

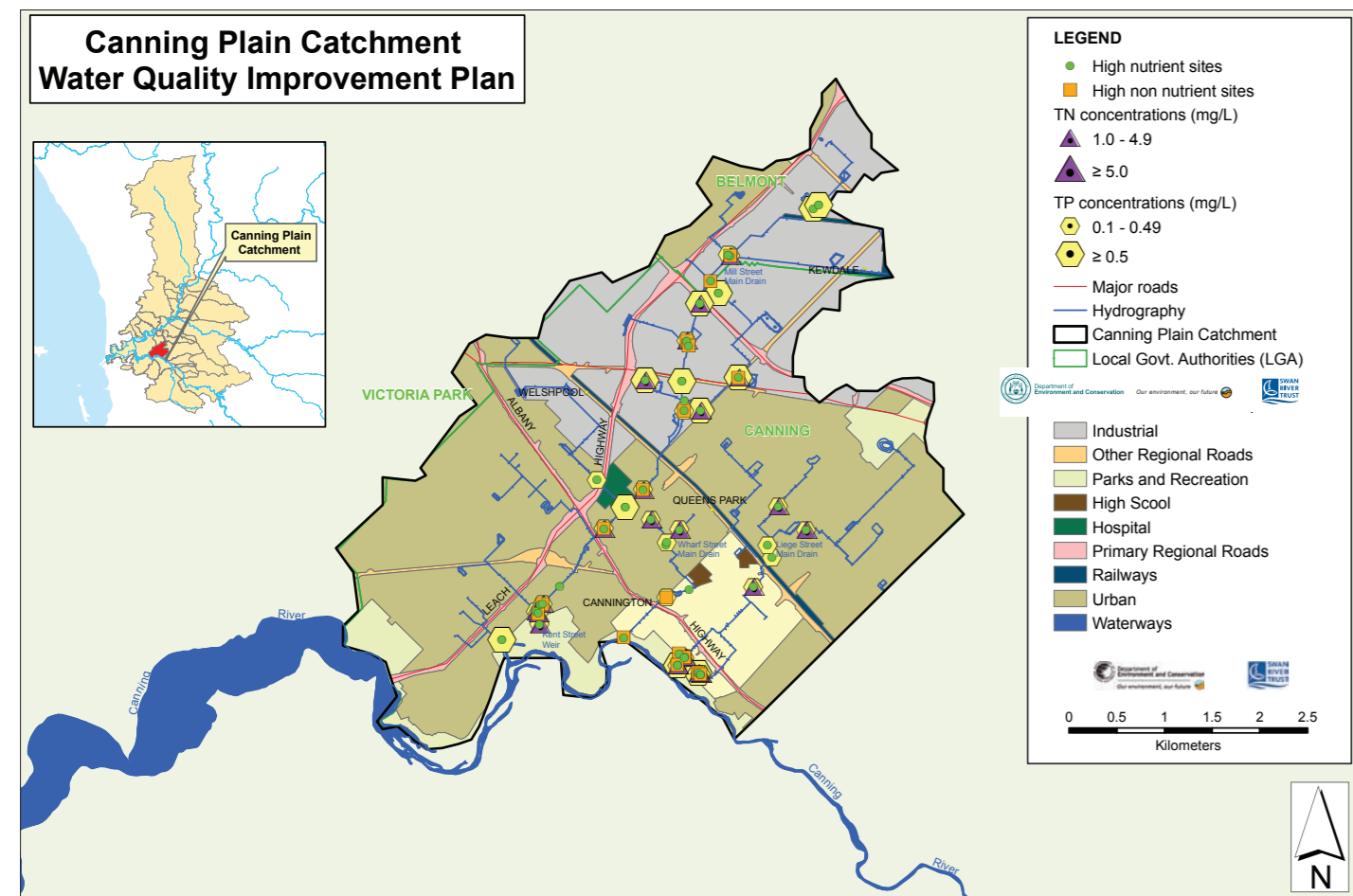
## 5. Monitoring and review

Strategy	Implementation	Lead organisations	Supporting partners	Timing
<b>How do we measure our success?</b>	<ul style="list-style-type: none"> <li>Organise initial stakeholder meeting to determine Key Performance Indicators (KPIs) and annual reviews to assess progress on KPIs; identify funding opportunities; and determine objectives and actions for next 12 months</li> <li>Seek funding and support to ensure ongoing implementation and monitoring of effectiveness of strategies and actions</li> </ul>	Trust, CoG, Perth Region NRM, DoW	SERCUL, CSIRO, WC, DoP, DEC, AGLG	Starting 2010

Annual reviews to assess progress will include lead organisations reporting on WQIP actions. This will contribute to an overall key performance indicator

of the Healthy Rivers Action Plan that aims for a measured improvement in the percentage of WQIP actions being implemented each year.

## Maps



## Coastal Catchments Initiative

In June 2006 the Swan Canning river system was identified as a hotspot for water quality issues as part of the Australian Government's Coastal Catchments Initiative (CCI). The Swan River Trust was responsible for preparing the regional Water Quality Improvement Plan for the Swan Canning river system.

The regional WQIP provides a roadmap for reducing

nutrient levels in the river system using scientific models and decision support tools prepared under this new initiative.

Integrating science and management actions, an accredited WQIP will underpin a long-term investment strategy to improve water quality in known hotspots such as the Swan Canning river system.



National Tree Day at Wharf Street project site, 2008



Industry located at a Mills Street Main Drain compensation basin, 2009



Sediment sampling at Anvil Way compensation basin, 2009

## Partners

This WQIP was developed in consultation with the following stakeholders



ANZECC & ARMCANZ 2000, *Australian and New Zealand Guidelines for Freshwater and Marine Water Quality, Volume 1, The Guidelines*, Australian and New Zealand Environmental and Conservation Council and Agricultural and Resource Management Council of Australia and New Zealand.

Department of Water 2009, *A baseline study of contaminants in the Swan and Canning drainage system*, Report No. WST 3.  
 Swan River Trust 2003, *Nutrient and contaminant assessment for the Mills St Main Drain Catchment*, Swan River Trust. SCCP Report No. 3

For more information

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 Swan River Trust Ph 9278 0900 www.swanrivertrust.wa.gov.au *Caring for the Swan Canning Riverpark*

June 2010

## Local Water Quality Improvement Plan Canning Plain Catchment



### Background

The Swan River Trust (Trust) works to reduce nutrients and other contaminants entering the Swan and Canning rivers.

The Trust has developed and is investing in local **Water Quality Improvement Plans (WQIPs)**. These will provide local councils and communities with a mechanism to prioritise recommendations and resources, and seek funding to improve water quality in catchments contributing the greatest amount of nutrients. These plans should be reviewed annually and assessed after five years. Under the Healthy Rivers Action Plan (HRAP), the Canning Plain Catchment is identified as one of eight priority catchments in the Swan Canning river system.

WQIPs trace nutrient and pollutant pathways through catchments from their source to the discharge point.

### Canning Plain Catchment Water Quality Improvement Plan

The 24-square-kilometre Canning Plain Catchment is mostly cleared for industrial, commercial and residential use. Historical land use and inappropriate practices are likely to have affected water quality and riparian vegetation in the catchment and Canning River.

The catchment contains a range of soil types, high groundwater table, an extensive drainage system of open and piped drains, and a number of compensation basins. There are four main drains – Cockram Street, Liege Street, Mills Street and Wharf Street – managed by the Water Corporation.

The Canning Plain Catchment Group (2000) and Belmont Vic Park Catchment Group (1998) merged to form the Two Rivers Catchment Group in 2003. The South East Regional Centre for Urban Landcare (SERCUL), a sub-regional natural resource management group, was formed in 2003 and facilitates education and rehabilitation projects to improve water quality in the south east region. The cities of Belmont and Canning have been working with these groups since their inception and continue to work in partnership.

The Trust, in partnership with the cities of Canning and Belmont, Water Corporation and SERCUL, is implementing a number of nutrient intervention projects throughout the catchment to reduce nutrient loads entering the Canning River.



Steps to develop a local WQIP

## 1. Existing activities

What are we doing to improve water quality?

Local WQIPs link to existing projects and programs in the catchment. They draw together activities contributing to improved water quality and target future investments for optimal water quality outcomes. Projects are based on partnerships with local government, community and shared stakeholders.

The Canning Plain Catchment Management Plan (CPCMP) was released in 2009 by SERCUL. It is the result of a partnership between government agencies and natural resource management groups. It contains risk assessment information and strategies to manage surface and groundwater issues. The action plan contained in the CPCMP aims to deliver best practice actions to improve water quality entering the Canning River. The Canning Plain WQIP implements water quality actions in the CPCMP Action Plan.

Examples of key existing programs in the Canning Plain Catchment.

### Drainage design and nutrient intervention

Stakeholders are trialling biofiltration and intervention technologies to determine their cost effectiveness and ability to remove nutrients. Black Creek (2001), Liege Street (2004) and Wharf Street (2008) constructed wetlands are icon projects in Cannington to improve water quality in low flows.

**Partners:** Cities of Belmont and Canning, Department of Environment and Conservation, Department of Water, SERCUL, the Trust and Water Corporation

**Long term outcomes:** Medium improvement in water quality

### Light industry programs

#### Light Industry Risk Assessment

This project targets light industrial precincts with a focus on minimising pollutant discharge from Small to Medium Enterprises (SMEs) in the Perth region. The assessments are regulatory, based on (Environmental Protection) Unauthorised Discharge Regulations 2004 and *Contamination Sites Act 2003*.

**Partners:** Cities of Belmont and Canning, Department of Environment and Conservation and Perth Region NRM

**Long term outcomes:** Low improvement in water quality for nutrients but medium improvement for non-nutrients

### Small Factory Environmental Management Support Program in the City of Canning

This research project assesses the behavioural response and cost effectiveness of direct collaborative engagement with those micro-sized light industrial businesses recognised as poor environmental performers. It was developed in response to an earlier project with SMEs that surveyed implementation of Best Management Practice in the workplace.

**Partners:** City of Canning, Department of Water, Murdoch University, SERCUL and Waste Management Authority

**Long term outcomes:** Low improvement in water quality for nutrients but medium improvement for non-nutrients

### Community activities and education

#### Phosphorus Awareness Project

The Phosphorus Awareness Project, funded by the Trust and delivered through SERCUL, is an education program for light industry, local government, school groups and the local community. It provides information on reducing nutrients and pollutants reaching waterways and raises awareness of the impacts of elevated nutrients in the river system. Both cities have been involved in the Annual Nutrient Survey for local government run by the project.

**Partners:** Cities of Belmont and Canning, community, SERCUL and the Trust

**Long term outcomes:** Medium improvement in water quality

### Community groups

There are several volunteer organisations that work with key stakeholders to coordinate and implement onground actions to improve wetland and catchment health.

**Partners:** Canning River Residents Environmental Protection Association, Canning River Regional Park Community Advisory Committee, Canning River Regional Park Volunteers, cities of Belmont and Canning, Department of Environment and Conservation, Friends of Queens Park Bushland, SERCUL, the Trust, Two Rivers Catchment Group and Wilson Wetland Action Group

**Long term outcomes:** Medium improvement in water quality and low improvement in biodiversity

## 2. Condition

What are the water quality and quantity issues in the Canning Plain Catchment?

### High levels of nitrogen, phosphorus and non-nutrient contaminants

Water quality is monitored fortnightly by Department of Water (DoW) on behalf of the Trust and reported through a catchment nutrient report on the Trust website ([www.swanrivertrust.wa.gov.au](http://www.swanrivertrust.wa.gov.au)). This report provides information across a 13-year period (1994-2006) on concentrations, nutrient fractions and seasonal variations for the Mills Street Main Drain. Water quality data is collected for Liege Street Main Drain and Wharf Street Main Drain. Only Mills Street Main Drain has long-term and adequate flow data and will be used as the benchmark for comparing reductions in targets.

Water quality data for the Canning Plain Catchment were sourced from the *Nutrient and contaminant*

*assessment for the Mills St Main Drain Catchment* (Swan River Trust 2003), *A baseline study of contaminants in the Swan and Canning drainage system* (Department of Water 2009) and the Water Information Network (WIN). The catchment nutrient reports indicate that Mills Street Main Drain has the third highest concentration of total nitrogen (TN) and total phosphorus (TP) of the 15 monitored catchments in the Swan Coastal Plain.

Samples were taken, 1999-2009, from 48 sites and analysed for TN and TP. The large range in results may be site and seasonal specific and future actions need to consider those variables when developing solutions.

Nutrient	HRAP targets	Exceed HRAP targets	Range	Median	Mean
Total nitrogen	1.0mg/L	38 sites on most sampling occasions	0.12-36mg/L	1.4mg/L	1.8mg/L
Total phosphorus	0.1mg/L	39 sites on most sampling occasions	0.005-25mg/L	0.2mg/L	0.36mg/L

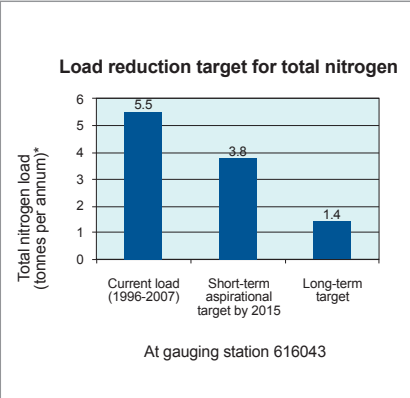
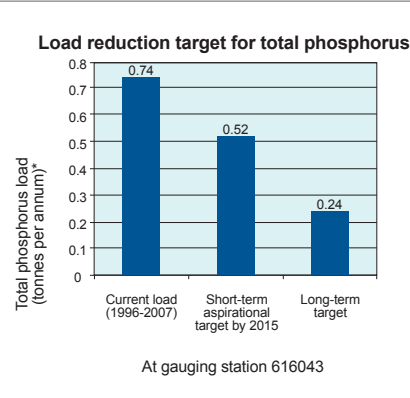
The parameters for non-nutrients were measured against the *Australian and New Zealand Guidelines for Freshwater and Marine Water Quality* (ANZECC

and ARMCANZ 2000). These guidelines were exceeded at a number of sites for aluminium, chromium, copper, iron, lead and zinc.

Water quality issues	Pollutant indicators	Pollutants/issues of concern
<b>Contaminants</b> <ul style="list-style-type: none"> <li>Medium to high nitrogen levels</li> <li>Medium to high phosphorus levels</li> <li>High non-nutrient contaminant levels</li> <li>Potential remobilisation of pollutants from sediments</li> <li>Possible acid-sulphate soils</li> </ul>	<b>Contaminants</b> <ul style="list-style-type: none"> <li>High nutrient and non-nutrient pollutant concentrations</li> <li>pH variations</li> <li>High colour, suspended solids and turbidity</li> </ul>	<b>Nutrients</b> <ul style="list-style-type: none"> <li>Total phosphorus</li> <li>Total nitrogen</li> </ul> <b>Non-nutrients</b> <ul style="list-style-type: none"> <li>Aluminium, chromium, copper, iron, lead and zinc</li> <li>Poly-aromatic hydrocarbons</li> <li>Organochlorine pesticides</li> <li>Microbial hazards</li> <li>Pollution events</li> <li>Sediment</li> <li>Major ions</li> <li>Gross pollutants</li> <li>Solvents</li> <li>Surfactants</li> </ul>
<b>Biotic</b> <ul style="list-style-type: none"> <li>Nuisance growth of aquatic plants</li> <li>Algal blooms in wetlands</li> <li>Odour from decaying algae and hydrogen-sulphide gas</li> <li>Microbial contamination</li> <li>Orange, muddy water</li> <li>Death/stress of desirable aquatic organisms and plants</li> </ul>	<b>Biotic</b> <ul style="list-style-type: none"> <li>Frequency and extent of algal blooms</li> <li>Absence of desirable aquatic plants and animals, loss of biodiversity</li> <li>Odour from decaying algae</li> <li>Turbidity</li> <li>Chlorophyll-a</li> <li>Sick or dying fauna</li> </ul>	

## 3. Values, objectives and targets

What water quality improvements would we like to achieve in the Canning Plain Catchment?

Values	Objectives	Targets
<b>River flow (RF)</b> Flows from the Canning Plain Catchment drainage system contribute to Environmental Water Requirements for the Canning River. They protect environmental values in the Canning River	<ul style="list-style-type: none"> <li>Mimic natural inundation and drying patterns which protect wetlands and floodplains</li> <li>Minimise the effect of extraction on water quality by mimicking the natural frequency, duration and seasonal flow</li> </ul>	No effect on Environmental Water Requirements for flow to the Canning River. Improved stormwater quality will assist in meeting Environmental Water Requirements
<b>Cultural and spiritual (CS)</b> Many people have a cultural (historical, indigenous or modern) and spiritual connection with the Canning River. It is a significant site to the Aboriginal people as it was used for cultural, hunting and recreation activities The Wilson Lagoon is a registered site of significance	<ul style="list-style-type: none"> <li>Improve water quality by 30% reduction in TN and TP annual loads by 2015</li> <li>Enhance and protect aquatic ecosystem health, recreation and aesthetics, and cultural and spiritual values</li> </ul>	<b>Nutrients</b> The aim is to reduce average TN and TP loads by 30% by 2015 as a short-term aspirational target Predictive modelling from the Swan Canning Regional WQIP has demonstrated that in the longer term a reduction in annual load of 74% TN and 67% TP from the Mills Street Main Drain Catchment is needed to meet nutrient targets
<b>Aquatic ecosystem health (AH)</b> The Canning Plain Catchment is a highly urbanised and industrial catchment with stressed ecological values. Its main drains affect the Canning River and its foreshore through delivery of stormwater high in nutrients and pollutants and highly altered flow regimes. The area of Canning River next to this catchment is registered under the National Estate and a System 6 Conservation Reserve. Improved ecological health for these assets relies on education, rehabilitation and nutrient intervention projects	 	
<b>Recreation and aesthetics (RA)</b> The Canning River Regional Park borders the south west of the Canning Plain Catchment. This is a valued amenity and provides for passive and active recreation. Flood storage in park areas provides an opportunity to improve aesthetics and water quality. Ongoing education is vital in raising awareness about issues affecting the catchment	<b>Non-nutrients</b> The target for non-nutrient contaminants is to meet ANZECC and ARMCANZ 2000 guidelines at all monitored sites <i>*based on the average annual flow data from 1997-2006 and applies to annual river discharge loads similar to 1997-2006</i>	

### Maintaining seasonal flow variability

The amount of water entering the Canning River from the catchment is important to maintain environmental and recreational values in the river. Data collected at DoW gauging station 616043 for the Mills Street Main Drain from 1997-2006 indicated the annual flow ranged from 0.5 to 8 gigalitres per

year. Data collected at gauging station 616123 for the Liege Street Catchment from 2005-08 indicated annual flow ranged from 0.9 to 2.4 gigalitres per year. There was no flow data from the other main drains to determine annual flow.

## 4. Implementation

How do we achieve the water quality targets?

Treatment train approach	Management strategies	Implementation	Lead organisations	Supporting partners	Timing
<b>1. Prevention</b> Land use and planning	<b>1.1 Review urban and infrastructure planning to incorporate best management practices*</b>	<ul style="list-style-type: none"> <li>Integrate the use of predictive modelling and decision support tools to determine priority sites to reduce nutrient exports (AH)</li> <li>Ensure water sensitive urban design is part of all coordinated redevelopment structure plans consistent with the requirements of the Better Urban Water Management, State Planning Policy 2.9 Water Resource and local environmental conditions (AH)</li> <li>Undertake strategic asset planning to identify opportunities to reduce groundwater interception and increase biofiltration treatment in open drain sections of the system (AH)</li> </ul>	Department of Planning (DoP), City of Canning (CoC), City of Belmont (CoB)	Department of Water (DoW), South East Regional Centre for Urban Landcare (SERCUL), Swan River Trust (Trust)	Starting 2010-11
	1.2 Application of water sensitive urban design (WSUD) practices	<ul style="list-style-type: none"> <li>**Develop and implement standard development conditions for Small to Medium Enterprises in industrial areas to incorporate appropriate wastewater treatment and disposal (AH)</li> <li>**Include Stormwater Manual Water Sensitive Urban Design (WSUD) principles in future road capital works programs (AH)</li> <li>**Develop a policy to protect existing local government open drains from becoming closed systems and where possible implement living stream principles (AH)</li> <li>**Ensure WSUD incorporates the other uses and functions of the particular location, including aesthetics, crime prevention through environmental design, and universal access principles to facilitate safe use for all people (RA)</li> </ul>	CoC, CoB	Department of Environment and Conservation (DEC), Trust, SERCUL	Starting 2010-11
	1.3 Continue to monitor water quality throughout the Canning Plain Catchment	<ul style="list-style-type: none"> <li>Seek funding and identify responsibility to implement ongoing water quality monitoring in the Canning Plain Catchment (AH)</li> <li>**Identify sites currently contributing to nutrient and non-nutrient load based on a review of historical land use data (AH)</li> </ul>	Trust, Perth Region NRM	SERCUL, CoC, CoB, DoW	Universities (e.g. Curtin)
<b>2. Minimisation</b> Efficiency in nutrient use	2.1 Expand urban education in efficient fertiliser management	<ul style="list-style-type: none"> <li>Reduce urban fertiliser use through education and accreditation programs (AH)</li> </ul>	Trust, CoC, CoB, DEC	SERCUL, Phosphorus Awareness Project	Ongoing
	2.2 Reduce nutrient and non-nutrient input from industry	<ul style="list-style-type: none"> <li>Encourage local government to adopt or maintain audits of Small to Medium Enterprises to ensure compliance with the (Environmental Protection) Unauthorised Discharge Regulations 2004 (AH)</li> <li>Encourage uptake and participation in the Small Factory Environmental Management Support Program (AH)</li> </ul>	Perth Region NRM	CoB, CoC, DEC	Ongoing
<b>3. Reduction</b> Source control	<b>3.1 Apply best management practice for nutrient management*</b>	<ul style="list-style-type: none"> <li>Ensure developers, builders and landscapers implement best management practices to control erosion and sedimentation to protect waterways (AH, CS)</li> <li>Establish a working group to develop procedures to determine management responsibility for nutrient contamination from past development in accordance with the <i>Contaminated Sites Act 2003</i> (AH)</li> <li>Where practical create vegetated buffer zones/verges and implement WSUD principles between waterways and turf in council reserves to help prevent herbicides, fertilisers and grass clippings entering waterways (AH)</li> <li>Develop and implement nutrient and irrigation plans for public open space and school reserves (AH, RA)</li> <li>Maintain street sweeping program and develop monitoring plan to assess efficiency of current schedules and future procedures (AH)</li> </ul>	Trust, SERCUL, CoC, CoB	Water Corporation (WC), DEC, DoW, Perth Region NRM	Starting 2010-11
		<ul style="list-style-type: none"> <li>Encourage uptake and participation in the Small Factory Environmental Management Support Program (AH)</li> </ul>	SERCUL	CoC, DoW, DEC	Ongoing
		<ul style="list-style-type: none"> <li>Where practical create vegetated buffer zones/verges and implement WSUD principles between waterways and turf in council reserves to help prevent herbicides, fertilisers and grass clippings entering waterways (AH)</li> <li>Develop and implement nutrient and irrigation plans for public open space and school reserves (AH, RA)</li> </ul>	CoC, CoB	DoW	Ongoing
		<ul style="list-style-type: none"> <li>Maintain street sweeping program and develop monitoring plan to assess efficiency of current schedules and future procedures (AH)</li> </ul>	CoC, CoB	DoW	Ongoing
<b>4. Amelioration</b> Conveyance and transmission	<b>4.1 Improve urban drainage design and support structural nutrient intervention</b>	<ul style="list-style-type: none"> <li>Increase biofiltration treatment and retention time at high nutrient sites (AH)</li> <li>Continue Canning River Restoration Project to address nutrient export using foreshore restoration (AH, CS, RA)</li> <li>**Maximise retrofitting of stormwater management systems to achieve improved water quality outcomes (AH)</li> </ul>	CoC, CoB, Trust	DoW, WC	Starting 2010-11
		<ul style="list-style-type: none"> <li>Full connection of existing and proposed industrial and residential areas where a sewerage scheme is available (AH)</li> <li>Manage wastewater scheme to reduce spills to the environment (AH)</li> <li>**Advocate for inflow sewage to be extended throughout industrial areas e.g. Kewdale and Welshpool (AH)</li> </ul>	SERCUL, Perth Region NRM	Trust	Starting 2010-11
<b>5. Treatment - Reuse - Disposal</b>	5.1 Achieve zero nutrient contribution from sewage	<ul style="list-style-type: none"> <li>Encourage the use of structural controls to address litter, sediment and vegetative materials at source (AH)</li> <li>**Adopt or maintain regular cleaning of gullies and stormwater pollutant traps to enable pollution spills to be contained and educted before entering the waterways (AH)</li> </ul>	State and local government	WC	Ongoing
	5.2 Promote urban drainage initiatives		WC	CoC, CoB	Ongoing

\*new management strategy \*\*new management actions

(AH) = aquatic ecosystem health, links to values for the catchment in Section 3

The Canning Plain Catchment WQIP aims to reduce nutrient loads entering the Canning River through nutrient intervention and changed management practices. By using a treatment train approach, a combined set of management actions are applied along nutrient pathways to minimise nutrient and non-nutrient contaminant losses to waterways.

The lead organisations and supporting partners will implement this WQIP in the constraints of existing budgets and resource levels. They are committed to working together to actively seek new resource opportunities.