

Stormwater
Management
Manual for
Western Australia

8
Education and
awareness for
stormwater
management



Department of
Environment

Cover photograph: Community Training Workshop

Stormwater Management Manual for Western Australia

8 Education and awareness for stormwater management

Prepared by Elizabeth Morgan, Department of Environment
Consultation and guidance from the Stormwater Working Team



Department of
Environment

February 2004

Acknowledgments

This manual chapter was prepared by Elizabeth Morgan, Department of Environment with consultation and guidance from the Stormwater Working Team. Special thanks to those who provided valuable experiences or information for the chapter; Julie Robert and Wendy Yorke. Sincere thanks to the following people whom provided valuable feedback on the drafts; Lisa Chalmers, Martyn Glover, Bruce Low, Greg Ryan, Lucy Sands, Rachel Spencer, Bill Till and Antonietta Torre. Publication coordination by Lisa Chalmers.

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The recommended reference for this publication is:

Department of Environment 2004, *Education and awareness for stormwater management, Stormwater Management Manual for Western Australia*, Department of Environment, Perth, Western Australia.

We welcome your feedback

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ISBN 1-92084-958-0 [Print]
1-92084-959-9 [PDF]
February 2004

Preface

A growing public awareness of environmental issues in recent times has elevated water issues to the forefront of public debate in Australia.

Stormwater is water flowing over ground surfaces and in natural streams and drains as a direct result of rainfall over a catchment (ARMCANZ and ANZECC, 2000).

Stormwater consists of rainfall runoff and any material (soluble or insoluble) mobilised in its path of flow. Stormwater management examines how these pollutants can best be managed from source to the receiving water bodies using the range of management practices available.

In Western Australia, where there is a superficial aquifer, drainage channels can commonly include both stormwater from surface runoff and groundwater that has been deliberately intercepted by drains installed to manage seasonal peak groundwater levels. Stormwater management is unique in Western Australia as both stormwater and groundwater may need to be managed concurrently.

Rainwater has the potential to recharge the superficial aquifer, either prior to runoff commencing or throughout the runoff's journey in the catchment. Urban stormwater on the Swan Coastal Plain is an important source of recharge to shallow groundwater, which supports consumptive use and groundwater dependent ecosystems.

With urban, commercial or industrial development, the area of impervious surfaces within a catchment can increase dramatically. Densely developed inner urban areas are almost completely impervious, which means less infiltration, the potential for more local runoff and a greater risk of pollution. Loss of vegetation also reduces the amount of rainfall leaving the system through the evapo-transpiration process. Traditional drainage systems have been designed to minimise local flooding by providing quick conveyance for runoff to waterways or basins. However, this almost invariably has negative environmental effects.

This manual presents a new comprehensive approach to management of stormwater in WA, based on the principle that stormwater is a RESOURCE – with social, environmental and economic opportunities. The community's current environmental awareness and recent water restrictions are influencing a change from stormwater being seen as a waste product with a cost, to a resource with a value. Stormwater Management aims to build on the traditional objective of local flood protection by having multiple outcomes, including improved water quality management, protecting ecosystems and providing livable and attractive communities.

This manual provides coordinated guidance to developers, environmental consultants, environmental/community groups, Industry, Local Government, water resource suppliers and State Government departments and agencies on current best management principles for stormwater management.

Production of this manual is part of the Western Australian Government's response to the *State Water Strategy* (2003).

It is intended that the manual will undergo continuous development and review. As part of this process, any feedback on the series is welcomed and may be directed to the Catchment Management Branch of the Department of Environment.

Western Australian Stormwater Management Objectives

Water Quality

To maintain or improve the surface and groundwater quality within the development areas relative to pre development conditions.

Water Quantity

To maintain the total water cycle balance within development areas relative to the pre development conditions.

Water Conservation

To maximise the reuse of stormwater.

Ecosystem Health

To retain natural drainage systems and protect ecosystem health .

Economic Viability

To implement stormwater management systems that are economically viable in the long term.

Public Health

To minimise the public risk, including risk of injury or loss of life, to the community.

Protection of Property

To protect the built environment from flooding and waterlogging.

Social Values

To ensure that social, aesthetic and cultural values are recognised and maintained when managing stormwater.

Development

To ensure the delivery of best practice stormwater management through planning and development of high quality developed areas in accordance with sustainability and precautionary principles.

Western Australian Stormwater Management Principles

- Incorporate water resource issues as early as possible in the land use planning process.
- Address water resource issues at the catchment and sub-catchment level.
- Ensure stormwater management is part of total water cycle and natural resource management.
- Define stormwater quality management objectives in relation to the sustainability of the receiving environment.
- Determine stormwater management objectives through adequate and appropriate community consultation and involvement.
- Ensure stormwater management planning is precautionary, recognises inter-generational equity, conservation of biodiversity and ecological integrity.
- Recognise stormwater as a valuable resource and ensure its protection, conservation and reuse.
- Recognise the need for site specific solutions and implement appropriate non-structural and structural solutions.

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Summary

The aim of this chapter is to present ways in which an education and awareness program can be developed for various sectors of the community to raise awareness and provide a catalyst for a change in behaviour to reduce the amount of pollution that enters the stormwater system. Education and Awareness is one of the non-structural methods that can be used in an integrated approach to best practice stormwater management.

The chapter utilises and expands on the concepts contained in the Australian Guidelines for Urban Stormwater Management (ARMCANZ/ANZECC, 2000). The Australian Guidelines place primary importance on education and awareness. This is consistent with the principle that any attempt to incorporate sustainability into the community must also explicitly address education and awareness.

Stormwater pollution from residential, industrial, commercial and agricultural areas is the result of many actions at various locations within the catchment. People are often unaware that their activities can impact on stormwater. Once they are aware and have learnt simple solutions to reduce or avoid causing stormwater pollution, changes to their behaviour are more likely. However, it has been found that in addition to education, it is important to have a supporting infrastructure and social structure close to people so that it is easy for them to comply with educational messages (e.g. providing adequate recycling stations).

The development of an environmental education program for stormwater can be split into a nine-step process. These nine steps recognise that for the program to be effective, a thorough understanding of the environmental issues, stakeholders, behaviour targeted and the best way to achieve an improved environment is needed.

Stormwater education programs have been shown to have many benefits over 'engineering' solutions, including favourable cost-benefit comparisons.



1 Introduction

Traditionally engineered stormwater systems capture water runoff from roads, roofs and land and direct it through stormwater pipes to rivers, streams, wetlands, compensating basins and oceans. In these situations, pollution from many sources within the catchment can be carried by stormwater into the streams and wetlands. As stormwater is rarely filtered or treated, refuse, chemicals and oils can enter our rivers, streams and the ocean, or into compensating basins for infiltration. This pollution can harm our wildlife and degrade local waterbodies or groundwater quality.

Contemporary stormwater management is aimed at reducing the impacts of development on the natural water cycle (Victorian Stormwater Committee, 1999, ARMCANZ/ANZECC, 2000, Institution of Engineers Australia, 2003). Stormwater management now emphasises stormwater quality, health of aquatic ecosystems and public amenity, in addition to managing stormwater quantity. By necessity, stormwater management needs to be broadly based, requiring multi-disciplinary inputs.

People are often unaware that their activities can impact on stormwater quality and result in environmental degradation. Once aware and informed of simple solutions that reduce or avoid causing stormwater pollution, a change in people's behaviour is more likely, keeping in mind other motivators behind behavioural change. However, although environmental education has shown to be successful in a number of cases, stormwater management usually requires an integration of approaches.

Figure 1 illustrates the numerous stormwater management approaches and that education and awareness is only one of these approaches. Other approaches are detailed in various chapters of this Manual.

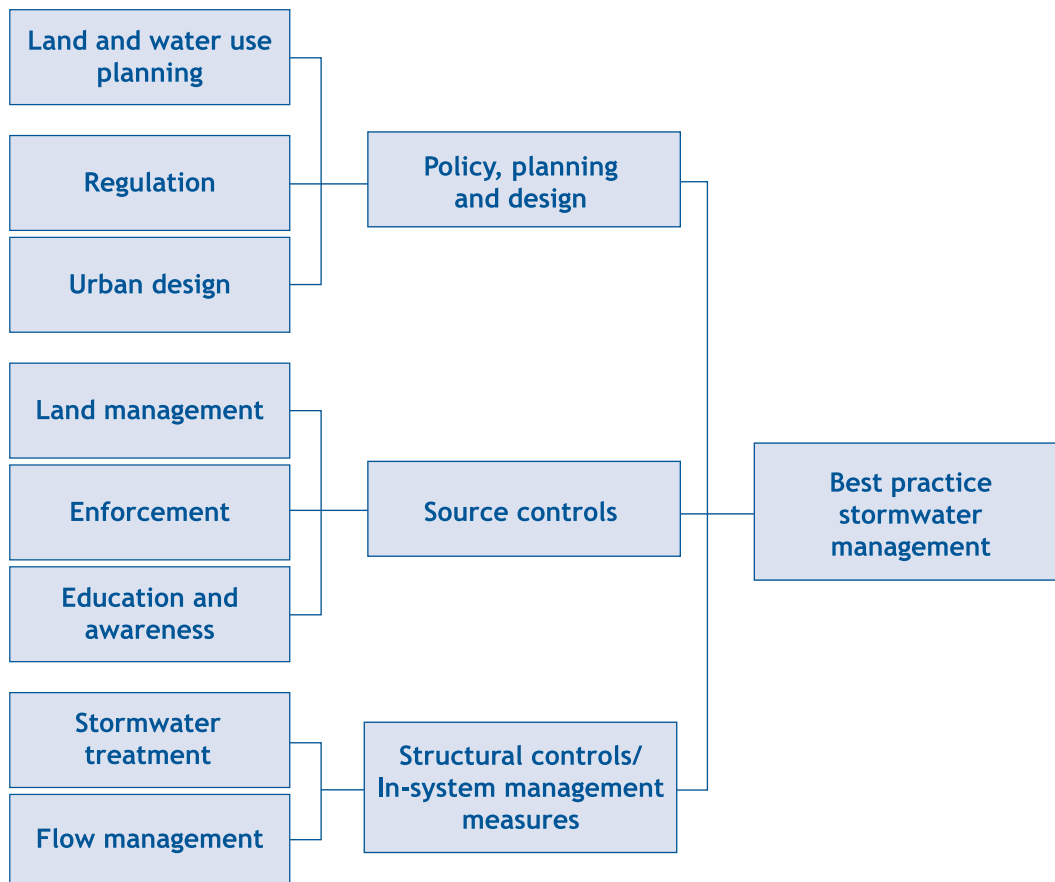


Figure 1. Best Management Practice of stormwater requires integration of a range of measures (ARMCANZ/ANZECC, 2000).

This chapter describes a methodology for developing education and awareness programs for stormwater pollution. A number of tools, techniques, methods and examples of successful programs are presented to help in the process of developing an education and awareness program.

The aim of this chapter is to present ways in which an education and awareness program can be developed for various sectors of the community to raise awareness and provide a catalyst for a change in behaviour to reduce the amount of pollution that enters the stormwater system. Education and Awareness is one of the non-structural methods that can be used in an integrated approach to best practice stormwater management.

1.1 What is stormwater pollution?

The main types of stormwater pollution include:

- litter, such as cigarette butts, cans, paper or plastic bags
- chemical pollution, such as detergents, oil or fertilisers, and
- 'natural' pollution, such as leaves, garden clippings or animal droppings.

Everyone has a part to play in reducing the amount of pollution contaminating our valuable water resources.

2 The broad policy context

There are a number of National and State strategies that provide the framework and principles for the development of best management practice for stormwater management in WA and the development and implementation of education and awareness programs as an integral part of stormwater management in this State. Below is a short description of some of the key policies that provide a framework for stormwater education in Western Australia.

Sustainability strategies

The 'National Strategy for Ecologically Sustainable Development' (NSES)(Commonwealth Government, 1992) sets out national objectives and principles of Ecologically Sustainable Development (ESD) for development that improves the total quality of life in a way that maintains the ecological processes on which life depends; including water quality management planning. The development of the National Strategy was one of the responses to the global agreement to move towards sustainability. Western Australia is a signatory to this Strategy.

The WA State Government has produced the draft State Sustainability Strategy (Government of Western Australia, 2002), in line with the NSES. The draft State Sustainability Strategy and the State Water Strategy, produced in 2003 by the State Government as a response to the need for sustainable water use in WA, make recommendations to promote Water Sensitive Urban Design and total water cycle management, of which stormwater management is a primary component. The National Strategy for Ecologically Sustainable Development, draft State Sustainability Strategy and State Water Strategy also recommend that education and awareness needs to play an integral part in delivering the objectives of sustainability.

Implementing sustainability through an education framework

The Commonwealth released 'Environmental Education for a Sustainable Future – National Action Plan' in 2000. The National Action Plan is intended to provide a framework for environmental education activities in Australia. It is also intended to be a starting point for an enhanced national effort in support of Australia's ecologically sustainable development.

The Department of Environment has prepared a draft Environmental Education Strategy for Western Australia. The draft is currently undergoing a further round of key stakeholder consultation before presenting to Cabinet later in 2003. The objectives of the WA Environmental Education Strategy and Action Plan are:

- i. Co-ordination and integration
- ii. Government leadership
- iii. Formal education
- iv. Building partnerships with the community, and
- v. Building partnerships with industry and business.

The National and State Strategies provide the framework by which an understanding of ESD can be developed by the community. As stated in the draft State Sustainability Strategy, 'we need to raise awareness of sustainability and provide education for sustainability if we are to shift to a more sustainable society' (Government of Western Australia, 2002).

The National Water Quality Management Strategy

Another key Commonwealth strategy is the 'National Water Quality Management Strategy' (NWQMS), from which a number of guidelines have been developed. This strategy is consistent with the NSESD and its principles, and the finalisation of the NWQMS was one of the recommendations of the NSESD. Western Australia is a signatory to the NWQMS and its implementation, as are all States in Australia. The NWQMS will be implemented in Western Australia through the State Water Quality Management Strategy (SWQMS).

The 'Australian Guidelines for Urban Stormwater Management' (ARMCANZ/ANZECC, 2000), is one of the guidelines that have been developed under the 'National Water Quality Management Strategy', and provides a nationally consistent approach for managing urban stormwater in an ecologically sustainable way. The Guidelines outline current best practice in stormwater planning and management in Australia and has set out a management preference hierarchy in line with the principles of ESD.

The application of ESD to management of urban stormwater therefore aims 'to develop and manage in an integrated way, the quality and quantity of surface and groundwater resources and to develop mechanisms for water resource management which maintain ecological systems while meeting economic, social and community needs' (ARMCANZ/ANZECC, 2000).

The Western Australian Stormwater Management Hierarchy

In line with the Australian Guidelines, a stormwater management hierarchy approach for managing urban stormwater is taken in Western Australia. The stormwater management hierarchy applied in WA is listed below.

1. Retain and restore natural drainage lines – retain and restore existing valuable elements of the natural drainage system, including waterway, wetland and groundwater features and processes.
2. Implement non-structural source controls – minimise pollutant inputs principally via planning, organisational and behavioural techniques, to minimise the amount of pollution entering the drainage system.
3. Minimise runoff – infiltrate or re-use rainfall as high in the catchment as possible. Install structural controls at or near the source to minimise pollutant inputs and the volume of stormwater.
4. Use of in-system management measures – includes vegetative measures, such as swales and riparian zones, and structural quality improvement devices such as gross pollutant traps.

These steps require the preservation of the valuable features of the water environment, control of the pollution at the source, and only proposes management measures within stormwater systems for residual impacts that cannot be cost-effectively mitigated by source or near source controls. The principles and objectives for stormwater management in WA are presented in Chapter 2 of this manual.

The stormwater management hierarchy and the principles and objectives of stormwater management place utmost importance on education techniques for stormwater management. Community participation is now considered an integral objective in stormwater management and is an effective means of preventing pollution of stormwater ‘at source’. If successful, and there is a reduction of pollution entering the stormwater system, then the need for other stormwater management techniques are reduced.

This chapter on education and awareness utilises and expands on the concepts contained with the Australian Guidelines for Urban Stormwater Management. The Australian Guidelines place primary importance on education and awareness. This is consistent with the principle that any attempt to incorporate sustainability into the community must also explicitly address education and awareness.

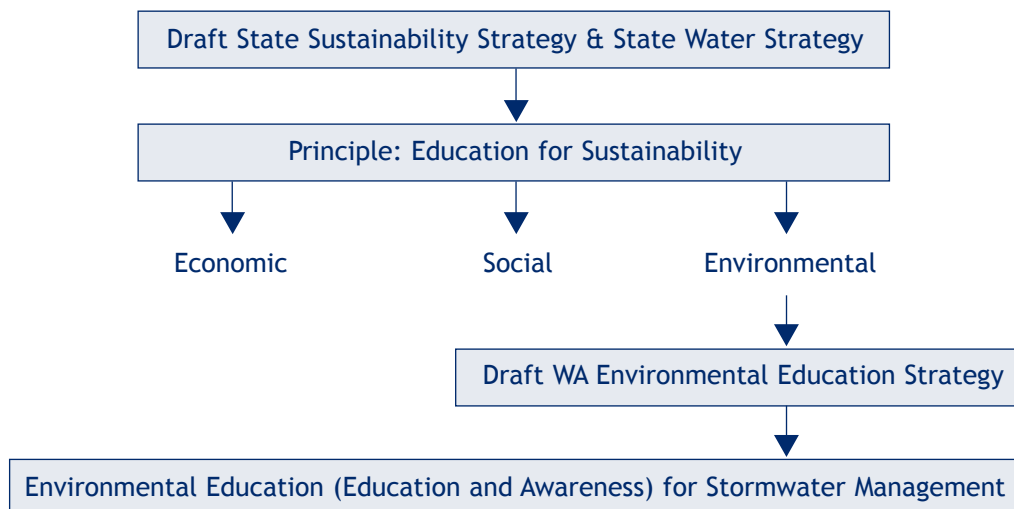


Figure 2. Western Australian Framework for Environmental Education for Stormwater

3. Who will benefit from this chapter?

This chapter of the Manual has been developed for people interested or involved in planning an environmental education program for stormwater, including:

- Local government authorities
- State Government departments and agencies
- The wider community
- Environmental groups, and
- Industry associations (and groups).

Table 1 gives some examples of how environmental education for stormwater can be delivered by various sectors.

Table 1. Delivery methods for stormwater environmental education projects.

| Sector | Example projects |
|--------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Local government | Providing subsidised composting bins Talks, presentations and seminars Exhibitions and displays Targeted mail outs |
| State government | River cleanup programs Joint government/industry programs Courses through schools, universities, TAFE and other educational bodies |
| Environmental/community groups | Planting days Project development Drain Stencilling Permanent displays and signs erected adjacent to waterways School visits Professional Development for Teachers |
| Industry associations | Teachers notes (like NIA) Workdays Member accreditation |

4. What will an education and awareness program achieve?

Stormwater pollution from residential, industrial, commercial and agricultural areas is the result of many actions at various locations within the catchment. People are often unaware that their activities can impact on stormwater. Once aware and informed of simple solutions that reduce or avoid causing stormwater pollution, a change in people's behaviour is more likely. However, it has been found that in addition to education, it is important to have a supporting infrastructure and social structure around individuals so that it is easy for them to comply with educational messages (e.g. providing adequate recycling stations) (Taylor & Wong, 2002).

It also should be noted that education is only one factor that influences an individual's behaviour. Other factors that influence behaviour include:

- the social values and standards passed on in the home, at school, through social groups and in the media
- age, gender, ethnicity, income and occupation
- recent events
- laws, regulations and policies – and how these are monitored, implemented and enforced
- the availability of technology, products and services; and economic factors such as financial incentives or disincentives, and
- convenience factors.

Education should be considered as one of a number of mechanisms to address issues that arise from people's actions. Other mechanisms include:

- enforcement: policy, legislation and regulation
- economics: monetary incentives and disincentives
- engineering, science and technology, and
- evaluation, monitoring and research.

The aim of environmental education for stormwater is therefore to influence behavioural change to reduce the amount of pollution that enters the stormwater system. The programs are more likely to show results if they are planned as part of an holistic approach towards stormwater best practice management.

4.1 What is environmental education and what makes it effective?

'Environmental education' is defined in its broadest sense to encompass raising awareness, acquiring new perspectives, values, knowledge and skills, and formal and informal processes leading to changed behaviour in support of an ecologically sustainable environment (Commonwealth of Australia, 2000).

Community education is a process used to:

- create awareness of issues
- enhance knowledge, understanding and skills
- influence values and attitudes, and
- encourage more responsible behaviour.

Community education can include formal education such as schools and tertiary institutions, public involvement activities, vocational education and training and community marketing campaigns.

Effective community education projects:

- involve stakeholders and learners in decisions about the planning, management, content, style and delivery of the project
- create a supportive environment for influencing behaviour

- support and strengthen existing community networks and help create new ones
- motivate and encourage ownership
- provide opportunities for examining beliefs and values
- identify and promote positive actions rather than discourage undesirable ones
- are relevant, accessible and affordable, recognising the differing circumstances and constraints in a community
- use two-way communication methods, and
- respond to the diverse needs of the community.

Source: NSW EPA and DLWC, 2001.

Community involvement in stormwater management is important to enable the community to develop ownership of both issues and the solutions. Raising the profile of stormwater issues in the community is likely to encourage greater involvement in stormwater management. Programs such as the ‘Yellow Fish Road’ drain stencilling for schools and industries or involvement in water quality monitoring can help mobilise some community participation and raise awareness about stormwater issues (EMRC, 2002). Further details on the Yellow Fish Road drain stencilling program, as well as numerous other stormwater education programs can be found in the examples section further in this chapter.

Research undertaken in the US found that the most successful stormwater management programs, out of over 150 programs surveyed, accomplished three goals in response to stormwater pollution problems (Morison, undated); these goals being:

- educating the public about the nature of the problem
- providing information to the people about what they can do to solve the problem, and
- involving the local community in hands on activities to achieve pollution reduction or restoration targets.

Environmental Education is a process that promotes knowledge and understanding of an issue, links processes, and encourages ownership that leads to positive behaviour changes.

4.2 Key principles of environmental education

Five key principles of environmental education are presented in the ‘Environmental Education for a Sustainable Future: National Action Plan’ (Commonwealth of Australia, 2000). These are:

- i. Environmental Education must involve everyone – environmental education cannot be confined to any one group in our society, it involves government, industry, the media, educational institutions, community groups and individuals.
- ii. Environmental Education must be lifelong – knowledge and skills continually need to be refreshed.
- iii. Environmental Education must be holistic and about connections – people need to think broadly and understand systems, connections, patterns and causes.

- iv. Environmental Education must be practical – one of the most fundamental defining characteristics of effective environmental education is that it must lead to actions which result in better environmental outcomes, not simply the accumulation of inert knowledge or impractical skills.
- v. Environmental Education must be in harmony with social and economic goals and accorded equal priority – effective environmental education should not be taught in a vacuum.

4.3 Current level of understanding and improvement through programs

The Urban Water Research Association of Australia (UWRAA) conducted a two-stage study throughout Australian cities (Brisbane, Sydney, Melbourne and Perth) (1995 and 1998) in response to the stormwater issue. The study had the following objectives:

- to determine the extent of community awareness and knowledge of issues associated with urban stormwater management;
- to determine community perceptions of urban stormwater as a potential resource;
- to investigate community attitudes to and perceptions of urban stormwater management in terms of responsibility;
- to determine the amenity value of urban stormwater management based on the community's economic, social and environmental attitudes; and
- to determine the extent to which communities can and want to be involved in the management of urban stormwater, and the actual effectiveness of community involvement in improving stormwater management outcomes.

The study found that 91 percent of Perth residents said they knew what stormwater was, only 45 percent explained that it was any form of urban runoff. In all cities, very few respondents had no idea what stormwater was.

Perth people have quite a good knowledge of where stormwater goes and although they have a better knowledge of the full definition of what stormwater is than either Melbourne or Brisbane, public education and awareness programs in this area would be useful.

The study attempted to define what was an individual's willingness to pay (WTP) to reduce the pollutant effects of stormwater on waterways. The WTP technique is a hypothetical evaluation technique that asks respondents how much they would be willing to pay for this reduction. The technique is an attempt which places a dollar value on how much reducing the effects of stormwater on the water quality of the wetlands, waterways and ocean is worth to the individual respondent and estimates of the benefits (value) from a reduction in stormwater effects can be made.

Stage 1 of the study also looked at reported community behaviour or action. The results indicate that people were generally positive about doing things that would assist stormwater pollution abatement. On calculating a total potential action score, Perth and Sydney showed a greater potential for action than Brisbane or Melbourne. The study also showed that the major predictors of potential community action in stormwater management were attitudinal. Therefore, any intervention that increases the extent to which stormwater is viewed as an environmental problem could also increase reported community action and WTP (Nancarrow *et al*, 1998, p 92). A study undertaken in 1993 (Syme *et al*, cited in Nancarrow *et al*, 1995, p 166) on motivation for reported involvement in wetlands preservation in Perth found that knowledge did affect reported behaviour, but only as filtered through emotion and assessment of the seriousness of the environmental problem.

Stage 2 of the study was to determine if specifically targeted information and activity produced positive changes in the attitudinal measures over time, and hence have some effect on pro-environmental behaviour. The study concluded that no measurable behavioural change occurred in any of the cities as a result of the experiment. It was found that there was little evidence to demonstrate that respondents were doing things to assist with stormwater management even though respondents reported that they were doing so (Nancarrow *et al*, 1998, p 159). However, it was reported that what was occurring was consistent with the familiar model from the behavioural change literature, awareness leads to knowledge, which leads to attitudinal change and then to practice, and that longer timeframes of about 7-10 years are needed for behaviour to change (Nancarrow *et al*, 1998, p109).

Andre Taylor and Tony Wong (2002) have presented an extensive literature review on various education programs nationally and internationally in the Cooperative Research Centre for Catchment Hydrology Technical Report 02/13 'Non Structural Stormwater Quality Best Management Practices – A Literature Review of their Value and Life-Cycle costs'.

Local levels of understanding

One Western Australian example of the level of understanding at catchment scale can be demonstrated by the Littoria Catchment Care Group, which has attempted to improve community awareness and understanding of stormwater issues that were formed as part of the above UWRAA study. This group has since disbanded, however, its work has continued through the Bannister Creek Catchment Group (formed in 1996). This group has continued with the 'Clean Drains...River Gains' stencilling that was adopted by the Littoria Catchment Care Group in the national study. A catchment group member has also continued the philosophy by integrating environmental education into Kinlock Primary school, which won the Earthschool awards.

The Bannister Creek Catchment Group (BCCG) has undertaken a project to transform a section of a drain, with support from the City of Canning, the Department of Environment, the Water Corporation, the Swan Catchment Urban Landcare Program, ALCOA, the Natural Heritage Trust and the local community. The project is part of the broader Swan-Canning Cleanup Program and Swan Region Natural Resource Management Strategy.

The retrofitting project at Bannister Creek is part of a broader program to improve the health of the catchment. More detail on the physical and biological parameters and results are given in Chapter 6. The project has been successful due to the high investment in partnership building with various stakeholders and a high level of community involvement and skill development.

Surveys and evaluation undertaken by BCCG show that the most important part of involving schools and the community in environmental education is that they have external support. It was also found that kit-based packs should only be a resource and needs to be integrated into an holistic environmental education program.

A second Western Australian example of the level of understanding at catchment scale is the ‘Phosphorus Awareness’ Project. This is being undertaken by the Canning Catchment Coordinating Group and assisted by a group of volunteers (Phosphorus Action Group). The project is based on the knowledge that we are using too much phosphorus in our daily lives. It has been found that about 64 tonnes of phosphorus is carried by Perth’s urban stormwater system each year.

Community surveys undertaken every two years has shown that 83 percent of respondents know that reduced phosphorus use in households and gardens could help the health of the river, while 93 percent of respondents would modify their household practices to help reduce the amount of phosphorus entering the river.

5 Developing an education and awareness program

Effective community education requires a thorough understanding of the environmental issues, stakeholder behaviour targeted, and is the best way to achieve an improved environment.

There are eight key steps to plan an effective community education program. Figure 3 shows the steps in the process:

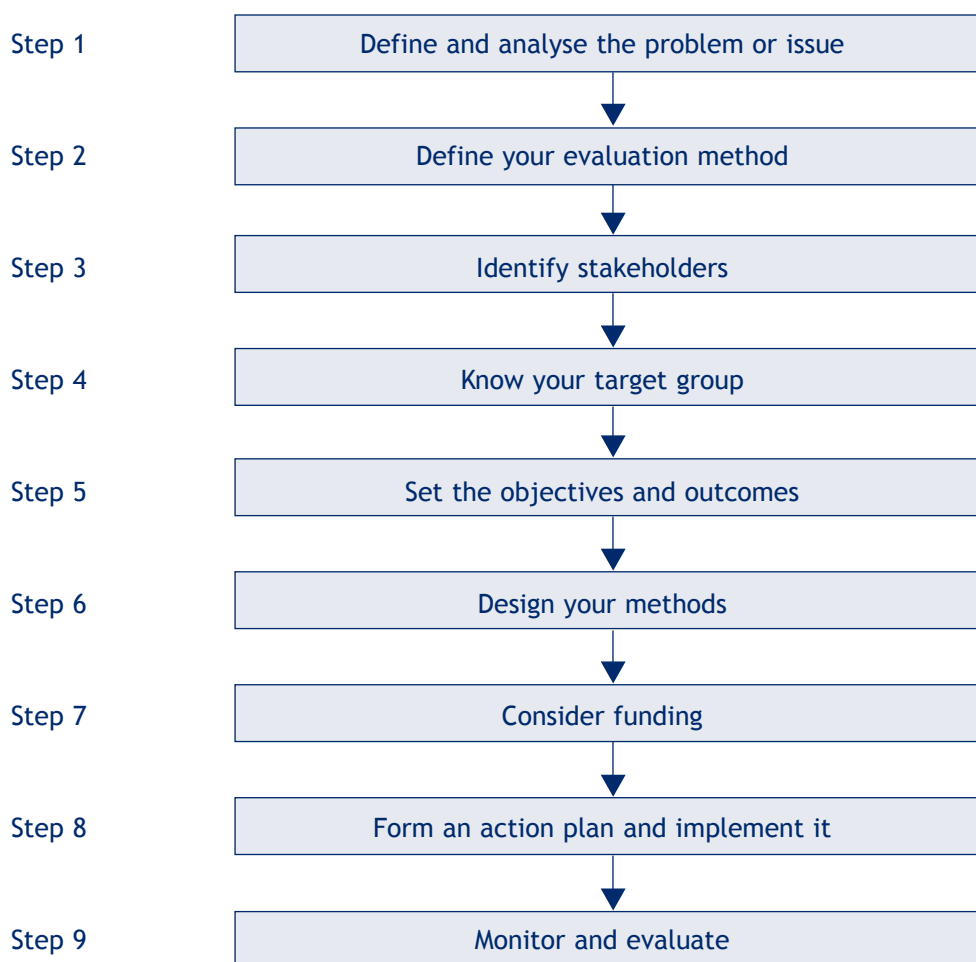


Figure 3. Steps in developing an education program

(adapted from VSC, 1999)

Step 1: Define and analyse the problem or issue

The first step is to establish what is causing concern. It is essential to determine the sources of pollution and who impacts on these sources.

Find out how much is already known about the problem by professionals working in the area and the community members who are associated with the issue or problem location. To define an issue or problem, you need to investigate, discuss, analyse and review with inputs from stakeholders. If you look for solutions before you fully understand the issue, you could have trouble clarifying what you want and are able to achieve.

Some of the questions that you may want to ask are:

What is the problem? Does the community realise the problem? What are the causes of the problem? What is the level of understanding? Have there been any campaigns in the area before? What has been done before? Is education the best way to deal with the problem?

If you know where you are, it is easier to define where you are going and produce an effective outcome.

Table 2 shows a few of the problem pollutants, with some examples of impacts the pollutant may have and some possible causes. This list is by no means extensive, but provides a starting point from where an issue can be identified and analysed. The importance of doing some research and preparation, and analysing a situation is clearly shown to be of prime importance at the inception of developing an education program. Issue identification is a vital step in developing a program that is effective, and for continual improvement, monitoring and evaluation of the program.

Table 2. Examples of pollutants and their possible cause and effects.

| Issue | Potential negative impact | Possible cause |
|----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Sediment or turbidity | <ul style="list-style-type: none">• Smothering of plants and animals on the bottom of the waterbody• Clogging of fish gills• Negative aesthetic effects | <ul style="list-style-type: none">• Erosion of sediment from catchment (e.g. building sites) or stream banks• Hosing path material into the stormwater drains |
| Nutrients (algae problems) | <ul style="list-style-type: none">• Stimulates the growth of algae, with the resultant decay leading to low dissolved oxygen levels affecting animal and plant life | <ul style="list-style-type: none">• Excessive use and inappropriate use of fertilisers, resulting in wash off into waterways, streams and wetlands• Animal faeces• Washing cars and disposing of water into drains |
| Gross pollutants | <ul style="list-style-type: none">• Reduces aesthetic appeal of waterways• Detrimental to aquatic life | <ul style="list-style-type: none">• Littering e.g. plastic bottles, wrappings or cigarette butts• Waste dumping |
| Petrol, oils and grease | <ul style="list-style-type: none">• Reduces aesthetic appeal of waterways• Toxic effect on aquatic life | <ul style="list-style-type: none">• Car maintenance activities (individuals or businesses)• Illegal dumping of waste lubricating or food oils• Leaks from vehicles |
| Pesticides and herbicides | <ul style="list-style-type: none">• Harms aquatic plants and animals | <ul style="list-style-type: none">• Inappropriate use of pesticides and herbicides• Pesticides and herbicides washed off into waterways and wetlands |

Depending on what the land use is within your catchment, or what activities are known to be of most prevalence, the education program can be tailored to suit a target audience. The following steps go through the process of identifying your target audience, defining objectives and forming methods to deliver the objectives. But all this does start with some analysing into the STATE of the issue and the PRESSURE analysis, before reacting with a RESPONSE.

The message might be: pick up your dog droppings, wash your car on the lawn, use less fertiliser – don't use fertiliser, pesticides or herbicides if it is just about to rain, or don't tip paint or chemicals down the drain. Step five details the process of creating and delivering a message.

Education and awareness programs focus mainly on quality source control, however, an education program may want to target or include quantity source control. For example, a program may want to encourage porous pavers so that stormwater can be infiltrated at source, and not enter stormwater infrastructure. In this way, the scouring and erosion effects of delivering high quantity bursts of stormwater through engineered drainage systems into wetlands or waterways can be decreased.

Step 2: Define your monitoring and evaluation methods

Monitoring and evaluation is detailed in Step 9. It is important to determine how the stormwater education program is going to be evaluated when you are designing the program. Of course, as each Step in the design of the stormwater education program is worked through, the methods of how you will monitor and evaluate will be refined.

In Step 1, some level of understanding of the problem or issue should have been identified. Steps 3 and 4 outline the process of defining the stakeholders and target audience. Maybe this would be a good time for collecting some baseline information. This could be by using phone or mail surveys with target questions or desktop research. This is discussed further in Step 4.

Other monitoring and evaluation methods you may wish to consider using include: change in practice, or water quality monitoring.

Step 3: Identify stakeholders

It is imperative that the education program identifies those individuals or groups that have responsibilities or are involved in some way in managing or protecting stormwater. Due to their involvement and ownership of the issue, many stakeholders will have knowledge, networks and resources that can add significant value to your project, such as: Local Government authorities, Department of Environment, Chamber of Commerce, a Catchment Management group and media.

It is important to identify the stakeholders, to involve them and to establish their views about the issue.

Partnerships can be formed to work together to solve an issue. At least one stakeholder should be from the target group.

Who are the key people in solving the problem? How will stakeholders be involved?

Step 4: Know your target group

Who do you need to reach? Who are you trying to influence with the project?

It is important to identify, get to know and involve your target group early in the project. Knowing the target group means much more than simple identification. A complete profile should be developed to identify the most effective communication methods to use.

A complete profile includes detailed demographic information such as age, locality, occupation, culture, interest, gender, socio-economic status and level of education. An understanding of the group's current knowledge, attitudes and practices concerning the issue will have to be gained. Finding out how the target audience receives information will help you develop, format and distribute your messages. What radio and television stations do they use; which magazines, newspapers or newsletters do they read? Do they belong to any organisations? Whose opinions do they value?

Any information that can be gathered on the target group will serve to benefit the education program. Researching the target group need not be complicated. It may involve setting up a focus group or discussion with a sample of people who are representative of the group. Other methods of gathering information may include surveys by mail and phone. These are both useful ways to get baseline information about a target audience, or by accessing information that may have already been gathered (from one of the stakeholders or a database for example).

Step 5: Determine objectives and outcomes

What do you want to achieve? What outcomes do you want? What are the key messages you want to create? How will achieving the objectives help solve the issue or problem?

Once the issues and the target groups are identified, it is necessary to determine the result you want from the education and awareness program. This can be defined by setting the goal, educational objectives and desired outcomes. The goal is a broad statement of what you want to achieve, such as, to undertake an education program to increase awareness of the connectiveness of stormwater pollution issues and encourage behaviour change. The objectives are how you want to achieve your goal, such as, to increase knowledge about the environmental impacts of stormwater pollution and to develop an understanding of the benefits of improved environmental management to the audience (e.g. economic). Outcomes are defined in terms of the effects and outputs you hope will result from the program, such as, increased knowledge and change of behaviour with respects to stormwater pollution.

How will the goals, objectives and outcomes be monitored and evaluated?

Step 6: Determine your methods

Determine which education tools and techniques are likely to work most effectively with the target group and whether the methods reflect the educational needs of the target audience.

Investigate methods, tools and techniques that will achieve the goals, objectives and outcomes – given time and financial constraints.

A mixture of techniques may increase the chances of success. Consideration will also need to be made whether there is an appropriate mix of informing techniques and those that facilitate action. Combining formats can reinforce the message considerably. For example, promoting environmentally-friendly

fertiliser use to homeowners through newspaper articles, community action days such as waterway and wetland walks, displays at shopping centres and promotional material such as stickers and pens creates interest in and supports such practices.

Education tools and techniques may include the following:

- printed material – in the form of newsletters or brochures, sent to each individual reader (household or business)
- other distribution material – fridge magnets, pens and car stickers
- media – newspapers, television, magazines and radio. Can be paid advertising or publicity through media releases or interviews
- interactive computer packages including CD ROMs and the internet
- launches and public releases by influential community citizens (e.g. ministers and advocates)
- signs – at bus stops or on billboards
- displays – at local shopping centres or at special functions, festivals and trade displays
- courses through schools, universities, TAFE and community colleges
- training or train the trainer courses
- awards or accreditation programs as part of an integrated program
- demonstrations such as water quality monitoring
- talks, presentations and seminars
- individual advice, communication or instruction, and
- participation/involvement (meeting and discussions, road gully stencilling, planting and cleanup days and tours or field days, such as drain walks).

The application of some of these tools and techniques can be seen in the example section of this chapter. The mixture of tools and techniques can be quite different depending on the target audience.

Examples of posters, pamphlets and signs can be found on the various websites listed at the end of this chapter and on pages 37-38.

Messages

There are two basic concepts that can form the basis of the messages in a stormwater education program, namely highlighting:

- the impacts of community activities on stormwater quality and the natural environment; and
- suggesting appropriate actions.

(from NSW EPA, 1998)

A key element to the success of your program will depend on how well you highlight the connection between people’s activities and the resulting environmental damage. Highlighting the ‘cause-effect’ relationship in an education campaign can assist people to recognise that their actions can reduce their environmental impact.

To be effective, messages must be understood by the target audience and appeal to them on their own terms. The message should be specific and tied directly to something your target audience values, such as money or health. These are the customers and you want them to ‘buy your product’ (CSOG, undated).

Issues and impacts have been identified in step one: analyse the problem or issue. Examples of issues and their impacts with possible causes are presented in Table 2. Table 3 gives some examples on MESSAGES that you may form based on the analysis of the problem.

Table 3. Example messages for Stormwater Education Projects (adapted from: NSW EPA, 1998).

| Key message | Actions to do more often | Actions to avoid |
|----------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>Changing motor oil</i> It takes only one litre of oil to contaminate one million litres of | Maintain the car check that there are no oil or radiator water leaks and that fuel is burnt ‘cleanly’ by keeping your car tuned. water. | Don’t maintain cars (including oil changing) where oil and grease may enter drains or groundwater. Never pour oil into the street drains. |
| <i>Landscaping and construction (sediment)</i> Sediment can be eroded from disturbed areas and be deposited into waterways. | Protect stockpiles from wind and rain by storing under secured plastic sheeting or tarpaulins. | Avoid piling sand and soil on areas where it can wash into the stormwater system. Don’t wash cement mixers into the drains. |
| <i>Gross Pollutants (rubbish)</i> Litter can blow into stormwater systems which reduces aesthetic appeal and can kill aquatic life. | Make sure that litter such as cigarette butts, cartons, fast food containers, plastic bottles and bags are disposed of correctly. | Never drop packaging or litter onto the ground. |
| <i>Fertiliser and Pesticide use</i> Fertilisers can encourage algal growth in waterways. | Consider alternatives to fertiliser, such as compost. If you do fertilise, use slow release fertilisers to the manufacturers directions, more will waste you money. Minimise areas of lawn, choose a water efficient and drought tolerant lawn such as some varieties of Couch or Saltene, improve the soil before planting and apply a soil wetting agent to help prevent runoff. Grow a native garden. Consider natural alternatives to pest control chemicals. | Don’t use fertilisers or pesticides when rain is forecast for the same day. Don’t over fertilise, it will just waste your money and potentially threaten the environment. |

Tips for effective communication

Community education needs to be delivered clearly from the outset. The messages need to:

- Be clear and concise – what is the issue, how does the target group contribute to the stormwater pollution, what are ways to reduce these impacts. The message should provide clear cause, effect and remedy linkages. The audience should become motivated and be given a sense of ownership of the issue and the solution.
- Use plain English – everyday language should be used, and the use of jargon or technical terms should be avoided as much as possible. The message should be pitched at the appropriate comprehension level of the audience.
- Use simple messages – avoid overloading the audience. Chances are that if too much information is given at one time, much of it will be overlooked, the audience will become disinterested and the message will not be delivered effectively.
- Link messages – ensure that each message clearly relates to the last sequence. The message should have a logical sequence.
- Translate to foreign languages if needed – this may be needed if your target audience is not English speaking. Ensure that cultural differences are considered when messages are translated.
- Be correct and up-to-date –the message should have a sound and current technical basis, and
- Be two-way – by allowing interaction, input and feedback from target groups.

These steps apply not only to written information, but also to verbal information and outreach programs.

Step 7: Consider funding

A primary practical consideration in developing an education and awareness program is establishing how much it will cost and who will pay. It will be necessary to identify possible funding sources and the benefits for potential funding organisations. Potential sources of funding may include grants from Local government, State Government grants and Private sponsorships.

Are there any in-kind opportunities? How will the project be modified if insufficient funding is available?

In seeking funding, potential benefits must be effectively illustrated to increase their chances of success.

Step 8: Form an action plan and implement it

An action plan will need to be prepared to identify steps to achieve the program objectives. An action plan identifies who has to do what and by when, what resources will be needed and also keeps the program on track.

The action plan should cover the ‘who, what, when, where and how’ theory. Timeframe, milestones, resourcing (money and people), and responsibilities are all necessary components.

Step 9: Monitor and evaluate

This requires the collection of information to show the effectiveness of the education and awareness program.

Monitoring and evaluation of the program can:

- help make decisions and recommendations about future directions
- identify the strengths and weaknesses of your project
- enable judgements to be made about the worth of the project
- determine stakeholder and target group satisfaction
- determine the rate and level of attainment of the objectives
- be used to correct, adjust or formulate ongoing steps in the program
- measure performance, and
- meets demands for accountability.

Did the project succeed in reaching the target community? Were the messages understood? What was successful and what wasn't?

Building an evaluation component into the program from the beginning will ensure some feedback is generated. Of course, the most important stage when evaluation and monitoring should be considered is when objectives are set.

Three types of evaluation can be identified (COSG, undated). These are – Planning evaluation, Process evaluation and Impact evaluation. Planning evaluations assess the likelihood that outreach programs will achieve their objectives. This includes asking the questions such as 'Are the objectives consistent with the goals', or 'has the target audience been sufficiently defined'. Process evaluations focus on implementation of activities as they relate to budget requirements, schedules and staff resources. This includes asking questions such as, 'do I have the resources to accomplish the identified objectives', or 'have I factored in enough lead time to get the materials published and distributed'. Impact evaluations assess the outcome or impacts produced by the outreach program and are directly tied to the original objectives. Thus the question to ask would be, 'to what extent did we achieve our objectives'.

The activity that results from this step could be the production of a report that summarises strengths, weaknesses and outcomes, with recommendations for future work.

5.1 Concluding remarks in developing a stormwater education program

There are three factors influencing education effectiveness, and these are

- how prevalent is the behaviour that the program seeks to modify
- how effective is the program in delivering the message to the population whose behaviour needs to be influenced, and
- what is the most effective educational technique to actually change the identified behaviour.

Source: The Centre for Watershed Protection

There is evidence to suggest that in addition to education, it is important to have a supporting infrastructure and social structure around individuals so that it is easy for them to comply with educational messages (Taylor and Wong, 2002, p68). This may mean methods as simple as providing people with easy access to litter bins and recycling locations, together with appropriate education.

6 Resourcing an education and awareness program

Cost of education programs

Taylor and Wong (2002, p70) found that 'the costs of educational and participatory initiatives for stormwater management vary greatly but have been documented, where available, for comparative purposes. Cost information of particular note included:

- Australian and overseas case studies demonstrate that regional and Statewide stormwater awareness campaigns usually run for less than one year and typically cost AUD\$0.42 - \$0.82 per capita (averaging AUD\$0.62 per capita)
- Intensive training programs such as the Master Gardener Programs cost approximately AUD\$15 326-\$19 157 per year to run, or \$0.23 per person per year (when the costs are spread over the entire population of the programs' area of influence), or AUD\$7.76-\$15.52 per hectare of lawn managed through the programs
- most education-based, US urban nutrient management programs cost less than AUD\$47 893 (US \$25 000) per year.'

Cost vs benefits

The majority of attempts to measure the performance of education and participation programs utilise simplistic styles of evaluation (e.g. measuring participation rates, changes in knowledge or changes in self reported behaviour). Few attempts have been made to link educational programs with actual changes in stormwater quality and/or pollutant loads (US EPA 1997, cited in Taylor and Wong, 2002). For example, published studies containing quantitative information on the effectiveness of educational BMPs in terms of water quality improvement could not be identified in a literature review by Strecker and Quigley (1998) as part of the US National Stormwater BMP database project (cited in Taylor and Wong, 2002).

Structural source controls are usually tested in laboratory situations. The information gathered is used to predict performance in terms of nutrient and pollutant retention ability, and together with associated capital and maintenance cost estimates, can be used to assess the likely unit cost rate of pollutant removal (Water and Rivers Commission, 2002).

It is more difficult to predict the effectiveness of non-structural source controls in water quality management because they cannot be readily tested by the conventional methods (Water and Rivers Commission, 2002). There has traditionally been a reluctance to include non-structural source controls in stormwater management programs in other States. In particular, it has been highlighted that in NSW, where the EPA has stressed a source control philosophy should be applied initially, with in-transit controls only applied if necessary, a lack of cost comparison between structural and non-structural source controls has been highlighted (NSW EPA, 1998). However, it can be concluded that control of pollutants at source using non-structural measures has the potential to be a very efficient water quality management option through minimisation or prevention of input (Water and Rivers Commission, 2002).

A model that provides cost comparisons – Nutrient input Decision Support System (NiDSS)

The Southern River/Forrestdale/Brookdale/Wungong Structure Plan Urban Water Management Strategy (UWMS) is a study recently completed to address issues of water and nutrient management for existing and future land uses in the Structure Plan Area (Water and Rivers Commission, 2002). As part of this study, a Nutrient Input Decision Support System (NiDSS) has been developed for the Swan Coastal Plain with particular relevance to the Southern River-Forrestdale-Brookdale-Wungong Structure Plan. The NiDSS is a tool to assist in land use management planning, to allow quantitative estimation of the potential reduction in nutrient inputs and provide cost estimates for various combinations of WSUD water quality management measures.

‘NiDSS focuses on the adoption of an integrated catchment approach to water quality management, including measures to minimise nutrient inputs at source, and provides a logical framework for the evaluation of the effectiveness of various best management practices for nutrient input management’ (Water and Rivers Commission, 2002).

The UWMS found that with respect to nutrients in the study area, current export to receiving waters is estimated to be less than 5 percent of input, with the majority coming from surface water rather than groundwater flow.

NiDSS calculates the total expected nutrient input for a particular residential density based on aggregating individual nutrient inputs from different land uses (lots, POS, road reserves, conservation areas) before implementing stormwater management measures. Information obtained from mail out questionnaire surveys of residential areas, aerial photography interpretation of land use within residential areas and other published information has been used to develop the data for the NiDSS. The impact of individual source and in transit (structural) controls on nutrient input can then be determined by either turning on/off individual controls or varying the effectiveness of these measures. The results present information on:

- estimates of total phosphorus (TP) and total nitrogen (TN) application to an area
- estimates of reductions due to source control measures (education, street sweeping, native plantings)
- estimates of reductions due to in-transit controls (e.g. Gross Pollutant Traps and Water Pollution Control Ponds), and
- estimates of the cost of removal (in Present Value Terms), including both capital and operating costs for a selected WSUD program.

The UWMS found that source control measures, such as education and native gardens, were found to be considerably more effective in reducing nutrient input than in-transit structural measures used to trap and remove inputs. Typically, 1-3 percent of total nutrient application to a catchment were found to be trapped by in-transit (structural) measures. Source controls were therefore considered the preferred method by which significant reduction in nutrient application can be achieved.

The study found that the order of cost for reducing phosphorus inputs are free for native plantings (assuming that they are planted at development stage), <\$5/kg/yr for education programs, \$150/kg/yr for street sweeping, \$800/kg/yr for GPTs, and \$4000/kg/yr for ponds and wetlands (Water and Rivers Commission, 2002, p23). Appendix 5 of the UWMS provides detail of the cost estimate calculations. The UWMS also tables the various constraints and pollutant removal efficiencies for various structural control methods.

The expected effectiveness of a public education campaign has been based on a phone survey conducted in NSW, as published in ‘Who Cares About the Environment 2000?’. In this survey, the environment was mentioned by 10 percent of those surveyed as one of the two most important issues for attention by State government at that time. It was also discovered that 17 percent of those surveyed nominated the environment as one of the two most important issues for attention by State government in 10 years from that time.

Water issues were the environmental issue of most concern, being nominated as the most important environmental issue by 27 percent of people surveyed. Additionally, the greatest number of those surveyed (17 percent) considered that education was the single most important thing that the government could do to protect or improve the environment.

Based on the results of the survey, NiDSS has assumed approximately 20 percent of people within a development could be reasonably expected to respond positively to a public education campaign on reduction of nutrient inputs.

The model then calculates education campaign nutrient reductions in lot garden and lawn fertiliser input, pet input (lot and POS) and car wash inputs. Cost estimates are based on distribution cost per household at annual frequencies.

Education programs are much less likely to have high engineering maintenance costs when compared to structural controls, such as Gross Pollutant Traps. Other benefits of education include:

- can target diffuse sources and specific pollutants – the diffuse source nature of stormwater pollution means that structural control techniques are less effective and more costly
- programs can be changed, so are flexible – structures are fixed into the landscape
- targets the individual, and
- mobilising the community into a different mindset to achieve a more sustainable environment.

7 Examples of program development and planning

The following examples follow eight steps (ie. does not explicitly address ‘Step 2: design your evaluation methods’ presented in this manual). The design of the evaluation methods, however, would have been planned at an early stage in all of these cases.

Example 1: Green Stamp Business Program

An accreditation program for the automotive industry developed and initiated by the Motor Trades Association WA in conjunction with the Department of Environment that is now being adopted nationally.

For more information, please contact Bernie Riegler at the Western Australian Motor Trades Association (MTA-WA) on (08) 9345 3466.

Step 1: Issue

Due to the nature of the chemicals used and traditional processes undertaken automotive repairers are often seen as polluters of their local environment.

Traditionally, a lack of succinct, industry-specific information and training has seen this trend continue within the industry, with many businesses struggling to comply with their legislative requirements. This is coupled with an inability of Government agencies to enforce their legislation, which has led to a substantial commercial imbalance between those that do burden the costs of proper environmental management and those that do not.

Consumers, though concerned about the environment, often don't consider the other environmental impacts of their vehicles and hence fail to recognise the additional commitment that many automotive repairers will make to manage their environmental responsibilities.

Step 2: Identify stakeholders

- Motor Trade Association of Western Australia (MTA-WA).
- Department of Environment.

Step 3: Target group

- All facets of the automotive industry, including mechanics, spray painters and panel beaters, engine reconditioners, wreckers, car yards, detailers, mobile mechanics, radiator repairers, etc.
- Vehicle owners.

Step 4: Objectives

- To assist small to medium businesses in the automotive service industry to incorporate processes that avoid, reduce, reuse, recycle or dispose of their wastes in a cost effective, efficient and environmentally sensitive manner.
- Raise consumer awareness of the 'other' environmental impacts of their vehicles and encourage them to utilise the services of Green Stamp Accredited businesses to service and repair their cars.
- Raise the profile of those industry leaders that are including the environment in their operating objectives.
- Work with relevant Government agencies to promote and encourage better environmental management within the industry.

Step 5: Methods

- Conduct obligation-free environmental audits to identify an individual business' current environmental impacts and provide practical solutions and if necessary, follow-up support.
- Compilation of industry-specific Environmental Guidelines that identify the environmental problem, the practical solutions and parties that can assist in their implementation.
- Via the Environmental Product and Service Directory, the Green Stamp has identified for automotive businesses the product and service providers in Perth that can help them to minimise or abate their environmental impacts.
- Delivery of environmental training seminars to managers and employees, educating them on the environmental impacts and practical solutions for responsible environmental management.
- Compilation and distribution of the Cleaner Times, an environmental newsletter for WA's automotive industry and related organisations and departments.

- Free drain stencilling to remind employees, contractors and visitors to premises that nothing except rain water should enter stormwater systems.
- Simplified environmental management plans to help businesses to monitor their practices and set a plan for future consideration.
- Dissemination of a range of Green Stamp information at www.greenstamp.com.au. This includes a list of Green Stamp Accredited businesses, the Environmental Guidelines, the Environmental Self-audits for mechanical repairers and body repairers and the Environmental Product and Service Directory.
- Promotion of automotive businesses that have received the Green Stamp Accreditation. Launched at the end of 2002, the Accreditation is rewarding those businesses that are incorporating environmentally friendly practices by promoting them as industry leaders. It also provides an incentive for those businesses that are not incorporating environmentally sensitive processes to do so.

Step 6: Funding

- To date, the Green Stamp has been driven by the MTA-WA, with funding assistance from the State Government's Waste Management and Recycling Fund.
- In May 2003, the Commonwealth government through Environment Australia's Eco-efficiency agreements began to support the program at the National level. This funding support was directed towards assisting the other affiliated Associations of the Motor Trade Association of Australia to implement the Green Stamp program's initiatives in their own States.

Step 7: Action plan

- Continued implementation of the Green Stamp program in Western Australia, including the dissemination of the program's resources and initiatives throughout the automotive industry.
- Promotion of Green Stamp Accredited workshops to consumers.

Step 8: Monitor and evaluate

- Follow up visits on 40 workshops that received an Environmental Audit found that 90 percent improved at least three of their practices within three months and 86 percent of those improved their overall Environmental Rating to the next level. (The "Environmental Rating" is a four-tier scoring system developed by the Green Stamp to show businesses their current level of achievement and help them identify priority issues they should address to improve.)
- In 2001, to improve the efficiency of the auditing process and the number of businesses surveyed, the audit was modified. Since then, over 200 Environmental Self-Audits for mechanical repairers and body repairers have been distributed throughout the industry.
- Since November 2001, the Green Stamp has presented 13 Environmental Seminars. The Seminars have attracted 126 participants from 99 companies and organisations. Though initially set up for automotive businesses, the Environmental Seminars have also attracted TAFE lecturers, Chamber of Commerce and Industry representatives, Local and State Government officers and students.
- There are 11 Green Stamp Accredited businesses in Perth at present, 10 of which are at the top level of Accreditation (Level 3) and the other at level 2.

Example 2: (sourced from NSW EPA & DLWC, 2001) Hawkesbury-Nepean Phosphorus Action Program

A community education and awareness project initiated by the Hawkesbury-Nepean Catchment Management Trust to improve water quality in the catchment.

For more information, phone Peter Salier on (02) 9995 5364.

Step 1: Analyse the issue or problem

The problem was the current health of the Hawkesbury-Nepean River, including the growth of algal blooms and water weeds (caused by excessive amounts of phosphorus and increasing population growth).

Step 2: Identify Stakeholders

The stakeholders were:

- local government/catchment councils
- Hawkesbury-Nepean Catchment Management Trust
- Department of Land and Water Conservation
- Environment Protection Authority
- Sydney Water Corporation.

Step 3: Know your target group

The target group comprised:

- catchment residents and the general community
- local government
- industry
- agriculture
- schools
- recreational and tourist groups.

Step 4: Determine objectives and outcomes

The goal was a healthy, diverse and productive Hawkesbury-Nepean river system for all.

The objectives were:

- To increase public awareness about the harmful effect of phosphorus on river health
- To provide information about the sources of phosphorus
- To encourage individual and corporate actions to help minimise phosphorus and pollutants, and
- To provide monitoring data to verify changes in the generation of phosphorus to reduce the incidence of algal blooms.

The outcomes were:

- Increased community awareness about the harmful effect of phosphorus on the river
- Less phosphorus generated in the catchment and entering watercourses
- Change in attitude and behaviour within the community, leading to sustainable gains, and
- Reduced chemical dosing required to treat phosphorus at sewage treatment plants.

Step 5: Design your methods

Methods comprised:

- Appointing a full time project manager
- Establishing a steering committee with representatives from the community, local government, government agencies and the Trust to set strategic direction for the program
- Establishing a working party with joint representatives from government and the Trust to implement Steering committee recommendations, and
- communication/marketing:
 - brochures, posters, T-shirts, drink coasters, bookmarks, carry bags, displays, catchment mailout, calendar
 - media activities: radio and press advertising, competitions, trade journal articles
 - meetings with key stakeholders and organisations to enlist support and develop joint programs
 - regular media releases to key stakeholders
 - school activities, teaching resources, competitions, and
 - public awareness; operational monitoring.

Step 6: Consider funding

The program was funded by the Special Environmental Levy, the Hawkesbury-Nepean Catchment Management Trust, Department of Land and Water Conservation and some catchment councils. The agencies and the Trust also gave 'in kind' support.

Step 7: Make an action plan and stick to it

The plan involved:

- a pre-benchmark survey (Nov 94)
- strategic media and marketing plan approved (Mar 95)
- a program launch (May 95)
- a local radio campaign (May 95)
- negotiating with Cumberland Newspaper Group for a regular column in each catchment paper and to support the program (Jun-Jul 95)
- negotiating with John Williamson to lend his support to the program (Jun 95)
- negotiating with Radio 2WS FM for community service time and support (Jul 95)
- a Streamwatch Open Day (Jul 95)
- intensive radio/print campaign (Aug-Dec 95)
- launch of the local government Phosphorus Action Policy (Aug 95)
- bus and carpark advertising (Aug-Dec 95)
- mail-out to all residents in catchment (Oct 95)
- school art, pledge and advertising projects (Sep-Dec 95)
- a schools Presentation of Awards Day (Dec 95)
- a field day for dairy farmers to promote dairy waste systems (Nov 95)
- an on-site wastewater disposal training course (Dec 95)
- an evaluation survey (Dec 95)

- negotiating with Panthers for monthly column and to support the program (Feb 96)
- negotiating with Sydney Water to monitor influent phosphorus at 3 STPs (Dec 95-May 96)
- launch of the school education package Enough is Enough with Sydney Water (Jun 96)
- preparing and circulating a report.

Step 8: Monitor and evaluate

Activities involved:

- a benchmark survey (telephone poll of 120 residents in 6 subcatchments) (Nov 94)
- monitoring of progress (Steering Committee, monthly)
- monitoring of influent to 3 STPs (ongoing)
- media monitoring
- water quality monitoring of Hawkesbury-Nepean River and tributaries (EPA, Sydney Water, StreamWatch)
- monitoring changes in practices of local government and agriculture
- an evaluation survey (telephone poll of 120 residents in 6 subcatchments) (Dec 95).

Example 3: (sourced from Douglas, 1998) Litter Awareness - Butt of our Beach, Waverley Council, NSW

For more information, phone Emily Scott on (02) 9369 8094.

Step 1: Issue: Cigarette butts are a major litter problem.

Step 2: Stakeholders: Local businesses, Council, Tourists.

Step 3: Target groups: smokers in public places.

Step 4a: Objectives:

- To raise awareness level of impacts of cigarette butts and other small pieces of litter on the environment
- To offer solutions to promote behaviour change
- To promote a positive image of Bondi Bay marine environment to show why it is worth protecting and how litter is affecting it
- To trial a variety of visual images to determine target group appeal.

Step 4b: Outcomes:

- To influence the behaviour of litterers and particularly smokers to dispose of their butts properly.

Step 5: Methods used:

- Development and distribution of 4 posters (3 with beach/marine focus and one on Centennial Park)
- Distribution of butt bottles – a pocket sized disposal option for use at the beach
- Installation of 25 ash cylinders at bus shelters, also posters were displayed at these shelters.

Step 6: Funding

Step 7: Action plan and implementation:

- Launch at Bondi Beach – with good media coverage
- Posters distributed and displayed at strategic outlets in the community
- Posters also sent to all coastal communities
- Butt bottles distributed at Bondi beach
- Ash cylinders installed at bus shelters and posters displayed.

Step 8: Monitoring and evaluation:

- No formal evaluation but anecdotally and by observation
- There has been a positive community response to the posters
- The ash cylinders and butt bottles are being used.

There is a recognised need for formal education but it was outside the scope and timeline of the project.

8 Linking programs

There are some programs and resources that already exist, which can provide resources when developing a stormwater education program.

Your education and awareness program may wish to include linking in with one of these already existing programs.

Swan River Trust and Swan Canning Cleanup Program

The Swan-Canning Cleanup Program is a major environmental management program that is working to reduce the frequency and extent of algal blooms in the Swan and Canning rivers, and prevent toxic blooms. It also aims to help maintain water quality now and in the future, help change land uses, planning and development to reduce nutrient inputs, and inform and involve the public in the process. The Cleanup Program is a \$3.5 million per annum program and is a State Government initiative managed by the Swan River Trust.

Through the Cleanup Program, the Swan River Trust has funded a large number of projects related to river and catchment monitoring and mapping, algae and nutrient research, computer modelling of estuarine dynamics, stormwater design, water quality management and Catchment Management Plans for key areas.

The Drain Game and Corporate Care Workdays are two new targeted-communication strategies being implemented to raise awareness and increase involvement.

The Drain Game was successfully launched at the 2001 Perth Royal Agricultural Show and proved highly popular with the community. The colourful community education activity helps people to understand how their actions affect the health of the rivers and was used at more than 24 community events in 2003.

Corporate Care Workdays is a new program that connects the corporate sector with the community in the catchment and gives private business the opportunity to make a significant contribution to environmental restoration projects and learn about river management issues. During 2001-2002 corporate care workdays were organised with four major city-based corporations.

For more information on using the Drain Game and planning a Corporate Care Workday, please contact the Swan River Trust on (08) 9278 0400. For more information on the Swan-Canning Cleanup Program and the Swan River Trust in general, visit the website www.wrc.wa.gov.au/srt or contact the Trust on (08) 9278 0400.

The Cleanup Program provides support to catchment groups and has also provided support for the development of the Local Government Natural Resource Management (NRM) Policy Development project conducted through the Eastern Metropolitan Regional Council.

The Local Government NRM Policy Development project gives environmental support to local governments in the Swan-Canning Catchment through policies, guidelines and checklists on different land activities available for direct adoption by local governments. The project also provides training in environmental areas to local government staff.

For more information on the Policy, please contact the Eastern Metropolitan Regional Council on (08) 9479 4808, or visit the website www.emrc.org.au.

The Swan Catchment Centre provides some resources for community participation in the Swan-Canning Cleanup Program through catchment management. One of its services includes the implementation of the Swan River Community Action Program, based on the Swan River Action Kit.

The Swan Catchment Centre has worked with local catchment groups to produce the Catchment Education Strategy for schools in the Perth Region. The Catchment Education Strategy aims to set a strategic framework for Integrated Catchment Management groups working in the Perth Region and as such serves as a common direction for the groups as a whole. One of the goals is to promote environmental education within the schools' Curriculum Framework, with one of the strategies being to support schools to select, plan and develop whole school environmental education programs linked to the Curriculum Framework. Before developing an education program, it may be helpful to contact your local catchment group or the Swan Catchment Centre.

For more information on the Swan River Community Action Program and the Swan River Action Kit, please contact the Swan Catchment Centre on (08) 9374 3333. For more information on the Catchment Education Strategy and Swan Catchment Centre in general, visit the website www.wrc.wa.gov.au/swanavon.

Swan Canning Industry Project: The Swan-Canning Industry Survey found small to medium industry was a major contributor of pollutants to the rivers. It recommended training and legislative measures to avoid these pollution risks.

In 2001-2002 training support in Cleaner Production was provided to 18 local government officers, eighty priority catchment group coordinators and seven industry operators.

The Cleaner Production Industry Training package was developed together with the Centre for Excellence in Cleaner Production. It addresses industry needs and encourages the development of cleaner production environmental management action plans.

For more information on the Swan Canning Industry Project, please contact the Industry Project Coordinator at the Department of Environment on (08) 6250 8000.

Ribbons of Blue

Ribbons of Blue is an environmental education network aimed at increasing community awareness and understanding about local water quality, and taking action for a better environment. Ribbons of Blue programs involve school students and community groups in monitoring water quality. Data collected from the sampling provides valuable information for identifying environmental problems and preparing management plans. Based on the outcomes of their monitoring, participating groups may develop action strategies to help manage any problems identified. Ribbons of Blue encourages a team oriented approach and fosters partnerships with local management authorities.

Ribbons of Blue Regional Coordinators, located throughout the State, support school and community involvement in the program. They provide technical expertise during fieldwork, training and help plan on-going monitoring and education programs.

Ribbons of Blue is part of the Natural Heritage Trust funded Waterwatch Australia network and is coordinated by the Department of Environment as the lead agency for Waterwatch in Western Australia. Ribbons of Blue is also supported by the Swan River Trust, Education Department of WA, Agriculture WA, GeoCatch, WA Plantation Resources, Friends of the River Toodyay, Manjimup Land Conservation District Committee and the Bennett Brook Catchment Group.

For more information on Ribbons of Blue and current contact details, visit the website www.wrc.wa.gov.au/ribbons or contact the Department of Environment on (08) 9278 0300.

The Geographe/Cape to Cape/Lower Blackwood Ribbons of Blue began a stormwater education project in 2001 with the production of posters, flyers, magnet, stickers and t-shirts- funded by a Coast and Clean Seas project. All the items produced were titled 'Don't let your Bay go down the Drain' or 'Take Care in the Catchment'. Several schools participated in painting local drains with messages such as 'don't let your bay go down the drain, 'clean water only' and 'drains to the bay'.

Please contact Ribbons of Blue/Waterwatch, GeoCatch, Busselton on (08) 9754 4331 for further information on the stormwater education project, including designing lesson plans and drain painting.

Yellow Fish Road

Yellow Fish Road is a network of volunteer groups who use stormwater drain stencilling to raise community awareness about stormwater pollution.

After purchasing a Yellow Fish Road Kit, community groups stencil anti-pollution slogans next to stormwater drains to remind other members of the community to help keep the waterways clean. Each community group is responsible for implementing its own Program. Participation helps remind the community that aquatic life can only live and thrive in unpolluted water.

Yellow Fish Road also produces information and education resources to inform communities about stormwater pollution.

For more information, please contact the Yellow Fish Road National Coordinator on (02) 9357 7377 or visit the website www.yellowfishroad.com.au.

Yellow Fish in Rockingham

The Yellow Fish program is a joint funded project by Coast and Clean Seas and the City of Rockingham. The program is based on similar programs in Australia and overseas. The stencil kit was altered for this project.

The stencilling of yellow fish on stormwater drain inlets by school children is linked to educational programs about reducing nutrients and other pollutants entering Cockburn Sound. The City of Rockingham stressed the importance of this linkage for sustainable behavioural change. The City of Rockingham also prepared a drainage management plan for the Palm Beach area.

For more information, please contact the City of Rockingham on (08) 9528 0333.

The Yellow Fish Program has also been implemented in a number of other catchments.

Yellow whale in Albany

Stencilling of stormwater drains with a yellow whale in Albany was part of a community awareness raising exercise by the City of Albany and Department of Environment. A local school designed a flyer as well as the logo for the stencil design, and undertook the stencilling. This formed a component of an overall Coast and Clean Seas project designed to demonstrate best practice in stormwater management through demonstration sites, leaflets, a foreshore clean up day and drain stencilling.

For more information, please contact the Department of Environment's Albany Office on (08) 9842 5760.

Phosphorus Awareness Project

The aim of the Phosphorus Awareness Project is to reduce phosphorus (P) and nutrient loads in the Swan-Canning catchment through changes in community and industry behaviour and practices resulting in healthy, sustainable river systems. This community awareness campaign seeks to promote appropriate fertiliser practices for the soils in the catchment, educate householders to use P free detergents in unsewered areas and consider P in pet droppings and bread fed to water birds. The project is managed by the Canning Catchment Coordinating Group and assisted by a group of volunteers, the Phosphorus Action Group. The project is funded by the Swan-Canning Cleanup Program and the Natural Heritage Trust's Envirofunds.

The project targets the community, schools, Local Government and high phosphorus using industries, through talks, displays, articles and demonstrations. The Algae Buster School Visitation Program educates school children on the effects of nutrients in river and wetland systems through hands on activities and is complemented by teacher resources. Community members are educated through presentations and displays at libraries, fairs, festivals and shows. Local Government and industry are educated through presentations, seminars, trade displays and articles. A Local Government Nutrient Survey is also conducted annually to educate and assess behavioural change.

The Phosphorus Awareness Project has a range of brochures, stickers and a magnet that are used to inform and educate the community about nutrient sources. The Fertilise Wise Guide is also a community education tool consisting of a soil map poster with five associated brochures, one for each main soil type in the Perth Metropolitan Area, providing information to gardeners on appropriate fertiliser types and application rates for their soil type.

For more information, please contact the Coordinator of the Phosphorus Action Group on (08) 9258 3493.

Great Gardens

Provides urban gardeners with additional knowledge and practical skills so that they become an integral part of the drive towards urban sustainability. Gardeners learn how to create a wonderful garden, attract native fauna, and be water and fertilise wise. The benefits for gardeners can include an attractive and functional garden that delivers their particular needs, while enhancing the value of their property and reducing their impact on the environment. The overall outcome of the program is the reduction of nutrients and pollutants reaching the Swan and Canning rivers through the application of improved gardening practises.

The Swan River Trust delivers the Great Gardens program through the Swan-Canning Cleanup Program, a major environmental management program that supports sustainability through State government, local government, industry, business, community groups and learning institutions to embrace 'best practice' and to become an integral part of the paradigm shift towards embracing urban sustainability. The program is delivered with support from the Water Corporation and the Nursery & Garden Industry Association, as well as Local Government within the Perth Metropolitan Area.

For more information, please contact the Community Relations Manager, Swan River Trust on (08) 9278 0400 and <http://www.greatgardens.info>.

Earthcarers in Western Australia

The Department of Environment, Western Metropolitan Regional Councils, the City of Nedlands and Edith Cowan University are currently trialing and evaluating the 'Earth Carers' behavioural change and involvement program. The Trial has been supported by the Waste Reduction and Recycling Fund, and is based on the NSW EarthWorks program.

Earth Carers is designed to instil a set of positive waste minimisation behaviours within households and the wider community. The program's principal focus offers considerable scope to reduce production of domestic waste and that is disposed of in landfill.

Earth Carers is designed for adoption by local government authorities and is comprised of two main components. The first component – the Earth Carers Course, provides skills to Earth Carer Volunteers in waste reduction, reuse, recycling and, importantly for the second component, techniques of community 'outreach.' Trained Earth Carer Volunteers supported by the local government authority then conduct the second component – community outreach, encouraging community members to minimise their household waste through use of compost bins, worm farms and purchasing decisions.

The trials are being evaluated with the assistance of Edith Cowan University and will provide valuable information for the development and implementation of Earth Carers throughout WA. The Western Metropolitan Regional Council has undertaken the first phase of evaluation of the Earth Carers program (WMRC, 2003). This has shown that the percentage of active participation rate is high at 63 percent and that the Earth Carers are very willing to be involved in outreach activities. Almost all of the participants who have completed the course have indicated that their knowledge of waste issues and belief in the value of waste minimisation has increased. Ninety-five percent of graduates who completed the survey claimed to have participated in one or two forms of public outreach (an organised event in a public place to encourage others to improve their waste behaviour – for example, all have been involved with composting demonstrations).

The next phase of the program is to establish Earth Carer Coordinator positions within local government authorities via applications to the Waste Reduction and Recycling Fund. These coordinator positions would establish, train and support Earth Carers Volunteers within local government authorities.

Although not targeting stormwater education, the program can be expanded to incorporate these issues. For example, a council may wish to emphasise the message that using compost and worm castings in the garden improves the soil and decreases the need for fertiliser. This in turn is good for our waterways because it reduces fertiliser in runoff (improving stormwater quality), can act to increase infiltration (meaning less runoff on the property) and reduces nutrient loss to groundwater. Most importantly, the program also illustrates that environmental education and outreach do have successful environmental outcomes.

For further information, please contact the Department of Environment on (08) 9278 0300, or the Western Metropolitan Regional Council on (08) 9384 1633.

Bannister Creek Catchment Group

The Bannister Creek Catchment Group (BCCG) is involved in several activities including: community events, community and school involvement/education, stakeholder meetings, project planning, revegetation works, weed removal and river restoration. As discussed in section 4.3, the BCCG has undertaken a project to transform a section of a drain, with support from the City of Canning, the Department of Environment, the Water Corporation, the Swan Catchment Urban Landcare Program, ALCOA, the Natural Heritage Trust and the local community. The retrofitting project at Bannister Creek is part of a broader program to improve the health of the catchment.

For more information on the Bannister Creek Catchment Group or the retrofitting project, please call the Catchment Coordinator on (08) 9458 5664.

Local Catchment Groups

Local Catchment Groups can prove a source of much information when planning a stormwater education program.

For more information on local catchment groups, friends groups or conservation groups, please refer to the Swan Catchment Centre website www.wrc.wa.gov.au/swanavon.

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10 Further information and resources

Internet Resources

www.epa.nsw.gov.au/stormwater/usp/index.htm

The New South Wales Environmental Protection Authority (NSW EPA) and the Stormwater Trust. The NSW EPA conducted a number of stormwater education campaigns between 1994 and 2000 to raise awareness of stormwater issues and in particular, certain behaviours that can pollute stormwater. The evaluations of these campaigns, together with the results of several other EPA surveys, have provided significant data on community knowledge, attitudes and behaviours in regard to stormwater pollution and the shift that has taken place. The EPA report 'Findings of EPA Social Research on Stormwater, 1994-2002' (Kimberley, 2002) presents these findings.

The website has a wealth of information on best practice for stormwater quality protection. Case studies of stormwater education in various councils are featured on the Council resource page link. Appendix 1 contains one example of a brochure on Stormwater Pollution that NSW EPA has produced. Many other examples can be viewed at the website.

www.epa.vic.gov.au/programs/stormwater/goals.asp

EPA Victoria's urban stormwater program (VSAP) is part of the Victorian government's 'Greener Cities' policy, and was launched by the Victorian Government in June 2000. The Victorian Government allocated \$22.5 million over three years to improve the environmental management of urban stormwater in Victoria.

The Urban Stormwater Best Practice Environmental Management Guidelines, published by CSIRO in 1999, were developed by EPA Victoria, Melbourne Water, Municipal Association of Victoria, local government, industry and Department of Natural Resources and Environment. These guidelines are referenced in this document.

www.stormwater.melbournewater.com.au

Melbourne Water conduct a variety of programs for community and school education on stormwater issues. Examples of the education kits for school children are: ‘Drains to the Bay’ kit for years 3-6 and ‘Drain to our Waterways’ for years 5-9.

www.mav.asn.au/stormwater

Capacity Building Program for Best Practice Urban Stormwater Management is coordinated by the Municipal Association of Victoria & Stormwater Industry Association of Victoria.

Funded by EPA Victoria through the Victorian Stormwater Action Program (VSAP), the CBP will develop and deliver statewide training/education packages to improve best practice environmental management of urban stormwater and sustainable urban development.

www.environment.sa.gov.au

The SA EPA has three very useful codes of practice: “Stormwater pollution prevention code of practice for the community”, “Stormwater pollution prevention code of practice for the building and construction industry” and “Stormwater pollution prevention code of practice for local, State and Federal government”.

www.stormwater.asn.au

The Stormwater Industry Association (SIA) is for people and organisations involved with or concerned about stormwater in Australia. The mission of the Association is to provide an integrated Stormwater Industry of a quality that satisfies customer needs in an effective, efficient and affordable manner. Each SIA state committee has representatives from educational organisations, product manufacturers, local government and consultancies.

www.yellowfishroad.com.au/aboutthesiaef/ouraims.html

The Stormwater Industry Association Education Foundation (SIAEF) is an environmental trust created by the New South Wales chapter of the Stormwater Industry Association in 2002. The SIAEF's objective is to develop and support stormwater education to help protect and improve the environment.

It oversees Yellow Fish Road, which has been gaining momentum since its introduction to Australia in 1998. The Foundation is dedicated to developing programs to service the educational needs of councils, residents, schools, community groups and the private sector that are working to prevent stormwater pollution.

www.waterwatch.org.au

In recognition of the growing concern for water quality, the Commonwealth Government initiated Waterwatch in 1993.

Waterwatch Australia is a national community water monitoring program that encourages all Australians to become involved and active in the protection and management of their waterways and catchments.

www.wrc.wa.gov.au, www.environ.wa.gov.au

Water and Rivers Commission website and Department of Environmental Protection website – containing policies, guidelines and guidance statements for the community and industry sectors.

www.wrc.wa.gov.au/srt/index.html

Swan River Trust website – One of the core tasks of the Swan River Trust is to raise awareness about issues affecting the river and increase community involvement in caring for the river and its catchment. Information is provided on their community awareness programs.

www.epa.gov/npdes/stormwater, www.epa.gov/owow/nps

US EPA has outreach kits, including an overview brochure on stormwater pollution, a homeowner's guide to preventing stormwater pollution and a poster for construction site operators on implementing sediment and erosion control practices, examples of which can be seen on these websites.

www.mastergardener.wsu.edu

The Washington State University Master Gardener website. WSU were the originators of the Master Gardener program. The website contains links to other programs run elsewhere.

The Master Gardener program originated in Washington State to enable Washington State University Co-operative Extension to better serve the public, specifically home gardeners. Whilst Master Gardeners teach gardening and horticultural classes, much of the emphasis is on social and environmental issues in their communities, such as the threat to water quality if used improperly, or threat to water quality from unsustainable practices. The Master Gardeners program also strongly advocates composting, which reduces waste to landfill, and revegetation of eroded river banks.

www.ngia.com.au

The Nursery and Garden Industry Australia has designed projects for teachers to use in schools. These projects include themes such as soil science, which provides a flow chart of the methods involved in checking and improving soil quality, design briefs to help students plan and plant native and heritage gardens, vegetables, fruit and pot plants, and environmentally friendly pest control.

The Nursery Industry Association also runs an accreditation program for nurseries and garden centres, which includes some environmental considerations. Contacts and further information can be found on the website.

www.catchment.crc.org.au

The Cooperative Research Centre for Catchment Hydrology's mission is to deliver to resource managers the capability to assess the hydrologic impact of land use and water management decisions at a whole of catchment scale. The CRC is undertaking a number of research programs and the website is a good resource for stormwater information.

CRC have developed a model, Model for Urban Stormwater Improvement Conceptualisation (MUSIC), which enables users to evaluate conceptual designs of stormwater management systems to ensure that water quality objectives for their catchments are met. However, education programs are not one of the BMPs evaluated.

www.canterbury.nsw.gov.au

Cooks River Environmental Assessment and Education Project – Bringing the Cooks River to Life.

www.manly.nsw.gov.au/thegreatestate

Manly Council has joined forces with the NSW Government Stormwater Trust and the University of Western Sydney (UWS) to develop a unique program linking environmental education, water quality monitoring, infrastructure provision and legislation to address concerns about ecosystem health in the catchment of Balgowlah Industrial Estate.

The Manly website also has details of the Council's independent telephone survey it commissioned. To assist with the development of an Environmental Education Strategy, the surveys objectives were to explore the local community's knowledge, attitudes, skills and behaviours in respect to environmental protection. It is the first known instance where a NSW Council has undertaken a telephone resident survey wholly devoted to environmental matters.

www.hastings.nsw.gov.au/fsMain.htm

Hastings Council Stormwater Education and Evaluation Program. This project aims to provide integrated, cost effective and long-term solutions to stormwater pollution by implementing an area wide education program as a key 'source control' tool. This program will be complemented and reinforced by structural measures, improved stormwater system maintenance and enhanced Council activities.

www.buttlitteringtrust.org

Research has found that cigarette butt littering is a complex behaviour compounded by a lack of infrastructure (bins, portable ashtrays), consistent enforcement of the law and a general lack of community knowledge about the environmental impact of butt littering. Cigarette butts are carried to our waterways through the stormwater system and pose an environmental threat.

The Butt Littering Trust is being developed to address cigarette butt littering in Australia.

The Trust's development has been facilitated to date by Nolan-ITU, an independent sustainability consultancy, in consultation with key environmental stakeholders. Funding support has been provided by British American Tobacco Australia Limited (BATA): \$1 million maximum will be committed by BATA to the Independent Trust for an initial trial period of two years. It is proposed that the Trust will distribute grants to the general categories of: Education, Research, Innovation, Benchmarking and measurement, Infrastructure provision and Infrastructure servicing.

Example poster signs and brochures



Figure 4. Poster
Don't let your river go down the drain – protect it (Swan River Trust and Water and Rivers Commission).



Figure 5. Poster
H₂Only (Swan River Trust and Water and Rivers Commission).



Figure 6. Poster
Make the connection – emergency (Swan River Trust).



Figure 7. Poster
Make the connection – pollution (Swan River Trust).



Figure 8. Poster
Make the connection – are you doing the right thing? (Swan River Trust).



Figure 9. Sign for drain
Do not wash anything down this drain (Swan River Trust and Water and Rivers Commission).



Figure 10. Sign for workshop
No Washing down in this area (Swan River Trust and Water and Rivers Commission).

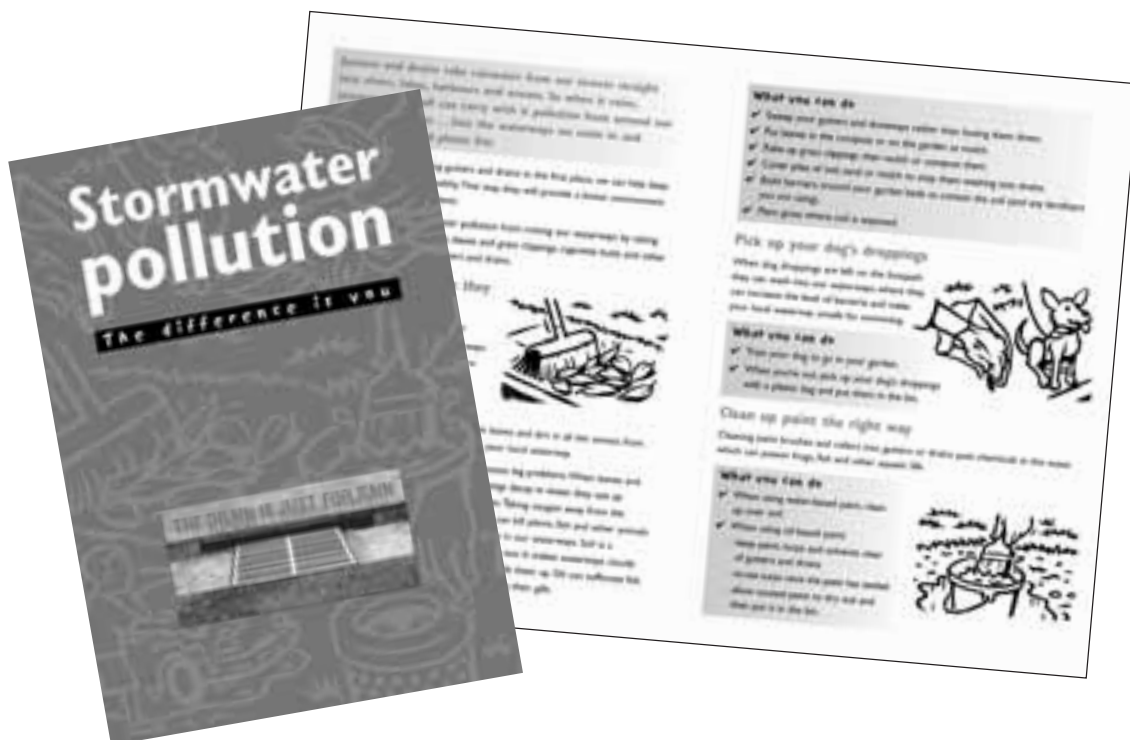


Figure 11. Brochure
Stormwater Pollution (NSW Environmental Protection Authority).

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The Water and Rivers Commission welcomes feedback to help us to improve the quality and effectiveness of our publications. Your assistance in completing this form would be greatly appreciated.

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1 2 3 4 5

How did you rate the design and presentation of this publication?

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How can it be improved?

How effective did you find the tables and figures in communicating the data?

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