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for the

Ringarooma River Catchment Water Management Plan

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Tasmania
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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*, the Water Development Plan for Tasmania 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 facilitating water infrastructure development projects.

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1 Executive Summary

This report describes current water management arrangements in the Ringarooma River Catchment Water Management Plan area. The report addresses roles and responsibilities, water development, water allocations, management arrangements and restriction management including access rules.

The key features of water management in the Ringarooma River catchment are as follows:

- There are two water managers within the catchment, the Department of Primary Industries, Parks, Water and Environment (DPIPWE) and the Winnaleah Irrigation Scheme Pty Ltd (WISPL).

- Water use and irrigation development has been increasing in the catchment over the last few decades. The largest development was the Winnaleah Irrigation Scheme, which became operational in the late 1980s.

- Water allocations from surface water resources fall into two types which are either taken directly from the water source and used (Direct Type) or taken into storage for use at a later date (Storage Type).

- Direct Type allocations are generally taken during the summer irrigation period (November – April). Storage type allocations are generally taken during the winter period (May – November) for storage in dams for use during the irrigation season.

- When both current and pending allocations are considered, 88,765 ML of surface water is allocated in the catchment, of which 55,016 ML is for non consumptive power generation. Of the remaining 33,749 ML of allocated water, 30,261 ML is used for irrigation, 1,135 ML is used for other commercial purposes and 282 ML is used for town water supply or by several small non riparian stock and domestic users.

- Groundwater use for irrigation purposes is estimated to be about 449 ML per year. Groundwater also provides most of the town water supply to the towns of Legerwood, Ringarooma and Winnaleah.

- During times of low surface water flow, restriction management for the catchment is based on flows at the DPIPWE stream flow gauging station on the Ringarooma River upstream of Moorina Road Bridge (Station #30).

- If the flows in the tributaries are low, sub-catchment restrictions are implemented. Legerwood Rivulet is an example of a sub-catchment that has had separate sub catchment restrictions in the past.

2 Introduction

This report presents information on the current water allocations, formal water management arrangements, water development and management practices for surface water resources in the Ringarooma River catchment. The report has been prepared by the Water Policy and Planning Branch in collaboration with the Regional Water Management Officer for the Ringarooma water management region, to be used as background information for the development and implementation of the Ringarooma Water Management Plan.

The report is one of a series of scientific, management and socio-economic reports required to inform development of the Ringarooma Water Management Plan (see References section for full titles). These reports address:

Generic information relevant for all catchments

- Water management in Tasmania: an overview of generic administrative arrangements to support implementation of the *Water Management Act 1999*, as relevant for water management planning (companion volume to this report).

Baseline information developed as part of the initial information-gathering phase of the planning process includes reports on:

- Catchment hydrology
- Environmental flows
- Groundwater
- Water quality
- River health
- Water management (this report)
- Baseline socio-economic profile

This *Water Management* report for the Ringarooma catchment should be read in conjunction with these other reports. The *Water Management* report will cross-reference these reports where appropriate, to minimise unnecessary duplication of information that may belong more appropriately in another report.

Taken together, these scientific, management and socio-economic reports will be analysed, in consultation with the catchment community, to propose objectives for the Ringarooma Water Management Plan. They will also be used to inform the development of allocation limits and access rules, and to assess any changes under the draft Plan.

2.1 Purpose and scope of this report

2.1.1 Purpose of the Ringarooma River Catchment Water Management Plan

The purpose of the Ringarooma Water Management Plan is to provide a sustainable management framework for the Ringarooma River catchment upstream of the confluence with the Boobyalla River, and streams flowing into Boobyalla Beach, by identifying the limits for sustainable allocation of water for all consumptive uses, and the access rules and conditions governing when and how water may be taken.

2.1.2 Purpose of this report

The purpose of this *Water Management* report for the Ringarooma Water Management Plan is to provide information on:

- current (prior to Water Management Plan) management arrangements including management responsibilities and formal arrangements governing the taking of water.

- the current level of development of the catchment's water resources and potential developments such as additional dams or water schemes that may impact on the catchment's water resources.
- the current volumes of allocations, their surety levels and the allocation types (i.e. taken directly for use, taken into storage or used non-consumptively) and period over which the allocations are taken.
- How these allocations are managed by water users, including the extent to which actual management practices diverge from current allocations and the formal conditions officially governing how water is taken.

This water management report provides the baseline for assessing issues, gaps and risks in current water management arrangements that may have an impact on environmental, social and economic values (outlined in other reports) that need to be considered in the Ringarooma Water Management Plan.

2.1.3 Scope of this report

This report addresses surface water management within the Ringarooma River catchment, including all its tributaries upstream of the confluence of the Ringarooma River with the Boobyalla River and streams flowing into Boobyalla Beach.

Groundwater in Tasmania is not currently subject to the same licensing or allocation requirements as surface water.

A report on the groundwater resource within the Ringarooma catchment is the subject of a separate report. Therefore, groundwater is not included in this discussion of surface water management except to refer to how much groundwater is used. The Ringarooma Water Management Plan is expected to recognise the inter-connectivity of surface water and groundwater systems, and the groundwater influence on surface water flow.

2.1.4 Structure of this report

Section 2 presents the context, purpose and scope of this water use and management report. The section also outlines how the report was developed and provides a brief overview of the Ringarooma River catchment.

Section 3 reviews current roles and responsibilities for management of water within the Ringarooma catchment.

Section 4 provides an overview of water development within the catchment.

Section 5 summarises key administrative features for water management in Tasmania specific for the Ringarooma catchment. Generic administrative arrangements are canvassed in a separate report.

Section 6 presents information on current levels of water allocation within the Ringarooma catchment, and the periods when allocations can be taken.

Section 7 summarises the current restriction management and access rules for water within the Ringarooma catchment.

Section 8 summarises the results of a survey of water use conducted in 2004.

2.2 Methodology

The report has drawn on information from multiple sources:

- Allocation and dam permit information drawn from the Department's Water Information Management System database.
- Analysis of relevant reports and documents created by the catchment's water managers as outlined in Section 3; including the *Act*, water licences and annual reports.
- Consultation with relevant staff in the Department.

2.3 Introduction to the catchment

The Ringarooma River catchment is situated in northeast Tasmania (Figure 1) and has a catchment area of approximately 974 km². The River begins on the northern slopes of Ben Nevis and Mount Maurice, and then flows in a northerly direction past the townships of Branxholm, Derby, Pioneer and Gladstone before entering Boobyalla Estuary and Ringarooma Bay. Most flows in the main channel of the River come from major tributaries on the south and south eastern boundary of the catchment. The lower floodplain at the bottom of the catchment contains internationally significant wetlands, listed under the Ramsar convention in 1971 (Convention on Wetlands in 1971, Ramsar, Iran).

During the 1900s, tin mining was the major industry in the catchment, operating in the middle to lower parts of the catchment. Water was used to aid the mining process. Several dams, including Cascade Dam and Mount Paris Dam delivered water throughout numerous water races to an array of mining operations.

The Frome Dam and the Moorina power station were constructed to provide electricity to the Brisies Tin Mine at Derby, at that stage the largest tin mine in the northeast.

A legacy of the past mining activity is still evident in the Ringarooma River downstream of Derby. Granite sands and gravels dominate the substrate of the river. This is strongly evident at Bells Bridge at Gladstone.

The Cascade Dam is now used as the supply dam for the Winnaleah Irrigation Scheme supplying water to properties via pipeline (pressurised) for irrigation, stock and domestic, and town water supply for the towns of Derby and Herrick. This dam now also has the facilities to generate power.

Tasmanian Irrigation Propriety Limited (TI) are currently constructing a pipeline from the Frome Dam to the northern branch of the existing Winnaleah Irrigation Scheme to increase the supply of water from the scheme. A number of smaller private dam developments are currently being proposed. In addition, TI is currently investigating the feasibility of a second community operated irrigation scheme and associated storage in the Upper Ringarooma.

The catchment is best known for its dairy industry, cropping (fresh and processed vegetables and poppies) and forestry. The dairy and cropping industries are concentrated in the middle and upper sections of the catchment and in a small section of land in the lower part of the catchment. Forestry (both native forest harvesting and plantation forestry) is largely located in parts of the middle and upper sections of the catchment.

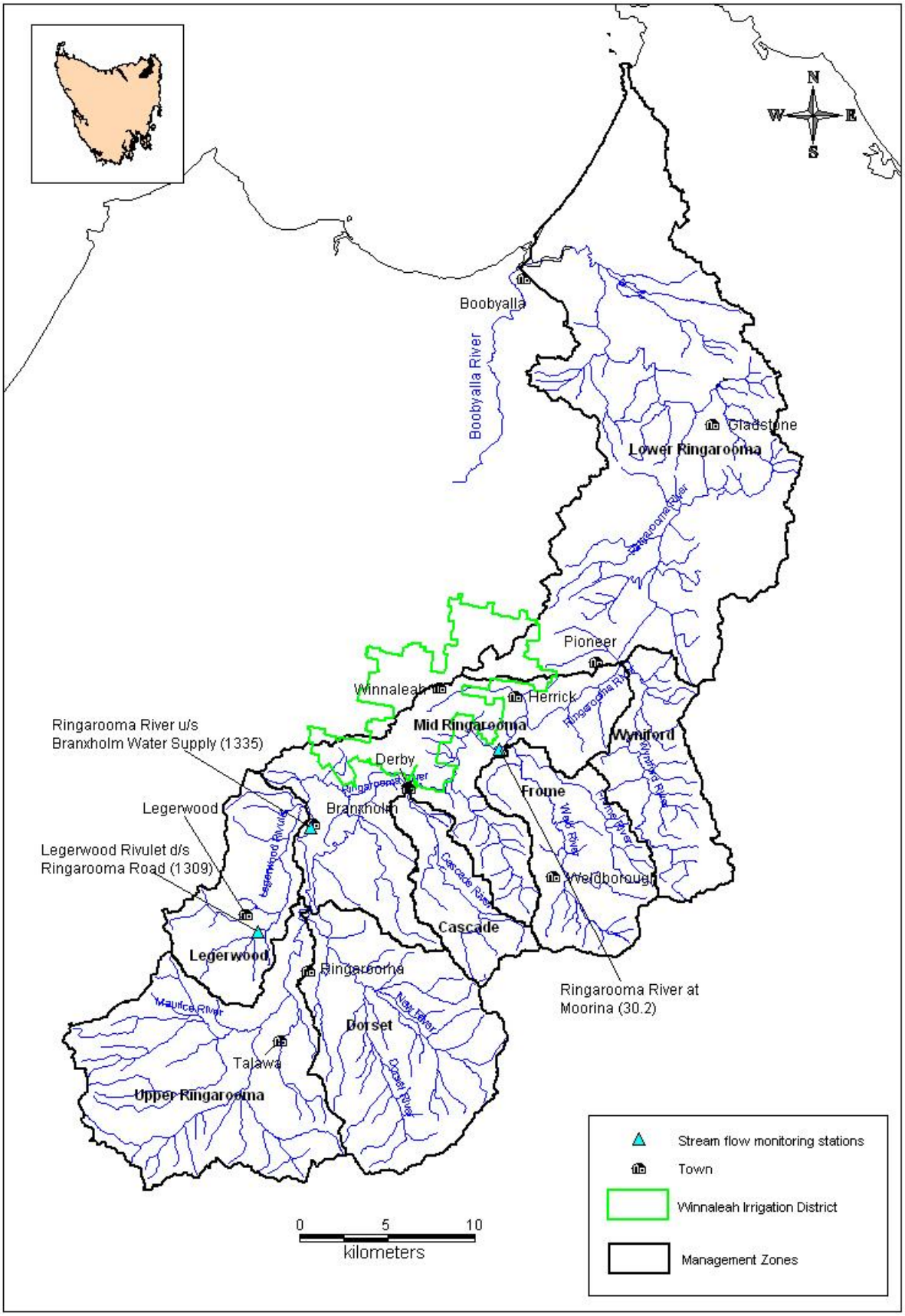

Figure 1 Map of the area included in the Ringarooma water management plan, showing surface water management zones, river names and the Winnaleah Irrigation District.

3 Roles and responsibilities for water management

There are multiple stakeholders with an interest in water management and use within the Ringarooma catchment.

Water management responsibilities at the catchment level are split between two managers; DPIPWE and the Winnaleah Irrigation Scheme Pty Ltd (WISPL). The split is largely defined by a distinct management area called an Irrigation District. WISPL is responsible for the water within the sealed scheme of the Irrigation District, where all other surface water across the catchment is administered by DPIPWE.

The two management arrangements within the Ringarooma catchment are:

1. the whole catchment: i.e. all surface water resources. DPIPWE is responsible for managing this on behalf of the Tasmanian Government.
2. the Winnaleah Irrigation District (Figure 1): WISPL is responsible for managing the Cascade Dam (which has a DPIPWE water licence) and the sealed system of the pipeline within the District.

For further background on water management roles and responsibilities in Tasmania see the companion report on generic administrative arrangements for water management in Tasmania.

3.1 Winnaleah Irrigation District

The Winnaleah Irrigation Scheme was commissioned in 1987, to supply water to 65 properties in the Winnaleah area via pipeline from the Cascade Dam. The Scheme has about 35 km of pipeline and has a carrying capacity of 50 ML/day. The scheme is operated under a gazetted Irrigation District and Irrigation Rights have been issued to title holders within the District under the *Irrigation Clauses Act 1973.* The Irrigation District (Figure 1) is half in the Ringarooma River catchment and half in the Boobyalla River catchment.

Up until 2000 the scheme was managed by the Rivers and Water Supply Commission, a Government Business Enterprise (now Tasmanian Irrigation Pty Ltd. a State Owned Company (SOC)). Since 2000, the Winnaleah Irrigation Scheme Pty Ltd has managed the Scheme. Members of the local management Board are elected by the holders of Irrigation Rights in the Scheme.

The Tasmanian Irrigation Schemes Pty Ltd currently holds the Water Licence for the Scheme. Winnaleah Irrigation Scheme Pty Ltd employs their own operating staff to oversee the day-to-day functions of the Scheme, and holds the Licence for the power generation.

3.2 Water licence holders

Water entitlements under a water licence are accompanied by obligations relating to compliance with license conditions and reporting. There are currently 77 water licence holders in the Plan area holding 93 licences and 310 water allocations.

Water entitlement holders include individuals, businesses and organisational water managers. These entitlements to water exist as water licences administered under the *Water Management Act 1999*.

Ben Lomond Water, which commenced operation in July 2009, is responsible for the management of town water supplies. Previously, Dorset Council managed town water supplies.

4 Water development in the Ringarooma catchment

4.1 Existing storages

There are two large dams in the Ringarooma catchment, Cascade Dam on the Cascade River near Derby and the Frome Dam on the Frome River near Moorina.

4.1.1 Cascade Dam

The Cascade Dam was built in 1934 to replace the dam destroyed after the 1929 flood disaster, where 14 lives were lost.

The dam suppled water to the tin mining operation at Derby until 1967. In 1972 the Tasmanian Government agreed to make the water available for irrigation.

The Winnaleah Irrigation Scheme was officially opened on 2 October 1987 and supplies water via a pipeline system to 65 properties.

The Cascade Dam now has a private power generation system on its outlet, supplying electricity to the state grid.

4.1.2 Frome Dam

The Frome Dam was built in 1908 to provide storage capacity for the Moorina Power Station, which provided electricity to the Pioneer Tin Mining Company. In 1988 the management of the power station and the dam moved to private hands when Moorina Hydro Pty Ltd was formed. Moorina Hydro Pty Ltd ceased to operate in 2009 and the management of the dam passed to the Tasmanian Irrigation Development Board (now TI).

Until it was decommissioned in 2008, the Frome dam had been operating as a water supply storage to the power station and town water to Pioneer. Water was diverted from the dam into the Pioneer race that leads to the power station, where water used for power generation it is released into OK Creek and flows back into the Ringarooma River. The confluence of OK Creek and the Ringarooma River is several kilometres downstream of the confluence of the Frome River with the Ringarooma River at Moorina. Town water supply to Pioneer is via the Pioneer water race.

TI has commenced construction of the Winnaleah Irrigation Scheme Augmentation (WISA) in July 2011. This will be discussed further in section 4.2.

4.2 Proposed water developments

The Tasmanian Government has committed to significant water development in Tasmania. The Tasmanian Irrigation Development Board (now TI), which was established by the Tasmanian Government in 2008, is responsible for implementing the Government's water development program.

In the Ringarooma River catchment, TI commenced construction of the Winnaleah Irrigation Scheme Augmentation in July 2011. This Augmentation to the existing Winnaleah Irrigation Scheme includes new pipelines, and associated infrastructure and upgrades, from the Frome Dam on the Frome River at Moorina providing additional highly reliable summer water to existing right holders and expanding the District to a total of approximately 4,500 ha of irrigable land.

Once the scheme is developed the Winnaleah Irrigation Scheme Pty Ltd will take over management responsibilities.

In addition to the Winnaleah Irrigation Scheme, TI has also proposed an Upper Ringarooma Irrigation Scheme as a part of their North East Dams Project.

Prior to water users gaining rights to the new schemes, TI requires a property based Farm Water Access Plan to be submitted to the Board. A Farm Water Access Plan provides detail on environmental issues linked to the use of water purchased from the TIDB. At this stage no Farm Water Access Plans have been developed within the Ringarooma catchment.

5 Administrative arrangements for allocation

See the companion report providing an overview of generic administrative arrangements for water management for general background on water licences, irrigation rights, dam permits, surety, water meters, water transfers and water trading.

5.1 Water Licences and Irrigation Rights

Except for the water Rights in respect of Water as specified under Part 5 of the WMA, all consumptive users of water within the Ringarooma River catchment must hold a Water Licence and allocation, or an Irrigation Right to access water. Water Licences, administered by DPIPWE, must be held by:

- the Water Entity of the Irrigation District; and
- all commercial water users in any part of the Ringarooma catchment.

The Water Entity, Tasmanian Irrigation Schemes Pty Ltd holds the Water Licence on behalf of the water users within the Winnaleah Irrigation District, who are issued Irrigation Rights under the *Irrigation Clauses Act 1973*.

The Minister may vary the conditions on a water licence within a specified period.

6 Water Allocations

6.1 Historical basis for current allocations

During the 1990s, the Rivers and Water Supply Commission (now Tasmanian Irrigation Schemes Pty Ltd) developed daily maximum extraction policies for Direct take (summer) allocations (Commissional Water Rights) within the Ringarooma catchment. This arrangement was under the provisions of the *Water Act 1957.*

- Direct take allocations in the Legerwood Rivulet had a maximum take of 0.360 ML per day for riparian title holders.
- Direct take allocations in the Ringarooma River and major tributaries had a maximum of 1.125 ML per day for riparian title holders.

In 1991, Policy number 28.01 (27/06/1991) established a Direct take maximum limit of 1.125 ML per day for holders of riparian titles to the Ringarooma River and major tributaries.

Since the establishment of these ‘take limits’ and issuing of allocations, farmers have progressively upgraded their irrigation infrastructure, and also increased areas under irrigation. In some cases water users had increased their water use from these irrigation upgrades, but had not applied to vary the volumes they take on their water licence.

In 1995, the Rivers and Waters Supply Commission, as a result of the Council of Australian Governments (COAG) water reforms agenda, placed a moratorium on further ‘direct take’ allocations (during the period December - April) across the State. This moratorium is currently in place, unless over-turned through a Water Management Planning process.

Licensed allocations (during the period May – November) within the catchment have continued to be approved and are largely associated with dam permit approvals. The

largest numbers of dam permit and storage allocations approvals have been in the Legerwood Rivulet catchment.

In 2003, the Department released the Water Resources Policy (Policy 2003/1) *Guidelines to assess applications for new water allocations from watercourses during winter*. This policy provides guidelines on how new water allocations during the winter should be assessed. The policy, amongst other things, stipulates that a dam storage capacity greater than 100 ML must be surveyed to confirm its true capacity prior to making an application. The policy also provided guidance on how to assess available yields upstream and downstream of the off-take location.

6.2 Allocation Types

Existing licensed allocations in the Ringarooma River catchment fall into two types which are, either taken directly from the water source for immediate use (Direct Type), or taken into storage for use at a later date (Storage Type).

Licensed allocations also specify a take period during which a volume is authorised to be taken. The majority of allocations are accounted for in one of three 'take' periods:

1 December – 30 April take period:

- Most direct take allocations are for Surety 5 water with a take period from 1 December to 30 April

1 May – 30 November take period:

- Most storage take allocations at Surety 5 and 6 specify a take period from 1 May to 30 November.
- Some licences may contain allocations with variations to these dates. For example, some licences specify a take period between 1 May to 31 October (see Table 4).

'Full year' (12 month) take period:

- Several Storage type allocations at surety 5 and 6 may be taken over the full year.
- Direct take allocations at surety 1 and 5 for town water supply specify a monthly or full year take period.

Direct type allocations are generally taken during the summer irrigation period (1 December – 30 April). Storage type allocations are generally taken during the winter period (1 May – 30 November) for storage in dams for later use during the irrigation season.

There are also full year allocations with take periods specified over 12 months

In addition to the allocation types and take periods, allocations can also be used for either consumptive or non-consumptive purposes. The majority of allocations in the Ringarooma River Catchment (55,016ML) are associated with use for non consumptive hydro power generation and are specified as full year direct take type allocations. These allocations differ from consumptive allocations because they are returned to the system (a natural water course) after being used for power generation; and therefore, become available for allocation to users downstream of this discharge point.

6.3 Allocations in the Ringarooma water management plan area

This section describes how water is allocated in the Ringarooma River catchment based on allocation type, allocation period and allocation purpose. Section 6.3.1 provides a summary of total allocations sorted by allocation type and allocation period for the entire area. Section 6.3.2 identifies the management zones in the area, and Section 6.3.3 identifies the volume used for each purpose in each management zone. Section 6.3.4 shows the volume of each of the different types of allocation, first sorted by allocation type, and then sorted by allocation period.

6.3.1 Summary of all allocations

The total volume of water allocated throughout the Plan area is 88,765 ML, of which 55,016 ML is non consumptive allocation for power generation and 33,749 ML is consumptive.

The following tables show a summary of how water is allocated in the Ringarooma River catchment based on allocation type (Table 1) and allocation period (Table 2). For more detail on how these numbers are distributed throughout the plan area, and the different types of allocation, see Tables 4 and 5.

Table 1 Total volume of licensed allocations and pending allocations presented by type of take (ML per year).

Type of take	Consumptive Volume (ML per year)	Non Consumptive Volume (ML per year)	Total Volume (ML per year)
Direct	9,977	55,016	64,993
Storage	23,772	-	23,772
Total	**33,749**	**55,016**	**88,765**

Source: DPIPWE, based on information current to 7 June 2011 (WIMS).

Table 2 Total volume of surety 5 and 6 licensed allocations and pending allocations, presented by period of take (ML per year).

Period of take	Consumptive Volume (ML per year)	Non Consumptive Volume (ML per year)	Total Volume (ML per year)
1 Dec to 30 April	14,977	22,760	37,737
1 May to 30 Nov	28,323	32,256	60,579
Total	**43,300**	**55,016**	**98,316**

Source: DPIPWE, based on information current to 7 June 2011 (WIMS).

Note: The total consumptive allocations in this table are greater than table 1 because:

- Full year consumptive allocations that do not specify a daily or monthly limit may be taken entirely in either take period. Therefore, as a precautionary approach, the full volume of full year allocations (9,851 ML) is accounted for in total in both periods.
- surety 1 allocations totalling 300 ML are not included in this table.

6.3.2 Management Zones

Information in this report is presented for each of eight management zones under the proposed Plan. The locations of these zones are identified in Figure 1 and include:

- **Legerwood** Rivulet and its tributaries.
- **Dorset** River and its tributaries, including the New River catchment.
- **Cascade** River and its tributaries.
- **Frome** River and its tributaries, including the Weld River catchment.
- **Wyniford** River and its tributaries.
- **Upper Ringarooma** River, comprising the Ringarooma River and all its tributaries above the confluence with the Dorset River.
- **Middle Ringarooma** River, comprising the Ringarooma River and all of its tributaries below the confluence with the Dorset River and above the confluence with the Wyniford River.
- **Lower Ringarooma** River, comprising the Ringarooma River and all of its tributaries below the confluence of the Wyniford River and above the confluence with the Boobyalla River. This zone also includes streams which flow into Bass Strait at Boobyalla Beach south of Petal Point.

6.3.3 Summary of allocations in each management zone sorted by purpose.

The total volume of licensed allocation, including consumptive, non consumptive and pending allocations is 88,765 ML. A total of 55,016 ML is licensed for power generation in the Cascade, Frome, Wyniford and Middle Ringarooma management zones (Table 2). The main consumptive purpose for licensed water in the area is irrigation (30,261 ML). Irrigation combined with other commercial uses (1,135 ML), town water supply (282 ML) and stock and domestic allocations (71 ML) make up the total licensed consumptive volume of 33,749 ML (Table 3).

Table 3 Current allocations by purpose in each management zone (ML per year)

Management Zone	Irrigation	Commercial	Town Supply	Stock and domestic	Power generation	Total
Upper Ringarooma	14,200	0	0	0	0	**14,200**
Dorset	1,698	0	190	0	0	**1,888**
Legerwood	2,585	86	0	0	0	**2,671**
Cascade	5,300	0	30	70	24,700	**30,100**
Frome	2,073	0	14	0	17,300	**19,387**
Middle Ringarooma	1,248	231	35	1	2,016	**3,531**
Wyniford	1,700	0	0	0	11,000	**12,700**
Lower Ringarooma	3,457	818	13	0	0	**4,289**
Total	**30,261**	**1,135**	**282**	**71**	**55,016**	**88,765**

Source: DPIPWE, based on information current to 7 June 2011 (WIMS).

6.3.4 Summary of allocations in each management zone by type of take, period of take and surety.

This section presents the different types of allocations in each management zone sorted first by allocation type (Table 4), then by allocation period (Table 5). The table with allocations sorted by period is required to determine what volumes are already allocated in each period, relative to how much water there is available to allocate in each period as recommended in the Stage 2 Hydrology Report.

Volumes sorted by allocation type

The different types of allocations in each management zone, sorted by direct take and storage take type are presented in Table 4. Table 4 shows:

- large volumes of non-consumptive allocations for power generation in the Cascade, Frome, Wyniford and Middle Ringarooma management zones.
- most of the licensed water allocated for consumptive use is Surety 5 storage allocation.
- the largest volumes of consumptive allocation are in the Upper Ringarooma management zone, followed by the Lower Ringarooma and Legerwood management zones.
- this assessment also includes 16,141 ML of pending applications.

Volumes sorted by allocation period

Table 5 presents the different types of allocations in each management zone, sorted by allocation period.

Summary of allocation surety

Table 6 summarises the volumes of surety 5 and 6 water allocated in each management zone. The cumulative volumes for the Middle and Lower Ringarooma account for the return of the non-consumptive allocations to the system.

Table 4 Total volumes allocated (ML per year), at the different types of 'direct' and 'storage' take allocation, by management zone.

Allocation Type	Surety	Allocation Period	Upper Ringarooma	Dorset	Leger-wood	Cascade	Frome	Middle Ringarooma	Wyniford	Lower Ringarooma	Total
Direct	1	Full year	0	0	0	0	9	23	0	9	41
Direct	5	Full year	0	0	86	0	0	232	0	0	319
Direct	5	1 Dec - 30 Apr	2,693	811	606	0	54	735	0	218	5,116
Direct(monthly town supply)	5	1 Dec - 30 Apr	0	0	0	0	2	6	0	2	10
Direct(monthly town supply)	5	1 May - 30 Nov	0	0	0	0	2	6	0	2	11
Direct(power gen)	**5**	**Full year**	**0**	**0**	**0**	**24,700**	**17,300**	**2,016**	**11,000**	**0**	**55,016**
Direct(pending)	5	Full year	0	0	0	0	2000	0	1700	0	3,700
Direct	6	1 Apr - 31 Dec	0	0	0	0	0	0	0	780	780
Total Direct		**Total**	**2,693**	**811**	**692**	**24,700**	**19,368**	**3,018**	**12,700**	**1011**	**64,993**
Storage	1	Full year	0	158	0	100	0	0	0	0	258
Storage	5	Full year	0	32	0	3,300	0	0	0	500	3,832
Storage	5	1 May - 30 Nov	695	302	1,318	0	15	338	0	850	4,593
Storage	5	1 May - 31 Oct	271	124	376	0	4	23	0	38	836
Storage (pending)	5	1 May-30 Nov	10,491	11	0	0	0	0	0	1850	12,352
Storage(pending)	5	1 May-31 Oct	31	0	58	0	0	0	0	0	89
Storage	6	1 May-30 Nov	18	0	223	0	0	0	0	0	241
Storage	6	1 May - 31 Oct	0	450	4	0	0	153	0	40	647
Storage	6	Full year	0	0	0	2,000	0	0	0	0	2,000
Total Storage		**Total**	**11,506**	**1,077**	**1,979**	**5,400**	**19**	**513**	**0**	**3,278**	**23,772**
Both types		**Total**	**14,200**	**1,888**	**2,671**	**30,100**	**19,387**	**3,531**	**12,700**	**4,289**	**88,765**

Table 5 Volumes of surety 5 and surety 6 water allocated (ML per year) in each management zone, arranged by allocation period. For a full explanation of values in this table see the notes on the following page.

Allocation Period	Allocation Type	Surety	Upper Ringarooma	Dorset	Leger-wood	Cascade	Frome	Middle Ringarooma	Wyniford	Lower Ringarooma	Total
Direct take period (1 May to 30 Nov)											
1 Dec - 30 Apr	Direct	5	2,693	811	606	0	54	735	0	218	5,116
1 Dec - 30 Apr	Direct(mthly supp)	5	0	0	0	0	2	6	0	2	10
Full year (distributed)	Direct(power gen)	5	0	0	0	10,218	7,157	834	4,551	0	22,760
Full year (in both periods)	Direct	5	0	0	86	0	0	232	0	0	319
Full year (in both periods)	Storage	5	0	32	0	3,300	0	0	0	500	3,832
Full year (in both periods)	Direct (pending)	5	0	0	0	0	2000	0	1700	0	3,700
	Total	**5**	**2,693**	**843**	**692**	**13,518**	**9,213**	**1,807**	**6,251**	**720**	**35,737**
Full year (in both periods)	Storage	6	0	0	0	2,000	0	0	0	0	2,000
	Total	**6**	**0**	**0**	**0**	**2,000**	**0**	**0**	**0**	**0**	2,000
Total Direct take period (1 Dec to 30 April)		**S5+S6**	**2693**	**843**	**692**	**15,518**	**9,213**	**1,807**	**6,251**	**720**	**37,737**
Storage take period (1 May to 30 Nov)											
1 May - 30 Nov (or 31 Oct)	Storage	5	966	426	1,694	0	19	361	0	888	5,429
1 May - 30 Nov	Direct(mthly supp)	5	0	0	0	0	2	6	0	2	11
Full year (distributed)	Direct(power gen)	5	0	0	0	14,482	10,143	1,182	6,449	0	32,256
Full year (in both periods)	Direct	5	0	0	86	0	0	232	0	0	319
Full year (in both periods)	Storage	5	0	32	0	3,300	0	0	0	500	3,832
Full year (in both periods)	Direct (pending)	5	0	0	0	0	2000	0	1700	0	3,700
1 May - 30 Nov (or 31 Oct)	Storage (pending)	5	10,522	11	58	0	0	0	0	1,850	12,441
	Total	**5**	**11,488**	**469**	**1,838**	**17,782**	**12,164**	**1,780**	**8,149**	**4,316**	**57,987**
1 May - 30 Nov (or 31 Oct)	Storage	6	18	450	227	0	0	153	0	40	888
Full year (in both periods)	Storage	6	**0**	**0**	**0**	**2,000**	**0**	**0**	**0**	**0**	**2,000**
1 Apr - 31 Dec (next pg)	Direct	6	0	0	0	0	0	0	0	780	780
	Total	**6**	**18**	**450**	**227**	**2,000**	**0**	**153**	**0**	**820**	**3,668**
Total Storage take period (1 May to 30 Nov)		**S5+S6**	**11,506**	**919**	**2,065**	**19,782**	**12,164**	**1,933**	**8,149**	**5,136**	61,655
Grand total for both periods			**14,200**	**1,762**	**2,757**	**35,300**	**21,378**	**3,740**	**14,400**	**4,780**	**98,316**

Notes on Table 5

Water allocated in each of the direct take and storage allocation periods, including current consumptive and non-consumptive allocation volumes and volumes related to pending applications for water allocations.

- Surety Level 1 allocations are not included in this table.
- For full year consumptive allocations, the allocated volume could potentially be taken in full in either the direct take or storage allocation period, depending on river flow conditions. For the purposes of water allocation, it is necessary to account for the allocated volume in full in both periods, in effect "doubling" the allocated volume. Hence an "extra" 9,851 ML of full year consumptive water allocation is included in the totals.
- Full year non-consumptive allocation volumes with a licensed daily rate of extraction are distributed evenly on a daily basis across the direct take (December - April = 151 days) and storage (May – November = 214 days) allocation periods. Annual allocations are proportionally distributed based on the licensed daily rates multiplied by the number of days in each allocation period.
- Surety Level 5 town water allocations (that have monthly volumes specified) are grouped to align with the direct take (December - April) and storage (May - November) allocation periods.
- There is an existing Surety Level 6 allocation under which 780 ML of water can be taken between 1 April and 31 December. This period largely mirrors the storage allocation period (except for April and December), and for the purposes of water allocation, this allocation volume is placed entirely in the storage period (May – November).

Table 6 Summary table of the volumes of surety 5 and surety 6 water allocated (ML/year) in each management zone of the Ringarooma River catchment.

Surety	Upper Ringarooma	Dorset	Legerwood	Cascade	Frome	Middle Ringarooma	Middle Ringarooma Cumulative	Wyniford	Lower Ringarooma	Lower Ringarooma Cumulative
Direct take period (1 December to 30 April)										
S5	2,693	843	692	13,518	9,213	1,807	17,714	6,251	720	12,977
S6	0	0	0	2,000	0	0	2,000	0	0	2,000
Total	**2,693**	**843**	**692**	**15,518**	**9,213**	**1,807**	**19,714**	**6,251**	**720**	**14,977**
Storage period (1 May to 30 November)										
S5	11,488	469	1838	17,782	12,165	1,780	29,858	8,149	3,240	24,655
S6	18	450	227	2,000	0	153	2,848	0	820	3,668
Total	**11,506**	**919**	**2,065**	**19,782**	**12,165**	**1,933**	**32,706**	**8,149**	**4,060**	**28,323**
Annual Total	**14,200**	**1,762**	**2,757**	**35,300**	**21,378**	**3,740**	**52,420**	**14,400**	**4,780**	**43,300**

Water allocated in each of the direct take and storage allocation periods, including current consumptive and non consumptive allocation volumes and volumes related to pending applications for water allocations. Cumulative volumes identified in the Middle and Lower Ringarooma management zones are calculated by combining the volumes allocated in each of those zones with the volumes allocated upstream of those zones. Non consumptive allocation volumes are not included in the cumulative allocation volumes in the Middle and Lower Ringarooma management zones, as a means of reflecting the return of this water to the river system.

Notes

- Surety Level 1 allocations are not included in this table.
- For full year consumptive allocations, the allocated volume could potentially be taken in full in either the direct take or storage allocation period, depending on river flow conditions. For the purposes of water allocation, it is necessary to account for the allocated volume in full in both periods, in effect "doubling" the allocated volume. Hence an "extra" 9,851 ML of full year consumptive water allocation is included in the totals.
- Full year non-consumptive allocation volumes with a licensed daily rate of extraction are distributed evenly on a daily basis across the direct take (December - April = 151 days) and storage (May – November = 214 days) allocation periods. Annual allocations are proportionally distributed based on the licensed daily rates multiplied by the number of days in each allocation period.
- Surety Level 5 town water allocations (that have monthly volumes specified) are grouped to align with the direct take (December - April) and storage (May - November) allocation periods.
- There is an existing Surety Level 6 allocation under which 780 ML of water can be taken between 1 April and 31 December. This period largely mirrors the storage allocation period (except for April and December), and for the purposes of water allocation, this allocation volume is placed entirely in the storage period (May – November).

Notes from Table 6 continued.

- The annual volume of non consumptive allocation taken from the Cascade River management zone is 24,700 ML.
- The annual volume of non consumptive allocation taken from the Middle Ringarooma management zone (Guiding Star Creek) is 2,016 ML.
- The annual volume of non consumptive allocation taken from the Frome River management zone is 17,300 ML.
- The annual volume of non consumptive allocation taken from the Wyniford River management zone is 11,000 ML.
- Non consumptive water allocations taken from the Cascade River and Guiding Star Creek are returned to the Ringarooma River in the Middle Ringarooma management zone (immediately below the confluence of the Cascade River and the Ringarooma River). Non consumptive water allocations taken from the Frome and Wyniford Rivers are returned to the Ringarooma River in the Lower Ringarooma management zone.
- Whilst the non consumptive water allocations taken from the Frome and Wyniford Rivers are physically returned to the Ringarooma River in the Middle Ringarooma management zone, the point at which the water is returned is toward the bottom of that zone. In effect, this water is not practicably available for allocation in the Middle Ringarooma management zone, and for the purposes of water allocation, the water is considered to be returned to the Ringarooma River at the top of the Lower Ringarooma management zone. Therefore, the cumulative volume of water allocated in the Middle Ringarooma management zone appears to be higher than in the Lower Ringarooma management zone (whole of catchment) as the non consumptive allocations in the Frome and Wyniford Rivers are included in the Middle Ringarooma zone total.
- Non consumptive allocation volumes taken from the Cascade River and Guiding Star Creek (2,016 ML) are not included in the total cumulative allocation volume (52,420 ML) for the Middle Ringarooma management zone, whilst the non-consumptive allocation volumes taken from the Frome and Wyniford Rivers (17,300 ML and 11,000 ML respectively) are not included in the total cumulative allocation volume (43,300 ML) for the Lower Ringarooma management zone.

6.4 Pending applications for a water allocations

Pending applications totalling 16,141 ML as at 7 June 2011 have been included in the assessment of allocations in this report. Applications for a further 145 ML of storage period allocations for the Upper Ringarooma management zone have been submitted since 7 June. These volumes have not been included in this report.

6.5 Dams in the Ringarooma River catchment

There are currently 174 dams in the Ringarooma River catchment, with a total storage capacity of 16,778 ML (including Cascade Dam and Frome Dam) registered on the Dam Permit database (WIMS). The number of dams in each Management Zone and their registered capacity are listed in Table 7. Also included in Table 7 are dams not listed on Department's register, but identified by a search of Google Earth in 2010.

Table 7 Number of dams in the Ringarooma River catchment, including the number of registered existing dams, registered proposed dams (and their capacities) by management zone.

Management zone		Registered existing dams	Registered proposed dams	Total registered dam capacity (ML)[1].	Number of non-registered dams (Google audit 2010[2])
Legerwood					
	Number	57	13		10
	ML	1,526	691	2,217	
Dorset					
	Number	17	4		9
	ML	747	96	843	
Cascade					
	Number	1	-		1
	ML	3,600	-	3,600	
Frome					
	Number	4	1		2
	ML	2,291	4	2,295	
Wyniford					
	Number	1	-		0
	ML	0.25	-	0.25	
Upper Ringarooma					
	Number	28	7		2
	ML	752	484	1,236	
Mid Ringarooma					
	Number	15	7	932	24
	ML	230	702		
Lower Ringarooma					
	Number	15	4		
	ML	3,882	1,683	5,655	1
TOTAL					
Number of dams		**138**	**36**	**174**	**49**
Volume (ML)		**13,028**	**3,660**	**16,778**	

[1]Dams listed as 'registered' include dams that are 'proposed dams'. Proposed dams may have been constructed, but information on their completion may not have been updated in the dam register.

[2]Non-registered dams are dams that were identified on a Google Earth image dated 19th February 2005.

Source: DPIPWE, based on information current to 4 April 2011 (WIMS).

The difference between the registered dam volumes and current storage allocations may be because some dam permits have been issued for the purpose of holding water from the Winnaleah Irrigation Scheme, holding dispersed surface water (referred to as a catchment dam), groundwater or water for stock and domestic purposes, which are generally not required to have a corresponding allocation. Also, there are pending applications for storage allocations which still require an associated dam permit.

7 Allocation management: access rules and restriction management

This section specifies the rules governing access to water under current restriction management arrangements for the Ringarooma catchment.

7.1 Current restriction management

The Ringarooma catchment is managed from the Department's monitoring station (Ringarooma River u/s Moorina Road Bridge #30.2) at Moorina on the Ringarooma River.

Historically a trigger point for restrictions of 43 ML/day was developed for the Ringarooma River. In the past decade an interim staged restriction, outlined below, has been developed. A total cease to take has never been implemented in the Ringarooma River, but has in the Legerwood Rivulet and Carries Brook (see Table 8). The following stages are usually implemented when the flow has been below the trigger for three consecutive days.

Stage 1	@	60ML/day	General warning
Stage 2	@	50ML/day	Ban on taking Temporary Water Allocations
Stage 3	@	45ML/day	50% reduction on Surety 5 Direct take allocations

The rate of rise and fall in stream flow, and pending rainfall patterns are considered when implementing restriction management.

Some sub-catchments, such as Legerwood Rivulet and Carries Brook are restricted separately in response to local flow conditions.

7.1.1 Legerwood Rivulet

Summer base flows in the Legerwood Rivulet and its tributaries are difficult to manage due to a number of in stream dams.

During periods of low flow, the Department strives to manage water access fairly, allowing licence holders to access a share of the water available. Dam owners are required to maintain the required passing flow rate via the dam outlet pipe works. The passing flow rate allows a continual flow through the system that provides access to water for downstream licence holders, stock and domestic users and for the environment.

Since 2008, the Department has used a gauging station on the Legerwood Rivulet to monitor and manage flows. A cease-to-take trigger has not been established for the Legerwood catchment. A total ban is usually imposed when a continual flow cannot be sustained through the system. The ban relates to all Surety 5 direct take allocations and any other allocations of lower Surety i.e. Temporary Water Allocations.

7.1.2 Other tributaries and sub-catchments including Carries Brook.

Flow in the different tributaries and sub-catchments of the Ringarooma catchment can exhibit considerable spatial variation. This is largely a function of the local groundwater interactions, which are controlled by the geology of each sub-catchment. Interpretation of surface water modelling indicates that about 50% of the total flow in rivers and streams in the Plan area is maintained by groundwater discharge (DPIPWE 2010a, DPIPWE 2011a). Hence, while flow

levels may be above cease to take limits in the main stream of the Ringarooma River, which has a high base flow supplemented by groundwater, local catchments may not have the same reliability of flow. Therefore, Authorized Officers implement local sub catchment based restrictions as required to meet the requirements and the objectives of the *Water Management Act 1999.*

7.2 Restrictions over the last decade

Over the last decade there were four seasons where restriction management has been implemented (Table 8).

Table 8 Summary of restriction management in the Ringarooma River catchment over the last decade.

Season	Area under restriction	Stage of restriction	Number of days restricted
2002-03	Ringarooma	Stage 2 (Ban on Temporary Water Allocations)	28
	Legerwood	Stage 3 (50% of Surety 5)	28
2006-07	Ringarooma	Stage 2 (Ban on Temporary Water Allocations)	39
	Carries Brook	Total ban (Surety 5)	84
	Legerwood	Total ban (Surety 5)	84
2008-09	Ringarooma (including Legerwood)	Stage 3 (50% of Surety 5)	13
2009-10	Legerwood	Total ban (Surety 5)	30

Restrictions are usually within the months of February and March, which is later than other catchments in the northeast. The 2006/2007 season was exceptionally dry across most parts of the State. In the Ringarooma River catchment, restrictions continued until the end of April.

8 Survey of Water Use

In 2004, the Department undertook a survey of all consumptive water use within the Ringarooma catchment, as part of the early stages of developing a Water Management Plan for the catchment. The survey assessed water use during the 2000/2001, 2001/2002 and 2002/2003 irrigation seasons. The survey showed that there was an average surface water use of 23,769 ML per year, and groundwater use of 449 ML per year.

The total volume of licensed consumptive allocations at the time of the survey was 14,608 ML and respondents indicated that 3,944 ML of these were not being used. Based on the survey estimated water use in excess of licensed allocations averaged around 13,104 ML per year.

10 References

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