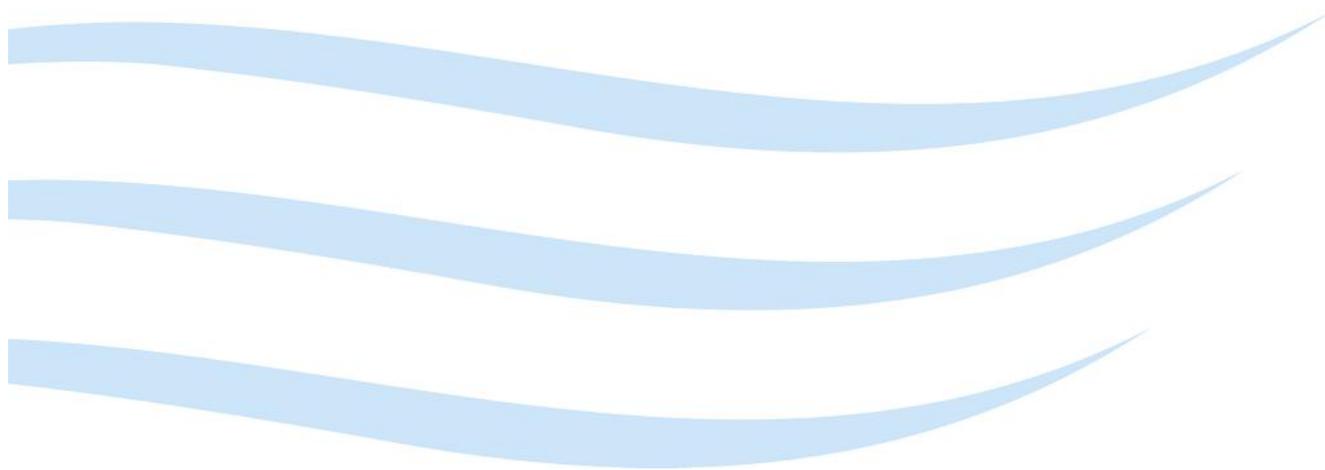


Sassafras Wesley Vale Water Management Plan



January 2012

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Preferred Citation

DPIPWE (2012). *Sassafras Wesley Vale Water Management Plan*. Water and Marine Resources Division, Department of Primary Industries, Parks, Water and Environment, Hobart.

The Department of Primary Industries, Parks, Water and Environment (DPIPWE)

The Department of Primary Industries, Parks, Water and Environment provides leadership in the sustainable management and development of Tasmania's natural resources. The Mission of the Department is to support Tasmania's development by ensuring effective management of our natural resources.

The Water and Marine Resources Division provides a focus for water management and water development in Tasmania through a diverse range of functions, including implementing the *Water Management Act 1999* and the National Water Initiative; design of policy and regulatory frameworks to ensure sustainable use of surface water and groundwater resources; monitoring, assessment and reporting on the condition of the State's freshwater resources; and providing regulatory and policy support for water infrastructure development projects.

CONTEXT

The Sassafras Wesley Vale area is situated on the central north coast of Tasmania east of Devonport (Figure 1). The area is bounded to the south and west by the Mersey River catchment and to the east by Port Sorell. The main surface water resources include Panatana Rivulet and Greens Creek, which flow into Port Sorell, and smaller creeks such as Pardoe Creek and Andrews Creek that flow directly into Bass Strait. Groundwater in the area is derived from aquifers within unconsolidated sediments and fractured rocks within the Devonport Port Sorell Sassafras Tertiary Basin.

The area lies within the Latrobe Municipality and the main towns include Port Sorell and Shearwater, Wesley Vale and Sassafras. The Sassafras Wesley Vale area is recognised for its very high level of agricultural production and most of the land is used for irrigated agriculture on rich basalt-derived soils. The area is best known for growing vegetables, poppies, pyrethrum and some dairying.

Most of the water extracted under licence is used for irrigation. The main town water supply for Port Sorell and Shearwater is delivered through a reticulated system, which uses water from the Forth River and is administered by Cradle Mountain Water.

Surface water hydrology in the area is characterised by high flows in winter, and very low flows in summer. Approximately 90% of the annual surface water yield in the area occurs during the winter period. Summer flow is largely maintained by a sustained flow of groundwater from springs which may be topped up by summer rainfall events.

Many dams have been constructed to capture and store the higher and more reliable winter flows. As a result of water extraction and dam development, the hydrology of the area has been modified significantly.

The extraction of water during the summer months has increased the frequency and duration of low and cease to flow events, which may have been exacerbated by the decline in rainfall that has occurred throughout much of Tasmania during recent years. The extensive development of dams has the affect of attenuating flows, which is likely to have reduced flow variability overall.

Together, these circumstances require careful management, particularly during the irrigation season, to ensure fair and equitable sharing of limited water supplies.

Farmers also use local groundwater in addition to surface water resources. Results of surveys of groundwater use undertaken in the area indicate that up to 5,000 ML is extracted annually (DPIW 2009b). The reduced rainfall and surface water flows experienced in recent years, together with increased demand for irrigation water, has led to a greater reliance on groundwater extraction.

Monitoring of groundwater resources to date suggests that groundwater extraction within most of the area has generally not caused long-term declines in groundwater levels. However, some monitoring wells have shown a sustained decline in water levels since 2006, most likely due to the reduced winter rainfall, possibly in conjunction with an increase in groundwater extraction. In addition, evidence from past research suggests that increased groundwater extraction may not be sustainable when there are consecutive years of lower than average recharge from winter rainfall.

Whilst the freshwater ecosystems in the area have been modified extensively due to agricultural development, a number of important freshwater environmental values still remain. These values include a number of wetland and riparian plant species, the Central North burrowing crayfish and the green and golden frog, which rely on the maintenance of groundwater levels in the area to survive during the summer months. Some native fish and invertebrate species have also been identified as having high conservation value in some of

the lower parts of the area's catchments, although their distribution has been impaired by the construction of instream dams.

As a result of dry climatic conditions in recent years, with lower than average rainfall in winter and near continuous low and cease to flow conditions in summer, farmers have not been able to obtain sufficient water to meet their irrigation needs during times of intensive cropping.

Consequently, the Sassafras Wesley Vale Irrigation Scheme was constructed in 2011, to supply water via pipeline from the Mersey River. It should be noted that the Scheme will supply water sourced from the Mersey River through a fully reticulated system, and hence will not be either taking water from, or augmenting supplies of water to, the water resources within the area of the Plan.

Regardless of the development of the Sassafras Wesley Vale Irrigation Scheme, the Tasmanian Government committed to develop a water management plan for the area to ensure that the local water resources are managed on a sustainable basis. The Sassafras Wesley Vale Water Management Plan will provide a strong foundation to underpin further irrigation development in the area with the construction of the Scheme.

The aim of the Sassafras Wesley Vale Water Management Plan is a sustainable, efficient and equitable management system for the area's water resources, which recognises and balances the needs of the environment with the needs and aspirations of all water users and the general community. This Plan ensures that the area's freshwater environmental values and its productive capacity to support a range of water uses, including stock and domestic supply and irrigation, are preserved into the future.

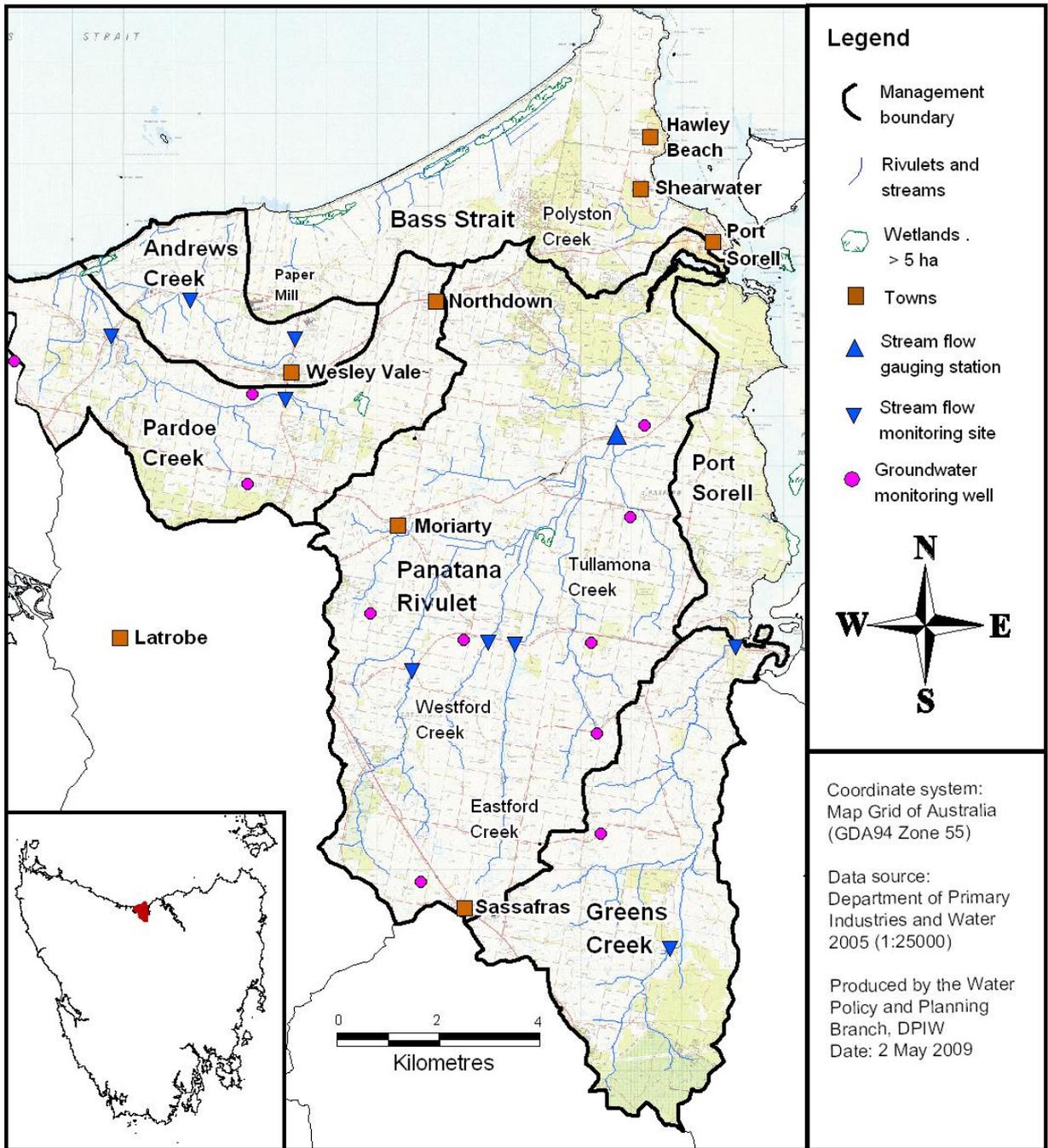


Figure 1 Map of the Sassafras Wesley Vale area, showing surface water catchments, groundwater and surface water monitoring sites and local towns.

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PART 1 INTRODUCTION

1.1 Name of Plan

This Water Management Plan is titled the Sassafras Wesley Vale Water Management Plan, hereafter referred to as **this Plan**.

1.2 Nature and Status of this Plan

This Plan is made under Part 4 of the *Water Management Act 1999* as amended, hereafter referred to as **the Act**, and is to be read as being subject to and consistent with 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

This Plan was adopted by the Minister, under section 28 of the Act, on 27 January 2012, and took effect upon the publication of a notice in the *Gazette*, under section 29 of the Act.

1.4 Review of this Plan

A review of this Plan will take place after the end of the 10th year of its adoption, unless otherwise reviewed pursuant to section 34(1A) of the Act.

1.5 Area to which this Plan Applies

This Plan applies to the water resources of the Sassafras Wesley Vale area as shown in Figure 1.

1.6 Water Resources to which this Plan Applies

This Plan applies to all water resources within the area of the Plan, including groundwater resources. Named surface water resources are set out in Table 1.

1.7 Surface Water Management Areas

Surface water resources have been divided into six management areas, as shown in Figure 1:

- a) Panatana Rivulet and all of its tributaries;
- b) Greens Creek and all of its tributaries;
- c) Pardoe Creek and all of its tributaries;
- d) Andrews Creek and all of its tributaries;
- e) Bass Strait catchment area;
- f) Port Sorell catchment area.

The Bass Strait and Port Sorell catchment areas contain small disparate streams sourced mostly from springs, which flow directly into Port Sorell or Bass Strait. Whilst specific provisions are not set out for these two catchments, the over arching provisions in this Plan will be applied as appropriate.

Table 1 Named surface water resources in the Sassafras Wesley Vale area.

Catchment	Named Streams		
Panatana Rivulet Catchment	Panatana Rivulet Westford Creek	Appleby Creek Eastford Creek	Tullamona Creek
Greens Creek Catchment	Greens Creek		
Pardoe Creek Catchment	Pardoe Creek		
Andrews Creek Catchment	Andrews Creek		
Bass Strait Catchment Area	Poyston Creek		
Port Sorell Catchment Area			

1.8 Water Management Provisions

The water management provisions of this Plan (set out in Parts 3, 4, 5 and 6) provide a sound management system for the water resources of the Sassafras Wesley Vale area, and a water regime that best gives effect to the objectives of the Plan.

The provisions are made in accordance with sections 14(3)(a), (b), (c), (d), (f) and (g) of the Act.

PART 2 VISION AND OBJECTIVES

2.1 Vision

The vision of this Plan is a sustainable, efficient and equitable management system for the water resources of the Sassafras Wesley Vale area, which recognises and balances the water needs of the environment with the needs and aspirations of all water users and the general community.

2.2 Objectives

As required under section 14(2) of the Act, this Plan includes a set of objectives, which have been developed in consultation with the community. In addition to the objectives of the Resource Management and Planning System of Tasmania and the objectives of the Act (Appendix A), the specific objectives of this Plan are listed below.

This Plan's objectives guide how freshwater resources are to be managed and allocated for consumptive and other use, and how the water needs of freshwater ecosystems are to be provided for.

2.2.1 Environmental Objectives

- a) Seek to manage flow regimes and groundwater levels and fluxes to:
 - (i) protect refuges of instream biotic communities during dry periods;
 - (ii) protect identified freshwater ecosystem values and natural geomorphic processes;
 - (iii) maintain estuarine processes dependent on freshwater inputs.
- b) Seek to ensure that water management activities do not adversely impact on the quality of water.
- c) Seek to ensure that groundwater extraction does not adversely impact on identified groundwater dependent ecosystems.

2.2.2 Water Usage and Development Objectives

- a) Provide access to water resources for stock and domestic use.
- b) Provide access to water resources for commercial use.
- c) Manage groundwater extraction within historical groundwater levels and minimise impacts on connected surface water resources.

2.2.3 Social Objectives

- a) Seek to manage flow regimes to ensure the aesthetic and recreational values of the rivulets and creeks are maintained.
- b) Foster the community's involvement in, and understanding of, the management of surface and groundwater resources, and aquatic environments.

PART 3 ADMINISTRATIVE PROVISIONS

3.1 Plan Administration

The Minister will be responsible for the administration and implementation of this Plan

3.2 Water Access Entitlements, Dam and Well Works Permits

For the purposes of this Plan, water licensing and allocation and the permitting of dam and well works will be undertaken in accordance with Parts 6, 7 and 8 of the Act, and will be consistent with this Plan and with the *State Policy on Water Quality Management 1997*, or its equivalent.

3.2.1 Rights Under Part 5 of the Water Management Act

Surface water may be taken for stock and domestic purposes on riparian properties without a licence in accordance with Part 5 of the Act. The quantities of water which may be taken for stock and domestic purposes must be in accordance with the *Water Management Regulations 2009*, as amended from time to time.

An owner or occupier of land may take dispersed surface water from the land for any purpose without a licence under Part 5 of the Act, unless a water management plan provides that a licence is required.

An owner or occupier of land may also take groundwater from the land for any purpose without a licence under Part 5 of the Act, unless a water management plan provides that a licence is required, or an order has been made to appoint the area a groundwater area under section 124(A) of the Act, and the order also provides that groundwater may not be taken from that groundwater area without the authority of a licence.

3.2.2 Water Licences

Holders of water licences within the area of this Plan will be responsible for complying with the terms and conditions as specified on their licences. Where necessary, existing water licences will be varied to be consistent with this Plan in accordance with section 69(2)(d) of the Act.

3.2.3 Transfers of Water Licences and Allocations

Water licences and allocations for either surface water or groundwater resources may be transferred either temporarily (limited period transfer) or permanently (absolute transfer).

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 Part 6 Division 4 of the Act. The Department will use the '*Guiding Principles for Water Trading in Tasmania*' (DPIWE 2004), as amended from time to time, when assessing applications for transfers of water licences and water allocations under the Act.

3.2.4 Conveyance of Water

Water that has been taken in accordance with the Act may be conveyed via a watercourse for extraction downstream. Any conveyance of water via a watercourse will be subject to the granting of a Watercourse Authority under Part 6A of the Act, which may be subject to specific conditions.

3.2.5 Metering Requirements

Commercial water users, including owners of all instream dams within the area of this Plan with a licence allowing the taking of water into the dam, and those who will require a licence to take groundwater, will be required to install metering systems in accordance with relevant Departmental policies and standards.

Water meter installations and reporting of water meter data must be undertaken and managed in accordance with the requirements of the Department.

3.2.6 Dam Works Permits

Dam works are to be undertaken only where a permit authorising those works has been issued under Part 8, Division 4 of the Act. Any works undertaken must be in accordance with the permit's terms and conditions.

A permit to construct a dam is required for all dams except those described in section 137 of the Act which include:

- a) a dam that is not on a watercourse and that holds less than one megalitre of water; or
- b) a dam constructed for the primary purpose of storing waste as defined in the Act (note that the construction of such dams may require authorisations under other legislation);
- c) a levee or bank that is constructed during a flood and removed entirely within four weeks of its construction.

In addition to a barrier across a watercourse, a 'dam' includes an excavation in a watercourse and a permanent flood levee, both of which require a permit under the Act.

3.2.7 Well Works Permits

Well works are to be undertaken only where a permit authorising those works has been issued under Part 7, Division 3 of the Act. Any works undertaken must be in accordance with the permit's terms and conditions.

3.3 Groundwater Management

This Plan recognises the connectivity between surface water and groundwater. Accordingly any extraction of groundwater within the area of this Plan must comply with relevant statutory instruments and the Department's regulations and policies pertaining to groundwater abstraction, licensing and management. Part 6 of this Plan covers groundwater management in detail.

PART 4 SURFACE WATER ALLOCATION

This Plan enables the allocation of water from the relevant surface water resources within specified limits, which have been set to best give effect to the objectives of the Act and the objectives of the Plan.

Allocation of surface water under this Plan takes into account the likely effects on rights under Part 5 of the Act and the relevant water access entitlements of existing users, freshwater ecosystem values identified through the Conservation of Freshwater Ecosystem Values Database, and Water Quality Objectives (where established), as determined under the *State Policy on Water Quality Management 1997* or its equivalent.

With respect to surface water, this Plan recognises the relatively high level of development in the area and the risk of further water allocation eroding the reliability of existing water access entitlements. To ensure the achievement of this Plan's environmental objectives and maintain the reliability of existing water allocations, no further direct take allocations will be granted in any of the catchments within the area of this Plan, with the exception of Pardoe Creek. With respect to the storage period, no further allocations will be granted at existing surety levels.

In recognition of their low reliability, any new allocations granted will be at a lower surety level than existing entitlements, and only where it can be demonstrated that the taking of water under these allocations has no impact on downstream users. Furthermore, any new direct take allocations will also be subject to conditions that ensure allocations at a higher level of surety are given higher priority during times when surface water is limited, whilst any new storage allocations will be subject to the condition that all entitlement holders with higher surety allocations must be able to take their full allocation prior to any water being accessed.

The granting of new water allocations will be undertaken in accordance with Part 6 of the Act, and any relevant policies and guidelines in place at the relevant time. In granting a new water allocation, the Minister may determine that it is to be used only in accordance with conditions for the avoidance, minimisation or management of associated environmental risks (section 58 of the Act).

Any application for a water licence, water allocation or transfer will be assessed on a case by case basis taking into consideration factors such as local hydrology and water availability, impacts on existing water users and freshwater ecosystem values as they relate to the proposed extraction point. The approval of new water allocations or transfers must also be consistent with this Plan's overall catchment allocation limits.

4.1 Surety of Allocations

Where the Minister considers it to be appropriate, a water licence may specify the surety with which a water allocation attached to that licence can be expected to be available for taking (section 56(1)(c) of the Act).

Surety levels indicate the relative priority of any entitlements to take water when supply of water is limited. Surety levels are also used to indicate the reliability of different allocation types, and are listed in descending order of priority below.

Surety Level 1 Rights under Part 5 of the Act for the taking of water for domestic purposes, public health purposes and consumption by livestock or fire fighting. Owners and occupiers of land may take dispersed surface water and groundwater from the land for any purpose. The taking of water under Part 5 of the Act does not require a water licence. In some areas, allocations have been granted under Part 6 of the Act for essential town water supplies at Surety Level 1. There are no Surety Level 1 entitlements in this catchment.

Surety Level 2 Water required to sustain ecosystems dependent on the water resource.

<i>Surety Level 3</i>	Water access entitlements replacing Prescriptive Rights granted under previous Acts. There are no Surety Level 3 entitlements within the area of this Plan.
<i>Surety Level 4</i>	Water access entitlements of special licensees such as Hydro Tasmania (under Part 6, Division 6 of the Act). There are no Surety Level 4 entitlements within the area of this Plan.
<i>Surety Level 5</i>	Water access entitlements under Part 6 of the Act for the taking of water for commercial purposes and non-essential town water supplies, by either direct abstraction or into storage.
<i>Surety Level 6</i>	Water access entitlements under Part 6 of the Act for the taking of water for commercial purposes at a lower level of reliability than Surety Level 5.

4.2 Take Period of Allocations

Under this Plan the take period for all direct take allocations is 1 December to 30 April inclusive. The take period for all storage allocations is 1 May to 30 November inclusive. Where necessary, water licences will be varied under section 69(2)(d) of the Act if the take period specified with respect to water allocations endorsed on those licences is inconsistent with the periods specified above.

4.3 Water to Meet Rights Under Part 5 of the Water Management Act

Volumes of water required to meet Part 5 Rights for stock and domestic use have been estimated using areas of relevant riparian land, likely stocking rates and likely household numbers, discounting those properties with a reticulated domestic water supply. These volumes are set out in Table 2.

Table 2 Estimated annual water volumes required to meet Part 5 stock and domestic needs of riparian properties in each catchment.

Part 5 Stock and Domestic Requirements	
Surety Level	1
Reliability	This water is available within natural flow variations and has the highest priority of access.
Panatana Rivulet	378 ML/year
Greens Creek	194 ML/year
Pardoe Creek	110 ML/year
Andrews Creek	34 ML/year

4.4 Surface Water Allocation Limits

Limiting the volume of water available for allocation to a particular level is an effective measure to ensure that the water regime provided under this Plan retains the broad hydrological characteristics necessary to give effect to the Plan's objectives.

4.4.1 Surface Water Yield

The surface water yield of each catchment for each of the direct take and storage periods has been determined using a hydrological model, which utilises rainfall, evaporation and estimated infiltration data. Yields at different levels of reliability have been determined at each of the catchment outlets over a 36 year period (1970 to 2006), and are set out in Tables 3 and 4.

Detailed groundwater modelling is not yet available for use and hence a coarse groundwater factor has been used in the determination of these yields. Comparisons from preliminary groundwater modelling data indicate that winter surface water yields are likely to be slightly lower and summer yields slightly higher than those presented.

Table 3 Surface water yield for the direct take period for each catchment (at the catchment outlet).

Catchment	Yield (ML)		
	80% Reliability ¹	50% Reliability (Median Yield) ²	20% Reliability ³
Panatana Rivulet	345	830	1,255
Greens Creek	120	379	540
Pardoe Creek	107	253	364
Andrews Creek	31	69	102

Table 4 Surface water yield for the storage period for each catchment (at the catchment outlet).

Catchment	Yield (ML)		
	80% Reliability ¹	50% Reliability (Median Yield) ²	20% Reliability ³
Panatana Rivulet	7,480	14,422	21,550
Greens Creek	2,077	4,548	8,018
Pardoe Creek	1,103	2,136	4,906
Andrews Creek	291	554	1,318

4.4.2 Method to Determine Water Allocation Limits

Surface water allocation limits have been established to identify the volumes of water available for allocation in each catchment, consistent with giving effect to the objectives of this Plan. Generally, the approach used to determine the allocation limit for a river system is based on assessing the volume of water available at a certain level of reliability, taking into account environmental water needs.

¹ Yield at 80% reliability is the volume of water expected to occur 8 years in 10.

² Yield at 50% reliability is the volume of water expected to occur 5 years in 10.

³ Yield at 20% reliability is the volume of water expected to occur 2 years in 10.

This Plan adopts an approach to determining surface water allocation limits that recognises the relatively high level of development in the area and the extent of existing allocations. As such, allocation limits have been set utilising yields with a lower level of reliability than would ordinarily be considered (20%), and hence these limits are less conservative than for other water resources which are less highly developed.

For each catchment, the limit for allocation of surface water in the relevant take period has been calculated using the following:

$$\text{Allocation limit} = (A - B) + [(C - A) \times 0.2]^4$$

where:

A = yield at 80% reliability (based on historical flow and modelled data for the relevant take period between 1970 and 2006);

B = the volume of water deemed necessary for stock and domestic use (including fire fighting) and for the basic ecological functions of the freshwater environment (which includes the maintenance of water quality);

C = yield at 20% reliability (based on historical flow and modelled data for the relevant take period between 1970 and 2006).

4.4.3 Direct Take Allocations

Allocation limits for the direct take period are set out in Table 5. Given the relatively high level of direct take allocation, there is a significant risk that further allocation of water would reduce the reliability of existing entitlements, increase the frequency and duration of low and cease to flow periods, and impact upon the taking of water for stock and domestic purposes.

Hence, no further direct take allocations will be made available under this Plan, with the exception of Pardoe Creek. Any further direct take allocations will be granted in Pardoe Creek at a lower surety level than existing entitlements, and only where it can be demonstrated that the taking of water under these allocations has no impact on downstream users. Furthermore, these allocations will also be subject to conditions that ensure allocations at a higher surety level are given higher priority during times when surface water is limited. Any further allocation of water granted in Pardoe Creek during the direct take period must be recognised as having a low level of reliability.

Table 5 Allocation limits for the direct take period in each catchment of the Sassafras Wesley Vale area, indicating the volume of water available for allocation at the catchment outlet⁵.

Catchment	Existing Allocations (ML) ⁶	Allocation Limit (ML)
Panatana Rivulet	232	230
Greens Creek	182	120 ⁷
Pardoe Creek	23	110
Andrews Creek	104	32 ⁸

⁴ Limiting allocation to a 20% proportion of the yield is considered to provide a conservative “rule of thumb” approach.

⁵ Water availability at a local scale will be dependent on location in the catchment.

⁶ As at the date of this Plan’s adoption.

⁷ Preliminary groundwater modelling data indicate that summer yields are likely to be slightly higher than those presented due to groundwater discharge to surface water.

⁸ The yield of Andrews Creek is considered to be significantly higher due to groundwater discharge through springs, which has not been able to be quantified to date.

4.4.4 Storage Allocations

Allocation limits for the storage period are set out in Table 6. There is scope for a small amount of further allocation in each of the four catchments.

This Plan recognises the importance of maintaining the reliability of existing entitlements, and hence any further allocation of water during the storage period will be granted at a lower surety level. Further allocations will also be subject to the condition that all allocations at a higher surety level must be met in full prior to any water being accessed. Consequently, all further allocations must be considered as having a relatively low level of reliability.

Table 6 Allocation limits for the storage period in each catchment of the Sassafras Wesley Vale area, indicating the volume of water available for allocation at the catchment outlet⁹.

Catchment	Existing Allocations (ML) ¹⁰	Allocation Limit (ML)	Volume Available for Allocation (ML) ¹⁰
Panatana Rivulet	4,101	4,629	528
Greens Creek	1,898	2,050	152
Pardoe Creek	872	1,346	474
Andrews Creek	112	370	258

4.5 Conversion of Surety Level 6 Allocations to Surety Level 5 Allocations

At the date of this Plan's adoption, a very small volume of water has been allocated at Surety Level 6 in the storage period: 121 ML in the Panatana Rivulet catchment and 45 ML in the Pardoe Creek catchment. Under this Plan, these allocations will be converted to Surety Level 5 allocations so that all existing entitlements will be of the same surety level. It is not expected that this conversion will have any adverse impact, given the volume of these Surety Level 6 allocations is very small in comparison to the overall level of allocation in each catchment.

4.6 Temporary Water Allocations

Temporary water allocations may be granted in accordance with section 90 of the Act, permitting the taking of water from storages where an authorisation does not otherwise exist. The granting of Temporary Water Allocations will be subject to a rule to be determined by the Department, ensuring that the taking of water under a Temporary Water Allocation:

- (a) is consistent with this Plan;
- (b) does not adversely affect the taking of water by other persons with a right to take water from the water resource; and
- (c) does not cause material environmental harm or serious environmental harm.

⁹ Water availability at a local scale will be dependent on location in the catchment.

¹⁰ As at the date of this Plan's adoption.

PART 5 SURFACE WATER ACCESS RULES

5.1 Restriction Management

In accordance with Part 6, Division 3 of the Act, the taking of water from a watercourse in the area of this Plan will be restricted or prohibited in the event of there being inadequate water. In such instances, the restriction or prohibition of the taking of water will be undertaken in observance of the surety level of water allocations, in accordance with section 94 of the Act.

Within the area of this Plan, the restriction or prohibition of the taking of water from a watercourse will be undertaken through the administration of a cease to take provision, and an associated staged restriction protocol where necessary.

The cease to take provision ensures the preservation of base flows up to a minimum level to meet domestic and stock watering supplies, maintain water quality and provide refuge for instream biotic communities during dry times. This is achieved by setting a flow threshold such that, when river flow drops to this threshold, the taking of water from a watercourse by licence holders, for commercial purposes, is prohibited. It should be noted that during extended dry periods, stream flows may naturally fall below the cease to take threshold.

5.1.1 Cease to Take Provision

Through the implementation of a cease to take provision, it is intended that minimum stream flows up to 0.4 ML/day will be maintained throughout the Panatana Rivulet and Greens Creek systems, and up to 0.25 ML/day will be maintained throughout the Pardoe Creek and Andrews Creek systems.

When the relevant threshold flows can no longer be maintained over a 24 hour period throughout the Panatana Rivulet and Greens Creek systems (0.4 ML/day) and the Pardoe Creek and Andrews Creek systems (0.25 ML/day), the taking of water from a watercourse, other than for stock and domestic purposes through rights under Part 5 of the Act, will not be permitted.

Before cease to take flow thresholds are reached, an Authorised Officer will assess whether adequate flow is being maintained throughout each of the catchments. Stream flow will be assessed at the monitoring sites set out in Table 7, as well as other locations deemed appropriate by an Authorised Officer, during periods of active management.

Table 7 Main surface water monitoring sites in each catchment (temporary structures may be deployed at any time for management purposes).

Catchment	Monitoring Site	Easting	Northing
Panatana Rivulet	Stream flow gauging station at Parkers Ford Road	460840	5438770
	Eastford Creek - v-notch weir at Oppenheims Road (temporary).	458840	5434640
	Westford Creek - v-notch weir at Valleyfield Road (temporary).	456640	5434640
	Upper Panatana Rivulet - v-notch weir at Valleyfield Road (temporary).	456800	5434120
Greens Creek	Gauge board at Frankford Road (temporary).	463171	5434642
	V-notch weir at Greens Creek Road (temporary).	461910	5428640
Pardoe Creek	V-notch weir at Pardoe Road (temporary).	450910	5440930
Andrews Creek	V-notch weir at Mill Road (lower) (temporary).	452520	5441580
	V-notch weir at Mill Road (upper) (temporary).	454470	5440380

Notwithstanding the cease to take provision, an Authorised Officer may, in accordance with Part 6, Division 3 of the Act, apply restrictions on, or prohibit the taking of water from, any watercourse in the area of this Plan at any time, if the rate at which water is taken is such that the quantity of water available can no longer meet stock and domestic water needs.

Whenever the cease to take provision is in effect during the storage period (1 May to 30 November inclusive), owners of an instream dam are required to ensure that its outlet is operated to pass all inflow entering the storage. If the outlet is unable to pass all flows entering the storage then it must be operated at maximum capacity until such time as inflows and outflows are equal, or the cease to take provision no longer applies.

5.2 Management of Inflows and Outflows from Dams

Notwithstanding the other provisions of this Plan, owners of instream dams must comply with any specific licence conditions in regard to the passing of inflows to their dam.

5.3 Variation to Period for Taking Direct Allocations

Notwithstanding Part 4.2 of this Plan, an Authorised Officer may, upon a request from a licence holder with a direct take allocation, notify that licensee that they are permitted to take water under their allocation prior 1 December. This decision will be based upon whether there have been sufficient flows in the relevant catchment to enable licensees with storage allocations to take their full allocations.

PART 6 GROUNDWATER MANAGEMENT

This Plan sets out a range of groundwater management provisions that will progressively be developed and implemented to best give effect to the objectives of the Act and the objectives of the Plan. Groundwater management provisions will be implemented in accordance with Parts 6 and 7 of the Act.

At the date of this Plan's adoption, an owner or occupier of land within the area of the Plan may take groundwater from the land for any purpose without the authority of a licence, under Part 5 of the Act. This Plan specifies how groundwater resources will be licensed, allocated and managed.

6.1 Groundwater Availability and Extraction

Estimates of the major components of the water budget for the groundwater systems in the Sassafras Wesley Vale area have recently been completed, based on historical hydrogeological investigations and modelling (DPIW 2009b).

Historical estimates of groundwater extraction, based on limited surveys of groundwater users, suggest that between 1,200 and 4,800 ML of groundwater is extracted annually on average. During dry summers when surface water becomes limited, higher levels of groundwater extraction are likely to take place. Average groundwater inflow (vertical and lateral recharge) for the area is estimated to be 16,380 ML/year but other estimates vary between 12,000 and 30,000 ML/year (DPIW 2009b). These estimates indicate that up to 29% of the average annual recharge is extracted each year, which is considered to pose a low to moderate risk to groundwater resources at a regional scale.

Long-term monitoring has shown that there is no consistent trend of declining or rising groundwater levels. There is a seasonal pattern of decline over the summer period followed by recovery over winter as groundwater is recharged. In drier years or following a series of dry years, groundwater levels may not fully recover or the recovery may be delayed, though recovery generally occurs eventually with sufficient recharge. Between 2006 and 2008 however, there was only a limited recovery of groundwater levels due to reduced rainfall recharge, and increased groundwater extraction.

These patterns of change in groundwater levels indicate that recharge is usually sufficient to balance the natural discharge and extraction from the system. If, however, there is a prolonged decline in groundwater recharge resulting from a sustained decline in rainfall, or if there is a significant increase in groundwater extraction, this could affect the annual recovery in groundwater levels. This may result in a continuing decline of groundwater levels at a regional scale and a consequent reduction in groundwater discharge to streams.

In addition, no detailed assessment has been made of the localised impacts of groundwater extraction on other water users, significant environmental values which are groundwater dependent and on surface water systems in this area. Recent groundwater investigation and modelling (described in DPIW 2009b) show that all of the streams in the area are groundwater dependent to some extent. If groundwater levels and flows are decreased due to increased groundwater extraction, spring discharge to surface water and river base flows may be affected.

This recent investigation has also shown the high level of connectivity between groundwater and surface water systems and the potential risk to surface water flows from groundwater extraction. Over the whole area, stream base flows make up approximately 43% of the total average annual surface water runoff. However, these base flows are likely to largely be derived from groundwater discharge, not surface water runoff.

Because of the potential risks of groundwater extraction identified above, it is necessary to progressively introduce groundwater management provisions to ensure sustainable use and development of groundwater resources in the Sassafras Wesley Vale area. At the date of this Plan's adoption, it is intended that licensing and allocation of groundwater extraction for

commercial purposes will be introduced following a detailed survey of the use of groundwater for all purposes.

It is also intended that the metering of major groundwater extraction will be introduced, and that monitoring and investigation of groundwater systems in the area will continue.

6.2 Appointment of Groundwater Area

It is intended that the Minister will, by order, appoint, name and define the Sassafras Wesley Vale area as a groundwater area under section 124A of the Act, within twelve months of the adoption of this Plan. It is intended that the order will provide that groundwater may not be taken for commercial purposes from the groundwater area without the authority of a licence.

This will enable the taking of groundwater in the area for commercial purposes to be licensed and allocations granted. Whilst licences and allocations will be required for extraction of groundwater for commercial purposes, the taking of groundwater for stock and domestic purposes will not require a licence.

At the time of adoption of this Plan, the Department is developing a regulatory framework for the introduction of groundwater licensing, allocation and metering within appointed groundwater areas. Under section 135B of the Act, until such time as groundwater licensing has been implemented within the area of this Plan, or until further notification, no applications for well works permits will be approved unless the proposed well is replacing water extraction from an existing well or is solely for stock and domestic purposes.

6.3 Groundwater Survey

The Department will undertake a detailed survey of the taking of groundwater for all purposes, including stock and domestic, irrigation and other commercial uses. This survey will form the basis for the initial allocation of groundwater to commercial groundwater users.

6.4 Groundwater Allocation

Allocation of groundwater under this Plan will take into account the likely effects on rights under Part 5 of the Act and the relevant water access entitlements of existing users, freshwater ecosystem values identified through the Conservation of Freshwater Ecosystem Values Database and Water Quality Objectives (where established), as determined under the *State Policy on Water Quality Management 1997* or its equivalent.

The granting of groundwater allocations and the transfer of groundwater allocations will be undertaken in accordance with Part 6 of the Act, and any relevant policies and guidelines in place at the time. In granting a new groundwater allocation, the Minister may determine that it is used only in accordance with conditions for the avoidance, minimisation or management of associated environmental risks (section 58 of the Act).

Any application for a water licence, new allocation or transfer will be assessed on a case by case basis taking into consideration factors such as local hydrology and water availability, impacts on existing water users and freshwater ecosystem values as they relate to the proposed extraction point.

As the estimated level of groundwater extraction relative to annual groundwater recharge is relatively high in the Sassafras Wesley Vale area, and the impacts of this extraction are not well defined or quantified, groundwater allocation will be limited initially to the existing level of extraction at the date of this Plan's adoption. This is to limit the risks of further impacts arising from additional groundwater extraction above historical levels.

Groundwater allocations granted to existing commercial users will be based on an assessment of demonstrated historical groundwater extraction (Part 6.3 of this Plan). Allocations will be granted for the taking of groundwater for commercial purposes. The taking of groundwater by an owner or occupier of land for stock and domestic purposes without the authority of a licence will continue to be allowed under Part 5 of the Act.

If additional studies are able to clearly demonstrate that additional groundwater extraction will not pose unacceptable risks, additional groundwater allocations may be able to be granted.

6.5 Restriction on the Taking of Groundwater

In accordance with Part 6, Division 3 of the Act, the taking of water from a well within the area of this Plan may be restricted or prohibited in the event of there being inadequate water. In such instances, the restriction or prohibition of the taking of water will be undertaken in observance of the surety level of water allocations, in accordance with section 94 of the Act.

6.5.1 Restriction Due to Low Groundwater Levels

If the seasonal level of groundwater in any monitoring well is measured at or below the historical autumn minimum level or lowest historical spring peak levels (recorded prior to 2006), the taking of groundwater other than for stock and domestic purposes may be restricted or prohibited as a precautionary measure, whilst investigations of the risks posed to groundwater levels by continuing extraction are conducted.

Restriction on the taking of groundwater will be based on the groundwater level thresholds, specified for relevant monitoring wells, set out in Table 8.

Table 8 Groundwater level thresholds for relevant monitoring wells.

Monitoring Well	Easting	Northing	Sub-basin	Spring Threshold Level (mbgs)	Autumn Threshold Level (mbgs*)
Stewart	461103	5437180	Port Sorell	1.25	4.5
Swan	460530	5430882	Sassafras	5.0	6.0
Richardson	460446	5432878	Sassafras	3.75	7.0
Beveridge	460340	5434675	Wesley Vale	10.25	12.0
Bramich	457824	5434733	Wesley Vale	7.75	9.0
Mitchell	455988	5435250	Wesley Vale	5.5	9.5
Foster	453570	5437827	Wesley Vale	1.75	3.5
Rockliff	456974	5429939	Sassafras	3.75	6.25
Marshall	448965	5440270	Wesley Vale	7.0	9.0
Atkins	453656	5439603	Wesley Vale	9.75	10.5
Thirlstane Golf Club	461383	5438982	Port Sorell	0.5	1.75

*metres below ground surface

6.5.2 Restriction Due to Limited and Connected Surface Water Resources

Due to connectivity between surface water and groundwater resources, the taking of groundwater from a well adjacent to a watercourse has the potential to directly and immediately affect stream flow in the same way as the direct extraction of water from the watercourse.

Under this Plan, when the cease to take provision is in effect in any of the surface water catchments (Part 5.1.1 of this Plan), the taking of groundwater, other than for stock and domestic purposes, from any wells within close proximity of a relevant watercourse may be restricted or prohibited in the same way as for the taking of surface water specified by the restriction notice. Available surface and groundwater monitoring information will be taken into consideration and an assessment made of the likely impacts of further groundwater extraction on surface water flows, prior to any restriction.

PART 7 MONITORING AND REPORTING

Information relating to the effectiveness of this Plan's water management provisions in achieving its environmental, water usage and development and social objectives will be collected and reported.

The basis of measuring this Plan's effectiveness in achieving its objectives will be to analyse stream flow gauging and water extraction and management information to determine whether the Plan's provisions were properly implemented in a reporting period, and if as a result of implementing those provisions, the intended water regime and specific river flow conditions were achieved with respect to environmental and water access outcomes.

7.1 Monitoring

7.1.1 Stream Flow Monitoring

River height and stream flow will be recorded at the various stream flow monitoring sites in the area of the Plan. Stream flow data will be made available on the Department's Water Information System Tasmania (WIST) website. Continued maintenance of stream flow gauging stations is subject to the availability of resources within the Department for this purpose.

7.1.2 Groundwater Monitoring

Monitoring of groundwater levels in the area will continue as a part of the Tasmanian Groundwater Monitoring Network. Groundwater monitoring data will be made available on the Department's WIST website. The names and locations of existing groundwater monitoring sites are presented in Table 4 in Part 6 of this Plan.

7.1.3 Surface Water Allocations

Changes to the number and total volume of licensed surface water allocations will be recorded. This information will be used to ensure that the total volume of water allocated in the catchments is not in excess of the provisions in Part 4 of this Plan. Water licence information is available on the Department's WIST website

7.1.4 Installation of Water Meters

Records of water meters installed within the area of this Plan will be maintained.

7.1.5 Water Extraction

Licensees will be required to record and report water meter data in accordance with the requirements of the Department.

7.1.6 Transfers of Licences and Allocations

Transfers of water licences and allocations within the area of this Plan and any water conveyed under a Watercourse Authority will be recorded.

7.1.7 Restriction Management

The Department will maintain records of, and monitor compliance with, any water restrictions within the area of this Plan.

7.1.8 River Health and Water Quality Monitoring

Additional surveillance monitoring information relating to the environment may be drawn upon where appropriate. It should be noted that the collection and reporting of this type of information will be dependent on Departmental resources and programs as they are implemented from time to time.

Where available, this type of information will provide an overall appraisal of the condition of the area's water resources and freshwater ecosystems. Any trends in this information will provide an indication of the sum total of all management actions in the area, and hence the information is limited in the extent to which it can be used to directly assess the performance of this Plan.

Under various programs, information may be collected relating to biological health, water quality and instream habitat condition at selected sites within the area of this Plan.

7.2 Reporting

The Department will report annually on the effectiveness of this Plan's water management provisions in achieving its environmental, water usage and development and social objectives.

PART 8 STATUTORY REQUIREMENTS UNDER SECTIONS 14 AND 15 OF THE *WATER MANAGEMENT ACT 1999*

Part 8 of this Plan provides details of the statutory requirements, as set out under Part 4 of the Act, that need to be addressed during the development of this Plan.

8.1 A Statement of the Objectives of the Plan, Including the Environmental Objectives (Section 14(2)(a))

8.1.1 Environmental Objectives

- a) Seek to manage flow regimes and groundwater levels and fluxes to:
 - (i) protect refuges of instream biotic communities during dry periods;
 - (ii) protect identified freshwater ecosystem values and natural geomorphic processes;
 - (iii) maintain estuarine processes dependent on freshwater inputs.
- b) Seek to ensure that water management activities do not adversely impact on the quality of water.
- c) Seek to ensure that groundwater extraction does not adversely impact on identified groundwater dependent ecosystems.

8.1.2 Water Usage and Development Objectives

- a) Provide access to water resources for stock and domestic use.
- b) Provide access to water resources for commercial use.
- c) Manage groundwater extraction within historical groundwater levels and minimise impacts on connected surface water resources.

8.1.3 Social Objectives

- a) Seek to manage flow regimes to ensure the aesthetic and recreational values of the rivulets and creeks are maintained.
- b) Foster the community's involvement in, and understanding of, the management of surface and groundwater resources, and aquatic environments.

8.2 A Description 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 this Plan is one that represents a balance in providing water to maintain environmental values and providing water for consumptive and other purposes.

In considering the balance provided by this water regime, it is important to understand the underlying environmental and water use context.

Whilst the relevant catchments retain some characteristics of the natural flow regime, such as frequency, duration and magnitude of high flow events, and the general long-term pattern of groundwater flows, the significant use and development of surface water resources for agricultural purposes is reflected in a relatively high level of hydrological modification. Furthermore, increasing commercial use of groundwater to supplement surface water use has the potential to impact not only groundwater flows, but also further modify surface water hydrology.

In regard to the Sassafras Wesley Vale area's freshwater ecosystems, whilst surface water hydrology has been significantly modified, important values remain. The water needs of these values are related mostly to the high flow components of the surface water flow regime, as well as groundwater flows and levels (DPIW 2008).

The context for seeking a water sharing balance is therefore clearly centred on a high level of consumptive water use to underpin highly productive agriculture, a modified hydrological regime, and a limited number of freshwater environmental values to which the maintenance of historic groundwater levels is of high importance.

As a result, this Plan's water regime ensures the continued provision of secure and certain access to water for consumptive and other purposes, whilst providing water needed to support the remaining environmental values.

The key components of the water regime that are relevant to the objectives of this Plan include:

- a) base flows that provide water to meet stock and domestic needs, maintain water quality and refuges for aquatic biota during dry times;
- b) moderate flows (freshes) and high flows that provide reproductive cues and dispersal mechanisms for some biota, and are important for transporting material (organic matter, sediments and nutrients) downstream and maintaining geomorphic processes;
- c) flood flows that support riparian zones, floodplains and wetlands, and maintain connectivity and exchange of resources between the river and its floodplain;
- d) groundwater flows and levels critical to the habitat of the species which are natural values in the area and surface water base flows, and the consumptive use of groundwater;
- e) freshwater inputs to support estuarine processes and habitats.

It is worth highlighting that the water regime provided by this Plan maintains the reliability of existing surface water allocations, notwithstanding potential impacts of climate change. This is achieved through the provision of allocation limits on surface water resources, and by initially limiting groundwater extraction to the level existing at the date of this Plan's adoption. Furthermore, this Plan provides for the progressive introduction of groundwater management provisions to ensure secure and certain access to groundwater and to maintain the reliability of groundwater supply.

Under this Plan, the water regime is managed through a combination of:

- a) the provision of catchment surface water allocation limits, which prevent any further allocation of surface water in the area at Surety Level 5, thereby maintaining the reliability of existing surface water allocations and ensuring water is available to maintain environmental values;
- b) the application of seasonal and daily limits on surface water abstraction, based on the location of the resource and individual allocations;
- c) the application of a cease to take provision for the entire year, which prohibits the taking of surface water below a certain threshold flow;
- d) licence requirements to manage the passing of flows through instream storages;
- e) the progressive introduction of groundwater management provisions: licensing; allocation; restriction on extraction; and metering.

8.3 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))

Under this Plan, the management of water resources in the Sassafras Wesley Vale area provides:

- a) secure access to water for stock and domestic purposes;
- b) a flow regime that meets the needs of aquatic ecosystems and maintains identified ecosystem values;
- c) secure and certain access to water for irrigation and other commercial purposes.

These outcomes are achieved through the provision of a water regime that best gives effect to this Plan's environmental, water usage and development and social objectives.

8.3.1 Environmental Objectives

- a) *Seek to manage flow regimes and groundwater levels and fluxes to:*
 - (i) *protect refuges of instream biotic communities during dry periods;*
 - (ii) *protect identified freshwater ecosystem values and natural geomorphic processes;*
 - (iii) *maintain estuarine processes dependent on freshwater inputs.*

A key consideration in managing the water resources in a catchment is the provision of a water regime that meets the needs of freshwater ecosystems. Given the intensive level of water use and development supporting agricultural businesses in this highly productive area, and significant modification to the hydrology and freshwater habitats of the relevant water resources, this Plan is focused on maintaining identified freshwater ecosystem values.

The main freshwater ecosystem values identified in the area are largely wetland species including a number of floral species and the green and golden frog, and species that rely on elevated groundwater levels during dry times such as the Central North burrowing crayfish (DPIW 2007; 2008).

In addition a number of estuarine bird and some fish species have been identified in the lower reaches of Panatana Rivulet and Greens Creek which are a part of the greater estuarine environment of Port Sorell and the Rubicon estuary. In summary, the water needs of these freshwater ecosystem values are most closely associated with the maintenance of the high flow components of the surface water regime and groundwater levels.

Surface water allocation limits and access rules, and the progressive introduction of groundwater management provisions are the key measures utilised by this Plan to provide a water regime that gives effect to its environmental objectives.

Limiting the volume of water available for allocation to a particular level is an effective measure in setting the overall hydrological character of a river system. Generally, the approach used to determine the sustainable allocation limit for a river system is based on assessing the volume of water available at a certain level of reliability, taking into account environmental water needs.

By determining the volume of water available for allocation, this Plan also provides water users with certainty as the reliability of their allocations will not be eroded by continuing allocation.

The approach to determining allocation limits is one in which water for the environment and stock and domestic use is "quarantined" from allocation. Under this Plan, the limit for allocation of surface water in the relevant take period has been calculated using the following:

$$\text{Allocation limit} = (A - B) + [(C - A) \times 0.2]$$

where:

A = yield at 80% reliability (based on historical flow and modelled data for the relevant take period between 1970 and 2006);

B = the volume of water deemed necessary for stock and domestic use (including fire fighting) and for the basic ecological functions of the freshwater environment (which includes the maintenance of water quality);

C = yield at 20% reliability (based on historical flow and modelled data for the relevant take period between 1970 and 2006).

The method to calculate the volume of water deemed necessary for the environment and stock and domestic purposes (and hence that is not to be allocated) is twofold. Firstly, for each of the storage and direct take periods, the volume of water deemed necessary for the environment and stock and domestic purposes is derived by adding the 20th percentile yield (storage period) and 30th percentile yield (direct take period) for each of the months in the relevant take period (B in the equation set out above). Secondly, an 80% proportion of the volume of water derived by subtracting the yield at 80% reliability (A in the equation set out above) from the yield at 20% reliability (C in the equation set out above) is retained for the environment (hence, a 20% proportion of this volume is available for allocation).

Under this Plan, water allocation at the existing level of surety at the date of the Plan's adoption (Surety Level 5) will be limited to between 30% and 43% of the median annual yield of the relevant surface water resources, ensuring that certain elements of the natural flow regime are maintained into the future, particularly the high flow elements. Whilst these flow regimes have been significantly modified, the retention of high flow events is important for identified freshwater ecosystem values and geomorphic processes, as well as estuarine processes dependent on freshwater inputs.

Any additional surface water allocations made under this Plan will be at a lower level of surety than existing allocations, in recognition of their low level of reliability. Any new direct take allocations will also be subject to conditions that ensure allocations at a higher level of surety are given higher priority during times when surface water is limited, whilst any new storage allocations will be subject to the condition that all entitlement holders with higher surety allocations must be able to take their full allocation prior to any water being accessed.

These allocation limits are not as conservative as for other surface water resources in Tasmania, reflecting the greater level of consumptive water demand and the limited freshwater environmental values in the Sassafras Wesley Vale area. The management of groundwater levels will be the most significant factor in preserving identified freshwater ecosystem values, which are mostly groundwater dependent (DPIW 2007; 2008).

One of the greatest challenges in the management of surface water resources in the Sassafras Wesley Vale area is maintaining a base flow during dry periods, and limiting the impact of dam development on the attenuation of freshes and high flows. Under natural conditions, it is likely that base flows were maintained by instream springs, however these flows are now largely intercepted by instream dams.

The cease to take provision and management of flow passage through dams provide the basis for ensuring the maintenance of base flow up to a minimum level. It is acknowledged that the cease to take flow thresholds under this Plan are relatively low. The focus of the cease to take provision is on ensuring the preservation of sufficient base flow to meet stock and domestic needs and to provide some refuge habitat during naturally dry periods. Groundwater extraction may also be limited to ensure that base flow is maintained where required.

There have been no specific environmental flow assessments undertaken for the relevant water resources. However, an assessment of freshwater ecosystem values indicates that these are largely groundwater dependent, and there are limited values within watercourses

(DPIW 2008). Hence the cease to take threshold is relatively low and the environmental benefits of a higher threshold are not considered sufficient to warrant the potentially significant impacts on water dependent businesses that would result.

The progressive introduction of groundwater management provisions will provide the basis for limiting extraction of groundwater where and when necessary to maintain groundwater levels to support dependent ecosystems. The maintenance of groundwater levels should also assist in maintaining the base flow component of the relevant surface water resources (DPIW 2008).

b) Seek to ensure that water management activities do not adversely impact on the quality of water.

The key flow-related risks to water quality in the relevant water resources are an increased frequency and duration of cease to flow events, and the potential release of poor quality water from dams for conveyance downstream. Under this Plan, the cease to take provision will ensure there is no increased frequency and duration of cease to flow events. This provision will also be supported by the management of flow passage through instream dams and the management of groundwater levels through the progressive introduction of groundwater management provisions.

Any conveyance of water via a watercourse will need to be authorised under Part 6A of the Act, ensuring that potential water quality issues can properly be assessed and considered.

c) Seek to ensure that groundwater extraction does not adversely impact on identified groundwater dependent ecosystems.

The progressive introduction of groundwater management provisions under this Plan will aim to ensure that groundwater extraction does not significantly impact on identified groundwater dependent ecosystems.

Historical monitoring of groundwater levels since the 1980s does not indicate that there is any consistent long-term change in groundwater levels, either up or down, across the region. There has been a decline in levels since 2006, which can largely be attributed to greatly reduced rainfall and recharge, and possibly also increased extraction as a result of the extended period of dry conditions and limited surface water availability. Groundwater monitoring indicates that in most years groundwater levels recover from the effects of extraction over the summer period. The main effect of extraction is likely to have been to increase the annual amplitude of fluctuations in groundwater levels. This suggests that the existing levels of groundwater extraction may not result in further significant changes to water regimes in most years, but this needs to be verified through additional investigation.

8.3.2 Water Usage and Development Objectives

a) Provide access to water resources for stock and domestic use.

Under the *Water Management Act 1999*, priority of access for stock and domestic use is conferred through the highest level of surety (Surety Level 1) afforded to Part 5 Rights. This Plan ensures access for stock and domestic use through the application of surface water allocation limits and the cease to take provision. Together, these measures ensure that water required to meet stock and domestic needs is not allocated to other uses, and that base flows are maintained up to a sufficient level.

Whilst the flow from springs generally provides some level of continuous surface flow, it must be emphasised that in the event of extended dry periods, naturally occurring cease to flow events may limit the availability of surface water for stock and domestic purposes.

b) Provide access to water resources for commercial use.

This Plan provides for the allocation of water for irrigation and other commercial purposes, and fair and equitable access to water under those allocations. This Plan also provides certainty by ensuring that the allocation of water will be conducted on the basis that the

reliability of existing water access entitlements is not eroded. It must be recognised, however, that the reliability of existing entitlements may be reduced through the impacts of climate change and drought.

An assessment of surface water yield of the relevant water resources indicates that any further allocation of water at the same level of surety of existing allocations is likely to reduce the reliability of those allocations. To ensure the achievement of this Plan's environmental objectives and maintain the reliability of existing water allocations, no further direct take allocations will be granted in any of the catchments within the area of this Plan, with the exception of Pardoe Creek. With respect to the storage period, no further allocations will be granted at existing surety levels. In recognition of their low reliability, any new allocations granted will be at a lower surety level than existing entitlements, and only where it can be demonstrated that the taking of water under these allocations has no impact on downstream users. Any new direct take allocations will also be subject to conditions that ensure allocations at a higher level of surety are given higher priority during times when surface water is limited, whilst any new storage allocations will be subject to the condition that all entitlement holders with higher surety allocations must be able to take their full allocation prior to any water being accessed.

- c) *Manage groundwater extraction within historical groundwater levels and minimise impacts on connected surface water resources.*

The progressive introduction of groundwater management provisions under this Plan will ensure that groundwater extraction is managed within historical levels, and that a fair and equitable framework to allocate and share groundwater is in place. Impacts on connected surface water resources will also be minimised through the application of restrictions on groundwater extraction adjacent to watercourses, where necessary.

8.3.3 Social Objectives

- a) *Seek to manage flow regimes to ensure the aesthetic and recreational values of the rivulets and creeks are maintained.*

People in the lower part of Panatana Rivulet use the river and estuarine area at Port Sorell for aesthetic and recreational purposes including boating, fishing and swimming (DPIWE 2003). In ensuring there is no increase in the frequency and duration of cease to flow events, this Plan should not limit recreational and aesthetic values through an increased incidence of flow-related water quality impacts.

- b) *Foster the community's involvement in, and understanding of, the management of surface and groundwater resources, and aquatic environments.*

This Plan represents a set of water management arrangements for the Sassafras Wesley Vale area which have been developed in consultation with the local community. A key element in this consultation focused on the development of relevant objectives for this Plan.

This Plan will also provide opportunity for ongoing involvement of the community in the progressive development and implementation of groundwater management provisions.

8.4 An Assessment of Likely Detrimental Effects of the Plan on the Quality of Water (Section 14(2)(d))

Under the *State Policy on Water Quality Management 1997*, Protected Environmental Values (PEVs) for surface waters have been identified for the Greater Rubicon catchment (DPIWE 2003), within which the Sassafras Wesley Vale area lies. PEVs are values or uses of the environment for which it has been determined that a given area of the environment should be protected, and form the basis of water quality management.

Water Quality Objectives (WQOs) for a specific body of water are 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. As yet, WQOs have not been set for the catchments in the Sassafras Wesley Vale area.

This Plan is consistent with the *State Policy on Water Quality Management 1997*, in that it is not likely to prevent the achievement of the PEVs nominated for the Greater Rubicon catchment in which the Sassafras Wesley Vale area lies, nor is it likely to prevent the achievement of WQOs once they are established.

It is unlikely that this Plan will prejudice the achievement of future WQOs associated with the protection of identified PEVs for the Greater Rubicon catchment. It is considered that the flow conditions that are most likely to lead to a reduction in water quality, for example cease to flow or very low flow events, are not likely to occur with any greater frequency or duration as a result of the water regime provided by this Plan.

It is therefore concluded that this Plan is not likely to have any detrimental effects on water quality.

8.5 An Assessment of the Capacity of the Relevant Resources to Meet the Likely Demands for Water by Existing and Future Users (Section 15(a))

Under this Plan, the demand for water for stock and domestic purposes should mostly be met within the capacity of the resource, notwithstanding naturally dry periods potentially limiting this supply at certain times.

Within the allocation limits established under this Plan, the relevant surface water resources are fully utilised under current agricultural production. However, the reliability of a significant portion of these allocations is relatively low, hence current demands are not fully met all of the time. Furthermore, there is no scope for significant expansion of irrigated agriculture to take advantage of the highly fertile soils and the significant agricultural production capacity of the region.

Farmers also use local groundwater in addition to surface water resources. Results of surveys of groundwater extraction undertaken in the area indicate that up to 5,000 ML is taken annually (DPIW 2009b). The reduced rainfall and surface water flows experienced in recent years, together with increased demand for irrigation water has led to a greater reliance on groundwater extraction, and probably higher levels of extraction.

Monitoring of groundwater resources to date suggests that groundwater extraction within most of the area has generally not caused long-term declines in groundwater levels. However, some monitoring wells have shown a reduced rate of recharge since 2006, most likely due to the reduced winter rainfall, possibly in conjunction with some increase in groundwater extraction. In addition, evidence from past research suggests that increased levels of groundwater extraction may not be sustainable when there are consecutive years of lower than average recharge from winter rainfall.

Future opportunities for water development within the area of this Plan are likely to be provided through the Sassafras Wesley Vale Irrigation Scheme. By transferring water from the Mersey River catchment, the Scheme will provide highly reliable water giving security to existing businesses as well as providing scope for irrigation expansion within the area of this Plan.

8.6 Likely Effects of the Plan on Existing and Future Users, Including Any Effects on Businesses Carried on by those Users (Section 15(b))

This Plan is unlikely to have any impact on existing licensed water users with surface water allocations, as the Plan makes no changes to current water management practices. Access to surface water will be maintained in the context of existing licensed water allocations and the rules regarding access to water under those allocations. This Plan will protect the reliability of existing surface water allocations, as there will be no further direct take allocations granted in any of the catchments within the area of this Plan, with the exception of Pardoe Creek. With respect to the storage period, no further allocations will be granted at existing surety levels.

In recognition of their low reliability, any new allocations granted will be at a lower surety level than existing entitlements, and only where it can be demonstrated that the taking of water under these allocations has no impact on downstream users. Furthermore, any new direct take allocations will also be subject to conditions that ensure allocations at a higher level of surety are given higher priority during times when surface water is limited, whilst any new storage allocations will be subject to the condition that all entitlement holders with higher surety allocations must be able to take their full allocation prior to any water being accessed.

By ultimately establishing limits to the extraction of groundwater, this Plan will ensure that groundwater resources are managed on a sustainable basis. In this regard, this Plan will potentially impact commercial groundwater users as there are currently no limits on groundwater extraction.

However, this impact is likely to be mitigated by the provision of an alternative water supply through the Sassafras Wesley Vale Irrigation Scheme. Whilst there will be a cost associated with taking water from the Scheme, it must be recognised that the level of reliability of this water is extremely high.

PART 9 INTERPRETATION AND DEFINITIONS

Words used in this Plan have their ordinary meanings as defined in the Macquarie Dictionary unless otherwise defined in the Plan or the *Water Management Act 1999*. A reference in this Plan to any legislation is to be taken as a reference to such legislation as it may be amended from time to time.

9.1 Statutory Definitions

Authorised Officer means an Authorised Officer appointed under section 237.

dam means a permanent or temporary barrier or structure that stores, holds back or impedes the flow of water and includes –

- a) any spillway or similar works for passing water around or over the barrier or structure; and
- b) a pipe or other works for passing water through or over the barrier or structure; and
- c) water stored or held back by the barrier or structure and the area covered by that water; and
- d) an artificial depression or hole excavated in a watercourse that holds water or impedes the flow of water; and
- e) an artificial levee or bank that holds back or diverts water in a watercourse –

but does not include –

- a) associated works and canals used in, or in relation to, the generation of electricity; or
- b) a tank or reservoir unless –
- c) the storage of water involves flooding natural ground; or
- d) the tank or reservoir is on a watercourse; or
- e) roads, buildings and other ancillary works that are not part of the dam.

dam works means any works for the construction, erection, enlargement, modification, repair or removal of a dam, or for the conversion of land to a dam, to which Part 8 or Part 8A applies or any work on any such dam which may significantly increase the dam's safety risk.

dispersed surface water means –

- a) water flowing over land otherwise than in a watercourse –
 - (i) after having fallen as rain or hail or having precipitated in any other manner; or
 - (ii) after rising to the surface naturally from underground; or
- b) water as mentioned in paragraph (a) that has been collected in a dam or reservoir.

domestic purpose means personal use for drinking, cooking and washing but does not include taking water to be used in carrying on a business unless it is for the personal use of persons employed in the business.

environmental objectives means the objectives of a water management plan proposed to further the provisions of section 6(1)(c).

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 –

- a) water occurring naturally below ground level; or
- b) water pumped, diverted or released into a well for storage underground.

groundwater area means an area of land that is appointed as a groundwater area by an order made by the Minister under section 124A.

licence means a licence granted and in force under Part 6.

meter means an instrument that measures and records a flow or level of water and includes any ancillary device attached to or incorporated in the instrument.

permit means a permit granted and in force under Division 4 of Part 8.

regulations means regulations made and in force under the Act.

stock watering means the provision of water for drinking by livestock and for normal husbandry practices associated with the keeping of livestock, but does not include the provision of water for livestock or animals subject to intensive farming.

surety means the actual or relative probability with which a water allocation is expected to be available in any year having regard to the natural variability of the supply of water.

taking, 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.

water allocation means a quantity of water that a licensee is entitled to take and use under a licence.

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
- e) the floodplain of any such stream –

but does not include –

- a) a channel declared by the regulations to be excluded from this definition; or
- b) 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 management plan means a water management plan in force under Part 4 and includes an interim water management plan under section 31.

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 or pressure which is to be described in terms of the major features of its temporal variation.

water resource means –

- a) a watercourse, lake or any dispersed surface water or groundwater; or
- b) a tidal area that a declaration under section 5A relates to.

well means –

- a) an opening in the ground below the surface of the earth excavated or used for the taking of groundwater; or
- b) a natural opening in the ground that gives access to groundwater; or
- c) any other excavation as may be provided by the regulations;

well works means an excavation undertaken to give access to groundwater, any other works undertaken to repair or modify the structure of a well or any works undertaken to plug, backfill, seal or decommission a well.

9.2 General 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.

allocation limit means the volume of water that can be allocated at a level of reliability taking into consideration environmental water requirements, rights under Part 5 of the Act and existing allocations.

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

catchment means the drainage area within which water will naturally flow towards a watercourse and includes the watercourse.

Department means the Department of Primary Industries, Parks, Water and Environment (DPIPWE).

direct take allocation means a quantity of water that a licensee is authorised to take from a watercourse under a licence, between 1 December and 30 April inclusive (in the Sassafras Wesley Vale area). Direct take allocations are primarily used for (though not limited to) extraction and direct application during the irrigation season (summer).

ML means megalitre (one million litres).

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 means the process by which the taking of water, when in limited supply, is reduced in accordance with section 94 of the Act.

reliability means the likelihood of the total volume specified on a water allocation being available in the relevant take period (i.e. reliability of 80% indicates the total volume is likely to be available 8 years in 10).

storage allocation means a quantity of water that a licensee is authorised to take from a watercourse under a licence, between 1 May and 30 November inclusive (in the Sassafras Wesley Vale area). Storage allocations are primarily used for (though not limited to) capturing and storing water in a dam in winter, for later use during the irrigation season.

stream flow gauging station means the Department's flow measuring device located at a particular reference point.

surface water means the surface water from all sources within the area of this Plan, either as dispersed surface water or as occurs in a watercourse.

take period means the period between the start date and end date specified on a licence for the taking of a water allocation.

water access entitlement means an entitlement to take water, which has been established through a water licence and any water allocations endorsed on that licence.

water user means:

- 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.

PART 10 REFERENCES AND FURTHER INFORMATION

Departmental reports and other supporting information can be found via the Department's website (www.dpipwe.tas.gov.au).

DPIW 2007 Assessment of Freshwater Ecosystem Values for the Sassafras Wesley Vale Irrigation Scheme Area: Guidance for Water Management. Water Management Planning Report Series No. WMP 07/10. Water Resources Division, Department of Primary Industries and Water, Hobart, Tasmania.

DPIW 2008 Environmental Values and Water Balance Assessment for the Proposed Sassafras Wesley Vale Irrigation Scheme Area. Technical Report No. WA 08/44. Water Resources Division, Department of Primary Industries and Water, Hobart, Tasmania.

DPIW 2009a Water Management Report for the Sassafras Wesley Vale Area Water Management Plan. Water Management Planning Report Series No. WMP 09/03. Water Resources Division, Department of Primary Industries and Water, Hobart, Tasmania.

DPIW 2009b Groundwater Report for the Sassafras Wesley Vale Area Water Management Plan. Water Management Planning Report Series No. WMP 09/04. Water Resources Division, Department of Primary Industries and Water, Hobart, Tasmania.

DPIWE 2003 Environmental Management Goals for Tasmanian Surface Waters. North-Central Coast Catchments and the Greater Rubicon Catchment.

DPIWE 2004 Guiding Principles for Water Trading in Tasmania. Policy 2003/2.

APPENDICES

Appendix A - Objectives of the Resource Planning and Management System of Tasmania and the *Water Management Act 1999*

Resource Management and Planning System of Tasmania

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.

Water Management Act 1999

The objectives of the *Water Management Act 1999* are to further the objectives of the resource management and planning system of Tasmania as specified in Schedule 1 and in particular 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 and riparian 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.