

# City of Banyule Yarra River Frontage Weed Action Plan



Prepared by Karen George and Stephen Erickson on behalf of Envirotechniques  
Pty Ltd  
PO Box 810 Eltham 3095  
Ph: 9431 6555  
Mobile: 0412 277 515  
Email: [envira@ozemail.com.au](mailto:envira@ozemail.com.au)

## **Introduction**

Weed invasion is recognised as one of the main threatening processes affecting the conservation of biodiversity in Australia and is estimated to cost Australia more than \$4 billion per annum (DSE and DPI 2007).

The City of Banyule Weed Management Strategy sets out a number of goals and objectives for council in relation to weed management, including:

- Reducing the spread of established weeds in the municipality on Council land, other public land and private land;
- Reducing the risk of new weed species establishing in the municipality;
- Reducing noxious and environmental weed infestations on non-Council managed public land and private land and increasing the level of community involvement in weed control activities; and
- Conducting and cooperating with other public land managers and private land owners in on-going monitoring and assessment of weed infestations and control strategies at both municipal and site-specific levels (O'Malley et al. 2006)

Specific strategies for achieving some of these goals and objectives include targeting priority weeds and prioritizing areas for intensive weed control works in wildlife corridors and along waterways; and encouraging and working with landowners adjoining reserves to remove noxious, environmental and Banyule priority weeds from their land (O'Malley et al. 2006).

The City of Banyule is also a participant in the State Government initiative "Tackling Weeds on Private Land", which aims to strengthen partnerships between government, industry and the community to provide for effective and coordinated weed management (DSE and DPI 2007).

In response to these objectives and strategies, and as part of the "Tackling Weeds on Private Land" initiative, weed mapping of several target weeds was undertaken on privately owned properties along the Yarra River frontage, Lower Plenty, between September and November 2006. The results of this mapping exercise form the basis of the management priorities and actions recommended within the following Action Plan. The aims of the Action Plan are to:

- Report on the weed mapping data collected within the study area in 2006;
- Prioritize weeds to be targeted for control throughout the study area;
- Establish some guiding principles for how weed control is to be approached throughout the study area; and
- Provide guidance to landowners on how to approach weed control on individual properties within the study area.

## **Definitions**

- Banyule Priority Weed* – Weeds that are considered of greatest threat to biodiversity values within the City of Banyule. Banyule Priority Weeds are determined using expert opinion and a ranking system based on the frequency of the weed occurring across sites supporting indigenous vegetation, and the level of threat it presents in displacing the vegetation (O'Malley et al. 2006).
- Emerging Weed* – Weeds considered threatening that have been found within the study area but only in isolated instances or in small areas.
- Environmental Weed* – Plants that invade native vegetation, usually adversely affecting regeneration and survival of indigenous flora and fauna (Carr et al. 1992).
- Established Weed* – Weeds that occur commonly and are sometimes widespread in the study area and not considered feasible to eradicate.
- Nationally Significant Weed* - Nationally agreed priority weeds for control and management, based on level of invasiveness, potential to spread and impact on socioeconomic and environmental assets (Australian Weeds Committee 2006).
- Noxious Weed* – Any weed declared under the *Catchment and Land Protection Act 1994* as a state prohibited weed, regionally prohibited weed, regionally controlled weed or restricted weed. A plant declared as a noxious weed must have or have the potential to become a serious threat to primary production, Crown land, the environment or community health in Victoria (Government of Victoria 1994).
- State Prohibited Weed* – A weed declared as such under the *Catchment and Land Protection Act 1994*, which either does not occur in Victoria, or if it does, is able to be eradicated from the state.
- Regionally Prohibited Weed* - A weed declared as such under the *Catchment and Land Protection Act 1994*, which is not widely distributed through the region, is capable of spreading further in the region and is reasonable to expect it can be eradicated from the region

<i>Regionally Controlled Weed -</i>	A weed declared as such under the <i>Catchment and Land Protection Act 1994</i> , which occurs in the region, is capable of spreading further in the region and that continuing control measures are required to prevent its spread.
<i>Restricted Weed -</i>	A weed declared as such under the <i>Catchment and Land Protection Act 1994</i> , that is a serious threat to primary production, Crown land, the environment or community health in another State or Territory, has the potential to spread into and within Victoria and for which there is an unacceptable risk of it spreading if sold or traded in Victoria.
<i>Weed -</i>	Undesirable plant that may be desirable in one setting but not in others (O'Malley et al. 2006).

## **Study Area**

Weed mapping was undertaken on a stretch of Yarra River frontage extending approximately 3 km downstream from Fitzsimons Lane to Montpellier Drive, Lower Plenty. Seventeen privately owned properties and one property managed by Parks Victoria were mapped for a set of target weed species.

The study area falls partly within the Highlands Southern Fall Bioregion of Victoria and partly within the Gippsland Plains Bioregion. Investigation of EVC mapping layers provided by DSE suggests an array of vegetation communities lies within the study area. Vegetation adjoining the Yarra River is predominantly Riparian Forest, Grassy Woodland or Floodplain Riparian Woodland. Escarpment Shrubland occurs on steep gradients towards the middle of the study area.

Vegetation quality throughout the study area varies in terms of the cover and diversity of remnant indigenous vegetation present, and the cover of introduced species. The majority of properties surveyed are residential, with the exception of the Edmund Rice Centre (Amberley), the parcel of vacant council land and land managed by Parks Victoria. Grazing of sheep and horses persists on some properties. In many cases, areas of vegetation adjoining the Yarra River have been fenced off.

The study area varies in slope, with generally flatter frontages occurring at the western and eastern most edges of the study area. Properties towards the middle of the study are very steep in places, particularly close to the water's edge. The study area adjoins the Yarra River and Westerfolds Park to the south, Fitzsimons Lane and Candlebark Park to the east, and additional residential properties to the north and west.

## **Methods**

Weed mapping of the study area was undertaken between September and November 2006. Following consent from individual landholders, properties were traversed on foot and weed data recorded on a PDA with a Bluetooth connection and GBM Mobile software. Weeds were mapped either as points (for small infestations or single plants) or polygons. A number of attributes were also recorded with each entry, including:

- Weed species;
- Density of weed cover (Low 0-25%, Medium 26-50%, Dense 51-100%);
- Area of cover (m<sup>2</sup>); and
- Recommended treatment type (e.g. drill and fill, spot spray, rig spray, hand weed, cut and paint).

Additional relevant information (e.g. inaccessibility for treatment) could also be recorded in the comments field if required. Following field collection, data was downloaded onto Council's mainframe GIS system.

Weed mapping was generally restricted to accessible areas of bushland adjoining the Yarra River, rather than landscaped areas in close vicinity to residences. Where possible, properties were systematically traversed along a series of transects, or divided into manageable blocks for particularly large properties. The following priority weeds (as determined by Banyule City Council staff) were targeted for mapping:

<i>Acer negundo</i>	Box Elder
<i>Acetosa sagittata</i>	Climbing Dock
<i>Ageratina adenophora</i>	Crofton Weed
<i>Allium triquetrum</i>	Angled Onion
<i>Asparagus asparagoides</i>	Bridal Creeper
<i>Cirsium vulgare</i>	Spear Thistle
<i>Crataegus monogyna</i>	Hawthorn
<i>Echium plantagineum</i>	Paterson's Curse
<i>Ehrharta calycina</i>	Perennial Veldt Grass
<i>Ehrharta erecta</i>	Panic Veldt Grass
<i>Foeniculum vulgare</i>	Fennell
<i>Fraxinus angustifolia</i>	Desert Ash
<i>Genista monspessulana</i>	Montpellier Broom
<i>Hedera helix</i>	English Ivy
<i>Lonicera japonica</i>	Japanese Honeysuckle
<i>Lycium ferocissimum</i>	African Boxthorn
<i>Nassella nessiana</i>	Chilean Needlegrass
<i>Nasella trichotoma</i>	Serrated Tussock
<i>Oxalis incarnate</i>	Pale Wood Sorrel
<i>Oxalis pes-caprae</i>	Soursob
<i>Pittosporum undulatum</i>	Sweet Pittosporum
<i>Prunus cerasifera</i>	Cherry Plum
<i>Rosa rubiginosa</i>	Sweet Briar
<i>Rubis spp. aggregate</i>	Blackberry
<i>Salix fragilis</i>	Crack Willow

<i>Solanum mauritianum</i>	Wild Tobacco Tree
<i>Solanum psuedocapsicum</i>	Madeira Winter-cherry
<i>Tradescantia fluminensis</i>	Wandering Tradescantia
<i>Ulex eropaeus</i>	Gorse
<i>Verbena bonariensis</i>	Purple-top Verbena
<i>Vinca major</i>	Blue Periwinkle
<i>Watsonia meriana</i>	Bulbil Watsonia

An additional weed species category “other” was also included. This was generally only used to map additional noxious weed species and isolated patches of what were considered to be potentially emerging weeds within the study area. Species in this category included Agapanthus *Agapanthus sp.*, Arum Lily *Zantedeschia aethiopica*, Iris *Iris sp.*, Daffodil *Narcissus*, Boneseed *Chrysanthemoides monilifera*, Cotoneaster *Cotoneaster sp.*, Hemlock *Conium maculatum*, Ragwort *Senecio jacobaea* and Variegated Thistle *Silybum marianum*.

## **Results**

No State Prohibited or Regionally Prohibited weeds were recorded from within the Study Area during the investigation. However, 16 Regionally Controlled weeds were recorded and seven Nationally Significant weeds were also recorded. Most of the weeds also have a Banyule Priority Weed risk rating of 3 (serious threat) or 4 (very serious threat), as outlined in the Banyule Weed Management Strategy.

The most widespread target weeds in terms of density and extent of cover located within the study area are Sweet Pittosporum, Panic Veldt Grass, Soursob, Blackberry, Hawthorn, Madeira Winter Cherry, Wandering Tradescantia and Bridal Creeper. These species generally occur on the majority of properties within the study area and are considered to be well established within the study area (Table 1).

Several target species were also only observed either as scattered single plants or very small isolated patches on a few individual properties and in this sense are considered to be emerging weeds within the study area. Species in this category include Box Elder, Climbing Dock, Paterson’s Curse, Fennell, English Ivy, Japanese Honeysuckle, African Boxthorn, Chilean Needlegrass, Serrated Tussock, Cherry Plum, Crack Willow, Wild Tobacco Tree, Gorse, Watsonia, Agapanthus, Arum Lily, Boneseed, Hemlock and Ragwort. Two of the target weeds specified for mapping were not recorded throughout the study area. These are Crofton Weed and Perennial Veldt Grass.

Table 1 lists the weed species mapped and provides some general comments on the extent of their infestation throughout the study area. The status of each weed species is also provided, including whether it is a nationally significant weed, noxious weed, or Banyule Priority Weed as stated in the Banyule Weed Management Strategy.

**Table 1: Weed species mapped along 3 km of Yarra River Frontage, Lower Plenty, September – November 2006**

\*Risk rating based on the Banyule Weed Management Strategy 2006. 1 = non-threatening weed species; 2 = potential threat; 3 = serious threat; 4 = very serious threat

\*\* Declared noxious under the Catchment and Land Protection Act 1994 within the Port Phillip and Westernport East Region. RC = Regionally Controlled.

Species	Common Name	Banyule Priority Weed Risk Rating*	Noxious Weed**	Weed of National Significance (National Weed Strategy)	No. of properties in study area where weed located	Comments
<i>Acer negundo</i>	Box Elder	2			1	Low density infestation
<i>Acetosa sagittata</i>	Climbing Dock				3	A few small patches towards centre of study area.
<i>Ageratina adenophora</i>	Crofton Weed				0	Not observed
<i>Allium triquetrum</i>	Angled Onion	4	RC		8	Large medium and high-density patches located throughout several properties.
<i>Asparagus asparagoides</i>	Bridal Creeper	4		√	12	Widespread at low and medium density. Many infestations appeared to be affected by rust fungus
<i>Cirsium vulgare</i>	Spear Thistle	3	RC		15	Common throughout study area at medium to low density.
<i>Crataegus monogyna</i>	Hawthorn	4	RC		15	Large, medium and high-density infestations occur at Amberley Way and further upstream. A few scattered sightings recorded downstream of Amberley Way.
<i>Echium plantagineum</i>	Paterson's Curse	3	RC		7	A few isolated dense patches and scattered single plants located throughout study area
<i>Ehrharta calycina</i>	Perennial Veldt Grass				0	Not observed
<i>Ehrharta erecta</i>	Panic Veldt Grass	4			8	Widespread throughout study area from Amberley way and further

Species	Common Name	Banyule Priority Weed Risk Rating*	Noxious Weed**	Weed of National Significance (National Weed Strategy)	No. of properties in study area where weed located	Comments
						downstream.
<i>Foeniculum vulgare</i>	Fennel	4	RC		1	Observed at low density on one property
<i>Fraxinus angustifolia</i>	Desert Ash	4			7	Several single plants located on several properties, with low density infestations and one medium density and high density infestation also observed.
<i>Genista monspessulana</i>	Montpellier Broom	4	RC		7	Dense patches are located downstream of Riverhill Drive. Also one medium density patch near Fitzsimons Lane.
<i>Hedera helix</i>	English Ivy	4			4	Isolated patches observed, with some dense patches recorded at Amberley Way.
<i>Lonicera japonica</i>	Japanese Honeysuckle	4			3	A couple of dense patches located.
<i>Lycium ferocissimum</i>	African Boxthorn	4	RC		2	One single plant and one small dense patch located.
<i>Narcissus pseudonarcissus</i>	Daffodil				1	One single plant observed.
<i>Nassella neesiana</i>	Chilean Needlegrass	4		√	1	One isolated patch located east of Palamino Court.
<i>Nassella trichotoma</i>	Serrated Tussock	4	RC	√	2	Very isolated – one plant towards centre of study area on Rosehill Road and two medium density patches at Amberley Way.
<i>Oxalis incarnata</i>	Pale Wood Sorrel				3	Some isolated patches near Fitzsimons Lane. One property towards centre of study area contains several large medium –



Species	Common Name	Banyule Priority Weed Risk Rating*	Noxious Weed**	Weed of National Significance (National Weed Strategy)	No. of properties in study area where weed located	Comments
						high density patches.
<i>Oxalis pes-caprae</i>	Soursob	4			9	Widespread infestations (low-high density) spread throughout several properties.
<i>Pittosporum undulatum</i>	Sweet Pittosporum	4			11	Widespread throughout study area.
<i>Prunus cerasifera</i>	Cherry Plum	4			4	A few scattered and isolated plants present.
<i>Rosa rubiginosa</i>	Sweet Briar		RC		7	Most infestations occur at Amberley Way and further downstream. Some scattered plants towards centre of study area.
<i>Rubis spp. aggregate</i>	Blackberry	4	RC	√	17	Widespread throughout at varying density.
<i>Salix fragilis</i>	Crack Willow	4		√	2	A few isolated occurrences.
<i>Solanum mauritianum</i>	Wild Tobacco Tree				3	Isolated and scattered single plants.
<i>Solanum pseudocapsicum</i>	Madeira Winter-cherry				11	Widespread at predominantly low density.
<i>Tradescantia fluminensis</i>	Wandering Tradescantia	4			15	Widespread throughout at med-high density.
<i>Ulex europaeus</i>	Gorse	4	RC	√	1	Isolated occurrence near Fitzsimons Lane.
<i>Verbena bonariensis</i>	Purple-top Verbena				2	Isolated occurrences.
<i>Vinca major</i>	Blue Periwinkle				2	A few isolated but large med-dense patches present.
<i>Watsonia meriana</i>	Bulbil Watsonia	4	RC		6	A few isolated but small dense patches recorded.
<i>Agapanthus sp.</i>	Agapanthus				3	Large low-density patches and a few small isolated dense patches.

<b>Species</b>	<b>Common Name</b>	<b>Banyule Priority Weed Risk Rating*</b>	<b>Noxious Weed**</b>	<b>Weed of National Significance (National Weed Strategy)</b>	<b>No. of properties in study area where weed located</b>	<b>Comments</b>
<i>Zantedeschia aethiopica</i>	Arum Lily				1	One small isolated patch at Amberley Way.
<i>Chrysanthemoides monilifera</i>	Boneseed	4	RC	√	2	Two single plants located.
<i>Cotoneaster</i> spp.	Cotoneaster	4			2	One large low-density patch recorded.
<i>Conium maculatum</i>	Hemlock		RC		2	Two isolated patches (1 low-density, 1 high-density) located on two adjoining properties on Montpellier Drive.
<i>Senecio jacobaea</i>	Ragwort		RC		1	One single plant located.
<i>Silybum marianum</i>	Variegated Thistle		RC		1	One low density patch.
<i>Iris</i> sp.	Iris				1	One isolated patch

## **Management Implications**

### *Study Area*

The weed action table below sets out some specific goals, objectives and recommended priorities for weeds mapped and located within the study area as a whole. It is recognized that the ability to undertake all actions will be limited by financial constraints and dependent upon the responses of vegetation and changing conditions (e.g. climate, policy framework etc.). The action table is therefore to be used as a guide only, and may need to be adapted in future to suit changing circumstances over time.

Target weed species within the action table have been categorized into either a high, medium or low priority for control, as it will not be feasible to tackle all weeds at once. Weeds within the high priority category were selected on the basis that they are:

- A Banyule Priority Weed with a risk rating of 3 or 4; and
- Are also either a weed of national significance and / or declared noxious weed species within the Port Phillip and Westernport East Region; and
- Are considered to be an emerging weed within the study area which could readily be brought under control.

It is envisaged that treatment of weeds within the High Priority category be initiated as soon as possible (1-2 years) to increase the possibility of eradication and / or prevention of further spread.

Weeds classified in the medium priority category include those weeds that are:

- A Banyule Priority Weed with a risk rating of 3 or 4; and
  - A weed of national significance and / or declared noxious weed species within the Port Phillip and Westernport East Region; but
  - Considered to be well established within the study area;
- or
- An environmental weed (but not a Banyule Priority Weed) that is considered to be emerging within the study area.

It will not be feasible to eradicate established weeds within the medium priority category, but some attempt will need to be made to control these weeds and prevent further spread, in order to fulfill obligations under the *Catchment and Land Protection Act 1994* and reduce their environmental impact on the study area. It will also be desirable to control other emerging environmental weeds within the medium priority category to prevent them becoming established and thereby creating a greater threat to the environment. Tackling these weeds before they become established will also help to limit the cost of weed control in the long term.

Low priority weeds are those environmental weeds that are not considered nationally significant or declared noxious, but are widespread throughout the study area, often in dense stands or covering a large area.

Effective control may need to be staged over a number of years to allow for restoration of habitat lost as a result of large scale weed removal, and to minimize other possible side effects such as bank destabilization and erosion due to exposure of bare earth. Staged removal may also be required when planning the control of established medium-priority weeds.

## Weed Action Table

<p><b>Goals</b></p> <ul style="list-style-type: none"> <li>• Maintain and improve (where possible) the ratio of indigenous species to exotic species cover throughout the study area</li> <li>• Maintain existing fauna habitat or ensure that alternative habitat is available in the vicinity.</li> <li>• Over time, reduce the cost of weed control required within the study area</li> <li>• Improve the capacity of landowners to undertake weed control on their individual properties</li> </ul>			
<p><b>Specific Objectives</b></p> <ul style="list-style-type: none"> <li>• Reduce the cover of nationally significant weed species</li> <li>• Reduce the growth and spread of identified Regionally Controlled weeds within the study area</li> <li>• Prevent the establishment of emerging weeds within the study area</li> <li>• Educate landowners on how to approach weed control on individual properties within the study area.</li> <li>• Revegetate using indigenous species where weeds are removed from degraded areas and natural regeneration is unlikely</li> <li>• Monitor the extent of weed infestation occurring in the study area over time</li> </ul>		<p><b>Performance Indicators</b></p> <ul style="list-style-type: none"> <li>• Properties to display a reduction in the cover / abundance of identified priority weeds</li> <li>• Absence of identified emerging weeds within the study area</li> <li>• Reduction in the amount of money spent controlling identified priority weeds in successive years</li> <li>• Increased cover and species richness of indigenous flora</li> </ul>	
<p><b>Works Items</b></p>			
<i>Issue / Works Item</i>	<i>Priority</i>	<i>Action</i>	<i>Timing</i>
Fennell – invades waterways, disturbed vegetation, drainage lines and seasonally moist areas. Capable of excluding other vegetation, fennel reproduces by seed.	High	<ul style="list-style-type: none"> <li>• One low density small patch identified which should be treated to prevent further spread. Herbicide application either by spot spraying or cut and paint method for larger specimens with little foliage.</li> </ul>	<ul style="list-style-type: none"> <li>• Spring</li> </ul>
Paterson’s Curse – Reduces pasture productivity and out-competes native ground flora, poisonous to stock. Annual plant reproducing from seed. Flowers early spring and summer. Seed may remain dormant in soil for at least 5 years	High	<ul style="list-style-type: none"> <li>• Herbicide application at rosette stage.</li> </ul>	<ul style="list-style-type: none"> <li>• Jan-early June</li> </ul>

*Yarra River Frontage Weed Action Plan*

<i>Issue / Works Item</i>	<i>Priority</i>	<i>Action</i>	<i>Timing</i>
Desert Ash – reproduces from seed and suckers from roots, forming dense stands. Invades riparian systems and grasslands. Dispersed by wind, water and dumped garden refuse (Blood 2001).	High	<ul style="list-style-type: none"> <li>Start upstream and work down, targeting those close to the water's edge in particular. Drill and fill where possible and leave standing. Educate landowners about the impacts of this plant as some appeared purposely planted in landscaped gardens.</li> </ul>	<ul style="list-style-type: none"> <li>Autumn</li> </ul>
Montpellier Broom – produces masses of long-lived seeds, dispersed by water, machinery, soil movement and dumped garden refuse	High	<ul style="list-style-type: none"> <li>Target medium density patch in upstream section of site adjoining Fitzsimons Lane to prevent further spread downstream. Continue downstream, targeting highest quality bushland areas first and work out from there as budgeted resources allow.</li> </ul>	<ul style="list-style-type: none"> <li>Spring, autumn</li> </ul>
Japanese Honeysuckle – Highly invasive, tolerant of a wide range of conditions and vegetation types. Reproduces from seed and vegetative means. Dispersed by water, soil movement, birds and dumped garden refuse	High	<ul style="list-style-type: none"> <li>Small number of dense isolated patches recorded. Spot spray where appropriate, removing from trees and shrubs first to prevent off-target damage. Cutting and painting may be more appropriate where indigenous ground-flora persists beneath Honeysuckle</li> </ul>	<ul style="list-style-type: none"> <li>Spring</li> </ul>
African Boxthorn – Reproduces from seed and suckers from root fragments if mechanically disturbed (Blood 2001). Dispersed by animals and dumped garden refuse. Germination may occur at any time of the year providing conditions are right.	High	<ul style="list-style-type: none"> <li>Regionally Controlled. Two small isolated occurrences which should be treated to prevent further spread, providing other habitat opportunities exist. Cut and paint. Monitor to ensure no regrowth occurs, or seedlings germinate</li> </ul>	<ul style="list-style-type: none"> <li>Autumn</li> </ul>
Chilean Needlegrass – Long-lived, highly invasive, unpalatable, reduces farm productivity through displacement of desirable pasture species, causes injury to stock. Produces stem seeds in addition to normal flower seeds that are self-fertilised. Builds up large and persistent seed bank in the soil. Seed attaches to clothing, livestock and machinery. Floodwater will move seed downstream.	High	<ul style="list-style-type: none"> <li>Handweed small infestations currently present and remove from site. Monitor closely to ensure prevention of further seedling establishment.</li> </ul>	<ul style="list-style-type: none"> <li>Year-round</li> </ul>

*Yarra River Frontage Weed Action Plan*

<i>Issue / Works Item</i>	<i>Priority</i>	<i>Action</i>	<i>Timing</i>
Serrated Tussock – Reduces livestock production, out-competes native ground flora. Perennial, reproducing from seed which predominantly germinates in autumn and winter. Plants rarely flower in the first year.	High	<ul style="list-style-type: none"> <li>Handweed, chip or spot spray isolated occurrences throughout study area and monitor for further subsequent infestations.</li> </ul>	<ul style="list-style-type: none"> <li>Year-round</li> </ul>
Crack Willow – highly invasive, reduce water flow and aeration, cause flooding and erosion, reduce water quality, and alter the ecology of riparian environments. Easily dispersed by stems and twigs breaking off and taking root, water and wind	High	<ul style="list-style-type: none"> <li>Staged removal, starting from upstream and working downstream. Where willows are effectively stabilizing the bank, alternative vegetation should be established prior to their removal. Remove willows that are unlikely to de-stabilize banks first. Use stem injection technique where possible.</li> </ul>	<ul style="list-style-type: none"> <li>Summer – early autumn</li> </ul>
Gorse - Highly invasive, flammability increases fire risk, harbors pest animals such as rabbits, reduces access to land and water. Reproduces from large numbers of seeds that remain dormant in the soil for up to 30 years. Bushes start flowering at about 18 months old. Disbursed by water, soil, machinery, footwear, birds and ants.	High	<ul style="list-style-type: none"> <li>One dense patch located in upstream section of study area. Should be targeted to prevent further spread of seed downstream. Control will require follow-up to ensure no further re-infestation. Herbicide application (spot spraying or cutting and painting) recommended where appropriate.</li> </ul>	<ul style="list-style-type: none"> <li>Spring, autumn</li> </ul>
Bulbil Watsonia – Highly invasive. Reproduces from corms and aerial cormils and (rarely) seed. Dispersed by water, machinery and contaminated soil (Blood 2001).	High	<ul style="list-style-type: none"> <li>Several small isolated low-dense patches present. Target to prevent further infestations, beginning upstream and working downstream. Spot spray or dab leaves with herbicide</li> </ul>	<ul style="list-style-type: none"> <li>Spring</li> </ul>
Bridal Creeper – Reproduces from seed or detached sections of the rhizome. Dispersed by animals, machinery, water and dumped garden refuse (Blood 2001).	High	<ul style="list-style-type: none"> <li>Rust already appears to be quite successful throughout many properties within the study area. Consider additional release of rust in the upper sections of the river where Bridal Creeper has been mapped but observed as untreated (Riverhill Drive). Spot spray isolated areas of Bridal Creeper further downstream.</li> </ul>	<ul style="list-style-type: none"> <li>Aug-Oct</li> </ul>

*Yarra River Frontage Weed Action Plan*

<i>Issue / Works Item</i>	<i>Priority</i>	<i>Action</i>	<i>Timing</i>
Boneseed – highly invasive, threatens native vegetation. Grows rapidly during winter. Prolific seeder. Seeds can remain viable in soil for many years. Dispersed by birds, rabbits, foxes cattle, and dumping of garden refuse.	High	<ul style="list-style-type: none"> <li>Two single plants recorded. Handweed where feasible. Cut and paint where impractical to handweed. Treatment will need to be followed up to ensure no re-infestation due to the large, long-lived seedbank.</li> </ul>	<ul style="list-style-type: none"> <li>Autumn</li> </ul>
Hemlock – Reproduces from seed which is dispersed by animals, water, machinery / vehicles and dumped garden waste (Blood 2001). Poisonous to humans.	High	<ul style="list-style-type: none"> <li>Two isolated patches located in close proximity to each other. Treat using herbicide application to prevent further spread.</li> </ul>	<ul style="list-style-type: none"> <li>Spring</li> </ul>
Ragwort – Prolific seeder, dispersed by water, wind, machinery and animals (Blood 2001).	High	<ul style="list-style-type: none"> <li>One plant located which should be removed prior to seeding to prevent further spread, particularly given its noxious status. Monitor to ensure no further establishment of seedlings.</li> </ul>	<ul style="list-style-type: none"> <li>ASAP</li> </ul>
Variegated Thistle – Reproduces from seed. Disperses by wind, animals	High	<ul style="list-style-type: none"> <li>One isolated low-density patch located in upstream section near Fitzsimons Lane which should be targeted to prevent further spread downstream. Spot spray at rosette stage.</li> </ul>	<ul style="list-style-type: none"> <li>Spring</li> </ul>
Cherry Plum – Hardy plant reproducing by seed. Dispersal is by water, animals and through dumped garden waste.	High	<ul style="list-style-type: none"> <li>Several single plants located throughout study area which could be drilled and filled and left standing where appropriate, or cut and painted to prevent further spread. Begin upstream and work down.</li> </ul>	<ul style="list-style-type: none"> <li>Autumn</li> </ul>
Cotoneaster – Reproduction by seed. Dispersed by animals and in dumped garden refuse.	High	<ul style="list-style-type: none"> <li>Occurs on one property at low density. Cut and paint or drill and fill where alternative habitat sources are available to prevent further spread</li> </ul>	<ul style="list-style-type: none"> <li>Autumn</li> </ul>
Box Elder – Invades riparian vegetation. Reproduces from seed and dispersed by water, wind and garden refuse.	Med	<ul style="list-style-type: none"> <li>Drill and Fill large plants and leave standing to maintain structure for habitat</li> </ul>	<ul style="list-style-type: none"> <li>Autumn</li> </ul>
Wild Tobacco Tree – Reproduces from seed and coppicing at base. Dispersed by water, animals and dumped garden refuse (Blood 2001).	Med	<ul style="list-style-type: none"> <li>Three isolated occurrences recorded which should be targeted to prevent further spread. Cut and Paint / Drill and fill</li> </ul>	<ul style="list-style-type: none"> <li>Autumn</li> </ul>
Daffodil – Reproduces from bulbs and seed.	Med	<ul style="list-style-type: none"> <li>One plant observed towards water's edge. Spot spray to prevent further spread</li> </ul>	<ul style="list-style-type: none"> <li>Spring</li> </ul>
Iris – Reproduces from underground corms and seed	Med	<ul style="list-style-type: none"> <li>One low-density infestation that should be treated to prevent further spread. Spot spray</li> </ul>	<ul style="list-style-type: none"> <li>Spring</li> </ul>



Yarra River Frontage Weed Action Plan

Issue / Works Item	Priority	Action	Timing
Climbing Dock – Reproduces from winged seed. Dispersed by water and wind.	Med	<ul style="list-style-type: none"> <li>Spot spray / hand weed where appropriate, working from source at Amberley Way, to isolated occurrences further downstream to prevent spread.</li> </ul>	<ul style="list-style-type: none"> <li>Spring</li> </ul>
Sweet Briar – Tolerant of a range of conditions. Reproduces by seed, suckers, root and crown fragments (Blood 2001). Dispersed by animals, machinery, water and dumped garden refuse. Seed viable for 3-4 years in soil.	Med	<ul style="list-style-type: none"> <li>Target single plants located towards middle of study area, then work downstream to prevent further spread. Cut and paint or spot spray where appropriate.</li> </ul>	<ul style="list-style-type: none"> <li>Spring, autumn for cutting and painting</li> </ul>
Blackberry - Harbours pest animals, restricts access to water and land, highly invasive. Has a two year growth pattern – young canes begin growing in spring, flowering occurs late Nov to late Feb and fruiting late Dec to April. New plants develop at tips of first-year canes in autumn and winter. Germination occurs during spring and early summer. Dispersed by birds, mammals, water and soil movement.	Med	<ul style="list-style-type: none"> <li>Widespread throughout study area. A staged approach will be required to reduce the impact of habitat loss for species (e.g. small birds) that take refuge in Blackberry thickets where other sources of habitat are no longer available. Target low density infestations amongst high quality indigenous vegetation first, then work towards dense infestations. Some re-establishment of indigenous vegetation (through regeneration or revegetation) may be required before tackling additional stages of removal of dense infestations.</li> <li>Work from upstream section of study area where possible. Management will need to be sustained over a number of years to prevent re-infestation. Consider the use of Blackberry Leaf Rust <i>Phragmidium violaceum</i> which will assist in slowing the rate of spread whilst other means of treatment (e.g. herbicide application) are applied.</li> </ul>	<ul style="list-style-type: none"> <li>Summer, early autumn</li> </ul>
Purple-top Verbena – Reproduces by seed spread by animals, wind, water and dumped garden refuse (Blood 2001).	Med	<ul style="list-style-type: none"> <li>Small isolated patches that should be treated to prevent further spread. Spot spray in conjunction with other targeted broadleaf herbaceous weeds.</li> </ul>	<ul style="list-style-type: none"> <li>Spring – early summer</li> </ul>
Agapanthus– Reproduces by seed and vegetatively. Dispersed by dumped garden refuse.	Med	<ul style="list-style-type: none"> <li>Cut and paint where infestations are small. Brushcut and immediately follow up with herbicide application where cutting and painting not practical. If removal not feasible, dead-head prior to seed-set to reduce spread.</li> </ul>	<ul style="list-style-type: none"> <li>Late spring-summer</li> </ul>
Arum Lily – Invades riparian habitats. Reproduces from seed and rhizomes. Seed prolific but short-lived. Disperses by water, animals, machinery and dumped garden refuse (Blood 2001).	Med	<ul style="list-style-type: none"> <li>One small dense patch recorded that should be treated to prevent spread. Spot spray.</li> </ul>	<ul style="list-style-type: none"> <li>Spring</li> </ul>

*Yarra River Frontage Weed Action Plan*

<i>Issue / Works Item</i>	<i>Priority</i>	<i>Action</i>	<i>Timing</i>
English Ivy – Tolerant of a wide range of conditions and vegetation types. Smothers ground flora preventing regeneration. Reproduces by seed and vegetatively	Med	<ul style="list-style-type: none"> <li>Ensure Ivy is removed from trees and shrubs to prevent flowering of ivy and damage to indigenous trees and shrubs until able to tackle ground level infestations. Will be time-consuming where ground flora is present beneath ivy, as spot spraying may be inappropriate. Fairly isolated occurrences at present so worth controlling to prevent spread.</li> </ul>	<ul style="list-style-type: none"> <li>Late spring – summer</li> </ul>
Blue Periwinkle – Highly invasive, reproducing from stem fragments rooting at nodes, and seeds. Dispersed by water, wind and dumped garden refuse (Blood 2001).	Med	<ul style="list-style-type: none"> <li>Small number of dense infestations present. Start upstream and work downstream. Focus on areas where indigenous ground flora persists first to prevent spread. Herbicide application where appropriate. Could be treated in conjunction with other introduced creepers such as English Ivy.</li> </ul>	<ul style="list-style-type: none"> <li>Spring</li> </ul>
Angled Onion – Reproduces form seed and bulb. Dispersed by water, animals, machinery, vehicles and contaminated soil (Blood 2001).	Med	<ul style="list-style-type: none"> <li>Herbicide application. Spot spray where possible, beginning from high quality areas and working out. Begin upstream and upslope, and work down. Rig spraying may be more appropriate for larger infestations where accessible. Brushcut to reduce seed set where spraying not feasible.</li> </ul>	<ul style="list-style-type: none"> <li>Aug-Oct</li> </ul>
Spear Thistle – Annual or biannual. Reproduces from seed and dispersed by water, animals and wind.	Med	<ul style="list-style-type: none"> <li>Widespread throughout study area at low-medium density. Properties with small and isolated occurrences could be spot sprayed, particularly upstream towards Fitzsimons Lane. Large infestations could also be tackled using a herbicide application at rosette stage, where budgeted resources allow. Could be undertaken in conjunction with other herbaceous broadleaf treatment, e.g. Patterson’s Curse.</li> </ul>	<ul style="list-style-type: none"> <li>Spring</li> </ul>
Hawthorn – Tolerates wide range of conditions. Reproduces by seed and suckering. Dispersed by machinery, garden refuse and planting.	Med	<ul style="list-style-type: none"> <li>Target in stages, beginning upstream where infestations are more isolated and scattered. For large, heavy infestations where little other vegetation remains, suitable replacement plantings should take place following initial removal, and become established before additional stages of removal are commenced. Drill and fill where practical and leave standing for habitat structure. Where Hawthorn is stabilizing steep embankments and erosion is an issue, removal should also be staged.</li> </ul>	<ul style="list-style-type: none"> <li>Autumn</li> </ul>
Madeira Winter-cherry – Reproduces from seed. Dispersed by water, birds and dumped garden waste. Fruit poisonous to humans.	Low	<ul style="list-style-type: none"> <li>Widespread at fairly low density throughout study area. Cut and paint where appropriate. Spot spray dense infestations if practical. Begin upstream in areas of high quality indigenous vegetation, working downstream.</li> </ul>	<ul style="list-style-type: none"> <li>Summer-autumn</li> </ul>

*Yarra River Frontage Weed Action Plan*

<i>Issue / Works Item</i>	<i>Priority</i>	<i>Action</i>	<i>Timing</i>
Panic Veldt Grass – Reproduces from seed. Dispersed by animals and contaminated soil. Long-lived.	Low	<ul style="list-style-type: none"> <li>Large, widespread infestations throughout study area. May be worth targeting in high quality areas where a high cover of indigenous grasses and other ground flora persists. Areas where treatment is likely to expose large areas of bare earth should be avoided.</li> </ul>	<ul style="list-style-type: none"> <li>Autumn, spring</li> </ul>
Pale Wood Sorrel – Late winter – summer flowering. Reproduces from bulbils formed on rhizomes and in leaf axils (Richardson et al. 2006).	Low	<ul style="list-style-type: none"> <li>Two small isolated patches recorded in upstream section of study area may be worth targeting initially to prevent further spread. Could be targeted using herbicide application at the same time as Soursob, beginning from highest quality areas first and working out to lower quality areas.</li> </ul>	<ul style="list-style-type: none"> <li>Late winter-spring</li> </ul>
Soursob – Invades a range of habitats. Reproduces from bulbs produced on tubers and rhizomes and some seed set. Dispersed by wind-blown bulbs, water, birds, machinery, soil movement and dumped garden refuse (Blood 2001).	Low	<ul style="list-style-type: none"> <li>Widespread and extensive infestations throughout study area. Target highest quality areas first, beginning upstream and working downstream. Herbicide application (spot spray or rig spray where appropriate).</li> </ul>	<ul style="list-style-type: none"> <li>Late winter-spring</li> </ul>
Sweet Pittosporum – Adaptable, highly invasive. Reproduces from seed and suckers. Dispersed by animals, contaminated soil and dumped garden refuse (Blood 2001). Most germination occurs in autumn	Low	<ul style="list-style-type: none"> <li>Widespread occurrences throughout study area. Target in stages, beginning upstream where infestations are more isolated and scattered. For large, heavy infestations where little other vegetation remains, suitable replacement plantings should take place following initial removal, and become established before additional stages of removal are commenced. Drill and fill where practical and leave standing for habitat structure. Where Pittosporum is stabilizing steep embankments, removal should also be staged, to minimize bank destabilization.</li> </ul>	<ul style="list-style-type: none"> <li>Autumn</li> </ul>
Wandering Tradescantia – Highly invasive. Reproduces from stem fragments rooting at nodes. Dispersed by water, soil movement, dumped garden refuse and machinery / vehicles.	Low	<ul style="list-style-type: none"> <li>Widespread and extensive infestations occur throughout study area. Begin treatment upstream and work downstream to prevent further spread. Target areas where indigenous ground flora still persists.</li> </ul>	<ul style="list-style-type: none"> <li>Spring – early summer</li> </ul>

*Yarra River Frontage Weed Action Plan*

<i>Issue / Works Item</i>	<i>Priority</i>	<i>Action</i>	<i>Timing</i>
Landholder education	High	<ul style="list-style-type: none"><li>• Provide access to weed mapping data for property owners within the study area</li><li>• Inform landowners about potential funding opportunities for undertaking weed control on their individual properties</li><li>• Provide information on weeds within the study area (biology, control, identification)</li><li>• Provide advice on where to go for additional information (e.g. appropriate expertise to undertake weed control works)</li></ul>	<ul style="list-style-type: none"><li>• Year round</li></ul>
Monitoring and Evaluation	High	<ul style="list-style-type: none"><li>• Establish photo points throughout study area to allow for 'before treatment' and 'after treatment' pictures</li><li>• Keep records of species found on site and diarize activities on site (e.g. herbicide use, planting tubestock etc.)</li></ul>	<ul style="list-style-type: none"><li>• Year round</li></ul>

## ***Individual Properties***

For landowners planning to undertake weed control on individual properties within the study area, some additional guiding principles may assist in best management practices being achieved on site. These include:

- Weeds of greatest threat and that are considered to be emerging weeds on the property should be targeted first. This will include nationally significant weeds, noxious weeds and Banyule priority weeds that are currently present in low density or in isolated areas on the property. Tackling these emerging weeds first will help to prevent further spread and establishment of these weeds on the property, and provide the best opportunity for eradication of these weeds prior to becoming established.
- Where practical, weed control should commence on upstream and upslope areas first, as many weeds can be dispersed by movement of their seed or other plant parts down watercourses and slopes (CRC undated). This may also mean coordinating weed management programs with neighboring landowners to prevent re-infestation of weeds.
- Work from the best quality areas first (i.e. those areas containing a high cover and diversity of indigenous plants), before tackling more degraded areas. This will provide the best opportunity for natural regeneration to occur, and weeds are less likely to re-establish in more intact areas of indigenous vegetation than more open, degraded areas.
- Where there are large infestations of woody weeds with little surrounding indigenous vegetation, removal of woody weeds should be staged over a number of years, with regeneration or revegetation to be established before further removal, to prevent a significant habitat loss and / or bank destabilization and erosion.
- Let indigenous plant regeneration or revegetation establishment dictate the rate of weed removal (CRC undated).
- Any weed management action undertaken must be able to be followed up in subsequent years to consolidate gains made and ensure re-infestation does not occur. This will need to be taken into consideration when planning a weed control program, particularly when resources (time, money) are limited.
- Consider which weed management techniques will be most effective, minimize environmental damage and help make the site resilient to further weed invasion (CRC undated).
- Monitoring and evaluation of progress will be important for providing some measure of success of the control program, and will also help to highlight when management approaches may need to be altered. A simple way of monitoring how the site is responding to weed control is to establish some permanent photo-points across the site. Take photos at these points before any control works begin, and continue to photograph these same points over time, once the weed control program has been implemented.

Keeping a diary of what has occurred on the site (e.g. herbicides used, timing of works and where), will help trace back which techniques are effective and what may need to be modified to get a better result. Keeping records of species found on the site (e.g. new weeds, regeneration of indigenous plants etc.) and their level of abundance will also be a useful way of tracking what is present on the site and how it is changing over time.

- Be realistic about what can be achieved in terms of time, money and expertise (Staton and O'Sullivan 2006).
- When planning a weed control program for an individual property, consider the following steps:
  - Obtain available weed mapping data for the site
  - Determine and locate other significant features of the site such as areas of intact native vegetation, water bodies, areas set aside for stock etc.
  - Determine the objectives to be achieved on the site.
  - Consider what resources are available for weed control, which weeds are to be targeted and what the highest priorities are.

## **References:**

Australian Weeds Committee (2006). *Australian Weeds Strategy – A National Strategy for Weed Management in Australia*. Natural Resource Management Ministerial Council, Canberra.

Blood, Kate (2001). *Environmental Weeds: A Field Guide for SE Australia*. CH Jerram & Associates, Mt Waverley.

Carr, G. W., Yugovic, J. V. and Robinson, K. E. (1992). *Environmental Weed Invasions in Victoria – Conservation and Management Implications*. Department of Conservation and Environment, East Melbourne.

CRC for Australian Weed Management (undated). *Introductory Weed Management Manual*. Department of Environment and Heritage, Canberra.

DSE and DPI (2007). Tackling weeds on private land (TWOPL) – building capacity in municipal councils. *Under Control* 35, 10-11.

Government of Victoria (1994). *The Catchment and Land Protection Act 1994 Act No. 52/1994*. Government of Victoria, Melbourne.

O'Malley, Austin, Kern, Lincoln and Stephens, Andrew (2006). *Banyule Weed Management Strategy 2006 Parts 1, 2 & 3*. Practical Ecology, Alphington.

Richardson, F. J., Richardson, R. G. and Shepherd, R. C. H. (2006). *Weeds of the South-East: An Identification Guide for Australia*. R. G. and F. J. Richardson, Meredith.

Staton, J. and O'Sullivan, J. (2006). *Stock and Waterways: A Manager's Guide*. Land and Water Australia, Canberra.