



Mount Lofty Ranges Watershed Protection Office

Status Report June 2003



Government
of South Australia



South Australia

WaterCare
It's in your hands



About the watershed

- provides 60% (on average) of Adelaide's water supply
- 90% of the land is privately owned
- 50,000 residents
- 1640 km² in area
- 90% of runoff occurs in July–September
- low water yield to catchment area ratio
- contains 9100 farm dams (with 31 GL storage capacity)
- covers parts of nine council areas

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The Environment Protection Authority's Watershed Protection Office exists to protect and improve the water resources in the Mount Lofty Ranges Watershed.

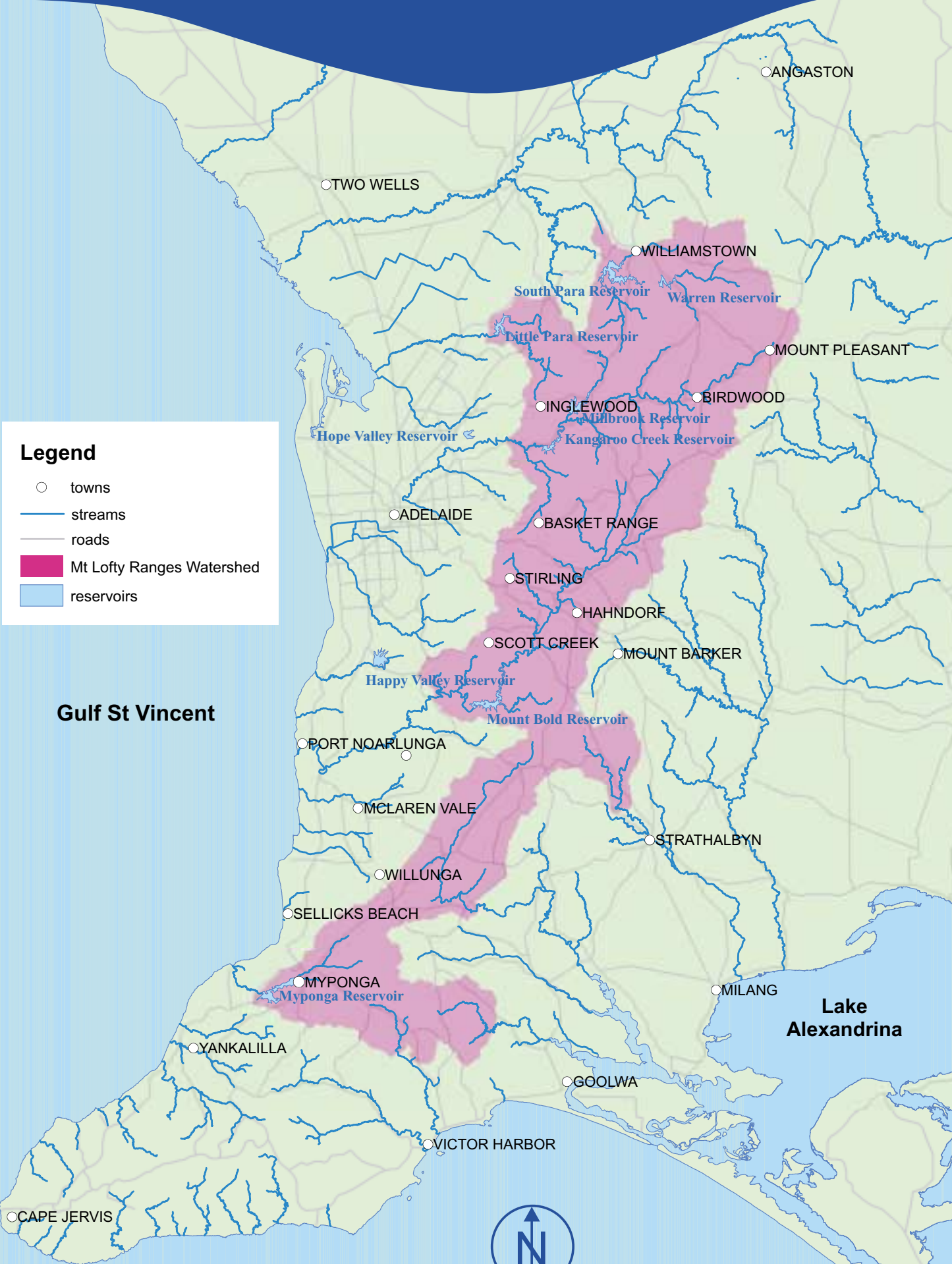
This task is fundamental to the welfare of most South Australians and the South Australian environment.

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Mount Lofty Ranges Watershed & Reservoirs



Glossary

BMP	Best Management Practice	MLRCP	Mount Lofty Ranges Catchment Program
CUP	Chemical Users Project	MLRW	Mount Lofty Ranges Watershed
COPP	Code of Practice for Pesticides	oocyst	The encysted form of the fertilised macrogamete, or zygote, in coccidian Sporozoa. Sporogonic multiplication in the oocyst results in the formation of sporozoites, which are infectious agents for the next stage of the sporozoan life cycle.
CRC	Cooperative Research Centre	PAR	Plan Amendment Report
CWMB	Catchment Water Management Board	PIRSA	Primary Industry and Resources South Australia
DAC	Development Assessment Commission	raw water	Source water, discharging into drinking water reservoirs; the largest contribution of raw water in the MLRW is surface water.
DHS	Department of Human Services	STEDS	Septic Tank Effluent Disposal System
DWLBC	Department of Water, Land and Biodiversity Conservation	WPO	Watershed Protection Office
EMS	Environmental Management System (according to ISO 14001)		
EPA	Environment Protection Authority		
EPO	Environment Protection Order		
EPP	Environment Protection Policy		
INRM	Integrated Natural Resource Management		
LMP	Land Management Practice		
MLR	Mount Lofty Ranges		



Dr Paul Vogel

“The Watershed Protection Office is a unit dedicated to the protection and improvement of the water resources in the Mount Lofty Ranges Watershed through its own endeavours and through working with and enhancing the work of its key strategic partners.”

The Environment Protection Authority’s Watershed Protection Office was created following a series of water quality incidents in South Australia in 1998.

Pesticides, and pathogens capable of causing disease, were discovered in some of the reservoirs supplying the bulk of the South Australian population with drinking water.

While the water quality scare prompted immediate action, the EPA and other water industry and public health experts knew that a long-term solution was needed for the Mount Lofty Ranges Watershed.

In response to the concern, the EPA prepared a report *The State of Health of the Mount Lofty Ranges Catchments from a water quality perspective* (2000), which showed that there was no single source of contamination that could be tackled and resolved in the short term.

An integrated and comprehensive approach over a longer period of time was required to undertake planning, development management, monitoring, targeted compliance management, remedial on-ground works, improved land management practices, wastewater management, and a communication strategy which would reach all stakeholders including the broader community.

Many government agencies and other groups had responsibility for various aspects of management of the watershed, but no single agency had prime responsibility and accountability for water quality and watercourse management.

The South Australian Government responded to this challenge by establishing the EPA Watershed Protection Office at Stirling and endorsing a comprehensive works program to reduce the risks to the water supply.

The Watershed Protection Office is a unit dedicated to the protection and improvement of the water resources in the Mount Lofty Ranges Watershed through its own endeavours and through working with and enhancing the work of its key strategic partners.

Dr Paul Vogel
Chief Executive
Environment Protection Authority

The Watershed Protection Office— an ongoing mission

When the Watershed Protection Office (WPO) was established in September 2000, it was recognised that providing solutions to the water quality issues of the Mount Lofty Ranges Watershed was a complex task.

More than 160 years of European domestic and agricultural occupation and settlement has resulted in degradation of our water resources—contamination and pollution through the very process of changing a pristine natural habitat into towns, farms, roads, houses, factories and shops.

Many attempts have been made by different organisations to tackle various pieces of the pollution jigsaw, but these attempts have often been independent of and occasionally at cross-purposes with each other—sometimes the jigsaw pieces simply did not fit.

The WPO was established for an initial five-year period to resolve these issues and lead an integrated approach to management of the diffuse pollution sources that exist in the watershed. These pollutants include:

- faecal contamination
- parasites (*Cryptosporidium* and *Giardia*)
- nutrient contamination
- sediment
- pesticide contamination.

In this status report the many achievements of the WPO are detailed, the ongoing programs and projects are described, and future directions needed to meet the original brief are outlined.

The report also discusses areas where changes can be made in the scope, responsibilities and activity of the office that will lead to greater benefits for the watershed.

The most important finding of the report is that determining, implementing and managing solutions to water quality is not a task that can be achieved in five years.

The WPO was created to fill the critical gap of managing water quality. The office has become the driver of the whole-of-government response that was needed to protect the community and the environment, and has worked with the support of its key stakeholders and partners towards that objective since its establishment.

The work of the WPO is divided into five program areas, each dealing with a specific area of responsibility while being integrated with each other in a way that provides a seamless response to the tasks. The program areas are policy, planning and compliance; monitoring and assessment; industry systems; wastewater and stormwater; and extension and communications.

The significant achievements and future objectives within each program are detailed in this document. The location of the office at Stirling has shown that protection and management of the watershed is best undertaken from a base within the watershed area. Staff have been able to establish greater credibility with local landowners, industries and councils; they are seen to be more 'in touch' with the region because their 'home' is in the watershed.

Due to increasing demands for water resources and a decline in the quality of Murray River water, the importance of the quality and security of the water in the Mount Lofty Ranges Watershed is now being realised. The WPO has become even more important today than when originally established.



Peter Newland
Manager,
Watershed Protection Office

y, planning and compliance



Many of the water quality problems now being experienced in South Australia's water resources result from increased use in agricultural, industrial and residential developments in the Mount Lofty Ranges Watershed.

As these developments expanded, their impacts on the environment and the watercourses increased. Few policies existed to control the uses the area was put to, and the planning regulations in place at the time now seem to have been often ill-informed or inappropriate.

The cumulative effects of unregulated development over many years and the introduction of different land uses have contributed to the diffuse pollution sources now contaminating the watershed.

The original objectives

The principal task of the policy, planning and compliance program is to ensure that water quality management principles and criteria are taken into consideration both when formulating planning policy and when local councils and state agencies conduct development assessments in the watershed.

WPO staff work to strengthen water quality provisions contained in the State's Planning Strategy and all plan amendment reports (PARs) that affect the watershed.

Advice and direction are provided on many forms of proposed development within the watershed by influencing the decisions of planning authorities on whether developments are appropriately sited and designed to protect the environment.

The policy, planning and compliance program includes developing and implementing compliance operations under the *Environment Protection Act 1993* (the Act), and enforcing powers to investigate and mitigate pollution incidents in the watershed.

The objectives of the program are central to the future wellbeing of the Mount Lofty Ranges Watershed and the supply and quality of water supplied to metropolitan Adelaide and south coast water consumers.

Significant achievements

Planning policy

Watershed Plan Amendment Report

One of the critical tasks and major early achievements was the input provided, from an environmental and water quality aspect, to the preparation of the Mount Lofty Ranges Watershed Plan Amendment Report (PAR).

The WPO was closely involved with Planning SA in preparing this PAR during 2001. The PAR was designed to provide for small-scale developments, and to add value to primary production in the watershed while still remaining subject to stringent location and environmental management performance standards.

Among other things, this PAR provided for limited expansion of the existing 10 approved wineries and associated developments such as cellar door sales and restaurants, but excluded approval of any further wineries.

Winery developments risk assessment study

Following approval of the Mount Lofty Ranges Watershed PAR in June 2001, the WPO began a study of the water quality risks associated with possible future winery and ancillary developments in the watershed within an economic development and planning context.

An inter-agency steering committee, including wine industry representation, was established to oversee the study, which is due for completion by June 2004.

Findings of the study are expected to provide the foundation for any future ministerial PAR dealing with these types of developments in the watershed.



Housing developments risk assessment mapping

Housing developments in environmentally sensitive parts of the watershed have been the source of many complaints.

In December 2002 the WPO began a major program to assess the environmental risks of housing development on the 4700 vacant allotments that existed in the watershed at that time. Each allotment was assessed against a set of environmental criteria that include:

- whether native vegetation would need to be cleared to allow for construction
- whether domestic wastewater could be adequately disposed of without polluting water resources
- slope
- proximity to watercourses
- risks of flooding.

Construction and continuing occupation in sensitive locations could result in soil erosion and sediments entering watercourses, inadequate disposal of on-site wastewater, and stormwater runoff affecting water quality. If allowed to continue, inappropriate housing developments will lead to increasing impacts on the environment and water resources.

The results of the study will provide a basis for any state government review of the options for avoiding further housing development in highly environmentally sensitive areas of the watershed.

The information will also provide the opportunity for local councils and relevant state agencies to nominate certain vacant allotments as inappropriate for housing development, and provide advice to prospective buyers on that basis.

Development assessment

Development application responses

Establishment of the WPO has increased the speed, strength and rigour of EPA 'advice' and 'direction' to local councils and the Development Assessment Commission (DAC) about a wide range of development applications in the watershed.

Most forms of development, apart from grazing, horticulture, forestry and construction of farm buildings, are designated as 'non-complying' outside the defined towns. All

development applications for 'non-complying' activities and those designated as 'environmentally significant' must be referred to the EPA under the *Development Act 1993*.

The most common types of development applications that have been referred to the WPO since its inception in 2000 are:

- land divisions involving boundary rearrangements or creation of additional allotments surrounding second dwellings on single allotments
- the construction of second dwellings on single allotments
- cellar door sales
- restaurants
- wineries
- tourist facilities
- aquaculture
- dairies
- a range of special uses such as nursing homes, sporting facilities, bakeries and shops, often just outside existing township boundaries.

Inappropriate development in sensitive areas of the watershed – for example, close to rivers and streams – can cause significant problems.

In the September 2000 to December 2002 period, in relation to building applications, the WPO recommended refusal of 27 applications out of 77 received. Of these 27, councils approved only 8, in concurrence with the DAC.

In relation to land divisions in the same period, refusal of 26 applications out of 40 received was recommended. Of these 26, the planning authorities ultimately made only 3 alternative decisions.

Development approval compliance audit

During 2001 a Planning SA officer placed at the WPO in Stirling reviewed compliance with development approval conditions for a wide range of 'non-complying' developments in the watershed that had been referred to the EPA during 1994–2000.

This indicates that the vast majority of advice provided by the WPO has either been adopted directly by local councils or picked up and accepted by the DAC when it considers a council's proposed approval, thus validating the recommendations.

This review revealed that more than 25% of approval conditions relating to water quality were not being complied with and more than one-third of these non-compliant activities had a high pollution potential.

A comprehensive report was prepared that included a series of recommendations about improvements to how development approval conditions are written, an education program for staff involved in assessing development applications, procedural adjustments, and the need for local councils to employ development compliance officers.

Compliance

Dairy effluent management audits

A comprehensive environmental audit over two years of 105 dairies operating in the watershed commenced in October 2000. This involved a review of compliance with the *Environment Protection (Milking Shed Effluent Management) Policy 1997*.

The audit was undertaken with the full support and cooperation of the South Australian Dairy Farmers Association and involved a mix of 'cold' and prearranged visits to farms.

The dairy effluent management audit proved to be very successful in moving dairy farmers towards compliance with the industry-agreed environmental standard. WPO staff undertook 274 site visits, issued 29 Environment Protection Orders (EPOs) and 10 expiation notices, and initiated 3 prosecution investigations. By December 2002, 85% of dairies were operating in accordance with the policy.

Licensing activities under the Act

The WPO is responsible for protecting water quality in the watershed by issuing licences for activities such as waste depots, large quarries, abattoirs, wineries, sewage treatment works and septic tank effluent disposal systems (STEDS) – activities which are listed in Schedule 1 of the Act.

Up to the end of June 2003, 26 licences had been issued. Regular site visits and active pursuit of compliance has been undertaken and has proved to be essential.

Although the scale of most of these activities is relatively small compared to others in the state, the higher water quality risks that exist in a capital city water supply catchment require very high standards of licensing and enforcement, and this has been a hallmark of the WPO's activities.

Pollution incidents and complaints

The WPO has been active and effective in dealing with pollution incidents and complaints. Between September 2000 and 30 June 2003, 59 complaints or incidents (excluding minor or trivial matters) were received, and all except 7 cases were resolved.

EPOs were issued in many instances to require compliance with the general environmental duty or a specific Environment Protection Policy. In every case compliance was achieved and no further action was required. Unresolved complaints generally required the involvement of local councils and/or industry bodies.

Complaints or incidents mainly concerned wastewater discharges, stormwater pollution, air pollution and solid waste dumping. Several complaints related to foul odours from an abattoir and burning of rubbish, and three to environmental impacts of housing development on unsuitable sites.

Case Study: CLEANING UP A DAIRY

A visit to a dairy at Mt Jagged in August 2002 as part of the WPO's milking shed compliance audit found that effluent was escaping into a nearby watercourse, in breach of the *Environment Protection (Milking Shed Effluent Management) Policy 1997*.

In addition, washdown waters from the milk vat room and part of the milking pit and milking plant were being discharged into another watercourse.

Within a few days of the problems being pointed out, the dairy farmer had prevented any further effluent escaping. Then, using his own initiative and following discussions with our staff, he constructed a new milking shed effluent system in the form of a solids separation pit with a pump and sprinkler.

Washdown waters from all parts of the dairy are now being properly managed to prevent them entering any watercourse.

Monitoring and assessment



Monitoring and assessment of water quality within the Mount Lofty Ranges (MLR) was poorly integrated and coordinated in the past, with inadequate on-ground monitoring programs.

Historic agricultural and domestic occupation of the Mount Lofty Ranges Watershed had led to inappropriate developments and the discharge of a range of pollutants into streams. As a result, the quality of raw water in the MLR is highly variable, both across the watershed and within particular runoff events, and a wide variety of pollutants find their way into the raw water supply system.

Good catchment monitoring and assessment is critical in identifying high-risk areas in the watershed as well as in measuring the effectiveness of any remedial action. It also improves knowledge of water quality and the ability to address the issues.

The original objectives

One of the principal tasks was to be able to trace and identify sources of pollution.

To achieve this, the objectives of the monitoring and assessment program cover:

- enhancing existing monitoring programs and providing better coordination and data sharing across key partner agencies
- identifying areas of high risk to water quality
- implementing targeted monitoring programs in high-risk areas
- providing monitoring data to the community.

These objectives were expanded to include providing information on the effectiveness of improvement programs and the condition of, and risks to, raw water quality. This was required to support other investigation and mitigation initiatives within the WPO.

Significant achievements

Land status dataset

In an historic first, a method and classification system was developed for mapping land cover and land use (land status data). This completed the first land status dataset for the watershed in 2001.

The project provided high-resolution, accurate and detailed maps showing what is on the land and what the land is used for, e.g. crops, grazing, native vegetation, farm dams.

Accurate and reliable land status data is essential when undertaking natural resource assessments—the validity and success of such assessments had been compromised in the past by lack of adequate data.

The project created a validated method that is applicable for the whole of South Australia. It is suitable for both local level assessments and regional planning, and meets national and state standards, allowing its use with regional datasets.

Industry was consulted to ensure validation of the data and confidence in the accuracy of the final datasets, which were finished in early February 2002.

Spatial information collected from the project will be used with water quality and catchment data to determine significant risks to Adelaide’s water supply. The team, in consultation with industry groups, will develop management options to reduce these risks.

More than 50 CDs of the data have been issued, and the dataset has been used on a range of WPO and other projects, including:

- trace sampling
- viticulture risk assessment
- dairy risk assessment
- other water quality risk assessments

Other organisations that have used the dataset include:

- Catchment Water Management Boards (CWMBs)



- Flinders University
- Department of Epidemiology & Preventative Medicine, Monash Medical School
- Landholders
- Mount Lofty Ranges Catchment Program
- Local Government
- Phylloxera and Grape Industry Board of SA
- DWLBC
- PIRSA

Water quality snapshot program

The water quality snapshot program, which collected water samples during significant runoff after heavy rain, has enabled analysis for more than 64 water pollutants (including *Cryptosporidium* and pesticides).

Developed for 34 subcatchments throughout the watershed, the project collected two water samples at the bottom of each subcatchment in 2001 and one sample during 2002. The snapshots provide an indication of which particular pollutants were high in subcatchments at the time of sampling, as well as enabling target trace sampling to occur.

Trace sampling program

This program enabled the WPO to conduct trace sampling for pollutants in high-risk subcatchments. In this way sources of pollutants can be located and remedial actions instigated to reduce the risk and impact on water quality.

Previous water quality monitoring had not incorporated trace sampling, so could not easily assist in identifying the source of a problem and addressing it.

Pathogen project

The WPO has been a significant partner in the CRC for Water Quality and Treatment's project, *Management of Pathogens in Source Waters*.

The aim of the project is to characterise the behaviour of *Cryptosporidium* during storm events, and attempt to identify possible indicators of its presence that will reduce the need for expensive testing.

The office was instrumental in the coordination of on-ground logistics within South Australia and in defining sampling strategies for the national project.

Pesticide sampling

The water quality snapshot program met significant difficulties in capturing a representative sample of pesticides within a subcatchment.

To address this issue, an innovative monitoring device called a 'semi-permeable membrane device' (SPMD) has been trialled. The SPMD is immersed in a stream and can be left in place for up to a month. During this time, the lipid-filled membranes in the SPMD passively accumulate pesticide residues present in the water.

Other achievements

To date, other achievements include:

- developing a project to look at the effectiveness of buffer zones in reducing the number of viable *Cryptosporidium* oocysts¹ reaching watercourses
- developing the regional integrated water resources monitoring and assessment strategies for the MLR region.

¹ See definition in glossary

Case Study: PUBLIC HEALTH DANGER

Cryptosporidium is a water-borne parasite that can cause gastro-enteritis. Its presence in drinking water supplies is a well-known public health concern around the world and has led to major contamination outbreaks. One such scare in New South Wales in 1998 led to notices being issued to boil water in the whole of metropolitan Sydney.

Routine sampling in 2001 by the WPO's monitoring and assessment team in the Kenton Valley at Gumeracha revealed high pathogen levels, particularly *Cryptosporidium*, in the raw water supply.

The team set up a trace sampling strategy to isolate the likely source of the pathogen. Five possible sites were identified, including intensive grazing areas and areas that contained septic tanks.

Further testing identified a damaged septic tank from which raw sewage was travelling overland into a creek. The Adelaide Hills Council environmental health officer investigated the site and the landowner was instructed to repair the septic tank.



The most common rural industries in the watershed with the potential to cause diffuse pollution include horticultural industries such as fruit, grape, vegetable, flower and herb growing; forestry; and intensive and broadacre animal grazing.

Although land use and location of a rural industry may have overall effects on water quality, the actual on-farm land management practices are thought to determine whether these effects are aggravated or mitigated.

The WPO's industry systems program looks closely at key rural industries and their current management practices to evaluate high-risk activities and determine and promote best management practices.

The aims of this work are to reduce the levels of nutrients, pathogens, fertilisers, pesticides and sediments passing into streams; reduce erosion; and improve stream health.

The original objectives

The primary objective of the industry systems program is to improve water quality by encouraging the commitment of key rural industries to business approaches that are environmentally sustainable.

More specifically, the program aims to develop and apply strategies that address sustainability in two primary factors that affect water quality – chemical use and land management practices in agriculture.

To make a difference on the ground, WPO staff work closely with environmental pioneers in horticulture and animal husbandry.

Significant achievements

Chemical use in the watershed

The Mount Lofty Ranges Watershed is renowned for the quality of its apples, pears, cherries, vegetables and many other crops. Extensive forests and vineyards are also present, with the number of vineyards expanding as the popularity of wines produced in the Adelaide Hills region increases.

Pesticides and synthetic fertilisers are used to control pests and/or enhance plant growth, but the chemicals these products contain can contaminate rivers and streams, and reach the drinking water supplies, if not used and managed with care.

Based on historic and recently-collected water quality information which indicated elevated pesticide levels in the watershed, the WPO's industry systems team approached the issue from two different angles.

Development of pesticide user profiles

Analysing samples from reservoirs for pesticides to detect risks to drinking water is an expensive process. One way to reduce that expense, and achieve a more informed result, is to identify specific pesticides and establish where and when they are being used.

To achieve this, the team initiated a program to develop profiles of pesticide users and use to ensure that water sampling and analysis in reservoirs could be targeted more specifically.

These profiles greatly assist in establishing links between the types of activity, such as apple or grape growing, the types of pesticides used and the patterns of use.

Case Study: HERBICIDE CONTAMINATION THREAT

Simazine is a herbicide commonly used to control weeds and grasses in orchards and vineyards, and in berry, nut and ornamental crops.

It works best if flushed into the soil, so growers like to apply it just before rain. As a result water run-off, soil erosion and sediment deposition can carry the herbicide into creeks and downstream reservoirs. It is therefore critical that good management practice is followed when applying Simazine. How much is applied—and when—determine whether it enters a watercourse.

In 2002, water samples collected in Balhannah Creek and Victoria Creek showed levels of Simazine above Australian Drinking Water Guidelines.

The trace sampling protocol used to track these samples back to their potential sources included collecting surface water and soil samples from properties with potential high-risk land uses. The WPO's industry systems team then interviewed landholders, council spray contractors and wine industry peak body members to obtain information about handling, storage and application procedures for Simazine.

Risky herbicide application practices—particularly using Simazine just before rain and near storm drains—were believed to be the most likely reasons for the two elevated samples.

As a consequence of this and other similar incidents, WPO staff are collaborating with industry groups and spray contractors to develop strategies to improve herbicide application practices, including the development of a legally binding code of practice for environmentally responsible pesticide use.

The team works with the PIRSA Farm Chemicals Branch and other agencies, and is establishing specific profiles for different areas and land uses.

Code of Practice for Pesticides in South Australia

A code of practice was clearly needed to control the negative impacts of pesticide use across South Australia.

In November 2002 the EPA established a subcommittee to develop an environmental Code of Practice for Pesticides (COPP) in South Australia. This code will have substantial benefits for the watershed.

The committee is driven by the EPA and includes representatives from industry associations, CWMBs, local government, the Animal and Plant Control Commission, PIRSA, the Department of Human Services (DHS), Workplace Services (DAIS) and contract sprayers.

When finalised, the COPP will make it easier for pesticide users to meet their environmental obligations and minimise the risk of environmental harm arising from misuse.

The code will refer to, and be accompanied by, a series of environmental guidelines for different pesticide uses and users. Guidelines for use by lifestyle landholders and for the control of weeds around waterbodies are currently being developed.

Land management practices

Factual information will enable the WPO to determine the location of high-risk areas in the watershed and to develop measures to reduce impacts on water quality.

One of the essential needs is an understanding of the different land management practices used in the principal rural industries. Land use, the characteristics of different pollutants, and an understanding of how water quality changes during significant rainfall events are also critical to this knowledge base.

Although land use categories have been mapped in the watershed, information about land management practices (LMPs) within each of the land use types has generally not been well understood or documented.

The office is using several initiatives to understand the complexity of commonly used LMPs and derive best management practices (BMPs) to improve water quality.

Land management practices survey

Certain types of LMPs pose a higher risk to water quality through chemical use, fertiliser use, irrigation practices, water use and proximity to watercourses.

The WPO developed and managed a survey of selected rural industries to fill the information gap, targeting eight of these industries – tree crops, vines, livestock, horses, vegetables, row berries (e.g. strawberries), flowers/herbs and forestry.

The survey illustrated the different types of land management practices in use. The results are now included in the decision-making process for developing improvements in current practices and BMP guidelines among the target rural industry sectors.

Viticulture project

The viticulture industry is collaborating with the WPO in an ongoing project to assess its current land management practices.

In the first phase, current practices by vignerons and the risks their industry poses to water quality are being evaluated through consultation with the industry and via a literature review conducted by a Flinders University honours student sponsored by the WPO.

The second phase will test how changed land management practices and application of best practice could have a positive impact on water quality.

Promotion of best management practices

One of the WPO's principal tasks is to promote best land management practices and innovative environmental stewardship.

The approach has been to develop a strategy that shows how best practice can deliver improved and tangible environmental outcomes for the watershed.

The strategy seeks to use the momentum provided by the primary drivers for change in land management practice in the MLR, i.e.:

- regulatory and policy requirements
- market pressures for 'green' produce
- community relations and issues of friction created by agricultural activity close to the urban fringe.

One concept the office is encouraging is the use of voluntary environmental management arrangements (VEMAs), under which industries and firms voluntarily agree to improve their environmental management, using a range of different processes.

Although formally structured environmental management has not been popular in the MLR farming community, in recent years the market pressures, urban fringe issues and expectations of increased regulation in a sensitive watershed have led the industries concerned to look for a holistic business management system.

The WPO has met this need by promoting the implementation of environmental management systems (EMS) to ISO 14001 standards for selected agricultural sectors.

Wastewater and stormwater



One of the most potent risks to water quality in the Mount Lofty Ranges Watershed is effluent from human sources. It can contaminate drinking water with pathogens such as Cryptosporidium and Giardia, which can cause sickness and disease.

While most properties in the major towns are connected to mains sewerage systems, about 75% of all residents in the catchment rely on septic wastewater treatment systems such as on-site septic tanks or a septic tank effluent disposal system (STEDS) operated by the local council.

In addition, stormwater runoff from roads and general urban living can contribute heavy metals, oil and grease, nutrients and faecal material to rivers and streams.

The original objective

The main focus of the wastewater/stormwater program is to protect the water resources in the catchment by reducing the impact of wastewater and urban stormwater on water quality.

Significant achievements

Waste Control Systems Audit Project

Traditional septic tanks, with their associated soakage systems, rank as one of the greatest pathological and nutrient risks to local creeks and Adelaide's water supply.

The WPO played a significant role in the delivery of the Domestic Waste Control Systems (WCS) Audit Project, which was one of the biggest surveys of its type in Australia.

The audit was a joint venture funded and directed by the WPO, Onkaparinga and Torrens CWMBs, SA Water, DHS and Adelaide Hills Council (acting as project manager for the task). It has been an excellent example of how working with key partners and stakeholders can achieve positive results.

More than 1449 homes with on-site wastewater disposal systems, mainly within townships in the watershed, were audited over one year. The survey revealed the true extent of the risk septic tanks and aerobic systems pose to water quality. It showed that 44% (644) of septic tanks were failing in urban areas where there was neither mains sewer nor STEDS—and only 16% of owners knew their systems were failing.

As a result of the problems uncovered in the audit, a waste control systems management strategy project was initiated, which focused on upgrading the major failing domestic systems. In the 12 months following the audit, Adelaide Hills Council followed up the major failing systems, with more than 48% (178) already upgraded or awaiting upgrading.

Managing licences

One of the WPO's major roles has been to manage the licences for wastewater treatment facilities, which constitute some of the largest individual point sources of pollution.

Licences have been issued for five STEDS, three sewage treatment plants and one winery; they include enforced standards to meet the overall objective of protecting water quality.

The licences are reviewed each year, and are renewed only after assessment of results from the monitoring program and the irrigation management plan; this ensures that wastewater treatment and disposal/reuse are operating at optimum levels.

In several cases, grossly inadequate reports by operators failed to identify major problems such as leaking lagoons and overloaded treatment systems, and follow-up action was required.



Monitoring and evaluation tracking

In response to the need to track the monitoring, reporting and evaluation issues associated with licences, a toolkit of worksheets was developed to assist operators and WPO staff to understand the status of each wastewater system.

The toolkit, which is an electronic reporting form, automatically determines how a system is performing against its design criteria. It uses easily obtainable information, such as the area of lagoons, number of house connections and rainfall/evaporation data, and enables the office staff and the operator to track the performance of each STEDS.

Two councils have trialled the toolkit with encouraging results, and its possibilities for use with other STEDS and with winery and abattoir wastewater systems around the state have earned it wider recognition. Selected councils are currently evaluating the toolkit and will provide feedback.

Monitoring wastewater overflow

Potential pollution from overflow of wastewater collection networks, particularly wastewater pump stations, is not covered by EPA licences.

Overflow guidelines were researched and an appropriate risk assessment system developed after investigations revealed poor overflow records. The assessment program is based on the likelihood and the potential size of a spill, the capability to handle abnormal events and the consequences of a spill.

This will enable the WPO to determine the pump stations at highest risk and create action plans to mitigate the risk. The system is designed so that it can be integrated with the Code of Practice for Sewer Overflows, which is being developed based on the draft national guidelines for sewer overflows and the Water Quality EPP.

Managing septic tank pump-outs

Concerns over poor management of wastewater from septic tank pump-outs (septage), and the proposed increase for disposal charges by SA Water from \$1.50 to \$92.00 per kilolitre, created the need to establish a Mount Lofty Ranges biosolids and green waste reuse working party.

The price increase for disposal will force the total cost of a septic tank pump-out, including the contractor's charges, to rise from about \$175 to about \$450 for a 3000 L tank. This may cause septic tank owners to delay or avoid pump-outs, thereby creating a much higher pollution risk in the watershed.

The working party, involving SA Water, Adelaide Hills Council, Mount Barker Council and the WPO, is examining options for sustainable reuse of septage, including the possibility of composting biosolids with green wastes.

Other achievements

Other achievements include:

- encouraging SA Water to increase expenditure on mains sewerage extensions in the watershed
- funding concept/feasibility plans for the development of key STEDS schemes where there is a high failure rate of septic tanks – Inglewood/Houghton, Mylor and Summertown/Uraidla
- overseeing a Flinders University student project to monitor and assess various stormwater treatment infrastructures in Woodside. High levels of heavy metals, such as lead, copper and zinc, were found in overflows entering the Onkaparinga River.



The extension program provides information services and technical advice on water quality related issues through education programs and products, local publicity and media campaigns, and on-ground direct community support.

Before the WPO was established, it was recognised that the importance of protecting the watershed needed to be communicated to every member of government, industry and the community.

While existing agencies already had various programs in place, there was a need to ensure delivery of consistent and integrated communications and to bring the partner agencies together to better coordinate delivery of their education products and programs.

While integration with partner agencies has been vital, the WPO has also led the delivery of new high-priority education and extension initiatives. Initial results indicate that this work has led to attitude and behavioural change among people in the watershed.

The original objectives

The extension program was given both on-ground and communications objectives, which included to:

- manage and provide technical and financial support for the Myponga Watercourse Restoration Project to protect and enhance water quality and catchment health
- manage the Chemical Users Project in the watershed, ensuring water quality protection and enhancement through the responsible use of chemicals
- lead and support literature research and development of products and publications associated with water quality management as a resource for natural resource management workers and the community in the watershed
- develop and implement a communications strategy, including management of public relations, media and brand campaigns, project launch events, display and presentation materials and web-based information services, in partnership with collaborating agencies
- work with the community to provide scientific and technical advice on water quality management within the watershed
- develop partnerships with, and support education and awareness-raising programs run by, collaborating partner agencies, local government, industry sectors and the EPA.

Significant achievements

Myponga Watercourse Restoration Project

The Myponga Watercourse Restoration Project was initiated in August 2000 to work with the community in protecting and enhancing water quality through watercourse restoration works.

Removal of native vegetation had caused erosion, waterways had been choked by exotic plants such as broom and blackberry, trees and shrubs had been replaced by pastureland, and more than 100 years of grazing pressure had left watercourses severely degraded.

The result was significant impact on the health of aquatic ecosystems and the quality of water entering the Myponga Reservoir, which supplies much of southern Adelaide and the Fleurieu Peninsula.

To date, landholders from 30 properties have joined the Myponga Riparians Group, a community Landcare group organised and managed by the WPO's extension team. Together, they have completed some and are undertaking other on-ground watercourse restoration works aimed at improving catchment health and water quality.

The on-ground achievements have been considerable and have included:

- fencing 17 km of watercourse to control stock access to sensitive riparian zones
- constructing 14 stock crossings to control movement over watercourses
- installing 35 off-stream drinking water points
- controlling willow and woody weeds on all participating properties
- planting 7 ha of tube stock to stabilise riparian areas and restore wildlife habitats
- constructing an erosion control mechanism to manage significant bank erosion
- conducting soil testing and liming for pasture improvement to reduce erosion and surface water runoff
- creating awareness and discussing water quality management issues within the local communities of Myponga and Pages Flat.



The WaterCare campaign—'It's in your hands'

Originally an initiative of the catchment boards and the state government, the WaterCare campaign was established due to a need for consistency in badging and information for all water related educational materials and products. The WPO contributed a significant amount of funding and human resource time to the expansion of this campaign, which now provides coordinated and simplified messages and unity for all the different organisations that issue water education and awareness information throughout South Australia. The logo is well established and has achieved a very high recognition rate (76%) in the community.

The EPA now manages the brand in conjunction with the catchment boards, SA Water, the Department for Environment and Heritage and the Department of Water, Land and Biodiversity Conservation to ensure a whole-of-government approach to the campaign.

Chemical Users Project

Clear evidence that the general community knew little about the safe use of chemical products such as herbicides and pesticides led to the formation of the Chemical Users Project (CUP). The project was created with support from SA Water, and was initially managed by PIRSA before WPO management from September 2000.

A lack of understanding of the impacts of chemicals on human and environmental health was evident among urban and lifestyle landholders in the watershed. Although not scientifically quantified, this has subsequently been substantiated by the behavioural changes resulting from the project.

The problem was that chemical products were being applied excessively—both in concentration and quantity—posing a significant cumulative risk to water quality and aquatic ecosystems.

The WPO delivered education workshops to 1450 people between September 2000 and June 2003. More than 600 people attended the spring 2002 and autumn 2003 workshops, a result of the greater level of awareness generated by the project.

By June 2003 the CUP had provided more than 12,000 people with face-to-face information through demonstrations, presentations and workshops. Included in the project is an associated communications strategy that ensures all people living in the watershed are exposed to messages about responsible chemical use through the local print media, radio, advice sheets, leaflets and flyers, and program presentations.

The CUP also collaborates with industry sectors and agencies responsible for development of chemical use policy and legislation.

New initiatives designed to encourage responsible chemical use were introduced in spring 2001 and have proved to be highly successful and popular. They include demonstrations of correct chemical use at hardware stores, garden centres and nurseries, and through gardens participating in South Australia's Open Garden Scheme; and training for staff selling chemical products at stores, centres and nurseries.

Literature and publications

Before the creation of the WPO, various bodies – now key partners – produced and distributed a range of information materials concerning water quality issues and the watershed.

While this played a valuable role in helping to spread the word about water quality, it came from diverse sources with diverse messages, and the need for material delivering consistent information from government and non-government bodies was evident.

The WPO has managed and coordinated the task of producing and supporting a wide range of products and literature associated with water quality. These include:

- displays and fact sheets supporting the *State of the Health of the Catchments in the Mount Lofty Ranges* report. When the report was released, the displays were rotated across local government offices, CWMBs, the MLR Catchment Centre, PIRSA offices, Natural Resource Centres, Animal and Plant Control Boards and libraries
- stakeholder and public information material for projects including the land status dataset and Myponga Watercourse Restoration Project
- technical input and financial support for publications on watercourse erosion processes and low cost solutions, and the *Third Edition Watercourse Management Manual*
- three literature reviews on *Cryptosporidium* and *Giardia*, weed control in riparian zones, and buffer zones.

Communications and public information

Establishment of the WPO as a new water quality partner within the Mount Lofty Ranges Watershed called for the development of an effective and comprehensive communications and public relations strategy.

As part of developing a communications strategy, a watershed community study was undertaken, as well as internal and stakeholder research. The study, which

involved a survey of 504 households within the watershed region, assisted with the development and implementation of the communications strategy. In the process, working relationships have been built with numerous partners including industry sectors, CWMBs, SA Water, MLRCP, local councils and, importantly, the watershed community.

Communications and public relations achievements include:

- launching the WPO through coordination of an official launch event and development of numerous 'roadshow' presentations for key stakeholders
- launching projects and reports at strategic times, including the Chemical Users Project, Land Status Dataset Report and Waste Control Audit Project. Project launches were supported with presentations, displays and literature
- delivering communications and public relations information through media and promotional events
- establishing a commitment to working with regional and partner agency print media, ensuring the delivery of water quality messages at strategic times and locations across the watershed community
- contributing to and influencing the development of the WaterCare brand
- organising field days to raise awareness of WPO initiatives and projects among industry stakeholders and the wider community
- providing project support and water quality advice to numerous partner agencies through representation on working groups and steering committees
- providing a water quality information and resource service to secondary and tertiary students and the general community.

Case Study: POLLUTANT SAFEGUARDS AT INDUSTRIAL CENTRE

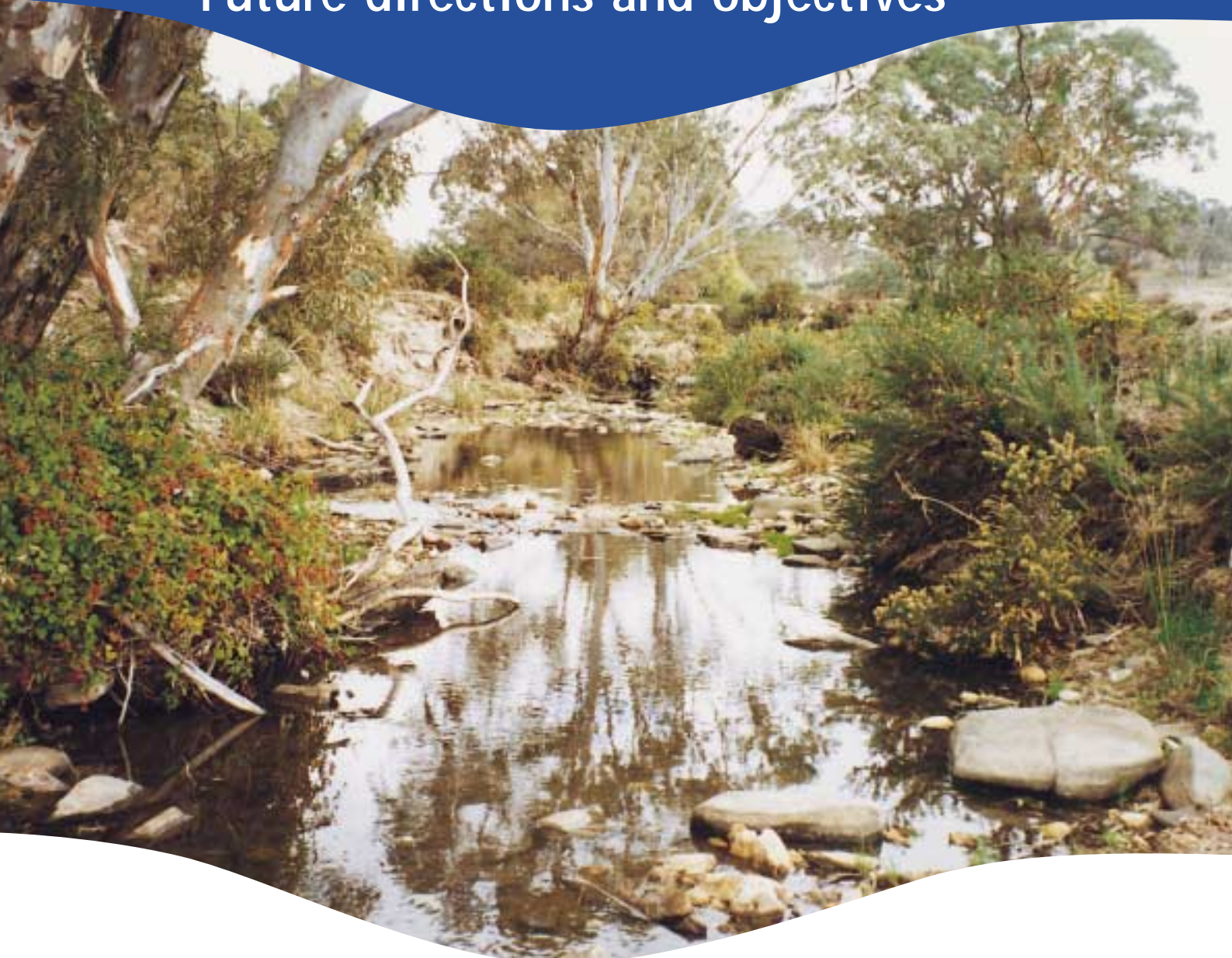
Following the closure of Lobethal Woollen Mills in 1992, the Adelaide Hills Council developed the property as an 'incubator centre' for small business.

About 24 small businesses, including cabinet making, food production, wine making, vehicle restoration, waste recycling, sheet metal fabrication and crafts, are located there, but the building is located over a major creek, into which wastewater from all the work areas drains.

An audit revealed the presence of small quantities of a range of chemicals, food ingredients, thinners, solvents and pesticides. Each of these substances is a potential pollutant, but collectively their release has serious implications for water quality in the Onkaparinga River.

The centre management has now installed spill response kits at strategic locations to prevent the entry of pollutants into the stormwater drains. Employers are being encouraged to train employees at the centre in their use and to develop an emergency response plan.

Looking to the future— Future directions and objectives



It is clear from the achievement reports that significant and much needed progress has been made in putting together the jigsaw that constitutes the protection of water resources in the Mount Lofty Ranges Watershed.

Projects have been started and some completed, planning and development issues have been tackled, riparian damage is being repaired, chemical and pesticide use is better understood and is being improved, land management is moving towards best practice, and compliance is being tightened.

During the course of the work, the WPO has been established as the focal point of the coordinated effort to make a difference to water quality in the watershed. This has been acknowledged by the widespread support and recognition it has received.

To cite just one example—the land status dataset has ‘tremendously impressed’ Adelaide Hills Wine Region Incorporated. The information, they say, will be invaluable in identifying who is growing what and where, evaluating the extent of the industry in the Hills, and coordinating the management of phylloxera outbreaks.

Building on this success, each of the five program areas, while maintaining individual targets, have identified courses of action that fulfil two requirements—the completion or continuation of current projects, and the identification of projects recognised as critical to protecting and improving water resources in the watershed in the future.

To meet this challenge, a ‘Blueprint for the Watershed’ will be developed to provide a vision for the watershed and a clear guide for the protection of this important water resource into the future.

The ‘blueprint’ will be designed in partnership with the other bodies currently working in the MLR, including SA Water, DWLBC, the Mount Lofty Ranges INRM Board, the CWMBs, DHS and PIRSA.

Its aims will include support of existing plans, assistance with future planning, and provision of a clearer understanding of roles and responsibilities. It will also be aimed at transcending any future structural changes to organisations involved in care of the watershed.

Policy, planning and compliance

Planning policy and development regulation

Through involvement in the development assessment process, the WPO has identified a range of other planning policy and development regulation amendments that should be introduced and applied in the watershed.

These amendments relate to:

- new dwellings proposed in environmentally sensitive areas
- replacements for existing dwellings on single allotments
- second dwelling land divisions

- allotment boundary rearrangements
- creation of flood plain zones
- wastewater lagoons
- landfilling and excavating
- flood levee banks.

The WPO will work with Planning SA to develop a Ministerial PAR that addresses these issues.

Development assessment framework

The WPO is preparing a development assessment framework, outlining the critical issues and criteria that will need to be met as a minimum before any support is offered to applications for ‘non-complying’ developments in the watershed.

The criteria will relate to issues such as:

- intensification of land use
- water quality risks
- neutral or beneficial impacts on water quality
- cumulative effects
- precedence
- land capability
- buffers
- soil protection
- retention of vegetation cover.

Once completed, the framework will be promoted to councils, other government agencies, and development proponents and their consultants as standard development application considerations.

Pollution complaints

The WPO will continue to respond vigorously to pollution complaints and incidents, and to license activities listed in the Act.

In addition, environmental audits of the following activities are planned:

- petrol stations
- mechanical repair workshops
- local council and utility depots
- vineyard and orchard chemical storage, mixing and spray equipment cleaning facilities
- intensive animal keeping activities (including horses, deer and alpaca)
- plant nurseries
- poultry sheds.

Water Quality EPP

The introduction of the *Environment Protection (Water Quality) Policy 2003* on 1 October 2003 requires extra compliance and enforcement work within the watershed, including the need to issue, where appropriate, exemptions under the Act to landowners who are unable to comply.

The WPO will exercise the compliance tools of the policy in the watershed and issue EPOs or expiation notices, or take prosecution action, where necessary.

Monitoring and assessment

Based on the original monitoring and assessment objectives, and with the benefit of feedback and input from the key partners, the critical future needs as of June 2003 in this area are to:

- further improve knowledge of the watershed and identify which areas are at high risk in relation to water quality
- provide useful water quality information to influence policy and identify priority industries and land uses.

To achieve these objectives, the monitoring and assessment program have considered five critical projects, which are described below.

Integrated monitoring program

In a partnership project with SA Water, the CWMBs and DWLBC, the WPO will install monitoring devices at strategic locations to sample water for clarity, nutrients, pathogens, heavy metals and salinity.

The program will add to and validate the water quality snapshot data already collected and could be extended to other subcatchments which returned high results during snapshot sampling. The program will:

- identify high risk areas
- contribute extensively to catchment risk assessment

- improve the value of the snapshot data
- provide benchmark data
- be integrated with stakeholders' needs.

Small scale monitoring

The WPO will implement this project and, where appropriate, may approach industries as partners. Several industries and land uses have been identified where additional information is required about their impact on water quality. They are:

- rural living
- housing developments
- viticulture
- orchards
- market gardens
- horses
- stormwater in urban townships.

Initially, a literature review will be undertaken to identify the latest research on water quality impacts from different land uses. Any knowledge gaps will then be the subject of a monitoring program focused on the relevant industries and land uses. Viticulture, orchards, housing developments and stormwater in urban townships will be targeted first.

Composite sampler review

This is a collaborative project between the EPA, DWLBC, the CWMBs and SA Water that the WPO will manage. It will review a sampling program that provides valuable water quality data.

The stakeholders consider that data from the program is critical for decision making in relation to future monitoring programs. It could also provide land use information that may direct on-ground works programs and identify high-risk areas.



When a trend analysis has been completed by DWLBC, the stakeholders will develop a project brief to:

- establish data trends in relation to land use and land use change, including pollutant loads, water quality and discharge/flow
- compare trends in relation to kinks in trend lines, climatic data and groundwater influences
- establish maximum and minimum daily loads
- identify the relative contribution of pollutants and discharge/flow between subcatchments from different land uses
- identify when pollutant concentrations exceed specified water quality guidelines.

Land status dataset update

Land status data – what is on the land, what it is used for and how it is managed – is essential for natural resource management and critical when considering the sustainability of land and water resources and the risks associated with resource use.

The land status data project was carried out in 2001 using 1999 aerial photographs. This work now needs to be brought up to date.

To create the first land status dataset, an original methodology needed to be developed, but updating the current data will require much less effort because only changes in land use will need to be identified and updated.

Trace sampling

The trace sampling program developed during 2002 in response to the results of the water quality snapshot project was performed under similar conditions to the snapshot project, which meant that pollutants could be missed in the sampling process.

A new trace sampling project is being considered using semi-permeable membrane devices (SPMD) to identify high-risk pesticide areas. The 2002 project did identify the source of pollutants, but the new approach will make the process more efficient and effective.

The project will be undertaken to:

- identify high-risk areas in relation to pesticides
- provide pesticide information relating to priority industries or land uses that will contribute to improvements
- provide other stakeholders with valuable information for use in decision making and directing works.

Industry systems

A range of requirements has been identified that needs to be addressed to maintain the improvements achieved with rural industries to date, and build on the work of protecting water quality through improving industry practices.

The WPO will promote the development and use of a risk assessment approach that links stream pollutants to land management practices. Once practices have been identified and priorities set according to their risk to water quality, the office will initiate steps to engage and support industries in mitigation actions.

The types of actions envisaged include improved pesticide use and handling, farm planning and design, on-farm environmental management systems and alternative farming techniques.

Industry collaboration will also see the development of codes of practice (regulatory and non-regulatory), guidelines, best practice recommendations, voluntary environmental management arrangements and targeted auditing.

Best practice management

To assist rural industries in complying with the Water Quality EPP, best land management practices (BMPs) will be promoted and implemented. When opportunities arise, links will be made to state and national BMP initiatives to support, promote and build on local initiatives.

The main aim is to identify and promote those BMPs that are expected to have the greatest impact on the improvement of water quality. The WPO will develop a monitoring and evaluation system to test (and which is expected will prove) the link between BMPs and improved water quality.

This work will assist with the production of meaningful codes of practice and guidelines incorporating proven BMPs.

Wastewater and stormwater

To build on existing successful projects and programs for wastewater and stormwater management, there is a series of projects that need to be continued or completed.

A major requirement is to bring about improved reporting and management of all STEDS in the watershed through use of the WPO's monitoring and evaluation toolkit.

It will also be necessary to complete the pump station risk assessment program, the first stage being to establish risk management plans for all system components. Operators will be required to undertake mitigation works at high-risk sites.

The WPO will continue to support the waste control systems management strategy project to mitigate the hazards of high-risk, on-site domestic wastewater systems and to investigate further the link between *Cryptosporidium* and failing septic tanks.

The Mount Lofty Ranges biosolids and green waste reuse project will continue to be managed, and development of a biosolids handling facility for sustainable disposal and reuse of septage in the region encouraged.

There is also a need to continue to press for the establishment of further STEDS for the Inglewood/Houghton, Mylor and Summertown/Uraidla areas.

Working with stakeholders, it is hoped to develop alternative and innovative wastewater treatment and reuse systems for individual households and communities. In conjunction with the CWMBs, SA Water and local councils, it is also hoped to improve stormwater management systems and develop a better understanding of the impact of urban runoff. This can be achieved through a coordinated approach to the development of improved catchment management plans, stormwater master plans and digitised stormwater infrastructure mapping.

The WPO will continue to research the fate of heavy metals from road runoff and their impact on the raw water supply, and relate the results to the design and application of stormwater improvement devices. This will assist in the development of a strategy for the management of road runoff in the watershed, particularly for the main arterial roads, in cooperation with Transport SA, the CWMBs and local councils.

Extension and communications

The WPO's role in developing relationships with key partners and the community of the watershed is a continuous one.

The office will work to develop and maintain effective communications to support and enhance relationships with all its stakeholders. This will assist in delivering consistent and effective information and messages, and achieving change in the knowledge, attitudes and behaviours of all stakeholders toward water quality and its importance as a water resource in the Mount Lofty Ranges Watershed.

The following broad groups are the major stakeholders:

- internal WPO project managers and staff
- natural resource management organisations
- industry organisations
- science, research and extension organisations
- government agencies
- the media
- community groups
- service and information providers
- tertiary organisations
- residents, landowners, landusers and beneficiaries of the watershed.

The Myponga Watercourse Restoration Project requires a further 12 months of WPO involvement and investment, after which a report will be written detailing achievements and providing future directions.

The Chemical Users Project has funding commitments from its partners until June 2005. Under WPO guidance, management and leadership, it will continue to educate members of the community and improve water quality by providing information about better use and handling of pesticides.

This report has shown how staff at the Watershed Protection Office have tackled the responsibility given to them to protect and improve the water resources of the Mount Lofty Ranges Watershed.

The particular strength of the WPO, which is recognised by its key partners, rural industries and the wider community, is the integrated nature of its programs and resource capabilities.

The capacity to draw upon disciplines dedicated to monitoring and assessment; policy, planning and compliance; targeted wastewater management; and community and industry inclusion has proved beneficial.

The ability to integrate these disciplines and to translate key business initiatives across program teams as they evolve is a particular feature of the WPO that has enabled it to achieve such significant momentum across the broad scope of its role in a relatively short period of operation.

Teams at the WPO will continue their work, completing existing programs and commencing new programs and projects as identified in 'Future directions and objectives'. This will ensure that the water resources of the Mount Lofty Ranges Watershed are protected and improved.

Staff will build on previous success in bringing together key stakeholders and interested parties to achieve the common goal and lead the way in meeting the challenges ahead.

The report *State of Health of the Mount Lofty Ranges Catchments from a water quality perspective (2000)* stated that '... multiple uses place pressure on the water resource and can impact on water quality' and 'the five-year program is significant and targeted at improving water quality and reducing the risks'.

It was also stated in the report that 'long-term water quality improvements' could only be achieved if everyone worked together. The protection and improvement of water quality in the Mount Lofty Ranges Watershed requires a **long-term** commitment that extends far beyond works already achieved, as the watershed will always be a multiple-use catchment imposing a high degree of risk to water quality.

The work of the EPA's Watershed Protection Office is significant and targeted at improving water quality and reducing risks. A long-term commitment to these targets is the only way of protecting the future quality and security of the water resources of the Mount Lofty Ranges Watershed.



