
**THOMPSONS CREEK
CATCHMENT PLAN**

FEBRUARY 1998

Prepared by the Thompsons Creek Catchment Committee

COVER: THOMPSONS CREEK AT DON LESTER'S PROPERTY 'CHARLEMONT'.

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ABBREVIATIONS

ABS	Australian Bureau of Statistics
CALP	Catchment and Land Protection (as in CALP Board or Act)
CCMA	Corangamite Catchment Management Authority
CRCS	Corangamite Regional Catchment Strategy
DNRE	Department of Natural Resources and Environment
EPA	Environment Protection Authority
ESD	Ecologically Sustainable Development
ESLM	Ecologically Sustainable Land Management
FFG	Flora and Fauna Guarantee (as in FFG Act)
LMAC	Lake Modewarre Advisory Committee
LPIS	Land Protection Incentive Scheme
NHT	Natural Heritage Trust
NLP	National Landcare Program
RCD	Rabbit Calicivirus Disease
RUCC	Rural-Urban Community Coordinator
TCCC	Thompsons Creek Catchment Committee
TCPO	Thompsons Creek Project Officer
VFF	Victorian Farmers Federation

SECTION 1.

ACKNOWLEDGMENTS

The production of the Thompsons Creek Catchment Plan involved the collective efforts of many people who have an interest in the ecological and economic welfare of the catchment. Members of the Thompsons Creek Catchment Committee (TCCC) coordinated its development and committed themselves not only to its completion but also to ensuring funding for its future implementation. Their time and energy was also given to convening the working groups set up to investigate each of the major program areas of this Plan. Committee members are listed in Appendix 1. but special mention is made of the contribution of Sandi Allen for her dedication and enthusiasm in carrying out the role of Chairperson and many other additional functions; the extensive technical advice provided by Graeme Anderson and Paul Whinney, Catchment Management and Sustainable Agriculture DNRE, Michael Sayers, Rural-Urban Community Coordinator, and the planning and administrative assistance from Jeanette Spittle, Surf Coast Environment Officer.

Many catchment landowners were seconded to working groups and freely gave their advice and ideas. Their input towards the preparation of this Plan has been significant and valuable. These people are also listed in Appendix 1.

Surf Coast Shire provided full logistic support to the Project Officer and the TCCC, extending from administrative assistance and technical advice to the use of venues for committee meetings and workshops. Their involvement in this project is gratefully acknowledged.

Finally, the production of this Plan is a result of funding provided under the National Landcare Program. Their past and continued funding (now consolidated under the Natural Heritage Trust) for projects aimed at resource conservation and management within the Thompsons Creek catchment is greatly appreciated.

PLAN SUMMARY

This Plan is intended as a reference document to guide the TCCC and the Project Officer. The Plan has been developed with a 10 year Vision in mind, although it is recommended that a performance review be conducted after 5 years in 2003.

The key features of the Plan include;

- 8 major programs that i) address issues that contribute to environmental degradation in our catchment, ii) promote actions that are directed at improving its environmental and economic health, and iii) provide a framework to support, encourage and monitor actions recommended by the Plan.
- A combination of short, medium and long term actions and strategies to achieve the Vision within 10 years.
- Actions and strategies that meet community expectations.

Major goals or expected outcomes of the Plan include;

- * A minimum of 50% of rural tenements greater than 60 ha managed according to ESLM principles,
- * A progressive and significant reduction in the incidence of blue-green algal blooms,
- * A 50% reduction in 1998 pest animal numbers over 5 years, extending to 75% over ten years,
- * Elimination of Furze in the catchment by 2008,
- * Establishment of an additional 80km of protective fencing to improve the environmental condition of our waterways,
- * The protection of 17 catchment sites supporting significant remnant woodlands,
- * The protection of threatened species currently known to exist in the catchment.

The Plan has been prepared with the understanding that we have a unique opportunity before us to positively tackle land degradation and promote wise use and management of our land, water and biological resources.

Recent NHT funding has allowed the TCCC to appoint a Project Officer to commence implementation of this Plan. Additional NHT funding also provides an opportunity for immediate commencement of a number of important on-ground actions, while future funding or sponsorship to support complementary activities is anticipated.

INTRODUCTION

Why Have a Plan for Thompsons Creek Catchment?

The region that drains water into Thompsons Creek is one of a number of sub-catchments that form the greater Corangamite catchment. The Corangamite Catchment Management Authority (CCMA) provides advice on the management of the land and water resources in the region. The approaches adopted in implementing and coordinating this management are outlined in the *Regional Catchment Strategy*, June 1997.

The CCMA have identified 22 land degradation issues that significantly impact on the social, environmental and economic health of the region. A number of these are relevant to the Thompsons Creek Catchment and without appropriate remedial action will become more problematic and costly to the community as time progresses. These issues and the actions to address them are discussed in detail within the following programs.

A great deal of the onus in tackling land degradation and promoting sustainable land use practices has been taken up by members of the Thompsons Creek and Torquay Landcare groups. In addition to these, members of the Lake Modewarre Advisory Committee (LMAC), Greening Connewarre, Torquay Coast Action and Breamlea Coast Action have also been involved in environmental restoration projects in their geographic areas of interest. There are other community groups, schools and individuals who are active in similar ways across our catchment.

As a means of achieving land management and resource conservation objectives, it is important that various groups and individuals have a common goal to work towards. This Plan has been written for that purpose and recommends actions that can be applied locally or regionally but be relevant and applicable at a broader catchment perspective.

Meeting Community Expectations

In July 1997, an information brochure was delivered to all landowners in the Thompsons Creek Catchment. The brochure included a questionnaire seeking responses to various land degradation and land use issues. Approximately 18.5% of catchment residents responded to the survey and results indicated a high level of concern about the issues that were identified by the brochure.

The data have been interpreted for landowners of tenements equal to, or above, 10ha and those below 10ha. An assumption is made that the former are more likely to be rural landowners involved in some form of commercial enterprise while the latter are more likely to include residents of small rural 'lifestyle' blocks and townships. Figures 1 and 2 indicate that there are some differences in the way these two community sectors prioritise the issues raised in the questionnaire. The one exception is that both rated pest plants, particularly Furze, and pest animals, mainly rabbits, as the two most serious problems contributing to land degradation in the catchment.

These particular concerns tended to be more pronounced with larger landowners although problems relating to dryland salinity and the quality of our waterways were also viewed by this sector as significant issues to be addressed. Interestingly, the relatively high level of concern over waterway quality was shared by both sectors possibly because issues such as periodic algal blooms have visible and demonstrated impacts across the broader community.

Another observation that can be made is that the level of concern expressed by smaller landowners is more evenly spread over a wider range of issues and, in some cases, is relatively higher than those of their rural counterparts. The decline of native wildlife, clearance of native vegetation and planning for urban and semi-rural development were particular issues where smaller landowners showed a greater concern.

Fig. 1. Issues rated as serious problems or as concerns by rural landowners

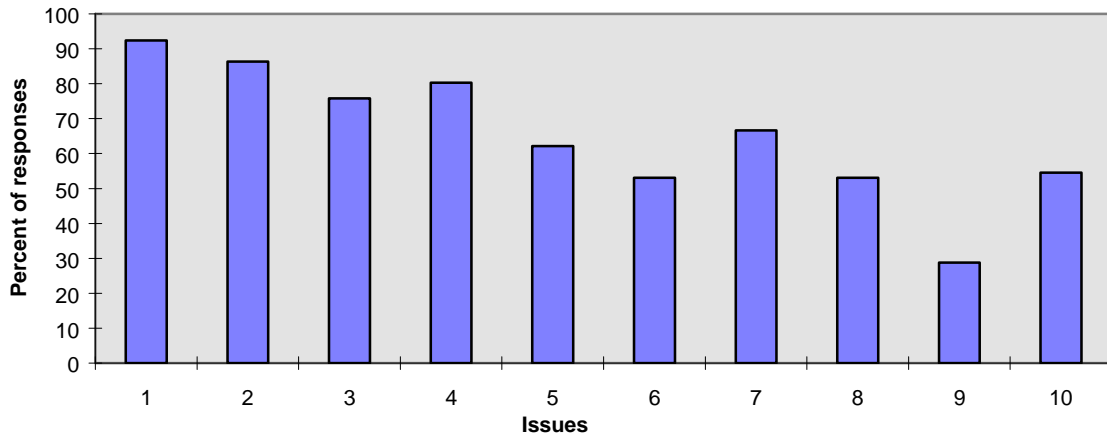
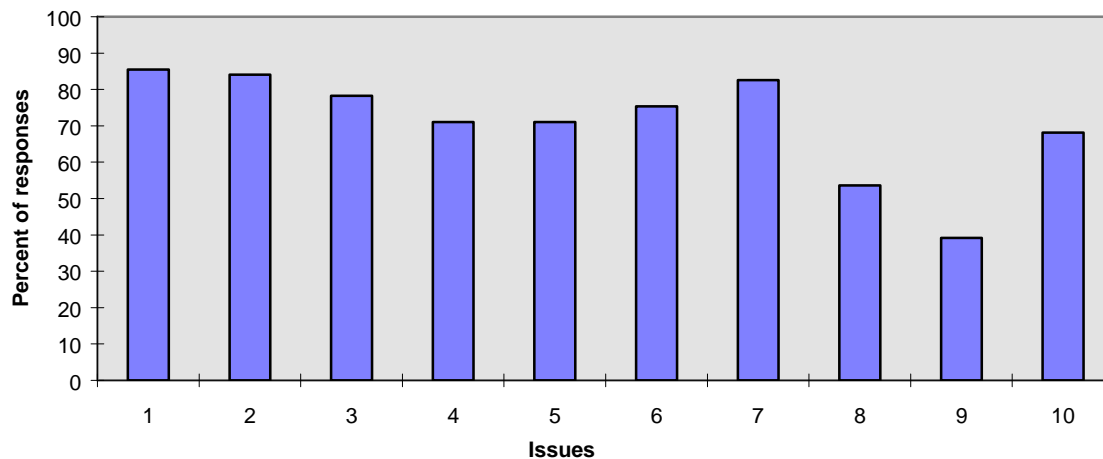


Fig. 2. Issues rated as serious problems or as concerns by small-block and township landowners



1 = pest plants	6 = clearance of native vegetation
2 = pest animals	7 = loss of native wildlife
3 = quality of our waterways	8 = roadside management
4 = salinity	9 = public land use
5 = erosion	10 = planning for urban and semi-rural development

Notwithstanding these differences, two important pieces of information were gleaned from the survey, namely;

- Respondents registered a high level of concern over most issues raised in the survey. Only the issue of ‘public land use’ did not attract at least a 50% ‘serious problem or concern’ rating from respondents.
- Many respondents rightly noted that most issues were linked or inter-dependent in some sense, and for this reason placing priorities on issues was difficult.

The survey has provided a clear indication by the community that a Plan for the remediation of the catchment is timely and warranted. Further, the Plan recognises that there are particular issues that need to be more closely and rigorously tackled although in some cases this may not be initially evident to the reader. For example, pest plants and pest animals are collectively regarded by the wider community to be the most serious threats to our catchment. The respective programs that address these problems are relatively short of definitive actions but the Plan places strong emphasis on the development of a specific Furze Action Plan. The rationale behind this recommendation is that this singular issue requires a more strategic approach than can be developed here and that a concerted and coordinated effort to remove Furze will not only improve landscape values, it will also greatly assist rabbit control. This is one instance that illustrates the interdependency between issues noted by survey respondents.

How the Plan was developed

In 1995, landowners abutting Thompsons Creek were invited to a local public meeting to discuss various environmental topics relating to the area, and to discuss initiatives that were being implemented to address these issues. Participants agreed that progress towards this goal were constrained by a lack of coordination, resources and direction.

An outcome of this meeting was the formation of a committee (TCCC) that included representation from the Torquay and Thompsons Creek Landcare groups, Greening Connemara and Breamlea Coast Action. Two non-affiliated community landowners were also enlisted while officers from DNRE and Surf Coast were included to provide technical and administrative support.

The TCCC subsequently identified the need to integrate the activities and initiatives of the various community groups under a single plan that considered the total catchment of Thompsons Creek.

Funding to prepare the Plan was provided for under the National Landcare Program and its development involved a number of steps that included;

- A community-wide survey to quantify concerns and prioritise issues.
- The formation of a number of working groups established to consider options and possible solutions to priority issues.
- Mapping of catchment tenements to provide a profile on land occupation.

VISION

This Plan has been developed with a 10 year vision that will see the catchment as a model to others, where;

“the community, and their next generation, benefit from their efforts and achievements in producing a healthy and diverse environment”.

A commitment by all landowners to embrace this vision is expected to result in;

- A catchment which supports a unique range of habitats and ecological processes.
- A catchment that is managed for multiple uses consistent with ESD principles.
- A catchment which meets the needs of residents, and benefits from their participation.

THE CATCHMENT

Thompsons Creek is located approximately 10 kilometres south of Geelong, originating in the Gherang region and entering the sea at Breamlea. For most of the year there is very little flow from the headwaters to its discharge into the sea, although in some years substantial flows and even floods have resulted after periods of sustained and heavy rains.

The catchment is located within the geomorphic division known as the South Victorian Coastal Plain. The land is gently undulating and elevation generally does not exceed 70m except along the north-western boundary where it rises towards the Barrabool Hills. Mount Moriac, the weathered basalt cone of a former volcano, is 247 metres above sea level. At the mouth of Thompsons Creek, the land is flat and subject to tidal influences resulting in the formation of a large semi-saline saltmarsh. This complex covers an area of about 2km² behind the sand dunes that run parallel to the coastline.

Throughout the catchment the land is largely covered by Pliocene to Quaternary sediments and Newer Volcanics. Near Gherang, some of the older sediments such as the quartz, sand and gravels of the Eastern View formation occur close to the surface supporting an extractive industry over the past several years. Nearer the coast the soils include a high level of alluvium and outwash deposits making it suitable for land uses such as vegetable and flower growing.

Thompsons Creek drains a catchment covering an area of approximately 30,000 hectares and is fed along its length by minor tributaries including Ravens Creek, Taylors Gully, Merrigig Creek, Duneed Creek, Hindhaugh Creek and Tea-tree Creek. The total length of waterway exceeds 200 kilometers.

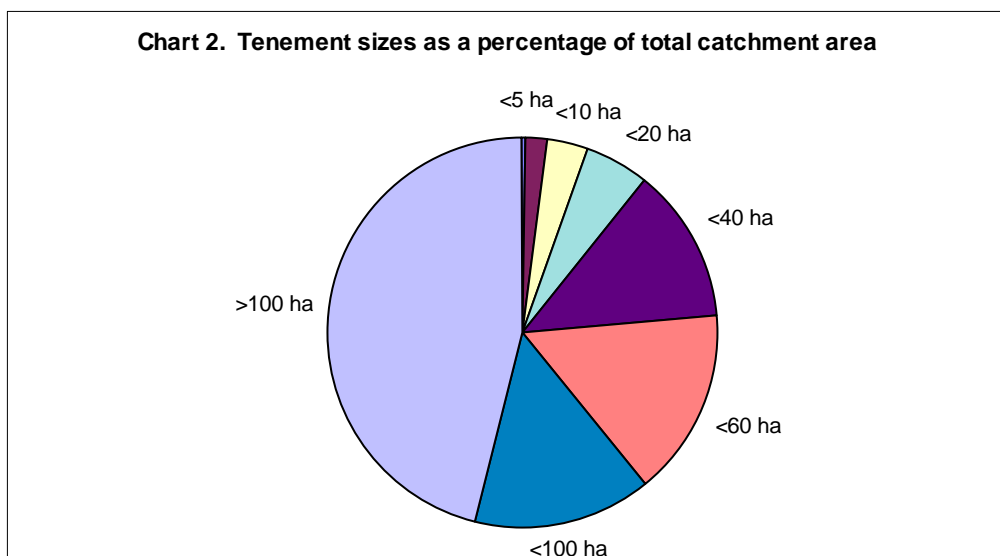
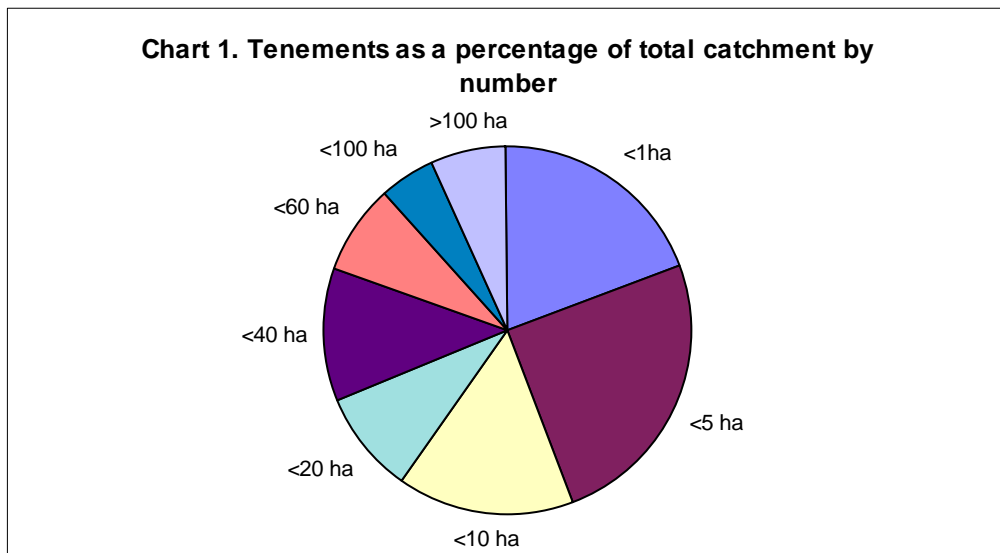
Two major waterbodies in Lake Modewarre and the Wurdiboluc water storage impoundment are located at the head of the catchment. Strictly speaking, Lake Modewarre is the drainage base of a smaller and distinct catchment. It has been included in this plan because water periodically released from the Lake via pipe and channel to nearby Browns Swamp has the potential to impact on water quality of the Thompsons Creek Catchment.

Other waterbodies of the catchment include the wetlands of Brown's Swamp, Lake Gherang, Dutton's Swamp and Breamlea Saltmarsh while important streamside reserves occur where waterways intersect various roadways. These reserves contain important vegetation communities such as remnant grasslands and woodlands, although soil disturbances and weed invasions have severely degraded some of these areas. Examples include Horseshoe Bend, Dans, Willowite, Pettavel, and Larcombs Roads.

The catchment currently supports a range of rural industries mostly related to broadacre cropping and grazing but also including semi-intensive animal husbandry such as horse breeding and dairy farming, intensive poultry farming, mineral extraction, horticulture, viticulture and tourist-related enterprises. The last includes many service industries catering for specialist accommodation and dining in addition to activities associated with aviation and horse or camel riding.

Alpaca and Water Buffalo farming is also conducted in the catchment. Although on a small scale, these land uses represent interesting examples where landowners are prepared to investigate alternatives to traditional farming practices.

There are about 1100 landowners within the catchment but only about 65% are regarded as permanent residents. The following pie charts provide a breakdown of tenement sizes that include all landowners irrespective of their residential status. Some interesting observations can be made from the first of these charts, namely that 60% of the catchment population live on or own land that is less than 10 ha in size and only 6.5% (70 landowners) occupy land greater than 100 ha. While this last figure may appear relatively low, Chart 2 illustrates that these landowners occupy slightly greater than 46% of the catchment by area.



These charts clearly demonstrate that most of the population is concentrated into residential nodes which include the townships of Moriac, Breamlea and Freshwater Creek and the semi-rural developments at Layard, Connewarre and Mt Duneed, Lakeside Drive and Torquay Heights.

It also indicates that the landowners with large tenements have an equally important part to play in the success of this plan as do landowners on smaller allotments. To this extent, the actions of this plan require a balance that takes into account all demographic sectors within the catchment.

SECTION 2

PROGRAM 1. IMPROVING RURAL LAND MANAGEMENT PRACTICES AND PRODUCTIVITY

ISSUES

Thompsons Creek Catchment has been greatly modified since white settlement. It has been significantly cleared of its original, deep-rooted vegetation principally for agriculture and, to a lesser extent, residential uses. Dams and diversions have contributed to altered water flow patterns and the addition of fertilisers, insecticides and nutrients from land uses have impacted on water quality. The soils have been continually reworked under European farm practices, removed for other uses or subject to erosion by wind and water.

There is no doubt that past practices to increase the availability of agricultural land by clearing, and improving soil productivity by applying additives and fertilisers, was carried out with the good intent. Unfortunately, the legacy of those practices is now with us in the form of some serious land degradation problems.

For example, one of the many consequences of past vegetation clearance has been the gradual rising of our groundwater due to increased infiltration of rainwater. When the salt-laden groundwater nears the surface and into the root-growing zone, it not only affects the type and cover of vegetation (in some cases bare 'salt scalds' result), but it also increases the incidences of waterlogging and erosion.

These problems, in turn, impact on our means to sustain productivity, maintain property values and to enjoy the living environment we have chosen. Moreover, the cause and effects of these problems are not confined to the same property or area. Rather, the effects can be experienced far removed from the cause, and therefore dealing with the problem requires wider community involvement and action.

The group-based approach of the Landcare program has been instrumental in achieving this objective and highlighting the collective value to the community of including natural resource conservation initiatives as a part of wise land management.

While traditional agriculture remains as the dominant rural land use in the catchment, we have to recognise that there has been a recent tendency towards non-traditional enterprises, including intensive and semi-intensive animal husbandry, horticulture and viticulture, being carried out generally on smaller land allotments.

If we are to achieve the above Landcare objective across the breadth of the catchment we need to ensure that the principles governing ESLM can be applied to the range of property sizes and land uses that are currently operating within the catchment.

At present, dryland salinity affects many areas of the catchment and is continuing to spread at a rate of 4% per year. ⇒ The Corangamite Salinity Strategy has recommended a number of salinity control programs to combat salinity.

This concept has given rise to the term ⇒ 'ecologically sustainable land management' (ESLM).

GAINS AND GAPS

Gains

- The 1990's have been proclaimed as the *Decade of Landcare*. The national plan prepared as part of this declaration states that the overall goal is to 'achieve, by the year 2000, ecologically sustainable land use through management of land degradation'. There are currently 2 Landcare groups established within the catchment. The Thompsons Creek and Torquay Landcare groups have been active in organising field days and undertaking projects to fence remnant vegetation, revegetate degraded areas and control pest plants and animals. In addition groups receive and share practical and theoretical knowledge about sustainable land management practices.
- Members of Greening Connewarre have also undertaken projects to fence remnant woodlands and promote regeneration on private land.
- The Department of Natural Resources and Environment (DNRE), through their extension services, provide advice to landowners on 'best practice' management as part of Whole Farm Planning Courses.
- DNRE also administers the Land Protection Incentive Scheme (LPIS) to assist landowners in relevant activities.
- Implementation of the Corangamite Salinity Strategy has achieved the following gains:
 - a matrix of inspection bores in 'salinity hot spots' to monitor vertical movements and saline content of the groundwater.
 - a proportion of the discharge areas planted out to salt tolerant pastures and forage shrubs.
 - tree planting and perennial pastures establishment has been encouraged in recharge areas to reduce infiltration.
 - the appointment of a Salinity Link Officer (now under the function of the Rural Urban Community Coordinator) supported by NLP/NHT funds with administrative and funding assistance from VFF and Surf Coast Shire.
 - the development of the Saltwatch program as an education and awareness program in schools.
- The establishment of commercial woodlot plantation on private land under partnership with Midway Forest Products has assisted in increasing deep-rooted vegetation cover.
- Gordon TAFE College and Ballarat School of Mines conduct a Chemical Users Course for landowners active in pest plant and animal control. These courses provide certification in appropriate use and application of farm chemicals.
- Tax deductions in the form of credits or rebates to encourage ESLM have been recently implemented under taxation reforms.

Gaps

- There is a lack of clear financial incentive to manage land sustainably and conversely a lack of accountability for allowing or contributing to the deterioration of land.
- Financial incentives have the potential to contribute to degradation by ‘propping up’ unsustainable operations.
- There is a need for relevant data to be collated and be easily accessed to assist land use management and planning.
- Many landowners lacked the knowledge and information required to undertake the necessary measuring, monitoring and remedial action.
- The economic rationale of lifting nature conservation profile in land management needs to be demonstrated by example.
- The Landcare program tends to have a focus on improving practices associated with traditional farming rather than alternative farming techniques.
- Whole Farm Planning Courses are currently limited to landowners in designated salinity ‘hotspots’.

ACTIONS

- 1.1. Consolidate, and improve access to, information that will assist with improving land use decisions. Collation should include, but not be limited to, the following information;**
 - land capability and land use hazards,
 - areas affected by dryland salinity,
 - areas of conservation significance/ sites with potential to serve conservation aims.
- 1.2. Target and encourage the formation of landowner ‘cluster’ groups and assist, educate and resource them in:**
 - the reclamation of land subject to degradation,
 - the protection of areas with high nature conservation value.**Formation of ‘cluster’ groups should be based on common interests such as property boundaries or contiguous waterway links.**
- 1.3. Continue to implement actions of the Corangamite Salinity Strategy by encouraging tree planting as opportunities arise.**
- 1.4. Investigate options and processes that will encourage landowners to pursue ‘best practices’ aimed towards achieving ESLM.**
- 1.5. Investigate and promote improved incentive arrangements or similar mechanisms to meet the objectives of the CRCS.**
- 1.6. Continue, and expand, Whole Farm Planning Courses as a means of promoting the integrated management of soils, water and vegetation.**

Tenement maps will assist in identifying group ‘clusters’. ⇒

One option might include individual, voluntary agreements endorsed by landowners, industry representatives and land managers. The agreements would set out realistic and reasonable outcomes. A second option might be the adoption of a voluntary land ⇒ accreditation scheme. Positive accreditation would be seen as an asset, for example, when selling or bank borrowing. The preparation of a Whole Farm Plan could contribute towards accreditation.

EXPECTED OUTCOMES

- A minimum of 50% of rural tenements greater than 60 ha managed according to ESLM principles through;
 - a targeted and facilitated approach to gain adoption of best practices.
 - the development and on-going support of groups that are based on common interests or concerns, allowing more effective integration of activities and cost sharing arrangements.
 - the provision of adequate incentives.
- Measurable improvements to the natural environment as a result of productivity increases that stem from best practices in land management.
- The lowering of the groundwater table and decline of dryland salinity in the catchment through implementing activities to reduce infiltration.

COMPLEMENTARY ACTIONS

<i>ISSUE</i>	<i>ACTION</i>
<i>data acquisition/dissemination</i>	2.6 3.2 7.2 7.3 7.4 7.5 7.6 7.7 7.8 7.9
<i>salinity</i>	7.4 8.5
<i>group formation</i>	5.4
<i>best practices</i>	4.4 4.8 6.2
<i>monitoring/performance indicators</i>	7.4

PROGRAM 2. IMPROVING THE QUALITY OF OUR WATERWAYS

ISSUES

riparian describes the ecological association between waterway and streamside vegetation

Well managed, protected waterways and riparian zones are valuable for many reasons. They supply water for stock and provide for recreational opportunities. They have an aesthetic role in the landscape, function as habitat corridors and control or reduce erosion. Healthy waterways support a variety of aquatic life and the food chains necessary for their survival.

Progress in assessing, protecting and enhancing our catchment's waterways has been achieved (see gains) but their condition is still considered to be generally poor. Recent studies undertaken by Deakin University on the water quality of Lake Modewarre indicate a high level of nutrients, in the form of total nitrogen and total phosphorus, are stored in the waters and sediments (Heffer, 1997). The report states that the Lake is 'degraded' according to standardised assessment criteria for waterways due to excess salinity levels and high concentration of nitrogen. This condition is expected to continue, or be exacerbated, by inflows from the main drainage line that enters from the north-east and in the absence of any major lake outflow.

Thompsons Creek exhibits seasonal fluctuations in flows and varies markedly in terms of depth, width and quality throughout its length. Studies have recorded high levels of dissolved salts and phosphate 'plugs' in the creek waters (Billows, 1997; Barwon Region Community Waterwatch program) while Ralston (1996) documents a number of locations experiencing water quality deterioration and stream habitat losses.

From a total catchment perspective, a number of issues can be identified, namely;

- Stormwater from the townships of Moriac, Breamlea and Freshwater Creek, and from semi-rural developments at Layard, Modewarre, Torquay Heights, Lakeside Drive and around Connewarre, includes nutrients and litter that currently enter our waterways without any level of treatment.
- Nutrients, chemicals (e.g. natural salts, biocides, surfactants, hydrocarbons) and biological matter have the potential to enter waterways from other sources such as drift and runoff from the commercial use of treated effluent, from stock paddocks and pastures, from roads and construction sites or from the seepage of overflowing or poorly maintained septic tanks.
- Streamside erosion, caused by stock and machinery disturbance, rabbits and vegetation clearance, or sediment movement from fallow paddocks, roadsides and gravel stocks, leads to water turbidity and loss of sunlight penetration. Soils entering waterways also facilitates nutrient transport, particularly phosphates.
- Clearance of stream bank vegetation has affected the quality and presence of instream habitat for aquatic fauna. It has also impacted on the beneficial process of biofiltering which can reduce nutrient levels carried in solution through the sub-soils.

Moriac alone contributes about $\frac{3}{4}$ tonne of total phosphate and 1 tonne of total nitrogen per year to our waterways ⇒

in this context *biofiltering* means the uptake and utilisation of nutrients by plants

dams can have positive benefits when they are managed as wetlands but this use needs to be balanced against other natural functions of the waterway ⇒

Expected annual costs of algal blooms range from \$K117 -262 for Lake Modewarre and \$K26-42.5 for Thompsons Creek (DNRE 1997b).

50% of this fencing has been the result of Landcare actions carried out within the previous 5 years. ⇒

- Changes to the moisture levels in the soils and clearance of native vegetation has allowed weeds to invade and proliferate along waterways.
- Dams and diversions have altered flow regimes, and as a consequence, affected ecological processes and balances of the waterways, including those relating to natural flooding events.
- Intruding saline groundwater has increased salinity levels of the waterways and brought about a decline in species composition and biodiversity.

While it is unrealistic to expect restoration to pristine condition, an achievable objective would be to reduce impacts from high nutrient levels and increase stream habitat values. Excessive nutrient loads contribute to the increased growth of submergent macrophytes and, under favourable conditions such as increased temperature and light intensity, can result in periodic algal blooms which may be toxic. The latter problem has implications on stock watering, reduces the waterway’s visual appeal and recreational opportunities and impacts on land values.

GAINS AND GAPS

Gains

- The development and on-going activities of the Community Waterwatch Program which assists community groups in monitoring the chemical and physical properties of water at 19 sites.
- 36 kilometres (approximately 17%) of the catchment’s waterways has been fenced to protect them from disturbances. The majority of landowners adjacent to Lake Modewarre have removed weeds and fenced their properties to exclude stock from entering the Lake verges. A number of other landowners on smaller rural blocks have reduced weed cover to allow natural regeneration alongside water courses.
- Chemical Users Courses covering correct use and storage of agricultural chemicals have been attended by many landowners in the catchment. Proper application of agricultural chemicals minimises the risk of entry to waterways.
- Studies by Deakin University on the water quality of Lake Modewarre, reports prepared by Ralston (1996), Billows (1997) and data obtained by the Community Waterwatch Program provide baseline information for a number of sites.
- The new Surf Coast Shire Planning Scheme includes conservation overlays for principle waterways throughout the catchment. Overlays are referenced to a set of objectives that assist in assessing planning applications for works and buildings in these areas.

Gaps

- There is insufficient information available to determine detailed strategies for nutrient management across the entire catchment.
- Stormwater management is poorly considered in planning for semi-rural developments. Management should consider the treatment and drainage requirements for stormwater runoff to avoid pollution and street flooding.

This action has been supported by NHT funding. A set of criteria for determining the distribution of funds to landowners has been developed. ⇒

- Significant lengths of the catchment's waterways are unprotected and degraded.

ACTIONS

- 2.1. Fence unprotected catchment waterways and where necessary revegetate streambanks with a minimum 3 row filter strip of native species, preferably of local provenance. Provide subsidies for fencing costs and investigate further incentives to assist landowners. Ensure alternative shade and watering points for stock are provided elsewhere.**
- 2.2. Investigate the development of an artificial wetland on undeveloped land to receive stormwater runoff from Moriac township. Encourage community ownership by promoting the functional role of the wetland in water quality management.**
- 2.3. Investigate the installation and maintenance requirements for litter traps and the construction of vegetated swales for the following rural-residential nodes:**
 - Kestral/Kalkarra Crescents
 - Lakeside Drive
 - Freshwater Creek
 - Torquay Heights
- 2.4. Investigate the revegetation of Surf Coast Shire land between the rural development of Layard and Brown's Swamp for the purpose of managing local runoff and improving habitat values.**
- 2.5. Investigate and determine the impact on stream and riparian environments of physical barriers constructed to regulate water flows. Review the impacts of these barriers and, where necessary, the economic and social implications of removal.**
- 2.6. Encourage further collection of baseline information on the water quality of Lake Modewarre to determine future directions in nutrient management. Investigate potential benefits of including Brown's Swamp in future management strategies for Lake Modewarre.**

EXPECTED OUTCOMES

- The progressive and significant reduction of blue-green algal blooms by;
 - * improving biofiltering processes
 - * better stormwater management
 - * minimising streamside erosion
 - * promoting community activities to protect the natural environment.

- Enhancing riparian areas for wildlife habitat and landscape values by fencing 80km of waterway supporting existing remnants or where revegetation projects have been completed.

COMPLEMENTARY ACTIONS

ISSUE

stormwater management

water flows

water quality

ACTIONS

6.5 8.6

8.6

1.6 7.4 7.6 8.6

PROGRAM 3. CONTROLLING PEST ANIMALS

ISSUES

There are a range of pest animals found in the catchment including species of birds, insects, mammals and fish. This program focuses on actions that are directed at controlling rabbits, foxes and feral cats because they have the capacity to cause significant land degradation or to impact adversely on land productivity.

Catchment survey results indicate that pest animals, particularly rabbits, represent the most serious environmental problem facing the catchment - possibly because they contribute to increasing land degradation *and* decreasing land productivity. Foxes and feral cats, on the other hand, do not contribute overtly to land degradation but are associated with livestock losses. Their impacts on native wildlife populations are also well known.

Rabbits numbers increase and decrease in cycles determined by food and shelter availability, reproductive success and the implementation of control programs. They are generally found over areas where suitable harbour such as Furze and Boxthorn exists and particularly where sandy, light soil types occur. Infestations are relatively high within and behind the coastal dunes near Breamlea and land immediately east of Ghazeepore Road.

Past control of rabbit numbers has mainly concentrated on poisoned bait laying. The Thompsons Creek and Torquay Landcare groups have been active in control programs using bait layers and bait supplied by DNRE.

With many small 'lifestyle' allotments throughout the catchment, bait poisoning with 1080 or Pindone as a control option is not appropriate. However, these landowners equally share the responsibility to undertake control measures that is placed on landowners of larger properties, and measures such as ripping and harbour removal and fumigation with Phostoxin are considered feasible methods. These methods also apply to small areas of Crown land and land managed or owned by the Surf Coast Shire located within the catchment.

The Rabbit Calicivirus has not been released within the catchment although it is likely to have spread to the area since kills have been recorded just north of the catchment. Reductions in rabbit numbers due to both the Rabbit Calicivirus Disease (RCD) and Myxomatosis will continue to occur but conventional methods and on-going action to complement the role of the viruses will be required to keep their numbers at a manageable level.

Foxes and feral cats are widespread throughout the catchment. Foxes have been listed as a potentially threatening process under the Flora and Fauna Guarantee Act 1988 because they pose a threat to native wildlife. Control programs aimed at reducing fox and feral cats will be required to be conducted simultaneously with a rabbit control program to avoid further impacts on native fauna as a result of rabbits being displaced from their diet.

GAINS AND GAPS

Gains

- There have been good results, achieved mainly by poisoning campaigns, in reducing rabbit numbers in areas of the catchment.
- Education programs and technical advice on rabbit, fox and feral cat control have been actively pursued through DNRE extension services. DNRE provides equipment and materials for control programs, particularly those undertaken by groups that can benefit from equipment sharing. Groups are also eligible for community grants to undertake control actions.
- Local and external contractors are available to control and remove rabbit harbour such as Furze.
- A plan for rabbit control on the coastal dunes between Breamlea and Torquay has been prepared by specialist consultants. ‘Vertebrate Pest Control for the Torquay Foreshore Managed Lands’ sets out a course of action involving poisoning in preferred feeding areas and the destruction of warrens. Mapping warrens has been conducted using aerial photography.

Gaps

- There has been an over reliance on baiting as a control option. Baiting needs to be integrated with additional methods for the most effective control in the longer term.
- Follow-up measures to control pest animals have been lacking or inconsistent. The perception that control measures are ineffective when neighbouring landowners do not share the burden of control is likely to contribute to this problem. Follow-up strategies apply to landowners of both private and public lands and to all tenements in rural and semi rural areas irrespective of size.
- 1080 is an inappropriate control measure for small ‘lifestyle’ landowners. This method requires reasonably large areas to be cost effective.
- The cost and time factors associated with the Chemical Users Course deters action.
- RCD has been seen as a panacea for rabbit control.
- Foxes do not have an economic impact on rural ‘lifestyle’ landowners with smaller tenements. This constrains cooperative action since they perceive the issue as more of a problem to livestock producers.
- Thompsons Creek Catchment is not considered a priority area for NHT funding through the Rabbit Busters Initiative.
- Implementation of plans that advocate control measures for rabbits, foxes and feral cats is often not supported by adequate funding and integrated action by private and public land managers.

<p>refer to DNRE's 'identification of Control Areas' and 'Controlling rabbits in Urban Areas' ⇒</p>	<p>ACTIONS</p>
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Rabbits

- 3.1. Identify targeted areas for rabbit control and, where applicable, encourage integrated rabbit control programs that take account of land size and use.**
- 3.2. Ensure information on control programs is disseminated regularly to catchment landowners as progressive reports on control results. Reports should also include information on Chemical Users Courses, availability of other subsidies or incentives and equipment and materials.**
- 3.3. Improve access to, or the delivery of, specialised material and equipment. Investigate the use of local sites for DNRE to issue poison baits.**

Foxes and feral cats

- 3.4. Identify priority control areas for foxes and feral cats and, where applicable, encourage suitable control measures that take account of land size and use.**
- 3.5. Ensure fox and feral cat control programs are undertaken in tandem with rabbit control programs.**

General control

- 3.6. Investigate simplifying the Chemical Users Course to reflect landowner needs and commitments.**
- 3.7. Ensure control programs extends to all land, including public land and land managed or owned by Surf Coast Shire, through adoption of the Good Neighbour Initiative.**

EXPECTED OUTCOMES

- A 50% reduction in 1998 pest animal numbers over 5 years, extending to 75% over ten years.
- Observable improvements in our natural resource values.
- Measurable economic improvements relating to increasing land productivity.

COMPLEMENTARY ACTIONS

<i>ISSUE</i>	<i>ACTIONS</i>
<i>coordinated actions between Landcare groups</i>	4.5 8.4
<i>rabbits</i>	7.5
<i>chemical use</i>	4.4 4.5

refer to DNRE's 'identification of Control Areas' and 'Dealing with Foxes in the Urban-Rural Fringe' ⇒

/PROGRAM 4. CONTROLLING PEST PLANTS

Phalaris and Tall Wheat grass are useful species in combating salinity.⇒ However, they are considered weeds where they are invading the Breamlea Saltmarsh.

ISSUES

Weeds are plant species growing in the wrong place. They include species that are noxious and those that impact on environmental values in a variety of ways.

For example, they can degrade natural ecosystems by choking waterways, invading native vegetation communities, harbouring pest animals, reducing landscape quality and so forth. Their impact on agricultural production can be high. They can reduce crop and pasture value or be harmful to stock.

While the results of the catchment survey indicated there was a wide range of species that concerned landowners, including Patterson's Curse, thistle species, Phalaris, Boneseed, Broom, African Boxthorn, Wild Watsonia, Hedge Wattle and various other introduced grasses and shrubs, the two species that were clearly regarded most troublesome were Furze and Serrated Tussock. On this basis, and for reasons relating to available resources, actions and strategies described below are directed only at these two weed species.

Furze is widespread and prevalent in many parts of the catchment, particularly along drainage lines, roadsides and other land that is not actively cultivated or grazed. It provides harbour to rabbits and readily out-competes native vegetation. These problems impact on our ability to maintain or enhance catchment biodiversity and maximise land productivity.

Serrated Tussock is invasive under certain circumstances such as low soil fertility and where minimal competition occurs. It has the potential to reduce stocking capacity on agricultural because it has low nutrient value. Plants produce a high number of seeds which are naturally dispersed by wind and water, or transported in hay or by stock. It is currently distributed in 'pockets' throughout the catchment although on-going mapping projects will be useful in determining dispersion trends. At present, most areas of infestation are being treated to control further spread.

GAINS AND GAPS

Gains

- Furze can be eliminated by persistent but relatively labour-intensive action.
- Serrated Tussock requires a more strategic approach if control is to be practical. Fortunately, its potential to degrade agricultural land has not yet reached that stage and therefore opportunities for planning and executing remedial actions are available.
- 'A Strategy for the Management of Serrated Tussock in Victoria' has been prepared to guide strategies and action aimed at controlling the spread of the weed.
- Extension Officers have accurately mapped infestations of Serrated Tussock through the catchment. The Officers advise landowners of the presence of plants and suitable control measures. A spraying program to control plants located on roadsides has been undertaken by Surf Coast Shire and VicRoads.

- A policy framework is likely to be developed for incorporation into the Shire Planning Scheme. It is expected that the policy will outline the permitted uses and activities in areas designated as Serrated Tussock Affected Areas.
- Chemical Users Courses include the appropriate use of Frenock in destroying Serrated Tussock plants.
- Surf Coast Shire has undertaken Furze control works at Rice, Dans, Larcombes, Giddings, Pettavel and Willowite Road Reserves.
- Equipment sharing between members of Landcare groups has been effective in facilitating weed control, particularly for Furze.

Gaps

- The benefits of removal of Furze and Serrated Tussock have to be clearly seen to exceed the costs of control works for continued action to be promoted.
- Control of Serrated Tussock requires training in plant identification because of the similarity with native tussock species.
- The cost of suitable chemicals is relatively high because it is supplied in bulk, and where it is supplied in smaller quantities the cost is inflated above the unit price.
- Weed control is ineffective where a lack of follow-up activity to remove regrowth or seedlings is not undertaken.
- Furze is not considered a priority weed for control by the CCMA (given the magnitude of pest plant invasions, both in cover and variety, incentive funding is generally targeted towards priority species).
- Many landowners on rural 'lifestyle' properties do not eradicate pest plants for a number of reasons. They may not see any economic gain in doing so, they may not be adequately resourced or they may not realise it is a weed.

ACTIONS

Furze

- 4.1. Develop a Furze Action Plan for the catchment. The plan should identify specific priority areas for control, set operational time-frames and investigate educational opportunities to illustrate the benefits of control.**
- 4.2. Investigate the availability of incentives and human resources to assist control activities determined by the Plan.**
- 4.3. Encourage cooperative and complementary actions by landowners, including all public land managers, to remove Furze.**
- 4.4. Encourage greater participation in Chemical Users Courses.**

Priority areas could be assessed against the ⇒ level of rabbit activity, severity of erosion, the need to conserve native vegetation, the extent or concentration of infestation, etc.

The removal of Furze should be a pre-requisite to qualify for assistance under other funding initiatives.

Educating landowners in non-infested areas of the benefits of screening incoming machinery as a protective measure will assist with this recommendation. ⇒ Guidelines for contractors involved in roadside maintenance, construction and clean up during development, etc., also need to be prepared and enforced.

- 4.5. **Improve landowner access to weed contractors or encourage and facilitate greater use of spray units.**
- 4.6. **Include information in a landowner kit to improve identification skills and to raise awareness of the benefits of controlling Furze.**

Serrated Tussock

- 4.7. **Assist with Surf Coast’s planning, mapping and control initiatives. Assist with DNRE’s policy and extension activities consistent with ‘A Strategy for the Management of Serrated Tussock in Victoria’.**
- 4.8. **Introduce initiatives to reduce the incidences of off-site transfer of Serrated Tussock seed from infested areas to non-infested areas.**
- 4.9. **Investigate a market-driven accreditation system for ‘weed seed-free’ produce.**
- 4.10. **Utilise enforcement procedures under the CALP Act 1994 where necessary to gain compliance.**
- 4.11. **Utilise the identification skills of agricultural contractors to detect new infestations of Serrated Tussock.**
- 4.12. **Include information in a landowner kit to improve identification skills and to raise awareness of the benefits of controlling Serrated Tussock.**

EXPECTED OUTCOMES

- An increased effort applied to Furze removal with elimination from the catchment achieved by 2008.
- The confinement of Serrated Tussock to defined and controllable areas through a process of regulation, education and the provision of incentives.

COMPLEMENTARY ACTIONS

<i>ISSUE</i>	<i>ACTIONS</i>
<i>Furze removal</i>	6.6
<i>Serrated Tussock control</i>	6.6 7.2
<i>chemical use</i>	3.6
<i>public awareness of pest plants</i>	6.6 6.7

PROGRAM 5. CONSERVING AND ENHANCING OUR LOCAL BIODIVERSITY

ISSUES

Thompsons Creek supports a variety of habitat types and ecological processes.

The mouth of the creek near Breamlea is dominated by a large estuarine saltmarsh providing suitable habitat for a number of significant flora and fauna species. Spiny Peppergrass (*Lepidium ascersonii*) occurs in an isolated site within the saltmarsh on the black, salty clays and in association with Chaffy Saw-sedge (*Gahnia filum*) and Blue Tussock-grass (*Poa poiformis*). The saltmarsh also provides a preferred food source for the over-wintering Orange-bellied Parrot (*Neophema chryogaster*). Both the Spiny Pepper-grass and the Orange-bellied parrot are rated as being threatened on a National scale. There are many other species of flora and fauna found within the saltmarsh that are also considered significant on a regional scale.

Lake Modewarre, Wurdiboluc Reservoir, Lake Gherang, Brown's Swamp and Dutton's Swamp are located at the head of the catchment. With the exception of the Wurdiboluc Reservoir, water levels in each of these wetlands are variable and carrying capacity tends to fluctuate on a seasonal basis. Dutton's Swamp usually experiences complete summer dryness while Lake Modewarre has only been known to dry out on one or two occasions. When levels are suitable, they provide habitat to a range of waterbirds such as native ducks, Grebes, Swampheens, Pelicans, Ibis, Cormorants and Terns. Dutton's Swamp provides important habitat for broilgas which are now regarded as rare and restricted in Victoria.

Between these catchment features are scattered remnants of the heathy or grassy woodlands, grasslands and riparian zones that once covered the catchment landscape. The woodland remnants are variously dominated by Stringybark Messmate (*Eucalyptus obliqua*), Manna Gum (*E. viminalis*) or Red Gum (*E. camaldulensis*).

Unfortunately, many of these ecosystems are now either highly modified or subject to continuing disturbances, a condition that was clearly identified as a major concern by respondents of the survey. Habitat loss and native species decline were seen as serious problems particularly by landowners of smaller properties (i.e. less than 10 ha) and township residents.

The Breamlea Saltmarsh is threatened by edge effects related to agricultural practices, past domestic waste storage, roadway construction and maintenance, traffic and residential uses. Weed invasions, particularly Tall Wheat Grass, Phalaris and Sea-spurge, pose serious threats to the wetland values because these species spread vigorously to out-compete saltmarsh flora.

Eutrophication of the waterbodies and creeks is occurring because of restricted flows or poor flushing and the addition of nutrients from sources such as stormwater drains, agricultural land, road washoff and contaminated groundwater. Sedimentation and turbidity due to poor soil management have reduced photosynthetic activity needed to sustain aquatic life.

Remnant woodlands are fragmented and are generally small in size. Very little of their original understorey and ground cover remains. The loss of these flora components has placed the remaining trees under pressure from disease and attack by insects normally controlled by birds dependent on that understorey. Furthermore, changed nutrient and moisture levels as a result of land uses and practices, and the limited regeneration opportunities, have led to vegetation dieback and death.

Birds such as the Powerful Owl, Masked Owl, Black Falcon, Letter-wing Kite, Grey Goshawk, Swift Parrot, Superb Parrot and Ground Parrot have been recorded from the local area but preferred habitats of these species, such as hollow bearing trees, winter flowering food sources, heath cover, etc., are now poorly represented. The virtually total elimination of our native grasslands, changes in fire regimes of our heathlands and predation by pest animals have been the principle causes that have led to the demise of species such as the Plains Wanderer, Eastern Barred Bandicoot, Striped Legless Lizard and the New Holland Mouse. Our waterways are essentially deplete of aquatic species, particularly native freshwater fish, because of changed flow conditions and water pollution. All the above listed species have been recorded from the catchment at some stage but are now rated as threatened in Victoria and eligible for special protection under the FFG Act 1988.

Sections of roadsides or streamside reserves are now considered to be the only sites where relatively intact vegetation communities remain. Even so, management practices to reduce fuel loads, improve drainage and trimming to protect service assets have altered structural and floristic characteristics of the vegetation. Weeds continue to invade roadsides and streamsides.

Woodlands and grasslands not only have a role in providing habitat for our flora and fauna but vegetation, particularly trees, contribute to carbon sequestration by acting as sinks for carbon dioxide. To this extent, improving vegetation cover is seen as one of the most important measures in reducing greenhouse emissions.

Australia has joined in a global commitment to effectively reduce or stabilise greenhouse emissions over the next several decades. ⇒

GAINS AND GAPS

Gains

- Thompsons Creek and Torquay Landcare groups have been active in projects that contribute significantly to improving the nature conservation values of the catchment, particularly through the development of individual Whole Farm Plans and revegetation projects.
- Greening Connewarre has undertaken revegetation projects and fenced woodland remnants with an aim to create a green corridor belt between Thompsons Creek and Hospital Swamp north of the catchment.
- On-ground activities and public awareness initiatives by the Breamlea Coast Action group have been directed at improving the understanding and appreciation of the coastal dune and estuarine saltmarsh areas east of the Creek mouth. Torquay Coast Action is similarly active west of the mouth.
- Conservation covenants with the Trust for Nature on private and Council owned land, and the reservation of Crown Land for flora and fauna protection, has occurred over most areas of the Breamlea Saltmarsh.

- Remnant roadside vegetation has been assessed and the development of management statements for those sections exhibiting high conservation significance is intended.
- The *Surf Coast Shire Rural Environmental Study* (1997) has identified several sites in the catchment that have high conservation values for flora and fauna.
- The new Shire Planning Scheme provides for control overlays that regulate future works and constructions in sensitive areas such as waterways and sites of remnant vegetation.
- The Shire has received funding to prepare management plans for a number of important streamside reserves and unused road reserves.

Gaps

- The new Shire Planning Scheme can only be applied where new permit applications and title arrangements are submitted.
- The link between biodiversity maintenance and agricultural productivity is not well understood or recognised by many landowners.
- Recognition of the important functions and processes of ecological systems such as wetlands, woodlands, grasslands, heathlands is generally low.

ACTIONS

- 5.1. Provide protection for significant remnant vegetation identified in the *Surf Coast Shire Rural Environment Study* (1997). Investigate additional protection such as covenants or agreements.**
- 5.2. Establish a network of habitat corridors that link the variety of natural ecosystems occurring in the catchment as indicated in Map 1.**
- 5.3. Implement the Flora and Fauna Guarantee Act 1988 to conserve specific populations of threatened plants and animals currently known to exist within the catchment. These species, and others that have been historically recorded from the catchment, are listed in Appendix 2.**
- 5.4. Target and encourage small property owners by assisting, educating and resourcing them in ways to promote and protect nature conservation values. Formation of groups should be based on common interests such as property boundaries, roadways, contiguous waterway links or stands of remnant vegetation.**
- 5.5. Promote the concept of biodiversity and the derived economic benefits in;**
 - agroforestry operations
 - Whole Farm planning
 - planning permits applications and agreements
 - tourism and accommodation enterprises

NHT funds are available for this initiative ⇒ It is important that management prescriptions are developed with the landowner covering fire management, weed control, grazing, etc.

Midway Forest Products are engaged in cooperative programs to establish agroforestry on private lands. Their assistance should be sought in achieving this action ⇒

promote the use of indigenous species in revegetation activities

Management plans should address relevant site issues such as specific weed control, water quality and landscape improvements and pest animal control (including carp in Lake Modewarre).

- 5.6. Investigate the suitability of the following sites for functional and educational promotion of nature conservation:**
- * Surf Coast Shire owned land adjacent to Lake Modewarre and Browns Swamp,
 - * Private land such as Dans Road Swale and Rockford Road disused quarry,
 - * Streamside reserves at Horseshoe Bend, Willowite, Pettavel, Larcombs and Dans Roads,
 - * Disused water channels originating from Wurdiboluc Reservoir,
 - * Freshwater Creek recreational and streamside reserves,
 - * Unused roads:- i) Giddings Road extension and ii) between Nortons and Hendy Main Roads,
 - * Moriac Recreation Reserve.
- 5.7. Identify funding opportunities to support catchment revegetation projects by promoting their role as carbon sinks and their contribution to carbon sequestration.**
- 5.8. Prepare management plans for Lake Modewarre/Brown's Swamp, Lake Gherang and Breamlea Saltmarsh.**
- 5.9. Encourage 'Land for Wildlife' agreements with landowners to assist in the protection of remnant vegetation and the promotion of biodiversity.**
- 5.10. Support the development of management prescriptions for high conservation roadsides incorporating fire risk analyses endorsed by the Surf Coast Municipal Fire Prevention Officer. Investigate the 'adoption of significant roadside' concept for schools, community groups, adjacent landowners, etc. to assist management objectives.**
- 5.11. Provide appropriate signs to identify significant roadside reserves.**
- 5.12. Seek funds to support academic studies that increase our knowledge and appreciation of our native flora and fauna.**

EXPECTED OUTCOMES

- Protection of 17 catchment sites supporting remnant vegetation identified in the *Surf Coast Shire Rural Environment Study* (1997).
- Management plans for Breamlea Saltmarsh, Lake Modewarre/Browns Swamp and Lake Gherang to be completed by 2000.
- The completion of a 'green corridor' as illustrated in the Catchment Brochure (attached) by 2008.
- Management prescriptions for all roadsides supporting vegetation of high conservation significance.

- Formation of 'Lifestyle' landowner groups to encourage collective action in nature conservation.

COMPLEMENTARY ACTIONS

ISSUES

revegetation initiatives/habitat improvements
funding opportunities for increasing biodiversity
roadside conservation

ACTIONS

2.1 2.4 8.5
8.5
8.7

PROGRAM 6. COMMUNITY EDUCATION AND AWARENESS

ISSUES

It would be reasonable to assume that most landowners in the Thompsons Creek Catchment have some level of awareness about the issues and problems associated with land degradation. However, the extent to which they perceive the severity, or the potential for these problems to become exacerbated, is expected to vary greatly.

To be able to influence and consolidate community support for this plan, it is important that all resident and non-resident landowners of the catchment are fully and equally informed about these issues and the benefits of acting to control or manage them.

Further, it is important that awareness is complemented with education so that landowners are not only informed on issues and ramifications of land degradation, but are also provided with specific information as to *what* they can do and *how* they can participate in resource management.

This program introduces strategies and actions that are designed to increase the access to, and the delivery of, information to meet those needs.

GAINS AND GAPS

Gains

- Thompsons Creek and Torquay Landcare groups, Breamlea Coast Action, Torquay Coast Action, Greening Connewarre and the Lake Modewarre Advisory Committee provide forums where information on new initiatives, field trials, courses, etc., can be disseminated and incorporated into local activities.
- The Regional Landcare Network newsletter provides a medium to keep members informed on issues and activities relevant to the Landcare program.
- Extension services of DNRE and the Rural Urban Community Coordinator have been instrumental in informing, educating and assisting with activities involving resource management in the catchment.
- The Corangamite Catchment Management Authority has included community education and participation as a core project in their Regional Strategy.
- The Surf Coast Shire, in partnership with DNRE and local environment groups, organise a monthly display to raise awareness of local environmental weeds and appropriate methods of control.
- Programs such as Saltwatch and Community Waterwatch have educational and extension components to keep the community involved and informed.

Gaps

- Many landowners do not participate in activities and initiatives directed at improving resource management and conservation. There may be many reasons for this, including philosophical, social and economic reasons or they may be reticent to participate because they see little relevance or personal benefit.

The distribution of the newsletter or bulletin could be linked with existing mailing networks. Case studies could promote biodiversity, review new technologies or methods, illustrate Whole Farm Plan improvements, etc. ⇒

Information given to landowners should include which soaps are appropriate and where they can be purchased. Local shop owners can assist with the promotion of this initiative. ⇒

ACTIONS.

- 6.1. Prepare a catchment newsletter, bulletin or supplement that i) provides information on current initiatives and outcomes in resource management, ii) documents 'case studies', iii) provides relevant contacts for assistance, and iv) allows feedback opportunities.**
- 6.2. Continue to encourage extension support from DNRE in the implementation of activities that promote the 'good land-use practice' concept.**
- 6.3. Liaise with Moriac, Mt Moriac and Mt Duneed Primary Schools and encourage the inclusion of local environmental studies as a standard curriculum unit.**
- 6.4. Establish catchment reference sites that provide potential for educational opportunities in environmental study and monitoring.**
- 6.5. Promote a phosphate-free use ethic and regular septic tank maintenance among catchment residents. Inform landowners about the impact and consequences of excessive phosphate in waterways.**
- 6.6. Promote a 'good landowners don't have weeds' concept. Improve skills necessary to identify Furze and Serrated Tussock across all community sectors and highlight benefits of control and removal.**
- 6.7. Prepare an 'educational kit' for new purchasers of land within the catchment. The kit should be relevant to the purchaser and include information that promotes environmental care and responsibility.**
- 6.8. Prepare regular media articles for mainstream newspapers and community newsletters that have a distribution within the catchment.**
- 6.9. Investigate sponsored signage at strategic locations to i) promote a sense of place and identity with catchment residents and ii) interpret site specific actions.**
- 6.10. Investigate the use of a WEB site to promote catchment projects and activities.**
- 6.11. Investigate display options dedicated to highlighting activities and initiatives that improve the environmental quality of the catchment.**

EXPECTED OUTCOMES

- A catchment community that is informed about causes of land degradation and sufficiently educated and resourced to assist in their control and mitigation.

COMPLEMENTARY ACTIONS

ISSUE

Education/promotion

ACTIONS

1.2 2.2 3.2 4.6
4.8 4.12 5.5 5.4
5.6 5.9 5.11 5.12
8.4

PROGRAM 7. MONITORING AND EVALUATION

ISSUES

If we are to resolve the complex and challenging problems posed by land and water degradation of our catchment, we need to be able to;

- quantify existing conditions and establish desired goals and targets,
- monitor subsequent changes to evaluate whether the targets are being achieved.

This Plan provides for, to the best extent possible, a number of measures to improve or consolidate information that can be used to assess existing conditions. The goals and targets are expressed as the outcomes in each of the programs.

Monitoring and evaluating requires the ongoing collection, analysis and interpretation of data that can be routinely and conveniently collected by community groups and individuals. The data collected can be either analytical such as nutrient levels, soil pH, rabbit numbers, budget costs, etc., or descriptive as in photographic surveys to assess landscape values, regeneration processes or erosion control.

In either case, it is important that key indicators are in place to assess trends on a local to catchment-wide scale. It is equally important that these indicators are relevant and applicable at higher scales, that is at the Corangamite Catchment, State and National levels.

In many cases trends will only be evident or measurable over long periods. Changes in groundwater levels above normal variances are unlikely to be detected in the shorter term but it is important that data are collected even if 10 years of sampling and observations only serves to determine these variances.

GAINS AND GAPS

Gains

- Monitoring groundwater bores in 'salinity hot spots' has been conducted over recent years as part of the Corangamite Salinity Strategy.
- Similarly, Community Waterwatch has been active in the catchment with water quality being assessed in several sites.
- Studies of the water quality of Lake Modewarre have been carried out with further work scheduled in 1998.
- Mapping of Serrated Tussock distribution has been completed as a combined NRE and Surf Coast Shire initiative.

Gaps

- The current data sets are being acquired in isolation and with varying levels of interpretation to the community.

Suggested indices include qualitative measures for land values, and quantitative measures for Landcare membership, WFP courses, water quality parameters, trends in groundwater levels and protected length of waterway. Refer to publications such as Woodhill and Robins (1998) and DNRE (1997a).

Industry Commission suggest a coordinating role be taken by the ABS

see 'Monitoring of Rabbit Numbers Using Warren Counting' NRE July 1996.

- There are substantial gaps of information or a lack of comprehensive, detailed catchment data at a resolution that allows actions to be monitored and evaluated.
- Sampling design, location, collection and interpretation of current Community Waterwatch data needs to be reviewed and upgraded.
- Financial resources are poorly allocated for establishing comprehensive catchment databases.

ACTIONS

- 7.1. Develop an integrated set of economic, social and environmental indices that can serve to monitor and evaluate the progress and expected outcomes of the Plan.**
- 7.2. Continue current mapping of Serrated Tussock infected areas and control spread by immediate poisoning as ground truthing progresses. Identify potential areas of infestation based on natural dispersal processes and control.**
- 7.3. In liaison with the CMA, determine key catchment indicators and sites to evaluate measures aimed at achieving ESLM.**
- 7.4. Investigate improved methods of data acquisition and analysis to better understand, forecast and interpret trends in groundwater hydrology and salinity impacts.**
- 7.5. Establish a monitoring program in priority to determine rabbit numbers and to evaluate the effectiveness of control measures.**
- 7.6. Review the Community Waterwatch sampling program for the catchment. Investigate options to improve water quality data collection and interpretation.**
- 7.7. Investigate technologies and processes to improve the integration and interpretation of current sampling programs and data sets.**
- 7.8. Collate and catalogue all photographs and relevant documents that can be utilised for the purpose of monitoring and interpretation.**
- 7.9. Enlist the assistance of tertiary students in the collection and analyses of data that could improve monitoring resolution of social, economic and environmental trends.**

EXPECTED OUTCOMES

- The provision of data to measure condition and evaluate actions.
- The available information to direct future resource management and support external funding where needed.

COMPLEMENTARY ACTIONS

ISSUE

data collection - water

data collection - land

ACTIONS

2.6 6.4

1.1 3.1 3.4

PROGRAM 8. SETTING A SUPPORTIVE FRAMEWORK

ISSUES

The Surf Coast Shire is the responsible authority for administering the local planning statutes while DNRE acts as a referral authority and CMA as a strategic planning authority. All three play a major part in encouraging and supporting land protection and resource management activities.

At a more local level, delegated authorities like LMAC or community groups such as Landcare, Greening Connewarre, Breamlea Coast Action and Torquay Coast Action can equally contribute to these aims, particularly in their implementation. In reality, planning authorities have broad responsibilities and often rely on the resources, input and advice from these locally focussed groups.

While the TCCC has essentially brought these local groups together under an umbrella body, there are no similar arrangements or formal procedures presently in place between the three levels of government. These arrangements need to be developed if the use and flow of information and resources are to be maximised.

Other issues relating to future directions of the TCCC and opportunities available to support and strengthen the actions of this Plan also need to be investigated.

GAINS AND GAPS

Gains

- The restructured Surf Coast Shire Planning Scheme includes new controls overlays and policies to protect environmentally sensitive areas such as waterways and stands of remnant vegetation. The new planning scheme also provides a means of recognising both the CRCS and this Plan as referral documents in setting planning guidelines and objectives.
- There has been a greater level of dialogue between agencies involved in resource management and community groups dedicated to promoting and undertaking on-ground works. Representative bodies such as TCCC have an important function in facilitating this process.

Gaps

- No formal processes exist to coordinate or link the various land management and planning functions of DNRE, CMA and Surf Coast Shire.
- No statutory provisions are set in place to influence, encourage or reward actions or works undertaken by landowners that meet land protection objectives.
- Rate relief is only provided to landowners in the agricultural sector who can demonstrate the non-arable nature of land areas because they are occupied by such features as swamps.

- Applying site-specific conditions that promote environmental care on planning permits is often difficult, particularly where applications include plans that have progressed beyond the design stage before being assessed.

ACTIONS

The TCCC should be an incorporated body with the mandate to oversee and integrate activities aimed at improving the environmental quality of the catchment.

Refer to 'Working Together in Catchment Management'

This action applies to land set aside solely for the purpose of improving environmental condition and amenity. Remedial works for erosion control should be eligible for rate relief

Consideration should be given to an adequate monetary bond or an accreditation to promote compliance

- 8.1. **Continue and promote the planning and administrative role of the TCCC. Review the committee's composition annually so that it best reflects community representation and receives appropriate technical and administrative support. The TCCC should prepare and disseminate a strategic plan that sets out functions, roles and responsibilities of the committee. Particular consideration should be given to;**
 - **Investigation of options such as sponsorship or levies to assist with actions not supported by government funding,**
 - **Establishment of sub-groups responsible for;**
 - * **determining criteria to allocate resources and funds for on-ground works and activities,**
 - * **investigating agreements between landowners and Surf Coast Shire that encourage completion and future commitments,**
 - * **preparing funding submissions or seeking sponsorship for high priority actions identified in the Plan.**
- 8.2. **Encourage the development of a Municipal-wide representative forum that includes the CMA, Surf Coast Shire and NRE to improve internal and external information flows.**
- 8.3. **Ensure the aims of the CRCS and the TCCS are recognised within the Surf Coast Shire Planning Scheme.**
- 8.4. **Continue to support the Landcare Network in its endeavour to develop and strengthen the local Landcare movement.**
- 8.5. **Investigate rate rebates or exemptions for land that is set aside for the protection and enhancement of remnant vegetation and for the purpose of improving ground water and surface water quality.**
- 8.6. **Investigate the introduction of planning scheme provisions that address;**
 - **off-site movement of aerial spray, soil and nutrients,**
 - **stormwater management for new and expanding rural residential areas,**
 - **the construction of new dams and diversions,**
 - **the removal or displacement of top-soil within or adjacent to waterways.**
- 8.7. **Ensure that 'environmental care' conditions are included in Surf Coast Shire contract specifications with external and internal contractors, particularly those relating to road construction and maintenance.**

- 8.8. Provide clear directions to prospective applicants for planning permits, including private individuals, land developers and service providers, that environmental guidelines will be applied, where relevant, as part of the referral process. Any conditions applying to the planning permit should be considered in the design phase and complied with in the construction/development phase.**

EXPECTED OUTCOMES

- Improvements in planning, implementation and evaluation of land protection initiatives.
- Greater landowner involvement in land protection activities through the provision of rate relief.
- Implementation of Planning Scheme provisions that support resource management aims.

COMPLEMENTARY ACTIONS

ISSUE

Strategic and statutory planning

Improving communications

incentives/funding

ACTIONS

4.7 7.4

1.2 5.4

1.5 3.2 4.2 5.7

5.8 8.5 5.9 5.10

SECTION 3.

TABLE 1. IMPLEMENTATION SUMMARY

PROGRAM	KEY ACTION	RESPONSIBILITY /INPUT	TARGETS	PERFORMANCE INDICATORS	FUNDING SOURCES	TIMEFRAME
1. Land Management and Productivity	Data consolidation	DNRE Surf Coast RUCC	Updated maps and information databases by 1999 with on-going refinements and additions	Information in a form that can be used effectively in land use planning		By June 1998
	Rural group formation	DNRE Surf Coast Landcare groups RUCC	9 cluster groups formed within 3 years	50 % of rural landowners (> 60ha) adopting ESLM practices. 10 WFP/yr		By Dec 2008
	Salinity Control	DNRE Surf Coast CMA RUCC	Increased deep-rooted vegetation cover in 'hotspots'. Continuing tree planting programs across catchment. Salinity control cost benefit analysis	Stabilised groundwater levels by 2003. A measurable lowering by 2008.	NHT	Ongoing
2. Waterway quality	Fencing waterways	DNRE	80 km of additional waterway protected by 2008.	Improvements indicated by water quality parameters and catchment indicator	NHT	By Dec 2008
	Stormwater improvements	Surf Coast EPA NRE	Nutrient management wetland established at Moriac. Revegetation at Layard. Installation of litter traps at nominated sites. Improved septic tank maintenance	Reduced phosphate level and litter in waterways. Increased number of septic tank inspections and enquires to Surf Coast. Significant reduction in incidences of BG algal blooms.	Public NHT	By Dec 2003
	Water Quality Studies	Surf Coast RUCC Waterwatch Deakin Uni LMAC	Review of flow regulators by 2002 Improved nutrient management of Lake Modewarre and Browns Swamp.	Improved recreational values of Lake Modewarre as assessed by LMAC.	NHT LMAC Surf Coast	Studies completed 1999. Ongoing monitoring

3. Pest Animal Control	Rabbit control program	CMA DNRE Surf Coast Landowners	Completed mapping of priority areas through aerial p/g and transect spotlighting. A landowner commitment to continual rabbit control.	50% reduction by 2003, 75% by 2008. Greater attendance at Chem users course/bait purchase, etc.	NHT	On going
	Fox and Feral Cat Control	CMA DNRE Surf Coast Landowners	Control areas identified.	75% reduction by 2008. Greater attendance at Chem users course/bait purchase, etc.	NHT	Ongoing and parallel with above.
4. Pest Plant Control	Furze Control	DNRE Surf Coast Landowners	A Furze Plan by 1999 Adoption of Plan over 10 years.	Total control or elimination of Furze by 2008	NHT	By 2008
	Serrated Tussock Control	CMA Surf Coast DNRE Landowners	Initial mapping of ST areas by June 1998. Ongoing mapping to 2008. Implementation of control measures.	Confinement of ST to manageable sites indicated by distribution map.	NHT	Ongoing
5. Conserving Biodiversity	Remnant Vegetation Protection	DNRE Surf Coast Landowners	Establish 36km of protective fencing to protect sites of remnant vegetation identified by the <i>Surf Coast Shire Rural Environment Study</i> .	Remnant exhibiting active regeneration and measurable improvements in fauna activity by 2001.	NHT	By Dec 2001
	Catchment Habitat Corridor	DNRE Surf Coast Landowners	Establish a green corridor linking various ecosystems of the catchment.	Completion of a mixed tree/shrub planting project	NHT Industry	By Dec 2008
	Small landowner group formation	TCPO	3 groups formed to combine actions suitable and applicable to small l/owners	10 improved properties that qualify for Land for Wildlife registration.		By Dec 2008
	Biodiversity promotion	Surf Coast DNRE	Biodiversity concept incorporated in catchment activities and initiatives, particularly by documenting case studies	Concept included as part of policy or procedure with agroforestry, WFP, tourism, etc.		Ongoing
	Management Plans	TCPO Consultant	Management Plans for Breamlea Saltmarsh, Lake Gherang and Lake Modewarre/Browns Swamp. Management prescriptions for significant roadsides.	Implementation of plans by 2002	Surf Coast NRE	By Dec 2002

6. Community Education and Awareness	Information-based projects	Surf Coast DNRE	The production of Educational Kits for new landowners. Production of a Catchment Newsletter. Establish a WEB site. Establish display areas in the catchment.	Landcare membership. WEB site hits Newsletter feedback.		
	Behaviour-based projects	Surf Coast DNRE	The adoption of 'good land-use practices', 'furze-free' and 'phosphate-free' ethics	see indicators for relevant programs.	NHT Surf Coast	By 2001
7. Monitoring and Evaluation	Program based initiatives	TCPO	Establish rabbit monitoring program Improvements in water quality program. A set of key indicators to monitor adoption of ESLM. Establish a process that improves collection and interpretation of salinity data.	See indicators for relevant programs.		By Dec 1998
	Plan based initiatives	TCPO	Improved processes for data collation, integration and interpretation Development of a multi-scale index for evaluation.	The production of databases that improve planning and decision making. The production of an index that is widely accepted as a reflection of catchment health.		By Dec 1998
8. Setting a Supportive Framework	Improving Communications	CMA Surf Coast DRNE	A Municipal-wide forum to facilitate information exchange. A long-term commitment to assist with the Landcare Network	Formation of a forum to ensure information exchange over all levels of planning and management.		By Dec 2000
	Providing Incentives	Surf Coast DNRE	100 % rate relief accepted for land protection works.	A rate relief policy introduced into Shire planning scheme.		By Dec 1999
	Statutory and Strategic Processes	Surf Coast CMA	CCRS and TCCP recognised as formal planning documents.	The CRCS and TCCP recognised in the local planning scheme.		By Dec 1999

NOTE: 1. The input of the Thompsons Creek Catchment Committee is inferred in all aspects of planning and implementation.

The Thompsons Creek Project Officer is similarly treated except where that position takes the principle role.

NOTE: 2. All key actions are considered HIGH Priority.

SECTION 4.

APPENDIX 1.

Thompsons Creek Catchment Committee

		AFFILIATION
Chairperson	Ms Sandi Allen	Torquay Landcare
Secretary	Ms Jeanette Spittle	Surf Coast Shire
Planning Officer	Mr Peter Moulton	
Members	Mr Graeme Anderson	DNRE
	Mr Paul Whinney	DNRE
	Mr Michael Sayers	RUCC
	Mr Andrew Boyle	Thompsons Creek Landcare
	Mr Lachlan Polkinghorne	Thompsons Creek Landcare
	Mr John Welsh	Community landowner
	Ms Kath Ralston/Susan Howells	Breamlea Coast Action
	Mr Russell Mitten	Greening Connewarre
	Mr Tim Baylis	Community landowner
	Mr Brian Gane	Lake Modewarre Advisory Committee

Working Groups

Sustainable Land Management and Enterprise WG

Paul Whinney (Coordinator)
Peter Moulton
Graeme Anderson
Michael Sayers
John Gavins
Don Lester
Sandy Allen
Tim Baylis
Andrew Boyle
Chris Noble
John Harris

Flora and Fauna

Jeanette Spittle (Coordinator)
Peter Moulton
Tim Denton
Mal Winter
Betty Moore
John Welsh
Susan Howells
Steve Finlay
Faye Gibson
John Carney
Rhonda Bunbury
Heather Leslie

Water quality, Salinity and Erosion WG

Graeme Anderson (Coordinator)
Peter Moulton
Heather Adams
Craig Billows
Rachael Keary
Andrew Boyle

Pest Plant and Animal WG

Michael Sayer (Coordinator)
Peter Moulton
David Boyle
Keith Grossman
Sandy Allen
Andrew Boyle
Simon Falkiner
John Bowman

Community Education, Awareness and Participation WG

Sandi Allen (Coordinator)
Peter Moulton
Brian Tanner
Michael Sayers
Nerada Turner
Andrew McDonald

APPENDIX 2.

Flora and Fauna listed under Schedule 2 of the Flora and Fauna Guarantee Act 1988 recorded from Thompsons Creek Catchment.

Fauna species	Comments/Habitat requirements (conservation status in catchment)
Plains Wanderer	Native grasslands or unimproved pasture (scarce).
Orange-bellied Parrot	Halosarcia/Sarcocornia herbfields (only at Breamlea)
Little Tern	Transient coastal bird/sandy beaches (under threat from predation and disturbance)
Fairy Tern	Transient coastal bird/sandy beaches (see Little Tern)
Hooded Plover	Breeds on sandy beaches in region (predation and nest disturbances)
Brolga	Swamps, shallow lakes and flooded grasslands (e.g. Dutton's Swamp)
Great Egret	Shallow swamps and flooded fields (Dutton's and Brown's Swamps)
Eastern Barred Bandicoot	open scrubland and tussock (possibly non-existent in catchment)
Freckled Duck	Open lakes and wetlands (Lake Modewarre)
Grey-crowned Babbler	Open woodlands (poorly represented)
Masked Owl	Sparse open forest (scarce)
Powerful Owl	Roosting in dense woodlands often along streams. Requires hollow for breeding (scarce)
Superb Parrot	Woodlands along streamsides and in dry country (disturbed and poorly represented)
Swift Parrot	Eucalypt woodlands (significantly reduced)

Ground Parrot	wetter heathlands (not common in catchment)
Rufous Bristlebird	Coastal heathy woodlands (not common in catchment)
New Holland Mouse	Coastal heathy woodlands (off Forest Rd)
Striped Legless Lizard	Summer cracking basalt clays/native tussock grasslands (now scarce)
Australia Grayling requirements	Aquatic fish with specific habitat (representation very poor)
Yarra Pigmy Perch	Aquatic fish with specific habitat requirements (habitat now highly disturbed or scarce)
Small Ant Blue	Butterfly requiring specific ant association (unknown status)
Flora species	
Spiny Peppercress (<i>Lepidium achersonnii</i>)	Found in one isolated location within catchment
Yarra Gum (<i>Eucalyptus yarraensis</i>)	Found as solitary trees or in small stands mostly on roadside reserves (found only in the west of the catchment)
Flora Community	
Western Basalt Plains grassland community	small remnants of Kangaroo Grass dominated grassland on basalt are found on roadside and streamside reserves. In all but a few exceptions, the viability of these sites to withstand continuing pressures from weed invasions, soil disturbances and changed hydrology is considered poor.

APPENDIX 3.

Useful Contacts in the Thompsons Creek catchment.

Shire Councillors

Cr Lindsay Schroeter
Cr Brian Tanner

Winchelsea Riding
Moriac Riding

Landcare Program

Mr Lachlan Polkinghorne

National Landcare Project Officer

Corangamite Catchment Management Authority

Mr Andrew Boyle

Moriac Landowner

Surf Coast Shire

Ms Jeanette Spittle

Environment Officer

Victorian Wetland Trust

Ms Susan Howells

Breamlea resident

FarmSmart Program

Mr Colin Hacking

Program Coordinator

Department of Natural Resources and Environment

Mr Rob Jolly

Coordinator Flora, Fauna and Fisheries

Mr Graeme Anderson

Catchment and Sustainable Agriculture

Mr Paul Whinney

Catchment and Sustainable Agriculture

Mr David Boyle

Catchment and Sustainable Agriculture

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THE THOMPSONS CREEK CATCHMENT PROJECT

— This brochure presents the key actions and features of a Plan developed by the local community —

Catchment features

- approximately 1100 landowners
- approximately 30,000 ha in area
- 200km of waterways

Land Management

- Assistance and advice will be available to all landowners to encourage actions that improve land and water resources rather than degrade them.

Salinity and Erosion

- Planting 40,000 trees per year will help to combat the affects of rising saline groundwater and to stabilise areas susceptible to erosion. Revegetation activities will also increase fauna habitat values and provide both on-farm and environmental benefits.

Rabbits, Foxes & Feral Cats

- Control measures will be centred on removal of harbour for rabbits, particularly Furze.
- Priority areas will be identified and programs will be developed for control of these pest animals.
- Our intended aim, by 2008, is the reduction of the rabbit, fox and feral cat population to 25% of the 1998 levels.

Furze and Serrated Tussock

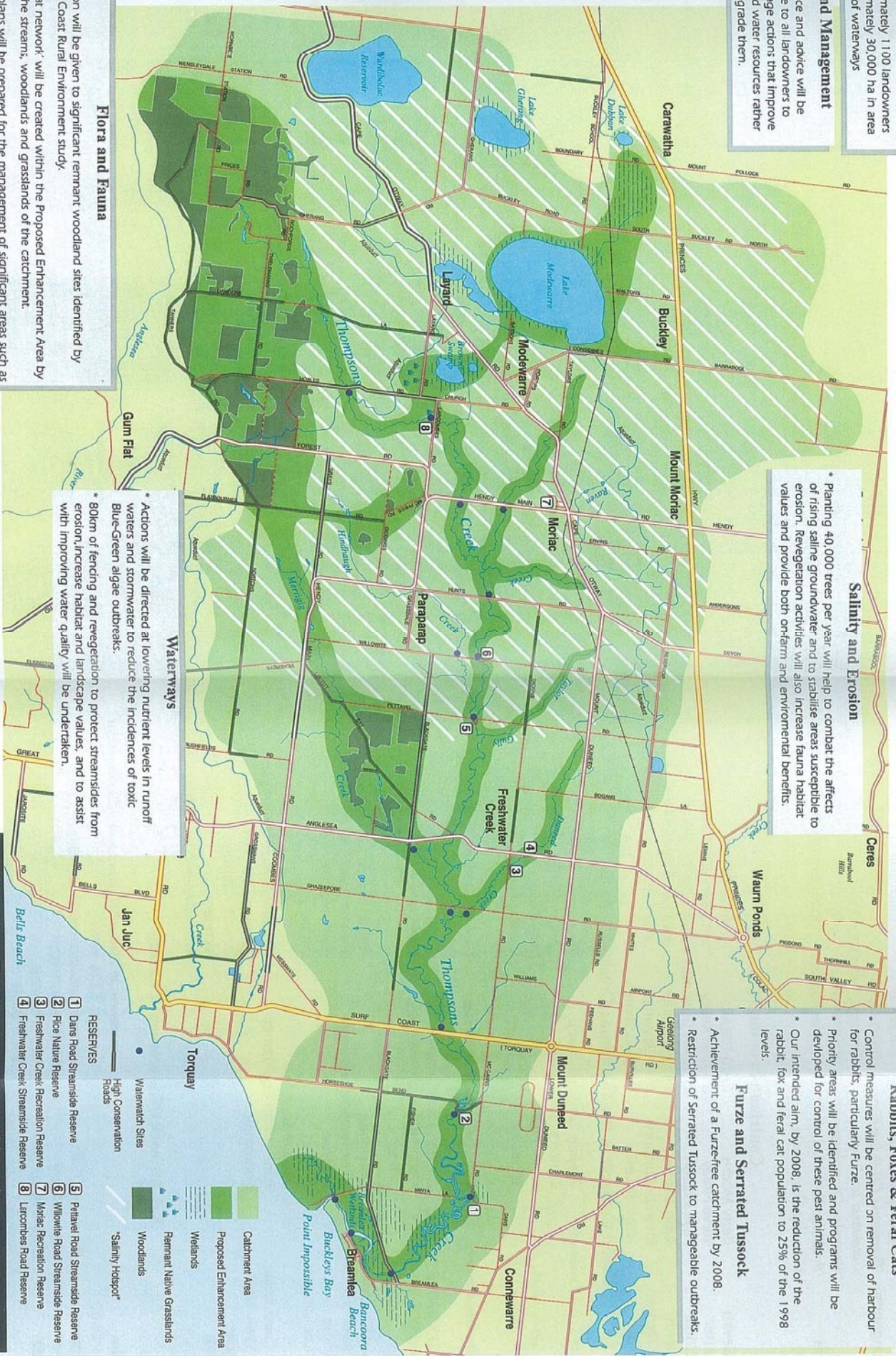
- Achievement of a Furze-free catchment by 2008.
- Restriction of Serrated Tussock to manageable outbreaks.

Flora and Fauna

- Protection will be given to significant remnant woodland sites identified by the Surf Coast Rural Environment study.
- A 'habitat network' will be created within the Proposed Enhancement Area by linking the streams, woodlands and grasslands of the catchment.
- Special plans will be prepared for the management of significant areas such as Breamlea Saltmarsh, Lake Modewarre, Lake Gherang and Browns Swamp.
- Special protection will be provided for threatened species existing within the catchment consistent with Victoria's Biodiversity Strategy.

Waterways

- Actions will be directed at lowering nutrient levels in runoff waters and stormwater to reduce the incidences of toxic Blue-Green algae outbreaks.
- 80km of fencing and revegetation to protect streambanks from erosion, increase habitat and landscape values, and to assist with improving water quality will be undertaken.



- RESERVES**
- 1 Duns Road Streamside Reserve
 - 2 Ripa Native Reserve
 - 3 Freshwater Creek Recreation Reserve
 - 4 Freshwater Creek Streamside Reserve
 - 5 Pratarel Road Streamside Reserve
 - 6 Willow Road Streamside Reserve
 - 7 Mear Recreation Reserve
 - 8 Larconness Road Reserve
- High Conservation Roads**
- Waterwatch Sites**
- Wetlands**
- Remnant Native Grasslands**
- Woodlands**
- "Salinity Hotspot"**

The Plan has a 10year Vision where "The community, and their next generation, benefit from their efforts and achievements in producing a healthy and diverse environment".