

GEOGRAPHY BULLETIN



The
Geography Teachers' Association
of New South Wales Inc.

Winter 2009
Volume 41 No 3

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Water  for Life
NSW GOVERNMENT

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GEOGRAPHY BULLETIN

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of New South Wales Inc.

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The Geography Bulletin is a quarterly journal of the Geography Teachers Association of New South Wales. The 'Bulletin' embraces those natural and human phenomena which fashion the character of the Earth's surface. In addition to this it sees Geography as incorporating 'issues' which confront the discipline and its students. The Geography Bulletin is designed to serve teachers and students of Geography. The journal has a particular emphasis on the area of the Pacific basin and its near neighbours and a specific role in providing material to help meet the requirements of the Geography syllabuses. As an evolving journal the Geography Bulletin attempts to satisfy the requirements of a broad readership and in so doing improve its service to teachers. Those individuals wishing to contribute to the publication are directed to the 'Advice to Contributors' on page 58. Articles are submitted to two referees. Any decisions as to the applicability to secondary and/or tertiary education are made by the referees. Authors, it is suggested, should direct articles according to editorial policy.

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Vol 41, No3

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WINTER 2009

EDITORIAL



Sue Field, Editor



In this edition

In this special edition of the *Geography Bulletin* we focus on water. The GTA has had a long involvement with the Water for Life education project, since 2006. The GTA has successfully managed a grant to develop teaching programs with a water focus and now the GTA has a new grant to promote the Water for Life education project to schools through professional development activities for Geography teachers and through special editions of the *Geography Bulletin*.

The GTA would like to thank Dr Susan Bliss, Lorraine Chaffer and the students from Stella Maris College (Manly) for their contributions to this edition of the *Geography Bulletin*.

Professional development

After a very successful year of professional development activities for the GTA, plans are well underway for a huge range of events for GTA next year. The calendar of events for terms one and two in 2010 are at the back of this edition. Look out for flyers arriving in your school or through faxstream or email. The calendar of events can also be accessed on the GTA website at – www.gtansw.org.au/ along with registration forms and programs as the events get closer.



Top: Warragamba Dam water storage. Above: The Spillway, Warragamba Dam.
Photographs courtesy of Pam Gregg

INTRODUCTION



Water for Life
NSW GOVERNMENT

Sue Field, Water for Life Project Manager

The Geography Teachers' Association of NSW (GTA) has had a long involvement with the Water for Life education project. GTA has been a major partner in this education project to develop a teaching program for Stages 4 and 5 Geography.

The GTA also managed the Stage 3 HSIE section of the project in conjunction with the Primary HSIE Teachers' Association.

The programs for Stages 4 and 5 Geography can be downloaded from the GTA website at www.gtansw.org.au by going to 'Resources for teaching' and *Water for Life*. The full set of programs, Stages 3 to 5, is on a CD that will be distributed at *Water for Life* workshops.

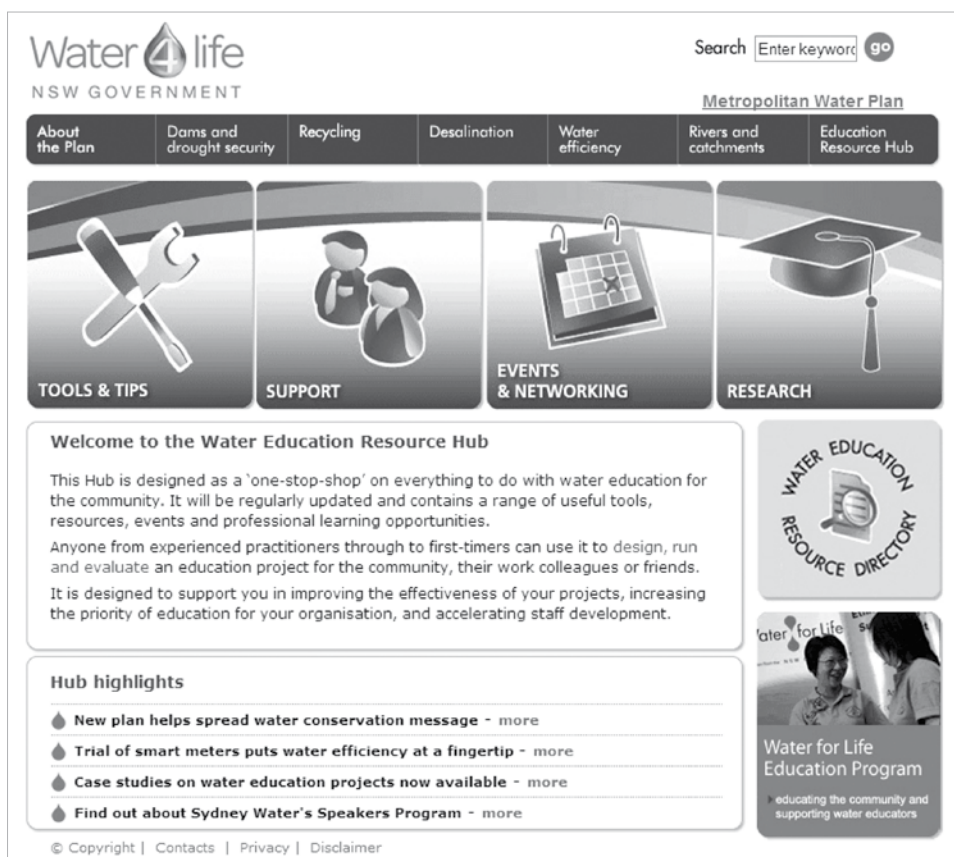
During 2008, the GTA and the DET presented 22 workshops around the state, which included a session on the *Water for Life* programs. The session introduced teachers to the programs as an example of quality programming using the DET sample programs as a base. These workshops were financially supported by funds, granted to the GTA, from the *Water for Life* education project. This edition of the *Geography Bulletin* is also partly funded from this *Water for Life* education project grant.

In 2009, a successful workshop for water was conducted at Warragamba Dam. (See separate report, page 4.)

I have also been successful in gaining another *Water for Life* grant for the GTA, to fund a new series of workshops for Geography in 2009/2010. (See separate advertisement, page 14.) These grants were highly contested and only seven groups of local government and community organisations were successful.

For more information on the *Water for Life* education project go to their website at – www.waterforlife.nsw.gov.au/education

The site has a wealth of information for schools on: the Metropolitan Water Plan for Sydney, dams, recycling, desalination, water efficiency, rivers and catchments, plus the Education Resource Hub.



Survey

The GTA and *Water for Life* have spent a lot of time and money developing the programs for water in Geography. They have been presented widely but we still have no idea if anyone is using them. We need your help with some feedback, see Survey Form insert.

Please take a few moments to respond to a few questions and send it back to us. To show we appreciate your time we are giving prizes. The prizes have been kindly donated by Sydney Attractions Group, with family passes to Sydney Aquarium or Sydney Wildlife World or Sydney Tower.

Prizes:

First response received

Most impressive response received

Lucky draw from all responses received

All responses due back by 5pm Friday 18 December 2009.

WORKSHOP REPORT

– Warragamba Dam

Sue Field, Workshop organiser

In July, the GTA conducted a teacher workshop at Warragamba Dam: *Warragamba Dam as a fieldwork location for Geography teachers, years 7–10*. This workshop was a wonderful opportunity for teachers to experience the new education centre that has recently opened there. Building is still underway for the interpretive centre but the education room is in operation for schools, with magical views over the dam and valley. Warragamba Dam's recreational facilities reopened to the public on Sunday 8 November 2009 after being closed for more than a decade.

In the morning session, teachers listened to Kathy Driscoll, Malcolm Hughes and Stephen Waite talk about water catchments and the Sydney Metropolitan Water Plan. Sue Field presented the *Water for Life* programs for Geography and an array of resources for the classroom. The highlight of the day was definitely the site tour with Kathy Driscoll, which included an overview of the kind of activities that are done with school groups visiting the centre.

In the afternoon, attention was given to quality fieldwork and assessment issues, and other fieldwork locations such as filtration plants and sewage treatment works. As usual, all participants left the workshop loaded up with resources for their classes.



Inside the Pumping Station. Photograph courtesy of Pam Gregg

We only had a small group of participants from across all sectors and some people had travelled a long way to get there. In the evaluations, teachers were asked what they will do differently back at school, as a result of the Warragamba Dam workshop. Here are some of their answers:

- Use fieldwork more often
- Apply fieldwork skills
- Make a broadsheet
- Push hard to have fieldwork for all years
- RAP integration, fieldwork planning
- Strengthen teaching of water in the relevant years
- Plan excursion for next year
- Write new programmes, plan fieldwork for next year, brief faculty
- Further develop home water consumption assignment
- Review follow-up activities, possible change in topics/ case studies for year 10, build up skills for students. Local sewage plants
- Check out Warragamba for excursion for Year 8
- Include more fieldwork. Rewrite programming for Stage 4/5. Check out local sewage works as a possible fieldwork site
- Re-evaluate programs and assessment and include more fieldwork
- Incorporate more fieldwork and use broadsheets in class activities

Overall, participants found the day informative, enjoyable and resource rich.



Kathy Driscoll, Sydney Catchment Authority leading the teacher tour. Photograph courtesy of Pam Gregg



Water for Sydney. Photograph courtesy of Pam Gregg

WATER: availability, quality, accessibility

Dr Susan Bliss Director Global Education NSW

FACTS AND FIGURES

- Water and sanitation are fundamental *human rights*. Everyone everywhere has the right to sufficient, affordable, accessible and safe water for personal and domestic uses.
- The average person uses 500-800 litres of water per day in developed countries compared to 60–150 litres per day in developing countries.
- 1.1 billion people do not have access to safe drinking water and 2.6 billion do not have adequate sanitation.
- 1.8 million people die each year from diarrhoeal diseases – 90% are children under 5 years.
- Agriculture consumes 60% to 80% of fresh water resources in most countries.
- Water-borne diseases are responsible for 80% of illnesses and deaths in the developing world – killing one child every eight seconds.
- In 2006 floods killed 5,862 people and affected 31,134 people. In contrast, droughts and food insecurity killed 74 people and affected 39,671 people.



Photograph 1: Salinity in the Thar Desert, India. Susan Bliss

Water is Earth's most precious resource. About 80 per cent of the world is covered by water, yet only three per cent of it is fresh. Three-quarters of this fresh water is frozen in icecaps and most of the remainder is found underground. This leaves about one-half of one per cent of the world's fresh water for our use. If 100 litres represents the world's water, half a teaspoon of it, is the fresh water we can use. With population growth, pollution and climate change the future challenge as informed, responsible inhabitants is to protect and value water for a sustainable future.

Water is the source of life – vital for health, food and economic development. Exclusion from water and sanitation services on the basis of poverty, ability to pay, group or place of habitation is a violation of the human right to water. Without sufficient and affordable clean water, people suffer a range of illnesses, such as diarrhoea.

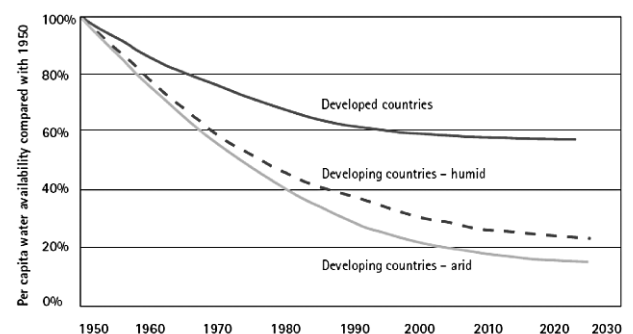
As a result many people are unable to work or attend school, and continue to be trapped in the cycle of poverty.

Availability, quality and accessibility are essential for a sustainable future:

- not everyone, everywhere on Earth has access to water. Australians are high consumers of water (350 litres per person per day) compared to people living in Asia, Africa and Latin America (50-100 litres per day). Water scarcity threatens food security and global peace in Middle East countries. By 2050 the impacts of climate change is expected to leave two-thirds of the world's population living in regions where water supplies are under stress and where water consumption outstrips water supply; and

Figure 1: Declining water quantity

Water availability continues to decline (1950–2030)



Source: Bridging Troubled Waters: Assessing the World Bank Water Resource Strategy, World Bank, 2002.

Source: *Make Every Drop Count – Australia and Aid* page 7
www.aisaid.gov.au/publications/pdf/everydrop.pdf

WATER: availability, quality, accessibility



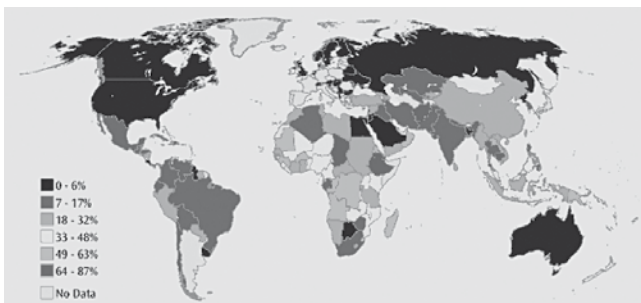
Photograph 2: A small girl named Noon (3 years) who paddles while people bath and do their laundry on the banks of the Sekong River which passes through southern Laos before it's confluence with the Mekong River. Photo by Jim Holmes – www.flickr.com/photos/ausaid_photolibrary/3490032473/

Photograph 4: Women and children carry water in their village in India. Antony Funnell/AusAID – www.globaleducation.edna.edu.au/globaled/go/cache/offonce/pid/3340;jsessionid=51845A8C8F5520CD91B7E9B5A34EA4D



b) unsafe water, coupled with a lack of basic sanitation, kills 1.6 million children under the age of five years, every year. Over 1.1 billion people do not have access to clean drinking water and 2.6 billion people do not use a toilet. They defecate in the open or into water supplies (rivers, lakes) that is then drunk by people, sometimes causing death. Most developing countries have problems with access to clean water. Families, particularly women and children, spend hours collecting water for drinking.

Figure 2: Percentage of population without reasonable access to safe drinking water 2009



Source: www.theglobaleducationproject.org/earth/human-conditions.php

Reasonable access to safe drinking water is defined as the availability of at least 20 litres per person per day from an improved source within 1 kilometre of the user's dwelling.



Photograph 3: People bath and do their laundry on the banks of the Sekong River, Lao PDR. Photo by Jim Holmes – www.flickr.com/photos/ausaid_photolibrary/3490032461/

THE RIGHT TO WATER

The human right to water entitles everyone to sufficient, safe, acceptable, accessible and affordable water for personal and domestic uses. An adequate amount of safe water is necessary to prevent death from dehydration, reduce the risk of water-related diseases and provide for consumption, cooking and hygiene. Being able to wash one's hands and drink clean water has a major impact on health. As poor people are more likely to get sick, and ill health perpetuates poverty. It then triggers a vicious cycle that hampers economic and social development.

The following fundamental human rights can not be fully realised without water:

- **right to life:** without water, life can not be sustained
- **right to food:** water is essential for farming. About 70% of freshwater is used for agriculture and more than one third of global food production is based on irrigation
- **right to self-determination:** all people have the right to manage their own resources, such as water
- **right to adequate standard of living:** cannot be realised without access to water
- **right to adequate housing:** all people should have sustainable access to safe drinking water, sanitation and washing facilities within homes
- **right to education:** lack of a proper supply of water forces children to walk long distances, often several times a day – thus missing school
- **right to take part in cultural life:** the destruction or pollution of water-related cultural sites represents a failure to take adequate steps to safeguard the cultural identity of ethnic groups.

Unfortunately the right to water is often denied in developing as well as developed countries.

Source: www.worldwatercouncil.org/index.php?id=1764&L=0%22onfo%20ti

In 2008, Pope Benedict XVI called for solidarity and responsibility in national and international water policies. He said water, which is regarded as a universal and inalienable right, is ignored as millions of destitute people have limited access to potable water that has caused illness, suffering, conflict, poverty and death.

WATER: availability, quality, accessibility



Photograph 5: A child in Gamei Jaya Village, Papua washes his face with clean water. The village is now able to access clean water through a \$3.7 million project funded by Australia that focuses on health, disaster management and clean water and sanitation. Australia provided the support following an earthquake that struck the region in 2004, killing over 130 people, injuring hundreds and leaving over 1,000 residents homeless. Photo by: Dian Lestariningsih http://www.flickr.com/photos/ausaid_photolibrary/3771147369/

UNITED NATIONS MILLENNIUM DEVELOPMENT GOALS 2000 – 2015

In 2000, 189 world leaders pledged to halve the proportion of people without sustainable access to safe drinking water by 2015 (Goal 7). To achieve the MDG water target, an additional 1.5 billion people will require access to an improved water supply by 2015. This is an additional 100 million people each year (or 274,000/day) until 2015. According to a recent publication by UN Human Settlements Programme (UN-Habitat), almost 1 billion people now live in slums, mostly in developing countries where slum-dwellers account for 40% of the urban population. This number could climb to 2 billion by 2020. Slums present a particular challenge, as they are rarely supplied with clean, safe water or adequate sanitation. The Johannesburg Declaration adopted at the World Summit of Sustainable Development in September 2002, also set a target to halve the proportion of people who do not have access to basic sanitation by 2015.

While the adequacy of water may vary according to different environmental and socio-economic conditions, three factors apply in all circumstances:

- **availability:** each person has the right to a water supply that is sufficient and continuous for personal and domestic uses, such as drinking, personal sanitation, washing of clothes, food preparation, personal and household hygiene. The quantity of water available for each person should correspond to the World Health Organisation (WHO) guidelines,

which take into account health, climate, and working conditions;

- **quality:** the water required for personal or domestic use must be safe and free from micro-organisms, chemical substances and radiological hazards that constitute a threat to a person's health; and
- **accessibility:** water and water facilities and services must be accessible to everyone, without discrimination:
 - o physical accessibility: water must be within the safe physical reach for all the population, which is defined as 'within the immediate vicinity of each household, educational institution and workplace';
 - o economic accessibility: indirect costs and charges associated with securing water must be affordable for all,
 - o non-discrimination: no discrimination on the grounds of age, physical or mental disability, health status (including HIV/AIDS), sexual orientation and civil, political, social or other status which impairs the equal right to water,
 - o information accessibility: the right to seek, receive and impart information concerning water issues.

Source: www.worldwatercouncil.org/index.php?id=1764&L=0%22onfo%20ti

WATER: availability, quality, accessibility

PROGRESS TOWARDS GOAL 7

At present, the world is on track to meet Millennium Development Goal 7, to halve the proportion of people without access to improved drinking water and basic sanitation by 2015. The annual cost of meeting the water

and sanitation target is \$11.3 billion. If no action is taken, 135 million people will die from water borne diseases by 2020. Local, national and global active citizenship has already resulted in 1.7 billion people gaining access to safe drinking water from 1990 to 2009.

Figure 3: Millennium Development Goal Target 7 Ensure Environmental Sustainability; Progress Chart 2009

Goals and Targets	Africa		Asia				Oceania	Latin America & Caribbean	Commonwealth of Independent States	
	Northern	Sub-Saharan	Eastern	South-Eastern	Southern	Western			Europe	Asia
Halve proportion without improved drinking water	high coverage	low coverage	moderate coverage	moderate coverage	moderate coverage	high coverage	low coverage	high coverage	high coverage	moderate coverage
Halve proportion without sanitation	moderate coverage	very low coverage	low coverage	low coverage	very low coverage	moderate coverage	low coverage	moderate coverage	moderate coverage	high coverage

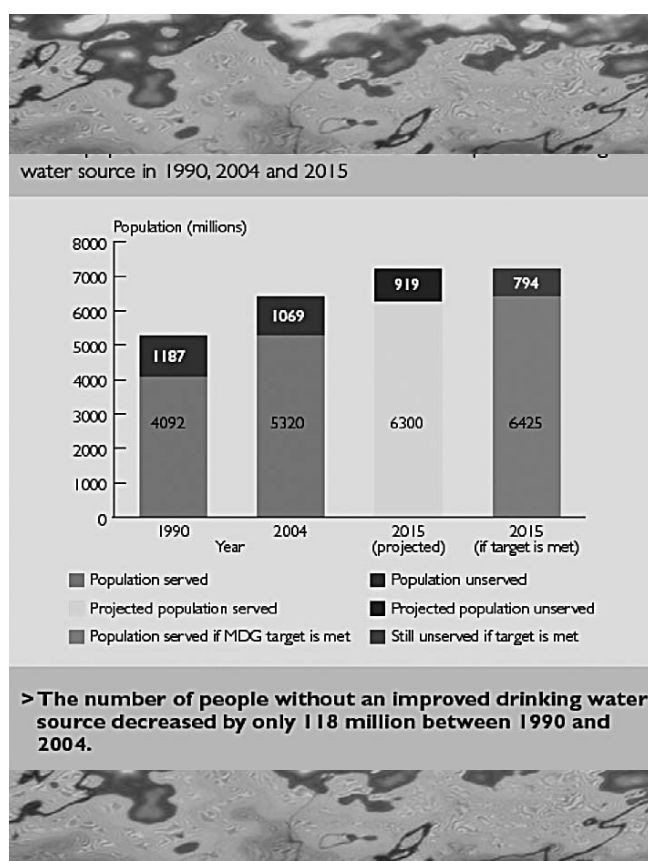
The progress chart operates on two levels. The words in each box indicate the present degree of compliance with the target. The colours show progress towards the target according to the legend below:

- Already met the target or very close to meeting the target.
- Progress sufficient to reach the target if prevailing trends persist.
- Progress insufficient to reach the target if prevailing trends persist.
- No progress or deterioration.
- Missing or insufficient data.

* The available data for maternal mortality do not allow a trend analysis. Progress in the chart has been assessed by the responsible agencies on the basis of proxy indicators.

Source: http://mdgs.un.org/unsd/mdg/Resources/Static/Products/Progress2009/MDG_Report_2009_Progress_Chart_En.pdf

Figure 4 Reaching Millennium Development Goal 7 by 2015 – Improved access to clean drinking water








Source: www.who.int/water_sanitation_health/monitoring/jmpfinal.pdf

IMPROVED DRINKING WATER SOURCES	UNIMPROVED DRINKING WATER SOURCES
Piped water into dwelling, plot or yard	Unprotected dug well
Public tap/standpipe	Unprotected spring
Tubewell/borehole	Cart with small tank/drum
Protected dug well	Bottled water
Protected spring	Tanker-truck
Rainwater collection	Surface water (river, dam, lake, pond, stream, canal, irrigation channels)

WATER FOOTPRINT

The water footprint is a calculation of the water needed for the production of any product or service from start to finish. A water footprint can be calculated for consumers (e.g. an individual, family, village, city, state or nation) or producers (e.g. a public or private organisation). The global average water footprint is 1240 m³ water/person/year. The Chinese average is 700 m³ (smallest in the world) and the United States is 2480 m³ (largest in the world). The UK is 1695 m³, Australia 1393 m³ and Nepal 849 m³.

WATER: availability, quality, accessibility

LITRES OF WATER	PRODUCT
16,000	1 kilogram of beef 
23,000	1 leather bag 
3,000	1 kilogram of rice 
1,000	1 litre of milk 
140	1 cup of coffee 

A minimum of 2,500 litres of water is needed to feed a person for one day, which is the same amount used to produce one litre of bio-fuel.

Case studies of coffee, tea, cotton and nations – www.waterfootprint.org/?page=files/CaseStudies

a) Types of water footprints

There are three different types of water footprints:

- **blue water footprint:** volume of freshwater evaporated from the global blue water resources (surface water and ground water)
- **green water footprint:** volume of freshwater evaporated from the global green water resources (rainwater stored in the soil as soil moisture);
- **grey water footprint:** volume of polluted water, calculated as the volume of water required to dilute pollutants to such an extent that the quality of the water remains above agreed water quality standards.

b) Global citizenship

The Water Footprint Network promotes the transition towards a sustainable, fair and efficient use of fresh water resources worldwide by:

- increasing the water footprint awareness of communities, government bodies and businesses and their understanding of how consumption of goods and services and production chains relate to water use and impacts on fresh-water systems;
- encouraging forms of water governance that reduce the negative ecological and social impacts of the water footprints of communities, countries and businesses.

LOCAL– GLOBAL CITIZENSHIP

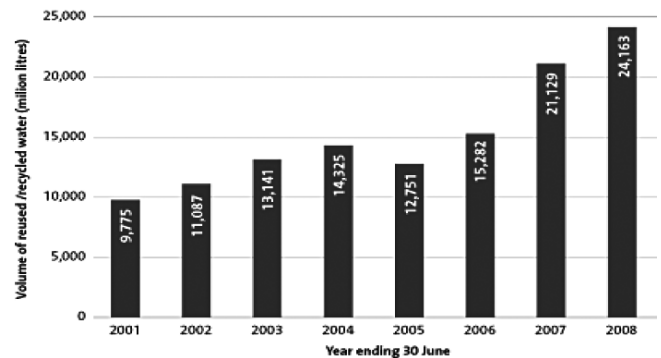
World Water Day is 22 March and World Toilet Day is 19 November.

a) Local: Recycling water

In 2007–08, Sydney Water recycled 24,163 million litres of wastewater. By 2015, planned schemes will increase

recycling to 70 billion litres a year. Other Sydney water recycling projects include areas in western Sydney, Hoxton Park, Ropes Crossing, Camellia and Wollongong.

Figure 5 Total volumes of recycled water from recycling schemes managed by Sydney Water 2001–2008



Source – www.sydneywater.com.au/annualreport/SustainabilityIndicators/Water_efficiency.cfm

b) Global: AusAID

Access to clean water and effective sanitation is essential for a healthy population and environmental sustainability. The Australian Government recognised the importance of water and sanitation and aims to increase development assistance in this sector by \$300 million from 2008/09 to 2010/11. Australia works with developing country governments, private and non-government entities, and bilateral and multilateral development agencies to improve access to clean water and effective sanitation in urban, peri-urban and rural areas, and improve water security by protecting freshwater sources. Australia's partnerships with multilateral agencies such as the United Nations Children's Fund (UNICEF) supports efforts to minimise risks to water quality from industrial and agricultural pollution.

Australian aid promotes the efficient, equitable and sustainable use of water resources through focusing on two central aspects:

- **water governance** – managing the sustainable use of water;
- **delivery systems** – improving the efficiency of existing water systems while increasing the access to water and sanitation services.

Australia involves local communities in project design and implementation of water projects. For further information see: <http://www.ausaid.gov.au/keyaid/water.cfm>.

c) Global: World Forum Conferences

The fifth World Forum Conference on Water held in Istanbul in 2009 was attended by 30,000 people from around the world. The forum marked the rise of a new paradigm – a turning from a production-orientated approach to an eco-orientated approach to managing the world's quantity and quality of water. *'Inaction is not an option. Do not wait for things to happen, act now while preparing for an uncertain future;* (William Cosgrove, former president World Water council). More details at –

WATER: availability, quality, accessibility

www.worldwatercouncil.org/fileadmin/wwc/World_Water_Forum/WWF5/Water_at_a_Crossroad.pdf

d) Global: World Water Council

The World Water Council was established in 1996 in response to increasing concern from the global community about world water issues. Its mission is to promote awareness, build political commitment and trigger action on critical water issues at all levels, to facilitate the efficient management and use of water on an environmentally sustainable basis.

SUSTAINABLE DEVELOPMENT

Little can be done to increase precipitation or ground water but more **sustainable development** of limited water supplies is essential for long-term survival. Many countries have resorted to recycling water and sewage, planting drought-tolerant crops, building desalination plants, increasing the price of water, and placing restrictions on water use. In Burkina Faso and Mali, with the assistance of Oxfam, the local community placed lines of stones along the contours of sloping ground to slow water run-off and reduce the amount of water required to grow crops.

a) Ecosystems: the negative impact of human activity on the environment must be considered when sustainably managing water resources. Humans can not continue to draw water from nature (rivers, lakes, groundwater) for use in agriculture, industry and everyday life without taking into account nature's needs - ecosystems (animals and plants). Humans need to respect the resource base on which life depends and see land and water as two sides of the same coin. Sustainable catchment management is one possible solution.

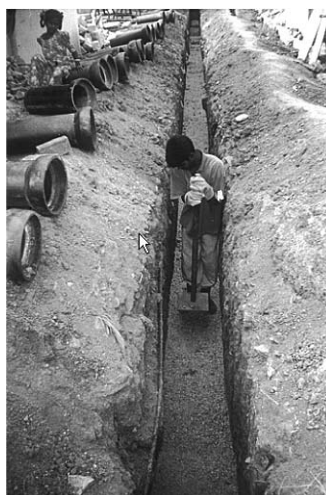
b) Food supply: the challenge is to increase food production by obtaining 'more crop per drop', while ensuring a more equitable allocation of water. Since 70% of the world's water is used for irrigation, even small changes in the way crops are planted, watered and harvested can make a difference. Improved methods to increase productivity of rain fed agriculture, also needs to be developed. Poor populations are the most vulnerable, and the strain will increase with population growth and climate change.

c) Industry: is both a major user of water resources and contributor to economic and social development. To move towards sustainability, industries must be assured of an adequate supply of water. In return, industries need to ensure water used in industrial processes is used efficiently and not returned to nature as untreated waste that pollutes the environment. Technology is important for recycling of water, and a variety of economic and legislative measures can provide incentives for responsible management.

d) Risks: water related hazards, such as floods, droughts, tropical storms, erosion and pollution should be factored into an integrated approach to water resource

management and policy. Although the world's poor suffer the most when exposed to such dangers, everyone's security is at stake. One way to minimise risk is to develop more capacity in the monitoring and forecasting of extreme events. With this information, early warning systems and infrastructure can be installed, and new planning strategies devised. It is also necessary to ensure that climate variability and change have their place in the total picture.

e) Governance: moves beyond water management issues and into processes of political, social and institutional change. Many countries agree that good governance means allowing every sector of society to participate in the decision-making process. However, mechanisms for doing this are not always in place. International cooperation and assistance may play a role - particularly in developing countries - by helping to strengthen institutional capacity.



Photograph 6: Laying sewer pipes, Chandranagar. Pilot water supply and sanitation projects supported the costs of laying the distribution networks in the settlements. Source: www.flickr.com/photos/ausaid_photolibrary/3320402177/

Understanding

1. Everyone does not have equal access to both water quantity and quality. What does this mean?
2. Explain the relationship of access to clean water and sanitation to poverty and wealth.
3. List three countries affected by lack of clean water. What is the impact on the population's health?

Using skills

4. Figure 1: Refer to an Atlas and list three countries where less than 6% of the population do not have access to safe drinking water and three countries where over 64% do not have access. Which continent has the worst access to safe water? What is the relationship between access to safe water and wealth?
5. Figure 2: For the current year calculate the percentage of water available in developed countries and arid developing countries. What is the gap? Discuss how the gap could be reduced.
6. Figure 3: Why do people carry water? Whose job does it appear to be? Describe the effect of carrying water every day on a child's health and development.

WATER: availability, quality, accessibility

7. Figure 5: What is meant by access to improved drinking sources? What are the improvements since 1990? What is the difference between the projected and the MDG 7 target in 2015? Explain how the gap could be reduced.

Thinking and Analysing

8. By 2025, fresh water available for use is projected to be 5100 cubic metres per person - enough to meet human needs if distributed equally among the world's population. Imagine you are working for an organisation to improve access to both the quantity and quality of water in developing countries. Describe what you would do.
9. Prepare a report on one of the following international water hotspots – Israel, Vietnam, Bangladesh, Philippines, Moscow, southern Africa, Kenya. Go to www.jaconline.com.au/geoactive/. Click on Geoactive1 2E, scroll to Chapter 10, An Unequal World and then click on the Water Hotspots weblink for this chapter (www.itt.com/waterbook/intl_hot_spots.asp).

ICT

Access to clean water is linked to sanitation. Refer to Geography Bulletin Summer 2008, Vol 40 No 1, page 25 *International Year of Sanitation* by Susan Bliss, an article containing information, worksheets and activities on sanitation for the United Nations 2008 International Year of Sanitation.

Other resources

- Global Education Case Studies – www.globaleducation.edna.edu.au/globaled/go/cache/offonce/pid/16;jsessionid=6157F4681B2892AC76D64792348E4119
 - Collecting water, wells and pumps in Niger
 - Good servant, bad master Mekong River
 - Waterways, weeds and weevils Papua New Guinea
 - Water, the source of life Democratic Republic of Congo
 - Getting connected in Bangalore
- Global Education On Line Projects
 - Sanitation and Disease – www.ozprojects.edu.au/course/view.php?id=13
 - Millennium Development Goals – www.ozprojects.edu.au/course/view.php?id=75
- Millennium Development Goals Report 2009 – http://mdgs.un.org/unsd/mdg/Resources/Static/Products/Progress2009/MDG_Report_2009_En.pdf
- Global Education Learning Quests
 - Climate Change and Pacific Islands
www.globaleducation.edna.edu.au/globaled/go/pid/3132
- Global Education Water Use Quiz – www.globaleducation.edna.edu.au/globaled/quiz?action=viewQuiz&quizId=1195 and Keeping Millennium Development Goal Promises
 - www.globaleducation.edna.edu.au/globaled/quiz?acti

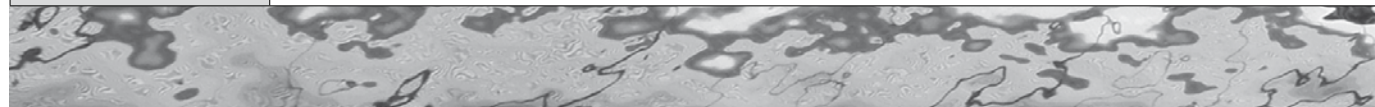
[on=viewQuiz&quizId=2472](#)

- World Bank Access to Safe Water – www.worldbank.org/depweb/english/modules/environment/water/
World Bank overview of water use including teaching materials and student exercises.
- AusAID – www.ausaid.gov.au/
The Australian Agency for International Development (AusAID) manages the Australian Government's official overseas aid program.
- Sustainability Education – www.environment.gov.au/education/
The website has sections for community, government, industry and small business, students and teachers.
- UNESCO Water Portal – www.unesco.org/water/
UNESCO's water portal coordinates and provides database access and worldwide information on freshwater, including scientific policies, programmes, water forums, events, photos and useful links.
- United Nations Water Quiz – www0.un.org/cyberschoolbus/waterquiz/waterquiz4/index.asp
- Water for Life: International Year of Freshwater – www.ausaid.gov.au/closeup/water/default.cfm
Outline of Australia's approach to the provision of water supply and sanitation projects – involvement of local communities, in project design and implementation.
- WHO Water, Sanitation and Health – www.who.int/water_sanitation_health/en/
World Health Organisation information about global issues in water, sanitation and health, including a fact sheet providing a great summary on water and sanitation related diseases and statistics.
- WaterAid – www.wateraid.org/international/learn_zone/video/default.asp
Games, online videos, teaching packs and audio
- AusAID Making Every Drop Count – www.ausaid.gov.au/publications/pubout.cfm?Id=8650_3406_3901_1959_9059&Type=
- Australian Water Association – www.awa.asn.au/AM/Template.cfm?Section=Home1&WebsiteKey=2afdcb7-9faa-4ce8-98f3-584320286b49
- International Water Centre – www.watercentre.org/
- WaterAID Australia – www.wateraid.org/australia/
- World Bank Water and Sanitation Program – www.wsp.org/
- World Vision Water, Sanitation and Hygiene – www.worldvision.com.au/Issues/WaterSanitationHygiene.aspx
- Water and Sanitation Program – www.wsp.org/

WATER: availability, quality, accessibility

Geography 7–10 Syllabus Links with Water

Cross Curriculum	ICT, Work and Employment, Indigenous, Civics and Citizenship, Environment, Gender, Literacy, Numeracy
Values and Attitudes	Ecological Sustainability, Just Society, Informed and Active Citizenship
Geographical Tools	Maps, Graphs, Statistics, Photographs, GIS; Research Action Plan and Fieldwork
4G1	Physical Elements of Environments/Interaction of Physical and Human elements; World Heritage Sites (Lakes, Waterfalls, Coral Reefs); Geographical Research – Water in Local Environment
4G2	Global Environments – Deserts, Rainforests etc; Hydrologic Processes
4G3	Access to Water; Variations in the Distribution; Access and Use of Natural Resources; Global Organisations
4G3	Geographical issues – Access to Fresh Water, Climate Change, Human Rights, Land Degradation, Threatened Habitats, Tourism, Urbanisation, Use of Ocean Resources, Ecological Sustainability
5A1	Pattern of Climate, Weather, Natural Resources, Vegetation Natural Hazards – Floods, Droughts, Tropical Cyclones, Bushfires
5A2	Resource Depletion - Community Changes
5A3	Land and Water Management, Waste Management, Coastal Management
5A4	Population Trends, Human Rights, Aid – Global Citizenship



Comment on the National Geography Curriculum

Nick Hutchinson

Next year there will be a number of opportunities for teachers to comment on the National Geography Curriculum (NGC). The initial advice paper for the NGC will be written between October and December 2009 with a National Forum scheduled for February 2010, to gather responses to the initial advice paper. The GTANSW HSC Exam Review meetings in February 2010 will be an opportunity to canvas opinion and encourage members to take part in the national consultation process. The Association is also investigating the use of the DET's video conference facilities for consultation with teachers in remote areas.

During February and March, 2010, the *Shape of Australian Curriculum: Geography* paper will be developed. Another opportunity for consultation will arise in April, 2010 with national consultation on the *Shape of Australian Curriculum: Geography* paper. From June to December, the writers and advisory group will develop the scope and sequence for the NGC. This provides a further opportunity for consultation because the scope and sequence document will also be accompanied by a consultation process. Should the dates, events and milestones be adhered to the NGC will be

written between January and June 2011, to be published in June 2011.

There are also other avenues for members to express their points of view. Teachers are encouraged to join blogs such as the NSW-based Geogtchonline@yahoogroups.com.au or Martin Pluss' Ning <http://australiangeographyteachers.ning.com/>, or Malcolm McInerney's Google Group <http://groups.google.com/group/21st-century-geography-in-australian-schools?hl=en>. AGTA's webpage also provides opportunities for further discussion www.agta.asn.au/discussions/index.htm

Teachers are also encouraged to attend and voice their views at the National AGTA Conference in Adelaide, 10–13 January, 2011.

Finally, all Australian geography teachers should keep informed about the *Australian Curriculum, Assessment and Reporting Authority (ACARA)* process via their website at www.acara.edu.au and take advantage of the opportunities provided by ACARA to feed comments and ideas into the process.

WATER: DEVELOPING FIELDWORK SKILLS

Conducting surveys and graphing results

Lorraine Chaffer, Head Teacher Gorokan High School

The study of water and water related issues provides many opportunities for students to develop their fieldwork research skills. People have different perspectives and opinions on water related issues. Students can conduct surveys to determine the variations in opinions within their school, their community or their wider circle of friends, relatives and social contacts.

CHOOSING AN ISSUE

There are a range of water related issues that could be investigated using a survey.

Choose an issue that has relevance to your local community and which might be supported by local media reports.

Examples of issues that could be investigated include:

- attitudes to desalination
- attitudes to adding recycled sewerage water to drinking supplies
- opinions on water licensing in rural areas
- strategies families use to conserve water
- compliance with water restrictions
- irrigation versus environmental flows
- water pollution – causes, sources and opinions on water quality.

USING THE RESEARCH ACTION PLAN (RAP) FRAMEWORK

Stage 4 students can be introduced to the RAP through a water survey. Stage 5 students must complete a RAP in their study of issues in 5A3. Land and Water Management is one of the issues that can be investigated using a RAP.

By following the RAP, students will focus on the aims of their research, the development of key questions, the use of secondary support information and the use of the surveys, collating and analysing their findings and presenting those findings in a relevant format. At the completion of the research students can then propose individual action they could undertake in relation to the issue (citizenship).

DEVELOPING THE SURVEY AND ANALYSING AND COLLATING THE RESULTS

An excellent site that provides detailed information on designing and conducting surveys for geographical research can be found at TaLe (Teaching and Learning Exchange). The key word is Fieldwork. The most relevant sections are Part 2: In the field (conducting fieldwork including surveys and interviews) and Part 3: Back at your desk (different types of graphs and how to draw them).

NSW DET schools can access the site at www.tale.edu.au

A sample Water Pollution Survey from TaLe – www.tale.edu.au



Hello, my name is Jenni French and I am a student at Kable High.

Twenty Geography students are investigating the problem of litter in Kable Creek and we need some information to take to the council.

Could you please spare a few minutes to complete the questions that follow.

Circle your answers to the following.

- | | | | |
|---|--|-------|----|
| 1 | Do you know Kable Creek? | Yes | No |
| 2 | Have you ever seen bottles or papers or other litter in the water there? | Yes | No |
| 3 | Do you think it is a problem? | Yes | No |
| 4 | Where do you think the litter comes from? | <hr/> | |

- 5 What can council do to reduce the litter?
Please tick the ideas below that you agree with.

- ☐ Educate the community about the problem of littering
☐ Fine people caught littering
☐ Empty the bins in the local parks more frequently
☐ Place litter traps on the stormwater drains feeding into the creek
☐ Other. Please specify

Thank you for your time.

USING ICT TOOLS

Students can also use ICT tools to design surveys and graph the results. A good example is Survey Monkey – www.surveymonkey.com/ Search for 'Creating a survey' online. ICT tools such as Excel can be used to create surveys and to collate and graph survey results.

OTHER RELEVANT FIELDWORK TASKS

Students could conduct other practical fieldwork activities to support their survey findings or for use as background material when developing their surveys. Such tasks could include water bug testing, chemical water quality testing, taking photographs or making on site line drawings, field maps and measurements.



Making a difference by teaching about water in 2010 at:



Coastal Environment Centre

Narrabeen
Wednesday 3 March

Centennial Parklands Learning Centre

Paddington
Tuesday 23 March

Australia's Industry World

Port Kembla
Wednesday 31 March

Georges River Environmental Education Centre

Chipping Norton
Wednesday 21 April

School of Arts Hall

Wentworth Falls
Tuesday 1 June



Workshops for Geography teachers Years 7–10

This workshop series is presented by the Geography Teachers' Association of NSW in conjunction with the *Water for Life* program for Sydney. The series of workshops is designed to provide teachers with an opportunity to find out about real case studies of organisations (community, school and government) working to improve their water efficiency.

All the workshops will have a practical session or tour to learn about water projects first hand.

Each workshop will have different speakers and case studies, so teachers may want to attend more than one. There will be great resources for the classroom at all the workshops.

Registration flyers will be available early in Term 1 and for download from the GTA website – www.gtansw.org.au

For more information contact Sue Field, Water for Life project manager at office@gtansw.edu.au

Dams + Recycling + Desalination + Water Efficiency = Water  life

ARTHUR PHILLIP AWARDS 2009

GTA NSW – Geography Fieldwork Competition

The Geography Teachers' Association of NSW (GTA NSW) organises an annual competition for students and schools to foster an enthusiasm for Geography through engagement and rewards. The emphasis of the competition is fieldwork and the gathering of primary data as part of authentic research in Geography.

THE ARTHUR PHILLIP STORY

Arthur Phillip was the first Governor of NSW and founder of Sydney, but more importantly, as an experienced sea captain he had an excellent knowledge of the geography of the world. During the 1988 Bi-Centenary celebrations, The Geography Teachers' Association of NSW initiated a Geography Fieldwork Competition for secondary school students. It was appropriately named the Arthur Phillip Awards to commemorate his achievements.

AWARDS CEREMONY

This year the awards ceremony was held in the Sydney Harbour Room at the Sydney Harbour Foreshore Authority offices in The Rocks. It was a wonderful opportunity to reward students for their achievements in research and fieldwork. For the first time this year awards were given to teachers and schools for their commitment to the competition. One teacher award was given to the school that showed the best attempt to address active citizenship in all the projects entered, with one of their students winning the first prize in the Dr Maurine Goldston-Morris Award for Excellence in Civics and Citizenship. This award was given to Smiths Hill High School in Wollongong. The other teacher award is the Dr Maurine Goldston-Morris Award for Excellence by Teachers and Schools. Merewether High School has a wonderful culture of encouraging students to enter competitions and every teacher in the HSIE faculty at the school entered the competition in one of the competition categories. All their entries were very strong as usual and they managed to collect a few prizes, taking 1st, 2nd and 3rd place in the GTA Visual Presentation Award for Stage 4 students. They also received a Highly Commended in the Brock Rowe Award for the Senior Geography Project.

Dr Maurine Goldston-Morris is the President of the Arthur Phillip Society and she has been associated with these fieldwork awards since they began in 1988. She makes a generous financial contribution to the event through her sponsorship of the major awards for both civics and citizenship and teachers and schools.

Congratulations to all the schools that took part and to all the prize winners for this year.



2009 AWARD WINNERS

The GTA Visual Presentation Award

Megan O'Riordan, Merewether High School

Samantha Nguyen and Lily Iervasi,
Merewether High School

Rachael Long and Kathy Nithiyananthan,
Merewether High School

Bree Turner and Katie McLean,
Ravenswood School for Girls

Kirsten McNee and Danielle Winder,
Ravenswood School for Girls

The Global Education Fieldwork and Research Award

Celia Moore, Ravenswood School for Girls

Pip Hughes, Ravenswood School for Girls

The Dr Don Biddle Issues in Australian Environments Fieldwork Award

Kimberley Barrett, Mount Saint Benedict College
Katya Pesce, Tara Anglican School for Girls
Ellen Barrett, Mc Carthy Catholic College, Tamworth

The Brock Rowe Fieldwork Award

Connor Ryan, St Ignatius College, Lane Cove
Matthew Cheok, St Ignatius College, Lane Cove
Dannielle McLaughlin, Picton High School
David Russell, The Hills Grammar School
Bronnie Burstal, Merewether High School

The Water for Life Fieldwork Award

Kate Crimmins, Stella Maris College, Manly
Aimee Sutton, Tara Anglican School for Girls
Chloe Christensen, Stella Maris College, Manly

The Dr Maurine Goldston-Morris Award for Excellence in Civics and Citizenship

Vivienne Rontziokos, Smiths Hill High School, Wollongong
Rhianna Cardamone, Sutherland Shire Christian School

The Dr Maurine Goldston-Morris Awards for Excellence by Teachers and Schools

Excellence in Civics and Citizenship

Smiths Hill High School, Wollongong

Overall Excellence in Fieldwork and Research

Merewether High School, Newcastle

STUDENT WORK

This year we have taken the opportunity to include the student entries from Stella Maris College, Manly in this edition of the *Geography Bulletin*. These students entered the *Water for Life* Fieldwork Competition and they won 1st place and 3rd place. This category was introduced to encourage students to undertake the junior geography project on a topic related to water.

Criteria for the *Water for Life* Fieldwork Competition (Stage 5 only)

- undertake research into a relevant water issue in NSW, using fieldwork to gather primary data
- support fieldwork with secondary data if required
- analyse data gathered
- present research findings
- propose individual or group action in response to findings

The prize money for this award comes from the *Water for Life* education project.

Fieldwork Competition in 2010

All schools are encouraged to enter next year. Look out for the brochures coming into schools in Term 1. Information and registration forms will also be posted on the GTA website at www.gtansw.org.au/.



Sydney Harbour Foreshore Authority

Sydney Harbour Foreshore Authority owns and manages some of the State's most significant assets, including Sydney's heritage and cultural precincts at The Rocks and Darling Harbour.

Sydney Learning Adventures is an initiative of the Sydney Harbour Foreshore Authority. The vision of Sydney Learning Adventures is to create quality educational experiences that are enriching, diverse, accessible and sustainable. The programs are designed for all stages of learning and across many different syllabus areas including geography.

Programs for geography include:

- Bangabaoui: Aboriginal cultural cruise – students will learn about Sydney Harbour from an Aboriginal perspective.
- People and places: Pyrmont through time – students will observe the natural and built environments of Pyrmont and investigate changes over time.
- Red and gold: making a multicultural Australia – students will examine migration to Australia and its impact on communities, including the Chinese Garden of Friendship.



The Geography Teachers' Association of NSW wishes to thank the staff at Sydney Harbour Foreshore Authority (and Sydney Learning Adventures) for their support of our Fieldwork Awards event.

Water for Life Fieldwork Award 2009 award winning student entries

Water Quality in Manly

Kate Crimmins (student)

Stella Maris College, Manly



Water Quality

Water quality is the physical, chemical and biological fundamentals of water.

Manly Lagoon is a small coastal lagoon located on the boundary of Manly and Warringah Councils. The lagoon is long and narrow extending more than 3km west and north from the mouth of the lagoon.



The water quality has changed over time as the following information will suggest. This can cause many different affects both negative and positive, through environmental and human impacts.

Results of Fieldwork August 2009

Location	Upper Brookvale Ck. Clearview Place (Behind Whitworths/fgi)	Nolans 2 Reserve (Near drain) Riverview Parade
Description of area	Borders industrial and residential and parkland areas	Residential and urban. It borders recreational district
Water Temperature (°C)	11	17
pH	6.5	6.5
Turbidity	5	Less than 80
Total dissolved solids	280	3200

Results of Fieldwork May 2003

Location	Behind Whitworths, Clearview Place	Nolans 2 Reserve
Water Temperature (°C)	16	18.5
pH	7	7
Turbidity	<10	<10
Total Dissolved solids	170	450

ANZECC Guidelines, 2000 For 95% protection level

	Minimum	Maximum
Temperature (°C)	15	35
pH	6.5	8
Dissolved Oxygen (% Saturation)	80	110
Turbidity (NTU)		10
Ammonia (mg/L)		0.90
Nitrate (mg/L)		0.7
Orthophosphate (mg/L)		0.005

Temperature of Manly Lagoon

Water temperature is a measure of how hot or cold the water is. Temperature is measured in degrees Celsius (°C).

Water Temperature is very important as it determines the biological activity and growth of aquatic species.

Temperature affects:

- The rate of photosynthesis of aquatic plants
- The metabolic rate of water animals
- The speed of development, timing and accomplishment of reproduction
- Mobility of aquatic organisms
- Migration patterns of aquatic organisms
- The amount of oxygen that can be dissolved in the water
- The sensitivity of organisms to toxins, parasites and diseases.

Water temperature is affected by:

- Depth
- Flow rate
- Amount of sunlight or shade
- Turbidity
- Altitude
- Season
- Time of day
- Incoming waters
- Overland flow



Manly lagoon was tested 14 degrees in August 2009. This means that it is less than the ANZECC guidelines meaning that it can affect the number of species and the number of individuals of a species and can decrease them until finally there are few, or none.

Manly lagoon was tested 17.25 degrees in May 2003 meaning that it is a low temperature and could affect species living and around the water.

As the Manly lagoon water test shows, over the six years manly lagoon has differentiated in temperatures however in 2003 Manly lagoon was tested in May meaning it should be warmer than when it was tested in 2009 in August. Overall, the water temperature should be much higher to prevent more species of aquatic life forms from disappearing. As there was not many that were seen at Manly Lagoon it can be assumed that temperature of the water could be a major cause.

pH of Manly Lagoon

PH is a measure of the relative acidity or alkalinity of a substance. PH is the hydrogen ion concentration and is expressed as 0 (acid) to 14 (alkaline), with the neutral point at 7.

The optimal pH for most organisms in Australian freshwaters is 6.5 - 8.2. Changes in pH outside this normal range will cause a reduction in species diversity, as the more sensitive organisms disappear. Acidic water can cause aquatic organisms to suffer from skin pains, tumours, ulcers and impaired gill functions.

Extremely high or low pH levels will lead to the death of aquatic life.

Small changes in pH can greatly influence the amount that can be used by aquatic life of nutrients and heavy metals. Levels of pH below 5.5 can cause heavy metals to be trapped in sediments which are released into the water meaning it can intoxicate aquatic organisms.

PH can be influenced by:

- Geology
- Characteristics of the catchment
- Urban run-off
- Acid sulphate soils
- Photosynthesis.



In Manly Lagoon the pH level was 6.5 in August 2009. This means that it is quite normal for an Australian lagoon and will not affect much.

In Manly Lagoon the pH level was 7 in May 2003, this was also quite normal.

This means that the pH levels in Manly lagoon are very normal for Australian waters and have not varied throughout the six years, and therefore the aquatic animals have a much higher rate of surviving in these levels.

Turbidity of Manly Lagoon

Turbidity is a measure of the cloudiness or muddiness of water. The greater the amount of total suspended and colloidal solids in the water, the higher the turbidity results.

High turbidity can reduce light dispersion and can suffocate organisms living in or on the bottom of the water. If light dispersion is reduced significantly, plant growth may decrease, impacting on the organisms that are dependent on the plants for food or shelter. This can result in a reduced rate of photosynthesis by plants and a less quantity of oxygen being released into the water.

Very high levels of turbidity for a short period of time may not be significant. Suspended solids can smother aquatic organisms, which can prevent proper egg or larval development and potentially interfere with particle feeding activities.

Types of suspended and colloidal solids that cause an increase in turbidity include:

- Sediments
- Phytoplankton
- Finely divided organic and inorganic matter
- Other microscopic organisms.

These suspended and colloidal solids can vary in colour. They are usually white, red, brown, grey or green.

Causes of turbidity can be:

- Soil washed off the surrounding land during heavy rainfall or floods
- River/stream bank erosion
- Sediment from building site developments
- Stormwater.

In 2009 in August the Turbidity was less than 42.5, this is much more than the maximum turbidity level according to the ANZECC guidelines, this means that long-term high turbidity can reduce biodiversity.

In 2003 in May the Turbidity was less than 10, this is the maximum level it should be according to the ANZECC guidelines.

Overall the turbidity levels from 2003 to 2009 have been changed a lot, which has created many problems for the environment around Manly lagoon. The main source of turbidity at Manly lagoon would be stormwater as residential, recreational and industrial areas create wastes that may not be disposed of and when it rains the runoff collects this waste which runs into Manly lagoon. When visiting Manly Lagoon, the water does look polluted due to phytoplankton growth seen on top of the water, which light cannot penetrate through. This causes loss of many aquatic species living in and around the lagoon.

Human and Environmental Impact

Manly lagoon is surrounded by residential, industrial and recreational areas. These wastes include rubbish, pesticides, and unwanted chemicals. This creates many problems for the environment as these wastes end up polluting the lagoon. This in turn increasing and decreased the levels of turbidity, temperature and pH below and above the ANZECC guidelines. This creates huge problems as species diminish and the water quality is low so that it has no real use.

Manly Lagoon was once an un-spoilt coastal wetland, and only 30 years ago the waterway provided fish and numerous recreational opportunities. Currently Manly Lagoon is only 10% of its original size, and swimming, boating and fishing is banned, due to polluted water and sediment. This is due to environmental issues such as temperature and runoff into the lagoon from polluted areas. Also the vegetation surrounding the lagoon has died due to the pollution creating a bigger problem as the unwanted wastes run straight into the lagoon.

Human and Environmental areas have impacted the quality of the lagoon so much so, people are warned about swimming and fishing in it. This doesn't only affect humans, as aquatic species have vanished due to too much nutrients and pollution. This can destroy the lagoon's aquatic food chain. By creating problems for one species can create a bigger problem as the rest of the chain is threatened.



Management Strategies

– Reduce nutrient input.

For example:

- Increase and recover the buffer zone of the lagoon and native flora. Starting from areas of most importance at the top of the catchment, where contamination affects all parts of the



ecosystem downstream, while then working down to the bottom of the catchment. This would effectively reduce the amount of pollution flowing into the lagoon from urban runoff and soil infiltration, with this vegetation acting as a trap or sink to the pollution.

- Increase maintenance of current gross pollutant traps as well as incorporating more into the catchment.
- Find an alternative to the current sewage over flow system that allows raw sewage into the lagoon every time there is heavy enough rain to make the system over flow.

– Increase water flow into the lagoon so to create a greater turn over of water.

Manly Lagoon

Water quality in manly has varied in some areas over the six years however in others little has changed. Manly Lagoon has an average turbidity level of above 95% and an average pH and temperature within the ANZECC guidelines, however with new strategies and management the lagoon should undergo many changes that will in time prevent pollution and create a water quality that will suit the original ecosystem and accommodate the aquatic food chain.

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Has Manly lagoon water quality improved in the past ten years?

Chloe Christensen (student)

Stella Maris College, Manly

Focus Questions:

1. What is the difference between Manly Lagoon's water quality 10 yrs ago and now?
2. What are some contributors of water quality?
3. What management strategies have been developed and have there been any improvements that are visible today?

Manly Lagoon



1. Manly Lagoon water quality over 10 yrs

This data was collected through the use of various instruments which can be used to find turbidity, temperature, pH levels etc. Through observation of the surrounding environment we can also gather data on how the lagoon affects the surrounding area and how it contributes to various activities.

Water Quality in 2003

Location	Clearview place. Upper Brookvale Ck. (Site 1)	Nolan's 2 reserve (Site 2)
Comments	Bad smell	Boom across lagoon collecting rubbish
Water Temp °C	16	18.5
pH	7	7
Turbidity (NTU)	<10	<10
% dissolved oxygen	87	68
Dissolved solids (mg/L)	170	170
Available phosphates (mg/L)	0	0.26
Copper (mg/L)	0.06	0.17

Water Quality in 2009

Location	Clearview place. Upper Brookvale Ck. (Site 1)	Nolan's 2 reserve (Site 2)
Comments	Clear, smells clean	Smells like rotten egg, sediment is cloudy and dirty
Water Temp °C	11	17
pH	6.5	6.5
Turbidity (NTU)	<5	<80
% dissolved oxygen	83	42
Dissolved solids (mg/L)	280	80
Available phosphates (mg/L)	0.08	0.03
Copper (mg/L)	0.25	0.3

In 2003 the comments made about site 1 included that it had a really bad smell. In 2009 the comments were that it smelt clean and the water was clear. This shows an improvement in the way the lagoon looks and smells which leads us to assume that its water quality has definitely improved in the past ten yrs. At site 2 comments were made about a boom that had been installed to collect rubbish and stop it from travelling further downstream. In 2009 the comments were that it smelt like rotten egg and had cloudy/dirty sediment. From this we can see that a boom was installed to help with the poor water quality of the lagoon, unfortunately 6 years later there has been next to no visible improvement in the look and smell of the lagoon. Our senses have been used to collect this data and have given us a general idea of how much manly lagoon water quality has improved.



Temperature measure how hot or cold the water is and its exact measurement in °C. It is an important factor in measuring the biological activity present in the water.



pH measures the relative acidity or alkalinity of a substance.

Turbidity is a measure of the clarity of the water. Cloudier water usually indicates water that is more polluted. E.g. a reading of <5 indicates that the water is very clear as opposed to a reading of <80 which would mean that the water is quite murky.

The percentage of dissolved oxygen indicates how much oxygen is present in the water. The higher the percentage, the more sustainable the water is for containing aquatic life and providing for the surrounding environment.

From these results we can see that there has been a slight improvement in Site 1. The turbidity and temperature have decreased making the water quality much cleaner and clearer. The quality of Site 2 seems to have gotten worse. The turbidity levels shot way up making the water very murky and brown. The percentage of dissolved oxygen



also decreased making it harder to sustain any life. These results indicate that at the top of the lagoon there is evidence that the quality is better, whilst towards the bottom it is getting worse. This may be due to the fact that Site 1 is smaller and may be easier to maintain and Site 2 has received more pollution due to many creeks leading into it.

2. Contributors of water quality

Some of the main contributors of water quality are the surrounding environment and the location of the water. Manly lagoon runs through industrial areas and recreational facilities, picking up all the pollution and anything else in these areas. The amount of water flowing into the lagoon increases during storms. This becomes an issue when the storm water begins to pick up rubbish, fertilizers and other pollution and runs straight into the lagoon. For a long time manly lagoon has been affected by the illegal discharge and dumping of industrial and trade waste. This has greatly affected the lagoon and has lead to its deterioration and polluted state. 10 years ago there were fewer industrial estates around manly creeks and lagoons then there are now. Due to this increase the amount



of industrial waste entering the lagoon has become a major issue. The sites we visited helped us to get an idea of the environment where the lagoon was situated and its affect on the lagoon. Site 1 is located behind an industrial area but does not seem to be affected by it. It is surrounded by trees which

help filter out some of the pollution in the creek. The area is very sheltered and leads into a big storm water drain which indicates that the storm water that enters the creek needs to be controlled. Site 2 is located in a recreational area which means that it is more likely to be affected by littering and fertiliser run off. The area is much more open than Site 1 and has very sludgy banks as opposed to the sand and rocks found at the bottom of Site 1. The difference in the environment has helped influence the noticeable difference in water quality at both sites and overall in Manly Lagoon.

3. Management Strategies



In the past 10 years site 1 has undergone some changes so that the lagoon quality could improve. Site 1 now has a storm water drain which helps to manage the vast amount of water that builds up when it rains. This is useful because it helps to control the storm water and decrease the amount of pollution that

it picks up along the way. Site 1 also has had many plants and trees planted around it. This helps to filter out some of the toxins or pollution that may enter the creek. These management strategies have proven useful as in the past 6 years there has been a vast improvement in the environment and quality of the water at Site 1.

Site 2 has had a boom installed across the middle of the lagoon to collect rubbish that has been causing damage to the environment. It also has metal grates at the end of some stormwater drains that end up in the lagoon. This stops the increasing amount of litter that ends up in the lagoon from travelling further downstream and eventually ending up in the ocean. Site 2 has also had a significant amount of plants and trees planted on the edge of the lagoon which has formed a small reserve. This stops the fertilisers and other pollutants from the recreational facilities from draining into the lagoon. The trees also help to cleanse the water

as they play a small role in helping to filter out some of the pollution present in the lagoon. These strategies have yet to show an affect. At the moment there hasn't been much of a visible improvement but they may still prove effective in the near future. it seems that for Site 2 further action needs to be taken to improve its water quality.



In conclusion, Manly Lagoon seems to be getting off to an okay start to achieving better water quality. From the results shown here the water quality has improved over the past ten years in some aspects and deteriorated in the others. These results have shown evidence that seems to show that these strategies that have been set up seem to work really well on the smaller parts of the lagoon such as the creeks and streams that flow into it e.g. Site 1, but seem to have little effect on the lagoon itself in the big picture i.e. Site 2. It seem that in the present time further steps need to be taken to ensure that manly lagoon quality can improve so that maybe in the next 10 years the results will show that the quality has substantially improved.

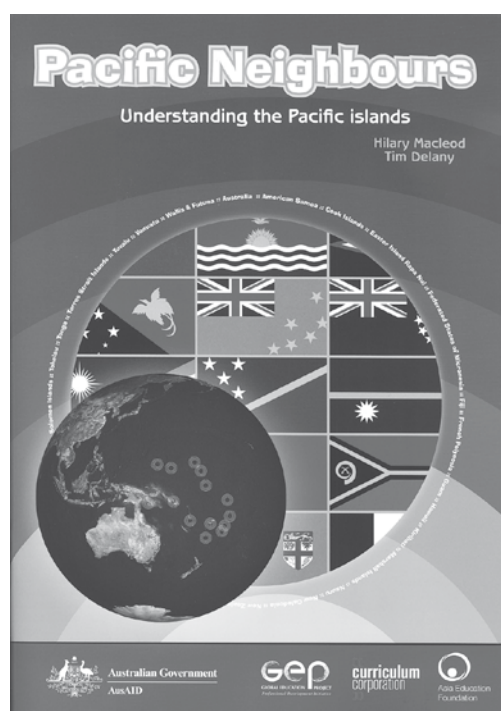
Pacific Neighbours – Understanding the Pacific Islands



Report from briefing meeting in Canberra – October 2009

Susan Bliss and Sue Field

*Arthur Burch, Manager of AusAID's
Global Education program*



Educators from across Australia gathered at University House, ANU to be introduced to a new teaching resource for secondary schools. It has been jointly produced by AusAID, Global Education Project, Curriculum Corporation and the Asia Education Foundation.

The resource looks at the characteristics of the Pacific region, Australia's connection with the Pacific region, environmental issues, sustainable development, tourism and impacts of globalisation. It goes into the historical, geographical, political and social development of Pacific island nations and includes the challenges they face in achieving sustainable futures. Developing an understanding of Australia's place and role in the Pacific region will help put our role as global citizens into perspective.

The resource will be most useful for Year 10 Geography classes investigating Australia in Its Regional and Global Contexts. This book will be one of the new resources available to GTA to share with teachers at workshops in 2010.

SAMPLE PROGRAM



WATER FOR LIFE

TEACHER RESOURCE FOR
STAGE 3 HUMAN SOCIETY
AND ITS ENVIRONMENT (HSIE)
STAGES 4 AND 5 GEOGRAPHY

Developed by the Primary HSIE Teachers' Association
and the Geography Teachers' Association of NSW as
part of the NSW Government's Water for Life Program.

Acknowledgements

Water for Life Teacher Resource for Stage 3 Human Society and Its Environment

This project is a partnership between the NSW Geography Teachers' Association, NSW Science Teachers' Association, and the former NSW Department of Water and Energy, with the support of the former NSW Department of Environment and Climate Change, the NSW Department of Education and Training, the Office of the Board of Studies and the Primary HSIE Teachers' Association.

Water for Life Teacher Resource for Stages 4 and 5 Geography

This project is a partnership between the NSW Geography Teachers' Association, NSW Science Teachers' Association, and the former NSW Department of Water and Energy, with the support of the former NSW Department of Environment and Climate Change, the NSW Department of Education and Training, and the Office of the Board of Studies.

Water for Life Teacher Resource for Stage 3 Human Society and its Environment

Water for Life Teacher Resource for Stages 4 and 5 Geography

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August 2009

Contact the NSW Geography Teachers' Association for copyright information.



Introduction to Water for Life Teacher Resource for Stages 4 and 5 Geography

There is an ongoing need to ensure that young people acquire a broad understanding of water sustainability and its implications for their own lives and the broader community.

The Water for Life project is a partnership between the NSW Geography Teachers' Association, NSW Science Teachers' Association, and the former NSW Department of Water and Energy, with the support of the former NSW Department of Environment and Climate Change, the NSW Department of Education and Training and the Office of the Board of Studies.

The project partners:

- have developed appropriate water-related teaching and learning materials
- have developed a professional development package
- will work with teachers from the greater Sydney region to utilise the resources.

Objectives of the Water for Life project

The objective is to develop relevant water sustainability understandings, attitudes and behaviours in young people to equip them to play an informed and active role in conserving water for current and future needs.

This project will build on and extend other school programs to ensure that teachers of Years 5 to 6 (HSIE and Science and Technology) and Years 7 to 10 (Geography and Science) classes have access to high quality teaching and learning resources on water sustainability, and are trained to use them effectively.

Overview of the teaching programs for Years 7 to 10 Geography

These programs are a modification of the sample programs produced by the Curriculum K-12 Directorate, NSW Department of Education and Training. The sample programs for all the geography topics can be found on the website at: www.curriculumsupport.education.nsw.gov.au.

The programs in this resource are a model of how the Department's sample programs can be adapted to meet the specific needs of a school and its community.

These programs (from 4G1 to 5A3) have been produced with a focus on water – related topics at the global, Australian and local community levels. This emphasis on water provides the opportunity for students to integrate their learning in Geography from Years 7-10 and to develop a deeper knowledge and understanding of these issues around water conservation and sustainability



Summary of water focus in units

Unit	Focus
4G1	The Greater Blue Mountains as a World Heritage area and a water catchment area for Sydney. Includes fieldwork
4G2	River environments at the global, Australian and local levels. Includes fieldwork at Warragamba Dam.
4G3	Water and gender issues on a global scale and UNESCO as a global organisation working to reduce global inequalities regarding water.
4G4	Access to fresh water and urbanisation as the two global issues. Includes local fieldwork at the school level and links urbanisation to Sydney's water supply.
5A1	Drought as a natural hazard for Australia. Includes fieldwork in the local community.
5A2	New technologies for water supply in a Sydney community: Newington. Includes fieldwork at Newington and Sydney Olympic Park.
5A3	Waste management including wastewater management in Sydney. Land and water management including stormwater harvesting at a local level. Includes fieldwork at the school level.

The program for 5A4 is a reprint of the sample program from the Curriculum Support website. It has been included to complete the suite of units.

A resource for all schools

This focus on water is crucial for all NSW students, including rural communities in drought-affected areas. This resource has been written with a Sydney focus in many places, but these examples can be substituted by more relevant examples to suit the location of the school.

There needs to be a balance between local, Australian and global levels of study. Students need to be assisted to understand water issues in their full Australian and global contexts.

Australian examples are also a part of global geography and they are used in Stage 4 to connect students with their world, to assist them to understand global concepts and examples.



Syllabus fit

These programs have been 'mapped' against the syllabus and they meet syllabus content requirements, including geographic tools and ICT demands.

Geographic tools

The mandatory tools allocated to each unit by the syllabus have been included in these units. If teachers are modifying the suggested tasks they need to take care to substitute another task that includes the prescribed tools.

If teachers are integrating units (as in the example of 4G1 and 4G2) the tools for both units can also be integrated.

It is not the place of this program to explain how to teach the tools. This program has been written for teachers trained as geography teachers. There are commercial resources available for teachers needing further assistance with tools.

The tools and skills in these programs have been carefully sequenced to build on prior learning from the previous units especially with respect to the research and fieldwork components.

Information and Communication Technologies (ICT)

The ICT in the geography syllabus is mandatory for all schools and all students. These programs have modelled a variety of ICT tasks to assist teachers with this aspect of the syllabus. Many of the tasks can be successfully delivered without the use of ICT and teachers should not see ICT as a barrier to using these programs. However, teachers need to ensure that they are meeting the requirements of the syllabus.

Terminology

The terminology used in these programs comes from the syllabus, specifically the *learn about* and *learn to* statements. It is essential that all students are exposed to this terminology in Year 7. If students do not know or understand the meaning of any of the concepts or terms used in the tasks, teachers will need to explicitly teach these terms and concepts before proceeding with the tasks.



Student fit

These programs have been written for an average student. Teachers with students in the higher and lower ability ranges in their classes will need to modify the tasks to meet the full range of student abilities in the class.

The programs are an example of 'quality teaching'. They are based on the scenario model that provides students with direction in a real life application of geography. Some of the scenarios, although written as hypotheticals, would be more effective as authentic tasks, giving students an opportunity to connect their learning to their world. They also allow students to demonstrate civics and citizenship and contribute to school environmental management, and to the community.

Student-centred learning

Many of the tasks are student-centred and rely on groupwork to engage students and to immerse them in learning. Where teachers are not comfortable with group work, the tasks can be varied to have students working individually, in pairs or as a whole class (teacher-centred). Group work is more time-efficient for many of the topics especially when there is a lot of content to cover. Group work suits all ability levels and enables the teacher to offer individual assistance and more explicit teaching when necessary.

Timing

The syllabus does not allocate time to each of the focus areas because the time spent on each topic will depend on the school and the class, pedagogy and prior learning. Therefore no time allocation has been indicated but every attempt has been made to make the tasks achievable by an average class.

Assessment of learning

All the tasks provided in these programs are *assessment for learning* tasks. Some activities in these tasks can be selected to be *assessment of learning* as well. *Assessment of learning* tasks require marking guidelines to be constructed.

Three sample tasks for *assessment of learning* have been provided: one for Stage 4 and two for Stage 5. Teachers make their own choices about which tasks become *assessment of learning* for the purposes of reporting. All assessment tasks must fit the school and faculty policies and procedures and be part of their assessment schedule for the prescribed stage.



Years 7 – 10 Geography 4G1 Investigating the World

This program has a focus on water-related topics.

The program is a modified version of the sample program produced by the Curriculum K-12 Directorate, NSW Department of Education and Training.

Focus area 4G1	Investigating the World
Focus	An introduction to the discipline of Geography and the nature of geographical inquiry
Outcomes A student: <ul style="list-style-type: none"> 4.1 identifies and gathers geographical information 4.2 organises and interprets geographical information 4.3 uses a range of written, oral and graphic forms to communicate geographical information 4.4 uses a range of geographical tools 4.5 demonstrates a sense of place about global environments 4.6 describes the geographical processes that form and transform environments 4.10 explains how geographical knowledge, understanding and skills combine with knowledge of civics to contribute to informed citizenship. 	
Suggested ICT Create a desktop-published document for a specific audience Develop and refine search techniques using the internet Collect and interpret electronic information.	
Resources (Include resources available within your school and community.) There are a variety of commercial textbooks that can support the tasks outlined in this topic to provide background for students and that have skills based activities incorporating mandatory tools. The use of the Internet is assumed as a source of information. Websites World Heritage Australian Government's World Heritage website covers locations, criteria, implications, laws, listing process and specific detail on each of the sites. http://www.environment.gov.au/heritage/worldheritage/	



Blue Mountains

Mountains City Council – World Heritage Listing

<http://www.bmcc.nsw.gov.au/mediacentre/worldheritagelisting/>

Map of Greater Blue Mountains Area

<http://www.environment.gov.au/heritage/worldheritage/sites/blue/pubs/gbm-map.pdf>

Sustainable Blue Mountains

<http://www.sustainablebluemountains.net.au/home/>

Groundwater – lifeblood of the environment

<http://www.bluemountains.org.au/Water/GroundWaterBooklet.pdf>

Water

Water for life

<http://www.waterforlife.nsw.gov.au/>

Sydney Water

<http://www.sydneywater.com.au/index.cfm>

Sydney Catchment Authority

<http://www.sca.nsw.gov.au/about/>

<http://www.sca.nsw.gov.au/news/media/65.html>

The National Water Commission

http://210.247.163.235/nwi/water_governance/nsw-supply.cfm

Teacher note

This program assumes students have completed the requirements of Stage 3 HSIE K-6 Syllabus. To avoid the teaching of geography skills in isolation, the world heritage content of this topic has been used as the context to teach the geographic tools. The following learn to and learn about statements have been included in 4G2 to develop a more cohesive and relevant approach to 4G1:

- global representation using maps
- *recognise continents using different map projections*
- the importance and use of latitude
- *use latitude to describe the global pattern of climate, including the spatial and seasonal change in insolation*
- the importance and use of longitude
- *use longitude to explain world time zones*
- global patterns of physical and human features
- *describe global patterns of physical and human features.*



<p>Learn abouts Learn tos</p>	<p>Teaching and learning activities</p> <p><i>Assessment:</i> The activities require students to demonstrate their learning and are all <i>assessment for learning</i> activities. Some activities might be selected and included in a school assessment schedule for <i>assessment of learning</i>.</p>
<p>Geographical research</p> <ul style="list-style-type: none"> • key geographical questions • fieldwork: the use of geographical tools in investigating the physical and human environment. • <i>apply key geographical questions to a local environment</i> • <i>use geographical tools to measure and record elements of the local environment</i> • <i>present geographical information about the local environment using a range of written, oral and graphic forms</i> 	<p>4) <i>Why do you think the Greater Blue Mountains are listed as a World Heritage site and give reasons for your answer?</i></p> <p>5) <i>Do the Greater Blue Mountains provide water for Sydney?</i></p> <p>Task 4 The Greater Blue Mountains supplying Sydney's water</p> <div data-bbox="683 947 1278 1892"> <p>Background</p> <p>Two examples of government agencies impacting on water in the Blue Mountains World Heritage area.</p> <p><u>Sydney Catchment Authority:</u> The Authority has historically reserved Special Areas of restricted and prohibited access for the preservation of water quality in Sydney's drinking water sources. Almost half of these areas exist in the Greater Blue Mountains World Heritage Area, and surveys of the areas have found the significant contribution that they have provided for flora and fauna conservation.</p> <p><u>Sydney Water:</u> 2006 saw the planning and environmental impact assessment work start for Stage two of the Priority Sewerage Program (PSP), improving sewerage services for towns and villages with high environmental sensitivity for improved sewerage. Of particular significance to our study is the Yellow Rock and Hawkesbury Heights construction as this is directly adjacent to the World Heritage listed Blue Mountains National Park and the catchment area for Sydney's drinking water.</p> <p><i>Sources: Media releases and information from the Sydney Catchment Authority and Sydney Water.</i></p> </div>



Learn abouts Learn tos	Teaching and learning activities <i>Assessment:</i> The activities require students to demonstrate their learning and are all <i>assessment for learning</i> activities. Some activities might be selected and included in a school assessment schedule for <i>assessment of learning</i> .
<p>Geographical research</p> <ul style="list-style-type: none"> • key geographical questions • fieldwork: the use of geographical tools in investigating the physical and human environment. • <i>apply key geographical questions to a local environment</i> • <i>use geographical tools to measure and record elements of the local environment</i> • <i>present geographical information about the local environment using a range of written, oral and graphic forms</i> 	<p>Different government agencies are responsible for providing Sydney's water.</p> <p>What are the different roles of these agencies in the Greater Blue Mountains?</p> <ul style="list-style-type: none"> • Investigate the two media releases and their websites to research their roles. • Write a half page report comparing their different roles, referring to examples of how they both operate in the Blue Mountains. <p>Task 5 Fieldwork in the Greater Blue Mountains</p> <div data-bbox="678 1093 1276 1193" style="border: 1px solid black; padding: 5px;"> <p>The purpose of this fieldwork is to investigate the landscape and make the connections between Tasks 3 and 4 and the real world.</p> </div> <ul style="list-style-type: none"> • Visit places such as Echo Point, Scenic World or Govett's Leap to get an impression of the landscape and discuss the geomorphic processes operating at each location. • Ask geographical questions such as: What is there? Where is it? Why is it there? • Record your information using appropriate diagrams, sketch maps, line drawings and photographs. • Conduct your survey of visitors. (in pairs and remember to be polite) • Speak to a representative of National Parks and Wildlife Service about the criteria and process for being listed as a World Heritage Area, organisations responsible for the World Heritage Area, legal obligations of governments and the different roles of individuals, groups and governments in protecting the area and protecting the water supply for Sydney.



Learn abouts Learn tos	Teaching and learning activities <i>Assessment:</i> The activities require students to demonstrate their learning and are all <i>assessment for learning</i> activities. Some activities might be selected and included in a school assessment schedule for <i>assessment of learning</i> .
World Heritage Sites <ul style="list-style-type: none"> the criteria and process for World Heritage listing international treaties and agreements related to World Heritage sites organisations responsible for World Heritage sites use <i>geographical questions to investigate a World Heritage site</i> explain the importance of World Heritage listing legal obligations of governments to the preservation of World Heritage sites outline the role of individuals, groups and governments in identifying and protecting World Heritage sites 	<p>When back in class:</p> <ul style="list-style-type: none"> collate the answers from the survey and write a half page summary of your findings compare your answers with the actual World Heritage criteria and write a report (one page) on visitors' appreciation of the Greater Blue Mountains as a World Heritage Area and catchment for Sydney's water supply. <p>Teacher note</p> <p>See sample <i>Assessment of learning</i> task for this</p> <p>Task 6 School magazine article</p> <div data-bbox="671 1140 1289 1480"> <p>Scenario</p> <p>Using the information you have collected in this study prepare a desktop-published article (no more than two pages) "World Heritage site provides water for Sydney"</p> <p>The article should be engaging for your fellow students reading the school magazine. Use the following headings and include photographs and sketches from fieldwork.</p> </div> <ul style="list-style-type: none"> What are World Heritage sites? Which international organisation is responsible for World Heritage listing? Examples of World Heritage sites near Sydney. How can a site be listed? Why the Greater Blue Mountains was listed as a World Heritage site. The international agreements that relate to World Heritage sites. The Greater Blue Mountains as a water catchment for Sydney's water.



Assessment for Stage 4 Geography

This is an assessment of learning task for 4G1. It is the final activity in *Task 5 Fieldwork in the Greater Blue Mountains* for the Focus Area: *4G1 Investigating the World*.

Task

Write a report (one page) on visitor's appreciation of the Greater Blue Mountains as a World Heritage Area and as a catchment for Sydney's water supply.

Rubric

In your answer include:

- a sketch map of the Greater Blue Mountains World Heritage Area and the catchment for Sydney's water
- the actual criteria for declaring the Greater Blue Mountains a World Heritage Area
- a summary and interpretation of the results from the survey conducted at a tourist location in the Blue Mountains
- geographical terminology and mapping conventions.

Marking criteria	Mark range
<ul style="list-style-type: none"> • Provides a detailed and accurate sketch map of the area, including the Greater Blue Mountains Area and the catchment for Sydney's water. • Provides actual criteria for World Heritage Listing. • Gives a concise summary of survey results. • Comprehensively interprets survey results. • Uses high-level geographical terminology and appropriate mapping conventions. 	9 – 10
<ul style="list-style-type: none"> • Provides a detailed and/or accurate sketch map of the area, including the Greater Blue Mountains Area and the catchment for Sydney's water. • Provides actual criteria for World Heritage Listing. • Gives a summary of survey results. • Interprets survey results. • Uses some geographical terminology and 	7 – 8



appropriate mapping conventions.	
<ul style="list-style-type: none"> Provides a sketch map of the area, with some detail of both the Greater Blue Mountains Area and the catchment for Sydney's water. Provides some criteria for World Heritage Listing. Gives a basic summary of survey results. Gives a limited interpretation of survey results. Uses some geographical terminology and mapping conventions. 	5 – 6
<ul style="list-style-type: none"> Makes some attempt at the sketch map or criteria for World Heritage Listing or area of the catchment for Sydney's water. Gives a limited summary of survey results with some comment. Limited use of geographical terminology and mapping conventions. 	3 – 4
<ul style="list-style-type: none"> Make general statements about the Blue Mountains, World Heritage and Sydney's water supply. Makes general statements about survey. 	1 - 2



Years 7 – 10 Geography 4G2 Global Environments

This program has a focus on water-related topics.

The program is a modified version of the sample program produced by the Curriculum K-12 Directorate, NSW Department of Education and Training.

Focus area 4G2	Global Environments
Focus	The geographical processes that form and transform global environments, and human interactions within environments
Outcomes A student: <ul style="list-style-type: none"> 4.1 identifies and gathers geographical information 4.2 organises and interprets geographical information 4.3 uses a range of written, oral and graphic forms to communicate geographical information 4.4 uses a range of geographical tools 4.6 describes the geographical processes that form and transform environments 4.8 describes the interrelationships between people and environments 4.10 explains how geographical knowledge, understanding and skills combine with knowledge of civics to contribute to informed citizenship. 	
Suggested ICT Collect and interpret electronic information. Design and create a multimedia presentation.	
Resources (Include resources available within your school and community.) There are a variety of commercial textbooks that can support the tasks outlined in this topic to provide background for students and that have skills based activities incorporating mandatory tools. The use of the Internet is assumed as a source of information. Websites Rivers MSN Encarta – rivers: introduction, formation, factors that shape a river, river patterns, measuring rivers, importance, conservation and preservation (USA focus) http://encarta.msn.com/encnet/refpages/refarticle.aspx?refid=761569915	



<p>Learn abouts Learn to</p>	<p>Teaching and learning activities</p> <p><i>Assessment:</i> The activities require students to demonstrate their learning and are all <i>assessment for learning</i> activities. Some activities might be selected and included in a school assessment schedule for <i>assessment of learning</i>.</p>
<p>From 4G1</p> <ul style="list-style-type: none"> • <i>global representation using maps</i> • <i>recognise continents using different map projections</i> • <i>the importance and use of latitude</i> • <i>use latitude to describe the global pattern of climate, including the spatial and seasonal change in insolation</i> • <i>the importance and use of longitude</i> • <i>use longitude to explain world time zones</i> • <i>global patterns of physical and human features</i> • <i>describe global patterns of physical and human features</i> <p>Global Environments</p> <ul style="list-style-type: none"> • <i>types of global environments and their location:</i> <ul style="list-style-type: none"> ○ coasts ○ coral reefs ○ deserts ○ grasslands ○ mountains ○ polar lands ○ rainforests ○ rivers ○ tundra ○ wetlands 	<p>Teacher note</p> <p><i>During the research phase of Task 1, it is likely that teachers will need to teach explicitly some aspects of global patterns including the effects of latitude (earth's axis and rotation) and insolation (the uneven heating of the earth's surface). These matters have been included in 4G2 to provide a closer link with global environments and to make 4G1 more coherent.</i></p> <p>Task 1 World Discovery Tour</p> <div data-bbox="638 1070 1248 1361" style="border: 1px solid black; padding: 5px;"> <p>Scenario</p> <p>Research the different types of global environments and plan a world discovery tour that will take you to all the continents and will include one destination from each of the listed global environments. Plot the tour on a world map and prepare a brochure describing the key features of each destination.</p> </div> <p>In your initial research:</p> <ul style="list-style-type: none"> • investigate atlases and other sources to find examples of different map projections (e.g. Mercator) and how they depict the different continents • explain how latitude affects the global pattern of distribution of the types of global environments in relation to the uneven heating of the earth's surface • use a world map to indicate the global distribution of each of the types of global environments and label them • investigate the effect of relief variations on the types of global environments.



<p>Learn abouts</p> <p>Learn tos</p>	<p>Teaching and learning activities</p> <p><i>Assessment:</i> The activities require students to demonstrate their learning and are all <i>assessment for learning</i> activities. Some activities might be selected and included in a school assessment schedule for <i>assessment of learning</i>.</p>
<ul style="list-style-type: none"> locate different global environments 	<p>On your world map outline of the tour include:</p> <ul style="list-style-type: none"> the location of each environment (latitude and longitude) the route to be travelled the time zones crossed from one environment to the next (changing longitude lines) the compass directions between each destination the distance between each destination using two different expressions of scale. <p>In your brochure include:</p> <ul style="list-style-type: none"> dates of the tour (start/finish) position of each of the 10 locations visited on a small map brief (6 lines) description of the key physical and human features of each environment in the places visited clothing requirements (relate your answer to at least one climate graph) for each destination pictures / photos for some of the destinations. <p>Teacher note</p> <p><i>This program provides a number of opportunities for students to undertake the production of multimedia presentations. Students can fulfil this ICT requirement in any of the tasks within this topic. Teachers will need to organise this according to the resources available and ensure that all students have the opportunity to use ICT somewhere within the unit.</i></p>



<p>Learn abouts Learn tos</p>	<p>Teaching and learning activities</p> <p><i>Assessment:</i> The activities require students to demonstrate their learning and are all <i>assessment for learning</i> activities. Some activities might be selected and included in a school assessment schedule for <i>assessment of learning</i>.</p>
<p>A global environment: Rivers</p> <ul style="list-style-type: none"> the spatial distribution of rivers the major geographical processes that operate within rivers atmospheric processes biotic processes geomorphic processes hydrologic processes the way humans, including indigenous groups, interact with the rivers: <ul style="list-style-type: none"> atmospheric processes biotic processes geomorphic processes hydrologic processes <i>recognise the spatial distribution of rivers</i> <i>describe the geographical processes that shape rivers</i> <i>draw and describe the operation of a simple ecosystem</i> 	<p>Task 2 Rivers</p> <div data-bbox="638 703 1240 893" style="border: 1px solid black; padding: 5px;"> <p>Scenario</p> <p>The government has commissioned you to research and provide a multimedia report on the geographic processes that operate within your selected type of environment: rivers.</p> </div> <p>Teacher notes</p> <ol style="list-style-type: none"> The multimedia presentation can include the use of: <ul style="list-style-type: none"> PowerPoint overhead transparencies pictures / diagrams from the Internet on a poster word documents web page design. This activity is based on the websites listed in the Resources section at the front of this unit. It would help students if the selected rivers connected to prior learning. For example, if students have studied (or are studying) Ancient Egypt, select the Nile River, or if they are studying Ancient India, select the Ganges River. <p>For your multi-media report:</p> <ul style="list-style-type: none"> mark the major rivers of the world on a blank world map describe the geomorphic and hydrologic processes that form rivers construct a line drawing that depicts the major features of a significant river (selected from outside Australia)



Learn abouts Learn to	Teaching and learning activities <i>Assessment:</i> The activities require students to demonstrate their learning and are all <i>assessment for learning</i> activities. Some activities might be selected and included in a school assessment schedule for <i>assessment of learning</i> .
<ul style="list-style-type: none"> • <i>describe the interaction of humans with the rivers</i> 	<ul style="list-style-type: none"> • provide a brief explanation for the existence and development of the major features of the selected river • describe the range of climate/weather patterns evident across the length of the selected river • construct a table showing the flora / fauna evident across the length of this selected river • draw and label a diagram of one of the ecosystems that operate in the selected river environment and outline the importance of water in this ecosystem • outline any threats to this ecosystem and any strategies that can be implemented to protect this ecosystem • describe some of the special ways people live in river valleys and how different groups (including indigenous groups) have adapted to living near rivers.
A community and the way it interacts with rivers <ul style="list-style-type: none"> • <i>the way the environment influences the community</i> • <i>the way the relationship between the community and the environment is changing</i> • <i>strategies and processes that individuals, groups and governments use to influence change</i> • <i>the way the community is responding to these changes</i> 	Task 3 Communities working with their environment <div data-bbox="691 1473 1295 1910"> Scenario You are part of a company that has been hired to investigate river problems in the Sydney – Illawarra Region. To better understand Sydney's problem, first you need to work in teams (as consultants) to investigate the situation in other rivers of the world. Secondly you will visit a local dam to better understand catchment storage and supply issues. </div>



<p>Learn abouts</p> <p>Learn tos</p>	<p>Teaching and learning activities</p> <p><i>Assessment:</i> The activities require students to demonstrate their learning and are all <i>assessment for learning</i> activities. Some activities might be selected and included in a school assessment schedule for <i>assessment of learning</i>.</p>
<ul style="list-style-type: none"> • describe the interrelationship of a river with a specific community • explain how individuals, community organisations and government actions are contributing to the current management of the environment • identify the responsibility of government to the community and its environment • describe current use of the environment and suggest strategies for future ecological sustainability 	<p>a) World river case studies</p> <p>Teacher note</p> <p><i>This activity is based on case studies found on the website provided (see Resources section at front of unit). Whilst some classes may be able to work directly from the website, some classes will need more scaffolding and brief fact sheets provided by their teacher.</i></p> <p><i>These rivers have been selected to expose students to a range of global locations they may not be familiar with. Teachers may substitute any of these rivers with more appropriate alternatives where similar information is available. One of the rivers could be your 'selected river' from Task 2.</i></p> <p>Form into six groups of consultants. Each group is to investigate one of the six rivers, from different areas of the world.</p> <ul style="list-style-type: none"> • <u>Sultan Sazligi (Sultan Marshes) in Turkey</u> – a large wetland complex hosting many globally threatened bird species. • <u>Aammig Wetland in Lebanon</u> – an example of the negative impact of social and political unrest, and the positive impact of international conservation treaties. • <u>Rhone River in France and Switzerland</u> – 400 years of development for flood control, navigation, hydroelectricity and irrigated agriculture. • <u>Lower Indus River in Pakistan</u> – balancing development and maintenance of wetland ecosystems and dependent livelihoods. • <u>Sabie River in South Africa</u> – protecting biodiversity in an internationally important conservation area (Kruger National Park).



<p>Learn abouts Learn tos</p>	<p>Teaching and learning activities <i>Assessment:</i> The activities require students to demonstrate their learning and are all <i>assessment for learning</i> activities. Some activities might be selected and included in a school assessment schedule for <i>assessment of learning</i>.</p>
	<ul style="list-style-type: none"> • <u>Lower Mekong River</u> – <i>international collaboration for sustainable development.</i> <p>Each group of consultants should investigate:</p> <ul style="list-style-type: none"> • the location of the river / wetland • how communities have used the river over time • how the river has changed and why • the impact of these changes on the community • how the community is responding to these changes in rivers • how ecologically sustainable the river is in its current state. <p>Each group of consultants shares their findings with the class in an oral presentation and a summary page.</p> <p>b) Visit to Warragamba Dam</p> <p>Teacher note</p> <p><i>This activity may be substituted with a visit to a local dam or reservoir, depending on the location of the school.</i></p> <p><i>It is advisable to contact Sydney Catchment Authority Education Officers for further information and supporting materials regarding local dams and reservoirs. For contact details, visit:</i> http://www.sca.nsw.gov.au.</p> <p><i>Sydney Water runs tours of sewage and water treatment plants within their area of operations. A list of the plants is available on Sydney Water's website at:</i> http://www.sydneywater.com.au/EnsuringtheFuture/WaterSchool/FieldTrip/</p>



<p>Learn abouts Learn tos</p>	<p>Teaching and learning activities</p> <p><i>Assessment:</i> The activities require students to demonstrate their learning and are all <i>assessment for learning</i> activities. Some activities might be selected and included in a school assessment schedule for <i>assessment of learning</i>.</p>
	<p><i>If you live outside Sydney Water's area of operations, contact your local water utility for relevant tours.</i></p> <p>Background</p> <p>The 2006 Metropolitan Water Plan presents definitions and solutions that provide clarity to the international situations. The Plan outlines that "a Fundamental part of securing the rivers' health is providing water for their ecological needs. This can be achieved by a wide range of means, including releasing flows from weirs, modifying dams and controlling water extractions. Environmental water should be provided at times and in volumes that mimic natural conditions as closely as possible."¹ These initiatives assist in fulfilling some of the 'interim environmental objectives for river flow'²</p> <p>Before visiting the dam:</p> <ul style="list-style-type: none"> • investigate a range of images (e.g. oblique, aerial, ground-level, satellite) showing changes in the dam over time • locate the dam on a topographic map using grid and area references. <p>At the dam:</p> <ul style="list-style-type: none"> • record information using sketch maps, line drawings, photographs and notes • gather information about the changes to the river and its dam in response to the physical environment • obtain relevant brochures where available.

¹ 2006 Metropolitan Water Plan p8

² <http://www.sca.nsw.gov.au/publications/files/SH002.pdf> p20



<p>Learn abouts Learn tos</p>	<p>Teaching and learning activities <i>Assessment:</i> The activities require students to demonstrate their learning and are all <i>assessment for learning</i> activities. Some activities might be selected and included in a school assessment schedule for <i>assessment of learning</i>.</p>
<p>A community and the way it interacts with rivers</p> <ul style="list-style-type: none"> the way the environment influences the community the way the relationship between the community and the environment is changing strategies and processes that individuals, groups and governments use to influence change the way the community is responding to these changes <i>describe the interrelationship of a river with a specific community</i> 	<p>Your investigation of the dam should include:</p> <ul style="list-style-type: none"> the location of the river that has been dammed how communities have used the river over time how the river has changed and why the impact of these changes on the community how the community is responding to these changes in river flows how ecologically sustainable the river is in its current state. <p>Task 4 Alternative water strategies for Sydney</p> <div data-bbox="691 1211 1295 1861"> <p>Facts</p> <ol style="list-style-type: none"> Currently Sydney's drinking water is 100% from rainfall. Warragamba Dam supplies 80% of Sydney's drinking water supply and recently there have been long periods that have seen below average inflows. Householders are the largest consumers of water in Sydney. The water we use inside and outside our homes accounts for 70% of Sydney's total water consumption. The industrial sector uses 12%, business uses 10% and the government 8%. Sydney stores more water per head of population than many other cities of the world. <p>Source: www.waterforlife.nsw.gov.au.</p> </div>



Learn abouts Learn tos	Teaching and learning activities <i>Assessment:</i> The activities require students to demonstrate their learning and are all <i>assessment for learning</i> activities. Some activities might be selected and included in a school assessment schedule for <i>assessment of learning</i> .
<ul style="list-style-type: none"> • <i>explain how individuals, community organisations and government actions are contributing to the current management of the environment</i> • <i>identify the responsibility of government to the community and its environment</i> • <i>describe current use of the environment and suggest strategies for future ecological sustainability</i> 	<div data-bbox="647 656 767 685" data-label="Section-Header"> Scenario </div> <p data-bbox="647 712 1230 965">Your company has investigated river and sustainable water management issues in communities both globally and locally. You now have to come up with appropriate strategies to respond to these issues. You first investigate strategies being used by the NSW Government and then you apply these strategies to your local community.</p> <p data-bbox="647 974 1230 1099">The range of the NSW Government's strategies to save Sydney's water, recycle Sydney's water, increase Sydney's water supply or defend Sydney against drought.</p> <ol data-bbox="647 1108 1107 1263" style="list-style-type: none"> 1. Accessing deep water in the dams 2. Recycling 3. Desalination 4. Water efficiency measures <p data-bbox="647 1290 1230 1415">Working in four groups, investigate each of these four strategies being used by the NSW Government. Each group to investigate a separate strategy.</p> <ul style="list-style-type: none"> • Member or pairs in each group are to investigate a strategy from a different community perspective. These perspectives will include those of householders, industrial users, business users and governments. (see Facts for this task) • Each member or pair researches a strategy from their perspective and contributes to a group presentation on their strategy, and a handout for other groups. • Each group presents a strategy with its different perspectives to the class, who will then vote to determine the presentation they learnt most from.



<p>Learn abouts Learn tos</p>	<p>Teaching and learning activities <i>Assessment:</i> The activities require students to demonstrate their learning and are all <i>assessment for learning</i> activities. Some activities might be selected and included in a school assessment schedule for <i>assessment of learning</i>.</p>
	<ul style="list-style-type: none"> • Handouts are distributed. <p>Task 5 Community meeting on water strategies</p> <div data-bbox="691 824 1289 1055"> <p>Scenario</p> <p>Your school is conducting a community meeting to debate the value of different strategies being proposed by Sydney Water for your local area. Your class has been invited to lead the discussion.</p> </div> <p>Questions to be addressed by class:</p> <ul style="list-style-type: none"> • How has Sydney's water crisis affected your school? • What water strategies have been used by your school and how well have they worked? • Are your strategies ecologically sustainable? • What are the merits of the strategies being suggested by the NSW Government for your area? • What is the perspective of your school on these strategies? • What other strategies should your school consider?

AGTA's GeoCareers Website

www.geocareers.net.au



THE GeoCareers website is a 'user friendly' resource for learning about geographical careers. The website contains resources and case studies of young people who have studied geography at school and see a link between what they learnt in geography and what they do in their job. The main sections of the website include:

Meet a geographer

People who have studied geography are highly sought after in a wide range of careers for the special skills and knowledge they bring. In this section you can read about the interesting and rewarding careers in which people who have studied are employed. This section includes profiles of people working outdoors, indoors, helping people, engaged in environmental care, sharing knowledge with others and undertaking research.

Studying geography

Whether you are a secondary school student or enrolled in a tertiary institution such as a university or college this section will assist you find the right course. It includes links to State and Territory education departments, curriculum authorities and tertiary institutions offering geography.

Resources

A range of resources that help students make decisions about their future career include:

- Career pamphlets
- Online resources
- Geospatial careers
- Job search indexes
- Volunteer work.

This is a great website for students, their teachers, career counsellors and subject/career selection personnel.

GTA NSW Professional Development and Upcoming Events for Terms 1 and 2 2010

HSC EXAMINATION REVIEW

A review of the 2009 HSC Geography examination by experienced markers and teachers. In response to the needs of our members, this activity will be held in three locations this year using different presenters at each location.

- * *Santa Sabina College, Strathfield*
Tuesday 9 February 4pm – 6:30pm
- * *St Mary Star of the Sea College, Wollongong* Thursday
11 February 4pm – 6:30pm
- * *Merewether High School, Newcastle*
Monday 16 February 4pm – 6:30pm

CONFIDENCE WITH SKILLS AND THE SCHOOL CERTIFICATE

Due to popular demand and the success of last year's skills workshops we are conducting four more in 2010. Next year they will go to country as well as the metropolitan areas. Once again the main audience is teachers of geography that are not confident with geography, with an emphasis on Years 7-10 skills, particularly the skills required for the School Certificate Test in Geography. The day will include research and fieldwork skills along with examination techniques. These workshops will be led by Lorraine Chaffer from Gorokan High School and Pam Gregg who has recently retired from Keira High School. Pam is also a Coordinating Senior Marker at the School Certificate marking centre with extensive experience with the SC.

- * *Leichhardt PTC NSW Conference Room*
Monday 1 March 8:30am – 3:30pm
- * *Calrossy Anglican School, Tamworth*
Tuesday 9 March 8:30am – 3:30pm
- * *Wagga Wagga Council Chambers*
Tuesday 4 May 8:30am – 3:30pm
- * *Charles Sturt University, Bathurst*
Friday 21 May 8:30am – 3:30pm

MAKING A DIFFERENCE BY TEACHING ABOUT WATER IN GEOGRAPHY

These workshops are in the Sydney Water region of Sydney, Blue Mountains and Illawarra for the *Water for Life* project. They focus on case studies of local water efficiency projects and fieldwork (guest speaker) opportunities. Each workshop in the series is different, using local speakers from schools, government and business organisations. Each workshop will include a practical session or inspection of a water project. These workshops will be facilitated by Sue Field, Manager for the Water for Life Education Project with GTA.

- * *Narrabeen Coastal Environment Centre*
Wednesday 3 March 8:30am – 3:30pm
- * *Centennial Parklands Learning Centre*
Tuesday 23 March 8:30am – 3:30pm
- * *Australia's Industry World, Port Kembla*
Wednesday 31 March 8:30am – 3:30pm
- * *Georges River Environmental Education Centre*
Wednesday 21 April 8:30am – 3:30pm

- * *School of Arts Hall, Wentworth Falls*
Tuesday 1 June 8:30am – 3:30pm

USING CONTEMPORARY RESOURCES IN GLOBAL GEOGRAPHY

This is the *Global Education* series of workshops. These workshops are always well supported and the evaluations are impressive. This series will have a focus on quality teaching using contemporary resources in the classroom. The resources used will have applications from Years 7–12. A central feature of these workshops is the DVD: *The Burning Season*, which is a documentary on climate change, threatened habitats and land degradation. The movie uses a case study on rainforest burning in Indonesia to investigate these issues and what can be done to change it. Teachers attending the workshop will receive a copy of the DVD, included in the registration fee. These workshops will include practical sessions on skills and vary in structure at different locations. These workshops will be led by Dr Susan Bliss, Director of Global Education NSW and Sue Field, Manager of Secondary Project for Global Education NSW.

- * *Glenbrook Theatre*
Thursday 11 March 8:30am – 3:30pm
- * *Quality Inn and Western Plains Zoo, Dubbo*
Thursday 18 March 4:30pm – 6:30pm
and Friday 19 March 8:30am – 3:30pm
- * *Minnamurra Rainforest Centre*
Tuesday 25 May 8:30am – 3:30pm
- * *Queenwood School and Taronga Park Zoo*
Wednesday 16 June 8:30am – 3:30pm
- * *Canberra Grammar School*
Thursday 24 June 8:30am – 3:30pm
- * *Sea Acres Rainforest Centre, Port Macquarie*
Friday 30 July (Term 3) 8:30am – 3:30pm

HSC GEOGRAPHY: URBAN PLANNING FOR SYDNEY

This workshop will have speakers on the Urban Places topic, with a focus on planning for Sydney. Teachers attending the workshop will receive class sets of the urban planning books for Sydney.

- * *Leichhardt PTC NSW Conference Room*
Wednesday 28 April 8:30am – 3:30pm

HSC WORKSHOP: PEOPLE AND ECONOMIC ACTIVITY

This mini conference is specifically designed for the HSC Geography course. The presentations will focus on global tourism and the challenges facing the global wine and viticulture industries. Of course there will be a wine tasting tour and dinner included.

- * *Crowne Plaza Hotel, Hunter Valley*
Wednesday 12 May 4:30pm – 7:30pm and
Thursday 13 May 8:30am – 3:30pm

More information, please see the GTA website: www.gtansw.org.au/ or email office@gtansw.org.au
Registration forms are downloadable from the website.

Advice to contributors

1. **Objective:** The *Geography Bulletin* is the quarterly journal of the New South Wales Geography Teachers' Association, Inc. The role of the *Geography Bulletin* is to disseminate up-to-date geographical information and to widen access to new geographic teaching ideas and methods. Articles of interest to teachers and students of geography in both secondary and tertiary institutions are invited, and contributions of factually correct, informed analyses, and case studies suitable for use in secondary schools are particularly welcomed.

2. **Content:** Articles, not normally exceeding 5000 words (no minimum specification), should be submitted to the Editor at the following address:

PO Box 577, Leichhardt, NSW, 2040

Articles are welcomed from tertiary and secondary teachers, students, business and government representatives. Articles may also be solicited from time to time. Articles submitted will be evaluated according to their ability to meet the objectives outlined above.

3. **Format:** An original on disk plus one hard copy should be submitted. Tables should be on separate pages, one per page, and figures should be clearly drawn, one per page, in black on opaque paper suitable for photographing. Photographs should be on glossy paper, and strong in contrast. An indication should be given in the text of approximate location of tables, figures and photographs. Every illustration needs a caption.

4. **Title:** The title should be short, yet clear and descriptive. The author's name should appear in full, together with a full title of position held and location of employment.

5. **Covering Letter:** A covering letter, with return forwarding address should accompany all submitted articles. If the manuscript has been submitted to another journal, this should be stated clearly.

6. **Photo of Contributor:** Contributors should enclose a passport-type photograph and a brief biographical statement.

7. **References:** References should follow the conventional author-date format:

Abbott, B. K. (1980) *The Historical and Geographical Development of Muswellbrook* Newcastle: Hunter Valley Press.

Harrison, T. L. (1973a) *Railway to Jugiong* Adelaide: The Rosebud Press. (2nd Ed.)

Harrison, T. L. (1973b) The Spatial Distribution of Macadamia Plantations on the Far North Coast of New South Wales, *Journal of Rural and Agricultural Problems*, 13, 4, Oct. pp. 347–359.

O'Donovan, M. J., et al. (1980) "Animal life in the North Star District of New South Wales". "In W.W. Murphy, (Ed.) *Readings in Regional Geography* (Vol. 2), Sydney: Williams and Sons.

8. **Italics** should be indicated by underlining.

9. **Spelling** should follow the *Macquarie Dictionary*, and Australian place names should follow the Geographical Place Names Board for the appropriate state.



Cover – Aerial view of Warragamba Dam. Photograph courtesy of Department of Environment, Climate Change and Water.

Books for review should be sent to:

Mr John Lewis, Review Editor,
The GTA Office
PO Box 577
Leichhardt NSW 2040

Deadlines for articles and advertising

Summer issue – 1 December
Autumn issue – 1 March
Winter issue – 1 May
Spring issue – 1 August

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Email: office@gtansw.org.au

EDITORIAL POLICY

Editorial policy attempts to:

- promote material which will assist the study and teaching of geography
- encourage teachers to share their ideas on teaching geography
- provide a means by which teachers can publish articles
- inform readers of developments in geographical education

Articles are sought reflecting research and innovations in teaching practices in schools. From time to time issues of the Bulletin address specific themes.

Refereeing

All suitable manuscripts submitted to the *Geography Bulletin* are subject to the process of review. The authors and contributors alone are responsible for the opinions expressed in their articles and while reasonable checks are made to ensure the accuracy of all statements, neither the editor nor the Geography Teachers' Association of New South Wales Inc accepts responsibility for statements or opinions expressed herein.

