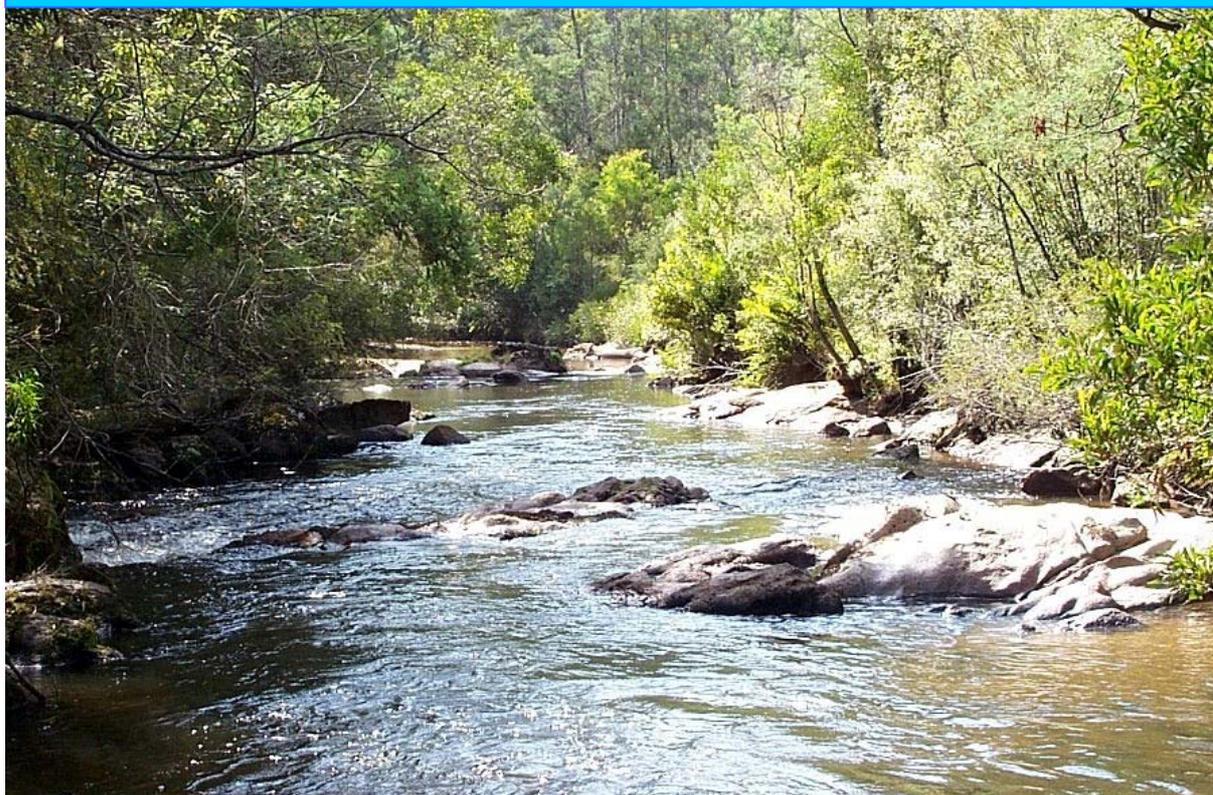


# GREAT FORESTER CATCHMENT WATER MANAGEMENT PLAN



Great Forester River at the Forester Road Gauging Station

Department of Primary Industries, Water and Environment  
Water Assessment and Planning Branch  
July 2003

(Amended pursuant to a decision by the Resource Management and Planning Appeal Tribunal on 11 November 2003)



Natural  
Heritage  
Trust

Helping Communities  
Helping Australia



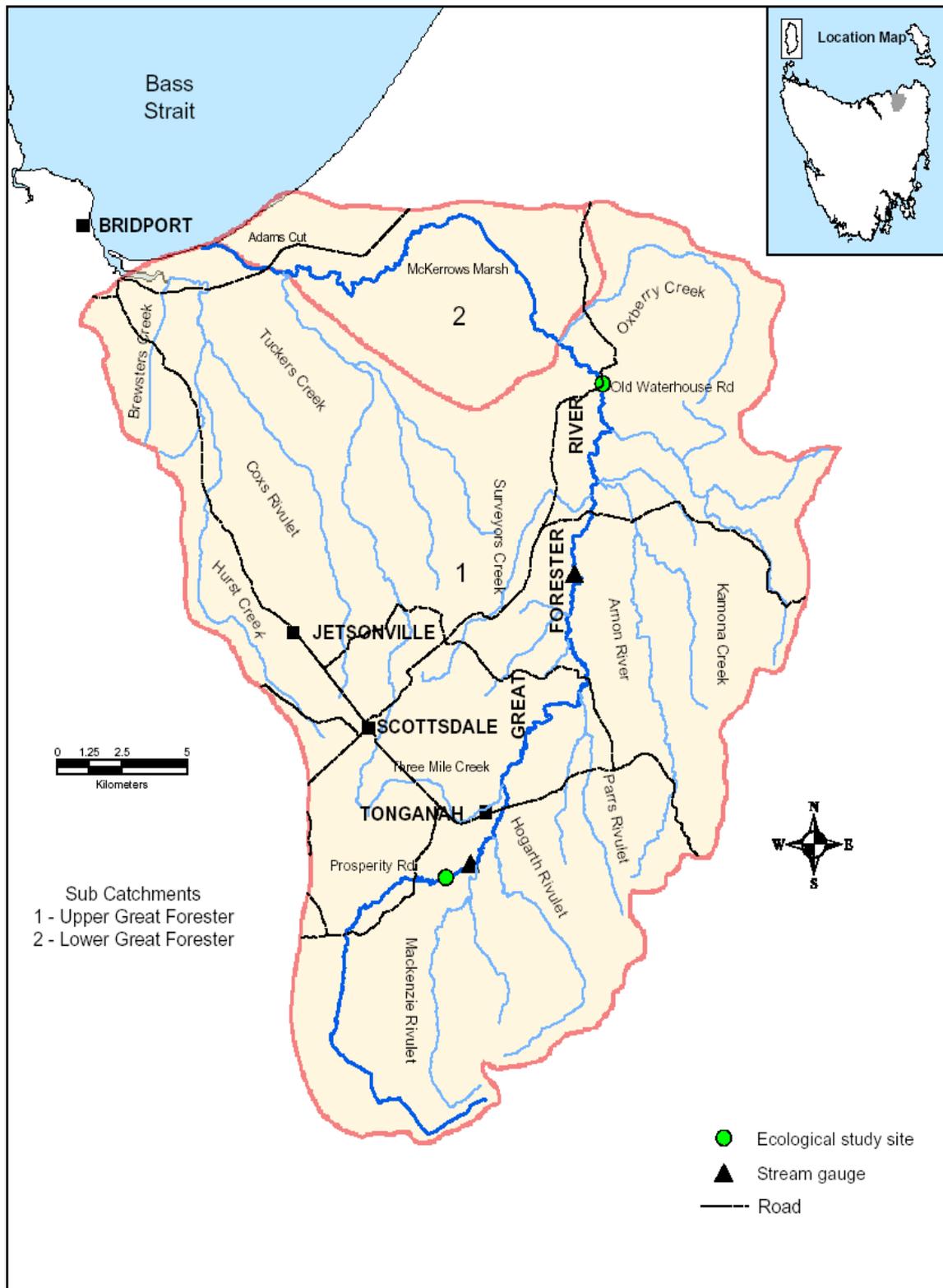
Tasmania

DEPARTMENT of  
PRIMARY INDUSTRIES,  
WATER and ENVIRONMENT

ISBN 0 7246 6303 7

**Figure 1**

**Location Map - Great Forester Catchment**



# TABLE OF CONTENTS

<b>FOREWORD</b> .....	<b>1</b>
<b>PART 1 PRELIMINARY</b> .....	<b>2</b>
TITLE AND APPLICATION .....	2
OBJECTIVES OF THE WATER MANAGEMENT ACT 1999 .....	3
INTERPRETATION AND DEFINITIONS .....	4
<b>PART 1A PLAN REVIEW AND INTERIM ARRANGEMENTS</b> .....	<b>6</b>
<b>PART 2 WATER MANAGEMENT PROVISIONS</b> .....	<b>8</b>
MANAGEMENT RESPONSIBILITIES .....	8
WATER LICENSING.....	8
WATER ALLOCATIONS.....	9
TRANSFERS OF WATER LICENCES AND ALLOCATIONS.....	10
METERING .....	10
MEASUREMENT OF WATER FLOW THROUGH DAMS .....	11
RESTRICTION MANAGEMENT .....	12
MONITORING .....	12
ANNUAL INTERIM ASSESSMENT OF THE PLAN .....	17
REVIEW OF THE PLAN .....	17
<b>PART 3 ASSESSMENTS REQUIRED UNDER SECTIONS 14 and 15 OF THE ACT ...</b>	<b>18</b>
ASSESSMENT OF THE QUANTITY OF WATER NEEDED BY THE ECOSYSTEMS THAT DEPEND ON A WATER RESOURCE AND THE TIMES AT WHICH, OR THE PERIODS DURING WHICH, THOSE ECOSYSTEMS WILL NEED THAT WATER - SECTION 14(2)(A).....	18
ASSESSMENT OF LIKELY DETRIMENTAL EFFECTS, ARISING FROM THE TAKING OR USE OF WATER FROM THE RESOURCE, ON THE QUANTITY OF WATER THAT IS AVAILABLE TO MEET THE NEEDS OF ECOSYSTEMS THAT DEPEND ON THE RESOURCE – SECTION 14(2)(B).....	21
ASSESSMENT OF LIKELY DETRIMENTAL EFFECTS OF THE PLAN ON THE QUALITY OF WATER – SECTION 14(2)(C) .....	22
ASSESSMENT OF THE CAPACITY OF THE RELEVANT RESOURCE TO MEET THE LIKELY DEMANDS FOR WATER BY EXISTING AND FUTURE USERS – SECTION 15(A).....	23

LIKELY EFFECTS OF THE PLAN ON EXISTING AND FUTURE USERS, INCLUDING ANY EFFECT ON BUSINESSES CARRIED ON BY THOSE USERS – SECTION 15(B) .....	24
---	----

<b>REFERENCES .....</b>	<b>28</b>
-------------------------	-----------

<b>APPENDIX 1 – TRIAL RESTRICTION MANAGEMENT PROTOCOL .....</b>	<b>29</b>
---	-----------

**TABLES**

Table 1	Summary of environmental monitoring .....	14
Table 2	Summary of water management and land use monitoring .....	16
Table 3	Environmental Water Requirements (December to April) .....	19
Table 4	Monthly Environmental Water Requirements at the Forester Rd Gauging Station .....	19
Table 5	Likelihood that Environmental Water Requirements would not be maintained for at least half the days in any given month .....	20
Table 6	Seasonal water shortfalls for two restriction scenarios (1992/93 – 2001/02) .....	26
Table 7	Trial restriction management protocol .....	29

## FOREWORD

This Water Management Plan has been prepared by the Department of Primary Industries, Water and Environment and the Great Forester Catchment Water Management Planning Consultative Group. Funding for development of the Plan was provided by the Department and the Natural Heritage Trust.

The purpose of the Plan is to provide a framework for managing the catchment's water resources in accordance with the objectives of the *Water Management Act 1999*.

The Plan includes provisions relating to water management responsibilities, water licensing and allocations, water transfers, metering, restriction management, monitoring and reporting, and plan review. The Plan also contains assessments related to the water needs of ecosystems, the likely detrimental effects of the Plan on water quality, the capacity of the water resource to meet demand, and the likely effect of the Plan on water users and their businesses.

During development of the Plan many representations were made by interested individuals and groups. A separate report has been prepared summarising these representations and the subsequent amendments made to the Plan.

The Plan recognises that improvements in water management will require improved monitoring of flow records, water usage, and the economic and environmental effects of planning provisions. It also recognises that community access to water information and involvement in management decisions are critical to the long-term success of the planning process.

The Environmental Water Provisions enshrined in the Plan represent the first step in reducing the environmental risk to aquatic ecosystems in the catchment to an acceptable level. The long-term environmental vision of the Plan is to implement 'moderate risk' Environmental Water Provisions, subject to maintaining the economic and social well being of the community.

All parties involved in development of the Plan recognise that to increase the Environmental Water Provisions during the irrigation season beyond those specified in the Plan may well require further water development. The Department is committed to funding an initial environmental feasibility study for a preferred community storage site to improve the agricultural productivity of the catchment.

## PART 1 PRELIMINARY

### TITLE AND APPLICATION

This Water Management Plan is titled the Great Forester Catchment Water Management Plan hereafter referred to as the Plan.

The Plan is to be read as being subject to the *Water Management Act 1999* hereafter referred to as the Act.

The Plan consists of this document and the accompanying map of the Great Forester River catchment at **Figure 1**.

The Plan area is the Great Forester River catchment, including the subcatchments of Tuckers Creek, Hurst Creek and Coxs Rivulet.

The Plan applies to the management of:

- All water in both permanent and temporary watercourses;
- All water stored in dams within the Plan area; and
- All groundwater aquifers within the Plan area.

In accordance with Section 28 of the Act, the Minister adopted the Plan on 30 July 2003.

In accordance with Section 29 of the Act, the Plan takes effect on the date of the publication of its notice in the Gazette.

In accordance with Section 34 of the Act, the Plan is to undergo a formal statutory review three years after its adoption by the Minister.

Nothing in this plan absolves any person from the need to obtain any licence, permit, approval or other requirement under the Act or in any other applicable legislation.

## **OBJECTIVES OF THE WATER MANAGEMENT ACT 1999**

The purpose of the Plan is to provide a framework for managing the water resources of the Great Forester catchment in accordance with the objectives of the Act.

The objectives of the Act are to provide for the use and management of the freshwater resources of Tasmania having regard to the need to:

- (a) promote sustainable use and facilitate economic development of water resources; and
- (b) recognise and foster the significant social and economic benefits resulting from the sustainable use and development of water resources for the generation of hydro-electricity and for the supply of water for human consumption and commercial activities dependent on water; and
- (c) maintain ecological processes and genetic diversity for aquatic ecosystems; and
- (d) provide for the fair, orderly and efficient allocation of water resources to meet the community's needs; and
- (e) increase the community's understanding of aquatic ecosystems and the need to use and manage water in a sustainable and cost-efficient manner; and
- (f) encourage community involvement in water resource management.

It is the obligation of the Minister, the Secretary, a water entity and any other person on whom a function is imposed or a power is conferred under the Act to perform the function or exercise the power in such a manner as to further the objectives of the Act and of the Resource Management and Planning System of Tasmania.

## INTERPRETATION AND DEFINITIONS

Words used in the Plan have their ordinary meanings as defined in the Macquarie Dictionary unless otherwise defined in the Plan or the Act. A reference in the Plan to any legislation is to be taken as a reference to such legislation as it may be amended from time to time.

### **General Definitions:**

**Act** means the *Water Management Act 1999* as amended or, if that Act is repealed, any Act enacted in substitution for that Act.

**ARMCANZ and ANZECC** means the Agriculture and Resource Management Council of Australia and New Zealand and Australian and New Zealand Environment and Conservation Council.

**Catchment** means the area within which water will naturally flow towards a watercourse and includes the watercourse.

**Consultative Group** means the Great Forester Catchment Water Management Consultative Group, comprised of 11 community representatives as follows: Vegetable Growers and lower catchment irrigators (2), Dairy Farmers (2), Hop Growers (1), Poppy Growers (1), Brid-Forester Integrated Catchment Management Group (2), Waterwatch (1), Dorset Council (1) and Forestry Tasmania (1), with a chairperson nominated by the Group. During the development of the Plan, this Group was known as the Great Forester Catchment Water Management Planning Consultative Group.

**Department** means the Department of Primary Industries, Water and Environment (DPIWE).

**Direct take** means extraction of water directly from a watercourse.

**Environmental Water Provision (EWP)** means that part of the Environmental Water Requirement that can be met; that is, the water regime preserved for the environment through agreement or negotiation. A 'moderate risk' Environmental Water Provision is one that would sustain the ecological values of aquatic ecosystems at a moderate level of risk.

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

**Lower catchment** means the Great Forester River below the junction with Oxberry Creek.

**Managed Minimum Flow** is the flow at which direct takes from watercourses are banned.

**ML** means megalitre (one million litres).

**Protected Environmental Values (PEVs)** means the value or use for which it has been determined that a given area of the environment should be protected in accordance with the provisions of the State Policy on Water Quality Management 1997.

**Restriction Management** is the process of restriction of direct takes between the Trigger Flow and the Managed Minimum Flow.

**Special Licence** means a licence granted and in force under Division 6 of Part 6 of the Act.

**Trigger Flow** is the point at which restriction management begins.

**Turbidity** means the cloudiness in water caused by suspended material such as clay, silt, finely divided organic and inorganic matter, soluble coloured compounds and plankton and microscopic organisms. Standard units for measuring turbidity are NTU (Nephelometric Turbidity Units).

**Unregulated stream** means one in which flow is not controlled by means of a weir, dam or similar structure.

**Upper catchment** means the Great Forester River and all tributaries above the junction with Oxberry Creek. The upper catchment also includes Hurst Creek, Coxs Rivulet and Tuckers Creek.

**Watercourse** means a river, creek or other natural stream of water as defined under the Act.

**Water Quality Objectives (WQOs)** means, in relation to a specific body of water, the most stringent set of water quality guidelines which should be met to achieve all of the Protected Environmental Values nominated for that body of water.

**Water user** means any person who has a right to take water under Part 5 of the Act.

## **PART 1A PLAN REVIEW AND INTERIM ARRANGEMENTS**

This part of the Plan is inserted pursuant to a decision made by the Resource Management Planning and Appeal Tribunal on 11 November 2003.

As detailed elsewhere in this Plan, it is to be formally reviewed in accordance with section 34 of the Act upon the expiry of three years after its adoption by the Minister. The adoption occurred on the 30<sup>th</sup> of July 2003. The review is to take place having regard to the monitoring and other information which is to be collected in the meantime in accordance with the requirements of the Plan. That information must include a hydrological model of the catchment, sufficient to enable assessment of the natural flow which might be expected in the river if no abstraction were occurring and as far as possible include all uses in the catchment, including passive uses.

It is anticipated that the review will take approximately six months, but it will be completed as soon as practicable.

The reviewed Plan must contain the assessments required under sections 14 and 15 of the Act, in appropriate detail. In particular, and without prejudice to the generality of the foregoing, it must specify the ecosystems which need the water and the quantity of water which they need. The description of the ecosystems must include identification of any endangered or threatened species which they include.

The Environmental Water Provision under the reviewed Plan must insofar as relevant be related to the whole year, and not just the irrigation season.

The methodology used to determine the Environmental Water Provision must be clearly described, scientifically justifiable and consistent with any State policies which provide a framework for the identification and provision of water for ecosystems in Tasmania and water quality guidelines.

Until 30 July 2007, the Environmental Water Provision which this Plan provides consists of the combination of the following –

- The Managed Minimum Flow of 30ML/day at which Surety 5 takes from watercourses in the catchment are banned; and
- the seasonal and daily limits on abstraction which are imposed by licence conditions; and
- the requirement that restriction management be undertaken by the Department.

The Plan will be amended prior to that date to contain a continuing Environmental Water Provision. Part 3 of the Plan will be amended at the same time to include revised assessments for the purposes of sections 14(3)(a) to (c) of the Act, taking account of the monitoring and other information which has been collected.

Until the amendment of the Plan as required above, no new Surety 5 allocations will be issued for the abstraction of water from a watercourse in the catchment area during all or part of the period from December to April inclusive. Nor will any Surety 6 allocation be granted, by variation to an existing licence or by the grant of a new licence, other than in accordance with the

document entitled “List for appendix 2: proposed Surety 6 summer allocations” tendered in evidence at the hearing of appeal 308/03 and held by the Tribunal. That list may be amended in accordance with section 34(5) of the Act in the event that this is necessary to address any administrative error which may have been made in connection with the compilation of the list. The purpose of this prohibition is to ensure as far as possible that abstraction for the purposes of irrigation during those months does not exceed the levels which applied prior to the adoption of this Plan.

## **PART 2 WATER MANAGEMENT PROVISIONS**

### **MANAGEMENT RESPONSIBILITIES**

The Department will be responsible for administration of the Plan.

The Consultative Group will:

- Advise the Department on implementation of the Plan and local water management issues;
- Seek advice from, and report to the organisations or constituencies represented by Group members on matters relating to implementation of the Plan;
- Participate in the annual interim assessment and the formal review of the Plan;
- Assist in the determination of the local impacts of the plan on the community, including economic, environmental and social impacts; and
- Advise and provide assistance on any other matters considered by the Consultative Group as relevant to the operation of the Plan.

The Department will call a meeting of the Consultative Group as and when required.

Administration by the Department applies unless there is an application by a water entity or group of landholders under Section 37 of the Act to administer all or part of the Plan and a water entity is declared by the Minister under Section 38. The water entity then replaces the Department as administrator of the Plan.

The water entity must provide the Minister with an annual written report on its administration of the Plan, in accordance with Section 45 of the Act.

### **WATER LICENSING**

The following licensing provisions are made in accordance with Section 14(3)(b) of the Act.

For the purposes of the Plan, water licensing provisions will be undertaken in accordance with Part 6 of the Act and will take into account the likely effects on water quality objectives as determined under the State Policy on Water Quality Management 1997.

Water licence holders in the catchment are responsible for complying with terms and conditions on water licence and dam permits.

Water licensees are also responsible for providing such information to the Department as may reasonably be required for implementation of the Plan's provisions. This information may relate to water use, water transfers, groundwater use and the effect of water management provisions on water users.

### **Groundwater**

All persons taking groundwater for uses other than stock and domestic use from a well or bore within the Plan area will require a licence in accordance with Part 6 of the Act.

The Department will implement a groundwater licensing system within the first 5 years of the Plan. Licence conditions will cover reporting of water usage and drilling records.

## **WATER ALLOCATIONS**

The following allocation and water usage provisions are made in accordance with the requirements of Section 14(3)(a) of the Act.

For the purposes of allocation, irrigation is assumed to start on 1 November and finish on 30 April.

### **Sureties**

The sureties of water allocations in descending order of priority are listed below, in accordance with the requirements of Section 94 of the Act. These sureties determine the order of priority of access to water resources during periods of restriction management. For example, stock and domestic and essential town water supplies (Surety 1) have the highest priority during any restrictions.

**Surety 1** – Stock and domestic and essential town water supplies

**Surety 2** – Water required to sustain the Managed Minimum Flow

**Surety 3** – Licences replacing rights registered under Section 100D or Section 100H of the Water Act 1957

**Surety 4** – Special Licences (Note: currently there are no special licences in the catchment)

**Surety 5** - Water licences issued under the Act, including those that permit the taking of water:

(a) into dams constructed either prior to, or following adoption of the Plan by the Minister; and

(b) for non-essential town water supplies

**Surety 6** – All new water allocations issued for the period December to April will be Surety 6. These will include usage that was in excess of water already allocated as Surety 5 on water licences, where such usage has been ratified by the Consultative Group and the Department following the 2003 water usage survey.

Temporary water allocations will only be issued for taking water in accordance with the requirements of Section 90 of the Act and when the flow in the river at the Forester Road gauging station is above the Environmental Water Requirements specified in the Plan.

Water allocations determined under the Plan will take into account the likely effects on water quality objectives as determined under the State Policy on Water Quality Management 1997.

### **Groundwater Allocations**

Groundwater allocations will be established for all users of groundwater except stock and domestic users. The quantity of the allocation will be based on an assessment of groundwater usage that will include consideration of current and future usage, the capacity of the relevant aquifer(s) to supply these needs, and the impact on Water Quality Objectives as determined under the State Policy on Water Quality Management 1997.

## **TRANSFERS OF WATER LICENCES AND ALLOCATIONS**

The following transfer provisions are made in accordance with Section 14(3)(c) of the Act.

- For the purposes of Sections 97(2)(b) and 98(1)(a) of the Act, transfers of water licences and allocations will be permitted within the Plan area, subject to meeting the requirements of Part 6 Division 4 of the Act.
- A transfer of a water allocation into the catchment will be permitted, subject to meeting the requirements of Part 6 Division 4 of the Act.

Water users can obtain transfer application forms and specific advice on any intended application from the Department's Regional Water Management Officer.

In summary, an application must:

- be in an approved form and accompanied by the prescribed fee;
- be consistent with the Objectives of the Act and with this Plan;
- demonstrate that the transfer could not reasonably be expected to lead to environmental harm;
- demonstrate that the transfer will not have a significant adverse impact on other persons taking water from the water resource;
- demonstrate that the total quantity of water available to the transferee after the transfer does not exceed the quantity that could be used sustainably on their land;
- demonstrate that the quantity of water available to the transferee after the transfer does not exceed the quantity that is required for the purpose for which it is intended;
- if necessary, include written evidence that any person who has a financial interest in a licence or a water allocation consents to the proposed transfer of that licence and/or allocation.

The Department will make the following summary information publicly available on an annual basis, subject to voluntary disclosure by applicants of financial details:

- the number and volume of water allocations transferred within the catchment
- the average price/ML of water allocations transferred

All personal details such as property and licensee names will remain confidential.

## **METERING**

Licensees who take water directly from any watercourse in the catchment, including dams on any watercourse, for irrigation, industrial, town water supply or other commercial purposes will be required to install a suitable meter, in accordance with Part 11 of the Act. Installation of water meters must be completed by 31 October 2003. In exceptional circumstances approval to vary this requirement may be granted at the discretion of the Department, following written representation from the water user providing reasons for the request.

Water users may purchase meters from DPIWE, or from their own supplier provided the meter meets the minimum specifications required by DPIWE. Purchase costs incurred by the

Department will be recovered from water users over a three-year period. Costs will be invoiced at the same time as the annual allocation licence fees. In exceptional circumstances approval to vary this requirement may be granted at the discretion of the Department, following written representation from the water user providing reasons for the request.

Metering will start on 1 November.

Meters will not be required for extraction from dams where there is no natural throughflow during the period November to April inclusive.

Spot audits of metering activities, and metering of stock and domestic takes will be undertaken at the discretion of the Department.

Water users will be required to record their metered water usage every 7 days, and daily during restriction periods.

Records of metered water use will be provided by water users to the Department at its discretion.

### **MEASUREMENT OF WATER FLOW THROUGH DAMS**

For all dams on a watercourse a suitable flow measuring device such as a V-notch weir is to be installed within 2 years of the commencement of the Plan, or at the discretion of the Department, to measure inflows and outflows from the dam or series of dams.

## **RESTRICTION MANAGEMENT**

### **Upper Catchment**

The objective of restriction management is to seek to prevent the river flow from falling below the Managed Minimum Flow of 30ML/day.

When the flow at the Forester Road gauging station drops to the Managed Minimum Flow there will be a total ban on Surety 5 and Surety 6 direct takes.

Restriction management will be undertaken by the Department. In exercising its judgement on restriction management, the Department will make reference to the Trial Restriction Management Protocol outlined in Appendix 1. This protocol does not form part of the Plan's provisions, but has been included for the information of water users, the general community and the Department.

Restrictions will be lifted in reverse order to the stages described in the Trial Restriction Management Protocol agreed to by the Consultative Group.

The Managed Minimum Flow will not be increased unless agreed with stakeholders.

### **Lower Catchment**

When the flow at the Forester Road gauging station falls to 35ML/day, any restrictions or lifting of restrictions in the lower catchment will be determined on the judgement of an expert panel consisting of the Regional Water Management Officer, a lower catchment irrigator, an aquatic ecologist, and a hydrologist.

## **MONITORING**

The Plan's monitoring program is designed to collect and record information relating to the following areas of interest:

- The state of the aquatic environment in catchment watercourses;
- Water management activities and compliance; and
- Changes in areas of land used for plantation forestry and other major land use activities.

The overall objective of the program is to gather sufficient information on these areas to enable an assessment of the environmental and economic effects of the Plan provisions, and of land use changes in the catchment over a three-year period.

## **Environmental Monitoring**

The environmental monitoring program will collect and record information relating to:

- The biological health, water quality and in-stream habitat condition of selected sites in the Great Forester catchment; and
- The status of fish populations at selected sites in the Great Forester mainstream.

This information will allow an assessment of the response of environmental variables (water quality, in-stream habitat, macroinvertebrates and fish) to the implementation of the provisions outlined in the Plan.

The Environmental Water Requirements as defined in the first assessment in Part 3 of this Plan will be reviewed within 3 years following adoption of the Plan by the Minister.

### *River Health Monitoring (macroinvertebrates)*

- River health sampling will be carried out once per year at 10 – 15 sites across the catchment. In riffle habitats, the sampling will be carried out twice per year (Spring and Autumn). River health will be assessed using the Department's river health models.

(see explanatory notes below)

### *Fish Monitoring*

- Surveys will be undertaken to assess the status of fish populations in the Great Forester River mainstream at both environmental flows study sites (Great Forester at Waterhouse Road and Great Forester at Prosperity Road) and one site in the lower catchment.
- Each of the three sites will be surveyed once per year in summer to determine relative abundance (using standardised electrofishing), fish community composition and recruitment. Each individual fish will be identified and measured to determine species community composition and structure. Additional work may be required if appropriate.

### *Water Quality Monitoring*

- Snapshot samples of basic water quality parameters (turbidity, dissolved oxygen, conductivity, pH and temperature) will be collected in three seasons as part of fish (Summer) and macroinvertebrate (Spring and Autumn) surveys around the catchment. In undertaking water quality monitoring, reference will be made to any Protected Environmental Values and Water Quality Objectives as determined in accordance with the State Policy on Water Quality Management 1997.

**Table 1 – Summary of environmental monitoring**

<b>Monitoring Activity</b>	<b>Monitoring method / location</b>	<b>Monitoring frequency</b>	<b>Reporting</b>	<b>Recording and Reporting Responsibility</b>
River health monitoring	Sampling at 10 – 15 sites	annual	annual	DPIWE
	Riffle habitats	twice yearly (spring & autumn)	annual	DPIWE
Fish surveys	Sampling at 3 sites (environmental flows study sites and lower catchment)	annual (summer)	annual	DPIWE
Water quality	Snapshot samples at fish survey and macroinvertebrate sampling sites (turbidity, dissolved oxygen, conductivity, pH and temperature)	3 times per year (summer, spring and autumn)	annual	DPIWE

*Additional studies prior to review of the Water Management Plan*

The Department will work with the Consultative Group to improve understanding of the following areas of mutual interest:

- Environmental Water Requirements for periods outside of the irrigation season.
- The wetland environment at the bottom of the Great Forester River catchment.
- The relationships between flow and water quality in the lower catchment, particularly related to delivery of the quality of water to wetlands and coastal environments.
- The Environmental Water Requirements of Hurst Creek.
- The habitat requirements of *Astacopsis gouldi* (Giant Freshwater Lobster).
- Gather information to progress understanding of the habitat requirements of *Engaeus orramakuna* (Mt Arthur Burrowing Crayfish), *Engaeus spinicaudatus* (Scottsdale Burrowing Crayfish), *Limnodynastes peroni* (Striped Marsh Frog) and *Litoria raniformis* (Green and Gold Frog).
- Continuous monitoring of basic water quality parameters to determine relationships with flow.
- Monitoring and training partnerships with the local community in the Great Forester catchment. This will include monthly monitoring undertaken by Waterwatch.

*Explanatory notes on river health sampling*

The river health of selected sites in the Great Forester and associated tributaries will be assessed using the Department’s river health models (AusRivAS). Both ‘presence/absence’ and ‘rank abundance’ models will be used to assess the biological health of the catchment in terms of water quality, in-stream habitat and flow related impacts. Presence / absence models are based on the presence or absence of macroinvertebrate taxa at sites sampled. Rank abundance models are based on the relative numbers of macroinvertebrates in a sample.

Presence/absence models are sensitive to gross changes in water quality (eg point source pollution) and habitat related impacts while rank abundance models are more sensitive to the detection of flow related impacts. The use of both of these models with one another will provide greater interpretation of the various impacts operating at sites assessed.

## **Water Management and Land Use Monitoring**

### *Background*

The water management and land use monitoring program will collect and record information relating to:

- Streamflow monitoring at the Forester Road gauging station and the installation of any additional flow monitoring sites
- Water usage recorded by meters installed under the Plan, and progress on meter installation
- Any changes to water allocations; in particular, those which arise from the catchment water usage survey
- Information on dam applications and water transfers
- Water restrictions, compliance and cost recovery
- Changes to land use area; in particular, plantation forestry
- Economic effects on licensed water users

This information will be used to assess and report on the effectiveness of the Plan's water management provisions and on their economic, social and environmental impact.

**Table 2 – Summary of water management and land use monitoring**

<b>Management Activity</b>	<b>Recording method or indicator</b>	<b>Recording frequency</b>	<b>Reporting</b>	<b>Recording and Reporting Responsibility</b>
Streamflow monitoring	Forester Rd Gauging Station Prosperity Road Gauging Station	ongoing	DPIWE website from Nov – May inclusive. Also available by contacting water ranger or RWMO.	DPIWE
Installation of additional monitoring & flow information points	not applicable	to be decided	annual	to be decided
Installation of water meters	no. of meters installed	ongoing	annual	DPIWE and water users
Water usage	metering	ongoing + weekly diary during irrigation season	3 – monthly (1 Sep, 1 Dec, 1 Mar, and 1 June) to DPIWE. Weekly to DPIWE during restrictions.	DPIWE and water users
Dam applications	no. of applications no. of approvals / refusals	ongoing	annual	DPIWE
Allocations	Progress with allocation review	monthly	annual	DPIWE
Water transfers	no. of applications no. of approvals volumes of transferred water allocations average price/ML of transferred water allocations (subject to voluntary disclosure by parties involved)	ongoing	annual	DPIWE
Restriction management	Restriction periods – duration and intensity Record of public notification Nos. of any official warnings, fines and prosecutions	as required	annual	DPIWE
Fees and Cost Recovery	Time and costs associated with water management	annual	annual	DPIWE
Reporting on plantation forestry and other land uses	Changes to plantation area (Forestry Tasmania & private) as a proportion of total catchment, and catchment above Forester Rd gauging station, incl. 3-year projections.  Any relevant technical reports on changes to catchment yield  Changes in area of other types of land use	ongoing	annual	Forestry Tasmania and DPIWE
Reporting on economic effects of the plan	Economic survey of licensed water users; survey format to be designed by the Consultative Group and DPIWE  Analysis of general monitoring activities, including the effects of any restrictions	annual	annual	DPIWE

## **ANNUAL INTERIM ASSESSMENT OF THE PLAN**

The Department will prepare and make publicly available an annual monitoring and assessment report. The report is to include the following monitoring information collected under the program defined in this Plan, including:

- river health monitoring
- fish surveys
- water quality monitoring
- stream flow records, including any equipment installation
- licence and allocation transfers
- installation of flow meters
- licensed water usage
- number of dam storage applications and approvals
- progress with the review of allocations
- water transfers
- restriction management
- fees and cost recovery
- changes in land use area, including plantation forestry
- an annual survey of water users to obtain data on the local economic effects of the Plan
- any other activities relevant to administration of the Plan

The annual report will contain an analysis of the economic, social and environmental effects of the Plan.

The Department will hold an annual public meeting with water users to discuss the annual report. The meeting will be held before 30 June each year.

## **REVIEW OF THE PLAN**

In accordance with Section 34(1) of the Act, a formal review of the Plan is to be undertaken three years after its adoption by the Minister.

### **PART 3 ASSESSMENTS REQUIRED UNDER SECTIONS 14 and 15 OF THE ACT**

#### **ASSESSMENT OF THE QUANTITY OF WATER NEEDED BY THE ECOSYSTEMS THAT DEPEND ON A WATER RESOURCE AND THE TIMES AT WHICH, OR THE PERIODS DURING WHICH, THOSE ECOSYSTEMS WILL NEED THAT WATER - Section 14(2)(a)**

The following assessment is made in accordance with the requirements of Section 14(2)(a) of the Act.

The vast majority of the Great Forester catchment is almost entirely riverine. The river was diverted in the 1920's directly to the coast by excavating what is known as "Adams Cut" which essentially is a large canal with levee banks. The natural river channel is now separate, and enters into Bridport estuary at Bridport. It is uncertain whether this estuary receives any flow from the Great Forester mainstream with the exception of flows from Hurst Creek and Cox's Rivulet as the confluences of these are located downstream of the diversion.

The Great Forester River enters the McKerrows Marsh wetland at the bottom of the catchment. The wetland forest comprises approximately 400 hectares of unallocated Crown Land and river reserve. The area supports a complex range of communities, most of which are dependent on recurrent flooding from the unregulated river. The dominant community is blackwood swamp forest. The area has been recommended as a high priority for reservation in recognition of its regional conservation significance. A significant amount of work would be required to determine the specific environmental water requirements for the wetland, which would also include the need to determine its geomorphological history. Similarly, little is known about the ecosystem requirements of the aquifer system within the underlying Scottsdale sedimentary basin.

In view of the above factors it is considered that no true "estuary" exists, and therefore it is considered that there are essentially only two types of significant surface water dependent ecosystems existing in the catchment – riverine and wetland. In relation to other water dependent ecosystems identified under the National Principles for the Provision of Water for Ecosystems (ARMCANZ & ANZECC, 1996) in the Great Forester catchment, there is no information available on the specific environmental water requirements of the floodplain and riparian vegetation. However, flood flows can still occur in the catchment because there are no dams on the Great Forester River, nor are there any major dams on tributary watercourses.

The majority of historical flood plain habitat in the catchment has been converted to pasture or for intensive agriculture. The State of Rivers report indicates that many areas of riparian vegetation throughout the catchment have been cleared or are degraded by the dominance of exotic species, although much work has been undertaken by the local community to rehabilitate these areas. For example, the Dorset Streamcare Project has been initiated as a joint Dorset Council / Natural Heritage Trust project to provide funds to Dorset municipality landholders to fence and revegetate riparian areas. To date the project has funded over 200 kilometres of fencing in order to improve water quality, stabilise stream channels and enhance biodiversity. Local Landcare Groups have also undertaken numerous projects to rehabilitate stream ecosystems.

This assessment focuses on the water requirements of the Great Forester River as it supplies a large proportion of the water needed by the catchment community, and is subject to high ecological risk during periods of low flow. However, it is recognised that future water management must include further study of other water dependent ecosystems in the catchment.

### **Environmental Water Requirements – Great Forester River**

Environmental Water Requirements (EWRs) for the Great Forester River during the period December to April have been determined from a study undertaken by the Department of Primary Industries, Water and Environment (McKenny and Read, 1999). The investigation looked at how aquatic species and their habitats respond to variations in river flow from December to April inclusive, when the river is subjected to the most stress. It was guided by ecological and community values collated in January 1998 during the first stage of the water management planning consultation process.

Ecological study sites were established near the Prosperity Road and Waterhouse Road river crossings (Figure 1). The Prosperity Road site is broadly representative of the upper reaches of the river, and is dominated by sequences of short cobble riffles interspersed with cobble/sand runs and some deep pools. The Waterhouse Road site has long sandy runs with some deep pools, and is representative of the middle to lower reaches of the river from the Tasman Highway to McKerrow’s Marsh. River flow information was derived from gaugings taken at each site.

Flow requirements of key species found at each of the study sites were estimated using the Instream Flow Incremental Methodology, or IFIM. This is a widely accepted method suitable for both regulated and unregulated watercourses. Using this method, it was determined that the EWRs, or flows required at each site to maintain the aquatic environment at a low level of risk, are as follows:

**Table 3 - Environmental Water Requirements\* (December to April)**

<b>Prosperity Road Site (ML/day)</b>				
December	January	February	March	April
>45	>25	>25	>20	>35

<b>Waterhouse Road Site (ML/day)</b>				
December	January	February	March	April
>130	>95	>80	>70	>105

\*Average monthly flows

Scaled to the gauging station downstream of Forester Rd, the EWRs are as follows:

**Table 4 - Monthly Environmental Water Requirements at the Forester Rd Gauging Station**

December	January	February	March	April
>105	>75	>65	>50	>85

The EWRs would also protect brown trout, an introduced aquatic species that was nevertheless identified by the community as a recreational water value. Although the flow requirements for

brown trout are somewhat higher than for other aquatic species, they would also be required to maintain a low-risk habitat for the giant freshwater crayfish, *Astacopsis gouldii*.

The likelihood that EWRs would not be maintained under ‘natural flow’ conditions for at least half of any given month in the irrigation season is given in the table below. The figures have been obtained by examining the adjusted\* flow records at the Forester Road gauging station (1970 to 2001) to see how many times the EWRs were not maintained for each month.

**Table 5 - Likelihood that Environmental Water Requirements would not be maintained for at least half the days in any given month**

	<b>Dec</b>	<b>Jan</b>	<b>Feb</b>	<b>Mar</b>	<b>Apr</b>
<i>Environmental Water Requirements (ML/day)*</i>	105	75	65	50	85
Likelihood under ‘natural flow’ conditions (no water usage)	4 years in 10	5 years in 10	4 years in 10	1 year in 10	5 years in 10

*\* For the purposes of this analysis, the flow records were adjusted to remove the estimated water usage in each year.*

## **ASSESSMENT OF LIKELY DETRIMENTAL EFFECTS, ARISING FROM THE TAKING OR USE OF WATER FROM THE RESOURCE, ON THE QUANTITY OF WATER THAT IS AVAILABLE TO MEET THE NEEDS OF ECOSYSTEMS THAT DEPEND ON THE RESOURCE – Section 14(2)(b)**

The following assessment is made in accordance with the requirements of Section 14(2)(b) of the Act.

### **Water Allocations and Usage**

Water licences and allocations have been issued in the catchment to support major water uses such as irrigation, industry, mining and recreation. Under this system, approximately 26ML/day have been ‘permanently’ allocated for direct takes from the Great Forester River and its tributaries during the period December to April. For each licence, the amount of water that can be extracted has both a seasonal and daily limit. The seasonal limit is typically based on a period of 100 days’ irrigation.

Depending on river flow conditions, temporary licences and allocations have also been issued for periods of up to 3 months.

It is estimated that, on average, 54 ML/day is taken directly from the Great Forester River and its tributaries during the period December to April. Approximately 20ML/day of this total amount are taken upstream of the Forester Road gauging station. The 28ML/day difference between the estimated daily usage and the total amount allocated is mainly accounted for by temporary allocations, but may also include some unlicensed usage.

### **Likely Detrimental Effects of Water Usage**

The restriction management provisions in the plan establish a ‘Managed Minimum Flow’ of 30ML/day to replace the previous level of 25ML/day. Both flows represent the point at which direct takes for irrigation are banned.

In addition, the trial restriction management provisions gradually increase the severity of restrictions from the new trigger flow warning point of 45ML/day, down to the total ban at 30ML/day.

The general effect of the provisions will be to decrease the frequency, duration and intensity of low flow, since more water will be kept in the river system for environmental purposes.

At this stage it is not possible to accurately determine the specific effect due to uncertainties in water use and in the response of the river system to progressive restrictions.

Further data on water usage, restriction management effects and environmental health indicators will be gathered under the monitoring program outlined in Part 2 of this Plan. The monitoring program will eventually produce data of sufficient quantity and quality to allow for a quantitative assessment of the effects of water use.

## **ASSESSMENT OF LIKELY DETRIMENTAL EFFECTS OF THE PLAN ON THE QUALITY OF WATER – Section 14(2)(c)**

The following assessment is made in accordance with the requirements of Section 14(2)(c) of the Act.

The 1999 State of Rivers Report for the Great Forester catchment showed that nitrogen and phosphorous concentrations were highest in the Great Forester River near Tonganah. This indicates that most of the river's nutrient load comes from the upper catchment, where greatest agricultural activity occurs. Faecal contamination was generally greater during summer, when higher water temperatures enhance the survival of bacteria. Turbidity levels were low during stable baseflow periods, but increased by as much as 300% during flood events.

The main environmental effect of implementing the Plan will be to decrease the frequency and duration of low flows during the summer irrigation period. This will tend to lower water temperatures and thus have a beneficial effect in terms of raising oxygen levels and reducing faecal and nutrient contamination. It will also reduce the potential for algal blooms to occur in the river system.

High flow conditions, and hence turbidity levels, will not be affected by the provisions of the Plan.

It is therefore concluded that the Plan will not have any detrimental effects on water quality.

**ASSESSMENT OF THE CAPACITY OF THE RELEVANT RESOURCE TO MEET THE LIKELY DEMANDS FOR WATER BY EXISTING AND FUTURE USERS – Section 15(a)**

The following assessment is made in accordance with the requirements of Section 15(a) of the Act.

The capacity of the water resource to meet the demands of existing and future users is governed by catchment yield, current water allocations and usage (including water harvested into dams), and the level of Environmental Water Provisions.

The Plan recognises existing use in excess of pre-Plan licensed allocations, subject to a survey of water usage for the 1999/2000, 2000/2001 and 2001/2002 irrigation seasons, and to ratification by the Department and the Consultative Group. This usage component, if approved, will be classified as Surety 6 (see Part 2 of the Plan), whereas pre-Plan licensed allocations are Surety 5.

As there have been prolonged periods of very low flow (< 30ML/day) in 3 of the last 10 irrigation seasons, the Department considers that there is no capacity for issuing additional Surety 5 direct take allocations for this period without seriously compromising water security for both commercial users and the environment.

Major expansion of water demand, particularly in the upper catchment, can be catered for by building additional storage to harvest ‘winter’ flows and occasional ‘summer’ high flows. It is likely that some gains could also be achieved through improved water usage efficiency.

Applications for further dams would be subject to the dam approval process specified under Part 8 of the Act.

The Great Forester catchment also contains extensive groundwater resources which in some areas, particularly the lower to middle catchment, may be suitable for supplementing irrigation supplies. Drilling records indicate that bore yields and groundwater quality are variable, and site-specific investigations would be required to determine whether groundwater of a suitable quality and quantity is available on any particular property.

## **LIKELY EFFECTS OF THE PLAN ON EXISTING AND FUTURE USERS, INCLUDING ANY EFFECT ON BUSINESSES CARRIED ON BY THOSE USERS – Section 15(b)**

The following assessment is made in accordance with the requirements of Section 15(b) of the Act.

### **Needs of Existing and Future Water Users**

The Plan takes into account the needs of existing and future users by introducing a number of positive, forward – looking provisions. These will lead towards a sustainable water management system, improve knowledge of environmental water requirements and commercial water usage, and enhance local community involvement in water management activities. The following sections describe the likely effects of each provision on water users and their businesses.

### **Management Responsibilities**

The Department will be responsible for administration of the Plan and will call a meeting of the Consultative Group as and when required.

The Consultative Group will:

- Advise the Department on implementation of the Plan and local water management issues;
- Seek advice from, and report to the organisations or constituencies represented by Group members on matters relating to implementation of the Plan;
- Participate in the annual interim assessment and the formal review of the Plan;
- Assist in the determination of the local impacts of the plan on the community, including economic, environmental and social impacts; and
- Advise and provide assistance on any other matters considered by the Consultative Group as relevant to the operation of the Plan.

Administration by the Department applies unless there is an application by a water entity or group of landholders under Section 37 of the Act to administer all or part of the Plan and a water entity is declared by the Minister under Section 38. The water entity then replaces the Department as administrator of the Plan.

The water entity must provide the Minister with an annual written report on its administration of the Plan, in accordance with Section 45 of the Act.

The major change for water users resulting from this arrangement is the opportunity for direct input to water management through the Consultative Group. For example, water users can report on how water usage constraints or opportunities have effected them throughout the irrigation season by participating in the annual economic survey. This information will be included in the annual interim assessment and used to refine restriction management and other relevant planning provisions.

## **Groundwater Licensing**

Groundwater licensing will be introduced within 5 years of the Plan's commencement. The licensing system will benefit groundwater users by establishing their legal right to take water, subject to sustainability constraints. It will also provide a formal and effective means for the Department to manage the groundwater resource.

## **Water Allocations**

The Plan recognises the priority of rights to water during restriction periods as given in section 94 of the Act.

'Existing usage' in excess of licensed allocations has been determined through a water usage survey and reviewed by the Consultative Group and the Department before ratification. The agreed amount of 'existing use' as described above has been recognised as a Surety 6 allocation on water users' licences.

This will have a major beneficial effect on water users' businesses, since it provides legal recognition of water use that was previously only authorised on a temporary basis, or was not approved by the Department.

Temporary water allocations will only be issued for taking water in accordance with the requirements of Section 90 of the Act and when the flow in the river at the Forester Road gauging station is above the Environmental Water Requirements specified in the Plan. The major effect on water users will be to eliminate the risk of property or business development based on low surety water.

The economic value of Surety 5 and Surety 6 allocations will be enhanced because this will put an effective cap on the issue of further allocations during the standard irrigation season. However, the cap on further direct take allocations will mean that future expansion of irrigation activities will require the development of additional infrastructure such as dams to store winter flows.

Groundwater allocations will be issued as part of the licensing process discussed previously.

## **Transfers of Water Licences and Allocations**

The Plan facilitates water transfers from low value to higher value uses. This is achieved by the creation of a public database of information on water transfers that will assist water users in establishing water sale or purchase costs in their area. The Plan also permits transfer of water allocations into the catchment, subject to the requirements of the Act.

## **Metering**

The implementation of a metering system for commercial water users will encourage efficient use, improve on-farm water management, reduce Departmental management costs and improve overall knowledge of the river system and its response to water takes.

Purchase and installation costs will be approximately \$1,000 for each 150mm offtake point. Meters will need to be installed by 31 October 2003. Water users may purchase meters from

DPIWE, or from their own supplier. Purchase costs incurred by the Department will be recovered from water users over a three year period. Costs will be invoiced at the same time as the annual allocation fees. In exceptional circumstances approval to vary this requirement may be granted at the discretion of the Department, following written representation from the water user concerned providing reasons for the request.

## Restriction Management Provisions

The most significant provision of the plan in terms of the effect on water users is the introduction of restriction management provisions that include a Managed Minimum Flow of 30ML/day. This will replace the ban level of 25ML/day.

At the Managed Minimum Flow, as with the former level of 25ML/day, direct takes from upper catchment watercourses will be banned. In addition, the trial restriction management provisions gradually increase the severity of restrictions from the new starting point for restrictions of 45ML/day, down to the total ban at 30ML/day.

The general effect of the provisions will be to increase the frequency, duration and intensity of restriction periods since more water will be kept in the river system for environmental purposes.

The likely change in water availability for irrigators can be estimated by calculating the seasonal water shortfalls<sub>(1)</sub> for the 25ML/day (pre-Plan) and 30ML/day (post-Plan) restriction scenarios.

The figures in the table below have been obtained by examining hydrographs<sub>(2)</sub> for the last 10 irrigation seasons<sub>(3)</sub> and estimating the area of the graph that falls below each of the 25ML/day and 30ML/day restriction lines. The areas represent volumes of water that would have been potentially ‘lost’ to water users as a result of implementing the restriction triggers.

Notes (1), (2) and (3) – see ‘Notes and definitions’ section on next page

**Table 6 – Seasonal water shortfalls for two restriction scenarios (1992/93 – 2001/02)**

Season:	92/93	93/94	94/95	95/96	96/97	97/98	98/99	99/00	00/01	01/02
<b>30ML Shortfall (ML):</b>	0	0	330	10	0	170	15	30	255	5
<b>25ML Shortfall (ML):</b>	0	0	165	0	0	35	0	5	100	0
<i>Difference (ML):</i>	<i>0</i>	<i>0</i>	<i>165</i>	<i>10</i>	<i>0</i>	<i>135</i>	<i>15</i>	<i>25</i>	<i>155</i>	<i>5</i>

For example, the 1994/95 season was the worst season in the last 10 years in terms of the intensity and duration of low flows. In this season, the total shortfall would have been 165ML if the 25ML/day trigger had been enforced. That is, seasonal water use above the gauging station would have had to be reduced by 165ML to maintain a minimum flow of 25ML/day.

Similarly, the total shortfall would have been 330ML if the 30ML/day trigger had been enforced. Therefore, the inferred effect of the Plan in such a year would be to further reduce the water available to irrigators above the gauging station by  $330 - 165 = 165$ ML. Note that water users below the gauging station would have to contribute a similar amount if water restrictions were applied equally across the catchment.

It must be strongly emphasised that these figures are only estimates. They cannot be accurately converted to an economic loss in dollar terms due to uncertainties in how the river flow would respond to progressive restrictions.

Nevertheless, the Department recognises that gathering economic information during implementation of the Plan will be critical to assessing the effect on water users and their businesses. An annual survey of water users will therefore be conducted to gather the data necessary for such an assessment.

*Notes and definitions:*

(1) Seasonal water shortfall = the volume of water that would have been required to prevent the river flow from dropping below the specified restriction trigger in each year. Since there are no major dams in the upper catchment from which water could be released, the only way of making up this type of shortfall at present is to restrict takes from catchment watercourses.

(2) A hydrograph is a plot of stream flow against time. For this analysis, average daily flow data (ML/day) from the Forester Road gauging station was used.

(3) Irrigation season – the figures are based on the standard season of December to April inclusive.

Further data on water usage and restriction management effects will be gathered under the monitoring program outlined in Part 2 of this Plan. It is expected that the monitoring program will eventually produce data of sufficient quantity and quality to allow for a quantitative assessment of the effects of planning provisions on water users.

### **Monitoring and Reporting**

A monitoring and reporting system will benefit water users by providing quality information they can use to refine their business decisions.

### **Review of the Plan**

The Plan will be formally reviewed 3 years after its adoption by the Minister. This will provide medium – term security for water users.

There will also be an annual interim assessment of the Plan, including reporting by the Department on administration activities and monitoring.

## REFERENCES

**Agriculture and Resource Management Council of Australia and New Zealand and Australian and New Zealand Environment and Conservation Council (1996).** National Principles For The Provision Of Water For Ecosystems. Occasional Paper SWR No 3.

**Bobbi, C., Nelson, M., Krasnicki, T. and Graham, B. (1999).** State of Rivers Report for Rivers in the Great Forester Catchment. Department of Primary Industries, Water and Environment, Report Series WRA 99/05 – 08.

**Department of Primary Industries, Water and Environment (2000).** Proposed Environmental Management Goals for Tasmanian Waters, Dorset and Break O’Day Municipal Areas. Public Discussion Paper.

**Department of Primary Industries, Water and Environment (2002).** Great Forester Catchment Draft Water Management Plan 2002.

**McKenny, C. and Read, M. (1999).** Ecological flow requirements for the Great Forester River. Department of Primary Industries, Water and Environment, Report Series WRA 99/15.

**Tasmania (1999).** Water Management Act.

## APPENDIX 1 – TRIAL RESTRICTION MANAGEMENT PROTOCOL

The following protocol does not form part of the Plan provisions, and has been included for reference purposes only.

During periods of low flow, direct takes from upper catchment streams and notification of restrictions will be managed with reference to the following trial protocol.

Restrictions will be lifted in reverse order to the stages described in the Trial Restriction Management Protocol agreed to by the Consultative Group.

**Table 7 – Trial restriction management protocol**

<b>River Flow (ML/day)*</b>	<b>Restrictions</b>	<b>Application</b>	<b>Notification</b>
<b>45</b> (Trigger Flow)	<ul style="list-style-type: none"> <li>General warning to be issued by DPIWE</li> </ul>	upper catchment <sub>1</sub> streams	DPIWE to notify all licensed water users and Consultative Group members of impending water restrictions via direct contact, radio and newspaper
<b>40</b>	<ul style="list-style-type: none"> <li>Surety 6 direct takes restricted by 20%</li> </ul>	upper catchment streams	as above
<b>35</b>	<ul style="list-style-type: none"> <li>Ban on Surety 6 direct takes; and</li> <li>Surety 5 direct takes restricted by 20%</li> </ul>	upper catchment streams	as above

\*measured at the Forester Road gauging station.

**Note:**

1. Upper catchment = the Great Forester River and all tributaries above the junction with Oxberry Creek, including Hurst Creek, Coxs Rivulet and Tuckers Creek.