



Beveridge Recreation Reserve Vegetation Management Plan 2011-16

**Merri Creek Management Committee for Mitchell Shire Council,
February 2011
With funding from Melbourne Water**



Cover image;

The Swamp Tigertail, *Synthemis eustalacta* has larvae that hunt in sediments and still waters of swamps. It is seldom reported in the Melbourne area or on the Volcanic Plains and its occurrence at Beveridge Spring is potentially significant, indicating the unusual hydrology and habitat of the site.

Photo taken at Beveridge Recreation Reserve, February 2010. MCMC

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1 Introduction

This Vegetation Management Plan was commissioned by Mitchell Shire Council to provide direction for on-ground remnant vegetation management throughout the Beveridge Recreation Reserve.

Strategic support for undertaking this Vegetation Management Plan is provided by the Council Plan 2009-2013 (Mitchell Shire 2009) to 'Protect and enhance our natural environment'.

The most pressing issue for vegetation management in the Beveridge Recreation Reserve is that changes in vegetation structure, in particular unmanaged weed infestations and expansion of areas dominated by the native Common Reed, *Phragmites australis*. These changes have reduced amenity values of the Reserve and, notwithstanding the habitat values of the Reedbeds, their expansion has degraded some of the other ecological values in the Reserve.

Toward the end of developing this plan, a minor consultation with a leading wetland restoration and consultation firm, Australian Ecosystems, was commissioned by Merri Creek Management Committee (MCMC), to inform recommendations on wetland management at the Reserve. Dylan Osler, an experienced ecologist from this firm, provided expert opinions during a two hour on-site consultation in July 2010.

The assessment of vegetation assets in this plan also aims to inform ongoing discussions on other recreational proposals for the Reserve.

The five-year timeframe for actions in this plan was chosen as being one appropriate to the multi-year nature of many vegetation management actions without engaging in more speculative long-term planning that would require additional resources to explore in a meaningful way. It is envisaged that a review and update of this plan be carried out in 2014-5. Some of the directions for vegetation management requires the nomination of longer-term direction for the parts of the Reserve however this plan is not intended to replace or pre-empt other master-planning processes for the Reserve which should be part of a more intensive consultative process.

The target audiences for this plan are:

- Beveridge Recreation Reserve Committee of Management - to provide information in strategic planning and decision making for the Reserve
- Mitchell Shire Council Environmental Programs Unit staff - for assessing infrastructural proposals, design constraints, developing budgets and grant applications relating to the vegetation management of the Reserve
- Council maintenance staff and private contractors involved in vegetation management at the Reserve - to identify works and provide background essential to devising induction and detailed works programs
- Department of Sustainability and Environment (DSE) and Parks Victoria (PV) staff involved in assessing and tracking biodiversity actions relating to significant biodiversity assets
- Beveridge Pony Club.
- Wider community with an interest in the Reserve

1.1 Location

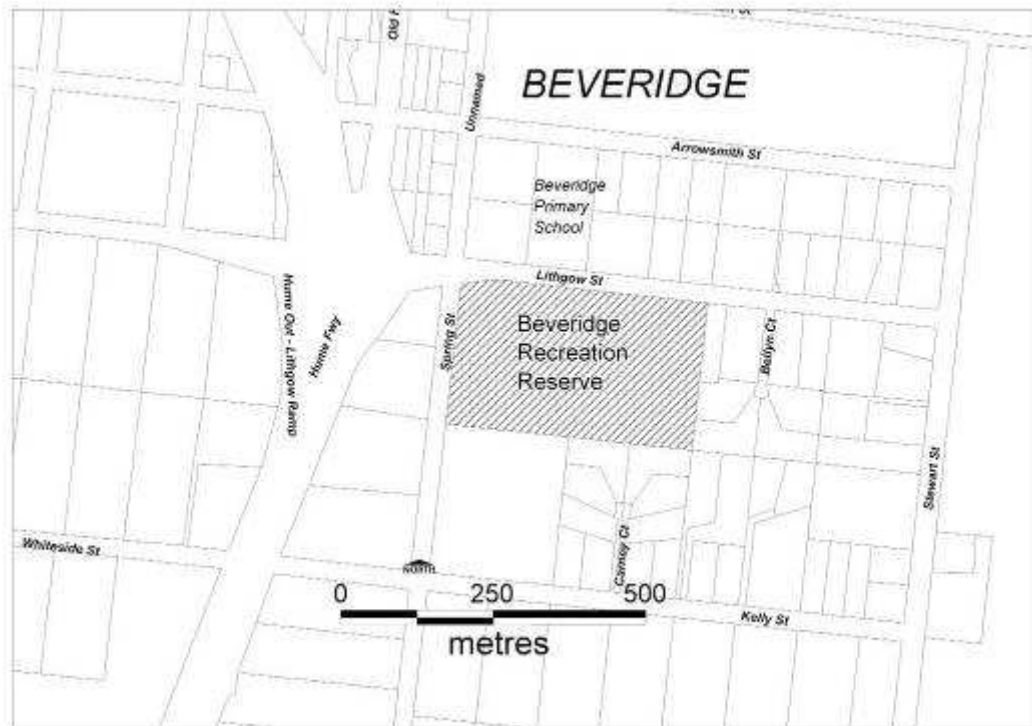
The Beveridge Recreation Reserve (the Reserve) is bounded by Spring Street to the west, Lithgow Street to the north and private land to the east and south in the township of Beveridge, which is approximately 42 kilometres north of Melbourne in the Shire of Mitchell. The coordinates for the Reserve are:

Lat/Long: 37° 28' 30.5" S, 144° 58' 36.0" E
MGA 55: 321088, 5850493

The Reserve is found on Map 686 A3 of the Melway Greater Melbourne Street Directory (Melway, 2010)

The Reserve occupies 10 hectares below the southern flanks of the dormant volcano, Mt Fraser. A perennial spring occurs at the break of slope in the middle of the Reserve.

■ **Figure 1.1-1 Location of Beveridge Recreation Reserve**



1.2 Regional Context

The biological values of the Reserve have been variously interpreted in the context of the Merri Creek Catchment, the Greater Melbourne Area and Port Phillip Region in various documents the most pertinent of which are outlined below:

References specific to the Reserve

Under the Victorian Government's sites of biodiversity significance (BioSites) scheme, the Reserve is indicated as being of *Regional significance* as 'BioSite 5046'. (DSE 2005a).

The most comprehensive analysis of the biodiversity significance of the site was that of Beardsell (1997), in which the site was judged to be of Regional Significance within the Greater Melbourne Area. Values that contributed to Beardsell's assessment are included in Section 1.4 Reserve's values and significance.

Wetlands

Wetlands often constitute 'biodiversity hotspots' recognised for their diverse assemblage of species and ecosystems, some of which have international, national, regional and local significance. An analysis of historical and extant wetlands indicates that only 83ha out of an original 2,140ha (<4%) remains in the Merri Catchment (MCMC 2009). In Victoria, almost 4,000 natural wetlands (191,000 hectares) have been lost since European settlement. In this context, the wetland at Beveridge represents a rare example of a much diminished habitat type and thus a priority for further efforts at protection, research and restoration. Objectives and targets relevant to wetlands in the Merri catchment are included in pages 139-142 of the Merri Creek and Environs Strategy (MCMC 2009).

Habitat corridor

The Beveridge Recreation Reserve is relatively distant from habitat corridors identified as part of the Merri Creek Catchment 'Habitat Corridor Network' (MCMC 2009). The position of the Reserve at a head of the Kalkallo Creek and the fragmentary native vegetation along the creek limits its function as a riparian habitat corridor. However, the wetland at the Reserve remains connected to the wider habitat network as a 'stepping stone' site for highly mobile species such as wetland birds and forest species attracted to the Swamp Scrub vegetation. The perennial Beveridge spring is potentially important as a refuge for water dependant flora and fauna. The 'Swamp Tigertail' Dragonfly *Synthemis eustalacta*, (see Section 3.6) may be significant in this regard.

Hardy fauna species probably continue to use the degraded drainage line along the Kalkallo Creek to the Reserve. These connections for wetland fauna may be enhanced or re-established through sympathetic management of the open space along the Kalkallo Creek. Making such a connection useful for the maximum number of fauna species will require a study of focal species and land capability in any proposed corridor (See Section 6.1 Action B6).

1.3 Creation of the Reserve (land tenure)

The Reserve consists of Crown Land allotment, 61, 62, 63, in the township of Beveridge.

The Reserve is Crown Land that is owned by the Department of Sustainability and Environment. Such land is nominally the responsibility of the delegated authority, Parks Victoria. In this case Mitchell Shire Council has been delegated as the Committee of Management (CoM) and has subsequently delegated management of the Reserve to the Beveridge Recreation Reserve CoM.

The Reserve was identified in the recommendations of the Land Conservation Council Melbourne District 2 Review (LCC 1994). Under an ongoing revision of these recommendations by the Department of Sustainability & Environment, the 'VEACRECS25' – the status of different sections of the Reserve was further defined with the area of the spring and south to the boundary designated as 'Bushland Reserve' (See Fig. 1.3-1 below). This encompasses the area of the reserve with the higher biological values. It is this 3.4 ha of Bushland Reserve for which Parks Victoria retains responsibility (Ion Maher pers. comm. 31st October 2010). Recommendations included in the VEACRECS25 (which remain to be published at the time of writing) for Bushland Reserves include; 'to maintain the character and quality of the local landscape' and 'to protect remnant areas of indigenous vegetation and areas with habitat value'. A specific recommendation for this site was that, 'The spring-fed wetland and associated flora and fauna are to be protected.' (Unpublished internal DSE data, pers. comm., Christie Boyle 12th December 2009).

Figure 1.3-1 Area designated as Bushland Reserve in the VEAC25 Scheme.



Source; Biodiversity Interactive Maps (<http://mapshare2.dse.vic.gov.au/MapShare2EXT/imf.jsp?site=bim>).
Viewed December 18th 2009

The entire Reserve is zoned as Public Park and Recreation (PPRZ) in the State Government's Planning Scheme.

In order to clarify the requirements of these overlapping planning schemes, a site meeting with DSE, PV and Mitchell Shire was held on 18th May 2010. At this meeting it was confirmed that Parks Victoria remains responsible for the Bushland Reserve section of the Reserve and must be included in approvals for changes proposed in this area. During this meeting, a general direction on appropriate use of the Bushland Reserve section (as either Informal Parkland or Habitat Zone) of the Reserve was identified by the Parks Victoria officer attending and, together with the detail from VEACRECS25 provided above, this forms the basis of Vegetation Management Zones in this section of the reserve.

In order to reduce overlapping responsibilities, a process for making the Council the designated manager of the Bushland Reserve section of the Reserve, without the need for Parks Victoria oversight was underway as of the writing of this Plan (pers. comm. V. Pasic 25th January 2010)

1.4 Reserve's values and significance

Vegetation types

Approximately four hectares of the Reserve is occupied by remnant vegetation of poor to moderate quality, mainly in the swamp and stony knoll areas.

Of the five vegetation types identified at the site by Beardsell (1997), the author has proposed a corresponding list of Ecological Vegetation Class (EVC) equivalents in Table 1.4-1 based on experience in the Merri catchment. These require careful interpretation, in particular due to the perennial spring-fed nature of the wetland (published benchmarks often assume a seasonally variable overland flow). It is noted that the characterisation of vegetation types is most appropriately done by a qualified botanist with experience of a wide range of EVCs. Such an assessment would provide greater assurance in management directions and conservation status. It is recommended that such an assessment be pursued (See section 6.1 Action B12). This would potentially assist community engagement and may assist grant funding submissions.

Table 1-1 Vegetation Communities (Beardsell) and proposed list of corresponding Ecological Vegetation Class

Vegetation Communities (Beardsell, 1997)	Interim Ecological Vegetation Class
Kangaroo Grass stony knoll grassland	Stony Knoll Shrubland EVC 649
Common Tussock Grass- Tall Sedge & Common Tussock Grass Plains Grassland	Creekline Tussock Grassland EVC 654
Swamp Gum Swampy Woodland	Swamp Scrub EVC 54 *
Common Reed, Cumbungi-Tall Spike Sedge (emergent herbfield)	Tall Marsh EVC 821
Not identified	Plains Grassland EVC 132

**Swampy Riparian Woodland EVC would also be similar to Beardsell's 'Swamp Gum Swampy Woodland' however the absence of any Eucalyptus ovata trees or stumps suggest that the Woolly tea-tree dominated areas instead comprise a form of Swamp Scrub EVC (Osler, D., pers comm. 19th July 2010).*

With the exception of the recently defined 'Tall Marsh' EVC, all of these EVCs warrant the highest priority for vegetation protection, reservation and management based on criteria under Port Phillip and Westernport Native Vegetation Plan as identified in Merri Creek Environs Strategy 2009-2014. (MCMC 2009). Tall Marsh is a component of 'Shallow Freshwater Marsh Wetland EVC Mapping Unit', which has in the past been identified as Endangered on the Victorian Volcanic Plains (DSE 2003). However, no published updated analysis of this EVC is available.

A conjectural map of the EVCs present or likely to have occurred in the Reserve, is included as Appendix 4 in Section 8.4. An additional EVC (Plains Grassland, EVC 132) has been added to this map for the higher slopes on the north of the Reserve, based on similar topography in other parts of the Merri Catchment. However, Plains Woodland or Scoria Cone Woodland EVCs are alternative vegetation types that may have been present.

The Woolly Tea-tree dominated areas of the site are characteristic of Swamp Scrub (EVC 53) of the Victorian Volcanic Plain (VVP). This EVC is dominated by Woolly Tea-tree on the VVP, and can have occasionally emergent trees in particular Swamp Gum (*Eucalyptus ovata*) and Blackwood (*Acacia melanoxylon*) on the drier fringes.

It was also D. Osler's opinion that although small, this stand of Swamp Scrub is of high ecological importance as;

- it represents an ecological vegetation type that is likely to have been naturally restricted on VVP in the greater Melbourne area
- it is one of the only stands of Swamp Scrub on public lands in the VVP in the greater Melbourne area
- the Woolly Tea-trees are unusually tall-growing. Typically this species occurs in riparian areas subject to flooding and so have to periodically regrow after flooding. The usual form is therefore a shrubby and multi-trunked with relatively young trunks and branches.
- the continuation of weed control in the Reserve will allow ground layer components of this EVC to expand (Osler, D, pers. comm. 19th July 2010)

In an email of 21st July 2010, D. Osler provided the following notes;

- The predominant Reed and Cumbungi areas of the swamp are a form of Tall Marsh EVC. This EVC is likely to have naturally occurred within the area but has increased in cover as a response to the various changes in land management. A limited but distinctive flora associated with Reeds at this site is present including *Crassula helmsii*, *Carex fascicularis* and *Epilobium billardieranum* although some areas do hold a natural monoculture of Reed. The Index to Wetland Condition EVC Benchmarks describes Tall Marsh as 'typically in species-poor swards'. Therefore, it should not be presumed that the lack of diversity is indicative of poor health, but a characteristic of the EVC.
- Some currently weed-dominated areas on the swamp's south-eastern and north-western fringe have remnant vegetation and physical characteristics that suggest that they could be restored as Swamp Scrub. Species reflective of this include Tassel Sedge (*Carex fascicularis*), Common Reed (*Phragmites australis*), Common Spike-sedge (*Eleocharis acuta*), Austral sweet-grass (*Glyceria australis*) and Streaked arrow-grass (*Triglochin striata*).

The quality of remnants of all these vegetation types in the Reserve is generally poor to moderate and Creekline Tussock Grassland appears to have been extirpated since Beardsell's observations. As previously mentioned, the existence of Plains Grassland at this site is hypothetical. An impression of the current vegetation quality based on several random walks through the site is included as Section 8.6, Appendix 6. Impression of Vegetation Quality (July 201)

Fauna

Three sources of statements on the significance of the site as it relates to fauna have been referred to in this plan. Firstly, the Beardsell (1997) assessment is the only one backed up by a comprehensive methodology and long-term observations, but is now very dated. Secondly, the Ecological Consulting Services report provides some up-to-date observations, however, suffers from limited observation time, which limits the value of the general statements made regarding significance of the site. A third source of information are incidental observations made during the production of this plan by the author.

The methodical acquisition and compilation of new observations in all seasons over a period of time is strongly recommended to update data from Beardsell. Community members and organisations are a viable source of such monitoring for fauna groups such as frogs, birds and dragonflies to assist with these observations.

Beardsell (1997)

Beardsell (1997) has described the wetland at the Reserve as the last remnant of 'Inverloch Swamp' and significant for its habitat values. This site achieved the lowest (third) class of regional significance in the detailed scheme Beardsell devised for assessing significance for the NERO report. Four criteria contributed to the regional significance status:

- Diversity (Species/assemblage Richness - point census-trapping) criteria
 - o Local Significance for water birds, Regional significance for frogs, Local significance for reptiles,
- Representativeness Faunal Assemblages - reference grid data
 - o Regional Significance for Herpetofauna - 12 species recorded
 - o Local significance for birds - 32 bird species recorded
- Representativeness - significant species
 - o Local significance as a site that contained six species considered as 'Critical Fauna' for the Greater Melbourne Area (those in the highest four Regional significance sub-categories)
 - o In addition, was locally significant for containing five species considered Regionally restricted.
- Population density- viability and abundance
 - o Regional significance for International Migratory Birds
 - o Regional significance for Frogs

Since 1997, two the fauna species identified by the Beardsell at the Reserve, ie Growling Grass Frog and Latham's Snipe (as a Migratory species), have become listed under the Australian Government's Environment Protection and Biodiversity Conservation Act (1999). No records were available for these species at the site from more recent sources. However, given the mobility of both species and nearby populations of Growling Grass Frog, either could conceivably still visit the site, or potentially recolonise the site.

Ecological Consulting Services (2009)

In contrast to Beardsell's assessment, a report commissioned by Mitchell Council in 2009 by Ecological Consulting Services (2009), concluded that the swamp provided limited fauna habitat values, in particular for wetland birds and frogs. It cited as reasons for this the lack of intensive controls of Toowoomba Canary Grass, **Phalaris aquatica*, Spear Thistle, *Cirsium vulgare* and management of Common Reed leading to a simplification of habitat. Section 3.4.1 in the ECS plan on the wider conservation significance of the site as part

of a Habitat Corridor Network includes the prognosis that the site provides little in the way of connectivity for terrestrial fauna and has limited conservation significance at a landscape scale in its present state.

The list of bird species in the Ecological Consulting Services report included Buff-rumped Thornbill, *Acanthiza reguloides* sighted in October 2008. Although this was not remarked upon as exceptional, it does constitute an anomalous sighting given box-forest habitat typical of this species. Confirmation of this species at this site would be an outlying population of a species that was not reported from the Volcanic Plains bioregion area covered by Beardsell (1997 p. 118). Yellow Thornbills, *Acanthiza nana*, observed by the author at this site in July 2010 are a possible confusion species and misidentification should be considered.

Incidental observations made during production of this report.

A Swamp Tigertail Dragonfly *Synthemis eustalacta* identified from a photo taken in February 2010 appears to represent an unusual record for this species. Records of Melbourne Museum specimens from Victoria were provided by the entomologist, Ian Endersby. These show that most records near Melbourne are from the Highlands Bioregions, (e.g. Healesville, Taggerty, Ferntree Gully). The only other record from the Victorian Volcanic Plains Bioregion is a pair of 1959 specimens taken from Meredith over 70 kilometres to the south west. Otherwise, records are predominantly from the Victorian Alps and Highlands. In an email received on 1st June 2010, Ian Endersby commented that some of that rarity is due to lack of sampling, but that this species does tend to be more of a high country resident. The distinctive hydrology is likely to be a factor in its occurrence at this site, possibly as a relict population from the more extensive swamps that once occurred in this area or as a species persisting in a traditional climatic refugia. Greater sampling intensity may prove the species to be more widespread in a range of connected populations. However, at this stage the significance of a population of this species is probably of at least Regional significance for the Melbourne area.

A Golden Whistler using the Woolly Tea-tree areas observed on 18th May 2010 and again on the 17th July 2010 supports the likely role of this site as a wintering site for altitudinal migrant woodland and forest-dependent birds. It may also have a role as a 'stepping stone' habitat for migratory species and still appears to be suitable for playing this role for the EPBC-listed species Latham's Snipe. Other locally uncommon migratory species observed in July 2010 were a White-eared Honeyeater (altitudinal migrant) and a Spiny-cheeked Honey-eater (apparently seasonal migrant from inland).

Following inspection of the site on 19th July 2010, ecologist D. Osler confirmed that the Reed beds at this site do have potential for supporting populations or temporary habitat for Bitterns, Crakes and other wetland wildlife of conservation interest.

1.5 Legislation

CaLP Act

The principal legislation relating to weeds in Victoria is the Catchment and Land Protection Act 1994 (CaLP Act). There is also provision under the Local Government Act 1989 for councils to enact local by-laws targeting specific weeds.

Key provisions of the Catchment and Land Protection Act 1994 relating to noxious weeds relevant to management of the Beveridge Reserve are that:

Under the CaLP Act landowners must take all reasonable steps to:

- eradicate Regionally Prohibited¹ Weeds; and
- prevent the growth and spread of Regionally Controlled² Weeds.

¹ Regionally Prohibited Weeds are not widely distributed in a region, but are capable of spreading further. It is reasonable to expect that they can be eradicated from a region and they must be managed with that goal. Land owners, including public authorities responsible for Crown land management, must take all reasonable steps to eradicate Regionally Prohibited Weeds on their land.

² Regionally Controlled Weeds are usually widespread and are considered important in a particular region. To prevent their spread, continuing control measures are required. Land owners have the responsibility to take all reasonable steps to prevent the growth and spread of Regionally Controlled Weeds on their land.

A land owner must take all reasonable steps to prevent the spread of Regionally Controlled Weeds and established pest animals on a roadside that adjoins the land owner's land.

No weeds in the Reserve qualify as Regionally Prohibited Weeds (ie requiring eradication), but ten weed species qualify as Regionally Controlled Weeds and one as Regionally Restricted Weeds (ie prohibiting its sale or trade). These weeds are listed in section 8.2 Appendix 2. Weed Species and Priority Index. All such weeds have been accorded a high priority in the weed control table. Although eradication is not required for Regionally Controlled Weeds, it is a feasible goal for this site and eradication will free up resources to tackle other weed issues, some having greater impact on native vegetation (e.g. *Phalaris aquatica*).

The adjacent roadsides contain some highly invasive weeds such as Blackberry, Spear-thistle and Clustered Dock and so effective eradication of the reserve should also be consider the road reserve as a part of the vegetation management of the Reserve.

There is high risk of introduction of noxious weeds due to the movement of horses and slashing machinery through the Reserve. Impending urbanisation may also be increase the influx of weeds originating as garden escapees. Adoption of, and increased awareness about, the need for machinery and vehicle hygiene measures (including for horse floats and slashers) may reduce the risk of establishment of new weed species. Patrol and inspection for new weed incursions should be integrated with vegetation maintenance, and should be concentrated on areas of high risk such (ie in disturbed areas, among trees and areas where horses are tied).

Victoria's Native Vegetation Framework

Vegetation in the Reserve is subject to Victoria's Native Vegetation Framework (Department of Sustainability and Environment [DSE] 2002), which aims to minimise reduce and mitigate any destruction of vegetation and offset any destruction that does occur.

In the opinion of the author, it is likely that all the vegetation identified as 'Moderate' in Appendix 6 will qualify for consideration under this legislation.

A more detailed investigation should be undertaken where destruction or significant modification of vegetation in any part of the Reserve is to be considered.

EPBC Act

On 21 June 2008, Natural Temperate Grasslands of the Victorian Volcanic Plain were listed under the Environment Protection and Biodiversity Conservation (EPBC) Act. A degraded example of this vegetation occurs in the rocky areas of the Reserve. Due to the small size and extent of degradation (listed remnants must be greater than 0.05 ha and native grasses must comprise greater than 50% cover of the site) there are no parts of the site that would qualify for protection under the Act.

Under the EPBC Act, federal government approval is required if a new activity is likely to have a significant impact on the protected grasslands and grassy woodlands. If federal government approval is required, then it is up to the landowner or land manager to seek this approval.

Individual species are also subject to the EPBC Act. One of these species, the Growling Grass Frog (*Litoria raniformis*) has been recorded from this site (Beardsell 1997). Three other species with EPBC status that occur in similar environments elsewhere in the Merri catchment are the Matted Flax Lily, Golden Sun Moth and Striped Legless Lizard. Searches made at times of the year most favourable for detection of these species should be undertaken (Section 6.1, Action B2). *Dianella amoena* is most visible during the flowering period of November-December, at least two years and avoiding the period immediately following significant biomass removal. Golden Sun-moths have very specific conditions for emergence during a flying period that is variable but extends from early November to January. Protocols for searching these species may be obtained from the Department of Sustainability & Environment.

2 Management objectives

The primary objective of this Vegetation Management Plan is to improve and conserve the environmental values on the site.

Subsidiary objectives of the plan are that the Reserve:

- supports viable and robust ecosystems
- continues to support a significant and representative native vegetation remnant
- has valued educational and public relations roles for the natural environment

- is used and appreciated by people without compromising key biodiversity values

3 Resource Conservation

3.1 Geology and topographic

It is beyond the scope of this plan to present a detailed assessment of the geology and topography of the Reserve. Geological and topographical features that are pertinent to the vegetation management of the Reserve include:

- Entire site appears to be underlain by basaltic rocks and derived clays
- Peaty, organic matter occupies the swamp area
- Low-lying areas adjacent to the existing swamp appear to retain a high organic content, perhaps reflecting former extent of swamp vegetation.
- Rocky outcrops with shallow soils are present in the central north and central south of the Reserve

The spring-fed swamp is apparently uncommon and an assessment of its geological significance (See Section 6.1, Action B3) should be undertaken as suggested by Target 2 in the Geodiversity chapter of the *Merri Creek and Environs Strategy* (MCMC 2009, p. 77).

Conserving significant features of this geology would involve avoiding earthworks that would cover rocky outcrops or change topography.

Rocks and dirt have been shoved into two piles in the past on the southern side of the swamp. Whether these piles could be used as a stockpile of landscaping rocks for the Reserve or as a basis for a lookout or other feature needs to be determined. They currently constitute a source of weeds, a likely haven for vermin and a possible safety hazard. They are also a weed source for adjoining areas of the Reserve.

Some of these features may constitute significant landscape features (see Section 3.7) that will ideally be retained or enhanced as a result of vegetation management.

3.2 Hydrology

It is beyond the scope of this plan to make definitive statements on the significance of the existing hydrology of the spring and no detailed description of this feature appears to have been undertaken. However, the hydrology of this site appears to be unique in the Merri Creek valley and uncommon on the Victorian Volcanic Plains.

It is strongly recommended that an assessment of the existing hydrology be undertaken as a matter of priority (See Action B3 in Section 6.1 Background Actions) prior to any proposals to significantly alter this feature. This includes redirecting storm water runoff from streets, as has previously been suggested (Ecological Consulting Services 2009, p. 14).

3.3 Water quality

A detailed assessment of water quality is not within the scope of this plan. However, some relevant points that may impact on vegetation management for the site include:

- It has been identified that septic tank lines from the CFA shed and Community Centre were directed towards the swamp (Mitchell Shire Council 2006)
- Results from testing of nutrient (nitrogen and phosphorus) levels was supplied to Council's Environmental Health Officer in September 2009. These results were interpreted by Council as indicating that no significant septic contamination was present in water from the spring (Kelly, E. pers. comm., 9th October 2009). Melbourne Water have commented that there is a need to ensure that septic tank lines are not directed into the wetland area and that ongoing monitoring of the water quality should occur (E. Manifold and L. Mitchell in email of 26th October pers. comm.). Clarification of the design of the septic tank lines is recommended under Action B8 in Section 6.1 of this plan.
- Increased urbanisation in this area of Beveridge may increase the pressure to direct storm water into the swamp. Such proposals must consider the significance of the natural hydrology and its role in maintaining the existing vegetation structure.
- Existing contamination sources include the Spring Street roadside where undirected drainage currently enters the ditch, which is connected to the swamp. The roadside adjacent to the Reserve on Spring Street currently could be acting as a grassed swale, providing some water treatment for water entering the road. Roadworks and disturbance on Spring Street must consider the impact on runoff entering the swamp. A high quality water sensitive urban design treatment is recommended (Section 6.1, Action C6) on this roadway .

3.4 Environmental impacts/Ecological history

The following environmental history is based on the general history of the Merri Creek valley, notes in Beardsell (1997), observations provided by local residents, as well as interpretation of existing conditions and structures on site. Much of this is conjectural and it is recommended that additional detail is sought from local residents and other historical sources to improve the interpretation of earlier-sketchier periods.

Pre-1830s - Area subject to land management of the Wurundjeri for tens of thousands of years. Surrounding grasslands and possibly parts of the swamp may have been burned to enhance growth of favoured food plants, promote game or improve safety. Food harvesting of roots and tubers by Wurundjeri may have been a significant source of soil disturbance which, along with the activities of native wildlife such as Bettongs, Bandicoots and Pademelons ('bioturbation') would have influenced vegetation composition. The reliable water from the spring and foods from the swamp may have made this an important site for camping.

1830-1860s – The abrupt disruption of Wurundjeri land management patterns occurred simultaneously with introduction of livestock and the beginnings of an influx of exotic plant and pest animal species. Profound vegetation changes such as decimation of sensitive plants (including staples such as *Microseris* species) and dominance of less palatable grass species (such as *Austrostipa* sp.) have been documented as occurring soon after the introduction of large flocks of sheep to the Port Phillip district.

It is possible the drystone-wall fence on the southern boundary dates from this time, the boulders for its construction having been removed from surrounding grassland areas with consequences for boulder-associated flora such as dwarf lilies, grasses and ferns.

1860s-1960s Progressive extinction of small mammals responsible for 'bio-turbation', introduction of rabbits and grazing would have led to further stresses on indigenous plants remaining in this area. This would have made the vegetation more susceptible to invasion by the constantly increasing variety of exotic plants being introduced. The homestead on the south of the Reserve means this area may have been subject to more intensive disturbance such as grazing by house cows and vegetable gardening, contributing to the generally poor vegetation quality. The survival of a single old-variety apple to the west of the stony knoll suggests this area may also have had an orchard, another factor in removing indigenous vegetation.

Draining of the surrounding Inverlochy Swamp may have allowed grazing onto formerly unsuitable ground for longer periods and the dying out of more sensitive swamp flora. Some old fence posts in the interior of the swamp indicate that grazing once occurred across the site although was presumably restricted around the spring to avoid animals becoming bogged.

Pasture improvement including seeding with *Phalaris aquatica* and Rye-grass may have occurred during this time.

1960s-1990s In the 1970s the site was described as having cattle grazing through the areas that are now Tall marsh, with the creek visible as a small drainage line. The Swamp Scrub was the focus of an annual drive to control foxes. Grazing via agistment of the Crown land was occurring up to the 1990s. Beardsell (1997) noted that pugging, nutrient enrichment and substrate damage were all occurring and contributing to weed invasion. He observed that the grazing was preventing regeneration of Woolly Tea-trees while allowing Hawthorn and Blackberry to thrive. Beardsell also attributed increasing infestation of *Spiny Rush and the extensive areas of the native salt-tolerant Streaked Arrow-grass to increasing salinity of the site. He considered that sewage and storm water contamination from Beveridge township may have been reducing water quality. Observations of species such as Yellow-billed Spoonbills and Growling Grass-frogs are indicative of extensive shallow open water areas would have been present at this time although Beardsell also noted presence of Tall Marsh species and associated fauna such as Reed-warblers.

1990s-2007 The development of extensive Reed-beds appears to have followed cessation of grazing and the Reed-dominated area has continued to expand. Progressive development of the site for recreational purposes, including slashing of paddocks for equestrian and informal sports, construction of equestrian facilities, parking, CFA shed, Community Hall and tennis courts. Some regeneration of Woolly Tea-trees has occurred. An Envirofund grant at this site in the allowed the council to carry out.....

2007-2010 Introduction of vegetation management specifically for the improvement of remnant vegetation including herbicide control of thistles, Briar, Blackberry and Spiny Rush. Two burns of Reed bed areas (2007 and 2009) were carried out to remove high fuel loads and to observe whether this may lead to a reduction in Reed-density. Interpretive signage and a Habitat Assessment carried out under a grant.

3.5 Vegetation

A vegetation survey was carried out at the site in February 2010 and further observations in July 2010, which identified 49 indigenous plant species and 69 exotic (including two non-indigenous native plants) species across the site. (See Appendix 1). Additional species may be added to these lists in the future owing to seasonal difficulties in detecting some species.

A conjectural map of Ecological Vegetation Classes across the Reserve is included as Appendix 4 and an impression of vegetation quality is included as Appendix 6. Impression of Vegetation Quality (July 201

Conservation of vegetation is discussed under relevant EVC types below.

Stony Knoll areas

The highest number of indigenous species (19) was found on the Stony Knoll area in the south of the Reserve. Although 18 species were also found on knoll area in the north of the Reserve, only six of these species were found in both areas. Different land use histories may have contributed to the markedly different flora. Under improved management and with a translocation/planting program, it is possible both of the knoll areas could eventually support the full range of these species (31), which would be desirable for restoration and plant conservation. (See Section 6.2 Action P6).

Creekline Tussock Grassland

Vegetation broadly equivalent to Creekline Tussock Grassland appears to have been eliminated since it was identified at the site by Beardsell (1997). Based on its occurrence in other parts of the Merri Creek, it is presumed to have occupied the low-lying areas now occupied by dense **Phalaris aquatica*. Grazing is likely to have weakened this vegetation type in earlier decades. Subsequent to cessation of grazing, competition from **Phalaris aquatica* may have caused elimination of the *Poa labillardierei* as a dominant species, a process which has been observed at other sites on the Merri Creek by the author. Restoring this vegetation type would involve total reconstruction of the vegetation. This has been attempted at other sites in the Merri Creek, but is a resource intensive exercise.

Tall Marsh

The description in the NERO report of 'mudflats' and 'herb fields' (Beardsell 1997) suggests a more open habitat, probably maintained by grazing, was present during the 1980's and early 1990s. The predominant Reed and Cumbungi areas of the swamp are a form of Tall Marsh EVC. This EVC is likely to have naturally occurred within the area, but has increased in cover as a response to the various changes in land management (Osler, D. pers comm. 17th July 2010). Due to the expansion of Tall Marsh vegetation, some habitat characteristics have been altered, including those that supported Growling Grass Frogs (*Litoria raniformis*) and some other threatened species identified by Beardsell (1997).

In comments received from the Beveridge Recreation Reserve Committee of Management, (Beveridge Recreation Reserve Committee of Management c.o. Annette Cocking 25th October 2010) the lack of public appeal of the Reed-dominated area is raised and it is stated that there is community support for beautification or landscaping to make the site more accessible. Consideration of the option of 'cleaning out' or dredging the spring area is requested.

For two reasons, the option of managing the Tall Marsh area through engineering works as proposed has not been further pursued in this report.

- Firstly, the feasibility of dredging the spring as a means of reducing the dominance of Reeds is highly conjectural due to the distinctive spring-fed nature of the wetland. It is the opinion of the author that this would need to be assessed by a hydrologist or engineer. The means by which dredging achieves open water in the more familiar circumstance of dams or reservoirs filled by overland drainage is by physically removing the vegetation and sediments. It then achieves a lasting effect by reducing the base of the water-body such that the water is maintained at a depth that will retard growth of emergent vegetation. The means of achieving this depth of water suggests major earth moving would be required in the site at Beveridge.
- Secondly, the distinctive spring-fed wetland nature of the wetland and relative scarcity of similar environments near Melbourne suggests that the site has intrinsic biological and geological significance and that should be assessed in a larger context prior to any large scale modifications to its structure being considered. Such an assessment is recommended in Section 6.1 as Action B3.

While large engineering works to alter the Tall Marsh area are not recommended, further investigation to identify feasible and ecologically compatible options for improving the amenity of the area for community uses is included as Action P3 in Section 6.2 of this plan. Melbourne Water have expertise in carrying out methods of Common Reed removal however strongly recommend further assessment of values and threats before such an action is taken (E. Manifold and L. Mitchell, pers. comm. Via email 26th October 2010).

During discussion on-site with D. Osler on 16th July 2010 the following points were made in relation to whether attempts should be made to reverse the trend of the wetland area to develop a Tall Marsh structure.

- A program to permanently reduce the extent and density of Reeds is not simple or inexpensive and relies on ongoing management. Reducing Reeds to reinstate vegetation structure capable of supporting *Litoria raniformis*, (formerly present at this site under earlier grazing), would involve an intensive effort for uncertain results. Owing to the lack of remnant vegetation that could supply a reference, the structure of any sustainable alternative vegetation to the existing Tall Marsh would be highly speculative. For all these reasons, an extensive program of Reed reduction is not advisable.
- Reed beds at this site do have potential for supporting populations or temporary habitat for Bitterns, Crakes and other wetland wildlife of conservation interest. A limited, but distinctive flora associated with Reeds at this site is present including *Crassula helmsii*, *Carex fascicularis* and *Epilobium billardieranum* although some areas do hold a natural monoculture of Reed. The Index to Wetland Condition EVC Benchmarks describes Tall Marsh as 'typically in species-poor swards'. Therefore, it should not be presumed that the lack of diversity at the site is indicative of poor health, but a characteristic of the EVC.

Swamp Scrub

The very distinctive Swamp Scrub vegetation has been the subject of the most intense weed control efforts since 2008. These appear to have been successful in reducing the extent of Blackberry infestation in particular. Strong regeneration of ground storey herbs and sedges is apparent. This suggests that improvement of the vegetation should be relatively straightforward despite the challenges that the initial Blackberry control presents. Some areas of *Carex gaudichaudii* and regenerating Woolly tea-tree present good opportunities to extend this vegetation type. These areas, dominated by **Phalaris aquatica*, will require intensive grassy weed control and may be aided by conducting ecological burning prior to control, (See Section 6.2 P7)

During the on-site consultation with D. Osler on the 16th July, the following points relating to Swamp Scrub were made:

- There is a strong ecological rationale to improve the quality and extent of existing vegetation. In particular, there is potential to increase the extent of Swamp Scrub vegetation.
- Establishing patches of Tea-tree plantings on the perimeter of the swamp would not be ecologically inappropriate and may address poor aesthetic perception of the dense reed beds by introducing visual diversity along the interface. Temporary reduction of Reeds would be needed to establish these plants. Such plantings must take into account the effect they may have on the logistics of managing Tall Marsh vegetation, particularly the continued use of fire as a management tool.

Plains Grassland

The higher areas of the Reserve currently have only traces of indigenous vegetation, primarily species that are able to persist under a slashing regime. Restoration of these areas would require total reconstruction with attendant ongoing maintenance costs. Plantings developed for amenity could usefully aim towards reconstructing the simpler Scoria Cone Woodland (EVC 894). Identification and retention of existing indigenous ground storey plants in future planting schemes should be considered.

3.6 Fauna

The two published sources of information on fauna for this site (Ecological Consulting Services (ECS) 2009 and Beardsell (1997) contain a number of management recommendations for improving habitat for fauna at the Reserve.

Beardsell (1997), suggested that the Regional significance of the Reserve would increase with cessation of grazing and planting of further Woolly tea-trees and Swamp Gums.

The ECS (2009) report concluded that the swamp provided limited fauna habitat values, in particular for wetland birds and frogs. It cited as reasons for this the lack of intensive controls of **Phalaris aquatica*, Spear Thistle and control of Common Reed - leading to a simplification of habitat.

Specific recommendations from the ECSs (2009) report relating to the vegetation of the site were:

- investigate use of mosaic burning across the site or strategic grazing
- reduce the density of Common Reed
- increase weed control
- investigate diversion of stormwater into the Spring Street swamp

While grazing did cease within a few years of the NERO report (Beardsell 1997) being completed, some fauna values declined rather than improved. In particular there was a decline in the habitat value of the site for species

favouring more open wetland areas (e.g. Growling Grass Frogs and Yellow-Billed Spoonbills) due to increase in the area of Tall Marsh vegetation. However, for reasons detailed in the previous section on vegetation, it is not advised that the recommendation in the ECS report (to reduce density of Common Reed) be followed. While the Tall Marsh vegetation is not suitable for some previously occurring species, Reed beds at this site do have potential for supporting populations or temporary habitat for Bitterns, Crakes and other wetland wildlife of conservation interest. (D. Osler pers. comm. 17th July 2010). Management of this vegetation

The ECS (2009) recommendation to divert water into the swamp is also cautioned against for reasons described in Section 3.2 Hydrology of this plan. The rationale for diverting water is not identified by ECS and the unusual spring-fed hydrology and potential specialised habitats it may foster are not considered.

A Swamp Tigertail dragonfly observed by the author in February 2010 indicates that poorly known fauna with specialised habitat needs may be present and raises caution against significantly altering hydrology. Monitoring of the site in November to February for observing the habits and particular habitat use of this insect is recommended by Ian Endersby (pers comm) and monitoring for specialised fauna is supported by staff from Melbourne Water's West River Health section in reviewing this document (E. Manifold and L Mitchell pers comm. in memo dated 26th October 2010). While the ECS report occurred in 2009, the resources to carry out survey for many significant groups was relatively limited and for many fauna groups, inadequate data is available to assess vegetation management actions. It is recommended additional ongoing monitoring attempt to be initiated, perhaps incorporating community-based volunteers (See Section 6.1, Action B5 & B10).

Establishing patches of Tea-tree plantings on the perimeter of the swamp may address poor aesthetic perception of the dense reed beds by introducing visual diversity along the interface (D. Osler pers. comm. 19th July). Any such planting will need to take into account other management imperatives such as avoiding making it unfeasible to conduct biomass control burning. Temporary reduction of reeds would be needed to establish these plants. Migratory (Golden Whistler, White-eared Honeyeater) and resident (Yellow Thornbill, Grey Fantail) forest birds using the dense Swamp Scrub would benefit from increasing the extent of this vegetation type. This is consistent with the recommendations of Beardsell (1997).

Ecological burning is likely to be an essential tool for weed control efforts, improving the quality of the existing vegetation and for ongoing fuel management. For retention of fauna refuge, it is essential that this occurs in a 'mosaic' as recommended in the ECS (2009) report. Any such fire planned for the section of the Reserve currently proposed as 'Bushland Reserve' (and thus assigned to Parks Victoria) has a requirement that it be registered through the Department of Sustainability & Environment system (pers. comm., Ion Maher, Ranger in Charge, Kinglake in an email of 31st October 2010).

3.7 Landscape

The visual character of landscapes is discussed in the Merri Creek and Environment Strategy 2009-2014 (Merri Creek Management Committee 2009 pp. 41-51).

Issues to do with visual amenity of Reed-dominated areas were raised by the Beveridge Recreation Reserve Committee of Management during the production of this report (c.o. Annette Cocking pers. comm. 25th October 2010) and some points relating to this are included under the notes on 'Tall Marsh' in Section 3.5 Vegetation. It is beyond the means of this report to further investigate options to address the visual amenity issue raised and this will need to be part of ongoing discussions between stakeholders (See Action P3 in Section 6.2 Project Actions).

A number of landscape issues, objectives and targets relate to vegetation management at Beveridge Recreation Reserve. Of the **issues**, the following are particularly important in relation to the Reserve:

- Under '*Visual Character Issue 18*', it is highlighted that the visual amenity of Merri Creek's tributaries was not assessed in the 1993 Merri Creek Concept Planning background reports.
- '*Visual Character Issue 12*', highlights that exotic vegetation can contribute to a mixed landscape valued by some members of the community. Further, "The Merri Creek's value and potential as a habitat corridor obliges management to restore and/or establish indigenous plant communities thereby contributing to a more natural visual character though some prefer exotic landscapes." (Merri Creek Management Committee 2009 pp. 49-51).

The following **objectives** were adopted by the authors of the MCES 2009-14 (Merri Creek Management Committee 2009) from the State Planning Policy Framework (SPPF), or from the Merri Creek Environmental Significance Overlay (which refer to Merri Creek Management Committee, 2004). Whilst ESO do not apply to waterway corridors not covered by the ESO, the MCES includes the statement that their use here implies they should be, (Merri Creek Management Committee 2009 pp. 49-51).

1. To protect and enhance the natural and visual character of the waterway corridors
2. To protect sites and features of high landscape value (from SPPF 12.05-2)

3. To ensure development responds to its context and reinforces special characteristics of local environment and place by emphasising the underlying natural landscape character (from SPPF 12.05-2).
4. To create a peaceful, passive open space quality in the creek parkland and valley. (from ESO)

The MCES identifies a series of targets for 2009-2014, any of which are pertinent to conservation of landscape values in the Reserve and its vegetation management, (Merri Creek Management Committee 2009 pp. 49-51).

1. To strengthen the connection of private gardens and streetscapes adjacent to catchment waterways to the underlying natural landscape character.
2. To protect and enhance stream geomorphology, the valley form and key natural landscape features such as gorges, escarpments and stands of remnant vegetation especially River Red Gums.
3. To refine and document what the underlying natural landscape character of Merri Creek and its tributaries is, what extant features contribute to it, identify sites and features of high landscape value and how these values can be best be protected and enhanced, through a new landscape study covering all the main waterway corridors of the catchment.
4. The natural and visual character of Merri Creek and all major tributaries is protected by an Environmental Significance Overlay (as well as other provisions) in the relevant Council's planning schemes by 2010.
5. Vegetation management and well-designed screening vegetation which enhances the visual environment of the corridor and protects views for creek users, while being sensitive to the need for an active interface with adjoining residential areas.
6. Escarpments and rocky outcrops are managed as features and restored through integrated weed control and rubbish removal, and any risk management of such features considers the value of the feature itself prior to applying major changes to the visual character of that feature.
7. All areas undergoing a weed removal program including willow removal are revegetated with indigenous species (with the exception of Heritage Parkland areas).

From the above, it is evident that major revegetation or landscaping of the Reserve must carefully consider its existing and potential landscape values under different management scenarios. A number of distinctive landscape features of a small scale are present at the Reserve, including drystone walls, an old fruit tree, low rocky rises and the unusual Woolly tea-tree swamp. Restoration of the indigenous vegetation has the potential to enhance these features, but the vegetation management at the Reserve must also consider the values of existing non-indigenous vegetation.

In the future, more urbanisation of the surrounding land for housing may increase the need to consider filtering or screening views at the Reserve. Anticipation of such new housing may assist in ensuring these are of a nature that these minimise impact on the amenity of the Reserve (e.g. by determining appropriate fencing styles and landscaping).

An assessment of visual amenity assets of the Reserve and future impacts and recommendations for adjacent development would assist in achieving targets identified in the MCES including 4, 5, 6 and in particular 7. Target 7 is 'To refine and document what the underlying natural landscape character of Merri Creek and its tributaries is, what extant features contribute to it, identify sites and features of high landscape value and how these values can best be protected and enhanced through a new landscape study covering all the main waterways of the catchment'

3.8 Cultural Heritage

Aboriginal Heritage

Despite the area not falling within a currently mapped area of Indigenous cultural heritage sensitivity, the presence of Aboriginal cultural heritage area within the Reserve should not be dismissed. In particular, stone chips on the Stony Knoll areas of the Reserve observed during preparation of this plan resemble Aboriginal stone artefacts and should be assessed. It is recommended that this assessment of the Reserve's Indigenous cultural heritage be undertaken pro-actively (Section 6.1, Action B1). It should certainly occur prior to consideration of major infrastructural changes such as construction of paths, which will trigger referral to the Aboriginal Heritage Act, and has the potential to trigger the Heritage Act 1995.

For the Aboriginal Heritage Act (State) see

<http://www.aboriginalaffairs.vic.gov.au/web7/aavmain.nsf/headingpagesdisplay/aboriginal+cultural+heritage+original+heritage+act+2006>

Aboriginal Heritage Regulations define areas of Aboriginal cultural heritage sensitivity to include land within 200 metres of a waterway, unless the land has been subject to significant land disturbance. If there is doubt, it is prudent to follow this through the Act. The process for preparing a cultural heritage management plan is available at

<http://www.dpcd.vic.gov.au/web14/dvc/dvcmain.nsf/AllDocs/9A6108E116632C49CA257591001BD8BC?OpenDocument>. The relevant Registered Aboriginal Party for this area is the Wurundjeri Tribe Land Compensation and Cultural Heritage Council.

Vegetation management actions proposed under this plan are generally aligned with the needs of retaining Aboriginal cultural heritage, in particular avoiding significant soil disturbance. A further recommendation is that field staff be made aware of Indigenous cultural heritage protocols in event of finding artefacts.

Non-indigenous heritage

The Burra Charter sets a standard of practice for those who provide advice, make decisions about, or undertake works to places of cultural significance, including owners, managers and custodians. This appears to offer the best guidance for making judgments on conservation of non-indigenous heritage on this site. (<http://www.nationaltrust.com.au/burracharter.html>)

In the opinion of the author, the following elements of the Reserve's landscape may be deemed to constitute culturally significant features. An assessment of these features should be made to identify features that may be retained as a means of retaining this value in the long-term landscaping plans.

- Drystone wall
- Fence posts
- Farm ruins and remains of associated plantings (inc. some that are known environmental weeds)
- An isolated apple tree that appears to be old and of a 'heritage' variety

The vegetation management actions recommended in this plan do affect some of these values. The removal of hazardous barbed wire from a length of old farm fencing would ideally retain the weathered fence posts as indicators of old boundaries.

The control of an expanding infestation of suckering Elm and Privet is desirable and should be commenced in the short term, despite their likely origin as plantings in a homestead garden. (Section 6.2 Action P2)

It is recommended that Mitchell Shire Council undertakes a more formal assessment of cultural values of the Reserve to inform future planning. (See Section 6.1, Action B4).

3.9 Liaison

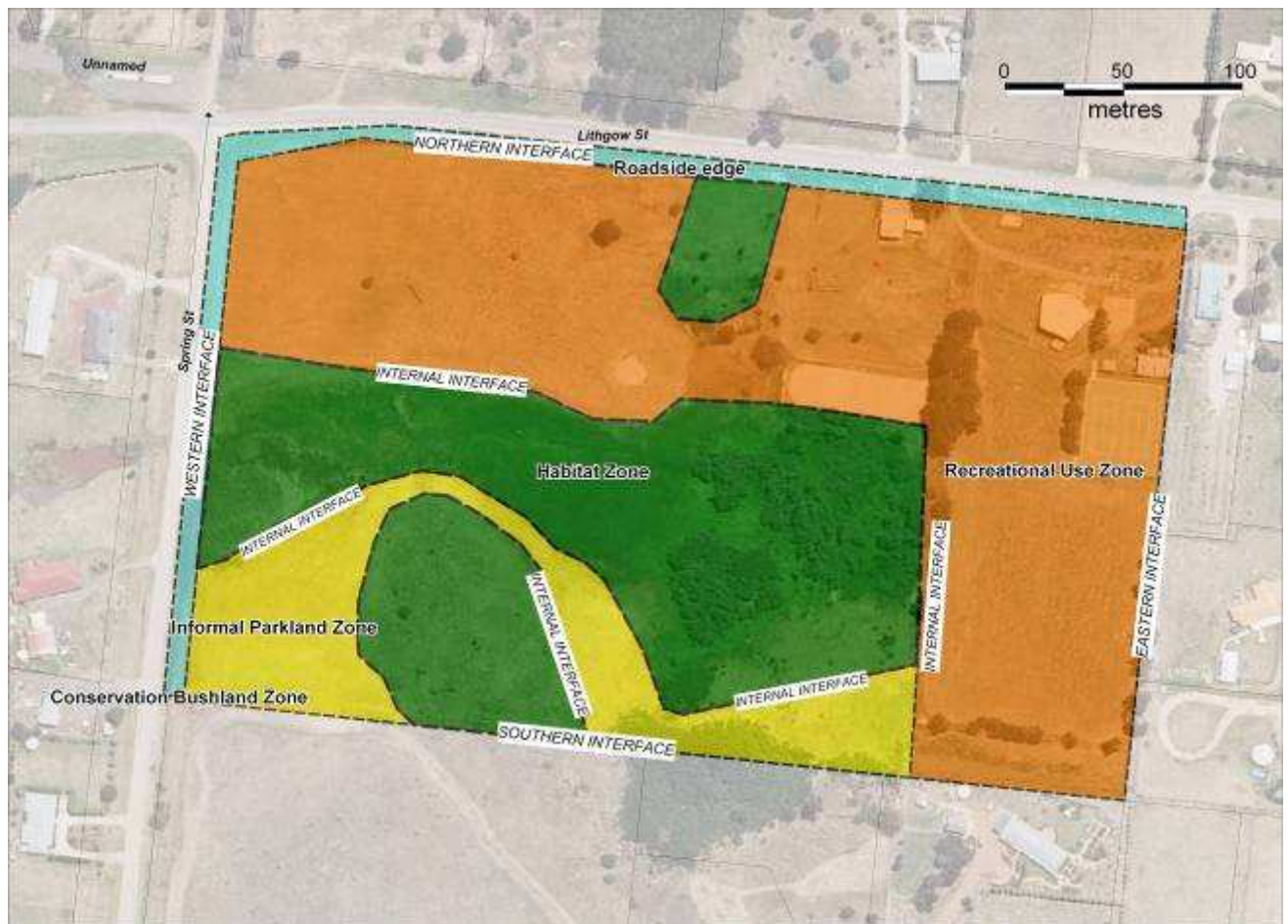
Co-coordinated management of the site relies on communication with a range of stakeholders and authorities. A site meeting on 18th May 2010 helped clarify the roles of Mitchell Shire Council, the Committee of Management for Reserve, Parks Victoria and the Department of Sustainability and Environment regarding the Reserve. At this meeting it was confirmed that Parks Victoria continues to have a role in the approval process for any major development in the Reserve. The particular importance of seeking partnering with the Beveridge Recreation Reserve Committee of Management on vegetation management issues is highlighted in Section 6.3 Action M11.

In addition to the above major stakeholders, it is the following constitute a significant resource for perspectives and information on the Reserve Reserve users, Local residents, in particular those with adjoining properties, Merri Creek Management Committee, Friends of Merri Creek, Wallan Environment Group, and Melbourne Water. It is recommended that input from all these groups be sought in planning major developments at this site.

3.10 Interface management

Vegetation management on external interfaces of the Reserve with roadsides and with adjacent properties will require active and ongoing liaison with relevant agencies and adjacent landholders. The roadside has been included as a management zone for the purposes of this vegetation management report. The internal interfaces between different management zones, in particular between Conservation and Recreation Zones (See Figure 3.10-1).

■ Figure 3.10-1 Location of Interfaces



External interface

Several issues relating to vegetation management will need to be considered in conjunction with adjoining landholders and agencies, including council road maintenance crews and CFA. These include:

1. **Environmental weeds** - Elm and other environmental weeds growing along southern interface. Some control measures may be able to be done on the Elm and Privets growing on this interface, but reinfestation will occur unless eradication works are done in conjunction with the adjoining landholder. It is strongly recommended that liaison be established with this landholder for this purpose and also for maintenance of the drystone wall.
2. **Fuel breaks** – Should be subject to inspection with the local CFA officer. These should reference council Municipal Fire Prevention Plans or the new proposed Integrated Fire Management Plan (Joe Watkins, Environmental Service Manager pers. comm. 5th November 2010). Any such fire planned for the section of the Reserve currently proposed as 'Bushland Reserve' (and thus assigned to Parks Victoria) has a requirement that it be registered through the Department of Sustainability & Environment system (pers. comm., Ion Maher, Ranger in Charge, Kinglake in an email of 31st October 2010). Fuel breaks can be established using mowing along most internal interfaces of the Reserve. Exceptions are small stretches in the Stony Knoll area of the Reserve on the southern boundary, and along the western boundary where the heavily vegetated roadside ditch is contiguous with the heavy vegetation of the larger swamp. Weed control and ecological burns have good potential to maintain a low fuel load on the Stony knoll. Slashing of vegetation in the ditch from the roadside may be the only feasible means of reducing the risk from fires moving between the roadside and Tall Marsh vegetation. (Section 6.3 M7)
3. **Management of roadside reserves** - ideally roadside slashing surrounding the Reserve will be regular in order to reduce seeding of weed species. Eradication of Blackberry and other serious environmental weeds should be organised to occur into the roadside reserve in tandem with works inside the Reserve. Vehicle hygiene measures to reduce re-infestation of weeds should be considered for serious environmental weeds such as Chilean Needle Grass *Nassella neesiana*. (See section 6.3, Action M10)
4. **Amenity plantings** - screening plantings may be contemplated as a part of future landscaping for the Reserve and has considerable potential to increase amenity and habitat values. Such landscaping should prioritise use of indigenous species to maximise habitat values and to support the highly fragmented

remnants in the surrounding landscape. Plantings should be designed with reference to fire protection and management needs.

5. **Traffic view lines** - any future landscaping should avoid obscuring view lines at critical points such as on the corner of Spring and Lithgow Streets.

Internal interfaces

The Committee of Management of the Reserve will be a valuable forum for discussing the following issues that occur along the interfaces between different vegetation management zones, as these tend to align with the areas of interest for the different user groups represented on this committee.

1. **Delineation of vegetation management protection areas** – Determining the exact location of boundaries between the management zones should involve discussion with the user groups to identify any small-scale issues and alignment issues.
2. **Buffer mowing to prevent weed propagule³ incursion** – Frequent mowing in ‘buffers’ adjacent to unmown Habitat Zones may be a useful means of avoiding weed propagules entering the habitat zone and keeping Reed incursions to slashed areas to a manageable height. Mowing schedules and design of the interface to facilitate mowing equipment should be discussed with user groups and maintenance staff.
3. **Access within site** - The appropriate location of gates and openings in any barriers between zones needs to be discussed with people undertaking on-ground works in order to identify the most efficient and safest location for maintenance and emergency access. Recreational users of the different zones should also be involved in this discussion.
4. **Amenity plantings** - Plantings to improve visual presentation of the Swamp Zone have been proposed for the northern side of the swamp. Where these adjoin the recreation areas, liaison to identify design issues for equestrian users needs to take place (See Action P4 in Section 6.3 Project Actions) . For example, the nature of the vegetation adjacent to the ‘Menage’ area that is to replace recently controlled Blackberry infestations.
5. **Appropriate barrier design guidelines** - In some areas, fencing to divide equestrian uses on Recreation Zones from Habitat Zones may be helpful, in particular, replacing current dangerous barbed wire fences. These dividers need to be of a standard appropriate for equestrian uses. Design should involve the adjoining equestrian users, managers of the mown vegetation and of the Habitat Zones. Such barriers have potential to double as vermin-proof fences.

4 Land Use

4.1 Vegetation management

Vegetation restoration

Weed management that will reverse competition and foster natural regeneration should be the first priority for vegetation management of Habitat Zones. However, some revegetation may be warranted in areas in order to:

- achieve timely replacement of competitive indigenous vegetation cover
- reintroduce plant species presumed to have disappeared as a result of earlier land uses
- develop plantings for habitat and/or amenity purposes such as screening, shade trees or environmental interpretation.

Biomass Reduction

Biomass reduction involves either slashing, ‘mulching’, grazing or use of fire to remove standing vegetation in order to stimulate essential ecological processes (such as germination, preparation of seed bed, rejuvenation of mature plants, nutrient redistribution) that may be critical in maintaining species composition of the reference vegetation type. Biomass reduction can also double as a means of:

- reducing fuel loads that pose a potential fire risk
- providing improved conditions for control of exotic weeds
- replacing expensive labour-intensive physical removal of vegetation for purposes of exotic weed control

Developing a burn regime will allow for integration of other vegetation management objectives and allow for better budgeting. (See Section 6.3, Action M9)

³ ‘Propagules’ is a term used to cover any structure a plant may use to disperse and reproduce itself, mostly seeds, but also including bulbs, rhizome fragments etc.

Fire has already been used in 2007 and 2009 to remove bulky biomass among the Reed-beds and **Phalaris aquatica* dominated areas of the Informal Use Zones in the Reserve. Observation was also made by the author that while this provided some amenity improvement and has possibly some useful ecological effects, it has failed to reduce the density or extent of Common Reeds in the long term. In fact, monitoring in South Australia suggests *Phragmites* species recover rapidly after burning and that grazing is a more effective means of inhibiting its dominance. (Queensland Government, 2005). Cutting of Common Reeds is identified as a more effective way of reducing stand vigour of Reed stands (Sainty and Jacobs 1981).

The skills and resources of the Beveridge CFA (based at the Reserve) have made possible previous burns at this site. An ongoing procedure and schedule for burns should be developed in consultation with the CFA. Such discussions should take place in accordance with council Municipal Fire Prevention Plans or the new proposed Integrated Fire Management Plan (Joe Watkins, Environmental Service Manager pers. comm. 5th November 2010). Any such fire planned for the section of the Reserve currently proposed as 'Bushland Reserve' (and thus assigned to Parks Victoria) has a requirement that it be registered through the Department of Sustainability & Environment system (pers. comm., Ion Maher, Ranger in Charge, Kinglake in an email of 31st October 2010).

Identification of additional vegetation management actions (such as slashing of boundaries) that will facilitate fuel reduction should take place as a part of this consultation.

Reed management

For reasons already described (see Section 3.5 Vegetation), reduction in the extent and density of the Reeds is not recommended, as it is considered neither feasible nor is it warranted from an ecological standpoint. Temporary reduction in Reed density through cutting may be attempted for the purposes of establishing some additional areas of Swamp Scrub on peripheral areas.

Mowing/slashing is a viable means of maintaining the boundary between the current reeds in the Habitat Zone and the existing slashed areas in the Recreation and Informal Use Zones.

Retention of the Reed beds means that the build up of fuel loads will continue to be an ongoing issue. It is proposed that, in consultation with the CFA, periodic biomass reduction burns be carried out as a recurrent maintenance task. These burns should continue the principles established with burns in 2007 and 2009 of retaining approximately a third of the Reed bed unburnt to act as a refuge for wildlife. Preventing entry of fire into the Swamp Scrub areas will also be essential. Additional landscaping or infrastructure should avoid complicating or making unfeasible this biomass reduction.

Weed Management

In developing maintenance and enhancement actions for indigenous vegetation it is helpful to identify priority classes among the 69 weed species (identified so far) that might be treated. Actions for weed management are listed in Maintenance Actions (Section 6.3 M1, M2, M3, M4 & M8).

Three criteria were used to create an index score to allocate management priority for the weeds present in the reserve:

- Regionally Controlled Weeds where there is a legal obligation to control the species (Score 2 [Regionally Controlled] or 0 [not Regionally Controlled]).
- Potential for eradication with application of a moderate amount of resources (2 = high probability, 1 = low probability in the short term, but possible with a concerted effort over a number of years, 0 = no likelihood of ever being eradicated from the reserve as a whole).
- The degree of threat that the weed poses to indigenous vegetation, (2 = invades established indigenous vegetation areas and capable of altering conditions such that the viability of indigenous vegetation is impaired, 1 = generally invades only heavily disturbed indigenous vegetation, and likely to co-exist with established vegetation without causing serious ecological change, 0 = generally weeds that tend to diminish in the absence of regular disturbance in the presence of indigenous vegetation).

Scores for points 2 and 3 have been subjectively allocated based on the experience of the author in the local area. The index results in a score of 0 to 6.

Priority 1 (score 5-6)

Eradication feasible and highly indicated in the short term

Priority 2 (score 3-4)

Intensive works to control are necessary for successful maintenance of remnants, but eradication across the entire Reserve is generally impractical, at least in the short term.

Priority 3 (Score 1-2)

Usually don't threaten established indigenous vegetation, but removal may be desirable for aesthetics or new planting establishment.

The weed species with Priority Index (section 8.2) includes individual weed scores for the criteria and priority scores. Table 4-1 Descriptions of High Priority and Selected Second Priority Weed Species (see next page) includes management notes for all High Priority weeds and those Priority 2 weeds that, in the author's opinion warrant a particular effort for their control. Consideration should be made of including such species into a local weed control by-law, with reference to resources available to inspect and enforce.

A number of serious environmental weeds present elsewhere in the Merri Creek catchment have not been recorded from the reserve (eg. Lobed Needle-grass, Chilean Needle Grass, Alligator Weed). Hygiene measures to ensure these species are not inadvertently introduced to the reserve are warranted to avoid adding to the weed control burden. (See Section 6.3, Action M2).

■ **Table 4-1 Descriptions of High Priority and Selected Second Priority Weed Species**

WOODY WEEDS				
Scientific Name	Common Name	Location & Population	Threat/	CaLP Status
<i>Crataegus monogyna</i>	Hawthorn	A few individuals mainly around margins of Reserve	Priority 1 Readily spread by birds, a thorny, deciduous shrub that can shade out indigenous ground storey vegetation and generates cover for rabbits.	<i>Regionally Controlled</i>
Control notes Cut and paint on this species. This species presents a low threat in its current low numbers, but could be readily eradicated from the park with minimum of time.			Season Herbicide applications need to occur during growing period (summer-autumn).	
<i>Genista monspessulana</i>	Montpellier Broom		Priority 1	<i>Regionally Controlled</i>
Control notes Methodical herbicide application with an appropriate brush control herbicide as well as chipping out plants should allow eradication of this species to occur. New plants are likely to grow from soil-stored seed for many years to come. Preventing seed set of young plants is essential to break the cycle and achieve eradication.			Season Herbicide applications should occur in warmer months but avoid drought periods. Hand removal may occur at any time.	
<i>Hedera helix</i>	Ivy	A low number of on drystone wall and widespread on trees within Swamp	Priority 2	<i>Not listed</i>
Control note: See notes in Muyt (2001) pp. 138-140			Season While actively growing, Spring	
<i>Ligustrum vulgare</i>	European privet	A dense infestation of suckering stems on southern boundary	Priority 2/	<i>Not listed</i>
Control note: See Muyt (2001) pp. 194-196. He notes that mass germination of seed is likely to occur following clearing and this must be anticipated and resources allocated to treat these. Care will be needed to avoid damaging drystone wall while treating stems.			Season May be deciduous- treat	

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				during growing season.	
<i>Lycium ferocissimum</i>	African Boxthorn	A few scattered individuals	Priority 1		<i>Regionally Controlled</i>
Control note: Avoid treatments in mid summer when the plant often loses its leaves (summer storms may stimulate regrowth at which time the plant is susceptible).				Season Whenever foliage is present	
<i>Rosa rubiginosa</i>	Briar Rose	Mainly through stony knoll zone in south.	Priority 1	A thorny shrub that can become dense if left untreated. Restricts access for maintenance of indigenous vegetation and generates cover for rabbits.	<i>Regionally Controlled</i>
Control note: Cut and paint this species where it is growing tall and straggly amid indigenous vegetation although regrowth is likely from the woody rhizomatous root system. Spraying any regrowth with an herbicide containing metsulfuron-methyl is a more effective treatment since resources from the rootstock will have been mobilised. Ideally map infestations and ensure areas are inspected and treated in the period following removal of top growth whether through fire or cutting. This species presents a low threat in its current low numbers, but could be readily 'eradicated' from the Reserve.				Season Herbicide applications need to occur during growing period (summer-autumn). Physical removal of young plants may occur at any time.	
<i>Rubus. anglocandicans</i>	Blackberry	Several large thickets through the swamp area	Priority 1		<i>Regionally Controlled</i>
Control note: Works to date have removed Blackberry from amid desirable swamp vegetation with alternating herbicide and physical removal of the dead canes and treatment of regrowth. The staged approach has avoided damage to indigenous vegetation. (See Section 6.3 Action M3).				Season Herbicide applications need to occur during growing period (summer-autumn). Avoid while in berry.	

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GRASSY & BULBOUS WEEDS				
Scientific Name	Common Name	Location & Population	Threat	
<i>Asparagus asparagoides</i>	Bridal Creeper	Several scattered individuals within swamp	Priority 1	<i>Regionally Restricted</i>
Control notes: As the plants appear relatively small, physical removal may still be a feasible. A concerted attempt while the infestation is relatively small should therefore be a high priority as chemical control is limited and any program will need to contemplate inspection and re-treatment for up to five years. This should be thorough, removing as much of the rhizome mass as possible. It can occur anytime the plant is visible and soil relatively soft. The conditions following Blackberry cane removal are likely to provide the best opportunities for detection and removal. (See Section 6.3, M4)			Season May die back in dry conditions in the spring-fed conditions of the swamp, growth may be continuous	
<i>Juncus acutus</i>	Sharp Rush	Occurs throughout the swamp area, in low numbers and some swards	Priority 1	<i>Regionally Controlled</i>
Control notes: Inspection and repeat applications is usually needed. (See Section 6.3, Action M4)			Season	
<i>Phalaris aquatica</i>	Phalaris, Toowoomba Canary Grass	Throughout the wetter parts of the reserve, as a virtual monoculture in the South western corner.	Priority 2 Smothers indigenous vegetation. Can seriously compete for soil water with native vegetation. Stands of this species produce very heavy fuel loads approximately three times larger than Kangaroo Grass grassland. (Stoner, Adams and Simmons, 2004)	<i>Not listed</i>
Control notes: Only treat in areas where it is intermingled with more desirable vegetation. Slashed stands of this species are likely to remain as an important cover for the ground until substantial further. An effective treatment sequence would include brush cutting or burning in autumn, a herbicide treatment of regrowth in late winter and a repeat inspection to treat stray regrowth in spring prior to elongation of culms. Inspection and repeat applications is usually needed.			Season Herbicide application is best spring prior to flowering (November) although brush cutting may stimulate susceptible regrowth later in season.	

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BROADLEAF WEEDS				
Scientific Name	Common Name	Location & Population	Threat	
<i>Carduus pycnocephalus</i>	Slender Thistle	Scattered through swamp area where recent weed control efforts have bared ground	Priority 1 Common weed of pastures, only occurring in low numbers in undisturbed grassland. This is a controlled weed under CALP act.	Regionally Controlled
Control notes- Treat during rosette stage. Suitable herbicides include MCPA				
<i>Cynara cardunculus</i>	Artichoke Thistle	Low density infestation through reserve, esp. on knoll in south. Reinvasion likely from windblown seed from adjacent paddocks.	Priority 1 Common weed of pastures, only occurring in low numbers in undisturbed grassland. This is a controlled weed under CALP act.	Regionally Controlled
Control notes- Treat during rosette stage. Suitable herbicides include MCPA				Season May-October
<i>Cirsium vulgare</i>	Spear Thistle	Very Low density infestation throughout reserve. Reinvasion likely from windblown seed from adjacent paddocks.	Priority 1 Common weed of pastures, only occurring in low numbers in undisturbed grassland. This is a controlled weed under CALP act.	Regionally Controlled
Control notes- Treat during rosette stage. Suitable herbicides include MCPA				Season May-October
<i>Echium plantagineum</i>	Patterson's Curse	Low density infestation through reserve, esp. on knoll in south.	Priority 2 Common weed of pastures, only occurring in low numbers in undisturbed grassland. This is a controlled weed under CALP act.	Regionally Controlled
Control notes- Treat during rosette stage. Suitable herbicides include MCPA				Season May-October
<i>Cirsium vulgare</i>	Spear Thistle	Very Low density infestation throughout reserve. Reinvasion likely from windblown seed from adjacent paddocks.	Priority 2 Common weed of pastures, only occurring in low numbers in undisturbed grassland. This is a controlled weed under CALP act.	Regionally Controlled
Control notes- Treat during rosette stage. Suitable herbicides include MCPA				Season May-October

4.2 Open space categorisation

Categorisation of the types of public open space is valuable for describing the primary function of different areas which is essential for defining appropriate vegetation management. It allows for nomination of the key values of different areas of the Reserve and compatible activities and priorities for action. The Open space categorisation used by Moreland City Council is an example of a framework for categorisation (Moreland City Council 2004). Of the eight types of open space described in Moreland's Open Space Strategy, three appear relevant to Beveridge Recreation Reserve. These are described in Table 4.2-1. A category for 'Roadside Zone' is included here to reflect the priority of this area for purposes of traffic management.

The proposed categorisation of land in the Beveridge Recreation Reserve largely reflects current land usages and also identifies areas where the goal to maximise the protection of biodiversity values could be adopted.

Refinement of boundaries on ground is needed to allow for addressing issues such as mowing requirements and ensuring continued patterns of access. (Eg. the gap between the Habitat Zones is critical for equestrian access).

Categorisation of the vegetation zones in the Reserve are described below. These zones are mapped in section 8.5 Appendix 5. Vegetation Management Zones for Beveridge Recreation Reserve Reserve.

■ **Table 4-2 Open Space Categorisation**

Zone	Issues at Beveridge Community Park	Authorised uses
Recreation Zone		
Carry only traces of indigenous vegetation, of species with low conservation significance where 'higher impact' recreation or other community use is the primary land use goal.	4.96 hectares (50 %) of the reserve is to be managed as Recreation Zone. Recreation relies on hard-wearing mown areas and structures that are typically maintained by council staff or community without specific vegetation management skills. Management activities in other parts of the reserve should ensure they do not cause this vegetation to become unsuitable for designated activities. Some management may be needed to ensure serious exotic weeds in this zone are treated so they do not pose a threat to Habitat Zone vegetation. Amenity plantings in this zone may complement or, conversely, impact negatively on Habitat Zone vegetation so should be developed in consultation with managers of the Habitat Zone vegetation.	Equestrian uses, ball games, 'dogs off-lead' areas, visitor facilities such as BBQs, picnic tables etc. as determined by Council and the BRR COM
Informal Parkland Zone		
Carry only traces of indigenous vegetation of species with low conservation significance but has value for wildlife due to its seclusion and interaction with Habitat Zones.	1.26 hectares (14%) of the parkland is to be managed as Informal Parkland Zone These areas need to be maintained to ensure no adverse impact on either habitat or recreation zones. Most of this area currently consists of exotic pasture grasses which it is proposed to maintain in a slashed condition to reduce fire risk and make suitable for low-impact recreation. The bulk of this area (west of the knoll) has already been subject to occasional slashing (visible in the aerial photo from February 2010 included in Section 8.3). The area east of the Stony knoll will require inspection to identify whether any levelling is needed to make this suitable for mowing. Areas of this Zone may be suitable for revegetation to enhance the Habitat Zone. Further consultation is required between stakeholders as indicated in feedback provided by the Beveridge Recreation Reserve Committee of Management on whether more intensive uses may be possible in the South west corner of this part of the reserve.	Walking, dogs on-lead, informal ball games, general nature appreciation

Habitat Zone		
Land containing remnant indigenous vegetation in the process of restoration. Primarily for flora and fauna conservation rather than recreation.	3.47 hectares (36%) to be managed as Habitat Zone Fencing and interpretation signage may assist public recognition and acceptance of conservation based management which should include allowing dead trees to stand and biomass burning. A boardwalk through the swamp may be considered. Biomass reduction in a staged manner will be needed for the Stony Knoll areas at perhaps 3-5 year intervals. Aim to ensure patches of unburnt/slashed area are retained as refuge, but that all areas get treated over time resulting in a vegetation 'mosaic'.	Walking, nature appreciation from defined paths
Roadside Zone		
Land outside fence, generally with only traces of indigenous vegetation. Although significant indigenous vegetation exists in the ditches on the western boundary.	0.52 hectares of roadside about the north and western boundaries of the reserve. Likely to be subject to disturbance by utilities maintenance, informal parking etc. Mostly maintained by Council roadside crews. Potential to be a buffer to weed invasions to the reserve and, conversely, to be source of weeds. The ditch on the western boundary in particular requires more intensive management as it is contiguous with the swamp system.	Walking, parking overflow for large events, access for utilities maintenance.

4.3 Public safety

Risks influenced by vegetation management include, but are not limited to the following. This selection is based on risks commonly raised in other parts of the Merri Creek catchment and issues identified during discussions around Pony club activities.

Snakes

Three venomous species, ie Tiger snake, Copperhead and Eastern Brown Snake, are commonly found in the Merri Creek catchment. Snakes are legally protected fauna and an important part of the ecosystem.

These snakes continue to be found regularly in agricultural and even inner urban parkland as well as bushland habitats. So, they may survive even as Beveridge develops as a more intensively urban area. Vegetation management proposals will not alter the suitability of snake habitat in a predictable way, although Reed management ultimately aims to increase frog populations, which may as a consequence improve Tiger Snake and Copperhead survival.

In parklands or reserves, snakes are commonly encountered on mown areas that provide basking opportunities adjacent to habitat areas that provide food and shelter. Pathways and boulders may be especially favoured as basking sites. Morning encounters at such sites are likely as the animals may not be warm enough to move quickly out of the way.

It is proposed that the main means of managing this risk is to include messages (via brochures and signage) about living with snakes in parkland so that visitors to the reserve are aware of the means of avoiding risky encounters. In other areas of the Merri Creek catchment this has been achieved via signage, path stenciling and information brochures. In the experience of MCMC, presentations by snake-handler demonstrations by responsible operators are especially effective for raising awareness and discussion with a balance of caution and respect. Such activities will be especially needed as new residents from non-rural areas, potentially naïve about snakes, settle in the area. (See Section 6.2 Action P 4).

Risks associated with vegetation management near pony riding

Uneven ground, rocks and projecting branches are features of the Habitat Zone that may be hazardous to both horses and their riders. Means of preventing horses from inadvertently entering Habitat Zone areas include

fencing of the northern boundary of the wetland with an appropriate type of fence for use near horses (i.e. post and rail with high visibility). (see Section 6.2 Action P1)

For field staff undertaking vegetation management within the conservation areas of the Reserve it is essential that they understand activities that may constitute a risk or nuisance to equestrian uses in the non-conservation areas of the reserve that they access. Issues where the vegetation management activities may cause problems include:

- Leaving cut branches or other vegetation residue in recreation zone either intentionally or unintentionally
- Leaving ruts in the surface of the recreation zone due to driving heavy vehicles in wet conditions.
- Undertaking management activities during equestrian activities that have the potential to startle horses

The issues above can be handled through specific induction of field staff and identifying the communication of equestrian activity times. Details for inclusion on an induction could be documented with representatives of the Beveridge Reserve Committee of Management involved in Beveridge Pony Club.

Fire

The dense standing dead biomass that reeds accumulate has the potential to generate an intense fire, most likely through the actions of an arsonist or by due to careless use of spark-generating machinery during warm conditions.

The swamp/wetland area is currently surrounded by extensive areas of mown areas and roadways that help isolate fire from infrastructure however there is some danger to the Reserve's visitors, if they are present during such a fire. Some potential vegetation management measures (such as plantings that could increase fuel loads near areas that currently constitute fuel breaks) have the potential to increase fire risk. Other activities, (such as reed-management) may reduce the fuel risk.

- Continue to investigate whether it is warranted to reduce the extent of the wetland dominated by tall reed vegetation for habitat and biodiversity purposes. Maintain current margins with 'tight' mowing.
- Identify with CFA officers the area where fuel gaps need to be maintained or enhanced. Should be subject to inspection with the local CFA officer. These discussions should reference council Municipal Fire Prevention Plans or the new proposed Integrated Fire Management Plan (Joe Watkins, Environmental Service Manager pers. comm. 5th November 2010). Any such fire planned for the section of the Reserve currently proposed as 'Bushland Reserve' (and thus assigned to Parks Victoria) has a requirement that it be registered through the Department of Sustainability & Environment system (pers. comm., Ion Maher, Ranger in Charge, Kinglake in an email of 31st October 2010).
- Ensure field staff are aware of, and adhere to, directives for use of machinery in areas during high fire risk weather
- Ensure recreational activities involving fire (e.g. fireworks, bonfires, campfires) only occur in areas that do not constitute a risk and are strictly controlled through appropriate signage and open space risk management protocols for community events
- Undertake fuel reduction either through fire or biomass removal as a part of reed management

Falling dead standing trees that have been retained as habitat

Dead trees are highly valuable for habitat (as perches/basking sites for wildlife, food and shelter for a wide range of invertebrates), however, these can constitute a hazard in areas with high visitor use due to risk of falling limbs or trees.

Visitor occupancy of the Habitat Zones is limited and the risk of falling trees within this zone is low. However, dead trees on the margins of the Habitat Zone that may fall into Recreation Zone could constitute a risk.

Council or field staff responsible for maintaining remnant vegetation should broadly assess the risk level that a dead tree constitutes and, when a hazard is suspected, alert the appropriate authority to arrange for inspection or felling to occur. The size and lean of the dead tree will influence which individual trees constitute a hazard.

Trees deemed hazardous should be felled in a controlled manner both to avoid the immediate risk to Reserve users and also the hazard that unexpected fallen limbs may constitute to equestrian activities. Monitoring of the risk associated with dead trees should be periodically assessed (Section 6.3 Action M5)

Retaining felled trees in the Conservation Zone is a way of retaining many of the biodiversity values of dead trees on site and is preferred to removing these trees, where feasible.

5 Monitoring and evaluation

A monitoring program for some vegetation management actions proposed for the Reserve is described in Table 5.1. This monitoring is an essential minimum to be able to fulfill the 'adaptive management' approach and should therefore be considered in the design of any project and appropriately resourced.

■ **Table 5-1 Monitoring**

Monitoring question	Aim of monitoring	Measurable attribute	Survey intensity	Season
1. What progress has been made on eradication of High Priority and selected second priority weeds	Assess progress towards eradication and highlight need for any change in control efforts (e.g. Increase, changed focus of attention, cessation)	Presence and extent of weed species	Annual	Will vary with species but a late spring (October) will provide allow monitoring to double as site inspection for early summer control measures for many of the weed species
2. Assess plant establishment of under revegetation activities	To identify issues with plant establishment to inform decisions to follow up plantings or design of future plantings.	Survivorship counts, assess general health,	At 6 months and annually for five years	Winter will allow assessment of plantings after summer drought stress

Additional monitoring activities that could be considered by the land manager include:

- Swamp Tigertail Dragonfly habitat use
- Habitat hectare assessments of the swamp, as a whole

6 Implementation and Management Actions 5 years

In the following tables;

- ‘notional cost’ is \$ <\$1000, \$\$1000-\$10,000, \$\$\$ >\$10,000. ‘Timing’ refers to the time when it is desirable that the action should be completed by to allow for progression of vegetation management goals. In particular the completion of Background report that may be needed to assess decisions.
- Beveridge RR COM = the Committee of Management of the Beveridge Recreation Reserve, ARCUE = Australian Research Centre for Urban Ecology. VNPA = Victorian National Parks Association.
- While major stakeholders are already committed to engage in liaison under existing arrangements, some organisations have been included in the table below as potential partners with a view to approaching them for their cooperation as these tasks are being planned.

6.1 Background Actions

These actions will improve the information base for further planning and refinement of management actions. Some of these investigations may identify additional projects or provide information that will support further grant applications.

■ **Table 6-1 Background Actions**

	Management issue	Management Goal	Management Action	Timing	Priority	Responsibility	Organisation partners	Notional Cost	Ecological rationale and contingencies
B1.	Aboriginal cultural heritage assessment has not been carried out in the Reserve and its values are unknown. See 3.8	Aboriginal cultural heritage assessment has been completed and recommendations reflected in management.	Aboriginal cultural heritage assessment commissioned and implications of findings disseminated to stakeholders.	2011	High	Mitchell	Beveridge RR COM	\$\$	Aboriginal cultural heritage values may be affected by vegetation management. Guidelines based on an assessment will ensure compliance.
B2.	Presence/absence of some EPBC Act species is not currently established. See 1.5 (EPBC Act)	Surveys have reliably determined presence/absence of EPBC listed species	Appropriately timed surveys for EPBC listed species take place	2012	High	Mitchell	DSE, MCMC,	\$	EPBC listed species have particular Actions and also provide
B3.	Hydrological and geological characteristics of the swamp, are incompletely known which limits confidence in making management proposals See 3.1, 3.2 & 3.5	A hydrological and geological study identifying dynamics, water recharge area, geomorphological significance and characteristics influential on vegetation and fauna.	Contract a hydrological engineer with experience in investigations relating to natural hydrological systems	2014	High	Mitchell	Melbourne Water	\$\$	Important for informing management recommendations. Until this is prepared, management will need to adopt precautionary approach relating to hydrology.

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	Management issue	Management Goal	Management Action	Timing	Priority	Responsibility	Organisation partners	Notional Cost	Ecological rationale and contingencies
B4.	The values of non-indigenous heritage on the site is unassessed See 3.8	Non-indigenous heritage features assessed and recommendations reflected in management	Non-indigenous heritage assessment commissioned and implications of findings disseminated to stakeholders	2012	Medium	Mitchell	Beveridge RR COM, adjacent landholders with drystone wall and ruins	\$\$	Non-indigenous heritage values may be affected by vegetation management activities- most notably Elm and privet eradication. Having guidelines based on an assessment will ensure these are aligned
B5.	Fauna data is out of date See 3.6	Community-based fauna monitoring activities in place with methodical documentation of results	Liaise with groups that already carry out similar monitoring	2013	Medium	MCMC	FOMC, Wallan Environment Group, Bird Observer Club, VNPA, educational institutions, ARCUE	\$	Fauna usage of the reserve is important for refining vegetation/habitat prescriptions
B6.	Ecological history of site remains incomplete See 3.4	Pertinent details of the environmental history are gathered and documented in a revision of this management plan	On an ongoing basis, seek knowledgeable local residents and document their observations of environmental matters	2014	Medium	Mitchell DSE	Beveridge RR COM, WEG, FOMC	\$	A complete environmental history will inform decisions and may reveal unsuspected approaches and threats.

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	Management issue	Management Goal	Management Action	Timing	Priority	Responsibility	Organisation partners	Notional Cost	Ecological rationale and contingencies
B7.	Potential for enhanced habitat connectivity along Kalkallo Creek is unknown. See 1.2	Identify projects to maximise habitat connectivity of the Community Reserve along Kalkallo Creek are identified	Do a desktop assessment of open space and private land with potential for habitat enhancement, identify attitude of relevant landholders.	2014	Medium	MW, Mitchell	Adjacent landholders, MCMC	\$	Long-term survival of some flora and fauna in the Reserve is contingent on sympathetic management downstream
B8.	Runoff and ditches along the Spring Street interface connect directly with swamp. It has not been confirmed whether design of the septic tank lines from the community centre may allow contamination of the wetland. See 3.3	Spring Street interface is structured so that runoff is treated, vegetation is manageable and contamination is able to be avoided. The design of the septic tank lines is confirmed to be adequate or is re-designed if it is not.	Develop and re-construct the road frontage using 'Water Sensitive Urban Design' The design of the septic tank lines from buildings in the reserve is examined.	2015	Medium	Mitchell	MW		The current situation possibly leaves the swamp as a whole vulnerable to contamination and the vegetation is difficult to manage. Opportunities for complimentary habitat of the site could be lost with a standard drainage treatments.
B9.	Amenity plantings in non-Habitat Zone should be compatible with environmental management. See 3.5	Plantings in reserve are fulfilling amenity and management needs that maximise habitat values and management logistics..	Develop a planting scheme and principles that identifies a plant palette and siting.	2015	Medium	Mitchell,	Beveridge RR COM		Planting schemes and plant pallettes will increase the likelihood that these will complement and enhance ecological restoration works.
B10.	Habitat needs of the Swamp Tigertail dragonfly are unknown. See 3.6	Areas of critical habitat identified and dynamics of retaining suitable habitat identified and reflected in vegetation management plan.	Observation and documentation of critical habitat including favoured courtship, feeding and egg-laying sites	2015	Medium		Mitchell, educational institutions. WEG, FOMC	\$	There is potential for habitat restoration works to impact on dragonfly population due to ignorance of critical habitat needs.

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	Management issue	Management Goal	Management Action	Timing	Priority	Responsibility	Organisation partners	Notional Cost	Ecological rationale and contingencies
B11.	Landscape/visual amenity issues are currently un-planned and will be increasingly impacted by development around the Reserve. See 3.7	Landscaping and maintenance actions are in place that is in place that protect and enhance the Reserve's visual amenity into the future.	An assessment of visual amenity assets of the reserve and future impacts and recommendations for adjacent development complying with the points identified in the Merri Creek and Environs Strategy	2013	Low	Mitchell	Beveridge RR COM	\$\$	Landscaping works have the potential to enhance or degrade ecological values of the Reserve and planning will prevent negative impacts resulting from ad-hoc developments.
B12.	Ecological Vegetation Class characterisation is provisional See 1.4 'Vegetation types'	Have a well-founded reference state identified including restoration targets and species reintroduction lists	Contract botanical consultant with expertise in wetland characterisation	2014	Low	Mitchell	MCMC, DSE	\$	Well founded ecological descriptions are critical to a more comprehensive effective restoration.

6.2 Project Actions

These are 'one-off' projects to improve indigenous vegetation, which are of a scale that would not be covered by recurrent maintenance funding. Due to their defined length and outcomes, such projects may form the basis of grant applications or community-based projects

■ **Table 6-2 Project Actions**

	Management issue	Management Goal	Management Action	Timing	Priority	Responsibility	Organisation partners	Notional Cost	Ecological rationale and contingencies
P1.	Safety issues exist where Recreation Zone and Habitat Zone are not well defined See 4.3	Post and rail fencing in place to prevent pony access to Habitat zones. Induction for field staff working near horses.	Conduct liaison to discuss and act on the safety issues identified in this report in 4.3.2	2011	High	Mitchell	Beveridge RR COM, MCMC	\$\$	Appropriate definition of interfaces will avoid the installation of inappropriate or inadequate measures
P2.	Elm and Privet infestation on the southern boundary threatens swamp, drystone wall and prevents revegetation or amenity planting. See 3.8	Eradication of elms and privet on Reserve and on adjacent private property.	Grooming followed by herbicide application conducted in conjunction with adjacent landholder	2012	High	Mitchell, Adjacent landholder	MCMC	\$\$\$	Because of suckering habit, Elm and Privet will continue to be a menace to environmental values unless eradicated.
P3.	Public perception of Reed beds remains poor, due to landscape preferences. See 3.5 & 3.7	Have amenity landscape planning that is feasible and ecologically appropriate around Habitat Zone	In conjunction with the stakeholders, continue to develop options for landscaping around the Habitat Zone	2013	High	Mitchell	Beveridge RR COM, PV, MCMC	\$	Public perception and acceptance of Habitat zones will contribute to higher protection through greater understanding of needs.

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	Management issue	Management Goal	Management Action	Timeline	Priority	Responsibility	Organisation partners	Notional Cost	Ecological rationale and contingencies
P4.	Snake hazard in the Reserve is inadequately identified for casual users and many potentially naïve new residents will soon move into area. See 4.3	Snake hazard is appropriately signposted in the Reserve and effective interpretation on issue is regularly occurring in township	Develop appropriate messages for signage around snakes and institute snake handler demonstrations to occur locally at least every three years.	2011	Medium	Mitchell	Beveridge RR COM, Mitchell	\$	Snake awareness is vital to safe appreciation of biodiversity values of reserve and community support for conservation measures.
P5.	The area of Swamp Scrub is limited and some adjacent areas appear suitable for restoration by assisted regeneration See 3.5	Areas of Swamp Scrub expanded into suitable area via assisted regeneration	Biomass reduction takes place in the south-eastern flank of the Swamp Scrub and north western fringe-, allowing enhanced weed control into <i>Carex</i> under storey to enhance natural spread of these species	2012	Medium	Mitchell	Beveridge RR COM, WEG, FOMC	\$\$	Maximising extent of Swamp Scrub would increase and resilience of remnant areas. The potential restoration sites show signs of 'passive restoration' that may be enhanced with strategic biomass reduction and weed control.
P6.	Stony knoll remnants occur patchily across site, in low numbers See 3.5	Both areas of Stony knoll have viable populations of the range of appropriate species	Weed control near remnants is prioritised to enhance natural regeneration and revegetation takes place that establishes the range of species across both sites	2014	Medium	Mitchell	COM, WEG, DSE	\$\$	Small and fragmentary remnant patches are more vulnerable to ongoing local extinction.
P7.	To expand the area of Swamp scrub, assisted regeneration may need to be augmented with revegetation to complete and enhance this action. See 3.5	Areas of Swamp Scrub expanded into suitable area via revegetation	Additional plantings of Woolly tea-tree and other species	2014	Medium	Mitchell	Beveridge RR COM, WEG	\$	Revegetation may be teamed with 'assisted regeneration' approaches to increase chances of timely restoration.

6.3 Maintenance Actions

These actions are needed to at least maintain the current values of the indigenous vegetation, halt or reverse degrading processes and fulfil legislative requirements for controlled weeds. Mostly these actions require recurrent funding or funding that must be maintained over several years. Actions aim to develop vegetation that is as self-sustaining as possible however resource needs may vary seasonally and some level of ongoing maintenance is needed for all vegetation in public open space. Some one-off actions considered essential to maintenance are included in this table.

■ **Table 6-3 Maintenance Actions**

	Management issue	Management Goal	Management Action	Time line	Priority	Respon sibility	Organisation partners	Noti onal Cost	Ecological rationale and contingencies
M1.	Priority 1 Woody weed eradication See 4.1	Briar, Gorse, Hawthorn, Broom, Boxthorn eradication complete in areas not covered by Action M1.	Seasonally appropriate control rounds continue to be carried out in Reserve and extended to all zones	2015	Medium	Mitchell	MCMC	\$\$	Works since 2008 represent an investment needing ongoing treatment to ensure this is held.
		Elm and Privet containment until such time as eradication Project (P 6) can occur.	Suckers of Elm and Privet removed from where they are close to swamp environment	2011	High	Mitchell	MCMC	\$	Elm suckering will potentially accelerate in wet soils. Ensure removal of stumps to avoid subsequent staking tyres and tripping hazards.
M2.	Hygiene measures for reducing new weeds establishing in the Reserve are not in place See 4.1 'Weed Management'	Implementation of weed hygiene procedures, including vehicle hygiene,	Develop weed hygiene procedures and induct relevant contractors	2012	High	Mitchell	Beveridge CRCOM, MCMC, DPI	\$	Reducing and identifying new weed infestations is more cost-effective than treating established infestations.
M3.	Swamp Scrub is infested with serious weeds, in particular Ivy and Blackberry See 4.1	Priority 1 weeds eradicated from Swamp Scrub areas	Priority weed control in this area is continued through to 2015. (staged spray and physical removals of Blackberry and Ivy)	2015	High	Mitchell	MCMC	\$\$	Works since 2008 are need ongoing treatment to ensure this is held. Blackberry eradication is an essential step in getting access to interior of Swamp.
M4.	Spiny Rush and Bridal Creeper are in low numbers and could be eradicated	Spiny Rush and Bridal Creeper eradicated.	Concerted eradication efforts to these weeds in appropriate seasons and patrol treated	2015	High	Mitchell	MCMC	\$	These weeds, present a serious threat. Eradicating the small populations will free up

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	<i>See Table 4.1-1</i>		areas.						resources.
	Management issue	Management Goal	Management Action	Timeline	Priority	Responsibility	Organisation partners	Notional Cost	Ecological rationale and contingencies
M5.	Dead standing trees are important habitat but can be a risk to Reserve visitors See 4.3	Standing dead trees that present a risk are identified and felled in a timely manner	Field staff are instructed to consider the risk posed by standing dead trees as part of routine vegetation management works and report risks to Mitchell Council for felling	2011	High	Mitchell	MCMC, Beveridge RR COM	NA	Standing dead trees are valuable habitat but cannot be allowed to remain where they cause a risk.
M6.	Monitoring is needed to assess success of vegetation management actions See Table 5.1	Monitoring is occurring for significant vegetation management actions.	Monitoring Program identified in Table 5.1 are approved and resources included in maintenance program.	2011	High	Mitchell	MCMC	\$	Monitoring is an essential activity for adaptive management in ecological restoration.
M7.	Slashed fuel breaks around the Reserve are not continuous on the stony knoll on southern boundary or swamp on western boundary See 3.10	Biomass on Stony knoll is maintained at a safe level. Tall Marsh vegetation on the western roadside zone has a maintenance regime that reduces biomass in an ecologically sensitive manner.	Identify a slashing and weed management regime for the western roadside interface. Carry out biomass reduction on the Stony Knoll.	2011	High	Mitchell	CFA, DSE	\$\$	Slashing for fuel breaks has potential to impact negatively on environmental values. Conversely, there are efficiencies in aligning weed control and fuel reduction actions.
M8.	Priority 1 Broadleaf weeds persist and require consistent management to eradicate See 4.1	Artichoke thistle, Patterson's Curse and other Thistles eradicated and re-invasions prevented from seeding	Schedule weed control rounds and patrols for at least three visits per year in order to break weed flowering/seeding cycle.	2014	High	Mitchell	MCMC	\$\$	These weed species are at low numbers, but will require consistent treatment over a period of approx three years to exhaust soil-stored seed banks and then patrolling to prevent re-establishment.

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	Management issue	Management Goal	Management Action	Timeline	Priority	Responsibility	Organisation partners	Notional Cost	Ecological rationale and contingencies
M9.	Ecological burning is occurring, but is currently un-programmed, reducing potential for coordinated weed control and restoration. See 4.1	Burning across Reserve is occurring in predictable pattern that fulfils ecological and safety needs and is aligned with weed management.	Develop a burn regime for Stony Knoll and for Tall Marsh areas of the site with consultation between council, CFA and MCMC	2011	Medium	Mitchell	CFA, MCMC	\$	Burn regimes facilitate long-term planning, resourcing and maximise effectiveness of other restoration efforts.
M10.	Roadsides are not currently subject to a weed control program aligned with Reserve needs. See 3.10	Priority weeds on roadside eradicated and weed hygiene measures implemented in conjunction with Shire's roadside maintenance crews	Identify stakeholders and develop and implement a specific weed eradication scheme for this area, or extend management resources from Reserve into Roadside Zone	2011	Medium	Mitchell	MCMC	\$	Priority weeds on the Roadside Zone threaten vegetation improvement works inside the Reserve.
M11.	Strategies identified in this report will require understanding and cooperation of Reserve users and stakeholders See 3.9	Stakeholders have understanding of, have commented on and support Actions identified in this plan.	Ongoing discussion of actions Vegetation Management Plan with Beveridge Recreation Reserve Committee of Management for consideration and amendment	2011	Medium	Mitchell	Beveridge RR COM, MCMC	\$	Successful application of the actions in this report will require aligned goals from all stakeholders.

7 References

- Beardsell, C. 1997 *Sites of Faunal and Habitat Significance in the North East Melbourne*, A report prepared for the North-East Region of Councils (NEROC) by Dunmoochin Biological Surveys, Melbourne.
- Department of Natural Resources and Environment (NRE) 2002 Victoria's Native Vegetation Management – A framework for Action
- Department of Sustainability and Environment (DSE) 2003 Biodiversity Action Planning. Landscape Plan for the Craigieburn Zone in the Victorian Volcanic Plain Bioregion. (Draft May 2003)
- Department of Sustainability and Environment (DSE) 2004 *EVC/Bioregion Benchmark for Vegetation Quality Assessment, Victorian Volcanic Plain bioregion, EVC 132_61: Heavier-soils Plains Grassland*.
http://www.dse.vic.gov.au/conserv/EVC-PDF/VVP_0132_61.pdf (Viewed 16/11/09)
- Department of Sustainability and Environment (DSE) 2005a Biosites, Maps and Reports for Land and Water Management Agencies, Port Phillip Region The State of Victoria Department of Sustainability & Environment (CD-ROM)
- Department of Sustainability and Environment (DSE) 2005b The Index of Wetland Condition. Conceptual framework and selection of measures P. 2
- Department of Environment, Water, Heritage and the Arts 2009 Farming and Nationally Protected Grasslands and Woodlands of the Victorian Volcanic Plain.
<http://www.environment.gov.au/epbc/publications/pubs/grasslands-victoria-fact-sheet.pdf> (Viewed 5/1/10)
- Ecological Consulting Services 2009. Spring Street Swamp Assessment. Unpublished report for Mitchell Shire Council. Newport.
- Frood, Douglas, 1992, *Vegetation of the Native Grasslands in the Merri Creek Valley, Outer Melbourne Area*, Ecological survey report No. 92 Department of Conservation & Environment
- Land Conservation Council 1994 *Melbourne Area District 2 Review Final Recommendations* July 1994
<http://www.veac.vic.gov.au/lcc/melbdist2part1.pdf> (Viewed 4 /1/10)
- McMahon, A.R.G. and Schulz, M. 1993 *Merri Creek Concept Plan. Flora and Fauna* Report by Ecological Horticulture Pty. Ltd for Merri Creek Management Committee and Melbourne Water.
- Melway 2011 *Melway Greater Melbourne Ed. 38*. Melway Publishing Pty. Ltd. Mount Waverley
- Merri Creek Management Committee, 2004, *Understanding planning issues along the Merri Creek and Policy: Development Guidelines for the Merri Creek*. <http://www.mcmc.org.au/file/reports/Merri-Creek-Devel-Guidelines-2004-Web.pdf> (Viewed 25th January 2010).
- Merri Creek Management Committee 2009 *Merri Creek and Environs Strategy 2009-2014* Merri Creek Management Committee, Melbourne
- Mitchell Shire Council 2006 *Beveridge Recreation Reserve Master plan* Unpublished report commissioned by Mitchell Shire Council
- Moreland City Council, 2004, Open Space Strategy
- Mitchell Shire Council 2009 *Council Plan 2009-2013* p 8.
http://www.mitchellshire.vic.gov.au/Files/CouncilPlan_2009-2013_July1509.pdf (Viewed 11/12/09)
- Muyt, Adam 2001 Bush Invaders of South-East Australia. R.J. & F.J. Richardson, Meredith
- Port Phillip & Westernport Catchment Management Authority, 2006, Port Phillip and Westernport Native Vegetation Plan, Port Phillip and Westernport Catchment Management Authority

Queensland Government, 2005 *Wetland* Management Profile Great Artesian Basin spring Published by Ecosystem Conservation Branch, EPA Queensland. (Viewed 17 June 2010
<http://www.derm.qld.gov.au/register/p01718aa.pdf>)

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

Sainty, G.R. and Jacobs, S.W.L. 1981. *Waterplants of New South Wales* Water Resources Commission, N.S.W, Sydney

Vallee, L., Hogbin, T., Monks, L., Makinson, B., Matthes, M. and Rossetto, M. 2004, *Guidelines for the Translocation of Threatened Plants in Australia 2nd Ed.* Australian Network for Plant Conservation. Canberra

Walsh, N. G and Stajsic, V. 2007, *A Census of the Vascular Plants of Victoria 8th Ed.* Royal Botanic Gardens, Melbourne

8 Appendices

8.1 Appendix 1. Table of Plant Species present in the Reserve

‘*’ indicates and exotic, ‘#’ non-indigenous native plant

Species	Common name	Beveridge Rec.Res., A SE Corner	Beveridge Rec.Res., B Tea tree thicket swamp	Beveridge Rec.Res., C Knoll	Beveridge Rec.Res., D Open Swamp	Beveridge Rec.Res., E SW Corner	Beveridge Rec.Res., F Northern Paddock	Beveridge Rec.Res., G Northern Knoll	Beveridge Rec.Res., H Roadside	Bev. Rec. Res. TOTAL
<i>Acacia mearnsii</i>	Black Wattle		1					1		2
<i>Acacia melanoxylon</i>	Blackwood		1				1	1		3
<i>Acaena novae-zelandiae</i>	Bidgee Widgee						1			1
<i>Acaena ovina</i>	Sheep's Burr			1						1
* <i>Acetosella vulgaris</i>	Sheep Sorrel			1			1			2
* <i>Aira caryophyllea</i>	Silvery Hair Grass							1		1
* <i>Amaryllis belladonna</i>	Easter Lily	1								1
<i>Apium prostrata</i>	Native Celery		1		1					2
* <i>Aptenia cordifolia</i>	Heart-leaf Ice Plant	1								1
<i>Arthropodium strictum</i>	Chocolate lily							1		1
<i>Arthropodium minus</i>	Small Vanilla lily							1		1
* <i>Arctotheca calendula</i>	Capeweed						1	1		2
* <i>Artemisia arborescens</i>	Silver Wormwood	1								1
* <i>Aster subulatus</i>	Aster-weed					1				1
* <i>Atriplex prostrata</i>	Hastate Orache				1					1
<i>Austroanthonia caespitosa</i>	Common Wallaby Grass			1		1	1	1	1	5
<i>Austroanthonia fulva</i>	Leafy Wallaby Grass						1			1
<i>Austroanthonia geniculata</i>	Knead Wallaby Grass							1		1
<i>Austroanthonia penicillata</i>	Slender Wallaby Grass			1			1	1		3
<i>Austroanthonia racemosa</i>	Stiped Wallaby Grass			1		1		1		3
<i>Austrostipa bigeniculata</i>	Knead Spear-grass							1		1
<i>Austrostipa oligostachya</i>	Spear Grass			1						1
<i>Austrostipa scabra</i> <i>ssp.falcata</i>	Slender Spear-grass			1						1
* <i>Brassica fruticulosa</i>	Twiggy Turnip			1						1
* <i>Briza maxima</i>	Large Quaking Grass							1		1
* <i>Bromus catharticus</i>	Prairie Grass						1	1		2
* <i>Bromus diandrus</i>	Rip gut Brome			1						1
<i>Calystegia sepium</i>	Large Bindweed		1		1					2
* <i>Carduus pycnocephalus</i>	Slender Thistle		1		1					2
<i>Carex appressa</i>	Tall Sedge				1					1
<i>Carex fascicularis</i>	Tassel Sedge	1			1					2
<i>Carex gaudichaudiana</i>	Fen Sedge	1								1
* <i>Centaurium erythraea</i>	Common Centaury					1				1
* <i>Chenopodium album</i>	Fat Hen							1	1	2
<i>Chenopodium pumilio</i>	Small Crumb-weed			1						1
* <i>Cirsium vulgare</i>	Spear Thistle	1			1	1			1	4
<i>Crassula helmsii</i>	Water Stonecrop					1				1
<i>Crassula sieberi</i>	Stonecrop							1		1

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Species	Common name	Beveridge Rec.Res., A SE Corner	Tea tree thicket swamp	Beveridge Rec.Res., C Knoll	Beveridge Rec.Res., D Open Swamp	Beveridge Rec.Res., E SW Corner	Beveridge Rec.Res., F Northern Paddock	Beveridge Rec.Res., G Northern Knoll	Beveridge Rec.Res., H Roadside	Bev. Rec. Res. TOTAL
<i>Convolvulus erubescens sensu lato</i>	Blushing Bindweed			1						1
* <i>Conyza spp.</i>	Flea-bane								1	1
* <i>Coprosma repens</i>	Mirror Bush		1							1
* <i>Crataegus monogyna</i>	Hawthorn	1	1							2
* <i>Cynara cardunculus</i>	Spanish Artichoke		1	1					1	3
<i>Cynoglossum suaveolens</i>	Sweet Hound's-tongue			1						1
* <i>Cynosurus echinatus</i>	Rough Dog's Tail			1						1
* <i>Dactylis glomerata</i>	Cock's-foot	1	1	1			1	1		5
* <i>Echium plantagineum</i>	Patterson's Curse						1	1		2
<i>Einadia nutans</i>	Nodding Saltbush						1			1
* <i>Ehrharta longiflora</i>	Annual Veldt Grass			1						1
<i>Eleocharis acuta</i>	Common Spike-rush				1					1
<i>Elymus scaber var. scaber</i>	Wheat-grass							1		1
<i>Epilobium billardieranum</i>	Smooth Willow Herb				1					1
# <i>Eucalyptus cladocalyx</i>	Sugar Gum							1		1
* <i>Festuca arundinacea</i>	Tall Fescue				1					1
* <i>Fumaria muralis</i>	Wall Fumitory		1							1
* <i>Galium aparine</i>	Cleavers		1						1	2
* <i>Genista monspessulana</i>	Montpellier Broom			1						1
<i>Geranium sp. 5</i>	Naked Crane's Bill			1					1	2
* <i>Hedera helix</i>	Common Ivy		1							1
* <i>Helminthotheca echioides</i>	Bristly Ox-tongue	1	1		1	1		1	1	6
* <i>Holcus lanatus</i>	Yorkshire Fog		1	1	1					3
* <i>Hordeum marinum</i>	Salt Barley Grass					1				1
* <i>Hypochoeris radicata</i>	Cat's Ear						1			1
<i>Hypoxis glabella var. glabella</i>	Tiny Star							1		1
<i>Isolepis cernua</i>	Nodding Club-sedge		1		1					2
* <i>Juncus acutus</i>	Spiny Rush	1			1					2
* <i>Juncus articulatus</i>	Jointed Rush								1	1
<i>Juncus australis</i>	Austral Rush	1							1	2
* <i>Lactuca saligna</i>	Willow-leaf Lettuce				1	1				2
* <i>Lactuca serriola</i>	Prickly Lettuce	1		1	1	1			1	5
<i>Lemna disperma</i>	Duckweed								1	1
* <i>Lepidium africanum</i>	Common Pepper Cress							1		1
<i>Leptospermum lanigerum</i>	Wooly Tea-tree	1	1							2
* <i>Ligustrum vulgare</i>	European Privet	1								1
* <i>Lolium perenne</i>	Perennial Rye			1			1	1		3
<i>Lomandra filiformis</i>	Wattle Mat Rush			1				1		2
* <i>Lycium ferocissimum</i>	African Box-Thorn	1								1
* <i>Malus cv.</i>	Apple			1						1
<i>Melicytus dentatus</i>	Tree Violet		1							1
* <i>Melilotus indicus</i>	Sweet Melilot					1				1
* <i>Mentha spicata</i>	Common Mint				1					1
<i>Microlaena stipoides var. stipoides</i>	Weeping Grass			1			1	1		3

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Species	Common name	Beveridge Rec.Res., A SE Corner	Beveridge Rec.Res., B Tea tree thicket swamp	Beveridge Rec.Res., C Knoll	Beveridge Rec.Res., D Open Swamp	Beveridge Rec.Res., E SW Corner	Beveridge Rec.Res., F Northern Paddock	Beveridge Rec.Res., G Northern Knoll	Beveridge Rec.Res., H Roadside	Bev. Rec. Res. TOTAL
* <i>Modiola caroliniana</i>	Carolina Mallow		1	1					1	3
* <i>Nasturtium officinale</i>	Two-rowed Watercress				1				1	2
* <i>Olea europaeus</i>	Olive	1								1
<i>Oxalis perennans</i>	Wood Sorrel			1			1	1	1	4
* <i>Paspalum dilatatum</i>	Paspalum						1	1		2
<i>Pennisetum clandestinum</i>	Kikuyu			1						1
<i>Persicaria prostrata</i>	Creeping Knotweed			1						1
* <i>Phalaris aquatica</i>	Toowoomba Canary Grass	1		1	1	1	1	1	1	7
<i>Phragmites australis</i>	Common Reed	1	1		1					3
* <i>Pinus radiata</i>	Monterey Pine	1					1			2
# <i>Pittosporum undulatum</i>	Sweet Pittosporum		1							1
* <i>Plantago lanceolata</i>	Ribwort	1	1	1		1	1		1	6
* <i>Poa pratensis</i>	English Meadow-grass			1					1	2
<i>Poa sieberiana</i> ssp. <i>sieberiana</i>	Tussock Grass						1	1		2
* <i>Podranea ricasoliana</i>	Port St. John Vine	1								1
* <i>Polypogon monspessulana</i>	Common Beard Grass				1					1
<i>Portulaca oleraceus</i>	Pigweed								1	1
* <i>Prunus cerasifera</i>	Cherry Plum			1						1
* <i>Romulea rosea</i> var. <i>australis</i>	Onion Grass			1				1		2
* <i>Rosa</i> CV a	Moss Rose	1								1
* <i>Rosa</i> CV b	Rose cultivar	1								1
* <i>Rosa rubiginosa</i>	Briar Rose	1		1				1		3
* <i>Rubus ulmifolius</i>	Blackberry		1		1		1		1	4
<i>Rumex brownii</i>	Slender Dock			1			1			2
* <i>Rumex crispus</i>	Curly Dock	1		1	1					3
<i>Rumex dumosus</i>	Wiry Dock			1						1
* <i>Rumex conglomeratus</i>	Clustered Dock								1	1
* <i>Schinus molle</i>	Peppercorn	1								1
<i>Senecio quadridentatus</i>	Cotton Fireweed							1		1
* <i>Solanum nigrum</i>	Black Nightshade		1					1		2
* <i>Sonchus asper</i> ssp. <i>asper</i>	Rough Milk Thistle		1		1					2
* <i>Soncus oleraceus</i>	Milk Thistle	1	1	1	1		1	1		6
<i>Tricoryne elatior</i>	Yellow Rush-lily							1		1
* <i>Trifolium fragiferum</i>	Strawberry Clover				1	1				2
<i>Typha domingensis</i>	Cumbungi				1				1	2
* <i>Ulmus</i> aff. <i>procera</i>	English Elm	1								1
<i>Urtica incisa</i>	Bush Nettle		1							1
<i>Wahlenbergia luteola</i>	Yellowish Bluebell			1						1
	TOTAL SPECIES	27	26	40	29	14	23	35	22	122
	TOTAL NON INDIGENOUS	22	17	21	18	11	13	17	15	69
	TOTAL INDIGENOUS	5	9	19	11	3	10	18	7	53

'C' in CaLP Act refers to as 'Regionally Controlled' in the Port Phillip and Westernport region. See Section 0

8.2 Appendix 2. Weed Species and Priority Index

Species	Common name	CaLP category ⁴	Threat	Eradicability	Priority Index	Priority Ranking
<i>Asparagus asparagoides</i>	Bridal Creeper	Restricted	High	High	6	High Priority
<i>Cynara cardunculus</i>	Spanish Artichoke	Regionally Controlled	High	High	6	High Priority
<i>Echium plantagineum</i>	Patterson's Curse	Regionally Controlled	High	High	6	High Priority
<i>Genista monspessulana</i>	Montpellier Broom	Regionally Controlled	High	High	6	High Priority
<i>Juncus acutus</i>	Spiny Rush	Regionally Controlled	High	High	6	High Priority
<i>Lycium ferocissimum</i>	African Box-Thorn	Regionally Controlled	High	High	6	High Priority
<i>Rubus sp.</i>	Blackberry	Regionally Controlled	High	High	6	High Priority
<i>Carduus pycnocephalus</i>	Slender Thistle	Regionally Controlled	Low	High	5	High Priority
<i>Cirsium vulgare</i>	Spear Thistle	Regionally Controlled	Low	High	5	High Priority
<i>Crataegus monogyna</i>	Hawthorn	Regionally Controlled	Low	High	5	High Priority
<i>Rosa rubiginosa</i>	Briar Rose	Regionally Controlled	Low	High	5	High Priority
<i>Festuca arundinacea</i>	Tall Fescue	Uncategorised	High	High	4	Second Priority
<i>Hedera helix</i>	Common Ivy	Uncategorised	High	High	4	Second Priority
<i>Ligustrum vulgare</i>	European Privet	Uncategorised	High	High	4	Second Priority
<i>Paspalum dilatatum</i>	Paspalum	Uncategorised	High	High	4	Second Priority
<i>Pinus radiata</i>	Monterey Pine	Uncategorised	High	High	4	Second Priority
<i>#Pittosporum undulatum</i>	Sweet Pittosporum	Uncategorised	High	High	4	Second Priority
<i>†Schinus molle</i>	Peppercorn	Uncategorised	High	High	4	Second Priority
<i>Ulmus aff. procera</i>	English Elm	Uncategorised	High	High	4	Second Priority
<i>Acetosella vulgaris</i>	Sheep Sorrel	Uncategorised	High	Low	3	Second Priority
<i>†Amaryllis belladonna</i>	Easter Lily	Uncategorised	Low	High	3	Second Priority
<i>Aptenia cordifolia</i>	Heart-leaf Ice Plant	Uncategorised	Low	High	3	Second Priority
<i>†Artemisia arborescens</i>	Silver Wormwood	Uncategorised	Low	High	3	Second Priority
<i>Atriplex prostrata</i>	Hastate Orache	Uncategorised	High	Low	3	Second Priority
<i>Dactylis glomeratus</i>	Cock's-foot	Uncategorised	High	Low	3	Second Priority
<i>Ehrharta longiflora</i>	Annual Veldt Grass	Uncategorised	High	Low	3	Second Priority
<i>#†Eucalyptus cladocalyx</i>	Sugar Gum	Uncategorised	Low	High	3	Second Priority
<i>Helminthotheca echioides</i>	Bristly Ox-tongue	Uncategorised	High	Low	3	Second Priority
<i>Holcus lanatus</i>	Yorkshire Fog	Uncategorised	High	Low	3	Second Priority
<i>Juncus articulatus</i>	Jointed Rush	Uncategorised	High	Low	3	Second Priority
<i>Lolium perenne</i>	Perennial Rye	Uncategorised	High	Low	3	Second Priority
<i>†Malus cv.</i>	Apple	Uncategorised	Low	High	3	Second Priority
<i>Melilotus indicus</i>	Sweet Melilot	Uncategorised	Low	High	3	Second Priority
<i>Nasturtium officinale</i>	Two-rowed Watercress	Uncategorised	High	Low	3	Second Priority

⁴ As of March 2008

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Species	Common name	CaLP category	Threat	Eradicability	Priority Index	Priority Ranking
† <i>Olea europaeus</i>	Olive	Uncategorised	Low	High	3	Second Priority
<i>Phalaris aquatica</i>	Toowoomba Canary Grass	Uncategorised	High	Low	3	Second Priority
<i>Plantago lanceolata</i>	Ribwort	Uncategorised	High	Low	3	Second Priority
<i>Poa pratensis</i>	English Meadow-grass	Uncategorised	Low	High	3	Second Priority
† <i>Podranea ricasoliana</i>	Port St. John Vine	Uncategorised	Low	High	3	Second Priority
<i>Polypogon monspessulana</i>	Common Beard Grass	Uncategorised	High	Low	3	Second Priority
<i>Prunus cerasifera</i>	Cherry Plum	Uncategorised	Low	High	3	Second Priority
† <i>Rosa</i> CV a	Moss Rose	Uncategorised	Low	High	3	Second Priority
† <i>Rosa</i> CV b	Rose cultivar	Uncategorised	Low	High	3	Second Priority
<i>Solanum nigrum</i>	Black Nightshade	Uncategorised	High	Low	3	Second Priority
<i>Trifolium fragiferum</i>	Strawberry Clover	Uncategorised	High	Low	3	Second Priority
<i>Aira caryophylla</i>	Hair Grass	Uncategorised	Low	Low	2	Low Priority
<i>Arctotheca calendula</i>	Capeweed	Uncategorised	Low	Low	2	Low Priority
<i>Aster subulatus</i>	Aster-weed	Uncategorised	Low	Low	2	Low Priority
<i>Brassica fruticulosa</i>	Twiggy Turnip	Uncategorised	Low	Low	2	Low Priority
<i>Briza maxima</i>	Large Quaking Grass	Uncategorised	Low	Low	2	Low Priority
<i>Bromus catharticus</i>	Prairie Grass	Uncategorised	Low	Low	2	Low Priority
<i>Bromus diandrus</i>	Ripgut Brome	Uncategorised	Low	Low	2	Low Priority
<i>Centaurea erythraea</i>	Centaury	Uncategorised	Low	Low	2	Low Priority
<i>Chenopodium album</i>	Fat Hen	Uncategorised	Low	Low	2	Low Priority
<i>Conyza</i> spp.	Flea-bane	Uncategorised	Low	Low	2	Low Priority
<i>Cynosurus echinatus</i>	Rough Dog's Tail	Uncategorised	Low	Low	2	Low Priority
<i>Fumaria muralis</i>	Wall Fumitory	Uncategorised	Low	Low	2	Low Priority
<i>Galium aparine</i>	Cleavers	Uncategorised	Low	Low	2	Low Priority
<i>Hordeum marinum</i>	Salt Barley Grass	Uncategorised	Low	Low	2	Low Priority
<i>Hypochoeris radicata</i>	Cat's Ear	Uncategorised	Low	Low	2	Low Priority
<i>Lactuca saligna</i>	Willow-leaf Lettuce	Uncategorised	Low	Low	2	Low Priority
<i>Lactuca serriola</i>	Prickly Lettuce	Uncategorised	Low	Low	2	Low Priority
<i>Lepidium africanum</i>	Common Pepper Cress	Uncategorised	Low	Low	2	Low Priority
<i>Romulea rosea</i>	Onion Grass	Uncategorised	Low	Low	2	Low Priority
<i>Rumex conglomeratus</i>	Clustered Dock	Uncategorised	Low	Low	2	Low Priority
<i>Rumex crispus</i>	Curly Dock	Uncategorised	Low	Low	2	Low Priority
<i>Sonchus asper</i> ssp. <i>asper</i>	Rough Milk Thistle	Uncategorised	Low	Low	2	Low Priority
<i>Sonchus oleraceus</i>	Milk Thistle	Uncategorised	Low	Low	2	Low Priority

† low-threat species surviving from old farm garden plantings should be retained until the concept of retaining and managing for heritage purposes is evaluated.

Native species that are outside of their natural range and may constitute a weed threat

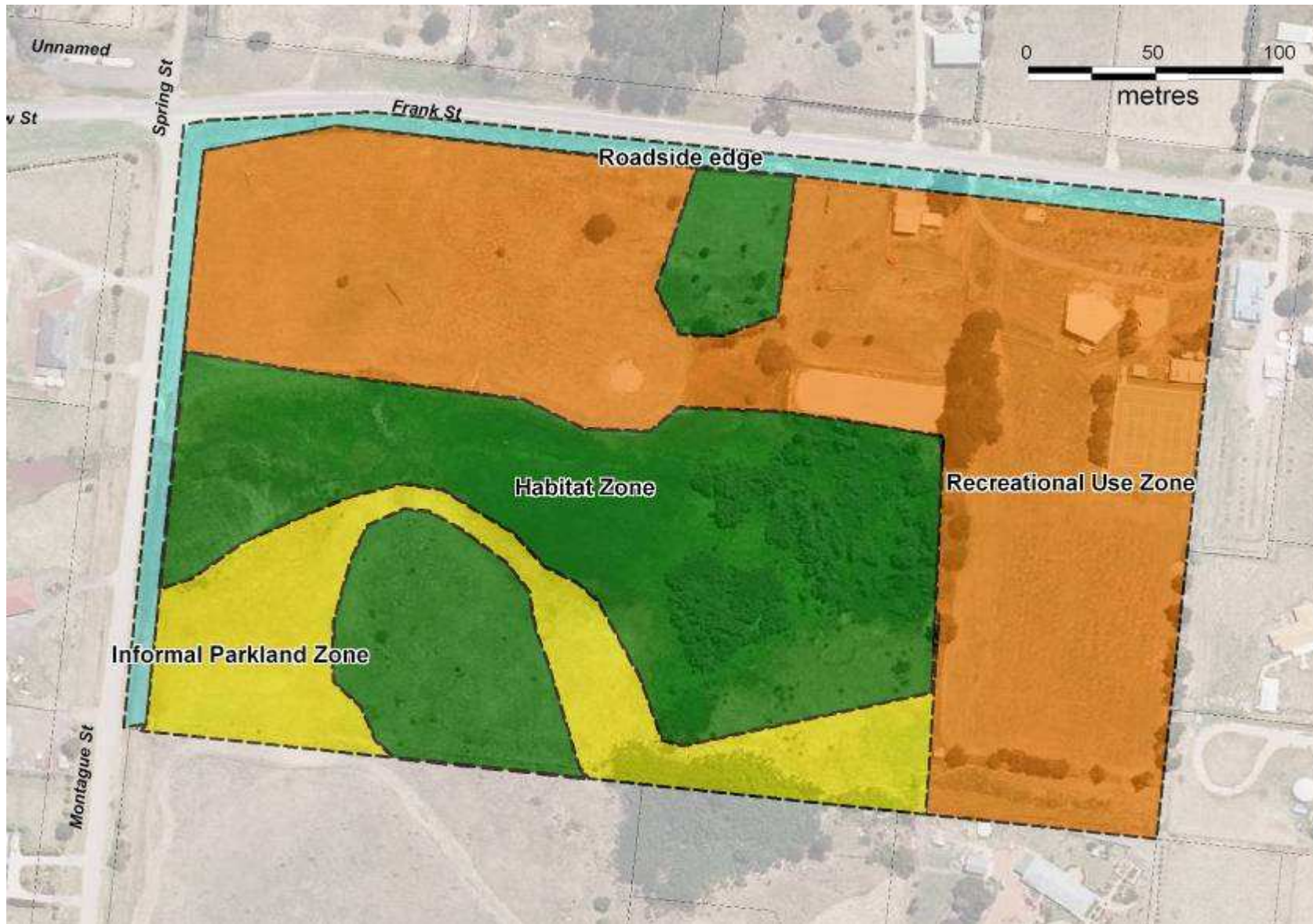
8.3 Appendix 3. Aerial Photo of Beveridge Recreation



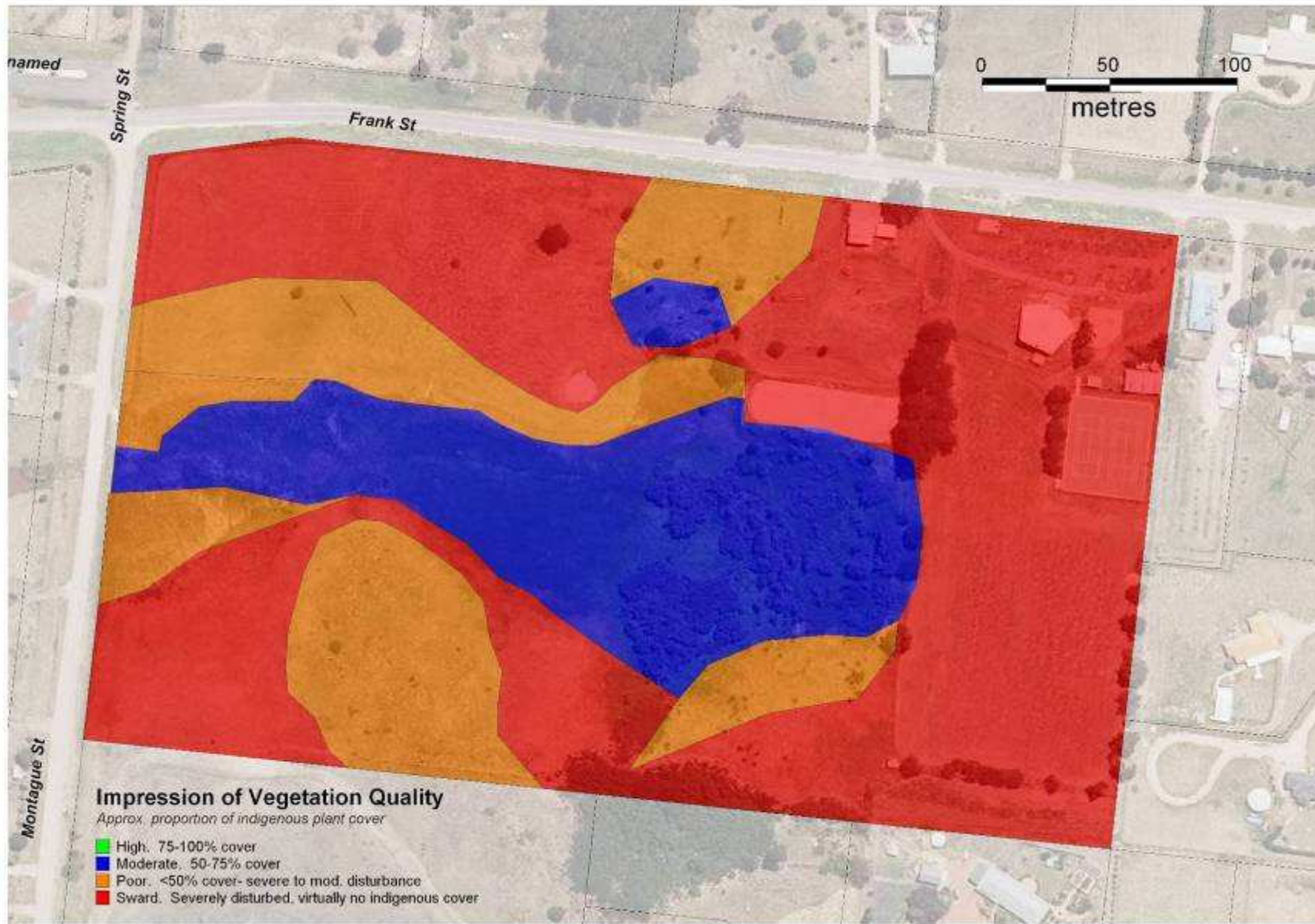
8.4 Appendix 4. Conjectural Map of EVCs for Beveridge Recreation Reserve



8.5 Appendix 5. Vegetation Management Zones for Beveridge Recreation Reserve



8.6 Appendix 6. Impression of Vegetation Quality (July 2010)



8.7 Appendix 7 Photos



The drystone wall on southern boundary has historical, landscape and habitat values.



Native Bush Nettle and sedge species are re-colonising areas where Blackberry is removed from among Swamp Scrub. This is an example of 'assisted regeneration'.



A small area of Stony Knoll on the northern side of the Reserve proved to contain some of the most diverse and intact native vegetation on the site.



An infestation of hundreds of Elm suckers on the southern boundary will require cooperation with the adjoining landholder to control.



This old variety apple tree is an example of an exotic plant that may be retained as a heritage feature without unduly impacting on nearby indigenous vegetation.