Warrnambool City Council

Black-faced Cormorant

Merri River Restoration Strategy

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Introduction:

A major sub-catchment within the Hopkins River Basin the Merri River rises near Penshurst in western Victoria discharging at Pickering Point, southwest of Warrnambool. Within the boundaries of the Warrnambool City Council (WCC), the river winds for 25.9 km, flowing through a mixture of farming, residential and industrial lands. The catchment of the lower Merri River encompasses most of the urban area of Warrnambool, with the exception of some land in East Warrnambool belonging to the Hopkins River catchment (ID&A, 2000).

Much of the upper and middle catchment of the river has been cleared for agricultural purposes, including dairy, wool and lamb, beef and cropping Eg: potato production (ID&A, 2000). Urbanisation is having an increasing impact on the lower catchment, with land developed for industrial and residential use. The Draft Merri River Catchment Restoration Plan 2000 states 'that water quality in the lower reaches of the river is poor' with only a small stretch of land at Winslow Gorge containing remnant vegetation along its length.

It is not a coincidence that water quality is poor downstream of areas void of native vegetation. Riparian vegetation assists in the filtration of over land water flows preventing silt, phosphate and nitrate from entering watercourses. This is also a supply of plant material that is utilized by fish and invertebrates for food and/or refuse. The riparian zone is an important habitat for terrestrial fauna for both food and shelter. It also provides shade to rivers, which in turn regulates water temperatures, which assists in the control of aquatic weed and algal growth.

Nationally significant wetlands are located to the southwest of Warrnambool. The Merri River feeds these wetlands that include Kelly's Swamp, Saltwater Swamp and the South Warrnambool Wetlands (Dixon 2002). The river also forms an important link between these areas via the cutting and a series of important flood plains. Flood plains and wetlands form important habitats with many species of fish, insects and birds timing their reproduction with the flooding of these zones (Appendix 3).

Other areas of ecological significance within the lower Merri River include Lake Pertobe and the Swinton St wetlands.

Photo 1: SWINTON ST WETLAND.

A large variety of bird species inhabit these areas permanently or seasonally (Appendix 3). Many of these are listed under the Japanese and Chinese and Australian Migratory Bird Agreements (JAMA & CAMBA). Some of these species are also listed in the Victorian Flora and Fauna Guarantee Act as vulnerable through to critically endangered.

River use within WCC boundaries varies widely, with the principal uses being water for stock, recreational uses such as rowing/canoeing and fishing and stormwater disposal. WCC is presently going through the process of implementing its Stormwater Management Plan.

Warrnambool markets itself extensively as a tourist destination, and this is greatly enhanced by the aesthetic values of the city's rivers. The Merri River estuary is a popular beach area for families over the summer months, and has been included in the Merri Marine Sanctuary, which recognizes the area's outstanding marine species diversity.

This strategy seeks to identify waterway issues along the Merri River within Warrnambool and provide key actions to aid in river restoration. Implementation of these actions will assist in improvements in water quality and biodiversity within the city's boundary.

The poor condition of the lower Merri River and competing demands on water for recreation, industry and farming uses requires that an appropriate management plan be in place to achieve the best environmental outcomes while satisfying stakeholder needs.

Strategy Objectives:

The objectives of this strategy are:

- To improve instream and riparian environments of the Merri River within WCC boundaries.
- To protect environmental and cultural values within and along the river.
- To aid in behavioral changes within council and community management and use of the river.
- To educate the community and council about local environmental issues.
- Increase aquatic quality and biodiversity.

Regional Strategies and Plans:

The Merri River Management Plan supports and is supported by regional and national strategies/plans including:

- Warrnambool Environmental Management Plan, WCC.
- Coastal Wetlands Strategy, WCC.
- South Warrnambool Wetlands Management Plan, WCC.
- Regional Catchment Strategy 2 2002 - 2007, GHCMA.
- Draft Merri River Catchment Restoration Plan, GHCMA.
- Southwest Victoria Regional Coastal Action Plan.
- Victorian Greenhouse strategy.
- National Local Government Biodiversity Strategy.

Water Quality:

Glenelg Hopkins Catchment Management Authority undertakes a Waterwatch program, which consists of community and individuals who form a voluntary water-monitoring network. Water monitoring from numerous sites along the Merri River within Warrnambool suggests that phosphorus levels in the river are elevated, with pH levels slightly alkaline within the lower catchment. Electrical conductivity fluctuates quite a bit within the system, while low dissolved oxygen levels were observed on occasion (Appendix 2).

Salinity is a problem within the middle reaches of the Merri River catchment and this impacts on water quality downstream in locations such as Warrnambool (MRRP, 2000). Elevated nutrient levels from farm runoff, combined with low turbidity and decrease in shade due to the removal of riparian vegetation, are likely to be responsible for the proliferation of algae and aquatic weeds within the studied area. Azolla, known as a water fern has a blue green algae that fixes nitrogen (Boulton & Brock 1999), covers large sections of the river around Wollaston Bridge.

Biodiversity:

Biodiversity encompasses all plants and animals within an area. This includes microorganisms (bacteria) to sand fleas to trout, swamp harrier and aquatic and terrestrial plants. It can also be used to describe habitats and entire eco-systems, for example estuaries, South Warrnambool Wetlands and flood plains.

Flora and fauna diversity in the Warrnambool area has declined drastically since European settlement. It is not known if this rate of decline is continuing or has slowed.

The Merri River provides habitat for many significant and endangered Fauna species. As well as feeding wetlands of national significance the river is home to twenty species of native fish, as well as a Native Water Rat (*Hydromys chrysogaster*) and Platypus (*Ornithorhynchus anatinus*) communities (Douglas, 2002). Department of Primary Industry (DPI) annually release brown trout into the river system in winter. The number released varies from year to year with release sites above and below the Bromfield St weir. In 2002 6,000 were released below the weir with 1,300 released above (pers Com. Department Primary Industry March 2003).

A large number of bird species, both migratory (Japanese and Chinese Migratory Bird Agreement, JAMBA & CAMBA) and permanent residents are dependant on the Merri River system. JAMBA and CAMBA aim to protect both the species and its habitat. The hooded plover (*Thinornis rubricollis*) is has also been recorded within the Lower Merri and is listed as Vulnerable under the Flora and Fauna Guarantee Act (Department of Sustainability Environment).

Riparian habitat has been extensively removed from along the Merri River within Warrnambool. However, if reestablished, riparian areas would enable the re-colonization by a number of species no longer common within Warrnambool. The establishment of riparian vegetation will create a ‘wildlife corridor’ along the river attracting once common species such as the sugar glider (*Petaurus breviceps*), agile antechinus (*Antechinus agilis*) and southern brown bandicoot (*Isoodon obesulus*) as well as smaller reptiles such as lizards.

Sites of Cultural and Historical Significance:

Aboriginal people from the Warrnambool area are from the Kirrae Whurrong Nation east of the Hopkins River and the Gundjit-mara nation west of the Hopkins River. The Kirrae Whurrong people contained approximately 21 clan groups and the Gundjit-mara about 59 with at least 7 dialects spoken from west to east.

Photo 2: WOLLASTON BRIDGE

The lower Merri and estuary were popular food gathering and living areas for the Gundjit-mara people prior to European settlement with Thunder Point midden sites registered on the National Estate.

The catchment as a whole is culturally and historically significant to the local Koori people for native food and water supply and no site in particular is therefore highlighted. Kelly's Swamp was a major meeting place, known as Tarerer, for thousands of people where ceremonies and celebrations took place as well as national agreements to properly manage the areas resources. Today Tarerer is a multi cultural musical festival celebrating the past and the present (Warrnambool Environment Management Plan 2002).

The Land Conservation Council listed Wollaston Bridge (Photo 2), constructed in 1890, as a site of cultural heritage in 1989. Further upstream, near Woodford, is located the remains of Struth's Mill, built in 1847 and the first water powered mill built in Victoria.

SITE DESCRIPTIONS & KEY ACTIONS:

Lower Estuary:

The lower Merri River Estuary, Stanley St Bridge to the mouth, empties into Stingray Bay; Stingray Bay has been included in the Merri Marine Sanctuary, which also includes the Merri and Middle Islands. The South Warrnambool Wetlands also feeds directly from this section of the estuary.

It is used extensively as a family recreational area including fishing by both human and fauna families.

Key Actions
• Remove boxthorn and exotic weed species. • Revegetation work along riverbanks. • Interpretive signage.

Ferrier Drive Reserve: (Map 1):

This area of the river extends between the Stanley and Harris St Bridges. It boundaries consist of the Ferrier Drive Reserve on the west and Lake Pertobe to the east. The eastern bank is heavily vegetated, predominantly with natives, where as the western bank consists of an open grassed flood plain (Photo 3).

Photo 3: Ferrier Drive Reserve.

Revegetation work is presently being carried out within the western area along with a fishing jetty with disabled access.

Key Actions
• Remove exotic weed species. • Revegetation work along riverbanks. • Interpretive signage at viewing platform. • Investigate possible placement of picnic table within reserve area.

Harris Street to Wellington Street: (Map 2):

This run of the river is found between Harris and Wellington St Bridges and consists of flood plains both sides of the rivers (Photo 4). There is a 10m wide strip of land either side of the river that is owned by NRE and is presently leased for stock. A management plan is being prepared by WCC with the aim of fencing and regulating stock access.

Photo 4. Harris Street to Wellington Street.

This area has been identified as a salt marsh habitat, which is Orange-bellied Parrot winter habitat and therefore should be managed to retain the vegetation while improving the water quality of water run-off into the river. As past grazing by kangaroo and wallabies etc would have contained the biomass there is a view that selective grazing, by stock, during selective times of the year may be used. The management of this area is presently being looked at by WCC in partnership with DSE.

Key Actions
• Remove boxthorn and exotic weed species. • Fence both riverbanks to prevent stock access. • Revegetation work along riverbanks. • Interpretive signage at existing viewing platform. • Placement of picnic table in reserve area beside Harris St.

Fairway Block: (Map 3):

This block is designated on WCC plans as a western extension of Denham Dr over Wellington St. Consequently a strip of Public Open Space adjoins the crown land reserve lying along the bank, widening the length of bank available for revegetation.

Photo 5: Fairway Block

The eastern end of the block features 36-40 mature Norfolk Pines in two rows running parallel to the riverbank (Photo 5). A local Landcare Group has carried out some revegetation work in the western corner of the block. Bank topography in the middle section is high with little vegetation behind the fenced plantings, however Boxthorn is regenerating within the revegetation area. The western end of this block consists of a low-lying floodplain with the dominant vegetation consisting of introduced pasture grasses. Properties adjacent to the river have no pastoral purpose and as such, aesthetic values of the area can be enhanced through revegetating without erecting fences between crown & private land. Total bank length of this block is 564m. Access is gained via two WCC owned blocks in Fairway Crescent and from The Wellington St Bridge.

Key Actions
• Remove boxthorn and exotic weed species from amongst Landcare revegetated area & riverbank. • Plant additional plants within Landcare revegetated area and along riverbank on floodplain. • Preserve the Norfolk Pines in the Eastern area and the planting of understory plants. • Investigate possible placement of picnic table between Norfolk Pine rows • Open space on blocks adjoining Fairway Cr blocks maintained for recreational use. • Revegetated crown land should remain unfenced from adjacent private properties

Duirs Block: (Map 3):

Duirs block lies along the north bank of the Merri River between Wellington Street Bridge and Block Street. Its vegetation is composed exclusively of pasture grasses, except for several native shrubs growing up the bank near a viewing platform/jetty at the Duirs Street extension.

Photo 6: Duirs Block

Topographically, this block has a low profile at its eastern end, rising to the middle at the river bend, before lowering again to the west. Parts of the crown land extending along the bank have been incorporated into the properties running parallel to the river. The viewing platform/jetty provides the only established pedestrian access point to the river within the project area. The crown land along this block is 25m in width, with a total bank length of 794m. Access is possible via the Duirs Street extension and Block Street.

Key Actions
• Removal of weeds both mechanically and chemically. • Path construction and maintenance from Duirs St to platform/jetty between revegetation areas. • Revegetate crown land through planting & incorporate with WCC 'Northcote Dr' reserve. • Revegetation to take into account future shared footway along river. • Access from Duirs St to river viewing platform/jetty preserved. • Access to riverbank for launching recreational craft (kayaks/canoes) should be available.

O'Brien Block: (Map 3):

This block is a short section of riverbank at only 193m in length. The crown land reserve is contiguous with private land owned by A C & A King. The eastern paddock of this property incorporates the crown land and allows stock access to the riverbank, causing erosion. Revegetation efforts have been made along the riverbank in front of the residence upon the western block. Access is via private property.

Key Actions
• Fence crown land from paddock to prevent stock access to river. • Revegetate crown land.

Coastal Block: (Map 3):

This block has been greatly ecologically degraded. The absence of fencing allows stock access to the riverbank, combined with the proliferation of boxthorn **Photo** and the resulting rabbit infestation has caused extensive erosion lowering water quality downstream.

Photo 7: EROSION & BOXTHORN ALONG WCC PROPERTY.

Rabbit warrens are extensive along this section, especially upon hillocks where vegetation is especially sparse. At its western end, this block divides some residentially developed areas from the knackery, and accordingly can be planted out to form a barrier between these areas. Total bank length is 1,893m. Neighbouring properties are owned by WCC. Access to this block could not be determined.

Key Actions
• WCC should include environmental protection into their lease agreements. • Fence crown land reserve from riverbank and revegetate. • Combat rabbits through baiting/burrow ripping & the erection of rabbit-proof fencing. • Investigate alternative stock watering methods, pumps etc.

Landmann Block: (Map 4):

This block comprises the land on the north bank of the Merri River from Block Street to the Swinton Street Bridge. At the eastern end, land close to the riverbank is dominated mostly by the presence of a gravel road, with little vegetation restricted to a narrow grass strip and numerous 'shiny-leaf' bushes along the north side of the road. Further west, a combination of paddocks adjoin the river, some fenced, others not to the bridge. The properties adjoining the far west of the block are residential.

Vegetation is mostly pasture grass, with tall, dominant reed communities in sections. Exotic weeds persist in sections, especially in the area near the bridge. Total bank length of this block is 1,852m. Creating an access point to the river near Swinton St Bridge is worth consideration. Other access points are at Landmann St and Wilson Street.

Key Actions
• Remove shiny-leaf and boxthorn from eastern end of Northcote Dr and around bridge. • Preserve reed communities along bank. • Fence crown land from paddocks where not already fenced where needed for stock exclusion. • Create access point for canoes/kayaks near bridge. • Revegetate along the riverbank. • Access to the river for recreational use from bridge should be created near bridge.

Cassady's Bridge Block: (Map 5):

This block is comprised of Public Open Space lying along the south bank of the Merri River from Cassady's Bridge upstream to Morriss Road. The block is 10m wide along 415m of riverbank. Vegetation along this block is predominantly mature Willows and Poplars.

Photo 8: EXOTIC TREE INFESTATION UPSTREAM OF CASSADY'S BRIDGE

Density of these species in places overshadows understory grasses and weeds, resulting in degraded riverbanks with much erosion and root systems that strangle the river. Due to the narrowness of the block, coupled with the hindrance posed by exotic tree infestation, access for works along the block is difficult with access needed to be negotiated with neighbouring landholders. The largest adjacent landholder is Ryan's Properties Pty Ltd.

Key Actions
• Negotiate with adjoining landholders to gain access to block via their properties. • Remove mature willow trees from along riverbank with chemical use eg: injection. • Hemlock to be managed. • Plant out bank with GHCMA suggested species.

Manuka Block: (Map 5 & 6):

This block located at 14 Manuka Drive, is designated Public Open Space and takes in a large stretch of riverbank along a bend. Total bank length upon this block is 238m. Vegetation upon the block is predominantly pasture grass covering most of the central and roadside areas of the block. Along the riverbank numerous exotic tree species are established. Many of these likely do not cause exceptional harm to the river, and may not be of high priority for removal. Access to this block is easily obtained via road access to the block in Manuka Drive.

Key Actions

- Remove exotic trees.
- Plant out spaces along bank with CMA suggested species.
- Plant bed of CMA suggested species within block (see Map 2.1).
- Space for recreation should be maintained on block.
- Bank stabilisation work to be carried out on exposed section of bank.

TARHOOK RESERVE: (Map 7):

This block is comprised of two WCC owned parcels of land at 100 Woodend Rd, between the Mountain Ash Drive subdivision and the Merri River. Total bank length of this block is 531m. Currently this block is leased out to an adjacent landholder for grazing.

A management plan is presently being developed by Paul Gray to conserve a wetland area located upon a northern area of the block. Removal of exotic tree species and revegetation along river would enhance works undertaken within the Russell's Creek project area. Vegetation within the block is predominantly pasture grass with some trees along the bank. The block is easily accessible from both Woodend Rd and Tarhook Rd.

Key Actions

- Negotiate with leaseholder to revegetate banks of property – this could be tied in with wetland preservation plan.
- Fence off riverbank from paddock to protect revegetated area.
- Remove willows and exotic trees.
- Carry out revegetation work along riverbank.
- Fence off wetland for stock exclusion.
- Carry out revegetation of wetland.
- Pathway etc for continue passive recreation use.
- Improve stormwater drainage line and outlet for litter and silt retention.

Membery-Kingston Block: (Map 8):

This block is comprised of two parcels of land (20 Membery Way & riverbank adjacent to 16 Kingston Close).

Photo 9: PLANTED EUCALYPT OVERSHADOWED BY TALL GRASS

The western end of the block is maintained by Parks & Gardens for a playground and public open space. The majority of the eastern end is covered in grasses and exotic weeds up to 1.5m high. Riverbank vegetation is scarce save for weeds and a grove of mature poplar trees near the Membery Way access point and two mature willow trees at the eastern end.

Fence lines with neighbouring properties are lined with native Eucalypts. Some revegetation works have been undertaken already, to mixed success. River red gums, *Eucalyptus camaldulensis*, have been planted in a line through the western end of the block, numbering around ten. Plantings of other Eucalypt species have been undertaken towards the western end of the block, though these have been to limited success due to poor maintenance that has seen grass and weeds overshadow the seedlings. Only fourteen of these were observed, within a height range of 0.7–1.5m. Access to this block is best achieved via Membery Way.

Key Actions

- Mow long grasses & weeds for several months to limit proliferation of hemlock and stimulate growth of Eucalypts planted at eastern end.
- Remove willow and poplar trees from banks along site.
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- Demolish corrugated-iron shed mid-way along bank, as it is an eyesore serving no purpose.
- River access point, currently across park from Membery Way access point, should be upgraded.
- Views of the river from Kingston Close residences should be preserved if non-compromising to environmental goals.
- Plant CMA suggested species along length of bank and in patches throughout block (see Map 2.2).
- Designate some sections of bank to be planted with low-height species to preserve river views.
- Allow room between plantings for future track to run alongside river on this block.

Windsor Block: (Map 8):

This block is comprised of two riverbank land parcels adjacent to private property (10 Windsor Court & 17 Windsor Court). At the eastern end the Merri River bends northwards, increasing bank length within the block. No substantial tree groves grow along the riverbank, though several individual exotic trees persist, including a mature willow at the eastern end. These number no more than seven in total. Other riverbank vegetation is a patchwork of grasses and weeds of low height. No fences exist separating the block from neighbouring paddocks, thus it is assumed that stock can access the river. Fence lines run north–south from the St. Ives subdivision to the riverbank, and shelterbelts of native trees are established along these boundaries, mostly comprised of *Eucalyptus* species. No revegetation has been undertaken on the block itself. Access to the riverbank along this section is limited for large vehicles. Discussion may need to be held with neighbouring private landholders to obtain access for the removal of trees and other works requiring heavy machinery.

Key Actions

- Determine an access point to the block through private property.
- Remove exotic trees from riverbank.
- Construct fences to restrict stock access from neighbouring paddocks and protect plantings.
- Plant CMA suggested species along length of bank and in patches throughout block (see Map 2.2).
- Plant river bend area with low-height species to preserve river views upstream from court.
- Allow room between plantings for future track to run alongside river on this block.

Russell's Creek Block: (Map 8):

This block (Map 2.2) comprises a drainage reserve running along the creek and two contiguous blocks of creek-side public open space. While other urban sections of Russell's Creek have undergone restoration, this section remains degraded, though works performed would be enhanced by those completed upstream. Small clumps of poplar trees grow along the block, numbering 2–3 to each clump. Other vegetation is exclusively pasture grass maintained to a low level along both sides of the creek. Topographically, the areas adjacent to the creek that include public open space are on an incline, with residential subdivisions on the hilltops away from flood-prone areas. A fence demarcates the Kingston Close subdivision from the block, while the eastern boundary is unfenced. However, stock does not graze in the area adjacent to this boundary. Substantial revegetation has been undertaken behind a property on the eastern side of the block, comprising a wide range of *Callistemon*, *Eucalyptus*, *Allocasuarina*, *Banksia* and other genera. Access to this block can be gained through the Membery-Kingston block to carry out any works.

Key Actions

- Remove poplar clumps from creek without furthering erosion.
- Fence eastern side of creek if deemed necessary to divide revegetation from private land.
- Plant CMA suggested species along length of creek (see Map 2.2).

Weir Block: (Map 9):

This block encompasses the road extension of Bromfield Street north of Dalton's Road and the private property at 138 Bromfield Street. Total bank length on block is 376m. Riverbank vegetation mostly comprises weed species along the bank, with several mid-size exotic tree species at intervals.

PHOTO 10: FISH LADDER & WEEDS AT THE WEIR.

A juvenile willow (<3m high) grows adjacent to the weir. Space for car parking and a river access point need to be preserved. Species adapted to high-traffic area are recommended and appropriating the WCC land incorporated into 138 Bromfield St will allow more effective revegetation to be planted. Access to this block is available via the Bromfield St–Dalton's Rd corner.

Key Actions

- Discuss revegetation with the landholder using CMA as an intermediary.
- Remove weeds and exotic trees from the riverbank.
- Place barrier back from weir to prevent parking close to bank and subsequent erosion.
- Consult private landholder and enquire if paddock is intended for grazing. If so, fence from paddock to protect seedlings.
- Investigate planting native grass species along sides of the fish ladder that withstand human traffic.
- Plant limited height species near weir that over time will preserve access to the weir without damaging its structural foundations.
- Plant out CMA suggested species along riverbank and in a shelterbelt running along the Eastern length of the Bromfield St extension.

Ponting Block: (Map 9):

This block is composed of mostly private properties. The western-most parcel is Public Open Space, within which council can implement some revegetation regardless of private co-operation. Upon this parcel, the riverbank portion is currently fenced from the river by a landholder with no lease, thus allowing revegetation to occur within this enclosure upon appropriation. Vegetation within this block is varied between properties. Most feature native trees away from the riverbank, either in shelterbelts, within paddocks or in gardens. All residences are alongside Ponting Dr, with floodplain near the river. Riverbank vegetation is low & scrubby, with many exotic tree species and weeds. The eastern-most property has revegetated riverbank vegetation adjacent to Wollaston Bridge. Access to this block is mainly via private property. Public Open Space at the western end is accessible via Ponting Drive.

Key Actions

- Educate landholders on environmental regeneration and encourage them to improve their properties, emphasizing the riverbank.
- Use eastern-most property as an example to other landholders as to the revegetation that can be undertaken on their properties.
- Encourage the preservation of mature native trees on properties & the removal of exotics.
- Initiate contact between CMA and landholders.
- Appropriate fenced area on Public Open Space at riverbank, leave fence intact & remove weeds/exotic trees from enclosure.
- Plant understory bushes underneath shelterbelt trees on Public Open Space to increase habitat for native animals.
- Revegetate Public Open Space enclosure with CMA suggested species.

Stadium Block: (Map 9):

The future use of this block is uncertain, with the future use of the YMCA stadium in doubt due to the high renovation costs of the building. Enormous potential exists for this block to become the centerpiece of this project, as it is currently a degraded environment in a high profile area. Vegetation on the block is mostly weed and exotic tree species, though 130 Queen's Road boasts possibly the most ecologically important vegetation within the project area – mature *Eucalyptus* and *Allocasuarina* trees of hollow forming age along its southern and eastern boundaries. The weed hemlock dominates the remainder of this parcel.

WCC leases 130 Queen's Road to a nearby landholder, save for the riverbank on which a 'shared footway' connects Wollaston Rd to Queen's Rd. Schoolchildren and walkers exercising all year round use this path. Fences on this block are temporary, while a sturdy safety fence surrounds the BMX track north of the stadium.

Key Actions

- Ensure future site use corresponds with environmental goals. This may involve the retention of riverbank public open space in the future.
- Remove willows/poplars & weeds from riverbank along block.
- Investigate removing exotic trees on west side of stadium and replacement with natives.
- Lease agreement for 130 Queen's Rd should be reviewed with the view to incorporating the block into a riverside reserve with significant mature trees.
- Hemlock within 130 Queen's Rd block controlled, corrugated iron fence demolished and bushes beneath native trees removed.
- Vegetation planted along riverbank should preserve river views along path (see Map 2.3).
- Revegetate along the 'shared footway' with native aesthetic species designed to enhance the aesthetics of the path. This would involve devoting the 4m nearest the track to the planting of native grasses and heath species, behind which bird-attracting medium size bushes (*Banksia*, *Grevillea*, *Hakea*, *Callistemon* etc.) would be planted to a depth of 20m.
- The remaining area of 130 Queen's Road would be devoted to CMA suggested species.

St. James Park Block: (Map 9):

St James Park is a vast reserve containing a wetland area, numerous exotic trees and the historically significant Wollaston Bridge.

Photo 11: ECOLOGICALLY IMPORTANT TREES & DELAPIDATED FENCE ON WCC PROPERTY.

The bridge was built in 1890, is of a unique design and was listed as a site of cultural heritage by the Land Conservation Council in 1989. The reserve is maintained by Parks & Gardens. Pasture grass dominates vegetal cover, with numerous mature willows at the eastern and southern margins, and along the riverbank. Several other European trees inhabit the park, though these are predominantly towards the eastern end. A wetland 'drain' runs northwest–southeast through the path, though vegetation along its course has been poisoned. Extensive erosion has occurred near the bridge, a result of high use for accessing views of the river and recreational canoe/kayak launching.

Revegetation has to be sympathetic to the historical and cultural value of the bridge. The riverbank South of the bridge is known to be habitat inhabited by platypus. The block is readily accessible via Wollaston Road.

Key Actions

- Car parking area should be delineated to reduce spreading erosion caused by vehicles.
- Large willows/poplars should be removed from riverbank downstream of bridge.
- Weeds need to be cleared from the riverbank.
- Investigate the placement of native wood snags into the river at its bend far away from the bridge. Platypuses have been recorded within this reach of the river.
- Wide bank area between the waterline and footway should be revegetated as per plan for corresponding riverbank zone in Stadium Block, varying vegetation to reconcile views of the river with taller riparian vegetation.
- The drain running across the park to be planted to encourage amphibious wetland fauna in the wetter months and filter stormwater prior to entering the river.
- Plant around bridge to reduce erosion & withstand heavy traffic. A narrow path could be left between plantings to minimize harm to vegetation while they are establishing.

Brentwood Park Block: (Map 10):

This block of Public Open Space follows the Merri River's course upstream from Wollaston Bridge along both banks. It adjoins private property along its length, with a residential subdivision on the north bank and paddocks on the south.

PHOTO 12: AZOLA COVER ON MERRI RIVER.

Total bank length within the block is 1,109m. The riverbanks along this block are especially infested with exotic species, with willows and poplars featuring prominently. In areas with less exotic trees, grass overshadows most weed species, growing to a height of over one meter.
The river narrows in sections within this block, which has exacerbated the 'channeling' effect of the willows and established a carpet of the aquatic plant azola, over the water for most months of the year. A high bank runs along the north bank ~250m from the bridge. Recreational access to the river from residences on the north bank needs to be preserved.
Access to the Public Open Space to undertake works will have to be negotiated with private landholders adjacent to the block.

Key Actions

- Obtain landholder cooperation in riverbank restoration plan. This will primarily involve gaining access to public open space through private land.
- Fence property boundaries to keep stock from gaining access to plantings and riverbank.
- Remove willows and poplars replacing them with native vegetation over time to retain bank stability.
- Investigate the placement of native wood snags in river to encourage better river flow and fauna habitat.
- Replace cypress stand adjacent to Wollaston Rd with natives as cypress trees die.
- If non-floodplain areas of private property adjoining reserves are to be subdivided in future, recommend that public open space be obtained at river bend, so wider sections of riparian zone can be restored.

Grange Block 1(Southern) and 2 (Northern): (Map 11):

These two blocks are found on the north and south sides of Grange Road. Block 1 is approximately 230m south of Grange Road and is 30m wide and 62m in length and is the smaller of the two blocks. The riparian vegetation consists of pasture grass and boxthorn. The area is not fenced allowing stock access to the river. Between stock and rabbits sections of the riverbank have been denuded of any form of vegetation and is open to erosion (Photo 13).

PHOTO 13: SHOWS THE EFFECT OF RABBITS AND STOCK ON A SECTION OF UNFENCED RIVERBANK.

Grange block 2 is a larger block at approximately 217m long with a width of 20m. A small section of this area has a shallow vegetation strip of tea tree. There is some stock access in the form of lamas. The Grange Road Reserve is has a continuous southern boundary of boxthorn and is also heavily infested with briar rose.

PHOTO 14: NORTHERN GRANGE BLOCK.

PHOTO 15: LAMAS, NTH GRANGE

Key Actions

- Obtain landholder cooperation in riverbank restoration plan. This will primarily involve gaining access to the southern public open space through private land.
- Fence property boundaries to keep stock from gaining access to plantings and riverbank on both blocks.
- Remove the willow on the southern block.
- Removal of boxthorn and briar rose infestation.
- Revegetation with native species.

Participation

The revegetation/restoration of the Merri River riparian vegetation is not a short-term project. To ensure the success projects need to be well planned and have the correct maintenance requiem in place and carried out.

Work will be carried out on council controlled land with the view of setting an example for private landowners along the full reach of the river. Community groups will be encouraged to participate in the planting and maintaining of restored areas. The creation of 'Friends of the Merri River' group/groups can be investigated in the future. By encouraging the community to take ownership of restored areas a greater awareness of environmental issues affecting our waterways may result.

Youth Employment and Work for the Dole Schemes have successfully carried out environmental projects, which have included Middle Island, Grannies Grave, Russell Creek and Merri River revegetation, pest control and protection works. It is envisioned that council continues its involvement in these programs to enable work on the Merri River projects can continue.

Project Priorities

Due to the cost and logistics it is not possible to carry out the entire suggested projects within the one year. To this end, individual works have been prioritised to ensure that those works undertaken first are those most likely to have the maximum positive impact on the ecological health of the Merri River.

Table 12: Priority works to be carried out on council controlled land along the Merri River.

Block	**Recommended Works**	**Priority**
Fairway	× Removal of weeds & exotic trees × Re-establish native vegetation × Erection of picnic table	High High Low
Duirs	× Fencing of crown land × Building of path to viewing platform × Re-establish native vegetation	Medium Medium High
O'Brien	× Fencing of crown land × Re-establish native vegetation	Medium Medium
Coastal	× Alter lease agreement to include environmental issues × Fencing of crown land × Control rabbits on block × Re-establish native vegetation	High High High High
Landmann	× Removal of weeds & exotic trees × Fencing of crown land × Building of river access point × Re-establish native vegetation	Medium High Low High
Cassady's Bridge	× Removal of weeds & exotic trees × Re-establish native vegetation	Medium High
Manuka	× Removal of weeds & exotic trees × Re-establish native vegetation	Medium Medium
Woodend	× Alter lease agreement to include environmental issues × Removal of weeds & exotic trees × Fencing of WCC land × Re-establish native vegetation	High High High High
Membery-Kingston	× Removal of weeds & exotic trees × Demolish shed × Re-establish native vegetation	High Low High
Windsor	× Removal of weeds & exotic trees	High

	× Fencing of WCC land × Re-establish native vegetation	High High
Russell's Creek	× Removal of weeds & exotic trees × Fencing of WCC land × Re-establish native vegetation	Medium Low High
Weir	× Removal of weeds & exotic trees × Fencing of WCC land × Delineate car parking area × Re-establish native vegetation	High Low Medium High
Ponting	× Removal of weeds & exotic trees × Re-establish native vegetation	High High
Stadium	× Removal of weeds & exotic trees × Place native wood snag in river × Re-establish native vegetation × Establishing 'Friends of the Merri'	Medium Medium Medium High
St. James Park	× Removal of weeds & exotic trees × Delineate car parking area × Clear tree stumps × Place native wood snags in river × Re-establish native vegetation × Planting of vegetation (drain)	High High High Medium High Medium
Brentwood Park	× Removal of weeds & exotic trees × Fencing of WCC land × Place native wood snags in river × Re-establish native vegetation	High Low Medium High
Grange Southern Block	× Removal of weeds × Fencing of WCC land × Re-establish native vegetation	High High High
Grange Northern Block	× Removal of weeds × Fencing of WCC land × Re-establish native vegetation	High High High
Jubilee Park Woodford *	× Removal of cypress pines × Re-establish native vegetation	High High

*Work presently being carried out by community group.
Woolaston Bridge Poplar trees, (weeds) have been removed and revegetation work being carried out by the landowner (Des Crowe), GHCMA and WCC.

Implementation:

The revegetation of the Merri River should be implemented in several stages. The timeframe of the stages will gradually restore riparian vegetation to the riverbanks and neighbouring reserves, allowing an effective and lasting change to occur.

Canopy tree species (e.g. *Eucalyptus, Acacia, Melaleuca* genera) require time to establish themselves within an ecosystem. Their slow early growth rates are compensated for by their ecosystem dominance at maturity. Water and soil resources during early stages of growth are in heavy demand, especially in areas being planted out with many seedlings at one time. Understory plants (e.g. *Banksia, Hakea* genera & Fabaceae, Epacridaceae families) have a faster growth rate.

Ecologically and aesthetically, it may not be ideal to remove all exotic trees from a riverbank area being revegetated at a single time. Ecologically, this can destabilize the bank, causing further erosion and degrading water quality. Aesthetically to view a tree-lined riverbank suddenly stripped of all vegetation is not viewed by everybody as a good thing. A careful balance must therefore be struck between exotic tree removal and revegetation works.

Some exotic tree species are more ecologically degrading than others. Willow trees have dense root systems that can channel rivers and can change their course over time. There root system can be invasive having detrimental effects on platypus feeding and nesting habitats. It is therefore recommended that in areas with large numbers of exotic trees that they are removed over a period of time in conjunction with revegetation work.

Management Issues:

Ongoing management/maintenance of revegetated areas has to be considered by council to ensure that works undertaken do not overburden its maintenance staff. Maintenance will be needed in controlling weeds and the replacement of dead plants however this will reduce as native plants mature out competing many weed species.

Weeds such as gorse and boxthorn will re-shoot from small root sections and will need to be spot sprayed as part of a maintenance requiem. This will be more cost effective than the removal of large plants every few years.

There may be opportunities to enlist the management of revegetated areas to community groups to some degree. A 'Friends of the Merri River' group could be established to undertake replanting and weeding works on a half-yearly basis, lessening the maintenance burden on council's Parks & Gardens department. The utilization of mulch/jute matting in some areas can be used to reduce water use and maintenance time by reducing the need for weeding.

Conclusion:

The Merri River plays an important role in the life of Warrnambool's residents. Not only does it service primary producers as a source of water throughout the district, but it is also a much-utilized recreational asset for the wider community. The Warrnambool City Council, local landowners, Framlingham Aboriginal Trust, GHCMA and a wide range of community groups all have the continued health of the river in their best interests. The implementation of this project will therefore require consultation and partnerships between these stakeholders. Cooperation between council, landowners and community interests will be crucial in the long run in ensuring that any efforts to restore the river remain successful.

Revegetation of environmentally degraded stretches of the Merri River should be a high priority for the Warrnambool City Council. Restoration of its riverbanks within the city will reduce ongoing erosion and other processes leading to the poor water quality currently a problem in the lower reaches of the catchment. Additionally, revegetated areas would help to sustain and allow for the re-colonization of native fauna specie populations within the city.

PHOTO 16: WHITE-FACED HERON

Any effort to fully restore the river requires council to strongly lead by example. As the largest landholder along the Merri River, council should look to revegetate its properties to emphasize the ecological responsibility the community shares for its health. This will be of value in persuading landowners within Warrnambool to carry out similar work within their properties. Work carried that improves both water quality and aesthetics will value add to both council and privately owned land with river frontage.

In the long term council's work can be used to show case the work that is required to be done by other councils and shires along the length of the Merri. To reduce the effects on the lower Merri and rehabilitation work within Warrnambool's boundaries communication with Shires and Councils in the upper reaches of the river will be required. Silt and nutrients etc move down stream affecting the lower reaches of all riverine systems.

Appendix 1: Plant Species

Within this management plan, references are made to suggested species to be planted along various stretches of the Merri River. This has been done as vegetation types vary between habitats, and so a single list is unsuitable. Four lists have been compiled for this plan and are outlined below.

GHCMA recommended species for the Merri River:

The following plant species are those recommended for riparian revegetation along the lower Merri River by the Glenelg-Hopkins CMA. All species listed are available from several local nurseries as well as the Society for Growing Australian Plants. However plants generally need to be ordered in October/November to be propagated for the following autumn planting.

Species	Common name	Description
Acacia mearnsii	Black Wattle	Erect **spreading tree** 7-10m high; widespread and common in open forest on hillsides
Acacia melanoxylon	Blackwood	**Tall tree** 8-30m high; found from coast to ranges, often common at higher altitudes in wet forest
Eucalyptus ovata	Swamp gum	**Tall bushy tree** to 30m high; found in wetter regions of Southern Australia, especially along river systems
Eucalyptus viminalis	Manna gum	**Straight erect tree** to 50m high; found in many environments along Eastern Australia; koala habitat
Melaleuca squarrosa	Scented Paperbark	**Shrub or small tree** to 12m high; widely distributed in Victoria, in heath & open forest, in damp places
Banksia marginata	Silver Banksia	**Shrub or small tree** 2-10m high; widespread from coast to mountains and further inland
Acacia verticillata	Prickly Moses	**Spreading prickly shrub** 1-3m high; found in heath and open forest, often in moist sandy situations
Bursaria spinosa	Sweet Bursaria	**Large shrub** to 5m high; widespread along East coast from Queensland to South Australia

Native grass species:

The following species are suggested for planting around areas requiring easy access. All natives, they grow to low heights and provide habitat for amphibians, lizards and seed-eating birds such as grass parrots.
* Species appropriate for planting in the drain within St James Park.

SPECIES	COMMMON NAME	DESCRIPTION
Danthoria penkillata	Slender Wallaby Grass	**Grass**; habitat for lizards, food for seed-eaters
Danthoria procera	Tall Wallaby Grass	**Grass**; habitat for lizards, food for seed-eaters
Danthoria setacea	Bristly Wallaby Grass	**Grass**; habitat for lizards, food for seed-eaters
Microlaena stipordes	Weeping Grass	**Grass**; habitat for lizards, food for seed-eaters
Poa labillardieri	Tussock Grass	**Grass**; habitat for lizards, food for seed-eaters
Poa poliformis	Tussock Grass	**Grass**; habitat for lizards, food for seed-eaters
Dianella spp. *	Flax Lily	**Rush**; habitat for amphibians & insects
Isolepis nodosa *	Knobby Club Rush	**Rush**; habitat for amphibians & insects
Lomandra longifolia *	Spiny Headed Mat Rush	**Rush**; habitat for amphibians & insects
Kunzea pomifera	Muntriea	**Ground cover**; habitat for amphibians & lizards
Kennedia prostrata *	Running Postman	**Ground cover**; habitat for amphibians & lizards
Patersonia occidentalis	Long Purple Flag	**Australian iris** to 55cm high; beautiful purple flowers

Low growing species:

The following species at maturity grow to a low height. They are therefore ideal for preserving river views from residences and paths over time.

SPECIES	COMMMON NAME	DESCRIPTION
Daviesia breviflora	Leafless Bitter-Pea	**Small erect shrub** to 1.5m high; local & colorful
Daviesia latifolia	Hop Bitter-Pea	**Small erect shrub** to 1.75m high; local & colorful
Leucopogon virgatus	Common Beard-heath	**Small shrub** to 1.5m high; local & pleasant smelling
Melaleuca gibbosa	Slender Honey Myrtle	**Open shrub** to 2m high; likes moist conditions
Dianella revolute	Spreading Flax Lily	**Rush**; habitat for amphibians & insects
Kennedia prostrata	Running Postman	**Ground cover**; habitat for amphibians & lizards
Patersonia occidentalis	Long Purple Flag	**Australian iris** to 55cm high; beautiful purple flowers

Appendix 2:

Using date format 'dd/mm/yy'	Parameter Name (Long)	Units of Measurement	MER001	MER002	MER005	MER010	MER011
23/08/2001	Dissolved Oxygen	mg/l			6		
23/08/2001	Electrical Conductivity	uS/cm			2230		
23/08/2001	Ortho Phosphorus	mg/l P			0.140000001		
23/08/2001	pH	Units			7.5		
23/08/2001	Temperature	Degrees C			11		
23/08/2001	Turbidity	NTU			20		
10/10/2001	Dissolved Oxygen	mg/l				5	
10/10/2001	Electrical Conductivity	uS/cm				2065	
10/10/2001	pH	Units				7.5	
10/10/2001	Temperature	Degrees C				15.5	
10/10/2001	Turbidity	NTU				10	
15/11/2001	Electrical Conductivity	uS/cm			742		
15/11/2001	pH	Units			7		
15/11/2001	Temperature	Degrees C			18		
15/11/2001	Turbidity	NTU			30		
21/11/2001	Dissolved Oxygen	mg/l			5		
21/11/2001	Electrical Conductivity	uS/cm			720		
21/11/2001	Ortho Phosphorus	mg/l P			0.140000001		
21/11/2001	pH	Units			7		
21/11/2001	Temperature	Degrees C			18.20000076		
21/11/2001	Turbidity	NTU			32		
28/11/2001	Dissolved Oxygen	mg/l				12	
28/11/2001	Electrical Conductivity	uS/cm				1295	
28/11/2001	Ortho Phosphorus	mg/l P				0.140000001	
28/11/2001	Temperature	Degrees C				17.79999924	

Using date format 'dd/mm/yy'	Parameter Name (Long)	Units of Measurement	MER001	MER002	MER005	MER010	MER011
28/11/2001	Turbidity	NTU				10	
13/03/2002	Electrical Conductivity	uS/cm			2300		
13/03/2002	pH	Units			8		
13/03/2002	Temperature	Degrees C			20.10000038		
13/03/2002	Turbidity	NTU			10		
17/05/2002	Electrical Conductivity	uS/cm					3900
17/05/2002	pH	Units					7.5
17/05/2002	Temperature	Degrees C					11.1000004
17/05/2002	Turbidity	NTU					10
18/07/2002	Electrical Conductivity	uS/cm					2990
18/07/2002	pH	Units					7.5
18/07/2002	Temperature	Degrees C					11.8999996
18/07/2002	Turbidity	NTU					10
31/07/2002	Electrical Conductivity	uS/cm					3250
31/07/2002	pH	Units					7.5
31/07/2002	Temperature	Degrees C					11.8000002
31/07/2002	Turbidity	NTU					10
14/08/2002	Electrical Conductivity	uS/cm					2790
14/08/2002	pH	Units					7.5
14/08/2002	Temperature	Degrees C					11.1999998
14/08/2002	Turbidity	NTU					10
2/09/2002	Electrical Conductivity	uS/cm					2780
2/09/2002	pH	Units					7.5
2/09/2002	Temperature	Degrees C					12.1000004
2/09/2002	Turbidity	NTU					10
13/09/2002	Electrical Conductivity	uS/cm					3140
13/09/2002	pH	Units					7.5
13/09/2002	Temperature	Degrees C					15.3000002

Using date format 'dd/mm/yy'	Parameter Name (Long)	Units of Measurement	MER001	MER002	MER005	MER010	MER011
13/09/2002	Turbidity	NTU					10
12/11/2002	Electrical Conductivity	uS/cm					1856
12/11/2002	pH	Units					7.5
12/11/2002	Temperature	Degrees C					18.2000008
12/11/2002	Turbidity	NTU					10
27/11/2002	Dissolved Oxygen	mg/l		2			
27/11/2002	Electrical Conductivity	uS/cm		2690			
27/11/2002	Ortho Phosphorus	mg/l P		0.11			
27/11/2002	pH	Units		8			
27/11/2002	Temperature	Degrees C		19.3999996			
27/11/2002	Turbidity	NTU		10			
11/12/2002	Dissolved Oxygen	mg/l	5	6			
11/12/2002	Electrical Conductivity	uS/cm	9000	8000			
11/12/2002	Ortho Phosphorus	mg/l P	0.11	0.06			
11/12/2002	pH	Units	8	8			
11/12/2002	Temperature	Degrees C	17.5	17.6000004			
11/12/2002	Turbidity	NTU	10	10			
18/12/2002	Dissolved Oxygen	mg/l	4	5			
18/12/2002	Electrical Conductivity	uS/cm	1100	1000			2560
18/12/2002	Ortho Phosphorus	mg/l P	0.045	0.045			
18/12/2002	pH	Units	8.5	8			7.5
18/12/2002	Temperature	Degrees C	23.7000008	23.7000008			20.6000004
18/12/2002	Turbidity	NTU	10	16			10
16/01/2003	Dissolved Oxygen	mg/l	5	3			
16/01/2003	Electrical Conductivity	uS/cm	3610	3210			
16/01/2003	Ortho Phosphorus	mg/l P	0.045	0.14			
16/01/2003	pH	Units	8	7.5			
16/01/2003	Temperature	Degrees C	19.2999992	18.7000008			
16/01/2003	Turbidity	NTU	10	18			

APPENDIX 3:

Merri River

COMMON NAME	***SCIENTIFIC NAME***	**COMMENTS**
BIRD		
Caspian Tern	Sterna caspia	Vulnerable/ River mouth
Crested Tern	Sterna bergii	Lower risk near threatened/river mouth
Golden Perch	Macquaria ambigua	Vulnerable/cutting
Great Egret	*Ardea alba*	Endangered/river mouth
Pacific Gull	Larus pacificus	Low risk near threatened/river estuary
Royal Spoonbill	*Platalea regia*	Vulnerable/river mouth

SOUTH WARRNAMBOOL WETLANDS

COMMON NAME	***SCIENTIFIC NAME***	**COMMENTS**
BIRD		
SWW/MP		
Australian Magpie	*Grallina cyanoleuca*	
		Listed in the China-Australia Migratory Birds Agreement (CAMBA)
Bar Tailed Godwit		Listed in the Japan-Australia Migratory Birds Agreement (JAMBA)
Black Duck		
Black faced Shag		
Black Shouldered Kite	*Elanus axillaris*	
Black Swan		
Brown Falcon	*Falco berigora*	
Brown Thornbill	*Acanthiza pusilla*	
Calamanthus		
Caspian Tern		Listed in the China-Australia Migratory Birds Agreement (CAMBA)
Chestnut Teal		
Cisticola (Goldern Headed)		

Crested Tern	*Sterna bergii*	Listed in the China-Australia Migratory Birds Agreement (CAMBA) Listed in the Japan-Australia Migratory Birds Agreement (JAMBA)
Eastern Curlew		Listed in the China-Australia Migratory Birds Agreement (CAMBA) Listed in the Japan-Australia Migratory Birds Agreement (JAMBA)
Eastern Swaphen		
European Gold Finch	*Carduelis carduelis*	
Feral Pigeon	*Columba livia*	
Gannet		
Great cormorant	*Phalcarocorax carbo*	
Great Egret	*Ardea alba*	Endangered
Green shank		
Grey Strike Thrush		
Grey Teal	*Anas gracilis*	
Hoary Headed Crebe	*Larus pacificus*	
House sparrow		
Large White Egret		
Little Black cornorant	*Phalcarocorax sulcirostris*	
Little Grass Bird		
Little Penguin		
Little Pied Cormorant	*Phalcarocorax melanoleuco*	
Long Billed Corellas		
Lttle Racen		
Marsh Tern		
Mask Tern		
Masked Lapwing	*Vanellus miles*	
Moore Hen	*Gallinula SPP*	
Mudlark		
New holland Honeyeater	*Phylidonyris novaehollandiae*	
Pacific Gull	*Larus pacificus*	
Pelican	*Pelecanus conspicillatus*	
Pied Oyster Catcher	*Haematopus longirostris*	
Red Wattled Bird	*Anthochaera carunculata*	
Red Wattled Bird		
Reed warbler		

Royal Spoonbill	*Platalea regia*	Vulnerable
Silver Gull	*Larus nonaehollandie*	
Silvereye		
Sinding Honeyeater		
Skylark	*Alauda arvensis*	
Snipe		
Spotted Turtle dove		
Starlings		
Sulfur Crested cockatoo	*Cacatua galerita*	
Superb Blue Wren	*Malurus cyaneus*	
Swamp Harrier	*Circus approximans*	
Turnstones Common Sandpiper		
Welcome Swallow	*Hirundo neoxena*	
Whistling Kite		
White Faced Heron	*Ardea novaehollandiae*	
White Fronted Chat	*Epthianura albifrons*	
White Ibis	*Threskiornis molucca*	
Willie wagtail	*Rhipidura leucophrys*	
Whiskered Turn	*Chlidonias hybridus*	Lower risk near threatened

MAMMALS

SWW/mp

Swamp Wallabies
White-tailed Water Rat
Ring-tailed Possum

REPTILE

SWW/MP

White-lipped Snake
Tiger Snake
Copper Head Snake
Brown Snake
Skink spp

Amphibians
SWW/MP
Frog spp

Native FLORA
Significant Plant Species SWW/MP

Grassland Cransbill	*Geranium retrosum*	Rare, in Coastal Limestone Shrubland.
Trailing Hemichroa	*Hemichroa pentandra*	Restricted but locally common in Saltmarsh Herbfield, Sub-community.
Thyme Rice-flower	*Pimelea serpyllifolia spp.*	Common in Coastal Limestone Shrubland
White Sebaea	*Sebaea albidiflora*	Rare, probably restricted to Saltmarsh Herbfield Sub-community.
Coast Candles	*Stachousia spathulata*	Common in Coastal Limestone Shrubland.
Austral Seablite	Suaeda australis	Frequent in Saltmarsh Herbfield and uncommon in Coast Tussock-grass Grassland
Coast Bonefruit	*Threlkeldia diffusa*	Common in Coastal Limestone Shrubland and uncommon in Tussock-grass Grassland.

REFERENCES:

ID&A, Natural Resource Managers, 2000. *Draft Merri River Restoration Plan*. ID&A Pty Ltd.

Douglas, S, 2002. *Platypus survey of the Merri River in southwest Victoria*. SW TAFE student report.

Dixon, P 2002. *Evaluation of the status and category of wetlands in the Glenelg Hopkins Region.* Report to Glenelg Hopkins CMA.
(http://www.worngundidj.wias.net.au/nursery.pdf)

Warrnambool Environment Management Plan. Warrnambool City Council.