

# PROSSER CATCHMENT MANAGEMENT PLAN

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Prepared for the Glamorgan Spring Bay Landcare Management Committee

Funded by the Natural Heritage Trust

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## GLOSSARY AND ABBREVIATIONS

**Biota:** All of the species of plants and animals at a particular locality.

**Critical habitat:** The whole or any part of the habitat that is essential to the survival of a species of flora or fauna listed on the *Threatened Species Protection Act 1995*, which may require special management considerations or protection.

**DPIWE:** Tasmanian Government Department of Primary Industries, Water and Environment

**Ecological community:** An assemblage of native species that interact with each other and occupy a common geographical area in the wild.

**Endemic:** Confined to a particular area, so that for example, a Tasmanian endemic species occurs naturally only in Tasmania.

**Extinct:** Not located in the wild during the past 50 years and not in captivity or cultivation.

**Fauna:** Animals, whether vertebrate or invertebrate, in any stage of biological development and includes eggs and any part of the animal.

**Flora:** Plants, whether vascular or non-vascular, in any stage of biological development and any part of plants.

**GSB-LMC:** Glamorgan-Spring Bay Landcare Management Committee

**Habitat:** The area, locality, site or particular type of environment, or any part of them, occupied or used by any flora or fauna.

**Recovery plan:** A plan made under section 25 of the *Threatened Species Protection Act 1995*, for any species of flora or fauna which is under threat of extinction.

**Species:** A population or group of individual flora or fauna which interbreed to produce fertile offspring or which possess common characteristics derived from a common gene pool.

**Taxon:** A taxonomic group of any rank into which organisms are categorised.

**Threat abatement plan:** A plan made and in force under section 27 of the *Threatened Species Protection Act 1995*. The threat abatement plan deals with any process which, in the opinion of the Director, is a threatening process.

**Threatened species:** Flora or fauna that is listed in Schedule 3, 4 or 5 of the *Threatened Species Protection Act 1995*. That is, species or subspecies listed as extinct, endangered, vulnerable or rare.

## FOREWORD

In preparing this Plan I have sought to incorporate all the work done to date and the collective knowledge that is within the community whether in Landcare, Coastcare, Waterwatch, business groups, community groups or individuals. Clearly it is a large task to collate, interpret and summarise all the information into a Plan that presents the community's shared vision, issues of concern and the strategies and actions that will achieve results.

The prime result sought is to provide the Catchment community with background information and a focus of understanding and direction.

Implementation of the Plan and the action details remain within the hands of organisations and individuals who are residents or are otherwise stakeholders in the Catchment.

The natural resources of the Catchment are rich in ecological, economic and social values. Landscape beauty, animal and plant diversity and rarity, good climate and beaches and high social cohesion, make the catchment highly attractive for living and working, with natural resources suited to a range of specialist and high value agriculture and aquaculture, and an expanding tourist economy. These factors indicate that the economic aspirations of the community are being realised and will expand further. However it is from this prosperity that threats continue to grow; threats to the ecology and the environmental values that make the Catchment attractive and unique. It is possible through good planning for the Catchment to support population and production increases, while reducing resource use and ecological and social losses.

The major threats discussed in the Plan are;

- continued net loss of natural vegetation and habitat for animals from clearing of natural vegetation and weeds,
- loss of scenic and landscape values and ecological biodiversity to inappropriate land management and development, and
- soil degradation through salinity and erosion,
- water quality degradation and loss of aquatic and riparian habitat due to inefficient water use and poor land management particularly riparian land.

The Plan does not provide the money to do the significant work needed over the next twenty years and beyond. It hopefully will help provide the knowledge and vision that is needed for the community to initiate and drive the actions, to source funding and get the work done. A community that has a clear picture of where it wants to get to, will find that resources are available. from government, business and individuals.

The Australia State of Environment 2001 Report (Environment Australia, 2002) released in March 2002, states that:

“The key to Australia's sustainable future lies in ourselves: our attitudes towards the environment, our heritage and each other. Positive change can be achieved when people see options for improvement in their quality of life and opportunities for their children and grandchildren. This change is accelerated when public awareness is translated into political action that influences the activities of our society to care for our country.”

# EXECUTIVE SUMMARY

## Background and Vision

In 1995 the *Prosser Landcare Survey* (Gee 1995) was produced by the Prosser Committee of the (then) Spring Bay Landcare Committee. The Glamorgan-Spring Bay Landcare Management Committee initiated community consultation through a Catchment tour and meeting on 6<sup>th</sup> June 1999 which through further consultation and research, led to the preparation of this Plan. The Committee developed the following vision for the Catchment.

### *Vision for the Swan-Apsley Catchment*

*To provide current and future generations with a healthy Catchment with a diverse natural environment.*

*To have a balanced and sustainable use of natural resources for an economically viable community.*

*To have enhanced water quality through sound land and water management.*

The Plan provides a description of the natural resources of the Catchment and seeks to provide a focus for the community to use its authority under State legislation to directly determine the future outcomes for the Catchment in terms of sustainable use and development of natural resources, and the protection of recognised values.

The Swan-Apsley Catchment lies on the mid east coast of Tasmania between the Eastern Tiers and the Tasman Sea and contains a unique combination of rich and varied natural landscapes, valuable agriculture, aquaculture and fishing industries, and scenery and recreation with high community appeal. The Catchment is a major focus for the East Coast and State tourism industry, it supports an active and growing population and contains high Aboriginal and European heritage values. The Catchment contains the internationally renowned Freycinet National Park and the southern part of the Douglas-Apsley National Park and has extensive coastal reserves. The biodiversity of the Catchment is represented by a diverse mix of native forests, woodlands, remnant grasslands and wetlands which contain many significant populations of indigenous Tasmanian flora and fauna, including some regionally indigenous plant and fish species.

The future prosperity for residents of the Catchment, and the protection and enhancement of environmental and social values for the Catchment, is directly related to;

- the success of the community in cooperatively managing the Catchment resources
- the development and continual improvement of strategies, based on experience gained
- the completion of on-ground actions.

## Community Values and Issues

The values and issues for the Catchment, identified through a community consultation process, are summarised into four major groups as follows.

### *1. Water*

- Water availability for town water supplies, agriculture, aquaculture, recreation and the environment, while recognising existing water rights
- Water quality for town water supplies, aquaculture (especially Moulting Lagoon), recreation and the environment.

### *2. Biodiversity*

- Protection and enhancement of the biodiversity (i.e. ecosystems health) of
  - waterways (i.e. rivers estuaries and wetlands) including riverbanks and riparian land,
  - vegetation communities (including forests, woodlands, grass and heathlands)

- coastal ecosystems including landforms
- Protection of threatened species
- Control of weeds and pests.

### ***3. Economic (Agriculture and Aquaculture)***

- Protection and enhancement of the agricultural value of farmland and soil, including erosion, salinity, weed, game and fire management, facilitation of water storage for cropping.
- Protection and enhancement of the aquacultural value of waterways (especially Moulting Lagoon and Great Oyster Bay)

### ***4. Social***

- Increased community awareness of the values and issues of the Catchment.
- Increased community involvement through capacity building and empowerment.
- Research and monitoring to reduce the risk and to improve the decision making on future management and use of the Catchment's resources.
- Recognition and protection of the aesthetic and recreational values of the Catchment especially waterways and coastal landforms, vegetation and habitat.
- Planning policies to protect visual amenity and biodiversity

### **Achievements to Date**

The Landcare Committee has, through a Natural Heritage Trust (NHT) Devolved Grant and community involvement, undertaken a program of weed control, revegetation, and fencing to protect remnant vegetation and allow natural regeneration and habitat recovery. The Committee's work has also been instrumental in the establishment of significant reserves under the Private Forest Reserve Program and promoting other private reserves programs. The Committee has provided support for the Land for Wildlife Program, Greening Australia, Coastcare and a part-time Waterwatch Facilitator who is working with community groups on water quality monitoring and education.

### **Natural Resource Management Issues**

The Plan provides information on the major natural resources of the Catchment and discusses the major current and anticipated resource management issues. These are summarised below:

#### ***Tasmanian Natural Resource Management Framework***

The finalisation and adoption of Catchment Management Plans for each catchment in the Municipality has become even more relevant with the introduction of the Tasmanian Natural Resource Management (NRM) strategy and pending legislation. Under the proposed Natural Resource Management Act, Glamorgan Spring Bay Municipality will form part of the Southern Region and three Regional Natural Resource Management Committees will be established.

Regional strategies will be developed and funding for natural resource management programs, including the National Action Plan for Salinity and Water Quality and the second phase of NHT funding will be strongly influenced by the Regional NRM Councils.

By the adoption of well-considered and well-understood catchment management plans, Council and the community will be well placed to receive financial support for future projects.

#### ***Community Capacity Building***

The community and their knowledge and commitment is the critical resource for the better management of the Catchment. Because of the high degree of community input into natural resource planning and community actions required and expected by the Plan through Landcare,



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Coastcare, Waterwatch and other community groups, then community capacity building is important to ensure that implementation and future reviews of the Plan occurs.

Making available to the community, the extensive knowledge and skills within the State Government Departments, particularly the Department of Primary Industries, Water and Environment (DPIWE) is another critical part of community capacity building, which can be facilitated by Council, the Landcare Committee and directly by the community or community groups. There is a high capacity and desire by DPIWE specialists to communicate directly with land managers, owners, and community groups, often requiring only the organisation of suitable forums. Community forums addressed by specialists in different areas of natural resources, have been used to good effect in the past few years and there is scope to greatly increase this activity.

### ***Natural Resource Management Funding***

The increased level of NRM planning and activities conducted throughout Australia in recent years has been NHT funded through Landcare, Coastcare, Waterwatch and similar programs. While the second phase of NHT funding is assured, the ongoing and future level of funding is less certain. In some local government areas of Australia the essential role of natural resource management planning and the need for secure long term funding has been recognised by the application of environmental levies. It would be prudent for Council and the community to consider soon the question of ongoing funding.

## **Natural Resources**

### ***Groundwater***

There is no known significant groundwater resource in the Catchment apart from the Dolphin Sands aquifer whose recharge source and capacity has yet to be identified. Its capacity is presently assessed as limited to the supply of the residential needs of the area. Increased research and monitoring of quality and flows, for this aquifer is essential to assist in determining sustainable limits and risks. Support for current and future research into the aquifer is recommended and future research into other groundwater resources in the Catchment may be advisable.

### ***Soils***

The river flats of the main rivers contain significant areas of alluvial soils with good agricultural value, which have been farmed for over 170 years. In particular the Swan alluvial area has red-black clay-loams with good structure, few stones and free draining. Some areas have relatively shallow, good agricultural soil over clays. In a few areas where there is insufficient depth above sub-surface water there are seasonal marshes. Significant areas adjacent to the Swan and mid Apsley Rivers are subject to flooding.

The recent substantial increase in cropping and the use of irrigation in the alluvial soils of the Catchment has placed increased pressure on soil structure and may increase the risk of soil erosion. The risk of soil erosion of river-banks is significant and large areas east of the Swan River have moderate sheet and rill erosion risk. Salinity risk is moderate for a small area to the west of the lower Swan River and this area is also at risk from tree decline.

Integrated resource management in farm management planning is demonstrated by the close relationship between good weed, soil and natural vegetation management practices and this is a focus of this Plan.

### ***Riparian Land***

The riparian land adjacent to the good alluvial soils in the mid Swan and Apsley Catchments has experienced substantial degradation over many years with erosion, weed infestation and loss of native vegetation. Significant control of weeds has been undertaken in recent years, however there is an urgent need to give greater recognition to the ecosystem services provided to the Catchment and the community by riparian areas; particularly for downstream water quality, biodiversity and the unique riparian vegetation and habitat for fauna.

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Planning to give focussed and coordinated actions on riparian land can improve agricultural capability of the adjoining land and will rapidly give improved river water quality. The Plan gives high priority to the restoration of native riparian vegetation through large sections of the rivers in the mid and lower Catchment.

The rivers in the Catchment are characterised by relatively short duration flow peaks due to the short river lengths and some steep grades. The Swan, Cygnet and Apsley Rivers have significant flood plains which require coordinated planning that extends well into the future to prevent ongoing and extensive sheet and riverbank erosion.

### ***Water Management***

The Plan discusses the significant effects of the Tasmanian Water Management Act 1999 particularly for water allocation, dam approvals and environmental flow requirements.

A water management strategy which takes account of the ephemeral nature of the rivers in the Catchment, follows the hierarchy of water allocation rights and integrates across all economic, social and environmental requirements is advocated.

### ***Town Water Supplies***

The high flow variability of the major rivers means that significant storage capacity is required to ensure reliable availability of town water during prolonged dry periods. If drinking water is to be supplied, then water treatment to reduce turbidity (sediments) is essential. Periodic high turbidity levels in the Swan and Apsley Rivers at the take-off points for town water supplies and the absence of town water treatment plants has resulted in boil water alerts for Bicheno and Swansea for most of the past year.

The community has identified as a high priority the need for a strategic long term planning for water extraction, storage, treatment and usage. The Plan identifies the importance for this planning to integrate town water and irrigation water needs.

Glamorgan-Spring Bay Council is currently addressing the design and resourcing issues associated with upgrading water storage and treatment capacity for Bicheno and Swansea townships and rapid progress is to be expected once the current DPIWE study of water development options has been assessed. The Catchment Management Plan presents options for demand management and recommends an assessment of water supply alternatives, which can significantly affect the design and cost of town water supplies.

### ***Irrigation***

The limiting factor for agricultural yield has often been water availability, especially as the region is subject to extended periods of low rainfall. The current DPIWE study to present future development options for irrigation and town water storage and supply, needs to be assessed carefully by the community due to the high interconnection between economic, environmental and social issues.

It is evident that significant further development of the substantial cropping and horticulture potential in the Catchment depends upon water storage infrastructure that will allow the peak flow events in rivers to be collected and stored. The significant environmental flow requirement of the Water Management Act has removed the large economic advantage of in-stream over off-stream dams. Integrated planning that assesses the total water extraction and storage requirements for farming and town water, and the environmental requirements within the Catchment is now essential. The need for Water Management Plans for the Swan and Apsley Rivers and the potential use of water trusts are discussed.

### ***Aquaculture***

The Moulting Lagoon estuary supports an extensive aquaculture industry which relies on the availability and the high quality of water flowing from the upper Catchment. The water quality of

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the Swan River, as the larger and more intensely farmed Catchment, is the most critical for the aquaculture industry and the ecological health of the Estuary.

Knowledge of the estuarine ecosystem is very poor and the Plan recommends the establishment of a cooperative research program to gain greater knowledge necessary for sustainable use of natural resources that impact on Moulting Lagoon.

### ***Environmental Flows for Waterways***

Environmental flows are a description of the water regimes needed to sustain ecological values of aquatic ecosystems at a low level of risk. Minimum environmental flows are developed through the application of scientific methods and techniques and the application of local knowledge based on many years of observation. Environmental flows are not static, minimum flow provisions but are variable, recognising low and high flow events as part of waterways' normal processes. They are a regime of flow and water quality, delivered within a risk management framework that recognises both the variability of stream flow between years, and that environmental flows cannot always be met.

Setting environmental flows is not an attempt to restore modified rivers to a pristine state but rather to preserve existing environmental and social values. Environmental flows are critical for the maintenance of water values for downstream uses such as water supplies, the aquaculture industry and recreational uses.

For the Swan River, the current and emergent demands on the summer flow for town water, cropping irrigation, aquaculture and the environmental water requirements are potentially at a critical stage. An initial assessment of the environmental flow for the Swan River has just been completed and requires consideration. The Plan recommends the development of an interim Water Management Plan in order to allow a degree of security and certainty for both the users and the environment.

### ***Social Water Values***

The community places a very high social value on the quality and availability of water for the maintenance and enhancement of the aesthetic, recreational and environmental value of watercourses. There is also significant economic value from high quality water, which together with landscape values, are essential for tourism.

Township stormwater discharge directly to the sea will increase the threat to coastal water quality, particularly from dog faeces, as residential growth continues.

A high priority on continued and expanded water quality monitoring by the community through Waterwatch and Council in conjunction with DPIWE programs is reflected in the Plan.

### ***Biodiversity***

Biodiversity is the variety of all life forms that includes plants, animals, micro-organisms and the ecosystems of which they are a part.

Biodiversity is essential for our survival, our quality of life and is both a key part, and an indicator of ecological and natural resource sustainability.

Australia is one of the most biologically diverse countries in the world, with a large portion of its species found nowhere else in the world, and the east coast of Tasmania in particular has a high level of regionally endemic plants and animals.

The value of native vegetation can be summarised as follows.

- Environmental: Maintenance and strengthening of bio-diversity, protection of threatened flora species and habitat for threatened fauna species, protection of water quality, and estuarine and coastal ecosystems
- Economic: Water quality protection, weed control particularly in riparian areas, insect pest control through bio-diversity and widespread bird communities and populations.

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Enhanced tourism attraction through improved landscape values from a green, well managed, “Arcadian” landscape.

- Social: Quality of life from protected water quality for consumption and recreation, and aesthetically improved, weed free landscapes, particularly riparian and coastal areas.

The protection of native vegetation communities and the restoration of threatened vegetation communities are among the major natural resource management actions needed in the Catchment.

Human activity has been, and remains the major cause of loss of biodiversity. European settlement in the Catchment has produced widespread modification of the flora and fauna resulting from agriculture, forestry, fishing, human settlement and the introduction of exotic species of terrestrial and aquatic plants, animals and diseases. Native vegetation has been highly degraded in the riparian and coastal areas of the Catchment as the result of farming and coastal recreation and residential uses. There has also been a major loss of native grasslands to introduced grass species.

The most significant impediments to the conservation and management of biodiversity are lack of knowledge and public awareness of biodiversity; and insufficient integration of resource management actions. Through the Nature Conservation Branch of DPIWE and the scientific community in general, substantial progress has been made in recent years with research and mapping of vegetation communities and endangered species. This Plan emphasises the importance of integrating this information with natural resource planning and use, and of disseminating this information through ongoing awareness-raising/education activities.

Native grasslands, coastal heathlands, wetlands and some eastern Tasmania forest types are considered to be the most threatened plant communities in the Catchment and in Tasmania generally. Heathlands contain significant regionally endemic species such as Apsley Heath and Freycinet Heath which are both endangered. The Catchment has good representation of Oyster Bay Pine and has some remaining South Esk Pine (listed as endangered) which are both Tasmanian endemic trees.

Loss of habitat in coastal and river plains through extensive clearing for agriculture has led to significant decline in the populations of Tasmanian bettong (*Bettongia gaimardi*) and eastern barred bandicoot (*Perameles gunnii*) which is now absent from the majority of its natural range (Smith et al 2002). Eastern Quoll has a preferred habitat in the bush-pasture/grassland interface in the Catchment and the endangered New Holland Mouse is present in parts of Freycinet National Park.

Threatened aquatic species includes the regionally endemic fish Swan Galaxias (in the upper tributaries of the Catchment), Australian Grayling and Green and Gold Frog.

Threatened birds include the Swift Parrot that requires coastal blue and black gums, the endemic Tasmanian Wedge-tailed Eagle that depends on tall mature eucalypt forests and the coastal nesting Fairy Tern. The Hooded Plover is of high conservation significance and has vulnerable nesting sites in coastal sand dunes.

The Catchment contains significant estuaries, wetlands and saltmarshes, whose ecological processes are not well understood. This includes Moulting Lagoon and Apsley Marshes, which are both internationally recognised wetlands under the RAMSAR convention as sanctuaries for birds. The Lagoon is a valuable natural habitat and breeding area for fish, bird and other fauna and is an important aquaculture resource and a popular recreational area.

Development in coastal areas has degraded many vegetation communities, including salt marshes and wetlands. Many dune communities are highly degraded, having being affected by clearing, erosion from beach access, weed infestation, introduced plants, marram grass plantings (particularly at Dolphin Sands), and recreational activities.

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The Tasmanian *Threatened Species Protection Act 1995* and the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* protect threatened species. These Acts require approval for activities that may increase the risk to listed species. Each Act has a Schedule that lists plant and animal species that are threatened according to the hierarchy endangered (long-term survival is unlikely while the factors causing them to be endangered continue), vulnerable (likely to become endangered while factors causing them to be vulnerable continue) and rare (small populations that are not endangered or vulnerable but are at risk). The Tasmanian *Threatened Species Protection Act* lists some 600 species of plant and animal recognised as being threatened and 16 animal and 102 plant listed species are to be found within the Catchment. The Catchment contains all six of the State's endemic threatened heath (Epacris) species of which 3 are endangered, 2 are vulnerable and 1 is rare.

Tasmania has developed strategies and policies including the *Threatened Species Strategy for Tasmanian, Draft June 1998* and specific recovery plans for certain species. Community education and support of DPIWE recovery plans for threatened plant communities such as the *Tasmanian Forest Epacrids Recovery Plan* (DPIWE 1998), *Recovery Plan for the Pedder, Swan, Clarence, Swamp and Saddled Galaxias* (Crook, D.A. & Sanger, A.C. 1997) and *Community Recovery Plan: Eucalyptus ovata – Callitris oblonga* (Black Gum-South Esk Pine) Forest (DPIWE 1999) are strongly recommended.

There are extensive National Parks and Reserves which cover 27,600 Hectares or 20% of the Catchment area. In addition substantial protection of important vegetation communities and habitat has been achieved through the Private Forests Reserves Program (565 Ha on 4 properties), Land for Wildlife Program and other programs to reserve private land for plant and animal species protection. As much inadequately reserved vegetation and animal habitat is on private land, continued strong recognition and encouragement of contributions to the private land reserves programs by Council and the community is proposed in the Plan.

### **Weed Management**

The community rated weed management among the top priorities of issues for Catchment management and this has been a major focus for Landcare activity since 1997. Although the primary responsibility for weed management rests with landowners, collective action is necessary and has proved to be effective as the problem often exceeds the capacity of individual landowners to address it adequately and because coordinated actions are much more effective.

The *Weed Management Act 1999* and *WeedPlan: A Tasmanian Weed Management Strategy 1996* have been introduced to fulfil the *National Weeds Strategy* and to minimise the negative effects of weeds on Tasmania's productive capacity and natural ecosystems.

The *East Coast Regional Weed Strategy* (Stewart, 2000) objectives are in summary; community information, resourcing and integrated activities. Local strategies and action priorities are specified in the *Glamorgan-Spring Bay Weed Management Plan* (Kelly & Andrewartha 2000) and include; weed mapping, training, information and integrating weed management with other actions.

It is important that Council have a weed enforcement officer trained under the Act to ensure that "site-led" and "weed-led" priorities as specified in the *Glamorgan-Spring Bay Weed Management Plan* can be effectively coordinated. Weed mapping by Landcare is well advanced.

### **Other Issues**

The root rot fungus, *Phytophthora cinnamomi* is well established in parts of the Catchment and heathlands in particular are highly susceptible. There is a need for greater community awareness of the locations and the risk of the spread of this disease.

Game management plans are recommended as part of farm management planning where there are problems with feral or native animals. Foxes have recently been reported from close the Catchment and liaison with the DPIWE fox program and community involvement is recommended.

## **EXECUTIVE SUMMARY**

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Fire management plans, in which agreed strategies and methods are documented and well understood is recommended to address community concerns about fire risk and fuel levels and to ensure fire plans are coordinated between all agencies and landowners.

## CATCHMENT MANAGEMENT OBJECTIVES AND RECOMMENDED ACTIONS

This section gives the management objectives and actions that are recommended by the Plan. Many of the actions can be completed within three years as a reasonable target, however many of the actions are ongoing. Generally the responsible persons or bodies to drive the actions is identified however achievement of objectives is strongly dependent on community input and energy and Council and Landcare Committee leadership.

### Groundwater

Objective	Action
1. To maintain the security and quality of the Dolphin Sands groundwater aquifer and gain increased knowledge of the aquifer.	<p>1.1 The Council, community and Landcare Committee to support the continued priority of Dolphin Sands groundwater quality monitoring by the community, Waterwatch and Council; and for the monitoring to be expanded to more sites, and to include testing for nitrates (as an indicator of nutrient contamination) and the level of the aquifer.</p> <p>1.2 That a map and database of the location of Dolphin Sands water spears, sewerage absorption trenches and groundwater monitoring results be established by Council in consultation with Waterwatch and the community; with database management to be agreed with Waterwatch in consultation with MRT.</p>
2. To improve the long-term management of groundwater in the Catchment.	<p>2.1 That the community, Council and Waterwatch encourage and support, current and proposed research and monitoring projects for groundwater in the Catchment, such as the proposed University of Tasmania post-graduate research into the source(s) of the Dolphin Sands groundwater.</p> <p>2.2 That Waterwatch and the Council, in consultation with MRT, identify priority research proposals that will assist with information to support good management of the Catchment's groundwater resources.</p>

### Soil Management

Objective	Action
1. Property owners to have good knowledge of farmlands with salinity and soil erosion risk.	<p>1.1 The Landcare Committee and the farming community, in conjunction with DPIWE specialists, to facilitate the development and availability of soil survey services using services offered by agricultural consultants.</p> <p>1.2 From DPIWE risk assessment maps, property owners to identify specific farmlands with erosion and salinity risk and prepare detailed erosion and salinity risk assessments with specialist support.</p>

## Catchment Management Objectives and Recommended Actions

### Soil Management (continued)

Objective	Action
1. Property owners to have good knowledge of farmlands with salinity and soil erosion risk. (continued)	1.3 The Landcare Committee and the farming community, in conjunction with DPIWE specialists, to organising field days/seminars involving DPIWE specialists and agricultural consultants with expertise in salinity and erosion.  1.4 The Landcare Committee, Council and the farming community, in conjunction with DPIWE and MRT specialists, identify priorities for research of soil risks, and encourage and support research and monitoring projects, that will assist with good management of the Catchment's soil resources.
2. Soil erosion and salinity risk to be reduced.	2.1 The Landcare Committee and DPIWE to encourage property owners with identified soil risks to develop soil management strategies and plans.  2.2 For farm management plans and soil management information to recognise the close relationship between soil erosion, weeds, natural vegetation, land use and the water table.
3. Maximise agricultural capability of farmlands.	3.1 Farmers, with Landcare and Council encouragement and support, to use DPIWE and other specialist services to undertake land capability assessments as part of whole (integrated) farm planning.

### Riparian Land

Objective	Action
1. For the Swan-Apsley Catchment to become a model of sound riparian management through increased information exchange and adoption of current best practice.	1.1 The Landcare Committee and Council to encourage landowners to use specialist advice for the management and protection of riparian areas.  1.2 The Landcare Committee to continue to encourage landowners to establish riparian reserves and to use NHT resources for fencing, weed removal and revegetation in degraded riparian areas.
2. Prevent excessive erosion of stream banks.	2.1 Council, Committee and the community to; <ul style="list-style-type: none"> <li>➤ Encourage reduced livestock access to streams</li> <li>➤ Encourage off-stream watering of livestock</li> <li>➤ Establish natural vegetation and grassed buffers along flood plains</li> <li>➤ Revegetate river banks with native vegetation</li> </ul>
3. Raise awareness of the benefits of riparian buffers to agricultural and environmental management.	3.1 Prepare information packages ("toolkits") to mail out to property owners on the benefits of riparian buffers and includes copies of relevant literature.



## Catchment Management Objectives and Recommended Actions

### River Structure

Objective	Action
<p>1. Substantially reduce flood erosion of the riverbeds and riverbanks in the Swan-Apsley Catchment over the next five years through coordinated planning and action involving all landowners, other Catchment managers, and Landcare and Council officers.</p>	<p>1.1 Affected landowners, with support from Council and the Landcare Committee, to develop management plans for the critical alluvial sections of the Apsley, Swan, Cygnet and Wye Rivers, such plans to be coordinated between properties for each section and to integrate all natural resource management issues.</p> <p>1.2 Council and the Landcare Committee to encourage landowners to establish riparian reserves with native vegetation to strengthen riverbanks and use Landcare incentives for the establishment of riparian fencing and off-stream stock watering facilities to exclude stock access to rivers.</p> <p>1.3 Council and the Landcare Committee to encourage landowners to use Rivercare and other specialist advice for the management and protection of riparian areas, and to facilitate field days to provide advice on best practice management of natural river structures.</p> <p>1.4 Council to advise all landowners of the need to use specialist advice and to gain approval from Council through the Landcare Coordinator, and with DPIWE/Rivercare advice as required, prior to river structure or bank protection work, or the relocation of large woody debris.</p> <p>1.5 Council and Landcare to clarify, document and make available to riparian land managers, the approval process for structural river work.</p> <p>1.6 For the control of weeds and restoration of native riparian vegetation to continue to be given high priority in Landcare and other NHT funded projects.</p>
<p>2. Have increased knowledge of long term river structure processes and changes for the Catchment.</p>	<p>2.1 Establish a photographic database of river structure using GPS fixed viewing points.</p> <p>2.2 Establish indicators of riparian stability including water quality measures such as turbidity (in conjunction with water quality objectives).</p> <p>2.3 Rivercare, DPIWE and DIER professional officers conduct ongoing monitoring of road bridges over rivers for erosion and river stability.</p>

## Catchment Management Objectives and Recommended Actions

### Water Management

Objective	Action
1. For all stakeholders in the Swan, Apsley & Meredith Rivers to have certainty and security in the availability of water while ensuring water quality and availability for the environment including estuarine needs.	<p>1.1 The Committee and Council together, to initiate the preparation of a Water Management Plan for the Swan River with support from DPIWE and the Minister, and full consultation with the community.</p> <p>1.2 As a second priority, initiate the preparation of Water Management Plans for the Apsley and Meredith Rivers.</p>
2. For all water stakeholders in the Catchment to be well informed about Tasmanian water management issues and the status of water availability and water development plans in the Catchment.	<p>2.1 Council to maintain a watching brief on water management in the Catchment and ensure full community briefing and consultation, with particular reference to environmental flows, water developments and water storage proposals.</p> <p>2.2 The community and Council, through Waterwatch and with support from DPIWE, to facilitate ongoing community awareness and capacity building on Tasmanian water management issues. This includes legislation and policies, environmental flow assessments, and water development options for the Catchment, through field days/seminars, distribution of relevant publications and other activities.</p>

### Water Quality

Objective	Action
1. The Catchment community to have good knowledge of the water quality of rivers, estuaries, coastal waters and groundwater.	<p>1.1 Council, with Waterwatch and community support, to lead the development and maintenance of a water quality database which is linked to DPIWE data, (including State of the Rivers Reporting).</p> <p>1.2 Waterwatch, with community and Council support, to facilitate access to DPIWE water quality data, reports, specialist services and support.</p> <p>1.3 Waterwatch and Council in consultation with DPIWE, to identify the priorities for additional water monitoring and the person(s) to be responsible for maintaining water data.</p> <p>1.4 The community, Landcare Committee and Council to continue to encourage, support, and expand as required, water quality monitoring by Waterwatch, Council, DPIWE, community groups and research institutions.</p>

## Catchment Management Objectives and Recommended Actions

### Water Quality (continued)

Objective	Action
2. To maintain and improve the water quality for the Catchment rivers and streams.	<p>2.1 The community, Landcare Committee and Council to encourage the re-establishment of native vegetation in riparian areas and parts of the Catchment at risk of erosion, and to continue to support NHT and other incentives for land owners to establish riparian reserves.</p> <p>2.2 Council and forestry operators to reduce sediment runoff from roads into waterways, by identifying potential problem areas and roads requiring priority to be sealed.</p>
3. For the townships of Bicheno and Swansea to have contemporary standard water treatment facilities installed within the shortest achievable timeframe.	3.1 Council to give the highest priority to the design, funding and installation of contemporary standard water treatment facilities at Bicheno and Swansea.

### Water Availability and Water Use

Objective	Action
1. Have secure water supplies for Bicheno, Swansea and Coles Bay townships with sufficient water storage capacity in place to meet the reasonable needs of town water users during extended dry periods, with the best contemporary demand management practices in place.	<p>1.1 Council to initiate a plan for secure long-term water supplies for Bicheno and Swansea in conjunction with DPIWE, through a study of options, based on the outcomes of the current Water Developments Options Study and with community consultation.</p> <p>1.2 Council to initiate a study into contemporary demand management practices appropriate to the Catchment (in conformance with the COAG water reform agenda), including two part pricing and other water conservation incentives, with community consultation.</p>
2. For farmers in the Swan River Catchment to have certainty and security of water availability, including options for storage of peak river flows to allow the sustainable development of the agricultural capacity of farmlands, while maintaining the environmental water requirements of the River.	2.1 Council and representatives from the Landcare Committee, the East Coast Primary Producers Association and the community, to discuss water development options with DPIWE, to establish agreement for further detailed study of irrigation water storage options and to consider the possibility of forming a Water Trust for the Swan River valley farmlands.

## Catchment Management Objectives and Recommended Actions

### Native Vegetation

Objective	Action
<p>1. Council, with support from the community, to have in place an overall Natural Resource Management (NRM) strategy for biodiversity and natural ecosystem protection according to the.</p> <p>For the NRM strategy to:</p> <ul style="list-style-type: none"> <li>- protect and restore where feasible, all endangered plant communities in the Catchment.</li> <li>- follow priorities established for the various vegetation communities.</li> </ul>	<p>1.1 Council, Landcare and the community to assist with the dissemination of information regarding the Private Forests Reserve, Land for Wildlife Programs and the other public and private land biodiversity covenanting and conservancy programs.</p> <p>1.2 Council, Landcare and the community to expand their public and landowner information program on the protection of native vegetation through recognition for landowners with covenants, and appropriately located signage and published information.</p> <p>1.3 Council to continue to apply, and further develop as appropriate, rate rebates and other incentives to achieve the objective.</p> <p>1.4 Council to continue to improve the management and further development of public reserves, particularly using those actions that contribute to achieving the objective.</p> <p>1.5 The Landcare Committee to continue to encourage the planting of native species to replace weeds and restore degraded riparian areas and to protect priority threatened plant communities from further weed invasion, applying NHT funds according to established priorities.</p> <p>1.6 Council, Landcare and the community to encourage and facilitate an integrated approach to the restoration of threatened plant communities involving DPIWE specialists to set priorities and to assist to inform landowners and the community.</p> <p>1.7 Council, Landcare and the community to encourage farm managers and land owners to include in farm management planning, the protection and enhancement of biodiversity and naturally diverse native vegetation as a critical component of land use, particularly for threatened plant communities on private land.</p>
<p>2. To control the spread of the root rot fungus, <i>Phytophthora cinnamomi</i> into native vegetation.</p>	<p>2.1 Request DPIWE to expand the public education program on the threat of root rot fungus through appropriately located signage, pamphlets and mapping.</p>

## Catchment Management Objectives and Recommended Actions

### Wildlife

Objective	Action
1. For the Catchment to have protected habitat for all threatened animals and where achievable, to restore degraded habitat.	<p>1.1 Council, Landcare and the community to provide information and support for DPIWE programs to protect the habitat of threatened animal species (eg Land for Wildlife), and to assist in expanding public information programs on endangered animal species &amp; protection programs.</p> <p>1.2 Council, Landcare and the community, in cooperation with DPIWE, to expand the public education program on the threat of pets to shore bird breeding and other native animals through appropriately located signage &amp; information pamphlets.</p>

### Weeds

Objective	Action
1. To have coordinated, cost-effective and priority based weed management within the Catchment as part of, and conforming to the <i>Glamorgan-Spring Bay Weed Management Plan</i> .	<p>1.1 The Landcare Coordinator and Weed Plan Coordinator to continue the program of weed mapping and to arrange entry of weed data into a digital weed map for the Catchment.</p> <p>1.2 The person to fulfil the role of Weed Plan Coordinator as specified in the <i>Glamorgan-Spring Bay Weed Management Plan</i> to be determined by Council.</p> <p>1.3 For Council to initiate GIS skills training to allow entry of data into a digital weed map for the Catchment using Council's GIS and with linkage to the DPIWE State Weed Database.</p> <p>1.4 The Landcare Coordinator and Weed Plan Coordinator to make available the weed information in the weed map relevant to the owner of each significantly affected property and to outline the objectives, proposed methods and proposed activities to landowners.</p> <p>1.5 Council, Landcare and Weed Plan Coordinator to encourage the planned and managed use of approved mechanical, chemical and biological control agents for the control of weeds.</p> <p>1.6 Council and the community to encourage householders to use local native species in gardens.</p> <p>1.5 Council and the community to monitor for Rice Grass intrusion and new weeds or new weed locations.</p>

## Catchment Management Objectives and Recommended Actions

### Game Management

Objective	Action
1. For the impact of wildlife grazing on pasture lands to be reduced.	1.1 Landcare, Council and the farming community to encourage land owners to provide water storages for native wildlife during times of drought to reduce animal movement into pasture lands.
2. To have fair and responsible management of possums and wallabies.	2.1 Landcare and the farming community to encourage landholders to establish Game Management Plans.
3. Protect habitat for threatened species.	2.2 Landcare, Council and DPIWE to encourage landowners to identify potential habitat for threatened species and participate in programs to protect such habitat.

### Fire Management

Objective	Action
1. For the community to be well informed and prepared for fire risk.	1.1 Council, Landcare and the Tasmanian Fire Service to promote fire protection publications to the community. 1.2 Council and the Tasmanian Fire Service to publicise fire management plans and strategies, with particular reference to recommended procedures for fuel reduction burns and their impact on native plant regeneration.
2. For fire management strategies to recognise the protection of native plant communities.	2.1 Council and DPIWE to develop and promote fire management strategies that protect native plant communities.

# PART 1 BACKGROUND TO THE PLAN

## 1.1 Background

The Spring Bay Landcare Group was formed on 7<sup>th</sup> August 1992 and a strategic planning workshop was held on 28<sup>th</sup> and 29<sup>th</sup> November 1992.

In August 1995 a Spring Bay Landcare Strategic Plan titled “Will You Care? Before it is too late!” was published (Steane 1995) for the Group. This report covers the area of the former Spring Bay municipality which corresponds approximately to the Prosser Catchment defined by the Department of Primary Industries, Water and Environment (DPIWE) map *Tasmanian Catchment Boundaries for Land and Water Management, 2000*. The report gives a summary of the natural resources and Landcare issues for the area and gives recommendations for the Council in conjunction with the Landcare Group.

In 1995 the *Prosser Landcare Survey* (Gee 1995) was produced by the Prosser Committee of the (then) Spring Bay Landcare Committee. This Survey gave an overview of the Catchment’s natural resources and focussed on riparian weeds and erosion, recommending ways Landcare and individual landowners could tackle these problems.

The Glamorgan Spring Bay Landcare Management Committee was formed in late 1995 and is a special committee of the Glamorgan Spring Bay Council. The Committee has been successful in gaining Natural Heritage funding for Landcare projects starting with the East Coast Drought Landcare Program which was conducted from 1995 to 1996. Following the recommendations of the *Prosser Landcare Survey*, the major task of removing willows from the Prosser River riparian area was successfully undertaken in 1996.

The Committee initiated further community consultation through a Catchment tour and meeting on 6<sup>th</sup> June 1999, attended by 30 farmers and other residents, a Southern Midlands Landcare representative and several specialists from State Government agencies. At the meeting a Prosser Catchment Planning group was formed.

The Glamorgan Spring Bay Landcare Management Committee initiated the preparation of this Plan in 2001 to consolidate natural resource values and issues for the Catchment.

The Committee conducted further community consultation on the proposed Prosser Catchment Management Plan with a public meeting at Orford on 28<sup>th</sup> November 2001 with speakers providing information on the catchment management planning process, and the *Tasmanian Water Management Act 1999* and *Threatened Species Protection Act 1995*. From this meeting a set of values and issues were developed which are summarised in Section 1.3.

## 1.2 Catchment Mission, Vision and Strategies

The Spring Bay Landcare Strategic Plan contains the following mission statement derived from the 1992 workshop.

*To protect remnant species and habitats and to rehabilitate degraded lands in the context of planned and sustainable land use to leave a better environment for future generations.*

The Landcare Strategic Plan also contains the land care vision;

- *to sustain productivity*
- *to protect coastline*
- *to maintain and improve the quality of water and river systems*
- *to control pests and weeds*
- *to improve management of waste*
- *to maintain and improve the aesthetic quality of the landscape.*

The Landcare Strategic Plan lists five key strategies as;

- *research and information collection*
- *publicity and public relations*
- *education and training*
- *participative planning and policy making*
- *funding submissions and sponsorship*

Since the 1992 workshop the Glamorgan Spring Bay Landcare Management Committee has refined the vision for both the Swan-Apsley and Prosser Catchments to become:

- ***To provide current and future generations with a healthy catchment with a diverse natural environment.***
- ***To have a balanced and sustainable use of natural resources for an economically viable community.***
- ***To have enhanced water quality through sound land and water management.***

### 1.3 Values and Issues

At the Catchment tour and meeting on 6<sup>th</sup> June 1999 the values and issues of concern to the community were identified. These have been incorporated into the following summary along with the outcomes of the 1995 strategic planning questionnaire and the public meeting held at Orford on 28<sup>th</sup> November 2001.

While the vision and values can be expected to remain relatively unchanging, the issues will tend to change as actions are completed and new information becomes available.

#### ***Summary of Values and Issues for the Prosser Catchment***

<b>Resource</b>	<b>Values/Attributes Sought</b>	<b>Issues and Concerns</b>
Water quality	In rivers: In estuaries Town water	Effect (of siltation) on drinking water quality Effect on ecosystem health Exclusion of stock from rivers Impact of riparian erosion. Impact of road run-off Chemicals run-off
Water	Availability	Drought proofing town water and agricultural supplies
Groundwater	Availability	Need for research
Natural vegetation	Protection and enhancement	Weeds Vegetation clearing on steep slopes and water courses
Riparian areas	Protection and enhancement of native vegetation and protection from erosion	Riparian natural vegetation buffer zone Erosion Where to fence on the flood plain
Estuaries	Ecosystem protection and research	Wastewater - impacts of septic tank and treatment plant outflows on coastal and estuary ecosystems



Coastal	Protection of recreation value Need for research into natural processes	Management Sub-divisions Boat launching Vehicles on beaches
Landscape	Beauty	Protection
Biodiversity	Protection and enhancement High proportion of original forest cover	Feral pests
Agriculture capacity	Economic value	Weeds Water availability Soil salinity risk Soil erosion risk
Fisheries	Aquatic biodiversity	Protection of fish breeding habitat and migrating fish passage
Community	Involvement Ownership	Educational value of the catchment Identification of priorities and available resources to implement actions Whole catchment integration of issues

#### 1.4 Intention of the Plan

It is the intention of the Glamorgan-Spring Bay Landcare Management Committee that a Catchment Management Plan be developed for the Catchment that;

- provides background information on the natural resources of the catchment,
- provides a summary of the community's values and issues regarding the catchment,
- sets objectives and actions for management of the catchment, and
- provides guidelines on processes and responsibilities for management of the catchment.

It is the intention of this Plan to bring together under a single framework much of the work that has been done to date.

The Catchment Management Committee emphasises that the plan is about the community leading the process through cooperation, information and education. It also enables the community to then have coordinated input into relevant policy decisions.

A Catchment Management Plan also seeks to identify sources of environmental degradation and by doing so to alert the community to the path for a model or "best practice" for balancing their economic, social and environmental needs for the future.

#### 1.5 Principles of the Plan

The guiding principles used in the Plan are;

1. Reducing the pressure on the natural resources of the catchment is to be achieved by changing the behaviour of users and beneficiaries of these resources.
2. That approaches to changing behaviour shall be both equitable and innovative, with a preference for incentives and education over rules and sanctions.
3. The Plan shall reflect a serious attempt to listen to, and take into account, all stakeholder interests.

4. Management shall be based on objective analysis, and the success of plans and programs shall be objectively measured against clear targets.
5. The Plan's objectives and strategies must prevent deterioration of our natural resources and also to provide positive examples of sustainable approaches to productive use.
6. The Plan is intended to be the foundation for a long-term program and shall be refined through learning from implementation.
7. There shall be emphasis on outcomes resulting from on-ground actions over the next few years.

Water extraction issues will be dealt with in terms of the principles to be applied and potential environmental and social impacts, and not detailed water development or allocation plans. These will be covered in part by the consultancy, "*Study of Water Development Options on the East Coast*" currently being conducted by the Water Development Branch of DPIWE (DPIWE 2001a).

It is intended that the Plan recognises and works in conjunction with Council, State and National government programs.

## **1.6 Relationship to Other Management Plans**

At the public meeting held in November 2001 it was indicated that catchment management planning is a framework within which a range of plans are components (Temple-Smith, 2001). Other components can, and should, include;

- Land use management plans, including a Council Planning Scheme
- Water management plans, including town water development plan
- Rivercare plans
- Vegetation management plans
- Fauna management plans
- Coastal management plans
- Agricultural development plans
- Erosion control plan
- Weed management plans
- Waste management plans
- Parks and reserves plans
- Recreation and heritage plans.

Some of these are already in place for the Catchment or the Glamorgan-Spring Bay municipal area and these are given in Appendix 1.

This Catchment Management Plan has been developed with reference to the existing plans relevant to the catchment and the Municipality. Ensuring that the various specialist plans are coordinated with the Catchment Management Plan is an ongoing review process. Each of the plans needs to be cross referenced and be part of a holistic integrated planning approach for the Catchment.

## **1.7 Natural Resource Management and National Programs**

The Catchment Management Plan has been developed to conform to the Tasmanian Natural Resource Management Framework - 2002 (DPIWE 2002) to the greatest extent possible. This will allow the Plan to form the basis of a Natural Resource Management Plan for the Catchment or as part of a Municipal Natural Resource Management (NRM) Strategic Plan.

It is anticipated that this Catchment Management Plan will be incorporated into Tasmanian Regional Strategies at a later date, under the Tasmanian Natural Resource Management

Framework and this will give the Plan legal status for decisions and appeals on natural resource management issues such as land use approvals, water allocation and dam approvals.

The shift to Natural Resource Management in Australia has been reinforced by the creation of the Natural Resource Management Council (NRMC), co-chaired by the Federal Ministers of Agriculture Fisheries and Forestry, and Environment and Heritage. The NRMC will have a standing committee of industry representatives and experts.

The draft accreditation criteria for accreditation of integrated catchment/regional management plans, have been recently specified (NRMC 2001) as being, (summarised);

1. *Scientific analysis of natural resource conditions, problems and priorities ... (to) underpin plans:*
2. *Effective involvement of all key stakeholders ....*
3. *.... focus on the causes rather than symptoms of problems.*
4. *... demonstrate(d) consistency with other planning processes, agreed national and state outcomes and basin-wide strategies and targets ...*
5. *Continuous development and improvement of the plan involving all relevant stakeholders ... (with) evaluation processes for reviewing the plan and reporting on progress ....*

The proposed Tasmanian Natural Resource Management Act (scheduled to be effective from mid 2002) will establish three NRM regions in the State, each with a Regional NRM Committee that will establish a Regional NRM Strategy. The Glamorgan Spring Bay Municipality will form part of the Southern Region. Funding for natural resource management programs, including the National Action Plan for Salinity and Water Quality and the second phase of NHT funding will be strongly influenced by the Regional NRM Councils. This and other Catchment Management Plans for the municipality will be incorporated into the Municipal and Regional NRM Strategies.

### ***Coast and Clean Seas Program***

The Coast and Clean Seas Program is an NHT funded national program to reduce factors causing environmental harm to coasts. In Tasmania this program is administered by DPIWE through a State assessment committee.

Funding has been received under this program for the following programs.

Upgrade of the Orford wastewater treatment lagoon system and use of the effluent at the Orford golf course by constructing the extra treatment lagoons, a rising main and reuse dam.

Triabunna Estuary Rehabilitation, Education and Community Re- Valuing Project sponsored by the Triabunna District High School and the Friends of the Park community group.

Glamorgan-Spring Bay Catchments Program and Waterwatch Extension-Stage 2.

Protection and Rehabilitation of the East Shelley Beach Foreshore, sponsored by the East Shelley Beach Coastcare Group and Glamorgan Spring Bay Council

Prosser River Estuary Celebration Project, sponsored by the Eastcoast Regional Development Organisation Inc

Solutions to Control Access, Regenerate Vegetation and Inform Users at Boltons Beach Cons. Area, sponsored by the Friends of Boltons Beach with Parks & Wildlife Service

Implementation of the Millingtons Beach Conservation Area Strategic Works Program, sponsored by the East Coast Regional Development Organisation

Bandicoots at the Beach project sponsored by the Orford Primary School and Tasmanian Parks and Wildlife Service

The Coast and Clean Seas Program is scheduled to finish in 2002.

### ***Clean Quality Water Program***

The Clean Quality Water Program is a joint State and Commonwealth Government initiative, administered by DPIWE, to secure clean water in river systems and provide clean water to towns in rural and regional areas. The main objectives of the Clean Quality Water Program are to upgrade town water supplies and sewage lagoons using cost-effective solutions.

Orford and Triabunna townships have received financial support under this program for town water supplies.

### ***National Action Plan on Salinity and Water Quality***

ARMCANZ have developed a nationally agreed National Action Plan for Salinity and Water Quality and inter government agreements to implement this Action Plan are being finalised. A program of consultation and communication with regional communities is to commence soon. Key issues are the importance of research and development on sustainable farming systems; the nature and scope of regional bodies for developing and implementing accredited regional plans; ensuring that the new plans would build on and not duplicate existing work; and an understanding of how Action Plan funds would be delivered to regions to finalise and implement plans. Although the Swan-Apsley catchment does not fall within one of the 21 priority areas identified under the National Action Plan for Salinity and Water Quality, this does not preclude funding applications for salinity abatement or water quality improvement programs for the Catchment.

## **1.8 Future Development of the Catchment Management Plan**

Substantial changes are likely to occur in the Prosser Catchment over the next 20 years. Changes may be to the environment, climate, population or the local economy. Contingency planning can help prepare the community to better handle such changes and minimise negative impacts and maximise the benefit from opportunities.

For example the Catchment has a history of prolonged droughts and to flash flooding of the Prosser River alluvial areas around Buckland. The high variability of the rivers and the Tasmanian government initiative to increase agricultural production through greater irrigation is the basis of the current study of water development options for the East Coast (DPIWE 2001). This and subsequent studies and contingency plans may require the Catchment Management Plan to be reviewed.

Similarly the development of an Environmental Management System for Agriculture at a Federal level was only briefly referred to in this Plan, but is likely to become increasingly relevant and be worthy of future inclusion (AFFA 2001).

This Plan also recognises that in order to be prepared for the future, now is the time for new partnerships, cooperative arrangements at the catchment level, decentralised management and stronger governance arrangements.

## **1.9 The Catchment: Areas and Land Use**

The Prosser Catchment is formed by the watershed of the Prosser and Sandspit Rivers and Maclaines and Eighty Acre Creeks plus numerous coastal streams within the Catchment boundary which extends from Cape Bernier in the south to Boltons Bluff in the north. The Catchment includes Maria Island to the east of Orford and Triabunna.

The catchment lies on the mid east coast of Tasmania in the southern part of the Glamorgan-Spring Bay municipality and is centred at latitude 42.5° South.

The Prosser Catchment area is 1,046 square km excluding Maria Island which has an area of approximately 100 square km. The Prosser River sub-catchment is the largest with an area of 708 square km (70,756 Ha). The major land uses are State forests (approximately 13%), the Buckland

Military Training Area (11%) and National Parks and State Reserves (14%). The remainder is predominantly private forest and farmland. The following table summarises land use by area.

Land Use	Area in hectares (Ha)	% total catchment area.
Commonwealth Land - Buckland Military Training Area	12,700	11.1 %
Conservation Area & Coastal Reserves	190	0.2 %
National Park and Reserves	14,056	12.2 %
Private Property	70,800	61.7 %
State Forest	14,490	12.6 %
State Forest Reserve	2,305	2.0 %
Water Conservation Area	370	0.3 %
Total	114,740	100 %

Note: 100 Ha = 1 square km

### 1.10 Geomorphology

The highest peak in the Catchment is Mount Hobbs (823m) on the western boundary of the Prosser River catchment in the southern part of the State's Eastern Tiers (Map 1 refers). The western boundary of the Catchment is generally over 400m in altitude and includes Brown Mountain (792m), the second highest peak. The southern boundary of the catchment is marked by lower hills with ridges in excess of 400m through the State Forests increasing in the south-eastern part through the Wielangta State Forest, with Prossers Sugarloaf (647m) and Mount Jacob (522m) near the east coast. There are lower altitudes along the northern boundary with the Little Swanport catchment with Hobbs Lagoon marshes at 320m altitude near the north-east corner of the Catchment.

Maria Island contains an impressive dolerite ridgeline from the cliffs of Bishop and Clerk (630m) at the northern end to the highest peak, Mt Maria (710m). Quaternary sand forms the narrow isthmus separating the northern and southern parts of the Island.

The Catchment's generally east facing coastline includes many beaches and rocky foreshore including several impressive dolerite bluffs and cliffs which have resulted from intrusions and uplifts in the Jurassic period. Drowned river valleys from the sea level rise following the end of the last ice age have formed the sheltered waters of Spring and Prosser Bays. There are several coastal sand bars which form lagoons including Cockle Bay, Earlham and Okehampton Lagoons.

The Catchment contains features of geological heritage significance which are discussed in Section 2.2.

### 1.11 River Hydrology

The Prosser River rises west of Levendale and flows approximately 35 km to the sea at Orford. The major tributaries join the Prosser at the Prosser Plains at 60 to 80m altitude in the centre of the Catchment, which extend for about 7 km east from Buckland. For approximately 5 km before entering Prosser Bay the Prosser River passes through the notable Paradise Gorge formed by erosion through dolerite.

The upper catchment streams are relatively short and of steep grade with intermittent flows. For the Prosser River catchment, a large alluvial plain is formed where the tributaries join and this area is subject to periodic flooding. Record floods occurred in December 1916, April 1929 and

April 1960 and these and lesser floods cut access across the Prosser Plain for up to three weeks with water extending for half a kilometer in width at the height of the flood (Gee 1995).

The Brushy Plains Rivulet is the longest tributary with the highest source in the State Forests around Brown Mountain. On reaching the Prosser Plain, the Prosser and all the tributaries form multiple channel river braids. Also in this area the River was historically choked by willow which has been largely removed through an extensive Landcare program. The Brushy Plains Rivulet catchment includes a small plain of fertile soil centered at Runnymede at 230m altitude.

## 1.12 Climate

The catchment has a cool temperate climate with generally low and often variable rainfall between years. River valleys and basins experience severe frosts in winter and frost have been recorded throughout most of the year. The prevailing winds are westerly with frequent easterly moist winds.

### *Rainfall*

The catchment lies in the rain-shadow of the State's prevailing westerly winds with most rainfall coming from easterly winds from small cyclonic depressions off the east coast, especially in early summer. Rainfall is generally fairly even throughout the year with January to March and September being the driest months. The record suggests that if the higher December rains do not eventuate then summer droughts can be a problem.

Rainfall data published by the Bureau of Meteorology (for the years indicated) for Orford (1968-93), Triabunna (1900-93) and Buckland (1909-93) are given below. **Note:** Rain-days = the average number of rain days for each month.

**Table of Monthly Rainfall for the Major Towns**

Month	Orford		Triabunna		Buckland	
	Average rainfall (mm)	Rain days	Average rainfall (mm)	Rain days	Average rainfall (mm)	Rain days
January	44.2	9	45.1	8	47.9	8
February	45.1	8	50.7	7	46.1	8
March	48.6	10	53.7	8	49.5	9
April	60.8	11	56.4	9	54.6	10
May	68.7	12	55.2	9	55.3	11
June	55.4	11	59.8	10	60.6	11
July	63.9	13	51.0	10	56.0	11
August	61.8	13	46.7	10	53.0	12
September	50.6	12	43.0	10	43.0	11
October	61.7	13	61.0	11	60.1	12
November	66.5	14	54.9	11	54.2	11
December	68.7	12	67.2	10	71.7	10
Total	696.0	138	645.7	113	651.9	124

Annual rainfall is lowest in the coastal and central catchment areas where the averages are in the range 650 to 700 mm. The annual rainfall is highest and in excess of 800 mm in the south west of the Catchment which includes the towns of Nugent and Runnymede due to the influence of the higher hills extending inland from Cape Bernier which includes Wielangta State Forest.

### *Temperature*

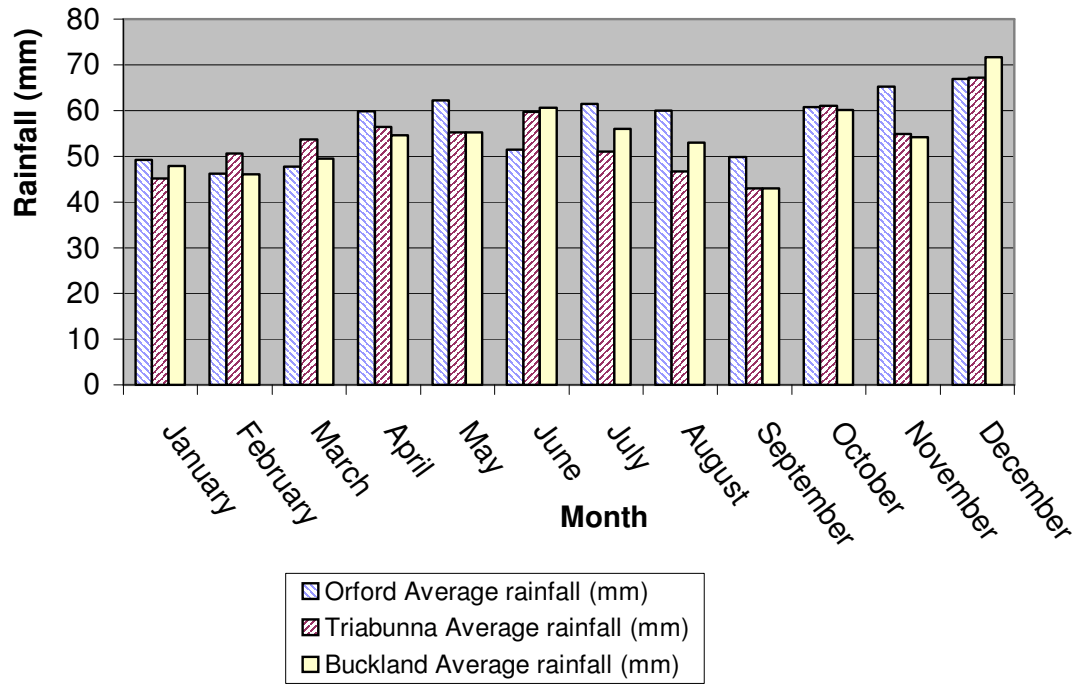
The Bureau of Meteorology maintains records only for Orford for which the record for the period 1951 to 2001 is given in the following table and chart.

**Table: Temperature at Orford 1951 to 2001 (°C)**

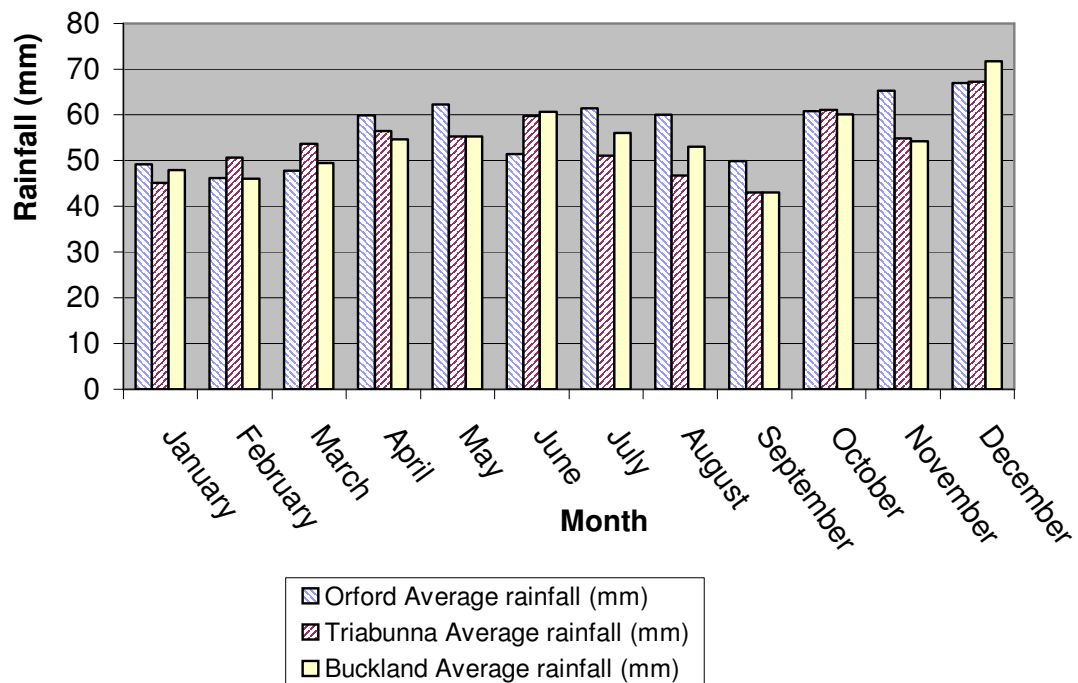
Month	Highest daily max	Average daily max	Average daily min	Lowest daily min
January	38.7	21.9	11.6	3.2
February	38.8	22.1	12	3.3
March	36.2	20.6	10.5	1.1
April	28	18.5	8.3	0
May	25.7	15.8	6.1	-2.1
June	20.5	13.3	4	-5.3
July	19.5	13.1	3.4	-3.3
August	22.6	14	4	-1.8
September	28.4	15.6	5.5	-2.6
October	32.4	17.4	7.1	0
November	35.6	18.6	8.9	0.4
December	37.2	20.3	10.4	3.2
Annual	38.8	17.6	7.7	-5.3

Temperatures further inland in the Catchment have less maritime influence and therefore show greater extremes with a higher incidence of sub-zero temperatures and frosts.

### Chart of Monthly Rainfall



### Chart of Monthly Rainfall





### 1.13 Natural Resources

The Natural resources of the catchment will be discussed in more detail later under “Part 2 Natural Resources”, however a brief overview is given here.

The Catchment has an extensive and varied coastline including the 82 km of coastline on Maria Island. Maria Island provides sheltered waters in Mercury Passage, which together with deep water provides an excellent sheltered harbour in the estuary of Spring Bay.

The geology of the Catchment is predominantly Jurassic (200 to 150 million years ago) dolerite and older (Permian to Triassic, 300 to 200 million years ago) sandstone, siltstone and mudstone. There is an area of older Devonian granite in the south-east corner of Maria Island which is the southern-most occurrence of the pink granite that characterises large parts of Freycinet Peninsula and the Tasmanian east coast. The dolerite is generally intensely jointed and weathers to brown, clayey and rich soils. The sandstone weathers to produce sandy, erosion prone and nutrient poor soils and cliff and cave formations occur, notably along the Bluff and Sand Rivers (Gee 1995). Springs occur along the contact lines between the dolerite and sandstone. Valleys and estuaries contain alluvial soils consisting of sand, clay and silt. The mountains and hills are mainly weathered and frequently exposed dolerite. Sand deposited by the rise in sea level following the end of the last ice has formed beaches, sand bars and lagoons in many places along the coast including the area around the isthmus in Maria Island.

Sand, gravel, dolerite for crushed rock and sandstone for building have all been commercially extracted in the past and continue to be used.

Prior to European settlement the Catchment vegetation was predominantly dry sclerophyll forest and woodland with eucalypt dominant upper canopy. Small areas of treeless heathland, sedgeland and poorly drained flats, and grassy open woodland, were among the first areas cleared for sheep grazing. The floodplain vegetation on the Prosser Plain was dominated by tea-tree (*Leptospermum* spp) and sedge (*Carex* spp) (Goede 1965). There are small areas of wet sclerophyll and rainforest in higher rainfall areas and sheltered gullies.

Much of the native vegetation and waterways of the upper catchment are relatively intact because steeper grades and rocky soil makes it less suited for farming although much forest has been partially cleared for low intensity grazing. Extensive, good quality eucalypt forest remains on private lands and in State Forests. Some of the best representative large and medium sized eucalypt overstory, dry sclerophyll forest was included in reserves as part of the Regional Forests Agreement. This included the Three Thumbs State Reserve (3,120 Ha) in the Wielangta Forest, an extension to the Cape Bernier Nature Reserve (1,522 Ha), and Mt Morrison (732 Ha) and Brown Mountain (652 Ha) Forest Reserves.

Open heathland is now rare, having been extensively developed for agriculture and residential use. Similarly many other plant communities in the Catchment have been severely degraded through agriculture, clearing, fire and disease, including grasslands and certain forest communities. Native vegetation on uncleared private land is generally in reasonable condition, although many plant communities, some containing threatened species, are a high priority for conservation in Tasmania.

The Catchment contains significant well preserved dry sclerophyll forest and good representation of the State’s endemic flora species including Oyster Bay Pine and a total of 15 threatened Tasmanian endemic plants, including Barber’s Gum, Midlands Wattle and Clasp Leaf Heath on Maria Island.

Riparian areas in the Catchment are often the last refuge for native flora and fauna and they have been identified by several studies as containing important native vegetation communities and species. Askey-Doran (1993) recommendations include;

“... preventing the clearance of vegetation, and managing the use of fire and stock in riparian zones.

Policies aimed at protecting riparian zones should not only preserve native flora and fauna but the entire riparian environment providing benefit to the landowner and as well as society in general.

... Buffer zones following the Tasmanian Forest Practices Code (1993) should be retained on land used for forestry, agriculture and urban developments.”

Kirkpatrick *et al.* (1991) identifies the Prosser River at Orford as an important area for the reservation of native plant species.

The Catchment provides habitat for a number of the State’s threatened fauna including one of the three main locations of the Tasmanian Hairstreak butterfly in the Sandspit River Wildlife Sanctuary, Nature Conservation Area around Earlham Lagoon, south of Rheban. The habitat of this threatened butterfly includes silver wattle, black wattle, blackwood and it is known to winter under the bark of white gum (*E. viminalis*)

Other species listed gazetted as threatened and found within the Catchment are the Australian Grayling, Swift Parrot, Wedge-tailed Eagle (Tasmanian sub-species), Broad-toothed stag beetle, Great crested grebe, Little tern and Fairy tern.

The catchment lies on one of the State’s most popular tourist routes and Orford is the southern gateway to the popular recreational areas on the East Coast.

The Triabunna Estuary area has suffered significant degradation yet still supports a large range of marine and bird species.

## **1.14 Cultural Resources**

### **1.14.1 The Community**

#### **Governance**

The catchment falls almost totally within the boundaries of the Glamorgan-Spring Bay Council municipal area. A strip along the southern boundary including Nugent, the Black Hills area and other parts of the Catchment’s State Forests lie within the Sorell Municipality. Runnymede, Levendale and Woodsdale Road on the east and north-east boundary lie within the Southern Midlands Municipality including the State Forest adjacent to Bluff River.

Glamorgan-Spring Bay Council was created in 1994 by the merger of the Glamorgan and Spring Bay Councils. Nine Councilors are elected for a period of 4 years at a General Council election and Council elects the positions of Mayor and Deputy Mayor from their number. Council operates within the Tasmanian Local Government Act 1993 and has direct regulatory control over water, wastewater, land use planning, environmental management, including for industries up to level 1 in scale as defined under the Tasmanian Environmental Management and Pollution Control Act 1994 (EMPCA). Council is also responsible for municipal roads, public health at the local level, and supports communities services such as child-care and aged-care.

#### **Population and Demographics**

The total population of the Prosser catchment is estimated to have been a little less than 2,000 at the 1996 census (ABS, 2001) which includes the towns of Triabunna (population 766) and Orford (460).

Triabunna lies at the head of Spring Bay and is the municipal administrative centre for the Glamorgan-Spring Bay Council.

Orford lies on the east coast at the mouth of the Prosser River on Prosser Bay. and the adjacent coastal holiday areas of Shelly Beach and Spring Beach experience large population increases during holiday periods. Although no studies on the holiday population have been conducted it is believed that the population peaks at approximately 2,200 people. The natural beauty, coastal scenery, and sheltered waters attract visitors to the region, which has been a holiday destination

for Hobartians for well in excess on 100 years. Recreational pursuits include bushwalking, fishing, kayaking, water skiing, sailing, sailboarding, scuba diving and canoeing. The permanent and temporary populations are strongly concentrated on the coast.

East Shelley Beach is within the township of Orford. The area has attracted an increasing number of people to live and holiday with an increasing number of developments. This increased use of the area coupled with lack of active management by Council, who are the land manager, has led to loss of significant remnant vegetation, the proliferation of weeds, erosion and resulting conflict within the local community. A newly formed Coastcare group is undertaking a project that aims to empower the community to work actively with Council to remove weeds, enhance remnant vegetation, consolidate access and prevent erosion, protect heritage features, increase resident awareness of sound coastal management practices and broaden participation in a series of working bees focusing on common ground tasks. The outcome is intended to be a more cohesive and aware community working towards the long term protection of Shelley Beach.

Boltons Beach is relatively remote but popular east coast beach. It attracts surfers, fishers, shack-owners and land-holders on a regular basis and has approximately 12 full-time residents. It has recently been upgraded to Conservation Area status. The area is regarded statewide as one of 12 priority one sites for the protection of shorebirds. The problems in the conservation area include unlawful beach access by four wheel drives and quad motorbikes, dogs roaming free and weed invasion mainly by African Boxthorn.

Attitudinal surveys that indicate that environmental values and issues are of major concern to the growing over-50 population demographic and this evidence is supported by the information obtained through the community consultation process, which is reflected in the values and issues, summarised in Section 1.3 of this Plan.

The change in the over 50 year-old demographic discussed here, is reflected in the values expressed in this Plan and given the economic benefits, should be promoted, within environmentally sustainable limits. Therefore land use and resource management planning will need to take this demographic trend and potential into account.

### **Community Facilities**

There are primary schools at Orford (2002 enrolment 98) and Levendale (33) and a district high school at Triabunna (204). The Prosser House Respite Centre is an aged care and accommodation centres at Orford. There are child care and community health centres and a pharmacy at Triabunna. There is a State library at Orford and a tourist information centre at Triabunna. There is a public tennis court at Triabunna and recreation grounds at Orford and Triabunna.

On the coast there is boat launching access at Raspins Beach at Orford, Shelley Beach, and Triabunna and a slipyard off Freestone Point Road in Spring Bay. There are excellent and very well sheltered yacht moorings in Spring Bay.

Transport to Maria Island is provided by a regular commercial boat service from the Eastcoaster Resort on Louisville Road, Orford to Darlington on the Island.

There are many active community groups including the Triabunna/Orford Region Chamber of Commerce, Spring Bay Farmers Group, Orford Residents and Ratepayers Association, Rotary Club of Spring Bay, Spring Bay Lions Club, Spring Bay Neighbourhood Watch, Probus Club, Glamorgan/Spring Bay Waterwatch, East Shelly Beach Landcare Group, and Spring Bay R.S.L. Sub-Branch at Triabunna.

The coast offers spectacular views of Maria Island from many locations and also has many attractive beaches, picnic sites and approved public camping sites.

Both Triabunna and the main Orford townships are served by town water and sewerage schemes.

Both Triabunna and Orford as far as Shelly Beach are served by town water supplies and wastewater treatment systems which are discussed further in Section 2.8.2.

## Industry

The main industries in the Catchment are agriculture, tourism, fishing and shellfish aquaculture, forestry, and service and light industries. Grazing and some cropping have traditionally dominated agriculture in the Catchment. The colder frost prone Prosser Plains are less suited to cropping however alluvial soils at the mouth of the Sandspit River have recently seen an increase in cropping activity.

Triabunna has for many years been a centre for the forestry and fishing industries based on the neighbouring resources. In the early 1970s the existing woodchipping plant and port facilities were established at Freestone Point on Spring Bay. Triabunna has a district office for Forestry Tasmania and is a centre for the forestry activities in the Catchments State Forests. A plant to produce alginates from seaweed was established on Spring Bay at Louisville Point in 1960s but this was subsequently closed. Fishing and fish processing have been a significant industry centred at Spring Bay since the first European settlement and is now well known as a centre for scallops and abalone. Slipyard, fishing and recreational boat facilities have also operated in Spring Bay for many years and continue to provide employment.

A call centre was established at Triabunna in xxx and currently employs approximately xxx people. Triabunna's location on the best natural harbour on Tasmania's east coast with good port, transport and other services, offers good potential to attract further industry.

The Maria Island National Park attracts a regular flow of Tasmanian, interstate and international tourists and has particular appeal to groups and nature based tourists. The State Parks and Wildlife Service has rangers located on Maria Island but it has no commercial activities or services. Maria Island's rich history and natural values provide good potential for sensitive tourist development with particular attraction for retreats for business, academic, scientific and arts groups.

There is a range of tourism businesses including accommodation from resort to backpacker, cabin and caravan park standard and several restaurants and other food establishments. There is also some adventure and nature based tourism businesses.

### 1.14.2 Aboriginal Heritage and Culture

There is evidence that Aboriginal people lived in Tasmania from at least 37,000 years ago (P&WS 2000). They were hunters and gatherers who depended on the natural resources of the land and coastal marine environment for food, clothing, utensils, weapons, ornamentation, and shelter.

The Oyster Bay Tribe of the Tasmanian Aboriginal people ranged over a wide area. In 1831 G.A. Robinson recorded that "... huts were erected all along the banks of the (Prosser) river." (Plomley, 1996). It is believed that Aboriginal people wintered on the east coast, making use of seasonal availability of different wildlife and their eggs, such as the short tailed shearwater (*Puffinus tenuirostris*, frequently known as mutton-birds), and in lagoon and riverine areas, black swan (*Cygnus atratus*) and duck (*Anas* spp.). They also fed extensively on shellfish and marine life including marine vegetables. Women gathered abalone (*Notobaliothus*), rock lobsters (*Jasus edwardii*), *Turbo undulata*, mussels (*Mytilus edulis planulatus* and *Brachyodontes rostratum*) and oysters (*Ostrea angasi*). The evidence from the contents of Aboriginal middens distributed abundantly today along the eastern coast of Tasmania is that seafood comprised a significant part of the diet of many Aboriginal tribes, for much of the year. The bones, mainly of fur seals (*Arctocephalus pusillus doriferus* and *A. forsteri doriferus*) and elephant seals (*Mirounga leonina macquariensis*), but also of dolphins (*Delphinus delphis*), have been found in Tasmanian middens.

At the end of August the bands would progressively move inland, joining other bands into the Midlands. Aboriginal people hunted and ate many native animals including Bennett's wallaby (*Macropus rufogriseus rufogriseus*), Forester kangaroo (*Macropus giganteus tasmaniensis*), young thylacine

(*Thylacinus cynocephalus*), pademelon (*Thylogale billardieri*), wombat (*Vombatus ursinus tasmaniensis*) and echidnas (*Tachyglossus aculeatus setosus*) (Plomley, 1966).

Aboriginal people used many native plants and animals of eastern Tasmania (Plomley 1966, Jones 1988), including young shoots of the grass tree (*Xanthorrhoea*), which were pulverised before being eaten, plants of coastal heathlands including the fruits of native cranberry (*Astroloma humifusum*) and underground parts of bracken (*Pteridium esculentum*) (Kirkpatrick & Harris 1999). Thin stems of paper bark and tea-tree (*Melaleuca* and *Leptospermum*) were used to make spears. Wooden hunting clubs and wooden wedges, used to dislodge abalone and other shellfish, would have been made from hardwood trees, such as native olive (*Notelaea ligustrina*) or *Eucalyptus*. Huts and wind-breaks were made from interlaced branches and fibrous stringy-bark (*Eucalyptus obliqua*). Finely woven baskets were made from various species of reeds and rushes (including *Juncus* spp.). Broad strands of bull-kelp (*Durvillea antarctica*) were cut into circular pieces to make water carriers, with handles made from sticks and string.

The Aboriginal people used fire to modify the landscape and vegetation to suit their seasonal migration and hunting needs. Burning is believed to have played a significant role in maintaining open grasslands and grassy woodlands in many areas, and in maintained large areas of habitat for Bennett's wallaby and Forester kangaroo. Fire was also an important part of Aboriginal ritual for the dead (Brown, 2000). The Aboriginal people used bark canoes for sea travel and were well established on Maria Island at the time of European exploration.

There is an abundance of Aboriginal heritage including shell middens, rock quarries, rock shelters and stone artifacts, typically located behind beaches, beside estuaries, along cliffs and rocky coastal areas.

All sites containing evidence of Aboriginal occupation or use are protected by the *Aboriginal Relics Act 1995* and it is an offence to disturb any such site without the written permission of the Minister. The Aboriginal Heritage Unit of DPIWE should be contacted prior to undertaking works that may disturb Aboriginal Heritage sites.

### **1.14.3 European Heritage**

Three years later the French explorer, Nicholas Baudin, spent five days investigating the island. The diversity of these early explorers is summed up by the variety of names given to the coastline - everything from Ile du Nord to Chinaman's Bay, Mistaken Cape and Cape Boulanger.

The earliest known European knowledge of the area dates from December 1642 when Dutch explorer Abel Tasman named Maria Island after the wife of his patron Anthony Van Diemen, the Governor-in-Chief of the Dutch East India Company in Batavia.

Englishman Captain John Cox anchored at Shoal Bay and set foot on Maria Island in 1789, where he made contact with the local Aborigines. In February 1802, French explorer Nicolas Baudin's two ships moored in Oyster Bay (now Shoal Bay) on the west coast of Maria Island for 10 days, from where this scientific voyage undertook extensive charting, drawing and scientific collection and study of the area from Freycinet Peninsula to Blackman Bay. Many of the present coastal names in the area date from this voyage, including Cape Peron, Cape Maurouard, Point Lesueur and Isle du Nord on Maria Island and Cape Bernier, Point des Gallets and Cape Bougainville on the Tasmanian east coast. Baudin's two ships carried a strong contingent of scientists who made extensive, friendly contact with the Tasmanian Aboriginal people. Following a long illness from dysentery, René Maugé died during this stay and was buried at the point that bears his name today. He is believed to be the first European buried in Tasmania.

European settlement commenced in the early nineteenth century when whalers and sealers plundered the local seal population and exploited the Aborigines. By the mid-1820s there were four whaling stations operating along the coast.

In 1825 a penal colony was established at Darlington on Maria Island with 50 convicts but closed in 1832 after the prison at Port Arthur was established. The Commissariat Store and the

Penitentiary still stand at Darlington from this period. The Commandant of Darlington penal settlement in this period, Major Thomas Lord established a property at Okehampton and established a signal station in order to communicate with his officers on the Island.

In 1842 Darlington was reopened as a penal colony, a second convict station was established at Point Lesueur and over 800 convicts arrived on the Island and an extensive building program ensued. This second settlement was also short-lived and was abandoned in 1851 after which a few farmers arrived to take advantage of good sheep pastures and the mild climate. By 1860 European farming settlement was sufficiently established for Spring Bay to be declared a municipality. The local Council chambers were built in 1862.

The district around Buckland, originally known as Prosser Plains, was settled in the 1820s. In 1841 a probation station for new convicts was established and between 1842 and 1847 the convict road from Triabunna on the north side of the Prosser River built. In 1846 Governor Franklin named the settlement after William Buckland, Dean of Westminster from 1845 to 1856 who was a noted geologist, having been appointed Professor of Mineralogy at Oxford University in 1813 and who had tried to reconcile geology with the Bible. St John the Baptist Anglican Church was built in Buckland in 1846 with a particularly historic stained glass east window believed to date from the fourteenth century. The Buckland Hotel was licensed in 1845. In 1855 the last probation station in the area was closed with the end of convict transportation to Tasmania.

Access to Triabunna from Hobart was generally by boat until the 1840s as the overland route was served only by a rough track with river fords (Gee 1995) and would have been unsuited to the transport of goods and produce. Between 1870 to 1890 a sandstone quarry operated between Shelly Beach and Spring Beach from which stone was exported including that used for Melbourne's Law Courts.

St Marys Anglican Church in Triabunna was built in 1880 represented the increasing importance of the town as a rural service centre.

In 1884, Italian silk merchant Diego Bernacchi leased all of Maria Island with the dream to turn the Island into a Mediterranean paradise. He planted 50 000 grape vines, produced wine, built the 30-room Grand Hotel and the Coffee Palace (which still stands) and attracted a State school, general store, butcher and baker to the Island. The project was abandoned around 1895, but Bernacchi returned in 1920 to build a pier and railway line to manufacture cement. By 1930 the cement works had been abandoned and sheep farming once again assumed economic preeminence. In 1972 the whole island became a National Park.

The effect of European settlement was the rapid destruction of the Aboriginal culture of the time through force of arms, disease and the loss of Aboriginal habitation.

There are a number of European heritage properties of in the catchment listed by the Tasmanian Heritage Council of which the more significant are listed in Appendix 3.

### **1.15 Threats to the Catchment's Natural Resources**

Through the catchment management planning process, including Landcare project planning and community consultation work done to date, the major threats to the natural resources, productivity and amenity of the catchment have been identified by the community. These are; weeds, degraded water quality, loss of natural vegetation, riparian erosion, degradation of riparian vegetation and degradation of coastal vegetation and amenity from human impact. There is also an emerging threat of soil salinity. These issues are discussed in more detail in Part 3.

It is evident that there will be competing interests and priorities among the community regarding natural resource management, particularly over riverbank and coastal activities, land use and vegetation management issues. Strategic natural resource management planning led by Council and the Landcare Committee and involving other community groups such as Waterwatch,

Coastcare provides the opportunity to build community cohesion, avoid conflict and overcome inaction.

This Plan is intended to assist by providing information on natural and cultural resources and by identifying and promoting agreed strategic planning and management actions.

## **1.16 Community Natural Resource Organisations**

### **Landcare**

Landcare is a national environment program, funded through NHT and operating in partnership with state and local governments. Landcare is project based and aims to improve the agricultural and environmental values of the land through protection and restoration programs.

The East Coast Primary Producers Association initiated Landcare projects in 1994. Glamorgan-Spring Bay Landcare Committee was formed as a sub-committee of Glamorgan-Spring Bay Council in 1995 and employs a full-time Landcare Coordinator. Projects associated with improving sustainable land use, such as weed control, revegetation, fencing for vegetation reserves, erosion control and river rehabilitation have been undertaken in the Catchment since 1995.

### **Waterwatch**

Waterwatch Tasmania is part of the nation-wide Waterwatch network that was established in 1993. Waterwatch is a network of trained coordinators that bring people together to monitor, restore and protect Australia's waterways for current and future generations.

The Glamorgan-Spring Bay Landcare Management Committee initiated and manages a Waterwatch Program Group and has a Waterwatch coordinator based in Swansea covering the entire municipality. The Group has several ongoing projects involving schools and the community.

### **Coastcare**

Coastcare is a national environment program aimed at protecting and caring for coasts and oceans, which funds activities to protect and rehabilitate dunes, estuaries, wetlands and marine areas. Coastcare is a program of the Commonwealth Government through NHT, operating in partnership with State and Local Governments. Coastcare also has an important community education role.

A North-East Tasmania Coastcare Coordinator provides support and facilitation for groups active with the Catchment. Through the Coastal and Marine Planning Program, managed by the National Oceans Office in Hobart, the *Action Plan for Marine and Coastal Management in east and north-east Tasmania* was developed in 2000 (Buchhorn, 2001) with support from the Dorset, Break O'Day and Glamorgan-Spring Bay Councils and DPIWE. This Plan provides a thorough and action focussed plan for the coast in these Municipalities.

The 2002 Coastcare Festival was held near Swansea in February 2002 from which many outcomes were achieved as well as a valuable sharing of ideas and experience.

### **Bushcare**

Bushcare is a national environment program by the Commonwealth Government operating through NHT in partnership with State and Local Governments, industry and the community. Bushcare aims to conserve biodiversity outside national parks and reserves through projects that protect existing native bushland, increase native vegetation plantings and increase the use of native vegetation in farming.

## PART 2 NATURAL RESOURCES AND NATURAL RESOURCE MANAGEMENT ISSUES

### 2.1 Introduction

In this Part of the Plan the natural resources are given a basic description, of sufficient detail to identify critical components and their interrelationships with other natural and cultural resources and with community values. These are then analysed for the issues that arise and the resulting actions that can be taken, areas of concern, or issues requiring further research, analysis or assessment.

The natural resources of the catchment attracted Aboriginal and European settlement to the area and are today recognised as having strong environmental, economic and social values which need to be well understood in order to be well managed. Natural resources are the foundation on which a huge range of economic, social and environmental services are provided and most of these are not given a value in the traditional economic sense. That is, they provide environmental and social benefits (goods and services) which are uncosted and not financially paid for.

It is not just the description of the components of natural resources that describes a region, but the combinations of these that give unique values to regions and can define micro-regions. Physiography is the description of the combined natural resources from the four major groupings of topography (landforms rivers etc), geology and soil, climate, and flora and fauna (the living resources). There are several examples of combinations of natural resources in the catchment giving a unique physiography. Vineyards and orchards are good examples of industries that rely on a specific physiography by taking advantage of climate, aspect, soil, water availability and water storage sites. Similarly fishing is an example of an industry that is dependent on complex and poorly understood or researched ecosystem relationships where sustainability of the industry depends upon river and estuarine aquatic ecosystems.

Within a catchment ecosystem there are more critical parts such as riparian, coastal and estuarine areas where there is an interface between land and water resources which performs a more critical ecosystem role. These are also the areas that are more vulnerable to human degradation due to their particular value to people such as for residential, agricultural or recreational uses. For these reasons, particular attention is paid to these interface areas in this Plan.

When the objective of a successful natural resource management strategy that allows sustainable development of natural resources to meet the community's needs is achieved, the major issue for the community will be how and when to limit population growth.

### 2.2 Methodology of Analysis

The methodology used in this Plan is essentially an assessment of all natural resources for their contribution to meeting the community's values. For ease of analysis and in order to identify priorities, three broad headings are used for the values held by the community. These are:

***Social value:*** ability to meet the needs of the community for social amenity, which includes cultural, recreational, and aesthetic, at all levels of society, from the individual through to the community level. This includes for example; the value of clean and reliable domestic water supplies, clean beaches for swimming and other recreation, clean air, clubs and community groups, democratic government, education and health services.

***Economic value:*** ability to meet the needs of the community to have the overall and sustainable prosperity of the region increase, with an increase in employment opportunities through economic growth. For example the community recognises the high economic value of the aquaculture and wild fishing industries, and therefore the value of the natural resources, e.g. clean water on which they depend. Economic value could be regarded as a subset of social value, as indeed could environmental value, at least in part. However economic value is recognised



separately because sustainable economic growth is a tool by which desired social and environmental outcomes can be achieved.

***Environmental value:*** ability to sustain the Catchment's ecosystem for its own intrinsic value or worth and also in recognition of the ecosystem's fundamental relationship to natural resources and hence to meet the needs of the community for sustainable natural resources.

By using this methodology the value of a natural resource can be more easily identified and the hence the means to protect that value identified. The methodology also allows the merits and risks of a given proposal to be identified.

For example re-using wastewater has an economic cost which can be compared with the economic value of the wastewater, the environmental value of removing the environmental degrading discharge to an estuary, plus the social value of improved recreation water risk and ecosystem sustainability.

## **2.3 Geology**

### **2.3.1 General**

The geology of the Catchment is predominantly Jurassic (200 to 150 million years ago) dolerite, which intruded into older Parmeener supergroup (Permian to Triassic, 300 to 200 million years ago) sedimentary sandstone, siltstone and mudstone. The intrusion of the igneous dolerite in Tasmania occurred about 6165 million years ago with the break up of the Gondwana supercontinent (Davies 1988).

There is an area of older Devonian granite in the south-east corner of Maria Island which is the southern-most occurrence of this pink granite that characterises large parts of Freycinet Peninsula and the Tasmanian east coast.

The hills on the north-eastern boundary of the Catchment can be regarded as the southern boundary of the State's Eastern Tiers. The mountains and hills are mainly weathered dolerite with frequently exposed rock. The dolerite is generally intensely jointed. Springs occur along the contact lines between the dolerite and sandstone.

The Parmeener sedimentary rock extends from the lower Brushy Plains and Tea Tree Rivulets in a band northward to the upper catchment of the Sand and Bluff Rivers and west to occur in parts of the upper Prosser River. This rock type also occurs in areas of the upper catchments of Brushy Plains Rivulet and Sandspit River and in the coastal areas around Orford and Triabunna from Stapleton Point to Flensers Point/Okehampton Bay. The Parmeener sedimentary rock consists of almost horizontal sediments containing sandstone, siltstone, mudstone and some carbonaceous shale, coal and marine deposits including marine fossils. In many places the sandstone has weathered to produce cliff and cave formations, notably along the Bluff and Sand Rivers (Gee 1995).

Quaternary (Recent Era) alluvial sediments with sand, gravels, mud and sandstone occur in the Prosser Plains in the mid Prosser catchment, the head of Spring Bay, the area from Rostrevor Lagoon north of Triabunna to the lower and mid catchment of Eighty Acre Creek, the mouth of Sandspit River and the isthmus and west coast of north Maria Island.

Sand deposited since the rise in sea level following the end of the last ice has formed beaches, sand bars and lagoons in many places along the coast including at the mouth of Sandspit River and the isthmus on Maria Island.

Sand, gravel, dolerite for crushed rock and sandstone for building have all been commercially extracted from various areas in the Catchment in the past and continue to be used.

### 2.3.2 Geological Heritage Features

The Tasmanian Geoconservation database records eight sites in the Catchment with geological features of significance which are recorded in the Register of the National Estate. These are given in Appendix 4.

The major features include the following.

- Bluff River Sandstone Cliffs/Caves Complex including speleothems and weathering features,
- Sand River sandstone cliffs/caves complex
- Sandspit Creek sandstone cliffs/caves complex
- Hellfire Bluff uplifted marine cliff, block slide and topple
- Wielangta Slump landform complex
- Rheban Beach - Earlam Lagoon; spit, lagoon and saltmarsh

The management notes on the Geoconservation database indicate that these geological features are vulnerable to mechanical impacts of various sorts, including excavation and vehicle disturbance. Delicate weathering features and stalactites are vulnerable to vandalism, souvenir hunters and inadvertent damage from recreational visitors.

It is also noted that speleothems are likely to be dependant on groundwater chemistry, which may be affected by vegetation clearance adjacent to the gorge. The speleothems are best protected by protecting the gorge as a whole, including an intact soil and vegetation buffer on the gorge rim to maintain natural groundwater chemistry.

## 2.4 Groundwater

The State Government agency, Mineral Resources Tasmania (MRT), does not rate the prospectivity of the Catchment for major groundwater resources as high. Dolerite has approximately 50% chance of producing usable quantities of water and where fracturing is intense, irrigation quantities are possible. Triassic sedimentary rocks have a higher success rate (Thompson 1996). Because the dolerite is generally intensely jointed and because springs occur along the contact lines between the dolerite and sandstone, groundwater resources are believed to offer significant further potential.

To date groundwater bores have been used to a limited extent by farmers within the Catchment.

There have been no significant studies, monitoring or assessment of the Catchment's groundwater resource to date. The Groundwater away from the coast may be an important source of water for streams and therefore any further major exploitation of this resource should first be well researched and investigated.

The current lack of study of groundwater in the Catchment could be initially addressed by the identification and referral of research proposals to MRT and research institutions.

## 2.5 Soils

### 2.5.1 Introduction

The soils in the Catchment are generally not regarded as high quality soils and this has tended to limit the extent of irrigated grazing, cropping and horticulture. The Catchment's dolerite weathers to give brown, clayey and rich soils which are generally shallow and rocky. The mountains and hills have predominantly rocky soils with frequently exposed dolerite. The Catchment's sandstone weathers to produce sandy, erosion prone and nutrient poor soils. Valleys and estuaries contain alluvial soils consisting of sand, clay and silt. Alluvial and sandy soils occur in the lower Eighty Acre Creek catchment, north of Spring Bay, around Sandspit River estuary, Prosser Plains, and in coastal areas including the isthmus and areas north thereof on Maria Island. The alluvial soils of the Prosser Plains have the most suitable land for more intensive farming, however the colder frost prone climate has been a limiting factor.

Soil quality is essential for agriculture, and avoiding erosion and retaining soil stability is essential for agriculture, forestry and conservation. Accordingly good land management practices are vital for long term agricultural prosperity. The recent introduction of more intensive irrigated cropping in the Catchment will place increased pressure on soil structure and increase the risk of soil erosion.

### 2.5.2 Soil Assessment

The assessment processes that are readily available at present in Tasmania to assess soil and land degradation risk assessment are as follows.

- Land systems surveys (Davies, 1988) provide broad scale documentation of physical, and biological resources for specific areas of land. They group, map and describe areas of land with similar geology, topography, soils, vegetation and rainfall and thereby providing the information for better land use, planning and management. Land systems surveys have been completed and mapped for the State, however the limitation is the very broad scale of the survey.
- In the assessment of risk for soil and land degradation, known contributory factors can be used to predict potential risk from erosion, soil structure decline, tree decline and salinity. Gully and tunnel erosion, mass movement and salinity can also be estimated from visual evidence in the field (Grice, 1995).
- Land Capability Assessment is an interpretive system for evaluating a range of resource information. Land capability assessment identifies limitations such as soil and geology. Land suitability assessment identifies the crops and other uses that the land is most suited for. There is significant benefit for farmers to conduct land capability and suitability assessments for their farmland as the information can be used for detailed and long term farm soil management and land use planning.

Erosion, salinity and tree decline hazards as reported by Grice (1995), and subsequently updated by DPIWE Land Management Branch, are rated as nil to minor for all land except as indicated in the following table and the attached catchment maps.

It is important in using this information to recognise the limitation that these are state-wide and broad scale assessments of soil risk and do not show localised, farm level risks.

Sheet and Rill Soil Erosion Map

### **2.5.3 Soil Erosion**

There are several sources of soil erosion risk in the Catchment. These include river bank, gully and sheet erosion. Sheet erosion is the transport of a uniform layer of soil by rainfall and rill erosion arises on recently disturbed soils where numerous small channels are formed. Sheet and rill erosion arise when non or poorly vegetated soil is subject to significant surface water flows which readily transport the surface soil particles.

Gully erosion is the formation of channels that periodically carry water and can easily grow in width and depth. Gully erosion includes stream and river bank erosion. Flood prone areas and hilly areas that have been devegetated are particularly susceptible to this type of water erosion.

Mass movement is the downhill slumping of soil and rock and includes soil creep and, in minor form, the small terraces created by livestock traversing steep slopes.

Tunnel erosion is the transport of sub-surface soil by water while surface soil remains relatively intact leading to tunnels which may eventually collapse forming potholes or gullies.

### **2.5.4 Soil Salinity**

Salinity problems arise from changes in the hydrology of the land resulting from changes in land use such as clearing of natural vegetation and irrigation. Salinity has not arisen as a major current problem in the catchment, however with increased agricultural demands on the more productive alluvial land a significant risk emerges. DPIWE have produced a broad scale map of salinity risk for the catchment and this map is attached. For properties with moderate salinity risk indicated or concerns about salinity risk, it is advised that detailed assessment be conducted at a more detailed scale using specialist services such as electromagnetic induction (EM) surveys. A Salinity Containment Risk Assessment Monitoring and Management (SCRAMM) process has been established by Southern Farming Systems in conjunction with DPIWE and specialist agricultural consultants can provide support for salinity assessment. Mineral Resources Tasmania (MRT) resources for field assessments is very limited however they are participating in ground water monitoring with a test bore on a property in the alluvial area of the Swan River and should be consulted for specialist advice. The NSW Government *Salt Action* program provides more information on the use of EM which is available on the Salt Action website.

### **2.5.5 Soil Sodicity**

Sodicity is a problem with soil structure that arises when the ratio of sodium ions to magnesium and calcium ions, known as Sodium Adsorption Ratio (SAR), becomes excessive. It is frequently caused by excessive irrigation and is indicated by water-logging and loss of soil structure.

### **2.5.6 Tree Decline**

Tree decline is the sudden or gradual death of trees and is most common on agricultural land and in low rainfall areas. The cause or causes are not known however factors appear to be defoliation by insects or possums, damage to root systems by cultivation or compaction by stock and micro-climate change due to the removal of surrounding trees.

## Gully Soil Erosion Map

### 2.5.7 Soil Risk Assessment

Based on the work by Grice (1995) the enclosed maps have been produced by DPIWE and the following table gives a summary.

**Table of Soil Risk Assessment from Grice (1995)**

Hazard type	Hazard Class	Areas
Sheet and rill erosion	Class 2; Moderate	A large proportion of the cleared land in the Catchment excluding much of the flats and marshlands.
Gully erosion	Class 2: Minor	Throughout the mid and lower elevations of the Catchment where vegetation has been significantly cleared
	Class 3 Moderate	North-east of the Catchment in the area of Murphys, Tin Pot and Rayners Marshes
	Class 4 Severe	The alluvial soil on the Prosser Plains, Twamley Flats, Gatehouse Marsh, Back River and around Runnymede.
Tunnel erosion	Class 2 Minor	Parts in eastern and north-eastern areas around Levendale and Woodsdale.
Mass movement	Class 3	A small area surrounding Nugent
Soil structure decline (Sodicity)	Class 1 Nil to Minor	Most of the Catchment
Tree decline	Class 1 Nil to Minor	All areas assessed that were not Class 2
	Class 2 Moderate	A majority of the Catchment area that was assessed.
Salinity		Nil reported in Grice (1995)

**Note:** Erosion hazard ratings are to the following scales:

Sheet and rill:	Class 1 Nil to Minor, Class 2 Moderate, up to Class 5 Extreme
Gully:	Class 1 Nil, Class 2 Minor, Class 3 Moderate, Class 4 Severe
Tunnel:	Class 1 Nil, Class 2 Minor, tunnels less than 1m depth, Class 3 Severe, tunnels greater than 1m depth
Mass movement:	Class 1 Nil, Class 2 Minor terracing only, Class 3 mass movements
Soil structure decline:	Class 1 Nil, Class 2 Moderate, Class 3 Severe
Tree Decline:	Class 0 No assessment possible, Class 1 Nil to Minor, Class 2 Moderate, 10-40% of branches are dead within the tree's canopy, Class 3 Severe, Class 4 Extreme
Salinity	Class 1 Nil, Class 2 Moderate, Class 3 Severe

*Land Systems of Tasmania: Region 6 South, East and Midlands* (Davies 1988) gives land types and specific locations from which significant soil risk has been identified. The land system description used is based on zones according to geology, rainfall and elevation; each zone being further divided with land system codes and associated names, according to more locational detail and other factors. The description given here is directly extracted from Davies and is only edited or abbreviated.

An abbreviated summary as it relates to soils risk is given below. Mapping and greater description of the zones, including vegetation, is given in the report (Davies 1988).

All Land Zones are low rainfall (<750mm). It should be noted that the Catchment's sandstone weathers to produce sandy and nutrient poor soils, which are the most erosion prone.

Land Zone	Landforms	Location	Geology	Soil Risks
B	Sand dunes, spits & associated landforms	Rheban and the isthmus area on Maria Island	Tertiary	Prone to wave and wind erosion, and flooding and waterlogging of wetlands and coastal lagoons.
D1	Dolerite hills	Extensive area of rugged dolerite hills & associated flats throughout the Eastern Tiers from east of Campbell Town to Triabunna & most of coast from Stapleton Point to Cape Bernier, near Nugent, Buckland, Runnymede, Levendale & Orford.	Dolerite	Erosion hazards are rated low. Streambank erosion, flooding & waterlogging are problems on drainage flats. Land degradation & erosion risk also from vehicular traffic and recreation in coastal areas. Sheet, rill & gully erosion sometimes occurs on crests & slopes following major disturbance.
I1	Hilly	Rostrevor around and north of Triabunna Levendale. North of Runnymede towards Parattah including Levendale and Woodsdale.	Parmeener sandstone, siltstone and mudstone.	Particularly prone to sheet, rill gully & streambank erosion and flooding & waterlogging on drainage lines & flats. Tunnel erosion on slopes & flats.
P	Undulating plains and flats	Twamley Flat. Plains east of Buckland. Flats at Runnymede	Tertiary	Sandy crests & flats are particularly prone to sheet & rill erosion. Flooding, waterlogging & severe gully & streambank erosion on flats.
S1	Rolling sandstone hills	Moreys Hill. Rolling hills and sandy flats between Triabunna and Okehampton Bay, Buckland district and around Orford, Sandspit River and Rheban	Triassic Sandstone	Particularly prone to sheet, rill gully & streambank erosion and flooding & waterlogging on drainage lines & flats. Tunnel erosion on slopes & flats. Great care is needed if land is to be cleared during heavy spring and summer rains.



## Soil Salinity Map

## **2.5.8 Soil Management**

### **Soil Management Plans**

Good soil management must start from good quality knowledge and understanding of the soils of the Catchment at the local level. From the erosion and salinity risk assessment work done by DPIWE at the broad catchment level, areas of greatest risk can be identified for further study, involving on-ground risk assessment and specialist surveys. This can provide information on which catchment or regional soil management plans can be prepared. Such plans would provide a platform of knowledge on which it is easier for landowners to prepare farm soil management plans. As more information is aggregated from property level to local or regional level then the total knowledge base expands rapidly. On-going monitoring is essential component of soil management plans.

It is essential to also recognise that in the long-term good quality soil management is essential if there is to be a legacy of a valuable soil resource for future generations and that it provides regional promotion benefits for the entire community.

### **Soil Management Incentives**

Focussed community and landowner education, particularly in combination with incentives, is the most efficient and effective method to achieve sustainable natural resource management.

In areas identified as potentially at risk, incentives for landowners to adopt soil farm management plans can be an important and sometimes necessary component of regional soil risk management. This may include an environmental management system (EMS) certification to the proposed national standard, or rates and land tax rebates. It must be recognised that where soil is identified as at risk, change of land use may be required which generally would involve loss of financial return in the immediate future for a long term and often general community benefit. It could become accepted practice for soil management that financial and other incentives are applied, in the same way that threatened species have been protected through the conservation covenant system in place in Tasmania.

Facilitating and coordinating the resources of government agencies (DPIWE), agricultural specialists and the community to undertake the regional soil risk assessments and soil plans is the role of the Landcare Management Committee or subsequent representative catchment management committees of the future. Such facilitation and coordination is designed to harness the extensive and high quality scientific and specialist skills in DPIWE and the community, into providing useful and focussed regional information and expertise. This facilitation and coordination role must be provided with ongoing funding and local government commitment, regardless of the funding provided through NHT and similar sources.

### **Soil Management Practices**

Good farm management practice, including the use of vegetation and appropriate land use, can substantially reduce the risk of erosion. Good farm practice can include;

- Avoiding over-grazing and over-irrigation
- Maintaining a good cover of vegetation whether pasture, grass, crops or natural vegetation
- Revegetating areas identified as groundwater recharge areas
- Fencing off bare or salt-scalded areas from stock access
- Planting such areas with salt tolerant pasture species and salt bush
- Monitoring ground water and surface soil salinity levels
- Regularly testing irrigation water quality

## **2.6 Riparian Land**

### **2.6.1 Introduction**

The linear corridor of the riparian zone is complex and dynamic in nature (Daley 2002). Riparian land requires particularly careful management because of its critical role as one of the major interfaces of natural ecosystems between land and fresh water. Riparian vegetation has a very high value through its critical role in performing essential environmental, social and economic functions.

In the Prosser Catchment due to significant intense farming and residential use of riparian areas and the generally low Catchment rainfall, good management of riparian areas is particularly important. The central basin of the Prosser River and its tributaries and the lower catchment of the Sandspit River have been used for agriculture for over 150 years and the riparian zones have been extensively cleared of natural vegetation, usually to the river's edge, with frequent periods of intensive grazing and cropping. For most of the Catchment, undisturbed natural vegetation remains in only a small proportion of the riparian areas.

The rivers in the catchment are characterised by relatively short duration flow peaks due to the short river lengths and some steep grades. The flow rates of the rivers vary considerably during the year. The Prosser Plain is subject to periods of flooding as occurred in 1916, 1929 and 1960. These and lesser floods cut access across the Prosser Plain for up to three weeks. Periods of low or nil flow typically occur every year. The catchment is in a rain shadow from the prevailing westerly winds and the rainfall is fairly evenly distributed over the year. Spring and autumn peaks arise when changeable weather patterns bring easterly winds (P&WS 1999).

Widespread clearing of vegetation and intensive farming of riparian land increases surface run-off in times of heavy rain and dramatically increases the risk of soil erosion, and nutrient and pesticide run-off to rivers. The removal of natural vegetation has led to the opportunity for invasive weed infestation particularly gorse and willow. It has also increased the incidence and the risk of riverbank erosion and the sediment load into the rivers.

The upper catchment has been subject to only limited clearing associated with forestry and grazing activity and as a result the headwater and gorge sections of the rivers are relatively intact and the riparian vegetation is generally continuous. The steep and inaccessible nature of the upper catchments has served to protect these reaches from human induced changes, developments and disturbances.

Much of upper and mid catchment areas that are not suited to more intensive grazing have been significantly cleared of native vegetation to increase stocking rates or selectively logged. Significant removal of riparian vegetation and stock access to streams has contributed to weed infestation and some stream bank erosion.

### **2.6.2 Benefits of Good Riparian Management**

1. Protecting remaining native riparian vegetation and restoring degraded native riparian vegetation gives an enhancement of catchment values and numerous specific benefits including the following.
  - i. Riparian vegetation traps soil and nutrients giving improved water quality and in-stream habitat and ecosystem health. Natural vegetation and grass filter strips can trap about 90% of sediment flowing from upslope (Land and Water Resources 1996b).
  - ii. Good quality natural riparian vegetation is well recognised as a successful technique for rehabilitation of streambank and water quality degradation.

- iii. A wide riparian zone accommodates the natural dynamics and behaviour of a river system.
  - iv. Riparian areas with healthy vegetation and natural levels of woody debris help to protect and repair river systems.
  - v. Riparian areas with healthy natural vegetation provide a more secure habitat for native flora and fauna. Riparian corridors linked to each other and to adjacent natural forests and woodlands provide links for the spread of plant and animal species and results in increased abundance and diversity of species and substantially improved ecosystem health.
  - vi. Natural vegetation provides a habitat for insect predators such as birds that help to naturally protect crops and pasture.
  - vii. Vegetated riparian land can provide windbreaks that reduce soil drying from winds and provide shelter for stock.
  - viii. Riparian trees and vegetation reduces the influence of sunlight and temperature in summer, which significantly reduces the risk of toxic algae growth.
  - ix. A farm landscape with weed free natural riparian vegetation gives a higher land capital valuation.
  - x. Deep-rooted vegetation lowers the water table and thereby reduces the risk of salt and nutrient rise into sub-surface flows which can affect stream water quality.
2. The exclusion of stock from riverbanks dramatically reduces the contamination of river water with faecal bacteria and algae and improves the quality of water for stock watering and town and household use.
  3. The loss of productive use of land set aside for riparian vegetation can be more than compensated by increased productivity from the retained pasture and croplands. Combined riparian vegetation supplemented with adjacent land for agroforestry offers the opportunity for establishing commercial value while protecting riverbanks and floodlands from high intensity, water-flow peaks.
  4. Linked natural vegetation areas substantially improve the scenic landscape values with consequent benefit to residents' and visitors' aesthetic pleasure and provide a strong sense of good management, focussed on the harmonious integration of natural processes and introduced activities.

### **2.6.3 Riparian Land Management Practice**

Good riparian land management involves the following practices.

1. Preserving existing riparian vegetation and restore degraded riparian areas including fencing of a riparian strip of at least 10 meters width, but preferably 20 meters or as indicated by the site situation, to provide protection of native vegetation from grazing. Many sites protected from stock grazing have the capacity to naturally regenerate due to an abundant upstream or an immediate seed source and therefore planting tubestock may not be required.
2. Controlling riparian weeds, with a focus on gorse and any remaining willows, and replacing weeds with native vegetation. Avoid root disturbance during removal of riparian gorse or other weeds, as disturbance of the soil surface is likely to result in the loss of surface strength and increased soil erosion, increased water turbidity and further weed invasion. Instead a "cut and paint"<sup>1</sup> technique should be used, directly followed by a program of

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<sup>1</sup> "Cut and paint" describes the method of cutting the plant close as possible to the base and immediately applying herbicide directly to the cut.

active revegetation of natives species and on-going weed maintenance. Where herbicide spraying of weeds is undertaken, use only those herbicides that are registered for use along streams and follow the guidelines for appropriate application methods. Whilst gorse provides a certain level of bank protection, it is not a desirable long-term species for sustainable and healthy waterways.

3. Preventing stock access to the main rivers and tributaries with the provision of off-stream stock watering as required.
4. Establishment of riparian buffer zones of sufficient width to filter nutrients and sediments from rivers and provide riparian land stability.
5. Burning for any reason along streams is not recommended, as riparian zones are fire-sensitive areas whose native flora and fauna are poorly adapted to recover from heat disturbances but are more adapted to flood disturbances. Burning also gives an advantage to gorse and other weed regeneration from seed.
6. Using specialist advice and DPIWE, Rivercare and Waterwatch resources by landowners for the management and protection of riparian areas.
7. Using NHT resources for fencing, weed removal and revegetation in degraded riparian areas.

## **2.7 River Structure (Riparian Geomorphology)**

### **2.7.1 Introduction**

#### ***Geology***

The majority of the Prosser catchment geology is Jurassic dolerite which forms a thick cap above older sandstone, siltstone and mudstone. Much of these latter sedimentary rocks were formed under marine conditions as indicated by fossils on their surface. Weathering and erosion processes have broken these rocks into smaller fragments, which have entered the river system over time. These fragments have become alluvial sediments and have been stored in floodplains and terraces or within the channel system as bed load (this is the sediment that the river system moves downstream during floods). A great deal of the older alluvial sediment may be cemented together to form a very resistant material found in the valley floor. Therefore the rivers in the Catchment flow over and against a variety of materials, such as dolerite, sandstone, cemented sediments and younger alluvial sediments.

Downstream of the steep, rocky headwater and river gorge areas, where the river gradients drop and the valleys widen, floodplains have developed as indicated in the central Prosser catchment and the lower Sandspit River. The role of bedrock control on the channel reduces and the stream tends to flow over its own alluvial sediments. The alluvial sections of the Prosser River system are characterised by large quantities of sediment that are deposited like a fan at the beginning of the floodplain reaches. The character of these gravel splays induces floodwater to naturally develop and use secondary (distributive) channels on the floodplain. The floodplains are generally composed of a mainly gravel and cobble base with finer sand and silts forming the top 1 to 3 meters. Rivers are most dynamic where they can easily erode and deposit the alluvial material that makes up their floodplains. This is why most stream management issues, such as bank erosion, occurs in alluvial river settings.

Large, natural runs of boulders and cobbles within the channel are characteristic of the reaches in the steep, upper catchment. Further downstream where the river has the energy to pick up and transport smaller sediments, the stream forms boulder rapids and cobble/ gravel riffles (similar to small rapids in the course of the stream). Pools form in between these stream bed features. During dry periods surface flow retreats beneath the layer of river sediments and the stream is geomorphically dormant. During flooding the stream becomes geomorphically active with swift flood waters and the river is able to pick up and move its sediment load.

The sediment that the river transports, known as bed load or sediment load, is deposited in areas of lower stream energy. Within the channel, some of these areas include the inside of meander bends, the lee of obstructions and backwaters. Across the large river profile deposition occurs within reaches whose stream gradient lowers.

#### ***Hydrology***

For rivers in their natural state, the high energy contained in floodwaters is dissipated by flowing through and over riparian vegetation, woody debris and a 'rough' stream bed. Stream energy is also lost when the river uses up energy flowing through secondary channels.

The relationship that the main river channels have with their floodplains and secondary channels is critical to the functioning and stability of the rivers throughout their alluvial areas. Any artificial alterations to the main channel and or the floodplain will result in changes to the behaviour and appearance of the river system.

Stream bank erosion during flood events is a significant problem in the alluvial areas of the Prosser River and can cause loss of valuable alluvial farmland and degraded water quality through increased sedimentation load. Increased sediment load (in particular, the smaller sized material that is suspended in the water column) into the rivers, as indicated by measured turbidity levels, affects all aspects of river ecology health and the quality of water drawn off for town water

supplies. It also has a potential impact on the ecological health of downstream wetlands and estuaries. Floodplain management is a major issue for farmers wishing to utilise valuable alluvial soils, particularly for cropping.

Stock access to rivers degrades riverbank stability in those areas where stock has access by the prevention of native species revegetation and by direct soil disturbance. In many cases this is a significant contributor to riverbank erosion. Stock pugs the toe of the bank, making it more vulnerable to erosion. Stock also interrupts natural regeneration of vegetation, thereby having a long term impact upon stream stability.

### ***River Debris***

Woody debris in rivers is a vital part of their natural ecology, creating both habitat and nutrient for native species. Large woody debris (LWD) is deposited by flood flows in the alluvial areas of the Prosser River. Generally when the proportion of LWD exceeds approximately 10% of the channel cross section and is at right angles to the direction of flow, it can cause significant local water level increase and channel diversion during flooding, however all river systems are different and it is recommended that further advice be sought from the Rivercare team at DPIWE before removing or relocating LWD. Current best practice management is to leave as much wood in rivers as possible and to remove or relocate only large log jams or when there is interference to irrigation facilities or structures such as bridges (L&WR 1998). The use of large tree debris can be used to assist with riverbank stabilisation actions.

### **2.7.2 Principles of River Structure Management in Alluvial Areas**

The rate and extent of undesirable channel changes including river bank erosion are increased by:

- the loss, degradation or changes to diverse native riparian vegetation,
- removal of woody debris that provides structural support to the bed and banks of the channel,
- channel alterations such as straightening, gravel extraction, diversions and blockages,
- mono-cultures of woody weeds,
- floodplain activities such as levee construction, drainage, and blocking of secondary channels, and
- stock damage to stream banks.

A set of guiding principles for river structure management is as follows:

#### ***Scientific Principles***

1. River stability and functioning is dramatically improved with healthy native vegetation. In the absence of natural rock controls, vegetation and woody debris plays a vital role in providing strength and stability to alluvial sections of river systems. Removing vegetation and woody debris and functioning along streams exposes the stream to faster rates of erosion and deposition. In comparison, upper catchment streams flowing through a bedrock valley or gorge is fixed in position and vegetation plays less of a protective role. Maintaining or restoring healthy riparian vegetation is a cost effective and long-term preventative measure for stream bank erosion.
2. Preventative measures can reduce the rate of channel instability and stream bank change. Replacing gorse and other woody weeds with natural vegetation communities and re-establishing stream banks with a wide buffer of complex riparian vegetation will assist in supporting stream banks, slowing floodwaters and reducing surface water flow rates.
3. Any stream and riparian land disturbance will result in long term changes to the river such as an increase in erosion.
4. The character and behaviour of rivers will be influenced by the construction of levees. By spreading the flow across alluvial floodplains, rivers are able to dissipate large quantities of energy. Levees confine the flow and energy of floods to the main channel where naturally

this energy would be spread onto the floodplain. There is a large amount of research that supports the direct relationship between the increasing rate and extent of both bed and bank erosion with the construction of levees along river banks. Where rivers cannot access their floodplains in order to dissipate energy then generally the channel will be enlarged through erosion. The rate at which this channel enlargement occurs is dependent upon the nature of flooding and the resistance that river bank material and vegetation has against erosion. Bed and bank erosion in the channel is often a symptom of these structures.

5. The energy contained in floodwaters is also influenced by both catchment wide and stream bank vegetation. Vegetation along stream banks on the floodplain and throughout the catchment slows floodwaters through hydraulic resistance or 'roughness'. A proportion of water is also intercepted by catchment wide vegetation, reducing the amount of surface water (and energy) entering the river system.
6. Riparian vegetation binds soil banks and strengthens and protects the channel from erosion. Where native vegetation has been removed through clearance or replaced by gorse, the channel is vulnerable to erosion. A good example of areas sensitive to vegetation loss and subsequent erosion are break-out points where floodwaters leave the channel and enter the floodplain via secondary channels and outside bends.
7. In-stream woody debris is a critical habitat for native fauna and assists to slow floodwaters by dissipating energy. In some situations it provides structural support to the bed and banks of the channel.
8. It is unwise to extract or relocate the gravels in alluvial river bed splays in order to channelise the flow downstream of the bridge constriction. Any extraction or channel building that confines floodwaters to a single channel or isolates the channel from its floodplain will increase the potential for erosion of the bed and banks of the river at some other location in the course of the river.
9. Wetlands and lagoons as well as natural riparian vegetation, play a most important role in filtering flood-borne sediments, thereby protecting river and estuarine water quality.
10. Rivers and streams reflect a delicate balance between sediment, water and vegetation. Any alterations to one factor will invariably result in changes to the others.

#### ***Management Principles***

11. Changes to the way the rivers and streams behave needs to be anticipated over the long term.
12. Any heavy machinery work that disturbs the gravel armouring surface of a channel may also de-stabilise the bed of the stream and initiate erosion.
13. Excluding stock access to the riverbanks will remove the significant risk of stock induced riverbank erosion. Where stock access is essential, a hardened surface should be provided.
14. Preventative actions to protect the stream, water quality, farm assets and natural assets are cheaper and less time consuming than expensive restoration works.

#### ***Related Issues***

Managing stock using a fencing system can be difficult and often costly. This is especially the case in floodplains and in many cases it is impractical. However where fencing is viable it is strongly recommended.

There are a variety of fences that are suitable for riparian zones. These often reduce the amount of time and money that goes into their installation and maintenance. They include electric fencing and drop down fencing. Agricultural consultants and fencing supply companies are a good source of practical information

Off stream watering facilities will be necessary if stock is to be completely excluded from the waterway. If this is inappropriate, fencing may be used to define a hardened point for stock to



drink along the stream although water quality is improved by completely removing stock from the riparian zone.

### **2.7.3 River Structure Management Practice**

Good river structure management involves the following practices.

1. Coordinated and long-term planning of structural river works involving all land managers, Landcare, Council officers for each of the critical alluvial sections of the Catchment Rivers, utilising the resources of DPIWE Rivercare specialists and other specialists as required.
2. River structure planning and coordinated protection activities to seek Natural Heritage Trust financial support.
3. Establishment of riparian reserves with native vegetation to strengthen riverbanks.
4. Excluding stock access to the main rivers and tributaries
5. In-stream woody debris to be left undisturbed; except where the accumulation of large woody debris presents the risk of flooding, stream bank erosion or interference with essential facilities.
6. Ongoing information access and education on the best practice management of river structures.
7. The use of Rivercare and other specialist advice by landowners prior to any river structure activities.

## 2.8 Water Management – Legislation, Policies and Programs

In order to set objectives for maintaining and enhancing water quality and quantity it is necessary to have a good understanding of existing water management legislation, policies and programs applying within the State.

### 2.8.1 Water Management Act

The main document of relevance to water management in the catchment is the Tasmanian *Water Management Act 1999*. The Act has introduced the changes in water management in Tasmania in accordance with national principles specified in the Council of Australian Governments (COAG) water reform agenda. The following major changes introduced with the Act are relevant for the Catchment.

- Provides for tradable water allocations
- Water needs of the ecosystem (environmental flows) must be recognised in day to day water management decisions
- Provision for the development of Water Management Plans
- Water management plans, activities and water allocations to be demonstrated as sustainable
- Community input into water planning and management, through stakeholders and community consultation is required
- Cost reflective water licensing
- A new statutory system for dam approvals
- Allows the creation of water districts
- Allows approved water entities to provide water

Some of the practical implications of the Act are:

- Water quality standards and monitoring requirements will increase in rural water management.
- All approved water transfers and some water takes into storage are currently required to be metered and all extractions from rivers will be required to be metered in the future.
- Groundwater will be regulated and water drawn will be monitored to ensure extraction levels are sustainable.
- Full costs of in-stream dams will need to be assessed against the cost of off-stream dam options.
- Effective fish passage provisions will increasingly be required for in-stream dams; increasing their cost.
- Cumulative effects of dams in a catchment will be more rigorously assessed.
- Trading of water will tend to move water to its most economical use.
- Unallocated water resources, after environmental flows are set, will increasingly be offered for tender on the open market.

The Act specifies the priorities for water allocation according to the following hierarchy of uses or needs.

1. Stock, domestic and fire-fighting use for riparian tenements
2. Town water supplies
3. Fire fighting
4. Ecosystems (environmental flows)
5. Licences which were concessional water rights prior to the implementation of the Act, Water Trusts and the Hydro Electric Corporation
6. Other licences

## 7. Industrial and commercial

Appeals against a decision on water allocation or dam construction may be made to the Appeal Tribunal under the Resource Management and Planning Appeal Tribunal Act 1993.

A more detailed summary of the Act and its effects is given in Appendix 6.

### 2.8.2 Water Management Policies and Programs

The *National Water Quality Management Strategy* (ARMCANZ/ANZECC 2000) provides policies, a process and a series of national guidelines for water quality management. The Strategy's policy objective is: "to achieve sustainable use of the nation's water resources by protecting and enhancing their quality while maintaining economic and social development." To set local targets, the Strategy uses the concept of environmental values for water quality, which are to be established by government and the community through a consultation process.

The *1997 State Policy on Water Quality Management* (DPIWE 1997) conforms to this National Strategy and outlines specific Tasmanian policies and programs to achieve and maintain water quality objectives on a catchment basis. Key components include:

- Establishment of a framework for community involvement in setting water quality objectives. Environmental values (as referred to in the National Strategy) relating to particular activities which require protection (recreation, ecosystem, aquaculture, irrigation etc.) are to be determined through a catchment-based consultative process and be identified in local planning schemes.
- Managing diffuse sources of pollution by controlling erosion and stormwater runoff from land disturbance; establishing codes of practice to control agricultural runoff; adherence to guidelines for road construction and maintenance; and adherence by forestry operations to the Forest Practices Code.
- Promotion of guidelines for stream and waterway management.
- Managing point source pollution by avoiding or limiting discharges, assessing toxicity of emissions, establishment of mixing zones and use of modern technology.
- Defining approaches to, and responsibility for, water quality monitoring in terms of co-ordination and quality control; public access to data and the use of data.

The Tasmanian *Water for Ecosystems Policy 2001* has been developed under the Water Management Act. The Commonwealth EPBC Act 2000 is also relevant for environmental flows and ecosystem protection and has overarching authority.

### 2.8.3 Environmental Flows

A specific aim of the *Water for Ecosystems Policy* is to allow for the further development of the State's water resources in areas where the level of stress on the water resource is low and where management decisions are unlikely to impinge on existing businesses.

Environmental flows are a description of the water regimes needed to sustain ecological values of aquatic ecosystems at a low level of risk. Minimum environmental flows are developed through the application of scientific methods and techniques and the application of local knowledge based on many years of observation. Environmental flows are not static, minimum flow provisions but are variable, recognising low and high flow events as part of waterways' normal processes. They are a regime of flow and water quality, delivered within a risk management framework that recognises the variability of stream flow between years.

Setting environmental flows is not an attempt to restore modified rivers to a pristine state but rather to preserve existing environmental and social values. Environmental flows cannot always be met and the risk management approach recognises this. Environmental flows are critical for

the maintenance of water values for downstream uses such as water supplies, the aquaculture industry and recreational uses.

The identification of the water needs of ecosystems is a key element in the achievement of sustainable water management. Environmental flows are the water regimes that can be set aside to protect the environment by providing a buffer against water quality deterioration, maintaining aquatic plants, providing food sources to sustain fisheries, and preventing harmful events such as algal blooms.

In practice, for water systems in which there is no conflict between ecosystem needs and user needs, the full amount of water can be allocated to the environment. In systems which are over-allocated, it is necessary to consult with users to achieve a balance between environmental and social benefits. Consideration of these options leads to two definitions which are used in Water Management Plans or making water allocation decisions under the Water Management Act.

**Environmental Water Requirements** (EWR's) are descriptions for water regimes needed to sustain ecological values of aquatic ecosystems at a low level of risk. These descriptions are developed through the application of scientific methods and techniques or through the application of local knowledge based on many years of observation.

**Environmental Water Provisions** (EWP's) (called **Water Provisions for the Environment** WPE's in the Tasmanian Policy) are that part of the Environmental Water Requirements that can be met through negotiation and agreement.

Environmental Water Requirements are generally called environmental flows. It is important to recognise that they are not only flows, static flow provisions, nor minimum provisions. They are variable, recognising low and high flow events as part of waterways' normal processes, and they are a regime of flow and water quality, delivered within a risk management framework.

Determining environmental flows uses methods that include, for example;

- determining ecological trigger flows for processes such as fish migration,
- determining the needs of wetlands and estuaries, and
- using IFIM (In-stream Flow Incremental Methodology) which is based on studying the habitat preferences of "key taxa" at transects across representative sections of the river. Key taxa are ecosystem health indicator species and are usually macroinvertebrates and macrophytes.

Setting environmental flows is not an attempt to restore modified rivers to a pristine state but rather to preserve existing environmental and social values. It is also important to recognise as a myth the view that ecosystems have adapted to a modified state in a waterway. A stressed aquatic ecosystem frequently experiences a rapid, catastrophic failure.

Environmental flows cannot always be met and the risk management approach recognises the variability in stream flow between years.

It is important to recognise that environmental flows are not only necessary to meet the needs of ecosystems, but are also critical for the maintenance of water values for downstream uses such as water supplies, the aquaculture industry and recreational uses.

Under the Water Management Act all water users, including non-consumptive users such as aquaculture and recreation, have a legal water right. This may be expressed as an environmental flow and may be quantified (i.e. a specific minimum flow at certain times of the year) or unquantified (i.e. a specified quality requirement). It is possible for all water in a waterway to be allocated to the environment; that is for no extractive uses to be approved.

Assessments of the environmental flow for the Rivers in the Catchment have not been undertaken and are not currently scheduled for assessment by DPIWE as the rivers are not considered to be under threat from over utilisation. Should significant water developments be proposed then a Water Management Plan including environmental flow assessments would need to be undertaken prior to the approval of such developments.

#### **2.8.4 Communication and Consultation**

A communication and community consultation strategy for water management is needed to ensure that this Plan's objective of having a well informed community is achieved. Waterwatch have developed a Waterwatch Communication Strategy and it would be efficient to use this as the basis for a Glamorgan-Spring Bay water communications strategy. Such a strategy could be most effective as part of the overall Municipal communications strategy.

## **2.9 Water Quality**

### **2.9.1 Introduction**

Water quality has not been raised as a major issue of concern for Catchment residents during the various consultation processes although the following concerns about risks were raised.

- The impact of nutrients from septic tank and treatment plant discharges to rivers and estuaries.
- Management of roads for water run-off impacting on river water quality.
- Education on the role of natural vegetation in riparian areas in maintaining water quality.
- The potential pollution threat to Prosser River water and to water supplies in Paradise Gorge from fuel and other pollutant spillage from vehicles.

Water quality is significantly and at times severely affected by riverbank and gully erosion as noted in the previous Section of this plan. Willow infestation of riverbanks also has a detrimental effect on aquatic ecology and the major willow removal program conducted on the Prosser River has largely overcome this problem however it will take many years and a continued program to ensure a restoration of healthy riparian vegetation. Riverbank and gully erosion is significant in many parts of the Catchment which, among other negative effects, contributes to degraded water quality. The worst areas noted for this erosion are;

- Twamley Flats on Tea Tree Rivulet,
- The Stonehurst area on Back River, and
- Mosquito Marsh area at Levenbanks on the Prosser River.

In the Levenbanks area, channel erosion has caused the Prosser River to be cut back to bedrock in places with subsequent loss of aquatic habitat. In some locations, excavation of riparian willows has made rivers vulnerable to increased riverbank erosion pending the re-establishment of riparian vegetation.

A flow regime in the rivers of the Catchment, which includes many peak flow events and floods, makes water quality particularly sensitive to degraded and weed infested riparian zones due to high water sediment load during high water flows.

### **2.9.2 Water Quality Assessment**

As part of the AusRivers/Healthy Rivers water quality program, an assessment was undertaken on the river health of the Prosser and Sandspit Rivers at various locations in 1998 by the Water Resources Division of DPIWE. The methodology was to assess the diversity of aquatic species and compare this to a reference. Unimpacted sites were chosen as the reference sites and these have the codes E30 and E31 in the following table which is a summary of the findings of the study. It can be seen that habitat was assessed as significantly impaired at four locations out of 15 in the Prosser River catchment and none out of four sites on Sandspit River. It should be noted that 1998 was recorded as a dry year for the catchment, which would have caused a natural drop in observed species diversity.

The data set is a too small to draw substantial conclusions however the indication is that the water quality of the rivers is not substantially impaired and they may be quite healthy. Follow-up study at the same sites is required before a clear understanding of catchment river health, its natural variation and variations with time if any, can be gained.

**Table of River Water Ecosystem Health, AusRivers, 1998**

<b>Prosser River</b>		<b>Season</b>	<b>Location</b>		<b>River Health Rating</b>	<b>Habitat</b>
<b>Assessment Site</b>			<b>Northing</b>	<b>Easting</b>		
<b>Code</b>	<b>Name</b>					
E30	Back/ Stonehurst	Autumn 98	5291800	564200	X	Edgewater
E30	Back/ Stonehurst	Spring 98	5291800	564200	B	Riffle
E30	Back/ Stonehurst	Spring 98	5291800	564200	A	Edgewater
E31	Brushy Plains Rt/ Buckland	Spring 98	5279500	558600	A	Edgewater
ET08	Bluff/ Burley Flat	Autumn 98	5299300	557300	B	Edgewater
ET08	Bluff/ Burley Flat	Spring 98	5299300	557300	B	Edgewater
ET13	Bluff/ Sand River Rd	Autumn 98	5285300	557600	A	Edgewater
ET13	Bluff/ Sand River Rd	Spring 98	5285300	557600	A	Edgewater
ET14	Brushy Plains Rt / Tasman Hwy	Autumn 98	5279600	549400	A	Edgewater
ET14	Brushy Plains Rt / Tasman Hwy	Spring 98	5279600	549400	A	Riffle
ET14	Brushy Plains Rt / Tasman Hwy	Spring 98	5279600	549400	A	Edgewater
ET20	Prosser R/ Mosquito Marsh	Spring 98	5288300	546500	B	Riffle
ET20	Prosser R/ Mosquito Marsh	Spring 98	5288300	546500	A	Edgewater
ET22	Tea Tree Rt / Twamley Rd	Autumn 98	5377600	564500	A	Edgewater
ET22	Tea Tree Rt / Twamley Rd	Spring 98	5377600	564500	A	Edgewater
<b>Sandspit River</b>						
E32	Sandspit R/ Ringrove	Autumn 98	5277500	573700	A	Edgewater
E32	Sandspit R/ Ringrove	Autumn 98	5277500	573700	X	Riffle
E32	Sandspit R/ Ringrove	Spring 98	5277500	573700	A	Riffle
E32	Sandspit R/ Ringrove	Spring 98	5277500	573700	X	Edgewater

**Legend for river health rating**

- X - More diverse than reference (potentially biodiverse or suffers from nutrient enrichment)
- A - Equivalent to reference (unimpacted)
- B - Significantly impaired
- C - Severely impaired
- D – Impoverished

The Prosser River is included in a region for assessment under the National Action Plan on Salinity and Water Quality. Accordingly an environmental flow assessment of the Prosser River is scheduled to be undertaken in 2004. This could be expected to include sites above and below the Prosser River dam and in the estuary.

Waterwatch is currently preparing a monitoring program for the Prosser Catchment to be undertaken by the Glamorgan-Spring Bay Waterwatch group.

**2.9.3 Defining Water Quality**

Water quality is defined according to its ability to meet the values held by the community and is usually measured by physical, chemical and biological indicators compared to a pristine or undisturbed environment, or compared to an earlier set of data applying prior to some disturbance.

Water quality values given in Section 1.3 can be summarised as follows.

- maintaining and improving aquatic ecosystem health

- safe and aesthetic for swimming
- useable for irrigation
- useable for stock watering
- suitable and sustainable for fishing and fish consumption
- suitable and sustainable for shellfish farming

Protected Environmental Values (PEV's) are those values set through a process under the Tasmanian Policy on Water Quality Management, 1997.

The PEV's of surface waters in the Municipality have yet to be identified through the formal DPIWE process. This is expected to be undertaken in March 2002. The aim of identifying PEV's is to protect the existing water quality of surface waters in the catchment. PEV's are the values or uses of a water body which are determined as important for protection. Although this process will essentially duplicate the community value setting work already done by the Landcare Committee and given in this Plan, it will give greater regulatory strength to the values and management objectives that have been set.

## **2.9.4 Water Quality Values**

### **Town Water**

Orford including Shelly Beach is supplied with town water from a dam and treatment plant, located on the Prosser River in the upper reach of Paradise Gorge, that are owned by the Rivers and Water Supply Commission but operated by Council. In addition, the filtered and chlorinated water is piped from Orford under Spring Bay to the woodchip and fish processing plants in the Freestone Point area.

Triabunna town water is supplied from the Bradys Creek Reservoir (60ML capacity) which stores water from Bradys Creek catchment augmented from a weir of 6ML capacity on Maclaines Creek via a 200mm nominal diameter diversion pipe. Water is delivered to the Triabunna treatment plant at a capacity 2.6 ML/day via a 200mm pipeline. This supply is treated using a lagoon-type sedimentation plant with alum dosing and chlorination.

No problems are experienced with the drinking water quality from the Orford scheme as the water treatment plant, although about 40 years old, operates effectively. The filter system and clear water pump station at the treatment plant was upgraded in the early 1990s.

The Maclaines Creek catchment (6,478 ha), serving the Triabunna water supply, is predominantly in forested dolerite land, which includes a water reserve of approximately 330 ha. Most of the remainder of the catchment is in the Buckland Military Training Area. The main Triabunna water supply storage in the Brady Creek catchment is however in predominantly sedimentary rock leading to a higher probability of siltation. Brady's storage suffers from water quality issues and the storage is currently aerated. Triabunna has two secondary high level reservoirs that are uncovered and this increases the risk of siltation or other contamination.

A program to upgrade the Triabunna water supply to a more reliable standard is recommended.

### **Estuarine and Coastal Water Quality**

The major environmental impacts to the water of the Prosser Bay and Spring Bay estuaries, based on other estuary studies such as the Derwent Estuary Program, would most probably be the following.

- Nutrient loading from wastewater treatment lagoon discharge (2 point sources) and septic tank absorption trench excess discharge to surface or groundwater.
- Siltation from riverbank, gully and sheet erosion, from gravel roads and other disturbances in the water catchments.



- Changes in river flows due to the Prosser River dam. This would be manifest as a reduction in the number of short duration peak flow events, particularly after periods of low rainfall, and applies to the Prosser River in Paradise Gorge, the coastal estuary, sand bar and Prosser Bay.
- More rapid rise and fall in water levels in the Prosser and its tributaries and their streams, and in the Sandspit River in those parts where there has been significant clearing of native vegetation, particularly riparian vegetation.
- Change in flow patterns associated with the sand bar at the mouth of the Prosser River.
- Loss of migratory path of some species of fish, including eels, between the Prosser River above and below the dam.
- Impact of urban stormwater run-off from the townships at Triabunna, Orford, Shelly Beach, etc. which includes silt, nutrient from dog faeces etc, slipway and marine vessel waste and anti-fouling chemicals, rubbish and road waste.
- Degradation of natural ecosystems, sea grass decline etc.

The long-term impacts associated with the Prosser Dam have not been extensively assessed. There is anecdotal information from the consultation process suggests that the migration of “whitebait” (i.e. juvenile fish) in the Prosser estuary was greatly diminished, as was the general abundance of fish, following dam construction.

The recent study of Tasmanian estuaries by Edgar, Barrett and Graddon (1999) assessed the Prosser, Spring Bay and Earlham Lagoon estuaries and their associated catchments into five classes by conservation significance based on human population densities and to a lesser degree on aquatic species richness and other factors. The Prosser, Spring Bay and Earlham Lagoon estuaries were included in this study and Earlham Lagoon was assessed as Class C (moderate conservation significance) and Prosser and Spring Bay were assessed as Class D (low conservation significance). The report indicates that human activities of agriculture, forestry and urban development in the catchments result in a significant increase in nutrient and sediment loads to estuaries and coastal water. Further details are given in Section 2.13.

### ***Sewerage Treatment Plant Discharge***

Both Triabunna and Orford have lagoon-based sewerage treatment plants. These have in the past failed to meet their licenced limits for effluent discharge to the sea, which presents a risk of sewage pollution in the Bays with a consequential risk to recreation use, aquaculture and the environment. Proposals to reuse the effluent have been prepared and design and funding has been finalised. The Orford system will be upgraded by constructing extra treatment lagoons, a rising main and reuse dam and the majority of effluent will be used for agriculture irrigation. The Triabunna lagoon sewerage system will be replaced with a new scheme more distant from the town and the majority of effluent will also be used for agriculture irrigation.

Both these projects are ready for construction pending State Government approval. Both shall be funded in part through Coast and Clean Seas and Clean Quality Water programs under the Natural Heritage Trust.

Water quality in the estuaries would be further improved by the alternate disposal of sewerage treatment lagoon wastewater that exceeds the reuse demands. This would require assessment after implementation of the currently proposed re-use schemes.

A review of the potential benefit and cost of extending sewerage collection systems to replace septic tanks is recommended. A review of stormwater management and filtration systems is also recommended.

### **Aquaculture**

The Spring Bay estuary supports an aquaculture industry with several oyster and mussel farms, and marine farmed scallops and abalone. There is a fish-meal factory on Freestone Point Road

and wild crayfish and abalone processing plants. These businesses rely on the maintenance of high water quality in the water flowing from the surrounding land and the upper catchments.

Based on present knowledge, the changes to natural processes that are of greatest concern are increased sedimentation and nutrient flow leading to sea-grass decline through reduced photosynthesis capacity, and other changes to the natural aquatic ecosystem.

Any reduction in the negative impact of degraded water quality from the Catchment will reduce the risks to the aquaculture industry in Spring Bay. More research leading to greater knowledge of wastes and water contamination is the highest priority for the long-term protection of the aquaculture industry.

Because Spring Bay is an open estuary with relatively good ocean flushing, the risks of changes to the estuary water quality are lower than for more closed estuaries, however localised negative impacts from poor quality in water flowing from Catchment present a risk.

### **Crop Irrigation and Stock Watering**

Water quality has not been an issue for crop irrigation or stock watering to date. The risk of high salinity, (indicated by electrical conductivity), which is a major issue in the Coal River and elsewhere, could in future emerge as a problem in some areas of the Catchment if the level of crop irrigation increases. For this reason, among many others, continued water quality monitoring is important.

### **Social and Environmental Values**

The community has identified the importance of maintaining a healthy habitat for aquatic flora and fauna species, the aesthetic values of the watercourses and the recreational uses such as swimming and fishing within the catchment. To continue to enjoy these uses and values the water quality and quantity of the rivers and streams need to be monitored and maintained.

The evidence from the DPIWE AusRivers/Healthy Rivers studies given in Section 2.9.2 suggests that the current water quality in the rivers in the catchment is relatively good under most conditions.

Groundwater quality is separately discussed in Section 2.3.

## **2.9.5 Processes affecting Water Quality**

### **Stream Bank Erosion**

Stream bank erosion and meander migration are natural processes, however human influence accelerates this process. The objectives of this Plan are therefore to reduce and reverse where possible the impact of human activities on stream banks. This in turn will reduce the amounts of soil and nutrients entering the water leading to improved water quality.

### **Agriculture**

The major risks to water quality from agricultural activity include; clearing of riparian vegetation for cropping or stock access to water, nutrient input from stock grazing in riparian areas, river bank erosion and loss of vegetation from stock, burning of riparian vegetation, clearing of fallen trees, removing stream bed or bank material (e.g. rocks, gravel, sand, etc), applying fertilizers or chemicals close to riparian areas or in excess and in-stream dams.

#### ***Water abstraction***

River and estuarine ecosystems depend on seasonal flows and flushes of good quality water which are significantly affected by in-stream dams, particularly where the effect is cumulative from multiple in-stream dams in a given catchment.

The cumulative effects of water abstraction above a certain level from watercourses, including groundwater and for off-stream dams, can have a significant impact on flows, particularly on seasonal variation, and thus alter riparian and estuarine ecosystems.

### ***Stock Streamside Watering and Access***

Excluding stock access to rivers improves water quality by the removal of stock as a contributor to river water faecal bacteria contamination, turbidity and nutrient loading. It also reduces the risk of stock-induced streambank erosion.

Stock faecal pollution can have a detrimental effect on the health of downstream animals. Leptospirosis and bovine virus disease can easily be transferred via rivers. The more water is polluted with silt, manure, algae and chemicals, the less water livestock tend to drink and the less milk and beef they produce. Stock pollution also detrimentally affects drinking water quality, downstream aquaculture and natural ecosystem health.

Nutrient loading is the major contributor to toxic algal blooms in wetlands and water storages.

After fencing to exclude stock from streambanks, the suitable options for stock watering are:

- Limiting streambank access to designated surface hardened points,
- Pumping water from the water source to off-stream watering points or to tanks or dams for piping of stock watering points.

### ***Riparian Buffers***

The critical role of healthy riparian vegetation to maintain river water quality is discussed in Section 2.7.

### ***Chemical Run-off***

The run-off from crop lands and pasture from the excessive use of chemical fertilisers and pesticides presents a threat to water quality which has emerged as a major problem in intensively farmed lands elsewhere in Australia. There is no evidence of this problem to date in the Catchment however it is a potential problem that requires on going water quality monitoring to detect any early indications. Good farm practice for fertilisers and pesticides use requires ongoing farm management education and support services to guarantee water quality and also to reduce the cost of chemicals to the optimum level.

### **Forestry**

Forest practices are regulated through the Forest Practices Code and administered through the Forest Practices Board.

The major risks to water quality from forestry activity are largely related to clear-felling logging activities and include; inadequate riparian buffers, pine plantations with no riparian buffers, accidental burning of riparian vegetation due to poor burning practices, introduction of exotic plant species and fungal diseases due to poor machinery hygiene practices, the use of poisons in riparian areas to remove eliminate grazing native animals, ecosystem changes as the result of the use of herbicides or pesticides on plantations adjacent to riparian areas, high sediment loads from clear-felled logging sites, sedimentation road-user pollutants from road and bridge construction and repair and loss of genetic diversity and reproductive capacity from forests adjacent to the riparian areas.

### **Roads, Quarries and Development**

Roads and quarries have a high potential to contribute to sediment runoff to watercourses, including from past and present mines and quarries, sedimentation from road construction and repair, introduction of exotic plants due to poor machinery hygiene and chemicals from tyres and other road-use pollution.

Clearly mining extraction from stream substrate has a major direct and long-term negative impact on water quality, habitat and river geomorphology.

The Forest Practices Code January 2000 also gives a good guide for road construction protection measures.

There are a number of factors to take into consideration when planning, locating and building roads and other infrastructure in order to minimise sediment runoff resulting in reduced water quality and these are discussed on Section 2.9.9.

### **Urban**

Urban and industrial development, both existing and future, have a high potential to negatively impact on watercourse quality. This includes activities such as; clearing of riparian vegetation, insufficient riparian buffers, introduction of exotic plant species and domestic animals and the resulting changes to the natural ecosystem, changes to riparian geomorphology by landscaping, nutrient loading from the use of fertilizers, burning of riparian vegetation, rubbish disposal particularly toxic chemicals, poorly maintained septic systems and polluted storm water run-off.

### **2.9.6 Water Quality Monitoring**

Monitoring involves surveying aquatic life, vegetation surrounding the water body, and collecting, processing and analysing samples of water.

Water quality monitoring is important for a variety of reasons, including:

- as a means of gathering information about waterway health,
- to understand the impacts of human activities, both good and bad,
- to provide data that will assist in making good management decisions and evaluating the effects of these decisions, and
- to promote community knowledge and involvement in actions to improve and protect the condition of the waterway.

Common indicators of aquatic health include the condition of the habitat, bacteria levels, nutrient concentrations, aquatic invertebrates, turbidity and dissolved oxygen. Monitoring can be as simple as putting together a detailed visual survey or as complex as collecting and analysing numerous chemical and biological samples. Monitoring for the present of residual agricultural chemicals (pesticides, herbicides and fungicides) in waterways needs to be undertaken, initially to determine presence or otherwise in at risk locations.

Council and community support and facilitation of research projects are strongly recommended to expand knowledge beyond what can be achieved with current limited resources.

The Glamorgan-Spring Bay Municipal area has active Waterwatch groups which have been developed and supported by the Waterwatch Coordinator. The data and information collected by Waterwatch is highly important for the future management of water quality, as is the educative role of Waterwatch. For these reasons it is essential that the role of Waterwatch coordination be continued regardless of the future funding of Waterwatch through NHT.

The establishment and maintenance of a water database, and its coordination with DPIWE and Council databases, is a high priority for the community and essential to improve knowledge of water in the Catchment. A water database will greatly improve the community, Council and DPIWE's ability to make sound, long-term decisions on sustainable water management. Development of community Waterwatch skills and of quality assurance (QA) in Waterwatch, using DPIWE specialist staff, is recommended by this Plan.

### **Water Information Resources and Electronic Data System (WIRED)**

The Tasmania Department of Primary Industries, Water and Environment has developed a system which makes available a range of water information including current river levels and flows, catchment reports, data summaries for individual water quality sampling and stream gauging sites, and fortnightly river level plots. It is intended for the data on WIRED to be a resource for community groups, consultants, water developers and government staff and to assist in water management planning in the State. The system has been funded by the State and Federal governments under the Natural Heritage Trust program.

Information is available at the website: <http://wired.dpiwe.tas.gov.au/hoo/WaterManagement>.

Current information on the WIRED database is from the only river flow monitoring station in the Catchment, which is on the Prosser River up-stream of the Prosser Dam. Records of flow and water quality are available for the years 1965 to 1993 after which regular monitoring at the site ceased.

### **2.9.7 The Role of the Council Planning Scheme**

The *Glamorgan Spring Bay Planning Scheme 1994*, (Schedule 8) outlines principles, objectives and performance criteria applicable to all use or development within 40m of river banks in areas identified as “Watercourse Protection Special Areas” and within 30m of the boundary of any wetland or waterway not individually identified. Watercourse Protection Special Areas, which includes forestry river reserves, are shown on the map attached to the Planning Scheme. The purpose of this provision is to protect the natural drainage functions, the botanical, zoological and landscape values, and to control erosion, pollution and undesirable changes in stream hydrology. All development or use of land within these buffers involving the clearance of natural vegetation or significant sub-surface disturbance requires a Planning Permit from Council. In determining whether approval should be given, Council is to consider the impact of the proposal on the stability of the land, the minimisation of vegetation clearing, the effect on environmental and recreational values and the effect on the water quality of the river or stream.

Schedule 10 of the *Glamorgan Spring Bay Planning Scheme 1994* refers to erosion and sedimentation control. The purpose of this schedule is to provide guidance for the control of water quality as a result of runoff from the construction and development phase of any land use or development. During the construction phase the following practices are to be implemented where applicable:

- limit the surface area exposed and the duration of exposure,
- implement rehabilitation or soil stabilising measures,
- divert water flows around construction sites, and
- construct sediment traps.

Once the site is developed the following practices are to be used:

- provide infiltration measures,
- install gross pollutant traps,
- install water pollution control ponds, and
- provide dry detention basins.

## 2.10 Water Availability

### 2.10.1 Introduction

The East Coast of Tasmania has highly variable rainfall patterns and river flows. Having sufficient water for urban and agricultural usage is most important for residents, farmers and industry. Within the Catchment, residential water demand peaks during the summer months when the number of residents and visitors in the Catchment increases dramatically. Agricultural demand for irrigation water has not been high in the past as the areas of prime irrigated cropping land has been regarded as limited. There is however evidence that irrigation water demand is increasing with increased potential for cropping.

### 2.10.2 Current Agricultural Water Study

The Tasmanian Government Department of Primary Industries, Water and Environment received a consultant's report, prepared by Thompson and Brett with support from Hydro Consulting and Serve-Ag, in May 2002 to the brief; *Initial Studies for Water Resource Development Options on The East Coast* (DPIWE 2001).

The brief stated in part;

“There are many existing water requirements that must be met prior to further extraction of water for irrigation. These include the allocations for town water supply and existing use allocations. There are also minimum environmental flows that must be maintained for ecosystem health.

Taking into account the above limitations due to existing requirements, the most practicable source of water for irrigation and urban supply needs to be determined.

Water availability needs to be assessed in the (among others) Prosser catchment (Prosser River, Sandspit River, Maclaines Creek, Eighty Acre Creek).”

Analysis was conducted to determine water availability in the Catchment using DPIWE historical stream flow records, including information on seasonality, spatial distribution, and reliability (ie. recurrence interval) of flows, and assessment of agricultural potential. This was essentially a desk-top study based on existing data and reports.

The total irrigated agricultural potential for the Prosser Catchment estimated in the report is given in the following table (Thompson & Brett 2002).

Irrigated Area in Hectares (ha)			Estimated total water requirements (ML/year)	Estimated existing irrigation rights (ML/year)	
Current	Potential				
	Marginal cropping	Horticulture	Pasture		
104	2,978	128	1,133	4,616	852*

\* includes 690 ML for Orford town water

#### Notes

Marginal cropping indicates marginal land suitable for poppy and cereal crop rotation

Horticulture indicates viticulture and stone fruits

Pasture indicates mainly dairy development

ML = Megalitres

The two areas assessed as suitable to consider undertaking water storage investigations were;

- adjacent to the Buckland on the Prosser River and
- north of Orford adjacent to Eight Acre Creek,

The following summary quotes extensively from the Report (Thompson and Brett, 2002).

The area north of Orford adjacent to Eighty Acre Creek was assessed as having no suitable storages and that “limited development could be achieved through the construction of small farm storages”.

For the area adjacent to Buckland, the irrigation water requirement estimated in the Report is given in the following table.

Description	Irrigable Area (ha)	Annual Water Requirements (ML)
Existing irrigation area	not stated	not stated
Potential marginal cropping	1,759	911
Potential horticulture	(presumed nil)	(presumed nil)
Potential pasture	(presumed nil)	(presumed nil)
TOTAL	1,759	911

A prospective dam site was identified on the Prosser River, approximately 3.5km upstream of the township of Buckland, located at grid reference 555850E, 5282880N on the 1:25,00 series Buckland TasMap. Based on the stream gauging record analyses for the Prosser River the estimated mean annual yield for the proposed storage was 17,370 ML and the estimated ‘dry year’ annual yield was 3,345 ML.

#### *Required Dam Capacity*

The assessed agricultural irrigation potential for the area of 911 ML per annum, after allowing for losses, becomes a water requirement of 2,100ML per annum. “The yield analysis, less the environmental flow allowance, indicates that the catchment will adequately supply the required capacity during ‘normal’ years but not during the drier years. A larger storage capacity would be required to enable the drier years to be supplied and a detailed hydrological study would need to be undertaken to determine the required capacity ... however, for the purpose of this Report a 3,000ML capacity storage was (considered)”.

#### *Proposed Dam*

The dam considered was an earth fill dam, with an estimated cost of \$474,000, embankment height of approximately 12 metres, length of approximately 175meters, requiring 40ha of land to be acquired, approximately 23ha of land to be cleared with an estimated storage capacity in excess of 3,000ML. The report’s conclusion was that for the agricultural area adjacent to Buckland, a proposed 3,000 ML storage on the Prosser River, located to the north of Buckland, would serve an irrigation area of 1,759 ha.

#### *Cost of Water per Megalitre*

The capital cost per ML of stored water was estimated to be \$158.00 and this was compared with \$600/ML quoted for an economical farm dam.

#### *Environmental Water Requirements*

An assessment of environmental water requirements was not conducted in the study however an environmental flow requirement was estimated using a generalised approach. This approach assumed that the environmental flow required would be of allowing 20% of average monthly winter flows and 30% of average monthly summer flows was adopted for this study, to give an approximate total annual environmental flow required of 3,844 ML. When deducted from the Prosser River’s recorded flows this gives the annual volumes available for storage of 13,526 ML for the mean yield and zero ML for the dry year. The report indicated that “A detailed

environmental flow study would be required to determine the actual environmental flow requirements” and that “The dam may also create water quality issues within the storage and these would need to be addressed.”

Although the report concluded that “The disadvantages are ... (p)ossible environmental issues”, a full environmental analysis would reveal that there were significant impacts on habitat, water quality and stream ecology and that further and longer term research would be needed, to know how major the impacts would be.

In the conclusions the Report gives states that

“the advantages of this proposal are as follows:

- Supplies the irrigable area by gravity,
- The impounded area is upstream of the area identified as potentially irrigable land and, therefore, does not inundate productive farm land
- Potential to supply the township of Buckland

and the disadvantages are as follows:

- Requires acquisition of private land
- Possible environmental issues”

The Thompson and Brett Report stated that the “catchment is the most under developed at present in respect to cropping and horticulture ... predominantly due to the unreliability of water supply. A large area has been assessed as having agricultural potential from this desktop study but further field assessment and verification is necessary” and that the dam site on the Prosser above Buckland “is ideal and would create a large storage capacity for a relatively small embankment volume” and recommended this option for further investigation.

There is currently no consideration being given for government financial support for an in-stream dam on the Prosser River above Buckland. Therefore further development of this option is dependent on a community of interest identifying funding for the storage and application of the irrigation water.

### **2.10.3 Town Water Supplies**

The existing town water supplies for Triabunna and Orford are described in Section 2.9.3.

The treatment plant on the Prosser River was originally built for Triabunna industrial and Orford town water needs and was designed to supply 450ML per annum. The woodchip mill now draws approximately 300ML per annum, however the mill has indicated a capacity to reduce water usage. The water storage capacity for town water supply to Orford is considered to be adequate for twenty years or longer due to the high storage capacity of the Prosser River dam.

A pipeline to increase the reliability of supply to Triabunna from the larger Prosser River catchment and storage interconnects the Triabunna and Orford water schemes.

Future increase in water availability to Triabunna is possible by augmenting the existing Maclaines Creek catchment storage or by diverting a greater supply from the Orford treatment plant. The Triabunna treatment plant could be relatively cheaply augmented by the addition of air scouring in the backwash operation.

### **Demand Management**

In recent times, substantial capital savings have been achieved in Australia and internationally by the application of demand management techniques to reduce per capita treated water consumption.

Conservation measures to reduce per capita demand include:

- Water meters at all properties on town water and a use-proportional charging system. This is generally applied as a two part pricing system, a fixed charge for water reticulation



maintenance and charging administration and a use-proportional charge for water treatment and water mains, capital and maintenance.

- Education on water conservation including the encouragement of native vegetation gardens to replace expansive lawns and high water requirement gardens.
- Education and incentives for the installation of domestic rainwater storage tanks. For example within Australia this is generally achieved by the use of publicity, rate rebates, and sometimes mandatory rainwater storage tanks for all new buildings.

A report was prepared for the Glamorgan-Spring Bay Council in 1994 (LPH 1994) on long term planning for the provision of town water for Swansea. This report estimated the water usage under various demand management regimes as given in the following table.

**Table: Demand Management Options**

Demand Regime	Uncontrolled Demand	Managed Demand	Restricted Demand	Rationed Demand
Type of demand control	None	Individual property meters and use-proportion charging	Use-proportion charging and education (reduced usage of 25% for domestic and 50% for gardening)	No garden watering and best available domestic conservation measures
Water usage (Litres per person per day)	550	370	240	110

## 2.11 Biodiversity

### 2.11.1 Introduction

Biodiversity is the variety of all life forms that includes plants, animals, micro-organisms and the ecosystems of which they are a part. Biodiversity is essential for our survival, our quality of life and is both a key part, and an indicator of ecological and natural resource sustainability.

Australia is one of the most biologically diverse countries in the world, with a large portion of its species found nowhere else in the world, and the east coast of Tasmania in particular has a high level of regionally endemic plants and animals. The Prosser Catchment is well represented with Tasmanian endemic flora and fauna.

Human activity has been, and remains the major cause of loss of biodiversity. European settlement in the Catchment has produced widespread modification of the flora and fauna resulting from agriculture, forestry, fishing, human settlement and the introduction of exotic species of terrestrial and aquatic plants, animals and diseases.

The most significant impediments to the conservation and management of biodiversity are lack of knowledge and public awareness of biodiversity; and insufficient integration of resource management actions. Through the Nature Conservation Branch of DPIWE and the scientific community in general, substantial progress has been made in recent years with research and mapping of vegetation communities and endangered species. The opportunity now is to integrate this information with natural resource planning and use, and to disseminate this information to the community.

Although there is considerable attention to threatened species and their protection in State legislation and policy, it is important to note that the long-term protection and enhancement of biodiversity can only be achieved through protection of all elements of viable ecosystems and that. Thus an integrated management approach is required that involves various parts such as reserves and conservation covenants; farm and forestry practices; protection, enhancement, development and linkages for vegetation communities; as well as recovery plans and community education.

### 2.11.2 Threatened Species Protection

A plant or animal species is described as threatened if it is at risk of becoming extinct. By far the biggest threat to Tasmania's wildlife is the loss of habitat through human influences such as land clearing, land development, agricultural land practices, fire and recreational activities in vulnerable habitat such as coastal areas.

Tasmania has a well developed strategy for the protection of threatened species which is covered by the *Threatened Species Protection Act 1995* and the *Draft Threatened Species Strategy for Tasmania, June 1998*. The *Threatened Species Protection Act* lists over 600 species of plant and animal recognised as being threatened. The status of thousands of other native species remains unknown. The number of threatened species may well increase as knowledge of our flora and fauna improves, especially of non-vascular plants and marine species, which are at present poorly described and understood. Some species already at risk may not be currently listed.

Threatened species are classified into three levels to reflect their risk of extinction. These levels, listed in descending order from the most threatened, are:

**Endangered:** taxa in danger of extinction because long-term survival is unlikely while the factors causing them to be endangered continue. Also includes species presumed extinct since European settlement.

**Vulnerable:** taxa likely to become endangered while factors causing them to be vulnerable continue.

**Rare:** taxa with small populations in Tasmania that are not endangered or vulnerable but are at risk.

The Act specifies that without a permit it is prohibited to:

- a) take, trade in, keep any listed species
- b) disturb any listed species on land subject to an Interim Protection Order or contrary to a Land Management Agreement
- c) disturb any listed species that are subject to a Conservation Covenant

Commonwealth protection is also provided through the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) which also lists threatened species in the Schedules of the Act.

The Draft Threatened Species Strategy for Tasmania has been developed to outline the approach to conserving Tasmania's threatened species and has the following aims:

1. To ensure that threatened species can survive and flourish in the wild;
2. To ensure that threatened species and their habitats retain their genetic diversity and potential for evolutionary development; and
3. To prevent further species becoming threatened.

The Strategy takes two broad approaches towards these objectives:

1. Addressing key threatening processes
2. Addressing priority threatened species

There are many threatening processes which impact on Tasmania's native flora and fauna and the Strategy identifies the following six processes as having the greatest impact.

1. Clearance of native vegetation
2. Impacts of pests, weeds and diseases
3. Degradation of water systems
4. Inappropriate use of fire
5. Inappropriate and illegal harvesting
6. Impacts of stock

The Strategy looks at methods for prioritisation of individual threatened species. Factors considered may include the species' distinctiveness, its cultural significance, its reservation status or its level of endemism.

Seven primary mechanisms are addressed in the Strategy in order to integrate threatened species conservation across all sections of the Tasmanian community. These are:

1. Community participation
2. Working with land owners, land managers and industry
3. Consideration of social and economic factors
4. Establishing an adequate knowledge base
5. Improving resources for implementing the strategy
6. Recognition of threatened ecological communities
7. Reviewing the Strategy

In the past, some landowners have been concerned that the presence of listed threatened species on their land may reduce their ability to work the land. However the conservation and management of threatened species can be achieved by undertaking a cooperative approach with landowners. Often the threatened species has co-existed with, and is adapted to, the existing management regime and therefore only minor changes to existing practices may be required.

### ***Land Management Plans and Agreements***

Some species and species habitat may best be managed under specific agreements with the owners of the land where the species is found and best protected. Land management plans and management agreements are provided for in the Tasmanian Threatened Species Protection Act. These are drawn up following discussions between landholders and government in cases where the conservation actions are well known for the species in question and where the affected land is identified. Land management plans and agreements are prepared on a voluntary basis, however, land management agreements are binding on both parties as detailed in the Act. These plans and agreements will become increasingly important as necessary recovery actions are identified.

There are three government funded programs for conservation including the Private Forest Reserves Program, and Land for Wildlife and Protected Areas on Private Land programs. These are administered by DPIWE and offer varying incentives to landowners.

Glamorgan-Spring Bay Council also offers rate rebates for land that is subject to a conservation covenant.

Taxation benefits are available to landowners for approved nature conservation programs including for land placed under a conservation covenant.

#### **2.11.3 Threatened Species in the Catchment**

The schedule of species listed under the Tasmanian Threatened Species Protection Act contains 8 animal and 73 plant species that occur in the Catchment. Section 2.13 identifies and discusses the fauna species listed in the Act and habitat management issues.

Appendix 5 gives the plant species listed in the Act that are found in the Catchment and specific habitat details summarised from the *Threatened Flora Manual of North East Tasmania* (DPIWE undated) by Suzette Wood and Naomi Lawrence. Section 2.12 describes the Catchment's vegetation along with plant community conservation priorities and management and this includes reference to many of the threatened plant species. This information is of high value to determine priorities and actions for native vegetation, weed, riparian and coastal management to protect threatened species and to achieve biodiversity objectives.

#### **2.11.4 Threatened Species Recovery Plans**

DPIWE has initiated recovery plans for a number of threatened species. These are an important method for the preservation of the most endangered species and require the catchment community to be involved and informed. The following table gives a summary of the recovery plans that are relevant for the Prosser Catchment.

**Table of Threatened Species Recovery Plans:**

<b>Recovery Plan Title</b>	<b>Status</b>	<b>Author</b>
<b>Fauna</b>		
The Forty-spotted Pardalote recovery plan: management phase	Final (1991)	Bryant, S.L. 1991, Department of Parks, Wildlife and Heritage, Hobart.
Wedge-Tailed Eagle Recovery Plan 1998-2003	Final (1999)	Phil Bell and Nick Mooney, DPIWE, in conjunction with the Wedge-tailed Eagle Recovery Team July 1999
Eastern Barred Bandicoot Recovery Plan for Tasmania: Research Phase 1991-1995	Draft	The species is no longer under consideration for listing as threatened.
Swift Parrot Recovery Plan 2001-2005	Final (2000)	Prepared by the Swift Parrot Recovery Team, February 2000

<b>Recovery Plan Title</b>	<b>Status</b>	<b>Author</b>
<b>Flora</b>		
Recovery Plan: Tasmanian Forest Epacrids 1999-2004	Final (1997)	David Keith, Tasmanian Parks and Wildlife Service December 1997. ISBN 0724662022 Copyright 1997 Environment Australia, Canberra The preparation of this Recovery Plan was funded by Environment Australia under the Tasmanian Comprehensive Regional Assessment
Recovery Plan for Tasmanian Native Grasslands 2000-2002	Draft (1999)	Philip Barker, DPIWE, in conjunction with the Tasmanian Native Grasslands Recovery Team 1999
Recovery Plan for Threatened Tasmanian Lowland Euphrasia Species 1997-2001	Draft	Wendy C Potts, DPIWE, in conjunction with the Euphrasia Species Recovery Team
Recovery Plan – Selected Tasmanian Forest Associated Plants 1998-2002	Final	P.C.J. Barker and K.A. Johnson, Biology and Conservation Branch, Forestry Tasmania Copyright: The Director, Environment Australia.

## 2.12 Native Vegetation

### 2.12.1 Introduction

Much of the native vegetation in the upper catchment is relatively intact and in good condition, because the upper catchment is generally inaccessible, has low agricultural value, and much is contained in State Reserves and State Forests. This however is not generally the case for the privately owned land where there has been extensive modification and clearing of the natural vegetation for forestry, farming and other development activity. Most private land has experienced major forest clearing and loss of native grasslands to introduced grass species for grazing or fodder crops. There has also been significant loss of healthy native riparian vegetation and weed invasion.

Strategic management of vegetation to achieve desired social and environmental outcomes is critical for the successful management of water quality, soil and land, agricultural productivity, aesthetics and biodiversity in the Catchment.

In eastern Tasmania threats to plant species are greatest in settled agricultural districts. Here many native grasslands and grassy woodlands have been cleared, reducing available habitat for species such as the eastern-barred bandicoot (*Perameles gunnii*). In heathlands and dry sclerophyll forests, the introduced plant pathogen Phytophthora RootRot (*Phytophthora cinnamomi*) is threatening many species, such as Freycinet heath (*Epacris barbata*).

Weed invasion and changes to fire regimes may increase plant competition and prevent regeneration, increasing the threat of extinction for species such as South Esk pine (*Callitris oblonga*), which is already at risk because of habitat clearance.

The public meetings held to discuss this Catchment Management Plan and Catchment Management Committee meetings have all indicated a high level of community concern for preserving native vegetation. Good community knowledge of the issues involved has also been demonstrated however this knowledge is not widespread and it is clearly evident that substantial public education on the values and issues concerning native vegetation and habitats is required. Issues raised by the community have included; maintaining and restoring native riparian, coastal and grassland vegetation, ensuring adequate native vegetation as habitat for endangered animal species, and preventing and reversing tree decline.

There are a number of policies and programs relevant to native vegetation management in the catchment including:

- The Vegetation Management Strategy for Tasmania (Bushcare, 1998)
- Tasmanian Regional Forest Agreement 1997 (Forest Practices Board, 2000) including the Private Forest Reserve Program
- Protected Areas on Private Lands, funded under the National Reserves System Program
- Tasmanian Forest Practices Act 1985
- Glamorgan-Spring Bay Council Planning Scheme 1994 (GSBC, 1994)

The Tasmanian Forest Practices Act 1985 specifies that the Forest Practices Code which shall prescribe the manner in which forest practices shall be conducted so as to provide reasonable protection to the environment.

The Tasmanian Regional Forest Agreement is an inter-governmental agreement between the State of Tasmania and the Commonwealth of Australia, which was signed on the 8<sup>th</sup> November 1997. The Agreement is intended to provide for the long term sustainable management of Tasmania's forests, both public and privately owned. The Agreement applies for 20 years, with five-yearly reviews.

The Vegetation Management Strategy for Tasmania (Bushcare, 1998) is a guide to prospective Bushcare grant applicants on the vegetation types, natural environments and threatened species that are known to have high conservation value, and thus funding priority, for Tasmania. These priorities are used as the basis for assessing applications for Bushcare funding for projects “relating to the conservation of remnant bush containing threatened or poorly protected communities or species...” (Bushcare, 1998). Bushcare’s concern is with all indigenous vegetation on all land tenures, and includes treeless vegetation types such as saltmarsh, heath and wetlands.

### 2.12.2 Conservation Priorities

All of the native vegetation within the Catchment should be considered important in maintaining the overall health of the Catchment. However, several specific vegetation types have been identified by various programs (particularly the *Tasmanian Regional Forest Agreement* and the *Vegetation Management Strategy for Tasmania*) as being particularly important for conservation. In general these targeted plant communities are those which have been cleared the most since European settlement and have the least remaining representation. Conservation priorities for the mapped vegetation units within the Catchment are summarised in the table in Section 2.12.3.

The forest community priorities in this Plan are based on a simplified forest conservation priority system developed by CARSAG (Comprehensive, Adequate and Representative Scientific Advisory Group) and the RFA Private Land Reserve Program Unit. Bioregions have been identified under the Comprehensive, Adequate and Representative (CAR) system and the Prosser Catchment falls within the South East bioregion, IBRAV (Interim Bioregion version 5.0).

Forest and non forest vegetation communities that are not already adequately reserved are the target of the Private Forest Reserves Program (PFRP) and the Protected Areas on Private Lands (PAPL) program. Substantial protection of priority plant communities has been achieved, and can be further advanced, under these and similar conservation programs such as Land for Wildlife, private conservancy programs and other management agreements and conservation covenants.

Conservation priority plant communities also need to be referred to by the community, Landcare and related programs and the Council.

Priority forest communities found in the Catchment include those dominated by black peppermint (*Eucalyptus. amygdalina*) and blue gum (*E. globulus*) which is Tasmania's floral emblem, with more than 75% of blue gum forests having been cleared. Tall old-growth forests which feature swamp gum (*E. regnans*) or stringybark (*E. obliqua*) are also a priority and found in the Catchment.

The non-old-growth forests have a conservation priority one level lower than their old-growth equivalents. Increased importance is assumed to apply to all old growth forests because of its greater value as habitat for arboreal and log dwelling fauna, and because many old growth forests have been less disturbed.

The priority ranking for forest community conservation is, in descending order of priority; Critical, Urgent and Important. The priorities are defined as follows.

- Category 1, Critical – Old growth of Endangered, Rare and Vulnerable communities and non old growth Endangered communities
- Category 2, Urgent – Old growth of communities that are not in any rare or threatened categories and non old growth Vulnerable and Rare communities
- Category 3, Important – Non old growth communities not in any rare or threatened categories.

It should be noted that Category 3 does not imply that the communities involved are necessarily of low or no priority. In many cases they will be communities which may not be adequately reserved and may also be subject to significant threatening processes.

Further information on significant forest communities can be obtained from the Private Forest Reserves Program staff in DPIWE.

The non-forest vegetation priorities in the table are derived from those determined by the Tasmanian Vegetation Management Strategy Scientific Reference Group and given in the *Vegetation Management Strategy for Tasmania*. (Bushcare 1998). This document describes the plant communities, gives established conservation priorities, and lists specific priority issues and recommended actions for each of the plant communities by bioregion. Management issues and recommendations for the listed plant communities are also included in the *Tasmanian Bushcare Toolkit* (Bushcare 1999).

### 2.12.3 Vegetation Communities and Conservation Priorities

The following table gives a broad vegetation description, the TasVeg mapping code and the land area for each vegetation community that occurs within the Catchment. This table was derived from data provided by the Bushcare TasVeg Unit in DPIWE.

The TasVeg mapping units are generally based on the dominant tree species but also relate to geology, location and understorey species. The table groups vegetation communities by broad vegetation types.

The associated TasVeg map showing the distribution of vegetation types in the Catchment is included. This mapping process was undertaken under NHT (Bushcare) and RFA programs managed by DPIWE. It should be noted that the mapping process has necessarily been approximate. In particular, care should be exercised in interpreting for small areas such as riparian vegetation types, which may be underestimated in their presence or significance. In time the detail will be improved and community input into the mapping is encouraged.

In the following table the priority indicated for forest community groups apply to old-growth representations of the forest. The asterix (\*) indicates the conservation priority for some sub-units of the vegetation community.

#### Vegetation Communities, Areas and Conservation Priorities for the Prosser Catchment:

Code	Description	Area (Ha)	Area/Catchment Total	Priority
<b>Dry Eucalypt Forest - Total</b>		<b>53,686</b>	<b>51.32%</b>	
AC	E. amygdalina – coastal	701	0.67%	Urgent
AD	E. amygdalina on dolerite	301	0.29%	Urgent
AS	E. amygdalina on sandstone	10,781	10.31%	Critical
D	E. delegatensis	504	0.48%	Urgent
G & GG	E. viminalis and/or E. globulus coastal shrubby	1,212	1.16%	Urgent
O	E. obliqua	5,290	5.06%	Urgent
OV	Shrubby E. ovata – E. viminalis	65	0.06%	Critical
P	E.pulchella–E.globulus–E.viminalis grassy shrubby complex	32,950	31.50%	Urgent
R	E. regnans forest	1,558	1.49%	Urgent
TI	inland E. tenuiramis forest	25	0.02%	Urgent
TD	E. tenuiramis on dolerite	39	0.04%	Urgent
V	E. viminalis grassy	260	0.25%	Critical



### Vegetation Communities, Areas and Conservation Priorities for the Prosser Catchment:

Code	Description	Area (Ha)	Area/Catchment Total	Priority
<b>Non Eucalypt forests/woodlands -Total</b>		<b>676</b>	<b>0.65%</b>	
CR	Callitris rhomboidea forest	257	0.25%	Critical
L	Leptospermum lanigerum – Melaleuca squarrosa swamp forest	18	0.02%	Critical
SI	Acacia dealbata forest	187	0.18%	Urgent
Ta	Allocasuarina littoralis closed forest/woodland	17	0.02%	Medium
Tw	Acacia dealbata (scruffy) woodland	122	0.12%	-
Tz	Scrubby Bursaria spinosa/Acacia mearnsii /Dodonaea viscosa on slopes	75	0.07%	Medium
<b>Wet Forest - Total</b>		<b>5,877</b>	<b>5.62%</b>	
DT	E. delegatensis	1,302	1.24%	Urgent
OT	E. obliqua	4,324	4.13%	Urgent
M+	tall rainforest	252	0.24%	Critical
<b>Eucalypt woodland. Cover of &lt; 5% - Total</b>		<b>4,363</b>	<b>4.17%</b>	
Ea	E. amygdalina	1,007	0.96%	-
Eg	E. globulus	256	0.24%	High
El	E. obliqua	321	0.31%	Low
Em	E. pulchella grassy woodland	2,417	2.31%	Medium
Eo	E. ovata - E. viminalis	13	0.01%	High
Ev	E. viminalis	13	0.01%	-
Ew	E. Viminalis grassy woodland	336	0.32%	High*
<b>Grassland - Total</b>		<b>3,585</b>	<b>3.43%</b>	
Gc	Coastal grass & herbfields incl. Marram grass	85	0.08%	High
Gl	Lowland Poa	405	0.39%	High
Gn	Danthonia/Austrostipa with sparse Themeda & no shrubs	2,649	2.53%	High
Gt	Themeda native grassland	446	0.43%	High
<b>Heathland - Total</b>		<b>744</b>	<b>0.71%</b>	
Hc	Shrubby coastal heath	4	0.00%	Medium
Hg	Lowland and coastal sedgy heath (Lepidosperma spp.)	72	0.07%	Low
Hh	Lowland and intermediate heath	408	0.39%	Low
Hw	Wet heath	260	0.25%	Low

**Vegetation Communities, Areas and Conservation Priorities for the Prosser Catchment:**

<b>Code</b>	<b>Description</b>	<b>Area (Ha)</b>	<b>Area/Catchment Total</b>	<b>Priority</b>
<b>Saltmarsh - Total</b>		<b>231</b>	<b>0.22%</b>	
Ma	Saltmarsh (general)	211	0.20%	High
Mg	Saltmarsh (graminoid)	18	0.02%	High
Ms	Saltmarsh (succulent)	2	0.00%	High
<b>Scrub - Total</b>		<b>658</b>	<b>0.63%</b>	
Sb	Broad-leaf shrubbery	458	0.44%	High
Sc	Tall or dense & wind-pruned coastal scrub	33	0.03%	Medium
Sd	Sand dune vegetation	32	0.03%	High
Sl	Tall dry scrub	19	0.02%	High
Sm	Short paperbark swamp (Melaleuca spp.)	9	0.01%	Medium
Sr	Rainforest scrub	24	0.02%	High
Sw	tall wet scrub	84	0.08%	Low
<b>Wetland - Total</b>		<b>149</b>	<b>0.14%</b>	
We	Wetland (generic)	52	0.05%	High
Wh	Herbfield & grassland marginal to wetland	50	0.05%	High
Ws	Sedge/rush wetland	47	0.04%	High
Ri	riparian vegetation	120	0.12%	High
Ro	talus, boulders, rock	38	0.04%	-
Rs	sand, mud	20	0.02%	-
Fi	improved pasture/cropland	19,887	19.01%	-
Fj	Regenerating cleared land	2,070	1.98%	-
Fk	Bracken	1385	1.32%	Low
Fw	Weeds	67	0.06%	-
PL	Plantation	219	0.21%	-
Cutover		9,373	8.96%	-
U	Built-up, easements, misc. e.g. tip sites, quarries, gravel pits	821	0.78%	-
W	Water	642	0.61%	-
<b>Total</b>		<b>104,611</b>	<b>100.00%</b>	

#### 2.12.4 Vegetation Communities Description

The following brief descriptions of vegetation communities that occur within the Catchment are derived from the *Vegetation Management Strategy for Tasmania* (Bushcare, 1998) and *Land Systems of Tasmania* (Davies 1988).

##### **Forests**

Eucalypt forests occur throughout the Catchment and can be broadly divided into dry and wet forests. Dry sclerophyll or 'hard leaved' vegetation consists of eucalypt species and occurs in areas which receive less than 1,000mm of rainfall per annum. Dry sclerophyll has evolved in response to periodic droughts, the prevalence of fire and low nutrient soils (Williams. 1991).

Forests are defined by communities dominated by both eucalypt and non-eucalypt species where the canopy cover is greater than 30% and the dominant trees are taller than 8 meters.

Dry forests are further grouped by their understorey, which can be grassy, heathy or shrubby. Wet eucalypt forests are found in the gullies and higher altitude regions where the higher rainfall support a denser understorey composed of broad-leaved tall shrubs such as dogwood (*Pomaderris apetala*) and musk (*Olearia argophylla*). A similar range of eucalypts to those listed under woodlands can be the canopy dominant within these forests.

Several non-eucalypt forest types also occur within the Catchment one of which is Oyster Bay Pine (*Callitris rhomboidea*) forest. The Oyster Bay Pine can be found as either the dominant tree in a woodland or forest or as a major understorey component of eucalypt forest. Understorey types range from dominance of shrubs to grasses or heath species.

There are also some forest containing South Esk Pine (*Callitris oblonga*) and a community recovery plan for *Eucalyptus ovata* – *Callitris oblonga* forest has been issued by DPIWE (DPIWE, 1999).

Other non-eucalypt forest types within the Catchment include she-oak (*Allocasuarina verticillata*) forest and tea-tree (*Leptospermum* spp.)/paperbark (*Melaleuca* spp.) swamp forest.

Well drained rocky flats with deep duplex clay-loam soils over heavy clay, support woodland /open forest dominated by *Eucalyptus amygdalina* over an understory that includes *Lepidosperma laterale* (Broad Sword-sedge), *Melaleuca gibbosa*, *Leptospermum scoparium* (Manuka Tea-tree), *Poa hookeri*, *Deyeuxia quadriseta* (Reed Bent-grass) and *Helichrysum dealbatum*.

Similar soils to those above in gullies and protected slopes support *Eucalyptus globulus* (Blue Gum) over a dense understory which can include *Pomaderris apatama*, *Beyeria viscosa*, *Zieria arborescens*, *Bursaria spinosa*, *Coprosma quadrifida*, *Acacia mucronata*, *Pteridium esculentum* and *Acacia delbata* and *Acacia verticillata* (Davies, 1988).

##### **Woodland**

Woodland is a term generally used to describe a plant community which has a eucalypt canopy with less than 30% cover. The understorey can be made up of a variety of small-leaved shrubs, grasses and herbs. Similarly the canopy can be dominated by a range of different eucalypts.

Within the Catchment the dominant woodland eucalypt species are: white peppermint (*E. pulchella*), black peppermint (*E. amygdalina*), white gum (*E. viminalis*), stringybark (*E. obliqua*), gum-topped stringybark (*E. delegatensis*) and silver peppermint (*E. tenuiramis*).

Exposed crests and slopes with shallow, uniform, stony, black/brown loam soils over dolerite bedrock, support low woodland dominated by *Eucalyptus amygdalin*, (black peppermint) with areas of *Callitris rhomboidea* (Oyster Bay Pine), over an understory that may include *Casuarina stricta* (She Oak), *Leptospermum grandiflorum* (Southern Giant Tea-tree), *Cyatbodes divaricata* and *Xanthorrhoea* (Grass Tree).

Exposed slopes with shallow, duplex, stony clay-loam soils over heavy clay, support low open woodland dominated by *Eucalyptus amygdalina*, (black peppermint), *Eucalyptus viminalis* (white

gum) and *Eucalyptus. pulchella* (white peppermint) over an understory that includes *Acacia mearnsii*, (Black Wattle) *Lepidosperma lineare* (Little Sword-sedge), *Poa rodwayi*, *Deyeuxia quadriseta* (Reed Bent-grass), *Stipa mollis*, *Cheilanthes tenuifolia* (Rock Fern), *Bursaria spinosa* (Prickly Box), *Thema australis* (Kangaroo Grass) and *Casuarina littoralis* (Bull Oak).

Drainage flats with deep clay-loam over clay support *Eucalyptus ovata* (Black Gum) with an understory of *Melaleuca squarrosa*, (Scented Paper-bark), *Gahnia grandis* (Cutting grass) and *Leptospermum lanigeru*. (Woolly Tea-tree), (Davies, 1988).

Numerous woodland and forest communities within the Catchment have high conservation significance including:

- shrubby black gum (*E. ovata*)/ white gum (*E. viminalis*) forest
- black peppermint (*E. amygdalina*) forest on sandstone
- white gum (*E. viminalis*) and/or blue gum (*E. globulus*) coastal shrubby forest
- cabbage gum (*E. pauciflora*) forest
- inland and/or over-granite silver peppermint (*E. tenuiramis*) forests
- white gum (*E. viminalis*) grassy forest
- white gum (*E. viminalis*) wet forest on basalt
- woolly tea-tree (*Leptospermum lanigerum*)/ scented paperbark (*Melaleuca squarrosa*) swamp forest
- riparian vegetation in areas with less than 700mm rainfall
- vegetation with oyster bay pines (*Callitris rhomboidea*)
- dry rainforest with closed canopies dominated by native olive (*Notelea ligustrina*), dogwood (*Pomaderris apetala*) or musk (*Olearia argophylla*).

### ***Native Grassland***

Lowland native grassland is probably the Tasmanian vegetation type that has undergone the most destruction since European settlement. As a result this treeless vegetation type is considered an extremely high priority for conservation. This vegetation type also has a high concentration of rare and threatened species and all remnants should be considered significant.

There are two major types of grasslands in the Catchment:

#### **Lowland silver tussock (*Poa labillardierei*) grassland**

Lowland silver tussock grassland is generally found on alluvial river flats less than 600m above sea level. It also occurs in coastal areas on sand ridges or next to wetlands. The dominant grass is silver tussock (*Poa labillardierei*) which is a narrow-leaved species that forms dense tussocks up to 1m in height. The vegetation type is generally treeless or may have a very light tree cover, with scattered eucalypts such as black gum (*Eucalyptus ovata*), white gum (*E. viminalis*) or cabbage gum (*E. pauciflora*).

#### **Wallaby grass (*Austrodanthonia/Notodanthonia* spp.) and spear grass (*Austrostipa* spp.) with sparse kangaroo grass (*Themeda triandra*)**

This treeless vegetation type is characterised by the dominance of wallaby grass (*Austrodanthonia/Notodanthonia* spp.) or spear grass (*Austrostipa* spp.) and may also contain tussock grass (*Poa* spp.), weeping grass (*Ehrharta stipoides*) and kangaroo grass (*Themeda triandra*). It generally occurs in low altitude, low rainfall areas and may be found on valley flats and well-drained slopes on basalt and dolerite and on shallow soils on hilltops and ridges. It may also contain scattered eucalypts such as white gum (*E. viminalis*) and black peppermint (*E. amygdalina*).

### ***Heathland***

Heath is usually found close to the coast on highly infertile sandy plains or occasionally on poorly-drained inland sites and rock-plate hill tops. This vegetation type is dominated by shrubs less than 2m tall in the tallest layer. The most common species are tea-tree (*Leptospermum* spp.),

paperbark (*Melaleuca* spp.), banksia (*Banksia marginata*), casuarina (*Allocasuarina* spp.) and grass-tree (*Xanthorrhoea* spp.). Heathlands in Tasmania are significant for conservation, especially in areas that are not infected with root rot (*Phytophthora cinnamomi*). This Catchment in particular has very high heathland values with the only representation of many of the State's endemic and often critically endangered Epacris species. Of particular interest for the Catchment is pretty heath *Epacris virgata*, a vulnerable species whose occurrence is restricted to a small range near the coast just south of Orford.

*Epacris acuminata* (clasping-leaf heath), *Epacris apsleyensis* (apsley heath), *Epacris barbata* (bearded heath), *Epacris exserta* (south esk heath), *Epacris grandis* (great heath) and *Epacris limbata* (border heath). Details of these species are listed in Appendix 5.

### **Riparian**

Riparian bush is defined as vegetation occurring along streams, creeks, rivers and wetlands. A variety of bush types make up riparian vegetation including rainforest, wet forest, dry forest and scrub.

Riparian areas in the Catchment are often the last refuge for native flora and fauna and they have been identified by several studies as containing important native vegetation communities and species. Askey-Doran (1993) recommendations include;

“... preventing the clearance of vegetation, and managing the use of fire and stock in riparian zones.

Policies aimed at protecting riparian zones should not only preserve native flora and fauna but the entire riparian environment providing benefit to the landowner and as well as society in general.

... Buffer zones following the Tasmanian Forest Practices Code (1993) should be retained on land used for forestry, agriculture and urban developments.”

Askey-Doran (1993) identifies the following riparian plant communities as poorly reserved.

Closed scrub dominated by *Leptospermum lanigerum* and *Acacia mucronata*

*Callitris oblonga* (South Esk pine) with *Micrantheum* spp

Askey-Doran (1993) also notes that 28 terrestrial and 5 aquatic plant species are at risk regarding conservation.

Within this Catchment the most common tall shrub species in the riparian remnants are woolly tea-tree (*Leptospermum lanigerum*) and variable sallow wattle (*Acacia mucronata*).

### **Wetlands**

Wetlands are areas of shallow water that are usually flooded for at least part of the year. This vegetation type includes marshes which are defined by the dominance of non-woody plants such as sedges, rushes and grasses, lagoons which are defined by the dominance of submerged or floating plants and the swampy, marshy margins of lakes. Wetlands provide vital habitats and breeding grounds for many species, especially fish and water birds, some of which are endangered. Other treeless plant communities of and non-sedge enclosed wetlands (wetlands not dominated by genera such as *Ghania*, *Carex* or *Lepidosperma*).

### **Saltmarshes**

Saltmarshes are found on saline flats fringing low-energy coastal areas. They typically have a predominance of succulent plants (with thick fleshy leaves) and other species such as glassworts (*Sarcocornia* spp.), pig face (*Disphyma* spp. and *Carpobrotus* spp.) along with salt bushes (eg *Atriplex* spp.). Salt marsh occurs in Apsley Marshes, and bordering Moulting Lagoon and other estuaries. High conservation significance is attached to all saltmarsh types.

### **Coastal Vegetation**

Coastal vegetation is tolerant to salt spray and has successfully adapted to a range of soil types and salinity levels. Typical woodland and dune species are the coast wattle (*Acacia sophorae*), casuarinas (*Allocasuarina* spp.), spinifex (*Spinifex sericeus*) and the introduced marram grass (*Ammophila arenaria*). In large parts of Dolphin Sands the marram grass and NSW coastal wattle introduced species are dominant.

Development in the coastal area has degraded many vegetation communities, especially salt marshes and wetlands, while many dune communities are being affected by recreational activities. These communities are vulnerable to pollution, mechanical disturbance, grazing by stock, weed infestation, changes to hydrology and tidal patterns.

### 2.12.5 Specific Sites

In the area from the Coles Bay Road crossing of the Apsley River to the Freycinet National Park boundary, the following threatened species have been identified by Zacharek (1999).

- South Esk Pine (*Callitris oblonga*) – some good stands along the Apsley River and the Australian Bush Heritage Fund own a very good area just north of the Coles Bay Rd.
- Scrubmoss Bush Pea (*Pultanea selaginoides*) – this plant is under threat with one site recording 9 plants in 1991 and 3 plants in 1998.
- Apsley Heath (*Epacris apseyensis*) – a medium shrub which flowers between May and August. There are several sites with the largest population occurring in the National Park.
- Barber's Gum (*Eucalyptus barberi*) – this rare and endemic plant is recorded.

Important issues identified by Zacharek were;

- The two sites along the rivers that will be managed for these rare and threatened species, (Lilla Villa Bridge and north of the Aust. Bush Heritage block)
- Stream bank erosion particularly north of the Rosedale Road.
- Weeds, particularly gorse, which was observed to co-occur with erosion, is a specific threat to South Esk Pine and riparian vegetation.
- Fire management. Although fire will encourage regeneration of *Callitris oblonga*, it also encourages gorse germination and if a second fire occurs in a short time frame the *Callitris* will be killed out. The plant does not drop seed annually but releases it when the mature plants die.

White gum woodland (*eucalyptus viminalis*) with sedge and grass understory in the Great Oyster Bay Estate at Dolphin Sands has high conservation priority and is discussed in the Dolphin Sands resident's booklet (Thorp, 2002).

### 2.12.6 Land Conservation Covenants

Land with conservation values associated with flora, fauna or other natural resource or heritage values that meet national criteria can be accredited for addition to the National Reserve System.

This gives the potential for the land to obtain State and Federal Government accreditation and recognition and to gain access to Commonwealth funding.

Such land can be included in DPIWE administered programs such as the RFA Private Forests Reserve, Protected Areas on Private Land (NHT funded) and Land for Wildlife Programs and some private programs.

These programs require a covenant on the land to provide conservation security and to establish agreed management programs and methods. Some programs also offer financial assistance with fencing and other establishment or management costs, and support from conservation specialists.

### **2.12.7 Rural Tree Decline**

Rural Tree Decline is the accelerated death of trees in the rural landscape. Isolated trees in paddocks have been dying for many years but over the last couple of decades the community has witnessed the rapid decline of woodland and forest trees. Many factors are implicated including drought, possums, soil compaction, disease, loss of understorey and agricultural practises such as the addition of fertilisers, grazing, clearing and tilling.

Further information can be obtained from the *Tasmanian Bushcare Toolkit* (Bushcare 1999).

### **2.12.8 Fire Management**

Generally, fire management planning, including fuel reduction burning, needs to incorporate the identified vegetation priorities. This applies particularly for those protection priority plant communities and species that have a relatively high sensitivity to recovery from fire. Further information on fire management is given in Section 2.15 of this Plan.

### **2.12.9 Vegetation Monitoring**

Because native vegetation is a key building block of land ecosystems, its health provides a good indicator of the overall health of the local environment. Ongoing monitoring of the condition of native vegetation is important to assess program outcomes, the status of vegetation communities with conservation priority and to update vegetation mapping data. Monitoring of vegetation can be done together with weed mapping in the field.

DPIWE through Bushcare has published *A User's Guide to Monitoring Vegetation* (McCoull & Barnes, 2002) which outlines standard monitoring methods that can be used by community groups, extension staff, land managers and government to monitor long-term changes in native vegetation. The publication provides practical details and contains data collection forms.

## 2.13 Fauna/Wildlife

### 2.13.1 Introduction

Fauna is defined as any animal, vertebrate or invertebrate. All fauna is dependent upon its habitat for food, shelter and breeding sites. Rocks, fallen timber in bushland, woody debris in rivers, hollows in old trees and vegetation type diversity are examples of crucial habitat elements required for the survival of different species.

The Catchment provides the habitat for a number of the State's endemic fauna including Eastern Quoll and the Tasmanian Devil. Threatened fauna species represented in the Catchment include Forty-spotted Pardalote, Australian Grayling, Swift Parrot, Wedge-tailed Eagle (Tasmanian sub-species), and possibly the Eastern Barred Bandicoot (Bryant & Jackson, 1999). Species that are not listed but are considered to be of high conservation significance with colonies under threat from human activities are Little Penguin, Hooded Plover and Short-tailed Shearwater.

### 2.13.2 Threatened Fauna Species

The species listed under in the Tasmanian *Threatened Species Protection Act 1995* and recorded in the Catchment are shown in the following table, which also indicated the status of the species under the Commonwealth Environment Protection and Biodiversity Conservation Act 1999 (EPBC).

The Catchment may contain other listed species such as freshwater snails and beetles that have yet to be recorded.

#### List of Threatened Fauna Species – Prosser Catchment

NAME	COMMON NAME	TAS. ENDEMIC	TAS. STATUS	NATIONAL STATUS
<i>Pardalotus quadragintus</i>	Forty-spotted pardalote	e		V
<i>Aquila audax fleayi</i>	Wedge-tailed eagle	e	E	EN
<i>Lathamus discolor</i>	Swift parrot		E	EN
<i>Podiceps cristatus</i>	Great crested grebe		R	nil
<i>Sterna albifrons sinensis</i>	Little tern		E	nil
<i>Sterna nereis nereis</i>	Fairy tern		R	nil
<i>Prototroctes maraena</i>	Australian grayling		V	VU
<i>Pseudalmenus chlorinda myrsilus</i>	Tasmanian hairstreak butterfly	e	<i>Note 1</i>	
<i>Lissotes latidens</i>	Broad-toothed stag beetle	e	E	nil
<i>Thylacinus cynocephalus</i>	Thylacine	e	X	EX

#### Note 1

The Tasmanian hairstreak butterfly is waiting gazettal.

**Status Code:** (definitions are given in Section 2.11.2)

e - endemic to Tasmania

Tasmanian Threatened Species Act:

E – endangered, V – vulnerable, R – rare, X – extinct, P – protected

Commonwealth Biodiversity & Threatened Species Act:

EN – endangered, VU – vulnerable, CR – critical, EX - extinct



### 2.13.3 Fauna Priorities for the Catchment

#### Aquatic

Fish species recorded for the Prosser River catchment include eels (*Anguilla australis*), two lamprey species (*Geotria australis* and *Mordacia mordax*), Australian grayling (*Prototroctes maraena*) and brown trout (*Salmo trutta*).

The only aquatic species listed under the Tasmanian *Threatened Species Protection Act 1995* that is found in the Catchment is the Australian Grayling. Australian Grayling is a silver streamlined fish that grows up to 30cm in length and is found in the mid and lower reaches of rivers and streams that open to the sea. After spawning in gravelly beds, the larvae are thought to be swept to sea, returning after four to six months as whitebait. Major threats are loss of habitat in the lower reaches of rivers, dams and weirs, changes to river hydrology causing stream bed erosion and pollution.

The migration of aquatic species from the sea and estuary to the upper Prosser River was prevented with the construction of the Prosser Dam. A rope ladder for eel migration was provided soon after the dam's construction but it has not been maintained or assessed for effectiveness.

River water quality and healthy natural riparian vegetation are critical for healthy aquatic species habitat and natural river geo-morphology function are also important.

#### Birds

Relevant information on some of the bird species found in the Catchment that are listed in the Tasmanian *Threatened Species Protection Act* are discussed below.

##### *Wedge-Tailed Eagle (Aquila audax fleayt)*

This bird is classified as endangered due to loss of breeding habitat, disturbance at breeding time and persecuted by humans. There are only about 95 breeding pairs left in the State. It nests only in old-growth trees in native forests. The nests are usually found in tall Eucalypt trees in remnants of at least 10 ha in size and are used each year with some having being used for up to 50 years. Wedge-tailed eagles breed between August and January, are timid nesters and are likely to desert the nest if disturbed.

##### *Swift Parrot (Lathamus discolor)*

The Swift Parrot breeds only in Tasmania and is classified as vulnerable due to the loss of its foraging habitat. The population migrates to the mainland in February to March and returns in August to September to breed. During the breeding season the birds feed on the nectar of *Eucalyptus globulus* (blue gum) and sometimes on other eucalypt species, for example *Eucalyptus ovata* (black gum) prior to breeding. Swift Parrot distribution is directly determined by the distribution of blue gums. Earlier flowering coastal blue gums are particularly important.

##### *Forty-spotted Pardalote (Pardalotus quadragintus)*

The forty-spotted pardalote (*Pardalotus quadragintus*), a small perching bird with a body colour of mainly olive green on the back, grey on the front with pale yellow around the cheeks and on the vent. The wings are black with characteristic white spots. The species appears similar to two more common and widespread Tasmanian pardalotes, the striated pardalote (*P. striatus*) and the spotted pardalote (*P. punctatus*) but is distinguished by having no head markings, a duller body colour and shy behaviour.

The forty-spotted pardalote nests mainly in cavities in tree trunks, broken branches, fence posts or fallen stumps. The breeding season extends from August to December.

This bird is only found in Tasmania and is restricted to five main locations along the east coast, namely Flinders Island, Maria Island, Bruny Island, Howden and Tinderbox Peninsula. Within the Catchment it is found in the Maria Island National Park which is the State's largest colony

area of 2,030 ha with an estimated population of approximately 1,700 individuals. It is a fully protected species.

The forty-spotted pardalote is linked exclusively to white gum (*Eucalyptus viminalis*) and only occurs in dry grassy forest containing this tree. The major threat to the forty-spotted pardalote is any loss of white gum, whether it be well established mature stands or single trees. Overgrazing and over-firing prevents regeneration of white gum.

Protection of the species includes clearance control measures, both regulatory and voluntary, to assist in preventing the loss of white gum grassy dry forest and woodland.

Cats will prey on adults and chicks in nests near the ground so they should be restrained or prohibited from all areas in or near colonies.

Wherever possible, conservation management for the forty-spotted pardalote should be combined with that of the swift parrot (*Lathamus discolor*) which favours mature blue gum for nesting and foraging. There is a significant overlap in the range of both these threatened bird species in Tasmania which allows for integrated and regional strategic management planning.

#### General

The coastal areas in the Catchment are critical habitat for many sea birds particularly during for breeding. Coastal management is discussed further in Section 2.14.

#### **Land Animals and Invertebrates**

##### *Tasmanian hairstreak butterfly (Pseudalmenus chlorinda myrsilus)*

The Tasmanian hairstreak butterfly is found in the Catchment in the Sandspit River Wildlife Sanctuary, Nature Conservation Area around Earlam Lagoon, south of Rheban and this is one of the three main locations in Tasmania of this butterfly. The habitat of this threatened butterfly includes silver wattle, black wattle, blackwood and it is known to winter under the bark of white gum (*E. viminalis*)

## 2.14 Estuaries

Estuaries are semi-enclosed or periodically closed water bodies with unique aquatic environments affected by both freshwater and marine systems. The major estuaries in the Catchment contain essential habitat for many bird and fish species, particularly during their breeding and juvenile stages. They have been referred to as “the nurseries of the sea”.

A recent study of Tasmanian estuaries (Edgar, Barrett & Graddon, 1999) classified estuaries and their associated catchments into five classes by conservation significance. The classes and the classification of the Prosser Catchment estuaries are given in the table below.

Class Definition	Conser-vation Signif-icance	Management Action	No. class-ified in Tas.	Estuaries within Prosser Catchment
Class A: Minimal effects of human activity. Includes sites with exceptional fish and invertebrate diversity.	Critical	Essential for inclusion in representative reserves	10	none
Class B: Relatively pristine or contain an unusual range of species	High	Should be quarantined from future developments and existing human impacts reduced wherever possible. Aquatic biota should be protected from other line angling and existing marine farm leases.	38	none
Class C: Estuary and associated catchment affected by human habitation and land clearance but not badly degraded.	Mod-erate	Should be made available for recreational and commercial purposes	34	Earlham Lagoon
Class D: Estuary and associated catchment have been moderately degraded by human impacts.	Low	Moderately degraded. Should be made available for recreational and commercial purposes. Remediation processes should be assisted where practical.	21	Prosser River estuary Spring Bay
Class E: Estuary and associated catchment have been severely degraded by human impacts.	Low	Severely degraded. Should be made available for recreational and commercial purposes, where safe to do so.	8	none

Okehampton and Lagoon and Eighty Acre Creek estuary within the Catchment were not assessed.

Rivers into the Catchments estuaries are characterised by low runoff levels and high variability of flows. The study states that “upstream catchment activities are the single most important factor in determining the present day nutrient balance and water quality of estuaries”.

Deforestation within the catchments for agriculture and forestry has increased runoff and peak flow rates thereby increasing sediment and nutrient loads. Other major threats to the Catchment estuaries identified in the report are (i) increased siltation resulting from land clearance and urban and rural runoff, (ii) increased nutrient loads from sewage and agricultural use of fertilisers, (iii) foreshore development, (iv) marine farms, (v) modification to water flows through dams and weirs, (vi) the spread of introduced marine pests, and (vii) long-term climate change.

Recommendations relevant to the Catchment, in addition to those given in the above table included:

- minimise whenever possible the establishment and spread of introduced marine pests,
- policy development to integrate the management of catchments and the coastal and marine zones, and
- further research, including the collection of baseline data for the most important physical variables, including salinity, water flow, turbidity, nutrient concentration, oxygen concentration, suspended solids, temperature and pH.

Management issues for estuaries are discussed briefly in Sections 2.7 and 2.8 on water management and water quality, and management objectives and recommended actions for estuaries are included in the Executive Summary.

## 2.15 Coastal Management

As the narrow strip between terrestrial and marine environments, coastal areas have ecosystems with very specific vegetation and fauna habitat. For the Catchment these are discussed in Sections 2.11 and 2.12.

The catchment coastline has also been the focus for human habitation since Aboriginal settlement to the present, due to the highly valued food, farming, recreation and residential resources it provides.

For these reasons coastal areas in general require careful management, and this is particularly true for the Swan-Apsley Catchment which has a very high proportion of coastline and rapidly increasing human pressures.

Having multiple coastal management authorities compounds the problems of sustainable coastal management. The Tasmanian State Coastal Policy 1996 provides a regulated set of conditions and requirements for coastal management and development, and the establishment of numerous State coastal reserves in the past under Parks and Wildlife management has protected the coastal values of some of the more significant coastal areas. However much of the Catchment's coast and its associated habitat for coastal birds and coastal vegetation remains highly vulnerable to human impacts.

Coastal areas have special requirements for development under the Glamorgan-Spring Bay Council Planning Scheme (GSBC, 1994) including Sections 6.5 for Coastal Development and 8.9 for Coastal Rural Development.

The Prosser Catchment Management Plan recognises and endorses the implementation and operation of the *Action Plan – Marine and Coastal Management* (Buchhorn, 2001). This Action Plan gives a sound strategic approach to a cooperative coastal management system and contains a set of proposed actions. It is important for the community, Council and the Catchment Management Committee to become familiar with this Action Plan.

Coastcare has been an active agent in the Catchment in promoting and supporting community groups and actions to preserve critical coastal values. Ongoing support for Coastcare from Council and the community is as an important component of sound future coastal management.

Within the Catchment, the Prosser River coastal sandbar has been the subject of a recent report due to erosion pressure on Raspins Beach and the relocation of the sandbar is currently proposed.

## 2.16 Weeds

### 2.16.1 Introduction

The Catchment's weeds are introduced European species of plants have thrived in the cleared farming land and riparian areas and have spread to roadsides and estuaries. Weeds have a significant detrimental impact on the productivity of farms, the aesthetics of natural vistas, native plant community regeneration and the stability of ecosystems particularly bushland and riparian areas where they have contributed to soil erosion, and loss of farm productivity, native species habitat, and recreational and aesthetic amenity.

### 2.16.2 Weed Management

Weed management rated among the top priorities of issues for Catchment management during community consultation and has been a major focus for the GSB Landcare Management Committee since 1997. Although the primary responsibility for weed management rests with landowners and land managers, collective action is necessary and highly desirable where a particular weed type or a weed infestation requires focussed action, or where the problem transcends the capacity of the individual landowner to address it adequately.

Weed mapping for the Catchment is well advanced and will shortly be entered as digital data into a GIS map. There has been an effective program for the past 4 years under an NHT Landcare grant providing support to landowners to eradicate mainly gorse and willows in riparian, roadside and other badly infested areas. The use of a specialised gorse mulching machine, and "cut and paste" technique have proved to be the most successful.

For current information and services regarding weed identification and control the local Landcare Coordinator and DPIWE Southern Regional Weeds Officer can be consulted.

### 2.16.3 Weed Management Policies and Programs

The *National Weeds Strategy* treats environmental and agricultural weeds equally, recognises that weeds are one of Australia's major land degradation problems.

*WeedPlan: A Tasmanian Weed Management Strategy* is complementary to, and consistent with, the *National Weeds Strategy*. It is a strategic approach to integrated and coordinated weed management at a State level and aims to co-ordinate the individual efforts of the many people involved in weed control.

The Tasmanian *Weed Management Act 1999* is intended to ensure consistency with the principles of *WeedPlan* especially with respect to:

- facilitating stakeholder input into declared weeds policies and other relevant matters
- providing support for community weed management programs
- providing delegation of regulatory powers and
- providing a mechanism to ensure that specific appropriate and clearly defined policies are in place for declared weed species.

The *East Coast Regional Weed Strategy* (Stewart, 2000) and the *Glamorgan-Spring Bay Weed Management Plan* (Kelly & Andrewartha, 2000) are detailed local strategies that have been used to set the Landcare Committee objectives for weed management.

The Weed Management Act includes a list of "Declared Weeds" and these are listed in Appendix 1 of the *Glamorgan-Spring Bay Weed Management Plan* along with the "Weeds of National Significance" as weed led priorities.

Within the objectives for weed management given in the Executive Summary, the Committee identified the following targets for weed management.

- Eradicate Ragwort, Spanish Heath, Saffron Thistle and Pampas Grass from the entire Catchment.

- Eradicate Gorse, Broom and Blackberries from all roadsides in the Catchment (including a 30m buffer “on the other side of the fence”).
- Limit the spread of Gorse throughout the Catchment.
- Reduce the extent of Californian Thistle in the waterways of the Catchment.
- Encourage the eradication of Horehound on private properties throughout the Catchment.

## **2.17 Game Management**

Both native and introduced wildlife that graze on crops, pasture and orchards, require planned management that is integrated between neighbouring properties in order to ensure effective and coordinated actions. Game management plans are an important method of protecting native animals and reducing the risks from feral introduced animals. The development of game management plans is recommended for property owners and land management agencies who have issues or problems with game management.

The Moulting Lagoon Game Reserve Management Plan (P&WS, 1999) gives a good indication of the issues involved in the preparation of a game management plan.

Game management plans can be expected to be required for private forest reserves and private conservation areas as part of an overall management plan.

Game Management recommendations are given in the Executive Summary.

The Game Management Unit in DPIWE is available to provide advice and help with development of Game Management Plans.

## **2.18 Fire Management**

Periodically fire threatens the forest, woodland and grassland in the Catchment. The most vulnerable vegetation communities are dry sclerophyll forests and coastal vegetation with the Dolphin Sands area being particularly vulnerable. Of the community infrastructure, the Dolphin Sands residences, and to a lesser degree, parts of Bicheno close to bushland are the most vulnerable. Water quality can also be significantly affected where ash run-off and increased rates of soil erosion will result from significant fire damage.

The Tasmanian Fire Service has Brigade Chiefs at xxx. Advice can be obtained from these officers for bushfire hazard management planning and the protection of property. Typical protection measures include a 25 metre wide building protection zone, the use of low flammability plants and in the absence of reticulated water, a dedicated water storage for fire protection of approximately 20,000 litres with a secure pumping capability.

The Tasmanian Fire Service has produced a document "Planning Conditions and Guidelines for Subdivisions in Bushfire Prone Areas - October 1995" (Tasmania Fire Service 1995) and co-sponsored a pamphlet "Fire Retardant Garden Plants for the Urban Fringe and Rural Areas" (Tasmania Fire Service 1997). The Tasmanian Parks and Wildlife Service have a fire management plan for the Douglas Apsley National Park and Forestry Tasmania similarly for State Forests in the Catchment. These require, amongst other provisions, for periodic fuel reduction burning to be conducted.

The development and promotion of a fire management strategy for the protection of native plant communities in conjunction with DPIWE Conservation Management Branch and the Tasmanian Fire Service is recommended.



## 2.19 Forestry

The State Forests in the Catchment are part of Tasmania's multiple-use forest land agreed under the Regional Forest Agreement (RFA) of the Commonwealth and State Governments. State forests are managed for a number of purposes such as timber production, export woodchipping and conservation under ten year Forest Management Plans by Forestry Tasmania.

Operational details for timber harvesting are described in Forestry Tasmania's three year wood production plans and timber harvesting plans which are available for inspection at Forestry Tasmania and from local Council offices. All forest operations are required to comply with the provisions of the *Forest Practices Code*, which is administered by the Forest Practices Board. Copies of the *Forest Practices Code 2000* are available from Service Tasmania or the Forest Practices Board.

As part of the RFA a series of reports by bio-region, *Flora of Recommended Areas of Protection and Forest Reserves in Tasmania* has been produced (North, Andrews, et al, 1998). This is available from the DPIWE library.

State Forest Reserves in the Catchment are given below.

### Forest Reserves: Prosser Catchment

Name	Area (ha)	Notes: Special Values or Management Issues
Maclaines Creek	448	<u>National Estate</u> : Refugia present <u>Fauna</u> : Lathamus discolor
Alma Tier	155.4 (284)	<u>RFA Priority Comm</u> : RO. <u>Fauna</u> : Bettongia gaimardi
Sand River	78.7	<u>National Estate</u> : Geoheritage B Grass; Rare Communities; Representative Vegetation.
Brown Mountain	652	No information on CAR database
Sandspit River	232	No information of CAR database
Mount Morrison	739.2	
Total	2,305	

The major effects of forestry activity within the Catchment are potentially on river water quality through increased erosion and run off after clearing and burning, and from forestry road erosion, increased peak river flows causing increased river erosion and river sediment loads, and increased estuarine sedimentation. Research into the water quality impact of forestry activity is of interest to the Catchment community.

## 2.20 Parks and Reserves

The Catchment contains the Maria Island National Parks which is one of the State's major historic and natural resource reserves. Dating from 19xx it is adjoined by the Maria Island Marine reserve created in 199x to protect a representative regional marine ecosystem in a region with high commercial value from marine fisheries.

there are many reserves within the Catchment which have been created to preserve specific and unique natural resources. They all have high ecosystem protection and recreation value.

Management of these parks and reserves has not been discussed in any detail in this Plan as they generally have their own publicly available management plans and operate within the policies and strategic framework of the Tasmanian Parks and Wildlife Service.

## Table of National Parks and Reserves: Prosser Catchment

Name	Draft IUCN Category	Area (ha)	Effective Date	Notes & [Relevant Documents]
Maria Island National Park	II	11,550	14 June 1972	Wildlife [Maria Island and Ile des Phoques - Management Plan 1998]
<b>Nature Reserves</b>				
Ile des Phoques Nature Reserve				
Three Thumbs	III	3,120	27-Dec-2000	Representative forest
Little Beach	III	945	30-Apr-1999	Representative forest
Cape Bernier	Ia	1,522	10-May-1989	Coastal, scenic
Maria Island Marine Reserve				
Ile des Phoques	Ia	7.4	5-Apr-1978	Seal breeding
<b>Conservation Area</b>				
Sandspit River	?	95	30-Apr-1999	
Alpha Pinnacle (name?)	V	267	24-Jul-1996	Dry sclerophyll forest
Raspins Beach	VI	4.2	17-Nov-1981	Coastal
Millingtons Beach	VI	17.8	7-Apr-1983	Coastal
Stapleton Beach ??				
Point Home Lookout ??				
Flensers Point ??				
Harry Walker Tier ??	V	512	24-Jul-1996	Dry sclerophyll forest
<b>Historic Site</b>				
Nil				
<b>Private Sanctuaries</b>				
Sandspit River	V	550 or 454	6-Apr-1949 or 30-Apr-1999	Reserve subject to review by Parks and Wildlife
<b>Private Nature Reserves</b>				
Not recorded				

Under the National Parks and Wildlife Act 1970, the following definitions apply.

### National Park

A large natural area of land containing a representative or outstanding sample of major natural regions, features or scenery

### State Reserve

An area of land containing significant natural landscapes; natural features; and/or sites, objects or places of significance to Aboriginal people

### Nature Reserve

An area of land that contains natural values that contribute to the natural biological diversity or geological diversity of the area of land, or both; and are unique, important or have representative value

**Game Reserve**

An area of land containing natural values that are unique, important or have representative value particularly with respect to game species.

**Conservation Areas Listing**

An area of land predominantly in a natural state but mining, and in some cases, hunting, may be permitted.

**Nature Recreation Area**

An area of land predominantly in a natural state; or containing sensitive natural sites of significance for recreation

**Regional Reserve**

An area of land with high mineral potential or prospectivity; and predominantly in a natural state.

**Historic Site**

An area of land of significance for historic cultural heritage.

**Private Sanctuary**

An area of freehold land where the owner has agreed to the protection of significant natural and/or cultural values.

Notes: Maria Island is a national park. The Marine Extension to the park includes all the waters up to 1 km offshore from the north-eastern point of Fossil Bay to Return Point on the north-west coast of the island, a total area of 1500 hectares. The no fishing zone is marked on land by white stone markers at Return Point and Cape Boullanger (which is opposite Ile du Nord). Only recreational fishing is permitted within the fishing zone of the Reserve.

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## **APPENDIX 1: Relevant Legislation and Policy Documents**

### **Commonwealth**

Bushcare: The National Vegetation Initiative 1998  
Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)  
National Strategy for Ecologically Sustainable Development 1992  
National Water Quality Management Strategy 1998  
The National Weeds Strategy: A Strategic Approach to Weed Problems of National Significance

### **Tasmanian Legislation**

Aboriginal Relics Act 1995  
National Parks and Wildlife Act 1970  
Threatened Species Protection Act 1995  
Water Management Act 1999  
Weed Management Act 1999

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Draft Reserve Management Code of Practice 2001, Parks and Wildlife Service  
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State Coastal Policy 1996, DPIWE  
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Tasmanian Natural Resource Management Framework 2002  
Vegetation Management Strategy for Tasmania, Bushcare Unit, DPIWE  
Water for Ecosystems Policy 2001, DPIWE  
WeedPlan: A Tasmanian Weed Management Strategy, DPIWE

### **Glamorgan Spring Bay Council**

Glamorgan-Spring Bay Planning Scheme 1984

### **Existing Plans and Strategies Relating to the Prosser Catchment**

A User's Guide to Monitoring Vegetation, Bushcare Unit, DPIWE  
Action Plan for Marine and Coastal Management in east and north-east Tasmania, Coastlink and National Oceans Office  
Bushcare Toolkit, Bushcare Unit, DPIWE  
Community Recovery Plan Eucalyptus Ovata-Callitris Oblonga Forest 2000-2004, DPIWE  
East Coast Regional Weed Strategy, January 2000, East Coast Regional Weed Strategy Group  
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Fisheries

Birds Australia, [www.birdsaustralia.com.au](http://www.birdsaustralia.com.au)

Bushcare, [www.bushcare.tas.gov.au](http://www.bushcare.tas.gov.au)

Forestry Tasmania, [www.forestrytas.com.au](http://www.forestrytas.com.au)

Forest Practices Board, Tasmania, [www.fpb.tas.gov.au](http://www.fpb.tas.gov.au)

Glamorgan-Spring Bay Council, [www.gsbc.tas.gov.au](http://www.gsbc.tas.gov.au)

Private Forests Tasmania, [www.privateforests.tas.gov.au](http://www.privateforests.tas.gov.au)

Tamar Valley Weed Strategy, [www.weeds.tassie.net.au](http://www.weeds.tassie.net.au)

Tasmanian Government, State/Local Government Partnership Agreements

[www.dpac.tas.gov.au/divisions/lgo/partnerships](http://www.dpac.tas.gov.au/divisions/lgo/partnerships)

Tasmanian Government, Department of Premier and Cabinet - Local Government Division,  
[www.dpac.tas.gov.au/divisions/lgo](http://www.dpac.tas.gov.au/divisions/lgo)

Tasmanian Government, Department of Primary Industries, Water and Environment (DPIWE),  
Tasmania, [www.dpiwe.tas.gov.au](http://www.dpiwe.tas.gov.au)

Tasmanian Government, DPIWE, Parks and Wildlife Service, GIS, [www.gisparks.tas.gov](http://www.gisparks.tas.gov)

Tasmania Together, [www.tasmaniattogether.tas.gov.au](http://www.tasmaniattogether.tas.gov.au)

### APPENDIX 3: Inventory of National Estate Sites: Prosser Catchment

The following is a list of all sites that are recorded on the Register of the National Estate and their class and legal status (Australian Heritage Commission, website).

Place/Site Name	Location.	Class	Legal Status
Cape Bernier - Sandspit River Area	Wielangta Rd, Kellevie	Natural	Indicative
Convict Road	Tasman Hwy, Orford	Historic	Indicative
Indigenous Place	Buckland	Indigenous	Registered
Malunnah	5 Tasman Hwy, Orford	Historic	Registered
Maria Island Convict Sites	Triabunna	Historic	Registered
Maria Island Marine Region	Orford	Natural	Registered
Maria Island National Park	Triabunna	Natural	Registered
Mount Douglas Area	Buckland	Natural	Indicative
Mount Morrison Forest Reserve (North)	Phipps Rd, Runnymede	Natural	Indicative
Rheban Spit Private Sanctuary	Rheban Rd, Orford	Natural	Registered
Rostrevor Stables	Tasman Hwy, Triabunna	Historic	Registered
St John the Baptist Anglican Church and Churchyard	Duke St, Buckland	Historic	Registered
Three Thumbs State Reserve & adjacent area	Orford	Natural	Indicative
Wielangta Refugia Site	Orford	Natural	Indicative

#### Explanation of entries in Legal Status field

**Indicative:** data provided to or obtained by the Commission has been entered into the database and the place is at some stage in the assessment process. The Commission has not made a decision on whether the place should be entered in the Register.

**Registered:** the place is in the Register of the National Estate. Although some places may be legally registered because they are within a larger registered area they may not necessarily possess intrinsic significance.

#### APPENDIX 4: Tasmanian Geoconservation Database Records: Prosser Catchment

Site Name	Location	Type	Comments	Age	Degradation / Conservation issues
Sheepdip Creek Marsh	Sheepdip Creek, Buckland Military Training Area (BMTA)	Landform and palaeo-environment stratigraphy	Infilled deflation hollow lake, possibly containing a long Holocene pollen record. This is the only deflation hollow identified to date in the Eastern Tiers	Holocene	None / Potential threats
Bluff River sandstone cliffs/caves complex	Ten km long gorge section of Bluff River, BMTA.	Weathering and fluvial	Extensive river gorge sandstone cliff and cave complex. River erosion and tafoni-style (salt weathering) caves, some with delicate weathering features.	Cainozoic	None / Potential threats
Bluff River sandstone cave carbonate speleothems	Bluff River Gorge	Speleothems and weathering	Small calcite stalactites and flowstone under sandstone overhangs with no obvious source of carbonate, (possibly siderite nodules in sandstone).	Holocene	None / Potential threats
Wielangta Slump landform complex	Wielangta State Forest east of Sandspit River and west of Pony Bottom Creek.	Mass movement and periglacial	Complex, well developed 'fossil' mass movement landform complex. Includes slump ponds of stratigraphic & palynological significance, & evidence of Holocene slope instability with multiple colluvium layers of differing age. Potentially important research site.	Quaternary	Slight / Potential threats
Hellfire Bluff uplifted marine cliff, block slide and topple	Seawards slopes & cliffs of Hellfire Bluff, from Blowhole Point to Cape Bernier, & possibly north.	Mass movement	Blockslide and topple complex resulting from partial collapse of coastal cliffs, with associated enclosed depressions. Possible evidence of a former sea cliff.	Quaternary	None / Secure
Sandspit Creek sandstone cliffs/caves complex	Sandspit River Forest Reserve, Wielangta area	Weathering and fluvial	Sandstone cliffs with large seepage-style caves and overhangs	Cainozoic	Unknown / Unknown
Sand River sandstone cliffs/caves complex	Sand River valley rim, southern end BMTA.	Weathering	Extensive valley rim sandstone cliff and cave complex	Cainozoic	None / unknown

**APPENDIX 4: Tasmanian Geoconservation Database Records: Prosser Catchment (continued)**

Site Name	Location	Type	Comments	Age	Degradation & Conservation issues
Buckland Eocene Fossil Site	In the bank of Tea Tree Rivulet near Buckland	Palaeontology	Early Eocene mudstones were exposed in a river bank. These contained pollen and a well preserved flora that included Athrotaxis and the extinct cycad Pterostoma.	Tertiary	Destroyed by river erosion probably eroded out of existence.
Rheban Beach - Earlham Lagoon	Entire spit, lagoon and saltmarsh at mouth of Sandspit River in Private Sanctuary	Coastal landform	An unusually late Holocene spit comprised of four disconformable sets of beach ridges reflecting changing conditions in Mercury Passage. Saltmarsh often has shallow organic horizons over sand with specialised salt tolerant vegetation community.	Holocene	Potential threat

## APPENDIX 5: Threatened Species List for the Prosser Catchment

### Threatened Fauna Species

NAME	COMMON NAME	TAS. ENDEMIC	TAS. STATUS	NATIONAL STATUS
<i>Pardalotus quadragintus</i>	Forty spotted pardalote	e		V
<i>Aquila audax fleayi</i>	Wedge-tailed eagle	e	E	EN
<i>Lathamus discolor</i>	Swift parrot		E	EN
<i>Podiceps cristatus</i>	Great crested grebe		R	nil
<i>Sterna albifrons sinensis</i>	Little tern		E	nil
<i>Sterna nereis nereis</i>	Fairy tern		R	nil
<i>Prototroctes maraena</i>	Australian grayling		V	VU
<i>Pseudalmenus chlorinda myrsilus</i>	Tasmanian hairstreak butterfly	e	<i>Note 1</i>	
<i>Lissotes latidens</i>	Broad-toothed stag beetle	e	E	nil
<i>Thylacinus cynocephalus</i>	Thylacine	e	X	EX

#### Note 1

The Tasmanian hairstreak butterfly is waiting gazettal.

#### Status Code:

under the Tasmanian Threatened Species Act

e - Tas endemic

E - endangered

V - vulnerable

R - rare

P - protected

X - extinct

under the Commonwealth Biodiversity and Threatened Species Act

EN - endangered

VU - vulnerable

CR - critical

EX - extinct



## APPENDIX 5 Threatened Species List for the Prosser Catchment

### Threatened Plant Species

	NAME	COMMON NAME	TAS ENDEMIC	TAS STATUS	NATIONAL STATUS	HABITAT - GENERAL	HABITAT – SPECIFIC	COMMUNITY ASSOCIATION 1 <sup>ST</sup> /2 <sup>ND</sup>
1	<i>Acacia axillaris</i>	midlands wattle	e	V	VU	Wet eucalypt woodland/forest	mainly confined to riparian habitats in the Midlands and eastern Tasmania	<i>E. ovata</i> / <i>E. rodwayi</i>
2	<i>Acacia ulicifolia</i>	juniper wattle		R		Coastal heath/ open forest or woodland	sandy heaths, open forests and woodlands, generally in open and drier areas on light soils.	
3	<i>Agrostis aff. hiemalis</i>	alpine winter bent		R		Alpine	known only from Harzt Pass	
4	<i>Asplenium hookerianum</i>	hooker's spleenwort		V	VU	Sub-alpine	heavily shaded side creeks among the riparian tree roots or wet rock faces, at or above high water level. Known with certainty only from Hellyer Gorge, Dry's Bluff and near Orford	
5	<i>Austrostipa bigeniculata</i>	double-jointed spear grass		R		Dry sclerophyll woodland/forest	occurs in open woodland/ grassland on Forester Peninsula, Maria Island, Midlands, Queens Domain & south of St Helens	<i>Stipa stiposa</i>
6	<i>Baumea gunnii</i>	slender twig rush		R		Riparian	Marshes, wet moors, river banks near sea level, eg Apsley & Cygnet Rivers	

**APPENDIX 5 Threatened Species List for the Prosser Catchment (Continued)**

**Threatened Plant Species**

	NAME	COMMON NAME	TAS ENDEMIC	TAS STATUS	NATIONAL STATUS	HABITAT - GENERAL	HABITAT – SPECIFIC	COMMUNITY ASSOCIATION 1 <sup>ST</sup> /2 <sup>ND</sup>
7	<i>Brachyscome sieberi gunnii</i>	sieber's daisy	e	R		Dry Forest		
8	<i>Bracteantha bicolor</i>	white alpine everlasting		R		Grassland/ Wetland	Note 1	
9	<i>Caladenia carnea</i>	pink fingers			p			
10	<i>Caladenia filamentosa filamentosa</i>	daddy long-legs		R		Dry Sclerophyll Woodland/Forest	heathy and sedgy open Eucalypt forest and woodland on sandy soils	
11	<i>Carex gaudichaudiana</i>			pl				
12	<i>Carex longebrachiata</i>	drooping sedge		R		Grassland/Grassy Woodland	rough grassland & pastures. Recorded from the North- East, Central Highlands, Midlands and South West	
13	<i>Caustis pentandra</i>	thick twist rush		R		Heathland/ Coastal	East Coast - Freycinet & St Helens Note 1	
14	<i>Centaurium spicatum</i>	australian centaury	i	R		Dry Sclerophyll Woodland/Forest	often found on heavy soils around lake edges (often saline); seasonally inundated ground. Sometimes found in near- coastal areas	

**APPENDIX 5 Threatened Species List for the Prosser Catchment (Continued)**

**Threatened Plant Species**

	NAME	COMMON NAME	TAS ENDEMIC	TAS STATUS	NATIONAL STATUS	HABITAT - GENERAL	HABITAT – SPECIFIC	COMMUNITY ASSOCIATION 1 <sup>ST</sup> /2 <sup>ND</sup>
15	<i>Conospermum hookeri</i>	variable smoke bush	e	p		Coastal Heath/Woodland	known on the East Coast; Freycinet & St Helens	
16	<i>Cyphanthera tasmanica</i>	tasmanian ray flower	e	R		Dry Sclerophyll Woodland / Coastal	mainly coastal areas, regenerating well after fire. Known on Maria Island on granite soils	
17	<i>Danthonia procera</i>	tall wallaby-grass		p		tall wallaby-grass		
18	<i>Desmodium gunnii</i>	slender tick trefoil		V		Grassland/Grassy Woodland/Forest	found on a range of soil types	<i>E. sieberi</i> / <i>E.viminalis</i>
19	<i>Deyeuxia apsleyensis</i>	apsley bent grass	e	R		Dry Sclerophyll Woodland/Forest	undulating low hills east of the Apsley River, above Apsley Gorge	<i>E.amygdalina</i> / <i>E.viminalis</i>
20	<i>Deyeuxia benthamiana</i>	bentham's bent grass		R		Wet Eucalypt Woodland/Forest	known from the East Coast region and Mt. Wellington	
21	<i>Deyeuxia densa</i>	heath bent grass		R		Heathland/ Riparian	open to slightly shaded situations, from sea level to 750m in heaths, sedgelands, stream banks; Furneaux Group, East Coast, South West & Central Highlands. Known from Cygnet River	
22	<i>Dianella longifolia longifolia</i>	pale flax lily		R		Grassland/Grassy Woodland	Themeda grassland	<i>E.pauciflora</i> / <i>E.ovata</i>
23	<i>Dichopogon strictus</i>	chocolate lily		R		Grassland/Grassy Woodland	Themeda grassland Note 1	<i>E.amygdalina</i> / <i>E.viminalis</i>

**APPENDIX 5 Threatened Species List for the Prosser Catchment (Continued)**

**Threatened Plant Species**

	NAME	COMMON NAME	TAS ENDEMIC	TAS STATUS	NATIONAL STATUS	HABITAT - GENERAL	HABITAT – SPECIFIC	COMMUNITY ASSOCIATION 1 <sup>ST</sup> /2 <sup>ND</sup>
24	<i>Epacris acuminata</i>	clasping-leaf heath	e	R	EN	Wet Eucalypt Woodland/Forest	found on Jurassic dolerite, mostly in sub-alpine heathy woodland on mountain summits at 600-1100m elevation, or in riparian dry sclerophyll forest at 30-590 m elevation. Note 1	
25	<i>Epacris virgata</i> var. <i>autumnalis</i>	pretty heath		V	EN	Dry Sclerophyll Woodland/Forest	Foothills and flats on Jurassic Dolerite. Restricted to a small range south of Orford.	
26	<i>Eucalyptus barberi</i>	Barbers gum	e	R		Dry Sclerophyll Woodland/Forest	shallow doleritic soils along the east coast, usually occurs in scrub rather than forest; <i>E. globulus</i> may be present at these sites	<i>E.pulchella</i> / <i>E.ovata</i>
27	<i>Eucalyptus globulus pseudoglobulus</i>	gippsland blue gum		R		Dry Sclerophyll Woodland/Forest	moist loams to clays, predominately in South West	
28	<i>Euphrasia collina deflexifolia</i>	eastern eyebright	e	R		Open Woodland/ Heathland	open ground maintained by fire or exposure, often associated with road edges, tracks & sometimes found in saddles near head waters of creeks	

**APPENDIX 5 Threatened Species List for the Prosser Catchment (Continued)**

**Threatened Plant Species**

	NAME	COMMON NAME	TAS ENDEMIC	TAS STATUS	NATIONAL STATUS	HABITAT - GENERAL	HABITAT – SPECIFIC	COMMUNITY ASSOCIATION 1 <sup>ST</sup> /2 <sup>ND</sup>
29	<i>Gahnia rodwayi</i>	rodway's saw sedge	e	R		Dry Sclerophyll Woodland/Forest	heath or grass-sedge understorey, sometimes coastal	<i>E.pulchella</i>
30	<i>Glossostigma elatinoides</i>	small mudmat		R		Riparian	mud and shallow water along margins of swamps & streams; Prosser River near Orford in rocky areas	
31	<i>Glycine latrobeana</i>	clover glycine		V	VU	Dry Sclerophyll Woodland/Forest /Grassland and Grassy Woodland	associated with flat sites with loose, sandy soils in native grassland & woodland, sometimes on river banks. Occurs in Midlands, Central Highlands & North-East	<i>E.pauciflora</i> / <i>E.amygdalina</i> / <i>E.viminalis</i>
32	<i>Gynatrix pulchella</i>	common hemp bush		R		Wet Eucalypt Woodland/Forest Riparian	a riparian shrub occurring along rivers and in drainage channels in north of Tas. Note 1	
33	<i>Gyrostemon thesioides</i>	broom wheel fruit		R		Dry Sclerophyll Woodland/Forest		
34	<i>Haloragis heterophylla</i>	variable raspwort		R		Grassland/Grassy Woodland	known only from wet places in the Midlands, North, South East and East Coast of Tasmania; occurs in heavy clay soils in NSW	
35	<i>Helichrysum bicolor</i>			P				

**APPENDIX 5 Threatened Species List for the Prosser Catchment (Continued)**

**Threatened Plant Species**

	NAME	COMMON NAME	TAS ENDEMIC	TAS STATUS	NATIONAL STATUS	HABITAT - GENERAL	HABITAT – SPECIFIC	COMMUNITY ASSOCIATION 1 <sup>ST</sup> /2 <sup>ND</sup>
36	<i>Isoetes elatior</i>	tall quillwort	e	R		Wetland / Riparian	all plant parts are submerged year round, roots in gravel/silt substrate in moderate to swiftly flowing water; often with <i>I. muelleri</i> in calmer water: mud or silt	<i>Isoetes muelleri</i>
37	<i>Juncus prismatocarpus</i>	branching rush		R		Wet Eucalypt Woodland/Forest	Swampy places	
38	<i>Juncus vaginatus</i>	clustered rush		R		Riparian	permanently wet soakage area of marshes or stream edges	
39	<i>Lepidium pseudotasmanicum</i>	shade peppergrass		R		Grassland/Grassy Woodland	associated with bare ground, 'waste' or disturbed sites, often underneath introduced conifers	<i>E.viminalis</i> / <i>E.amygdalina</i>
40	<i>Lepilaena preissii</i>	slender water mat		R		Wetland	fresh to saline water, in estuaries & inland lakes; East Coast, King & Flinders Islands	
41	<i>Leucochrysum albicans tricolor</i>	hoary sunray		p		Grassland/Grassy Woodland	occurs from sea level to montane grasslands; Midlands and North-West, on basalt and mudstone	<i>E.pauciflora</i> / <i>E.ovata</i>

**APPENDIX 5 Threatened Species List for the Prosser Catchment (Continued)**

**Threatened Plant Species**

	NAME	COMMON NAME	TAS ENDEMIC	TAS STATUS	NATIONAL STATUS	HABITAT - GENERAL	HABITAT – SPECIFIC	COMMUNITY ASSOCIATION 1 <sup>ST</sup> /2 <sup>ND</sup>
42	<i>Limonium australe</i>	sea lavender		R		Estuarine		
43	<i>Lobelia rhombifolia</i>	branched lobelia		R		Dry Sclerophyll Woodland/Forest	occurring mainly on the East Coast, but also known from George Town, Southport and Cleveland	
44	<i>Millotia tenuifolia</i>	soft millotia		R		Dry Grassy Woodland/ Grassland	frequently occurs in dry places; sandy, light loamy soils	<i>E.amygdalina</i> / <i>E.viminalis</i>
45	<i>Mitrasacme divergens</i>	wiry mitrewort		p				
46	<i>Odixia achlaena</i>	odixia	e	R		Dry Sclerophyll Woodland/Forest	known only from near Kellevie, in the South-East	<i>Eucalytus</i> forest with <i>E.cordata</i> present
47	<i>Olearia hookeri</i>	hooker's daisy bush	e	R		Dry Sclerophyll Woodland/Forest	occasional in East & South-East & near Hobart; dry, rocky slopes; known on the Meehan Range on mudstone & at Friendly Beaches on sediment. Note 1	
48	<i>Ozothamnus lycopodioides</i>	lycopoid everlasting	e	R		Dry Sclerophyll Woodland/Forest	occurs only on east coast; rockplates & rocky slopes	<i>E. pulchella</i>
49	<i>Pimelea flava flava</i>	yellow rice flower		R				

**APPENDIX 5 Threatened Species List for the Prosser Catchment (Continued)**

**Threatened Plant Species**

	NAME	COMMON NAME	TAS ENDEMIC	TAS STATUS	NATIONAL STATUS	HABITAT - GENERAL	HABITAT – SPECIFIC	COMMUNITY ASSOCIATION 1 <sup>ST</sup> /2 <sup>ND</sup>
50	<i>Pomaderris intermedia</i>	tree pomaderris		R		Wet Eucalypt Woodland/Forest	lowland open forests, woodlands and heaths	
51	<i>Pomaderris phyllicifolia phyllicifolia</i>	narrow leaf pomaderris		R				
52	<i>Pterostylis squamata</i>	ruddy greenhood		R		Dry Sclerophyll Woodland/Forest	Well-drained sandy and loamy soils in heathy and grassy open eucalypt forest, woodland and heathland; eastern regions	
53	<i>Ranunculus amphitrichus</i>	river buttercup		R				
54	<i>Scaevola aemula</i>	fairy fanflower		E		Dry Sclerophyll Woodland/Forest	dolerite slopes, occurs on the East Coast, extending from the Apsley River down to the Prosser River. Also recorded from the Central Highlands	
55	<i>Scleranthus brockiei</i>	brock knawel		R		Alpine		
56	<i>Scleranthus fasciculatus</i>	spreading knawel		V		Grassland/Grassy Woodland	recorded in 1948 from the Queens Domain, Hobart	
57	<i>Scutellaria humilis</i>	dwarf scullcap		R		Wet Eucalypt Woodland/Forest	found in moist, shady places in the east of the state Note 1	



**APPENDIX 5 Threatened Species List for the Prosser Catchment (Continued)**

**Threatened Plant Species**

	NAME	COMMON NAME	TAS ENDEMIC	TAS STATUS	NATIONAL STATUS	HABITAT - GENERAL	HABITAT – SPECIFIC	COMMUNITY ASSOCIATION 1 <sup>ST</sup> /2 <sup>ND</sup>
58	<i>Spyridium eriocephalum</i>	heath spyridium		E		Dry Sclerophyll Woodland/Forest	local in dry places at Risdon & in the east, north & north-west. Note 1	
59	<i>Spyridium lawrencei</i>	small leaf spyridium	e	V	EN	Dry Sclerophyll Woodland/Forest	restricted to the central east coast from Avoca to Orford. Recorded from the Swan & St Pauls Rivers in riparian scrub & also on forested slopes north-west of Bicheno.	
60	<i>Spyridium microphyllum</i>	small-leaf spyridium	e	p				
61	<i>Spyridium parvifolium parvifolium</i>	australian dusty miller		R		Dry Sclerophyll Woodland/Forest	local in the North, North East, North West and on the Bass Strait Islands	
62	<i>Stellaria multiflora</i>	rayless starwort		R		Dry Sclerophyll Woodland/Forest	dry pasture and stony places throughout the state	
63	<i>Stenanthemum pimeleoides</i>	spreading stenanthemum	e	V	EN	Dry Sclerophyll Woodland/Forest	Tertiary gravels and sands	E.amygdalina
64	<i>Stipa bigeniculata</i>	Rare spear grass		p				
65	<i>Stipa nodosa</i>	spear grass		p				
66	<i>Stipa scabra</i>	rough spear-grass		p				

**APPENDIX 5 Threatened Species List for the Prosser Catchment (Continued)**

**Threatened Plant Species**

	NAME	COMMON NAME	TAS ENDEMIC	TAS STATUS	NATIONAL STATUS	HABITAT - GENERAL	HABITAT – SPECIFIC	COMMUNITY ASSOCIATION 1 <sup>ST</sup> /2 <sup>ND</sup>
67	<i>Teucrium corymbosum</i>	forest germander		R		Dry Sclerophyll Woodland/Forest	rocky slopes	<i>E. viminalis</i> / <i>E.pulchella</i>
68	<i>Thelymitra antennifera</i>	rabbit-ears		E		Coastal Heathland	Poorly/moderately drained peaty and sandy soils. Sometimes found in mossy skeletal soils on granite bedrock. Known only from sites on the east and north east coasts.	
69	<i>Thryptomene micrantha</i>	ribbed thryptomene		R		Heathland		
70	<i>Uncinia elegans</i>	handsome hook sedge		R		Alpine/Subalpine/ Eucalypt Grassy Woodland	one or two records from each of the regions of: Central Highlands, Midlands, East Coast and South West.	<i>E.gunnii</i>
71	<i>Veronica plebeia</i>	trailing speedwell		R		Wet Eucalypt Woodland/Forest	occurs in Wet Scerophyll forest in the north of the state, also recorded from limestone rocks near the Gordon River	
72	<i>Viola cunninghamii</i>	cunningham's violet		R		Wet Eucalypt Woodland/Forest	wide range; usually confined to moist sites below alpine areas, such as the Western Tiers.	

**APPENDIX 5 Threatened Species List for the Prosser Catchment (Continued)**

**Threatened Plant Species**

	NAME	COMMON NAME	TAS ENDEMIC	TAS STATUS	NATIONAL STATUS	HABITAT - GENERAL	HABITAT – SPECIFIC	COMMUNITY ASSOCIATION 1 <sup>ST</sup> /2 <sup>ND</sup>
73	<i>Vittadinia gracilis</i>	woolly new holland daisy		R		Dry Sclerophyll Woodland/Forest Grassland	rocky banks in Themeda grasslands; Midlands /Derwent Valley area	Themeda triandra

**Status Code:**

Under the Tasmanian Threatened Species Act

e – Tas endemic  
 i – possibly an introduced species, to be determined  
 pl - possibly a rare subspecies, to be determined  
 E - endangered  
 V – vulnerable  
 R – rare  
 p - protected

Under the Commonwealth Biodiversity and Threatened Species Act

EN - endangered  
 VU - vulnerable  
 CR - critical  
 p - protected

**Note 1:** Within the catchment, the species is only recorded on Maria Island