

Final Report

Bendigo Schools Smart Water project

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With the support of the Smart Water Fund

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Executive Summary

The Smart Water funding has provided the resources for a group of innovative schools in the Bendigo area to develop a range of effective water saving strategies that were designed to use water wisely, be a model for their community to develop water saving and efficiency programs at home and work and also to be a model for other school communities to develop their own water efficiency programs.

Kangaroo Flat, Eppalock and Strathfieldsaye Primary Schools commenced to develop their Smart Water Programs with the support of Alan Windust, a well known author and water conservationist, with the development of water wise gardens, curriculum units of study, community awareness programs and environmental projects.

Project Benefits

1. The water wise gardens focussed on several key strategies to capture and collect water, to use this efficiently with soil conditioning, mulch and a minimum volume of water to produce food in school vegetable gardens. The gardens were essential to support students to use this produce for cooking, healthy eating programs and to develop their own gardens at home. Many families developed home gardens based on the school model and supported the school gardens over weekends and holidays. Evidence of the high regard in which the gardens have been held by the community can be provided by the Strathfieldsaye garden that remained unfenced and open to the community over five years and experienced minimal disruption or vandalism, even with ripe vegetables and fruit readily accessed by any visitors to the school.
2. Curriculum units have been developed by each school and used to develop student knowledge, understanding of the issues related to water conservation and also to use this knowledge to influence the practices at home including monitoring water use. Throughout the project the effects of a prolonged drought magnified the importance of water conservation and students were key leaders in a range of programs to help raise community awareness of water conservation and the need to balance environmental concerns and community water needs.

Key Outcomes

1. The water wise gardens were highly successful in each location and have effectively altered mainstream curriculum programs at the lead schools with water wise gardening, healthy living and sustainability key curriculum themes in each school.
The impact on families has also been noted with many families developing their own gardens as a result of the skills, knowledge and interest of students.
2. The smart water garden program has been adopted by a number of local schools and has been used to build curriculum programs based on water conservation and sustainability.
3. Our project has complemented a number of state and federal government initiatives introduced over the period of our project including:
 - a. Fresh Fruit Fridays, Healthy Canteens and the Stephanie Alexander Kitchen Garden project to promote healthy lifestyles. The project schools had already achieved and exceeded the goals of these programs.
 - b. The SWEP program (Schools Water Efficiency Program) was introduced to evaluate the potential water saving improvements that could be implemented to reduce water use in schools. The SWEP program was unable to identify significant improvements in three of the lead schools with no improvements identified for Eppalock, a small number of backflow devices for Strathfieldsaye and minimal improvements for Kangaroo Flat. The minimal improvements recommended, at the low efficiency levels, demonstrated that the schools had already achieved high levels of water efficiency and modelled this for the community.
 - c. Community Water Grants. This program was incorporated into the schools Smart Water program and helped to extend the water savings capacity of our programs. These

complemented our schools compared to many schools where the funds were used to initiate changes that had been implemented as part of the Smart Water Schools.

4. Curriculum units have been developed and implemented in each base school and these have also been shared across a number of schools in Bendigo and Victoria. Staff from Strathfieldsaye Primary School have been commissioned by Sustainability Victoria to write units of work for schools across the State. These are based on the work of staff as a result of the smart water project.
5. Community impact
 - a. Each setting has had a significant community impact and worked to improve community education related to water efficiency.
 - i. Strathfieldsaye Primary School participated in a community development plan to develop community action plans which provide guidelines for the future growth of the community. Sustainability is seen as a major initiative and the school is seen as a central agency of the community development plan and an essential conduit for all programs. Sustainability Victoria has followed the community action plan process and has documented this model for other communities.
 - ii. Water saving activities have been conducted to gauge the effectiveness of water conservation projects. These included the Shower Timer Challenge to reduce water use in showers at family homes, along with collecting and using excess water from school drinking troughs on gardens.
 - iii. Community water forums. Students from the lead schools participated and lead a number of community education forums and river health conferences and our schools have been seen as leaders in their knowledge of this issue.
 - iv. ECO Schools. Kangaroo Flat and, to lesser extent, due to current building programs, Strathfieldsaye Primary School have extended their Smart Water Projects to incorporate all areas of sustainability as Eco Schools. Under Alan Windust's leadership this has included recycling, waste reduction, native plant propagation, revegetation projects and at Kangaroo Flat a carbon sink plantation.
6. Improvements are still being undertaken at schools. Strathfieldsaye has just negotiated a change to the new school Building Education Revolution program with the removal of 1,000 litre tank provided by the project to enable connection to two school tanks (45,000 litre tanks) to collect a significant amount of water to service the new building's toilet system. This represents a significant advancement on the model provided by the project and improves water efficiency as well as water conservation on site. Strathfieldsaye Primary School has the capacity to capture and reuse over one million litres per year (dependent on annual rainfall) on site.

Learning and recommendations.

1. The Bendigo Smart Water Schools project has been successful as a model of water conservation and efficiency and as a sustainable model for others. The number of schools currently following work produced by this project continues to increase.
2. The project will continue to grow in the lead schools and their communities and will continue to evolve as the issues around conservation of scarce resources develop. The current community consultation process regarding the management in the Murray Darling System is a good example of the changing nature of this debate and the need for a wide range of views to be taken into consideration.
3. The link and involvement of student families with home based data collection and water conservation activities linked to dollar savings, is an effective strategy to educate the community. Both student engagement and leadership are important components of making this successful and easily incorporated into the broader community.

4. Given the number of government initiatives introduced over the past five years, to achieve the aims of our project, it is evident that the intent and implementation of the Bendigo Schools' Smart Water project were important, on track and effective at saving water in schools and communities.
5. The Bendigo Schools Smart Water project is both sustainable and able to be replicated across all communities, especially given the additional funding allocated to the National Water grants. These grants already provided would enable most schools to commence our model without further financial assistance.
6. The educational changes introduced in relation to sustainability are seen as a mainstream part of the curriculum rather than an add on topic and essential learning for all students in any school setting.
7. Site selection is a critical factor for the establishment of long term sustainable projects; where future development is required and the selection of appropriate locations for learning centres (gardens, propagation, facilities) is essential to ensure achievements can be maintained.

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Background

The Bendigo School Smart Water project was initiated to provide a model to develop school programs related to the effective use and conservation of water. The program identified three key objectives. First, to develop school based water efficiency programs to reduce water use and to improve develop curriculum units based on water to improve student knowledge and understanding of the issues related to water conservation. Second, to improve information for the school community and increase community awareness of water conservation. Third, for the key sites supported by the Smart Water grant to be a model for other schools and their communities to develop their own smart water programs to reduce water waste and to develop water efficiency programs for their own sites.

The sites chosen were negotiated with the Smart Water Project team to include:

Kangaroo Flat Primary School: This was a newly constructed primary school and was just being occupied. Although a new site and modern facility there were only a limited range of water efficiency devices included in the building design and therefore this project aimed to introduce new ways to improve water use on this site.

Strathfieldsaye Primary School: This site has continuously been occupied by the school for 130 years and has grown quickly over the past ten years. There are a combination of buildings and stages of development across the site and this school was chosen to model how established schools could improve their water use.

Eppalock Primary School: This site is a small rural school servicing a farming community and was selected as a model for small communities and schools with limited resources to initiate large scale reforms on their own behalf.

Mandurang South: This is a closed school and was selected as a base to develop community projects based around water conservation, improvements to the natural waterway systems and land care as part of river health. This site would service schools, local groups and the broader community.

Alan Windust was employed by the project on the advice of the Smart Water Project team to help co-ordinate programs across the project schools. His knowledge and expertise in this area as a recognised author and educator in the field of water wise gardens was seen as an advantage for the project.

One aim of the project was to develop similar smart water programs across our four sites to demonstrate to all schools that our models are viable, easily replicated and extremely worthwhile for all communities.

Introduction

The objective of this project is to build an educational resource model for schools across Victoria to develop effective strategies for water conservation in a regional setting.

Comprising of a collaboration of four schools in the Bendigo area (Strathfieldsaye Primary School, Kangaroo Flat Primary School, Eppalock Primary School and Mandurang South Primary School / educational facility) the project aims to develop and implement a Water Wise Program as part of a regional Sustainable Schools Pilot Program. Each of the 4 local schools will conduct water efficiency audits at each respective property and implement water efficiency works as identified from the audit process. In addition, the four schools will collaborate together, working with their local community, students and teachers, to develop and deliver a water conservation education package, as part of the school's curriculum, to the students, leveraging off the audit and works completed, as a learning aid.

The selected schools offer a diverse range of characteristics in terms of size, infrastructure and student numbers, in order to demonstrate that water conservation infrastructure and education can successfully be implemented in a range of settings.

The project involves the implementation of infrastructure to collect rainwater and use this in a water wise garden setting to reduce water use and establish an alternative educational facility to undertake sustained studies and project based activities.

Strathfieldsaye Primary School is acting as lead agent for the three other participating schools Kangaroo Flat Primary School, Eppalock Primary School and Mandurang South Primary School.

Objectives/Goals

Comprising of a collaboration of four schools in the Bendigo area (Strathfieldsaye Primary School, Kangaroo Flat Primary School, Eppalock Primary School and Mandurang South Primary School / educational facility) the project aims to develop and implement a Water Wise Program as part of a regional Sustainable Schools Pilot Program.

1. Each of the 4 local schools will conduct water efficiency audits at each respective property and implement water efficiency works as identified from the audit process.
2. In addition, the four schools will collaborate together, working with their local community, students and teachers, to develop and deliver a water conservation education package, as part of the school's curriculum, to the students, leveraging off the audit and works completed, as a learning aid.
3. The selected schools offer a diverse range of characteristics in terms of size, infrastructure and student numbers, in order to demonstrate that water conservation infrastructure and education can successfully be implemented in a range of settings.
4. The project will involve the implementation of infrastructure to collect rainwater and use this in a water wise garden setting to reduce water use and establish an alternative educational facility to undertake sustained studies and project based activities.
5. Strathfieldsaye Primary School is acting as lead agent for the three other participating schools Kangaroo Flat Primary School, Eppalock Primary School and Mandurang South Primary School.

6. As the project evolved additional outcomes were planned, developed and where possible fully implemented especially for Eco Schools and for the Mandurang South Site.

The key objectives of the Mandurang South site were;

- Establish an environmental centre to promote community awareness of the need to care for the environment with programs designed on sustainability and water.
- Develop school based programs where students from a range of settings can collaboratively work on community projects.
- Provide a setting where community groups can work with students to develop resources to improve the local environment.

The key objectives of the Eco Schools Project were:

- Help children understand and enjoy the natural environment and to develop sustainable lifestyles.
- Provide a model to reduce community demand on environmental resources.
- Create a sustainable school environment from fence to fence, including a series of learnscapes.
- Provide an example for the community to develop sustainable systems in homes and community environments.
- Provide an example for the wider community to adopt and develop sustainable living practices.
- Relate school activities to the wider environment.
- Train teachers in eco school principles and practices.
- Provide students with a vehicle to study sciences, mathematics, economics, literacy and multi-media communications.

Key Steps / Milestones

- Milestone Description

Milestone 1 Detailed Project Plan (including Communications Plan) to be prepared by the Grantee and approved by SWF

Milestone 2 Implementation of rainwater collection system and water wise garden at Strathfieldsaye Primary School, Kangaroo Flat Primary School, Eppalock Primary school.

Milestone report to be prepared by the Grantee and approved by the SWF.

Milestone 3 Implementation of rainwater collection system and water wise garden at Mandurang South.
Milestone report to be prepared by the Grantee and approved by the SWF.

Milestone 4 Curriculum development and implementation at each of the four schools.

Milestone Report, showing the water wise curriculum material and an evaluation of its implementation and success, to be prepared by the Grantee and approved by the SWF.

Milestone 5 Final Report, detailing a Benefits Evaluation to be completed by the Grantee and approved by the SWF.

Communication Plan completed.

- Timing

- The project has achieved all milestones and apart from Milestone 3 all were on schedule and are ongoing well beyond the project life as planned and expected.
- As outlined in the report, the drought had a significant impact on the achievement of Milestone 3. However, apart from the location the outcomes for milestone 3 have been achieved and are able to be sustained beyond the project. We are convinced and committed that the site at Mandurang South will be a viable location for our programs and we are working on this at the moment and we have invested interest from local entrepreneurs who are keen to establish an alternative energy education centre on this site. This should help to provide an income stream to develop and maintain the site.

- **Financial Summary**

Milestone	Cost Description	Milestone Date dd/mm/yy	(\$) Applicant Contribution	\$ Smart Water Funding (Amount and Timing of Instalment)	\$ Other contributions		\$ Total Activity Cost
					Amount	Source	
Milestone 1 Detailed Project Plan (including Communications Plan) to be prepared by the Grantee and approved by SWF.	Planning	Week 4	\$ 2,500 (in kind)	\$ -			\$2,500
Milestone 2 Implementation of rainwater collection system and water wise garden at Strathfieldsaye Primary School, Kangaroo Flat Primary School, Eppalock Primary school. Milestone report to be prepared by the Grantee and approved by the SWF.	Implementation	Week 20	\$51,000 (in kind)	Up to \$48,000 within 10 Business Days of acceptance by the Manger of the Milestone Report			\$99,000
Milestone 3 Implementation of rainwater collection system and water wise garden at Mandurang South. Milestone report to be prepared by the Grantee and approved by the SWF.	Implementation	Week 40	\$17,000 (in kind)	Up to \$15,916 within 10 Business Days of acceptance by the Manger of the Milestone Report			\$32,916
Milestone 4 Curriculum development and implementation at each of the four schools Milestone Report, showing the water wise curriculum material and an evaluation of its implementation and success, to be prepared by the Grantee and approved by the SWF.	Curriculum development and implementation	Week 52	\$ 257,000 (in kind teacher salaries and support in development and delivery)	No payment required for this milestone.			\$257,000
Milestone 5 Final Report, detailing a Benefits Evaluation to be completed by the Grantee and approved by the SWF. Communication Plan complete.	Reporting	Week 60	\$2,000 (in kind)	Up to \$4,000 within 10 Business Days of acceptance by the Manger of the Milestone Report			\$6,000
Completion Date		Week 60	\$329,500 (in kind)	Up to \$67,916	\$ -		Up to \$397,416

- **Key Performance Indicators**
- **Milestone 1**
Detailed Project Plan (including Communications Plan) to be prepared by the Grantee and approved by SWF
 - Milestone report / comment
 - (a) Completed and approved.
- **Milestone 2**
Implementation of rainwater collection system and water wise garden at Strathfieldsaye Primary School, Kangaroo Flat Primary School, Eppalock Primary school. Milestone report to be prepared by the Grantee and approved by the SWF.
 - Milestone report / comment
 - (a) Completed and exceeded in all settings with the excellent results, there have been a number of schools adopting the model and also the eco schools project has been established as well.
 - (b) Community education programs at all levels of the community including Statewide support from Sustainability Victoria, Region wide conferences, Local Government forums and school community level.
 - (c) These models will be sustainable and self funding thereby being ongoing models for the community, even with considerable change due to building programs all lead schools and associate schools are committed to maintaining their programs.
 - (d) The projects have been complimented by a number of State and Federal initiatives.
- **Milestone 3**
Implementation of rainwater collection system and water wise garden at Mandurang South. Milestone report to be prepared by the Grantee and approved by the SWF.
 - Milestone report / comment
 - (a) The tank has been installed and further installation required.
 - (b) Waterwise garden project maintained at Strathfieldsaye and Kangaroo Flat Primary Schools.
 - (c) Community links developed and maintained above expectations.
 - (d) Community revegetation/ propagation programs implemented and ongoing. Over 4000 native trees propagated in 2008/ 2009 at Strathfieldsaye and used in community planting project.
 - (e) Full time student programs not commenced due to water restrictions and drought.
- **Milestone 4**
Curriculum development and implementation at each of the four schools
Milestone Report, showing the water wise curriculum material and an evaluation of its implementation and success, to be prepared by the Grantee and approved by the SWF.
 - Milestone report / comment
 - (a) Curriculum material produced and shared across schools at a wide variety of conferences and school visits including from international schools.
 - (b) Units written for Sustainability Victoria and published as exemplar models for Victorian schools.
 - (c) Ongoing curriculum programs in all schools and associate schools

- Milestone 5

- Final Report, detailing a Benefits Evaluation to be completed by the Grantee and approved by the SWF.
- Communication Plan complete.

Findings/Results/Outcomes

1. This project was ahead of its time and identified the need for proactive water conservation programs to be implemented in schools as a key agency in the community to raise awareness of ways to reduce water waste. The original aims of the project have been fully achieved and continue to develop as community awareness of the issues grow and change.
2. The support and funding provided by the Smart Water Grant demonstrated that relatively small levels of effectively targeted funding can have a significant effect and impact on communities and produce high quality sustainable projects that can relatively quickly become self sufficient and are able to be replicated as a model for others.
3. The drought has seen the need for water conservation as a major community issue and the challenge will be to maintain this as wet conditions return. Our project predicts that longer periods of dry weather will be more frequent and the demand for scarce resources will increase. Maximising the efficient use of water is the key to an effective solution. Our schools will continue to model and develop new material to assist school communities to improve in this area.
4. The achievements of the project have been significant and extended well beyond the three lead schools and will continue to provide a sustainable long term program well beyond the funded implementation phase. Other schools have commenced water wise gardens and sustainability programs based on the Smart Water Schools model developed across the lead schools.
 - a. The impact of the lead school's curriculum programs has been substantive and placed sustainability as central components of our programs.
 - b. Curriculum programs have been shared with many other schools across Victoria and specific units have been written for statewide distribution for Sustainability Victoria.
 - c. A significant number of state and federal initiatives have been introduced that support and reinforce the aims of the Smart water School Project and what was seen as innovative with this project is now strongly reinforced as community priorities with state and federal funding. These will add to the sustainability of our project.
 - d. Community development plans have been initiated at Strathfieldsaye and the school is seen as a central essential agency for positive community change.
5. The lead schools have presented to a wide variety of local, state and international audiences. This has helped spread the objectives of the Smart Water Schools program and demonstrated that children and schools can be effective change agents and a centre for community education.
6. Drought effects. The prolonged drought had both advantages and disadvantages for the project.
 - a. Advantages
 - i. The drought and resultant prolonged water shortages highlighted the need for increased community water awareness and the urgency to conserve water.
 - ii. The prolonged nature of the drought will mean long term solutions are found to minimise water waste at the school, home and community level.
 - iii. There will be permanent changes to our concept of water use
 - iv. There will be an increased focus on the health of the environment and the sustainability programs will be important components of school curricula. The current Murray Darling Basin review is an example of where community and environmental needs are in conflict and changes in attitude, water use and community growth will be key topics of interest.
 - b. The disadvantages

- i. The enforced water restrictions made it difficult to gauge the impact of the Smart Water Education programs in terms of community awareness, quantitative data related to water savings. Some initial figures were generated through students monitoring home water consumption (meter reading) and these demonstrated significant savings over the short term as a result of our programs e.g. shower challenge.
- ii. The Mandurang South component did not reach operational status due to the unreliable water supply for toilets. Drinking water was catered for as part of the project and all other aspects in relation to community links etc were in place. This site is still under development and will become operational.
- iii. That a number of community projects especially related to revegetation were unable to continue due to the limited water available to support the establishment of community plantations in new areas.

7. Mandurang South

- a. This site will continue to be developed by the school and will serve as a leading environmental learning centre for schools and communities and will be operational as planned.
- b. The current unexpected return to full water storages at the end of 2010 will be of great assistance to enable this to achieve this, as supply for services and plant propagation can be more reliable.
- c. Many of the aims of this site have been replicated at other lead schools and site work at Mandurang South has commenced.
- d. We are working with two developers of alternative energy systems who want to construct models of solar, wind and energy production at Mandurang South. This will form a basis for community projects to complement the smart water program at the schools and this site.

8. Community Links.

- a. The project has incorporated a wide range of community links and has the capacity to build on these into the future these include:
 - i. Bendigo South East Secondary College with students working on site at Mandurang South as part of "The Flora Hill Cluster Schools Boy's Education Program". A number of student teams have been working to develop the site.
 - ii. Local Primary schools to share programs on site and work with students who are placed at the school on a regular basis.
 - iii. La Trobe University students from the Education and Outdoor Education faculties have worked on programs at Mandurang South.
 - iv. La Trobe University Bundoora to develop and install web cameras and nesting boxes set up for web broadcasting.
 - v. Goldfields Revegetation Nursery, for advice and assistance with local plants.
 - vi. Goldfields walking trail project team to develop a stopover point on site for walkers on the trail from Robe SA to Bendigo.
 - vii. Bendigo Field Naturalists to assess the site and provide guidance for protecting sensitive areas at the site and local areas especially along the Sheepwash Creek.
 - viii. The Green Team (unemployed training program) who have conducted work on site.
 - ix. Australian Technical College to evaluate refurbishment of the buildings.
 - x. Fair water (local water conservation group) to assist with water conservation projects.
 - xi. Landcare (Sheepwash Creek) group to work on community projects along the Sheepwash Creek from Mandurang South to Strathfieldsaye.
 - xii. OTIS Foundation (respite care centre for breast cancer) as a revegetation site along the creek.
- b. The breadth of community links and sustained commitment to this project builds capacity for an ongoing project that will evolve as community education and knowledge improves and the needs based on annual rainfall and increased demand for scarce resources alters over time.

9. The higher rainfall levels in 2010 could result in a return to more wasteful practices and community awareness will need to be maintained to ensure all competing demands (aesthetic, urban, agricultural and environmental) for water can be achieved. The nature of schools programs will change in response to these demands.
10. Schools by their nature change over time and the impact of system wide changes can have a significant impact on our capacity to determine long term plans. Kangaroo Flat as a new school on a larger greenfields site that had a capacity to build facilities that can be developed and still cater for growth and dynamic change. Schools like Strathfieldsaye, Eppalock and Camp Hill who have developed projects on smaller sites (relative to school enrolment) have experienced difficulty in maintaining infrastructure due to new government initiatives including the Building Education Revolution stimulus package. While the Smart Water programs will be reinstated the disruption has a serious impact.

Conclusion

1. The funding from Smart water was essential in enabling this program to commence and that without the resources to install water saving/ collection devices this would not have been possible if schools had to rely on their own resources.
2. The Smart Water project has been very successful and achieved its aims to raise community awareness of improving water efficiency, reduce waste and to improve our capacity to collect and reuse water as a scarce resource.
3. Schools are seen as effective platforms to build short and long term community programs based on water conservation.
4. Models developed at the lead schools are able to be replicated and valued by other schools and their communities and is seen as a mainstream expectation for many communities.
5. The lead schools have significantly shifted their curriculum programs and focus on sustainability and will maintain this into the future.
6. Most schools throughout Victoria and across Australia, as a result of changed policies, government priorities and funding, can achieve long term sustainable outcomes to improve water efficiency.
7. School based projects need to be flexible enough to cater for changed initiatives and resource allocations or designed to be placed in a location that is outside predictable building zones.

Recommendations

1. Raising community awareness is an ongoing process and will need to change as competition for resources increases and the balance across all areas becomes more influenced by climatic changes.
2. The commitment to ongoing programs relying on school based resources is a high priority of each school.
3. That the project moves forward with the plans to develop the Mandurang south site and uses the community connections to commence programs as soon as possible.
4. That the project continues in its current form and with the support of the Smart Water project to promote the achievements of these schools.
5. That the funding allocated for milestone three be provided to enable this project to continue in an expanded form based on the grounds that the aims for this centre have been delivered in other ways and the commitment to making this aspect of the program an ongoing sustainable project with high levels of community support is still a high priority.

Acknowledgements

All schools would like to acknowledge the work by the Smart Water Project team and the funding from this grant has made this project possible and without their support we would not have been able to achieve the successes and education programs for our communities.

Appendix 1

1. Sample photos:

- b. Eco detectives students investigating river health and water quality.
- c. Eco Schools Project photos.

2. Sample curriculum units.

- a. 2007 Natures Cycles Biodiversity.
- b. 2007 Water Water Everywhere.
- c. 2008 Freshwater Unit PowerPoint Presentation.

3. Kangaroo Flat water wise garden report

4. Bendigo Smart Water schools Project 2006

- a. Outline of the project at this stage
- b. Opening the project for the schools.