

Woori Yallock Creek Stream Flow Management Plan

Stream Flow Management Plans – an introduction
background paper for Committee Members



March 2009

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Introduction

The purpose of this background paper is to provide Committee Members with an understanding of what drives the Stream Flow Management Plan (SFMP) process and how the Woori Yallock Creek SFMP will be developed.

Included in this paper is information relevant to the development of the SFMP. The information covers water diversions, how these diversions affect the health of the waterway and environmental flows.

A number of SFMPs have already been completed elsewhere in the Yarra Catchment such as Stringybark, Olinda and Hoddles Creeks to name a few. A number of the issues experienced during the development of these plans have been included in this paper as they may be relevant to and assist the committee in the development of the Woori Yallock Creek SFMP.

1 Stream Flow Management Plans – what are they?

With the steady development of Victoria there has been a corresponding increase in the demand and competition for available water. In meeting these demands, the environment has sometimes been over looked and not given adequate consideration. Furthermore, the rights to water of existing users are often ill-defined making the security of water uncertain.

In 2004, the Victorian Government released its *Our Water Our Future* action plan that established Environmental Water Reserves, the legal share of water for the environment, for all Victorian rivers, streams and groundwater systems.

Through the 'Restoring Unregulated Rivers Initiative', the government aims to ensure flows in unregulated rivers such as the Woori Yallock Catchment streams are sustainably managed for all uses including a share of water for the environment. This is to occur through the development of SFMPs. The Woori Yallock Creek has been identified by the Victorian Government as a priority, flow stressed, unregulated river system requiring the preparation of a SFMP to balance the sharing of stream flows for all water users.

Melbourne Water has been delegated the responsibility by the Minister to licence the extraction of water from rivers and streams within the Yarra Basin, and as a condition

of the delegation authority, also has the responsibility to develop SFMPs for priority waterways in its area of responsibility which includes the Woori Yallock system.

1.1 What will the Woori Yallock Creek Stream Flow Management Plan aim to achieve?

Stream Flow Management Plans (SFMPs) are intended to create a balanced and sustainable sharing of the available resource between all stakeholders, whether licensed diverters, the environment, water based recreation uses or aesthetic enjoyment. SFMPs define rules and agreements that allow water to be transferred, provide greater certainty for new developments and introduce a clear understanding of flow sharing rules in times of drought. The specific aim of a SFMP is set out in section 32A of the Water Act 1989:

'the water resources of the area are managed in an equitable manner so as to ensure the long-term sustainability of those resources'.

In summary, a SFMP will:

- Protect the long-term sustainability of the waterway environment by reaching a balance between environmental water requirements, consumptive users' needs for water and any social and cultural values associated with the water;
- Clarify licence holder's legal access to water, licence conditions, trading rights and diversion limits;
- Introduce new rules with which to allow diversions to meet agreed management objectives;
- Manage stream flows to meet agreed environmental objectives.

The management plan process will more clearly define conditions around licence holder's legal access to water and develop rules on licence transfers. Variations to licence conditions may be made which may alter the periods during which water may be diverted.

In addition to the above, a SFMP may also refer to linked issues in the catchment but we cannot make recommendations on such issues. Linked issues include riparian vegetation, river frontage management, trout stocking and catchment management issues, i.e. salinity or nutrient management. In general if the issues contribute to the

ability of the SFMP to meet its management objectives we will consider them as part of the process.

There is an existing moratorium on issuing of licences in the Yarra basin which sets extractions at current levels. The SFMP can amend the existing allocation cap in this catchment through the development of the plan.

1.2 The Stream Flow Management Plan process

Stream Flow Management Plans are legal documents and so the process for developing a plan is set out in the Water Act 1989. Melbourne Water, as the licensing authority for the Woori Yallock Catchment, is primarily responsible for overall preparation, administration and enforcement of management plans.

The plans are developed by consultative committees appointed by the Minister for Water, made up of representatives of the major interests in the catchment.

These consultative committees must develop recommendations on the best information that is available, making trade offs between environmental and water use interests in the process. These recommendations are then submitted to Government for approval, after which time they become a legal direction for Melbourne Water to allocate and administer licences issued under the Water Act 1989. Consultative committees must prepare a draft management plan within 18 months after its appointment.

Adaptive management

The plans are part of an adaptive management process, meaning decisions must be made on the best available information on the environment and water users' needs with the effect of these decisions reviewed and fine tuned over time. It is not practical to try to wait for the absolute answer to prove our assumptions and so the consultative committee is selected for its ability to make challenging decisions.

The preparation of management plans is based on:

- Using the best available scientific information, water allocation and use modeling to determine the environmental water requirements and water availability for current and future consumptive uses;
- Reducing the ecological stress caused by the taking and using of stream flows during critical low flow periods;
- Establishing an Environmental Water Reserve;
- Estimating and minimising the impacts to the reliability of supply of existing users by the establishment of an Environmental Water Reserve;

- Recognising the socio-economic implications of establishing an Environmental Water Reserve; and
- Managing the risks to achieving the Environmental Water Reserve.

Key Participants in the Process

The Victorian Government

The Minister for Water has the responsibility for the Water Act 1989 and represents the Victorian Government in the management of water resources. The responsibility for licensing water extraction in the Woori Yallock Catchment has been delegated to Melbourne Water to administer on day by day basis, however major resource decisions such as those made in the SFMP are still approved by the Minister.

Melbourne Water

Melbourne Water issues and administers licences to construct dams and to harvest water in the Woori Yallock Creek catchment. Melbourne Water does this in accordance with the Water Act 1989 and the rules set out in an approved SFMP.

Melbourne Water also facilitates the process of developing the SFMP, organising the consultative committee, providing it with information on which to base its recommendations and then publishing these recommendations in a draft plan.

The consultative committee

The Minister appoints a consultative committee and instructs them to prepare a draft SFMP to advise him in making water resource decisions. The consultative committee must prepare its draft plan within 18 months and make this draft plan available to the community.

The consultative committee appointments represent the different interests in the catchment, including Melbourne Water, government, farmers, environmental and local government interests. The members are people who the Minister believes has knowledge or experience of the catchment and the issues that will be discussed. At least half of the members must be local farmers/landowners from within the catchment. Their responsibilities include representing the community interests to help shape the SFMP and encouraging stakeholder engagement in the plan.

1.3 Key steps in developing a Stream Flow Management Plan

The key stages and activities in preparing a draft management plan are outlined in *Figure 1*.

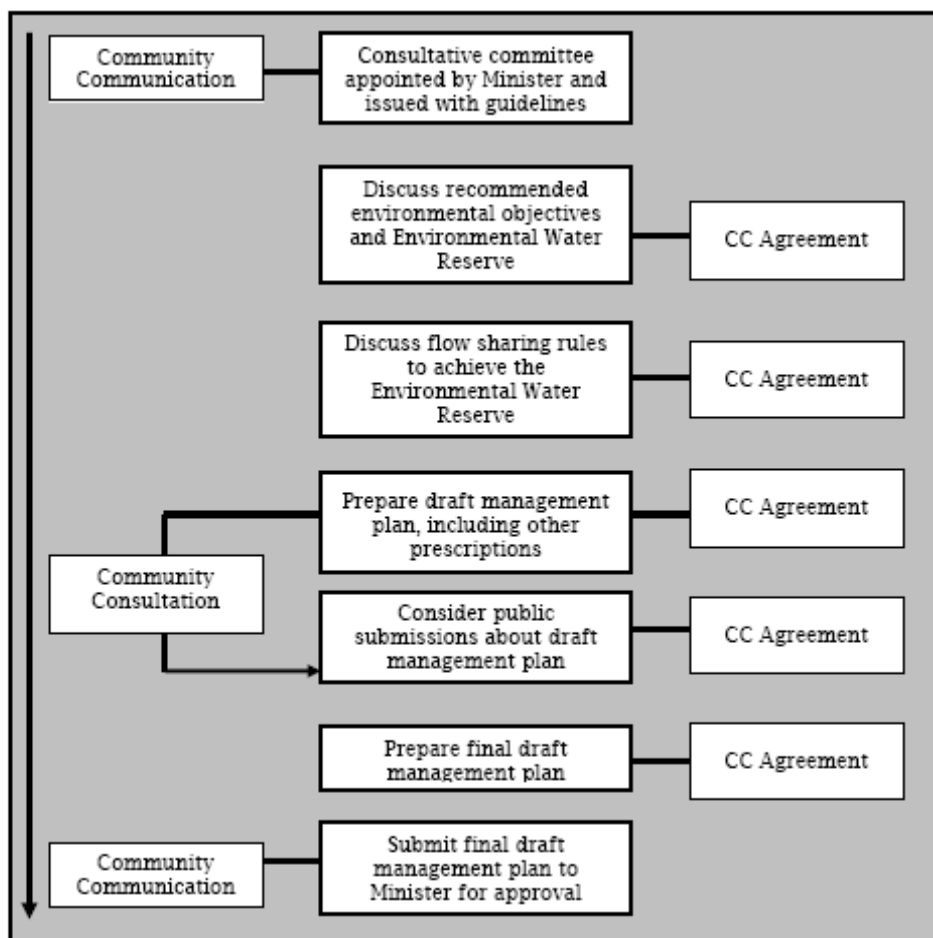


Figure 1 : The Process for preparing a Stream Flow Management Plan

1. Developing Objectives

The objectives set the direction of the SFMP. They set the outcomes that the consultative committee wants for the catchment. Trade offs between environmental and water use outcomes are usually made in the setting of the objectives so that the consultative committee has a shared goal to work towards.

The objectives must be compatible with both broader catchment management objectives set by the Victorian Government, and may include specific objectives for the environment, for water users or for cultural values. The objectives must:

- Provide for environmental water requirements within an agreed time frame;
- provide an agreed security of supply of current licence holders; and
- Ensure that development in the future occurs in an environmentally sustainable manner.

The wording of the objectives must clearly define outcomes that are measurable and meaningful.

2. Identifying and addressing issues in meeting the objectives

The consultative committee will investigate whether the catchment is currently meeting the objectives and if not, will identify where changes need to be made. This will be based on the best available information, even though this information may not always be perfect or complete and assumptions may need to be made. It is here that the input of the local water users is particularly valuable.

The consultative committee must take into account any other draft or approved management plan for the area when it is identifying its issues e.g. Groundwater management plan.

3. Defining rules to accomplish objectives

A SFMP may prescribe rules to meet its objectives relating to:

- requirements for metering, monitoring and accounting for water
- requirements for the location, capacity and operation of private dams which are—
 - (i) Not licensed; and
 - (ii) Not for domestic and stock use
- restrictions or prohibitions on the issue of water or dam construction licences
- restrictions on the taking of surface water to ensure that—
 - (i) Environmental flows are maintained; or
 - (ii) A maximum annual volume for the area is not exceeded
- conditions relating to the protection of the environment, including the riverine and riparian environment
- conditions to which water licences are to be subject
- conditions on dam construction, provided they do not limit D&S usage
- conditions under which water licences can be transferred, including a condition relating to the maximum volume of water which may be taken and used under the transferred licence
- the maximum volume of
 - (i) Each private dam on a particular lot in a plan of subdivision in the area concerned;
 - (ii) All private dams on every lot in a plan of subdivision in the area concerned
- Any matter relevant to the management plan's implementation.
- The total volume of water that may be taken by licence in the catchment each year.

4. Preparing a Draft Plan

The consultative committee's recommendations are compiled into a draft plan that is released for public comment. The consultative committee may amend the draft plan in response to constructive feedback that is received.

5. Approval of the final draft plan

The final draft SFMP will be submitted to the Minister for approval. The Minister may approve the plan and must present the approved management plan to each House of Parliament.

On the approval of a draft management plan, every licence issued in the catchment becomes subject to the rules within the plan. The approved plan is then binding on every person, including every public statutory body.

The draft management plan is not a list of recommendations - it is a plan that introduces prescriptions (rules) about the management of licenses in the Protection Area. However, depending on the rules within the plan, some prescriptions may not come into effect immediately but may be implemented over time.

1.4 Issues to consider in developing a Stream flow Management Plan

In developing its recommendations the Consultative Committee should consider:

Impacts on water users and the environment

- assessment of the impact of meeting environmental flows on reliability of supply under conditions of existing water use and under full licence entitlement (i.e. all licenses in the catchment are being fully used);
- assessment of impact of the growth in water diversions;
- assessment of the impact of all water diversions, including direct diversions, diversions from dams, domestic and stock use and groundwater extraction;
- assessment of the potential impact of both on-stream and off-stream dams on summer/autumn low flows if inflows to the dams are not passed;
- assessment of the impact of rostering and restriction rules on reliability of supply of licenses and low flows;
- Assessment of the benefits of diverting water during winter time instead of summer time as a way of reducing pressure on low summer flows.

Recommended environmental flows

The environment should be recognised as a valid “user” of water in the catchment, and as such deserves its share of the total water resource. Any reduction in flows from those that would have occurred naturally will increase the risk of environmental harm.

The environment’s share of water is usually protected in SFMPs by:

- An environmental flow made up of a minimum daily flow and protection for medium flow peaks (flushes) caused by rainfall, and
- A cap on the total amount of water that can be extracted each year.

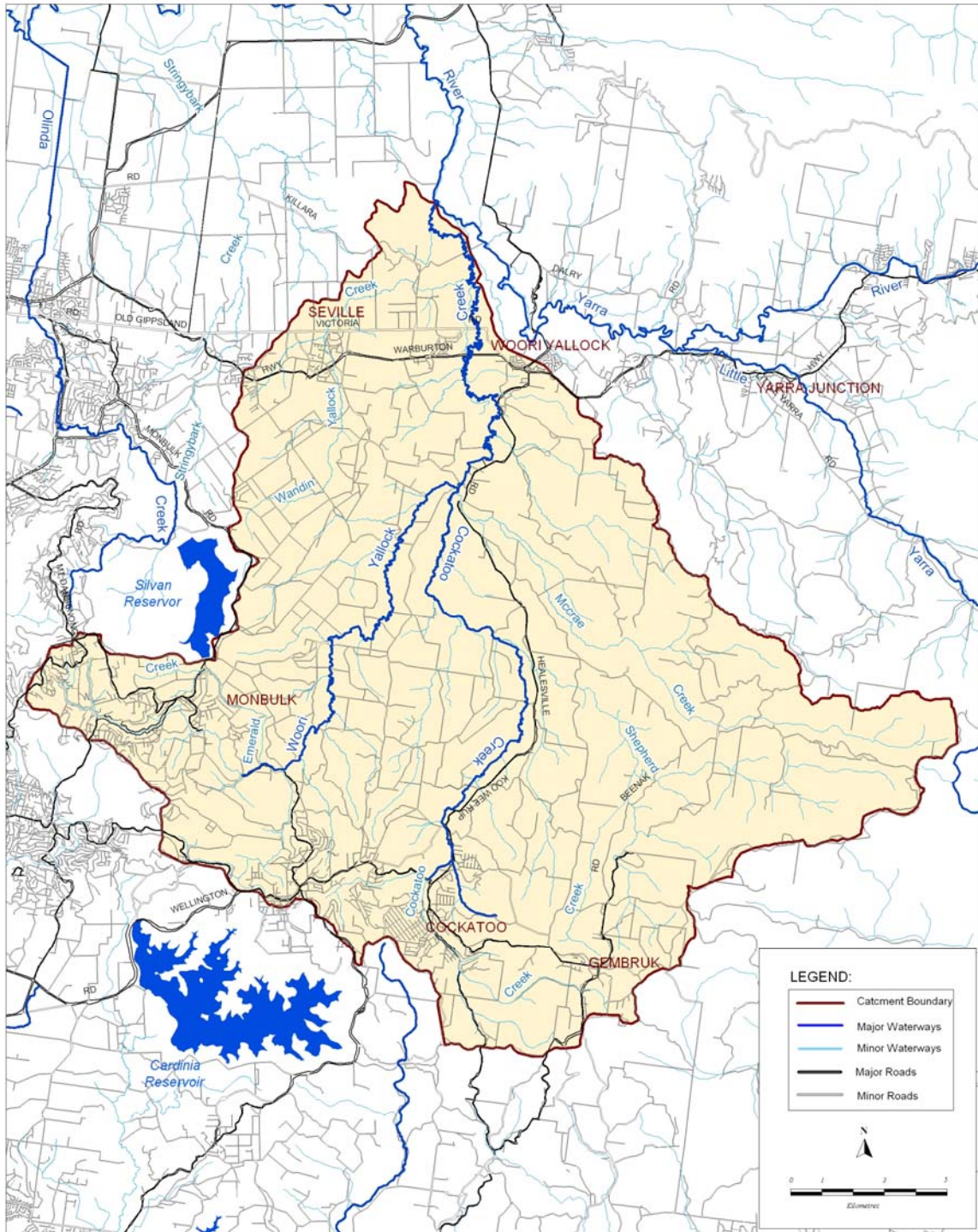
Environmental flow studies are undertaken during the development of SFMPs to determine the environmental water requirements of a waterway. Consultative committees and agencies then use environmental flow study recommendations when negotiating water sharing arrangements between users and the environment.

In Victoria, the FLOW’s methodology is used to identify the environmental flow and is used because:

- The FLOWS method recommends a flow regime with key flow components across the full year, including spring migration / spawning flows, flushes, minimum flows for summer and winter, rather than a single minimum flow.
- FLOWS is considered best practice and the recommendations link into the Victorian River Health Strategy’s idea of “ecologically healthy rivers”.
- the use of a hydraulic model as a tool in the interpretation and development of recommendations
- The FLOWS method has been used extensively in various parts of the state as a key input to Victoria’s water allocation program.

Groundwater development/usage impacts

Southern Rural Water manages groundwater diversions in the area and is required to develop management plans similar to SFMPs for groundwater resources. Due to the importance of groundwater/surface water interaction (groundwater discharge commonly supplies waterway base flows); consideration may be given to linking the recommendations of groundwater management plans to the SFMP. This would be particularly relevant in areas where groundwater discharge is a significant component of summer base flows.



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**Woori Yallock Catchment
Water Supply Protection Area**



Job No. 20081006

Figure 2: Map of the Woori Yallock Water Supply Protection Area

2 The Woori Yallock Creek – background

2.1 Catchment description

The Woori Yallock Creek rises on the eastern slopes of the Dandenong Ranges flowing in a generally northerly direction before joining the Yarra River northeast of the town of Seville, draining a catchment area of 272 km². Major tributaries include the Wandin Yallock, Emerald, Sassafras, Menzies, Cockatoo, Macclesfield, Wattle, Gembrook, Shepherd, McCrae, Tomahawk and Sheepstation Creeks (Figure 2).

The upper regions of the catchment are a mix of forest, intensive horticulture (viticulture, vegetables, flowers and tree farms), and urban developments. The lower, northern reaches have predominantly been cleared for grazing and horticulture. Approximately 80% of the catchment has been cleared, with this cleared area now used for urban and peri-urban developments, and intensive horticulture and grazing.

Small townships are located throughout the Woori Yallock Creek catchment including Cockatoo, Monbulk, Kallista, Seville, Emerald, Olinda and Gembrook.

The Woori Yallock Creek and its tributaries drain an area of high and reliable rainfall (1100-1200 mm per year) and maintain a permanent flow throughout the year, with a base flow provided by groundwater inputs. Groundwater and surface water interaction occurs within the catchment.

2.2 Environmental Values

Seven species of native fish have been found within the river catchment comprising; River Blackfish (*Gadopsis marmoratus*), Mountain Galaxias (*Galaxias olidus*), Australian Smelt (*Retropinna semoni*), Southern Pygmy Perch (*Nannoperca australis*), Common Galaxias (*Galaxias maculatus*), Shortheaded Lamprey (*Mordacia mordax*) and Short-finned Eel (*Anguilla australis*). The fish community is notable for the low numbers of introduced fish species and high numbers of large River Blackfish.

Three species of native crayfish have been collected in the catchment – Yarra Spiny Cray (*Euastacus yarraensis*), Central Highlands Spiny Cray (*Euastacus woiwuru*) and Gippsland Spiny Cray (*Euastacus kershawi*). A significant instream fauna of the catchment is the widespread presence of native freshwater mussels (*Hyridella*).

Other notable species within the Woori Yallock Creek include the Growling Grass Frog (*Litoria raniformis*), Southern Toadlet (*Pseudophryne semimarmorata*), Swamp Skink (*Egernia coventryi*), Platypus (*Ornithorhynchus anatinus*), Helmeted Honeyeater

(*Lichenostomus melanops cassidix*), the damselfly (*Hemiphysalia mirabilis*) and the caddisfly (*Plectrotarsus gravenhorstii*).

Instream flora in the catchment includes four Victorian threatened species - willow-herb (*Epilobium pallidiflorum*), forest sedge (*Carex alsophila*), brickmakers' saw-sedge (*Gahnia grandis*) and tall astelia (*Astelia australiana*). The threatened sedge-rich Mountain Swamp Gum (*Eucalyptus camphora*) community occurs in the Yellingbo State Nature Reserve along Woori Yallock Creek.

2.3 Catchment condition

Much of the upper catchment of the Yarra River has been cleared, and the same condition holds for the large sections of the Woori Yallock Creek. Davis *et al.* (1998), for example, reported that in some areas of the upland and rural unconfined sections of the catchment, 25 % of the vegetation in the riparian zone had been removed. The remaining 75 % consisted of only a narrow band of trees subject to major invasions by blackberries (*Rubus fruticosus*) and a variety of introduced deciduous trees. The major issues for these riparian zones includes: the maintenance of threatened plant communities, particularly the sedge-rich Mountain Swamp Gum community in the Yellingbo Nature Conservation Reserve, weed control and stock access, bed and bank erosion, water quality deterioration, fish barriers and maintaining stream flows

Despite parts of the catchment being degraded, there are pockets where the creeks are in excellent condition, such as parts of McCrae and Shepards Creek catchments, parts of Cockatoo Creek and Tomahawk Creek. Of particular significance is the Yellingbo Nature Conservation Reserve that contains a number of threatened/endangered flora and fauna species including the Helmeted Honeyeater, Leadbeaters Possum and the Sedge-rich Mountain Swamp Gum Community.

2.4 Why develop a Stream Flow Management Plan for the Woori Yallock Creek?

The large volume of water allocated from the Woori Yallock catchment compared to the average monthly flows creates competition for available flows and increases stress on the environment.

Over-allocation of water reduces security of supply and once that happens, relying upon a regular supply - whether you are a farmer, a household, or the environment - becomes increasingly risky. A SFMP assists in managing water for all uses including

the environment and clearly defines any opportunities and requirements for new water developments.

In addition, the stream supports a number of significant flora and fauna species. These environmental values need to be protected, in part by protecting a share of stream flows for the environment.

3 Hydrology, existing diversions management, water allocation and alterations to natural flows

3.1 Hydrology

There are seven active stream gauges in the catchment with varying lengths of record (Table 1). The best gauge record is that of the Woori Yallock Gauge (229215) which is situated at the bottom of the catchment and has been recording for the past 30 years. The remaining gauges have about five to six years of data, recording flow over a period of low rainfall.

Reach	Station	Stream	Location	Record
1	229215B	Woori Yallock Creek	Woori Yallock	01/01/75 to date
2	229681B	Wandin Yallock Creek	Seville East	24/06/93 to date
3	229679B	Woori Yallock Creek	Yellingbo	05/08/93 to date
4	229678A	McCrae Creek	Yellingbo	10/07/99 to date
5	229248A	Cockatoo Creek	Nangana	04/04/98 to date
	229677B	Shepherd Creek	Nangana	25/06/03 to date
6	229694B	Woori Yallock Creek	Monbulk	06/07/99 to date

Table 1: Stream gauges in the Woori Yallock Catchment.

The mean annual flow in Woori Yallock Creek is around 85,000 ML/year (over period 1975-2004). However, on a monthly basis, the stream flows are highly variable, with highest flows in July to October inclusive (the winter fill or dam-filling period) and lowest flows in January to May (figure 3).

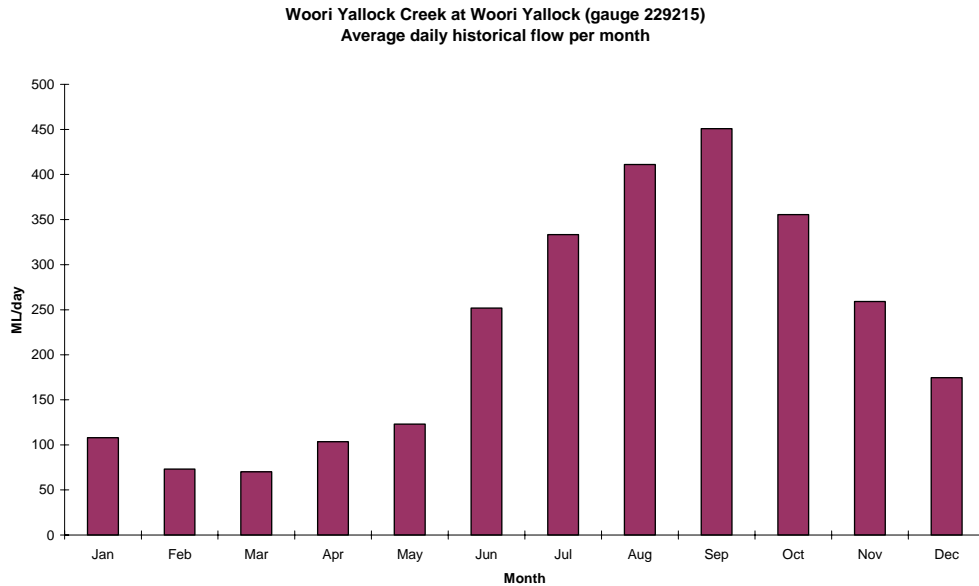


Figure 3: Average daily flow for period 1975 to 2007. Source: Melbourne Water

Table 2 shows that flow within the Woori Yallock Creek catchment can also be highly variable between seasons.

	Minimum Recorded Flow (ML/day)*	Maximum Recorded Flow (ML/day)*
Summer	10	4223
Autumn	9	2152
Winter	61	12238
Spring	28	10701

Table 2: the minimum and maximum recorded flows at Woori Yallock Gauge

* Instantaneous flows. For period 1975 to 2007. Source: Melbourne Water

Since the region is dominated by winter rainfall, most irrigation occurs over the summer season, and therefore, the impact of irrigation on stream flows in the catchment is greatest in summer. This is illustrated in Figure 3, which shows that the impact of water diversions on the natural stream flow is high from November to April and relatively low over the other months.

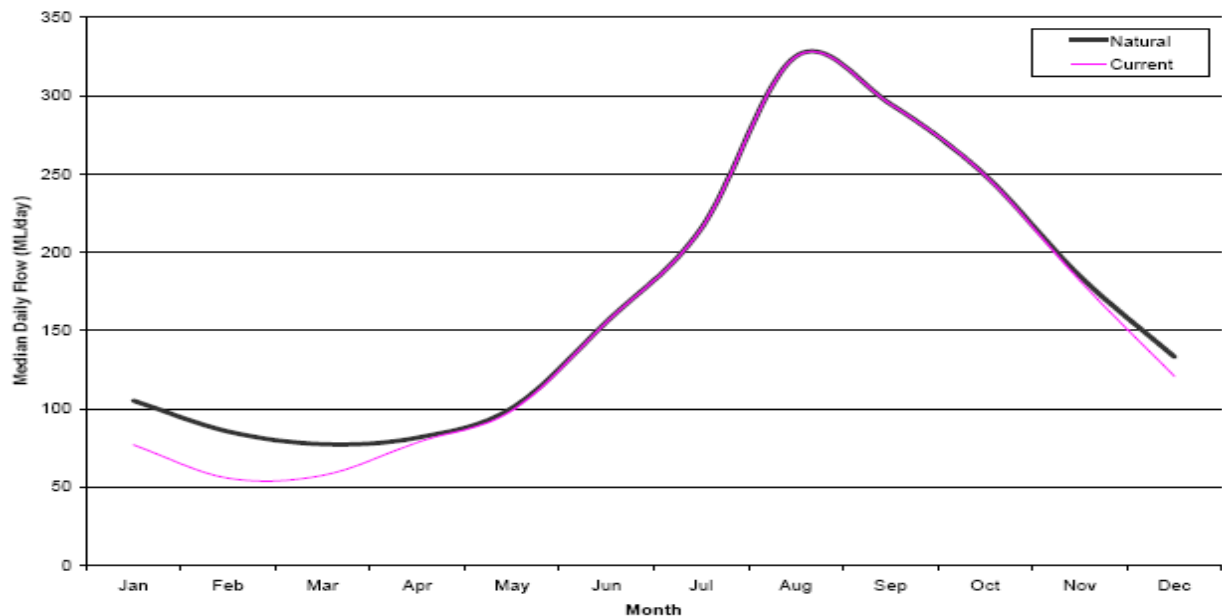


Figure 4 - Seasonal stream flows – natural (without diversions) and current (with diversions) - Woori Yallock Gauge 229215

All consumptive water use, whether through direct pumping from the river or captured in farm dams prior to rainfall runoff reaching the river, changes what flows down our rivers. In unregulated catchments, understanding the timing and duration of this use, and its influences on stream flows, is crucial to understanding the affect this has on the various environmental assets that rely on the river.

3.2 Licensing of water allocations

Melbourne Water is responsible for the management of surface water diversions within the Woori Yallock Creek catchment. Groundwater extractions within the catchment are managed by Southern Rural Water. There are approximately 570 licensed surface water diverters and a fish farm that are allocated over 9,000 ML/year from Woori Yallock Catchment system, most of this in summer.

The Yarra River catchment is capped at current allocation levels and no new water allocations are available. This cap applies to the Woori Yallock Creek catchment also and the only way to obtain a new or increased entitlement is through water trading downstream or at a local level. All other trades where water is transferred upstream or across-catchment requires the licence to be considered on a winter fill basis only; where water is available for extraction during the high flow winter months to be pumped in to an offstream storage dam for summer usage. Any new licence, or

Transferable Water Entitlement application, is assessed to consider potential impacts to existing licensed diverters and the environment.

3.3 Types of licences

Under the Water Act 1989, licences are required to take and use water from a waterway or farm dam. A Diversion Licence allows you to take and use water from a waterway or dam up to the amount and for the purpose specified on the licence.

Types of licences

There are three types of licences:

1. Standard Take and Use Diversion Licence

This licence allows you to take and use water from a waterway or dam up to the amount and for the purpose (see below) specified on the licence.

2. Farm Dam Licence

This licence allows you to take water from catchment dams that were historically utilised for irrigation. The difference between these licences and Dam Registrations is that Farm Dam Licences can be traded, liked a standard licence and incur annual fees.

3. Farm Dam Registration

This covers catchment dams that were historically utilised for irrigation or commercial purposes prior to the Water (Irrigation Farm Dams) Act 2002. They are granted in perpetuity.

Conditions

A water licence can have conditions on the timing of access to water. There are two types of conditions:

1. All-year Licences

A licence that allows taking of water from a waterway any time during the licence year.

2. Winter fill Licences

A winter fill Diversion Licence is a licence used in conjunction with a dam and which contains a condition restricting the period during which water can be taken from the waterway under the licence (termed the winter fill period). The winter fill period is commonly the high flow period during which time water may be pumped into the dam for later use during the irrigation period

or summer usage. Historically, the winter fill period is from the 1 May to 30 October or as defined in a SFMP or under local management rules.

Dam – Off-stream: A dam that is not constructed across a river, creek, stream, watercourse or waterway but is licensed to take water diverted, or pumped, from one of these sources.

Dam – On-stream: A dam constructed on, in or across a river, creek, stream, watercourse or waterway and licensed to take water from that source.

Purpose

Licences can be used for a range of purposes:

Irrigation

Water can be used for any irrigation purpose as well as for any domestic and stock, dairy, poultry farm and other general non-irrigation farm use on the nominated property.

Domestic and Stock Licences

Water that can be used for household purposes including watering of pet animals, cattle or other stock and irrigation of a kitchen garden, but does not include use for dairies, piggeries, feed lots, poultry or any other intensive or commercial uses.

On-stream or off-stream Dam Filling

Licence which will contain winter fill licence conditions as described above that can be used for filling of an on-stream or off-stream dam for later irrigation use.

Non-consumptive licences

Water can be used for a non-consumptive purpose and returned to the waterway such as for power generation or aquaculture.

Industrial/Commercial Licences

Licences to take and use water generally for industry and non-irrigation commercial uses.

Private Rights to Water

Some properties have rights to domestic and stock water without need of a licence. Section 8(1) of the Water Act 1989 provides that a person has a right to take water, free of charge, for that person's domestic and stock use from a waterway to which that person has access-

- (a) by a public road or public reserve; or

- (b) because that person occupies the land on which the water flows or occurs; or
- (c) in the case of a waterway, because that person occupies land adjacent to it and the bed and banks of the waterway have remained the property of the Crown by virtue of section 385 of the **Land Act 1958** or any corresponding previous enactment.

Section 11 of the Water Act extinguishes some of these rights upon subdivision of a property and to protect waterways from inappropriate pumping under Section 8(1), Section 8(8) of the Act also states that 'This section does not authorise any act or omission that may—

- (a) cause any water to be polluted; or
- (b) obstruct the flow of any water in a waterway; or
- (c) erode or otherwise damage the surrounds of any waterway.'

Consequently the right can only be exercised where sufficient flows exist within the stream to enable pumping to occur without works or other interference taking place within the waterway itself.

3.4 Water allocation and use in Woori Yallock catchment

Water in the Woori Yallock Catchment is currently used under licence for a variety of domestic and agricultural purposes including annual crops e.g. Lucerne; pasture irrigation, turf irrigation, and intensive horticulture.

Table 3 below shows the total licensed water allocation in the Woori Yallock Creek catchment but the actual water use varies considerably between seasons and years and is dependant on climate, rainfall, stream flow, irrigation method and land use (e.g. crop type).

Allocation Category	Volume (ML)
All-year Licences*	7849
Farm Dam (Registered)	1058
Farm Dam (Licensed)	451
Domestic and Stock (Licensed)	247
Total Allocation*	9065

Table 3: Summary of licences held in the Woori Yallock Creek Catchment

**This does not include a non-consumptive use licence for a fish farm, where water is returned to the creek.*

Source: Melbourne Water

There is currently limited knowledge of water use in the catchment. Metering of all active irrigation and commercial surface water use licences 5ML and above has been introduced. This will enable users to operate within their licence conditions and entitlements and provide water resource managers with a better knowledge of water use impacts on the environment.

3.5 Drought management

Melbourne Water's Drought Response Plan specifies minimum flows in the Woori Yallock Creek catchment through existing water sharing arrangements. These arrangements mean that, during periods of reduced flow, licences are managed using a staged approach with the introduction of restrictions (reduced hours of pumping and rosters) followed by bans if flows decline further.

The trigger gauge for this catchment is Woori Yallock Creek at Yellingbo. For the low-flow period the restriction and ban triggers are 45 ML/day and 31 ML/day respectively and for the high-flow period the restriction and ban triggers are 120 ML/day and 103 ML/day respectively.

In recent years, low stream flows have meant that licensed water users in the Woori Yallock Creek catchment have had reduced access to water. In 2007/08, licensed water users in the Woori Yallock Creek catchment (excluding Wandin Yallock Creek) were on bans for a total of 182 days and restrictions for a further 60 days, so had normal access to water for a total of 123 days (34% of the year). Bans or restrictions were in place for the majority of the peak irrigation demand period of December to March. For the Wandin Yallock Creek catchment, licensed water users were on bans for a total of 89 days in 2007/08.

In 2006/07, bans were in place in the Woori Yallock Creek catchment for a total of 249 days and restrictions for a further 51 days, and in the Wandin Yallock Creek catchment, bans were in place for a total of 156 days.

4 Potential issues and outcomes experienced in other Stream flow Management Plans

The aim of the Stream flow Management Plan is to maintain and recognise the existing licensed rights to water within the catchment whilst aiming to maintain and improve waterway health through the implementation of environmental flows. Importantly, the SFMP will result in a framework of rules with which to manage the

Woori Yallock Creek system to enable the meeting of agreed water management objectives. These rules will be incorporated into specific policies and procedures for the Woori Yallock Creek system.

As a number of SFMPs have been developed in the Yarra Catchment and elsewhere in the State, the following have been included as issues/outcomes commonly experienced during the development of a SFMP.

4.1 Environmental flows

Flow Sharing

Appropriate flow sharing rules will be determined through consultation between key stakeholders.

Rosters

Restrictions/rosters are a means of equitably sharing the available water resource between all licensed diverters, and the environment, during periods of low stream flow. Rosters can be managed by alternating days of the week or hours per day.

Stream gauging/Monitoring

In order to achieve the specified flow sharing arrangements, and to maximise use of the available water, existing stream flow gauging may require review/upgrading.

4.2 Licensing

Annual Licences

Annual Licences will have been reissued to reflect the SFMP recommendations concerning trading rules, area constraint removal, etc.

Annual Licence Allocation Cap.

SFMPs are normally developed due to inadequate flow sharing arrangements, as most existing licences have been granted to allow direct pumping from a waterway for irrigation purposes during the low flow summer period November – May inclusive. Accordingly, Annual or Summer Volume Licence caps have been set as new/or additional allocations would affect the level of security of existing licences and potentially stress the waterway further. The introduction of caps ensures security of supply to existing users and avoids potential detrimental affects to waterway health. In most systems it is expected that these caps will be equal to current licensed volume and extraction conditions.

Winter Fill Allocation Cap

Due to no further summer extractions being available other than through the transferable Water Entitlements process, and in accordance with agreed SFMP outcomes, existing licensed diverters may increase security of supply through the provision of winter fill licensing and offstream storage, where water is deemed available. The winter fill Cap typically defines the appropriate high flow months and the associated volume/cap/environmental flows that may be extracted from the system. This also applies to, and allows for, new developments.

Low Consumptive Use Licences

Low consumptive use licences refer to those used for domestic, stock, aquaculture and other miscellaneous purposes. Total consumption is less than or equal to 2 ML/yr. Given the nature of these licences and the expectation that very few new licences would be issued, these licences are not usually subject to environmental flow recommendations in a SFMP. However the scope for multiple low consumptive use licences to become a significant water user does need to be considered and addressed if an issue, especially in relation to conflicting urban and rural pressures.

4.3 Water Trading

Water trading is intended to:

- facilitate the transfer of water to the highest value use;
- promote efficiency;
- delay investment in new infrastructure
- protect security of supply of existing users; and
- Protect environmental flow provisions.

Water trading is likely to increase the overall water use as those licences currently unused (sleeper licences) become active. This will reduce the security of supply of existing users and may have detrimental effects on the environment and the management of environmental flow targets, particularly when water is traded upstream. Water traded downstream will not reduce security unless the water is not being utilised (sleeper licences). Trading water upstream may impact on security, depending on where the water is traded from and to.

Rules need to be introduced into the SFMP to ensure consistency between the requirements of the transferable water entitlement process within the *Water Act 1989* and those of the local system.

4.4 Monitoring and compliance

Melbourne Water are obliged to monitor and ensure environmental flows are maintained. Melbourne Water must submit an Annual Report to the Minister each year on the operation of the SFMP. The following matters shall be reported in the annual report of Melbourne Water:

- the annual volumes of water diverted from the stream under Licence within SFMP boundaries;
- meeting of designated environmental flow requirements as stipulated in the SFMP;
- details of any management problems relating to low flow periods, i.e. the extent of rostering;
- details of Tradeable Water Entitlements;
- water sales volumes;
- the implementation of the metering program; and
- any amendments to the SFMP.

Note: the above has been a recommendation of all SFMPs developed to date

Licence conditions shall be enforced in accordance with Melbourne Water policy and delegated functions of the *Water Act 1989*.

4.5 Reviewing the plan

The consultative committee may agree that a review, after say 5 years, would be appropriate to ensure the rules are satisfying the stream management objectives.

Note: the above has been a recommendation of all SFMP's developed to date.

4.6 Other issues for consideration

Catchment Dam Impacts

Consideration maybe required regarding the impacts of the construction of general catchment dams on overall stream flow yield, and therefore security of supply to diverters.

Groundwater Development/Usage Impacts

Rural Water Authorities are required to manage Groundwater diversions in a similar manner to surfacewater diversions and are required to develop Management Plans similar to SFMP's where varying groundwater zones are over allocated/stressed. Due to the importance of groundwater/surfacewater interaction (groundwater discharge

supply river baseflows), consideration may be required as to linking the development of Groundwater Management Plans in areas where groundwater discharge is a significant component of summer base flows.

List of common terms

All year licence - A licence that allows harvesting of water from a waterway any time during the year.

Catchment dam - A dam that is not located on a waterway, and which captures rainfall and runoff from the catchment.

Commercial use - Water used for irrigation of produce to sell and for industrial uses such as cooling or dairy washing

Domestic and stock licence (D&S) - A licence to take water from a waterway for use in and around a house or for watering of stock, but not for commercial purposes.

Environmental flow - A pattern of stream flows that maintains or improves aquatic ecosystems and their habitats by mimicking the size and timing of natural flows.

Natural flow - The flow that would exist if there was no harvesting of water by dams or direct extraction. Natural flows are estimated by adding an approximation of the water taken out of the catchment back onto the flows that are recorded at a stream gauge.

Macroinvertebrate - Animal species without a backbone that can be seen with the naked eye. Macroinvertebrates are commonly used as a measure of stream health.

Median - The middle number of a set of numbers, such that half the results are greater than the median and half are less than the median.

ML - Megalitre; one million litres.

Off-stream dam - A storage which is not located on a waterway as determined under the *Water Act 1989* definition, but is filled with water pumped from a waterway.

On-stream dam - A storage that is located on a waterway as determined under the *Water Act 1989*.

Reliability of supply - A percentage chance of being able to fully obtain a volume of water in any year.

Sleeper licences - Licenses held but not utilised.

Summer licence - Also known as an All-year licence (see above).

Transferable Water Entitlement - The temporary or permanent transfer of an existing licence to a new licensee, either in whole or in part.

Winter fill licences - Licences to fill off stream storages by direct pumping during the winter fill period. The permit is limited to the volume of the storage. No limit is placed on the area that may be irrigated from the off stream storage.

Winter fill period - The wetter months of the year when flows are high enough to allow additional water to be harvested over and above extraction by annual licence holders.