbicide applications such as foliar spray and scape & paint, are best performed when weeds are actively growing - usually spring and summer.



CUT & PAINT of larger stems has not proven effective to date. Trialing of this technique is continuing before any conclusions are made. Variations in herbicide application techniques such as SCRAPE & PAINT, may prove to be more effective with larger plants of Bluebell Creeper, as it has with weeds of similar woodiness and stem thickness e.g. English Ivy (*Hedera helix*).

SOME LESSONS LEARNT BY THE GROUP'S ACTIVITIES ARE LISTED BELOW:

- ♣ Always wear gloves when handling weeds. Bluebell Creeper and many other plants, contain plant toxins which can cause skin irritation and nausea.
- ♣ All weed root systems should be removed or poisoned, or else re-growth will occur.
- ♣ Weed treatments should take place before fruit ripening. If not, significant seedling regrowth will occur after weeding. With Bluebell Creeper, fruit ripening is indicated when the 2 to 3cm, tubular berries turn from green to a purplish colour.
- ♣ Follow-up weeding must be scheduled for long term success. It is better to be thorough the first time, so that less work is required later on.
- ♣ Volunteer working bees should not be longer than 4 hours, and perhaps a BBQ lunch provided. Otherwise attendance and enthusiasm will quickly fall.
- ♣ Natural regeneration of indigenous vegetation may be possible after weeding. The group discovered a significant amount of local plants germinated naturally from the soil once the smothering weed cover was removed. In fact, much greater growth rates have been observed from naturally regenerating seedlings as compared to tube-stock planted by the group. The saving in time and money when natural regeneration reduces the need for planting, is a great benefit.



Above: Cut & paint of established Bluebell Creeper (*Sollya heterophylla*) – Cannon's Creek Coast Action

Left: Bluebell Creeper infestation

Below: Berry fruits of Bluebell Creeper are eaten and spread by birds.

Cannon's Creek Coast Action would like to acknowledge the assistance of the Cannon's Creek CFA, local volunteers and Coast Action for providing grant money and technical advice for the project. For further information on Cannon's Creek Coast Action's experience with Bluebell Creeper, please contact Trevor Oorloff on ph: 5998 7076.





Mulching/Smothering
Hand Removal
Slashing
Foliar Spray

Bulbs, Tubers & Rhizomes

Plants with underground parts from which re-growth can occur.

CASE STUDY

THE BLAIRGOWRIE FORESHORE RESERVE COMMITTEE OF MANAGEMENT INC. & THE McCRAE HOMESTEAD COASTAL GROUP – bulbs, tubers & rhizomes TREATMENTS – Hand Removal, Mulching/Smothering, Foliar Spray, Cut & Paint

The Blairgowrie Foreshore Reserve Committee of Management has undertaken a diverse range of weed treatments which deal with many different forms of weeds. The committee discovered that **HAND REMOVAL**, when done properly, is far more successful than spraying with herbicides and safer to both volunteers and any nearby, non-target native plants. This has proven particularly true when dealing with weeds with underground parts from which re-growth can occur. Choices of treatment for these species tends to be focused on careful **HAND REMOVAL** of the above and below ground weed parts or alternatively, poisoning of the plant with a herbicide which kills the hidden plant parts as well.

A systemic herbicide such as *glyphosate*, is the most often used in this circumstance. But a word of warning: Glyphosate-based herbicides like *RoundUp*®, require the plant to be actively growing to enable the herbicide to be circulated around the plant quickly, to effectively reach the below ground parts. The more vigorous the growth of the weed when the systemic herbicide is applied, the more effective the treatment.















The group has treated Bridal Creeper (*Asparagus asparagoides*), a vine-like plant with underground tubers, by both **HAND REMOVAL** and **CUT & PAINT** techniques. The treatment selected in each case depended upon the degree of infestation and the amount of surrounding, indigenous plants which may be damaged if significant soil disturbance occurred from **HAND REMOVAL**. Similarly, Angled Onion (*Allium triquetrum*), has been successfully treated using either **HAND REMOVAL** or a **FOLIAR SPRAY**.

Blue Periwinkle (*Vinca major*), has many rhizome-like stems which are usually close enough to the surface to choose careful **HAND REMOVAL** rather than **FOLIAR SPRAY**, in most situations.

Other groups have adopted the alternative treatment of **MULCHING/SMOTHERING** their bulbous or rhizome-like weeds. Thick, scrap carpet pieces have been used by the McCrae Homestead Coastal Group to smother Angled Onion (*Allium triquetrum*). No pre-spraying was used, just the simple laying of carpet over the weeds and then leaving it in-situ for four months or more during the weed's growing season. Any leaf growth produced by the bulbs cannot penetrate the carpet to find the light it requires for growth and therefore the weeds eventually die. The larger the bulb

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EXAMPLE SPECIES

Common Name	Botanical Name	Suggested Treatments			
Angled Onion	<i>Allium triquetrum</i>	 all year	 spring and summer	 late winter and spring	
Bulbil Watsonia/Bugle Lily	<i>Watsonia meriana</i>	 all year	 all year	 spring and summer	 spring
Montbretia	<i>Crocsmia x crocosmiiflora</i>	 all year	 all year	 spring and summer	 spring and summer
Soursob	<i>Oxalis pes-caprae</i>	 all year	 winter and spring		
Spartina/Cord Grass	<i>Spartina anglica</i>	 all year			

Note: For slashing, repeated treatments are required to exhaust bulbs, tubers & rhizomes.

or rhizome, the longer the period required to kill the weed by smothering. Up to two years or more in the case of Kikuyu (*Pennisetum clandestinum*). Be patient, it does work!

THE BLAIRGOWRIE FORESHORE RESERVE COMMITTEE OF MANAGEMENT HAVE ALSO COME UP WITH A LIST OF 10 HELPFUL HINTS FOR EFFECTIVE WEED MANAGEMENT, DEVELOPED FROM THE COMMITTEE'S ACTIVE EXPERIENCE IN TREATING WEEDS. THE FOLLOWING LIST OFFERS SOME EXCELLENT ADVICE:

- ♣ Don't Rush
 - a) We have over a 150 years of malpractice to reverse
 - b) Be aware of where you put your **big feet**.
- ♣ Planning – Survey your area and make a map and species list.
- ♣ Observe the 3 R's of Bush Regeneration
 - Retention** (protection)
 - Regeneration**
 - Restoration** (& revegetation)
- ♣ Slow & Steady – Vision/Training Days/Explicit Instructions.
- ♣ Don't overextend work areas or resources.
- ♣ **Follow Up!** This is an area where many revegetation activities fail.
- ♣ The best helpers are the ones willing to learn – especially Plant Identification skills.
- ♣ With glyphosate-based herbicides such as *RoundUp*®, use **less, not more** if the first spray is not successful.☠
- ♣ **Hand weeding** when done properly, is far more successful than spraying and safer for volunteers and non-target species.
- ♣ **Inform & educate** the neighbours to deter the dumping of garden refuse and litter in areas of natural vegetation.



Above: Bulbs of Angled Onion (*Allium triquetrum*) will regrow if not removed, poisoned or smothered by mulch.

Below left: Tubers of Bridal Creeper (*Asparagus asparagoides*) need to be removed for hand removal to be successful.

☠ **Reminder:** Variation away from label recommendations constitutes an 'off-label use' of the herbicide, with implications to the coastal bush regenerator (refer to *Using Chemicals* p.14).



Glossary

- active ingredient (of a herbicide)** the substance within the formulation which kills plants
- annual** a plant species which germinates, grows, matures, sets seed and then dies, all within one year
- biennial** a plant species which germinates, grows, matures, sets seed and then dies, over the period of two years (usually flowering only in the second year)
- Bradley Weeding Method** hand weeding techniques incorporating minimal ground disturbance
- bulb** a swollen, underground, modified stem containing many buds and fleshy leaf-like scales
- bulbous** bulb-shaped; bulb-like
- chip mulch** a mulch material consisting of small chips, typically of woody branches
- climber** a plant which gains support by climbing up other plants
- contact herbicide** herbicide which effects only those plant parts to which it is applied
- corm** a swollen, underground, modified stem containing many buds and dry, scale-like leaves as in *Watsonia* species
- crown (of a herbaceous plant)** a mound of growth buds at or just below ground level
- dicotyledons** flowering plants with two seed leaves, a branched, often woody root system and typically broad leaves with branching veins
- environmental weed** an unwanted plant damaging to the environment in which it is located
- exotic** not native, usually implying introduction through human activity
- flowering cycle** the timing or seasonal production of flowers
- herbaceous** plant which has only leafy tissue, without woody stems
- indigenous** naturally distributed within a specific geographic region
- lignotuber** a conspicuous swelling of a woody stem base at or below ground level, which contains dormant growth buds capable of producing new shoots
- localised** restricted to the local area
- monocotyledons** flowering plants with only one seed leaf, a fibrous root system and typically narrow leaves with parallel veins
- mulch** any loose or sheet material which is placed on the soil surface to act as a barrier to weed growth and to decrease soil moisture loss
- native plant** a plant belonging to a specified region where it is found ie. found in region prior european settlement
- naturalised** successfully adapted to a new environment so that it forms a self-sustaining population
- noxious weed** plant identified under government legislation as harmful or destructive to an area
- organic** containing carbon; is or derived from a living organism
- perennial** persisting for three or more years
- prostrate** trailing on the ground
- regeneration** (of vegetation) a process whereby new individuals are produced to replace or restore vegetation; particularly in reference to native plant communities
- regenerative parts** plant parts from which regrowth can occur to restore a plant's structure
- remnant** remaining piece of the original vegetation which existed on a site
- residual herbicide** herbicide which remains active in the soil well after the time of application
- rhizome** an underground, horizontal-growing, modified stem
- ripened fruit** fruit containing mature seed capable of germination
- shoot** young stem or leaf growth
- sp.** abbreviation for *species* (singular)
- spp.** abbreviation for *species* (plural)
- ssp.** abbreviation for *subspecies*
- succulent** soft and fleshy in texture; plant containing high levels of moisture adapted to dry conditions
- sucker** a shoot developed from a root or specialised stem, close to or below ground level
- translocated (systemic) herbicide** herbicide which is absorbed into the internal tissues of a plant to be distributed to all above and below ground parts of the plant
- tuber** swollen, modified stem containing food storing tissue and growth buds from which new shoots can develop
- tuberous taproot** swollen modified root containing food storing tissue and growth buds from which new shoots can develop

Other References & Links

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EMAIL ADDRESSES

Coast Action/Coastcare

www.nre.vic.gov.au/coasts

Coast Kit

www.nre.vic.gov.au/coasts/coastkit

Landcare Weed Information Sheets

www.nre.vic.gov.au/plntanml/pests/index.htm

Weed Information (general)

www.nre.vic.gov.au/plntanml/pests/weedwar/index.htm

www.nre.vic.gov.au/web/root/domino/infseries/infsheet.nsf/View-Forms/LandcarePestPlants?Open

Note: To contact any of the groups case studied within *Coastal Weeds and their Treatments*, please contact the local Coast Action/Coastcare Facilitator (details on back cover).

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