



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

**ENVIRONMENTAL
MANAGEMENT
GOALS
for TASMANIAN
SURFACE WATERS**

**CATCHMENTS WITHIN THE CIRCULAR HEAD &
WARATAH/WYNYARD MUNICIPAL AREAS**

January 2000



Environmental Management Goals

For Tasmanian Surface Waters:

Circular Head and Waratah/Wynyard Municipal Areas

This discussion paper was used as a basis for community and stakeholder participation in the process of developing environmental management goals for the waterways that are located within the Circular Head and Waratah/Wynyard municipal areas. The Pieman Catchment is partially within the West Coast municipal area.

The discussion paper was prepared by the Environment Division in association with the Land and Water Management Branch, of the Department of Primary Industries, Water and Environment. The discussion paper was initiated from a workshop held with council officers from the Circular Head and Waratah/Wynyard Councils in July 1999.

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 discussion paper is divided into four main sections:

1. The first section discusses water reform in general, the State Policy on Water Quality Management and gives some general information relating to the area included in the discussion paper (Sections 1-3).
2. The second section discusses the proposed Protected Environmental Values for individual catchments. There is some repetition in this section because the discussion paper was designed so that individual catchment PEVs can be read in isolation from the rest of the document (Section 4).
3. The third section discusses water quantity values (Section 5).
4. The fourth section shows the community water values that were obtained from community workshops and public meetings (Section 6).

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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 is currently finalising 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 discussion paper was to explain how the water quality values (Protected Environmental Values) will be identified and used. Local communities have a key role in identifying these values in their catchments.

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 second purpose of this discussion paper was to canvas your views on what you value in your water resources from a water quantity perspective. Your comments will be of assistance to the Department in undertaking water quantity planning in your catchment.

1.3 What will this community input achieve?

The objective is to identify water management goals for the catchments within your region. These water management goals will include Protected Environmental Values (PEVs) as defined under the *State Policy on Water Quality Management*, and identified water quantity values.

1.4 What information did we receive from the community?

Local communities have a valuable understanding of their regional waterways. A series of workshops and public meetings were held throughout the region where we asked questions like: What uses or values do you have for surface waters in this area that rely upon maintaining or enhancing water quality? 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?

Answers to these questions were recorded as 'Community Water Values' These values are summarised in Table 12.

Planning to ensure sustainable use of these waters and protection of river health requires sound knowledge of local water quality and quantity issues. Community input to this process is important. Many of the Community Water Values and other issues that were raised at the meetings could be best managed through integrated catchment management.

1.5 How will your input be used?

Information from the community on water values particularly relating to water quality assisted the Board of Environmental Management and Pollution Control and your Council to finalise the range of Protected Environmental Values for the surface waters of your regional waterways. Protected Environmental Values and community water values will assist in the future development of catchment and water management plans. Further details of what this means is given in Section 4 below.

2 CIRCULAR HEAD AND WARATAH/WYNYARD CATCHMENTS OVERVIEW

2.1 Catchment description

The municipal areas of Circular Head and Waratah/Wynyard cover 8439 km² and include the following major river catchments:

- Arthur;
- Welcome;
- Montagu;
- Duck;
- Inglis/Flowerdale;
- Black/Detention;
- Part of the Pieman;
- Headwaters and Western tributaries of the Cam River;
- Headwaters of the Emu, Blythe and Leven Rivers;

The area also includes estuaries within its boundaries.

Weather in the area consists of mild winters and relatively cool summers. The average rainfall is high at over 1000 mm per annum.

There are approximately 22,120 people living in the municipal areas. Major towns include Wynyard, Somerset, Smithton and Stanley. There are also a number of small towns with less than a thousand residents. The combination of the high rainfall and fertile soils makes this region one of the most important agricultural regions in the State, producing approximately 16 % of the value of agricultural commodities in Tasmania. There are a wide variety of land-uses across the municipal areas. These include agricultural activities (grazing, dairying, crop irrigation), forestry (private and state), hydro electricity production, mineral exploration and mining, conservation, tourism and recreation. Marine farming

is a growing industry in some estuarine areas around the coast.

There are a number of important lakes and dams in the region including those on the Pieman River used for power generation. A water supply dam occurs on Deep Creek in the Duck River catchment. An estimated 5966 town water supply connections are served for domestic and industrial purposes with an annual water use of approximately 1 470 392 ML. Treated town water is supplied at Rosebery, Tullah, Smithton, Wynyard, Somerset, Waratah and Yolla. At present, there are no registered private water supplies in the municipal areas. It is highly likely that people living near permanently running streams would use stream water for garden and general household use. This is referred to as 'homestead use'.

Regional agricultural productivity relies on maintaining and enhancing the municipal area's water resources. There are 474 Commission Water Rights (CWR) allocated in the Circular Head and Waratah/Wynyard municipal areas. These are summarised in Table 1 and include both summer and winter water rights.

Table 1 : Catchment Water Allocations

Catchment	CWRs	Yearly Use (ML)
Pieman	0	0
Arthur	5	22016
Welcome	5	298
Montague	13	788

Duck	76	3526
Cam	41	1252
Black/Detention	61	5135
Inglis/Flowerdale	113	4060
Emu/Blythe/Leven	160	43588

The CWRs are primarily for irrigation with a small number being for other industrial purposes.

The local community and tourists use the waterways for a mixture of primary and secondary contact recreation activities. Many of the beaches in the area are popular swimming beaches. Recreational fishing is also undertaken across the region.

Estuaries and coastal waters in the region are becoming increasingly recognised for their suitability for aquaculture. The region currently supports a valuable Pacific Oyster industry and the potential exists for other shellfish and seaweed to be farmed. Commercial and private cast seaweed and bull kelp harvesting currently occur to a limited extent.

The region is also recognised for its valuable mineral resources. Six mines currently operate within the Pieman River catchment, quarries operate within several catchments and mineral exploration is active across the region. The regions includes a number of 'reserve classes' that are managed under the *National Parks and Wildlife Act, 1970*, the *Forestry Act, 1920* or the *Crown Lands Act, 1976*. Each of these Acts has defined management objectives for each reserve class for which it is responsible. In all of the reserve classes 'preservation of water quality' is a stated management objective. Several of the reserve classes have multiple use objectives meaning

that in addition to the conservation objectives, activities such as mineral exploration and mining can occur.

A Reserve Management Code of Practice, which will be applicable to all reserve classes, is currently being prepared. This code will help to ensure that the management objectives for the reserve classes are being achieved. Any mineral exploration or quarrying activities approved for these reserves will be expected to operate in accordance with the provisions of the Mineral Exploration Code of Practice and the Quarry Code of Practice. Prior to approval, new industrial developments will need to demonstrate the use of accepted modern technology and best practice environmental management, including waste reduction, reuse and recycling, to ensure that impacts on water quality are minimised.

Despite the above precautions, the high rainfall in the region might make the need for wastewater discharge unavoidable. In these circumstances the Board of Environmental Management and Pollution Control would consider the setting of a mixing zone in accordance with the requirements of Clause 20 of the State Policy on Water Quality Management 1997. Emission limits into the mixing zone must ensure the achievement of the water quality objectives that support the PEVs for the receiving waters at or beyond the edge of the mixing zone.

2.2 Characteristic water quality

Water quality across the region varies depending on local catchment geology, vegetation, rainfall and land use. Water within the Pieman and Arthur River catchments, for example, can be naturally high in tanins due to the organic rich soils and peats within the catchments. It is of interest to note that

the naturally occurring, highly coloured water in many of the creeks and rivers across this area may not meet, for this reason, the public health guidelines for swimming. Impacts on water quality and quantity reflect the land uses in the catchments. Some rivers in the Arthur and Pieman catchments, for example, are impacted by acid mine drainage. Catchments draining to the north coast have been influenced more by pastoral activities. Water quality is discussed in more detail on a catchment basis in Section 4 of this discussion paper.

2.3 Catchment environmental issues

As stream conditions are determined both by in-stream activities and surrounding land-use activities, waterways act as a touchstone of catchment health. Healthy waterways are indicative of sustainably managed catchments. There are a number of environmental issues relating to waterways in the Circular Head and Waratah/Wynyard municipal areas.

- Low flows, with some rivers ceasing to flow during particularly dry summers;
- Erosion from farmland within some catchments (impact of soil-type, overgrazing etc.);
- Replacement of native riparian vegetation by willows/weeds, and associated loss of aquatic and riparian habitat;
- Erosion from past forestry activities and land clearing, and associated

loss of, or stress to, aquatic and riparian habitats;

- Nutrient-enriched runoff may occur from irrigated land;
- Unrestricted access to streams by stock (erosion, muddying, faecal contamination);
- Water extraction from uncontrolled streams may affect rivers at times of low flow;
- Discharges from sewage treatment plants increase nutrient and bacterial loadings in streams;
- Both abandoned and currently operating mines discharging to rivers;
- The control of river flow for hydro electric power generation;
- Expanding urbanisation in the catchments may increase the potential for environmental problems such as sewage contamination from septic tanks, pollution from urban run-off of soil, nutrients and chemicals. Erosion from building sites and road construction/maintenance may also increase the potential for environmental problems;
- The need to maintain conservation values whilst facilitating appropriate development;
- Need to protect Karst systems.

Values and issues are discussed in more detail on a catchment by catchment basis in Section 4.

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

These values are described in more detail in Section 3.2.

The Board of Environmental Management and Pollution Control will then specify a range 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.

C: Raw Water for Drinking Supply

- (i) Subject to coarse screening only;
- (ii) 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.

Water used for domestic purposes such as washing and cleaning is known as ‘homestead use’ and can be recognised as a community water value. A ‘homestead use’ does not include water for drinking.

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.

3.3 Community Input

In consultation with the community and industry, the PEVs detailed in this document, were determined by the Board of Environmental Management, the Circular Head, Waratah/Wynyard and West Coast Councils and the Tasmanian Parks and Wildlife Service. The PEVs are shown in Section 4 and relate to the attached land tenure map for the region.

The community water values shown in Section 6 were obtained from a series of workshops and public meetings held at Smithton, Wynyard, Waratah and Rosebery during September and October of 1999. The community water values were used to help ensure that the PEVs accurately reflected the current uses and values of surface waters in the region. The community water values also provide a valuable beginning to integrated catchment management in the individual catchments discussed in this document.

4 WATER QUALITY : PROTECTED ENVIRONMENTAL VALUES FOR YOUR CATCHMENT

The PEVs for the surface waters of the Circular Head and Waratah-Wynyard municipal areas are described in Table 2-10 under land use categories. The PEVs apply to all surface waters within each land tenure category, other than¹:

- 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*.

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.

¹ State Policy on Water Quality Management 1997

4.1 PIEMAN RIVER CATCHMENT

The Pieman River catchment is approximately 4206 km² (based on the catchment shown in Figure 3). Rosebery and Tullah are the largest towns in the catchment. Towns generally support the local mining, forestry and tourism industry.

Large areas of the Pieman River catchment are recognised for their wilderness qualities. The headwaters of the Pieman begin in the Cradle Mountain Lake St Clair National Park. Parts of the Savage River National Park, Savage River Regional Reserve and Arthur Pieman Conservation Area are within the Pieman Catchment. Many of these areas, including the Tarkine Wilderness Area, are listed on the Register of the National Estate. Karst systems occur throughout the region.

The Pieman River has been subject to water quality monitoring since 1992 following a major fish kill below the Reece Dam in 1990^{2,3}. Water quality in the Pieman River catchment is generally influenced by the local geology and soil conditions. Water quality is characterised by low turbidity, slight acidity and high organic concentrations giving the water its characteristic clear, brown colour.

The Pieman River itself is regulated from Lake Murchison and Lake Mackintosh down to the Reece Dam for hydro electricity generation. Forestry

activities occur in the upper catchment of the Pieman River. There are four operating mines in the catchment mining for iron, zinc, lead, silver and tin. Due to the high rainfall in the area, these mines discharge water to rivers in the catchment. Abandoned mines are scattered throughout the catchment and acid mine drainage and erosion remain water quality issues for several of the rivers within the catchment. Lake Pieman waters are characterised by elevated zinc, aluminium, iron, manganese and in some case sulfate concentrations due to present and historic mining activities in the catchment.

Below the Reece Dam water quality is influenced by the presence of a salt wedge. This part of the river is within the Pieman River State Reserve and is an important recreational and tourism area.

The Board, Councils and Director of Parks initially suggested some water quality PEVs that may have been suitable for surface waters of the Pieman Catchment. The PEVs are based on the land tenure determined under the Tasmania-Commonwealth Regional Forest Agreement⁴.

These PEVs were presented at workshops and public meetings. Submissions from the public, industry and community groups were taken into consideration before the final PEVs set.

² Pieman River Environmental Monitoring Program, Technical Report 1992.

³ Pieman Monitoring: A Review of the 1990s. April 1999.

⁴ Inquiry into areas to be reserved under the Tasmania-Commonwealth Regional Forest Agreement: proposed recommendations report CAR reserves. Resource Planning and Development Commission Hobart. RPDC 1998

The PEVs have now been endorsed by the Board of Environmental Management, the Councils and the Director of Parks and will assist with catchment and water management planning. The PEVs are shown in Table 2 and correspond to the land tenure shown in Figure 2.

Remember – the PEVs chosen from the Policy are those values and uses that are currently in evidence.

Note: Towns in the catchment are generally small. The Board and Councils did not think these areas were intensive enough to warrant separate PEVs for surface waters flowing through them.

Table 2: Protected Environmental Values for the Pieman River catchment	
Land Tenure	Protected Environmental Values *(See note on page 22)
Surface Waters on Private Land (including forest on private 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"> (ii) Secondary contact water quality (iii) Aesthetic water quality <p>D: Agricultural Water Uses</p> <ul style="list-style-type: none"> (i) Irrigation (ii) Stock watering <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 may be harvested; that is acceptable for irrigation and stock watering purposes; and which will allow people to safely engage in secondary contact recreation activities such as paddling or fishing in aesthetically pleasing waters.</p>

Table 2: Protected Environmental Values for the Pieman River catchment	
Land Tenure	Protected Environmental Values *(See note on page 22)
<p>Surface Waters in State Forest</p> <p>In addition – Water supply on the Argent River and the Southwell River for mining (see Figure 2 for location); and water supply throughout catchment for power generation.</p>	<p>A: Protection of Aquatic Ecosystems</p> <p>(ii) Protection of modified (not pristine) ecosystems a. from which edible fish are harvested;</p> <p>having regard for Forestry Tasmania's 'Management Decision Classification System'</p> <p>B: Recreational Water Quality & Aesthetics</p> <p>(i) Primary contact water quality (ii) Secondary contact water quality (iii) Aesthetic water quality</p> <p>E. Industrial Water Supply – Mining, mineral processing and hydro-electricity power generation</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 may be harvested; which will allow people to safely engage in recreation activities such as swimming, kayaking, paddling or fishing in aesthetically pleasing waters; which is suitable for hydroelectric power generation and; on the Argent River, water which is suitable for use in mineral processing.</p>
Bakers Creek	<p>B: Recreational Water Quality & Aesthetics</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 maintain any aesthetic qualities of the creek.</p>
Ring River downstream of Bakers Creek	<p>A: Protection of Aquatic Ecosystems</p> <p>(ii) Protection of modified (not pristine) ecosystems b. from which edible fish are not harvested</p> <p>having regard for Forestry Tasmania's 'Management Decision Classification System.</p> <p>B: Recreational Water Quality & Aesthetics</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 the modified aquatic ecosystems from which edible fish may not be harvested and to maintain any aesthetic qualities of the rivers.</p>

Table 2: Protected Environmental Values for the Pieman River catchment	
Land Tenure	Protected Environmental Values *(See note on page 22)
Surface waters flowing through Forest Reserves from private land, state forest or un-allocated crown land	<p>A: Protection of Aquatic Ecosystems</p> <p>(ii) Protection of modified (not pristine) ecosystems a. from which edible fish are harvested;</p> <p>having regard to the management objectives for forest reserves outlined in Schedule 3 of the <i>Forestry Act, 1920</i></p> <p>B: Recreational Water Quality & Aesthetics</p> <p>(i) Primary contact water quality (ii) Secondary contact water quality (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, but healthy aquatic ecosystem from which edible fish may be harvested; which will allow people to safely engage in recreation activities such as swimming, kayaking, paddling or fishing in aesthetically pleasing waters.</p>
Surface waters that have their headwaters within Forest Reserves	<p>A: Protection of Aquatic Ecosystems**(See note on page 22)</p> <p>(i) Protection of pristine or nearly pristine ecosystems, 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 & Aesthetics</p> <p>(i) Primary contact water quality**(See note on page 22) (ii) Secondary contact water quality (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>

Table 2: Protected Environmental Values for the Pieman River catchment	
Land Tenure	Protected Environmental Values *(See note on page 22)
<p>Surface Waters on Un-allocated Crown Land</p> <p>In addition: Water supply on the Savage, Pieman, and Stitt Rivers; Mountain and Bakers Creek for mining (see Figure 2 for locations); and water supply throughout catchment for power generation</p>	<p>A: Protection of Aquatic Ecosystems</p> <p>(ii) Protection of modified (not pristine) ecosystems a. from which edible fish are harvested</p> <p>B: Recreational Water Quality & Aesthetics</p> <p>(i) Primary contact water quality (where such activities are permitted) (ii) Secondary contact water quality (iii) Aesthetic water quality</p> <p>E: Industrial Water Supply – Mining, mineral processing and hydro electricity power generation</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 may be harvested; which will allow people to safely engage in recreation activities such as swimming (where permitted), kayaking, paddling or fishing in aesthetically pleasing waters; which is suitable for hydro-electric power generation and on the Pieman, Savage and Stitt Rivers and Mountain and Bakers Creeks, water which is suitable for use in mineral processing.</p>
<p>Main Creek</p>	<p>A: Protection of Aquatic Ecosystems</p> <p>(ii) Protection of modified (not pristine) ecosystems b. from which edible fish are not harvested</p> <p>B: Recreational Water Quality & Aesthetics</p> <p>(ii) Secondary contact water quality (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 the modified aquatic ecosystems from which edible fish may not be harvested, to allow people to safely engage in recreational activities such as prospecting and to maintain any aesthetic qualities of the creek.</p>

Table 2: Protected Environmental Values for the Pieman River catchment	
Land Tenure	Protected Environmental Values *(See note on page 22)
<p>Lake Rosebery at end of Bluff Street (Tullah Water Supply)</p> <p>and:</p> <p>Mountain Creek downstream of Murchison Highway and Stitt River at confluence with Mountain Creek (Rosebery Water Supply)</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 (where such activities are permitted)</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 and disinfection</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 may be harvested; that is acceptable for a drinking water supply (subject to coarse screening and disinfection); and which will allow people to safely engage in primary and secondary contact recreation activities such as swimming (where permitted), paddling or fishing in aesthetically pleasing waters.</p>
<p>Surface Waters in National Parks</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 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</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, kayaking, paddling or fishing in aesthetically pleasing waters.</p>

Table 2: Protected Environmental Values for the Pieman River catchment	
Land Tenure	Protected Environmental Values *(See note on page 22)
<p>Surface waters flowing through Conservation Areas or Nature Recreation Areas from private land, state forest or un-allocated crown land;</p> <p>and:</p> <p>in the Arthur-Pieman Conservation Area surface waters affected by the settlement at Sandy Cape; the Interview River, the Italian River, Chimney Creek, Sunday Creek</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>having regard for the management objectives 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</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, but healthy aquatic ecosystem from which edible fish may be harvested; which will allow people to safely engage in recreation activities such as swimming, kayaking, paddling or fishing in aesthetically pleasing waters.</p>
<p>All other surface waters that have their headwaters within Conservation Areas or Nature Recreation Areas</p>	<p>A: Protection of Aquatic Ecosystems**(See note on page 22)</p> <p>(i) Protection of pristine or nearly pristine ecosystems,</p> <p>having regard for the management objectives for conservation areas 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**(See note on page 22)</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, kayaking, paddling or fishing in aesthetically pleasing waters.</p>

Table 2: Protected Environmental Values for the Pieman River catchment

Land Tenure	Protected Environmental Values ^{*(See note on page 22)}
<p>Surface Waters flowing through Regional Reserve from private land, state forest or un-allocated crown land</p> <p>and:</p> <p>Tulloch Creek, Salmon Creek down stream of Tulloch Creek, Wilson River down stream of Salmon Creek, South East Creek, Stirling River</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>having regard for the management objectives 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</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, but healthy aquatic ecosystem from which edible fish may be harvested; which will allow people to safely engage in recreation activities such as swimming, kayaking, paddling or fishing in aesthetically pleasing waters.</p>
<p>Surface waters that have their headwaters within Regional Reserve or their headwaters within a National Park</p>	<p>A: Protection of Aquatic Ecosystems^{** (See note on page 22)}</p> <p>(i) Protection of pristine or nearly pristine ecosystems,</p> <p>having regard for the management objectives 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^{** (See note on page 22)}</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, kayaking, paddling or fishing in aesthetically pleasing waters.</p>

Table 2: Protected Environmental Values for the Pieman River catchment	
Land Tenure	Protected Environmental Values *(See note on page 22)
Surface Waters flowing through State Reserve from private land, state forest or un-allocated crown land	<p>A: Protection of Aquatic Ecosystems</p> <p>(ii) Protection of modified (not pristine) ecosystems a. from which edible fish are harvested;</p> <p>having regard for the management objectives for State Reserves 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 (ii) Secondary contact water quality (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, but healthy aquatic ecosystem from which edible fish may be harvested; which will allow people to safely engage in recreation activities such as swimming, kayaking, paddling or fishing in aesthetically pleasing waters.</p>
Surface waters that have their headwaters within the State Reserve	<p>A: Protection of Aquatic Ecosystems**(See note on page 22)</p> <p>(i) Protection of pristine or nearly pristine ecosystems, having regard for the management objectives for state reserves 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**(See note on page 22) (ii) Secondary contact water quality (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>

Table 2: Protected Environmental Values for the Pieman River catchment	
Land Tenure	Protected Environmental Values *(See note on page 22)
Surface Waters on Hydro Electric Corporation Land	<p>A: Protection of Aquatic Ecosystems</p> <p>(ii) Protection of modified (not pristine) ecosystems a. from which edible fish are harvested</p> <p>B: Recreational Water Quality & Aesthetics</p> <p>(i) Primary contact water quality (ii) Secondary contact water quality (iii) Aesthetic water quality</p> <p>E: Industrial Water Supply –Hydro-electricity power generation</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 may be harvested; which will allow people to safely engage in recreation activities such as swimming, kayaking, paddling or fishing in aesthetically pleasing waters and which is suitable for hydro-electric power generation.</p>

Table 2: Protected Environmental Values for the Pieman River catchment	
Land Tenure	Protected Environmental Values^{*(See note on page 22)}
Pieman River Estuary	<p>A: Protection of Aquatic Ecosystems</p> <p>(ii) Protection of modified (not pristine) ecosystems a. from which edible fish, shellfish and crustaceans are harvested;</p> <p>having regard for the management objectives for reserves 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 (ii) Secondary contact water quality (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, but healthy aquatic ecosystem from which edible fish, shellfish and crustaceans may be harvested; which allows people to safely engage in activities such as swimming; and allows boating or fishing in aesthetically pleasing waters.</p>
Estuaries within the Arthur/Pieman Conservation Area and whose catchments are contained within the Conservation Area	<p>A: Protection of Aquatic Ecosystems^{** (See note on page 22)}</p> <p>(i) Protection of pristine or nearly pristine ecosystems;</p> <p>having regard for the management objectives for conservation areas 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^{** (See note on page 22)} (ii) Secondary contact water quality (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>

* 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 mining activities or other historic land uses 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. Water quality data is not currently available for most surface waters in these areas.

PROTECTED ENVIRONMENTAL VALUES FOR YOUR CATCHMENT

4.2 ARTHUR RIVER CATCHMENT

The Arthur River catchment (as shown in Figure 3) is approximately 3009 km². There are no large towns within the catchment and there are few roads. There is little information available regarding water quality within the catchment. Snapshot water quality and aquatic ecological monitoring has occurred at a limited number of sites in the catchment as part of the Monitoring River Health Initiative⁵ and also as part of the Tasmania-Commonwealth Regional Forest Agreement studies. Sporadic monitoring of acid mine drainage at the Mt Bischoff mine has also occurred. This tin mine operated between approximately 1878 – 1945 and now has significant acid mine drainage problems. There are other abandoned mines in the Arthur River catchment. The impact of these mines on water quality has not been determined.

The headwaters of the Arthur start in private land and there is extensive forestry activity throughout the catchment. Landuse impacts on water quality from agriculture, forestry and historic mining in the catchment are not known.

Like the Pieman River catchment the Arthur has large areas recognised for their wilderness qualities. Parts of the Savage River National Park, Savage River Regional Reserve and Arthur Pieman Conservation Area are within the Arthur River catchment. Many of these areas are on the Register of the

⁵Tasmania Monitoring River Health Initiative Final Report. March, 1998 Report Series WRA 98/03.

National Estate. The Arthur River estuary was given a high conservation status in recent survey of Tasmanian estuaries⁶.

Karst systems occur throughout the catchment. The importance of these systems to both groundwater and surface water quality needs to be recognised. It is usually through these systems that an interaction between groundwater and surface water occurs. The groundwater quality (salinity, organic content and turbidity) of the karst systems is usually quite different to that of the surface water quality and can have localised influences on the surface water quality where the two interact.

Land tenure categories are those determined under the Tasmania-Commonwealth Regional Forest Agreement⁷.

The Board, Councils and Director of Parks initially suggested some water quality PEVs that may have been suitable for surface waters of the Arthur River Catchment. These PEVs were presented at workshops and public meetings. Submissions from the public, industry and community groups were

⁶ Edgar G.J., Barrett, N.S., and Graddon, D.J. (1998) A classification of Tasmanian estuaries and assessment of their conservation significance: an analysis using ecological and physical attributes, population and land use. DPIWE .

⁷ Inquiry into areas to be reserved under the Tasmania-Commonwealth Regional Forest Agreement: proposed recommendations report CAR reserves. Resource Planning and Development Commission Hobart. RPDC 1998

taken into consideration before the final PEVs set.

The PEVs have now been endorsed by the Board of Environmental Management, the Councils and the Director of Parks and will assist with catchment and water management planning. The PEVs are shown in Table 3 and correspond to the land tenure shown in Figure 3.

Remember – the PEVs chosen from the Policy are those values and uses that are currently in evidence.

Note: Towns in the catchment are generally small. The Board and Councils did not think these areas were intensive enough to warrant separate PEVs for surface waters flowing through them.

Table 3: Protected Environmental Values for the Arthur River catchment	
Land Tenure	Protected Environmental Values *(See note on page 32)
Surface Waters on Private Land (including forest on private 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"> (ii) Secondary contact water quality (iii) Aesthetic water quality <p>D: Agricultural Water Uses</p> <ul style="list-style-type: none"> (i) Irrigation (ii) Stock watering <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 may be harvested; that is acceptable for irrigation and stock watering purposes; and which will allow people to safely engage in secondary contact recreation activities such as paddling or fishing in aesthetically pleasing waters.</p>

Table 3: Protected Environmental Values for the Arthur River catchment

Land Tenure	Protected Environmental Values ^{*(See note on page 32)}
<p>Waratah River</p> <p>(Waratah Water Supply – see location on Figure 3)</p>	<p>A: Protection of Aquatic Ecosystems</p> <p>(ii) Protection of modified (not pristine) ecosystems a. from which edible fish are harvested</p> <p>B: Recreational Water Quality & Aesthetics</p> <p>(i) Primary contact water quality (where permitted) (ii) Secondary contact water quality (iii) Aesthetic water quality</p> <p>C: Raw Water for Drinking Water Supply</p> <p>(ii) Subject to coarse screening and disinfection</p> <p>D: Agricultural Water Uses</p> <p>(i) Irrigation (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 modified, but healthy aquatic ecosystem from which edible fish may be harvested; that is acceptable for a town drinking water supply (subject to coarse screening and disinfection); irrigation and stock watering purposes; and which will allow people to safely engage in primary and secondary contact recreation activities such as swimming (where permitted), paddling or fishing in aesthetically pleasing waters.</p>

Table 3: Protected Environmental Values for the Arthur River catchment

Land Tenure	Protected Environmental Values ^{*(See note on page 32)}
<p>Surface Waters in State Forest</p> <p>In addition: Water supply for: paper production on the Wey River (see Figure 3 for location) and for spring water bottling at Victory Springs</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>having regard for Forestry Tasmania's 'Management Decision Classification System'.</p> <p>B: Recreational Water Quality & Aesthetics</p> <p>(i) Primary contact water quality</p> <p>(ii) Secondary contact water quality</p> <p>(iii) Aesthetic water quality</p> <p>E: Industrial Water Supply – Paper Production and spring water bottling</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 may be harvested; which will allow people to safely engage in recreation activities such as swimming, kayaking, paddling or fishing in aesthetically pleasing waters; and which is suitable for paper production on the Wey River and spring water bottling at Victory Springs.</p>
<p>Waratah River downstream of the historic Mt Bischoff Mine</p>	<p>A: Protection of Aquatic Ecosystems,</p> <p>(ii) Protection of modified (not pristine) ecosystems</p> <p>b. from which edible fish are not harvested;</p> <p>having regard for Forestry Tasmania's 'Management Decision Classification System'</p> <p>B: Recreational Water Quality & Aesthetics</p> <p>(ii) Secondary contact water quality</p> <p>(iii) Aesthetic water quality</p> <p>That is, as a minimum, water quality management strategies for down stream of Mt Bischoff Mine to the confluence with the Arthur River should seek to provide water of a physical and chemical nature to support the modified aquatic ecosystem, from which edible fish are not harvested; which will allow people to safely engage in recreation activities such as prospecting in aesthetically pleasing waters.</p>

Table 3: Protected Environmental Values for the Arthur River catchment

Land Tenure	Protected Environmental Values ^{*(See note on page 32)}
<p>Surface waters flowing through Forest Reserves from private land, state forest or un-allocated crown land.</p>	<p>A: Protection of Aquatic Ecosystems</p> <p>(ii) Protection of modified (not pristine) ecosystems a. from which edible fish are harvested;</p> <p>having regard to the management objectives for forest reserves outlined in Schedule 3 of the <i>Forestry Act, 1920</i></p> <p>B: Recreational Water Quality & Aesthetics</p> <p>(i) Primary contact water quality (ii) Secondary contact water quality (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, but healthy aquatic ecosystem from which edible fish may be harvested; which will allow people to safely engage in recreation activities such as swimming, kayaking, paddling or fishing in aesthetically pleasing waters.</p>
<p>Surface waters that have their headwaters within Forest Reserves</p>	<p>A: Protection of Aquatic Ecosystems^{** (See note on page 32)}</p> <p>(i) Protection of pristine or nearly pristine ecosystems,</p> <p>Having regard to the management objectives for forest reserves outlined in Schedule 3 of the <i>Forestry Act, 1920</i></p> <p>B: Recreational Water Quality & Aesthetics^{** (See note on page 32)}</p> <p>(i) Primary contact water quality (ii) Secondary contact water quality (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; which will allow people to safely engage in recreation activities such as swimming, paddling or fishing in aesthetically pleasing waters.</p>
<p>Surface Waters on Un-allocated Crown Land</p>	<p>A: Protection of Aquatic Ecosystems</p> <p>(ii) Protection of modified (not pristine) ecosystems a. from which edible fish are harvested</p> <p>B: Recreational Water Quality & Aesthetics</p> <p>(i) Primary contact water quality (ii) Secondary contact water quality (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, but healthy aquatic ecosystem from which edible fish may be harvested; which will allow people to safely engage in recreation activities such as swimming, kayaking, paddling or fishing in aesthetically pleasing waters.</p>

Table 3: Protected Environmental Values for the Arthur River catchment	
Land Tenure	Protected Environmental Values *(See note on page 32)
Surface Waters in National Parks	<p>A: Protection of Aquatic Ecosystems</p> <p>(i) Protection of pristine or nearly pristine ecosystems, having regard for the management objectives 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 (ii) Secondary contact water quality (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, kayaking, paddling or fishing in aesthetically pleasing waters.</p>

Table 3: Protected Environmental Values for the Arthur River catchment

Land Tenure	Protected Environmental Values ^{*(See note on page 32)}
<p>Surface waters flowing through Conservation Areas and Nature Recreation Areas from private land, state forest or un-allocated crown land;</p> <p>and:</p> <p>in the Arthur Pieman Conservation Area surface waters in areas available for grazing; surface waters north of Richardson Point that are contiguous with the coast; Cassiterite Creek and Sundown Creek</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>having regard for the management objectives 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</p> <p>(ii) Secondary contact water quality</p> <p>(iii) Aesthetic water quality</p> <p>D: Agricultural Water Use (Arthur Pieman Conservation Area Only)</p> <p>(ii) Stock watering (where such activities are permitted under the management plan or regulations)</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 may be harvested; which will allow people to safely engage in recreation activities such as swimming, kayaking, paddling or fishing in aesthetically pleasing waters. In the Arthur Pieman Conservation area only, water quality should also support stock watering where such activities are permitted under the management plan or regulation.</p>
<p>All other surface waters that have their headwaters within Conservation Areas and Nature Recreation Areas</p>	<p>A: Protection of Aquatic Ecosystems^{** (See note on page 32)}</p> <p>(i) Protection of pristine or nearly pristine ecosystems</p> <p>having regard for the management objectives outlined in Schedule 4 of the <i>National Parks and Wildlife Act, 1970</i></p> <p>B: Recreational Water Quality & Aesthetics^{** (See note on page 32)}</p> <p>(i) Primary contact water quality</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; which will allow people to safely engage in recreation activities such as swimming, kayaking, paddling or fishing in aesthetically pleasing waters.</p>

Table 3: Protected Environmental Values for the Arthur River catchment	
Land Tenure	Protected Environmental Values *(See note on page 32)
Surface waters flowing through a Regional Reserve from private land, state forest or un-allocated crown land	<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>having regard for the management objectives 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</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, but healthy aquatic ecosystem from which edible fish may be harvested; which will allow people to safely engage in recreation activities such as swimming, kayaking, paddling or fishing in aesthetically pleasing waters.</p>
Surface waters that have their headwaters within Regional Reserves	<p>A: Protection of Aquatic Ecosystems**(See note on page 32)</p> <p>(i) Protection of pristine or nearly pristine ecosystems</p> <p>having regard for the management objectives outlined in Schedule 4 of the <i>National Parks and Wildlife Act, 1970</i></p> <p>B: Recreational Water Quality & Aesthetics**(See note on page 32)</p> <p>(i) Primary contact water quality</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; which will allow people to safely engage in recreation activities such as swimming, kayaking, paddling or fishing in aesthetically pleasing waters.</p>

Table 3: Protected Environmental Values for the Arthur River catchment

Land Tenure	Protected Environmental Values ^{*(See note on page 32)}
<p>Surface waters flowing through State Reserves from private land, state forest or un-allocated crown 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>having regard for the management objectives 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</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, but healthy aquatic ecosystem from which edible fish may be harvested; which will allow people to safely engage in recreation activities such as swimming, kayaking, paddling or fishing in aesthetically pleasing waters.</p>
<p>Surface waters that have their headwaters within State Reserves</p>	<p>A: Protection of Aquatic Ecosystems^{** (See note on page 32)}</p> <p>(i) Protection of pristine or nearly pristine ecosystems,</p> <p>having regard for the management objectives outlined in Schedule 4 of the <i>National Parks and Wildlife Act, 1970</i></p> <p>B: Recreational Water Quality & Aesthetics^{** (See note on page 32)}</p> <p>(i) Primary contact water quality</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, kayaking, paddling or fishing in aesthetically pleasing waters.</p>

Table 3: Protected Environmental Values for the Arthur River catchment

Land Tenure	Protected Environmental Values ^{*(See note on page 32)}
<p>Estuaries from rivers or creeks that are not entirely contained within the Arthur Pieman Conservation area</p>	<p>A: Protection of Aquatic Ecosystems</p> <p>(ii) Protection of modified (not pristine) ecosystems</p> <p>a. from which edible fish, shellfish and crustaceans are harvested;</p> <p>having regard for the management objectives 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</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, but healthy aquatic ecosystem from which edible fish, shellfish and crustaceans may be harvested; which allows people to safely engage in activities such as swimming; and allows boating or fishing in aesthetically pleasing waters.</p>
<p>Estuaries within the Arthur/Pieman Conservation Area and whose catchments are contained within the Conservation Area</p>	<p>A: Protection of Aquatic Ecosystems^{** (See note on page 32)}</p> <p>(i) Protection of pristine or nearly pristine ecosystems,</p> <p>having regard for the management objectives for conservation areas outlined in Schedule 4 of the <i>National Parks and Wildlife Act, 1970</i>.</p> <p>B: Recreational Water Quality & Aesthetics^{** (See note on page 32)}</p> <p>(i) Primary contact water quality</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>

* 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 mining activities or other historic land uses 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. Water quality data is not currently available for most surface waters in these areas.

PROTECTED ENVIRONMENTAL VALUES FOR YOUR CATCHMENT

4.3 WELCOME RIVER CATCHMENT

The Welcome River catchment is located in the north west corner of Tasmania and covers an area of approximately 545.6 km². The catchment begins just north of Dismal Swamp Nature Reserve and extends west and north, over a flat low lying area, to the coast. Marrawah and Redpa are the largest towns in the catchment. In consultation with the Welcome River Catchment Management Group, a catchment management plan has recently been prepared for the River⁸. The management plan primarily looks at land drainage issues.

Agriculture and forestry (both State and private) are the main land uses within the catchment. The middle catchment has been extensively modified by drainage works and contains a river improvement scheme administered by the Department of Primary Industries, Water and Environment. Agricultural land is primarily used for sheep and cattle grazing. The catchment supports an extensive dairy industry.

The catchment contains a conservation reserve, a state reserve, a nature reserve and several small forestry reserves.

Coastal and estuary waters east of Shoal Inlet on the north coast are included in the Far North West Marine Farm Development Plan⁹. These areas are

also included on the Register of the National Estate because of important migratory bird habitats. Currently, no marine farms exist in the Welcome River estuary nor have zones been declared in this region.

Detailed water quality investigations have not occurred in the catchment. The significant changes to the drainage patterns in the catchment and the high intensity agriculture would have undoubtedly impacted water quality. High nutrient levels have been detected in snap shot surveys and the Monitoring River Health Initiative (MRHI) has detected impacts on the macroinvertebrate communities at sites in the lower catchment. High salinity levels have also been detected in the catchment. It is unclear if these have resulted from land uses or from salt spray. Due to the large amount of drainage that has occurred in this coastal catchment acid sulfate soils might be an issue of the future. This issue is yet to be investigated.

The Board, Councils and Director of Parks initially suggested some water quality PEVs that may have been suitable for surface waters of the Welcome River Catchment. These PEVs were presented at workshops and public meetings. Submissions from the public, industry and community groups were taken into consideration before the final PEVs were set.

The PEVs have now been endorsed and will assist with catchment and water management planning. The PEVs are shown in Table 4 and correspond to the land tenure shown in Figure 4.

⁸ Welcome River Catchment Management Plan. Thompson & Brett – Willing & Partners Consulting Group. March 1999.

⁹ Marine Farm Development Plan. Far North West. Department of Primary Industries, Water and Environment. May 1999.

Remember – the PEVs chosen from the Policy are those values and uses that are currently in evidence.

Councils did not think these areas were intensive enough to warrant separate PEVs for surface waters flowing through them.

Note: Towns in the catchment are generally small. The Board and

Table 4: Protected Environmental Values for the Welcome River catchment	
Land Tenure	Protected Environmental Values * ^(see note on page 39)
<p>Surface waters on Private Land (including forest on private land)</p>	<p>A: Protection of Aquatic Ecosystems</p> <p>(ii) Protection of modified (not pristine) ecosystems a. from which edible fish are harvested</p> <p>B: Recreational Water Quality & Aesthetics</p> <p>(ii) Secondary contact water quality (iii) Aesthetic water quality</p> <p>D: Agricultural Water Uses</p> <p>(i) Irrigation (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 irrigation and stock watering purposes; and which will allow people to safely engage in secondary contact recreation activities such as paddling or fishing in aesthetically pleasing waters.</p>
<p>Surface waters in State Forest</p>	<p>A: Protection of Aquatic Ecosystems</p> <p>(ii) Protection of modified (not pristine) ecosystems a. from which edible fish are harvested</p> <p>having regard for Forestry Tasmania's 'Management Decision Classification System'.</p> <p>B: Recreational Water Quality & Aesthetics</p> <p>(i) Primary contact water quality (ii) Secondary contact water quality (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, but healthy aquatic ecosystem from which edible fish may be harvested; which will allow people to safely engage in recreation activities such as swimming, kayaking, paddling or fishing in aesthetically pleasing waters.</p>

Table 4: Protected Environmental Values for the Welcome River catchment

Land Tenure	Protected Environmental Values ^{*(see note on page 39)}
<p>Surface waters flowing through Forest Reserves from private land, state forests or un-allocated crown land</p>	<p>A: Protection of Aquatic Ecosystems</p> <p>(ii) Protection of modified (not pristine) ecosystems a. from which edible fish are harvested</p> <p>having regard to the management objectives for forest reserves outlined in Schedule 3 of the <i>Forestry Act, 1920</i></p> <p>B: Recreational Water Quality & Aesthetics</p> <p>(i) Primary contact water quality (ii) Secondary contact water quality (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, but healthy aquatic ecosystem from which edible fish may be harvested; which will allow people to safely engage in recreation activities such as swimming, kayaking, paddling or fishing in aesthetically pleasing waters.</p>
<p>Surface waters that have their headwaters within Forest Reserve</p>	<p>A: Protection of Aquatic Ecosystems</p> <p>(i) Protection of pristine or nearly pristine ecosystems</p> <p>having regard to the management objectives for forest reserves outlined in Schedule 3 of the <i>Forestry Act, 1920</i></p> <p>B: Recreational Water Quality & Aesthetics</p> <p>(i) Primary contact water quality (ii) Secondary contact water quality (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>
<p>Surface waters on un-allocated Crown Land</p>	<p>A: Protection of Aquatic Ecosystems</p> <p>(ii) Protection of modified (not pristine) ecosystems a. from which edible fish are harvested</p> <p>B: Recreational Water Quality & Aesthetics</p> <p>(i) Primary contact water quality (ii) Secondary contact water quality (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, but healthy aquatic ecosystem from which edible fish may be harvested; which will allow people to safely engage in recreation activities such as swimming, kayaking, paddling or fishing in aesthetically pleasing waters.</p>

Table 4: Protected Environmental Values for the Welcome River catchment

Land Tenure	Protected Environmental Values ^{*(see note on page 39)}
<p>Surface waters flowing through Public Reserves from private land, state forests or un-allocated crown 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>having regard to the management objectives for objectives for public reserves outlined in Schedule 4 of <i>the Regional Forest Agreement (Land Classification) Act, 1998</i></p> <p>B: Recreational Water Quality & Aesthetics</p> <p>(i) Primary contact water quality</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, but healthy aquatic ecosystem from which edible fish may be harvested; which will allow people to safely engage in recreation activities such as swimming, kayaking, paddling or fishing in aesthetically pleasing waters.</p>
<p>Surface waters that have their headwaters within Public Reserves.</p>	<p>A: Protection of Aquatic Ecosystems</p> <p>(i) Protection of pristine or nearly pristine ecosystems</p> <p>having regard to the management objectives for public reserves outlined in Schedule 4 of <i>the Regional Forest Agreement (Land Classification) Act, 1998</i></p> <p>B: Recreational Water Quality & Aesthetics</p> <p>(i) Primary contact water quality</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>

Table 4: Protected Environmental Values for the Welcome River catchment	
Land Tenure	Protected Environmental Values *(see note on page 39)
Surface waters in the Arthur-Pieman Conservation Area	<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>having regard for the management objectives 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</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, but healthy aquatic ecosystem from which edible fish may be harvested; which will allow people to safely engage in recreation activities such as swimming, kayaking, paddling or fishing in aesthetically pleasing waters.</p>

Table 4: Protected Environmental Values for the Welcome River catchment

Land Tenure	Protected Environmental Values ^{*(see note on page 39)}
<p>Surface waters flowing through State Reserves or Nature Reserves from private land, state forests or un-allocated 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>having regard for the management objectives 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 (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 may be harvested; which will allow people to safely engage in recreation activities such as swimming, kayaking, paddling or fishing in aesthetically pleasing waters.</p>
<p>Surface waters that have their headwaters within State Reserves or Nature 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 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 (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, kayaking, paddling or fishing in aesthetically pleasing waters.</p>

Table 4: Protected Environmental Values for the Welcome River catchment

Land Tenure	Protected Environmental Values ^{*(see note on page 39)}
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, shellfish and crustaceans are harvested <p>B: Recreational Water Quality & Aesthetics</p> <ul style="list-style-type: none"> (i) Primary contact water quality (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, shellfish and crustaceans may be harvested; which allows people to safely engage in activities such as swimming; and allows 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.

PROTECTED ENVIRONMENTAL VALUES FOR YOUR CATCHMENT

4.4 MONTAGU RIVER CATCHMENT

The Montagu River catchment is approximately 357 km² and extends from near the Montagu River Forest Reserve in the north to the coast at Robbins Passage. Most of the tributaries on the Montagu River have been utilised as drainage channels for neighboring land and many of them have been cleared and straightened for this purpose. The two major drainage areas in the catchment are managed by the Togari and Brittons Swamp Drainage Trust. A catchment management plan recently developed for the Montagu River addresses several catchment water resource issues¹⁰.

The main land uses in the Montagu catchment are agriculture and forestry. High intensity agriculture occurs in some parts of the catchment especially around the Togari and Brittons drainage areas. Recent water quality data collected as part of the River Health program found high nutrient levels in several sites around the catchment. Low dissolved oxygen concentrations were recorded at one site during low river flow and slightly elevated salt levels were found at several sites. Snap shot views of aquatic macroinvertebrates (Monitoring River Health Initiative) found that communities were degraded. This is probably due to both habitat loss and poor water quality.

There are currently five marine farms in the Montagu estuary and further marine farm zones have been identified in the Robinson passage area. The marine farm management plan identifies PEVs

for the marine farm zones as being protection of modified aquatic ecosystems, from which edible shellfish are harvested.

The Board, Councils and Director of Parks initially suggested some water quality PEVs that may have been suitable for surface waters of the Montagu Catchment. These PEVs were presented at workshops and public meetings. Submissions from the public, industry and community groups were taken into consideration before the final PEVs were set.

The PEVs have now been endorsed by the Board, Councils and the Director of Parks and will assist in catchment and water management planning. The PEVs are shown in Table 5 and correspond to the land tenure shown in Figure 5.

Remember – the PEVs chosen from the Policy are those values and uses that are currently in evidence.

Note: Towns in the catchment are generally small. The Board and Councils did not think these areas were intensive enough to warrant separate PEVs for surface waters flowing through them.

¹⁰ Montagu River Landcare Group. Montagu River Catchment Management Plan. Sinclair Knight Merz. July 1999.

TABLE 5: Protected Environmental Values for the Montagu River catchment

Land Tenure	Protected Environmental Values ^{*(see note on page 45)}
<p>Surface waters on Private Land (including forest on private 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"> (ii) Secondary contact water quality (iii) Aesthetic water quality <p>D: Agricultural Water Uses</p> <ul style="list-style-type: none"> (i) Irrigation (ii) Stock watering <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 may be harvested; that is acceptable for irrigation and stock watering purposes; and which will allow people to safely engage in secondary contact recreation activities such as paddling or fishing in aesthetically pleasing waters.</p>
<p>Surface waters in State Forest</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 Forestry Tasmania's 'Management Decision Classification System'.</p> <p>B: Recreational Water Quality & Aesthetics</p> <ul style="list-style-type: none"> (i) Primary contact water quality (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 may be harvested; which will allow people to safely engage in recreation activities such as swimming, kayaking, paddling or fishing in aesthetically pleasing waters.</p>

TABLE 5: Protected Environmental Values for the Montagu River catchment

Land Tenure	Protected Environmental Values ^{*(see note on page 45)}
<p>Surface waters flowing through Forest Reserves from private land, state forests or un-allocated crown land</p>	<p>A: Protection of Aquatic Ecosystems</p> <p>(ii) Protection of modified (not pristine) ecosystems a. from which edible fish are harvested;</p> <p>having regard to the management objectives for forest reserves outlined in Schedule 3 of the <i>Forestry Act, 1920</i></p> <p>B: Recreational Water Quality & Aesthetics</p> <p>(i) Primary contact water quality (ii) Secondary contact water quality (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, but healthy aquatic ecosystem from which edible fish may be harvested; which will allow people to safely engage in recreation activities such as swimming, kayaking, paddling or fishing in aesthetically pleasing waters.</p>
<p>Surface waters that have their headwaters within Forest Reserves.</p>	<p>A: Protection of Aquatic Ecosystems</p> <p>(i) Protection of pristine or nearly pristine ecosystems</p> <p>having regard to the management objectives for forest reserves outlined in Schedule 3 of the <i>Forestry Act, 1920</i></p> <p>B: Recreational Water Quality & Aesthetics</p> <p>(i) Primary contact water quality (ii) Secondary contact water quality (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>

TABLE 5: Protected Environmental Values for the Montagu River catchment

Land Tenure	Protected Environmental Values ^{*(see note on page 45)}
Surface waters on un-allocated Crown Land	<p>A: Protection of Aquatic Ecosystems</p> <p>(ii) Protection of modified (not pristine) ecosystems a. from which edible fish are harvested</p> <p>having regard for Forestry Tasmanias 'Management Decision Classification System'.</p> <p>B: Recreational Water Quality & Aesthetics</p> <p>(i) Primary contact water quality (ii) Secondary contact water quality (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, but healthy aquatic ecosystem from which edible fish may be harvested; which will allow people to safely engage in recreation activities such as swimming, kayaking, paddling or fishing in aesthetically pleasing waters.</p>

TABLE 5: Protected Environmental Values for the Montagu River catchment

Land Tenure	Protected Environmental Values ^{*(see note on page 45)}
<p>Surface waters flowing through Public Reserves from private land, state forests or un-allocated crown land</p>	<p>A: Protection of Aquatic Ecosystems</p> <p>(ii) Protection of modified (not pristine) ecosystems a. from which edible fish are harvested;</p> <p>having regard to the management objectives for objectives for public reserves outlined in Schedule 4 of <i>the Regional Forest Agreement (Land Classification) Act, 1998</i></p> <p>B: Recreational Water Quality & Aesthetics</p> <p>(i) Primary contact water quality (ii) Secondary contact water quality (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, but healthy aquatic ecosystem from which edible fish may be harvested; which will allow people to safely engage in recreation activities such as swimming, kayaking, paddling or fishing in aesthetically pleasing waters.</p>
<p>Surface waters that have their headwaters within Public Reserves.</p>	<p>A: Protection of Aquatic Ecosystems</p> <p>(i) Protection of pristine or nearly pristine ecosystems</p> <p>Having regard to the management objectives for public reserves outlined in Schedule 4 of <i>the Regional Forest Agreement (Land Classification) Act, 1998</i></p> <p>B: Recreational Water Quality & Aesthetics</p> <p>(i) Primary contact water quality (ii) Secondary contact water quality (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>

TABLE 5: Protected Environmental Values for the Montagu River catchment	
Land Tenure	Protected Environmental Values *(see note on page 45)
Estuarine surface waters	<p>A: Protection of Aquatic Ecosystems</p> <p>(ii) Protection of modified (not pristine) ecosystems a. from which edible fish, shellfish and crustaceans are harvested</p> <p>B: Recreational Water Quality & Aesthetics</p> <p>(i) Primary contact water quality (ii) Secondary contact water quality (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, but healthy aquatic ecosystem from which edible fish, shellfish and crustaceans may be harvested; which allows people to safely engage in activities such as swimming; and allows 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.

PROTECTED ENVIRONMENTAL VALUES FOR YOUR CATCHMENT

4.5 DUCK RIVER

The Duck River catchment is approximately 616 km². The catchment begins north-east of the Roger River State Reserve and drains into Duck Bay on the north coast near Smithton. There is a town water supply on Deep Creek which supplies water to Smithton (Figure 6).

Forestry and agriculture are the primary land uses in the Duck River catchment. The lower Duck River catchment has been extensively drained to improve agricultural land. Water quality in some areas of the Duck River catchment has been affected by intensive agriculture. High nutrient levels, high faecal bacteria numbers and low dissolved oxygen levels have resulted¹¹. Recent 'State of Rivers' water quality monitoring has detected high salt levels in some locations in the Duck River catchment. Snap-shot macroinvertebrate information (MRHI¹²) indicated that aquatic communities at the four study sites were impacted. This has probably resulted from both water quality and habitat changes in the catchment. Willow infestation on the Duck River and its tributaries is a significant water resource issue for the catchment. Willow degrades natural habitat and impacts environmental flows during the summer months.

There are currently three marine farms in Duck Bay. These are covered by the Far North West Marine Farm Plan which includes PEVs for the marine farm zones. In the past degraded water quality, namely high faecal coliform numbers, has impacted aquacultural

activities in the bay¹³. Urban run-off from Smithton may also be impacting the estuarine water quality in the bay. An improvement in agricultural practices in the catchment has seen an improvement in water quality in Duck Bay.

The Board, Councils and Director of Parks initially suggested some water quality PEVs that may have been suitable for surface waters of the Duck River Catchment. These PEVs were presented at workshops and public meetings. Submissions from the public, industry and community groups were taken into consideration before the final PEVs were set.

The PEVs have now been endorsed by the Board, Councils and Director of Parks and will assist in catchment and water management planning. The PEVs are shown in Table 6 and correspond to the land tenure shown in Figure 6.

Remember – the PEVs chosen from the Policy are those values and uses that are currently in evidence.

Note: Towns in the catchment are generally small. The Board and Councils did not think these areas were intensive enough to warrant separate PEVs for surface waters flowing through them.

¹¹ State of the Environment Report – Tasmania (1996) Volume 1: Conditions and Trends.

¹² MRHI – Monitoring River Health Initiative

¹³ Consulting Environmental Engineers (1999) Duck Bay Marine Environment.

Table 6: Protected Environmental Values for the Duck River catchment	
Land Tenure	Protected Environmental Values <small>*(see note on page 54)</small>
<p>Surface waters on Private Land (including forest on private land)</p> <p>In addition, Edith Creek food processing water supply (see location on Figure 6)</p>	<p>A: Protection of Aquatic Ecosystems</p> <p>(ii) Protection of modified (not pristine) ecosystems a. from which edible fish are harvested</p> <p>B: Recreational Water Quality & Aesthetics</p> <p>(i) Primary contact water quality (Duck River at Trowutta Road - River Bend Youth Camp) (ii) Secondary contact water quality (iii) Aesthetic water quality</p> <p>D: Agricultural Water Uses</p> <p>(i) Irrigation (ii) Stock watering</p> <p>E: Industrial Water Supply – Food Processing</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 may be harvested; that is acceptable for irrigation and stock watering purposes; and which will allow people to safely engage in primary contact recreational activities such as swimming on the Duck River at Trowutta Road (River Bend Youth Camp) and secondary contact recreation activities such as paddling or fishing in aesthetically pleasing waters and on Edith Creek a supply of water suitable for use in food processing.</p>

Table 6: Protected Environmental Values for the Duck River catchment	
Land Tenure	Protected Environmental Values *(see note on page 54)
<p>Deep Creek</p> <p>(Smithton Water Supply – see location on Figure 6)</p>	<p>A: Protection of Aquatic Ecosystems</p> <p>(ii) Protection of modified (not pristine) ecosystems a. from which edible fish are harvested</p> <p>B: Recreational Water Quality & Aesthetics</p> <p>(i) Primary contact water quality (where such activities are permitted) (ii) Secondary contact water quality (iii) Aesthetic water quality</p> <p>C: Raw Water for Drinking Water Supply</p> <p>(ii) Subject to coarse screening and disinfection</p> <p>D: Agricultural Water Uses</p> <p>(i) Irrigation (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 modified, but healthy aquatic ecosystem from which edible fish may be harvested; that is acceptable for a drinking water supply (subject to coarse screening and disinfection), irrigation and stock watering purposes; and which will allow people to safely engage in primary contact recreation activities such as swimming (where permitted) and secondary contact recreation activities such as paddling or fishing in aesthetically pleasing waters.</p>
<p>Surface waters in State Forest</p>	<p>A: Protection of Aquatic Ecosystems</p> <p>(ii) Protection of modified (not pristine) ecosystems a. from which edible fish are harvested</p> <p>having regard for Forestry Tasmania's 'Management Decision Classification System'.</p> <p>B: Recreational Water Quality & Aesthetics</p> <p>(i) Primary contact water quality (ii) Secondary contact water quality (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, but healthy aquatic ecosystem from which edible fish may be harvested; which will allow people to safely engage in recreation activities such as swimming, kayaking, paddling or fishing in aesthetically pleasing waters.</p>

Table 6: Protected Environmental Values for the Duck River catchment	
Land Tenure	Protected Environmental Values <small>*(see note on page 54)</small>
Surface waters flowing through Forest Reserves from private land, state forests or un-allocated crown land	<p>A : Protection of Aquatic Ecosystems</p> <p>(ii) Protection of modified (not pristine) ecosystems a. from which edible fish are harvested</p> <p>having regard to the management objectives for forest reserves outlined in Schedule 3 of the <i>Forestry Act, 1920</i></p> <p>B: Recreational Water Quality & Aesthetics</p> <p>(i) Primary contact water quality (ii) Secondary contact water quality (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, but healthy aquatic ecosystem from which edible fish may be harvested; which will allow people to safely engage in recreation activities such as swimming, kayaking, paddling or fishing in aesthetically pleasing waters.</p>
Surface waters that have their headwaters within the Forest Reserve	<p>A: Protection of Aquatic Ecosystems</p> <p>(i) Protection of pristine or nearly pristine ecosystems</p> <p>having regard to the management objectives for forest reserves outlined in Schedule 3 of the <i>Forestry Act, 1920</i></p> <p>B: Recreational Water Quality & Aesthetics</p> <p>(i) Primary contact water quality (ii) Secondary contact water quality (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>

Table 6: Protected Environmental Values for the Duck River catchment	
Land Tenure	Protected Environmental Values *(see note on page 54)
Surface waters on un-allocated Crown Land	<p>A: Protection of Aquatic Ecosystems</p> <p>(ii) Protection of modified (not pristine) ecosystems a. from which edible fish are harvested</p> <p>having regard for Forestry Tasmania's 'Management Decision Classification System'.</p> <p>B: Recreational Water Quality & Aesthetics</p> <p>(i) Primary contact water quality (ii) Secondary contact water quality (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, but healthy aquatic ecosystem from which edible fish may be harvested; which will allow people to safely engage in recreation activities such as swimming, kayaking, paddling or fishing in aesthetically pleasing waters.</p>

Table 6: Protected Environmental Values for the Duck River catchment	
Land Tenure	Protected Environmental Values <small>*(see note on page 54)</small>
Surface waters flowing through Public Reserves from private land, state forests or un-allocated crown land	<p>A: Protection of Aquatic Ecosystems</p> <p>(ii) Protection of modified (not pristine) ecosystems a. from which edible fish are harvested;</p> <p>having regard to the management objectives for objectives for public reserves outlined in Schedule 4 of <i>the Regional Forest Agreement (Land Classification) Act, 1998</i></p> <p>B: Recreational Water Quality & Aesthetics</p> <p>(i) Primary contact water quality (ii) Secondary contact water quality (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, but healthy aquatic ecosystem from which edible fish may be harvested; which will allow people to safely engage in recreation activities such as swimming, kayaking, paddling or fishing in aesthetically pleasing waters.</p>
Surface waters that have their headwaters within Public Reserves.	<p>A: Protection of Aquatic Ecosystems</p> <p>(i) Protection of pristine or nearly pristine ecosystems</p> <p>having regard to the management objectives for public reserves outlined in Schedule 4 of <i>the Regional Forest Agreement (Land Classification) Act, 1998</i></p> <p>B: Recreational Water Quality & Aesthetics</p> <p>(i) Primary contact water quality (ii) Secondary contact water quality (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>

Table 6: Protected Environmental Values for the Duck River catchment	
Land Tenure	Protected Environmental Values <small>*(see note on page 54)</small>
Surface waters flowing through Conservation Areas from private land, state forests or un-allocated crown land	<p>A: Protection of Aquatic Ecosystems</p> <p>(ii) Protection of modified (not pristine) ecosystems a. from which edible fish are harvested</p> <p>having regard for the management objectives 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 (ii) Secondary contact water quality (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, but healthy aquatic ecosystem from which edible fish may be harvested; which will allow people to safely engage in recreation activities such as swimming, kayaking, paddling or fishing in aesthetically pleasing waters.</p>
Surface waters that have their headwaters within Conservation Areas	<p>A: Protection of Aquatic Ecosystems</p> <p>(i) Protection of pristine or nearly pristine ecosystems</p> <p>having regard for the management objectives 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 (ii) Secondary contact water quality (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, kayaking, paddling or fishing in aesthetically pleasing waters.</p>

Table 6: Protected Environmental Values for the Duck River catchment	
Land Tenure	Protected Environmental Values <small>*(see note on page 54)</small>
Surface waters flowing through State Reserves from private land, state forests or un-allocated crown land	<p>A: Protection of Aquatic Ecosystems</p> <p>(ii) Protection of modified (not pristine) ecosystems a. from which edible fish are harvested</p> <p>having regard for the management objectives 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 (ii) Secondary contact water quality (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, but healthy aquatic ecosystem from which edible fish may be harvested; which will allow people to safely engage in recreation activities such as swimming, kayaking, paddling or fishing in aesthetically pleasing waters.</p>
Surface waters that have their headwaters within State Reserves	<p>A: Protection of Aquatic Ecosystems</p> <p>(i) Protection of pristine or nearly pristine ecosystems</p> <p>having regard for the management objectives 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 (ii) Secondary contact water quality (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, kayaking, paddling or fishing in aesthetically pleasing waters.</p>

Table 6: Protected Environmental Values for the Duck River catchment	
Land Tenure	Protected Environmental Values *(see note on page 54)
<p>Estuarine surface waters</p> <p>In addition: Water extraction for fish processing at Stanley Wharf (see Figure 6 for location)</p>	<p>A: Protection of Aquatic Ecosystems</p> <p>(ii) Protection of modified (not pristine) ecosystems</p> <p>a. from which edible fish, shellfish and crustaceans are harvested</p> <p>B: Recreational Water Quality & Aesthetics</p> <p>(i) Primary contact water quality</p> <p>(ii) Secondary contact water quality</p> <p>(iii) Aesthetic water quality</p> <p>E: Industrial Water Intake – Fish Processing</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, shellfish and crustaceans may be harvested; which allows people to safely engage in activities such as swimming; and allows boating or fishing in aesthetically pleasing waters and, at Stanley Wharf is suitable for use in fish processing.</p>
<p>Estuaries (if any occur) whose catchments are contained entirely within Conservation Areas</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 conservation areas 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</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; 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.

PROTECTED ENVIRONMENTAL VALUES FOR YOUR CATCHMENT

4.6 BLACK & DETENTION RIVERS, CRAYFISH CREEK AND SISTERS CREEK

The area included in the Black River, Detention River, Crayfish Creek and Sisters Creek catchment is approximately 814 km².

Forestry and agriculture are the primary land uses in this catchment. There are no drainage or river improvement schemes in the catchment. Further, there are no major towns in the catchment. Little water quality information is available for this area. A snap shot picture of aquatic invertebrates in the upper catchment of the Detention River (Newhaven Road) indicated that the community was healthy. A report looking at the conservation value of estuaries indicated that the Detention Estuary had a higher conservation value than its neighboring estuaries in the Duck and Cam catchments.

The Board, Councils and Director of Parks initially suggested some water

quality PEVs that may have been suitable for surface waters of the Black & Detention river catchments and the Crayfish Creek and Sisters Creek catchments. These PEVs were presented at workshops and public meetings. Submissions from the public, industry and community groups were taken into consideration before the final PEVs were set.

The PEVs have now been endorsed by the Board, Councils and Director of Parks and assist with catchment and water management planning. The PEVs are shown in Table 7 and correspond to the land tenure shown in Figure 7.

Remember – the PEVs chosen from the Policy are those values and uses that are currently in evidence.

Note: Towns in the catchment are generally small. The Board and Councils did not think these areas were intensive enough to warrant separate PEVs for surface waters flowing through them.

Table 7: Protected Environmental Values for the Detention River, Black River and Crayfish Creek and Sisters Creek Catchments.

Land Tenure	Protected Environmental Values ^{*(see note on page 62)}
<p>Surface waters on private Land (including forest on private 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"> (ii) Secondary contact water quality (iii) Aesthetic water quality <p>D: Agricultural Water Uses</p> <ul style="list-style-type: none"> (i) Irrigation (ii) Stock watering <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 may be harvested; that is acceptable for irrigation and stock watering purposes; and which will allow people to safely engage in secondary contact recreation activities such as paddling or fishing in aesthetically pleasing waters.</p>
<p>Surface waters in State Forest</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 Forestry Tasmanias 'Management Decision Classification System'.</p> <p>B: Recreational Water Quality & Aesthetics</p> <ul style="list-style-type: none"> (i) Primary contact water quality (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 may be harvested; which will allow people to safely engage in recreation activities such as swimming, kayaking, paddling or fishing in aesthetically pleasing waters.</p>

Table 7: Protected Environmental Values for the Detention River, Black River and Crayfish Creek and Sisters Creek Catchments.

Land Tenure	Protected Environmental Values ^{*(see note on page 62)}
<p>Surface waters flowing through Forest Reserves from private land, state forests or un-allocated crown 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>having regard to the management objectives for forest reserves outlined in Schedule 3 of the <i>Forestry Act, 1920</i></p> <p>B: Recreational Water Quality & Aesthetics</p> <p>(i) Primary contact water quality</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, but healthy aquatic ecosystem from which edible fish may be harvested; which will allow people to safely engage in recreation activities such as swimming, kayaking, paddling or fishing in aesthetically pleasing waters.</p>
<p>Surface waters that have their headwaters within the Forest Reserve</p>	<p>A: Protection of Aquatic Ecosystems</p> <p>(i) Protection of pristine or nearly pristine ecosystems</p> <p>having regard to the management objectives for forest reserves outlined in Schedule 3 of the <i>Forestry Act, 1920</i></p> <p>B: Recreational Water Quality & Aesthetics</p> <p>(i) Primary contact water quality</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>

Table 7: Protected Environmental Values for the Detention River, Black River and Crayfish Creek and Sisters Creek Catchments.

Land Tenure	Protected Environmental Values <small>*(see note on page 62)</small>
Surface waters on un-allocated crown 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 (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 may be harvested; which will allow people to safely engage in recreation activities such as swimming, kayaking, paddling or fishing in aesthetically pleasing waters.</p>

Table 7: Protected Environmental Values for the Detention River, Black River and Crayfish Creek and Sisters Creek Catchments.	
Land Tenure	Protected Environmental Values <small>*(see note on page 62)</small>
Surface waters flowing through Public Reserves from private land, state forests or un-allocated crown land	<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>having regard to the management objectives for objectives for public reserves outlined in Schedule 4 of <i>the Regional Forest Agreement (Land Classification) Act, 1998</i></p> <p>B: Recreational Water Quality & Aesthetics</p> <p>(i) Primary contact water quality</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, but healthy aquatic ecosystem from which edible fish may be harvested; which will allow people to safely engage in recreation activities such as swimming, kayaking, paddling or fishing in aesthetically pleasing waters.</p>
Surface waters that have their headwaters within Public Reserves.	<p>A: Protection of Aquatic Ecosystems</p> <p>(i) Protection of pristine or nearly pristine ecosystems</p> <p>having regard to the management objectives for public reserves outlined in Schedule 4 of <i>the Regional Forest Agreement (Land Classification) Act, 1998</i></p> <p>B: Recreational Water Quality & Aesthetics</p> <p>(i) Primary contact water quality</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>

Table 7: Protected Environmental Values for the Detention River, Black River and Crayfish Creek and Sisters Creek Catchments.

Land Tenure	Protected Environmental Values ^{*(see note on page 62)}
<p>Surface waters flowing through National Parks or State Reserves from private land, state forests or un-allocated 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>having regard for the management objectives 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 (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 may be harvested; which will allow people to safely engage in recreation activities such as swimming, kayaking, paddling or fishing in aesthetically pleasing waters.</p>
<p>Surface waters that have their headwaters within National Parks or State Reserves</p>	<p>A: Protection of Aquatic Ecosystems</p> <ul style="list-style-type: none"> (i) Protection of pristine or nearly pristine, <p>having regard for the management objectives 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 (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, kayaking, paddling or fishing in aesthetically pleasing waters.</p>

Table 7: Protected Environmental Values for the Detention River, Black River and Crayfish Creek and Sisters Creek Catchments.	
Land Tenure	Protected Environmental Values <small>*(see note on page 62)</small>
Surface waters flowing through Conservation Areas from private land, state forests or un-allocated crown land	<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>having regard for the management objectives 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</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, but healthy aquatic ecosystem from which edible fish may be harvested; which will allow people to safely engage in recreation activities such as swimming, kayaking, paddling or fishing in aesthetically pleasing waters.</p>
Surface waters (if any occur) that have their headwaters within Conservation Areas	<p>A: Protection of Aquatic Ecosystems</p> <p>(i) Protection of pristine or nearly pristine ecosystems</p> <p>having regard for the management objectives 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</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, kayaking, paddling or fishing in aesthetically pleasing waters.</p>

Table 7: Protected Environmental Values for the Detention River, Black River and Crayfish Creek and Sisters Creek Catchments.

Land Tenure	Protected Environmental Values ^{*(see note on page 62)}
Estuarine surface waters	<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, shellfish and crustaceans are harvested <p>B: Recreational Water Quality & Aesthetics</p> <ul style="list-style-type: none"> (i) Primary contact water quality (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, shellfish and crustaceans may be harvested; which allows people to safely engage in activities such as swimming; and allows boating or fishing in aesthetically pleasing waters.</p>
for estuaries whose catchment is entirely contained within conservation areas or national parks (if any occur)	<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 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 (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 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.</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.

PROTECTED ENVIRONMENTAL VALUES FOR YOUR CATCHMENT

4.7 INGLIS/FLOWERDALE RIVERS

The catchment of the Inglis/Flowerdale Rivers covers an area of approximately 577 km². The towns of Wynyard, Somerset, Elliott and Yolla occur in the catchment. Sisters Beach and Boat Harbour are popular recreational areas.

Forestry, agriculture and gravel extraction are the main land uses in the catchment. Many of the river catchments are steep and siltation from excessive erosion is seen to be a water quality problem. Willow infestation is also a major problem that can impact on water quantity, quality and aquatic habitats. A snapshot view of aquatic invertebrates at one site midway down the catchment indicated that communities were moderately to severely impacted. Gravel extraction occurs at a number of sites along the river. There are currently 10 active level 1 pits. The impacts on water quality of past and present gravel pit operations are not known but erosion and siltation problems may be significant. Compliance with the Quarry Code of Practice should, and in some cases already is, minimising these impacts.

The Board, Councils and Director of Parks initially suggested some water quality PEVs that may have been suitable for surface waters of the Inglis/Flowerdale River catchments. These PEVs were presented at workshops and public meetings. Submissions from the public, industry and community groups were taken into consideration before the final PEVs were set.

The PEVs have now been endorsed by the Board, Councils and Director of Parks and will assist with catchment and water management planning. The PEVs are shown in Table 8 and correspond to the land tenure shown in Figure 8.

Remember – the PEVs chosen from the Policy are those values and uses that are currently in evidence.

Note: Towns in the catchment are generally small. The Board and Councils did not think these areas were intensive enough to warrant separate PEVs for surface waters flowing through them.

Table 8: Protected Environmental Values for the Inglis/Flowerdale River Catchment

Land Tenure	Protected Environmental Values ^{*(see note on page 69)}
<p>Surface waters on private land (including forest on private 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 (Big Creek at Stanwyn Reserve) (ii) Secondary contact water quality (iii) Aesthetic water quality <p>D: Agricultural Water Uses</p> <ul style="list-style-type: none"> (i) Irrigation (ii) Stock watering <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 may be harvested; that is acceptable for irrigation and stock watering purposes; and which will allow people to safely engage in primary contact activities such as swimming on Big Creek at Stanwyn Reserve and secondary contact recreation activities such as paddling or fishing in aesthetically pleasing waters.</p>
<p>Dowlings Creek (Yolla Water Supply – see Figure 8 for location)</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 such activities are permitted) (ii) Secondary contact water quality (iii) Aesthetic water quality <p>C: Raw Water for Drinking Water Supply</p> <ul style="list-style-type: none"> (ii) Subject to coarse screening and disinfection <p>D: Agricultural Water Uses</p> <ul style="list-style-type: none"> (i) Irrigation (ii) Stock watering <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 may be harvested; that is acceptable for a town drinking water supply (subject to coarse screening and disinfection), irrigation and stock watering purposes; and which will allow people to safely engage in primary and secondary contact recreation activities such as swimming (where permitted), paddling or fishing in aesthetically pleasing waters, where these activities are permitted.</p>

Table 8: Protected Environmental Values for the Inglis/Flowerdale River Catchment

Land Tenure	Protected Environmental Values ^{*(see note on page 69)}
Surface waters in State Forest	<p>A: Protection of Aquatic Ecosystems</p> <p>(ii) Protection of modified (not pristine) ecosystems a. from which edible fish are harvested;</p> <p>having regard for Forestry Tasmanias 'Management Decision Classification System'.</p> <p>B: Recreational Water Quality & Aesthetics</p> <p>(i) Primary contact water quality (ii) Secondary contact water quality (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, but healthy aquatic ecosystem from which edible fish may be harvested; which will allow people to safely engage in secondary contact recreation activities such as paddling or fishing in aesthetically pleasing waters.</p>

Table 8: Protected Environmental Values for the Inglis/Flowerdale River Catchment

Land Tenure	Protected Environmental Values ^{*(see note on page 69)}
<p>Surface waters flowing through Forest Reserves from private land, state forest or un-allocated crown land.</p>	<p>A: Protection of Aquatic Ecosystems</p> <p>(ii) Protection of modified (not pristine) ecosystems a. from which edible fish are harvested</p> <p>having regard to the management objectives for forest reserves outlined in Schedule 3 of the <i>Forestry Act, 1920</i></p> <p>B: Recreational Water Quality & Aesthetics</p> <p>(i) Primary contact water quality (ii) Secondary contact water quality (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, but healthy aquatic ecosystem from which edible fish may be harvested; which will allow people to safely engage in recreation activities such as swimming, kayaking, paddling or fishing in aesthetically pleasing waters.</p>
<p>Surface Waters that have their headwaters within Forest Reserves</p>	<p>A: Protection of Aquatic Ecosystems</p> <p>(i) Protection of pristine or nearly pristine ecosystems</p> <p>having regard to the management objectives for forest reserves outlined in Schedule 3 of the <i>Forestry Act, 1920</i></p> <p>B: Recreational Water Quality & Aesthetics</p> <p>(i) Primary contact water quality (ii) Secondary contact water quality (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>

Table 8: Protected Environmental Values for the Inglis/Flowerdale River Catchment

Land Tenure	Protected Environmental Values ^{*(see note on page 69)}
Surface waters on un-allocated crown 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 (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 may be harvested; which will allow people to safely engage in recreation activities such as swimming, kayaking, paddling or fishing in aesthetically pleasing waters.</p>

Table 8: Protected Environmental Values for the Inglis/Flowerdale River Catchment	
Land Tenure	Protected Environmental Values *(see note on page 69)
Surface waters flowing through Public Reserves from private land, state forest or un-allocated crown land.	<p>A: Protection of Aquatic Ecosystems</p> <p>(ii) Protection of modified (not pristine) ecosystems a. from which edible fish are harvested</p> <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> <p>(i) Primary contact water quality (ii) Secondary contact water quality (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, but healthy aquatic ecosystem from which edible fish may be harvested; which will allow people to safely engage in recreation activities such as swimming, kayaking, paddling or fishing in aesthetically pleasing waters.</p>
Surface waters that have their headwaters within Public Reserves	<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 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> <p>(i) Primary contact water quality (ii) Secondary contact water quality (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>

Table 8: Protected Environmental Values for the Inglis/Flowerdale River Catchment

Land Tenure	Protected Environmental Values ^{*(see note on page 69)}
<p>Surface waters flowing through Conservation Areas from private land, state forest or un-allocated 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>having regard for the management objectives for conservation areas 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 (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 may be harvested; which will allow people to safely engage in recreation activities such as swimming, kayaking, paddling or fishing in aesthetically pleasing waters.</p>
<p>Surface waters (if any occur) that have their headwaters within Conservation Areas</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 national parks 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 (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, kayaking, paddling or fishing in aesthetically pleasing waters.</p>

Table 8: Protected Environmental Values for the Inglis/Flowerdale River Catchment	
Land Tenure	Protected Environmental Values *(see note on page 69)
Estuarine surface waters	<p>A: Protection of Aquatic Ecosystems</p> <p>(ii) Protection of modified (not pristine) ecosystems a. from which edible fish, shellfish and crustaceans are harvested</p> <p>B: Recreational Water Quality & Aesthetics</p> <p>(i) Primary contact water quality (ii) Secondary contact water quality (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, but healthy aquatic ecosystem from which edible fish, shellfish and crustaceans may be harvested; which allows people to safely engage in activities such as swimming; and allows 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.

PROTECTED ENVIRONMENTAL VALUES FOR YOUR CATCHMENT

4.8 HEADWATERS AND WESTERN SIDE OF CAM RIVER CATCHMENT

The Cam River catchment is approximately 296.6 km². This discussion paper includes draft PEVs for the headwaters and tributaries on the western side of the Cam River (Figure 9).

Forestry and agriculture are the main land use activities occurring in the catchment. There is some un-allocated crown land along the western edge of the river and a public reserve is located on the western boundary of the catchment near Elliott.

There is little water quality information available for the Cam River. Macroinvertebrate communities at one site on the Cam were shown to be in good condition. Water quality monitoring associated with the State of Rivers reporting is due to commence on the Cam River this summer.

The Board, Councils and Director of Parks initially suggested some water

quality PEVs that may have been suitable for surface waters of the Cam River Catchment inside the Waratah/Wynyard municipal area. These PEVs were presented at workshops and public meetings. Submissions from the public, industry and community groups were taken into consideration before the final PEVs were set.

The PEVs have now been endorsed by the Board, Councils and Director of Parks and will assist in catchment and water management planning. The PEVs are shown in Table 9 and correspond to the land tenure shown in Figure 9.

Remember – the PEVs chosen from the Policy are those values and uses that are currently in evidence.

Note: Towns in the catchment are generally small. The Board and Councils did not think these areas were intensive enough to warrant separate PEVs for surface waters flowing through them.

Table 9: Protected Environmental Values for surface waters on the western side and headwaters of the Cam River catchment

LAND TENURE	Protected Environmental Values ^{*(see note on page 74)}
<p>Surface waters on private Land (including forest on private 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"> (ii) Secondary contact water quality (iii) Aesthetic water quality <p>D: Agricultural Water Uses</p> <ul style="list-style-type: none"> (i) Irrigation (ii) Stock watering <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 may be harvested; that is acceptable for irrigation and stock watering purposes; and which will allow people to safely engage in secondary contact recreation activities such as paddling or fishing in aesthetically pleasing waters.</p>
<p>Surface waters in State Forest</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 Forestry Tasmanias 'Management Decision Classification System'.</p> <p>B: Recreational Water Quality & Aesthetics</p> <ul style="list-style-type: none"> (i) Primary contact water quality (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 may be harvested; which will allow people to safely engage in primary and secondary contact recreation activities such as swimming, paddling or fishing in aesthetically pleasing waters.</p>

Table 9: Protected Environmental Values for surface waters on the western side and headwaters of the Cam River catchment

LAND TENURE	Protected Environmental Values *(see note on page 74)
Surface waters on un-allocated crown 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 (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 may be harvested; which will allow people to safely engage in recreation activities such as swimming, kayaking, paddling or fishing in aesthetically pleasing waters.</p>

Table 9: Protected Environmental Values for surface waters on the western side and headwaters of the Cam River catchment

LAND TENURE	Protected Environmental Values ^{*(see note on page 74)}
Surface waters in Public Reserves	<p>A: Protection of Aquatic Ecosystems</p> <p>(ii) Protection of modified (not pristine) ecosystems a. from which edible fish are harvested</p> <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> <p>(i) Primary contact water quality (ii) Secondary contact water quality (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, but healthy aquatic ecosystem from which edible fish may be harvested; which will allow people to safely engage in recreation activities such as swimming, kayaking, paddling or fishing in aesthetically pleasing waters.</p>
Surface waters (if any occur) that have their headwaters within the Public Reserve	<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 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> <p>(i) Primary contact water quality (ii) Secondary contact water quality (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 aquatic ecosystem and which will allow people to safely engage in recreation activities such as swimming, paddling or fishing in aesthetically pleasing waters.</p>

Table 9: Protected Environmental Values for surface waters on the western side and headwaters of the Cam River catchment

LAND TENURE	Protected Environmental Values ^{*(see note on page 74)}
Estuarine surface waters	<p>A: Protection of Aquatic Ecosystems</p> <p style="padding-left: 40px;">(ii) Protection of modified (not pristine) ecosystems</p> <p style="padding-left: 80px;">a. from which edible fish, shellfish and crustaceans are harvested</p> <p>B: Recreational Water Quality & Aesthetics</p> <p style="padding-left: 40px;">(i) Primary contact water quality</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, but healthy aquatic ecosystem from which edible fish, shellfish and crustaceans may be harvested; which allows people to safely engage in activities such as swimming; and allows 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.

PROTECTED ENVIRONMENTAL VALUES FOR YOUR CATCHMENT

4.9 HEADWATERS OF EMU, BLYTH AND LEVEN RIVERS

This discussion paper includes the setting of draft PEVs for those areas of the Emu, Blyth and Leven Rivers, that are within the Waratah/Wynyard municiple boundary (Figure 10).

The headwaters of each of these rivers are, therefore, included in the current PEV setting process and most of the area is private land. There is some state forestry at the top of the Leven River Catchment.

There is little information available regarding water quality in the headwaters of the three catchments. Rivercare studies have shown that water quality is generally good. A snap shot monitoring river health study showed that the macroinvertebrate communities at four sites on the Leven River were healthy.

The Board, Councils and Director of Parks initially suggested some water quality PEVs that may have been

suitable for surface waters for the headwaters of the Emu, Blyth and Leven River catchments. These PEVs were presented at workshops and public meetings. Submissions from the public, industry and community groups were taken into consideration before the final PEVs were set.

The PEVs have now been endorsed by the Board, Councils and Director of Parks and will assist with catchment and water management planning. The PEVs are shown in Table 10 and correspond to the land tenure shown in Figure 10.

Remember – the PEVs chosen from the Policy are those values and uses that are currently in evidence.

Note: Towns in the catchment are generally small. The Board and Councils did not think these areas were intensive enough to warrant separate PEVs for surface waters flowing through them.

Table 10: Protected Environmental Values for the headwaters of the Emu, Blythe and Leven River catchments	
Land Tenure	Protected Environmental Values ^{*(see note on page 76)}
<p>Surface waters on 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>(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>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 may be harvested; that is acceptable for irrigation and stock watering purposes; and which will allow people to safely engage in secondary contact recreation activities such as paddling or fishing in aesthetically pleasing waters.</p>
<p>Surface waters in State Forest</p>	<p>A: Protection of Aquatic Ecosystems</p> <p>(ii) Protection of modified (not pristine) ecosystem</p> <p>a. from which edible fish are harvested</p> <p>having regard for Forestry Tasmania's 'Management Decision Classification System'.</p> <p>B: Recreational Water Quality & Aesthetics</p> <p>(i) Primary contact water quality</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, but healthy aquatic ecosystem from which edible fish may be harvested; which will allow people to safely engage in secondary contact recreation activities such as 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

5 WATER QUANTITY: WATER QUANTITY VALUES

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. 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.

It is clearly recognised that there are competing uses for the available resource, and that 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 also on legitimate community values and uses. This community information on water quantity values was collected as part of the community consultation process.

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 that will be developed in close consultation with the community. These plans will be developed on a priority basis, with the most stressed rivers in the State being targeted initially.

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 erosion;
- 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.

From community input specific water management objectives can be developed for your catchment, and incorporated into a regional or catchment-based water management plan that will be developed in close consultation with the community. These plans will be developed on a priority basis, with the most stressed rivers in the State being targeted initially.

6. Community Water Values

The following community water values were obtained from a series of workshops and public meetings workshops held during September 1999. Some of these community water values represent current values and uses and are therefore reflected in the Protected Environmental Values shown in Section 4. Many of the community water values and issues shown in Table 11 should be managed through an integrated catchment management process. No distinction has been made, at this stage, as to which values and issues are relate to water quantity and which relate to water quality.

Table 11: Community Water Values (includes both water quality and water quantity values)

Table 11.1: Welcome and Montagu River Catchments	
Water Value Categories	Community Water Values
Ecosystem Values	<ul style="list-style-type: none"> • Whitebait runs • Maintain current wetlands • Maintain riparian vegetation whilst recognising drainage function of rivers • Maintain instream habitat whilst recognising drainage function of rivers • Management of bacterial and nutrient loads in rivers for ecosystem quality • Maintain instream fauna • Maintain <i>Astocopsis gouldi</i> populations and habitat • Maintain or enhance <i>Stenopsychodes lineata</i> (Caddisfly) populations in the Welcome River catchment • Maintain or enhance <i>Galaxiella pusilla</i> (dwarf galaxiid) populations in Welcome River catchment • Maintain habitat for the native crayfish <i>Geocharax</i>
Recreational Values	<ul style="list-style-type: none"> • Fishing – Welcome below weir near mouth and whole of catchment for the Montagu • Bush walking – Dismal Swamp • Shellfish Harvesting - Montagu estuary • General boating - Montagu estuary • Swimming/camping Montagu estuary • Duck shooting – estuaries and farm dams • Bird watching
Consumptive and non-consumptive Values (includes agriculture, industry and town water supply)	<ul style="list-style-type: none"> • Industry water intake for reticulated agriculture supply at Togari and Brittons Swamp (Montagu Catchment) • Stock and irrigation water • Water for forestry activities including fire fighting, weed and insect management and tree growth
Aesthetic Values	<ul style="list-style-type: none"> • Karst landscape (Montagu catchment) • Maintain current riparian zones
Physical Landscape Values	<ul style="list-style-type: none"> • Lower catchment sediment loads in Welcome – south of Harcus Road bridge (monitoring needed)

Table 11.1: Welcome and Montagu River Catchments

Other issues raised	<ul style="list-style-type: none"> • Drainage function of the Montagu and Welcome River recognised • Recognition of code of practice for dairy effluent to protect water quality • If creeks are fenced off to prevent stock access and water is pumped for stock watering- riparian water rights should be maintained • Any aboriginal middens or artifacts discovered in or around waterways should be reported to the relevant heritage officers to determine the significance of the site prior to making any changes.
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Table 11.2: Duck River Catchment

Water Value Categories	Community Water Values
Ecosystem Values	<ul style="list-style-type: none"> • Maintain quantity and quality of shellfish species • Riparian zone free of willow • Maintain suitable water quality and quantity to protect instream fauna • Maintain current instream habitat levels • Waterways free of rice grass • Maintain <i>Astacopsis gouldi</i> populations and habitat • Maintain habitat for the native crayfish <i>Geocharax</i>
Recreational Values	<ul style="list-style-type: none"> • Fishing throughout catchment • Boating (sailing, water skiing, sail boarding. Sea scout activities) downstream of Blackwood bridge • Swimming at Riverbend Camp (private property) • Tasmania Day regatta (estuary) • Bird watching • Oyster and clam harvesting • Smithton riparian beautification program
Consumptive and non-consumptive Values	<ul style="list-style-type: none"> • Maintain adequate flow for marine farming • Maintain adequate water quality for marine farming • Irrigation • Riparian rights (stock watering) • Homestead use • Commercial clam harvesting • Maintain suitable flows for boating activities in terms of access • Town water supply from Deep Creek • Industrial water supply for Classic Foods - Edith Creek • Water for forestry activities, including fire fighting, weed and insect control and tree growth
Aesthetic Values	<ul style="list-style-type: none"> • Aesthetic qualities above Roger River confluence and at the estuary • Riparian zones above Trowatta Road
Physical Landscape Values	<ul style="list-style-type: none"> • Prevention of bank erosion • Encourage stock restriction from stream banks

Table 11.2: Duck River Catchment	
	<ul style="list-style-type: none"> • Control of sediment loads in river (and monitoring)
Other Issues	<ul style="list-style-type: none"> • Any aboriginal middens or artifacts discovered in or around waterways should be reported to the relevant heritage officers to determine the significance of the site prior to making any changes.

Table 11.3: Black and Detention River, Crayfish and Sisters Creek Catchments	
Water Value Categories	Community Water Values
Ecosystem Values	<ul style="list-style-type: none"> • Maintain suitable environmental flows • Maintain instream habitat • Maintain riparian zones • Maintain instream fauna and flora • Maintain suitable environmental water quality • Maintain pool habitats in Crayfish Creek • Protect rare plant species at Detention Falls • Maintain giant freshwater lobster (<i>Astacopsis gouldi</i>) in Sisters Creek and throughout catchment • Maintain habitat for the native crayfish <i>Geocharax</i>
Recreational Values	<ul style="list-style-type: none"> • Gemstone fossicking in Sisters Creek catchment • Swimming at Spion Top crossing (Black River), Dip falls, Detention estuary, Crayfish Creek estuary, Black River estuary, most major estuaries, water hole at mouth of Sister Creek (it was expressed that water quality should be improved in this area so that it did not have to be closed to swimming) • Boating • Fishing • Horse riding • Motorbike riding • Bush walking • Camping • Shellfish harvesting • Tourism • Water skiing on Lake Llewellyn • Bird watching – Sisters Creek • Black River picnic area is a contemporary aboriginal community meeting place. Maintain the integrity of this site including the recreational fishing areas.
Consumptive and non-consumptive Values	<ul style="list-style-type: none"> • Agricultural use • Irrigation • Stock watering • Homestead use on Sisters Creek (not drinking) • Water for forestry activities including fire fighting, weed and insect control and tree growth
Aesthetic Values	<ul style="list-style-type: none"> • Tourism • Dip Falls

	<ul style="list-style-type: none"> • Black River picnic area • Detention Falls • Natural environment of Crayfish Creek • Maintenance of natural riparian zones • Maintain deep pools at mouth of Sisters Creek
Physical Landscape Values	<ul style="list-style-type: none"> • Bedrock pools in estuary (Crayfish Creek) • Rock formations – Dip Falls • Water falls on Sisters Creek and Detention River • Swimming hole at mouth of Sisters Creek • Doone Falls in Rocky Cape National Park
Other Issues	<ul style="list-style-type: none"> • Maintain facilities at Black River picnic area • Any aboriginal middens or artifacts discovered in or around waterways should be reported to the relevant heritage officers to determine the significance of the site prior to making any changes.

Table 11.4: Inglis/Flowerdale River Catchments	
Water Value Categories	Community Water Values
Ecosystem Values	<ul style="list-style-type: none"> • Maintain bird life throughout catchment • Maintain native fish throughout catchment • Overall habitat protection throughout catchment • Provide enough water to maintain or improve communities of native flora and fauna • Protect water quality throughout catchment to maintain or improve communities of native flora and fauna • Maintain water quality and quantity for giant freshwater lobster (<i>Astacopsis gouldi</i>) throughout catchment. Also protect native riparian vegetation to preserve habitat for <i>Astacopsis gouldi</i> • Maintain water quality for platypus and native fish • Burrowing crayfish • Freshwater sponges • Aquatic invertebrates • Cucumber herring • Maintain trout throughout catchment • Whitebait runs • Riparian vegetation • Manferns in upper catchment (including Frenches Road nature reserve) • Maintain suitable aquatic habitat • Riparian zones free of weed species • Wading birds • Maintain and protect riparian vegetation and eco-systems through which class 1 to 4 streams run. • Surface waters free of pesticides, herbicides and other chemicals.; • Water free of excess sediment
Recreational Values	<ul style="list-style-type: none"> • Fishing

Table 11.4: Inglis/Flowerdale River Catchments	
Water Value Categories	Community Water Values
	<ul style="list-style-type: none"> • Bird watching • Swimming in Inglis estuary, Lightning flats, Jeffersens Road, Big Creek (behind cheese factory), Blackfish Creek (Oldina Reserve), Boat Harbour Beach. There was one objection at the Wynyard public meeting to primary contact not being a PEV for all surface waters on private land. • Water skiing (estuary) • Kayaking – Inglis River • Bushwalking - Seabrook Creek nature reserve/ Inglis River walkways • Gemstone fossicking (Flowerdale River) • Picnicking at registered picnic areas • Mineral panning - Doctors Rocks • Boating in estuaries • Horse riding • Motorbike riding • Coastal diving • Photography • Tourism
Consumptive and non-consumptive Values	<ul style="list-style-type: none"> • Yolla water supply (Maintain quality and quantity of water for town water supply) • Stock and irrigation water supply • Homestead use (not drinking) • Domestic water supply • Sand mining activities (Inglis catchment) • Water for forestry activities, including fire fighting, weed and insect control and tree growth
Aesthetic Values	<ul style="list-style-type: none"> • Waterfalls – Calder River, Garner River, Camp Creek. Provide adequate flow at waterfalls particularly during the tourist season. • Frenches Road Nature Reserve - Seabrook Creek • Maintain aesthetic riparian quality (maintain and protect riparian vegetation) • Maintain minimum flows in main stream; • Protect large rock bars in the shallows of rivers and streams • Intrinsic qualities of rivers and catchment vegetation; • Wildlife associated with health rivers, streams and estuaries.
Physical Landscape Values	<ul style="list-style-type: none"> • Control of excessive sedimentation (turbidity) • Maintain flushing flows • Estuary • Maintain boating channel in estuary • Improve riparian zone management to prevent farm animals contaminating the waterways and to reduce erosion; • Minimise erosion in catchment to protect water quality; • Large rock bars in the shallow areas of rivers and streams
Other issues and values	<ul style="list-style-type: none"> • Aesthetics of public facilities near rivers and estuaries (in reserves).

Table 11.4: Inglis/Flowerdale River Catchments	
Water Value Categories	Community Water Values
raised	<ul style="list-style-type: none"> • In Waratah/Wynyard Planning Scheme - Agriculture and Forestry not separated. • Possibly need more viewing locations for rivers in general (people often use bridges). • Strong concern was expressed at the Wynyard public meeting that forestry operations were not being conducted in accordance with the Forestry Practices Code and there was not enough consultation. It was raised at the meeting that the Forestry Practices Code should be enforced and enhanced. The review of the Code was mentioned at the meeting. District Forest Plans should be reviewed to reflect community values. Management guidelines to protect 'Values' should be regulatory and enforced. • More thorough advertising of public meetings should have occurred. It was acknowledged that advertisements should be placed in other sections of newspapers rather than the public notices section and also more community radio advertisements could occur. • Concern was raised over the short time period allowed for public discussion of the PEVs. • In one instance surface waters, as used in the Discussion Paper, was interpreted as meaning the surface of a house. In the Discussion Paper surface water refers to rivers, creeks, lakes and wetlands. This is the definition of surface water within <i>the State Policy on Water Quality Management, 1997</i>. The quality of tank water is both a public health issue and a catchment management issue. • The use of pesticides and herbicides by industry, councils (road side spraying in drains) and the community needs to be better managed. • Concern was raised at the Wynyard public meeting about the need for local councils to take a more active interest regarding the management of conflicting land uses in some catchments. • The area of crown land south of French' Road Nature Reserve needs to be located and assessed as to its role in the Seabrook catchment; • Native vegetation on steeps in catchment needs to be protected and better managed • the inappropriate manner in which disused chemical containers are being discarded in some areas of the catchment should be addressed • Any aboriginal middens or artifacts discovered in or around waterways should be reported to the relevant heritage officers to determine the significance of the site prior to making any changes.

Table 11.5: Cam River Catchments	
Water Value Categories	Community Water Values
Ecosystem Values	<ul style="list-style-type: none"> • Riparian zone free of weed species • Maintain suitable water quality • Maintain penguins at mouth • Water free of pollutants • Platypus populations • Giant freshwater lobster (<i>Astacopsis gouldi</i>) throughout catchment

Table 11.5: Cam River Catchments	
	<ul style="list-style-type: none"> • Freshwater sponge - Guide river but probably throughout catchment • Native fish throughout catchment • Trout throughout catchment • Cucumber Herring – Estuary • Sea birds including waders • Maintain numbers and habitat for the Burnie burrowing crayfish (<i>Engaeus yabbimunna</i>)
Recreational Values	<ul style="list-style-type: none"> • Swimming in estuary • Fishing throughout catchment • Birdwatching throughout catchment • Boating and kayaking in estuary • Annual scout raft race • Walking in lower reserve area • Picnicking • Surf life saving (estuary) • Tourism
Consumptive and non-consumptive Values	<ul style="list-style-type: none"> • Quality and quantity of water for town water supply - lower Cam River just above estuary • Homestead use (not drinking) • Water for irrigation and stock use higher in catchment • Water for forestry activities, including fire fighting, weed and insect control and tree growth
Aesthetic Values	<ul style="list-style-type: none"> • High scenic value of lower 10 km of catchment • Cam heads at mouth of river
Physical Landscape Values	<ul style="list-style-type: none"> • Estuary • Management of riparian zones • Sand dunes at estuary
Other issues raised	<ul style="list-style-type: none"> • Aesthetic qualities on eastern bank of Cam river (measurement of Forest Practices Code) • Heritage values of boat building history in Cam catchment • Municipal boundaries should be changed to take into consideration catchment boundaries. • Any aboriginal middens or artifacts discovered in or around waterways should be reported to the relevant heritage officers to determine the significance of the site prior to making any changes.

Table 11.6: Arthur River Catchment

Water Value Categories	Community Water Values
Ecosystem Values	<ul style="list-style-type: none"> • Water free of man made chemicals • Provide adequate flows to maintain aquatic environment • Giant freshwater lobster (<i>Astacopsis gouldi</i>) – maintain suitable habitat and water quality • Imping Eel • Maintain suitable riparian protection and prevent clear felling to edge of rivers to ensure suitable wildlife corridors and protection of riparian flora) • Protect river banks from erosion • Maintain instream woody debris • Maintain suitable hydraulic habitat • Maintain high water quality • Water quality to protect instream fauna • Water quality to protect platypus • Maintain bird life • Native perch in estuary • Minimise acid mine drainage • Water free of excess sediment • Maintain Leatherwood trees in riparian zone • Riparian area free of crack willow in Magnet Area • Maintain Wedge-tailed eagles and Sea Eagles • Maintain fish species (both native and trout) • Lampreys in lower coastal rivers • <i>Astacopsis tricornis</i> • Burrowing freshwater crayfish • <i>Diplectrona lyella</i> (caddisfly) • Maintain habitat for the native crayfish <i>Geocharax</i>
Recreational Values	<ul style="list-style-type: none"> • Kayaking to Tayatea bridge • Tour boat cruises - to junction of Franklin/Arthur Rivers • Swimming from Franklin confluence down and near Farquhars Bridge and on dams at Waratah • Water skiing from Franklin confluence down • Scuba diving at mouth • Fishing throughout catchment • Rafting • Prospecting / Fossicking • Camping • Bush walking • Photography • Bird watching • 4WD'ing • Tourism (including at Farquhars bridge)

Table 11.6: Arthur River Catchment	
	<ul style="list-style-type: none"> • Waratah dam for camping and picnicking
Consumptive and non-consumptive Values	<ul style="list-style-type: none"> • Agricultural water use on private land • Bottled water from Farquhars Bridge • Homestead use (not drinking) • Water for fire fighting • Waratah town water supply • Water for forestry activities, including fire fighting, weed and insect control and tree growth
Aesthetic Values	<ul style="list-style-type: none"> • Maintenance of pools and rapids • Mini gorges • Riparian zones • Karst environment • Coastal environment • Hellyer Gorge System • Magnet Mine area on Arthur river • Dams around Waratah • Waterfall in Waratah
Physical Landscape Values	<ul style="list-style-type: none"> • Riparian rainforest environments • Julius River caves (protect cave systems on Julius River) • Cliff caves on Arthur River adjacent to Julius River confluence • Waterfalls on Rapid River • Magnesite karst systems • Waterfalls throughout catchment • Waterfall in Waratah
Other Issues Raised	<ul style="list-style-type: none"> • Concern regarding forestry practices • Heritage values throughout catchment • Importance of Leatherwood trees to honey industry • Importance of tourism development • Fossil beds on Rapid River • Rare plant near mouth of river - on slopes of catchment (<i>Beyeria leschenaultii</i> or <i>latifolia</i>) ?? • Any aboriginal middens or artifacts discovered in or around waterways should be reported to the relevant heritage officers to determine the significance of the site prior to making any changes.

Table 11.7: Pieman River Catchments

Water Value Categories	Community Water Values
Ecosystem Values	<ul style="list-style-type: none"> • Adequate water for the environment • Sea eagles and Wedge-tailed eagle • Platypus populations • Maintain riparian rainforest • Maintain Huon Pine in lower catchment • Maintain King Billy Pine in top of catchment • Whitebait runs • Maintain Trout throughout catchment • Native fish (only known river to have the 7 <i>Galaxiidae</i> species) • Maintain giant freshwater lobster (<i>Astacopsis gouldi</i>) • Water quality with minimal acid mine drainage • Maintain Black-backed salmon • Eels/Imping Eel/ Lampreys (lower part of catchment) • Maintian Leather wood trees • Maintenance of suitable water quality (including monitoring) • <i>Triglochin</i> (Strap weed) water reed and rushes in lower part of Pieman River • Improve riparian vegetation to protect rivers and streams from erosion • Water quality on the Stitt River and Ring River improved to support ecosystem values
Recreational Values	<ul style="list-style-type: none"> • River boat cruises • Tourism • Speed boats • Skiing • Fishing • Bushwalking • Canoeing • 4WD'ing • Photography • Horse riding • Swimming throughout catchment (where permitted); there were strong community aspirations for the water quality on the Stitt River downstream of the wastewater treatment plants and mines tailings dam to be improved to allow primary contact recreation activities to occur. • Shacks/camping • Prospecting • Rafting • Birdwatching
Consumptive and non-consumptive Values (includes industry supply, agricultural use and town water supply)	<ul style="list-style-type: none"> • Power generation • Homestead use • Town water supply at Tullah and Rosebery • Water for mine supply

Table 11.7: Pieman River Catchments	
Water Value Categories	Community Water Values
	<ul style="list-style-type: none"> • Firefighting
Aesthetic Values	<ul style="list-style-type: none"> • Riparian rainforest and Riparian zones • Rehabilitate riparian vegetation around Rosebery to make the waterways more attractive for tourism • Huon Pines in lower catchment • Slender tree ferns • Two waterfalls behind Rosebery • Dam systems
Physical Landscape Values	<ul style="list-style-type: none"> • Rainforest on river banks • Two waterfalls behind Rosebery
Other Issues Raise	<ul style="list-style-type: none"> • Heritage Values • Importance of Leatherwood trees to honey industry • Importance of tourism development • Any aboriginal middens or artifacts discovered in or around waterways should be reported to the relevant heritage officers to determine the significance of the site prior to making any changes.