



DEPARTMENT of PRIMARY  
INDUSTRIES, WATER and  
ENVIRONMENT

**ENVIRONMENTAL  
MANAGEMENT  
GOALS  
*for* TASMANIAN  
SURFACE WATERS**

**NORTH-CENTRAL COAST  
CATCHMENTS AND THE GREATER  
RUBICON CATCHMENT**

**FINAL PAPER**

**June, 2003**



## **Environmental Management Goals for Tasmanian Waters:**

Between late 2001 and 2003 Protected Environmental Values (PEVs) were set for the North-Central Coast Catchments and the Greater Rubicon Catchment. 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 surface waters in catchments draining into the central coast of Northern Tasmania, which included the catchments of the Emu, Blythe, Leven, Wilmot, Forth and Don Rivers; and the greater Rubicon catchment which drains into Port Sorell and includes the catchments of the Rubicon River and Franklin Rivulet. The Mersey River catchment was dealt with in a separate discussion paper. The Blythe River estuary, and adjacent Minna Creek and Tip Creek catchments were also covered in an earlier paper.

This paper was prepared by the Environment Division, in consultation with the Burnie City Council, Central Coast Council, Devonport City Council, Kentish Council, Meander Valley Council, Latrobe Council, the West Tamar Council and the Tasmanian Parks and Wildlife Service.

This paper has been modified into its current form to reflect that the process for setting PEVs for the North-Central

Coast Catchments and the Greater Rubicon Catchment. is now complete. It was 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 discussion 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 paper is divided into six main sections:

- The first part describes water reforms in general.
- The Second part provides a brief description of the catchments draining into the north-central coast and the Greater Rubicon catchment.
- Part three discusses the State Policy on Water Quality Management.
- The fourth part discusses Protected Environmental Values for the catchments draining into the north-central coast and the Greater Rubicon catchment.
- Water quantity values are discussed in part 5, and
- Part six discusses the community water values for the catchments.

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## 2 Introduction

### 2.1 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 it 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 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.

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. Our waterways are not immune from problems, however, and many of our river systems are showing signs of stress.

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

### 2.2 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 using environmental best practice.
- Facilitate and promote integrated catchment management.
- Focusing on overall water quality management strategies by identifying those water quality values and uses which are considered worthy of protection.

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

#### (b) water quantity management

The introduction of the *Water Management Act 1999* to replace the *Water Act 1957* 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 second purpose of this paper is to advise of what the public's views were and what was valued in the water resources from a water quantity perspective.

### **2.3 What did we want the public to do?**

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

- Which of your activities rely upon maintaining or enhancing the flow of water into catchment waterways?
- What uses or values do you have for surface waters in this area that rely upon maintaining or enhancing water quality?
- Are there certain places on your rivers that you traditionally use for swimming or other recreational activities (where permitted)?
- Do you fish in these waters (where permitted)?
- Are there specific features of your rivers and streams that are recognised scenic attractions, such as rapids or waterfalls?
- Do you use water for livestock watering?
- Do you know of rare or endangered animals or plants in, or adjacent to, specific areas of your rivers, streams?

- Does your river supply the local town water supply?
- Do you draw water from it to irrigate your farm?

The catchment stakeholders/publics' answers to questions such as these then 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 was important.

### **2.4 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 shown in management plans for the region.

Information from community stakeholders, catchment groups and the public on water quality 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.



### 3 Catchment Description

#### 3.1 Overview

The major catchments of the north central coast are the eastern side of the Cam River, the Emu, Blythe, Leven, Forth/Wilmot, and Don Rivers. The catchment of the Mersey River is covered in a separate paper, and the western side of the Cam River is included in a paper on catchments in the Waratah-Wynyard Municipal Area. The Blythe River estuary, Minna and Tip Creek catchments are also covered in a separate paper.

The major river catchments draining into the Port Sorell area are the Rubicon River and the Franklin Rivulet. The size of the major catchments of the North Central Coast and Greater Rubicon catchment are shown in Table 1. A number of creeks and smaller rivulets also drain into the coast in these areas. There are also a number of estuarine areas. The large estuaries in the central coast area are mesotidal river estuaries, while the estuary in the Port Sorell area is classified as a marine inlet<sup>1</sup>.

In general the rivers in this region flow in a north-north-easterly direction, draining into the central coast and Port Sorell areas; however the path of the Leven is more convoluted as it is blocked by the Loongana Range. The Forth River, the largest catchment in this area has the deepest reach with its headwaters on the Central Plateau in the Cradle Mountain-Lake St. Clair National Park. The Forth River is joined by the Wilmot River in the lower reaches, before draining into the sea.

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<sup>1</sup> Edgar, G. J., N. S. Barrett and D. J. Graddon. 1999. A classification of Tasmanian Estuaries and Assessment of their Conservation Significance. Report to Environment Australia.

**Table 1. Major Catchments Draining into the North-Central Coast and Port Sorell Areas<sup>2</sup>**

Catchment	Area (km <sup>2</sup> )
Cam River	240
Emu River	242
Blythe River	273
Leven River	563
Claytons Rivulet	75
Forth and Wilmot Rivers	1100
Don River	130
Franklin Rivulet	133
Rubicon River	263

The climate in the region varies with elevation and distance from the coast. The climate for the majority of the region is classified as temperate marine. In general the elevation increases away from the coast, average temperatures decrease and average rainfall increases. Average annual rainfalls in these regions range from 2,800 mm at Cradle Valley to 800-980 mm in coastal areas. Rainfall is predominant in the winter months with approximately 25% of annual rainfall occurring in the months of July and August. While overall the level of rainfall is substantial, irrigation is required in the summer months to support agricultural activities. The months of January to March are the driest with only 15% of rainfall occurring in this 3 month period.

The geology of the area is diverse, as reflected in the varied topography. Tertiary basalt is a common feature of the geology of the region, and is the basis of the red soils seen in the area. Quaternary and Tertiary sediments commonly occur on the coast and in valleys. Cambrian basalts are also significant, in addition to conglomerates, quartzites and schists,

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<sup>2</sup> Australian Coastal Atlas: [www.atlas.tas.gov.au](http://www.atlas.tas.gov.au)

particularly in the mountainous areas such as Mt Roland and the Dial Range. Permian and Devonian sediments are a feature of the Rubicon River catchment, and there is an area of ancient sediments and volcanics in the middle section of the Leven River catchment<sup>3</sup>.

The topography of the region is complex and includes plateau country, high mountains, rolling hills, flood plains, escarpments and coastal plains. Steep river valleys are a feature of rivers such as the Blythe, Emu, Cam, Leven, Wilmot and Forth. Gorges have formed from the erosive power of water flowing from high rainfall areas in winter periods. In contrast the Rubicon River originates at a relatively low altitude (approximately 300m) in a region of moderate rainfall and has relatively low flow rates<sup>4</sup>.

Much of the privately-owned land in the region has been cleared for agriculture. Native vegetation is reflective of the diverse topography of the region, and includes buttongrass plains and sub-alpine vegetation on the plateau, *Eucalyptus obliqua* wet forest around Castra, Lake Barrington, Bonney's Tier and Pine Hill Plantation, dry sclerophyll forests, inland grassy forests, heathlands and coastal vegetation.

Waterways in the region are habitat for a multitude of native species including threatened, rare or endangered fauna such as the giant freshwater lobster, freshwater snails, the Australian grayling, the Burnie burrowing crayfish,

velvet worms and the green and gold frog<sup>5</sup>.

Part of the Cradle Mountain – Lake St Clair National Park, which is part of the Tasmanian Wilderness World Heritage Area, and part of the Narawntapu National Park are located in these catchments. The Protected Environmental Values (PEVs) for the Narawntapu National Park have been established and appear in the management plan for the park. In addition there are a number of state reserves, nature reserves, conservation areas, nature recreation areas and regional reserves within the catchments.

### 3.2 Water Uses

The Forth and Wilmot rivers are utilised for the production of electricity as part of the Mersey-Forth Hydro Scheme. A dam across the Wilmot River in its upper reaches diverts water to the Wilmot Power Station on Lake Cethana. The Devil's Gate Dam and Power Station, on Lake Barrington, and the Palooka Dam and Power Station on Lake Palooka are also on the Forth River. Water from the upper reaches of the Mersey is diverted into the Forth as part of the Hydro scheme. The Mersey-Forth power scheme generates 15.8% of the state's electricity<sup>6</sup>.

The land tenures in the area include private land, state forest, national parks, conservation areas, forest reserves, crown land, Hydro-Electric Corporation land and public reserves. Farming, forestry, hydro-electricity generation and tourism are major activities in the region.

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<sup>3</sup> Moreton, R. M. and C. J. Grose. 1997. Forth Report, Land Capability Survey of Tasmania. Department of Primary Industries, Water and Environment.

<sup>4</sup> Bentley, J. 2001. The State of the natural Resources and Management of the Greater Rubicon Catchment. The Greater Rubicon Catchment Management Group.

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<sup>5</sup> Bryant, S. and J. Jackson. 1999. Tasmania's Threatened Fauna Handbook. Threatened Species Unit, Parks and Wildlife Service, Hobart.

<sup>6</sup> <http://www.hydro.com.au>

There is extensive use of water for stock and irrigation in these catchments. Agricultural activities extend from the coastal areas to the edge of the Cradle Mt.-Lake St. Clair National Park. Seasonal grazing and plantation forestry are the main types of agriculture at the higher elevations. At middle and lower elevations farming activities include plantation forestry, grazing of beef cattle, dairies and intensive cropping. The area in the lower catchments between Penguin and the Port Sorell area, and north of Erriba contains some of the best agricultural land in Tasmania. "Red" soils or krasnozems are a feature of the area. These soils which form from basalt are the most productive in the state and are capable of supporting 2 or even 3 crops per year<sup>7</sup>. Crops include onions, carrots, potatoes, peas, beans, brassicas, sweetcorn, poppies, pyrethrum and cereals.

Cradle Coast Water collects, treats and supplies bulk drinking water supplies to the Central Coast, Devonport, Latrobe and Kentish Councils from the Cam, Leven, Gawler and Forth Rivers. Burnie City Council takes water for drinking water supply and other uses from the Pet and Guide rivers for treatment/distribution within its municipality.

The major industrial use of freshwater is in the production of paper products at Burnie. Treated water from this mill is discharged into coastal waters. The second largest industrial water usage is for vegetable processing. Water is also used for on-farm washing of potatoes and root vegetables. Some water is used by a woodchip mill at Hampshire which then applies wastewater to irrigate a plantation. Water is also used for fire-fighting. A small amount of water is

utilised by a fishery on Patons Creek. The few other industries which have offtakes from the waterways take amounts that are less than 20 ML per year.

Marine farms producing shellfish are located in the Port Sorell estuary and are dependent on water of high quality. A Marine Farming Development Plan is being prepared for this area. The plan will show the Protected Environmental Values for the marine farming zones.

Waterways through the region are used for a variety of water-based recreational pursuits. Areas of note include Lake Barrington which is used for rowing and skiing, and the Port Sorell estuary which is used for boating, fishing and yachting.

### 3.3 Water Quality Issues

Water quality is impacted by a variety of human activities in the region. Specific issues include vegetation clearance, soil erosion, discharge of wastewaters from on-farm washing of vegetables, stock access to streams, fertiliser run-off, septic-tank leachate, and urban and industrial pollution primarily from stormwater run-off. The reduction and the modification of flows from agricultural activities including plantation forestry, hydro-electric schemes, town water use and industrial uses also have the potential to impact on water quality.

Riparian vegetation (on and adjacent to the banks of waterways) is particularly important to water quality and river health as it shades water, provides streamline habitat, stabilises river banks, reduces erosion, absorbs water-borne nutrients and traps silts. Large areas of riparian vegetation have been removed in agricultural and urban areas in the region. This increases unnatural

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<sup>7</sup> Moreton, R. M. 1999. Inglis Report, Land Capability Survey of Tasmania. Department of Primary Industries, Water and Environment.

erosion from river and stream banks and is most evident in storm events when banks deteriorate and muddy waters flow.

Siltation arising from the loss of riparian vegetation, land-clearing for agriculture and forestry, and roading is having substantial impacts on the environmental health of rivers downstream, effectively smothering life. The presence of unnatural levels of siltation and the loss of shade in riparian zones results in temperatures rising in waterways to the extent that in late summer in the lower reaches of rivers and streams the temperatures are reaching lethal levels for the endangered giant freshwater crayfish.

Stock access to streams contributes nutrients and microbial contaminants to streams, as does leachates from septic systems in rural and rural-residential areas. Fertiliser run-off from rural land also contributes nutrients. The influx of nutrients from these sources has the greatest impact on streams with low flows, such as those of relatively short length, that originate at low altitudes, and from which water is taken for agriculture and other activities. High levels of nutrients result in algal blooms, the growth of algae on rocks and a reduction in dissolved oxygen in waters. Algal blooms have been reported in Pantana rivulet in the Greater Rubicon catchment<sup>3</sup>. Contamination by microorganisms such as bacteria and viruses from faecal material can be hazardous to the health of humans and stock.

In urban areas nutrients enter waterways from the outflows of sewage treatment plants. Stormwater run-off channeled through urban drainage systems also contains high levels of nutrients from the faeces of domestic pets and garden fertilisers as well as contaminants such as oils, fuels, plastics, detergents, litter,

pesticides and herbicides. In the North-Central Coast and greater Rubicon catchments populations are concentrated in the coastal cities and towns. For example the population of Burnie city in 1996 was 17,202, whereas the population in the rest of the municipal area was 2,081<sup>8</sup>. Similarly the population in the coastal strip of the Central Coast Municipal area was 17,148 and the population in the non-coastal area of this municipality was 3,232.

Estuaries in the region have been classified as either moderately degraded (Blythe, Forth, and Port Sorell) or badly degraded (Cam, Emu, Leven and Don). These classifications reflect the degree of human disturbance in terms of activities in the catchments of these estuaries and population densities<sup>1</sup>. Turbidity, nutrient levels and changes in flow rates are impacts on estuaries originating largely in the upper catchments from farming, forestry and power generation, while impacts from the immediate vicinities of estuaries are stormwater and sewage discharge, clearing of vegetation for residential development and land reclamation activities. Declining fish stocks and declining seagrass beds are the results of these impacts. Early indications from a current study reflect the degraded classifications of these northern estuaries with relatively high levels of nutrients in the Port Sorell and Don River estuaries presumed to be a result of the extent of intensive agriculture in the region<sup>3</sup>.

Invasive weed species are a problem in both fresh and estuarine waterways. The effects of crack willow which infests many waterways in the region are a reduction in the diversity of

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<sup>8</sup> Australian Bureau of Statistics website.  
<http://www.abs.gov.au>

macroinvertebrate species and plant species, increased flooding, erosion, channel movement, accumulation of silt, leaves and twigs, reduction in flow, high turbidity and low dissolved oxygen levels. The Port Sorell area has a large infestation of rice grass. This weed promotes the accumulation of sediments and results in habitat changes that affect both plant and animal species<sup>3</sup>.

Specific water quality issues in the region include: the impact on smaller coastal waterways such as Claytons Rivulet and Button Creek by agriculture and septic tank leachate; impacts from past pulp mill discharge in the Emu River; impacts on the Blythe River by current and past industrial operations; leachate from a land fill in Burnie entering tributaries of the Cam River upstream of a town water supply off-take; and impacts on dissolved oxygen, temperature and turbidity in the Forth River as a result of the controlled release of water from Lake Paloona for electricity generation<sup>9</sup>.

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<sup>9</sup> Greene, G. 2001. North West Rivers Environmental Review. DPIWE

## 4 Water Quality: Protected Environmental Values (PEVs)

### 4.1 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)** of the surface waters in your region. **PEVs are the values or uses of the water body for which it is determined that any given area of that water body 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:

Protection of Aquatic Ecosystems

Recreational Water Quality and Aesthetics

Raw Water for Drinking Water Supply

Agricultural Water Use

Industrial Water Supply

These values are described in more detail in Section 3.2.

The Board of Environmental Management and Pollution Control will then specify a range of pollutant limits called 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 values to be protected.

The Policy then 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.

### 4.2 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 near 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
- (ii) Secondary contact
- (iii) Aesthetics

‘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.

### **C: Raw Water for Drinking Supply**

- (i) Subject to coarse screening and disinfection.

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 boiled before use.

### **D: Agricultural Water Uses**

- (i) Irrigation  
(ii) Stock watering

### **E: Industrial Water Supply**

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

## **4.3 Community Input**

We asked the public to examine and provide comment on some water quality PEVs which the Board and regional planning authorities had, as a starting point, suggested may be suitable for surface waters in the North-Central Coast catchments and the Greater Rubicon catchment.

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)?

Other questions were whether existing values and uses are under threat from deteriorating water quality, or whether there is the potential for improving water quality to support new uses.

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.

## **PROTECTED ENVIRONMENTAL VALUES FOR THE NORTH-CENTRAL CATCHMENTS & THE GREATER RUBICON CATCHMENT**

Between late 2001 and 2003 the State Government through the Board of Environmental Management and Pollution Control in association with the Burnie City, Central Coast, Kentish, Latrobe, Devonport City, Meander Valley and West Tamar Councils, the Director of National Parks and Wildlife and the planning authority for marine farming zones under the *Marine Farming Planing Act 1995* set Protected Environmental Values (PEVs) for surface waters for the North-Central Coast catchments and the Greater Rubicon catchment as required by the *State Policy on Water Quality Management 1997* (the Policy).

The Discussion Paper – *Proposed Environmental Management Goals for Tasmanian Surface Waters: North-Central Coast Catchments and the Greater Rubicon Catchment* – was developed by DPIWE in association with Councils and other planning authorities and approved for release to stakeholders and the public in September 2001. This paper explained the Policy and how the environmental values for water quality (PEVs) are identified and used.

The discussion paper was sent to 180 stakeholders who were invited to public meetings at Ulverstone, Port Sorell, Burnie and Sheffield in late October and early November 2001. These meetings were advertised twice in the Public Notices section of The Advocate. The meetings were also advertised online in

the local and rural diary sections on the ABC web-site, and in the Kentish Chronicle. At the meetings background information on Protected Environmental Values and the State Policy on Water Quality Management was provided and Community Water Values for the region were collected from the participants. Attendances at the meetings were as follows: Ulverstone – 15, Port Sorell – 4, Burnie – 3, Sheffield – 6. One written submission in respect of Port Sorell was received. A list of Community Water Values was compiled from information collected at the meetings and the written submission.

The significant changes to the PEVs arising from the consultation was the identification of swimming locations on or adjacent to private land. The amended PEVs and compiled Community Water Values were forwarded to all the stakeholders and others who attended the meetings to ensure that their values had been represented satisfactorily. No comments were received. There are no outstanding issues in relation to identifying the PEVs for the North-Central Coast catchments and the Greater Rubicon catchment.

Other issues 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

### North-Central Coast Catchments and the Greater Rubicon Catchment

Water resources in the area have a wide range of existing uses and values including irrigation, recreation, drinking water supply, aquaculture, hydro-electricity generation, aesthetic and ecological values. The PEVs for surface waters in the North-Central Coast catchments and the Greater Rubicon catchment are described in Tables 1 and 2 respectively under land tenures shown on the attached maps. The areas for which the PEVs are determined and municipal boundaries are shown on the attached maps.

The PEVs apply to all surface waters, other than<sup>10</sup>:

- 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 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.

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*.

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<sup>10</sup> State Policy on Water Quality Management 1997

**Table 2: PEVs for the North-Central Coast Catchments \***

<b>Land Tenure</b>	<b>Protected Environmental Values</b>
<p>Surface Waters on <b>Private Land</b> (including forest on private land)</p>	<p>A. Protection of Aquatic Ecosystems</p> <p>(ii) Modified (not pristine) ecosystems</p> <p>(a) from which edible fish are harvested</p> <p>B. Recreational Water Quality &amp; Aesthetics</p> <p>(i) Primary contact water quality (Mouth of the Blythe River, Lobster Creek Reserve, Tobruk Park, Victoria Park at Gunns Plains, Gables Park at Turners Beach, Canoe Course on the Forth River, Leith Boat Ramp on the Forth River, camping ground above the Forth River bridge, Alma Reserve on the Wilmot river, Fern Glade in Burnie (Emu River), Guide Waterfall picnic area, mouths of the Emu, Cam and Leven Rivers, where Ketties Creek enters the Leven River in the Dial Range, Wings Farm (Leven), Bannon Bridge (Leven), Frogs Flats, Lake Cethena, Lake Barrington)</p> <p>(ii) Secondary contact water quality</p> <p>(iii) Aesthetic water quality</p> <p>C. Raw Water for Drinking Water Supply</p> <p>(ii) Subject to coarse screening plus disinfection (Cradle Coast Water collection points on the Cam, Leven, Gawler and Forth Rivers; Burnie City water supply reservoirs on the Pet and Guide Rivers)</p> <p>D. Agricultural Water Uses</p> <p>(i) Irrigation</p> <p>(ii) Stock watering</p> <p>E. Industrial Water Supply (paper mill, woodchip mill, vegetable processing, on-farm vegetable washing, hydro-electricity generation – Forth catchment, aquaculture)</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 suitable as a raw water for drinking water supply subject to coarse screening plus disinfection at the offtake locations for town water supplies (Cradle Coast Water, Burnie City); 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 specific sites) and secondary contact recreation activities such as paddling or fishing (where permitted) in aesthetically pleasing waters; and which is suitable for paper mill production, woodchip mill production, vegetable processing, on-farm vegetable washing, hydro-electricity generation in the Forth catchment and aquaculture.</p>

**Table 2: PEVs for the North-Central Coast Catchments \***

<b>Land Tenure</b>	<b>Protected Environmental Values</b>
<p>Surface waters with their headwaters in <b>Forest Reserves</b>, or flowing through Forest Reserves from adjacent headwaters arising in nature Recreation Areas, Game Reserves, Conservation Areas or Regional Reserves.</p>	<p>A: Protection of Aquatic Ecosystems</p> <p>(i) Pristine or nearly pristine ecosystems</p> <p>having regard for the management objectives for forest reserves outlined in Schedule 3 of the <i>Forestry Act, 1920</i>.</p> <p>B: Recreational Water Quality &amp; 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 (hydro-electricity generation-Forth catchment)</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 near pristine aquatic ecosystem; which will allow people to safely engage in recreation activities such as swimming, paddling or fishing in aesthetically pleasing waters; and which is suitable for hydro-electricity generation.</p>

**Table 2: PEVs for the North-Central Coast Catchments \***

<b>Land Tenure</b>	<b>Protected Environmental Values</b>
<p>Surface waters flowing through <b>Forest Reserves</b> from private land, state forest or unallocated crown land.</p>	<p>A: Protection of Aquatic Ecosystems</p> <ul style="list-style-type: none"> <li>(ii) Protection of modified (not pristine) ecosystems               <ul style="list-style-type: none"> <li>(a) From which edible fish are harvested</li> </ul> </li> </ul> <p>having regard for the management objectives for forest reserves outlined in Schedule 3 of the <i>Forestry Act, 1920</i>.</p> <p>B: Recreational Water Quality &amp; Aesthetics</p> <ul style="list-style-type: none"> <li>(i) Primary contact water quality (where permitted)</li> <li>(ii) Secondary contact water quality</li> <li>(iii) Aesthetic water quality</li> </ul> <p>E. Industrial Water Supply (hydro-electricity generation-Forth catchment)</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; which will allow people to safely engage in recreation activities such as swimming, paddling or fishing in aesthetically pleasing waters; and which is suitable for hydro-electricity generation.</p>

**Table 2: PEVs for the North-Central Coast Catchments \***

<b>Land Tenure</b>	<b>Protected Environmental Values</b>
<p>Surface waters with their headwaters in <b>National Parks, State Reserves, or Nature Reserves</b> or flowing through National Parks, State Reserves, or Nature Reserves from adjacent headwaters arising in Nature Recreation Areas, Game Reserves, Conservation Areas, Regional Reserves or Forest Reserves.</p>	<p>A: Protection of Aquatic Ecosystems</p> <p>(i) Pristine or nearly pristine ecosystems **</p> <p>having regard for (i) the management objectives for national parks, state reserves and nature reserves outlined in Schedule 1 of the <i>National Parks and Reserves Management Act, 2002</i>, and (ii) the management objectives of the World Heritage Area Management Plan for surface waters within Tasmania’s Wilderness World Heritage Area.</p> <p>B: Recreational Water Quality &amp; 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 (hydro-electricity generation-Forth catchment)</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; which will allow people to safely engage in recreation activities such as swimming, paddling or fishing in aesthetically pleasing waters; and which is suitable for hydro-electricity generation.</p>

**Table 2: PEVs for the North-Central Coast Catchments \***

<b>Land Tenure</b>	<b>Protected Environmental Values</b>
<p>Surface waters flowing through <b>National Parks, State Reserves, and Nature Reserves</b> from private land, state forests or un-allocated crown</p>	<p>A: Protection of Aquatic Ecosystems</p> <ul style="list-style-type: none"> <li>(ii) Modified (not pristine) ecosystem               <ul style="list-style-type: none"> <li>(a) from which edible fish, crustacea and shellfish are harvested (where permitted)</li> </ul> </li> </ul> <p>having regard for (i) the management objectives for national parks, state reserves and nature reserves outlined in Schedule 1 of the <i>National Parks and Reserves Management Act, 2002</i>, and (ii) the management objectives of the World Heritage Area Management Plan for surface waters within Tasmania’s Wilderness World Heritage Area.</p> <p>B: Recreational Water Quality &amp; Aesthetics</p> <ul style="list-style-type: none"> <li>(i) Primary contact water quality (where permitted)</li> <li>(ii) Secondary contact water quality</li> <li>(iii) Aesthetic water quality</li> </ul> <p>E. Industrial Water Supply (hydro-electricity generation-Forth catchment)</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, crustacea and shellfish may be harvested; which will allow people to safely engage in recreation activities such as swimming, paddling or fishing in aesthetically pleasing waters; and which is suitable for hydro-electricity generation.</p>

**Table 2: PEVs for the North-Central Coast Catchments \***

<b>Land Tenure</b>	<b>Protected Environmental Values</b>
<p>Surface waters with their headwaters in <b>Nature Recreation Areas, Conservation Areas, Game Reserves and Regional Reserves</b>, or flowing through Nature Recreation Areas, Conservation Areas and Game Reserves from adjacent headwaters in a National Park, State Reserve or Nature Reserve.</p>	<p>A: Protection of Aquatic Ecosystems</p> <p>(i) Pristine or nearly pristine ecosystems**</p> <p>having regard for the management objectives for nature recreation areas, conservation areas and game reserves outlined in Schedule 1 of the <i>National Parks and Reserves Management Act, 2002</i>.</p> <p>B: Recreational Water Quality &amp; 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 (hydro-electricity generation-Forth catchment)</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 near pristine aquatic ecosystem; which will allow people to safely engage in recreation activities such as swimming, paddling or fishing in aesthetically pleasing waters; and which is suitable for hydro-electricity generation.</p>

**Table 2: PEVs for the North-Central Coast Catchments \***

<b>Land Tenure</b>	<b>Protected Environmental Values</b>
<p>Surface Waters flowing through <b>Nature Recreation Areas, Conservation Areas and Game Reserves</b> from private land, state forests or un-allocated crown land.</p>	<p>A: Protection of Aquatic Ecosystems</p> <ul style="list-style-type: none"> <li>(ii) Modified (not pristine) ecosystem               <ul style="list-style-type: none"> <li>(a) From which edible fish, crustacea and shellfish are harvested (where permitted)</li> </ul> </li> </ul> <p>having regard for the management objectives for nature recreation areas, conservation areas and game reserves outlined in Schedule 1 of the <i>National Parks and Reserves Management Act, 2002</i>.</p> <p>B: Recreational Water Quality &amp; Aesthetics</p> <ul style="list-style-type: none"> <li>(i) Primary contact water quality (where permitted)</li> <li>(ii) Secondary contact water quality</li> <li>(iii) Aesthetic water quality</li> </ul> <p>E. Industrial Water Supply (hydro-electricity generation-Forth catchment)</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, crustacea and shellfish may be harvested; which will allow people to safely engage in recreation activities such as swimming, paddling or fishing in aesthetically pleasing waters; and which is suitable for hydro-electricity generation.</p>

**Table 2: PEVs for the North-Central Coast Catchments \***

<b>Land Tenure</b>	<b>Protected Environmental Values</b>
<p>Surface waters flowing through <b>Public Reserves</b> (under the <i>Crown Lands Act 1976</i>) from private land, state forest or un-allocated crown land.</p>	<p>A: Protection of Aquatic Ecosystems</p> <ul style="list-style-type: none"> <li>(ii) Modified (not pristine) ecosystems                             <ul style="list-style-type: none"> <li>(a) From which edible fish, crustacea and shellfish are harvested</li> </ul> </li> </ul> <p>B: Recreational Water Quality &amp; Aesthetics</p> <ul style="list-style-type: none"> <li>(i) Primary contact water quality (where permitted)</li> <li>(ii) Secondary contact water quality</li> <li>(iii) Aesthetic water quality</li> </ul> <p>E. Industrial Water Supply (hydro-electricity generation-Forth catchment)</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, but healthy aquatic ecosystem from which edible fish, crustacea and shellfish may be harvested; which will allow people to safely engage in recreation activities such as swimming, paddling or fishing in aesthetically pleasing waters; and which is suitable for hydro-electricity generation.</p>
<p>Surface waters on <b>Unallocated Crown Land</b></p>	<p>A: Protection of Aquatic Ecosystems</p> <ul style="list-style-type: none"> <li>(ii) Modified not pristine ecosystem                             <ul style="list-style-type: none"> <li>(a) from which edible fish are harvested</li> </ul> </li> </ul> <p>B: Recreational Water Quality &amp; Aesthetics</p> <ul style="list-style-type: none"> <li>(i) Primary contact water quality (where permitted)</li> <li>(ii) Secondary contact water quality</li> <li>(iii) Aesthetic water quality</li> </ul> <p>E. Industrial Water Supply (hydro-electricity generation-Forth catchment)</p> <p>That is, as a minimum, water quality management strategies should seek to provide water of a physical and chemical nature to support modified (not pristine) ecosystem from which edible fish are harvested; which will allow people to safely engage in recreation activities such as swimming, paddling or fishing in aesthetically pleasing waters; and which is suitable for hydro-electricity generation.</p>

**Table 2: PEVs for the North-Central Coast Catchments \***

<b>Land Tenure</b>	<b>Protected Environmental Values</b>
<p>Surface Waters on <b>Hydro Electric Corporation Land</b></p>	<p>A: Protection of Aquatic Ecosystems</p> <ul style="list-style-type: none"> <li>(ii) Modified (not pristine) ecosystems</li> <li>(b) From which edible fish are harvested</li> </ul> <p>B: Recreational Water Quality &amp; Aesthetics</p> <ul style="list-style-type: none"> <li>(i) Primary contact water quality (where permitted)</li> <li>(ii) Secondary contact water quality</li> <li>(iii) Aesthetic water quality</li> </ul> <p>E: Industrial Water Supply (Hydro Electric Power Generation-Forth catchment)</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 may be harvested; which will allow people to safely engage in recreation activities such as swimming, paddling or fishing in aesthetically pleasing waters; and which is suitable for hydro-electric power generation.</p>

**Table 2: PEVs for the North-Central Coast Catchments \***

<b>Land Tenure</b>	<b>Protected Environmental Values</b>
<p>Surface waters within <b>State Forests</b>  (managed under the <i>Forestry Act</i> 1920)</p>	<p>A: Protection of Aquatic Ecosystems</p> <p style="padding-left: 40px;">(ii) Modified (not pristine) ecosystems</p> <p style="padding-left: 80px;">(a) From which edible fish are harvested having regard for Forestry Tasmania’s Management Decision Classification System</p> <p>B: Recreational Water Quality &amp; Aesthetics</p> <p style="padding-left: 40px;">(i) Primary contact water quality (where permitted)</p> <p style="padding-left: 40px;">(ii) Secondary contact water quality</p> <p style="padding-left: 40px;">(iii) Aesthetic water quality</p> <p>E. Industrial Water Supply (hydro-electricity generation-Forth catchment)</p> <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, paddling and fishing in aesthetically pleasing waters; and which is suitable for hydro-electric power generation.</p>
<p><b>Estuarine Surface Waters</b></p>	<p>A: Protection of Aquatic Ecosystems</p> <p style="padding-left: 40px;">(ii) Modified (not pristine) ecosystems</p> <p style="padding-left: 80px;">(a) From which edible fish, shellfish and crustacea are harvested</p> <p>B: Recreational Water Quality &amp; Aesthetics</p> <p style="padding-left: 40px;">(i) Primary contact water quality (where permitted)</p> <p style="padding-left: 40px;">(ii) Secondary contact water quality</p> <p style="padding-left: 40px;">(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 modified (not pristine) ecosystem from which edible fish, shellfish and crustacea are harvested; and which will allow people to safely engage in recreation activities such as swimming, paddling 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.
- \*\* Historic land uses including sewage effluent discharge into the Dove River catchment north of Dove Lake may have resulted in long term water quality impacts to some streams or rivers within these reserve classes and to their associated ecosystems. This may mean that the water quality in these rivers or streams may not currently support pristine or nearly pristine ecosystems or primary contact recreational activities. This should be taken into consideration at the time that management decisions are being made for individual rivers or streams.

**Table 3: PEVs for the Greater Rubicon Catchment\***

<b>Land Tenure</b>	<b>Protected Environmental Values</b>
<p>Surface Waters on <b>Private Land</b> (including forest on private land)</p>	<p>A. Protection of Aquatic Ecosystems</p> <p>(ii) Modified (not pristine) ecosystems</p> <p>(a) from which edible fish are harvested</p> <p>B. Recreational Water Quality &amp; Aesthetics</p> <p>(i) Primary contact water quality (mouth of Pantana Creek)</p> <p>(ii) Secondary contact water quality</p> <p>(iii) Aesthetic water quality</p> <p>D. Agricultural Water Uses</p> <p>(i) Irrigation</p> <p>(ii) Stock watering</p> <p>E. Industrial Water Supply (on-farm vegetable washing)</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 irrigation and stock watering purposes; which will allow people to safely engage in primary contact recreation activities such as swimming (at specific sites) and secondary contact recreation activities such as paddling or fishing in aesthetically pleasing waters; and which is suitable for on-farm vegetable washing.</p>

**Table 3: PEVs for the Greater Rubicon Catchment\***

<b>Land Tenure</b>	<b>Protected Environmental Values</b>
<p>Surface waters with their headwaters in <b>Forest Reserves</b>, or flowing through Forest Reserves from adjacent headwaters arising in Nature Recreation Areas, Game Reserves, Conservation Areas or Regional Reserves.</p>	<p>A: Protection of Aquatic Ecosystems</p> <ul style="list-style-type: none"> <li>(i) Pristine or nearly pristine ecosystems</li> </ul> <p>having regard for the management objectives for forest reserves outlined in Schedule 3 of the <i>Forestry Act, 1920</i>.</p> <p>B: Recreational Water Quality &amp; Aesthetics</p> <ul style="list-style-type: none"> <li>(i) Primary contact water quality (where permitted)</li> <li>(ii) Secondary contact water quality</li> <li>(iii) Aesthetic water quality</li> </ul> <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, paddling or fishing in aesthetically pleasing waters.</p>
<p>Surface waters flowing through <b>Forest Reserves</b> from private land, state forest or unallocated crown land.</p>	<p>A: Protection of Aquatic Ecosystems</p> <ul style="list-style-type: none"> <li>(ii) Protection of modified (not pristine) ecosystems                             <ul style="list-style-type: none"> <li>(a) From which edible fish are harvested</li> </ul> </li> </ul> <p>having regard for the management objectives for forest reserves outlined in Schedule 3 of the <i>Forestry Act, 1920</i>.</p> <p>B: Recreational Water Quality &amp; Aesthetics</p> <ul style="list-style-type: none"> <li>(i) Primary contact water quality (where permitted)</li> <li>(ii) Secondary contact water quality</li> <li>(iii) Aesthetic water quality</li> </ul> <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, paddling or fishing in aesthetically pleasing waters.</p>

**Table 3: PEVs for the Greater Rubicon Catchment\***

<b>Land Tenure</b>	<b>Protected Environmental Values</b>
<p>Surface waters with their headwaters in <b>National Parks, State Reserves, or Nature Reserves</b> or flowing through National Parks, State Reserves, or Nature Reserves from adjacent headwaters arising in Nature Recreation Areas, Game Reserves, Conservation Areas, or Regional Reserves.</p>	<p>A: Protection of Aquatic Ecosystems</p> <p>(i) Pristine or nearly pristine ecosystems</p> <p>having regard for the management objectives for national parks, state reserves, nature reserves and historic sites outlined in Schedule 1 of the <i>National Parks and Reserves Management Act, 2002</i>.</p> <p>B: Recreational Water Quality &amp; 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, paddling or fishing in aesthetically pleasing waters.</p>
<p>Surface waters flowing through <b>National Parks, State Reserves, and Nature Reserves</b> from private land, state forests or un-allocated crown</p>	<p>A: Protection of Aquatic Ecosystems</p> <p>(ii) Modified (not pristine) ecosystem</p> <p>(a) from which edible fish, crustacea and shellfish are harvested (where permitted)</p> <p>having regard for the management objectives for national parks, state reserves, nature reserves and historic sites outlined in Schedule 1 of the <i>National Parks and Reserves Management Act, 2002</i>.</p> <p>B: Recreational Water Quality &amp; 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 modified ecosystem from which edible fish, crustacea and shellfish may be harvested; and which will allow people to safely engage in recreation activities such as swimming, paddling or fishing in aesthetically pleasing waters.</p>

**Table 3: PEVs for the Greater Rubicon Catchment\***

<b>Land Tenure</b>	<b>Protected Environmental Values</b>
<p>Surface waters with their headwaters in <b>Nature Recreation Areas, Conservation Areas, Game Reserves and Regional Reserves</b>, or flowing through Nature Recreation Areas, Conservation Areas, Game Reserves and Regional Reserves from adjacent headwaters in a National Park, State Reserve or Nature Reserve.</p>	<p>A: Protection of Aquatic Ecosystems</p> <p>(i) Pristine or nearly pristine ecosystems</p> <p>having regard for the management objectives for nature recreation areas, conservation areas and game reserves outlined in Schedule 1 of the <i>National Parks and Reserves Management Act, 2002</i>.</p> <p>B: Recreational Water Quality &amp; 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 near pristine aquatic ecosystem; and which will allow people to safely engage in recreation activities such as swimming, paddling or fishing in aesthetically pleasing waters.</p>

<b>Table 3: PEVs for the Greater Rubicon Catchment*</b>	
<b>Land Tenure</b>	<b>Protected Environmental Values</b>
<p>Surface Waters flowing through <b>Nature Recreation Areas, Conservation Areas and Game Reserves</b> from private land, state forests or un-allocated crown land.</p>	<p>A: Protection of Aquatic Ecosystems</p> <ul style="list-style-type: none"> <li>(ii) Modified (not pristine) ecosystem <ul style="list-style-type: none"> <li>(a) From which edible fish, crustacea and shellfish are harvested (where permitted)</li> </ul> </li> </ul> <p>having regard for the management objectives for nature recreation areas, conservation areas and game reserves outlined in Schedule 1 of the <i>National Parks and Reserves Management Act, 2002</i>.</p> <p>B: Recreational Water Quality &amp; Aesthetics</p> <ul style="list-style-type: none"> <li>(i) Primary contact water quality (where permitted)</li> <li>(ii) Secondary contact water quality</li> <li>(iii) Aesthetic water quality</li> </ul> <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, crustacea and shellfish may be harvested; and which will allow people to safely engage in recreation activities such as swimming, paddling or fishing in aesthetically pleasing waters.</p>
<p>Surface waters flowing through <b>Public Reserves</b> (under the <i>Crown Lands Act 1976</i>) from private land, state forest or un-allocated crown land.</p>	<p>A: Protection of Aquatic Ecosystems</p> <ul style="list-style-type: none"> <li>(ii) Modified (not pristine) ecosystems <ul style="list-style-type: none"> <li>(a) From which edible fish, crustacea and shellfish are harvested</li> </ul> </li> </ul> <p>B: Recreational Water Quality &amp; Aesthetics</p> <ul style="list-style-type: none"> <li>(i) Primary contact water quality (where permitted)</li> <li>(ii) Secondary contact water quality</li> <li>(iii) Aesthetic water quality</li> </ul> <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, crustacea and shellfish may be harvested; and which will allow people to safely engage in recreation activities such as swimming, paddling or fishing in aesthetically pleasing waters.</p>

**Table 3: PEVs for the Greater Rubicon Catchment\***

<b>Land Tenure</b>	<b>Protected Environmental Values</b>
<p>Surface waters within <b>State Forests</b>  (managed under the <i>Forestry Act 1920</i>)</p>	<p>A: Protection of Aquatic Ecosystems</p> <ul style="list-style-type: none"> <li>(ii) Modified (not pristine) ecosystems                             <ul style="list-style-type: none"> <li>(a) From which edible fish are harvested</li> </ul> </li> </ul> <p>having regard for Forestry Tasmania’s Management Decision Classification System</p> <p>B: Recreational Water Quality &amp; Aesthetics</p> <ul style="list-style-type: none"> <li>(i) Primary contact water quality (where permitted)</li> <li>(ii) Secondary contact water quality</li> <li>(iii) Aesthetic water quality</li> </ul> <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; and which will allow people to safely engage in recreation activities such as swimming, paddling and fishing in aesthetically pleasing waters.</p>
<p>Surface waters on <b>Unallocated Crown Land</b></p>	<p>A: Protection of Aquatic Ecosystems</p> <ul style="list-style-type: none"> <li>(ii) Modified not pristine ecosystem                             <ul style="list-style-type: none"> <li>(a) from which edible fish are harvested</li> </ul> </li> </ul> <p>B: Recreational Water Quality &amp; Aesthetics</p> <ul style="list-style-type: none"> <li>(i) Primary contact water quality (where permitted)</li> <li>(ii) Secondary contact water quality</li> <li>(iii) Aesthetic water quality</li> </ul> <p>That is, as a minimum, water quality management strategies should seek to provide water of a physical and chemical nature to support modified (not pristine) ecosystem from which edible fish are harvested; and which will allow people to safely engage in recreation activities such as swimming, paddling or fishing in aesthetically pleasing waters.</p>

<b>Table 3: PEVs for the Greater Rubicon Catchment*</b>	
<b>Land Tenure</b>	<b>Protected Environmental Values</b>
<b>Estuarine Surface Waters</b>	<p>A: Protection of Aquatic Ecosystems</p> <p style="padding-left: 40px;">(ii) Modified (not pristine) ecosystems</p> <p style="padding-left: 80px;">(a) From which edible fish, shellfish and crustacea are harvested</p> <p>B: Recreational Water Quality &amp; Aesthetics</p> <p style="padding-left: 40px;">(i) Primary contact water quality (where permitted)</p> <p style="padding-left: 40px;">(ii) Secondary contact water quality</p> <p style="padding-left: 40px;">(iii) Aesthetic water quality</p> <p>E: Industrial Water Supply (Aquaculture in Marine Farming Zones)</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 (not pristine) ecosystem from which edible fish, shellfish and crustacea are harvested; which will allow people to safely engage in recreation activities such as swimming, paddling or fishing in aesthetically pleasing waters; and which is suitable for the farming of shellfish in marine farm zones.</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.

## 6 Water Quantity Values

### 6.1 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. 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 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 on legitimate community values and uses.

### 6.2 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;

The information from the public's input and gathering water management values from stakeholders, community groups and government agencies will be utilised when water management planning for the catchment is undertaken.

An appraisal of water quantity values will be undertaken in order to develop water management goals for the catchment. This will be undertaken during the water management planning process.

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.

The Community Water Values identified through the PEVs process can therefore be considered when making management decisions for water quantity.

## 7 Community Water Values for North-Central Coast Catchments and the Greater Rubicon Catchment

**Table 4: Community Water Values for the North Central Coast Catchments and the Greater Rubicon Catchment Collected at a Public Meeting Held in Ulverstone on 23/10/01.**

Water Value Categories	Specific Water Values
<b>1. Ecosystem values</b>	<ul style="list-style-type: none"> <li>• Maintain ecosystem health</li> <li>• Maintain highest possible water quality</li> <li>• Maintain adequate environmental flows</li> <li>• Maintain pollution-free waterways</li> <li>• Maintain natural/native riparian flora (at least 10m)</li> <li>• Maintain silt-free waters</li> <li>• Wetlands and estuaries are important to ecosystem food chain (and require adequate flow)</li> <li>• Vegetation in Forth Estuary such as swamp tea tree and areas of tussock</li> <li>• Rivers free of willows</li> <li>• Wildlife</li> <li>• Several species of white-bait run in the Forth, Don, Leven and Dip</li> <li>• <i>Astocopsis</i></li> </ul>
<b>2. Physical Landscape Values</b>	<ul style="list-style-type: none"> <li>• Value natural form of rivers</li> <li>• Boulder formations in the Blythe</li> <li>• Adams Creek Falls (Blythe catchment)</li> <li>• Guide Falls and Darling Falls (Emu River)</li> <li>• Sanderson Falls, St.Mary's Falls, St. Joseph Falls (Cam River)</li> <li>• Underground cataracts in the Blythe River</li> <li>• Leven Falls, Preston Falls (Leven Catchment)</li> <li>• Caves at Loongana</li> </ul>
<b>3. Consumptive and Non-Consumptive Values</b>	<ul style="list-style-type: none"> <li>• Vegetable processing (Simplot) on the Forth and Gawler Rivers</li> <li>• Irrigation</li> <li>• Vegetable washing – Clayton's Rivulet</li> <li>• Town water supply – 3 offtakes on the Forth River</li> </ul>
<b>4. Recreational Values</b>	<ul style="list-style-type: none"> <li>• Rafting</li> <li>• Canoeing</li> <li>• Swimming</li> <li>• Fishing</li> <li>• Surfing (at the bottom of the Forth)</li> <li>• Birdwatching</li> <li>• Camping</li> <li>• Picnicking</li> <li>• Walking</li> <li>• Swimming and boating in estuaries</li> <li>• Swimming at the Forth boat ramp, at the camping ground above the Forth River bridge and at the Alma Reserve on the Wilmot River</li> </ul>

	<ul style="list-style-type: none"> <li>• Trout in the Forth, Leven, Cam, Blythe and Claytons Rivulet</li> </ul>
<b>5. Aesthetic Landscape Values</b>	<ul style="list-style-type: none"> <li>• Leven Canyon lookout (including side streams)</li> </ul>
<b>Other values</b>	<ul style="list-style-type: none"> <li>•</li> </ul>
<b>Issues/concerns</b>	<ul style="list-style-type: none"> <li>• Serious concern about the water quality in Buttons Creek – degraded from septic tank leakage and agricultural activities</li> <li>• Concern about human impacts in the Leven catchment above Gunns Plains</li> <li>• Concern about impacts on flow fluctuations caused by Hydro activities in the Mersey – Forth (e.g. on the oxygen levels in the water)</li> <li>• Impact of septic systems above the estuary on the Forth</li> <li>• Watering of stocks in streams</li> <li>• Run-off from roads piped into streams</li> <li>• Impact of willows</li> <li>• The more protection of the Leven catchment above Gunns Plains the better</li> </ul>

**Table 5: Community Water Values for the North Central Coast Catchments and the Greater Rubicon Catchment Collected at a Public Meeting Held at Shearwater on 24/10/01, and from a Written Submission.**

<b>Water Value Categories</b>	<b>Specific Water Values</b>
<b>1. Ecosystem Values</b>	<ul style="list-style-type: none"> <li>• Value areas that are free of rice grass (<i>Spartina anglica</i>) and other weeds</li> <li>• Freshwater lobster and trout</li> <li>• Maintain existing quality</li> <li>• Maintain environmental flows</li> <li>• Maintain areas free of Pacific oysters, specifically swimming areas</li> <li>• Maintain and improve native riparian vegetation</li> <li>• Biodiversity of aquatic and terrestrial plants and animals</li> <li>• Pelicans and other shorebirds</li> <li>• Threatened species</li> <li>• Maintain penguin rookery at the point (Port Sorell)</li> <li>• Shark Nursery – Port Sorell Estuary</li> <li>• Maintain biodiversity – sea birds and waders, sea grass beds, fisheries, marine mammals</li> <li>• Water free from pollutants – sewerage, nutrients</li> <li>• Estuary free of exotic weeds/algae</li> <li>• Riparian zones rehabilitated with local indigenous plants</li> <li>• High water quality</li> </ul>
<b>2. Physical Landscape Values</b>	<ul style="list-style-type: none"> <li>• Lower part of the Rubicon is a series of holes and rapids</li> <li>• Intermittent falls and cascades/rapids e.g. Eagle Gorge</li> <li>• The Rubicon River has a hard rock base</li> <li>• Islands in the Port Sorell estuary (penguins)</li> <li>• Mud flats in the Port Sorell estuary</li> <li>• Natural coastal dynamics allowed to prevail</li> <li>• Areas without unnatural erosion</li> </ul>
<b>3. Consumptive and Non-Consumptive Values</b>	<ul style="list-style-type: none"> <li>• Irrigation and stockwatering (agriculture is the lifeline of the greater Rubicon catchment)</li> <li>• Aquaculture – oyster leases</li> <li>• Domestic homestead use</li> <li>• Forestry plantations</li> <li>• Dairy washdown from spring-fed instream dams</li> <li>• Ashgrove cheese</li> <li>• Nicholls poultry and processing</li> </ul>
<b>4. Recreational Values</b>	<ul style="list-style-type: none"> <li>• Swimming at the mouth of the Pantana Creek</li> <li>• Trout fishing in the upper Rubicon</li> <li>• Bream fishing at a hole near the DPIWE weir</li> <li>• Estuary fishing</li> <li>• Water skiing</li> <li>• Boating and sailing</li> <li>• Nature observers – the bush, birds</li> <li>• Tourism</li> <li>• Bushwalking in the National Park</li> <li>• Beach combing</li> </ul>

	<ul style="list-style-type: none"> <li>• Kayaking</li> <li>• Jet skiing</li> <li>• Swimming</li> <li>• Surfing</li> <li>• Wind surfing</li> </ul>
<b>5. Aesthetic Landscape Values</b>	<ul style="list-style-type: none"> <li>• There is good riparian vegetation on the Rubicon River (but not on tributaries)</li> <li>• Backdrop of the Dazzler Ranges</li> <li>• No buildings visible from waterway</li> <li>• Coastal remnants left intact</li> <li>• No forestry clearing visible from waterway</li> </ul>
<b>Other values</b>	<ul style="list-style-type: none"> <li>•</li> </ul>
<b>Issues/concerns</b>	<ul style="list-style-type: none"> <li>• Pacific oysters</li> <li>• Rice grass</li> <li>• Willows</li> <li>• Weir preventing movement of whitebait</li> <li>• Storm drains flowing into estuaries and beaches</li> <li>• Need for supplementary water to support agricultural activities (Dam?)</li> <li>• Water for limited irrigation and stock use higher in catchment and limited off-river storage</li> <li>• Cumulative effect of in-stream and spring-fed dams</li> <li>• Urban sprawl impacting on aesthetics, introducing weeds, increasing the amount of stormwater etc</li> <li>• Oyster leases impacting on aesthetics and recreational uses (boating and fishing)</li> <li>• No more rock walls in Port Sorell</li> <li>• Erosion from farms and forestry</li> <li>• No jet skis in Port Sorell estuary</li> <li>• No marina in Port Sorell estuary</li> <li>• Marine debris e.g. oyster baskets</li> </ul>

**Table 6: Community Water Values for the North Central Coast Catchments and the Greater Rubicon Catchment Collected at a Public Meeting Held in Burnie on 7/11/01.**

Water Value Categories	Specific Water Values
<b>1. Ecosystem Values</b>	<ul style="list-style-type: none"> <li>• Burnie burrowing crayfish (Cam, Emu and Blythe Rivers)</li> <li>• Riparian zone</li> <li>• Fern Glade (Emu River in Burnie) – Platypuses</li> <li>• Whitebait and Black galaxias in the Blythe River</li> <li>• Spotted galaxias and whitebait in Messenger Creek</li> <li>• Maintain water quality</li> <li>• Native fish and trout</li> <li>• Sea eels go up Chasm Creek</li> <li>• <i>Astocopsis</i> in Chasm Creek</li> <li>• Sea trout in Chasm Creek</li> </ul>
<b>2. Physical Landscape Values</b>	<ul style="list-style-type: none"> <li>• Changing shape of the mouth of the Emu River</li> <li>• Waterfalls such as the Guide, Serpentine, St. Georges, Sanderson and on the Darling River</li> <li>• Leven Canyon</li> <li>• Some parts of the Blythe go underground in the South Riana area</li> </ul>
<b>3. Consumptive and Non-Consumptive Values</b>	<ul style="list-style-type: none"> <li>• Fire-fighting</li> <li>• Town water supply</li> <li>• Dust control on roads – water tankers</li> <li>• Irrigation</li> <li>• Leven distillery</li> <li>• Spring in the Forth area is used locally for drinking water</li> <li>• Kara mines in the Emu catchment</li> <li>• Water from the Blythe scheme is used by Aluminates and ISK</li> </ul>
<b>4. Recreational Values</b>	<ul style="list-style-type: none"> <li>• Swimming at Fern Glade (Burnie – Emu River), Guide Waterfalls Picnic Area, mouths of the Blythe, Emu, Cam and Leven Rivers, the Dial Range where Ketties Creek enters the Leven, Fogs Flats, at the Ocean Vista opposite the school (coastal beach)</li> <li>• Paddling in the mouth of the Cam</li> <li>• Wave skiing, canoeing, and kayaking in the Cam, Leven and Blythe Rivers</li> <li>• Fishing in the Talbot Lagoon, Guide Dam, Cam, Emu River near the bridge, Lake Kara, at bridges over the Blythe River at Camena and South Riana, in the Leven at Gunns Plains and the boat ramp opposite the paper mill.</li> <li>• Good kayaking because of the boulders at The Gardens on the Leven River</li> <li>• Camping, swimming and kayaking at Victoria Park (Gunns Plains), Wings Farm and Bannon Bridge on the Leven</li> </ul>
<b>5. Aesthetic Landscape Values</b>	<ul style="list-style-type: none"> <li>•</li> </ul>
<b>Other values</b>	<ul style="list-style-type: none"> <li>•</li> </ul>
<b>Issues/concerns</b>	<ul style="list-style-type: none"> <li>• Effect on water of spraying for weed and insect control</li> <li>• People don't fish near the Kara mines because there is a fair bit of sediment</li> <li>• Creeks overgrown with blackberries, gorse and other weeds</li> </ul>

	<ul style="list-style-type: none"><li>• Swimming banned at the mouth of the Cam in summer</li><li>• Spraying of roadways by councils</li><li>• Spraying of railways</li><li>• Spraying by farmers across buffer zones</li></ul>
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**Table 7: Community Water Values for the North Central Coast Catchments and the Greater Rubicon Catchment Collected at a Public Meeting Held in Sheffield on 8/11/01.**

<b>Water Value Categories</b>	<b>Specific Water Values</b>
<b>1. Ecosystem values</b>	<ul style="list-style-type: none"> <li>• Preservation of all ecosystems in rivers</li> <li>• Protection of water quantity by protecting forest cover in headwaters</li> <li>• Protection of drainage lines (class 4 streams) in headwaters</li> <li>• Fish</li> <li>• Water flows in summer</li> <li>• Species diversity</li> <li>• Value areas free of blackberries, willows and introduced weeds</li> </ul>
<b>2. Physical Landscape Values</b>	<ul style="list-style-type: none"> <li>• Gorge on the Dasher River</li> <li>• Phillips Falls in the Forth catchment</li> <li>• Silver Falls</li> <li>• All creeks and rivers</li> </ul>
<b>3. Consumptive and Non-Consumptive Values</b>	<ul style="list-style-type: none"> <li>• Farming – irrigation and stock watering</li> <li>• HEC</li> <li>• Potable drinking water</li> <li>• Domestic/homestead use</li> </ul>
<b>4. Recreational Values</b>	<ul style="list-style-type: none"> <li>• Swimming at Lake Cethana, Lake Barrington and up into the Park above the Lemonthyme power station</li> <li>• Fishing</li> <li>• Water skiing (Lake Barrington)</li> <li>• Rowing</li> <li>• Boating including power boating</li> <li>• Dasher River – Bridal track</li> </ul>
<b>5. Aesthetic Landscape Values</b>	<ul style="list-style-type: none"> <li>• Areas with native forest (scenic)</li> </ul>
<b>Other values</b>	<ul style="list-style-type: none"> <li>•</li> </ul>
<b>Issues/concerns</b>	<ul style="list-style-type: none"> <li>• water flows in summer should not be achieved by stopping farmers using water</li> <li>• concern about clear felling</li> <li>• all effluent should be treated to a secondary level</li> <li>• use of the word “pristine” in the policy is misleading; there are non-reserved areas which are in a “pristine-like” state</li> <li>• landholders rights should be protected</li> <li>• concern about poisons entering waterways – especially atrazine and others from the triazine group that affect gender – there should be a zero-limit policy; concern that they are spraying within 50m of Lake Cethana that feeds into the Devonport town water supply</li> <li>• concern that there is a synergistic effect between pesticides and fertilisers that increases their toxicity</li> </ul>