

LIBRARY

Department of Biodiversity,
Conservation and Attractions

This PDF has been created for digital preservation. It may be used for research but is not suitable for other purposes. It may be superseded by a more current version or just be out-of-date and have no relevance to current situations.

YOUR GARDEN

with *Josh Byrne*

GARDENING SOLUTIONS FOR HEALTHIER RIVERS

GARDEN GUIDE

A guide for gardening on
the Swan Coastal Plain



Department of Biodiversity,
Conservation and Attractions



SWAN CANNING
RIVERPARK





Our iconic Swan Canning Riverpark is showing signs of environmental stress. What you do in your own backyard affects our rivers and therefore every Perth resident has an important role to play in helping to protect them.

There are simple and cost effective steps that gardeners can take to reduce nutrient pollution and it starts with only feeding plants what they need, when they need it.



April 2021



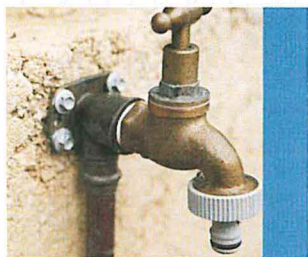
RiverWise Gardening



Minimise Nutrient Runoff

Find out how to have a healthy garden on less fertiliser.

know your garden.....	4
improve your soil.....	8
responsible fertiliser use.....	9
protecting your soil.....	13



Conserve Water

Discover how delivering the right amount of water to each plant also saves your soil.

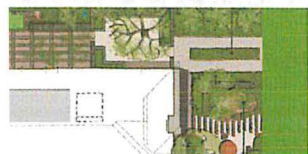
hydrozoning.....	14
stay waterwise.....	16
water efficient practices.....	18



Support Local Biodiversity

Choices to help you attract native wildlife to your garden.

incorporate local, native plant species.....	22
non toxic alternatives.....	23



RiverWise Garden Design

Gain the skills to landscape design your own RiverWise and Waterwise garden.

key features & approaches.....	24
--------------------------------	----

Getting Started

The back page is your action plan for taking three steps towards a RiverWise garden - what will you choose to do first?



Measure Your Garden

It's important to know the composition and dimensions of your garden. This helps you to understand how much water and fertiliser to use.

Garden Composition

A residential landscape should be grouped into 'zones' according to its water and nutrient needs. Example zones to group your garden into are:

- Productive garden beds
- Lawn
- Ornamental/exotic garden beds
- Native trees and shrubs

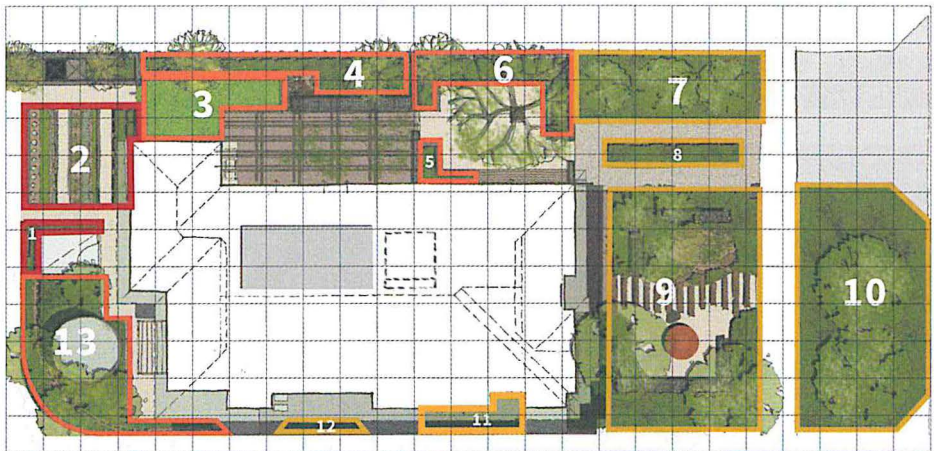
Garden Dimensions

The two steps in determining the dimensions of your garden beds and lawns are:





1. **Use a tape measure:** Measure the length (l) and the width (w) of each of the beds/lawns and multiply them together to determine the area (m²).
2. **Sketch it out:** Accurately sketch out your property on a piece of grid paper, including each of the garden types.

Productive Garden Beds

	L	W	Total
1	3m	3m	9m ²
2	2m	.75m	1.5m ²
	2m	.5m	1m ²
			11.5m ²



Property Sketch Key (Composition, zone number and zone colour code)

Productive garden beds	1&2		Ornamental/exotic garden beds	4,5,6,13	
Lawn	3		Native trees and shrubs	7,8,9,10,11,12	

Tip: Measure your garden beds and lawn

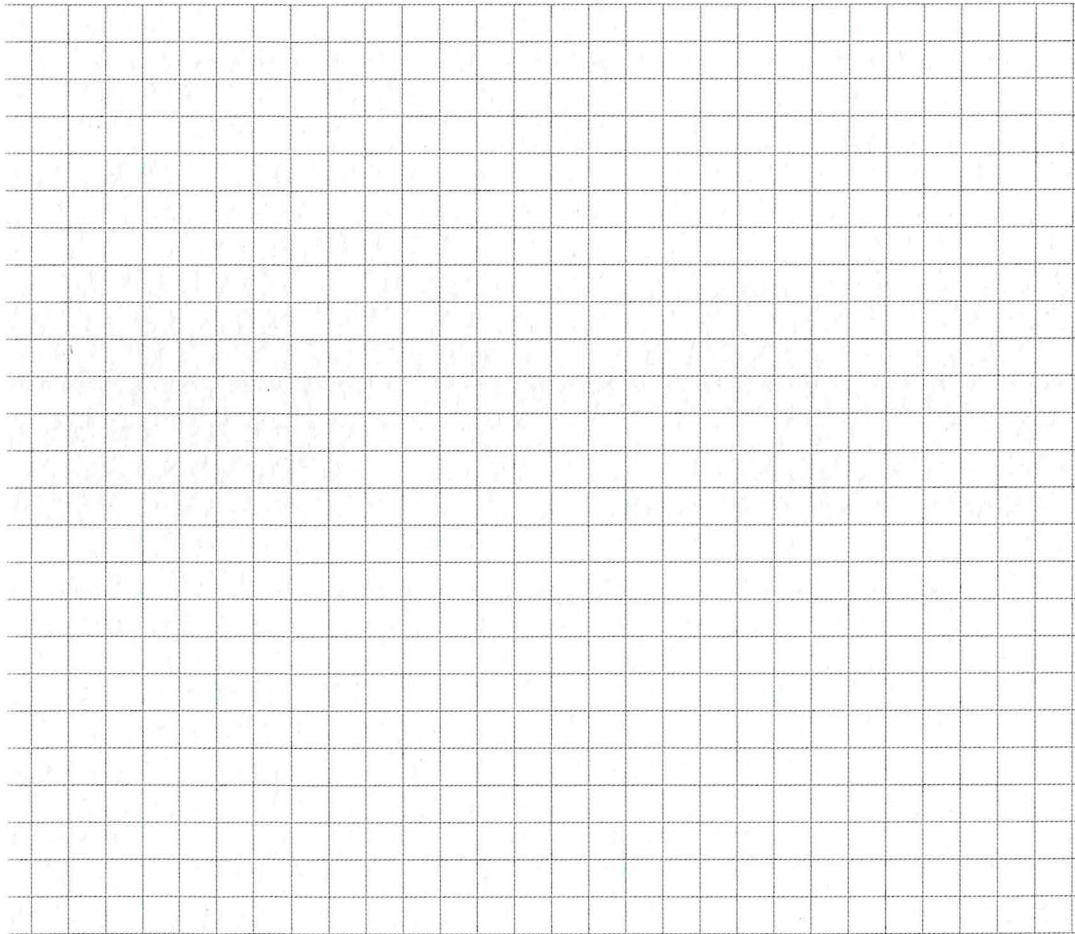
My action:

.....

How?

.....

When?



Know your Soil and Obtain a Soil Test

Nutrient deficiencies are often the result of pH problems (either too acidic or too alkaline) rather than insufficient fertiliser. The ideal pH for most garden plants is around 6.5 - 7 (neutral).

You can easily test the pH of your soil by purchasing a powder or liquid self test kit or using an electronic pH meter. If you do need to amend the pH of your soil by adding lime to raise pH, or sulphur based compounds to lower it, then just remember that it is a slow process.

In all cases applying organic matter to the soil assists in bringing both acidic and alkaline soils back to neutral while also improving the texture and vitality of the soil.

Obtaining a comprehensive soil test is a thorough way to accurately assess which nutrients, if any, are deficient in your soil. Soil laboratories can undertake these tests and provide a clear, simple written report of recommended nutrient adjustments.

Ideally, this test should be conducted annually.



Tip: Test the pH of your soil regularly.

My action:

.....

How?

.....

When?

Improve your Soil and Use Soil Conditioners

Perth's soils are predominately sandy soils with low nutrient content so they will benefit from soil conditioners to help increase their microbial activity and fertility as well as improve soil moisture and nutrient retention capacity. There is a variety of soil conditioners available including:

- **Compost** - Easily produced in your own backyard using food and garden waste products.
- **Clay** - Increases the water and nutrient holding capacity of sandy soils.
- **Mineral Soil Amendments (spongolite, zeolite)** - An alternative to clay and are naturally occurring materials that have the ability to hold nutrients and prevent leaching.
- **Soil Wetting Agents** - Act like a detergent to break down the waxy coating on hydrophobic soil particles to allow water to penetrate the soil profile.
- **Water Storing Granules** - Manufactured polymers which swell up as they absorb large quantities of water and nutrients. These are most suited to pots.



Tip: Using soil conditioners will increase soil nutrient retention

My action:

.....

How?

.....

When?

Apply the Right Amount of Soil Conditioner

The application and type of soil conditioners varies depending on the garden type. A guide for soil conditioner use is:

- **New garden beds (inc. productive beds)** - Compost, clays and mineral soil amendments should be applied as per the manufacturer's application rate which is typically a single application mixed thoroughly into the top 25cm of existing soil. Soil wetting agents should be evenly spread on the soil's surface.
- **Existing garden beds** - Whether soil conditioner/amendments are required will depend upon the soil's existing condition. If the soil is poor and plants look hungry, apply soil conditioners as per the recommended application rates and method on the product label.
- **Existing productive garden beds** - Reapply compost each time you re-plant and apply a soil wetting agent if the soil becomes non-wetting.
- **New lawns** - Soil conditioners should be mixed into the top 25cm of existing soil to create the lawn's sub base. This is then lightly compacted and levelled for roll-on or lawn seed to be applied.



Tip: Apply soil conditioners as per the manufacturer's recommendation.

My action:

.....

How?

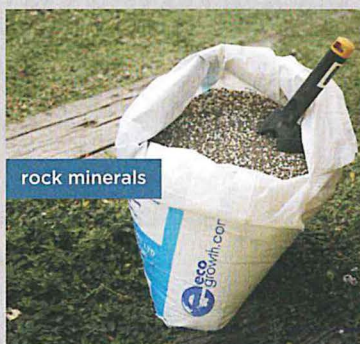
.....

When?

Select the Right Fertiliser

If fertiliser is required consider a granulated or liquid organic or controlled release fertiliser:

- **Granulated or Liquid Organic Fertilisers** - Derived from plant, animal, mineral material these are recommended for both garden or lawn application (depending on product selection) as they:
 - Improve soil structure and its water retention ability.
 - Introduce micro-organisms into the soil which helps with nutrient uptake in the plant.
- **Controlled release fertiliser** - Also known as slow release fertilisers are coated compressed pellets and release over a longer period of time because they are not water soluble. They are suitable for lawn as well as garden areas as they reduce the incidence of fertiliser burn.



Tip: If you need to fertilise consider an organic or controlled release fertiliser.

My action:

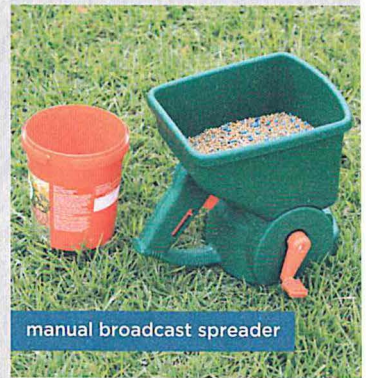
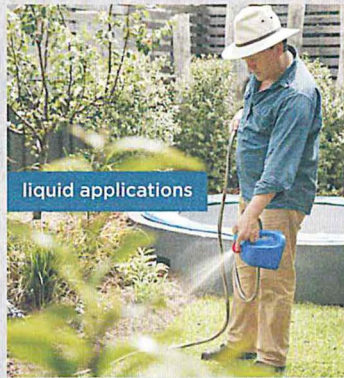
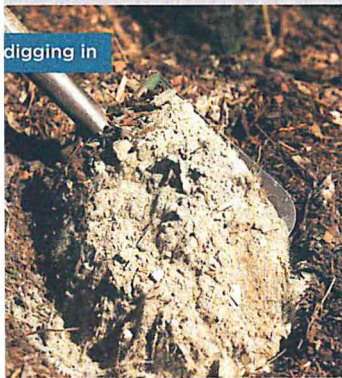
How?

When?

Apply Fertiliser Correctly

There are three main application methods for distributing fertiliser:

1. **Deep soil application or 'digging'** - Is the best method of mixing organic fertilisers into the soil prior to planting.
2. **Hand broadcasting or using a manual broadcast spreader** - If applied correctly, can provide an even distribution of the fertiliser to the required area.
3. **Liquid application** - Is an effective method of applying fertiliser as plants can uptake nutrients quickly. It is important to ensure you don't over apply, as liquid fertilisers can easily leach into groundwater and adjacent water courses. Also, if you use a solution that's too 'strong' you may burn or scorch the leaves. Frequent light applications are better than heavy, infrequent applications.



Tip: Choose an appropriate application method for measuring and distributing fertiliser.

My action:

How?

When?

Use the Right Amount of Organic Fertiliser

Organic and homemade fertilisers can provide significant benefits to gardens, however they should also be used in moderation. Consider the following as a guide:

- **Worm residue** - Steep a cup of worm castings in a bucket of water for a day then drain off the liquid to use as a liquid tonic to plants.
- **Worm casting** - Incorporate a handful into the planting holes of young plants or seedlings.
- **Aged animal manure** - Can be distributed on top of garden beds or dug through the soil. Dependant on the type of manure, up to 10L or one bucketful per m² should suffice for hungry plants like veggies and fruit trees.

It is important to remember that over fertilising with organic products, as well as other fertiliser types, can leach into the waterways and lead to algal blooms and fish kills. If the plant looks healthy and happy you probably don't need to fertilise.

To determine which product is suitable for what situation e.g. citrus or lawn, make sure you read the manufacturer's instructions.



Tip: Organic fertilisers, as with all fertiliser types, should be used in moderation.

My action:

.....

How?

.....

When?

When to Fertilise

Different garden types require fertiliser application at different times of the year.

- **Lawn Areas** - If fertiliser is required, apply in spring and early autumn. Avoid fertilising in winter as lawns become almost dormant and there is a high risk of fertiliser washing into stormwater drains or leaching into groundwater.
- **Ornamental Exotic Garden Beds** - Apply fertiliser bi-annually in spring and autumn.
- **Productive Garden Beds** - Apply granular fertiliser quarterly when replanting and liquid fertiliser as needed.
- **Native Garden Beds** - Apply fertiliser annually in spring for new plantings. Established plants don't need it often, if at all.



Avoid fertilising when heavy rain is forecast

Look out for this logo on fertiliser products. Refer to www.fertilisewise.com.au for more information on responsible fertiliser products & practices



Tip: Apply fertiliser according to your garden type and its seasonal needs.

My action:

How?

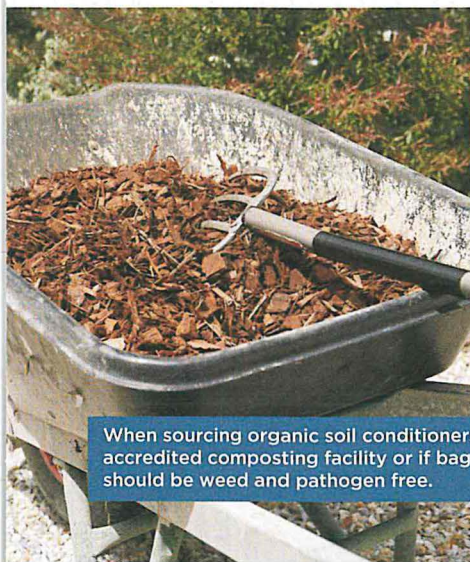
When?

Mulch

Mulch improves moisture retention by reducing evaporation from the surface of the soil. It also feeds plants essential nutrients as it breaks down, helps to suppress weeds and insulates plant roots from extreme temperature fluctuations.

It is important to maintain an even 50mm deep layer of organic, coarse mulch across all your garden beds.

To reduce the likelihood for organic litter entering our waterways, keep gutters and road verges clean by picking up lawn clippings and leaf matter.



Ensure a face mask is worn during the application of any soil amendment to prevent inhalation of material or associated micro-organisms.



When sourcing organic soil conditioners and mulches, check that they are sourced from an accredited composting facility or if bagged, they should have these labels on the bag. Mulches should be weed and pathogen free.

Tip: When sourcing organic soil conditioners and mulches look for the Waterwise and Smart Approved WaterMark logos.

My action:

.....

How?

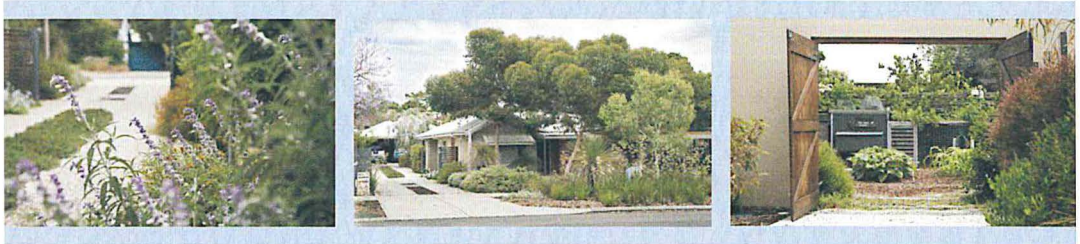
.....

When?

Use Hydrozoning Principles

Hydrozoning involves classifying garden areas based on the garden's fertiliser, water and maintenance needs. To ascertain which areas require more resources depends on its visual importance or amount of use. Below are some simple hydrozoning principles to consider:

- **Minimise plants with high water and fertiliser needs** - Generally lawns require more water, fertiliser and maintenance than a shrub bed; similarly with exotic shrubs compared to native shrubs and succulents.
- **Group similar plants in each hydrozone** - Plants should be grouped according to their fertiliser, water and sunlight requirements. For example: lawn and shrubs should be on separate hydrozones.
- **Irrigate based on hydrozones** - Use the identified hydrozones to assist with your irrigation layout. For example, it is recommended that sprinklers are used across all lawn areas and drip irrigation for garden beds.
- **Use consistent sprinkler heads on each hydrozone** - This ensures even water distribution and pressure to maximise water efficiency.
- **Minimise the amount of hard surfaces** - This helps to minimise the amount of stormwater runoff, increases the natural infiltration into the groundwater, increases local biodiversity and micro-organism activity in the soil and reduces the effect of heat absorption.



Tip: Hydrozoning can manage your gardens fertiliser and water needs.

My action:

.....

How?

.....

When?

An example of a hydrozone plan

HYDROZONE 1:

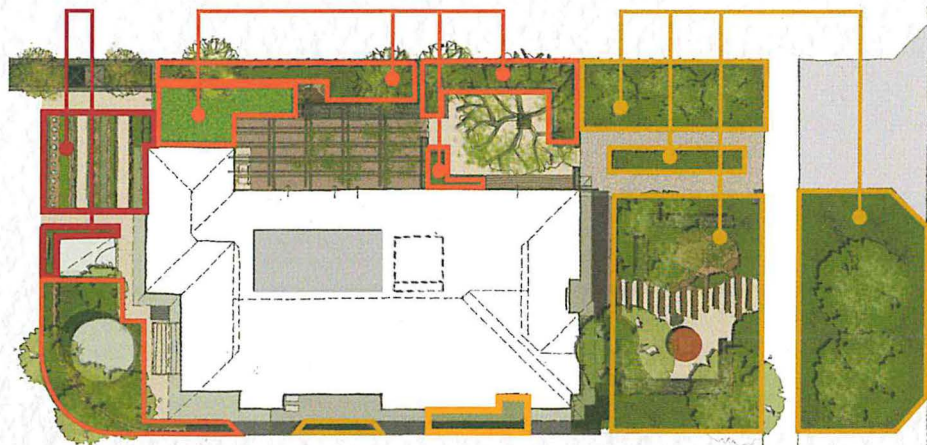
High Resource Needs -
Productive Garden Beds

HYDROZONE 2:

Medium Resource Needs -
Lawns, Exotic Trees and Shrubs

HYDROZONE 3:

Low Resource Needs -
Native Trees and Shrubs



Tip: Hydrozoning prioritises areas of high resource needs.

My action:

.....

How?

.....

When?

.....

Install an Automatic Irrigation System

Automatic irrigation controllers are programmable electronic timers which switch irrigation stations on and off at specified times. They are highly recommended because they:

- Are convenient and save time.
- Can be easily adjusted (or automatically self adjusted) to suit the climatic conditions/seasons.
- Reduce the likelihood of over or underwatering when managed properly.



Tip: Set short irrigation run times and turn off when it rains and over winter.

My action:

.....

.....

How?

.....

.....

When?

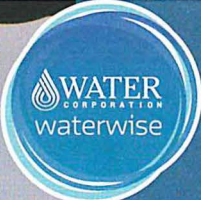
.....

.....

Consider Installing Water Saving Technologies

These devices can be fitted to most automatic irrigation systems, and can save water by irrigating based on the weather readings.

- **Evapotranspiration sensors and weather stations** - Sensors that will adjust the irrigation cycle based on a mixture of the current climatic conditions and the plant's estimated water demand.
- **Rain sensors** - Disconnect the automatic irrigation system controller temporarily when a specific amount of rainfall has occurred.
- **Soil moisture sensors** - Modify the pre-set irrigation run time based on the amount of moisture in the soil. i.e. If it has rained recently and the soil is moist, it will either reduce the run time or may even stop the program temporarily.



For all your irrigation needs consult with a Waterwise Garden Irrigator. A list can be found on the Irrigation Australia website: www.irrigationaustralia.com.au/regions/western-australia/western-australia-regional-committee

Tip: Set short irrigation run times and turn off when it rains and over winter water needs.

My action:

How?

When?

Select the Best Irrigation Type

The various sprinkler types and their recommended application are detailed below:



Fixed Spray Sprinklers

Recommended Application:

Lawn ✓ Garden Beds ✓

Fixed spray sprinklers have fixed radius heads set at a pre-set arc or a predetermined radius action. Position them so that they aren't blocked by vegetation and don't overspray onto paving.



Rotary Sprinkler

Recommended Application:

Lawn ✓ Garden Beds ✓

Rotary sprinklers provide even water distribution in calm wind conditions. Like all spray irrigation, large spraying distances can result in water loss through evaporation and wind drift.



Gear Drive Sprinklers

Recommended Application:

Lawn ✓ Garden Beds ✗

Gear drive sprinklers operate via water driven gears and usually require more water pressure to operate than rotary, spray or drip irrigation types. Gear drive sprinklers are vulnerable to water loss from wind drift and evaporation.

Tip: Sprinkler head types have different precipitation rates and distribution areas. To ensure accurate, effective and uniform distribution across your garden you need to ensure sprinkler heads (or drip emitters) are all of a consistent type, size and model.



Drip Irrigation

Recommended Application:

Lawn ✗ Garden Beds ✓

Drip irrigation is the most effective, water efficient means of irrigation available. Drip irrigation applies water on the ground and close to the root zone, effectively eliminating water loss due to overspray and wind drift. It can be mulched over, which further reduces the potential water loss through evaporation.



Micro Spray Irrigation

Not Recommended

Whilst micro sprays are inexpensive and easy to install, they have a number of disadvantages including higher maintenance requirements due to the spray heads clogging up, are quite easily damaged or vandalised, distribute a reduced, uneven spray pattern due to the fine droplet size, and lose a significant proportion of irrigation water due to wind drift and misting. These types of systems are not recommended.

My action:

.....

How?

.....

When?

Recommended Watering Times

The table below highlights the recommended watering times that should be programmed for each hydrozone. Refer to Page 12-13 for information on hydrozones.

The plant selection and the sprinkler type in each of these hydrozone areas will determine the watering run times. 'High resource needs' hydrozone areas can require an application of up to 10mm per watering day, the 'medium resource needs' zones receiving slightly less water application per watering day and 'low resource needs' hydrozones often require no irrigation.

Hydro-zone Type	Treatment	Sprinkler Type	Typical watering rate (mm per hour)	Recommended Irrigation Run Times (mins)						
				SUMMER Dec - Feb	AUTUMN Mar -May	WINTER Jun- Aug	SPRING Sept-Nov			
Seasonal Adjustment on Irrigation Controllers				100% water budget	75% water budget	N/A	75% water budget			
High Resource Needs	Planting Beds	Fixed spray	35-45	13-17	10-13	1st of JUNE WINTER SPRINKLER BAN BEGINS	SYSTEM OFF	10-13		
		Rotary	10-15	40-60	30-45			30-45		
		Gear Drive Rotator	10-20	30-60	23-45			23-45		
		Drip line	15-20	30-40	23-30			23-30		
	Lawn Areas	Fixed spray	35-45	13-17	10-13			31st of AUGUST WINTER SPRINKLER BAN ENDS	10-13	
		Rotary	10-15	40-60	30-45				30-45	
		Gear Drive Rotator	10-20	30-60	23-45				23-45	
									SYSTEM OFF	23-45
Medium Resource Needs	Planting Beds	Fixed spray	35-45	10-13	8-10	1st of JUNE WINTER SPRINKLER BAN BEGINS	SYSTEM OFF		8-10	
		Rotary	10-15	30-45	23-34				23-45	
		Gear Drive Rotator	10-20	23-45	17-34				17-34	
		Drip line	15-20	23-30	17-23				17-23	
Low Resource Needs	Planting Beds	No irrigation	None	SYSTEM OFF	SYSTEM OFF			1st of JUNE WINTER SPRINKLER BAN BEGINS	SYSTEM OFF	SYSTEM OFF

The above table is sourced from Water Corporation.

For Metropolitan Properties with Scheme Water

Between the 1st of September and 31st of May you can irrigate your property two days per week before 9am and after 6pm.

For Metropolitan Properties with Bore Water

Between 1st of September and 31st of May bore users can irrigate 3 days per week before 9am and after 6pm, but are encouraged to limit watering to 2 days per week.

For all metropolitan properties you are only allowed to water once before 9am on your allocated watering days and there is a complete winter sprinkler ban between the 1st of June and the 31st of August.



Tip: Visit the Water Corporation website at www.watercorporation.com.au/wateringdays to find your watering days. Also set shorter irrigation run times in spring and autumn.

My action:

How?

When?

Increase the Diversity of Plants

By incorporating a variety of plant species within your garden, you will achieve a greater range of habitats to attract local fauna. Aim for a mix of types and flowering times for added diversity.

Minimise Hard Surfaces

Consider replacing any under-utilised hard surface areas such as the spaces between the boundary and your house or even within the driveway with garden beds. By reducing the amount of hard surfaces in your property to around 30% of your property's total area (excluding the house and other structures) you will:

- Reduce the amount of stormwater run off and increasing the natural infiltration into the groundwater.
- Increase the local biodiversity and micro-organism activity in the soil.
- Reduce the effect of heat absorption caused by an area of hard surfacing.

Consider replacing impermeable surfaces with crushed gravel, mulch or permeable paving to allow stormwater to infiltrate locally replenishing groundwater and help to reduce the amount of polluted water entering stormwater drainage systems, through run off.



frog friendly garden



Kunzea baxterii



dragon fly

Create Fauna Habitats

There are several simple features that can be included in your garden that will provide great habitat for local wildlife. These could include:

- Incorporate multi-layered vegetation to create a range of habitats for animals.
- Establishing a frog friendly garden by installing a lined frog pond surrounded by native local rushes and sedges, as well as rocks and logs.
- Randomly placing old logs and rocks for reptiles and insects.
- Create a native verge garden to act as an attractant for local fauna.
- Installing bird, possum and bat nesting boxes within existing mature trees
- Keeping domestic pets indoors during the night to prevent injury or death to local fauna.

Managing Pests and Diseases

There are a number of natural, organic, biological and non toxic alternatives. These are available either on the market or as home made remedies such as fruit fly traps, milk sprays, bird netting and possum barriers. For more information on home made remedies go to www.greenharvest.com.au.

It is also worth considering:

- Adopting crop rotation in your productive garden.
- Maintaining good general garden hygiene reduces the spread of disease.
- Growing plants which attract beneficial predatory and parasitic insects such as flowering parsley.

Chemical pesticides are not recommended as they can reduce biodiversity and the number of beneficial insects in your garden. They can also be harmful to humans and pets and leach into adjacent waterways adversely affecting the local aquatic ecosystem.

To avoid pesticides leaching into waterways it is important to follow instructions and the application rates.

It is important that you dispose of pesticides correctly. Chemical pesticides are toxic and can interfere with the operation of wastewater treatment systems and harm aquatic life in local waterways. Do not pour left over pesticides down the sink, sewer or street drain.

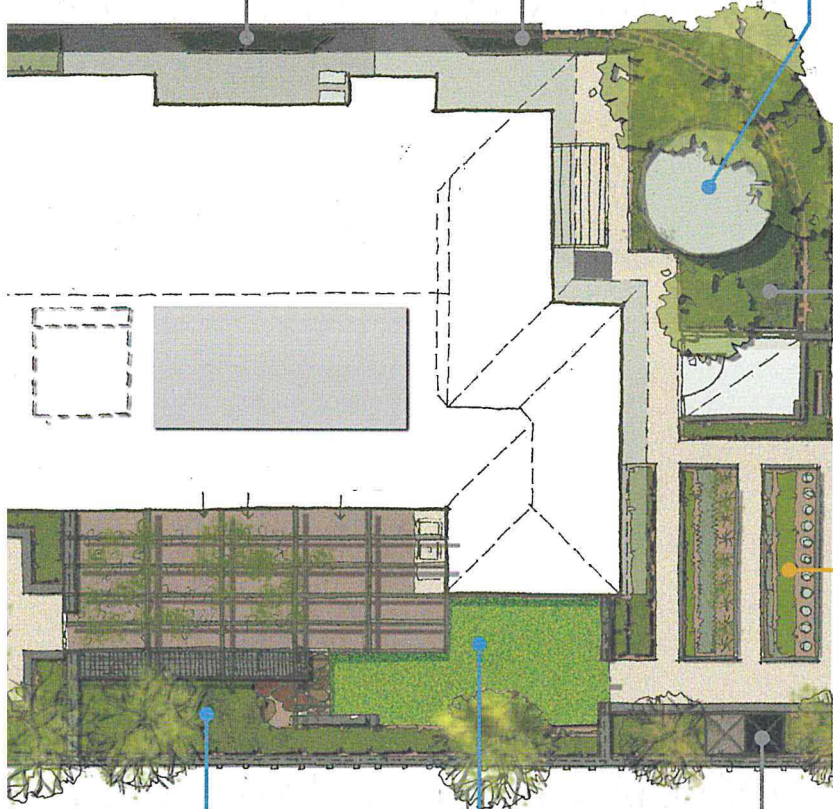


Tip: Supporting biodiversity can help make your garden more resilient.

My action:

How?

When?



Maximise water efficiency in garden beds with the use of drip line irrigation or stream rotors on fixed rigid riser sprinklers. For information on irrigation see pages 18-19.

Minimise lawn areas as they have high fertiliser and water needs. For information on hydrazoning see page 14.

Install a compost bin and/or worm farm to turn your kitchen and garden waste into valuable organic compost for the garden. Refer to page 15 for further information.

Adopt crop rotation practices within your productive garden beds to control pests and diseases. Refer to page 22 for further information.

If you apply fertiliser make sure you refer to the manufacturer's rates to avoid excess leaching into waterways. Refer to page 8.

Conserve water by installing a rainwater tank which can be used to help irrigate your garden and be plumbed to your toilet and washing machine to save even more water.

Measure your garden beds and lawns to accurately understand how much water and fertiliser you should be using. For information on measuring see page 4 & 5.

Install simple irrigation technologies such as a rain sensor or soil moisture sensor. These can adjust your irrigation watering run times during/following rain events. See page 17 for further information.

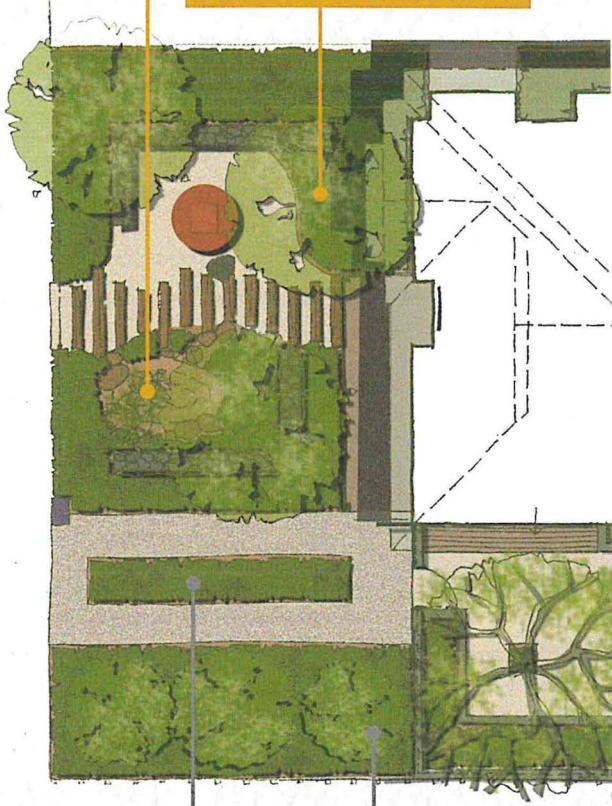
Native verge gardens are a great water efficient alternative to lawns. If you install these gardens in winter, you don't need to install permanent irrigation as hand-watering should be sufficient during hot periods.

Obtain a soil test to determine what nutrients, if any, are deficient in your soil. Refer to page 6 for more information.

Native verge gardens planted with local endemic shrubs and trees support local biodiversity and require minimal fertiliser and water. Refer to page 22.

Minimise hard surfacing with clever use of low growing natives in non-trafficable areas of the driveway. Refer to page 15.

Maintain a 5-10cm layer of mulch in garden beds. Refer to page 13.



Native trees provide essential habitat for local fauna. Mature, established trees are perfect for incorporating bird, possum and bat nesting boxes. Refer to page 22 for further information.

Frog ponds are great garden features that can encourage and support local fauna and help to control pests and diseases. Refer to page 22.

My 'Top Three' Actions

Action 1:	
How?	
When?	

Action 2:	
How?	
When?	

Action 3:	
How?	
When?	

YOUR GARDEN

with Josh Byrne

GARDENING SOLUTIONS FOR A HEALTHY RIVER

Document prepared by
Josh Byrne & Associates
on behalf of the Department of Biodiversity, Conservation and Attractions
and supported by the Water Corporation



Department of Biodiversity,
Conservation and Attractions



SWAN CANNING
RIVERPARK



RIVER
GUARDIANS



WATER
CORPORATION



JOSH BYRNE
& ASSOCIATES

