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Department of Environment

RIBBONS OF BLUE WATERWATCH WA Communities Caring for Catchments

Showcasing Ribbons of Blue/Waterwatch WA

A collection of regional case studies to acknowledge the achievements of schools and community groups, to share learnings and experiences and to inspire further involvement.

OUR OBJECTIVES

1 Increase community awareness and understanding of water quality issues in a whole of catchment context.

2 Provide school and community educational opportunities through a range of curriculum areas and public forums.

3 Encourage collaborative action involving the community, schools, local government authorities and state government agencies to identify and resolve water related catchment issues.

4 Support community monitoring projects to contribute useful water quality data for community and agency application in raising awareness and resolving issues.

5 Maintain networks and partnerships to share data and information, and to support the continuity of the program across the state.

OUR VISION

Local communities actively involved in learning about and protecting environmental water quality, and sharing responsibility for management of waterways, wetlands and groundwater.

Contents

This case study booklet was developed to acknowledge the major achievements of Ribbons of Blue participants, to share learnings and experiences, and inspire further involvement and encourage participation in the Ribbons of Blue program.

The case studies reflect the energy, commitment and accomplishments of students, teachers, school administrative staff, community group members, program sponsors and Ribbons of Blue staff members.

Ribbons of Blue congratulates all those involved in the case study examples on their significant contribution to environmental education and to protecting Western Australia's unique environment.

This case study publication has been developed by the Ribbons of Blue State Support Team.

The State Support Team would like to thank and acknowledge regional Ribbons of Blue Coordinators, Amy Kimber (Media Officer, Department of Environment) and teachers and community group members who assisted in writing the case studies and award profiles for the case study booklet.

Author: Bronwyn Ryan

Printed on 100% recycled stock.

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Ribbons of Blue's educational resources

Ribbons of Blue has developed a series of educational resources to assist teachers, students and community group members participating in the program. These resources are available to registered Ribbons of Blue groups at no cost. Check with your Ribbons of Blue Coordinator or visit our website at http://www.ribbons.environment.wa.gov.au to find out more.

Macroinvertebrate Identification Key

The Macroinvertebrate Identification Key is a flipchart designed to assist students and community groups in the classification of aquatic macroinvertebrates. The Key utilises a series of 'True' and 'False' questions regarding the appearance of the macroinvertebrate and features full colour photographs.

Estuarine Invertebrate Identification Guide

The Draft Estuarine Invertebrate Identification Guide was developed in 2004 to complement the Macroinvertebrate Identification Key. The publication assists in the identification of major groups of invertebrates found in the estuaries of Western Australia, with colour photographs of 26 species and information on estuarine habitats and taxonomy. It also contains guidelines for creating a reference collection and sampling of estuarine invertebrates. The draft Guide is currently being trialed throughout Western Australia.

Teacher Resource Activity Kit, *Ribbons of Blue–In and Out of the Classroom*

Ribbons of Blue–In and Out of the Classroom is a compilation of a diverse range of educational activities suitable for students from middle primary through to upper secondary that can be used to learn about water quality and catchment management issues. This draft Kit also incorporates a section where students and teachers can investigate water and other natural resource management issues in their own particular 'patch', thus making this resource specific to each region. The draft Kit is currently being trialed throughout Western Ausralia.

Water Chemistry Series: The Chemistry behind water quality testing

This educational resource was specifically designed to meet post compulsory education curriculum in chemistry at the TEE level. The publication provides students with skills in investigation and science communication; the capacity to utilise science learning in decision making processes and to act responsibly; and an understanding of the nature of science as a human activity. Copies were distributed in 2002 to all schools in Western Australia with Year 11 and Year 12 intakes.

River Flow Simulation Model

The River Flow Simulation Model was designed to assist students and the community to understand how rivers work, the causes of environmental problems and waterways restoration concepts. The model is interactive, with the focus of learning on discovery. Refer to Case Studies from the Mid West for further details.

Groundwater Models

Four groundwater models are available for loan to teachers and community groups. These interactive groundwater models demonstrate the movement of groundwater in an urban and agricultural catchment, where native vegetation may be present or absent.

Catchment Model

The Catchment Model is a three dimensional, interactive model of a generic catchment that aims to demonstrate what a catchment is, how a catchment works and catchment management principles. An educational activity is provided for use or adaptation.

Sunset Over the Catchment Board Game

This creative board game was developed and marketed by a group of students from Beachlands Primary School in Geraldton with the help of Ribbons of Blue. The game is an enjoyable way to teach people about the complexity of water management, including allocation of water for conservation and commercial purposes, and is aimed at helping to change community attitudes towards water as a finite resource.

15 years of learning

... about Western Australia's water resources

Ribbons of Blue (RoB) was initiated in Western Australia as a schools environmental education program in 1989. The Department of Environment is the host agency for Ribbons of Blue.

Ribbons of Blue uses water quality monitoring and catchment management activities as tools to focus learning and develop understanding, while involvement in on-ground action projects builds a sense of environmental, social and civic responsibility for the shared management of local environments.

The case studies in this booklet demonstrate that Ribbons of Blue is both an adult community education provider and a schools educational program.

For community groups

Ribbons of Blue aims to give local people the skills and the opportunities they need to work towards a common goal of assisting in the conservation, management and rehabilitation of Western Australia's unique environment. Practical and logistical support and training is available to assist adult learners to meet their individual needs, abilities and aptitudes.

For schools

Ribbons of Blue can be directly linked to the curriculum and integrated across all learning areas for individual teachers or across the whole school. Resource materials and staff are available in Ribbons of Blue regions to assist and support teachers to implement the program.

From a trickle to a torrent

The name Ribbons of Blue was chosen because it complemented the 1980s roadside revegetation scheme Ribbons of Green and was expected to lead to community action for waterways protection. Ribbons of Blue has certainly achieved this!

Fifty-seven schools were involved in the first Ribbons of Blue sampling period in May 1990. By 2004, this number had grown to 230 schools and 146 community groups involved in water quality monitoring, education and awareness activities, and local action projects. A total of 823 sites were monitored stretching from Carnarvon in the north west to Pemberton in the south west.

RIBBONS OF BLUE WATERWATCH WA
Communities Caring for Catchments

Case Studies from the Avon



Eadine Spring – fostering environmental responsibility

Eadine Spring, a permanent wetland located 15 kilometres west of Northam, has proved a fertile outdoor classroom for the students of St Joseph's Primary School, Northam who are involved in the Department of Environment's Avon Ribbons of Blue program (RoB).

The Eadine Spring project aims to rehabilitate one of the Avon's permanent waterways while providing valuable environmental education to local students and an area to trial weed control techniques and revegetation with riparian species.

Through their involvement, students have increased their understanding and awareness of wetland health through interactive learning such as monitoring the pH, electrical conductivity (salinity), temperature and turbidity of the main pool.

Water quality monitoring has given students the opportunity to understand trends in changing water quality parameters and to develop an understanding of catchment related issues.

Students have become confident in the collection of water quality data and measurements, and are able to interpret the findings and display them in various visual formats.

The project also includes bird watching and identification, mammal surveys, frog surveys and aquatic macroinvertebrate monitoring.

Weed invasion and lack of habitat at the wetland have been improved by volunteer work undertaken by students such as revegetation, with over 2000 seedlings already being planted at Eadine Spring.

These activities give students the opportunity to understand complex natural systems such as wetland ecology, the link between water quality, species richness and the diversity of fauna living in and around Eadine Spring.

Students and teachers from St Joseph's, Northam, who have been involved in RoB are high achievers. In recognition of the school's ongoing restoration, revegetation and monitoring of Eadine Spring, an Accredited River Manager award was presented to the school at the Avon Catchment Council partnership agreement signing at Government House in 2002.

St Joseph's Primary School, Northam, submitted a winning entry in the early adolescence category in the RoB State Schools competition 2002.

Year 7 students designed and developed an interpretive brochure and signage for a walk trail at Eadine Spring. The innovative brochure demonstrated the students' understanding, recognition and interpretation of the ecological, conservation, social and cultural features of the local waterway.

In 2004, Year 6 students were runners-up in the Ribbons of Blue Student's Competition *Macroinvertebrate DigiVid*.

The restoration of Eadine Spring will be continued into the future under the scope of the Avon Natural Resource Management Strategy as an Local Area Plan (LAP).

Teacher Cheryl O'Meara says, "The partnership between the school, the Department of Environment, Main Roads and Ribbons of Blue is providing the students with a tangible, practical awareness of the importance of environmental management and conservation".

Photographs this page left to right:

Students from St Joseph's testing the Fab 4 (conductivity, pH, temperature and turbidity).

Students from St Joseph's sorting macroinvertebrates at Eadine Spring. Photographer: Patricia Janssen, Department of Environment.

Eddy Wajon of KBR presents Year 6/7 students from St Joseph's with a new water quality meter. Photographer: David Gibb, Department of Environment.

Photographs opposite left to right:

Toodyay District High School students assist with planting sedges to stabilise banks along Phillips Brook.

Log walling was trialed to reduce bank erosion. Photographer: Bernie Kelly, Department of Environment.

Macroinvertebrate sampling in Dewars Pool on the Toodyay Brook. Photographer: David Gibb, Department of Environment.



What's going on in Phillips Brook?

Many of the landowners in the Phillips Brook Catchment, located in the Shire of Toodyay, have long recognised the environmental value of their local waterways as important habitat for birds, fish, invertebrates and other aquatic fauna.

In 1999, concerned landowners formed the Phillips Brook Catchment Group, aiming to protect the health of the brook by carrying out measures to alleviate land degradation and stream erosion and to enhance stream biodiversity.

The group sought Ribbons of Blue (RoB) support for the initial design and implementation of a catchment monitoring program. RoB support included training, resources, information and support related to the development of a water quality monitoring plan. The group envisages long-term monitoring to identify trends in water quality following their revegetation and river restoration works.

Turbidity, temperature, electrical conductivity and pH levels continue to be monitored on a monthly basis at six selected sites as a baseline record of the health of the brook.

The water quality data shows that the water flowing into Toodyay Brook is brackish, has an average pH of 7.3 and water clarity is good. Bank erosion and high sediment levels can be a problem during major rainfall events.

Landowners along the Phillips Brook can use the collected water quality monitoring data to see if the water in the brook can be utilised for various agricultural practices, such as stock watering.

In 2000, advice from the Department of Environment and Bushcare Australia was sought in conjunction with RoB to prioritise sites along the brook for creek line revegetation.

With support from its partners, group members prepared a riparian revegetation trial site, to combat the problem of bank erosion and consequent high sediment levels.

Weed control measures were implemented and the group also planted trees native to the region.

Log walling has been constructed with tree branches and logs secured to sections of the bank to dissipate stream energy and protect the newly revegetated embankments.

Several rock riffle structures have been created to arrest the erosive power of the stream flow, reducing scouring and the transportation of sediment downstream. At present, the results of the river restoration activities are inconclusive but more should be known in the future.

As a component of the school's environmental education program, RoB worked with students from the Toodyay District High School who assisted by planting native sedges and rushes, which will help to minimise further erosion.

The school has also sampled the macroinvertebrate communities living in the brook as a part of the RoB National Macroinvertebrate Snapshot. RoB activities can be linked into the WA School Curriculum Framework and can develop the students' active citizenship role in the community, which could in turn lead to higher levels of environmental responsibility and action.

Since their formation, the Phillips Brook Catchment Group have endeavoured to consolidate their stream restoration plans within a framework that uses water quality indicators of environmental health to evaluate the ongoing success of their projects.

The restoration of Phillips Brook will be continued into the future under the scope of the Avon Natural Resource Management Strategy as a Local Area Plan (LAP).

Phillips Brook Catchment Group continues its stream restoration work on the brook as a demonstration project of immense value to other regional landowners.

REGIONAL PROGRAM SPONSORS

Natural Heritage Trust
Helping Communities Helping Australia

Government of Western Australia
Department of Environment

Swan Avon Integrated Catchment Management
Avon Catchment Council

Toodyay Friends of the River

Case Studies from the Blackwood

From a weed-infested drain to a bubbling brook…

The Geegeelup Brook project site is a wonderful addition to the areas of natural beauty that Bridgetown has to offer, and living proof of the support communities can obtain to take action to improve their local environment.

The Geegeelup Brook stretches along 21 kilometres of hilly Blackwood Valley terrain before it joins the Blackwood River at Bridgetown, in the heart of Western Australia's south west region.

On its journey toward the river, the Geegeelup Brook passes through farms, areas of State forest, the Hester Conservation Reserve, the Hester Dam drinking water catchment, industrial areas, parks, schools, orchards, plantations, and the Bridgetown CBD.

A restoration project began in 2003 on a section of the brook resembling a weed infested drain running through the centre of Bridgetown, where it joins the Blackwood River. Blackwood Waterwatch joined the Shire of Bridgetown-Greenbushes (SoBG), the Department of Environment (DoE) and the newly formed "Friends of the Geegeelup Brook" (FoGB) to provide support and advice on the project. Blackwood Waterwatch is the Ribbons of Blue program in the Blackwood subregion.

The SoBG and the DoE commenced earthworks straight away, with four rock riffles constructed, creating deep pools. The channel was widened and reclaimed from the Kikuyu grass that had all but smothered the brook.

Blackwood Waterwatch organized for more than 300 sandbags to be placed along the brook and around the edges of the pools and riffles to help stabilize the banks before the winter rains to prevent erosion of the riverbanks and provide habitat. Local community members and the "Friends of Geegeelup Brook" turned out in force to help, creating a real sense of community participation and motivation.

Prior to the start of on-ground works, an application for a Green Corps team to work on the Geegeelup Brook restoration project was approved. The team started on the brook in June 2003, under the guidance and supervision of Blackwood Waterwatch.

The Green Corps team undertook a stream foreshore assessment, established five permanent bank and water monitoring points, identified and controlled weeds, and planted indigenous seedlings along the brook.

The team also constructed a bridge, path and seat along the restoration site to encourage people to observe and enjoy the site. The work by the Green Corps team has provided base-line data so changes in the physical, chemical or biological environment of the brook can be detected.

With assistance and training from Blackwood Waterwatch, the FoGB continue to carry out monthly water testing at the restoration site and undertake regular sampling for macroinvertebrates.

Throughout the project, Blackwood Waterwatch has provided assistance with project design, hands-on implementation and ongoing monitoring support.

Blackwood Waterwatch has:

- coordinated the activities of volunteers and school groups
- provided hands-on training in the use of equipment
- assisted with plant identification and water quality monitoring
- trained volunteers to carry out macroinvertebrate sampling, stream foreshore and vegetation assessments; and
- assisted with seed collection and the propagation of local riparian plants.

Blackwood Waterwatch and all those involved in the project are pleased to report that the signs of life are returning to the brook, and water quality continues to show significant improvements.

In 2004 Blackwood Waterwatch held a River Festival at the restoration site, where several hundred students and community members took part in fun and educational activities and displays involving wildlife, "weedbusters", and historical images of the river at Bridgetown. A highlight of the event was the story telling by local Aboriginal elders.

Blackwood Waterwatch continues to carry out macroinvertebrate sampling and water quality testing at the brook with local schools including St Brigids Primary School, Bridgetown Primary School and Bridgetown District High School.

Through curriculum planning across all curriculum learning areas, from art and English, to society and environment and science, students participate in physical, chemical and biological water quality monitoring, carry out stream foreshore and vegetation assessments and collect and propagate native seeds for revegetation. Blackwood Waterwatch has supported these activities over the years by providing teachers and students with activities, resources, equipment, training, professional development and funds.

The project has generally raised awareness in the community about the impact of the urban area on the Blackwood River, and has provided residents with the opportunity to contribute to the improvement of their local environment.

Participating in the project has given people from all walks of life the ability, motivation and networks to take on similar opportunities to improve their environment.

The project represents key aspects of a good natural resource management project, as promoted by the South West Catchments Council (SWCC), including:

- community ownership and involvement
- partnerships with industry, community, local and state Government
- on-ground remedial action to improve water quality and biodiversity, habit creation and removal of weeds; and
- ongoing monitoring and evaluation of biological, physical and chemical parameters of the local environment.

Photograph opposite page:

Community member Matt Egan planting at Geegeelup Brook on National Tree Day 2004. Photographer: Cheryl Hamence, Blackwood Waterwatch.

Photographs this page left to right:

Geegeelup Brook project site before restoration began. Photographer: Clark Ward.

Geegeelup Brook benefits from the hard work and efforts of all involved in restoring the brook. Photographer: Cheryl Hamence, Blackwood Waterwatch.

REGIONAL PROGRAM SPONSORS

Natural Heritage Trust
Helping Communities Helping Australia

WA PLANTATION RESOURCES

RIBBONS OF BLUE WATERWATCH WA
Communities Caring for Catchments

Case Studies from the Gascoyne

Carnarvon's Scout Group monitors local water resources

The 1st Carnarvon Scout Group was one of the first community groups to join the Gascoyne Ribbons of Blue (RoB) program when it began in January 2003.

One of their main activities has been monthly monitoring of the water quality in Chinaman's Pool, a Class A Flora and Fauna Reserve located along the Lower Gascoyne River.

The horticulture and fishing industries and Carnarvon's water supply rely heavily on the health of the Gascoyne River, highlighting the importance of community awareness about the health of Chinaman's Pool and surrounding water sources.

The data collected by the Scouts has raised community awareness about water quality issues in the area, and has been added to the Waterwatch database, which is used at a national level to analyse and report on monitoring at the regional and catchment level.

As a result of the Scouts' monitoring, signage is erected warning the community of algal blooms in the pool when the river level has dropped and stagnated for any length of time.

Filter paper from each monitoring period is now being stored to give a visual representation of historical turbidity and algal levels in the reserve.

The area of land has required maintenance to restore it to Class A reserve status, and so the Scouts planted trees, pulled weeds and cleaned up rubbish as part of their Community World Citizenship task.

The Scouts will revegetate the reserve to help ensure the riverbank is protected from erosion in times of flood. Revegetation will also increase the native fauna habitat, deterring local pests such as feral cats and mice.

Gascoyne Ribbons of Blue coordinator Inez Stemp said some of the Scouts lived on plantations near the river.

"Ribbons of Blue has raised their awareness about how their actions impact on the river, and ensures they are striving to protect the future water resources of the town," she said.

A member of the Scout Group was rewarded with a World Conservation Badge for her monitoring, which involved taking biological surveys of a wetland and monitoring a range of environmental factors such as the weather and the water cycle.

The Scout, 15-year-old Heather Broad, also requested the opportunity to complete her work experience with RoB, to gain a better understanding of the work involved behind the scenes of environmental monitoring. Samples were taken from different sites along the river, which identified high nitrate levels during the end of the fifth river flow for 2004. The data, along with samples collected by the Department of Agriculture, provided collaborative evidence to undertake corrective measures, which included changing stock fence lines, moving watering points out of river systems and addressing the management of grazing paddocks.

At the conclusion of her work experience, Heather commented on how rewarding and challenging the week had been.

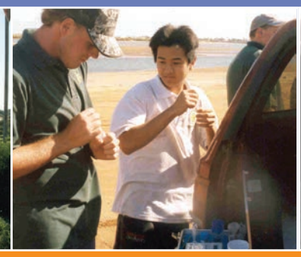
"Work experience with Ribbons of Blue has given me the opportunity to gain further skills that will be a great advantage in my future career path," Ms Broad said.

Participation by the 1st Carnarvon Scout Group in RoB has encouraged scouts to become more involved and pro-active in waterways health, today and for the future. Their involvement contributes to the attainment of Management Action Target W13 of the draft Gascoyne–Murchison Natural Resource Management Strategy that focuses on education and awareness.

Photographs left to right:

Scout Heather Broad testing nutrient levels at Chinaman's Pool, Gascoyne River. Photographer: Inez Stemp, Department of Environment.

Chinaman's Pool, Lower Gascoyne River, Carnarvon. Photographer: Inez Stemp, Department of Environment.



Carnarvon Senior High School monitors local inlet

Students from the Senior Science group at Carnarvon Senior High School work with Ribbons of Blue (RoB) to monitor various water quality parameters of the water in the local Fascine each month, with outcomes linked to the Senior Science syllabus.

Students have written major reports discussing the health of the Fascine and provided a complex analysis of the environmental issues in the surrounding area.

Long-term monitoring data collected prior to the introduction of any activities that may occur in or along the Fascine will provide a base for comparison in the assessment of the Fascine's water quality.

Incoming Year 11 students will continue the existing monitoring program, while outgoing Year 11 students continuing into Year 12 will create a rehabilitation or development program for the site with the aim of implementing it.

This will hone their skills as environmental investigators as well as their ability to design and implement practical solutions to environmental problems, and create a consultation process between the students and the wider community.

Summing up the value of their involvement in RoB, through the use of a feedback questionnaire, the students said they had:

- increased their awareness of how their environment works
- gained an understanding of how pollution from the stormwater pipe in Carnarvon affects the Fascine
- gained an appreciation for the relevance of water surveys and environmental monitoring
- gained an ability to use various test kits and other scientific equipment; and
- developed plans to start a revegetation project enhancing the natural values of the mangrove habitats along the shore.

In a small community where many senior high school students leave to complete their education in Perth, these students are developing a greater understanding of the importance of their local surroundings.

"I value learning more about the environment of Carnarvon and helping to maintain the quality of the Fascine," said Year 11 student Hayley Weeks.

By gaining experience in hands-on science, students discover the relevance of their data and their ability to make a difference through involvement in the management and care of their local aquatic environment.

The students' work will significantly contribute to the attainment of education and awareness targets of the draft Gascoyne–Murchison Natural Resource Management Strategy, which contributes to the outcomes of the future Rangelands NRM strategy.

Photographs left to right:

Carnarvon SHS Senior Science group monitoring at the Fascine 2004.

Students from left to right: Hieu Bui, Yr 11; Ms Clare Bennett, teacher; Michael Curtin, Yr 12; Wade Mason, Yr 11;and Kieran Barron, Yr 12. Photographer: Inez Stemp, Department of Environment.

The section of the Fascine monitored by the Senior Science group, facing Carnarvon and adjacent to the Yacht Club. Photographer: Inez Stemp, Department of Environment.

Students from left to right: Michael Curtin, Yr 12; Hieu Bui, Yr 11; and Kieran Barron, Yr 12. Photographer: Inez Stemp, Department of Environment.

Water quality monitoring kit. Photographer: Inez Stemp, Department of Environment.

RIBBONS OF BLUE WATERWATCH WA
Communities Caring for Catchments

Case Studies from the Geographe/Cape to Cape

Restoring the 'Ghost Trail' at Yallingup

Ribbons of Blue (RoB) has been instrumental in encouraging and supporting schools and community groups at Yallingup and Smiths Beach to undertake water quality monitoring and on-ground restoration works.

During the 1990s the community of Yallingup recognised the need to improve the health and condition of Yallingup Brook. The Yallingup Land Conservation District Committee (LCDC) realised that effective, long-term management required a thorough assessment of the brook to develop a prioritised plan of action.

In 1997 the Geographe Catchment Council (GeoCatch) in partnership with the Yallingup LCDC was successful in obtaining a National Heritage Trust grant to develop a River Action Plan for Yallingup Brook.

The main management issues identified in a prioritised plan of action were weeds, access, loss of riparian vegetation, erosion and siltation and water quality. RoB assisted in the development of the plan, which was aligned with the regional objectives of the Geographe Catchment Management Strategy, by monitoring several sites on the brook with Dunsborough Primary School.

RoB has recruited volunteers and been instrumental in raising awareness of the issues affecting the brook.

The RoB program has brought together teachers and students from Dunsborough Primary School, the Steiner School, Our Lady of the Cape Primary, MacKillop Catholic College, Lynwood Senior High School (Perth), Green Corps, TAFE Landcare students and volunteers from Curtin University and Conservation Volunteers Australia.

Activities supported by RoB have included:

- realignment of part of the brook to reduce flooding on the track
- restoring the walls of unstable banks
- creating riffles, a pool and implementing erosion control through matting, planting and the removal of weeds
- rehabilitating several areas of the brook; and
- monitoring the water quality of the brook.

The groups sample for macroinvertebrates and test for pH, conductivity, turbidity and temperature, undertake site assessments and investigate the geology and soil types of the area.

A busy bee organised in 2001 was attended by fifty local and absentee landowners to remove weeds from the 'Ghost Trail'. The ongoing involvement of the local community has been crucial to the long-term success of the project.

One group of students from Dunsborough Primary School has adopted part of the beach. They plant seedlings and pick up litter to help prevent erosion of the dunes near the brook and remove hazards that may impact on marine life and beach users.

Involvement in the restoration of the Ghost Trail walking trail along Yallingup Brook to the beach has increased the students' awareness and understanding about where they live, the impact they have on the environment and how they can contribute to its sustainable management.

This is linked to the curriculum framework learning area outcomes of society and environment in particular, but also covers areas related to English, science and mathematics.

The project has resulted in many individuals in the local community gaining a strong sense of ownership for the area, and regularly picking up litter, removing weeds and helping with the planting of local native species.

"We are so impressed with the understanding and awareness that the community have gained through being involved with Ribbons of Blue activities. We will leave the brook in better condition that when we found it". Committee member, Yallingup LCDC.

The community education, technical support and advice on waterway quality monitoring and waterway restoration provided by RoB throughout this project directly links to the overarching intentions and management action targets for the South West Catchments Council's Regional Strategy.

Photographs left to right:

'After' photo of Yallingup Brook, taken from the bridge. Photographer: Jenny Mitchell, Department of Environment.

Year 7 Dunsborough Primary School students rehabilitating dunes near the mouth of Yallingup Brook. Photographer: Jenny Mitchell, Department of Environment.

Sorrell Gillett joins in with local community members as part of a Ribbons of Blue busy bee placing rock for erosion control. Photographer: Jenny Mitchell, Department of Environment.

Locals take action in Cowaramup Brook

Concern about water quality prompted Ribbons of Blue (RoB) to begin working with the Gracetown Progress Association (GPA) in 2003, undertaking foreshore assessments to develop an action plan for Cowaramup Brook.

RoB, GPA volunteers, the Cape to Cape Catchments Group (CCG) and the Shire of Augusta–Margaret River (SAMR) worked with landholders to collect information about the type and extent of native vegetation, weeds, erosion, fencing and stock access, vehicle and stock crossings and habitat elements.

With funding provided by RoB and the CCG, the Department of Environment mapped the information collected and RoB and members of CCG and GPA prepared an action plan.

RoB encouraged Cowaramup Primary School Year 5 and 6 students to become involved in the project.

Students spent several lessons learning about river processes and ecology from the RoB coordinator before attending an excursion on Cowaramup Brook.

Cowaramup Brook landholders were invited to join the students on the excursion. This provided an opportunity to involve the landholders in the project and gave the students a chance to engage with the real world outside the classroom. The students interviewed the landholders about the brook before doing macroinvertebrate sampling and foreshore surveys.

In late 2003 approximately fifty parents and community members attended a Cowaramup Brook and Healthy Creeks community meeting organised by RoB. The students gave PowerPoint presentations, recited poems they had written and displayed posters and a 3D model they had made about the brook.

The event provided a challenging learning opportunity for students as well as enabling the community to learn about Cowaramup Brook, stream ecology and management. It also provided an opportunity for students to be involved with the community and to develop their sense of environmental responsibility.

The Department of Environment has undertaken water quality monitoring since September 2004 to gain a better understanding of water quality in the brook.

It is hoped that over time this data, combined with data collected by RoB, will enable the community to better understand the environmental state of the brook and whether land management practices need to be changed to protect and improve water quality.

RoB will continue to encourage and support the school in its involvement in monitoring, on-ground works and raising awareness about environmental issues relating to Cowaramup Brook.

In 2005, students will test water samples to help landholders make decisions regarding what to plant in different areas along the brook, particularly amidst concern regarding saline seeps in the brook.

RoB, CCG, GPA, the SAMR, the Department of Conservation and Land Management and the community will undertake implementation of the action plan.

Outcomes of the action plan already include an increased awareness amongst students and landholders about the Cowaramup Brook system and the establishment of 3.5 kilometres of fencing on the brook to restrict stock access to enable regeneration of native vegetation and erosion control.

This partnership will continue to contribute to the South West Catchments Council's natural resource management targets for the region.

Photographs left to right:

Cowaramup Brook. Photographer: Genevieve Hanran-Smith, Department of Environment.

Cowaramup Primary School students Marianne and Noah undertake macroinvertebrate sampling and foreshore assessments with landholder Ross Campbell. Photographer: Genevieve Hanran-Smith, Department of Environment.

Case Studies from the Kwinana Peel

Kwinana Peel schools investigate their groundwater

In 1998 the Department of Environment (DoE) expressed concern about the amount of groundwater used, the number of groundwater users not meeting licence conditions and the quality of groundwater in the Mandurah area.

Almost all schools in the region use bores to water their school gardens and grounds. Many of the bores had licences that required the school to report to the DoE on water use and conductivity (salinity) levels.

Ribbons of Blue (RoB) set up a meeting with all school principals in the Mandurah subregion to discuss a proposed RoB pilot bore monitoring project that would provide the DoE and schools with a better understanding of groundwater quality in the area while assisting schools in meeting their licence conditions.

Schools were encouraged to use the bore monitoring project as part of their approach to students' education to raise awareness of groundwater. Resources to support school activities were provided to all teachers by RoB.

The principals embraced the project, having been unaware of the licence conditions.

An outline of how and when to collect samples was provided to school registrars, with samples collected in autumn and late spring/early summer used to track peak use during summer and aquifer recharge in winter. For quality assurance purposes, samples were sent to RoB for testing. When the analysis was completed RoB met with the school groundsperson to go through the results and present a species list of native plants that were compatible with the water quality at that specific site. This provided the school with an opportunity to plant native species that would reduce water use.

Schools such as Riverside Primary School have found that native species use less water, are more tolerant of higher salt levels and still provide the shade and aesthetic environment required by staff and students in the playground. Several other schools have replaced or are working toward replacing introduced species with native plants tolerant of the brackish groundwater found in much of the Mandurah area.

Students and teachers, Department of Education and Training and DoE staff now have a better understanding of groundwater quality. Teachers have linked the groundwater education project closely with maths, science and society and the environment learning area outcomes.

The project has resulted in:

- almost all schools meeting their licence conditions
- a reduction in groundwater use across the schools
- greater education and awareness of groundwater and groundwater issues in the region
- data that provides schools and the DoE with a picture of groundwater quality in the area; and
- better schools utilities management with gardens that use less water and are tolerant of groundwater salinity.

Adrian Perry, Principal of Riverside Primary School said, "The Ribbons of Blue bore monitoring project has certainly made us more aware of groundwater and groundwater issues at the school. The native seedlings provide us with just as much shade and grow better than the trees that were planted here originally".

In 2004 the project expanded into local government. RoB will work together with DoE staff and the City of Mandurah to better manage groundwater in the region.

This partnership project with schools, local government and other agencies supports the South West Catchments Council's outcomes by raising awareness of groundwater as a valuable resource in need of protection through increased monitoring and careful usage.

These partnerships will go a long way to assist people in their understanding and protection of one of our most precious resources – groundwater.

Photograph

Glencoe Primary School students testing their bore. Photographer: Phil McGarry, Department of Environment.

Friends of the Reserve Boddington

The Friends of the Reserve Boddington Inc (FoRB) formed in 1998 to encourage community water quality monitoring and the restoration of local rivers. Their aim is to protect riparian reserves to promote land and water protection and improvement.

Their work has resulted in the establishment of partnerships between agencies including the Department of Environment (DoE), local government and business, community Landcare officers and the broader community.

In 1999 FoRB invited RoB to assist them in the planning and implementation of their water monitoring project. Members of the group had already been working to revegetate the banks of the river and had purchased equipment to start monitoring water quality associated with these reserves.

The project links river action planning with on-ground action in the region to improve water quality and has been extended to include both the Hotham and Williams Rivers.

RoB has helped FoRB to collect water quality data at fourteen sites, coordinate community water monitoring days and to work with school students to build a frog pond at the local school.

FoRB's data has indicated that some areas in the eastern wheatbelt are becoming increasing saline and could impact on stock productivity and the health of local waterways.

Through the partnership with RoB it was determined that the community had little or no knowledge of the level of salt in their waterways, particularly in the eastern section of the catchment.

In 2001 RoB initiated a community forum in partnership with the DoE, inviting a wide range of stakeholders to provide comment on a proposed River Action Plan.

The result of that meeting was the formation of the Boddington Rivers Action Group (BRAG). BRAG is made up of a cross section of the community who meet monthly to discuss issues and projects relating to the health of all local waterways. The FoRB is actively involved in the BRAG committee and has assisted with projects such as the establishment of a fish ladder at the local weir.

In 2003 Ribbons of Blue staff approached Worsley Alumina Pty Ltd for sponsorship. The subsequent funding resulted in the first of an ongoing series of community monitoring salinity snapshots of the Williams and Hotham Rivers coordinated by RoB that involved monitoring at 79 sites for salinity and pH over a 520 kilometre area.

Baseline conductivity data for the region gathered from the project has been shared with all contributing parties and will be used for landuse and river restoration planning as well as education and awareness of salinity issues in the catchment.

RoB partnerships, such as the FoRB project, provide a strong link with the South West Catchments Council's capacity building outcomes in regard to the provision of technical advice, training, facilitating community development and implementation of projects that raise the community's knowledge, understanding and values of local waterways.

Kwinana Peel RoB Coordinator Thelma Crook said one of the greatest benefits of the program had been the establishment of a communications network between the various groups.

"These partnerships are extremely valuable as it means sharing resources, information and funding resulting in a better informed community and increased on-ground action," she said.

Photographs left to right:

Salinity Snapshot sponsored by Worsley. Photographer: Paul Leoni, Department of Environment.

Adrian Parker (Department of Environment) and Melanie Nichols (Boddington Gold Mine) looking on while FoRB and BRAG member, Ray Farmer, takes a sample as part of the Worsley Salinity Snapshot. Photographer: Paul Leoni, Department of Environment.

Case Studies from the Leschenault

Supporting the Crooked Brook Forest Community Group

"Ribbons of Blue has made Crooked Brook Forest Community Group members aware of the educational value of the forest. We were so interested and intrigued by what we learned about the billabong, we were as eager as the children to discover what lived below the water's surface." Crooked Brook Forest Community Group Secretary.

Over the past six years the Leschenault Ribbons of Blue program (RoB) has worked with the Crooked Brook Forest Community Group (CBFCG) to support the volunteers who manage the forest facilities.

CBFCG's motivated and passionate local residents have created one of Greater Bunbury district's favourite places for residents, schools groups and tourists to visit.

Crooked Brook flows just south of Dardanup before joining the Preston River about 25 kilometres from Bunbury in State forest. A member of CBFCG constructed a small earth dam on a tributary to the brook forming a "billabong" amidst native bushland. The group saw the billabong's potential for creating a picturesque setting for picnics and walking. CBFCG's vision to create a 'forest for all people' has become a reality with well maintained and accessible walking trails for the elderly, disabled and children. RoB assisted CBFCG by introducing people to the facility and providing information and resources on the waterway and natural ecosystem.

RoB has led numerous schools on "Waterway Discovery" tours. The billabong provides a perfect study area for the tours, which enable students to learn about macroinvertebrates, frogs, birds and plants that live in or near the water body. The RoB Coordinator's guided walk around the trails involves water quality testing and macroinvertebrate sampling.

Each year, local school students undertake "snapshots" of water quality through sampling, providing data on the health of the waterway and gaining a valuable learning experience. This "hands-on" learning enables students to experience real life water quality monitoring and apply previous classroom learning to the outdoor environment. Since the catchment of the waterway is almost pristine, students can readily relate their water quality results to the immediate environment.

All water quality data is compiled by RoB and reported to CBFCG which keeps records and baseline data of the healthywaterway. This data can be used by other groups, local government or interested parties as a benchmark for water quality in the Crooked Brook catchment.

The group also receives records of all schools and the number of participants that visit the forest from RoB. This information has been used to support applications for continued funding to maintain the facility.

After learning about the success of the RoB excursions and activities, CBFCG decided that it was not only school students who would be interested in learning about the organisms thriving in the billabong. RoB worked with CBFCG to create interpretative signage to provide information on macroinvertebrates, their importance to the aquatic food chain and their presence as indicators of water quality. RoB is also working with the Department of Conservation and Land Management to produce interpretive signage depicting the resident frog species, their calls, and their importance as early warning signals when the environment is in danger.

Frogs are very sensitive to changes in the environment, including changes to water quality. CBFCG called on RoB to help identify the species of frogs that inhabit the billabong. Five species were identified with many more expected to be living in the surrounding area.

The success of the community effort, including the many volunteer hours, planning meetings and busy bees to erect signs and maintain trails and amenities, is evident in the natural beauty of the forest and the community's knowledge about the local environment.

The CBFCG and RoB partnership has resulted in visitors to the Crooked Brook coming away with an awareness of the life that the waterway supports and the importance of maintaining a healthy catchment for recreation and a vibrant ecosystem.

There is a strong emphasis in RoB activities at Crooked Brook Forest to meet various Management Action Targets of the South West Catchments Council's Natural Resource Management Strategy. One target is to increase community awareness of and engagement in, natural resource management, which includes an increased understanding of water quality and catchment management through activities, events and school excursions.

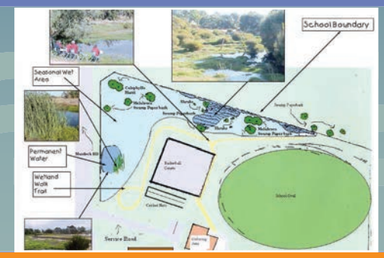
Photographs this page left to right:

What have we got here?....Brendan Kelly examines his macroinvertebrate catch at Crooked Brook.

Students "scoop" the living proof of water quality at Crooked Brook. Photographer: Brendan Kelly, Department of Environment.

Photograph opposite page:

Glen Huon Primary School Wetland Planning Map. Memories of the old school wetland.



A living learning laboratory: Glen Huon Primary School

Many schools in the Leschenault region are lucky enough to have a wetland or waterway on or near their school grounds.

In Eaton the Glen Huon Primary School's unique wetland is an on-site living learning facility used by teachers and Ribbons of Blue (RoB) to achieve student learning outcomes.

Before the school was built in 2000, Principal Carolyn Nankervis and RoB discussed the potential educational values of the remnant wetland on the school grounds. They identified opportunities to link RoB activities into the Curriculum Framework to meet Society and Environment learning outcomes, particularly active citizenship and arts and science. These student learning activities related to water quality, aquatic food chains, birdlife, wetland plants and frog life-cycles.

The school quickly recognised the high level of advice, information and support RoB could offer the school to help retain and rehabilitate the wetland. RoB contributed to the school's Environmental Management Committee, helped to organise weed scalping and landscaping of the wetland and supported environmental education activities and wetland rehabilitation. A project that identified local frog species led to the choice of the Slender Tree Frog as the school mascot.

After participating in RoB macroinvertebrate snapshots and student research projects over several years, students, teachers and RoB staff are currently developing an Action Plan to rehabilitate and manage the wetland.

Future actions involve a rubbish mitigation plan, planting a buffer zone using local wetland species to help protect the wetland from contaminants, and drain painting to educate people about potential pollution that can flow into the wetland.

Some of the activities completed by students include a litter survey, a flora and fauna survey, macroinvertebrate snapshots and seasonal water quality monitoring. RoB provided resources such as survey forms and water quality monitoring equipment.

The students found that the primary source of litter was from adjacent building sites with a small amount from passers by and the school. They decided to include a bin near the wetland, some signage and drain cover paintings in their Action Plan. Action planning and associated activities develop the students' problem solving skills as they demonstrate positive attitudes and behaviours towards the environment.

Students met English outcomes and experience active citizenship first-hand by writing letters to the local Council requesting bird and duck-crossing signs on the busy road next to the school wetland. RoB also wrote to the Council for permission to paint drain covers around the school and wetland. The Council agreed to the drain painting and students are hoping for the bird and duck-crossing signs.

Drain painting aims to reduce contaminants that end up in the wetland and to raise awareness about wetland degradation. It is a key contribution from RoB and the school to the South West Catchments Council's natural resource management targets for the region: raising community awareness and increasing understanding and participation in looking after natural resources.

When students are directly involved in sampling, surveys, action planning and wetland rehabilitation, they:

- develop positive attitudes towards the environment
- realise the importance of wetlands in the environment
- experience water quality sampling in order to monitor the health of the wetland and evaluate rehabilitation actions; and
- move from awareness to action.

The wetland has generated a high level of student interest and enthusiasm and is a unique and innovative learning opportunity.

"We used our Ribbons of Blue flipcharts to help us identify the macroinvertebrates in our tray. There were lots of different critters! That's how we know that the wetland is healthy."—Year 2 student during a "snapshot".

Students illustrated their love of their wetland by writing letters to the media protesting plans to build a road through the wetland in 2004. Unfortunately, the bulldozers moved in but students and teachers remain positive about the part of the wetland that will be retained.

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Leschenault Catchment Council
South West Catchments Council
Living the Vision City of Bunbury

RIBBONS OF BLUE WATERWATCH WA
Communities Caring for Catchments

Case Studies from the Mid West

Ribbons of Blue's innovative educational resources – A case study of the River Flow Model

Investigating river restoration provides students and adults alike with a great opportunity to learn about how rivers work, how environmental problems are caused and the best methods of restoring our waterways.

Mike Johnson, Mid West Ribbons of Blue Regional Coordinator, has designed a river flow simulation model to demonstrate these concepts in an interactive manner with a focus on hands-on, experiential learning as opposed to teacher-centred learning.

The first version of the river flow simulation model was a sheet of 6 by 2 metre black plastic laid on a slope. Soil and a supply of water were the only requirements.

An above ground model was then designed to be:

- user-friendly to teachers and members of the community
- adjustable to vary the slope
- easily stored and transported; and
- suitable for displays.

The model can be used to demonstrate:

- erosion
- transportation of sediment
- the role of vegetation
- the role of woody debris
- the role of rocks and riffles
- formation of pools
- stock watering points
- stock crossings
- waterlogging; and
- wetland and dryland salinity.

St Joseph's School Primary School (Moora) teacher Jill Short was very impressed by the model and its potential as a hands-on learning tool for her students. Ms Short arranged for the model to be set up at the school, where RoB worked with students from two classes.

The students were taken through a series of practical activities looking at the way rivers function, causes of river degradation and the ways in which degraded rivers can be restored.

After observing the model in action Ms Short presented a series of river flow model and restoration activities by herself. She then conducted demonstrations to every class in the school, from pre-primary through to Year 7.

Year 7 students demonstrated an understanding of the river flow and restoration issues, when paired with pre-primary students.

The older students were trained to set up the model and dismantle it, and explain the issues to their 'buddies'.

The activities helped to raise student awareness and understanding of some of the issues facing the Moore River, their local waterway. Participating in hands-on river flow modelling activities also helped to reinforce the students' learning experience.

To ensure that the activities with the model were not just a one-off lesson, the teachers at St Joseph's then organised a series of ten activities to complement the river flow model. The activities included guest speakers, identifying potential sites within the town, making a photographic record of the local creek and discussing the river model.

Using the buddy system has provided the students at St Joseph's Primary School in Moora the opportunity to further develop positive values and attitudes towards the environment, particularly in regards to their local waterways.

A RoB professional development day held at C.Y. O'Connor TAFE provided TAFE students and teachers with the perfect opportunity to learn about river flow and restoration using the River Flow model.

A student activity booklet containing activities related to the model is currently being developed.

The river flow model is available for loan to teachers or community groups. Please contact your regional Ribbons of Blue Coordinator for further information.

Photographs left to right:

Students from St Joseph's Primary School in Moora observing the energy of moving water. Photographer: Mike Johnson, Department of Environment.

Using the river model at the Gingin Expo to demonstrate a restored creek. Photographer: Mike Johnson, Department of Environment.

Year 7 students from Mt Tarcoola Primary School assemble the river model. Photographer: Mike Johnson, Department of Environment.

Burges Street sump

Stormwater sumps normally appear as fenced off blocks filled with weeds. In an effort to clean up the sumps it was decided to use the Burges Street sump as a demonstration site for future sump developments in the City of Geraldton and the Shire of Greenough.

In addition, it was also intended to improve the quality of the stormwater that entered the groundwater basin of Geraldton.

Ribbons of Blue (RoB) coordinated the project which involved various groups from the community.

Mission Employment Work for the Dole crew members removed plants, such as tamarisk and sunflowers that impacted negatively on the sump, and also posed health risks to the wider community (peppers and bulrushes).

The City of Geraldton provided machinery and crew to remove and replace the contaminated soil which was further analysed by the Department of Environment.

The sump was landscaped with rocks and recycled timber in terraces and a pool safety fence was erected to replace the existing chain mesh fence, thus improving the aesthetics of the area.

Beachlands Primary School students planted "sump friendly" trees and sedges. The sedges act to break down the nutrients in the stormwater run off assisting to improve the quality of the water that seeps into the groundwater of Geraldton.

The result is a clean sump that provides a healthy environment for aquatic life such as tadpoles and water beetles. It provides an educational resource for water monitoring and environmental studies to be used by schools and it promotes community awareness about the RoB "Clean Drains Project".

Clean Drains Project

Bluff Point Primary School, in conjunction with Ribbons of Blue (RoB) and with a Coast Care grant, is promoting community awareness of the impact that the community has on the health of the Chapman River and the wildlife and aquatic life that the river supports.

As a constant reminder the slogan "Water to the River" was stenciled over each stormwater entry point that feeds into the river from the roads that surround the Chapman River. The slogan reminds people that anything, be it waste water or litter, that goes down these drains will eventually make its way to the river and affect its health and that of the wildlife.

Additionally two murals have been painted to reinforce the "Water to the River" message.

Under the Chapman Bridge along the walkway a mural designed by the students of Bluff Point Primary School has been cement rendered by a Work for the Dole team. The final painting was completed by the students and depicts insect and bird life that live in and around the river.

A water tank in Spalding Park is also being given a facelift. The mural depicts the aquatic and bird life that populate the river, while also showing the stormwater outlet pipes that feed the river. This reminds the community about their direct link and responsibility to the health of the river.

As a consequence of these beautiful murals, the aesthetics of the area has improved and the incidence of graffiti has been drastically reduced.

Photographs left to right:

Burges Street Sump, located near Beachlands Primary School (Geraldton), prior to landscaping. Photographer: Mike Johnson, Department of Environment.

Years 3 and 4 Students from Beachlands Primary School hard at work restoring the Burges Street Sump. Photographer: Mike Johnson, Department of Environment.

Eye-catching Clean Drains Project mural illustrated by Year 7 students from Bluff Point Primary School (Geraldton) depicting how stormwater can impact on our water quality. Photographer: Mike Johnson, Department of Environment.

RIBBONS OF BLUE WATERWATCH WA
Communities Caring for Catchments

Case Studies from the Swan

Greenwood Senior High School solves nutrient mystery

Early in 2001, Ribbons of Blue (RoB) coordinated the installation of two groundwater monitoring bores on the western and eastern sides of Lake Goollelal, to enable the comparison of the groundwater and surface water quality data in the lake.

Lake Goollelal, along with Lake Joondalup, Walluburnup and Beenyup Swamp forms the 1,500 hectare Yellagonga Regional Park in Perth's northern suburbs.

A groundwater monitoring program was undertaken by students at Greenwood Senior High School (GSHS) with the assistance of RoB.

This assistance has included the provision of training, equipment and equipment maintenance, technical information and assistance during student excursions.

To complement their groundwater monitoring program, students participated in the RoB National Macroinvertebrate Snapshot in 2001. A toxic, blue-green algae bloom was discovered in the lake at levels seven times above the recommended recreational guidelines.

Guy Evans, science teacher at GSHS, explained the purpose of the water quality monitoring program.

"Our aim was to train the students in water quality monitoring techniques. However, further investigation showed something unusual at the lake", said Guy.

While unable to continue with surface water quality monitoring of the lake due to safety reasons, students at GSHS, with the assistance of RoB, monitored the groundwater from the two bores.

Results from the bore on the eastern side of Lake Goollelal showed extremely high levels of nutrients, particularly nitrates, which were up to 500 times greater than on the other side. The results indicated that polluted water could potentially be discharging into the wetland.

Year 8 students further investigated the source of the nutrient plume by continuing groundwater and surface water monitoring. Their findings helped to detect elevated levels of nutrients in the groundwater entering the lake and contributed to the mapping of the plume.

The students' monitoring acted as an early warning system alerting authorities to the problem. As the lake was closed to recreational activities it was important to be aware of the extent of the problem.

Sparked by the students' findings, a larger scale investigation was launched by the Department of Environment in partnership with University of Western Australia Honours student, Nicole Roach, and the Yellagonga Catchment Group to determine the source of the nutrient enrichment.

The results of this study showed that the groundwater pollution was localised to a small corner of the lake. Further investigations by the Yellagonga Catchment Group are progressing.

As yet no definite conclusions have been reached as to the cause of the plume. However, it is likely that it was caused by past or current land uses on the eastern side of the lake.

The students have greatly benefited from their involvement in the monitoring program by:

- making and testing hypotheses
- learning to use a range of technical equipment
- gaining a greater understanding of their local environment
- increasing their understanding of the chemical and biological processes in wetlands; and
- gaining a greater appreciation of the politics and complexities that surround such studies.

Monitoring by GSHS students and the Yellagonga Catchment group at Lake Goollelal is contributing to the Swan Catchment Council's community capacity building management action targets.

Photographs left to right:

Year 8 student Keith Ellis, a Greenwood Senior High School student, sampling the surface water quality in the Yellagonga Regional Park. Photographer: Kelli O'Neill, Department of Environment.

Greenwood Senior High School students sinking a groundwater bore at Lake Goollelal.

Yellagonga Catchment Group keeps an eye on wetland health

The Yellagonga Catchment Group (YCG) was established in December 1999 in response to community concern over a severe nuisance midge problem caused by the increasing eutrophic conditions of Lake Joondalup.

Lake Joondalup, along with Lake Goollelal, Walluburnup and Beenyup Swamp forms the 1,500 hectare Yellagonga Regional Park in Perth's northern suburbs.

The group works with volunteers to regularly monitor the quality of water entering the lake via surface water drains and groundwater inflow. They have also created a 'living stream' in one of the drains which helps to clean the water before it enters the lake.

By providing educational opportunities for local students and adults, RoB and the catchment group are working together to raise awareness of local water quality issues, develop skills and knowledge and encourage behaviour change.

RoB has assisted YCG in the development of a water quality monitoring program and by providing skills training and equipment to group members.

Volunteers monitor the groundwater, surface water and drains entering Lake Joondalup each month for nutrients and other physical parameters. The results have highlighted that all bores in the area are contaminated to some extent with nutrients. Two bores in particular (which coincide with residential areas experiencing the worst midge plagues in summer) have consistently high nutrient concentrations. The YCG is investigating the possibility of sinking additional bores and undertaking a land-use survey, to determine the source(s) of the contamination.

The groundwater monitoring program has recently been extended to include the groundwater entering Lake Goollelal and Walluburnup Swamp. Please refer to the Greenwood Senior High School case study for more information about monitoring at Lake Goollelal.

Combined with the monitoring of surface water, this program will help to determine the source of nutrients entering this system of wetlands.

In partnership with the City of Wanneroo, City of Joondalup, Friends of Yellagonga Regional Park, Department of Environment Rivercare Officers and RoB Swan coordinators, the YCG is upgrading stormwater outfalls within the park by transforming them into 'living streams'. The first 'living stream' pilot project in August 2004 involved the restoration of the Church Street stormwater drain in Wanneroo. The aim of the project is to enhance biodiversity, provide habitat for local wildlife and reduce nutrient loading of nitrogen and phosphorus into Lake Joondalup. RoB participated in this restoration project by providing technical advice and making a presentation on water quality monitoring.

RoB and the YCG are working together with schools to raise students' awareness of local environmental issues by:

- using the RoB catchment model to teach students about how pollutants enter the lake and surrounding wetlands and the impacts these pollutants have; and
- encouraging teachers to get their class to 'adopt' a site, which involves visiting recently revegetated sites and helping to remove introduced vegetation species or sampling for macroinvertebrates with the assistance of YCG members and RoB.

Yellagonga Catchment Group is a part of the urban north sub-regional group that works together with RoB towards the achievement of water regional asset targets identified in the Swan Region Strategy for Natural Resource Management.

Photograph

Yellagonga Catchment Group members monitoring stormwater. Photographer: Nicole Roach, Yellangonga Catchment Group.

REGIONAL PROGRAM SPONSORS
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Department of Environment
Swan Avon Integrated Catchment Management
Avon Catchment Council
Swan-Canning Cleanup Program

Case Studies from the Warren

East Manjimup Primary School's Outdoors Environmental Classroom

A small seasonal stream to the north of the school buildings in East Manjimup has become a great study area for natural sciences and environmental awareness.

Students from East Manjimup Primary School involved in the Warren Ribbons of Blue program (RoB) have studied all aspects of water quality and applied this knowledge to assess water conditions on their own turf.

From the water quality data collected and general site assessments, the students have become aware of local environmental issues and in particular, the major influences on the stream's environment.

Existing uses that impacted on the site health included uncontrolled horse agistment, storm water inputs, weed infestation and a plantation of introduced blue gums.

As part of their work with RoB, the students have designed and commenced implementation of a Local Action Project for the stream area that retains existing land uses while addressing their environmental impact. The project includes suppression of weeds and the improvement of natural water quality.

Activities have included water quality testing, site mapping, creation of two new ponds, identification of flora and fauna, shade tree planting, fencing and embankment landscaping. Future activities will include reed-bed rehabilitation, stock control fencing, introduction of large wood debris for in stream habitat, the creation of a rock riffle to increase oxygen levels, a proposed nature study walk trail, interpretative signs and general landscaping.

Through these activities the site has become an Outdoors Environmental Classroom. The students study within a variety of curriculum areas that include science, society and environment, mathematics, art and English.

Students have also networked into the wider community by inviting a variety of guest experts to give presentations at the site and to help in the implementation of the restoration work. This has included weed experts, indigenous representatives and landcare officers.

Three classes are now involved in the RoB and each has a chosen a field of interest. The focus areas are continued stream restoration, enhancement of fauna habitat, indigenous signage and the use of bush tucker species in the revegetation.

In 2004 the students were successful in applying for an Australian Government Envirofund grant in conjunction with the Shire of Manjimup, Warren Catchments Council and RoB that will see the erection of new stock-control fencing, the construction of a footpath safety fence and general landscaping.

In 2005 the East Manjimup Primary School has joined hands with the local indigenous residents to expand the project to a cross cultural format. This will see indigenous language, culture, customs, environmental management and consciousness combining with the students' rehabilitation project to achieve a healthy restored waterway and also greater social and cultural understanding.

Photographs left to right:

East Manjimup Primary School Year 7 students receiving their Envirofund grant at the rehabilitation site in 2004.
Photographer: Andy Russell, Warren Ribbons of Blue Coordinator 2002.

East Manjimup Primary School Year 7 students taking water samples from the school stream. Photographer: Andy Russell, Warren Ribbons of Blue Coordinator 2002.

Shade tree planting by Year 7 students on the degraded East Manjimup Primary School stream site after initial blackberry control spraying.
Photographer: Andy Russell, Warren Ribbons of Blue Coordinator 2002.

Quinninup Community Association – this little community group has achieved big things

The Quinninup Community Association (QCA), made up of local residents, retirees, artists, farmers and landowners, first became involved in the Warren Ribbons of Blue program (RoB) in order to learn about the water quality of their local rivers, particularly the salt levels in the town's reservoirs.

Through their involvement with RoB, QCA members have regularly collected water quality data from their local streams and the Warren River for over ten years.

The QCA has also improved community recreational facilities and established walk trails in the area.

As dedicated water monitors, they have increased their personal knowledge on water quality and local catchment issues, working with the Quinninup Primary School, the Department of Agriculture, Manjimup Landcare, the Shire of Manjimup, the Water Corporation and the Manjimup Weed Action Group.

Their hard work means they are able to play a positive role in educating their community on river and stream health, as increasing salinity in the river system is a cause for concern in this region.

The valuable, long-term collection of their data is now helping to identify trends in local water quality, with a specific focus on salinity and weeds. This information initiated community action to enhance the water quality of local rivers.

The group has undertaken weed control around their local water-supply catchment, presented information at local expos, proposed water-based information/interpretation signage along walkways and successfully sought grant money for water monitoring equipment now used by the QCA and the Quinninup Primary School.

In partnership with RoB, the QCA is developing an eight-site monitoring program to focus on the increasing salt levels of the Warren River. These strategic monitoring sites span approximately 30 kilometres of the Warren River and incorporate the confluence of the major tributaries in the Quinninup area.

Data collected by the group will be utilised by RoB, Manjimup Landcare, and the Department of Environment's Warren Recovery Team, and will assist in developing further community education and river restoration initiatives regarding changes in salt levels within the river system.

Training, information, resources and equipment provided by Ribbons of Blue to the Quinninup Community Association has been instrumental to achieving the group's aims of learning about and protecting water quality in their area.

The partnership between QCA and RoB contributes to community capacity building and data management action targets for the South West Catchments Council's Natural Resource Management Strategy.

Photographs left to right:

QCA president Liz Bursey helping Quinninup Primary School students study aquatic macroinvertebrates at Karri Lake.
Photographer: Daran Atkinson, Warren Ribbons of Blue Coordinator 2001.

QCA members and Quinninup Primary School students testing the water quality of Karri Lake—the town's water supply.
Photographer: Daran Atkinson, Warren Ribbons of Blue Coordinator 2001.

QCA members running RoB information display at Quinninup's local expo fair.

Prime Minister's Award

... for WA Plantation Resources and Blackwood Waterwatch

School students and community volunteers throughout the South West region have been rewarded at a national level for their efforts to improve water quality in the Blackwood River.

The Blackwood Waterwatch program—a partnership between WA Plantation Resources and community groups—was the national winner in the Prime Minister's 2003 Excellence in Community Business Partnership Awards.

The program was named national winner of the category for medium-size businesses.

Now in their fourth year, the Prime Minister's Awards celebrate national organisations that have developed partnerships that actively contribute to social cohesion and a better Australia.

WA Plantation Resources established the Blackwood Waterwatch Program in 1991 in response to community concerns about the state of the Blackwood River.

Blackwood Waterwatch is the Ribbons of Blue program in the Blackwood region.

Since 1992, students and community members from 17 catchment groups and 35 schools have been gathering information to help explain the health of the Blackwood River and to guide rehabilitation projects.

Activities include monitoring the river and creeks, developing information kits, tree planting, recycling and composting, bore monitoring and school environmental art projects.

Congratulations to all those involved in Blackwood Waterwatch over the past 13 years for this magnificent achievement.

Fitzroy River

... a new addition to the Ribbons of Blue family

The Fitzroy River Ribbons of Blue project has been a warmly welcomed educational opportunity for Fitzroy Valley schools and communities to exchange knowledge and understanding about the cultural, social and environmental importance of the Fitzroy River.

The health of the river system is enormously important and central to all the Fitzroy community members' lifestyles. The schools in the region have embraced Ribbons of Blue into a number of areas of their curriculum. School visits to the river have included visual and site assessments, physical chemical tests, macroinvertebrate studies, fish biologist talks and fieldwork activities.

Artwork competitions and posters have been designed, traditional language workshops have been coordinated and further relevant RoB curriculum documents have been developed in classrooms. The RoB program provides the Fitzroy Valley community an exciting and enjoyable way to learn about the river from a scientific perspective.

The Fitzroy River Ribbons of Blue project is proudly sponsored by the Australian Government, the Rangelands NRM Coordinating Group and the Kimberley Land Council.

Muludja Community School students looking for macroinvertebrates.

Photographer: Hugh Wallace-Smith, Kimberley Land Council.

REGIONAL PROGRAM SPONSORS

Natural Heritage Trust

Kimberley Land Council

RANGELANDS NRM Co-ordinating Group

Ribbons of Blue celebrates

... 15 years of excellence in environmental education

Students, teachers, community group members and sponsors from around Western Australia were recognised by the Minister for the Environment, the Honourable Dr. Judy Edwards MLA, for their commitment to the environment at the Ribbons of Blue celebration event in December 2004. A profile of some of our award winners follows.

Introducing…

Mr Shane Moad

Member, River Conservation Society York Inc.

Winner of the State Community Group Ribbons of Blue 15 Years of Achievement Award for Significant Community Achievement.

Shane Moad first became involved with Ribbons of Blue after a motorcycle accident prompted him to think of ways in which he could contribute to the community. He was particularly concerned for young people who were not old enough to have seen the river in a pristine state and did not realise the condition to which it could be restored.

After more than ten years, Shane is still raising community awareness about the Avon River in the Shires of York and Beverley. "To actually do something productive for the river has been a highlight," Mr Moad said.

"I've seen it improve over the last six years and seen people become more aware of it. There's more wildlife, different vegetation growing back, and tortoises at Gwambygine Pool."

Shane monitors the water during the six to seven months of the year when it rains, assesses the banks, and analyses water samples for salinity, turbidity, pH, temperature and conductivity.

Mr Ken Hill

Teacher, Geographe Primary School

Winner of the Geographe/Cape to Cape/ Lower Blackwood region Ribbons of Blue Schools Awards 2004.

One of the first things Ken Hill noticed when he was transferred to Geographe Primary School was the potential for the wetland next to the school to be used as an educational resource. He successfully applied for a grant from Coles Supermarkets to undertake work at the wetland, and with the help of his students removed rubbish, filled in old drains and rehabilitated the area by planting native vegetation around the lake.

"The lake is unique because it never dries up due to its depth, and so it supports bird life and other native fauna year round," Mr Hill said.

At Mr Hill's suggestion, an arc of picnic tables was built overlooking the lake, and, with room for 32 students, provided the perfect outdoor classroom.

"Environmental education is such a tremendous area that is widely untapped by teachers, and it is so important if you want to produce a generation of environmentally aware children that care about improving water quality in their area," Mr Hill said.

Future plans involve submitting a proposal to the council to put a plan for the wetland in place and writing an integrated environmental education program for the school, which will also incorporate some Aboriginal education.

Mrs Lorraine Ellis

Teacher, Newton-Moore High School

Returning to Newton-Moore High School in 1998, Lorraine Ellis was disappointed to see the once vast wetland behind the school had been developed as residential blocks or turned into a dumping ground for rubbish and debris. After calling for the Environmental Protection Authority to place a value on the area as an educational tool, an additional 20 metres was made available for rehabilitation.

Since then, a fence identifying the area has been constructed by students, more than 1,000 seedlings have been planted, rubbish has been removed and regular monitoring has been established. The site is now visited by other schools in the area, environmental groups and teachers, with students involved in the program acting as 'mini' RoB teachers.

The work of the students and Mrs Ellis has been recognised nationally with the receipt of the National Water Prize and international acclaim at the Stockholm Junior Water Awards.

"The big buzz for me is when students start taking ownership for the program. Winning that part of the wetland really motivated them, and it was the students who generated community awareness about the importance of the area," Mrs Ellis said. "We have a lot of national and international connections through our website and even get inquiries from overseas students interested in the program."

Mrs Ellis is currently finalising teaching modules on Wetlands Studies, which will soon be published and are already sought after by the Australian Water Association.

Miss Lesley Griffiths

Teacher, Glencoe Primary School

Winner of the Kwinana-Peel region Ribbons of Blue Schools Awards 2004.

With Year 5 students involved in 'Top of the Catchment' studies, Lesley Griffiths saw an excellent opportunity to extend learning into Year 6, where students would study the 'Bottom of the Catchment' through the Ribbons of Blue program.

Miss Griffiths said the extended learning has given the students a better understanding of the issues affecting the catchment, and the ability to pass their knowledge on to their parents and peers.

"In the Mandurah area it's very important they are aware of these issues especially with the estuary forming such a major part of our environment," Miss Griffiths said.

"Year 6 students present the information they gather from their research to the class, and if they have any questions they can go directly to the Ribbons of Blue Coordinator.

"I've noticed that people are now more aware and willing to look at things like fertilisers on their lawn and what's going to happen if those fertilisers get washed in the estuary."

Over the school year the students completed a workbook incorporating a wealth of information about the catchment including history, climate, geology, vegetation, landuse, maps and monitoring techniques.

Ms Jodie Carrott

Teacher, St Francis Xavier Primary School

Winner of the Mid West region Ribbons of Blue Schools Awards 2004.

A visit to Jodie Carrott's house will reveal the special fascination that drives her involvement in the Ribbons of Blue program – a fascination that she has passed on to her students.

Frog paraphernalia is just a small indication of the wealth of knowledge Ms Carrott possesses on Western Australia's frogs and their habitats.

As part of their involvement with Ribbons of Blue, Ms Carrott's students research different frogs and produce reports on their size, appearance, interesting dynamics and breeding habits and relate the information to the health of the river.

"It's great seeing the children get so much out of it, and learning so much without even realising it because it's such fun, hands-on learning," Ms Carrott said.

"It's definitely increased their environmental awareness.

"There's a great level of parent involvement as well, which means they're also becoming aware of all the wildlife that's there, and it influences their decisions daily."

An environmental pledge introduced by Ms Carrott allows students to explain how they will help to protect aquatic environments upon completion of the program.

Congratulations

… to all other award winners on their accomplishment

Ribbons of Blue State Awards 2004

These awards celebrate and recognise the contribution made by individuals, schools, community groups or partners via their involvement in Ribbons of Blue over the last fifteen years, on a statewide basis.

Ribbons of Blue Schools 15 Year Achievement Award

- North Dandalup Primary School for their wonderful whole-school approach to environmental education.
- MacKillop Catholic College for their ongoing commitment to environmental education from improving the wetland near their school to being involved in issues affecting the wider community.

Ribbons of Blue Community Group 15 Year Achievement Award

- The Dunsborough Coast and Landcare Group for their outstanding community contribution to the restoration and revegetation of Dugalup Brook from an eroding drain to a Living Stream.

Ribbons of Blue Partnership 15 Year Achievement Award

- The Geographe Catchment Council (GeoCatch) and its predecessor, the Geographe Bay Advisory Committee, for their outstanding vision in recognising that Ribbons of Blue can help deliver GeoCatch's management objectives to the community.
- Special commendation awards were also presented to the Department of Education and Training and the Department of Environment's Hydrological Technology Centre.

Ribbons of Blue Regional Awards 2004

Winners of the regional Ribbons of Blue Schools Awards 2004

These Awards recognise schools, teachers or students who have achieved excellence in environmental education during 2004.

- Cheryl O'Meara, Teacher, St Joseph's Primary School, Northam.
- Carolyn Nankervis, Principal, Glen Huon Primary School.
- Cooinda Primary School
- Kristie Flynn, Teacher, St Francis Xavier School, Geraldton.
- Judith Duff, Deputy Principal, Carnarvon Primary School.
- Glen Forrest Primary School.
- Fred Liddle and Tammy Liddle, Teachers, Mount Tarcoola Primary School.
- Mary Callaghan, Teacher, Beachlands Primary School.

Ribbons of Blue Community Group Awards 2004

These Awards recognise the significant community achievement of community groups involved in the Ribbons of Blue program during 2004.

- Cape to Cape Catchments Group.
- Crooked Brook Forest Community Group.
- Robin Broad, 1st Carnarvon Scout Group.
- South East Regional Centre for Urban Landcare groups.
- Wooroloo Brook Land Conservation District Committee.
- Phillips Brook Catchment Group.

Ribbons of Blue Partnership Awards 2004

These Awards recognise the exemplary support and commitment to Ribbons of Blue by its partners during 2004.

- Tammin Alcoa Landcare Education Centre.
- Shire of Augusta–Margaret River.
- Worsley Alumina Pty Ltd.
- The Mission Employment Work for the Dole Crews.
- The Swan Catchment Council.
- The City of Geraldton.

Statewide evaluation

… a Blue Ribbon performance

In September 2003, the Department of Environment undertook an evaluation of the state-wide Ribbons of Blue/Waterwatch WA program. The evaluation found that Ribbons of Blue has been a huge success and has strong community support.

The evaluation confirmed Ribbons of Blue has:

- brought about greater awareness of water quality and environmental issues, including attitudinal changes and tangible positive changes in environmental action.
- fostered a sense of responsibility and ownership of local ecosystems.
- resulted in a greater value placed by the community on waterway / ecosystem health, brought about a greater understanding of scientific method, scientific equipment usage and data analysis through water quality monitoring and fostered responsibility and ownership of local ecosystems by the community.
- collected data that provides valuable information for identifying environmental problems and preparing management plans. Based on the outcomes of their monitoring, participating groups may develop action strategies to help manage any problems identified.
- created important links between state and local government authorities, community groups, schools and environmental programs. These links have facilitated an integrated approach and resulted in on-ground environmental action projects and increased remedial action.

What do community groups think?

The evaluation demonstrated that community group involvement in Ribbons of Blue has:

- encouraged participants to take action to protect the environment.
- changed adult behaviour in regard to the protection of the environment.
- increased cooperation between the community group, government and other key stakeholders.

Denise Gillies
Crooked Brook Forest Community Group
Our Ribbons of Blue Coordinator has provided us with expert guidance and the opportunity to improve our knowledge of the management of our waterway.

Shayne Calliss
South West TAFE Brunswick River Restoration Project
I feel the Ribbons of Blue project in Bunbury has helped educate an entire generation of people in water quality and environmental issues relating to water.

Greg Marston
Friends of the Reserve Boddington
Ribbons of Blue has served as a practical demonstration of monitoring water quality to promote understanding of environmental impacts on the catchment ecosystem.

What do teachers think?

- Ribbons of Blue provides the ideal way for students to gain knowledge, skills and values through participating in hands-on, 'real' science.
- Ribbons of Blue increases the value that students place on the environment.
- Ribbons of Blue is highly motivational for students. Through their children's involvement, parents also become more aware of and interested in environmental issues.

- The Ribbons of Blue curriculum material and professional development programs provided for teachers meets their needs and the range of teaching and learning activities in Ribbons of Blue are suitable for their students.
- Ribbons of Blue had increased cooperation between the school, community groups, government, members of the public and other key stakeholders.

Kathy Holt, Teacher
Our Lady of the Cape Primary School, Dunsborough

Students were able to become involved in the scientific process of investigation, research, testing, analysing and concluding. They have become 'active citizens' in the local area and have raised their awareness of important environmental issues and how they can make a difference.

I was surprised by the enjoyment and motivation that the children gained through their involvement in the program, as well as the obvious effects on their learning and forming of attitudes.

Ribbons of Blue provides such a fantastic opportunity for student awareness, skills and knowledge to be developed in relevant 'real' situations.

Michael Black, Teacher
North Beach Primary School

My students now see Star Swamp in a different light. They live within its catchment and are more aware of how their behaviour affects the quality of the swamp.

It's nice for students to feel that they are part of a 'big picture' and that they are playing an important role.

Ribbons of Blue has turned out to be a wonderful learning opportunity that perfectly combines knowledge, skills and values.

Charlie Ballard, Teacher
Calista Primary School

It's a great way to contribute to the local community, involve the students in useful outdoor activities which have an important effect on their environment and it allows the students to study, monitor and help conserve the local wetland.

Senior High School teacher

By doing Ribbons of Blue, the students gain a deep understanding of environmental issues, work collaboratively with a number of community groups and gain invaluable skills and knowledge as well as develop their own values system.

What do students think?

- Ribbons of Blue helps students understand the importance of looking after the environment, the problems of water pollution and the importance of monitoring water quality and issues related to waterways.
- Ribbons of Blue has enhanced students' knowledge, attitudes and values towards the environment.
- Ribbons of Blue has enhanced students' scientific skills, practical skills, mathematical skills, written skills, and their self confidence and self esteem.
- Ribbons of Blue has helped students with their schooling in terms of solving problems and putting their school work to practical use.
- Ribbons of Blue has helped students to work better with their classmates and their teachers, and has improved their relationships with community members.
- In line with the Curriculum Framework goal of active citizenship, Ribbons of Blue helps students to do something useful for the community and to become more informed citizens.

Year 12 student
Geraldton Secondary College

The Ribbons of Blue program monitors and rehabilitates our waterways in an existing area by involving the community and encouraging them to actively participate.

Many Australians love our waterways, and the organisms that live in these environments. I personally would love to be more involved with the program, and help do research and monitor the waterways.

Year 7 student
Katanning Primary School

Before we did Ribbons of Blue, I didn't know about land clearing, or that too much manure isn't good for farms and what causes algal blooms. We have worked on the Internet, solved puzzles bit by bit, filmed a short movie and worked with younger children. I think that Ribbons of Blue has helped all of us to work together as a team.

Source: Department of Environment *Ribbons of Blue/Waterwatch WA Evaluation Final Report,* 15 September 2003. Stamfords Advisors Consultants.

The Ribbons of Blue State Support Team

... supporting regional Ribbons of Blue programs

The Ribbons of Blue State Support Team assists Ribbons of Blue regional coordinators to coordinate projects and facilitate the effective and efficient delivery of the program across Western Australia.

The Ribbons of Blue evaluation identified that the State Support Team was integral in the program's success. There was a strong belief that support and assistance from the State Support Team is very important for regional coordinators to achieve the objectives of their job.

The Ribbons of Blue State Support Team is based in the Community Education section of the Department of Environment. The Team is comprised of a full-time State Program Manager, a part-time Community Education Coordinator funded by the Department of Environment, and a qualified full-time teacher on secondment from the Department of Education and Training employed as the Ribbons of Blue Education Coordinator.

The State Support Team assists regional coordinators by providing the following:

- Training and networking
- Technical advice and logistical support
- Strategic direction (including membership of the National Australia Waterwatch Network)
- Maintenance of the Ribbons of Blue data Quality Assurance/Quality Control program
- Coordination of state-wide activities and events
- Development of educational resources for students, teacher and community groups
- State-wide professional development for teachers and assistance in the delivery of regional professional development for teachers and community groups
- Assistance integrating Ribbons of Blue within WA's regional natural resource management structure
- Development of partnerships
- Seeking sponsorship
- Promotion and marketing
- Reporting; and
- Ongoing development of the program and evaluation of outputs and outcomes.

Key achievements during 2004

Educational Resources/Activities

- Publication of Draft Estuarine Invertebrate Identification Guide *Estuarine Invertebrates – A Photographic Guide for Southwestern Australia*
- Publication of Draft Teacher Resource Activity Kit *Ribbons of Blue—In and Out of the Classroom*
- Macroinvertebrate DigiVid students competition; and
- Groundwater Model Users Guide.

Regional Coordinator Training/ Networking/Support

- Adult Learning Principles training
- Curriculum Framework training
- Rivercare/Ribbons of Blue workshop; and
- Regional Coordinators Professional Development Workshop.

Coordination of Statewide Activities and Events

- Saltwatch Snapshot
- Macroinvertebrate Snapshot; and
- RoB 15 Year Celebration.

Professional Development for Teachers

- Science Teachers Association of WA
- Primary Science Teachers Conference (PRISSEM)
- Tertiary Undergraduate Professional Development opportunities
- Beginner Teachers Conference; and
- Other theme based state and regional teacher professional development.

Raising the Profile of Ribbons of Blue

Draft Case Studies Publication; Adult Learning Poster; River Flow Model (Royal Show); displays, maintenance of the Ribbons of Blue website.

Quality Assurance/Quality Control Program

Provision of calibration solutions to RoB registered groups, technical advice, coordination of equipment maintenance, RoB Water Quality Monitoring Equipment Guide, Waterwatch Australia Database support.

Strategic Direction

Implementation of the recommendations of Ribbons of Blue Evaluation 2003; planning, funding applications, Halls Creek pilot project; Submissions to WA's Natural Resource Management Strategies; Waterwatch Australia Network Steering Committee.

Partnerships

- Department of Education and Training Partnership Agreement 2004–2006
- Department of Agriculture
- regional sponsorships and partnerships.

Community Education

The State Support Team has been instrumental in achieving school education outcomes, such as:

- Development of the WA Schools for Sustainability Environmental Education Awards 2005
- Coordination of the Premier's Education for Sustainability Competition
- Assistance in achieving sustainable schools outcomes
- Development of the DoE Schools Environmental Education Advisory Committee; and
- Provision of professional development opportunities for teachers.

Ribbons of Blue

... says thank you

Ribbons of Blue would like to acknowledge the incredible dedication and enthusiasm of thousands of teachers, students and environmental community group members involved in Ribbons of Blue. Without them and the inspiration and support of state and local government officers, professionals and individuals, government, commercial and industry sponsors the Ribbons of Blue program would not be the success it is today.

STATE PROGRAM **SPONSORS**

Government of Western Australia
Department of Environment

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