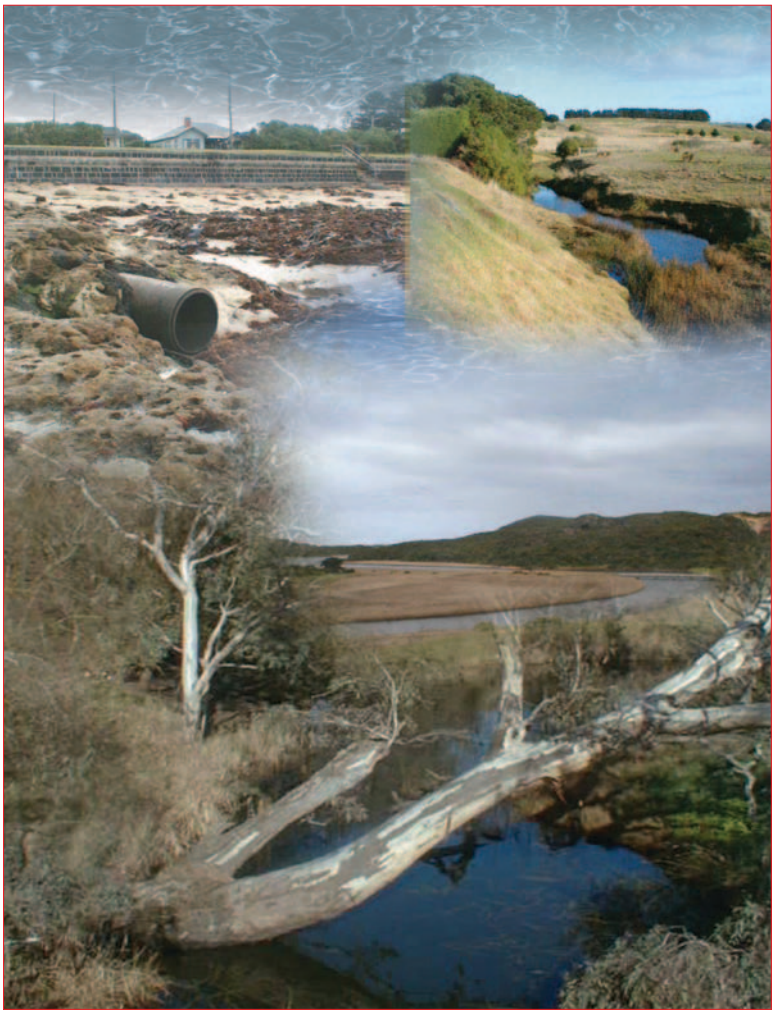
Corangamite Stormwater Management Plan

Volume 1: The Strategies



Corangamite SHIRE

KBR

CORANGAMITE STORMWATER MANAGEMENT PLAN

Volume 1: The Strategies

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1 Introduction

Corangamite Shire Council (The Council) in association with Corangamite Catchment Management Authority (CCMA), the Glenelg Hopkins Catchment Management Authority (GHCMA) and Environment Protection Authority Victoria (EPA) has prepared the Corangamite Stormwater Management Plan (The Plan) to improve the quality of urban stormwater discharged into local waterways.

1.1 WHAT IS THE PURPOSE OF THE CORANGAMITE STORMWATER MANAGEMENT PLAN?

The aim of the Corangamite Stormwater Management Plan is to identify actions to improve the environmental management of urban stormwater and protect the environmental values and beneficial uses of receiving environments. It identifies those activities that may adversely affect water quality and sets in place strategies to protect waterway values and beneficial uses from stormwater runoff. The Plan contains strategies of two types:

- *Reactive management strategies:* developed in response to current threats and activities that have been identified as posing a priority risk to stormwater quality.
- *Management framework strategies:* developed to enhance existing management practices and in doing so avoid any adverse impacts on stormwater quality.

With its focus on protecting water quality, the Corangamite Stormwater Management Plan does not consider hydraulic issues, including the capacity of the drainage system and flooding issues. However, in developing the recommendations to improve water quality, care has been taken to ensure that the recommended actions do not cause flooding or drainage problems. The Plan establishes a common understanding and integrated approach between Council, various government agencies and the community on the protection of stormwater quality in Corangamite Shire.

1.2 WHAT AREA DOES THE PLAN COVER?

The Plan addresses stormwater issues in the receiving waterways in the towns of Camperdown, Cobden, Darlington, Derrinallum, Lismore, Noorat, Port Campbell, Princetown, Simpson, Skipton, Terang and Timboon.

1.3 WHY PREPARE A STORMWATER MANAGEMENT PLAN?

Stormwater includes rainfall collected from roofs as well as road run-off, wash-down water and all other water that discharges into the drainage network, rivers, streams, creeks and lakes. Unlike sewage, stormwater is not generally treated before being discharged to local waterways.

Urban development can have a significant impact on stormwater. The clearing of land and the use of impervious surfaces can increase run-off and stormwater flows, which can also lead to erosion and sedimentation. The accidental or deliberate discharge of various pollutants from residential, commercial and industrial areas, as well as from roads and other areas, can flow into local drains and waterways. The individual and cumulative impacts of these pollutants can have a major effect on water quality.

Improved stormwater management is critical in minimising the discharge of pollutants into local waterways. It can be achieved through structural works to capture pollutants and treat runoff (e.g. wetlands, gross pollutant traps and other physical works). It can also be achieved through the use of non-structural measures designed to prevent stormwater being polluted (e.g. the use of planning controls to manage development, revised management practices, community education programmes and other measures).

1.4 WHAT IS THE FORMAT OF THE PLAN?

The Corangamite Stormwater Management Plan comprises two volumes:

- *Volume 1:* summarises the objectives of the Plan, along with the process used to develop the Plan, and the key issues identified during the preparation of the plan. It also contains detailed recommendations to improve stormwater quality and management throughout the municipality.
- *Volume 2*: provides additional information, including a detailed analysis of stormwater threats, waterway values, priorities and various options to improve urban stormwater quality throughout the municipality. Volume 2 also contains supporting appendices.

This is Volume 1 of the Plan.

1.5 WHO HAS BEEN INVOLVED IN THE PREPARATION OF THE PLAN?

The Corangamite Stormwater Management Plan has been prepared by Kellogg Brown & Root Pty Ltd (KBR) under the supervision of a Steering Committee comprising representatives of Council, CCMA, GHCMA and EPA. A Project Working Group was also established to act as a reference group, providing input on local issues and management opportunities.

A list of representatives in the Steering Committee and Project Working Group is contained in Volume 2, Appendix B.

2 Stormwater planning

The Corangamite Stormwater Management Plan has been prepared in a climate of heightened stormwater awareness and concerns about the need to protect water quality from the adverse impacts of urban development. It complements Landcare and other successful initiatives in rural areas and helps improve overall catchment management by focussing on the water quality threats from urban areas. The following provides an overview of stormwater planning with further details provided in Volume 2, Section 2.

2.1 WHY HAS THE CORANGAMITE STORMWATER MANAGEMENT PLAN BEEN PREPARED?

The Plan is being prepared as part of Council's commitment to the environment and in response to regional catchment initiatives.

The Shire's waterways are valuable assets. In addition to carrying stormwater, they provide important ecological habitats, are attractive recreational areas and in some instances enhance property values. However, urban land use can have a significant impact on water quality by increasing flows and the discharge of sediments, litter, chemicals and other pollutants to the waterways.

Historically, urban drainage systems have been designed to collect, convey and dispose of stormwater in order to minimise damage to property and threats to public safety. With changes in community expectations and legislation, the direction has shifted focus to also consider water quality issues.

Following concerns about stormwater quality, EPA, Melbourne Water and the Municipal Association of Victoria (MAV) formed the Victorian Stormwater Committee. This resulted in the development of stormwater agreements, a number of pilot municipal stormwater plans and the *Urban Stormwater Best Practice Environmental Management Guidelines*, published by the CSIRO.

In 2000, the State Government established the Victorian Stormwater Action Program (VSAP) and appointed the Victorian Stormwater Advisory Committee to oversee the programme. A sum of $22.5 million was allocated over the 3-year period 2000–03 to aid in the development and implementation of municipal stormwater plans and the completion of strategic projects to further advance best practice environmental management of urban stormwater.

2.2 COMPLEMENTARY PROGRAMS

Various Federal, State and Local government initiatives have been undertaken to improve water quality, including the preparation of State Environment Protection Policies and various catchment strategies. The need to improve stormwater quality features prominently in such plans along with the recommendations for councils to prepare their own stormwater plans.

In addition to the above, various initiatives have been undertaken to heighten community awareness of stormwater issues, including: the production of community education material and television advertisements by Melbourne Water and EPA, and community Waterwatch and Streamwatch, programs which collate data on water quality while also improving community awareness of waterway issues.

3 Methodology

A risk-based approach has been used to prepare the Corangamite Stormwater Management Plan. It has involved the identification of waterway values and threats to water quality in each catchment as well as overall management issues. Recommendations have been developed in response to the priority areas of concern. The following provides an overview of the process with further details provided in Volume 2, Section 3.

3.1 HOW HAS THE CORANGAMITE STORMWATER MANAGEMENT PLAN BEEN PREPARED?

The Corangamite Stormwater Management Plan has been prepared in accordance with the revised version of Chapter 3 of the *Urban Stormwater Best Practice Environmental Management Guidelines* (developed by Melbourne Water in 2000). The process is summarised in Figure 3.1.

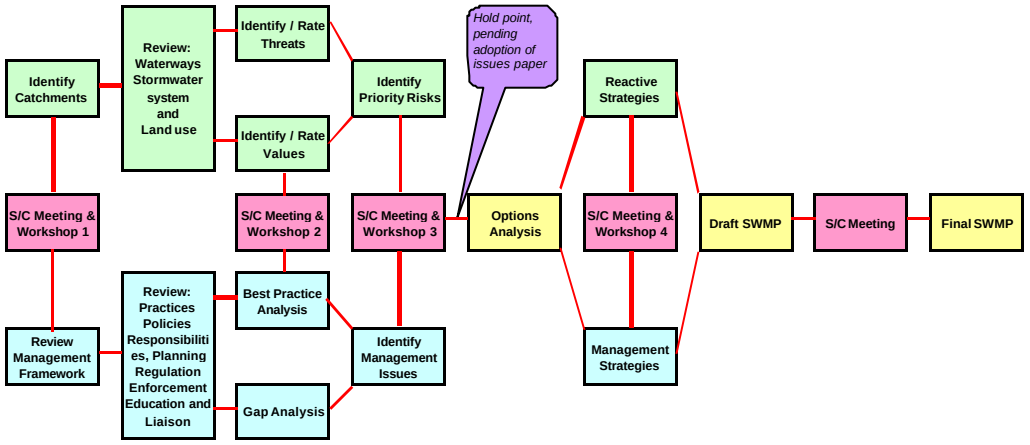

Figure 3.1
THE PROCESS

The process has involved:

- the engagement of, and ongoing consultation with, key stakeholders (both within and external to Council);
- the identification of study catchments and existing land uses, policies, strategies and responsibilities relevant to stormwater management;

- a review of existing stormwater management arrangements and waterway conditions;
- the identification of waterway values and the threats to water quality;
- a risk assessment based on the impacts of key stormwater threats on receiving environmental values;
- the identification of priority management issues;
- the identification of management strategies to address priority issues;
- the development of a framework that allows for implementation, review, and continuous improvement of the Plan.

Information was gathered by reviewing literature and field studies, and through consultation with various stakeholders. Regular meetings and workshops were held with the Steering Committee and Project Working Group to ensure that the Plan responds to local priorities and that the recommended strategies and actions are owned by the stakeholders that are responsible for their implementation. A list of representatives from the Steering Committee and Project Working Group is contained in Volume 2.

3.2 THE RISK ASSESSMENT PROCESS

3.2.1 Identification of waterway values and threats to water quality

Within each of the study areas, waterway values and threats to water quality were identified through a review of existing information, site visits and consultation with the project working group.

Both existing and potential threats and values have been identified.

The values and threats were assigned a rating of very high (4), high (3), moderate (2), low (1) or non-existent/negligible (0).

3.2.2 Risk assessment

A risk assessment process has been used to identify the priority issues of concern. It considers the probability of various threats and their impacts on waterway values due to the sensitivity of each value to each threat. The process is summarised in Figure 3.2.

For each township, the combination of specific threats, values and their sensitivities have been computed in order to determine individual risks.

The major beneficiaries of improved water quality are environmental values (e.g. in-stream and riparian habitat) and contact values (e.g. recreation and extraction/use). However, a large number of the identified risks relate to stormwater impacts on conveyance functions, landscape values and other characteristics that are less susceptible to changes in water quality.

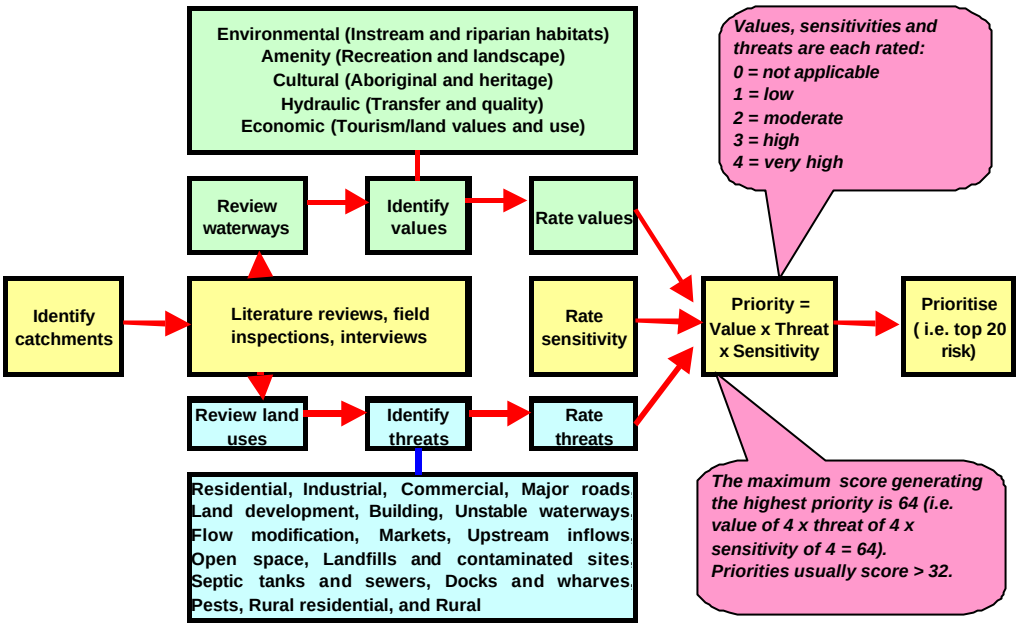

Figure 3.2
THE RISK ASSESSMENT

As the focus of a stormwater management plan is on improving stormwater quality by reducing pollutant loads to local waterways, the environmental and contact values have been used as a means of further refining the priorities, and focussing strategy development in areas that will lead to the greatest efficiencies in stormwater quality management.

3.3 THE MANAGEMENT REVIEW

The management review has involved the identification of current management practices, activities and programmes that contribute to stormwater management within the municipality. They include responsibilities, existing policies, stormwater knowledge, the planning framework, regulatory matters, local laws, community education, operational and contractual issues.

3.4 STRATEGY DEVELOPMENT

The recommendations have been prepared in close consultation with Council officers and representatives of other agencies who have responsibility for the proposed actions.

The reactive management strategies were developed through a process that progressively screened and evaluated a range of best practice management actions in order to identify the most effective options. Initially, a range of generic management actions were considered for each issue to eliminate responses that were not considered to be applicable to the specific stormwater threat.

The options related to:

- education and awareness;
- planning and regulation;
- structural treatment measures including primary (e.g. litter traps and sediment traps), secondary (e.g. grass swales and porous pavements) and tertiary (e.g. artificial wetlands) treatment measures;
- source controls;
- maintenance and operations activities;
- site management;
- information and data collection.

Potentially suitable options were then considered in more detail. This included the identification of specific locations for structural measures, consideration of the advantages and disadvantages of each option opportunity, the preparation of capital and ongoing (maintenance) cost estimates and an analysis of their cost effectiveness.

The management strategies were developed using a slightly different process that focussed on identifying gaps in existing management practices and procedures and developing recommendations aimed at improving specific elements of Council's management framework. Matters considered included:

- changes to the Planning Scheme, including the Municipal Strategic Statement (MSS), local policies and permit conditions;
- changes to specifications for service delivery (engineering standards);
- modifications to the local approvals process;
- opportunities to improve coordination and communication within Council;
- opportunities to improve coordination and communication with external agencies;
- improvements to strategic planning activities;
- ongoing management of infrastructure and operations;
- internal training and skill requirements.

The options were reviewed by the Steering Committee and Project Working Group to ensure that they were capable of being implemented.

An implementation framework was developed to provide Council with guidance on how to resource and coordinate the implementation of the Plan.

4 Municipal profile

The Corangamite Stormwater Management Plan addresses stormwater issues in the main settlements within the Corangamite Shire. The following provides an overview of the study area, the catchments and the waterways with further details provided in Volume 2, Section 4.

4.1 WHAT ARE THE KEY CHARACTERISTICS OF THE SHIRE?

Corangamite Shire is located in the south west of Victoria, approximately 200 km from Melbourne. The Shire is located in the Western Districts and covers an area of approximately 4,600 km^2, extending from Skipton in the north, to the coast of the Southern Ocean in the south. The Woady Yaloak River, Lake Corangamite, Scoullers Road and the Gellibrand River form the eastern boundary while the Curdies River, Ayresford Road and Mount Emu Creek form the western boundary. Corangamite Shire is bounded by the Shire of Moyne in the west, Colac Otway and Golden Plains Shires in the east and the Ararat and Pyrenees Shires in the north (refer Figure 4.1).

The Shire has a population of approximately 18,000 people with the main towns being Camperdown, Terang and Cobden, followed by Skipton, Noorat, Darlington, Timboon, Simpson, Port Campbell, Princetown, Derrinallum and Lismore. These are the urban areas for which the Plan is being prepared.

The Shire is predominantly rural in nature, with large areas of productive agricultural land. Northern areas are used mainly for grazing of sheep and cattle, with some cropping. In the south, dairying is the major agricultural activity and milk production constitutes approximately 60 per cent of the Shire's total agricultural production (Corangamite Municipal Strategic Statement, 2002).

Corangamite Shire contains a number of commercial centres, the largest being in the Shire's population centre of Camperdown. Smaller rural service centres exist in the other urban areas.

A number of major roads traverse the Shire including the Glenelg Highway in the north, the Great Ocean Road in the south and the Hamilton and Princes Highways in the centre. Roads of regional importance include the Camperdown–Lismore Road, Timboon–Port Campbell Road, Terang–Mortlake Road, Camperdown–Cobden Road and Cobden–Port Campbell Road.

While the larger towns are sewered, a number of the smaller towns are unsewered. The Municipal Strategic Statement (MSS) identifies the availability of infrastructure as an important issue, with Council's vision statement acknowledging the role of Council in planning and facilitating economic and social development to enhance quality of life for its citizens while securing a sustainable environment.

The topography of the Shire is variable and includes large expanses of flat plains in the northern area, within which the internationally significant Western District Lakes occur, there are several volcanic cones in the centre and undulating hills close to the coastline. The coast itself is a spectacular mix of escarpments and estuary beaches and features the renowned Twelve Apostles rock formations and the Port Campbell National Park.

A key challenge for the Shire, as identified in the Corangamite Municipal Strategic Statement, is the need for Council to balance its desires and obligations to protect environmental values with its desire to encourage growth in the tourism industry and to maintain a profitable agricultural industry. The Plan focuses on the urban areas and will provide an important vehicle for integrating catchment management principles into the planning scheme, local laws, Council operations and various residential, commercial, industrial and building practices throughout the municipality.

4.2 THE SHIRE'S WATERWAYS

Important waterways within the Shire include the Gellibrand and Curdies Rivers, and Mount Emu, Port Campbell, Browns Waterholes, Kennedys, Powers, Latrobe and Cobden Creeks. Many lakes in the Shire are part of the internationally significant Ramsar listed Western District Lakes. The Western District Lakes consist of Lakes Corangamite, Gnarpurt, Terang, Colongulac, Bookar and Milangil within Corangamite Shire, and Lakes Beeac, Cundare and Murdeduke outside the Shire boundary. Other lakes in the area include Purrumbete, Gnotuk and Bullen Merri. The Southern Ocean is an important water body that forms the southern boundary of the Shire.

Figure 4.2 shows the main waterways within the Shire, while Table 4.1 provides a summary of the waterways relevant to the study areas.

4.3 THE STUDY CATCHMENTS

The focus of the Plan is to manage the impacts of urban areas on stormwater quality, and therefore receiving waterway quality. As such, the Plan targets Corangamite's key urban areas and townships.

Examination of topographic features and land use patterns to focus on urban areas has resulted in the Shire being divided into twelve study areas, defined by the major waterway which drains them. The study areas identified for consideration in the Plan are:

- Camperdown (Lake Colongulac)
- Cobden (Cobden Lake, Cobden Creek and Curdies River)
- Darlington (Mount Emu Creek)
- Derrinallum (Lake Tooliarook)

- Lismore (Browns Waterholes, Mundy Gully Creek and Lake Gnarpurt)
- Noorat (Noorat School natural soakage into groundwater)
- Port Campbell (Port Campbell Creek and the Southern Ocean)
- Princetown (Gellibrand River, Latrobe Creek and the Southern Ocean)
- Simpson (Storage Dam and Kennedy's Creek)
- Skipton (Mount Emu Creek)
- Terang (Pejark Drain, Lake Terang and Mount Emu Creek)
- Timboon (Powers Creek and Port Campbell Creek).

Values and threats identification, risk assessment, and identification of priority management issues and management strategies in the preparation of the Plan are undertaken within the context of each of these twelve towns. The characteristics of the study areas are summarised in Table 4.2.

Table 4.1 The waterways

Waterway	Description
Western District Lakes *(Lake Colongulac, Lake Tooliarook, Lake Gnarpurt and Lake Corangamite)*	The Western District Lakes region is a Ramsar listed wetland area of international significance providing habitat for water birds. The lakes are important for breeding and as a refuge during drought conditions. Important species supported by the lakes include the Freckled Duck, Australasian Shoveler, Banded Stilts, Great Crested Grebe and Eurasian Coots. The lakes listed under the Ramsar classification within Corangamite Shire are Lakes Gnarpurt, Terang, Colongulac, Bookar and Milangil. The lakes occur on the Western Basalt Plains topography and drain much of the surrounding land. The surrounding land use is predominantly rural, with cropping and grazing the major activities. Some of the Lakes (e.g. Lake Gnarpurt) are important to the local eel fishing industry. Lake Gnarpurt and Lake Tooliarook eventually drain to Lake Corangamite.
Gellibrand River	The Gellibrand River is part of the Otway Coast basin. Its headwaters are within the forested Otway Ranges in Colac Otway Shire, and the river flows through this region and out onto coastal plain topography before entering Corangamite Shire and forming the boundary between the two shires for part of its length. Within Corangamite Shire, land use adjacent to the river is mainly rural and includes activities such as dairying and cropping. The river discharges into the Southern Ocean at Princetown, where the river forms a large estuarine area, and is an important area for fish breeding, spawning and nursery purposes. The river has a particularly significant assemblage of native freshwater fish and is the best Blackfish habitat in Victoria. At the mouth of the river, land use consists of conservation zones, with the Port Campbell National Park on the west and the Otway National Park in the east.
Mount Emu Creek	Mount Emu Creek is part of the Hopkins River basin and is the western most waterbody in the Shire, forming the boundary between Corangamite and Moyne Shires for part of its length. The creek's headwaters are near Lake Burrumbeet and it flows in a south-westerly direction past the towns of Skipton, Darlington and Terang and eventually discharges into the Hopkins River. The creek flows through volcanic plains terrain where land uses are predominantly rural and include activities such as grazing of sheep and cattle and cropping. The water quality in the upper to middle reaches is generally considered good and a population of platypus is present in the creek.
Browns Waterholes/ Mundy Gully Creek	Browns Waterholes has its headwaters to the north of Lismore near Mingay, while Mundy Gully Creek originates near Bradvale. The two waterways converge just south of Lismore and eventually discharge into Lake Gnarpurt. The waterways flow through volcanic plains topography and the land adjacent to them is subject to rural land uses. Browns Waterholes is a chain-of-ponds system, reverting to a series of waterholes in the drier months. The system provides an important drought refuge for several fish and macroinvertebrate species.
Kennedys Creek	Kennedys Creek is an ephemeral creek that has its headwaters just south of the Simpson township and flows in a westerly direction to discharge into Cooriemungle Creek, which discharges in turn to the Curdies River. The creek flows over coastal plain topography where land use is predominantly rural.
Port Campbell Creek	Port Campbell Creek has its headwaters north of Port Campbell township and flows south through coastal plains topography to discharge into the Southern Ocean at Port Campbell. Surrounding land use is rural with a range of dairying and cropping activities occurring.
Powers Creek	Powers Creek originates to the south-east of Timboon and flows through the township in a north-westerly direction before discharging to the Curdies River. The creek flows through coastal plains topography where land uses are mainly rural and dairying is common.
Cobden Creek	Cobden Creek has its headwater north of the Cobden township. It is ephemeral for much of its length, becoming a semi-permanent stream south of the township. It flows into Cobden township and through the Cobden Lake before eventually discharging into the Curdies River.
Curdies River	Curdies River has its headwaters near Lake Purrumbete. It flows through the Shire in a south-westerly direction before discharging into the Curdies Inlet, which is open to the Southern Ocean at Peterborough. The inlet is an important estuarine habitat for spawning, migration and nursery activities of fish species. Land use along the river is rural with much of the adjacent land being pasture.
Southern Ocean	The Southern Ocean forms the southern boundary of Corangamite Shire and is the discharge point of the Curdies and Gellibrand Rivers and Port Campbell Creek. The ocean is an important tourism feature within the Shire and adjacent land use is predominantly conservation zone (i.e. Port Campbell and Otway National Parks).

4.4 REGIONAL CONTEXT

The waterways of Corangamite Shire are part of two catchment management authority regions, the Glenelg Hopkins and the Corangamite, and part of several river basins, the Hopkins Basin, Otway Coast Basin and Lake Corangamite Basin. Some of the waterways pass through several shires and ultimately drain to the Southern Ocean (refer to Figure 4.1). Accordingly, while the Plan is being developed for the key urban settlements within the municipality, it also has regard to broader regional issues and strategies.

Both agricultural and urban land uses have impacted on water quality in the local waterways. In response to these and other issues, various Federal, State and Local government initiatives have been undertaken or are under way to improve water quality. Examples of such initiatives include state wide policies such as the various State Environment Protection Policies (SEPP) and associated codes of practice (e.g. *SEPP Waters of the Western District Lakes)*, the Victorian Coastal Strategy 2002, and the Strategic Directions Statement for Victoria's Ramsar Sites. Local initiatives include the Western District Lakes Ramsar Site Strategic Management Plan; the Corangamite and Glenelg-Hopkins Catchment Nutrient Management Plans; and the Corangamite Draft Waterway Health Strategy. The need to protect and improve water quality and stormwater quality features in such documents, along with recommendations for councils to prepare municipal stormwater management plans.

The Corangamite Stormwater Management Plan has regard for other catchment strategies and issues and should be integrated and implemented with regard to current plans and catchment strategies to ensure that both local and regional water quality objectives are achieved. The Shires of Moyne, Colac Otway, Golden Plains and Ararat have all either prepared or are in the process of preparing Stormwater Management Plans, offering opportunities for cooperation and integration of strategies and programmes.

Table 4.2 The study catchments

Catchment	Description
Camperdown	Camperdown is the largest population centre within the municipality, with approximately 3,153 people. Land use is made up of a combination of residential areas, a commercial precinct focused along the Princes Highway, isolated areas of industrial activity and a range of open space types (formal and informal). Camperdown's urban stormwater drains via three urban waterways to Lake Colongulac which is a Ramsar listed wetland and forms part of the Western District Lakes network. The lake is recognised as being ecologically, scientifically and hydrologically important. Camperdown's urban area is serviced by a reticulated sewerage system and a combination of piped and open drain stormwater systems.
Cobden	Cobden is the third largest population centre within the municipality, with approximately 1,408 people. Land use consists of residential and rural residential areas. The commercial area is concentrated around Lavers Hill-Cobden Road/Curdies Road. There are also a number of industries within the town, including Bonlac Dairy Foods and a newly developed industrial estate. Open space areas include Cobden Lake, areas along Cobden Creek and formal open space areas such as recreation ovals. Cobden is serviced by reticulated sewerage.
Darlington	Darlington has a small population of approximately 249 people. There are no industrial land uses and a very limited commercial area. Darlington's stormwater drains to Mount Emu Creek. The town is not serviced by a reticulated sewerage system.
Derrinallum	Derrinallum has a small population of approximately 265 people. Land uses include a small area of residential, a small commercial area along the Main Street and an industrial area that primarily services the surrounding agricultural industry. The town's stormwater drains to Lake Tooliarook. Open space areas include a number of formal and informal areas, including schools, recreation parks and ovals. The town is not serviced by reticulated sewerage. Septic systems are aging within the town.
Lismore	Lismore has a small population. Land uses include residential, commercial along either side of High Street and areas of industrial. Open space areas include both formal and informal areas (e.g. Grimwade Park recreation area and the golf course). The town's stormwater drains to Browns Waterholes which in turn drains to Mundy Gully Creek and then into Lake Gnarpurt. There is no reticulated sewerage infrastructure within this town.
Noorat	Noorat has a small population, with approximately 249 people. Noorat has a small residential area and a limited commercial and industrial area, with the main industries and commercial areas being located in nearby Terang. Noorat also has a recreation area. Noorat drains to groundwater via the Noorat school natural soakage. The town is not serviced by reticulated sewerage.
Port Campbell	Port Campbell has a small population, with approximately 281 people. Land use in the town consists of a residential area (permanent and seasonal), a commercial area focused around Lord Street which services local requirements and tourist business (e.g. restaurants, cafes, accommodation); there are no industrial land uses within the town. Open space areas are primarily informal (e.g. foreshore reserve, caravan park backing onto Port Campbell Creek). Port Campbell's urban area drains to the Southern Ocean either directly, or via Port Campbell Creek.
Princetown	Princetown has a small population, with approximately twenty people. The town has a very small residential area, with no future plans of growth. Similarly, there is no industrial land use within the town and a very small commercial area. Open space is limited to a recreation reserve near the Gellibrand River. The town's stormwater drains to the Gellibrand River then into the Southern Ocean. There are approximately 10 to 12 buildings in the town, all of which are on septic systems. A bore located in the reserve provides water.
Simpson	Simpson has a small population of approximately 250–300 people. Land use consists of residential areas, a commercial area concentrated around Gondain Street and a small industrial estate located on the northern outskirts of the town which primarily services the surrounding agricultural industry. The town's urban stormwater drains to Storage Dam which in turn drains to Kennedys Creek. The town has a sewerage system and reticulated water supply.

Table 4.2 continued

Catchment	Description
Skipton	Skipton has a small population, with approximately 453 people. The land use is a combination of residential and rural residential land use. The commercial area is concentrated around Montgomery Street (Glenelg Highway). There are a number of industries, including an eel farm. The town's stormwater drains directly to Mount Emu Creek, which is ecologically significant. Skipton's urban area is not currently serviced by a reticulated sewerage system. There are plans in the near future to introduce a modified sewerage treatment system.
Terang	Terang is the second largest population centre within the municipality, with approximately 1,867 people. Land use is a combination of rural and rural residential, with a commercial area concentrated along High Street. There are also a number of industrial sites within and surrounding the town. There are a range of open space areas, the more formal spaces being focused around Lake Terang (dry). The majority of Terang's urban area (generally north of the highway) drains to Pejark Drain which in turn drains to Mount Emu Creek. Some stormwater south of the highway also drains to Lake Terang, however this is regularly pumped out. Terang's urban area is serviced by reticulated sewerage. Terang has its own sewerage treatment plant. The stormwater system is a combination of open swale drains and underground piped drains. Overall, there is a need for further information with regard to Terang's stormwater system.
Timboon	Timboon has a small population, with approximately 690 people. Land uses consist of residential, a commercial area focused around Timboon-Curdie-Vale Road, open space areas and a small portion of industrial land use, primarily servicing the dairying industry. The town's stormwater drains directly to Powers Creek which in turn drains to Port Campbell Creek. Both creeks are of ecological significance. New reticulated sewerage infrastructure has recently been installed by South West Water to reduce reliance on septic tanks.

5 Values

The key goal of the Corangamite Stormwater Management Plan is to protect and enhance the values of the receiving waterways. A range of values has been identified, including environmental, amenity, cultural, stormwater and economic values. The following provides a summary of the values with further details provided in Volume 2, Section 5.

5.1 WHAT IS A WATERWAY VALUE?

The principal values to be protected by the Plan are described in Table 5.1.

Table 5.1 Typical values

Value category	Specific types	Description
Environmental	In-stream habitat	In-stream ecological values based on water quality, habitat quality and diversity, flora and fauna species, extent of invasion by exotic species and general in-stream condition and stability.
	Riparian habitat/flora	Waterway condition and ecological values based on extent and quality of remnant (native) vegetation, weed infestation and stability of riparian zone.
Amenity	Recreational amenity	Public access and utilisation for passive and active recreation including shared trails, formal linkages, utilisation for activities involving primary and secondary contact, extent of open space, facilities such as car parks and picnic areas, continuity of open space and visual attractiveness.
	Visual/landscape amenity	Aesthetic appreciation of the natural and built environment including consideration of natural and man made structures, landscapes and places of importance, visual access and relationships to adjacent facilities.
Cultural	European cultural heritage	Places and sites of European Heritage value, possibly including sites of pioneering significance, historical buildings and infrastructure, trails and transport routes.
	Indigenous cultural heritage	Places and sites of Indigenous Heritage value such as artefact scatters, landscape and places of significance (e.g. relating to story telling), ceremonial sites (e.g. Bora rings), campsites and trails.
Stormwater	Flood and conveyance	Contribution to protection against flooding including consideration of waterway capacity, designated floodwalls and flood protection infrastructure (e.g. levees).
	Water quality treatment	Contribution to water quality management (including stormwater). This may include existing wetlands or other infrastructure that has been developed to improve water quality.
Economic	Property and tourism	Property value associated with proximity to water and tourist destinations. These may include values associated with visual amenity, access and enjoyment.
	Extraction and use	Other economic benefits associated with receiving waters (e.g. water supply for irrigation).

The values have been assessed for their local and regional significance. Where a value was considered very important to the local community it was given the same rating as if it was considered very important to the region, irrespective of its regional significance. In this way both local and regional values have been considered equally.

Consideration has been given to potential values to cover those instances where a change in conditions may improve the environmental, amenity or economic values of a waterway.

5.2 WHAT ARE THE MOST IMPORTANT VALUES?

Key waterway values (i.e. high and very high values) in the municipality include:

- *Environment (In-stream habitat):* the waterways provide important in-stream habitat for a variety of species. For example, Lake Colongulac and Lake Gnarpurt are both Ramsar listed wetlands, recognised for their scientific, ecological and hydrological values. Similarly, Mount Emu Creek is an important habitat for a range of fish species and for platypus in Skipton. Lake Tooliarook is identified in the Corangamite Planning Scheme as being environmentally significant. The Gellibrand River is an important estuarine environment, providing habitat to twelve native fish species.
- *Environment (Riparian habitat):* the waterways provide important corridors for a range of flora, fauna and avifauna. The riparian habitat values surrounding Lake Colongulac, Curdies River (downstream of Cobden), Lake Gnarpurt, Port Campbell Creek and Powers Creek/Curdies River near Timboon all have very high ratings. In addition, Mount Emu Creek, Lake Tooliarook and the Gellibrand River also have riparian habitat which is of high value.
- *Amenity (Recreation):* there are a range of passive and active recreational opportunities presented by the waterways and their immediate surrounds which are of significant value to the local and regional communities of Corangamite Shire. Extensive pathways exist along a number of waterways, particularly along Powers Creek, Lake Terang and Cobden Lake, with plans to introduce additional pathways to other waterways, such as to Lake Colongulac from Camperdown. Other key uses of waterways throughout the municipality include for swimming, fishing, boating and water skiing. Other important features include the coastal areas of Port Campbell and Princetown, which provide a range of fishing and boating opportunities and passive recreational activities, such as walking.
- *Amenity (Landscape):* the waterways and their environs provide an important natural landscape feature in an urban and rural context. Port Campbell Creek and the Southern Ocean at Port Campbell are good examples of the role of waterways in enhancing the visual character of the town's urban environment, with much of the town's recreational and development activities taking advantage of close proximity to the water. Similarly, Cobden Lake in Cobden and Storage Dam in Simpson provide important landscape features to the towns. Mount Emu Creek, as it flows through Skipton and Darlington, also provides a significant landscape resource. The Gellibrand River and Latrobe Creek's estuarine environment provides a significant landscape element for Princetown.

- *Cultural (Indigenous):* the waterways within the municipality are historically important to the indigenous community, particularly as a food and water source. For example, Noorat was an important meeting location for the local indigenous community, similarly Lake Colongulac, Lake Tooliarook and Mount Emu Creek were important water sources.
- *Stormwater (Conveyance):* a number of the receiving waterways perform an important role as the primary receiver of urban stormwater, in addition a number of the waterways also perform a flood conveyance role.
- *Economic (Property and tourism):* the urban environment is enriched by the proximity of waterways. This is particularly evident in coastal areas such as Port Campbell and Princetown. Anecdotal evidence indicates that the land values around the waterways within coastal areas such as Port Campbell are enhanced by their proximity to the water. Similarly, a number of the waterways serve as attractions for visitors. Lake Colongulac, Cobden Lake and Powers Creek also provide a tourism resource.

Table 5.2 provides a summary of the values in each catchment.

Figure 5.1 shows the location of the very high and high values.

Table 5.2 Summary values

		Catchments											
		Camperdown	Cobden	Darlington	Derrinallum	Lismore	Noorat	Port Campbell	Princetown	Simpson	Skipton	Terang	Timboon
Environmental	In-stream habitat	VH	H	VH	H	VH	N	H	VH	M	VH	M	H
	Riparian habitat	VH	VH	H	H	VH	N	VH	H	M	H	M	VH
Amenity	Recreation	H	H	L	H	L	N	VH	H	L	M	H	H
	Landscape	H	H	M	M	L	N	VH	H	H	H	H	M
Cultural	Indigenous heritage	H	M	M	H	H	M	VH	H	L	M	M	M
	European heritage	M	M	M	L	M	N	H	M	L	M	M	M
Stormwater	Conveyance	L	H	H	H	H	H	M	M	H	H	M	H
	Water treatment	L	M	L	L	L	M	L	L	H	L	L	L
Economic	Property and tourism	H	H	M	M	M	N	VH	H	M	M	M	H
	Extraction and use	H	H	N	M	M	M	M	H	L	M	L	L

Note:

VH = Very High

H = High

M = Medium

L = Low

N = Non-existent/negligible

6 Stormwater threats

Urban development can have a major impact on stormwater. The Corangamite Stormwater Management Plan aims to identify activities that pose the greatest threat to stormwater quality. The following provides a summary of the key threats with further details provided in Volume 2, Section 6.

6.1 WHAT IS A STORMWATER THREAT?

A stormwater threat is an activity or land use with the potential to damage the receiving environment, via impacts to stormwater quantity or quality.

The threats include activities that are currently having an impact on stormwater and those that have the potential to impact on stormwater, including those activities where management approaches may already be in place to minimise the risks.

Common stormwater threats are described in Table 6.1.

Table 6.1 Typical threats

Threat	Cause	Key pollutants and impacts
Residential land use runoff	Atmospheric deposition and build-up from traffic, washing cars, fertiliser application, poor waste management (domestic refuse), lawn clippings and vegetation.	Increased flow, sediment, nutrients, litter, oxygen depleting material, hydrocarbons, pathogens, trace metals, pesticides and surfactants.
Industrial land use runoff	Atmospheric deposition and build-up from traffic, poor waste management, accidental spills and illegal discharges.	Increased flow, sediment, nutrients, litter, oxygen depleting material, hydrocarbons, pathogens, trace metals, pesticides and surfactants.
Commercial land use runoff	Atmospheric deposition and build-up from traffic and poor waste management practices.	Increased flow, sediment, nutrients, litter, oxygen depleting material, hydrocarbons, pathogens, trace metals and surfactants.
Major road runoff	Atmospheric and vehicular deposition and accumulation.	Sediment, litter, trace metals and hydrocarbons.
Land development	Poor sediment and erosion control, uncontrolled wash down of equipment, deposition of sediment, vehicles and spills from construction process (e.g. concreting).	Sediments and nutrients.
Building site runoff (lot scale)	Poor management of building site waste and materials.	Sediment and litter.
Unstable and degraded waterways	Poorly controlled stock and recreational access, weed infestation, damage from waterway works, development encroachment, vegetation loss, and eroded and unstable riparian zones.	Sediment, nutrients and oxygen depleting material.

Table 6.1 continued

Threat	Cause	Key pollutants and impacts
Flow modification	Extraction of water for agricultural purposes.	Reduced flows.
Markets and events	Poor waste management (litter and commercial waste), illegal discharges, atmospheric deposition and build up from traffic and wind blown litter.	Oxygen depleting material, pathogens, sediments, nutrients, litter and surfactants.
Upstream inflows	Runoff from upstream catchments, entering via creeks and waterways.	Sediment, nutrients, litter and pathogens.
Open space runoff (e.g. golf course and sporting grounds)	Wash off of nutrients (fertilisers) and litter from public gardens, parks, sporting facilities, golf courses and discharge of poor quality water from ornamental lakes.	Nutrients, litter and oxygen depleting materials.
Landfill and contaminated sites	Runoff or leaching from landfills and contaminated sites.	Oxygen depleting material, pathogens, sediments, nutrients, litter, trace metals, hydrocarbons and toxicants.
Unsewered properties	Infiltration and overflow from sewerage systems and septic tank.	Oxygen depleting material, pathogens and nutrients.
Docks and wharves	Runoff from wharf areas including atmospheric deposition, spilt raw product, erosion from unsealed areas and accidental spills.	Sediment, raw product (oxygen depleting materials), oils and greases, trace metals and toxic substances.
Pests	Weed invasion and feral pests, including carp.	Sediment, nutrients and oxygen depleting material.
Rural residential	Runoff from unmade roads and septic tanks.	Sediment, nutrients and oxygen depleting material.
Rural	Runoff from unmade roads, septic tanks and intensive activities such as poultry sheds, landscape suppliers etc.	Sediment, nutrients and oxygen depleting material.

Source: Chapter 3, Best Practice Environmental Management Guidelines (2000).

6.2 WHAT ARE THE MAIN STORMWATER THREATS?

There are a number of threats to urban stormwater quality in Corangamite Shire. These include activities that are currently having an adverse impact or could have an adverse impact on water quality, including:

- *Industrial:* the municipality's industrial areas are primarily focused around servicing the agricultural land uses within the municipality. Many of the towns studied as part of the stormwater management plan have some form of industrial land use. There are a number of large scale industries including a range of industries in Camperdown, Bonlac Foods in Cobden and Pivot Fertiliser in Skipton and Timboon, all with the potential to threaten stormwater quality.
- *Major roads:* a number of major roads traverse the Shire including the Princes Highway, Glenelg Highway, the Great Ocean Road and the Hamilton Highway. Roads of regional importance include the Camperdown-Lismore Road, Timboon-Port Campbell Road, Terang-Mortlake Road, Camperdown-Cobden Road and Cobden-Port Campbell Road. Given the volumes, types of traffic and quality of these roads, there is a threat presented, in the form of atmospheric deposits and load spillages. A number of the towns provide a truck stop over function, which in turn leads to increased threats associated with litter and other forms of pollution.

- *Upstream inflows:* the municipality has a large agricultural sector, which includes dairy and grazing (sheep and cattle). These land uses may present a potential threat in terms of increased nutrient and sediment levels entering the waterways further upstream.
- *Septic and sewer:* Camperdown, Cobden, Terang, Timboon, Simpson and Port Campbell are sewered, the remaining towns are unsewered. Issues associated with septic and sewerage leakage and grey water discharge have been identified as a potential threat to urban stormwater quality.
- *Pests:* most receiving waterways within the municipality are experiencing some degree of threat from both weed and animal pests.

Table 6.2 provides a summary of threats in each catchment. Figure 61 shows the location of very high and high threats.

Table 6.2 Waterway threats

Threats	Catchments											
	Camperdown	Cobden	Darlington	Derrinallum	Lismore	Noorat	Port Campbell	Princetown	Simpson	Skipton	Terang	Timboon
Residential	VH	H	L	L	L	L	M	L	M	L	H	M
Industrial	VH	H	L	M	M	M	L	N	M	H	H	H
Commercial	VH	L	L	M	L	M	H	M	M	M	M	H
Major roads	VH	M	M	L	H	M	H	L	M	M	H	M
Land development	L	M	L	L	L	L	VH	M	L	H	L	H
Building sites	M	M	M	M	M	M	H	M	M	M	M	M
Unstable waterways	H	H	M	M	M	N	H	L	M	M	M	L
Flow modification	H	M	L	L	H	L	M	L	M	L	H	L
Markets and events	M	M	M	M	M	M	M	M	M	M	M	M
Upstream inflows	M	M	L	L	M	L	H	H	H	M	H	H
Open space	M	M	L	M	M	L	M	L	L	M	M	H
Landfills etc.	L	L	N	M	N	L	L	N	L	N	N	L
Septic and sewer	L	L	H	H	H	VH	M	M	L	H	M	L
Docks and wharves	N	N	N	N	N	N	H	N	N	N	N	N
Pests	L	M	M	M	M	L	M	M	M	M	M	H
Rural residential	M	M	M	L	M	M	L	L	L	M	M	M
Rural	L	H	L	M	L	L	H	H	H	M	H	H

Note:

VH = Very High *H = High*

M = Medium *L = Low*

N = Non-existent/negligible

7 Priority risks

Stormwater priorities have been determined using a risk based methodology that correlates the threats and values in order to identify the level of risk and the priorities within each catchment. The following provides a summary of the results with further details provided in Volume 2.

7.1 WHAT IS A STORMWATER QUALITY PRIORITY?

For each catchment, the combination of specific threats, values and their sensitivities have been computed in order to determine individual risks.

Table 7.1 summarises the very high and high risks concerning the environmental and contact values of the waterways and in doing so provides a list of priority areas of concern.

Table 7.1 Water quality priorities

Risk	Catchment	Threat	Value(s)
VERY HIGH RISK			
64	Camperdown	Industrial	In-stream habitat
64	Camperdown	Major roads	In-stream habitat and riparian habitat
48	Camperdown	Residential	In-stream habitat
48	Camperdown	Industrial	Extraction/use
48	Darlington	Septic/sewer	In-stream habitat
48	Lismore	Major roads	In-stream habitat
48	Lismore	Septic/sewer	In-stream habitat
48	Port Campbell	Land development	Recreation
48	Skipton	Industrial	In-stream habitat
48	Skipton	Septic/Sewer	In-stream habitat
HIGH RISKS			
36	Camperdown	Residential	Recreation
36	Camperdown	Industrial	Recreation
36	Camperdown	Major roads	Recreation
36	Camperdown	Unstable waterways	In-stream habitat
36	Camperdown	Flow modification	In-stream habitat
36	Cobden	Industrial	In-stream habitat and extraction/use
36	Derrinallum	Septic/sewer	In-stream habitat
36	Lismore	Major roads	Riparian habitat
36	Lismore	Flow modification	In-stream habitat

Table 7.1 continued

Risk	Catchment	Threat	Value(s)
36	Port Campbell	Major roads	In-stream habitat, riparian habitat and recreation
36	Port Campbell	Land development	In-stream habitat
36	Port Campbell	Building sites	Recreation
36	Port Campbell	Unstable waterways	Recreation
36	Port Campbell	Upstream inflows	Recreation
36	Port Campbell	Docks/wharves	In-stream habitat
36	Port Campbell	Rural	Recreation
36	Princetown	Upstream inflows	In-stream habitat
36	Princetown	Rural	In-stream habitat
36	Skipton	Industrial	Extraction/use
36	Skipton	Land development	In-stream habitat
36	Timboon	Industrial	In-stream habitat
36	Timboon	Open space	Riparian habitat
36	Timboon	Pests	In-stream habitat and riparian habitat
32	Camperdown	Residential	Riparian habitat
32	Camperdown	Industrial	Riparian habitat
32	Camperdown	Commercial	In-stream habitat
32	Darlington	Major roads	In-stream habitat
32	Darlington	Pests	In-stream habitat
32	Lismore	Industrial	In-stream habitat
32	Lismore	Pests	In-stream habitat
32	Port Campbell	Land development	Riparian habitat
32	Princetown	Septic/sewer	In-stream habitat
32	Princetown	Pests	In-stream habitat
32	Skipton	Major roads	In-stream habitat
32	Skipton	Pests	In-stream habitat

In summary:

- the highest risk scenarios are industrial land use and major roads impacting on the in-stream and riparian habitat values at Camperdown;
- industrial land use is the dominant threat, resulting in very high risks to in-stream habitat and extraction and use in Camperdown and to in-stream habitat in Skipton. It also poses a high risk to recreation and riparian habitat values in Camperdown; in-stream habitat and extraction and use values in Cobden; extraction and use values in Skipton; and in-stream habitat values at Timboon and Lismore;
- other priority risks include major roads with two very high and eight high risks, septic and sewer with three very high and three high risks and pests with six high risks.

8 Reactive management strategies

Reactive management strategies are developed to address the major threats to environmental values that were identified through the risk assessment process. The strategies contain specific actions that represent the most cost effective and feasible means of managing priority management issues, and will be underpinned by more long-term management framework changes. The following provides an overview of the strategies with further details on their formulation provided in Volume 2.

8.1 WHAT ARE THE REACTIVE MANAGEMENT STRATEGIES?

Strategies have been developed for each of the priority risks, as summarised in Table 8.1.

Table 8.1 Priority management issues

Major threat	Values	Catchments
Industrial	In-stream habitat	Camperdown, Skipton, Cobden, Timboon, Lismore
	Recreation	Camperdown
	Riparian habitat	Camperdown
	Extraction and use	Camperdown, Cobden, Skipton
Major roads	In-stream habitat	Camperdown, Lismore, Port Campbell, Darlington, Skipton
	Recreation	Camperdown, Port Campbell
	Riparian habitat	Camperdown, Lismore, Port Campbell
Septic and sewer	In-stream habitat	Darlington, Lismore, Skipton, Derrinallum, Camperdown, Princetown
Pests	In-stream habitat	Timboon, Darlington, Lismore, Princetown, Skipton
	Riparian habitat	Timboon
Land development	In-stream habitat	Port Campbell, Skipton
	Riparian habitat	Port Campbell
	Recreation	Port Campbell
Residential	In-stream habitat	Camperdown
	Riparian habitat	Camperdown
	Recreation	Camperdown
Commercial	In-stream habitat	Camperdown
	Riparian habitat	Camperdown
Unstable waterways	In-stream habitat	Camperdown
	Recreation	Port Campbell
Flow modification	In-stream habitat	Camperdown, Lismore

Table 8.1 continued

Major threat	Values	Catchments
Upstream inflows	In-stream habitat	Princetown
	Recreation	Port Campbell
Rural	In-stream habitat	Princetown
	Recreation	Port Campbell
Building sites	Recreation	Port Campbell
Open space	Riparian habitat	Timboon
Docks and wharves	In-stream habitat	Port Campbell

8.2 WHAT DO THE STRATEGIES CONTAIN?

The strategies contain a range of recommendations:

- education and awareness (e.g. targeted literature, stormwater management education workshops, signage and community group consultation);
- structural treatment measures (e.g. gross pollutant traps, trash racks, grass swales, porous pavements, wetlands and sewer overflow improvements);
- source controls (e.g. improved waste collection, roof water diversion and waterway rehabilitation and revegetation, designed to control pollutants at the source);
- planning (e.g. highlighting stormwater management in the Local Planning Policy Framework and incorporation of stormwater conditions in planning permit requirements);
- site specific strategies and plans (e.g. sediment and erosion control plans, and zoning provisions);
- information and data collection (e.g. to support, reinforce and supply feedback on the effectiveness of the management measures);
- regulation and enforcement (e.g. effective enforcement will support the successful implementation of many of the management measures).

It is recognised that there is some duplication between strategies (e.g. most refer to the need to develop and distribute educational material). It is also recognised that there are numerous actions and that it would be improbable to expect that they could all be undertaken in the first year.

In response to the above, an overall implementation programme has been developed that consolidates some of the actions, provides timelines for when actions should occur and integrates the reactive management strategies with the management framework strategies.

The reactive management strategies are presented in Appendix A.

The implementation programme is presented in Appendix C.

9 Management framework strategies

A review of current management procedures and responsibilities was undertaken to identify current approaches to stormwater management. While typically focussed on Council, it also considered the responsibilities and actions of other stakeholders. Overall there appears to be a reasonable level of stormwater awareness within Council, although there are a number of areas in which current management approaches could be enhanced. The following provides a summary of the management review with further details provided in Volume 2.

9.1 WHAT ARE THE MANAGEMENT ISSUES?

9.1.1 Who is responsible for stormwater quality management?

Corangamite Shire Council is principally responsible for the management of urban stormwater quality within the Shire, however there are a number of other stakeholder agencies (e.g. CCMA, GHCMA, EPA, VicRoads, South-West Regional Waste Management Group, Parks Victoria, South West Water, the Department of Sustainability and Environment, the Department of Primary Industry and community groups). The successful management of waterways and ongoing improvement in water quality is dependent upon a strong sense of cooperation and clear understanding of responsibilities. Commitment to shared goals and the identification of clearly articulated actions will assist an integrated approach to implementation of desirable stormwater quality outcomes.

9.1.2 What level of commitment and knowledge does Council have to stormwater management?

The Corangamite Shire has made a clear commitment to improving urban stormwater quality in the Shire by seeking the development of this plan.

The *Corangamite Shire Corporate Plan 2001–2004* highlights the value that Council places on the environment and notes one of its five strategic objectives as being 'to lead in our environment management practices'. The plan sets out clear strategies and associated actions to achieve this objective.

Council has prepared both an *Environmental Management Plan and the Corangamite Waste & Litter Education Strategy 1999–2001*.

The successful management of the waterways and an ongoing improvement in water quality will be dependent on Council and other stakeholders having both the commitment to protect stormwater quality and access to the knowledge that is required to ensure best practice in urban stormwater management. Council and other stakeholders need to reinforce their commitment and ensure that they have suitably trained staff to meet this goal

9.1.3 How effective is the existing planning framework?

The Corangamite Planning Scheme, through the Municipal Strategic Statement (MSS) and Local Planning Policy Framework (LPPF), makes reference to the importance of environmental issues including catchment management. Within the LPPF it is recognised that the absence of reticulated sewerage systems within parts of the Shire is an issue for residential development.

The MSS makes reference to the general management of catchments and the need for the Corangamite Planning Scheme to contribute to the protection and enhancement of streams and the catchments in general.

There is an opportunity, through the review of the MSS and LPPF, to include more detailed reference to urban stormwater quality issues and to strengthen Council's statutory and strategic planning approaches to stormwater management.

9.1.4 What regulations does Council have to protect stormwater?

Council relies on the *Litter Act 1987* to address littering issues within the Shire. The majority of Corangamite's local laws relate to stock control. There are no local laws that address sediment and waste control from construction and building sites or the deposition of dog faeces. Local laws currently play no role in planning enforcement. The introduction and enforcement of local laws relevant to stormwater quality protection will assist in the overall management of water quality.

9.1.5 What education programmes exist?

Education and awareness programmes can play a major role in protecting and improving water quality. There is still a reasonably low level of awareness within the community and across the State on stormwater issues, which has led to education programmes by Melbourne Water, EPA, and various catchment management authorities. Developing community awareness is a key strategy as it minimises threats and activities that could pollute the Shire's waterways. In many cases, simple changes in behaviour can vastly reduce stormwater pollution.

9.1.6 Does Council advocate for and develop associations when developing strategies to address stormwater management?

Council has not previously sought funding for stormwater related projects. Council maintains good relations with the CCMA, GHCMA, EPA and neighbouring councils. Opportunities to foster these links should be encouraged. In particular, common stormwater management issues across municipalities should be identified and regional strategies to address them adopted.

9.1.7 Does Council's existing operational regime reflect best practice?

There are stormwater treatment devices installed at Port Campbell (i.e. seven litter traps). Through the development and implementation of the Plan, opportunities to identify other potential locations for the installation of structural stormwater devices should be investigated. Council has an extensive waste management system that includes a kerbside service for household garbage, and recycling is available in all towns. There is an opportunity for further community education regarding waste management and its impact on stormwater quality.

9.2 MANAGEMENT PRACTICES

In many instances priority risks can be directly linked to management practices. Accordingly, the identification of linkages between risk and management issues can play an important role in developing optimum solutions to the protection and improvement of urban stormwater.

9.3 WHAT ARE THE MANAGEMENT FRAMEWORK STRATEGIES?

Management framework strategies have been developed around the following themes:

- policy and commitment
- planning and regulation
- education
- advocacy
- information
- operations.

The strategies are presented in Appendix B.

10 Implementation plan

The implementation framework provides recommendations for effectively implementing the Corangamite Stormwater Management Plan. It has been prepared based upon the outcomes of the management framework review, and in consultation with the Council and Project Working Group.

10.1 HOW WILL THE PLAN BE MANAGED?

It will be important to obtain a clear commitment to improved stormwater management at all levels within Corangamite Shire. It will also be essential that Councillors gain a full appreciation of the issues contained within the Corangamite Stormwater Management Plan and the role they can play in championing the plan within the community. Avenues for achieving this could include the preparation of media releases indicating Councillor support of the adopted Plan. In addition, inclusion of Council's endorsement and overall support of the Plan should be recognised in the Corporate Plan and in the annual budget.

Council employees will also need to develop an understanding of the relevance of the Plan's key attributes to their day-to-day work responsibilities. This could be achieved by an in-house education campaign made available to all units of Council. Recognition of ongoing improvements in best practice management and their implications for ongoing achievement of the Plan's strategies should be shared across council units, as successful outcomes will build the strength and durability of the Plan.

Overall responsibility for implementing the Corangamite Stormwater Management Plan could be undertaken effectively at an executive level. If this was to occur, a small implementation committee could be formed with representatives from key council units at the commencement of the implementation phase to increase the opportunity for ownership of the Plan. The brief of the committee would be to ensure the implementation of the Plan takes place, is coordinated across relevant units of council, and provides a forum for raising issues in terms of the plan's implementation.

10.2 HOW WILL THE PLAN BE INTEGRATED?

The success of this plan will be dependent on the commitment and ongoing integration of activities within council and with relevant government agencies and service providers. The ongoing involvement of key members from those agencies currently represented on the Project Working Group, supplemented with other agencies as relevant (e.g. from the Southwest Regional Waste Management Group) may form a useful mechanism to ensuring integration and effective implementation of the Plan over time.

10.3 HOW WILL THE PLAN BE MONITORED?

One method of measuring the long term success of the Plan is to monitor the delivery and outcomes of implementation. Often the physical impact and effectiveness of specific implementation strategies may be difficult to measure, e.g. the outcomes from education programmes may be difficult to categorise in terms of quantifiable results in water quality improvements. An alternative strategy is to set indicators for the delivery of the implementation program as milestones and benchmark council's and other agency's performance in achieving those milestones.

Ideally milestones should relate to the priority of each specific risk and measure. Such milestones and any monitoring objectives should be identified when Council adopts the Plan and an implementation committee is established to oversee the implementation process.

10.4 WHAT FUNDING IS AVAILABLE?

A substantial funding commitment is required to successfully implement the Corangamite Stormwater Management Plan. The Council has a number of mechanisms through which it can source internal and external funding for stormwater management within the Shire. These include levying rates, user charge schemes, government grants and partnership agreements.

Some potential sources are listed below:

- The EPA is coordinating the Victorian Stormwater Action Program (VSAP), for which $22.5 million was allocated over a three year period to 2003, to improve the environmental management of urban stormwater in Victoria. Funding assistance had to be matched by local governments on a dollar for dollar basis for priority projects identified in stormwater management plans. VSAP funding may be available for a further year in 2004, pending State Government decisions.
- EcoRecycle Victoria works with sixteen Regional Waste Management Groups, which are the key stakeholders in the delivery of most of EcoRecycle Victoria's programmes. In particular they provide a planned basis for implementing best practice in addressing waste and recycling materials.

  EcoRecycle provides a number of funding opportunities. These include:

  – funding support to develop comprehensive facilities to collect, sort, treat and dispose of residuals and implement best practice in transfer station and landfill design and operation;

- kerb-side development programme: provides funding assistance to councils for the implementation of best practice elements for household waste reduction to landfill;
- commercial and industrial: provides funding to support the reduction in commercial and industrial waste generated and disposed to landfill;
- litter infrastructure: assists councils in the purchase of litter trap equipment;
- regional education officers: employment of officers through the regional waste management groups who coordinate and promote a strategic approach to waste and litter education based on the 'Becoming Waste Wise' model.
- resource recovery and waste management facilities: provide support funding for facilities that improve the efficiency and environmentally sustainable collection, transportation, recycling and disposal of material waste and residuals;
- public place and events: to support the development of infrastructure systems;
- sponsorships: provides some sponsorships for industry awards to encourage waste minimisation and resource management;
- litter prevention and control: provides funding to councils for the establishment of litter prevention task forces;
- community grants: as part of Waste Wise Community Participation Programme, funding is provided to Regional Waste Management Groups to assist local initiatives by community organisations to minimise waste and litter.

- Federal and State government funding of community education programmes. Key programmes include Waterwatch Australia, Landcare, the National Heritage Trust, and Coasts and Clean Seas.
- The *Planning and Environment Act* 1987, Part 3B, Development Contributions, provides a mechanism for local government to set up a development contributions plan for the imposition of a development infrastructure levy and or the imposition of a community infrastructure levy in relation to the development of land in the area which the plan applies. This process is applicable in new development situations only.

It is envisaged that most actions will be funded through a variety of sources. In addition to funding opportunities set out above, some of the recommendations may be implemented through community driven schemes. These include community fund raising, corporate sponsorship and in-kind contribution in the form of labour and equipment to undertake works.

Some of the government grants that could be applied to the Plan's implementation strategies (or complimentary strategies identified by the community) would require community groups to be in the lead role in preparing applications for funding and managing the implementation of projects.

Community based strategies may be seen as advantageous to the community in terms of capacity building, incorporation and recognition of local knowledge and expertise, influence and ownership of problem identification and solutions.

10.5 PROGRAMMING

Based on the identified priorities, funding opportunities and the practical ability of Council and other stakeholders to implement the actions, an overall implementation plan has been developed. The implementation plan is presented in Appendix C.

It is anticipated that the total cost to implement the strategies will be as follows:

Year 1: $A363, 800

Year 2: $A258, 500

Year 3: $A268, 500

The above costs are the estimated total costs and do not take into account grants, subsidies and other external funding opportunities. Depending upon Council's success in securing said funding, the actual implementation cost to Council would be less than those indicated.

10.6 CONCLUSION

The Corangamite Stormwater Management Plan is a Council initiative designed to improve environmental conditions within Corangamite Shire.

The Shire contains a number of waterways which are important to the municipality. In addition to carrying stormwater, they provide important ecological habitats, are attractive recreational areas and may enhance the region's economic values.

The Corangamite Stormwater Management Plan identifies actions to improve the environmental management of urban stormwater and protect the environmental values and beneficial uses of receiving environments. It identifies urban activities that may adversely affect waterway quality values and sets in place strategies to protect and enhance water quality and beneficial uses from stormwater runoff. By commissioning and adopting the Plan, the Corangamite Shire Council is demonstrating its commitment to improved stormwater management.

While the success of the Plan will be able to be measured through improved water quality, true success will come through increased awareness of stormwater issues and a change in attitudes designed to avoid the contamination of local waterways.

The challenge for all stakeholders, including Council, partner agencies and the community at large, is to work together and implement the recommendations of the Plan in order to protect and enhance the important environmental, economic, recreational, cultural and hydraulic values of the regional waterways.

Appendix A

REACTIVE MANAGEMENT STRATEGIES

Reactive Management Strategies										
		Actions	Estimated Costs						Cost	
No.	Type	Details	Capital Cost ($)	Ongoing Cost ($)	Respons-ibility	Priority	Comment	Ranking score	Rank
Residential land use									
The purpose of this strategy is to identify opportunities and implement strategies to minimise the impacts of residential land use on Lake Colongulac. Residential land use in Camperdown poses a very high risk to in-stream habitat values and a high risk to recreation and riparian habitat values within Lake Colongulac. Residential land use poses a potential threat to the quality of urban stormwater through atmospheric deposits and build up from traffic; nutrients from washing cars, fertiliser application, lawn clippings and leaf litter (particularly from decidiuous trees); and poor waste management practices. Key pollutants and impacts associated with residential activities include, increased flows, sediment, nutrients, litter, oxygen depleting material, hydrocarbons , pathogens, trace metals, pesticides and surfactants. This strategy provides an integrated approach to address the risk of residential runoff, with key aspects including education and awareness campaigns and initiatives; structural treatment measures; source control measures; and planning and regulation controls. Whilst this strategy has been specifically designed to respond to issues pertaining to Camperdown, the strategies are applicable to a other urban areas within the municipality and can be applied at other locations with minimal additional costs.									
RE1	Education and awareness	Implement a community awareness campaign, including displays, workshops and education material on environmental best practice in property management (e.g. waterwise gardens, vehicle washing, appropriate disposal of garden waste, use of fertiliser on gardens, collection & disposal of dog faeces - particularly in open space areas etc). Utilise EPAV, CCMA, GHCMA material if appropriate and involve the students of schools within Camperdown. The education campaign can be linked with many of Council's current strategies (i.e. Waste and Litter Education Strategy 1999-2001).	15000	5000	Council, CCMA, GHCMA, EPAV	Very high	Education and awareness campaigns have many similar elements. Costs could be reduced by combining with other education strategies or with other Councils	31746.032	7
RE2	Education and awareness	Facilitate a demonstration project showing best practice in stormwater management and WSUD. Investigate ways of including aspects of the site in educational curriculum and involving Camperdown Secondary College. Utilise outcomes from/or become involved in the WSUD project being undertaken by Melbourne Water and the Urban Land Corporation which is investigating community attitudes to WSUD. Utilise and expand on DNRE's Regional Stormwater Education Kit as an educational resource for schools. Localise the information to refer to issues relevant to Corangamite.	10000	2000	Council	High	Costs could be reduced - implement with RE1 actions.	160000	9

		Actions	Estimated Costs					Cost	
No.	Type	Details	Capital Cost ($)	Ongoing Cost ($)	Respons-ibility	Priority	Comment	Ranking score	Rank
RE3	Education and awareness	Undertake drain marking in residential areas. The stencilling can build on the current drain stenciling program and implement an awareness campaign during the stenciling program and investigate opportunities to include Waterwatch as a potential partner and involve primary and secondary school students. Key milestone to stencil 50 stormwater drains by December 2003.	9700	1000	Council stormwater project coordinator, Camperdown Secondary School students	***Very high***	Can be linked with RI1	***29115.646***	***4***
RE4	Education and awareness	Use the local press to publicise Council's initiatives regarding stormwater management, for example notify the community of the development of the stormwater management plan and any associated guidelines or activities such as the preparation of the Lake Colongulac feasibility and concept design project. Time releases to publicise workshops and other education events.	1000	1000	Council	***Very high***	0	***8163.2653***	***3***
RE5	Education and awareness	Incorporate stormwater quality protection in Council's general environmental awareness campaigns and provide stormwater protection information in Council's New Resident Information Packs (mention ways that residents can improve stormwater quality, including actions such as raking up of deciduous leaves and the reuse of grey water on gardens).	0	0	Council	High	No additional cost - undertake as part of existing Council obligations.	0	1
RE6	Education and awareness	Design and develop an environmental trail around significant lakes (e.g. Lake Colongulac) highlighting the importance of the Shire's waterways and how people can protect them. Key features of the trail may include information signs at the stormwater outlets to the Lake and natural features such as bird hides.	65000	5000	Council, CCMA, Tourism Victoria, Parks Victoria and DSE/DPI	Medium	0	36281.179	7
RE7	Education and awareness	Conduct an environmental awards program highlighting BPEM in residential areas. The awards could highlight positive actions taken by both existing residents and new developers. Possibly include as part of the existing environmental awards as part of the Corangamite Shire Business Acheivement Awards.	5000	5000	Council	Medium	Costs could be reduced - implement with other RE8 actions.	40816.327	8

		Actions	Estimated Costs					Cost	
No.	Type	Details	Capital Cost ($)	Ongoing Cost ($)	Respons-ibility	Priority	Comment	Ranking score	Rank
RE8	Education and awareness	Promote and support the Urban Program within the Corangamite Regional Nutrient Management Plan and the Glenelg Hopkins Nutrient Management Plan.	0	0	Council CCMA	Medium	No additional cost - undertake as part of existing Council and CCMA obligations.	0	1
RS1	Structural treatment measure - primary	Undertake a design feasibility and options study to address litter, gross pollutants, commercial, industrial, residential land use runoff and runoff from heavy vehicle parking and major highways. The purpose of the study will be to determine best practice management options including designs and costs provided to Council for improving stormwater quality entering Lake Colongulac via the north western outlet site. Aim to have prepared a draft feasibility and design conceptsby December 2003 and a final design concept and costings by March 2004.	22400	0	Council	***Very high***	Not necessary if the outfalls are redirected towards a wetland.	***7111.1111***	***2***
RS2	Structural treatment measure - primary	Incorporate open swale grass drains in the construction and reconstruction of streets and drains. Proposed kerb and channel works may need to be reassessed. Investigate different mowing regimes for improved water treatment, effectiveness and retrofitting to improve the efficiency of open swale drains for water quality treatment.	0	0	Council	Very high	No additional cost - undertake as part of existing Council obligations.	0	1
RS3	Structural treatment measure - primary	Reform drain outlets to waterways to act as natural sediment and litter traps and to minimise erosion (e.g. the 3 stormwater outlets to Lake Colongulac) particularly along Medanarook Creek.	20000	5000	Council	High	Council	1095238.1	10
RS4	Structural treatment measure - tertiary	Subject to the results of a concept design and feasibility studyof Medanarook Creek to construct a wetland or other appropriate end of pipe treatment and implement appropriate source control measures.	15000	0	Council, CCMA		Costs will be dependant on the outcomes of the design and feasibility study.		
RC1	Source controls	Encourage the installation of rainwater storage and reuse tanks to reduce runoff during storm events and water wise gardening initiatives to conserve water.	0	0	Residents, South West Water	***Very high***	No additional cost - if implemented as part of RE1..	***0***	***6***

		Actions	Estimated Costs					Cost	
No.	**Type**	**Details**	**Capital Cost ($)**	**Ongoing Cost ($)**	**Respons-ibility**	**Priority**	**Comment**	**Ranking score**	**Rank**
RC2	Source controls	Publicise the benefits of diverting roof water to grassed swales or gardens, or other pre-treat options in order to reduce total flows, scouring, sediment and nutrients entering the stormwater system and water costs to residents. Possibly through the establishment of a demonstration site.	0	0	Council, South West Water	Very high	No additional cost - if implemented as part of RC1.	0	1
RI1	Information	Develop a protocol and monitor the volumes of litter, silt and leaves in the drainage system during periodic drain maintenance (cleaning and inspections). Conduct litter surveys before and after drain stencilling by community groups	2700	1000	Council (stormwater project coordinator), Council's operations unit	Very high	0	12789.116	1
RSM1	Site Management	*No practical options identified.*							
RI1	***Information***	***Develop a protocol and monitor the volumes of litter, silt and leaves in the drainage system during periodic drain maintenance (cleaning and inspections). Conduct litter surveys before and after drain stencilling by community groups***	***2700***	***1000***	***Council (stormwater project coordinator), Council's operations unit***	***Very high***		27630.805	***5***
RP1	Planning and regulation	Undertake periodic audits and random inspections of 'hot spot' areas, for illegal dumping of domestic waste. Focus on areas identified by the Waste and Litter Education Strategy. This could be undertaken as part of Council's and SWRWMG's Waste and Litter Education Strategy and the Waste Wise program. Data and information collected should be stored in a central data store with all other litter monitoring data)	0	0	Council, SWRWMG, Schools	Very high	No additional cost - undertake as part of existing Council obligations. Related to I2.	0	1
RO1	Operations	*No practical options identified.*							
Industrial land use									

		Actions	Estimated Costs					Cost	
No.	Type	Details	Capital Cost ($)	Ongoing Cost ($)	Respons-ibility	Priority	Comment	Ranking score	Rank
The purpose of this strategy is to work with the Camperdown, Cobden, Lismore, Skipton and Timboon industrial community to identify opportunities and implement strategies to minimise the impacts of industrial land use on the receiving waterways for each of these towns. Industrial landuse poses a very high risk to in-stream habitat and extraction and use values in the receiving waters of Camperdown (Lake Colongulac) and Skipton (Mount Emu Creek). Industrial land use also poses a high risk to recreation and riparian habitat values in Cobden's receiving waterways (Cobden Lake); a high risk to extraction and use values in Mount Emu Creek in Skipton and in-stream habitat values in Timboon (Powers Creek), Lismore (Lake Gnarpurt, Browns Waterholes and Mundy Gully Creek). Industrial land use poses a threat to these waterways through atmospheric deposition and build up from traffic, poor waste management, accidental spills and illegal discharges. Key pollutants and impacts associated with these sources include, increased flows, sediment, nutrients, litter, oxygen depleting material, hydrocarbons, pathogens, trace metals, pesticides and surfactants. This strategy incorporates a balanced approach to address industrial based threats with key aspects including a number of education and awareness campaigns and ini									
IE1	Education and awareness	Implement an awareness campaign, including displays, workshops and education material relating to best practice at industrial sites for business owners/operators. (Utilise EPAV/CCMA material if appropriate). Where possible coordinate with visits undertaken by the Environmental Health Officer or with the water authorities' trade waste inspections. There may be a possibility to align such a program with the industrial program of the Waste and Litter Education Strategy and promote waste management and stormwater management at the same time. Build on the experiences of the pilot project being conducted in Ballarat - the Ballarat Stormwater Awareness Officer - Project Report - South West Education and Awareness for Industrial premises which is due for release at the end of 2002.	10000	5000	Council, EPAV, CCMA	Very high	Costs could be reduced - implement with other education strategies.	70546.737	3
IE2	Education and awareness	Conduct an environmental awards program highlighting businesses and industries that demonstrate a commitment to being environmentally aware, with particular focus on improving stormwater quality entering Lake Colongulac, Cobden Lake and Mount Emu Creek.	5000	5000	Council	High	Costs could be reduced - implement with other IE1 actions.	952380.95	7
IE3	Education and awareness	Undertake a business survey, advisory audit and education campaign (for example Old Joes Creek in the City of Knox) or neighbourhood improvement program to improve stormwater discharges to Lake Colongulac, Cobden Lake and Mount Emu Creek. Seek information on similar VSAP funded projects from the EPA and use educational information from EPA and CMA's as appropriate.	50000	5000	Council, CCMA, EPAV	High	Costs could be reduced - implement with other IE1 actions.	272108.84	5

		Actions	Estimated Costs					Cost	
No.	Type	Details	Capital Cost ($)	Ongoing Cost ($)	Respons-ibility	Priority	Comment	Ranking score	Rank
IS1	Structural treatment measure - primary	RS1 - feasibility and options study is also applicable to industrial runoff.	0	0	0		Costs are outlined in RS1.		
IS2	Structural treatment measure - secondary	Review the capability of the Camperdown Saleyards stormwater retention system. Seek EPA advice as to best practice in retention systems.	15000	0	Council EPAV	Very high		2222222.2	8
IS3	Structural treatment measure - tertiary	No practical options identified.							
IC1	Source controls	Audit loading, storage and waste storage areas to ensure contaminants (i.e. chemicals, litter, packages etc) are being handled appropriately and disposed of appropriately. This will be particularly important for industries that involve large quantities of chemicals (e.g. Pivot fertiliser). As part of this audit porcess review trade waste connections and illegal connections to the stormwater system.	5000	1000	Council	Medium		31746.032	2
IC2	Source controls	Review access and egress design for all major industrial sites with the aim to minimise potential spills/accidents.	0	0	Council	Medium	No additional cost - implement as part of IC1.	0	1
ISM1	Site management	Encourage the development of site based EMP's for key industrial sites (e.g. dairy and fertiliser sites) to address stormwater, waste management, spill management, chemical storage, bunding, signage etc. For example, use Cobden's new industrial estate as an opportunity to function as a role model for new developments taking place. Utilise information from EPA and other VSAP funded projects in developing the plans.	0	0	Council, EPAV	Very high	No additional cost - undertake as part of existing Council obligations.	0	1
ISM2	Site management	Ensure eel farming premises have adequate SMPs and EMPs in place. Monitor discharge licences which impact on adjoining waterways. Utilise information available from EPA and CMA's.	0	0	Council, EPAV, CCMA	Very high	No additional cost - ake as part of existing Council and agency obligations.	0	1

		Actions	Estimated Costs					Cost	
No.	Type	Details	Capital Cost ($)	Ongoing Cost ($)	Respons-ibility	Priority	Comment	Ranking score	Rank
ISM3	Site management	Review petrol station management, particularly the bunding, chemical storage and litter control procedures, with the aim to bringing all operators up to best practice standards. Utilise information from EPA regarding best practice for bunding, chemical storage etc.	5000	2000	Council, EPAV	Very high		740740.74	6
II1	Information and data collection	Undertake ongoing monitoring of the significant outlet drains (e.g. those discharging to Lake Colongulac, Cobden Lake and Mount Emu Creek) upstream and downstream of industrial premises. Seek EPA involvement in the monitoring and utilise EPA information regarding monitoring techniques and water quality.	15000	15000	Council, EPAV	High		740740.74	6
IPR1	Planning and regulation	Review discharge and waste management practices at all industrial premises through an advisory audit.	10000	5000	Council, EPAV	Very high		126984.13	4
IO1	Operations	*No practical options identified.*							
Commercial land use									
The purpose of this strategy is to work within Camperdown's commercial community to identify opportunities and implement measures to minimise the impacts of commercial land use on Lake Colongulac. Commercial land use runoff poses a high risk to in-stream habitat and riparian habitat values of Lake Colongulac through atmospheric deposition, build up from traffic and poor waste management and associated litter problems. Key pollutants and impacts associated with these sources include, increased flows, sediment, nutrients, litter, oxygen depleting material, hydrocarbons, pathogens, trace metals, pesticides and surfactants. This strategy offers an integrated approach to mitigate commercial threats with key aspects including a number of education and awareness campaigns and initiatives; structural treatment measures; source control measures and site management measures.								
CE1	Education and awareness	Implement an awareness campaign, including displays, workshops and education material for commercial business owners/operators regarding their responsibilities with regard to stormwater management. Target particular issues such as appropriate waste disposal (including disposal of cigarette butts and takeaway food containers), management of loading and unloading of materials and appropriate storage of goods (including chemicals). Use EPAV/CCMA material if appropriate.	10000	2000	Council	High	Costs could be reduced if implemented with other education strategies.	49382.716	5
CE2	Education and awareness	Undertake drain stencilling, with a priority on heavily used or tourist precincts. For example, build on drain stencilling already undertaken in Port Campbell, focusing on stencilling along Lord Street.	2000	1000	Council	Very high	Costs could be reduced if implemented with RE3.	8465.6085	2

		Actions	Estimated Costs					Cost	
No.	Type	Details	Capital Cost ($)	Ongoing Cost ($)	Respons-ibility	Priority	Comment	Ranking score	Rank
CE3	Education and awareness	Install signage at locations of the seven litter traps identifying their location, role and possibly results of monitoring/audits of litter trap contents.	5000	0	Council	Very high		20576.132	3
CS1	Structural treatment - primary	Install litter traps and side entry baskets in areas of high litter e.g. the streets in Port Campbell (Lord Street).	5000	1000	Council, Regional WMG	High		97959.184	4
CS2	Structural treatment - primary	RS1 - feasibility and options study is also applicable to commercial land use runoff.	0	0	0		Costs are outlined in RS1.		
CS3	Structural treatment - tertiary	*No practical options identified.*							
CC1	Source controls	Encourage traders to install cigarette butt containers and provide advice on the available and appropriate disposal options and along Princes Highway (Camperdown) and along Lord Street (Port Campbell).	0	0	Traders, Council	High	No additional cost - undertake as part of existing Council obligations.	0	1
CC2	Source controls	Encourage banks to review ATM operations to reduce street litter, particularly in hotspot areas such as the Princes Highway Camperdown.	0	0	Council	High	No additional cost - undertake as part of existing Council obligations.	0	1
CSM1	Site managment	Liaise with local interest groups to discuss management options for specific commercial areas. Focusing on implementing best practice waste management and recycling programmes.	0	0	Council	High	No additional cost - undertake as part of existing Council obligations.	0	1
CI1	Information	Monitor the outcomes of VSAP funded projects that address commercial runoff and remain up to date with best practice management information. This may be acheived by monitoring the research web pages or outputs from CRC for Catchment Hydrology and CRC for Freshwater Ecology and Melbourne Water, EPAV and MAV.	0	0	Council	High	No additional cost - undertake as part of existing Council obligations.	0	1
CPR1	Planing and regulation	*No practical options identified.*							
CO1	Operations	*No practical options identified.*							

		Actions	Estimated Costs					Cost	
No.	Type	Details	Capital Cost ($)	Ongoing Cost ($)	Respons-ibility	Priority	Comment	Ranking score	Rank
Septic and sewer seepage									
This strategy aims to address the impacts of septic and sewer seepage on the receiving waterways of Camperdown, Derrinallum, Darlington, Lismore, Skipton(although Central Highlands Water is introducing sewerage system to Skipton, this strategy will be relevant until such time as all of Skipton is connected) and Princetown. Septic and sewer seepage is associated with infiltration and overflow from sewerage systems and septic tanks. Key polluntants and impacts associated with this threat, include oxygen depleting material, pathogens and nutrients. Septic and sewer seepage poses a very high risk to in-stream habitats in recieving waterways associated with Darlington and Skipton (Mount Emu Creek) and Lismore (Lake Gnarpurt, Browns Waterholes and Mundy Gully Creek) and a high risk to in-stream habitats in the recieving waterways below Derrinallum (Lake Tooliarook) and Princetown (Gellibrand River and LaTrobe Creek). This strategy presents an integrated suite of activities to address the septic and sewer threat, including education and awareness campaigns and initiatives; source control measures; site management measures; planning and regulation controls; and operations procedures.								
SE1	Education and awareness	Implement a community awareness campaign for residents' with septic treatment systems, utilising displays, workshops and education material. Focus on their maintenance responsibilities, ongoing monitoring requirements and responsible water and waste management practices.	5000	1000	Council	Very high	Costs could be reduced if implemented with other education strategies.	14814.815	2
SE2	Education and awareness	Encourage connection to sewer where and when available, possibly through an incentive program offering rebates or discounted connection fees.	2000	2000	Council, South West Water	Very high	Costs could be reduced - implement with other SE actions.	14814.815	2
SE3	Education and awareness	Promote and support the implementation of relevant actions from the Corangamite Regional Nutrient Management Plan Sewerage Program and the Glenelg Hopkins Nutrient Management Plan Wastewater treatment program.	0	0	Council CCMA, GHCMA	Very high	No additional cost - undertake as part of existing Council obligations.	0	1
SS1	Structural treatment - primary	*No practical options identified.*							
SS2	Structural treatment - secondary	*No practical options identified.*							
SS3	Structural treatment - tertiary	*No practical options identified.*							

		Actions	Estimated Costs					Cost	
No.	Type	Details	Capital Cost ($)	Ongoing Cost ($)	Respons-ibility	Priority	Comment	Ranking score	Rank
SS4	Source control	Advocate either extension of reticulated sewerage system to reach unserviced properties or provision of an alternative waste disposal technique.	0	0	Council, South West Water	High	No additional cost - undertake as part of existing Council obligations.	0	1
SSC1	Source control	Advocate for the use of package treatment plants or neighbourhood waste management systems in Princetown.	0	0	Council, South West Water	High	No additional cost - undertake as part of existing Council and agencyobligations.	0	1
SSM1	Site management	Encourage property owners to ugrade and/or maintain on-site treatment systems so that septic discharges and sullage are retained on site. EPA can provide information regarding the correct operation of septic systems and on approved septic systems (available on the internet). A strategic project to develop a wastewater management database for on-site wastewater systems has been proposed. There is potential for Corangamite Shire to become involved in this project.	0	0	Council, EPAV	High	No additional cost - undertake as part of existing Council and agency obligations.	0	1
SSM2	Site management	Encourage property owners to reuse grey water by diverting it to gardens and lawns.	0	0	Council, South West Water	Very high	No additional cost - undertake as part of existing Council and agency obligations.	0	1
SPR1	Planning and regulation	Review permit documentation (maintain register) and carry out inspections of existing on site waste management systems and enforce maintenance requirements in permits. Investigate opportunities for a regional approach in association with adjoining Councils.	10000	5000	Council and other adjoining Councils	Very high	0	1269841.3	4
SPR2	Planning and regulation	Promote connection to reticulated sewerage, where available. Require annual inspections of septic tanks and the reporting of results to Council.	0	0	Council	Very high	No additional cost - undertake as part of existing Council obligations.	0	1
SI1	Information	*No practical options identified.*							

		Actions	Estimated Costs					Cost	
No.	Type	Details	Capital Cost ($)	Ongoing Cost ($)	Respons-ibility	Priority	Comment	Ranking score	Rank
SO1	Operations	Under existing legislation, perform a review of known septic seepage hotspot areas.	0	0	Council, South West Water	High	No additional cost - undertake as part of existing Council obligations.	0	1
Land development and building sites									
The purpose of this strategy is to work with the communities of Port Campbell and Skipton to identify opportunities and implement strategies to minimise the impacts of land development and building site activity on the receiving waterways of these towns. Threats associated with land development and building site activity are related to poor sediment and erosion control, uncontrolled wash down of equipment, deposition of sediment, poor site waste management and spills or deliberate discharge from sites (eg. washing paint or concrete down drains). Key polluntants and impacts associated with these threat types include sediments, nutrients and litter. Land development activity poses a very high risk to recreation values and a high risk to in-stream and riparian habitats in the receiving waterways of Port Campbell (Port Campbell Creek and the Southern Ocean) and a high risk to in-stream habitat values of Mount Emu Creek at Skipton. Building site activities at Port Campbell pose a high threat to recreation values of Port Campbell Creek and the Southern Ocean. This strategy provides a balanced approach to mitigate the effects of land development and building site runoff with key aspects including education and awareness campaigns and initiatives; source control measures; site management measures; information; planning an								
LE1	Education and awareness	Implement an awareness campaign, including displays, workshops and education material for contractors and developers regarding management of stormwater. Brochures can be used as a guide for contractors when preparing Environmental Management Plans and when preparing documentation to meet quality assurance procedures. Use EPAV/CCMA/GHCMA material as appropriate. Visit sites where best practice has been put in place (e.g. Lynbrook Estate).	5000	1000	Council	Very high	Costs could be reduced if implemented with other education strategies.	6913.5802	2
LS1	Structural treatment - primary	*No practical options identified.*							
LS2	Structural treatment - secondary	*No practical options identified.*							
LS3	Structural treatment - tertiary	*No practical options identified.*							

		Actions	Estimated Costs					Cost	
No.	Type	Details	Capital Cost ($)	Ongoing Cost ($)	Respons-ibility	Priority	Comment	Ranking score	Rank
LSC1	Source controls	Include requirements for source controls in permit requirements (e.g. litter containment on site, use of hay bales/sand bags to prevent sediment escape from site, covering and containment of stock piled materials etc.) and identification of the local waterway (ie. proforma which requires the developer to state how they are going to control ongoing litter and sediment).	0	0	Council	Very high	No additional cost - undertake as part of existing Council obligations.	0	1
LSM1	Site management	Encourage the housing and construction industry to develop a code of practice for environmental management and for control of wastes (including sediment, paints etc) from construction sites.	2000	0	Council	Very high		29629.63	4
LI1	Information	Monitor the outcomes of VSAP funded projects relevant to the land development and building industry and remain up to date with best practice management information (e.g. Control of building and construction site practices for the improvement of stormwater quality- a project involving the Cities of Melbourne, Moonee Valley, Moreland, Hume, Kingston and Casey. It will look at the development of model Local Laws and Codes of Practice).	0	0	Council	Very high	No additional cost - undertake as part of existing Council obligations.	0	1
LPR1	Planning and regulation	Ensure that all permits for subdivisions are granted with conditions relating to sediment control. Consider the application of water sensitive urban design requirements to subdivision and development permits on a case by case basis. Ensure that all subdivision and building sites are appropriately designed and sited with respect to waterways.	0	0	Council	Very high	No additional cost - undertake as part of existing Council obligations.	0	1
LPR2	Planning and regulation	Require land developers to prepare an EMP (including sediment/erosion control initiatives) for land for subdivision activities, particularly target undeveloped areas. Ensure a pre-commencement meeting is held to explain the EMP requirements to contractors.	0	0	Council	Very high	No additional cost - undertake as part of existing Council obligations.	0	1
LPR3	Planning and regulation	Enforce development controls (planning, local laws etc.) through regular site inspections.	0	0	Council	Very high	No additional cost - undertake as part of existing Council obligations.	0	1

		Actions	Estimated Costs					Cost	
No.	Type	Details	Capital Cost ($)	Ongoing Cost ($)	Respons-ibility	Priority	Comment	Ranking score	Rank
LO1	Operations	Investigate opportunities for Council to review its operations procedures relating to construction works and landscaping with a view to improving their responsiveness to stormwater quality issues. Utilise outcomes from the pilot programme being undertaken by LGPro which involves a number of Councils reviewing and developing best practice stormwater protection for construction works, road works and construction activities.	0	0	Council LGPro	Very high	No additional cost - undertake as part of existing Council obligations.	0	1
Major roads									
The purpose of this strategy is identify opportunities and implement strategies to minise the impacts of major road runoff on receiving waterways. Major roads pose a very high risk to in-stream habitat and riparian habitat and a high risk to recreation values in Lake Colongulac and Lake Gnarpurt, Browns Waterholes and Mundy Gully Creek. Major road runoff also poses a high risk to in-stream habitat, riparian habitat and recreation values in Port Campbell Creek and the Southern Ocean, and a high risk to in-stream habitat values of Mount Emu Creek. Major road runoff poses a potential threat to the quality of urban stormwater in terms of atmospheric and vehicular deposition and accumulation which results in sediment, litter, trace metals and hydrcarbon contaminants entering the stormwater system. Accidents resulting in spills of oils, engine coolants or loads are another potential risk. This strategy aims to reduce the impact of major roads through actions including education and awareness campaigns; structural treatment measures; source control measures; site management, information; planning and regulation and operations.								
ME1	Education and awareness	Liaise with the local truck industry (e.g. trucks involved in agricultural/horticultural cartage, timber transport trucks, milk tankers etc) regarding management of loads to avoid spillages, truck maintenance to minimise contaminants accumulating on the road including engine oils, grease, air pollution deposits etc.	0	0	Council, industry reps	Very high	No additional cost - undertake as part of existing Council obligations.	0	1
ME2	Education and awareness	Use the local press to publicise load spillages and the impact they are likely to have on local lakes (including Ramsar sites) and waterways (where possible use actual examples) and point out the measures that truck/vehicle owners and operators can take to minimise reoccurrence.	0	0	Council	Very high	Costs could be reduced - implement with other ME2 actions.	0	1
MS1	Structural treatment measures - primary	Investigate the installation of drainage entrance treatments/inline types (e.g. litter traps, trash racks, return flow litter baskets, circular screens etc) at known vehicle stopover locations, for example near the Caltex Petrol Station in Camperdown, close to waterways along Princes Highway, Hamilton Highway and the Great Ocean Road which carry a substantial amount of traffic.	5000	0	Council, VicRoads	Very high		113378.68	2

		Actions	Estimated Costs					Cost	
No.	Type	Details	Capital Cost ($)	Ongoing Cost ($)	Respons-ibility	Priority	Comment	Ranking score	Rank
MS2	Structural treatment measures - secondary	Investigate opportunities for the installation of grass swales, infiltration trenches or wetlands to treat road runoff the Mount Emu Creek crossing to collect and treat major road runoff.	0	0	Council	Medium	No upfront cost however installation will have a cost that is dependant on the type of measure installed.	0	1
MS3	Structural treatment measures - secondary	Incorporate pre-entrance treatment measures such as filter strips, grass swales, infiltration systems, bio-retention systems (for example, the centre of Geelong triple interceptor pits, porous pavements and oil and grease baffles in main road design.	0	0	Council, VicRoads	Very high	No additional cost - undertake as part of existing Council and VicRoads obligations.	0	1
MS5	Structural treatment - tertiary	*No practical options identified.*							
MSC1	Source controls	Review road drainage in close vicinity to waterways and develop 'emergency' detention basins where feasible so that spillages can be trapped.	5000	5000	Council, VicRoads	Very high		264550.26	3
MSC2	Source controls	Review existing street sweeping regime, checking to ensure that the schedule includes all hot spot areas.	0	0	Council	Very high	No additional cost - undertake as part of existing Council obligations.	0	1
MSM1	Site management	Require environmental management plans including site specific sediment and erosion control plans for road works and other construction activities in road reserves.	0	0	Council, VicRoads	Very high		0	1
MSM2	Site management	Ensure there are adequate litter bins along stopping points on major roads (e.g. at the Caltex petrol station in Camperdown). Encourage programs such as Clean Up Australia Day or Adopt a Highway to target litter along major roads	0	0	Council	Very high	No additional cost - undertake as part of existing Council obligations.	0	1
MI1	Information	Utilise information available through the EPAV (e.g. types and amounts of pollutants generated through road use) in education campaigns.	0	0	Council, EPAV	Very high	No additional cost - undertake as part of existing Council obligations.	0	1

		Actions	Estimated Costs					Cost	
No.	Type	Details	Capital Cost ($)	Ongoing Cost ($)	Respons-ibility	Priority	Comment	Ranking score	Rank
MPR1	Planning and regulation	Liaise with VicRoads to encourage WSUD and water treatment measures, such as the use of detention and treatment areas, in future projects. Utilise current best practice management information as it becomes available (e.g. Cooperative Research Centre for Catchment Hydrology report " Water Sensitive Road Design - Design options for improving stormwater quality road runoff").	0	0	Council, VicRoads	Very high	No additional cost - undertake as part of existing Council obligations.	0	1
MPR2	Planning and regulation	Council, in association with VicRoads, EPAV and the Police, need to reinforce controls with regard to speed limits, securing of loads, vehicle maintenance etc. Promote EPAV initiatives such as reporting people littering from their cars (i.e. phone in their number plate, litterers can be fined).	0	0	Council, EPAV, Vic Roads, Police	Very high	No additional cost - undertake as part of existing Council and agency obligations.	0	1
MO1	Operations	Ensure Council roadworks activities (e.g. spraying, vegetation removal, road maintenance) adhere to best practice guidelines.	0	0	Council	Very high	No additional cost - undertake as part of existing Council obligations.	0	1
MO2	Operations	Introduce controls with regard to best practice environmental management for Council staff, particularly targeting road crews near Lismore, Derrinallum and Skipton.	0	0	Council		No additional cost - undertake as part of existing Council obligations.	0	1
Upstream inflows									
The purpose of this strategy is to work within the communities of Princetown and Port Campbell to identify opportunities and implement strategies to minise the impacts of upstream inflows on Port Campbell Creek, the Southern Ocean, Gellibrand River and La Trobe Creek. Upstream inflows from tributaries higher up the catchment pose a risk to recreation values of Port Campbell Creek and the Southern Ocean and to in-stream habitat values in the Gellibrand River and LaTrobe Creek. Upstream inflows pose a potential threat to water quality primarily due to agricutlural land use activities resulting in contaminants such as sediment, nutrients, litter and pathogens. This strategy incorporates a balanced approach to mitigate the threat of upstream inflows including actions such as education and awareness campaigns, source control measures and site management measures.								
UE1	Education and awareness	Liaise with rural property owners to reduce sediment and pollutant loads washing into creeks that pass through the towns. Use DSE/DPI, CCMA, GHCMA and Landcare material as appropriate and utilise existing Landcare networks.	0	0	Council, DSE/DPI, CCMA, GHCMA	High	No additional cost - undertake as part of existing Council and agency obligations.	0	1

		Actions	Estimated Costs					Cost	
No.	Type	Details	Capital Cost ($)	Ongoing Cost ($)	Respons-ibility	Priority	Comment	Ranking score	Rank
UE2	Education and awareness	Develop, with landcare/friends of groups, localised catchment management plans extending from the upper rural catchments through the urban areas. Seek partnerships with DSE/DPI, CCMA, GHCMA to utilise current strategies and facilitate plan development and implementation.	5000	2000	Council, DSE/DPI, CCMA, GHCMA	High		19047.619	2
UE3	Education and awareness	Promote relevant actions within current CMA strategies (e.g. Regional Catchment Strategies and Draft Waterway Health Strategy).	0	0	Council	Medium	No additional cost - undertake as part of existing Council obligations.	0	1
US1	Structural treatment measures - primary	*No practical options identified.*							
US2	Structural treatment measures - secondary	*No practical options identified.*							
US3	Structural treatment - tertiary	*No practical options identified.*							
USC1	Source controls	Encourage actions that limit pollutants entering waterways from upstream areas (e.g. riparian zone revegetation and stock exclusion to limit sediment; review of agricultural chemical use and storage to limit toxicant input).	0	0	Council	Medium	No additional cost - undertake as part of existing Council obligations.	0	1
USC2	Source controls	Maintain unsealed roads and review the effectiveness/state of repair of open table drains with the aim of decreasing the amount of sediment entering waterways from unsealed road runoff.	0	0	Council	Medium	No additional cost - undertake as part of existing Council obligations.	0	1

		Actions	Estimated Costs					Cost	
No.	**Type**	**Details**	**Capital Cost ($)**	**Ongoing Cost ($)**	**Respons-ibility**	**Priority**	**Comment**	**Ranking score**	**Rank**
USM1	Site management	Encourage the production of rural property/farm management plans to improve overall farm management and limit the inputs of sediments, nutrients and chemicals entering the waterways from rural properties. DSE/DPI, in coordination with Council and Glenormiston Agricultural College (supported by Melbourne University), run farm management planning courses.	0	0	Council, DSE/DPI, CCMA, GHCMA	Medium	No additional cost - undertake as part of existing Council obligations.	0	1
UI1	Information	*No practical options identified.*							
UPR1	Planning and regulation	*No practical options identified.*							
UO1	Operations	*No practical options identified.*							
Pests									
The purpose of this strategy is to minimise the impacts of pests on the receiving waterways of Timboon, Darlington, Lismore, Princetown and Skipton. Pests pose a high risk to in-stream and riparian habitat values in Powers Creek in Timboon and a high risk to in-stream habitat values of Mount Emu Creek, Lake Gnarpurt, Browns Waterholes and Mundy Gully Creek, the Gellibrand River and LaTrobe Creek. Pests pose a threat in terms of bank instability and erosion (e.g rabbit burrowing) and the destruction of instream and riparian habitat (e.g. willows and carp). Pest activity in waterways can result in excess levels of sediment, nutrients and oxygen depleting material. This strategy addresses the impact of pests through education and awareness campaigns; source control measures; information; planning and regulation; and operations.								
PE1	Education and awareness	Liaise with the Shires of Moyne and Colac Otway to tackle pests along shared waterways e.g. Mount Emu Creek (Moyne Shire Council) and Gellibrand River (Colac Otway Shire Council). Communication with adjacent Shires can achieve a coordinated response to weeds whereby upper catchment areas are targeted before those areas downstream and greater results can be achieved.	0	0	Council, CCMA, GHCMA, DSE/DPI	Very high	No additional cost - undertake as part of existing Council obligations.	0	1
PE2	Education and awareness	Implement an awareness campaign, including displays, workshops and education material targeted at property owners adjacent to creek lines. It should focus on litter control and discourage people from throwing green waste into waterways, as well as highlighting the potential for muddied/dirt encrusted vehicles to spread weeds between sites.	5000	1000	Council	Very high	Costs could be reduced - implement with other education strategies.	207407.41	4

		Actions	Estimated Costs					Cost	
No.	Type	Details	Capital Cost ($)	Ongoing Cost ($)	Respons-ibility	Priority	Comment	Ranking score	Rank
PE3	Education and awareness	Promote and support the implementation of relevant programs within the CCMA Regional Catchment Strategy (e.g. the targeted pest management program), the GHCMA Regional Catchment Strategy (e.g. Management Action Targets for Pest Plants and Animals) and the GHCMA Weed and Rabbit Action Plans.	0	0	Council	High	No additional cost - undertake as part of existing Council obligations.	0	1
PS1	Structural treatment measures - primary	*No practical options identified.*							
PS2	Structural treatment measures - secondary	*No practical options identified.*							
PS3	Structural treatment - tertiary	*No practical options identified.*							
PSC1	Source controls	Undertake a targeted program of weed and vermin eradication, commencing with hot spot areas. Utilise existing information available from DSE/DPI, CCMA, GHCMA and Landcare Groups.	10000	2000	Council, CCMA, GHCMA, DSE/DPI	Medium		888888.89	6
PSM1	Site management	Develop site management plans for heavily pest infested areas that are of importance to the community (e.g. Lakes Colongulac and Gnarpurt) describing actions and programs to address the pest problem. Review the plans annually.	5000	1000	Council, CCMA, GHCMA, DSE/DPI	Medium		444444.44	5
PI1	Information	Distribute information to nurseries and homeowners informing them of plants that are considered environmental weeds in the area.	1000	0	Council	Medium	Costs could be reduced if implemented with RE1 actions.	5878.8948	2
PI2	Information	Develop maps showing priority areas for weed control. Utilise and build on current CMA and DSE/DPI information. Review the maps biennially.	5000	500	Council, CCMA	Medium		16460.905	3

		Actions	Estimated Costs					Cost	
No.	Type	Details	Capital Cost ($)	Ongoing Cost ($)	Respons-ibility	Priority	Comment	Ranking score	Rank
PPR1	Planning and regulation	Investigate the use of an incentive system to encourage landholders to address pest problems on their land.	0	0	Council, CCMA, GHCMA	Medium	No additional cost - undertake as part of existing Council and CMA obligations.	0	1
PPR2	Planning and regulation	Require all fill to be clean before use in order to limit the spread of pests. Encourage the use of all fill to be free from pests.	0	0	Council	Medium	No additional cost - undertake as part of existing Council obligations.	0	1
PO1	Operations	Review Council landscaping guidelines to ensure environmental weeds are not used in Council areas. Investigate options for using native grass species in Council areas and in the development of grassed swales as native species require less mowing on Council owned or managed land.	0	0	Council	Medium	No additional cost - undertake as part of existing Council obligations.	0	1
Unstable waterways									
The purpose of this strategy is to identify opportunities and implement measures to minimise impacts of unstable waterways on the receiving waterways of Camperdown, Port Campbell and Cobden. Unstable waterways pose a high risk to in-stream habitat values in Lake Colongulac and recreation values of Port Campbell Creek and the Southern Ocean and landscape values of Cobden Lake. Unstable waterways pose a potential threat to urban stormwater quality particularly in terms of poorly controlled stock and recreational access, weed infestation, damage from waterway works, development encroachment, vegetation loss, and eroded and unstable riparian zones. This results in pollutants such as sediment, nutrients and oxygen depleting material entering the waterway. This strategy includes an education and awareness campaign; structural treatment measures; source control measures; and site management.								
WE1	Education and awareness	Implement an awareness campaign, including displays, workshops and distribution of education material to land owners, particularly those with properties with waterway frontage, regarding BPEM of waterways environs. Highlight issues such as minimising stock access to waterways, revegetating and fencing the riparian environment either side of the waterways. Utilise existing information from the CMA's	5000	2000	Council, CCMA, GHCMA	High	Costs could be reduced if implemented as part of other education strategies.	2666666.7	2
WE2	Education and awareness	Promote and support relevant programs within the CCMA Regional Catchment Strategy (e.g. program 3.13 vegetation retention and protection) and the GHCMA Regional Catchment Strategy (e.g. 5.2.4 Management Action Targets for Biodiversity), particularly along watercourses.	0	0	Council, CCMA, GHCMA	Medium	No additional cost - undertake as part of existing Council and agency obligations.	0	1

		Actions	Estimated Costs					Cost	
No.	Type	Details	Capital Cost ($)	Ongoing Cost ($)	Respons-ibility	Priority	Comment	Ranking score	Rank
WS1	Structural treatment measures - primary	Investigate weed eradication and structural works in areas of particularly unstable waterways. Could link in with various GHCMA or CMA programs already underway such as the Draft Waterway Health Stratey prioritisation of bank protection and stabilisation and willow removal.	0	0	Council, CCMA, GHCMA	High	No additional cost - undertake as part of existing Council and agency obligations.	0	1
WS2	Structural treatment measures - secondary	*No practical options identified.*							
WS3	Structural treatment - tertiary	*No practical options identified.*							
WSC1	Source controls	Encourage landholders to limit stock access and clearing of riparian vegetation adjacent to waterways. Utilise existing Landcare networks and the CCMA biodiversity team for information and biodiversity program activities. Planning permits are required to remove native vegetation as per legislative requirements.	0	0	Council, CCMA, GHCMA, Landcare groups	High	No additional cost - undertake as part of existing Council and agency obligations.	0	1
WSM1	Site management	Review stormwater outlets and modify where required to reduce the capacity of flows to destabilise waterways. Modifications may include structures to reduce flow intensity, protecting the bank with rock works, or introducing a detention basin at the outlet to allow water to enter the waterway in a more controlled rate.	0	0	Council	High	No additional cost - undertake as part of existing Council obligations.	0	1
WI1	Information	Maintain up to date information regarding BPEM of pests. Liaise with other agencies, such as Landcare and CMAs, to share information.	0	0	Council	High	No additional cost - undertake as part of existing Council obligations.	0	1
WPR1	Planning and regulation	*No practical options identified.*							
WO1	Operations	*No practical options identified.*							
Flow modification									

		Actions	Estimated Costs					Cost	
No.	Type	Details	Capital Cost ($)	Ongoing Cost ($)	Respons-ibility	Priority	Comment	Ranking score	Rank
The purpose of this strategy is to work with the communities of Campderdown and Lismore to identify opportunities and implement strategies to to minimise the impacts of flow modification on Lake Colongulac and Lake Gnarpurt. Flow modification poses a high risk to instream habitat values of both lakes. Flow modification can occur through water extraction for agricultural purposes (i.e. reduced flows) or an increase in flow intensity, as occurs when stormwater is channeled to an outfall point or vegetation is removed from the water's flow path (i.e. change in flow type). This strategy includes education and awareness campaigns; source control measures; and planning and regulation controls.									
FE1	Education and awareness	Educate the community regarding the effects that increased urban runoff has on natural ecosystems.	0	0	Council, CCMA	Very high	No cost if implemented as part of RE strategies.	0	1
FE2	Education and awareness	Promote and support the implementation of relevant actions within the CCMA and GHCMA Regional Catchment Strategies (e.g. CCMA RCS Program 2.1.E changed flow regimes).	0	0	Council, CCMA	Medium	No additional cost - undertake as part of existing Council and agency obligations.	0	1
FS1	Structural treatment measures - primary	Reform drains to ensure high velocity and intensity urban runoff is discharged to streams in a more natural way. Investigate ways to improve the quality of water being discharged via these drains (e.g. a detention basin may reduce velocities and improve water quality through allowing sediments to settle).	0	0	Council	High	No additional cost - undertake as part of existing Council obligations.	0	1
FS2	Structural treatment measures - secondary	*No practical options identified.*							
FS3	Structural treatment - tertiary	*No practical options identified.*							
FSC1	Source controls	Encourage the use of rain water tanks, reuse of stormwater and activities that will reduce the amount of runoff from urban areas.	0	0	Council, South West Water	Medium	No additional cost - undertake as part of existing Council and agency obligations.	0	1
FSM1	Site management	*No practical options identified.*							

		Actions	Estimated Costs					Cost	
No.	Type	Details	Capital Cost ($)	Ongoing Cost ($)	Respons-ibility	Priority	Comment	Ranking score	Rank
FI1	Information	Invesigate the reuse of stormwater for Council irrigation purposes.	2000	0	Council, South West Water	High		493827.16	2
FRP1	Planning and regulation	Assess planning permit applications with regard to any effects that the development may have on the flow regime. Such consideration should be informed by hydrological flow and water quality modelling data representing different stormwater scenarios.	0	0	Council	Very high	No additional cost - undertake as part of existing Council obligations.	0	1
FO1	Operations	*No practical options identified.*							
Docks and wharves									
The purpose of this strategy is to work with the Port Campbell community to identifgy opportunities and implement measures to minimise the impact of the wharf on the instream habitat values of the Southern Ocean. Docks and wharves pose a potential threat to urban stormwater quality due to runoff from wharf areas which can contain atmospheric deposition, spilt raw product, erosion from unsealed areas, accidential spills and litter. This results in sediment, raw product (oxygen depleting materials), oils and greases, trace metals and toxic substances. This strategyy includes education and awareness campaigns; source control measures, site management; and information dissemintation.									
DE1	Education and awareness	Ensure those using the crane to lift boats are adequately trained and aware of the impact the activity may have on water quality.	1000	500	Council, Parks Victoria	Very high		326530.61	5
DE2	Education and awareness	Install signs at the wharf advising users of their environmental responsibilities. Use the signs to raise awareness of general stormwater issues.	1000	0	Council, Parks Victoria	Very high		17777.778	2
DS1	Structural treatment measures - primary	*No practical options identified.*							
DS2	Structural treatment measures - secondary	*No practical options identified.*							
DS3	Structural treatment - tertiary	*No practical options identified.*							

		Actions	Estimated Costs					Cost	
No.	**Type**	**Details**	**Capital Cost ($)**	**Ongoing Cost ($)**	**Respons-ibility**	**Priority**	**Comment**	**Ranking score**	**Rank**
DSC1	Source controls	Provide adequate numbers of litter bins along the wharf and review the frequency of their emptying (may require greater frequency during peak times).	0	0	Council	Very high	No additional cost - undertake as part of existing Council obligations.	0	1
DSM1	Site management	Develop a site management plan for the wharf that details how risks to water quality will be handled.	2000	0	Council, Parks	Medium		59259.259	3
DI1	Information	Compile information on wharf usage (e.g. frequency of boat launching, type of boat, pedestrian access etc). Use this information to develop the site management plan.	2000	0	Council, Parks	Medium		211640.21	4
DPR1	Planning and regulation	*No practical options identified.*							
DO1	Operations	*No practical options identified.*							
Rural land use									
The purpose of this strategy is to work with the rural communities in and around Princetown and Port Campbell to identify opportunities and implement measures to minimise the impacts of rural land use on the receiving waterways of these towns. Rural land use activities near Port Campbell and Princetown pose a high risk to recreation values in Port Campbell Creek and the Southern Ocean and in-stream habitat values in the Gellibrand River and LaTrobe Creek near Princetown. Rural land use activities pose a potential risk to urban stormwater quality due to runoff from unmade roads, septic tanks and intensive activities such as poultry sheds, landscape suppliers etc. This results in sediment, nutrients and oxygen depleting materials entering the waterways. This strategy aims to reduce the amount of pollutants in rural runoff through education and awareness campaigns; source control measures; site management; information dissemination; planning and regulation controls; and operations procudures.								
RUE1	Education and awareness	Support the education of landholders regarding the threat that rural activities can pose to water quality. Educational opportunities exist through the CCMA RCS program 4.1 community education, the CCMA and GHCMA RCS Agricultural landuse action programs and the DSE/DPI farm extension activities.	5000	2000	Council, Landcare, CMAs	Medium	Costs could be reduced if implemented with RE actions.	80000	2
RUE2	Education and awareness	Continue to support the drum muster program for farm chemical drums. Review the program to include new educational components focussing on stormwater issues for rural properties. Provide guidelines for property owners regarding appropriate chemical storage, particularly focussing on intensive agricultural industries (such as livestock feedlots, broiler farms etc).	0	0	Landcare, Council, EPAV	Medium	No additional cost - undertake as part of existing Council obligations.	0	1

		Actions	Estimated Costs					Cost	
No.	Type	Details	Capital Cost ($)	Ongoing Cost ($)	Respons-ibility	Priority	Comment	Ranking score	Rank
RUS1	Structural treatment measures - primary	*No practical options identified.*							
RUS2	Structural treatment measures - secondary	*No practical options identified.*							
RUS3	Structural treatment - tertiary	*No practical options identified.*							
RUSC1	Source controls	Identify sources of rural contaminants and undertake monitoring to determine the extent of the impact and possible means of reducing the contaminants. It is important that rural areas upstream of the towns are considered to reduce their impacts on urban stormwater downstream.	15000	15000	Council	Medium		666666.67	3
RUSM 1	Site management	Encourage the development of property and catchment plans (e.g. through Farm Management Planning courses run by DSE/DPI or as outlined in CCMA and GHCMA RCS such as CCMA RCS Program 1.1 Soil and Catchment Management).	0	0	Council, CMAs, DSE/DPI, Landcare groups	Medium	No additional cost - undertake as part of existing Council and agency obligations.	0	1
RUI1	Information	Utilise information obtained from research undertaken through the RCS, the Coorperative Research Centre for Catchment Hydrology - River Restoration Program and other relevant research, in education campaigns and media releases etc.	0	0	Council	Medium	No additional cost - undertake as part of existing Council obligations.	0	1
RUPR1	Planning and regulation	Develop/review, as appropriate, controls for the removal of vegetation on rural properties. Undertake a review of the planning scheme as outlined in the CCMA Regional Catchment Strategy.	0	0	Council, CMAs	Medium	No additional cost - undertake as part of existing Council and agency obligations.	0	1
RUO1	Operations	*No practical options identified.*							
Open space									

		Actions	Estimated Costs					Cost	
No.	**Type**	**Details**	**Capital Cost ($)**	**Ongoing Cost ($)**	**Respons-ibility**	**Priority**	**Comment**	**Ranking score**	**Rank**
This strategy aims to identify opportunities and implement measures to minimise the impact of Timboon's open space areas on Powers Creek. Open space areas within the town pose a high risk to riparian habitat values of the Creek. Open space poses a potential threat to the quality of urban stormwater through wash off of nutrients (fertilisers) and litter from public gardens, parks, sporting facilities and golf courses, distribution of environmental weeds from gardens and discharge of poor quality water from ornamental lakes. This strategy incorporates education and awareness campaigns and activities; structural treatment measures; source control measures; site management; information dissemination; planning and regulation controls; and operations measures in order to reduce the impact of open space areas on the creek.									
OE1	Education and awareness	Establish work procedures that ensure grass clippings/prunings are not left close to waterways or water bodies. Ideally clippings would be collected and composted. Provide education to Council's parks and gardens staff and the community.	0	0	Council	Very high	No additional cost - undertake as part of existing Council obligations.	0	1
OE2	Education and awareness	Develop signage demonstrating the values of local waterside parks (e.g. Powers Creek Reserve), good environmental practice and stormwater issues.	5000	0	Council, Powers Creek Reserve Committee of Management	Very high		114,286	3
OS1	Structural treatment measure-primary	Upgrade Cobden Lake through the addition of sediment ponds, litter nets, vegetated swales, weed removal and revegetation in order to improve stormwater quality and in-stream and riparian habitats of the Lake. Incorporate community awareness through drain stencilling and water monitoring. Utilise information and technical expertise from relevant agencies.	160000	1000	Council, EPAV, CCMA, GHCMA	***Very high***		***405,896***	***6***
OS2	Structural treatment measure-secondary	*No practical options identified.*							
OS3	Structural treatment measure- tertiary	*No practical options identified.*							

		Actions	Estimated Costs					Cost	
No.	Type	Details	Capital Cost ($)	Ongoing Cost ($)	Respons-ibility	Priority	Comment	Ranking score	Rank
OC1	Source controls	Review fertiliser, herbicide and pesticide use in council parks with the objective of minimising toxicant input into waterways/water bodies.	0	0	Council	Medium	No additional cost - undertake as part of existing Council obligations.	0	1
OM1	Site management	Develop site specific waste management plans for key events through lease arrangements with Council (e.g. for sporting clubs, markets etc).	5000	2000	Council, Event organiser	Medium		571,429	4
OM2	Site management	Consider temporary signage indicating waste disposal practice required at event location (5 x $200).	1000	0	Council	Medium		10,582	2
OM3	Site management	Follow up events, such as markets, with coordinated clean up plan (street sweeping, rapid rubbish collection, recycling containers, cigarette butt containers etc).	0	0	Council, Event organiser	Medium	No additional cost - undertake as part of existing Council obligations.	0	1
OM4	Site management	Encourage the development of an environmental management plan for the local golf courses (e.g. Timboon Golf Club and other golf courses and bowling greens).	15000	0	Council	High	Council, Golf Course managers	680,272	5
OP1	Planning and regulation	Require park users to develop environmental/waste management plans as part of lease conditions.	0	0	Council	Medium	No additional cost - undertake as part of existing Council obligations.	0	1
OO1	Operations	Review maintenance operations to ensure they meet with best practice requirements in terms of chemical use, irrigation and maintenance procedures (e.g. lawn mowing, pruning).	0	0	Council	Medium	No additional cost - undertake as part of existing Council obligations.	0	1

Appendix B

MANAGEMENT FRAMEWORK STRATEGIES

Management Framework Strategies							
Actions			Estimated Costs				
No.	Table	Details	Capital Cost ($)	Ongoing Cost ($)	Respons-ibility	Priority	Comment
Commitment							
C1	Commitment	Adopt the Corangamite Stormwater Management Plan.	1000	0	Council	Very High	No additional cost - undertake as part of existing Council obligations.
C2	Policy	Incorporate BPEM for stormwater and the Corangamite Stormwater Management Plan (SWMP) in Council policies and strategies (including the Corporate Plan, Roadside Environment Management Plan, Waste and Litter Education Strategy and other environmental, planning, waste management, drainage and open space strategies).	5000	0	Council	High	No additional cost- if implemented as part of C5.
C3	Responsibilities	Clarify stormwater management responsibilities throughout the Shire and for all of its waterways, particularly for those waterways crossing municipal boundaries (e.g. Mount Emu Creek and the Gellibrand River). Clarify stormwater drainage issues within Terang.	2000	0	Council, CCMA, GHCMA	High	No additional cost - if implemented as part of C5.
C4	Responsibilities	Clarify stormwater responsibilities within Council and designate a Council department or position with prime responsibility for the promotion and implementation of the Corangamite Stormwater Management Plan and liaison with the stormwater officer. Also designate a position within each Council department to liaise with the stormwater officer and report relevant information to the department.	5000	5000	Council	Very High	No additional cost - if implemented as part of C5.
C5	Resourcing	Appoint a stormwater officer with prime responsibility for the implementation of the Corangamite Stormwater Management Plan and for provision of educational and other programs highlighted as priorities in the Plan.	30000	30000	0	Very High	
C6	Resourcing	Allocate sufficient funds to implement the Corangamite Stormwater Management Plan.	0	0	Council	Very High	
C7	Coordination	Establish a committee to coordinate stormwater management between Council EPAV, CCMA, GHCMA and other agencies and community groups.	0	0	Council	High	
C8	Review	Identify funding sources and apply for funds to implement the Corangamite Stormwater Management Plan (e.g. through VSAP, NHT and from industry sources).	0	0	Council, EPAV, VSAP	High	No additional cost - undertake as part of existing Council obligations.

Actions			Estimated Costs				
No.	**Table**	**Details**	**Capital Cost ($)**	**Ongoing Cost ($)**	**Respons-ibility**	**Priority**	**Comment**
C9	Review	Monitor emerging trends in stormwater management, including the outcomes of strategic projects funded by VSAP, and incorporate the results into Council's stormwater management procedures. Refer to the Victorian Stormwater Action Programme website www.epa.vic.gov.au/vsap	0	0	Council	High	No additional cost - undertake as part of existing Council obligations.
C10	Review	Review the implementation of the Corangamite SWMP on an annual basis and if necessary amend the implementation program to respond to contemporary requirements.	2000	2000	Council	High	
Operations							
O1	Contracts	Amend council contracts and operational procedures to include the requirements for best practice standards on sediment and litter control (e.g. Consider the outcomes from the project being undertaken by LGPro to establish model contract provisions for Council construction activities etc.)	2000	0	Council	Very High	No additional cost - if implemented as part of C5.
O2	Waste Management	Seek to develop synergies between the outcomes of the Corangamite Stormwater Management Plan and the existing waste management practices.	0	0	Council	High	No additional cost - undertake as part of existing Council obligations.
O3	Waste Management	Monitor recycling and hard waste collections, litter and green waste collections and material collected through street and drain cleansing processes and use the results to modify practices to increase their efficiency (e.g. street sweeping will be required more frequently in autumn in areas where deciduous trees are present).	0	0	Council	High	No additional cost - undertake as part of existing Council obligations.
O4	Waste Management	Review bin design, placement and emptying procedures to minimise the potential for spillages.	0	0	Council	High	No additional cost - undertake as part of existing Council obligations.
O5	WSUD	Include water sensitive urban design (WSUD) in Council projects including carparks, open space, roads, drainage works and building sites.	0	0	Council	Very High	No direct cost - but the implementation may have a cost consequence on individual projects.

Actions			Estimated Costs				
No.	**Table**	**Details**	**Capital Cost ($)**	**Ongoing Cost ($)**	**Respons-ibility**	**Priority**	**Comment**
O6	EMPs	Prepare environmental management plans for Council activities, particularly construction and maintenance activities.	0	0	Council	Very High	No additional cost - undertake as part of existing Council obligations.
O7	EMPs	Review fertiliser, herbicide, pesticide, landscaping treatments and species choice to avoid the contamination of local waterways with chemicals and pests from Council maintenance activities.	0	0	Council	High	No additional cost - undertake as part of existing Council obligations.
O8	EMPs	Investigate water reuse options in Council projects, including the use of rain tanks for Council buildings (captured water could be used to irrigate gardens).	0	0	Council	High	No direct cost - but the implementation may have a cost consequence on individual projects.
Planning and regulation							
P1	Planning scheme	Review Local Planning Policy Framework and Municipal Strategic Statement sections of the Corangamite Planning Scheme to specifically refer to the need to protect and improve stormwater quality.	0	0	Council	Very High	No additional cost - undertake as part of existing Council obligations (e.g. when the next review is conducted).
P2	Planning scheme	Review the outcomes of the planning policy project being undertaken by the Association of Bayside Municipalities and consider including the outcomes in the Corangamite Planning Scheme.	5000	0	Council	High	
P3	Permit conditions	Amend Council's existing suite of standard permit conditions to include conditions relating to the protection of stormwater quality, particularly from construction, commercial and industrial premises. Utilise information and guidelines developed by the EPAV.	5000	0	Council	Very High	
P4	Planning guidelines	Develop and provide information on water sensitive urban design for developers, residents and other interested parties, utilising material developed by Barwon Water and EPAV.	2000	2000	Council	Very High	

Actions			Estimated Costs				
No.	**Table**	**Details**	**Capital Cost ($)**	**Ongoing Cost ($)**	**Respons-ibility**	**Priority**	**Comment**
P5	Planning guidelines	Encourage developers and builders to incorporate water sensitive urban design into projects before they are submitted for planning approval (for example, water tanks).	0	0	Council	High	No additional cost - undertake as part of existing Council obligations.
P6	Planning referrals	Refer planning applications for urban infrastructure, subdivision and development to Council 'experts', CCMA, GHCMA, DSE and DPI (as a statutory referral authority), South West Water and or EPAV, for comment, to ensure that they meet BPEM criteria and WSUD principles.	0	0	Council, CCMA, South West Water, EPAV	High	No additional cost - undertake as part of existing Council obligations.
P7	Enforcement	Actively enforce planning permit conditions, local laws and other regulatory requirements designed to protect water quality, including a review of resourcing and requirements.	0	0	Council	Very High	No additional cost - undertake as part of existing Council obligations.
P8	Enforcement	Integrate enforcement procedures with education programs and place emphasis on preventing, rather than prosecuting, problems.	0	0	Council	High	No additional cost - undertake as part of existing Council obligations.
Education and training							
E1	Council Officers	Promote opportunities for Councillors and Council staff to attend stormwater management seminars or related events, possibly combining trips with other municipalities and agencies to facilitate travel if necessary.	2000	2000	Council	Very High	
E2	Council Officers	Provide a program of internal training and forums for Council staff to develop a regular exchange of technical and operational information on stormwater. Make use on EPAV expertise in this field.	2000	1000	Council	Very High	
E3	Contractors	Require Council contractors to have an appreciation of stormwater issues and incorporate stormwater protection measures in their operating procedures.	0	0	Council	Very High	No additional cost - undertake as part of existing Council obligations.

Actions			Estimated Costs				
No.	Table	Details	Capital Cost ($)	Ongoing Cost ($)	Respons-ibility	Priority	Comment
E4	Community education	Incorporate BPEM for stormwater in Council's general environmental education programs.	0	0	Council	High	No additional cost - undertake as part of existing Council obligations.
E5	Community education	Support community group implementation of stormwater education programs (e.g. Cobden, Port Campbell and Camperdown schools).	5000	5000	Council	High	
E6	Community education	Implement targeted community education programs for residents, traders, industrialists, developers and contractors as set out in the reactive strategies.	0	0	Council	Very High	See reactive strategies for costs.
E7	Community education	Review the "Waste Minimisation Education Kit" prepared by SWRWMG, waste contractors and REO, and include information regarding the impacts of litter on water quality.	5000	5000	Council, SWRWMG	High	
Advocacy and association							
A1	Partnerships	Seek the cooperation and commitment of other stakeholders to achieve stormwater improvements throughout the municipality (e.g. CCMA, GHCMA, Landcare groups, Committees of Management and other interest groups such as schools).	2000	2000	Council, Waterwatch	Very High	No additional cost - if implemented as part of C5.
A2	Partnerships	Recognise and promote effective stormwater management as a shared responsibility between Council, State government, various agencies (e.g. CCMA and GHCMA) and interest groups (e.g. Landcare, Committees of Management and other interest groups such as schools) and the wider community.	0	0	Council, Waterwatch	High	No additional cost - undertake as part of existing Council obligations.
A3	Partnerships	Promote an integrated approach to stormwater management with landowners generally responsible for on-site issues, Council for local area and municipal wide programs and the CCMA and GHCMA for larger regional initiatives.	2000	2000	Council	High	No additional cost - if implemented as part of C5.
A4	Regional networks	Work with neighbouring Councils (e.g. the Shire of Corangamite and Moyne) to address regional stormwater issues (e.g. joint programs and the management of upstream inflows and shared waterways).	2000	2000	Council	Very High	No additional cost - if implemented as part of C5.
A5	Regional networks	Encourage and work with the MAV to lobby State Government, EPAV and/or other CMAs and DoI to respond to common management issues (e.g. community education, planning reform, regulatory reform, etc.) and therefore avoid duplication by Council (and other Councils).	2000	2000	Council, State Govt., EPAV, CMAs, DoI	Very High	No additional cost - if implemented as part of C5.

Actions			Estimated Costs				
No.	**Table**	**Details**	**Capital Cost ($)**	**Ongoing Cost ($)**	**Respons-ibility**	**Priority**	**Comment**
A6	Agencies	Encourage relationships between EPAV and Council (e.g. the Shire of Corangamite and Moyne) to be developed, with the objective of building an understanding of roles and responsibilities for stormwater management, including a greater understanding of when EPAV needs to be contacted (ie. Spills or when VSAP reports are due, etc.) Similarly, develop a greater understanding of roles and responsibilities for South West. In addition to outlining how EPAV information can be accessed.	0	0	Council, EPAV	High	No additional cost - undertake as part of existing Council obligations.
A7	Agencies	Implement joint and/or coordinated investigations with EPAV to address issues which are relevant across the region, such as land development and building controls, septic and sewer seepage etc. Liaise with other adjoining municipalities (Colac-Otway Shire Council, Golden Plains, Moyne, etc.).	0	0	Council, EPAV	High	No additional cost - undertake as part of existing Council obligations.
A8	Agencies	Encourage and support implementation of strategies developed by other agencies that aim to improve water quality. This may include the support of relevant actions within the CCMA's and GHCMA's Regional Catchment Strategies, the CCMA's Draft Waterway Health Strategy and Corangamite Nutrient Management Plan and the Glenelg Hopkins Nutrient Management Plan.	0	0	Council	High	No additional cost - undertake as part of existing Council obligations.
A9	Agencies	Support other agencies in the development and implementation of strategies addressing rural issues. For example the Corangamite Regional Nutrient Management Plan has an action program to address nutrient laden runoff from agricultural land and the Waste and Litter Education Strategy has identified that agricultural waste is a significant issue for the Shire. In addition, the CRC for Catchment Hydrology and CRC for Freshwater Ecology are undertaking a research into best practice to protect waterways, particularly the urban program of the CRCCH.	0	0	Council, CCMA, GHCMA	High	No additional cost - undertake as part of existing Council obligations.
A10	Works	Encourage government agencies and service providers (e.g. water, sewerage, electricity, gas and telecommunication companies) to adopt BPEM procedures and require EMPs for their projects.	0	0	Council, neighbouring Councils, CCMA	Very High	No additional cost - if implemented as part of C5.
A11	Statewide	Encourage EPAV and/or Barwon Water to develop simple guidelines for best practice stormwater management for residential, commercial and industrial areas, including quality protection and on-site re-use options.	0	0	Council, MAV	Very High	No additional cost - if implemented as part of C5.
A12	Statewide	Encourage EPAV, Barwon Water, Building Control Commission and the building industry to develop environmental management guidelines (including sediment and litter control) for building and construction sites.	0	0	Council, MAV	Very High	No additional cost - if implemented as part of C5.

Actions			Estimated Costs				
No.	**Table**	**Details**	**Capital Cost ($)**	**Ongoing Cost ($)**	**Respons-ibility**	**Priority**	**Comment**
A13	Statewide	Participate in strategic projects funded by VSAP and incorporate the results into Council's stormwater management procedures.	0	0	Council	High	
A14	Community groups	Liaise regularly with community groups such as Landcare, Committees of Management and individual or groups who have an interest in environmental management issues, particularly stormwater management issues.	2000	0	Council	High	No additional cost - if implemented as part of C5.
Information							
I1	Data collection	Coordinate water quality, littering, pollution incidents and complaint data within Council.	2000	2000	Council	High	
I2	Data collection	Monitor stormwater quality and performance of all GPT's and treatment devices and report the results in Council's environmental reporting program. (i.e. Keep records of amount of litter removed (wet or dry weight, date of clean out, etc.)	5000	2000	Council	High	
I3	Data collection	Make the above monitoring data and references to alternative data sources (e.g. Streamwatch) readily available to interested stakeholders.	2000	2000	Council	High	
I4	Data collection	Collation of data and information relating to Terang's urban stormwater drainage system, to ascertain impacts of urban stormwater on the quality of the recieving waterways. Following assessment of this data, opportunities to include Terang in the reactive management strategies should be investigated.	5000	0	Council	High	
I5	Waterwatch	Continue to support community waterwatch programs.	5000	5000	Council. Barwon Water	High	

Appendix C

IMPLEMENTATION PLAN

Actions			Estimated Costs				Estimated Combined		Indicative Implementation			
No.	**Type**	**Details**	**Capital Cost ($)**	**Ongoing Cost ($)**	**Respons- ibility**	**Comment**	**Capital Cost ($)**	**Ongoing Cost ($)**	Year 1	Year 2	Year 3	Estimated total cost
Management Framework Strategies												
Commitment												
C1	Commitment	Adopt the Corangamite Stormwater Management Plan.	1,000	0	Council	No additional cost - undertake as part of existing Council obligations.	0	0	0	0	0	0
C2	Policy	Incorporate BPEM for stormwater and the Corangamite Stormwater Management Plan (SWMP) in Council policies and strategies (including the Corporate Plan, Roadside Environment Management Plan, Waste and Litter Education Strategy and other environmental, planning, waste management, drainage and open space strategies).	5,000	0	Council	No additional cost- if implemented as part of C5.	0	0	0	0	0	0
C3	Responsibilities	Clarify stormwater management responsibilities throughout the Shire and for all of its waterways, particularly for those waterways crossing municipal boundaries (e.g. Mount Emu Creek and the Gellibrand River). Clarify stormwater drainage issues within Terang.	2,000		Council, CCMA, GHCMA	No additional cost - if implemented as part of C5.	0	0	0	0	0	0
C4	Responsibilities	Clarify stormwater responsibilities within Council and designate a Council department or position with prime responsibility for the promotion and implementation of the Corangamite Stormwater Management Plan and liaison with the stormwater officer. Also designate a position within each Council department to liaise with the stormwater officer and report relevant information to the department.	5,000	5,000	Council	No additional cost - if implemented as part of C5.	0	0	0	0	0	0
C5	Resourcing	Appoint a stormwater officer with prime responsibility for the implementation of the Corangamite Stormwater Management Plan and for provision of educational and other programs highlighted as priorities in the Plan.	30,000	30,000			30,000	30,000	30,000	30,000	30,000	90,000
C6	Resourcing	Allocate sufficient funds to implement the Corangamite Stormwater Management Plan.	0	0	Council	No cost to allocate, however the provision of funds will include a cost.	0	0	0	0	0	0
C7	Coordination	Establish a committee to coordinate stormwater management between Council EPAV, CCMA, GHCMA and other agencies and community groups.	0	0	Council		0	0	0	0	0	0
C8	Review	Identify funding sources and apply for funds to implement the Corangamite Stormwater Management Plan (e.g. through VSAP, NHT and from industry sources).	0	0	Council, EPAV, VSAP	No additional cost - undertake as part of existing Council obligations.	0	0	0	0	0	0
C9	Review	Monitor emerging trends in stormwater management, including the outcomes of strategic projects funded by VSAP, and incorporate the results into Council's stormwater management procedures. Refer to the Victorian Stormwater Action Programme website www.epa.vic.gov.au/vsap	0	0	Council	No additional cost - undertake as part of existing Council obligations.	0	0	0	0	0	0
C10	Review	Review the implementation of the Corangamite SWMP on an annual basis and if necessary amend the implementation program to respond to contemporary requirements.	2,000	2,000	Council		2,000	2,000	2,000	2,000	2,000	6,000

Actions			Estimated Costs				Estimated Combined		Indicative Implementation			
No.	Type	Details	Capital Cost ($)	Ongoing Cost ($)	Respons- ibility	Comment	Capital Cost ($)	Ongoing Cost ($)	Year 1	Year 2	Year 3	Estimated total cost
Operations												
O1	Contracts	Amend council contracts and operational procedures to include the requirements for best practice standards on sediment and litter control (e.g. Consider the outcomes from the project being undertaken by LGPro to establish model contract provisions for Council construction activities etc.)	2,000		Council	No additional cost - if implemented as part of C5.	0	0	0	0	0	0
O2	Waste Management	Seek to develop synergies between the outcomes of the Corangamite Stormwater Management Plan and the existing waste management practices.	0	0	Council	No additional cost - undertake as part of existing Council obligations.	0	0	0	0	0	0
O3	Waste Management	Monitor recycling and hard waste collections, litter and green waste collections and material collected through street and drain cleansing processes and use the results to modify practices to increase their efficiency (e.g. street sweeping will be required more frequently in autumn in areas where deciduous trees are present).	0	0	Council	No additional cost - undertake as part of existing Council obligations.	0	0	0	0	0	0
O4	Waste Management	Review bin design, placement and emptying procedures to minimise the potential for spillages.	0	0	Council	No additional cost - undertake as part of existing Council obligations.	0	0	0	0	0	0
O5	WSUD	Include water sensitive urban design (WSUD) in Council projects including carparks, open space, roads, drainage works and building sites.	0	0	Council	No direct cost - but the implementation may have a cost consequence on individual projects.	0	0	0	0	0	0
O6	EMPs	Prepare environmental management plans for Council activities, particularly construction and maintenance activities.	0	0	Council	No additional cost - undertake as part of existing Council obligations.	0	0	0	0	0	0
O7	EMPs	Review fertiliser, herbicide, pesticide, landscaping treatments and species choice to avoid the contamination of local waterways with chemicals and pests from Council maintenance activities.	0	0	Council	No additional cost - undertake as part of existing Council obligations.	0	0	0	0	0	0

Actions			Estimated Costs				Estimated Combined		Indicative Implementation			
No.	**Type**	**Details**	**Capital Cost ($)**	**Ongoing Cost ($)**	**Respons- ibility**	**Comment**	**Capital Cost ($)**	**Ongoing Cost ($)**	Year 1	Year 2	Year 3	Estimated total cost
O8	EMPs	Investigate water reuse options in Council projects, including the use of rain tanks for Council buildings (captured water could be used to irrigate gardens).	0	0	Council	No direct cost - but the implementation may have a cost consequence on individual projects.	0	0	0	0	0	0
Planning and regulation												
P1	Planning scheme	Review Local Planning Policy Framework and Municipal Strategic Statement sections of the Corangamite Planning Scheme to specifically refer to the need to protect and improve stormwater quality.	0	0	Council	No additional cost - undertake as part of existing Council obligations (e.g. when the next review is conducted).	0	0	0	0	0	0
P2	Planning scheme	Review the outcomes of the planning policy project being undertaken by the Association of Bayside Municipalities and consider including the outcomes in the Corangamite Planning Scheme.	5,000	0	Council		5,000	0	0	5,000	0	5,000
P3	Permit conditions	Amend Council's existing suite of standard permit conditions to include conditions relating to the protection of stormwater quality, particularly from construction, commercial and industrial premises. Utilise information and guidelines developed by the EPAV.	5,000	0	Council		5,000	0	5,000	0	0	5,000
P4	Planning guidelines	Develop and provide information on water sensitive urban design for developers, residents and other interested parties, utilising material developed by Barwon Water and EPAV.	2,000	2,000	Council		2,000	2,000	2,000	2,000	2,000	6,000
P5	Planning guidelines	Encourage developers and builders to incorporate water sensitive urban design into projects before they are submitted for planning approval (for example, water tanks).	0	0	Council	No additional cost - undertake as part of existing Council obligations.	0	0	0	0	0	0
P6	Planning referrals	Refer planning applications for urban infrastructure, subdivision and development to Council 'experts', CCMA, GHCMA, DSE and DPI (as a statutory referral authority), South West Water and or EPAV, for comment, to ensure that they meet BPEM criteria and WSUD principles.	0	0	Council, CCMA, South West Water, EPAV	No additional cost - undertake as part of existing Council obligations.	0	0	0	0	0	0
P7	Enforcement	Actively enforce planning permit conditions, local laws and other regulatory requirements designed to protect water quality, including a review of resourcing and requirements.	0	0	Council	No additional cost - undertake as part of existing Council obligations.	0	0	0	0	0	0

Actions			Estimated Costs				Estimated Combined		Indicative Implementation			
No.	Type	Details	Capital Cost ($)	Ongoing Cost ($)	Respons- ibility	Comment	Capital Cost ($)	Ongoing Cost ($)	Year 1	Year 2	Year 3	Estimated total cost
P8	Enforcement	Integrate enforcement procedures with education programs and place emphasis on preventing, rather than prosecuting, problems.	0	0	Council	No additional cost - undertake as part of existing Council obligations.	0	0	0	0	0	0
Education and training												
E1	Council Officers	Promote opportunities for Councillors and Council staff to attend stormwater management seminars or related events, possibly combining trips with other municipalities and agencies to facilitate travel if necessary.	2,000	2,000	Council		2,000	2,000	2,000	2,000	2,000	6,000
E2	Council Officers	Provide a program of internal training and forums for Council staff to develop a regular exchange of technical and operational information on stormwater. Make use on EPAV expertise in this field.	2,000	1,000	Council		2,000	1,000	2,000	1,000	1,000	4,000
E3	Contractors	Require Council contractors to have an appreciation of stormwater issues and incorporate stormwater protection measures in their operating procedures.	0	0	Council	No additional cost - undertake as part of existing Council obligations.	0	0	0	0	0	0
E4	Community education	Incorporate BPEM for stormwater in Council's general environmental education programs.	0	0	Council	No additional cost - undertake as part of existing Council obligations.	0	0	0	0	0	0
E5	Community education	Support community group implementation of stormwater education programs (e.g. Cobden, Port Campbell and Camperdown schools).	5,000	5,000	Council		5,000	5,000	0	5,000	5,000	10,000
E6	Community education	Implement targeted community education programs for residents, traders, industrialists, developers and contractors as set out in the reactive strategies.	0	0	Council	See reactive strategies for costs.	0	0	0	0	0	0
E7	Community education	Review the "Waste Minimisation Education Kit" prepared by SWRWMG, waste contractors and REO, and include information regarding the impacts of litter on water quality.	5,000	5,000	Council, SWRWMG		5,000	5,000	0	5,000	5,000	10,000
Advocacy and association												
A1	Partnerships	Seek the cooperation and commitment of other stakeholders to achieve stormwater improvements throughout the municipality (e.g. CCMA, GHCMA, Landcare groups, Committees of Management and other interest groups such as schools).	2,000	2,000	Council, Waterwatch	No additional cost - if implemented as part of C5.	2,000	2,000	0	2,000	2,000	4,000
A2	Partnerships	Recognise and promote effective stormwater management as a shared responsibility between Council, State government, various agencies (e.g. CCMA and GHCMA) and interest groups (e.g. Landcare, Committees of Management and other interest groups such as schools) and the wider community.	0	0	Council, Waterwatch	No additional cost - undertake as part of existing Council obligations.	0	0	0	0	0	0
A3	Partnerships	Promote an integrated approach to stormwater management with landowners generally responsible for on-site issues, Council for local area and municipal wide programs and the CCMA and GHCMA for larger regional initiatives.	2,000	2,000	Council	No additional cost - if implemented as part of C5.	2,000	2,000	0	2,000	2,000	4,000

Actions			Estimated Costs				Estimated Combined		Indicative Implementation			
No.	Type	Details	Capital Cost ($)	Ongoing Cost ($)	Respons- ibility	Comment	Capital Cost ($)	Ongoing Cost ($)	Year 1	Year 2	Year 3	Estimated total cost
A4	Regional networks	Work with neighbouring Councils (e.g. the Shire of Corangamite and Moyne) to address regional stormwater issues (e.g. joint programs and the management of upstream inflows and shared waterways).	2,000	2,000	Council	No additional cost - if implemented as part of C5.	2,000	2,000	0	2,000	2,000	4,000
A5	Regional networks	Encourage and work with the MAV to lobby State Government, EPAV and/or other CMAs and DoI to respond to common management issues (e.g. community education, planning reform, regulatory reform, etc.) and therefore avoid duplication by Council (and other Councils).	2,000	2,000	Council, State Govt., EPAV, CMAs, DoI	No additional cost - if implemented as part of C5.	2,000	2,000	0	2,000	2,000	4,000
A6	Agencies	Encourage relationships between EPAV and Council (e.g. the Shire of Corangamite and Moyne) to be developed, with the objective of building an understanding of roles and responsibilities for stormwater management, including a greater understanding of when EPAV needs to be contacted (ie. Spills or when VSAP reports are due, etc.) Similarly, develop a greater understanding of roles and responsibilities for South West. In addition to outlining how EPAV information can be accessed.	0	0	Council, EPAV	No additional cost - undertake as part of existing Council obligations.	0	0	0	0	0	0
A7	Agencies	Implement joint and/or coordinated investigations with EPAV to address issues which are relevant across the region, such as land development and building controls, septic and sewer seepage etc. Liaise with other adjoining municipalities (Colac-Otway Shire Council, Golden Plains, Moyne, etc.).	0	0	Council, EPAV	No additional cost - undertake as part of existing Council obligations.	0	0	0	0	0	0
A8	Agencies	Encourage and support implementation of strategies developed by other agencies that aim to improve water quality. This may include the support of relevant actions within the CCMA's and GHCMA's Regional Catchment Strategies, the CCMA's Draft Waterway Health Strategy and Corangamite Nutrient Management Plan and the Glenelg Hopkins Nutrient Management Plan.	0	0	Council	No additional cost - undertake as part of existing Council obligations.	0	0	0	0	0	0
A9	Agencies	Support other agencies in the development and implementation of strategies addressing rural issues. For example the Corangamite Regional Nutrient Management Plan has an action program to address nutrient laden runoff from agricultural land and the Waste and Litter Education Strategy has identified that agricultural waste is a significant issue for the Shire. In addition, the CRC for Catchment Hydrology and CRC for Freshwater Ecology are undertaking a research into best practice to protect waterways, particularly the urban program of the CRCCH.	0	0	Council, CCMA, GHCMA	No additional cost - undertake as part of existing Council obligations.	0	0	0	0	0	0
A10	Works	Encourage government agencies and service providers (e.g. water, sewerage, electricity, gas and telecommunication companies) to adopt BPEM procedures and require EMPs for their projects.	0	0	Council, neighbouring Councils, CCMA	No additional cost - if implemented as part of C5.	0	0	0	0	0	0
A11	Statewide	Encourage EPAV and/or Barwon Water to develop simple guidelines for best practice stormwater management for residential, commercial and industrial areas, including quality protection and on-site re-use options.	0	0	Council, MAV	No additional cost - if implemented as part of C5.	0	0	0	0	0	0
A12	Statewide	Encourage EPAV, Barwon Water, Building Control Commission and the building industry to develop environmental management guidelines (including sediment and litter control) for building and construction sites.	0	0	Council, MAV	No additional cost - if implemented as part of C5.	0	0	0	0	0	0
A13	Statewide	Participate in strategic projects funded by VSAP and incorporate the results into Council's stormwater management procedures.	0	0	Council		0	0	0	0	0	0

Actions			Estimated Costs				Estimated Combined		Indicative Implementation			
No.	**Type**	**Details**	**Capital Cost ($)**	**Ongoing Cost ($)**	**Respons- ibility**	**Comment**	**Capital Cost ($)**	**Ongoing Cost ($)**	Year 1	Year 2	Year 3	Estimated total cost
A14	Community groups	Liaise regularly with community groups such as Landcare, Committees of Management and individual or groups who have an interest in environmental management issues, particularly stormwater management issues.	2,000	0	Council	No additional cost - if implemented as part of C5.	2,000	0	2,000	0	0	2,000
Information												
I1	Data collection	Coordinate water quality, littering, pollution incidents and complaint data within Council.	2,000	2,000	Council		2,000	2,000	0	2,000	2,000	4,000
I2	Data collection	Monitor stormwater quality and performance of all GPT's and treatment devices and report the results in Council's environmental reporting program. (i.e. Keep records of amount of litter removed (wet or dry weight, date of clean out, etc.)	5,000	2,000	Council		5,000	2,000	0	5,000	2,000	7,000
I3	Data collection	Make the above monitoring data and references to alternative data sources (e.g. Streamwatch) readily available to interested stakeholders.	2,000	2,000	Council		2,000	2,000	0	2,000	2,000	4,000
I4	Data collection	Collation of data and information relating to Terang's urban stormwater drainage system, to ascertain impacts of urban stormwater on the quality of the recieving waterways. Following assessment of this data, opportunities to include Terang in the reactive management strategies should be investigated.	5,000	0	Council		5,000	0	0	5,000	0	5,000
I5	Waterwatch	Continue to support community waterwatch programs.	5,000	5,000	Council. Barwon Water		5,000	5,000	0	5,000	5,000	10,000
I6	Data utilisation	Utilise the data already obtained by CMAs and DSE/DPI to feed into the Corangamite Stormwater Management Plan (e.g. information available regarding the status of bank stability and willow infestation across the Shire).	0	0	Council		0	0	0	0	0	0
Estimated Management Framework Strategy Cost									***45,000***	***79,000***	***66,000***	***190,000***
Reactive Management Strategies												
Residential land use												
The purpose of this strategy is to identify opportunities and implement strategies to minimise the impacts of residential land use on Lake Colongulac. Residential land use in Camperdown poses a very high risk to in-stream habitat values and a high risk to recreation and riparian habitat values within Lake Colongulac. Residential land use poses a potential threat to the quality of urban stormwater through atmospheric deposits and build up from traffic; nutrients from washing cars, fertiliser application, lawn clippings and leaf litter (particularly from decidiuous trees); and poor waste management practices. Key pollutants and impacts associated with residential activities include, increased flows, sediment, nutrients, litter, oxygen depleting material, hydrocarbons , pathogens, trace metals, pesticides and surfactants. This strategy provides an integrated approach to address the risk of residential runoff, with key aspects including education and awareness campaigns and initiatives; structural treatment measures; source control measures; and planning and regulation controls. Whilst this strategy has been specifically designed to respond to issues pertaining to Camperdown, the strategies are applicable to a other urban areas within the municipality and can be applied at other locations wit												
RE1	Education and awareness	Implement a community awareness campaign, including displays, workshops and education material on environmental best practice in property management (e.g. waterwise gardens, vehicle washing, appropriate disposal of garden waste, use of fertiliser on gardens, collection & disposal of dog faeces - particularly in open space areas etc). Utilise EPAV, CCMA, GHCMA material if appropriate and involve the students of schools within Camperdown. The education campaign can be linked with many of Council's current strategies (i.e. Waste and Litter Education Strategy 1999-2001).	15,000	5,000	Council, CCMA, GHCMA, EPAV	Education and awareness campaigns have many similar elements. Costs could be reduced by combining with other education strategies or with other Councils	15,000	5,000	15,000	5,000	5,000	25,000

Actions			Estimated Costs				Estimated Combined		Indicative Implementation			
No.	**Type**	**Details**	**Capital Cost ($)**	**Ongoing Cost ($)**	**Respons- ibility**	**Comment**	**Capital Cost ($)**	**Ongoing Cost ($)**	Year 1	Year 2	Year 3	Estimated total cost
RE2	Education and awareness	Facilitate a demonstration project showing best practice in stormwater management and WSUD. Investigate ways of including aspects of the site in educational curriculum and involving Camperdown Secondary College. Utilise outcomes from/or become involved in the WSUD project being undertaken by Melbourne Water and the Urban Land Corporation which is investigating community attitudes to WSUD. Utilise and expand on DNRE's Regional Stormwater Education Kit as an educational resource for schools. Localise the information to refer to issues relevant to Corangamite.	10,000	2,000	Council	Costs could be reduced - implement with RE1 actions.	10,000	2,000	0	10,000	2,000	12,000
RE3	***Education and awareness***	***Undertake drain marking in residential areas. The stencilling can build on the current drain stenciling program and implement an awareness campaign during the stenciling program and investigate opportunities to include Waterwatch as a potential partner and involve primary and secondary school students. Key milestone to stencil 50 stormwater drains by December 2003.***	***9,700***	***1,000***	***Council stormwater project coordinator, Camperdown Secondary School students***	***Can be linked with RI1***	***9,700***	***1,000***	***9,700***	***1,000***	***1,000***	***11,700***
RE4	***Education and awareness***	***Use the local press to publicise Council's initiatives regarding stormwater management, for example notify the community of the development of the stormwater management plan and any associated guidelines or activities such as the preparation of the Lake Colongulac feasibility and concept design project. Time releases to publicise workshops and other education events.***	***1,000***	***1,000***	***Council***		1,000	1,000	1,000	1,000	1,000	3,000
RE5	Education and awareness	Incorporate stormwater quality protection in Council's general environmental awareness campaigns and provide stormwater protection information in Council's New Resident Information Packs (mention ways that residents can improve stormwater quality, including actions such as raking up of deciduous leaves and the reuse of grey water on gardens).	0	0	Council	No additional cost - undertake as part of existing Council obligations.	0	0	0	0	0	0
RE6	Education and awareness	Design and develop an environmental trail around significant lakes (e.g. Lake Colongulac) highlighting the importance of the Shire's waterways and how people can protect them. Key features of the trail may include information signs at the stormwater outlets to the Lake and natural features such as bird hides.	65,000	5,000	Council, CCMA, Tourism Victoria, Parks Victoria and DSE/DPI		65,000	5,000	0	0	65,000	65,000
RE7	Education and awareness	Conduct an environmental awards program highlighting BPEM in residential areas. The awards could highlight positive actions taken by both existing residents and new developers. Possibly include as part of the existing environmental awards as part of the Corangamite Shire Business Acheivement Awards.	5,000	5,000	Council	Costs could be reduced - implement with other RE8 actions.	5,000	5,000	0	0	5,000	5,000
RE8	Education and awareness	Promote and support the Urban Program within the *Corangamite Regional Nutrient Management Plan and the Glenelg Hopkins Nutrient Management Plan.*	0	0	Council CCMA	No additional cost - undertake as part of existing Council and CCMA obligations.	0	0	0	0	0	0

Actions			Estimated Costs				Estimated Combined		Indicative Implementation			
No.	**Type**	**Details**	**Capital Cost ($)**	**Ongoing Cost ($)**	**Respons- ibility**	**Comment**	**Capital Cost ($)**	**Ongoing Cost ($)**	Year 1	Year 2	Year 3	Estimated total cost
RS1	***Structural treatment measure - primary***	***Undertake a design feasibility and options study to address litter, gross pollutants, commercial, industrial, residential land use runoff and runoff from heavy vehicle parking and major highways. The purpose of the study will be to determine best practice management options including designs and costs provided to Council for improving stormwater quality entering Lake Colongulac via the north western outlet site. Aim to have prepared a draft feasibility and design conceptsby December 2003 and a final design concept and costings by March 2004.***	***22,400***	***0***	***Council***	***Not necessary if the outfalls are redirected towards a wetland.***	22,400	0	22,400	0	0	22,400
RS2	Structural treatment measure - primary	Incorporate open swale grass drains in the construction and reconstruction of streets and drains. Proposed kerb and channel works may need to be reassessed. Investigate different mowing regimes for improved water treatment, effectiveness and retrofitting to improve the efficiency of open swale drains for water quality treatment.	0	0	Council	No additional cost - undertake as part of existing Council obligations.	0	0	0	0	0	0
RS3	Structural treatment measure - primary	Reform drain outlets to waterways to act as natural sediment and litter traps and to minimise erosion (e.g. the 3 stormwater outlets to Lake Colongulac) particularly along Medanarook Creek.	20,000	5,000	Council	Council	20,000	5,000	0	20,000	5,000	25,000
RS4	***Structural treatment measure - tertiary***	***Subject to the results of a concept design and feasibility studyof Medanarook Creek to construct a wetland or other appropriate end of pipe treatment and implement appropriate source control measures.***	***15,000***	***0***	***Council, CCMA***	***Costs will be dependant on the outcomes of the design and feasibility study.***	15,000	0	15,000	0	0	15,000
RC1	Source controls	Encourage the installation of rainwater storage and reuse tanks to reduce runoff during storm events and water wise gardening initiatives to conserve water.	0	0	Residents, South West Water	No additional cost - if implemented as part of RE1..	0	0	0	0	0	0
RC2	Source controls	Publicise the benefits of diverting roof water to grassed swales or gardens, or other pre-treat options in order to reduce total flows, scouring, sediment and nutrients entering the stormwater system and water costs to residents. Possibly through the establishment of a demonstration site.	0	0	Council, South West Water	No additional cost - if implemented as part of RC1.	0	0	0	0	0	0
RI1	***Information***	***Develop a protocol and monitor the volumes of litter, silt and leaves in the drainage system during periodic drain maintenance (cleaning and inspections). Conduct litter surveys before and after drain stencilling by community groups***	***2,700***	***1,000***	***Council (stormwater project coordinator), Council's operations unit***		2,700	1,000	2,700	1,000	1,000	4,700
RP1	Planning and regulation	Undertake periodic audits and random inspections of 'hot spot' areas, for illegal dumping of domestic waste. Focus on areas identified by the Waste and Litter Education Strategy. This could be undertaken as part of Council's and SWRWMG's Waste and Litter Education Strategy and the Waste Wise program. Data and information collected should be stored in a central data store with all other litter monitoring data)	0	0	Council, SWRWMG, Schools	No additional cost - undertake as part of existing Council obligations. Related to I2.	0	0	0	0	0	0
Estimated Residential land use strategy									***65,800***	***38,000***	***85,000***	***188,800***
Industrial land use												

Actions			Estimated Costs				Estimated Combined		Indicative Implementation			
No.	**Type**	**Details**	**Capital Cost ($)**	**Ongoing Cost ($)**	**Respons- ibility**	**Comment**	**Capital Cost ($)**	**Ongoing Cost ($)**	Year 1	Year 2	Year 3	Estimated total cost
The purpose of this strategy is to work with the Camperdown, Cobden, Lismore, Skipton and Timboon industrial community to identify opportunities and implement strategies to minimise the impacts of industrial land use on the receiving waterways for each of these towns. Industrial landuse poses a very high risk to in-stream habitat and extraction and use values in the receiving waters of Camperdown (Lake Colongulac) and Skipton (Mount Emu Creek). Industrial land use also poses a high risk to recreation and riparian habitat values in Cobden's receiving waterways (Cobden Lake); a high risk to extraction and use values in Mount Emu Creek in Skipton and in-stream habitat values in Timboon (Powers Creek), Lismore (Lake Gnarpurt, Browns Waterholes and Mundy Gully Creek). Industrial land use poses a threat to these waterways through atmospheric deposition and build up from traffic, poor waste management, accidental spills and illegal discharges. Key pollutants and impacts associated with these sources include, increased flows, sediment, nutrients, litter, oxygen depleting material, hydrocarbons, pathogens, trace metals, pesticides and surfactants. This strategy incorporates a balanced approach to address industrial based threats with key aspects including a number of education and awareness campaigns and initiatives; structural treatment measures; source control measures; site management; information and data collection and planning and regulation control.												
IE1	Education and awareness	Implement an awareness campaign, including displays, workshops and education material relating to best practice at industrial sites for business owners/operators. (Utilise EPAV/CCMA material if appropriate). Where possible coordinate with visits undertaken by the Environmental Health Officer or with the water authorities' trade waste inspections. There may be a possibility to align such a program with the industrial program of the Waste and Litter Education Strategy and promote waste management and stormwater management at the same time. Build on the experiences of the pilot project being conducted in Ballarat - the Ballarat Stormwater Awareness Officer - Project Report - South West Education and Awareness for Industrial premises which is due for release at the end of 2002.	10,000	5,000	Council, EPAV, CCMA	Costs could be reduced - implement with other education strategies.	10,000	5,000	10,000	5,000	5,000	20,000
IE2	Education and awareness	Conduct an environmental awards program highlighting businesses and industries that demonstrate a commitment to being environmentally aware, with particular focus on improving stormwater quality entering Lake Colongulac, Cobden Lake and Mount Emu Creek.	5,000	5,000	Council	Costs could be reduced - implement with other IE1 actions.	5,000	5,000	0	5,000	5,000	10,000
IE3	Education and awareness	Undertake a business survey, advisory audit and education campaign (for example Old Joes Creek in the City of Knox) or neighbourhood improvement program to improve stormwater discharges to Lake Colongulac, Cobden Lake and Mount Emu Creek. Seek information on similar VSAP funded projects from the EPA and use educational information from EPA and CMA's as appropriate.	50,000	5,000	Council, CCMA, EPAV	Costs could be reduced - implement with other IE1 actions.	50,000	5,000	0	50,000	5,000	55,000
IS1	Structural treatment measure - primary	RS1 - feasibility and options study is also applicable to industrial runoff.	0	0		Costs are outlined in RS1.	0	0	0	0	0	0
IS2	Structural treatment measure - secondary	Review the capability of the Camperdown Saleyards stormwater retention system. Seek EPA advice as to best practice in retention systems.	15,000	0	Council EPAV		15,000	0	15,000	0	0	15,000
IC1	Source controls	Audit loading, storage and waste storage areas to ensure contaminants (i.e. chemicals, litter, packages etc) are being handled appropriately and disposed of appropriately. This will be particularly important for industries that involve large quantities of chemicals (e.g. Pivot fertiliser). As part of this audit porcess review trade waste connections and illegal connections to the stormwater system.	5,000	1,000	Council		5,000	1,000	0	0	5,000	5,000
IC2	Source controls	Review access and egress design for all major industrial sites with the aim to minimise potential spills/accidents.	0	0	Council	No additional cost - implement as part of IC1.	0	0	0	0	0	0

Actions			Estimated Costs				Estimated Combined		Indicative Implementation			
No.	**Type**	**Details**	**Capital Cost ($)**	**Ongoing Cost ($)**	**Respons- ibility**	**Comment**	**Capital Cost ($)**	**Ongoing Cost ($)**	Year 1	Year 2	Year 3	Estimated total cost
ISM1	Site management	Encourage the development of site based EMP's for key industrial sites (e.g. dairy and fertiliser sites) to address stormwater, waste management, spill management, chemical storage, bunding, signage etc. For example, use Cobden's new industrial estate as an opportunity to function as a role model for new developments taking place. Utilise information from EPA and other VSAP funded projects in developing the plans.	0	0	Council, EPAV	No additional cost - undertake as part of existing Council obligations.	0	0	0	0	0	0
ISM2	Site management	Ensure eel farming premises have adequate SMPs and EMPs in place. Monitor discharge licences which impact on adjoining waterways. Utilise information available from EPA and CMA's.	0	0	Council, EPAV, CCMA	No additional cost - ake as part of existing Council and agency obligations.	0	0	0	0	0	0
ISM3	Site management	Review petrol station management, particularly the bunding, chemical storage and litter control procedures, with the aim to bringing all operators up to best practice standards. Utilise information from EPA regarding best practice for bunding, chemical storage etc.	5,000	2,000	Council, EPAV		5,000	2,000	5,000	2,000	2,000	9,000
II1	Information and data collection	Undertake ongoing monitoring of the significant outlet drains (e.g. those discharging to Lake Colongulac, Cobden Lake and Mount Emu Creek) upstream and downstream of industrial premises. Seek EPA involvement in the monitoring and utilise EPA information regarding monitoring techniques and water quality.	15,000	15,000	Council, EPAV		15,000	15,000	0	15,000	15,000	30,000
IPR1	Planning and regulation	Review discharge and waste management practices at all industrial premises through an advisory audit.	10,000	5,000	Council, EPAV		10,000	5,000	10,000	5,000	5,000	20,000
Estimated Industrial land use strategy costs									***40,000***	***82,000***	***42,000***	***164,000***
Commercial land use												
The purpose of this strategy is to work within Camperdown's commercial community to identify opportunities and implement measures to minimise the impacts of commercial land use on Lake Colongulac and Port Campbell. Commercial land use runoff poses a high risk to in-stream habitat and riparian habitat values of Lake Colongulac through atmospheric deposition, build up from traffic and poor waste management and associated litter problems. Key pollutants and impacts associated with these sources include, increased flows, sediment, nutrients, litter, oxygen depleting material, hydrocarbons, pathogens, trace metals, pesticides and surfactants. This strategy offers an integrated approach to mitigate commercial threats with key aspects including a number of education and awareness campaigns and initiatives; structural treatment measures; source control measures and site management measures.											
CE1	Education and awareness	Implement an awareness campaign, including displays, workshops and education material for commercial business owners/operators regarding their responsibilities with regard to stormwater management. Target particular issues such as appropriate waste disposal (including disposal of cigarette butts and takeaway food containers), management of loading and unloading of materials and appropriate storage of goods (including chemicals). Use EPAV/CCMA material if appropriate.	10,000	2,000	Council	Costs could be reduced if implemented with other education strategies.	10,000	2,000	0	10,000	2,000	12,000
CE2	Education and awareness	Undertake drain stencilling, with a priority on heavily used or tourist precincts. For example, build on drain stencilling already undertaken in Port Campbell, focusing on stencilling along Lord Street.	2,000	1,000	Council	Costs could be reduced if implemented with RE3.	2,000	1,000	2,000	1,000	1,000	4,000
CE3	Education and awareness	Install signage at locations of the seven litter traps identifying their location, role and possibly results of monitoring/audits of litter trap contents.	5,000	0	Council		5,000	0	5,000	0	0	5,000
CS1	Structural treatment - primary	Install litter traps and side entry baskets in areas of high litter e.g. the streets in Port Campbell (Lord Street).	5,000	1,000	Council, Regional WMG		5,000	1,000	0	5,000	1,000	6,000
CS2	Structural treatment - primary	RS1 - feasibility and options study is also applicable to commercial land use runoff.	0	0		Costs are outlined in RS1.	0	0	0	0	0	0

Actions			Estimated Costs				Estimated Combined		Indicative Implementation			
No.	**Type**	**Details**	**Capital Cost ($)**	**Ongoing Cost ($)**	**Respons- ibility**	**Comment**	**Capital Cost ($)**	**Ongoing Cost ($)**	Year 1	Year 2	Year 3	Estimated total cost
CC1	Source controls	Encourage traders to install cigarette butt containers and provide advice on the available and appropriate disposal options and along Princes Highway (Camperdown) and along Lord Street (Port Campbell).	0	0	Traders, Council	No additional cost - undertake as part of existing Council obligations.	0	0	0	0	0	0
CC2	Source controls	Encourage banks to review ATM operations to reduce street litter, particularly in hotspot areas such as the Princes Highway Camperdown.	0	0	Council	No additional cost - undertake as part of existing Council obligations.	0	0	0	0	0	0
CSM1	Site managment	Liaise with local interest groups to discuss management options for specific commercial areas. Focusing on implementing best practice waste management and recycling programmes.	0	0	Council	No additional cost - undertake as part of existing Council obligations.	0	0	0	0	0	0
CI1	Information	Monitor the outcomes of VSAP funded projects that address commercial runoff and remain up to date with best practice management information. This may be acheived by monitoring the research web pages or outputs from CRC for Catchment Hydrology and CRC for Freshwater Ecology and Melbourne Water, EPAV and MAV.	0	0	Council	No additional cost - undertake as part of existing Council obligations.	0	0	0	0	0	0
Estimated commercial land use strategy									***7,000***	***16,000***	***4,000***	***27,000***
Septic and sewer seepage												
This strategy aims to address the impacts of septic and sewer seepage on the receiving waterways of Camperdown, Derrinallum, Darlington, Lismore, Skipton(although Central Highlands Water is introducing sewerage system to Skipton, this strategy will be relevant until such time as all of Skipton is connected) and Princetown. Septic and sewer seepage is associated with infiltration and overflow from sewerage systems and septic tanks. Key polluntants and impacts associated with this threat, include oxygen depleting material, pathogens and nutrients. Septic and sewer seepage poses a very high risk to in-stream habitats in recieving waterways associated with Darlington and Skipton (Mount Emu Creek) and Lismore (Lake Gnarpurt, Browns Waterholes and Mundy Gully Creek) and a high risk to in-stream habitats in the recieving waterways below Derrinallum (Lake Tooliarook) and Princetown (Gellibrand River and LaTrobe Creek). This strategy presents an integrated suite of activities to address the septic and sewer threat, including education and awareness campaigns and initiatives; source control measures; site management measures; planning and regulation controls; and operations procedures.												
SE1	Education and awareness	Implement a community awareness campaign for residents' with septic treatment systems, utilising displays, workshops and education material. Focus on their maintenance responsibilities, ongoing monitoring requirements and responsible water and waste management practices.	5,000	1,000	Council	Costs could be reduced if implemented with other education strategies.	5,000	1,000	5,000	1,000	1,000	7,000
SE2	Education and awareness	Encourage connection to sewer where and when available, possibly through an incentive program offering rebates or discounted connection fees.	2,000	2,000	Council, South West Water	Costs could be reduced - implement with other SE actions.	2,000	2,000	2,000	2,000	2,000	6,000
SE3	Education and awareness	Promote and support the implementation of relevant actions from the Corangamite Regional Nutrient Management Plan Sewerage Program and the Glenelg Hopkins Nutrient Management Plan Wastewater treatment program.	0	0	Council CCMA, GHCMA	No additional cost - undertake as part of existing Council obligations.	0	0	0	0	0	0

Actions			Estimated Costs				Estimated Combined		Indicative Implementation			
No.	**Type**	**Details**	**Capital Cost ($)**	**Ongoing Cost ($)**	**Respons- ibility**	**Comment**	**Capital Cost ($)**	**Ongoing Cost ($)**	Year 1	Year 2	Year 3	Estimated total cost
SS4	Source control	Advocate either extension of reticulated sewerage system to reach unserviced properties or provision of an alternative waste disposal technique.	0	0	Council, South West Water	No additional cost - undertake as part of existing Council obligations.	0	0	0	0	0	0
SSC1	Source control	Advocate for the use of package treatment plants or neighbourhood waste management systems in Princetown.	0	0	Council, South West Water	No additional cost - undertake as part of existing Council and agencyobligations.	0	0	0	0	0	0
SSM1	Site management	Encourage property owners to ugrade and/or maintain on-site treatment systems so that septic discharges and sullage are retained on site. EPA can provide information regarding the correct operation of septic systems and on approved septic systems (available on the internet). A strategic project to develop a wastewater management database for on-site wastewater systems has been proposed. There is potential for Corangamite Shire to become involved in this project.	0	0	Council, EPAV	No additional cost - undertake as part of existing Council and agency obligations.	0	0	0	0	0	0
SSM2	Site management	Encourage property owners to reuse grey water by diverting it to gardens and lawns.	0	0	Council, South West Water	No additional cost - undertake as part of existing Council and agency obligations.	0	0	0	0	0	0
SPR1	Planning and regulation	Review permit documentation (maintain register) and carry out inspections of existing on site waste management systems and enforce maintenance requirements in permits. Investigate opportunities for a regional approach in association with adjoining Councils.	10,000	5,000	Council and other adjoining Councils		10,000	5,000	10,000	5,000	5,000	20,000
SPR2	Planning and regulation	Promote connection to reticulated sewerage, where available. Require annual inspections of septic tanks and the reporting of results to Council.	0	0	Council	No additional cost - undertake as part of existing Council obligations.	0	0	0	0	0	0
SO1	Operations	Under existing legislation, perform a review of known septic seepage hotspot areas.	0	0	Council, South West Water	No additional cost - undertake as part of existing Council obligations.	0	0	0	0	0	0
Estimated septic and sewer strategy cost									***17,000***	***8,000***	***8,000***	***33,000***
Actions			**Estimated Costs (per**				Estimated Combined		Indicative Implementation			
No.	**Type**	**Details**	**Capital Cost ($)**	**Ongoing Cost ($)**	**Respons- ibility**	**Comment**	**Capital Cost ($)**	**Ongoing Cost ($)**	Year 1	Year 2	Year 3	Estimated total cost
Land development and building sites												

Actions			Estimated Costs				Estimated Combined		Indicative Implementation			
No.	**Type**	**Details**	**Capital Cost ($)**	**Ongoing Cost ($)**	**Respons- ibility**	**Comment**	**Capital Cost ($)**	**Ongoing Cost ($)**	Year 1	Year 2	Year 3	Estimated total cost
The purpose of this strategy is to work with the communities of Port Campbell and Skipton to identify opportunities and implement strategies to minimise the impacts of land development and building site activity on the receiving waterways of these towns. Threats associated with land development and building site activity are related to poor sediment and erosion control, uncontrolled wash down of equipment, deposition of sediment, poor site waste management and spills or deliberate discharge from sites (eg. washing paint or concrete down drains). Key polluntants and impacts associated with these threat types include sediments, nutrients and litter. Land development activity poses a very high risk to recreation values and a high risk to in-stream and riparian habitats in the receiving waterways of Port Campbell (Port Campbell Creek and the Southern Ocean) and a high risk to in-stream habitat values of Mount Emu Creek at Skipton. Building site activities at Port Campbell pose a high threat to recreation values of Port Campbell Creek and the Southern Ocean. This strategy provides a balanced approach to mitigate the effects of land development and building site runoff with key aspects including education and awareness campaigns and initiatives; source control measures; site managem												
LE1	Education and awareness	Implement an awareness campaign, including displays, workshops and education material for contractors and developers regarding management of stormwater. Brochures can be used as a guide for contractors when preparing Environmental Management Plans and when preparing documentation to meet quality assurance procedures. Use EPAV/CCMA/GHCMA material as appropriate. Visit sites where best practice has been put in place (e.g. Lynbrook Estate).	5,000	1,000	Council	Costs could be reduced if implemented with other education strategies.	5,000	1,000	5,000	1,000	1,000	7,000
LSC1	Source controls	Include requirements for source controls in permit requirements (e.g. litter containment on site, use of hay bales/sand bags to prevent sediment escape from site, covering and containment of stock piled materials etc.) and identification of the local waterway (ie. proforma which requires the developer to state how they are going to control ongoing litter and sediment).	0	0	Council	No additional cost - undertake as part of existing Council obligations.	0	0	0	0	0	0
LSM1	Site management	Encourage the housing and construction industry to develop a code of practice for environmental management and for control of wastes (including sediment, paints etc) from construction sites.	2,000	0	Council		2,000	0	2,000	0	0	2,000
LI1	Information	Monitor the outcomes of VSAP funded projects relevant to the land development and building industry and remain up to date with best practice management information (e.g. *Control of building and construction site practices for the improvement of stormwater quality*- a project involving the Cities of Melbourne, Moonee Valley, Moreland, Hume, Kingston and Casey. It will look at the development of model Local Laws and Codes of Practice).	0	0	Council	No additional cost - undertake as part of existing Council obligations.	0	0	0	0	0	0
LPR1	Planning and regulation	Ensure that all permits for subdivisions are granted with conditions relating to sediment control. Consider the application of water sensitive urban design requirements to subdivision and development permits on a case by case basis. Ensure that all subdivision and building sites are appropriately designed and sited with respect to waterways.	0	0	Council	No additional cost - undertake as part of existing Council obligations.	0	0	0	0	0	0
LPR2	Planning and regulation	Require land developers to prepare an EMP (including sediment/erosion control initiatives) for land for subdivision activities, particularly target undeveloped areas. Ensure a pre-commencement meeting is held to explain the EMP requirements to contractors.	0	0	Council	No additional cost - undertake as part of existing Council obligations.	0	0	0	0	0	0
LPR3	Planning and regulation	Enforce development controls (planning, local laws etc.) through regular site inspections.	0	0	Council	No additional cost - undertake as part of existing Council obligations.	0	0	0	0	0	0

Actions			Estimated Costs				Estimated Combined		Indicative Implementation			
No.	**Type**	**Details**	**Capital Cost ($)**	**Ongoing Cost ($)**	**Respons- ibility**	**Comment**	**Capital Cost ($)**	**Ongoing Cost ($)**	Year 1	Year 2	Year 3	Estimated total cost
LO1	Operations	Investigate opportunities for Council to review its operations procedures relating to construction works and landscaping with a view to improving their responsiveness to stormwater quality issues. Utilise outcomes from the pilot programme being undertaken by LGPro which involves a number of Councils reviewing and developing best practice stormwater protection for construction works, road works and construction activities.	0	0	Council LGPro	No additional cost - undertake as part of existing Council obligations.	0	0	0	0	0	0
Estimated land development and building site strategy cost									***7,000***	***1,000***	***1,000***	***9,000***
Major roads												
The purpose of this strategy is identify opportunities and implement strategies to minise the impacts of major road runoff on receiving waterways. Major roads pose a very high risk to in-stream habitat and riparian habitat and a high risk to recreation values in Lake Colongulac and Lake Gnarpurt, Browns Waterholes and Mundy Gully Creek. Major road runoff also poses a high risk to in-stream habitat, riparian habitat and recreation values in Port Campbell Creek and the Southern Ocean, and a high risk to in-stream habitat values of Mount Emu Creek. Major road runoff poses a potential threat to the quality of urban stormwater in terms of atmospheric and vehicular deposition and accumulation which results in sediment, litter, trace metals and hydrcarbon contaminants entering the stormwater system. Accidents resulting in spills of oils, engine coolants or loads are another potential risk. This strategy aims to reduce the impact of major roads through actions including education and awareness campaigns; structural treatment measures; source control measures; site management, information; planning and regulation and operations.											
ME1	Education and awareness	Liaise with the local truck industry (e.g. trucks involved in agricultural/horticultural cartage, timber transport trucks, milk tankers etc) regarding management of loads to avoid spillages, truck maintenance to minimise contaminants accumulating on the road including engine oils, grease, air pollution deposits etc.	0	0	Council, industry reps	No additional cost - undertake as part of existing Council obligations.	0	0	0	0	0	0
ME2	Education and awareness	Use the local press to publicise load spillages and the impact they are likely to have on local lakes (including Ramsar sites) and waterways (where possible use actual examples) and point out the measures that truck/vehicle owners and operators can take to minimise reoccurrence.	0	0	Council	Costs could be reduced - implement with other ME2 actions.	0	0	0	0	0	0
MS1	Structural treatment measures - primary	Investigate the installation of drainage entrance treatments/inline types (e.g. litter traps, trash racks, return flow litter baskets, circular screens etc) at known vehicle stopover locations, for example near the Caltex Petrol Station in Camperdown, close to waterways along Princes Highway, Hamilton Highway and the Great Ocean Road which carry a substantial amount of traffic.	5,000	0	Council, VicRoads		5,000	0	5,000	0	0	5,000
MS2	Structural treatment measures - secondary	Investigate opportunities for the installation of grass swales, infiltration trenches or wetlands to treat road runoff the Mount Emu Creek crossing to collect and treat major road runoff.	0	0	Council	No upfront cost however installation will have a cost that is dependant on the type of measure installed.	0	0	0	0	0	0
MS3	Structural treatment measures - secondary	Incorporate pre-entrance treatment measures such as filter strips, grass swales, infiltration systems, bio-retention systems (for example, the centre of Geelong triple interceptor pits, porous pavements and oil and grease baffles in main road design.	0	0	Council, VicRoads	No additional cost - undertake as part of existing Council and VicRoads obligations.	0	0	0	0	0	0
MSC1	Source controls	Review road drainage in close vicinity to waterways and develop 'emergency' detention basins where feasible so that spillages can be trapped.	5,000	5,000	Council, VicRoads		5,000	5,000	5,000	5,000	5,000	15,000

Actions			Estimated Costs				Estimated Combined		Indicative Implementation			
No.	**Type**	**Details**	**Capital Cost ($)**	**Ongoing Cost ($)**	**Respons- ibility**	**Comment**	**Capital Cost ($)**	**Ongoing Cost ($)**	Year 1	Year 2	Year 3	Estimated total cost
MSC2	Source controls	Review existing street sweeping regime, checking to ensure that the schedule includes all hot spot areas.	0	0	Council	No additional cost - undertake as part of existing Council obligations.	0	0	0	0	0	0
MSM1	Site management	Require environmental management plans including site specific sediment and erosion control plans for road works and other construction activities in road reserves.	0	0	Council, VicRoads		0	0	0	0	0	0
MSM2	Site management	Ensure there are adequate litter bins along stopping points on major roads (e.g. at the Caltex petrol station in Camperdown). Encourage programs such as Clean Up Australia Day or Adopt a Highway to target litter along major roads	0	0	Council	No additional cost - undertake as part of existing Council obligations.	0	0	0	0	0	0
MI1	Information	Utilise information available through the EPAV (e.g. types and amounts of pollutants generated through road use) in education campaigns.	0	0	Council, EPAV	No additional cost - undertake as part of existing Council obligations.	0	0	0	0	0	0
MPR1	Planning and regulation	Liaise with VicRoads to encourage WSUD and water treatment measures, such as the use of detention and treatment areas, in future projects. Utilise current best practice management information as it becomes available (e.g. Cooperative Research Centre for Catchment Hydrology report " Water Sensitive Road Design - Design options for improving stormwater quality road runoff").	0	0	Council, VicRoads	No additional cost - undertake as part of existing Council obligations.	0	0	0	0	0	0
MPR2	Planning and regulation	Council, in association with VicRoads, EPAV and the Police, need to reinforce controls with regard to speed limits, securing of loads, vehicle maintenance etc. Promote EPAV initiatives such as reporting people littering from their cars (i.e. phone in their number plate, litterers can be fined).	0	0	Council, EPAV, Vic Roads, Police	No additional cost - undertake as part of existing Council and agency obligations.	0	0	0	0	0	0
MO1	Operations	Ensure Council roadworks activities (e.g. spraying, vegetation removal, road maintenance) adhere to best practice guidelines.	0	0	Council	No additional cost - undertake as part of existing Council obligations.	0	0	0	0	0	0
MO2	Operations	Introduce controls with regard to best practice environmental management for Council staff, particularly targeting road crews near Lismore, Derrinallum and Skipton.	0	0	Council	No additional cost - undertake as part of existing Council obligations.	0	0	0	0	0	0
Estimated major road runoff strategy cost									***10,000***	***5,000***	***5,000***	***20,000***
Upstream inflows												

Actions			Estimated Costs				Estimated Combined		Indicative Implementation			
No.	**Type**	**Details**	**Capital Cost ($)**	**Ongoing Cost ($)**	**Respons- ibility**	**Comment**	**Capital Cost ($)**	**Ongoing Cost ($)**	Year 1	Year 2	Year 3	Estimated total cost
The purpose of this strategy is to work within the communities of Princetown and Port Campbell to identify opportunities and implement strategies to minise the impacts of upstream inflows on Port Campbell Creek, the Southern Ocean, Gellibrand River and La Trobe Creek. Upstream inflows from tributaries higher up the catchment pose a risk to recreation values of Port Campbell Creek and the Southern Ocean and to in-stream habitat values in the Gellibrand River and LaTrobe Creek. Upstream inflows pose a potential threat to water quality primarily due to agricutlural land use activities resulting in contaminants such as sediment, nutrients, litter and pathogens. This strategy incorporates a balanced approach to mitigate the threat of upstream inflows including actions such as education and awareness campaigns, source control measures and site management measures.											
UE1	Education and awareness	Liaise with rural property owners to reduce sediment and pollutant loads washing into creeks that pass through the towns. Use DSE/DPI, CCMA, GHCMA and Landcare material as appropriate and utilise existing Landcare networks.	0	0	Council, DSE/DPI, CCMA, GHCMA	No additional cost - undertake as part of existing Council and agency obligations.	0	0	0	0	0	0
UE2	Education and awareness	Develop, with landcare/friends of groups, localised catchment management plans extending from the upper rural catchments through the urban areas. Seek partnerships with DSE/DPI, CCMA, GHCMA to utilise current strategies and facilitate plan development and implementation.	5,000	2,000	Council, DSE/DPI, CCMA, GHCMA		5,000	2,000	0	5,000	2,000	7,000
UE3	Education and awareness	Promote relevant actions within current CMA strategies (e.g. Regional Catchment Strategies and Draft Waterway Health Strategy).	0	0	Council	No additional cost - undertake as part of existing Council obligations.	0	0	0	0	0	0
USC1	Source controls	Encourage actions that limit pollutants entering waterways from upstream areas (e.g. riparian zone revegetation and stock exclusion to limit sediment; review of agricultural chemical use and storage to limit toxicant input).	0	0	Council	No additional cost - undertake as part of existing Council obligations.	0	0	0	0	0	0
USC2	Source controls	Maintain unsealed roads and review the effectiveness/state of repair of open table drains with the aim of decreasing the amount of sediment entering waterways from unsealed road runoff.	0	0	Council	No additional cost - undertake as part of existing Council obligations.	0	0	0	0	0	0
USM1	Site management	Encourage the production of rural property/farm management plans to improve overall farm management and limit the inputs of sediments, nutrients and chemicals entering the waterways from rural properties. DSE/DPI, in coordination with Council and Glenormiston Agricultural College (supported by Melbourne University), run farm management planning courses.	0	0	Council, DSE/DPI, CCMA, GHCMA	No additional cost - undertake as part of existing Council obligations.	0	0	0	0	0	0
Estimated upstream inflow strategy cost									***0***	***5,000***	***2,000***	***7,000***
Pests												
The purpose of this strategy is to minimise the impacts of pests on the receiving waterways of Timboon, Darlington, Lismore, Princetown and Skipton. Pests pose a high risk to in-stream and riparian habitat values in Powers Creek in Timboon and a high risk to in-stream habitat values of Mount Emu Creek, Lake Gnarpurt, Browns Waterholes and Mundy Gully Creek, the Gellibrand River and LaTrobe Creek. Pests pose a threat in terms of bank instability and erosion (e.g rabbit burrowing) and the destruction of instream and riparian habitat (e.g. willows and carp). Pest activity in waterways can result in excess levels of sediment, nutrients and oxygen depleting material. This strategy addresses the impact of pests through education and awareness campaigns; source control measures; information; planning and regulation; and operations.											

Actions			Estimated Costs				Estimated Combined		Indicative Implementation			
No.	Type	Details	Capital Cost ($)	Ongoing Cost ($)	Respons- ibility	Comment	Capital Cost ($)	Ongoing Cost ($)	Year 1	Year 2	Year 3	Estimated total cost
PE1	Education and awareness	Liaise with the Shires of Moyne and Colac Otway to tackle pests along shared waterways e.g. Mount Emu Creek (Moyne Shire Council) and Gellibrand River (Colac Otway Shire Council). Communication with adjacent Shires can achieve a coordinated response to weeds whereby upper catchment areas are targeted before those areas downstream and greater results can be achieved.	0	0	Council, CCMA, GHCMA, DSE/DPI	No additional cost - undertake as part of existing Council obligations.	0	0	0	0	0	0
PE2	Education and awareness	Implement an awareness campaign, including displays, workshops and education material targeted at property owners adjacent to creek lines. It should focus on litter control and discourage people from throwing green waste into waterways, as well as highlighting the potential for muddied/dirt encrusted vehicles to spread weeds between sites.	5,000	1,000	Council	Costs could be reduced - implement with other education strategies.	5,000	1,000	5,000	1,000	1,000	7,000
PE3	Education and awareness	Promote and support the implementation of relevant programs within the CCMA Regional Catchment Strategy (e.g. the targeted pest management program), the GHCMA Regional Catchment Strategy (e.g. Management Action Targets for Pest Plants and Animals) and the GHCMA Weed and Rabbit Action Plans.	0	0	Council	No additional cost - undertake as part of existing Council obligations.	0	0	0	0	0	0
PSC1	Source controls	Undertake a targeted program of weed and vermin eradication, commencing with hot spot areas. Utilise existing information available from DSE/DPI, CCMA, GHCMA and Landcare Groups.	10,000	2,000	Council, CCMA, GHCMA, DSE/DPI		10,000	2,000	0	0	10,000	10,000
PSM1	Site management	Develop site management plans for heavily pest infested areas that are of importance to the community (e.g. Lakes Colongulac and Gnarpurt) describing actions and programs to address the pest problem. Review the plans annually.	5,000	1,000	Council, CCMA, GHCMA, DSE/DPI		5,000	1,000	0	0	5,000	5,000
PI1	Information	Distribute information to nurseries and homeowners informing them of plants that are considered environmental weeds in the area.	1,000	0	Council	Costs could be reduced if implemented with RE1 actions.	1,000	0	0	0	1,000	1,000
PI2	Information	Develop maps showing priority areas for weed control. Utilise and build on current CMA and DSE/DPI information. Review the maps biennially.	5,000	500	Council, CCMA		5,000	500	0	0	5,000	5,000
PPR1	Planning and regulation	Investigate the use of an incentive system to encourage landholders to address pest problems on their land.	0	0	Council, CCMA, GHCMA	No additional cost - undertake as part of existing Council and CMA obligations.	0	0	0	0	0	0
PPR2	Planning and regulation	Require all fill to be clean before use in order to limit the spread of pests. Encourage the use of all fill to be free from pests.	0	0	Council	No additional cost - undertake as part of existing Council obligations.	0	0	0	0	0	0

Actions			Estimated Costs				Estimated Combined		Indicative Implementation			
No.	**Type**	**Details**	**Capital Cost ($)**	**Ongoing Cost ($)**	**Respons- ibility**	**Comment**	**Capital Cost ($)**	**Ongoing Cost ($)**	Year 1	Year 2	Year 3	Estimated total cost
PO1	Operations	Review Council landscaping guidelines to ensure environmental weeds are not used in Council areas. Investigate options for using native grass species in Council areas and in the development of grassed swales as native species require less mowing on Council owned or managed land.	0	0	Council	No additional cost - undertake as part of existing Council obligations.	0	0	0	0	0	0
Estimated pest strategy cost									***5,000***	***1,000***	***22,000***	***28,000***
Unstable waterways												
The purpose of this strategy is to identify opportunities and implement measures to minimise impacts of unstable waterways on the receiving waterways of Camperdown, Port Campbell and Cobden. Unstable waterways pose a high risk to in-stream habitat values in Lake Colongulac and recreation values of Port Campbell Creek and the Southern Ocean and landscape values of Cobden Lake. Unstable waterways pose a potential threat to urban stormwater quality particularly in terms of poorly controlled stock and recreational access, weed infestation, damage from waterway works, development encroachment, vegetation loss, and eroded and unstable riparian zones. This results in pollutants such as sediment, nutrients and oxygen depleting material entering the waterway. This strategy includes an education and awareness campaign; structural treatment measures; source control measures; and site management.											
WE1	Education and awareness	Implement an awareness campaign, including displays, workshops and distribution of education material to land owners, particularly those with properties with waterway frontage, regarding BPEM of waterways environs. Highlight issues such as minimising stock access to waterways, revegetating and fencing the riparian environment either side of the waterways. Utilise existing information from the CMA's	5,000	2,000	Council, CCMA, GHCMA	Costs could be reduced if implemented as part of other education strategies.	5,000	2,000	0	5,000	2,000	7,000
WE2	Education and awareness	Promote and support relevant programs within the CCMA Regional Catchment Strategy (e.g. program 3.13 vegetation retention and protection) and the GHCMA Regional Catchment Strategy (e.g. 5.2.4 Management Action Targets for Biodiversity), particularly along watercourses.	0	0	Council, CCMA, GHCMA	No additional cost - undertake as part of existing Council and agency obligations.	0	0	0	0	0	0
WS1	Structural treatment measures - primary	Investigate weed eradication and structural works in areas of particularly unstable waterways. Could link in with various GHCMA or CMA programs already underway such as the Draft Waterway Health Stratey prioritisation of bank protection and stabilisation and willow removal.	0	0	Council, CCMA, GHCMA	No additional cost - undertake as part of existing Council and agency obligations.	0	0	0	0	0	0
WSC1	Source controls	Encourage landholders to limit stock access and clearing of riparian vegetation adjacent to waterways. Utilise existing Landcare networks and the CCMA biodiversity team for information and biodiversity program activities. Planning permits are required to remove native vegetation as per legislative requirements.	0	0	Council, CCMA, GHCMA, Landcare groups	No additional cost - undertake as part of existing Council and agency obligations.	0	0	0	0	0	0
WSM1	Site management	Review stormwater outlets and modify where required to reduce the capacity of flows to destabilise waterways. Modifications may include structures to reduce flow intensity, protecting the bank with rock works, or introducing a detention basin at the outlet to allow water to enter the waterway in a more controlled rate.	0	0	Council	No additional cost - undertake as part of existing Council obligations.	0	0	0	0	0	0

Actions			Estimated Costs				Estimated Combined		Indicative Implementation			
No.	**Type**	**Details**	**Capital Cost ($)**	**Ongoing Cost ($)**	**Respons- ibility**	**Comment**	**Capital Cost ($)**	**Ongoing Cost ($)**	Year 1	Year 2	Year 3	Estimated total cost
WI1	Information	Maintain up to date information regarding BPEM of pests. Liaise with other agencies, such as Landcare and CMAs, to share information.	0	0	Council	No additional cost - undertake as part of existing Council obligations.	0	0	0	0	0	0
Estimated unstable waterway strategy cost									***0***	***5,000***	***2,000***	***7,000***
Flow modification												
The purpose of this strategy is to work with the communities of Campderdown and Lismore to identify opportunities and implement strategies to to minimise the impacts of flow modification on Lake Colongulac and Lake Gnarpurt. Flow modification poses a high risk to instream habitat values of both lakes. Flow modification can occur through water extraction for agricultural purposes (i.e. reduced flows) or an increase in flow intensity, as occurs when stormwater is channeled to an outfall point or vegetation is removed from the water's flow path (i.e. change in flow type). This strategy includes education and awareness campaigns; source control measures; and planning and regulation controls.												
FE1	Education and awareness	Educate the community regarding the effects that increased urban runoff has on natural ecosystems.	0	0	Council, CCMA, GHCMA	No cost if implemented as part of RE strategies.	0	0	0	0	0	0
FE2	Education and awareness	Promote and support the implementation of relevant actions within the CCMA and GHCMA Regional Catchment Strategies (e.g. CCMA RCS Program 2.1.E changed flow regimes).	0	0	Council, CCMA, GHCMA	No additional cost - undertake as part of existing Council and agency obligations.	0	0	0	0	0	0
FS1	Structural treatment measures - primary	Reform drains to ensure high velocity and intensity urban runoff is discharged to streams in a more natural way. Investigate ways to improve the quality of water being discharged via these drains (e.g. a detention basin may reduce velocities and improve water quality through allowing sediments to settle).	0	0	Council	No additional cost - undertake as part of existing Council obligations.	0	0	0	0	0	0
FSC1	Source controls	Encourage the use of rain water tanks, reuse of stormwater and activities that will reduce the amount of runoff from urban areas.	0	0	Council, South West Water	No additional cost - undertake as part of existing Council and agency obligations.	0	0	0	0	0	0
FI1	Information	Invesigate the reuse of stormwater for Council irrigation purposes.	2,000	0	Council, South West Water		2,000	0	0	2,000	0	2,000
FRP1	Planning and regulation	Assess planning permit applications with regard to any effects that the development may have on the flow regime. Such consideration should be informed by hydrological flow and water quality modelling data representing different stormwater scenarios.	0	0	Council	No additional cost - undertake as part of existing Council obligations.	0	0	0	0	0	0
Estimated flow modification strategy cost									***0***	***2,000***	***0***	***2,000***
Docks and wharves												

Actions			Estimated Costs				Estimated Combined		Indicative Implementation			
No.	**Type**	**Details**	**Capital Cost ($)**	**Ongoing Cost ($)**	**Respons- ibility**	**Comment**	**Capital Cost ($)**	**Ongoing Cost ($)**	Year 1	Year 2	Year 3	Estimated total cost
The purpose of this strategy is to work with the Port Campbell community to identifgy opportunities and implement measures to minimise the impact of the wharf on the instream habitat values of the Southern Ocean. Docks and wharves pose a potential threat to urban stormwater quality due to runoff from wharf areas which can contain atmospheric deposition, spilt raw product, erosion from unsealed areas, accidential spills and litter. This results in sediment, raw product (oxygen depleting materials), oils and greases, trace metals and toxic substances. This strategyy includes education and awareness campaigns; source control measures, site management; and information dissemintation.												
DE1	Education and awareness	Ensure those using the crane to lift boats are adequately trained and aware of the impact the activity may have on water quality.	1,000	500	Council, Parks Victoria		1,000	500	1,000	500	500	2,000
DE2	Education and awareness	Install signs at the wharf advising users of their environmental responsibilities. Use the signs to raise awareness of general stormwater issues.	1,000	0	Council, Parks Victoria		1,000	0	1,000	0	0	1,000
DSC1	Source controls	Provide adequate numbers of litter bins along the wharf and review the frequency of their emptying (may require greater frequency during peak times).	0	0	Council	No additional cost - undertake as part of existing Council obligations.	0	0	0	0	0	0
DSM1	Site management	Develop a site management plan for the wharf that details how risks to water quality will be handled.	2,000	0	Council, Parks Victoria		2,000	0	0	0	2,000	2,000
DI1	Information	Compile information on wharf usage (e.g. frequency of boat launching, type of boat, pedestrian access etc). Use this information to develop the site management plan.	2,000	0	Council, Parks Victoria		2,000	0	0	0	2,000	2,000
Estimated docks and wharves strategy cost									***2,000***	***500***	***4,500***	***7,000***
Rural land use												
The purpose of this strategy is to work with the rural communities in and around Princetown and Port Campbell to identify opportunities and implement measures to minimise the impacts of rural land use on the receiving waterways of these towns. Rural land use activities near Port Campbell and Princetown pose a high risk to recreation values in Port Campbell Creek and the Southern Ocean and in-stream habitat values in the Gellibrand River and LaTrobe Creek near Princetown. Rural land use activities pose a potential risk to urban stormwater quality due to runoff from unmade roads, septic tanks and intensive activities such as poultry sheds, landscape suppliers etc. This results in sediment, nutrients and oxygen depleting materials entering the waterways. This strategy aims to reduce the amount of pollutants in rural runoff through education and awareness campaigns; source control measures; site management; information dissemination; planning and regulation controls; and operations procudures.												
RUE1	Education and awareness	Support the education of landholders regarding the threat that rural activities can pose to water quality. Educational opportunities exist through the CCMA RCS program 4.1 community education, the CCMA and GHCMA RCS Agricultural landuse action programs and the DSE/DPI farm extension activities.	5,000	2,000	Council, Landcare, CMAs	Costs could be reduced if implemented with RE actions.	5,000	2,000	0	0	5,000	5,000
RUE2	Education and awareness	Continue to support the drum muster program for farm chemical drums. Review the program to include new educational components focussing on stormwater issues for rural properties. Provide guidelines for property owners regarding appropriate chemical storage, particularly focussing on intensive agricultural industries (such as livestock feedlots, broiler farms etc).	0	0	Landcare, Council, EPAV	No additional cost - undertake as part of existing Council obligations.	0	0	0	0	0	0
RUSC1	Source controls	Identify sources of rural contaminants and undertake monitoring to determine the extent of the impact and possible means of reducing the contaminants. It is important that rural areas upstream of the towns are considered to reduce their impacts on urban stormwater downstream.	15,000	15,000	Council		15,000	15,000	0	0	15,000	15,000
RUSM1	Site management	Encourage the development of property and catchment plans (e.g. through Farm Management Planning courses run by DSE/DPI or as outlined in CCMA and GHCMA RCS such as CCMA RCS Program 1.1 Soil and Catchment Management).	0	0	Council, CMAs, DSE/DPI, Landcare groups	No additional cost - undertake as part of existing Council and agency obligations.	0	0	0	0	0	0

Actions			Estimated Costs				Estimated Combined		Indicative Implementation			
No.	**Type**	**Details**	**Capital Cost ($)**	**Ongoing Cost ($)**	**Respons- ibility**	**Comment**	**Capital Cost ($)**	**Ongoing Cost ($)**	Year 1	Year 2	Year 3	Estimated total cost
RUI1	Information	Utilise information obtained from research undertaken through the RCS, the Coorperative Research Centre for Catchment Hydrology - River Restoration Program and other relevant research, in education campaigns and media releases etc.	0	0	Council	No additional cost - undertake as part of existing Council obligations.	0	0	0	0	0	0
RUPR1	Planning and regulation	Develop/review, as appropriate, controls for the removal of vegetation on rural properties. Undertake a review of the planning scheme as outlined in the CCMA Regional Catchment Strategy.	0	0	Council, CMAs	No additional cost - undertake as part of existing Council and agency obligations.	0	0	0	0	0	0
Estimated rural land use strategy cost									***0***	***0***	***20,000***	***20,000***
Open space												
This strategy aims to identify opportunities and implement measures to minimise the impact of Timboon's open space areas on Powers Creek and Cobden+A265. Open space areas within the town pose a high risk to riparian habitat values of the Creek. Open space poses a potential threat to the quality of urban stormwater through wash off of nutrients (fertilisers) and litter from public gardens, parks, sporting facilities and golf courses, distribution of environmental weeds from gardens and discharge of poor quality water from ornamental lakes. This strategy incorporates education and awareness campaigns and activities; structural treatment measures; source control measures; site management; information dissemination; planning and regulation controls; and operations measures in order to reduce the impact of open space areas on the creek.											
OE1	Education and awareness	Establish work procedures that ensure grass clippings/prunings are not left close to waterways or water bodies. Ideally clippings would be collected and composted. Provide education to Council's parks and gardens staff and the community.	0	0	Council	No additional cost - undertake as part of existing Council obligations.	0	0	0	0	0	0
OE2	Education and awareness	Develop signage demonstrating the values of local waterside parks (e.g. Powers Creek Reserve), good environmental practice and stormwater issues.	5000	0	Council, Powers Creek Reserve Committee of Management		5,000	0	5,000	0	0	5,000
OS1	***Structural treatment measure- primary***	***Upgrade Cobden Lake through the addition of sediment ponds, litter nets, vegetated swales, weed removal and revegetation in order to improve stormwater quality and in-stream and riparian habitats of the Lake. Incorporate community awareness through drain stencilling and water monitoring. Utilise information and technical expertise from relevant agencies.***	***160000***	***1000***	***Council, EPAV, CCMA, GHCMA***		***160,000***	***1,000***	160,000	1,000	1,000	162,000
OC1	Source controls	Review fertiliser, herbicide and pesticide use in council parks with the objective of minimising toxicant input into waterways/water bodies.	0	0	Council	No additional cost - undertake as part of existing Council obligations.	0	0	0	0	0	0
OM1	Site management	Develop site specific waste management plans for key events through lease arrangements with Council (e.g. for sporting clubs, markets etc).	5000	2000	Council, Event organiser		5,000	2,000	0	0	5,000	5,000
OM2	Site management	Consider temporary signage indicating waste disposal practice required at event location (5 x $200).	1000	0	Council		1,000	0	0	0	1,000	1,000

Actions			Estimated Costs				Estimated Combined		Indicative Implementation			
No.	**Type**	**Details**	**Capital Cost ($)**	**Ongoing Cost ($)**	**Respons- ibility**	**Comment**	**Capital Cost ($)**	**Ongoing Cost ($)**	Year 1	Year 2	Year 3	Estimated total cost
OM3	Site management	Follow up events, such as markets, with coordinated clean up plan (street sweeping, rapid rubbish collection, recycling containers, cigarette butt containers etc).	0	0	Council, Event organiser	No additional cost - undertake as part of existing Council obligations.	0	0	0	0	0	0
OM4	Site management	Encourage the development of an environmental management plan for the local golf courses (e.g. Timboon Golf Club and other golf courses and bowling greens).	15000	0	Council	Council, Golf Course managers	15,000	0	0	15,000	0	15,000
OP1	Planning and regulation	Require park users to develop environmental/waste management plans as part of lease conditions.	0	0	Council	No additional cost - undertake as part of existing Council obligations.	0	0	0	0	0	0
OO1	Operations	Review maintenance operations to ensure they meet with best practice requirements in terms of chemical use, irrigation and maintenance procedures (e.g. lawn mowing, pruning).	0	0	Council	No additional cost - undertake as part of existing Council obligations.	0	0	0	0	0	0
Estimated open space strategy cost									***165,000***	***16,000***	***7,000***	***188,000***
Total reactive management strategies cost									***318,800***	***179,500***	***202,500***	***700,800***
Total strategies cost									***363,800***	***258,500***	***268,500***	***890,800***