

Environmental Watering: Rejuvenating Floodplains, Reinvigorating Communities

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ABSTRACT: Due to drought conditions in an already dry Mallee region, opportunities for water monitoring education have become increasingly reduced. Environmental watering of floodplain areas, via government initiatives and community water donations, has provided additional opportunities for groups to be involved with monitoring and be active in their community. This has particularly been the case with St Paul's Primary School, Mildura and to a lesser extent Ouyen Secondary School, Ouyen.

This paper recounts these two case studies in which Mallee Waterwatch has provided training, equipment, time and resources to assist in the monitoring of these newly inundated areas. Subsequently, the knowledge and skills gained through water monitoring activities have been seen to increase a student's ability to be actively involved in their community and to share their awareness of and sensitivity to natural environments with others. This paper will show that environmental watering of floodplain areas is therefore very important to the Mallee region for providing positive outcomes to both the natural environment and to the community.

This paper will also detail how the Waterwatch program can link students to natural resource management and help to achieve the environmental education objectives set out by the Belgrade Charter of 1975. It will show how environmental watering programs have led to interdisciplinary curriculum requirements being met as well as contributing to effective environmental education. It also details the partnership opportunities that exist between the community, schools, Mallee Waterwatch, Mallee Catchment Management Authority (CMA) and the Department of Sustainability and Environment (DSE) due to these environmental watering programs.

BACKGROUND

The Mallee CMA region is located in the north-west corner of Victoria and covers approximately 3.9 million hectares, with a regional population of approximately 65,000 people [1]. The major urban centre is Mildura, located in the north, with smaller towns in the region including Ouyen, Red Cliffs, Merbein, Irymple, Murrayville, Hopetoun, Rainbow, Birchip, Sea Lake, Robinvale and Nyah.

The Mallee is home to the State's most diverse flora and fauna populations and valuable environmental features including the Murray River, National Parks and Reserves and more than 900 wetlands [2]. Most of the creeks, streams and wetlands however, are ephemeral and predominately dry [2]. The Murray River is the principal source of water in the Mallee region for both urban and irrigational use.

The majority of the Mallee region's floodplains exist along the Murray River and when wet, can provide many opportunities for water-based education. The Mallee Waterwatch Program often visits these sites during excursions with school and community groups. The floodplains create an invaluable backdrop for educational activities such as macro-invertebrate surveys, chemical and physical water quality testing and stream habitat surveys. During the prolonged drought of the last few years however, Mallee floodplains have increasingly shown signs of stress and poor-health.

Environmental Flows Program

Wetlands and floodplains are important to the Mallee region as they provide habitat for many terrestrial and aquatic plants and animals and are important breeding and nursery grounds. Since European settlement, the hydrology of many floodplains has been significantly altered by river regulation, resulting in major changes to the frequency, magnitude and duration of flooding regimes. Altered flow regimes pose a threat to floodplain communities as they can reduce habitat diversity and subsequently biological diversity. In particular, the presence of stressed or dead River Red Gums (*Eucalyptus camaldulensis*) is a key indicator of a floodplain system in poor health.

Environmental flow allocations have been critical to floodplain areas during the drought period to provide more natural flow regimes to floodplains and subsequently nurture their ecological benefits. Under the Murray Darling Basin Commission's 'Living Murray' Initiative, two sites within the Mallee region are identified as 'Icon Sites', and have been earmarked for critical environmental flows. These sites are the Hattah Lakes and the Lindsay-Wallpolla Islands. Further floodplain sites between Nyah and the South Australian border have also been prioritised for environmental flows to improve flow conditions.

The Mallee CMA has been involved in the coordination and monitoring of this environmental watering. Water has been sourced through the 'Living Murray' Initiative, the Victorian Government's Bulk Entitlement for the Environment through 'Our Water Our Future', and from donated irrigator's water. Mallee Waterwatch has been able to partner with the CMA to provide the educational aspect of the environmental flows program.

The environmental flows program has generated some negative sentiment in the media in recent times. This has occurred because of water scarcity due to the prolonged drought, with some irrigators believing that water has been taken from their allocation and/or that water is wasted on the natural environment. The Mallee Waterwatch program has assisted the CMA in helping to educate the community in the importance of environmental flows to floodplain areas.

Water Donation Program

The 2004/05 and 2005/06 financial years saw irrigators and water authorities within the Mallee region donate almost seven gigalitres of unused temporary transfer water entitlements to their local environment [3]. This donated water was pumped onto priority wetland sites to help drought-stressed River Red Gums and Black Box (*Eucalyptus largiflorens*) species. Sites were chosen by degree of tree stress and the capacity to deliver the volume of water made available.

2004/05 – 1.3 GL delivered to sites at Burra Creek, Johnston's Bend and Karadoc.

2005/06 – 5.6 GL delivered to sites at Lindsay, Wallpolla and Mulcra Islands, Hattah Lakes, Pile Bend, Johnston's Bend, Chaffey Bend, Carina Bend, Ned's Corner, Abbotsford Bend, Spence's Bend, Grace's Bend, Buxton's Bend, Belsar Island and Burra Creek.

This program is of significance not only because of the environmental benefit to floodplains but because it was instigated and driven by almost 200 irrigators and other various organisations as part of the development of the Victorian Mallee Salinity and Water Quality Management Plan. The water that was donated to the environment may have otherwise been sold by the irrigators. Again, Mallee Waterwatch was involved in the program through the education of school groups and the community.

ENVIRONMENTAL EDUCATION

It has been suggested that environmental education is the most effective means of confronting the challenges of the future such as climate change, natural resource depletion and the social issues of poverty, hunger, ill health and illiteracy [4]. The principles of environmental education strongly follow those of sustainable development, including: the integration of economic, social, cultural and environmental factors; the conservation of natural resources; and the advocacy of peace and democracy.

A key milestone recognised for its contribution to the international environmental education movement was the IEEP International Workshop on Environmental Education 1975 held in Belgrade, Yugoslavia. This international workshop produced the first inter-governmental statement on environmental education, *The Belgrade Charter – A Global Framework for Environmental Education*. The Belgrade Charter set out aims, objectives, key concepts and guiding principles of environmental education on an international basis [5].

In Australia, it has been suggested that the environmental education movement is in its earliest stages where education aims to improve environmental knowledge and attitudes in students, and where school curriculum bodies become involved [6]. By partnering with local agencies such as CMAs, water authorities, DSE and Parks Victoria, Mallee Waterwatch can help to connect students to natural resource management, therefore providing a wider scope to their education.

The objectives of environmental education first set out in the Belgrade Charter are:

- To foster clear awareness of and concern about economic, social, political, and ecological inter-dependence in urban and rural areas;
- To provide every person with opportunities to acquire the knowledge, values, attitudes, commitment and skills needed to protect and improve the environment;
- To create new patterns of behaviour of individuals, groups and society as a whole towards the environment' [5].

It is thought that environmental education has been effective when students demonstrate *awareness* of and sensitivity to the environment, develop *attitudes* that are pro-environment and pro-participation, exhibit *ability* through appropriate knowledge and skills, and take *action* through a sense of responsibility, urgency and empowerment. The frequency and nature of intergenerational communication can also be used to measure the effectiveness of an environmental education program.

Elements of effective environmental education have been achieved via the environmental watering activities within the Mallee, and these will be discussed further in the case studies.

MALLEE WATERWATCH INVOLVEMENT

Mallee Waterwatch has been involved with both students and the community during various stages of the Environmental Flows Program and the Irrigation Water Donation Program. Waterwatch has accompanied class visits to watering sites, and aided water monitoring at these sites for salinity, pH, soluble phosphate, turbidity and macro-invertebrates. Aid was given by way of equipment, training, time and resources.

Water quality monitoring has also occurred at various sites in conjunction with Mallee CMA staff. A number of CMA staff have been trained in the use of Horiba water monitoring equipment, and are encouraged to use the equipment when out in the field working on various projects.

Mallee Waterwatch has also been involved in the 'Thankyou Days', an opportunity to personally thank the water donators for their huge contribution to the catchment, and to carry out community education at the same time.

Case Study: Ouyen Secondary School

Mallee Waterwatch was invited to participate in a science excursion to the Hattah – Kulkyne National Park with Year 9 Ouyen Secondary students. The Hattah Lakes system is a large floodplain area consisting of 17 semi-permanent freshwater lakes which are connected to the Murray River via Chalka Creek [7]. The natural hydrological regimes vary widely, ranging from lakes which hold some water constantly (although not during this recent prolonged drought period) to those with inflows averaging one year in four and with dry spells of four to 12 years [8]. The area supports River Red Gum communities and a variety of native plants and animals. The lakes are also important breeding grounds for waterbirds, including those listed on the Japanese and Australian Migratory Bird Agreement (JAMBA) and Chinese and Australian Migratory Bird Agreement (CAMBA).

The 'Living Murray' Icon site was receiving environmental flows from the Murray River as part of the Victorian Government's Bulk Entitlement for the Environment at the time of the excursion. For this reason, the class was interested to see what changes the water had made to their local environment.

There was some negative media about the environmental flow project at the time due to anger from irrigators who believed water was being taken from their allocation. Another objective of the excursion therefore was for students to form their own opinion on the 'hot' current affairs topic.

The students visited the pumping site and learnt about the area and about the environmental flows project. With the help of Mallee Waterwatch, the students monitored the water quality at the pump site, conducted a stream habitat survey along Chalka Creek, and surveyed the macro-invertebrate life within Hattah Lake. These tests and surveys provided the students with raw data from which they could form their own conclusions about the environmental watering program. As these tests revealed an ecosystem in excellent health, Mallee Waterwatch was able to demonstrate the positiveness of the watering project to the students in a 'negative' climate.

It could be assumed that at least some of the students communicated the day's proceedings to family members, adding an intergenerational aspect of environmental education to the

excursion. As the Hattah-Kulkyne National Park is local to the Ouyen area, the excursion may have also resulted in families going to inspect the inundated lake system themselves.

Case Study: St Paul's Primary

St Paul's Primary School was involved with the Water Donations Program at Johnston's Bend on many levels, including initial donation, environmental monitoring and community education.

The School contributed 11 megalitres from its own water right to Johnston's Bend, a Murray River floodplain near Mildura where the River Red Gums were in desperate need of water [9]. The donation was the start of a year-long environmental education program that integrated environmental issues with current affairs, politics, science, English and community action.

Prior to the water donation program, St Paul's Primary School had received a community water grant with assistance from the Mallee CMA to make their oval watering method more efficient. It was through this gained efficiency that the school had excess water available for donation.

Students attended the Johnston's Bend watering site when the pumps were first turned on and were able to watch as thirsty River Red Gum roots received the donated water. This gave students a feeling of responsibility and empowerment resulting in students keen to continue assisting in the management of Johnston's Bend.

With monitoring being a major component of the environmental watering project, Mallee Waterwatch suggested monitoring the site and trained students to undertake water quality tests and macro-invertebrate surveys. Students also monitored tree heath and epicormic budding, and made general observations about the site's response to the water.

The students researched articles about environmental watering and prepared their own media releases about their project. They were also involved in community education by creating an informative display for the community 'Thankyou Day', which was held for those individuals and organisations who donated water to the program. *"A project like the River Red Gum watering that is real to their area, and in the newspaper all the time, means the students now have a genuine interest which will continue on into the future"* (Teacher Mark Gibson, 2005, as cited in [9]).

Furthermore, the students presented their findings to hundreds of students at the International River Health Conference held in Mildura in October 2005. They focused on the importance of River Red Gums to the Murray River floodplain and the outcomes of the environmental watering program. Their interactive workshop completed their very integrated school project which met school curriculum requirements whilst allowing students to work within their community, empowering them to take action and educate others.

This case study is a great example of environmental education principles working within a local school. The students demonstrated an *awareness* of and sensitivity to the environment, developed *attitudes* that are pro-environmental and pro-participation, showed *ability* through appropriate knowledge and skills, and took *action* through a sense of responsibility, urgency and empowerment. *"The kids said 'you can't blame people in the past for what's happened, we have just got to do something about it now'. It was really good to see them trying to find answers themselves"* (Mark Gibson, 2005, as cited in [9]).

Intergenerational communication was a major component of the St Paul's environmental school program, and strongly demonstrates the effectiveness of the program. *"Even after the*

conference kids were still visiting the site with their families and noticing different changes like frogs and birds” (Mark Gibson, 2005, as cited in [9]).

KEY LEARNINGS FOR MALLEE WATERWATCH

- Environmental flow and donated water programs are highly important to the Mallee region, for providing *positive outcomes* to both the environment and community.
- Due to environmental watering programs school and community groups now have the opportunity to monitor sites previously without water, meaning more individuals are involved and more *water quality data* is collected.
- Delivering watering programs can provide both education and monitoring opportunities – *knowledge and skills* that increase a student’s ability to be actively involved as well as increase awareness of and sensitivity to the environment.
- Monitoring results can *show the positive benefits of environmental watering* to the community involved, and therefore help to counteract any negative sentiment. Associated community events such as the ‘Thankyou Days’ can be an important communication tool as well.
- The Donated Water Program, through its very nature, can be used as a tool to increase *community action, responsibility and empowerment*. It also acts as a link between the community and natural resource management.
- School and Community Groups have more interest participating in an on-going monitoring program if the site is part of *current affairs*, especially if the program receives media coverage.
- School involvement with Government Programs can be interdisciplinary in nature, with activities meeting a range of *curriculum requirements*, encompassing for example science, mathematics, English, history, study of society and politics. Links are also made between students and natural resource managers.
- Enthusiastic teachers are invaluable to the continuation of environmental projects/programs, including the continuation of monitoring for the Waterwatch program.

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