



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

**ENVIRONMENTAL
MANAGEMENT
GOALS
for TASMANIAN
SURFACE WATERS**

**MEANDER RIVER
CATCHMENT**

May 2004



Environmental Management Goals for Tasmanian Surface Waters:

Meander River Catchment.

Between 2000 and early 2004 Protected Environmental Values (PEVS) were set for the Meander River catchment. A discussion paper was prepared to facilitate public participation in setting the PEVs. This discussion paper was intended as a basis for community and stakeholder participation in the process of developing environmental management goals for the waterways that are located within the Meander River catchment.

The 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 Tasmanian Parks and Wildlife Service and the Meander Valley, West Tamar, Northern Midlands and Central Highlands Councils.

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

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

This final paper is divided into six main sections:

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

| | | |
|----------|---|-----------|
| 1 | WATER REFORM IN TASMANIA | 4 |
| 1.1 | WHY DO WE NEED WATER REFORM?..... | 4 |
| 1.2 | WHAT ARE THESE REFORMS?..... | 4 |
| 1.3 | WHAT WILL COMMUNITY INPUT ACHIEVE? | 5 |
| 1.4 | WHAT DID WE WANT THE COMMUNITY TO DO? | 5 |
| 1.5 | HOW WILL PUBLIC INPUT BE USED? | 5 |
| 2 | CATCHMENT CHARACTERISTICS | 7 |
| 2.1 | PHYSICAL DESCRIPTION | 7 |
| 2.2 | WATER RESOURCES | 7 |
| 2.3 | LAND USE | 8 |
| 2.4 | WATER QUALITY | 9 |
| 2.5 | COMMUNITY ACTIVITY | 10 |
| 2.6 | ENVIRONMENTAL FLOWS | 11 |
| 2.7 | COMMUNITY WATER VALUES..... | 11 |
| 2.8 | WATER MANAGEMENT GOALS | 12 |
| 2.9 | COMMUNITY BASED WATER MANAGEMENT PLANNING..... | 12 |
| 2.10 | CATCHMENT ENVIRONMENTAL ISSUES..... | 12 |
| 3 | WATER QUALITY: PROTECTED ENVIRONMENTAL VALUES | 14 |
| 3.1 | SETTING PROTECTED ENVIRONMENTAL VALUES | 14 |
| 3.2 | PROTECTED ENVIRONMENTAL VALUES CATEGORIES | 14 |
| 3.3 | COMMUNITY INPUT | 15 |
| 4 | PROTECTED ENVIRONMENTAL VALUES FOR THE MEANDER RIVER CATCHMENT | 16 |
| 5 | WATER QUANTITY VALUES FOR THE MEANDER CATCHMENT..... | 24 |
| 5.1 | OVERVIEW | 24 |
| 5.2 | WATER QUANTITY VALUES..... | 24 |
| 6 | COMMUNITY WATER VALUES MEANDER RIVER CATCHMENT | 27 |
| 6.1 | DELORAIN STAKEHOLDER WORKSHOP OUTCOMES 25 JULY 2000 AND DELORAIN PUBLIC MEETING 22 AUGUST 2000 | 27 |
| 6.2 | CARRICK STAKEHOLDER WORKSHOP OUTCOMES 26 JULY 2000 AND PUBLIC MEETING 23 AUGUST 2000 | 31 |

2 WATER REFORM IN TASMANIA

2.1 Why do we need water reform?

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

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

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

We take for granted that our use of water resources is sustainable; that our hard-working water will still be there in a healthy state to provide the same benefits for future generations.

Tasmanian rivers range from relatively short, swiftly flowing rivers fed from mountain sources to slowly flowing rivers which may be reduced to a series of pools during dry periods. Our waterways are not immune from problems, however, and many of our river systems are showing signs of stress.

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

In response to a general recognition across the community of the importance of having clean water and appropriate river flows, the Tasmanian Government is currently finalising a range of reforms designed to ensure that these values are protected for the future of the State.

2.2 What are these reforms?

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

Water quality management

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

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

This paper focuses on how water quality values will be identified and used. Local communities have a key role in identifying these values in their areas.

Water quantity management

The recent introduction of the *Water Management Act 1999* (to replace the *Water Act 1957*) provides opportunities for greater community involvement in the identification of water allocations

that are sustainable in the long term. The Act incorporates:

- 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.

At present, as part of the reform process, the Department of Primary Industries, Water and Environment is undertaking water quantity planning in selected catchments around the State. Information on water quantity values from stakeholders, catchment groups and the general public will be used to put water resource management on a sustainable footing within these catchments. Water management planning will be undertaken on a priority basis, with stressed rivers in the State being targeted initially. The Meander River catchment is one of the selected catchments.

2.3 What will community input achieve?

The objective was to identify water management goals for the catchments within your region. These will include Protected Environmental Values as defined under the *State Policy on Water Quality Management* and water quantity values which have been raised by the catchment community as part of the water management planning process.

2.4 What did we want the community to do?

Local communities have a valuable understanding of their regional

waterways. The following questions of catchment stakeholders were asked.

- Which of your activities rely upon maintaining or enhancing the flow of water into catchment waterways?
- Are there certain places on your rivers that you traditionally use for swimming or other recreational activities?
- Do you fish in them?
- Are there specific features of your rivers and streams that are recognized scenic attractions, such as rapids or waterfalls?
- Do you know of rare or endangered animals or plants in, or adjacent to, specific areas of your rivers or streams?
- Do you use water for livestock watering?
- Does your river supply the local town water supply?
- Do you draw water from it to irrigate your farm?
- How often do you need to draw water from it, and when?

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

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

2.5 How will public input be used?

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

Information from community stakeholders, catchment groups and the

public on water quantity values will be used to better plan the water resources of the catchments. Water management planning will be closely linked with overall catchment management planning to put water resource management on a sustainable footing for the State. Water management planning will be undertaken on a priority basis, with stressed rivers in the State being targeted initially.

3

CATCHMENT CHARACTERISTICS

3.1 Physical Description ¹

The Meander River catchment covers an area of about 1600 square kilometres in northern Tasmania. A major sub-catchment of the South Esk River Basin, its headwaters rise at about 1300 metres elevation in the high rainfall areas of the Great Western Tiers before it runs north and east to join the South Esk River below Hadspen. Its waters eventually discharge into the Tamar River at Launceston. Overall, it is estimated there are 1100 kilometres of streams draining the catchment, with the Meander River, Liffey River, Quamby Brook and Western Creek being the major waterways.

The Great Western Tiers have a considerable impact upon regional climatic conditions. Because of its higher altitude (over 1000 metres), the escarpment is characterised by greater annual rainfall (2200 mm average) and colder conditions with greater frequency of snow and frost. Conditions are less severe to the north and to the east with milder temperatures and lower rainfall (annual average around 700 mm in the east). However, some lower lying catchments such as the Meander and Liffey are prone to flooding due to high rainfall events along the escarpment. Conversely, lack of water can also be a problem in some years. Frosts are also common during the winter months.

The topography and geology of the catchment changes from the flat plains and alluvial terraces (alluvial sediments, clays and gravels) of the north and east; to rolling hills (on basalt) below the

escarpment; before rising to the steep and precipitous slopes and associated benches of the escarpment (metamorphic basement rocks overlain by permo-triassic sediments with dolerite outcrops). The geological character of the catchment has a significant role in determining catchment agriculture and land use through variation in topography, landforms and soil characteristics.

3.2 Water Resources ²

Stream flow is highly variable, both between years and between months. As there are no major storages in the catchment, for most of the year stream flow tends to reflect the seasonal rainfall patterns. Winter is the period of highest average flows. Water drawn off for irrigation between November and March does, however, significantly reduce stream flow. Land clearance and forestry operations can also affect water yield.

The Great Lake – South Esk Basin is a Hydro Electric Corporation (HEC) water district for which it has established rights to all the water in the South Esk River Basin for power generation purposes. The Meander catchment also provides approximately one third of the total outflow of the South Esk at the Trevallyn Power Station. Water is provided for town-supply, riparian stock and domestic use. Water use within the catchment is split between domestic use (600-700 ML), stock watering (600-700 ML) and irrigation (15000-20000 ML).

Inter-catchment diversion of water is limited. Some excess water diverted into the lower Liffey River from

¹ Draft Paper – Sindjic, M., Wright, D., Johnstone, J. & Priestley, T. *Meander Catchment Natural Resources, Their Uses & State*. DPIF.

² Unless otherwise cited from Bobbi, C., Fuller, D. & Oldmeadow, D. 1996. *State of Rivers Report for the South Esk Basin*. DPIF Report WRA 96/02.

Brumbys Creek via the Cressy-Longford Irrigation Scheme sustains flows in the lower reaches of this waterway through the summer. A small area of the Central Plateau in the upper Liffey River catchment is also used to increase yield to the Great Lake over winter months.

Town water supply is provided for Westbury/Hagley (352 ML), Exton (15 ML), Bracknell (73 ML), Carrick (80 ML) and Deloraine (512 ML). Commissioned water rights for industrial supply offtakes also exist for the Liffey River (Pivot Nutrition) and Dampers Creek (Lloyd Evans P/L).

The Meander River is the receiving water for three sewage treatment plants at Deloraine (annual discharge 280 ML), Westbury (annual discharge 110 ML) and Carrick (250 ML).

Regional wetlands and waterways also provide suitable habitat for a number of species of conservation significance. These are the green and gold frog, the giant freshwater crayfish, platypus and a number of bird species – grey goshawk, Australian shoveler, hardhead, swamp harrier, Latham's snipe³.

Groundwater is a significant resource within the catchment which, to date, is predominantly untapped⁴. Output from existing bores varies greatly with the nature of the aquifer from which water is being drawn. Sustained yield is particularly important for irrigation bores which are required to supply large

volumes of water over summer months. Groundwater quality is generally good throughout the catchment and suitable for most uses. While water from some deeper aquifers near Bishopbourne has high salinity levels, groundwater is generally of irrigation quality. Borewater may be suitable for domestic drinking purposes but water quality testing should be carried out and disinfection is always advisable. Pollution of aquifers is a potential threat, particularly in areas where permeable soils overlay fractured rock terrain. Certain types of land use in these areas – eg. waste disposal sites, intense cropping with associated heavy nitrogen fertiliser application, effluent from dairy farms – may affect groundwater quality.

3.3 Land Use⁵

Most of the catchment lies within the Meander Valley Municipality. Small areas to the north, east and south lie within the West Tamar, Northern Midlands and Central Highlands municipalities respectively.

Major forms of land tenure within the catchment are private land (over 70%), state forest (21%) and the Central Plateau Conservation Area (5%). Areas comprising the southern boundaries of the catchment are also registered on the World Heritage List for outstanding natural and cultural values.

The majority of forest within the catchment has some history of timber harvesting. Forests cover 38% of the catchment – 21% or 32,000 hectares on private land and 17% or 27,000 hectares on state forest. Forestry Tasmania manages about one fifth of the Meander

³ Inspiring Place Consultants. 2000. Draft *Meander Valley Council, Natural Resource Management Strategy*.

⁴ Lloyd Matthews (MRT) in Draft Paper – Sindicic, M., Wright, D., Johnstone, J. & Priestley, T. *Meander Catchment Natural Resources, Their Uses & State*. DPIF.

⁵ Draft Paper – Sindicic, M., Wright, D., Johnstone, J. & Priestley, T. *Meander Catchment Natural Resources, Their Uses & State*. DPIF.

catchment (33,500 hectares) with a mix of forest reserves (7000 hectares) and multiple use forest (26,500 hectares). Forest designated 'production zone' must be harvested in accordance with the environmental requirements of the Forest Practices Code. This outlines a range of operational requirements to preserve water quality covering areas such as no harvesting in streamside buffer zones, restricted vehicle access to streams etc. Forest reserves within the catchment – the Meander, Jackeys Creek, Quamby Bluff, Liffey, Drys Bluff, Long Ridge, Black Jack Hill, Stephens Hill, Brushy Rivulet & Reedy Marsh Forest Reserves – are excluded from timber harvesting because of their significant environmental values.

Farm surveys carried out in nine sub-catchments in 1994/95 give a snapshot of typical agricultural land use within the catchment. Cattle and sheep farming were widespread with about 40% of the catchment dedicated to pasture. Sixty-five dairies were located within the entire catchment, the majority of these being in the low altitude areas in the southern half of the catchment. Cropping activities take place in about 10% of the catchment, with the most intensive cropping taking place on the red clayey soils on basalt found in the middle of the catchment near Deloraine, Highplains and Exton. There were 323 farm dams in the catchment.

3.4 Water Quality ⁶

The State of Rivers Report for the South Esk Basin reports on water quality data collected from eight sites across the Meander catchment between 1992 and 1995. The main findings of this study were:

⁶ Bobbi, C., Fuller, D. & Oldmeadow, D. 1996. *State of Rivers Report for the South Esk Basin*. DPIF Report WRA 96/02.

- ↪ Nutrient concentrations in the Meander catchment were higher than the other major South Esk Basin catchments (South Esk and Macquarie). Quamby Brook near Westbury had consistently high levels of phosphorus and nitrogen. Estimates of annual average loads of nutrients lost from the catchment were 43 tonnes of phosphorus and nearly 470 tonnes of nitrogen. Much of this is transported during flood events. High nitrogen levels recorded in waterways appeared to be linked to the presence of sewage outfalls and to areas of intensive dairying activity. High concentrations of phosphorus also appear to be related to these activities.
- ↪ Suspended solids and turbidity (water clarity) levels were highest in the lower reaches of Western Creek and Quamby Brook. While levels were generally low, flood events boosted suspended solids loads one-hundred fold.
- ↪ Conductivity was generally at levels posing no salinity problems.
- ↪ Limited sampling revealed that indicators of faecal pollution were at high levels throughout the lower catchment. Deloraine weir was the site where peak bacterial levels were recorded on the Meander River.
- ↪ Daytime dissolved oxygen levels in the lower reaches of Quamby Brook were recorded at levels placing extreme stress on aquatic animals.
- ↪ The macroinvertebrate groups most sensitive to pollution – caddisfly, stonefly and mayfly – were missing from the Quamby Brook site in autumn 1995.
- ↪ In terms of the macroinvertebrate fauna (insects, crustacea etc.) the Meander River and tributaries are in

reasonable health, particularly in the upper catchment. A decrease in the condition of macroinvertebrate communities was recorded, however, in the Meander River downstream of Cubits Sugarloaf.

Readers are referred to the State of Rivers report for a more detailed analysis of regional water quality.

3.5 Community Activity ⁷

Since 1992 the Meander River Catchment has been the focus of Tasmania's first major integrated catchment strategy. This process develops regional responses to local environmental and natural resource issues by integrating community representation and know-how with the technical expertise and support that comes from both local and state government. The catchment management plan developed by the Meander Catchment Co-ordinating Group outlines the framework of the program.

One plank of this program is the community desire to manage the rivers and streams in such a way that water quality and appearance is protected and enhanced. Key objectives are measurable reductions in turbidity, faecal coliforms (to swimming standard), nitrogen and phosphorus in all regional waterways and a co-ordinated whole of catchment water monitoring program. On-ground activities to achieve this include river rehabilitation works; development of riparian buffer strips along waterways; initiatives to keep cattle out of streams; adoption of codes of practice for adjacent land-use likely to have impacts on water quality; increased water

quality monitoring to identify problem areas; and a range of other measures.

Water quantity is also an issue in the catchment waterways. Large variations in seasonal flow in the absence of any major on-stream storages can produce periods where demand for water exceeds supply. Water used for irrigation, town supply and for maintaining basic river health can be a scarce resource requiring development of an equitable water management plan. The Meander Catchment Co-ordinating Group identifies a need to ensure a water supply for all users which is economically and ecologically sustainable and socially acceptable. Key regional objectives are development of a fair and equitable system of water apportionment; more off-stream storages; investigate groundwater resources; adopt best practice in water use efficiency; minimise flood damage and local recognition of changes arising from national water reforms. On-ground activities to achieve this include assessment and identification of environmental flows; more information regarding surface and groundwater availability; willow removal in flood prone areas; wider dissemination of information on best practice water use; and a number of other measures.

Bank erosion is common in the lower two thirds of the Meander River, particularly where there is a lack of riparian vegetation and steeper river gradients. Streambank collapse and channel movement appears to be especially severe between Meander township and Westbury (35 km by river length). Estimates of riparian or riverbank vegetation coverage using aerial photographs indicate around 20% of waterways have riverbank infestation of willows, 60% have native or other vegetation cover and 20% have bare banks. Adjacent land use activities along waterways or in-stream

⁷ 1998. *Meander Catchment Management Plan*. Meander Catchment Co-ordinating Group

modifications such as removal of riverbed shingle or channel straightening can have severe repercussions in terms of streamside soil loss and degraded water quality. The Meander Catchment Coordinating Group has as its goal the stabilisation of streambanks by maintaining the natural form of rivers and streams, and improving riparian zone management. Key regional objectives are mapping the extent and severity of stream bank erosion; identify areas of river shortening activity; increase community awareness of the causes of erosion; promote the need for more native riparian vegetation and develop Rivercare plans for local streams. On-ground activities to achieve this include identification and remediation of affected areas; expanded riparian zone fencing; provide more information on regional native riparian vegetation; and other issues.

3.6 Environmental Flows

A number of draft water management objectives for the Meander River were proposed by Fuller and Graham as a means of protecting and enhancing the environmental and community values of the waterway⁸. These objectives arose out of an environmental flows study incorporating hydrological and ecological information with community water values assessment. Objectives were to:

- Manage the water flow regime to avoid water quality deterioration.
- Protect a near-natural bankfull flood flow regime.
- Identify and allocate additional water which can be allocated to users on a “high risk” basis.

- Establish and enforce a clear and well understood set of water management guidelines including triggers for restrictions.
- Promote the reduction of the effluent input to the stream and/or seek water allocations for the dischargers.
- Protect the instream ecosystems including fisheries by allocating and managing appropriate water for the environment.
- Encourage off-stream storage with off-takes in winter months.

3.7 Community Water Values

Community stakeholders reviewed existing values for their regional waterways at the November 1999 meeting of the Meander Catchment Coordinating Group⁹.

Ecosystem Values

- Water quality to meet prescribed standards
- vegetation rather than willows in riparian zone
- Appropriate diversity and density of in-stream flora and fauna

Consumptive and Non-Consumptive Use Values

- Meeting irrigation needs cost effectively
- Meeting HEC requirements
- Provision of quality water for stock
- Provision of quality water for humans
- Adequate dilution of effluent
- Provision of water to sustain a healthy stream environment

⁸ Fuller, D. & Graham, B. 1998. Environmental Flow Estimates – Meander River at Strathbridge. DPIF Report WRA 98/06

⁹ Fuller, D. & Graham, B. 1998. Environmental Flow Estimates – Meander River at Strathbridge. DPIF Report WRA 98/06

Recreational Values

- Water flows and quality for fishing
- Water flows and quality for swimming
- Water flows and quality for boating
- Safe and healthy environment for human activity

Physical Landscape Values

- Meandering form maintained
- Stable stream banks
- Native riparian vegetation retained
- Appropriate willow removal
- Natural flooding allowed

Aesthetic Values

- High clarity of water during base flows
- Free of algal blooms
- Strong association of human activity with river

3.8 Water Management Goals

The Meander Catchment Co-ordinating Group used the draft set of management objectives developed by Fuller and Graham as the basis for discussion in the development of the following water management goals in late 1999.

Flow and Water Level Maintenance

1. Maintain or mimic natural flow variability in all streams.
2. Maintain groundwaters within natural levels, and variability, critical to surface flows or ecosystems.
3. Promote management of the whole catchment, recognising the benefits to streamflow.

Flow Allocation and Management

4. Identify and allocate any water surplus to requirements.
5. Establish and enforce a clear and well understood set of water management

guidelines including triggers for restrictions.

6. Protect the instream ecosystems including fisheries by allocating and managing appropriate water for the environment.

7. Encourage off-stream storage with offtakes in winter months.

Water Quality Protection

8. Manage the flow regime to avoid water quality deterioration.

9. Eliminate effluent input to streams in the catchment.

3.9 Community Based Water Management Planning

The State has a commitment to prepare plans for 6 priority catchments under the NHT-funded Community Based Water Management Planning project, which commenced in May 1999. The plan for the Meander River catchment was to be completed by the end of 2001. It is to be based upon comprehensive community and stakeholder consultation and will take into account the range of water uses within the catchment, competing interests and demands and community expectations. The *Water Management Act 1999* provides the legislative framework for water management planning.

3.10 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 Meander River catchment.

- Erosion and soil loss in the catchment and deposition lower in the catchment.

- Loss of phosphorus from the catchment during flood events (probably in a form which is bound to eroded sediments).
- Effects of discharge from sewage treatment plants and other point source discharges on stream water quality.
- Minimising effects of dairying activities on stream water quality.
- Reducing faecal pollution of waterways.
- Protection of groundwater quality.
- Maintenance and enhancement of habitat quality and diversity for aquatic flora and fauna.
- Maintaining viable populations of endangered animal and plant species
- Flow related issues: potential for excessive extraction of water and the impact on in-stream flows.
- Impacts of land clearance and forestry operations on water yield.
- Inter-catchment diversion of water.
- Minimising stream bank erosion in catchment.
- Erosion through forestry activities (road construction, harvesting etc.) and associated loss of, or stress to, aquatic and riparian habitats;
- Environmental flow requirements.
- Willow infestations along many waterways clog existing channels; divert water to new channels with subsequent erosion; replace native riparian flora; and have impacts on water quality.

4 WATER QUALITY: PROTECTED ENVIRONMENTAL VALUES

4.1 Setting Protected Environmental Values

The first step in the implementation of the *State Policy on Water Quality Management 1997* is the identification of **Protected Environmental Values** (PEVs) of the surface waters in each region. **PEVs are the values or uses of the water body for which it is determined that any given area of that water body should be protected.** These values and uses should be clearly in evidence at the time of the implementation of the Policy.

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

- 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 of pollutant limits called Water Quality Objectives. These will be designed to ensure the quality of water in that water body is maintained at a level which will allow the chosen values to be protected.

The Policy then sets out a range of strategies which are aimed at ensuring that waste water discharges from point sources (such as industrial or sewage treatment plant discharges) and diffuse

sources (such as runoff from highways, urban areas, farms, forest harvesting etc.) will not endanger the achievement of the Water Quality Objectives.

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

4.2 Protected Environmental Values categories

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

A: Protection of Aquatic Ecosystems

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

What does pristine mean?

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

B: Recreational Water Quality & Aesthetics

- (i) Primary contact
- (ii) Secondary contact
- (iii) Aesthetics

‘Primary contact’ means recreation involving bodily immersion /

submersion where there is direct contact with water, & includes swimming, diving, surfing, water skiing.

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

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

C: Raw Water for Drinking Supply

- (i) Subject to coarse screening 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.

D: Agricultural Water Uses

- (i) Irrigation
- (ii) Stock watering

E: Industrial Water Supply

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

4.3 Community Input

We asked the community to examine and provide comment on some water quality PEVs which the Board and regional planning authorities had suggested as a starting point and may be suitable for surface waters of the Meander River catchment.

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

The community was asked the following:

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

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

5 PROTECTED ENVIRONMENTAL VALUES FOR THE MEANDER RIVER CATCHMENT

Between 2000 and 2004 Protected Environmental Values (PEVS) were set for the Meander River catchment. A discussion paper was prepared to facilitate public participation in setting the PEVs. This discussion paper was intended as a basis for community and stakeholder participation in the process of developing environmental management goals for the waterways that are located within the Meander River catchment.

The public discussion paper – *Proposed Environmental Management Goals for Tasmanian Surface Waters: Meander River Catchment* – was developed by the Department of Primary Industries, Water & Environment, local government and the Parks and Wildlife Service.

This paper explained the Policy and how the environmental values for water quality (PEVs) are identified and used.

The Discussion Paper was circulated amongst agencies and organisations having an interest in surface waters in the region. The identified stakeholders were then invited to participate in regional water values workshops at Deloraine (25/7/2000) and Carrick (26/7/2000). Information and comment arising from these workshops was incorporated into the Discussion Paper. Public meetings to provide opportunity for wider community input into the PEV setting process were then advertised in the Examiner (12/9/2000) and in the community notices of 7AD and 7LA radio stations. These meetings were held at Deloraine (22/8/2000) and Carrick (23/8/2000). These meetings were followed by an extended comment period until 25 October 2000.

The Protected Environmental Values for the Meander River catchment are shown in Table 1.

The PEVs apply to all surface waters within each land tenure category, other than¹⁰:

- 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

¹⁰ State Policy on Water Quality Management 1997

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.

TABLE 1: PROTECTED ENVIRONMENTAL VALUES FOR THE MEANDER RIVER CATCHMENT

| LAND USE | PROTECTED ENVIRONMENTAL VALUES– MEANDER RIVER CATCHMENT |
|---|--|
| For all surface waters within private land (including forest on private land) | <p>A: Protection of Aquatic Ecosystems</p> <p>(ii) Protection of modified (not pristine) ecosystems from which edible fish are harvested</p> <p>B: Recreational Water Quality & Aesthetics*</p> <p>(i) Primary contact water quality (Deloraine, Egmont [Birralelee Road], and Bracknell)</p> <p>(ii) Secondary contact water quality</p> <p>(iii) Aesthetic water quality</p> <p>C: Raw Water for Drinking Water Supply (Westbury/Hagley, Exton, Bracknell, and Deloraine)</p> <p>(ii) Subject to coarse screening plus disinfection</p> <p>D: Agricultural Water Uses</p> <p>(i) Irrigation</p> <p>(ii) Stock watering</p> <p>E: Industrial Water Supply (Hydro-Electric Power Generation, Pivot)</p> <p>That is, as a minimum, water quality management strategies should 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 suitable to supply town drinking water (subject to coarse screening plus disinfection) at Westbury/Hagley, Exton, Bracknell and Deloraine; that is acceptable for irrigation and stock watering purposes; and which will allow people to safely engage in primary and secondary contact recreation activities such as swimming (Deloraine, Egmont and Bracknell), paddling or fishing in aesthetically pleasing waters; and is suitable for use by Pivot and (following impoundment) in the Trevallyn Power Scheme.</p> |

| LAND USE | PROTECTED ENVIRONMENTAL VALUES– MEANDER RIVER CATCHMENT |
|--|--|
| <p>For all surface waters within State Forest (managed under the <i>Forestry Act 1920</i>)</p> | <p>A: Protection of Aquatic Ecosystems</p> <p>(ii) Protection of modified (not pristine) ecosystems from which edible fish are harvested taking into consideration Forestry Tasmania’s Management Classification System.</p> <p>B: Recreational Water Quality and 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 (Hydro-Electric Power Generation).</p> <p>That is, as a minimum, water quality management strategies should provide water of a physical and chemical nature to support a modified, but healthy aquatic ecosystem (recognising the designation of the area for multiple use forestry activities) from which fish may be harvested; that allows people to safely engage in primary and secondary contact recreational activities such as swimming and wading in aesthetically pleasing waters; and is suitable for use (following impoundment) in the Trevallyn Power Scheme.</p> |
| <p>Surface waters flowing through Forest Reserves from private land, hydro land, state forest or un-allocated crown land</p> | <p>A: Protection of Aquatic Ecosystems</p> <p>(ii) Protection of modified (not pristine) ecosystems from which edible fish are harvested 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>E: Industrial Water Supply (Hydro-Electric Power Generation)</p> <p>That is, as a minimum, water quality management strategies should 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 is suitable for use (following impoundment) in the Trevallyn Power Scheme.</p> |

| LAND USE | PROTECTED ENVIRONMENTAL VALUES– MEANDER RIVER CATCHMENT |
|--|---|
| <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 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</p> <p>(ii) Secondary contact water quality</p> <p>(iii) Aesthetic water quality</p> <p>E: Industrial Water Supply (Hydro-Electric Power Generation)</p> <p>That is, as a minimum, water quality management strategies should 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; and is suitable for use (following impoundment) in the Trevallyn Power Scheme.</p> |
| <p>Surface waters having their headwaters within the Great Western Tiers Conservation Area; Central Plateau Conservation Area</p> <p>(managed under the <i>National Parks and Reserves Act 2002</i>)</p> | <p>A: Protection of Aquatic Ecosystems</p> <p>(i) Protection of pristine or nearly pristine ecosystems having regard for the management objectives for conservation areas outlined in Schedule 1 of the <i>National Parks and Reserves Act, 2002</i> and for the management objectives of the World Heritage Area Management Plan within the World Heritage Area.</p> <p>B: Recreational Water Quality and 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 (Hydro-Electric Power Generation)</p> <p>That is, as a minimum, water quality management strategies should provide water of a physical and chemical nature to support a pristine or near pristine aquatic ecosystem that allows people to safely engage in primary and secondary contact recreational activities such as swimming, rafting and fishing in aesthetically pleasing waters; and is suitable for use (following impoundment) in the Trevallyn Power Scheme.</p> |

| LAND USE | PROTECTED ENVIRONMENTAL VALUES– MEANDER RIVER CATCHMENT |
|--|--|
| Surface Waters on Un-allocated Crown Land | <p>A: Protection of Aquatic Ecosystems</p> <p>(ii) Protection of modified (not pristine) ecosystems from which edible fish are harvested</p> <p>B: Recreational Water Quality and 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 (Hydro-Electric Power Generation)</p> <p>That is, as a minimum, water quality management strategies should provide water of a physical and chemical nature to support a modified, but healthy aquatic ecosystem from which edible fish may be harvested; that allows people to safely engage in primary and secondary contact recreational activities such as swimming, rafting and fishing in aesthetically pleasing waters; and is suitable for use (following impoundment) in the Trevallyn Power Scheme.</p> |
| 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 from which edible fish are harvested having regard for the management objectives outlined in Schedule 1 of the <i>National Parks and Reserves Act, 2002</i> and for the management objectives of the World Heritage Area Management Plan within the World Heritage Area.</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 (Hydro-Electric Power Generation)</p> <p>That is, as a minimum, water quality management strategies should 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 is suitable for use (following impoundment) in the Trevallyn Power Scheme.</p> |

| LAND USE | PROTECTED ENVIRONMENTAL VALUES– MEANDER RIVER CATCHMENT |
|---|---|
| <p>Surface waters that have their headwaters within State Reserves</p> | <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 1 of the <i>National Parks and Reserves Act, 2002</i> and for the management objectives of the World Heritage Area Management Plan within the World Heritage Area.</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 (Hydro-Electric Power Generation)</p> <p>That is, as a minimum, water quality management strategies should 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; and is suitable for use (following impoundment) in the Trevallyn Power Scheme.</p> |
| <p>Surface waters flowing through Public Reserves or other reserves dedicated under the <i>Crown Lands Act 1976</i> 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 from which edible fish are harvested having regard to the management objectives for objectives for public reserves</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 (Hydro-Electric Power Generation)</p> <p>That is, as a minimum, water quality management strategies should 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 is suitable for use (following impoundment) in the Trevallyn Power Scheme.</p> |

| LAND USE | PROTECTED ENVIRONMENTAL VALUES– MEANDER RIVER CATCHMENT |
|---|--|
| <p>Surface waters that have their headwaters within Public Reserves or other reserves dedicated under the <i>Crown Lands Act 1976</i></p> | <p>A: Protection of Aquatic Ecosystems</p> <p>(i) Protection of pristine or nearly pristine ecosystems having regard to the management objectives for public reserves. **</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 (Hydro-Electric Power Generation)</p> <p>That is, as a minimum, water quality management strategies should 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; and is suitable for use (following impoundment) in the Trevallyn Power Scheme.</p> |

*** Unless otherwise indicated local government does not endorse the use of surface waters flowing through urban areas or private land for primary and secondary contact.**

**** Subject to assessment under the *Regional Forest Agreement (Land Classification) Act 1998***

6 WATER QUANTITY VALUES FOR THE MEANDER CATCHMENT

6.1 Overview

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

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

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

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

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.

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

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

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

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

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

Physical Landscape values: These values are closely related to the physical nature of the catchment. This includes

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

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

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

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

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

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

Recreational values: These include the range of direct human uses of water bodies for purposes such as kayaking,

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

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

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

- maintenance or improvement of flow through gorges or over waterfalls;
- protection of scenic features in a river.

The Community Water Values identified through the PEVs and water management planning processes can be considered when making management decisions for water quantity.

In addition to those values and uses identified in 1999 by the Meander Catchment Coordinating Group, the following values were identified as State Water Quantity Values (identified by Davies and Humphries, 1996)

Ecosystem Values

- The maintenance of and/or improvement of habitat quality (both physical and chemical) and habitat diversity for riverine fauna and flora
- The maintenance and/or improvement of near-natural communities of native fauna and flora
- The maintenance of viable populations of flora and fauna known to be endemic to the river, or to have significant populations of high conservation value

Recreational Values

- The maintenance and/or improvement of recreational fisheries through maintenance of brown trout and blackfish populations and habitats
- The maintenance of safe fishing, boating and swimming conditions, particularly in relation to rapidly fluctuating flows
- The maintenance of high water quality, with an emphasis on prevention of excessive filamentous algal growth, cyanobacterial blooms and high bacterial loads

Physical Landscape Values

- The maintenance of a high diversity of near-natural habitats within the river channel
- The minimisation of bank erosion

Aesthetic Values

- The maintenance of high water quality through adequate flows, with an emphasis on prevention of excessive filamentous algal growth, cyanobacterial blooms and high turbidity
- The prevention of cessation of flow

7 Community Water Values Meander River Catchment

The following Community Water Values were collected at stakeholder workshops and public meetings held at Deloraine and Carrick in July and August 2000. These values add to those collected in 1999 by the Meander Catchment Coordinating Group and by Davies and Humphries, 1996.

7.1 Deloraine Stakeholder Workshop Outcomes 25 July 2000 and Deloraine Public Meeting 22 August 2000

| | |
|-------------------------------------|--|
| <p>Consumptive/ Non Consumptive</p> | <ul style="list-style-type: none"> • Town Drinking Water Supplies (Deloraine, Carrick, Bracknell, Westbury/Hagley, Exton) • Riparian (Riverside) Domestic offtake • Homestead Use – Individual offtakes for drinking and non drinking purposes. • Small Remote Area Power Systems mainly Upper Meander and Jackys Marsh (non hydro systems) • Irrigation • Industry Offtakes (Pivot) • Stock Watering • Extraction for on Farm Dams • Extraction for general Farming use (wash down, effluent removal etc) • Aquaculture (Eel Farms at Red Hill) • Deloraine Swimming Pool • Maintain Water Yields by controlling forestry and its operations. |
| <p>Recreational/ Aesthetic</p> | <ul style="list-style-type: none"> • Tourism Industry rely on clean good quality water with healthy ecosystems <ul style="list-style-type: none"> ❖ fishing(everywhere) ❖ ecotourism ❖ bird watching |

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|--|---|
| | <ul style="list-style-type: none"> ❖ canoeing ❖ kayaking(Upstream of Meander Bridge) ❖ picnicking ❖ rafting (upstream of Meander Bridge) • Water of low sediment loads (low turbidity) • Recreational value to local community ❖ fishing(everywhere) ❖ ecotourism ❖ bird watching ❖ canoeing ❖ kayaking(Upstream of Meander Bridge) ❖ picnicking • Swimming – Deloraine, Exton (Porter Bridge), Egmont, Hadspen, Bracknell, Ritters Bridge, Meander Bridge. • Deloraine Swimming Pool |
|--|---|

| | |
|---------------------------------------|---|
| <p>Ecosystem / Basic River Health</p> | <ul style="list-style-type: none"> • Sustain a healthy Brown Trout fishery • Maintaining a healthy Black Fish ecosystem • Maintaining a healthy self sustaining aquatic ecosystem. Key Species; <ul style="list-style-type: none"> ❖ Frogs including Green and Gold Frog ❖ <i>Astacopsis gouldi</i>(Freshwater Crayfish) ❖ Macroinvertebrates as a community index for healthy ecosystem ❖ Healthy Platypus (some problems with ulcers) ❖ Birds (Particularly riparian zone above Meander Bridge) • Maintaining low sediment loads (low turbidity) by; <ul style="list-style-type: none"> ❖ protecting riparian vegetation ❖ avoiding bank erosion ❖ Role of snags – ie reducing stream erosion • Waters free of blue green algae • Waters with low bacteria and nutrient levels • Water Quality to support healthy riparian vegetation. Vegetation provides organic debris (food source) in stream, sediment trapping, shade and buffering role and maintenance of rare and endangered species. • Water quality aspects derived from appropriate flow regime <ul style="list-style-type: none"> ❖ Adequate flow for dilution ❖ Adequate Ecosystem Flow ❖ Natural flow of feeder streams and groundwater • Maintain water quality at a level that is suitable to support organic farming |
| <p>Other Issues</p> | <ul style="list-style-type: none"> • Economic value as a basis for tourism ie Bird Watching • Micro-climate influences of waterways (particularly riparian areas) |

| | |
|--|---|
| | <ul style="list-style-type: none">• Hydrological Issues associated with land use activities ie;<ul style="list-style-type: none">❖ Changes in flows and soil moisture content associated with old growth forest removal and plantation use❖ Carbon content of soil water❖ Farm Drainage |
|--|---|

**7.2 Carrick Stakeholder Workshop Outcomes 26 July 2000 and Public Meeting
23 August 2000**

| | |
|-------------------------------------|--|
| <p>Consumptive/ Non Consumptive</p> | <ul style="list-style-type: none"> • Irrigation • Town Drinking Water Supplies (Deloraine, Carrick, Bracknell, Westbury/Hagley, Exton,) • Council supply to Town and individual • Homestead Use – Individual offtakes for drinking and non drinking purposes • Stock Watering (well managed stock access to rivers, trough water quality issues in lower Meander) • Water Extraction for general farming uses (dairy washdown) • Aquaculture (Eel Farming at Western Creek) • Industry Offtakes <ul style="list-style-type: none"> ❖ Tas Alkaloids ❖ Pivot at Liffey for truck washdown ❖ Gravel Extraction for washdown ❖ Timber Mills to spray logs to prevent combustion ❖ Hydro |
| <p>Recreational/ Aesthetic</p> | <ul style="list-style-type: none"> • Recreational value to local community <ul style="list-style-type: none"> ❖ fishing(everywhere) ❖ ecotourism ❖ bird watching ❖ canoeing ❖ kayaking(upstream of Meander Bridge) ❖ picnicking ❖ rafting |

| | |
|--------------------------------|---|
| | <ul style="list-style-type: none"> ❖ bushwalking ❖ shooting (Ducks) • Swimming – Egmont – Birralee Road, Bracknell on Liffey, Bowman Bridge at Meander, Hadspen at Old Bridge Site. • River is valued as providing a sense of place • Maintain aesthetics of Liffey Falls and Meander Falls • Maintenance of natural flow from groundwater has quality outcomes during low flow periods(recharge and discharge from groundwater) |
| Ecosystem / Basic River Health | <ul style="list-style-type: none"> • Maintenance of Waterfowl populations and other birds • Maintain a healthy Black Fish population • Sustain healthy Brown Trout and Rainbow Trout populations • Maintaining a healthy self sustaining aquatic ecosystem Key Species: <ul style="list-style-type: none"> ❖ Eels ❖ Macroinvertebrates as a community index for healthy ecosystems (refer to DPIWE studies) ❖ Healthy native aquatic plants ❖ Platypus ❖ Frogs ❖ Native Galaxiid (good populations in upper catchment) ❖ Native water rat (Rattus Lutreolus) • Ecosystem perceived as not healthy below the Liffey joining Meander • Maintain areas of the river that are free of Perch • Value areas that don't have 'improved' hydrology as improved hydrology has negative impacts on the river and river ecology • Maintain river bank vegetation for its values as; shade, food for stock and prefer native species instead of willows however if all willows are removed possums eat native eucalypts (ie Westbury) |

| | |
|--------------|---|
| | <ul style="list-style-type: none"> • Maintain Wetlands – Western Creek, Quamby Brook , including areas of Ovata Swamps and Plateau wetlands. <p>Minimise sediment loss in relation to river works.</p> |
| Other Issues | <ul style="list-style-type: none"> • Maintain the social values associated with the River • Drainage role (for sewage and general land drainage) • Water Quantity Issues (Urban and Agricultural aspects). Value equity of water pricing (Town verses Rural) • Recognition of the lack of quality water and the need for Industrial Incentives • Maintain the use of electric pumps over diesel pumps to reduce oil impacts • Value economic ways of controlling floods and utilising this water for ecosystem, social and agricultural values etc. • Waterways help maintain general economic livelihood of the Meander catchment for farming and the whole community • Changed hydrology – faster water delivery causes upstream and downstream changes, parts of river cut off downstream • Clean and Green Image of water is promoted and marketed |