



# Our Water

Source Water Protection for the ACT

Teaching Resources for water quality, catchment and conservation education.

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The Southern ACT Catchment Group thanks ACTEW's 'Source Water Protection Program and the Australian Government's 'Caring for Our Country' Grants for the continued funding and support of this resource.

Designed by Cate Riley at **fadstudios** [www.fadstudios.com.au](http://www.fadstudios.com.au)



**Australian Government**



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## Unit Description

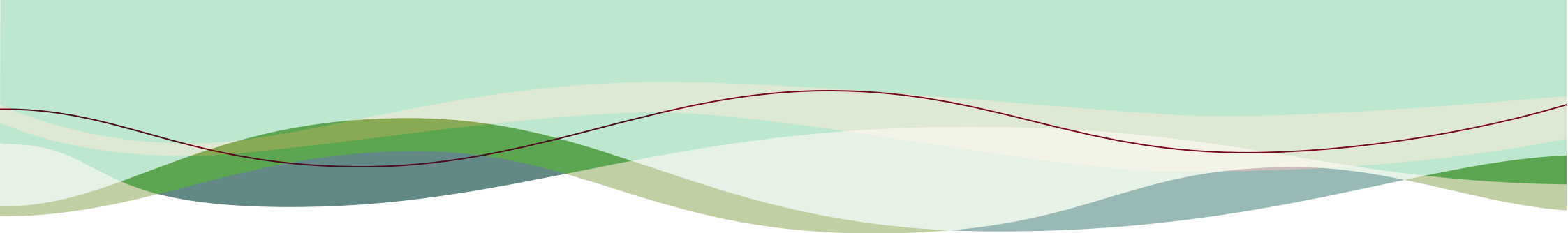
As Canberra's water requirements have increased, our need to find additional sources of water to cope with this demand has led to a greater reliance on all of the river systems flowing through the ACT. Up until the late 1970s only the Cotter River catchment with its system of three dams (Corin, Bendora and the Cotter) was necessary to meet all of our water needs. Such was the quality of water provided by the Cotter catchment that the water needed little treatment. This clarity and purity was made possible because the Cotter catchment lies within Namadgi National Park and is protected from human and domestic animal activities and faecal contamination, as well as other pollutants present within urban landscapes.

Population projections for Canberra in the 1970s showed that by 1979 the Cotter River system would not be able to cope with the increasing demand for water. The Queanbeyan River was dammed in 1979 to form the Googong Dam in order to meet this growing demand. The Googong catchment is now an important part of Canberra's water supply system. Water from this catchment flows through farmland, rural residential properties and forestry reserves. Extensive treatment is necessary to ensure a safe water supply, which increases the cost of supplying safe, drinking quality water.

The ACT population is increasing and our rainfall seems to be decreasing in response to climate variability. In early 2007 the ACT was heading towards a critical time in water supply history. The combination of record low inflows into our dams, a hot dry summer and higher than expected water consumption resulted in the depletion of our water storage levels. Until 2007, Canberrans only used the Murrumbidgee River for recreation. Places such as Pine Island and Kambah Pool will be familiar to many as popular swimming and picnicking locations. Extraction from the Murrumbidgee to supplement Canberra's water supply system commenced in May 2007. This water is treated at the Mt Stromlo Water Treatment Plant to Australian Drinking Water Guideline Standards.

The Paddys, Gudgenby and Naas Rivers and their tributaries flow into the Murrumbidgee River and provide their share of water for the growing city, as well as continuing to supply rural properties in the southern ACT. In fact ALL of the creeks in the southern ACT potentially feed our drinking water supply.

Many of our natural creeks were engineered into stormwater channels when suburbs were being built in Tuggeranong. Replacing



creek beds with concrete drains removes the natural filtering ability they once had.

**“WHAT DOES THIS MEAN IN TERMS OF OUR WATER QUALITY?”**

It simply means that anything and everything that finds its way into our drains and stormwater systems in the southern ACT has the potential to end up in our drinking water.

Also, anything that happens to contaminate the water of the Murrumbidgee River and its tributaries will carry a similar risk to Canberra’s water supply. Rubbish, chemicals, pathogens (disease-causing microorganisms), mud, and other sources of pollution are all potential problems that our water treatment system will have to cope with. This adds cost and uncertainty to a resource we tended to take for granted in the past.

The following teaching resource is designed to link source water and catchment health issues with the requirements of the ACT Department of Education’s *Every chance to learn* Curriculum framework for ACT schools, covering Preschool to Year 10 Essential Learning Achievement 20 (ELA): ‘*The student acts for an environmentally sustainable future*’. The ‘*Source Water Protection in the Southern ACT*’ resource is not limited to years K to 10, as many activities can be adapted and made suitable for Years 11 and 12.

A wealth of resources exists for teachers seeking exciting and motivating activities for students that address this ELA while teaching about water protection. Environmental organisations such as Waterwatch, Landcare, the Australian Sustainable Schools Initiative Program in the ACT and the ACT Natural Resource Management Council, among many others, have recently produced education packages that are informative and engaging. ActewAGL, along with utility providers in other states has also produced a range of resources for teachers as part of their community education commitment.

The Source Water Education project aims to assist teachers in finding, understanding and using the best and most suitable activities from this rapidly growing pool of resources to meet their curriculum needs quickly and efficiently.

There is an emphasis on ‘hands on’ and ‘field work’ activities. Most education activities, such as those produced by Waterwatch, have been used safely and successfully in schools across Australia for many years now. Activities have been identified for the 4 Bands of Development and all can be modified to suite all physical and cognitive abilities.

## The Source Water Education Officer can:

- ▶ assist with selecting and adapting learning elements to suite teacher/student needs.
- ▶ deliver lessons as a 'specialist' to classes where requested.
- ▶ provide in-service training in environmental education.
- ▶ assist and/or deliver field work and practical lessons.
- ▶ provide specialised equipment where necessary.
- ▶ book excursions to ACT utilities on behalf of the teacher/school.
- ▶ book and arrange visits by experts to schools.
- ▶ drive buses (any size) to assist with excursions and field work.

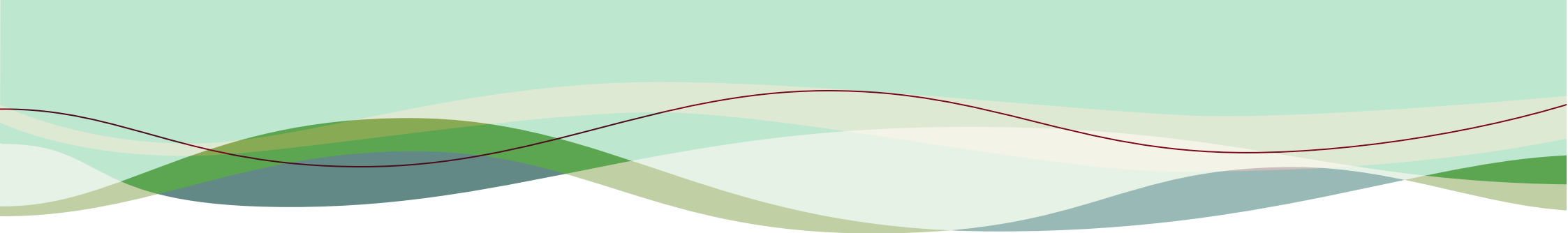
### Contact Details: Education Officer

Ph: 6296 6400, Fax: 6296 6455

Email: [waterwatch@sactcg.org.au](mailto:waterwatch@sactcg.org.au)

## Key Understandings

- 1 Water for life.** All known life on earth requires water to live. Water is essential for the human body to function properly.
- 2 Water Cycle.** The 'water cycle' is nature's huge water purification factory. Without this process we simply would not have any water to drink. We rely on this natural process to replenish our rivers and dams with pure, fresh water when it rains.
- 3 Canberra's water supply.** Until now Canberra's water supply has had little impact from human activity. Water from the Cotter catchment supply has needed almost no treatment. There is now a reliance on the Murrumbidgee River, and its tributary river and creeks, to supplement our growing domestic water demands. This water has a greater risk of being contaminated by human activity.
- 4 Diversified Ecological Systems.** The ecological diversity of our planet is critical in ensuring our survival as a species. Ecological systems that are diverse are less likely to succumb to natural disasters or disease.

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- 5 Altered waterways.** All of Canberra's lakes are artificial and most of the Murrumbidgee River's tributaries in the suburbs have been engineered into storm water drains. A ready example of these changes may be seen where Tuggeranong Creek passes under Lienhop Street in Theodore. This begins the seven kilometre concrete channel that runs all the way to Isabella Ponds.
  - 6 Pollution.** What we put down our stormwater drains and creeks will directly affect the quality of our water. Natural creeks and wetlands with their inherent filtering systems, remove nutrients and toxins from water before it flows into river systems. Concrete drains do not provide the same level of protection. This has increased the pollution risk to the Murrumbidgee River.
  - 7 Heritage.** The Murrumbidgee River has been the life blood of people of our region in the past and continues to be increasingly important today.
  - 8 Natural disasters.** Drought and fires have had a significant effect on ACT catchments. The fires of 2003 had such a dramatic effect that water could not be drawn from any of the ACT dams for 9 months following the fires, and forced the need for a water treatment plant on Mt Stromlo.

Drought has led to immeasurable ground cover loss in the regions 'up stream' of the ACT. The legacy has been increased silt and mud in the Murrumbidgee River after storm events to our south.



## Attitudes and Values

- 1 **Water and Health.** Having an understanding of how important water is to health and wellbeing, leads to an appreciation of how important it is to look after source water.
- 2 **Responsibility for water ways.** Students taking an active role in looking after local water ways are participating in community responsibility for water quality in the ACT.
- 3 **Conserving resources.** Everybody has a vital role to play in protecting our environment, especially in conserving our most precious resource, water.
- 4 **Values.** Transforming student's ideas into actions within the classroom, school and community develops a sense of efficacy and provides opportunities for inclusion.

## Focus Questions
































1. *Why is water important?*
2. *What is good quality water?*
3. *How do we measure water quality?*
4. *What natural processes enhance water quality?*
5. *Where does Canberra's water supply come from?*
6. *What is a water catchment?*
7. *How are environmental health and water quality connected?*
8. *What changes have occurred to Canberra's waterways?*
9. *What are the risks to our water supply?*
10. *How do our behaviours affect our water sources?*
11. *How has our use of the ACT's waterways changed over time?*
12. *What are some of the significant events in our waterway's history?*



## Rating of Teacher Resources

*The following is a key to the symbol system used as a guide for each resource.*

*A brief description of each resource is included in italics.*

 EC	Early childhood (Preschool to Year 2)	 LC	Later childhood (Year 3 to Year 5)
 EA	Early adolescence (Year 6 to Year 8)	 LA	Late adolescence (Year 9 to Year 12)
	Linked to National or ACT Curriculums		Visually creative activities
	Teacher information		Class discussion activities
	Lesson plans		Group work activities
	Guest Speaker		Hands on activities
	Excursion		Writing activities
	Adaptable for special needs		Numeracy activities
	Costs involved		Literacy activities
	Outdoor activities		Questions
	Audio/Video		Assessment materials
	Online or computer activities (  Denotes Pre-designed Smart Board activities)		Printable/photocopy handouts
	Drama / Musical activities		Homework/Project work
	Games		Research & enquiry
	Data collection and investigation		Further links and contacts

*Note: Most ACT schools have been given copies of resources produced by the ACT Government and ACTEW. Contact the Source Water Education Officer if difficulty is encountered obtaining any publications. Copies of most are also available for loan.*

**Contact: Education Officer • Ph: 6296 6400 • Fax: 6296 6455 • Email: [waterwatch@sactcg.org.au](mailto:waterwatch@sactcg.org.au)**

## Upper Murrumbidgee Waterwatch Education Programs

**UPPER MURRUMBIDGEE WATERWATCH** provides a network of skilled coordinators that deliver specialised class activities and teacher training, tailor made to meet the needs of all ages and abilities. [www.act.waterwatch.org.au](http://www.act.waterwatch.org.au) or Contact the Source Water Education Officer [waterwatch@sactcg.org.au](mailto:waterwatch@sactcg.org.au)



Focus Questions covered	Level	
1-12	EC - LA	

## Sustaining River Life

**TANYA RUCOSKY NOAKES (2010) – ‘A YEARS K-12 CURRICULUM AND ACTIVITIES GUIDE FOR TEACHERS AND NATURAL RESOURCES MANAGERS’**

ACT Waterwatch and RiverSmart Australia Ltd. [www.sustainingriverlife.org.au](http://www.sustainingriverlife.org.au) Resource pack was issued to ACT schools in 2010.

This folder is the essential text for the Waterwatch program. It has lesson plans that cover the full array of issues to do with water and aquatic ecology. The Education Officer's role as a Waterwatch Coordinator is also to support the use and development of lessons from this package. Highly recommended. Contact the Source Water Education Officer [waterwatch@sactcg.org.au](mailto:waterwatch@sactcg.org.au)



Focus Questions covered	Level	
1-4, 6-10	EC - LA	

## Frogwatch ACT & Region

**THE GINNINDERRA CATCHMENT GROUP** hosts a Frogwatch Education Program including an online resource and education officer who can give presentations to schools. The Frogwatch program is an annual frog population monitoring program for community volunteers and is supported by a dedicated project officer. There are training events, equipment loan and online data entry opportunities.

No cost involved. See website for details. [www.ginninderralandcare.org.au](http://www.ginninderralandcare.org.au) (or contact Source Water Education Officer).



Focus Questions covered	Level	
3, 4, 7, 9, 10	EC - LA	

## Platypus Watch

**AUSTRALIAN PLATYPUS CONSERVANCY.** A presentation is available to schools or group by an expert on platypus, their ecology and conservation (Includes a freeze dried specimen!). A group platypus watch survey can be organised at any waterway location or an excursion to Tidbinbilla Nature Reserve can be arranged to encounter platypus in the wetland sanctuary.(High probability and really the only chance to see them during the day.)

Contact Source Water Education Officer [waterwatch@sactcg.org.au](mailto:waterwatch@sactcg.org.au)

Focus Questions covered	Level	
1-4, 7, 9, 10	EC-LA	



## 'The wonder of WATER — The Cotter Dam Education Kit' 2010

**ACTEW CORP.** This expensively packaged and extensive resource was issued to ACT schools by Actew in 2010. It has a fantastic appendix 'The Cotter Heritage Story' which explores the history of Canberra the Cotter region as well as CD's, resources and suggested lesson ideas.

[www.actew.com.au/WaterSecurity/MajorProjects/education.aspx](http://www.actew.com.au/WaterSecurity/MajorProjects/education.aspx) (or contact Source Water Education Officer for loan of a copy).

Focus Questions covered	Level	
1-12	EC-LA	



## ACT Australian Sustainable Schools Initiative 2007

**ACT DEPT. OF TERRITORY AND MUNICIPAL SERVICES, CANBERRA** 'Educating for Sustainability through the ACT Curriculum'. Teaching ideas specifically aligned to the A.C.T's 'Every Chance to Learn' curriculum. Details can be found at: [www.sustainableschools.act.gov.au](http://www.sustainableschools.act.gov.au)

Focus Questions covered	Level	
1-12	EC-LA	



## 'Understanding Canberra's Wetlands'

**E.ROBINSON & J.DIBLEY(EDS)** — a school curriculum program for the study of constructed urban wetlands' 2010 ACT Dept. Environment Climate Change Energy and Water, ACT Australian Sustainable Schools Initiative, & ACT Dept. Education and Training. Resource pack was issued to ACT schools in 2010. (or contact Source Water Education Officer for loan of a copy).

Focus Questions covered	Level	
1-12	EC-LA	   



## 'Understanding the Land through the Eyes of the Ngunnawal People — A Natural Resource Management Program for ACT Schools'

**AUSSI ACT, NATURAL RESOURCE MANAGEMENT COUNCIL** Resource pack was issued to ACT schools in 2010.

Looks at the historical importance of land and water from the perspective of the Ngunnawal people .Comes with a CD Video resource and excursion lesson plan for an ACT river site. (If unavailable at your school contact Source Water Education Officer for loan of a copy).

Focus Questions covered	Level	
1, 5, 11, 12	EC-LA	              



## 'Operation:Coolenation'

**THE CARBON PLANET LTD SCHOOLS' PROGRAM [www.coolenation.com](http://www.coolenation.com)** A colourful, commercially produced education package for primary students based around 2 super hero characters. There is a CD of resources as well as glossy posters and handouts. .A school presentation program is also available. The Source Water Education Officer has a copy of the package for perusal.

Focus Questions covered	Level	
1, 4, 10	LC-EA	                 



## Australian Water Education Toolkit

<http://www.environment.gov.au/water/education/index.html> The Australian Water Education Toolkit is an exhaustive website search tool using filters to define school level, region, resource types and key concepts to search all on line water education sites in Australia.. It will have links to sites mentioned in this resource and many others. A brief description of resources is provided as well as icons defining features (Similar to this resource). **Well worth a look**

Focus Questions covered	Level
1-12	EC-LA



Australian Government

## Waterwise

<http://www.derm.qld.gov.au/waterwise/education/index.html> A terrific resource. Lots of detailed lesson plans and printable materials for Years K – 7 in downloadable PDF booklets. **Highly Recommended.**

Focus Questions covered	Level
1-4, 6, 7, 9, 10	EC-EA



## Water Corporation

<http://www.watercorporation.com.au> West Australian water education website. Registration is required to access lesson plans. Includes 'You Tube' clips and 'Smart Board' resources. Most content is understandably focused on WA catchments and issues. The Resources on water use, the water cycle, and behaviours are excellent. Only suitable for classes up to Yrs.

Focus Questions covered	Level
1, 2, 4, 6, 7, 9, 10	EC-LC



## Sydney Water

<http://www.sydneywater.com.au/Education> This is the education site for Sydney Water. Factual information and links to games and videos from other websites are the main features. At the time of reviewing this site the links to lesson plans were not working.

Focus Questions covered	Level
1-4, 6, 7, 9, 10	EC-LA



## Ollie's World — An Interactive Sustainability Resource

<http://www.olliesworld.com/planet/aus/info/index.htm> A very colourful website with many submenus. There is some good basic information but it is a hunt to find it. There is an extensive list of CD ROMs with lesson plans and activities for purchase. The site has a link to a free student website production package with templates using their themes. There are also some simple games and word puzzles.



Focus Questions covered	Level	
1-4, 6, 7, 9, 10	EC-EA	

## Yarra Valley Water

<http://www.yvw.com.au/Home/Waterandsewerage/Education/index.htm> Links to 'Mission H2O' game site, which is quite good and has lots of imbedded games throughout a virtual tour of a home. There are other pages with textual information, however the tours and resources (which look terrific) are all restricted to the Melbourne region.



Focus Questions covered	Level	
1, 2, 9, 10	LC-EA	

## Clean Up

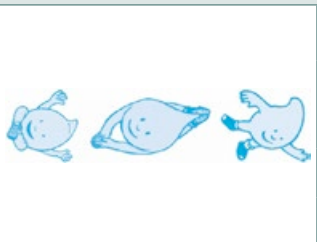
<http://www.cleanup.org.au/au/FunStuff/> Fun game picking up rubbish in a river with some information to read and quiz at the end.



Focus Questions covered	Level	
10	EC-LC	

## Whizzy's Incredible Journey











<http://www.derm.qld.gov.au/waterwise/whizzy/index.html> This is a link to a purchasable package by the Qld Government's 'Waterwise Queensland' education program featured previously. There are downloadable PDF samples of the materials. This includes posters and CD ROMs.



Focus Questions covered	Level	
1,4,6	EC	

## Water Education Tools







<http://www.water.wa.gov.au> Link to WA's Department of Water education page. Some of the links on the home were not working at the time of this review. The site mostly contains fact sheets as PDFs that can be down loaded and printed. Excellent Resource for senior students studying social and environmental issues. A frustrating feature is the linking of the same resources to many topic headings causing a lot of repetition while surfing the site. The 'student' menu links to the same resources as the teacher one but is more user friendly.

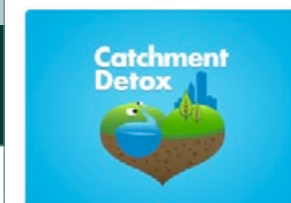
Focus Questions covered	Level	
1, 3, 4, 7, 9, 10	EC-LA	         



## Catchment Detox

<http://www.catchmentdetox.net.au/> This is an ABC Science website, looks pretty good. Interactive online game that can be played as individuals or in small groups or as a class. Printable material including fact sheets, further video and audio information, FAQs, and a guide for teachers

Focus Questions covered	Level	
4, 6, 9, 10	LC	     



## Jacaranda Educational Supplies

<http://www.see-change.org.au/sites/default/files/sustainable%2obook%2olist%2oJacaranda.pdf>

List of books suitable for sustainability and resources for schools

Focus Questions covered	Level	
1-12	EC-LA	                  

