



DEPARTMENT *of*
PRIMARY INDUSTRIES,
WATER *and*
ENVIRONMENT

**ENVIRONMENTAL
MANAGEMENT
GOALS
for TASMANIAN
SURFACE WATERS**

KING ISLAND

September 2003



Proposed Environmental Management Goals

For Tasmanian Surface Waters:

King Island Catchments

Between late 2001 and 2003 Protected Environmental Values (PEVS) were set for King Island. A discussion paper was prepared to facilitate public participation in setting the PEVs. This discussion paper was intended as a basis for community and stakeholder participation in the process of developing environmental management goals for the waterways that are located within the King Island catchments.

The paper was prepared by the Division of Environment Division in association with the Land and Water Management Branch, of the Department of Primary Industries, the Tasmanian Parks and Wildlife Service Water and Environment and the King Island Council.

This paper has been modified into its current form to reflect that the process for the King Island catchments is now complete. It is considered, however, that much of the information included in the discussion paper should remain as a record of the PEV setting process.

Words and expressions used in this final paper have, unless the contrary intention appears, the same meaning as defined in the *State Policy on Water Quality Management 1997* and the *Environmental Management and Pollution Control Act 1994*. Ecosystem refers to physical, chemical and biological aspects of the aquatic environment.

This final paper is divided into six main sections:

- The first part describes water reforms in general.
- The second part provides a brief description of the King Island catchments.
- Part three discusses the State Policy on Water Quality Management.
- The final Protected Environmental Values for the King Island catchments are shown in part four.
- Water quantity values are discussed in part five, and
- Part six lists the community water values for the catchments.

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1 INTRODUCTION

1.1 Why do we need water reform?

A good supply of fresh, clean water is an essential requirement for human life, a healthy environment and a productive economy.

We need water for drinking, for recreational activities like fishing, swimming and boating, to provide the food we eat and export, to generate clean electricity, and to support mining and other industries.

We also expect our rivers and lakes to look healthy, and provide a healthy environment for a wide range of aquatic plants and animals.

We sometimes take for granted that our use of water resources is sustainable; that our hard-working water will still be there in a healthy state to provide the same benefits for future generations. Our waterways are not immune from problems, however, and many of our river systems are showing signs of stress.

Tasmanian rivers range from relatively short, swiftly flowing rivers fed from mountain sources to slowly flowing rivers which may be reduced to a series of pools during dry periods.

River health, and the health of the economies that depend upon them, is clearly linked to the way we use the waters; the degree of regulation we impose; the quantity of water we take out; and the quality of water we return.

In response to a general recognition across the community of the importance of having clean water and appropriate river flows, the Tasmanian Government

has recently introduced a range of reforms designed to ensure that these values are protected for the future of the State.

1.2 What are these reforms?

Two major aspects of the water reforms are water quality management and water quantity management.

(a) water quality management

The *State Policy on Water Quality Management 1997* is designed to **maintain or enhance** the quality of Tasmanian surface waters. Principal objectives of the Policy include:

- Move on from reliance on ‘end of pipe’ controls to take into consideration the number of discharges into a given water body, or the sensitivity or current condition of the water body.
- Ensure that diffuse source and point source pollution does not endanger the achievement of water quality objectives, and that pollutants discharged to waterways are reduced as much as possible by the use of best practice environmental management;
- Facilitate and promote integrated catchment management.
- Focusing on overall water quality management strategies by identifying those water quality values and uses that are considered worthy of protection.

The first purpose of this paper is to explain how the water quality values will be identified and used. Local communities have a key role in

identifying these values in their catchments.

(b) water quantity management

The Government has recently finalised new water management legislation to replace the *Water Act 1957*. *The Water Management Act, 1999* provides for:

- Major changes to the institutional arrangements for water management;
- The ready transfer of water rights between different users;
- Enhanced stakeholder and community input into water allocation and management; and
- A more transparent and equitable water allocation system, including formal allocation of flows to maintain a healthy river environment.
- The development of water management plans

The second purpose of this discussion paper is to canvas your views on what you value in your water resources from a water quantity perspective.

1.3 What do we want the public to do?

Local communities have a valuable understanding of their regional waterways. The following questions of catchment stakeholders were asked.

- Which of your activities rely upon maintaining or enhancing the flow of water into catchment waterways?
- Are there certain places on your rivers that you traditionally use for swimming or other recreational activities?
- Do you fish in them?
- Are there specific features of your rivers and streams that are recognized scenic attractions, such as rapids or waterfalls?
- Do you know of rare or endangered animals or plants in, or adjacent to,

specific areas of your rivers or streams?

- Do you use water for livestock watering?
- Does your river supply the local town water supply?
- Do you draw water from it to irrigate your farm?
- How often do you need to draw water from it, and when?

The catchment stakeholders/publics answers to these questions helped to develop the community water values for regional wetlands and waterways. People had different views on these questions. What was needed to do was to try to think about the "big" picture, and how our own objectives may impact on the whole catchment and the wider community.

Planning to ensure sustainable use of these waters and protection of river health requires sound knowledge of local water quality and quantity issues. Therefore the public submissions providing local knowledge were important.

1.4 How will the public input be used?

Information from the public on values particularly relating to water quality assisted the Board of Environmental Management and Pollution Control and the councils to finalise the range of Protected Environmental Values for the surface waters of the regional waterways. These values will be used in management planning for the region.

Information from community stakeholders, catchment groups and the public on water quantity values will be used to better plan the water resources of the catchments. Water management planning will be closely linked with overall catchment management planning to put water resource management on a

sustainable footing for the State. Water management planning will be undertaken

on a priority basis, with stressed rivers in the State being targeted initially.

2 KING ISLAND CATCHMENTS OVERVIEW

2.1 Catchment Description

King Island lies at the western entrance to Bass Strait, midway between mainland Tasmania and Victoria. The total Island size is in the vicinity of 110,000ha. The Island is generally flat with the highest point being 168m above sea level. Coastal processes influence the vast majority of the Island. The population of the Island was 1,797 people in 1996.¹ However, it is widely recognised that the population has declined since the 1996 census.²

The climate on the Island is subject to the “Roaring Forties” which are strong prevailing westerly winds, however, overall the temperatures are moderate and reliable and the Island receives a moderate to high rainfall making it conducive to year round pasture growing. The mean daily maximums for King Island show annual variations from 20.6°C in February and 12.9°C in July, with minimum average temperatures varying from 13.1°C in February to 7.8°C in July.³ Precipitation ranges from 35.6mm in January to 124.1mm in July, with a yearly annual rainfall of 900mm.

2.1.1 Geology and Soil Types

The geology of the island is based on precambrian granite bedrock. On the

¹ Australian Bureau of Statistics, 1996. Census of Population and Housing – Basic Community Profile. Commonwealth of Australia.

² Morgan, H, 2001. King Island Natural Resource Management Review and Strategic Action Plan. King Island Natural Resource Management Group. Resource Management Group.

³ Data from the Bureau of Meteorology website: www.bom.gov.au/climate

eastern side of the Island there are metamorphic sedimentary grey quartzites, schists, siltstones and sandstones in the south east while for the west of the island the precambrian bedrock extends nearly the whole Island length. There are 24 geoconservation sites recognised on the Island ranging from areas of local significance to ones of World significance. Many of these occur in coastal areas.

King Island is divided into four physiographic units: the plains, plateaus, swamps and lagoons and coastal dunes.⁴ Most of the streams and rivers on the Island flow from the plateau before flowing through the countryside to sea. The heads of many of these streams and rivers occur in flat poorly drained areas while the lower parts of the streams cut steeply to the sea. For a large portion of the west of the Island the water flowing through the dunes has formed a system of lagoons.

Coastal processes influence all of King Island, and it is difficult to describe where the coast begins and ends. The geology of the Island has produced soils of light texture varying from sands to sandy loams. Some of the soil types have been modified by a high content of organic matter. Eight distinct soil categories have been named and identified on King Island and supports a distinctive vegetation type.

Natural erosion processes occur on the island from water and wind, particularly due to the sandy nature of the soils. These natural processes have been

⁴ Richley, L.R., 1984. Land Systems of Tasmania Region 1. Department of Agriculture, Tasmania.

exacerbated by land clearance practices since European settlement. The main forms of erosion on King Island are: wind erosion, mass movement, gully erosion, river bank erosion, stream channel erosion, sheet erosion and tunnel erosion⁵. Many of the rivers are susceptible to erosion based on their stream geomorphology and soil types.

Due to the exposed pyrite on the Island acid sulphate drainage can be a problem in some areas. Some exposure of the acid sulphate soils can be attributed to agricultural practices and the development of agricultural drainage. There is evidence of this on Seal River and Bungaree Creek with pH levels as low as 2 - 3 being recorded. pH on the Seal River is likely to be more as a result of past quarrying at Pearshape rather than from agricultural practices. These pH levels are detrimental to the health of downstream flora and fauna.

There is some evidence of dry land salinity on King Island. Salinity is evident in the Nugara and Naracoopa sands at Reekara, Loorana and Surprise Bay regions, Yellow Rock and Yambacoona. Salinity is an issue for the island as over thousands of year's winds and rains have deposited salts across the Island and thus salt has accumulated through the soil profile. The original vegetation of swamp forests and other salt tolerant species would have held both the water and salt in a natural balance. It is therefore not irrigation alone that causes salinity on the island, although it may accelerate the process.

2.1.2 King Island Flora

The vegetation on the Island has been significantly modified since European settlement by increases in fire and land clearing practices. Native vegetation only remains on approximately 35,894ha or 32% of the Island. Of this, about 6,800ha is in the Lavinia Nature Reserve, 550ha in Seal Rocks Nature Reserve, 1,000ha in Pegarah State Forest and <200ha in Kentford State Forest. Historically King Island consisted of massive eucalypt forests. Wildfires and large scale clearing have meant that very few mature trees remain today and the island is becoming dominated with pasture and rapidly diminishing scrub/heathland.

Many of the remaining areas of native vegetation (76%) occur on private land with the largest unreserved tract of native vegetation occurring on the south of the island from Grassy to Red Hut and Pearshape.

Due to the vegetation decline on King Island riparian vegetation is also at risk. Vegetation decline can be serious and can cause a decline in water quality, decline in aquatic habitat quality, loss of riparian buffer zones and increase the likelihood of weed invasion. A further cause of riparian vegetation decline is stock access to the waterways. Steps are being taken to manage stock access with the use of stock exclusion fences by some farmers. A number of the streams on the Island namely Fraser and Sea Elephant Rivers, Yarra Creek and Barrier Creek are gradually becoming fenced to exclude stock.

2.1.3 King Island Heritage

It appears that the first people to inhabit the Island were sealers in the late 1700's. Many shipwrecks have occurred around the Island. Settlers in

⁵ Grice, M.S. 1995. Assessment of Soil and Land Degradation on Private Freehold Land in Tasmania. Department of Primary Industries and Fisheries Report.

the early 1900's moved into the interior of the Island with the main objectives of clearing and burning well established timber country for growing grass and clover. The Island had a few population booms and some of which are attributed to the post world war settlement schemes.

Evidence of aboriginal occupation has been found on King Island. 23 main sites have been identified and most of these are small midden areas.

2.1.4 Employment and Industry

The major areas of employment for the Island are Agriculture, Forestry and Fishing, with the majority being employed in the agricultural sector. Agriculture is a very important industry for King Island with the Island being well known for its high quality beef and dairy produce due to the clean image of the Island. Other major industries for the Island are fishing, marine farming, kelp and forestry. Cray fishing is a large employer and brings a large amount of money into the community. Oyster farming is also a growing industry particularly in Sea Elephant River. Kelp harvesting is another valuable industry and the preliminary processing of the kelp occurs locally.

There is a small amount of forestry in evidence with about 1,300 hectares in State Forest Reserve. Forestry Tasmania manages the plantation areas of Pinus Radiata and native Bluegum. Aside from some other smaller industries on the Island such as the production of pepper, honey, organic herbs and teas, tourism is a growing industry. King Island attracts tourists with its peaceful environment and natural beauty. More recently establishment of organised tours and

signage at tourist locations has increased the tourism focus.

There are some industries on King Island of International significance such as the King Island Dairy and the King Island Meat Company. The King Island dairy discharges after preliminary settling wastewater to the ocean. This wastewater is reasonably contaminated and thus the company is currently undertaking a wastewater characterisation program. King Island Meat Company discharges wastewater and blood into a tea tree wetland and then to Porky Creek. This plant effluent is also high in contaminants. Although the King Island Meat company operations currently has a major impact on Porky Creek, the company will be installing a wastewater treatment system in the near future.

The majority of power generation for King Island is by means of four hydro 16-cylinder diesel engines housed in a power station at Currie. The four engines combined have an output of 4.4MW. The Hydro has installed 3 wind turbines at Huxley near Currie to produce 10% of the Islands electricity. More wind turbines may be installed to increase the percentage of power produced by wind.

2.2 King Island Waterways

Due to the uniform climate across King Island regional differences in the waterways are not due to climate but rather vegetation, topography, and the quality and character of wind blown sands.

2.2.1 Water Quality

There is a general lack of historical water quality data for the area. However, the Department of Primary Industries, Water and Environment in 1999 conducted a report on the Water

Quality of King Island Rivers and Streams.⁶ This report was a snap shot of the water quality on King Island over one week. This week long snapshot of water quality is thought to be indicative of stream and river status for a typical winter.

The report overall suggested that the condition of rivers and their water quality are seriously impacted by farming activities and poor riparian vegetation management. Salt levels are high in streams draining the western and northern areas, while nutrient levels in most are very high compared to levels measured in other Tasmanian rivers. The aquatic biota of the slower flowing streams is mainly dominated by macroinvertebrate communities, which can tolerate higher organic loads and swampy conditions.

The causes of King Island's poor water quality are a combination of its landscape, climatic patterns and land use. High water table, low elevation and flat topography results in poor drainage. Most of King Island's productive country is in the upper catchments, meaning that land use impacts affect streams at their source and potentially for the whole stream.

The nutrient levels found in Porky Creek were extremely high, clearly showing the impact of receiving effluent from the local abattoir. It was noted that this river needs some attention to reduce nutrient inputs before the water quality can be expected to improve. Historically the Pearshape Quarry may have had significant impacts on the quality of a tributary stream of the Seal River and subsequently the Seal itself;

however this quarry no longer discharges to the creek.

Untreated domestic sewage from Currie is discharged into a near shore environment north of Sting Ray Bay. However, King Island Council is currently developing plans for a sewage treatment plant for the town. Grassy sewage is collected and treated in an Imhoff tank before it is discharged to Grassy Bay.

Several factors are likely to be contributing to the degraded water quality of rivers and streams on King Island. One of the causes is the level of stock access to waterways. Many of the rivers have visible signs of stream bank and bed erosion from stock. A further issue is that many of the streams are intermittent in nature and so pollutants particularly in the form of faecal material build up over the summer period and when sufficient rainfall occurs the nutrients are transported to rivers. This increase in nutrient levels can cause excessive algal growth. Irrespective of the reasons for high nutrient levels in streams, the first step to manage the problem was identified to be better riparian management practices.

The data from this study suggest that water quality is generally poor across the Island except for Seal and Sea Elephant rivers. There is no water quality data available for the wetlands, estuaries and lagoons of the Island. It has been noted that many of the lagoons and wetlands have degraded habitat, which tends to indicate that water quality may be poor.⁷ Some of the lagoons and wetlands have been fenced to preclude stock and thus the riparian

⁶ Bobbi, C., Read, M., and Berry, K. 1999. Technical Report on a water Quality Survey of King Island Rivers and Streams. Land and Water Assessment Branch, DPIWE.

⁷ Morgan, H, 2001. King Island Natural Resource Management Review and Strategic Action Plan. King Island Natural Resource Management Group..

vegetation is in tact and in reasonable condition.

Water quality is important for the water supply off takes for the Island. The Island has two water supply systems under its control one located at Currie and the other at Grassy. The water supply for Currie is sourced from a series of groundwater bores located in the dune area to the south west of the town. There is considerable urban activity in the recharge area of the bores and this has the potential to adversely impact on town water quality. The off take for the water supply for Grassy is located on the Grassy River. Blue-green algal blooms have impacted on town water quality over the last two summers. The water quality of these waters is critical to maintain town water supplies.

A study conducted in 2000 describes King Island streams as being largely in the state they are due to surrounding stream vegetation. It was suggested that healthy riparian vegetation is essential to the stability of some of the streams.⁸ This study recommended several rivers and streams as being of high conservation value:

Ettrick River – as it is the only stream of its type on the Island. Boggy Creek – provides water to the Tufa Terraces (Limestone formations) which are a significant geoheritage site of the western dune system.

The rivers and dunes of the eastern part of the Island are considered to be in good condition. Most of the streams of the flat landscaped areas of the Islands northern plains have been highly modified by vegetation clearing, grazing

and drainage. However, Fraser River and Sea Elephant River have retained good riparian vegetation and so should be areas of high conservation significance.

The fresh water springs of the West Coast are a distinct feature of King Island. These springs have distinct flora characteristics and are systems that are easily disturbed. These springs can feed some of the inland rivers but more often feed natural coastal bog areas.

In addition to the surface waters that are felt to be of conservation significance for the Island there are several Wetlands listed in the Directory of Important Wetlands in Australia, these are: Bungaree Lagoon, Lake Flannigan, Lake Martha and Pearshape Lagoons. These wetlands or lagoons are of conservation significance due to the rare species that exist within them.

Lavinia State Reserve, on the north-east coast of King Island, covers 1,730ha and is listed under the Ramsar Convention as a wetland of international significance. The reserve is important for nature conservation due to its variety of landscapes, vegetation communities and fauna. It contains critical feeding and roosting habitat for the endangered orange-bellied parrot and several threatened plant species. The reserve also contains the longest system of beach ridges and parallel dunes in the State.

2.2.2 King Island Estuary Classification

The Island has two major estuaries, the mouth of Yellow Rock River on the north west coast and the mouth of Sea Elephant River on the east coast as well as a number of smaller estuaries; Ettrick, Yarra and Seal.

⁸ Jerie, K., Household, I., & Watt, E. 2000. Draft report on the conservation and management of rivers and streams of King Island Nature Conservation Branch, DPIWE.

A technical report published by the Tasmanian Aquaculture and Fisheries Institute on the conservation significance of the State's estuaries gives an indication of the relative health of estuaries on King Island.⁹ Results are summarised below.

The estuary in each group with the least human disturbance and greatest proportion of catchment area under statutory protection was considered to possess highest conservation significance. Estuaries could also be assigned a high level of conservation significance if they possessed exceptional species diversity or included species with restricted distributions. Using these criteria, estuaries were assigned to one of five classes:

Classification of Tasmanian estuaries:

Class A. *Critical conservation significance* - Estuary and associated catchment area show minimal effects of human activity and are identified as key components within an integrated system of representative reserves around Tasmania. Also includes sites with exceptional fish and invertebrate biodiversity. The technical report recommends that plants, animals and habitats within Class A estuaries and associated catchments should be fully protected as a matter of highest priority. No class A estuaries were identified for King Island.

Class B. *High conservation significance* - Estuary and associated catchment area remain relatively undisturbed or contain an unusual range of species. The technical report recommends that Class

B estuaries and associated catchments should be quarantined from future developments, and existing human impacts reduced wherever possible. Aquatic biota should be protected other than from anglers using hook and line or exploitation within existing marine farm lease boundaries. Sea Elephant Estuary was deemed to be of high conservation significance and is part of the Lavinia Ramsar site.

Class C. *Moderate conservation significance* - Estuary and associated catchment area are affected by human habitation and land clearance, but have not been badly degraded. The technical report recommends that Class C estuaries should be made available for a variety of recreational and commercial purposes. Yellow Rock, Ettrick and Seal were all recorded as estuaries of moderate conservation significance.

Yellow Rock estuary represents the last kilometre of this river and is probably one of the most modified aquatic environments on the Island.¹⁰ The vegetation surrounding the estuary is pasture with some aquatic plants still remaining. This however, has not degraded the important habitat the estuary provides for water birds and aquatic life.

Class D. *Low conservation significance - moderately degraded* - Estuary and associated catchment have been moderately degraded by human impacts. The Technical report recommends that Class D estuaries should be made available for a variety of recreational and commercial purposes. Remediation processes should be assisted where practical. The Yarra Estuary was

⁹ G.J. Edgar, N.S. Barrett and D.J. Graddon. 1999. *A Classification of Tasmanian Estuaries and Assessment of their Conservation Significance using Ecological and Physical Attributes, Population and Land Use*. Tasmanian Aquaculture and Fisheries Institute

¹⁰ Morgan, H, 2001. King Island Natural Resource Management Review and Strategic Action Plan. King Island Natural Resource Management Group.

deemed to be of low conservation significance.

2.2.3 Water Quality Issues

King Islands main water quality issues have been found to be high nutrient loads, poor condition of waterways and high salt levels. Most streams on King Island were found to have elevated nutrients and turbidity due to the following factors:

- Stock access to the riparian zone and waterway,
- Unprotected riparian vegetation,
- Streams and drainage channels receiving farm effluent,
- Unfenced lagoons and wetlands with poor riparian vegetation and stock access, and
- Stock access to farm dams.

A major concern for King Island is the management of the upper reaches of the catchments. Many of the water quality problems are due to a combination of the Islands landscape, climatic patterns and land use. The majority of King Islands productive country is in the upper reaches of the water catchments and thus practices need to be managed carefully as the streams are affected at their source and potentially impact on the whole stream. The formation of Waterwatch on the Island will continue to increase the awareness of the prevalent water quality issues.

Poor water quality can be a threat to biodiversity in terms of changes to habitat caused by altered environmental regimes such as temperature, pH, conductivity, nutrient levels etc. This can then in turn reduce the variety of species that can live in the waterway. Thus water quality management is

imperative to the future of King Island waterways.

2.2.4 Water Quantity

As well as water quality being an issue water quantity is a significant issue due to the large investment in the agricultural sector. King Island is generally a wet environment but over the last 10 years has seen significantly less rainfall. This rainfall reduction has impacted on some of the wetlands, lagoons and streams. Water availability tends to sway from too much water to not enough.

2.3 King Island Management Issues

During 1996 the King Island Natural Resource Management Group identified the following environmental issues as being significant for the island and many of these relate to or have an impact on water quality:

- Preservation of remnant vegetation, riparian reserves, water reserves and wetlands.
- Improved water quality of streams, rivers and surrounding oceans.
- Improved drainage and salinity.
- Development, coordination and introduction of catchment policies.
- Enhancement of biodiversity through establishment of native corridors
- Stabilisation of sand blows and protection of fragile areas.
- Vertebrate pest and weed control.

To assist with monitoring some of these issues and to determine the effectiveness of some management practices Waterwatch was established in 1999. Waterwatch monitors at approximately 3 monthly intervals on the following rivers: Yellow Rock River,

Ettrick River, Egg Lagoon, Porky Creek, Yarra Creek, Grassy River, Sea Elephant River, Fraser River and Seal River. Water quality and its management is seen as a high priority in the Natural Resource Management Plan.¹¹

¹¹ Morgan, H, 2001. King Island Natural Resource Management Review and Strategic Action Plan. King Island Natural Resource Management Group.

3 WATER QUALITY : THE STATE POLICY ON WATER QUALITY MANAGEMENT

3.1 Setting Protected Environmental Values

The first step in the implementation of the *State Policy on Water Quality Management 1997* is the identification of **Protected Environmental Values (PEVs)** for the surface waters in your region. **PEVs are the current values and uses of a water body for which water quality should be protected.** These values and uses should be clearly in evidence at the time of the implementation of the Policy.

The Policy specifies a range of PEVs which may be applied to a given water body. More than one PEV may be applied to a water body. The PEVs are:

- A. Protection of Aquatic Ecosystems
- B. Recreational Water Quality and Aesthetics
- C. Raw Water for Drinking Water Supply
- D. Agricultural Water Use
- E. Industrial Water Supply

The Board of Environmental Management and Pollution Control will then specify a range of Water Quality Objectives. These will be designed to ensure the quality of water in that water body is maintained at a level which will allow the chosen PEVs to be protected.

The Policy also sets out a range of strategies which are aimed at ensuring that waste water discharges from point sources (such as industrial or sewage treatment plant discharges) and diffuse sources (such as runoff from highways, urban areas, farms, forest harvesting

etc.) will not endanger the achievement of the Water Quality Objectives.

The Board and local planning authorities will use these strategies in land use planning and approvals processes, and in ongoing regulation, to ensure that the PEVs for a given water body are maintained or enhanced over time.

3.2 Protected Environmental Values categories

The Policy lists a range of PEVs which are used to describe the identified values and uses of a given water body. These are:

A: Protection of Aquatic Ecosystems

- (i) Pristine or nearly pristine ecosystems;
- (ii) Modified (not pristine) ecosystems:
 - (a) from which edible fish, crustacea and shellfish are harvested, or
 - (b) from which edible fish, crustacea and shellfish are not harvested.

What does pristine mean?

"Pristine" means waters not subject to human interference through discharges or other activities within the catchment (Australian Water Quality Guidelines 1992).

B: Recreational Water Quality & Aesthetics

- (i) Primary contact water quality
- (ii) Secondary contact water quality

(iii) Aesthetics water quality

‘Primary contact’ means recreation involving bodily immersion/ submersion where there is direct contact with water, & includes swimming, diving, surfing, water skiing.

‘Secondary contact’ means activities where there is some direct water contact, but it is unlikely that water will be swallowed (e.g. paddling, boating, and fishing).

‘Aesthetics’ means visual appearance of the water, being free from oil, grease, floating debris, unnatural colour, algal blooms etc.

The actual industry type must be specified in order to identify appropriate guidelines.

C: Raw Water for Drinking Supply

- (ii) Subject to coarse screening and disinfection.

Under the current *Policy* this PEV applies to water used as the intake source for **public use** (town water supply, in other words) and to registered private water supplies. It does not apply to the taking of water from surface waters by individuals for private use for the purposes of drinking etc.

The Director of Public Health recommends that raw water from any surface waterbody should be disinfected/boiled before use.

D: Agricultural Water Uses

- (i) Irrigation
- (ii) Stock watering

E: Industrial Water Supply

3.3 Community Input

We asked the public to examine and provide comment on some water quality PEVs which the Board of Environmental Management and Pollution Control and regional planning authorities had suggested as a starting point and may be being suitable for surface waters of King Island.

The community was asked if they agreed with the suggested PEVs for water quality, and why, or if they wished to propose other PEVs and why?

The community was asked the following:

- To identify specific areas of the rivers that may need different or

additional PEVs (traditional fishing areas, for example).

- Are there rare or endangered species in specific locations which need to be acknowledged?
- Are there specific locations or stretches of river which need different PEVs (traditional swimming holes, for example)?
- Are there existing values and uses under threat from deteriorating water quality.

The Board and the regional planning authorities considered and took account of all submissions before coming to a decision on PEVs for these wetlands and waterways.

4 PROTECTED ENVIRONMENTAL VALUES FOR KING ISLAND CATCHMENTS

Between 2001 and 2003 the Board of Environmental Management and Pollution Control, Director of National Parks and Wildlife and King Island Council set Protected Environmental Values (PEVs) for surface waters of King Island as required by the State Policy on Water Quality Management 1997.

A Discussion Paper – *Proposed Environmental Management Goals for Tasmanian Surface Waters: King Island Catchments* – was developed by DPIWE in association with the King Island Council and approved for release to stakeholders and the public in mid 2001. This paper explained the Policy and how the environmental values for water quality (PEVs) are identified and used.

The Discussion Paper was circulated amongst agencies and organisations having an interest in surface waters in the region. The identified stakeholders (81 people) and community were invited to participate in a regional water values workshop on King Island (18/10/2001). The meeting was advertised inviting the general public to have input into the PEV setting process. The meeting was advertised in the King Island Courier (2/10/2001 and 16/10/2001) and 18 people participated in the process. The meeting was followed by an extended comment period until (16/11/01). Information collected from the meetings was compiled, amendments were made to the PEVs and discussion paper and they were sent back to all stakeholders and workshop attendees and comment was invited on these changes until mid December 2001.

The major changes made to the PEVs as a result of the community consultation were as follows:

- The following locations were designated as primary contact recreation areas (areas that are commonly recognised as primary contact sites) for the non estuarine waters occurring adjacent to or on private land: Sea Elephant River, Yellow Rock River and Penny's Lagoon.
- Industrial water supply was removed from the Private Land Tenure category of PEVs as both King Island Dairy and King Island Meat Company source their water from groundwater and not surface waters.
- A protected environmental values category to cover State Forest was added to the land tenure categories.
- An Industrial Water Supply protected environmental values category was added to the National Parks, State Reserves, Nature Reserves tenure category in recognition of an existing marine farming licence on Sea Elephant Estuary.

Other issues and comments raised throughout the consultation process have been incorporated into the document.

Community Water Values should be incorporated into the future development of water management and catchment management plans.

PROTECTED ENVIRONMENTAL VALUES FOR KING ISLAND CATCHMENT

King Island lies at the western entrance to the Bass Strait, midway between mainland Tasmania and Victoria. The total Island size is in the vicinity of 110,000ha. The Island is generally flat with the highest point being 168m above sea level. Coastal processes influence most of the Island. The fresh surface waters and estuarine waters of King Island have many varied uses including recreational, irrigation, drinking water and industrial water supply and basic river health values. The PEVs for the surface waters of King Island are described in Table 1 under land use categories shown on the attached map.

The PEVs apply to all surface waters within each land tenure category, other than¹²:

- privately owned waters that are not accessible to the public and are not connected to, or flow directly into, waters that are accessible to the public; or
- waters in any tank, pipe or cistern.
 - “Privately owned waters” means any surface waters confined within the boundary of privately owned land and which do not flow into, or do not communicate with:
 - (a) the sea or arm or creek of the sea;
 - (b) a source of supply for a water district or irrigation water district;
 - (c) any river, stream, watercourse, lake, pond or marsh.

Management of all surface waters within the catchment shall focus on the achievement of water quality objectives. The water quality objectives will be determined by the Board of Environmental Management and Pollution Control in accordance with the *State Policy on Water Quality Management 1997*.

Achievement of these water quality objectives will maintain or enhance the water quality of those surface waters to ensure the protection of all of the following values and uses applying to each land use category. These values and uses are derived from the formal PEVs listed in Clause 7 of the Policy.

In general, diffuse source pollution can be managed to protect the PEVs by compliance with approved codes of practice, or by development and implementation of best practice environmental management guidelines where codes are not available.

In general, point source pollution should be managed to protect the PEVs by implementation of best practice environmental management, and by compliance with emission limits set by the regulatory authority. This may also require the setting of a mixing zone by the Board of Environmental Management and Pollution Control. For specific details refer to Part 4 of the *State Policy on Water Quality Management, 1997*.

Protected Environmental Values reflect current values and uses of a water body but do not necessarily imply that the existing water quality will support these values and uses.

¹² State Policy on Water Quality Management 1997

Table 1: Proposed PEVs for King Island Catchments

Land Tenure	Protected Environmental Values <small>(*see note on page 22)</small>
<p>Surface Waters within Private Land</p> <p>(including forest on private land)</p>	<p>A: Protection of Aquatic Ecosystems</p> <p>(ii) Protection of modified (not pristine) ecosystems</p> <p>a. from which edible fish are harvested</p> <p>B: Recreational Water Quality & Aesthetics</p> <p>(i) Primary contact water quality (Sea Elephant River, Yellow Rock River, Penny's Lagoon)</p> <p>(ii) Secondary contact water quality</p> <p>(iii) Aesthetic water quality</p> <p>C: Raw Water for Drinking Water Supply (Grassy River Offtake and Upper Grassy River Dam)</p> <p>(ii) Subject to coarse screening plus disinfection</p> <p>D: Agricultural Water Uses</p> <p>(i) Irrigation</p> <p>(ii) Stock watering</p> <p>That is, as a minimum, water quality management strategies should seek to provide water of a physical and chemical nature to support a healthy, but modified aquatic ecosystem from which edible fish may be harvested; that is acceptable for town drinking water (subject to coarse screening plus disinfection) at the Grassy River Offtake and the Upper Grassy River Dam; and that is acceptable for irrigation and stock watering purposes; which will allow people to safely engage in primary contact recreation activities such as swimming at Sea Elephant River, Yellow Rock River and Penny's Lagoon and secondary contact recreation activities such as paddling or fishing in aesthetically pleasing waters..</p>
<p>Porky Creek below King Island Meat Company Outfall</p>	<p>A: Protection of Aquatic Ecosystems</p> <p>(ii) Protection of modified (not pristine) ecosystems</p> <p>b. from which edible fish, crustacea and shellfish are not harvested</p> <p>B: Recreational Water Quality & Aesthetics</p> <p>(iii) Aesthetic water quality</p> <p>That is, as a minimum, water quality shall be maintained to provide water of a physical and chemical nature to support a modified ecosystem from which edible fish, crustacea and shellfish are not harvested and to maintain the aesthetic qualities of the creek.</p>

Table 1: Proposed PEVs for King Island Catchments

Land Tenure	Protected Environmental Values ^(*see note on page 22)
<p>Surface Waters flowing through National Parks, State Reserves, Nature Reserves or Historic Sites from Private Land, State Forest or Unallocated Crown Land</p>	<p>A: Protection of Aquatic Ecosystems</p> <p>(i) Protection of a modified (not pristine) ecosystems</p> <p>a. from which edible fish, crustacea and shellfish are harvested</p> <p>having regard for the management objectives for national parks, state reserves, nature reserves or historic sites as outlined in Schedule 4 of the <i>National Parks and Wildlife Act, 1970</i>.</p> <p>B: Recreational Water Quality & Aesthetics</p> <p>(i) Primary contact water quality (where permitted)</p> <p>(ii) Secondary contact water quality</p> <p>(iii) Aesthetic water quality</p> <p>E: Industrial Water Supply (Aquaculture as prescribed by existing marine farming licences issued pursuant to the <i>Living Marine Resources Management Act 1995</i>)</p> <p>That is, as a minimum, water quality management strategies should seek to provide water of a physical and chemical nature to support a modified ecosystem from which edible fish, shellfish and crustacea may be harvested; which will allow people to safely engage in recreation activities such as swimming (where permitted), paddling or fishing in aesthetically pleasing waters and which is suitable for Aquaculture as prescribed by existing marine farming licences issued pursuant to the <i>Living Marine Resources Management Act</i>.</p>
<p>Surface Waters with their headwaters within National Parks, State Reserves, Nature Reserves or Historic Sites.</p>	<p>A: Protection of Aquatic Ecosystems</p> <p>(i) Protection of pristine or nearly pristine ecosystems</p> <p>having regard for the management objectives for national parks, state reserves, nature reserves or historic sites as outlined in Schedule 4 of the <i>National Parks and Wildlife Act, 1970</i>.</p> <p>B: Recreational Water Quality & Aesthetics</p> <p>(i) Primary contact water quality (where permitted)</p> <p>(ii) Secondary contact water quality</p> <p>(iii) Aesthetic water quality</p> <p>That is, as a minimum, water quality management strategies should seek to provide water of a physical and chemical nature to support a pristine or nearly pristine ecosystem; and which will allow people to safely engage in recreation activities such as swimming (where permitted), paddling or fishing in aesthetically pleasing waters.</p>

Table 1: Proposed PEVs for King Island Catchments

Land Tenure	Protected Environmental Values ^(*see note on page 22)
<p>Surface Waters flowing through Nature Recreation Areas, Conservation Areas or Regional Reserves from Private Land, State Forest or Unallocated Crown Land</p>	<p>A: Protection of Aquatic Ecosystems</p> <ul style="list-style-type: none"> (i) Protection of a modified (not pristine) ecosystem <ul style="list-style-type: none"> a. from which edible fish are harvested <p>having regard for the management objectives for nature recreation areas, conservation areas and regional reserves as outlined in Schedule 4 of the <i>National Parks and Wildlife Act, 1970</i>.</p> <p>B: Recreational Water Quality & Aesthetics</p> <ul style="list-style-type: none"> (i) Primary contact water quality (where permitted) (ii) Secondary contact water quality (iii) Aesthetic water quality <p>That is, as a minimum, water quality management strategies should seek to provide water of a physical and chemical nature to support a modified ecosystem from which edible fish may be harvested, and which will allow people to safely engage in recreation activities such as swimming (where permitted), paddling or fishing in aesthetically pleasing waters.</p>
<p>Surface Waters with their headwaters within Nature Recreation Areas, Conservation Areas or Regional Reserves</p>	<p>A: Protection of Aquatic Ecosystems</p> <ul style="list-style-type: none"> (i) Protection of pristine or nearly pristine ecosystems <p>having regard for the management objectives for nature recreation areas, conservation areas and regional reserves as outlined in Schedule 4 of the <i>National Parks and Wildlife Act, 1970</i>.</p> <p>B: Recreational Water Quality & Aesthetics</p> <ul style="list-style-type: none"> (i) Primary contact water quality (where permitted) (ii) Secondary contact water quality (iii) Aesthetic water quality <p>That is, as a minimum, water quality management strategies should seek to provide water of a physical and chemical nature to support a pristine or near pristine aquatic ecosystem; and which will allow people to safely engage in recreation activities such as swimming (where permitted), paddling or fishing in aesthetically pleasing waters.</p>

Table 1: Proposed PEVs for King Island Catchments

Land Tenure	Protected Environmental Values ^(*see note on page 22)
<p>Surface Waters within State Forest</p> <p>(managed under the <i>Forestry Act 1920</i>)</p>	<p>A: Protection of Aquatic Ecosystems</p> <ul style="list-style-type: none"> (ii) Protection of modified (not pristine) ecosystems <ul style="list-style-type: none"> a. From which edible fish are harvested <p>having regard for the management objectives outlined in Schedule 3 of the <i>Forestry Act, 1920</i>.</p> <p>B: Recreational Water Quality & Aesthetics</p> <ul style="list-style-type: none"> (i) Primary contact water quality (where permitted) (ii) Secondary contact water quality (iii) Aesthetic water quality <p>That is, as a minimum, water quality management strategies should seek to provide water of a physical and chemical nature to support a healthy, but modified aquatic ecosystem from which edible fish may be harvested; and which will allow people to safely engage in recreation activities such as swimming (where permitted), paddling or fishing in aesthetically pleasing waters.</p>
<p>Surface waters within Public Reserves under the <i>Crown Lands Act 1976</i></p>	<p>A: Protection of Aquatic Ecosystems</p> <ul style="list-style-type: none"> (ii) Protection of modified (not pristine) ecosystems <ul style="list-style-type: none"> a. from which edible fish are harvested <p>having regard for the management objectives for public reserves outlined in Schedule 4 of the <i>Regional Forest Agreement (Land Classification) Act, 1998</i></p> <p>B: Recreational Water Quality & Aesthetics</p> <ul style="list-style-type: none"> (i) Primary contact water quality (where permitted) (ii) Secondary contact water quality (iii) Aesthetic water quality <p>That is, as a minimum, water quality management strategies should seek to provide water of a physical and chemical nature to support a modified, but healthy aquatic ecosystem from which edible fish are harvested; which will allow people to safely engage in recreation activities such as swimming (where permitted), paddling or fishing in aesthetically pleasing waters.</p>

Table 1: Proposed PEVs for King Island Catchments

Land Tenure	Protected Environmental Values ^(*see note on page 22)
<p>Surface waters within Unallocated Crown Land</p>	<p>A: Protection of Aquatic Ecosystems</p> <ul style="list-style-type: none"> (ii) Protection of modified (not pristine) ecosystems <ul style="list-style-type: none"> a. from which edible fish are harvested <p>B: Recreational Water Quality & Aesthetics</p> <ul style="list-style-type: none"> (i) Primary contact water quality (where permitted) (ii) Secondary contact water quality (iii) Aesthetic water quality <p>That is, as a minimum, water quality management strategies should seek to provide water of a physical and chemical nature to support modified, but healthy aquatic ecosystems from which edible fish may be harvested; which will allow people to safely engage in recreation activities such as swimming (where permitted), paddling and fishing in aesthetically pleasing waters.</p>
<p>Surface Waters within Hydro Electric Corporation Land</p>	<p>A: Protection of Aquatic Ecosystems</p> <ul style="list-style-type: none"> (i) Protection of modified (not pristine) ecosystems <ul style="list-style-type: none"> a. From which edible fish are harvested <p>B: Recreational Water Quality & Aesthetics</p> <ul style="list-style-type: none"> (i) Primary contact water quality (where permitted) (ii) Secondary contact water quality (iii) Aesthetic water quality <p>That is, as a minimum, water quality management strategies should provide water of a physical and chemical nature to support a healthy, but modified aquatic ecosystem from which edible fish may be harvested: which will allow people to safely engage in recreation activities such as swimming, paddling or fishing (where such activities are permitted) in aesthetically pleasing waters.</p>

Table 1: Proposed PEVs for King Island Catchments	
Land Tenure	Protected Environmental Values (*see note on page 22)
Surface Waters within Commonwealth Land	<p>A: Protection of Aquatic Ecosystems</p> <ul style="list-style-type: none"> (ii) Protection of modified (not pristine) ecosystems <ul style="list-style-type: none"> a. From which edible fish are harvested <p>B: Recreational Water Quality & Aesthetics</p> <ul style="list-style-type: none"> (i) Primary contact water quality (where permitted) (ii) Secondary contact water quality (iii) Aesthetic water quality <p>That is, as a minimum, water quality management strategies should provide water of a physical and chemical nature to support a healthy, but modified aquatic ecosystem from which edible fish may be harvested: which will allow people to safely engage in recreation activities such as swimming, paddling or fishing (where such activities are permitted) in aesthetically pleasing waters.</p>
All Estuarine Surface Waters	<p>A: Protection of Aquatic Ecosystems</p> <ul style="list-style-type: none"> (ii) Protection of modified (not pristine) ecosystems <ul style="list-style-type: none"> a. From which edible fish, crustacea and shellfish are harvested (where permitted) <p>B: Recreational Water Quality & Aesthetics</p> <ul style="list-style-type: none"> (i) Primary contact water quality (where permitted) (ii) Secondary contact water quality (iii) Aesthetic water quality <p>That is, as a minimum, water quality should be managed to provide water of a chemical nature to support a modified, but healthy aquatic ecosystem from which edible fish, shellfish and crustacea may be harvested (where permitted); which allows people to safely engage in activities such as swimming (where permitted), boating or fishing in aesthetically pleasing waters.</p>

* In general, diffuse source pollution can be managed to protect the PEVs by compliance with approved codes of practice, or by development and implementation of best practice environmental management guidelines where codes are not available.

In general, point source pollution should be managed to protect the PEVs by implementation of best practice environmental management, and by compliance with emission limits set by the regulatory authority. This may also require the setting of a mixing zone by the Board of Environmental Management and Pollution Control.

For specific details refer to Part 4 of the State Policy on Water Quality Management, 1997.

5 WATER QUANTITY VALUES FOR THE KING ISLAND CATCHMENTS

5.1 Overview

While water quality is a very important part of any water management regime, the issue of how much water a river or stream carries, and how that flow is managed, is of equal importance. Water quality and quantity are closely linked.

The State Government proposes to re-organise the way water flow in our rivers and streams is managed, and one of the key understandings is that there needs to be a specific allocation of water for the river or stream itself (*Water Management Act 1999*). This is necessary not only to protect the aquatic life of the river, but also to maintain basic "river health". If there is insufficient flow at crucial times of the year, the overall quality of the remaining water may be badly affected. This will very likely have a negative effect on human uses of the water, as well as on the environment.

In some instances there may be competing uses for the available resource, and there may need to be trade-offs needed to ensure a balanced sharing arrangement between human uses and the needs of the river environment.

The allocation of water for the environment must be based on scientific information, and also on legitimate community values and uses.

We want you to tell us of any water values and uses that occur in your rivers and streams.

5.2 Water quantity values

Five broad categories of water quantity values have been identified, and as with the water quality PEVs, it is likely that most rivers will attract more than one value/use category. The categories are:

- Ecosystem values;
- Physical landscape values.
- Consumptive and non-consumptive use values;
- Recreation values;
- Aesthetic landscape values;

From your input, specific water management objectives can be developed for your catchment, and incorporated into a regional or catchment-based water management plan.

In most cases, the government will weigh up the identified objectives with any available scientific data. Additional data may need to be obtained, and economic analyses done to determine what impact attempting to protect all the identified values may have. It is possible that, in some cases, there may simply not be enough water to go around, and a trade-off in values may then be necessary.

An explanation of the water quantity value categories and examples of specific values are given below:

Ecosystem values: The term is used to identify those values which are to be protected and / or enhanced in the current state of aquatic and adjacent land ecosystems. Specific water values associated with the ecosystem value category may be:

- protection of an endangered species (plant or animal);
- protection or improvement in native fish populations;
- protection of riverine vegetation;
- provision of adequate water for stream habitat for flora and fauna;
- provision of water for wetland and/or estuary ecosystems.

Physical Landscape values: These values are closely related to the physical nature of the catchment. This includes the nature and constitution of channels, the frequency of floods and droughts, soil and rock types, and vegetation coverage. These values are also closely associated with ecosystem function, and may overlap with the protection of ecosystem values. Specific water values associated with physical landscape values may include:

- provision of variable flows;
- prevention of artificial erosion whilst maintaining where appropriate natural processes of erosion and deposition;
- protection or improvement of riparian zone.

Consumptive and non-consumptive use values: These are related to the current and potential human uses of water bodies. Consumptive use refers to the extraction of water from the water body, with no return of it to the waterbody. Examples may include:

- provision of water for irrigation;
- provision of water for town supply;
- provision of water for industry.

Non-consumptive use refers to extraction or use of water, where the water is eventually returned to the river. Examples may include:

- use of water for hydro-electricity generation;
- use of water for fish farming.

Recreational values: These include the range of direct human uses of water bodies for purposes such as kayaking, canoeing, sailing, swimming, fishing etc. This type of value is difficult to quantify, but is an essential part of our way of life in Tasmania. Water quality issues are also important, especially where primary contact occurs (swimming for example), or where the recreational activity relies on a base of good quality water, such as a recreational fishery. Examples may include:

- maintenance or improvement of the quantity (and quality) of water for recreational fishery (trout, blackfish etc);
- provision of sufficient water for whitewater rafting;
- provision of sufficient water (of adequate quality) for swimming.

Aesthetic Landscape values: These values relate to human appreciation of water and adjacent environments. It is often extremely difficult to address these types of values, or work out the flow requirements to ensure their protection. They are, however, legitimate values which must be acknowledged in any good management process. Examples may include:

- maintenance or improvement of flow through gorges or over waterfalls;

- protection of scenic features in a river.

6 Community Water Values

The following Community Water Values for King Island were collected during the community consultation process (community workshop held on 18 October 2001). These values will be valuable in future natural resource management planning, water management planning and in determining appropriate Water Quality Objectives for the region.

Value Category	Community Water Values
Consumptive/ Non Consumptive	<ul style="list-style-type: none"> • Maintain water quality suitable for drinking water supply from Grassy River and the Grassy River Dam. • Maintain water quality at a level suitable for Homestead use throughout the Island but particularly Fraser River, Yellow Rock River and Barrier Creek. • Maintain water quality in Sea Elephant Estuary to support oyster farming. • Maintain water quality and quantity that is suitable for the use in dairy sheds. • Maintain water quality suitable to support aquaculture on the Sea Elephant Estuary
Recreational/ Aesthetic	<ul style="list-style-type: none"> • Maintenance of water quality at a level that is suitable to support swimming at the following locations: <ul style="list-style-type: none"> ❖ Sea Elephant River ❖ Fraser Estuary ❖ Yellow Rock River ❖ Penny's Lagoon • Maintain the water quality to support healthy fish populations and at a level suitable for recreational fishing at the following locations: <ul style="list-style-type: none"> ❖ Sea Elephant River ❖ Seal River • Maintain water quality at a level suitable to sustain commercial eel catching at Yellow Rock. • Maintain water quality at a level that is suitable to support duck shooting particularly on Bungaree Creek and the swamps and lagoons of the Island. • Maintain water quality at a level that is suitable to support kayaking and canoeing on Sea Elephant River and Penny's Lagoon • Maintain water quality at Penny's Lagoon to support windsurfing. • Maintain water quality on Big Lake to support sailing • Maintain water quality in all creeks such that they are suitable to be walked next to. Penny's Lagoon, Sea Elephant River, Fraser River, Barrier Creek, Yarra Creek, Etrick River, Grassy River and Grassy Dam are major areas where people like to walk by the water. Many people also like to walk anywhere on the plateau. • Maintain the aesthetics and tourist values of Big Lake, Pearshape, Little Cask Lake and Lake Flannigan. • Maintain the aesthetic values of the natural waterways particularly Martha Lavinia Nature Reserve and all of the natural lagoons on the west side of the Island and at the Northern end of the Island.
Ecosystem / Basic River Health	<ul style="list-style-type: none"> • Maintain areas free of algal blooms particularly on Grassy River. • Maintain the water quality of Grassy Dam particularly with respect to nutrient levels. Low nutrient water is of a higher value. • Maintain water quality and quantity to support platypus in the Fraser River, Sea Elephant River, Seal River, Yarra Creek and Grassy River. • Maintain water quality to support trout populations in Cask and Whickam lakes. • Maintain water quality and quantity to support populations of galaxiids

Value Category	Community Water Values
	<p>in the Fraser River, Sea Elephant River, Seal River, Yarra Creek and Grassy River.</p> <ul style="list-style-type: none"> • Maintain the values of the Lavinia Nature Reserve Ramsar site and the 6 lagoons that are wetlands of Australian significance. • Maintain all river and stream riparian zones for their biodiversity and for their role as wildlife corridors. • Maintain the water quality in all lagoons to support the Green and Gold Tree frog and the Striped Marsh frog. • Maintain the habitat values of the Sea Elephant River. • Maintain the pristine habitat which occurs around the following areas; Calliers Swamp, The Nook, Granite Lagoon, Swan Lagoon, Meatsafe Lagoon and North Meatsafe Lagoon.
Other Values/Issues	<ul style="list-style-type: none"> • Concern about the relocation of the tip from its current location as required by the State Government. • Concern about the potential salinity problems at Yellow Rock River, Egg Lagoon and Seal River. • Concern about the potential for acid sulfate soils • Camp Creek suffers from pollution from general residential sources. • Concern about the polluting potential of industries that are located along Porky Creek (abattoir) and Badger Box Creek (UHT Factory). • Concern that groundwater PEVs are required as there is a strong link between groundwater and surface streams.