

# LITTLE SWANPORT CATCHMENT WATER MANAGEMENT PLAN



Eastern Marshes Big Pond



Lower Green Tier Creek



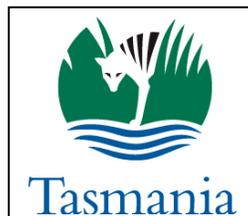
Little Swanport River at Swanston Rd Bridge



Little Swanport River at the Old Weir

Department of Primary Industries and Water  
Water Policy and Planning Branch  
June 2006

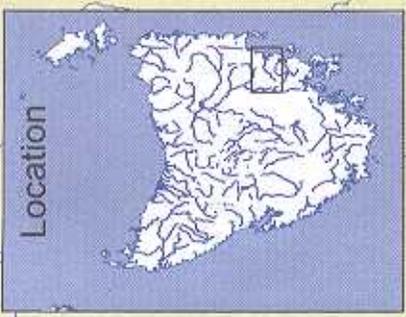
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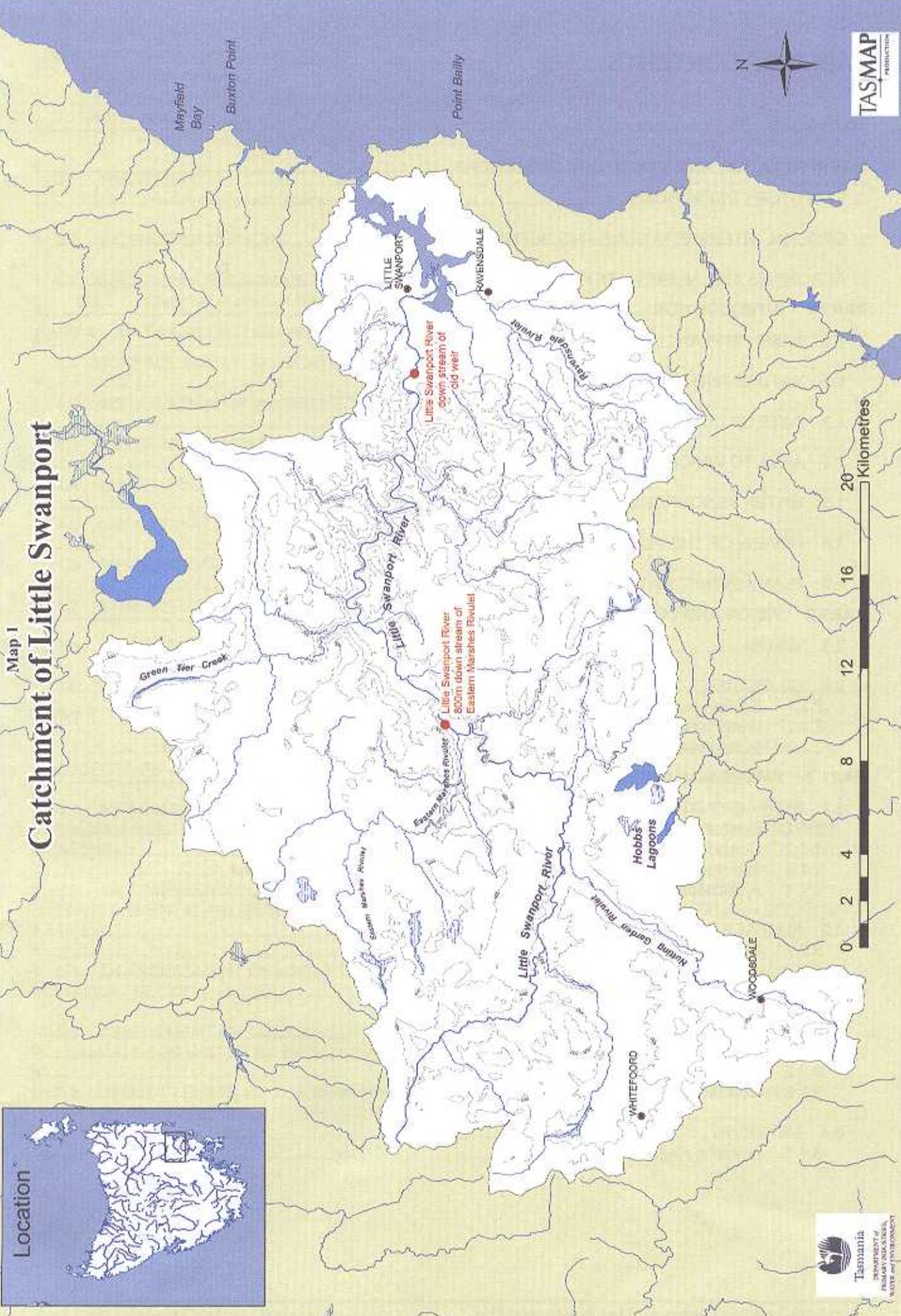
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# Catchment of Little Swanport

Map 1



## FOREWORD

The Department of Primary Industries and Water has prepared this Water Management Plan in consultation with the Little Swanport Catchment Water Management Planning Consultative Group. The Consultative Group has assisted the Department in the development of this Plan by providing advice on local water and management issues.

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*, and the *State Policy on Water Quality Management 1997*. The Plan is a statutory Plan that affects everyone who uses water in, or from the catchment.

The Plan includes environmental and other objectives and supporting provisions for licensing, allocations, transfers, restriction management and review of the Plan. The Plan also contains statutory requirements and assessments relating to the water needs of the catchment ecosystem, the effects of the Plan on water quantity and quality, the capacity of the water resource to meet demand, and the likely effect of the Plan on water users and their businesses.

The Plan recognises that community access to water information and involvement in management decisions are important to the long-term success of the planning process.

## INTERPRETATION AND STATUTORY 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.

### STATUTORY DEFINITIONS

**Environment** means components of the earth, including –

- (a) land, air and water; and
- (b) any organic matter and inorganic matter and any living organism; and
- (c) human-made or modified structures and areas –
- (d) and includes interacting natural ecosystems that include components referred to in (a) and (b)

**Groundwater** means water occurring naturally below ground level or water pumped, diverted, or released into a well for storage underground.

**Pollutant** includes –

- (a) a gas, liquid or solid; or
- (b) an odour; or
- (c) an organism (whether alive or dead), including a virus; or
- (d) energy, including noise, radioactivity and electromagnetic radiation; or
- (e) a combination of pollutants –  
that may cause environmental harm.

**Pollute** means –

- (a) discharge, emit, deposit or disturb pollutants; or
- (b) cause or fail to prevent the discharge, emission, depositing, disturbance or escape of pollutants.

**Responsible Water Entity** means a water entity responsible for the administration of a water management plan under section 38(1) or the administration of a water district under Part 9.

**Taking** means in the case of water from a water resource, includes-

- a) taking water by pumping or syphoning the water; and
- b) stopping, impeding or diverting the flow of water over land (whether in a watercourse or not) for the purpose of collecting or storing the water; and
- c) diverting the flow of water in a watercourse from the watercourse; and
- d) releasing water from a lake; and
- e) permitting water to flow under natural pressure from a well, unless the water is flowing from a natural opening in the ground that gives access to groundwater; and
- f) permitting stock to drink from a watercourse, a natural or artificial lake, a dam or reservoir.

**Watercourse** means a river, creek or other natural stream of water (whether modified or not) flowing in a defined channel, or between banks notwithstanding that the flow may be intermittent or seasonal or the banks not clearly or sharply defined, and includes –

- a) A dam that collects water flowing in any such stream; and
- b) A lake through which water flows; and
- c) A channel into which the water of any such stream has been diverted; and
- d) Part of any such stream; and
- da) The floodplain of any such stream –

But does not include –

- e) A channel declared by the regulations to be excluded from this definition; or
- f) A drain or drainage depression in the contours on the land which only serves to relieve upper land of excess water in times of major precipitation.

**Water regime** means –

- a) In respect of a watercourse, the pattern of flow in the watercourse, which is to be described in terms of the major features of its volumetric and temporal variation and which, in the case of a lake, is to include the fluctuation in the water level of the lake; or
- b) In respect of groundwater, the pattern of flow or fluctuation in the level of groundwater pressure which is to be described in terms of the major features of its temporal variation.

**Water resource** means a watercourse, lake or any dispersed surface water or groundwater.

## GENERAL INTERPRETATIONS AND DEFINITIONS

**Abstraction** means the taking of water from a water resource.

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

**Aquifer** means porous and fractured sediments and rocks that can store and yield groundwater.

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

**Consultative Group** means the Little Swanport Catchment Water Management Planning Consultative Group.

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

**Department's Gauging Sites** means the two streamflow and water quality gauging sites: Little Swanport River 800 metres down stream of Eastern Marshes Rivulet (site: 2212.1) and Little Swanport River d/s old weir (site: 2207.2).

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

**Environmental Water Requirements** are descriptions of the water regimes 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.

**Hydrograph** means a plot of discharge or water level against time. Depending on the time scale, this shows the shape of the flood pulse in response to a heavy rainfall event (days) or shows the flow regime of a river (months to years).

**Protected Environmental Values** means the value or use for which it has been determined that a given area of the environment should be protected. There can, and often will be, more than one protected environmental value for a given area. A list of potential protected environmental values is given in clause 7.1 of the *State Policy on Water Quality Management 1997*.

**Restriction management** is the process of restriction of direct takes.

**Surface Water** means the water from all sources within the catchment, either as diffused, water in natural channels, artificial channels, or other surface water resources.

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

**Water user** includes;

- a) any person who has a right or authorisation to take water under the Act; or
- b) any other person who uses the water resource for recreation or any other purpose; and

c) the environment.

**Water Quality Objectives** for a specific body of water are the most stringent set of water quality guidelines that should be met to achieve all of the Protected Environmental Values nominated for that body of water.

## **ACRONYMS AND ABBREVIATIONS**

**ANZECC** means Australian and New Zealand Environment and Conservation Council.

**AusRivAS** means the Australian River Assessment System.

**EWR** means Environmental Water Requirement.

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

**PEVs** means Protected Environmental Values.

**RMPS** means the Resource Management and Planning System of Tasmania.

**SKM** means Sinclair Knight Merz Pty. Ltd.

**WQO** means Water Quality Objective.

## **PART 1 INTRODUCTION**

### **1.1 NAME OF PLAN**

This Water Management Plan is titled The Little Swanport Catchment Water Management Plan hereafter referred to as the Plan.

### **1.2 NATURE AND STATUS OF THE PLAN**

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

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.

### **1.3 DATE OF COMMENCEMENT**

In accordance with Section 28 of the Act, the Minister adopted the Plan on the date specified in the certificate endorsed on the Plan.

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

### **1.4 AREA TO WHICH THE PLAN APPLIES**

The Plan applies to the Little Swanport catchment as shown on Map 1.

### **1.5 WATER RESOURCES TO WHICH THE PLAN APPLIES**

The Plan applies to all water resources in the Little Swanport catchment shown on Map 1.

### **1.6 REVIEW OF THE PLAN**

A formal review of the Plan will take place in the 5<sup>th</sup> year after its adoption by the Minister, unless otherwise reviewed pursuant to section 34(1) of the Act.

### **1.7 PLAN ADMINISTRATION**

The Minister will be responsible for administration of the Plan.

Administration by the Minister 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 Minister as administrator of the Plan and is subject to the requirements as provided for within the Act.

## **PART 2 VISION AND OBJECTIVES**

### **2.1 VISION**

The vision of the Plan is to maintain, develop and implement a fair, equitable and sustainable management system for the water resources of the Little Swanport catchment that recognises the needs of the environment and aspirations of all users of the catchment.

### **2.2 OBJECTIVES**

In addition to the objectives of the Resource Management and Planning System and the objectives of the Act (Appendix C), the specific objectives of the Plan are categorised and listed below.

#### *2.2.1 Environmental*

- a) Maintain natural refuges for instream biotic communities during naturally dry periods.
- b) Protect flow regimes important for geomorphic processes, riparian vegetation, and floodplain processes.
- c) Protect flow regimes to maintain estuarine processes dependent on freshwater inputs.

#### *2.2.2 Water usage and development*

- a) Protect water resources for current and future stock and domestic use.
- b) Provide water to meet existing and future licensed use.
- c) Establish water availability for potential sustainable economic development.
- d) Ensure that future allocations do not significantly impact on the quality of water.

#### *2.2.3 Management of the water resource*

- a) Improve knowledge of licensed water use.
- b) Improve knowledge of the catchment's water resources and aquatic environment.

## **PART 3 WATER MANAGEMENT PROVISIONS**

The Water Management Provisions in Part 3 of the Plan are designed to implement the specific Plan Objectives given in Part 2. The following provisions are made in accordance with all of Sections 14(3)(a)(b)(c)(d)(g) of the Act.

### **3.1 SURFACE WATER MANAGEMENT PROVISIONS**

#### *3.1.1 Surface Water Licences and Allocations*

Water licensing and allocation provisions will be undertaken in accordance with Part 6 of the Act, and will be consistent with the *State Policy on Water Quality Management 1997*.

Licensees in the catchment are responsible for complying with terms and conditions on water licences.

Water will be allocated under Part 6 of the Act in accordance with the following:

- a) Water allocated at Surety 5 as specified in provisions 3.2.1 and 3.2.2
- b) Water allocated at Surety 6 as specified in provision 3.2.3

Temporary water allocations may be permitted to take water from a water resource. Any such allocation will not exceed a three-month time period and must comply with Section 90(1) of the Act.

#### *3.1.2 Consideration of New Water Licences and Allocations*

The granting of new licences or permits that allow water abstraction, diversion or the construction of in-stream impoundments, must take account of the likely effects of the proposed action on water quality and comply with provision 3.1.3 of the Plan.

#### *3.1.3 Information to be Included with Applications for New Water Allocations*

It is the intention of this Plan that the taking of water from the water resources covered by the Plan and its usage for irrigation should not give rise to environmental degradation of those water resources. All applications for a new licence, or for the variation of a licence, where the purpose of the application, in whole or in part, is to obtain water for irrigation, shall be accompanied by a report that indicates –

- (i) the nature of the irrigation proposed; and
- (ii) the location of the land to be irrigated; and
- (iii) how it is intended to carry out the irrigation in accordance with best practice environmental management so as to avoid the contamination of any adjacent water resource or water body by irrigation activities.

Where required a licence shall include conditions with a view to minimising the potential for such contamination.

Attention is drawn to the land management publication *Soil Management - A Guide for Tasmanian Farmers* (DPIWE 2000), which is considered to reflect best practice environmental management at the time of its publication.

The proponent must take into consideration the allocation guideline for the relevant subcatchment (Table 1 provision 3.2.2). If the proposed new allocation was to exceed the allocation guideline for subcatchments where allocation guidelines have been determined, the proponent will need to demonstrate that the allocation will not have a significant adverse impact on environmental values or upon any existing licensee or a person taking water under Part 5 of the Act.

### 3.1.4 Applications for Flood Harvesting

Any persons wishing to harvest flood flows must either apply for a new licence or a variation to their existing licence to take flood flows. The licence will be limited by the Allocation Limits for Flood Harvesting in provision 3.2.3 of the Plan.

## 3.2 SURFACE WATER ALLOCATION LIMITS

Surface 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*.

### 3.2.1 Catchment Allocation Limits

The Plan provides a Surety 5 water allocation limit for the area of the Plan of 6084 ML/year.

### 3.2.2 Subcatchment Allocation Guidelines

The allocation guidelines for the major subcatchments within the area of the Plan are provided in Table 1. These guidelines have been established to ensure that the long term average flow from these subcatchments, including the impacts of catchment farm dams, remains above the low risk environmental flow. These guidelines indicate the potential water available for allocation in each subcatchment, but the total amount allocated across all subcatchments is limited by the catchment allocation limit of 6084 ML/year specified in Part 3.2.1.

**Table 1: Little Swanport River Subcatchment Allocation Guidelines**

Subcatchment	Allocation Guideline (ML)	Remaining Allocation within the Guideline (ML)
Little Swanport River u/s Nutting Garden Rvt	1862	1104
Nutting Garden Rivulet	1138	928
Eastern Marshes Rivulet	2187	702
Green Tier Creek	1785	1499
Ravensdale Rivulet	1051	854
Little Swanport R between Nutting Garden Rvt and Eastern Marshes Rvt	1663	1593
Little Swanport R between Eastern Marshes Rvt and Green Tier Ck	729	698
Little Swanport R between Green Tier Ck and outlet	2558	2492

### 3.2.3 Allocation Limits for Flood Harvesting

Any water allocation given under a water licence authorising the take of floodwater will be at Surety 6 or greater.

The maximum amount of water that may be taken under all licences on any one day will be limited to no more than 10% of the flow once the flow exceeds 2000 ML/day measured at the Little Swanport River 800 metres down stream of Eastern Marshes Rivulet (site: 2212.1) gauging site.

## 3.3 RESTRICTION MANAGEMENT

### 3.3.1 Restrictions on Taking Water

Surety levels indicate the priority of rights to take water during periods of restriction management. The sureties of water allocations are listed in descending order of priority below for the purposes of Section 94 of the Act. For example, stock and domestic and essential town water supplies (Surety 1) have the highest priority during any restrictions.

All licences within the Little Swanport Catchment are currently allocated as Surety 5 water. On commencement of the Plan, Surety 6 water may be allocated for flood harvesting in accordance with provision 3.2.3

#### *Surety 1 Water*

Water for essential town water supplies, domestic purposes, and consumption by livestock or firefighting under Part 5 of the Act.

#### *Surety 2 Water*

Water required to sustain the ecosystems dependent on the water resource.

#### *Surety 3 Water*

Water rights of licensees replacing prescriptive rights under previous Acts.

#### *Surety 4 Water - There are no Surety 4 rights in the area of the Plan.*

Rights of special licensees such as Hydro Tasmania.

#### *Surety 5*

Rights to take water for irrigation and other commercial purposes, by direct abstraction or for winter storage in dams.

#### *Surety 6 Water or greater*

Rights to take water for irrigation and other commercial purposes harvested during flood events.

### 3.3.2 Cease to Take

The cease-to-take provision will come into effect to protect the environment during periods of low flow.

### 3.3.3 *Conditions when Cease to Take Protocols are Implemented*

Licensees with Surety 5 water allocations will not be permitted to abstract water when the following flow conditions occur at the at the Department's Gauging Site (Little Swanport River 800 metres down stream of Eastern Marshes Rivulet (site: 2212.1)):

- a) The recorded flow is less than or equal to 7.6 ML/day from November to April inclusive (summer); and
- b) The recorded flow is less than or equal to 9.5 ML/day from May to October inclusive (winter).

During periods when the Surety 5 allocation cease-to-take provision is in effect it will be a condition of all Surety 5 licences that outlet pipes on all water storages must be operated to pass the inflow.

Surety 6 water allocations will not be permitted to abstract water when the recorded flow at the Little Swanport River 800 metres down stream of Eastern Marshes Rivulet gauging site (site: 2212.1)), is less than 2000 ML/day.

## 3.4 **METERING REQUIREMENTS**

Licensees who extract water from any watercourse in the catchment, including dams on any watercourse, for irrigation, industrial, town water supply or any other commercial purposes will be required to install an appropriate meter to measure the volume of water extracted.

All licensees will be required to install appropriate water meters within 12 months of the commencement of the Plan. The provisions in Part 11 of the Act and the Water Meter Standard (DPIWE 2004a) will apply with respect to the installation and operation of the meters.

## 3.5 **STORAGE MANAGEMENT**

### 3.5.1 *Dam Permits*

Dam works are to be undertaken in accordance with the terms and conditions on the permit issued under Part 8 of the Act and are to be consistent with the *State Policy on Water Quality Management 1997*.

### 3.5.2 *Measurement of Inflows and Outflows from Irrigation Dams*

In order to measure in and out flows from a dam or a series of dams, owners of all irrigation dams will be required to install either V-notch weirs, water meters, data-loggers or any combination of these methods.

The measuring device adopted will be at the discretion of the Department and will take into consideration the hydrological characteristics of the water resource and number and capacity of irrigation dams to be measured.

### 3.5.3 Rules for Passing Inflows

Outlets for all instream storages must be operated to pass the inflow when the cease-to-take protocol is in operation.

### 3.5.4 Rules for Passing Flood Flows

When the inflow of water into a dam exceeds the maximum capacity of the outlet, the outlet must be operated at maximum capacity until such time as the in/out flows are equal.

## 3.6 TRANSFERS OF WATER LICENCES AND ALLOCATIONS

For the purposes of Sections 97(2)(b) and 98(1)(a) of the Act, transfers of water licences and allocations will be permitted, subject to meeting the requirements of Division 4 Part 6 of the Act. The Department has developed 'Guiding Principles for Water Trading in Tasmania' (DPIWE 2004b) that apply to the assessment of all applications for transfers of water licences and water allocations under the Act.

If a proposed transfer would result in the subcatchment allocation (as defined in Table 1 in provision 3.2.2) exceeding the subcatchment's allocation guideline, the applicant will need to demonstrate that the transfer would not;

- a) be inconsistent with the objectives of the Plan or the Act,
- b) have a significant adverse impact on the environmental values of the subcatchment and,
- c) have a significant adverse impact on any existing licensee or person taking water under Part 5 of the Act; or
- d) contravene the *Environmental Management and Pollution Control Act, 1994*.

The applicant may also be required to comply with all or part of provision 3.1.3 at the discretion of the Department.

Water licences and allocations may be leased or sold upon approval of the Minister or the Minister's delegate. Transfers can either be for a limited period (temporary transfer) or permanent (absolute transfer).

## 3.7 LICENCE CONDITIONS

As required by Section 36 (2) of the Act the conditions imposed on new licences will be considered within this Plan. Existing licences will be varied in accordance with Section 69(2)(d) of the Act to the extent necessary to achieve consistency with implementing the requirements of the Plan.

### **3.8 GROUNDWATER MANAGEMENT**

The Department will establish a Groundwater Use Register within two years of the commencement of the Plan. The register will contain details including, but not limited to, well type; depth and construction; well location; the purpose for which groundwater is used; quantity and rates of groundwater abstraction; and water quality.

## **PART 4 DATA COLLECTION AND MONITORING**

Part 4 of the Plan describes the monitoring and reporting activities that will be undertaken to ensure satisfactory results of the Plan's objectives and management provisions. The Department recognises that an integrated approach between community groups, Local Government and the Department is important to achieve this.

In conjunction with the *State Policy on Water Quality Management 1997*, ANZECC have developed national guidelines for water quality in freshwater and marine ecosystems. The specific guidelines for Tasmania will be used as a reference tool for monitoring programs undertaken by the Department or community groups within the catchment.

In recognition of this, the Department will form partnerships with the catchment community and Local Government in working towards integration and co-ordination of monitoring activities consistent with the Tasmanian Surface Water Management Strategy.

Should a water management or water quality issue arise, the Department will take appropriate action in accordance with the provisions of this Plan and the Act.

### **4.1 SURFACE WATER ALLOCATIONS**

The Department will record changes in the number and total volume of licensed surface water allocations. The Department will use this information to ensure that the total water allocated in the catchment is not in excess of the provisions in provision 3.2 of this Plan.

### **4.2 INSTALLATION OF WATER METERS**

All licensees will be required to install water meters within 12 months from the commencement of the Plan (provision 3.4.1).

The Department will record the number and type of water meters installed during each year of the Plan. The installation of water meters, or similar devices, by all water licence holders will enable the Department to meter total water usage for the catchment for the protection of ecosystems and for the enforcement of the Act.

### **4.3 METERING OF LICENSED WATER USAGE**

Licensees will be required to record water usage in accordance with directions from the Department.

The Department will conduct spot audits of metering activities for compliance purposes to ensure that the conditions of water allocation licences are adhered to.

The Department will maintain a record of water use in the catchment.

#### **4.4 WATER TRANSFERS**

The Department will record the transfer of all water licences and allocations in the catchment.

#### **4.5 GROUNDWATER MANAGEMENT**

The Department will maintain a groundwater register of wells and bores.

#### **4.6 RESTRICTION MANAGEMENT**

The Department will maintain all records of any water restrictions within the Plan area.

#### **4.7 STREAMFLOWS**

River level and stream flow will be recorded at the Department's Gauging Sites and will be made available to the public on request.

#### **4.8 RIVER HEALTH**

River Health will be assessed using the AusRivAS method based on the presence/absence of aquatic macroinvertebrate fauna in edgewater and riffles. Annual sampling will be undertaken in the spring and autumn below the Little Swanport River 800 metres down stream of Eastern Marshes Rivulet gauging site (site: 2212.1).

#### **4.9 WATER QUALITY**

Continuous monitoring of water temperature, electrical conductivity, dissolved oxygen and turbidity will be undertaken at the Department's Gauging Sites.

Each month samples from the Department's Gauging Sites will be analysed for dissolved oxygen, pH and concentrations of major nutrients.

## **PART 5 STATUTORY REQUIREMENTS AND ASSESSMENTS**

### **5.1 STATEMENT OF THE OBJECTIVES OF THE PLAN, INCLUDING THE ENVIRONMENTAL OBJECTIVES - SECTION 14(2)(a)**

The specific objectives of the Plan including the environmental objectives are as follows:

#### **Environmental**

- a) Maintain natural refuges for instream biotic communities during naturally dry periods.
- b) Protect flow regimes important for geomorphic processes, riparian vegetation, and floodplain processes.
- c) Protect flow regimes to maintain estuarine processes dependent on freshwater inputs.

#### **Water usage and development**

- a) Protect water resources for current and future stock and domestic use.
- b) Provide water to meet existing and future licensed use.
- c) Establish water availability for potential sustainable economic development.
- d) Ensure that future allocations do not significantly impact on the quality of water.

#### **Management of the water resource**

- a) Improve knowledge of licensed water use.
- b) Improve knowledge of the catchment's water resources and aquatic environment.

## **5.2 AN ASSESSMENT OF THE WATER REGIME THAT BEST GIVES EFFECT TO THE ENVIRONMENTAL OBJECTIVES AND OTHER RELEVANT OBJECTIVES OF THE PLAN - SECTION 14(2)(b)**

The water regime that best gives effect to the environmental and other relevant objectives of the Plan is one that allows a moderate expansion in water allocation while maintaining a low risk of change to the environmental values of the lower reaches of the Little Swanport River and the Little Swanport estuary.

To assist in determining a water regime that meets these objectives the Department commissioned a daily water balance model for the Little Swanport catchment. The resultant model, produced by SKM, allows the catchment's water regime to be determined on a daily time-step for a range of water use scenarios. The model was calibrated and validated based on flow data from July 1971 to January 1990 and was extended by rainfall runoff modelling to represent the period 1/1/1900 to 31/12/2001. The extended modelling period allowed the model to investigate a greater range of climatic variability that exists outside of the observed flow period. This model has been used in conjunction with water use information and environmental flow studies to determine and describe a flow regime that best gives effect to the environmental objectives.

The flow regime is best described as the output of the daily catchment water balance model configured to run the water use provisions of the Plan. These provisions include:

- recognition of existing Part 5 rights;
- a total catchment allocation at surety 5 allocation of 6084 ML/year;
- the adoption of summer and winter cease-to-takes on all surety 5 allocations; and
- a flood harvesting rule which allows up to 10% of the total flood volume (ML/day) to be available when flow exceeds 2000ML/day.

In addition to these provisions, the Plan also includes the following provisions to assist in meeting the environmental and other relevant objectives of the Plan:

- subcatchment allocation guidelines;
- the requirement for new allocations to demonstrate consideration of the effects of new allocations on water quality; and,
- Provisions relating to water trading, metering and the recording of groundwater use.

The Plan's provisions meet the water use and development objectives by providing a moderate increase in the surety 5 allocation, and introducing a surety 6 water allocation which allows for limited access to flood harvesting.

At full allocation the flow regime in the Plan will provide a total surety 5 allocation of 6084 ML/year, with a further low reliability allocation for flood harvesting. The surety 5 allocation is a 42% increase in current allocation. Once taken up, this additional allocation will result in a 2.3% reduction of the mean annual discharge to the Little Swanport estuary (from both the Little Swanport River and Ravensdale Rivulet) over the current condition, which represents a 6.2% reduction in the mean annual discharge from the modelled natural condition. The modelled natural flows do not include land-use impacts. However, they have been constructed from land-use as it is now (not including dams and diversions), and projected backwards in time.

The predicted impact of the flow regime is presented in the annual and monthly flow duration curves (see Appendix in SKM File Note (2004b), in the back of the SKM Report (2004a)). These flow duration curves show the amount of time the flow exceeds any given discharge volume, and indicate the effects of the Plan (excluding flood harvesting) on the long-term variability of the flow regime. These curves are presented for three sites in the catchment: the Little Swanport River at Swanston (which is the gauging site downstream of Eastern Marshes Rivulet), the Little Swanport River at the outlet, and Ravensdale Rivulet at the outlet. The impacts of flood harvesting are constrained to a maximum of 10% of the flood peak, and only when flow at the Little Swanport River 800m downstream of Eastern Marshes Rivulet gauging site exceeds 2000ML/day. This is described in Part 5.3.

The flow regime provided by the Plan meets the low risk EWR calculated for the Little Swanport River by Pinto (2001, 2004) based on the median monthly flows, and the 20<sup>th</sup> percentile monthly flows. Twentieth percentile monthly flows have been adopted around Australia as representing river flows during dry conditions. Figure 17 illustrates the long term frequency of dry years in the Little Swanport catchment using the modelled natural streamflow data.

Comparison of the low risk EWRs with the median and 20<sup>th</sup> percentile monthly flows under the Plan's water regime (see Figures 1, 2, 3 and 4 in Appendix A), show that over the long-term in dry years, flows will be provided at a low risk of instream habitat loss. To ensure that this is achieved during dry years, a cease-to-take set at the low risk EWR based on 20<sup>th</sup> percentile flows has been set (see Part 5.3, Objective (a)). Minimum EWRs have not been determined for Ravensdale Rivulet, however the cease-to-take rule determined from the Department's Gauge at Little Swanport River 800m downstream of Eastern Marshes Rivulet also applies to Ravensdale Rivulet.

### **5.3 AN ASSESSMENT OF THE ABILITY OF THAT WATER REGIME TO ACHIEVE THE ENVIRONMENTAL OBJECTIVES AND OTHER RELEVANT OBJECTIVES OF THE PLAN - SECTION 14(2)(c)**

#### **Environmental Objective (a): Maintain natural refuges for instream biotic communities during naturally dry periods**

The water regime described in Section 5.2 provides adequate low flows during naturally dry periods to maintain refuges for instream biotic communities, as explained in the following paragraphs.

Low flows are protected through the application of a cease-to-take provision on all licensed allocations.

The cease-to-take flows were calculated by determining the amount of habitat available to instream fauna at the 80 percent exceedence flow, and the risk to the fauna of not providing flows that maintain this habitat availability (see Pinto 2001 and 2004 for more detailed explanation).

The water regime provided under the Plan takes into account the specific habitat requirements of native fish species in the catchment (*Galaxias maculatus*, *Anguilla australis* and *Anguilla reinhardtii*) as determined by Pinto (2001; 2004). It is also considered that habitat for other dominant native fish species such as *Galaxias truttaceus* and *Pseudaphritus urvilli* that prefer slower flowing habitats is provided by the water regime described in Section 5.2.

The endangered *Galaxias fontanus* has been translocated into the upper catchments of Green Tier Creek and Rocka Rivulet and *Galaxias brevipinnis* has been recorded during DPIW fish surveys in the catchment. Both species are present in lower catchment tributaries with natural flow regimes and minimal to no water allocation. In this context, the Plan ensures the provision of suitable habitat for both species.

Other native fish species such as *Prototroctes maraena* and *Geotria australis* have been sighted and recorded respectively downstream of Swanston in the mainstream. Little is known about the specific habitat preferences of these species although the presence of both species in the lower catchment is likely to reflect a preference for substrates suitable for spawning. The flow regime provided under the Plan is considered to represent a low risk of change of instream habitats and in this context is considered to provide suitable habitat for both species.

On the basis of the specific habitat requirements for dominant native fish species in the catchment described by Pinto (2001;2004) and the preferred habitats of other native fish species found in the catchment, the water regime provided under the plan is considered to maintain refuges and suitable habitat for native fish communities in the Little Swanport catchment.

The rationale for the cease-to-take flow based on the 20<sup>th</sup> percentile monthly flow providing natural refuges during dry periods is that:

- The Little Swanport River has evolved with a naturally variable flow regime,
- This natural flow regime includes periods of low flow;

- The cease-to-take rule will ensure that the availability of habitat during very low flows (i.e. flows less than 20<sup>th</sup> percentile monthly flows) will not decrease below that which would occur naturally as a consequence of licensed allocations.

In addition, analysis of the flow duration curves (see Appendix in SKM File Note (2004b)), show that the river has lower flows more often, and a greater frequency of cease-to-flow events, under natural conditions compared to those under current use and those conditions under the Plan. This is a result of water applied during the irrigation season that returns to the main stream and contributes to these greater-than-natural flows over summer.

**Environmental Objective (b): Protect flow regimes important for geomorphic processes, riparian vegetation, and floodplain processes.**

The water regime described in Part 5.2 will protect flow regimes important for geomorphic processes, riparian vegetation and floodplain processes, as illustrated in the following paragraphs.

A flow regime is described in terms of the major features of its volumetric and temporal variation, ie. the timing, duration, magnitude, frequency and predicability of different flows. The natural flow regime for the Little Swanport River incorporates all the flow components (eg. base or low flows, cease-to-flow events, flushing flows and flood events), and more importantly their variability, and plays a crucial role in regulating physical and biological processes in rivers. This environmental objective requires an assessment of the flush and flood components, and of the variability of the flow regime. The low flow component of the flow regime has been addressed in the assessment of the previous objective.

The average recurrence interval of floods (or peak discharges) describes the average amount of time in which a flood of a particular magnitude will occur. For example, under current conditions, a flood of 15,142 ML will occur, on average, once every 5 years in the Little Swanport River (as measured at the outlet). Comparison of the average recurrence intervals under current and those conditions under the Plan shows that the peak discharges occurring every 1, 2, 5, 10 and 50 years are almost identical (see Figures 5, 6 and 7 in Appendix A). This is regardless of site, and indicates that the water use under the Plan has a negligible effect on the frequency of floods occurring at the outlet on an annual or longer time scale.

To compare the flow regime on a within-year time scale, hydrographs of the flow regime under current conditions and the flow regime under the Plan were compared for the Little Swanport River at Swanston and the outlet, and for Ravensdale Rivulet, in a dry year, an average year, and a wet year (see Figures 8 to 16 in Appendix A). These figures show a slight reduction in the magnitude of peak discharges in dry years under the Plan, but no effect on the timing, frequency, duration or predicability of these flows in dry years. This slight reduction in peak magnitude occurs over the winter months only, when storage takes are licensed to occur, and when there is generally a greater frequency of peak events. Figures 8 to 16 (in Appendix A) clearly show no effect on the timing, frequency, magnitude, duration or predicability of within-year peaks in either wet or average years. Therefore, the model indicates a negligible long-term effect of the Plan on the current flow regime. The major features of the flow regime and its variability will be protected for geomorphic, riparian vegetation and floodplain processes. The protection of these processes and the negligible effect of the Plan on the current flow regime also provides for those native fish species that require flow triggers for migratory purposes. The maintenance of geomorphic processes also protect current spawning habitats for species such as *Prototroctes maraena* and *Geotria australis* in the Little Swanport mainstream below Swanston.

The Plan provides for flood harvesting. For the purposes of the Plan, a flood flow is defined simply as a flow which overtops the streambanks (Gordon *et al.*, 2004). Channel survey data from the Swanston environmental flows site identifies that the smallest bankfull flow (ie. smallest flood) at the majority of cross sections that occurs is estimated at 864 ML per day, however it was up to 2000 ML/day at several sites.

In relation to flood harvesting the Plan has taken a precautionary approach by adopting 2000ML/day as the flood “trigger” flow. The rules for flood harvesting are that the maximum amount of water that may be taken under all licences on any day will be limited to no more than 10% of the flow, once the flow exceeds 2000ML/day measured at the Department’s Gauge at Little Swanport River 800m downstream of Eastern Marshes Rivulet (also described in Section 3.2.3). This represents a 10 percent total allocation of flood magnitudes that greatly exceed bankfull flows of 864 ML/day. As such they are precautionary allocations that protect the role of floods consistent with the environmental objectives 5.1 b) and 5.1 c) of the Plan. Table 2 indicates the duration, frequency and volume of flood allocation events.

**Table 2: Average Frequency, Duration and Magnitude of Flood Allocation Events**

	<b>1900-2001 Modelled streamflow under “current” conditions</b>
Minimum duration (days)	1
Maximum duration (days)	9
Median duration (days)	2
Average duration (days)	2
Annual frequency (events/year)	2.1
Minimum volume (ML/year)	0
Maximum volume (ML/year)	5088
Median volume (ML/year)	434
Mean volume (ML/year)	857

**Environmental Objective (c): Protect flow regimes to maintain estuarine processes dependent on freshwater inputs**

The water regime described in Part 5.2 will protect flow regimes important for maintaining estuarine processes dependent on freshwater inputs.

The Little Swanport Estuary has been classified as a Class C estuary of moderate conservation significance (see *A Classification of Tasmanian Estuaries and Assessment of their Conservation Significance using Ecological and Physical Attributes, Population and Land Use*, Edgar, *et al.*, (1999)). This is defined as being an estuary and associated catchment area affected by human habitation and land clearance, but not badly degraded. The estuary is tide-dominated, elongate and contains tidal sandbanks in the main tidal channel. The hydrography of the estuary is complex due to the narrow entrance, long length of the channel, numerous shoals and irregular shape of the estuary. Water circulation is largely driven by wind and the complexity of the system is accentuated during times of flooding.

Although little information is available on the full range of fauna inhabiting the Little Swanport Estuary, estuaries and coastal wetlands have long been recognised as critical habitat and nursery areas for myriad marine species. The estuary is considered an important area for a range of native waterbird species. There are also 40 species of fish known to utilise different habitat niches within the Little Swanport Estuary in addition to molluscs such as introduced Pacific oysters (*Crassostrea gigas*), local flat oysters (*Ostrea angasi*) and various clams and mussels. Many of these species form communities that inhabit the seagrass beds within the estuary. Although some of the estuarine fish species are able to tolerate freshwater conditions and their abundance and distribution can indirectly be influenced by freshwater inputs into the estuarine environment, little is known of the specific freshwater requirements of these species.

While the specific freshwater flow requirements for estuarine processes and flora and fauna inhabiting these areas are not yet well known, it is likely these processes will also be dependent on all the flow components of a natural flow regime and their respective variability. As the flow regime is preserved under the Plan (as illustrated in the assessments for Environmental objectives (a) and (b)), it is considered that this objective will be met under the Plan.

**Water use and development Objective (a): Protect water resources for current and future stock and domestic use.**

Stock and domestic water use refers to water required for firefighting, stock watering and domestic purposes and represents 0.05% of current water use in the catchment, and 0.03% under the proposed provisions. The Department considers that the relatively small proportion of water for existing and future stock and domestic needs can easily be met by the flow regime described in Part 5.2.

Water required for stock and domestic purposes is further protected by its designation as Surety 1 water, which means that during periods of water restriction, water for stock and domestic purposes has the highest priority of all water use.

**Water use and development Objective (b): Provide water to meet existing and future licensed use.**

Recognising the significant environmental, social and economic values associated with maintaining the current environmental condition of the lower river and estuary, the Plan has adopted a precautionary approach to future development. Notwithstanding this, the Plan provides opportunity for ecologically sustainable development of water resources of the Little Swanport Catchment.

Current allocation volume is 3882 ML/year with an estimated current use of 3541 ML/year. The Plan provides for a total allocation of 6084ML/year, which represents a potential increase in water use of 72%. This is consistent with the Government's State of Growth initiative (DPIWE 2003a), which is to strategically expand Tasmania's primary industries and ensure their long-term prosperity.

This increase in allocation, capped for the period of the Plan, maintains flows required to sustain the water-dependent environmental values at a low level of risk, yet allows opportunities for future water development in the catchment.

The water regime described in Section 5.2 adequately provides flows for licensed consumptive use in the Little Swanport catchment.

The total volume of water available for allocation under the Plan is capped at 6084 ML/annum, which is an increase of 2202 ML compared to current allocation. As mentioned in provision 5.2, this amount represents all existing and proposed allocations, as well as a further 999 ML/year for reasonable future water demand. The total water available for allocation under the Plan is approximately 6.2% of modelled natural mean annual flow from the catchment.

No water is available for Surety 5 allocations when the flow at the Department's Gauging Site drops below 7.6 ML from November to April inclusive and 9.5 ML from May to October inclusive. This is known as the cease-to-take rule. These figures have been obtained from the EWRs developed for Swanston and using the 20<sup>th</sup> percentile monthly flows as the reference flows. In average years, there is enough water in the system such that even if all the allocated water is used, the low-risk EWRs would still be maintained (see Figure 1 in Appendix A). Twentieth percentile flows are used to represent conditions in a dry year, and therefore represent the system when water demand is high. EWRs were developed for each month, and the highest EWR from November to April inclusive, and the highest EWR from May to October inclusive, were taken as the summer and winter cease-to-take rules respectively. This cease-to-take rule ensures the EWRs are met, even when demand is high (see Figure 2 in Appendix A).

Increasing the volume allocated does not affect the reliability of Surety 5 allocations being fully available in a year. The probability of the current allocation at the gauging site being available, after accounting for the cease-to-take, is 100% in winter and 82% in summer. Under full allocation in the Plan this probability is 100% in winter and 73% in summer. The probability of availability drops over summer because there are lower flows over summer than in winter. Ninety-nine percent of current allocations and all proposed and future allocations under the Plan are licensed for winter diversion only, therefore the summer percent reliability is not relevant and the reliability of Surety 5 allocations being fully available in any one year is 100%. In other words, the total volume of water available at the gauging site, after accounting for the cease-to-take, exceeds total Surety 5 allocations in all years based on the 100 year modelled data. The percent reliability is only presented for the Little Swanport River at the Department's Gauging Site (Little Swanport River 800 metres down stream of Eastern Marshes Rivulet (site: 2212.1)), as approximately 90% of all allocations in the catchment are licensed above this point. Allocations from other areas, such as Green Tier Creek and Ravensdale Rivulet are similarly unaffected by an increase in allocation volume and also have a 100% reliability of water availability in a year.

**Water use and development Objective (c): establish water availability for potential sustainable economic development.**

The management provisions in Part 3 of the Plan ensure the availability of water allocations for further sustainable economic development at a catchment and subcatchment level. Each new application for water licences and allocations within the catchment must include details outlined in provision 3.1.3 of the Plan. The Plan further assesses the possibility for sustainable economic development in Part 5.5 of the Plan.

**Water use and development Objective (d): Ensure that allocations do not significantly impact on the quality of water.**

The allocations within the Little Swanport Catchment have been designed to meet a low level of risk to the instream and surrounding environments, and therefore the Plan is consistent with the *State Policy on Water Quality 1997*. The Plan is assessed to protect environmental flows while taking into account future and existing stock and domestic and irrigation demands (refer to Part 5.4). Parts 3 and 4 of the Plan implements management provisions and the ongoing monitoring of biological and chemical perimeters to ensure that the environmental values within the catchment are maintained.

In conclusion, the water regime described in Part 5.2 is assessed to be able to achieve the environmental and other relevant objectives of the Plan under Section 14(2)(c) of the Act.

#### **5.4 AN ASSESSMENT OF LIKELY DETRIMENTAL EFFECTS OF THE PLAN ON THE QUALITY OF WATER - SECTION 14(2)(d)**

The Plan is consistent with the objectives of the *State Policy on Water Quality Management 1997* by the provision of environmental water to maintain current environmental values within the Little Swanport catchment. The Plan adopts a precautionary approach to water development in the catchment, provides a flow regime which represents a low level of risk for in-stream habitat loss and that shows negligible departure from current patterns (see Part 5.3 for further discussion). The conditions most likely to lead to a reduction in water quality, for example cease-to-flow events, will not occur with any greater frequency than the flow conditions set out under the Plan and in addition, will not lead to an increase in flow conditions that would be expected to have detrimental effects on the quality of water in the catchment.

While Protected Environmental Values (PEVs) for surface waters have been identified for the Little Swanport catchment, the Water Quality Objectives (WQOs), that ensure the quality of water is maintained at a certain level allowing the protection of PEVs, have not been set. The State of Rivers project currently underway in the Little Swanport catchment will provide valuable data in the future development of these Water Quality Objectives (WQOs) under the *State Policy on Water Quality Management 1997*.

Protected Environmental Values for two identified areas of landuse (Mixed Rural and the Hobbs Lagoon irrigation system) are the protection of “Modified Aquatic Ecosystems, Recreational Water Quality and Aesthetics” (secondary contact and aesthetics) and “Agricultural Water Use” (for irrigation and stock watering). A third land use area (State Forest or forested crown land) provides PEVs for the protection of “Modified Aquatic Ecosystems and Recreational Water Quality and Aesthetics” (secondary contact and aesthetics). Protected Environmental Values in Mixed Rural Landuse tenures are also specifically identified to safeguard habitat for the endangered Swan Galaxiid (*Galaxias fontanus*) in Rocka Rivulet.

In accordance with the *State Policy on Water Quality Management 1997*, these values form the basis for water quality management such that the water provided is of a physical and chemical nature to support a healthy but modified ecosystem, from which edible fish are harvested and which allows people to safely engage in secondary contact recreation activities in the catchment. In providing low risk EWPs and a flow regime for the maintenance of current ecological and geomorphological processes, the Plan also provides for the maintenance of physical and chemical processes currently operating within the catchment. In this context it is unlikely that the Plan will prejudice the achievement of future Water Quality Objectives associated with the protection of identified surface water PEVs for the Little Swanport catchment.

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

The likely demands for water by existing and future users have been addressed in Part 5.3 in the assessments of water usage and development objectives (a) and (b) under the Plan. The Plan is assessed to protect environmental flows, to protect river flows and groundwater resources for existing and future stock and domestic demands, and to provide water for existing and future consumptive use (refer to Part 5.3 for details).

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

The main users of water in the catchment are:

- agricultural farmers, who use water for stock and domestic and irrigation purposes,
- aquacultural farmers, who use estuarine waters for growing oysters, and
- recreational users, who use the water for fishing, swimming, passive recreation associated with riverine habitats and landscapes, and other related ecotourism pursuits

The likely effects of the Plan on agricultural farmers have been addressed in Section 5.3 (Water usage and development Objectives (a), (b) and (c)). These sections, together with the analysis presented below, indicate that the Plan provides sufficient water for existing farming and related purposes. It also supports the future growth and development of farming operations, and therefore will not have any detrimental impacts on their businesses.

Current water allocations for agricultural purposes in the Little Swanport Water Management Plan area total 3882ML. During 2003 a survey of licensed irrigators was undertaken to identify the current value of irrigated agricultural production in the Little Swanport catchment (Bowman 2003). A total of 5 out of 9 survey forms were returned, accounting for approximately 90 percent of the estimated water use in the catchment. A few respondents accounted for the vast majority of activity and so the results will not be released for confidentiality reasons.

The Plan explicitly recognises the significant contribution that aquaculture in the Little Swanport estuary currently makes to the local, regional and State economies. The Plan also recognises the importance of the Little Swanport estuary to the oyster industry of South Eastern Australia. While the gross value of the aquaculture industry has not been quantified, it is undoubtedly significant. The Plan also recognises the potential for increased tourism, and its requirement for a “healthy” environment. It is in part for these reasons that the Plan has taken a precautionary approach to future irrigation development. Recognising this, future potential production from irrigation was estimated for the Little Swanport catchment based on an analysis of current water usage, potential water availability and land capability to determine the gross value of production under different water usage scenarios. Gross value represents the income generated from enterprises reliant on irrigation. The methodology used is based on reputable assessments undertaken elsewhere in Australia (ACIL Consulting, 2002; Independent Advisory Committee on Socio-Economic Analysis, 1998).

The analysis of future irrigation development in the Little Swanport catchment considers the future water use scenarios for which the hydrological impacts were modelled by SKM (2004a):

- Scenario 3 – an additional 2202 ML above current allocated usage available for allocation.
- Scenario 2 – an additional 6078 ML above current allocated usage available for allocation.

In addition to estimating the future potential based on these scenarios, future potential is also analysed based on the production capability of the catchment from information collected from a range of sources including interviews with landholders and agricultural consultants (Bowman 2003, Davey & Maynard et. al. 2003, DPIWE 2003b, Farquhar 2004, Thompson 2004, Williamson 2004).

The analysis showed that Scenarios 3 and 2 could potentially generate additional annual gross income of \$3.27 million and \$5.13 million, respectively. Furthermore, if all potentially irrigable land were to be developed, the annual gross income could potentially increase to \$7.45 million.

The analysis broadly considers the region's land capability, it does not, however, consider other factors such as discrete topographical and microclimatological factors that may influence the viability of irrigation in certain circumstances (eg horticulture). Other factors such as the availability of cropping contracts, changes in water use efficiency and application techniques or availability of suitable storage sites have not been taken into account.

This analysis is only intended to provide indicative values of potential increases in agricultural production. Therefore it does not take into account any environmental or social externalities arising from increased irrigation water usage, nor does it consider the economic benefits of the ecotourism or aquacultural industries.

The principal requirement of aquacultural farmers is freshwater flows into the estuary to maintain the quantity and quality of water necessary for their operations. The likely effects of the Plan on aquacultural farmers are addressed in Sections 5.3 (Environmental Objective (c)) and 5.4. The water regime described in Section 5.2 is deemed to protect the range of peak flow events and the water quality necessary to maintain estuarine processes (amongst other ecosystem processes). Based on current scientific knowledge, the water management provisions of the Plan are commensurate with delivering the water quantity and quality needs of the estuary such that there are no detrimental effects on the aquacultural businesses.

The likely effects of the Plan on recreational and ecotourism users are similarly deemed to have no detrimental impacts. Recreational pursuits in the catchment are more predominant in the lower half and generally rely on the presence of water in the system, particularly over summer, and a healthy aquatic environment. Minimum environmental flows will be maintained at a low level of risk to instream biotic communities (as addressed in Section 5.3, Environmental Objective (a)), and will thereby be automatically maintained for recreational pursuits. Ecotourism interests rely on a healthy riverine landscape, so rely on peak flow events to maintain geomorphic and riparian vegetation processes, as well as minimum flows. In other words, these users rely on the range and variability of flows, or the flow regime, which is also provided under the Plan (addressed in Section 5.3, Environmental Objective (b)). Therefore, it is considered that as the Plan meets the environmental objectives, it also meets the needs of recreational and ecotourism users and their businesses.

The likely effects of the Plan on the environmental values identified for the catchment are considered in Section 5.3 (Environmental Objectives (a), (b) and (c)). The Plan is assessed to maintain the ecological values identified in the Plan at a low level of risk.

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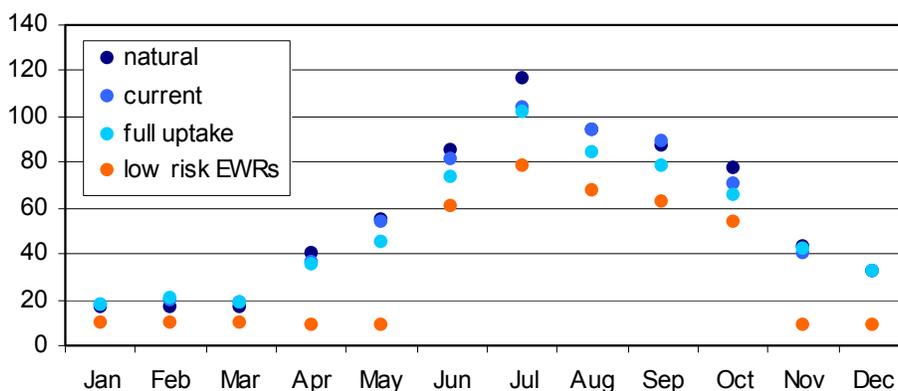
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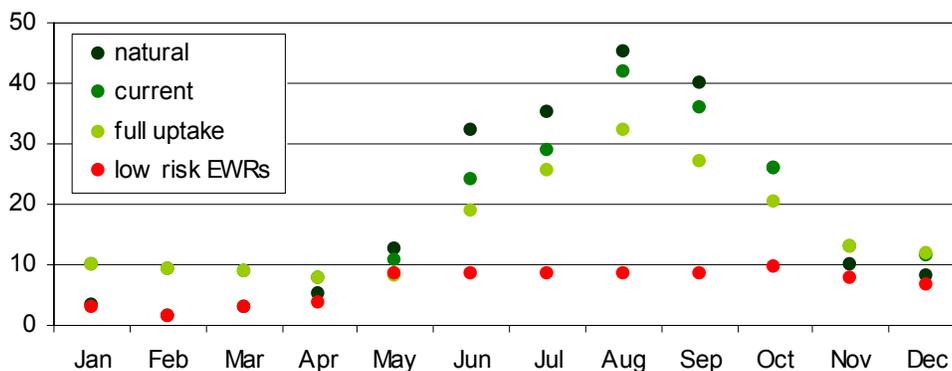
## APPENDICES

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

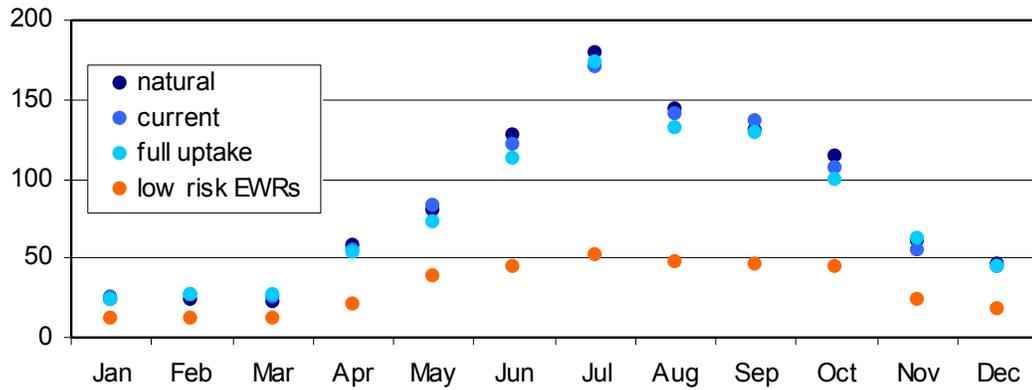
### Appendix A – Figures Associated with Part 5: Statutory Requirements and Assessments



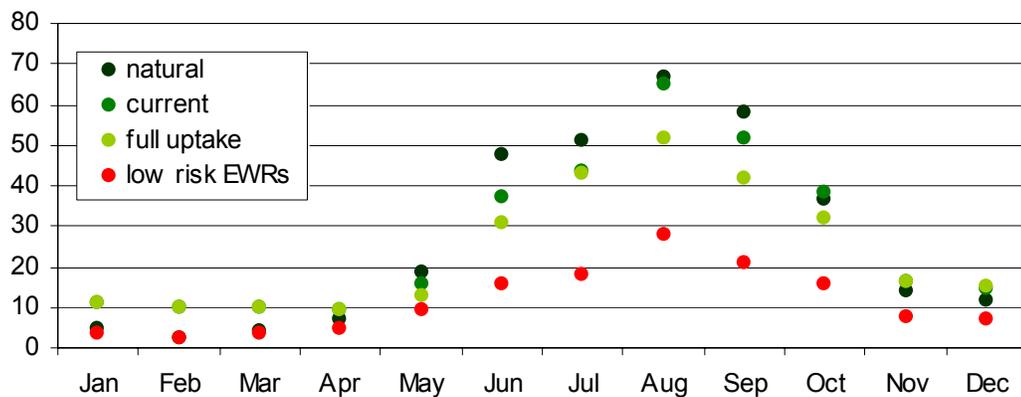
**Figure 1:** Median monthly flows (in ML per day) in the Little Swanport River at Swanston under natural, current and full uptake (under the Plan) conditions, and the low risk EWR boundary for median flows.



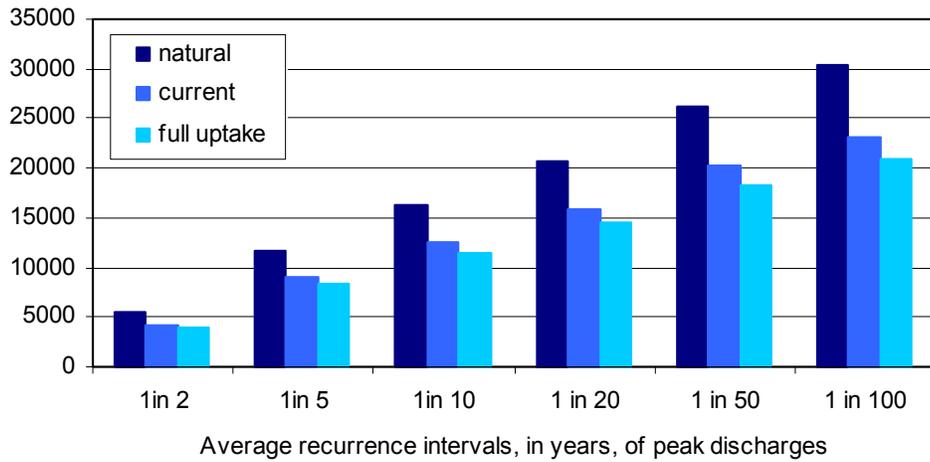
**Figure 2:** 20th percentile monthly flows (in ML per day) in the Little Swanport River at Swanston under natural, current and full uptake (under the Plan) conditions, and the low-risk EWR boundary for 20th percentile flows.



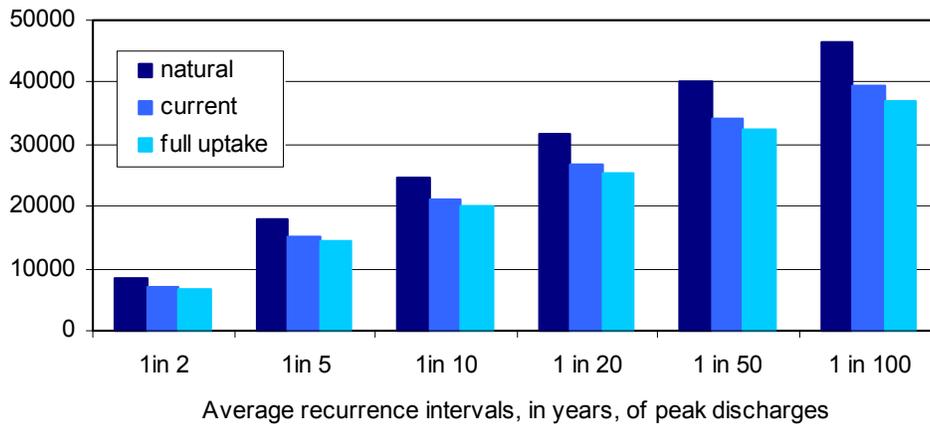
**Figure 3:** Median monthly flows (in ML per day) at the Little Swanport River outlet under natural, current and full uptake (under the Plan) conditions, and the low-risk EWR boundary for median flows (at Deep Hole).



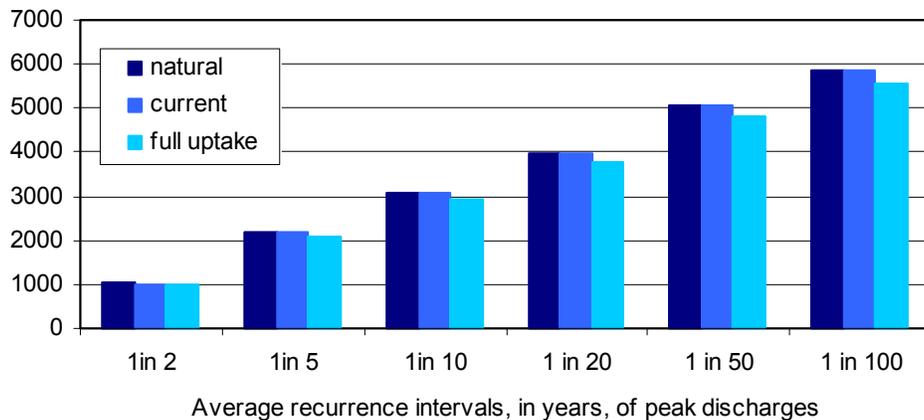
**Figure 4:** 20th percentile flows (in ML per day) at the Little Swanport River outlet under natural, current and full uptake (under the Plan) conditions, and the low-risk EWR boundary for 20th percentile flows (at Deep Hole).



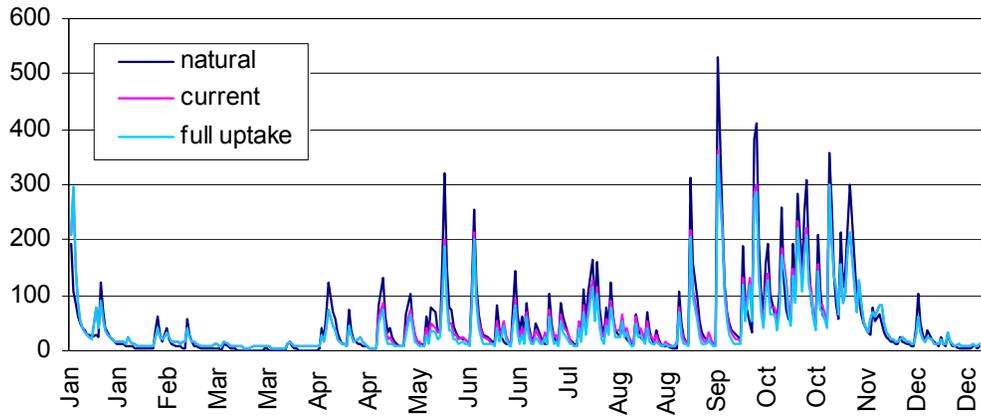
**Figure 5:** Average recurrence intervals of flood peaks (in ML/day) in the Little Swanport River at Sw anston under natural, current and full uptake (under the Plan) conditions.



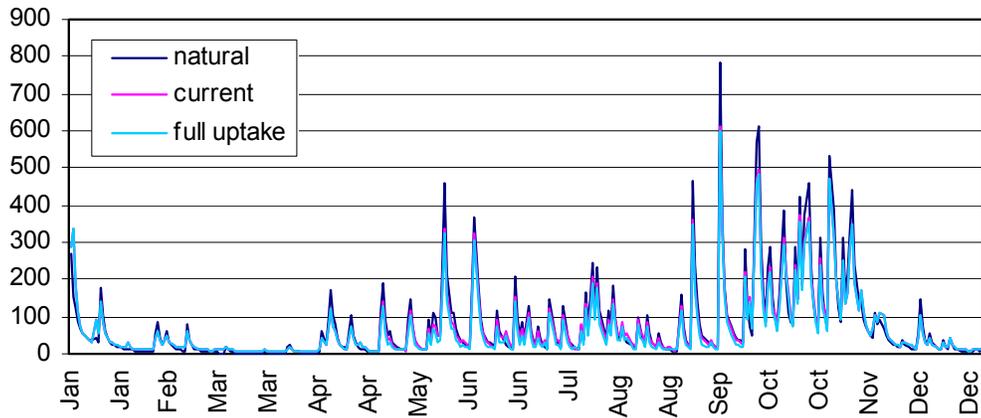
**Figure 6:** Average recurrence intervals of flood peaks (in ML/day) at the Little Swanport River outlet under natural, current and full uptake (under the Plan) conditions.



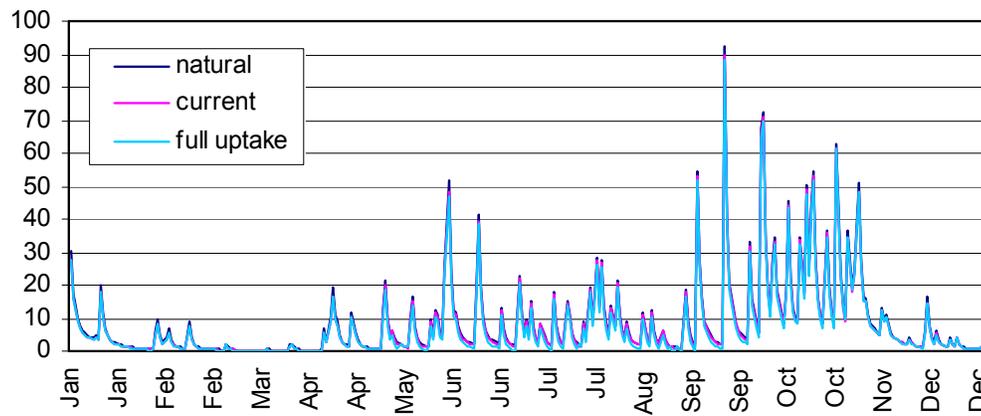
**Figure 7:** Average recurrence intervals of flood peaks (in ML/day) at the Ravensdale Rivulet outlet under natural, current and full uptake (under the Plan) conditions.



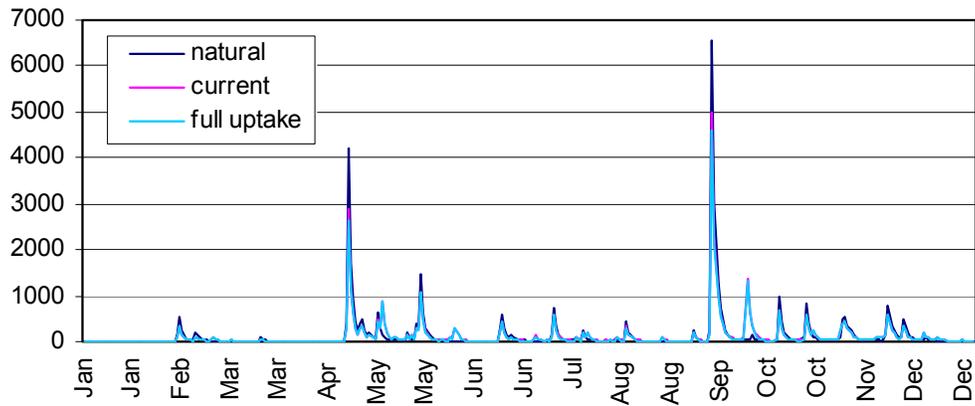
**Figure 8:** Flow regime (in ML/day) in the Little Swanport River at Swanston under natural, current and full uptake (under the Plan) conditions in an average dry year.



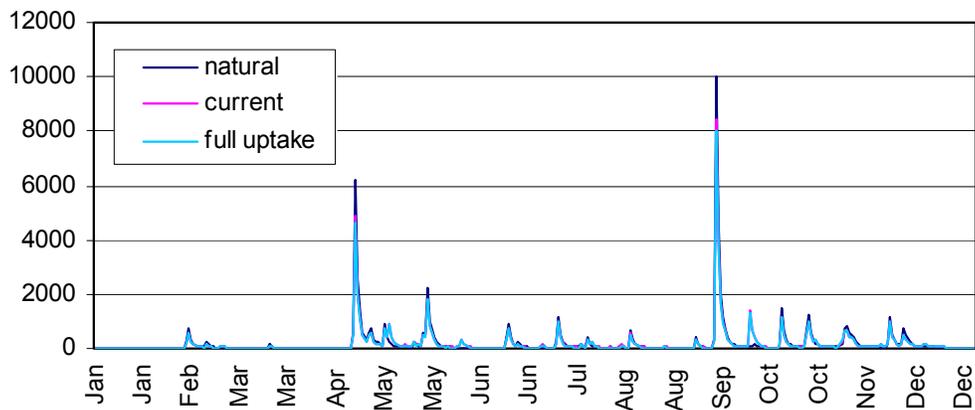
**Figure 9:** Flow regime (in ML per day) at the Little Swanport River outlet under natural, current and full uptake (under the Plan) conditions in an average dry year.



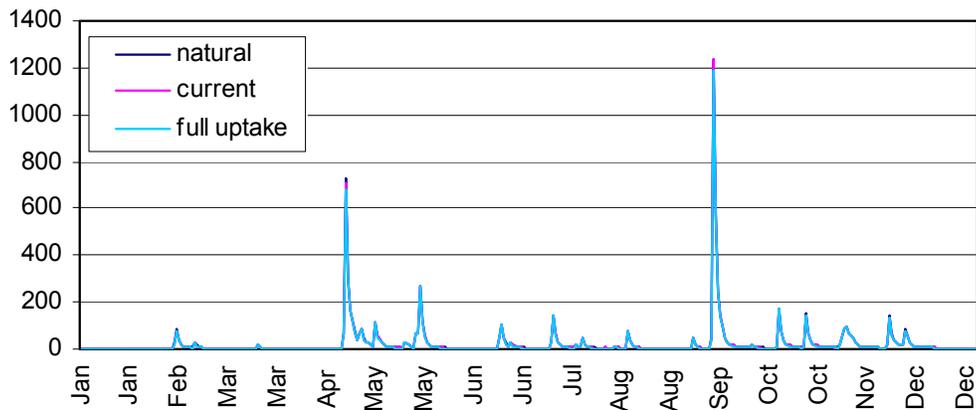
**Figure 10:** Flow regime (in ML per day) at the Ravensdale Rivulet outlet under natural, current and full uptake (under the Plan) conditions in an average dry year.



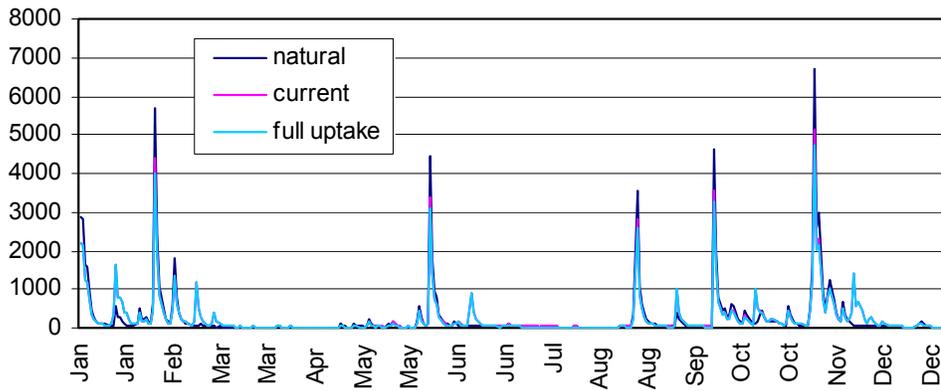
**Figure 11:** Flow regime (in ML/day) in the Little Swanport River at Swanston under natural, current and full uptake (under the Plan) conditions in an average year.



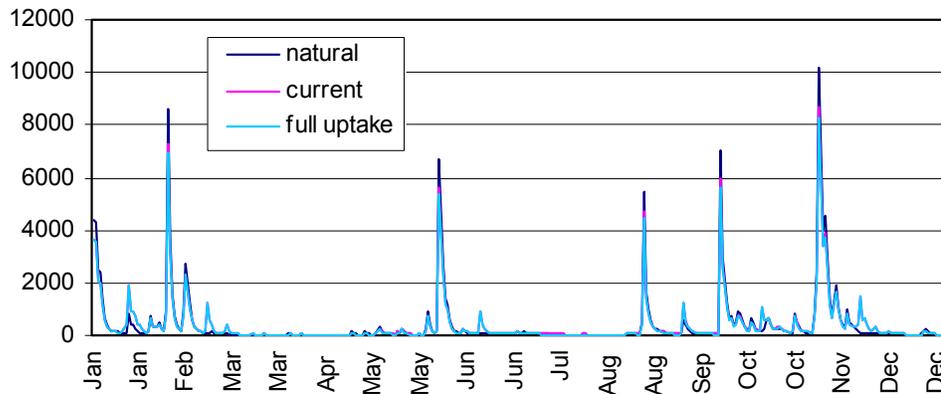
**Figure 12:** Flow regime (in ML per day) at the Little Swanport River outlet under natural, current and full uptake (under the Plan) conditions in an average year.



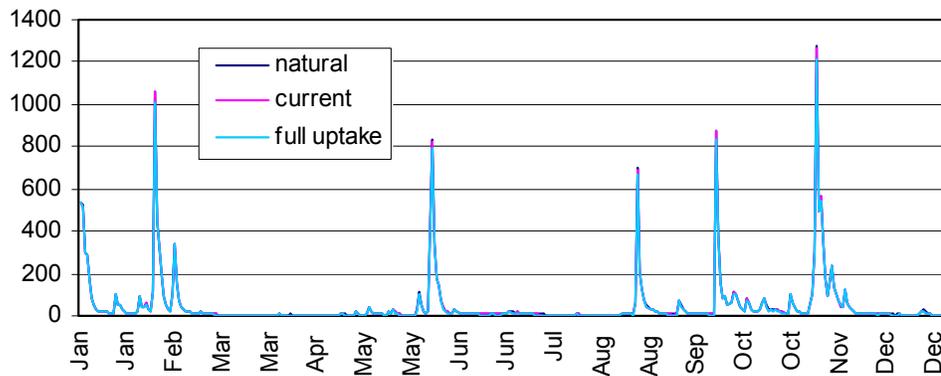
**Figure 13:** Flow regime (in ML per day) at the Ravensdale Rivulet outlet under natural, current and full uptake (under the Plan) conditions in an average year.



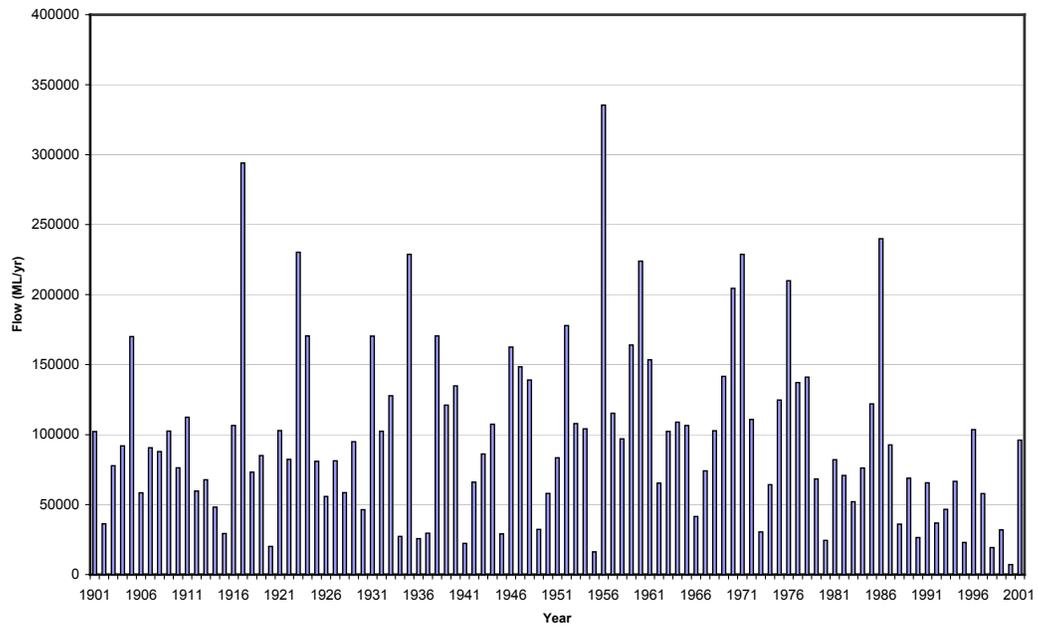
**Figure 14:** Flow regime (in ML/day) in the Little Swanport River at Swanton under natural, current and full uptake (under the Plan) conditions in an average wet year.



**Figure 15:** Flow regime (in ML per day) at the Little Swanport River outlet under natural, current and full uptake (under the Plan) conditions in an average wet year.



**Figure 16:** Flow regime (in ML per day) at the Ravensdale Rivulet outlet under natural, current and full uptake (under the Plan) conditions in an average wet year.



**Figure 17:** Modelled total annual discharge in the Little Swanport catchment (includes both the Little Swanport River and Ravensdale Rivulet discharge at the outlets).

## **Appendix B - Representation of Users and Interest Groups**

A Consultative Group was formed to advise the Department on the development of the Plan and local water management issues. Their role was also to seek advice from organisations or constituencies represented by Group members on matters relating to the development of the Plan.

The following community interests and groups have been represented on the 13-member Consultative Group during the development of the Plan:

- Catchment Management Group (1 member)
- Conservation Interests and Ecotourism (2 members)
- Farm Contractors (2 members)
- Farming and Irrigation (3 members, covering both upper and lower catchment)
- Glamorgan Spring Bay Council (1 member)
- Marine Farming and Aquaculture (1 member)
- Plantation Forestry (1 member)
- Southern Midlands Council (1 member)
- Waterwatch and Research (1 member)

## Appendix C – Objectives

### Objectives of the *Water Management Act 1999*

- a) The purpose of the Plan is to provide a framework for managing the water resources of the Little Swanport River Catchment in accordance with the objectives of the Act.
- b) 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:
- c) promote sustainable use and facilitate economic development of water resources; and
- d) 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
- e) maintain ecological processes and genetic diversity for aquatic ecosystems; and
- f) provide for the fair, orderly and efficient allocation of water resources to meet the community's needs; and
- g) increase the community's understanding of aquatic ecosystems and the need to use and manage water in a sustainable and cost-efficient manner; and
- h) 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.

### Objectives of the Resource Management and Planning System Tasmania

1. The objectives of the Resource Management and Planning System of Tasmania are:
  - a) to promote the sustainable development of natural and physical resources and the maintenance of ecological processes and genetic diversity; and
  - b) to provide for the fair, orderly and sustainable use and development of air, land and water; and
  - c) to encourage public involvement in Resource Management and Planning; and
  - d) to facilitate economic development in accordance with the objectives specified in paragraphs (a), (b) and (c); and
  - e) to promote the sharing of responsibility for Resource Management and Planning between the different spheres of Government, the community and industry in Tasmania.
2. In item 1(a), “sustainable development” means managing the use, development and protection of natural and physical resources in a way, or at a rate, which enables people and communities to provide for their social, economic and cultural wellbeing and for their health and safety while:
  - a) sustaining the potential of natural and physical resources to meet the reasonably foreseeable needs of future generations; and
  - b) safeguarding the life-supporting capacity of air, water, soil and ecosystems; and
  - c) avoiding, remedying or mitigating any adverse effects of activities on the environment.