

## **What is North Central Waterwatch?**

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North Central Waterwatch is a water quality education and monitoring program, which aims to increase community understanding, participation and ownership of local water quality issues. It achieves this goal by providing a broad range of structured activities, which encourage schools and the community to become actively involved in monitoring the health of North Central's creeks, rivers, channels and wetlands. Waterwatch groups regularly check on water quality and work in partnership with water authorities, local government, landholders and businesses to improve environmental conditions.

Participating groups include primary and secondary schools, tertiary institutions, community, conservation and landcare groups, and local government representatives.

North Central Waterwatch is divided into three regions, the Loddon/Campaspe Irrigation, Loddon/Campaspe Dryland and the Avoca/Avon-Richardson catchments, which all have a Waterwatch Facilitator and shared Regional Coordinator. The Loddon/Campaspe Dryland Facilitator, Loddon Campaspe Irrigation Facilitator and Regional Coordinator are based at the North Central Catchment Management Authority office in Huntly, while the Avoca/Avon-Richardson Facilitator is based in St Arnaud at the Department of Primary Industries office.

The overall objective of the North Central Waterwatch program is to provide the structure, expertise, and support required to empower school and community members to achieve the following:

1. Gain a comprehensive understanding of water quality issues
2. Learn how to collect valuable information associated with the water quality of local creeks, rivers or wetlands
3. Interpret the information they have collected and understand what it means
4. Discuss their findings with catchment managers and contribute to the development of management recommendations
5. Become actively involved in the implementation of on-ground works and the monitoring of their success

The school educational program provided by North Central Waterwatch is called River Detectives. Schools that are signed up as River Detectives benefit in a number of ways, which are outlined below.

### **Benefits of the RIVER DETECTIVES program to Schools**

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Concern for the health and quality of our local waterways and water resources is increasing throughout our community. The desire for an environmentally sustainable future of our water resources is particularly strong among students who are already among the best informed on such issues.

River Detectives is a hands-on water quality monitoring education program designed for both primary and secondary schools. The use of field-based testing kits and state wide ecological assessment methods enables scientific data to be collected and analysed. Collection of information will promote informed discussion about local waterway quality issues and possible river health improvements. This program also enables students to work in partnership with community groups, businesses and government authorities, to help make a difference and improve the health of our waterways.

The second component of the River Detectives program involves monthly activities, which are elective but highly recommended. Monthly activities compliment the water quality monitoring program, by focussing on water related topics/issues, including: habitat surveys, indigenous Australians, saltwater, aquatic bugs, water conservation, birds and wetlands, waste and stormwater, frogs, and environmental flows.

We all have our part to play in owning and understanding the state of our waterways. Monitoring water quality and understanding the biological characteristics of our wetlands, rivers and streams, will contribute significantly to the overall knowledge and management of our local and regional waterways.

# What do RIVER DETECTIVES Measure?

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North Central Waterwatch, through the River Detectives Program, endeavours to engage and educate students of all ages by providing a range of interesting hands-on activities that have been designed to integrate easily into the school curriculum. Your local coordinator can provide information outlining the different ways River Detectives activities relate to the CSF II, and now VELS, educational guidelines. River Detectives activities span various inter-related areas of river health assessment, each applicable to a broad range of subjects from Biology and Chemistry to English and the Arts.

## Water Quality Monitoring

Water quality monitoring provides students with a fundamental understanding of waterway health, and as a result is a core River Detectives activity. Water quality monitoring involves the measurement of various physical and chemical properties, such as temperature, salinity, turbidity, pH and nutrients. Students learn how these properties affect the health of rivers, creeks and wetlands, what causes them to change, and how we can minimise the impact we have upon our local waterways and the life they sustain.

### Introductory Physical and Chemical Tests (suitable for Primary Schools and beginners):

- TEMPERATURE –Temperature of the water is measured with a simple thermometer. Temperature affects chemical properties of the water and directly affects aquatic life in a number of ways.
- pH – Participants measure the pH (acid/base) of the water with a pH probe or pH strips. pH directly affects the survival of aquatic life as well as altering water chemistry in a number of ways.
- ELECTRICAL CONDUCTIVITY - Measures the amount of dissolved salts in the water (salinity level). Salinity affects the survival of all aquatic life. Participants measure electrical conductivity with an ‘easy to use’ conductivity meter.
- TURBIDITY – Participants can measure the ‘clarity’ of the water (relates to the amount of suspended particles present) using a turbidity tube. Turbidity affects aquatic animals and plants in many ways.

### More Advanced Physical and Chemical Tests (suitable for Upper Primary, Secondary Schools and experienced monitors)

- DISSOLVED OXYGEN (DO) - The amount of oxygen in the water is measured using a Modified Winkler Titration or colorimetric analysis. Healthy oxygen levels are very important for the survival of many aquatic animals.
- PHOSPHORUS- The amount of phosphorus in the waterbody can be measured by colorimetric analysis (colorimeter or colour wheel). Excess phosphorus can have detrimental effects on the ecology of waterways (excess plant growth and algal blooms etc).
- AMMONIA - Participants can measure the amount of ammonia in the water by colorimetric analysis. Ammonia is a good indicator of organic or industrial pollution.



## Macroinvertebrate Surveys

Macroinvertebrate sampling is another important and extremely popular activity for students. Macroinvertebrates are animals without backbones (invertebrates) that are ('macro') visible with the naked eye and include insects, worms, snails, crustaceans, water mites and more!

These aquatic 'mini beasts' play a significant role in maintaining the health of our local rivers, creeks and wetlands. Macroinvertebrates form an important part of the food chain and are essential for a healthy ecosystem. Not only do they help *maintain* river health, but are also a very good *indicator* of water quality. Many of these aquatic invertebrates are sensitive to even quite mild pollutants or changes in water quality. By investigating the amount and type of macroinvertebrates present, students can determine the environmental health of the stream. This activity takes 1-2 hours and is suitable for all ages. Stream health can be monitored over time using this technique, with a recommended interval between sampling, of 1-4 months. All you need is a sturdy net, some sorting tools (spoons and tweezers), large plastic trays and ice cube containers! This is one of the monthly activities, which often involves your local Waterwatch facilitator coming out to your waterway to help you out and provide sampling equipment.

## Community Stream Sampling Project

**C**ommunity Stream Sampling and Mapping in the Murray-Darling Basin (MDB) is a three year program funded under the National Action Plan for Salinity and Water Quality (NAP), and managed by the Bureau of Rural Sciences (BRS). The project delivers on the 2004 election commitment to commit \$20 million of Australian Government money into identifying and managing underground salt deposits in the MDB.

Schools currently participating in the North Central Waterwatch River Detectives program have the opportunity to be part of the Community Stream Sampling Project. The new project is very easily integrated into the existing monitoring program, with very small changes to current procedures. It has increased the capacity of North Central Waterwatch to provide training assistance, education opportunities and equipment to schools wishing to participate. **Schools that choose to participate in the new program will also receive an updated EC meter and a professional sampling pole free of charge!**

## North Central Waterwatch Frog and Fish Monitoring Programs

### Frog Identification and Mapping

The major aims of this project are to raise people's awareness of the types of frogs that live in the North Central region and to increase the understanding of their distributions. By raising awareness of the types of frogs, their life cycles, preferred habitats, breeding habits, feeding patterns and threats to their survival, North Central Waterwatch hopes to foster an interest in frog conservation among the community.

The program focuses on developing frog identification and surveying techniques in participants, as well as alerting people to some of the issues frogs are facing, in our region and beyond. North Central Waterwatch will be offering information and training sessions, monitoring equipment and technical support through this program.

Each species of frog has a characteristic “call” that can be used to identify them in most cases (sometimes the calls can be very similar between species and other means of identification must be used). Survey participants will use digital voice recorders (provided by North Central Waterwatch) to record frog calls, note certain site characteristics and other information (date/time etc) to return to North Central Waterwatch for analysis. All frog distribution data collected by North Central Waterwatch volunteers will be stored on a database then forwarded to relevant management authorities, providing them with valuable frog distribution information.

Participants, including River Detectives schools, can conduct surveys at any time – providing availability of equipment— with advice provided regarding the most appropriate times to survey. We have also created a range of frog identification sheets to help participants get to know the species of frog they are most likely to find in the North Central region. Please visit <http://www.vic.waterwatch.org.au/inform.php?a=7&b=625&c=626> to view these resources.

## Fish Identification and Mapping

When using dip nets to sample macroinvertebrates, a fish or two are often discovered in the sample. This provides the opportunity to find out more about the types and numbers of fish in waterways. North Central Waterwatch has developed an additional fish identification and distribution mapping program to make the most of this opportunity.

This program has been developed strictly for recording “incidental” catches of native and exotic fish species during activities such as macroinvertebrate sampling and recreational fishing.

A series of Fish Identification fact sheets have been developed by North Central Waterwatch to assist identification of fish and to provide the community with information on some of the more common fish found in our waterways. River Detective schools may find the fish identification sheets useful as an education tool. You can find them online at <http://www.vic.waterwatch.org.au/inform.php?a=7&b=625&c=626>






### Common Spadefoot Toad

*Neobatrachus sudelli*

DESCRIPTION AND CHARACTERISTICS

**Adults**  
The Common Spadefoot Toad is a burrower, remaining underground for most of its time but becoming active after rainfall. Adults can be grey, brown or yellow on their back with large brown or olive green blotches. While their back is warty their underside is white and smooth. Reproductively active individuals have a back that is either smooth or covered in low rounded warts. They have baggy skin around their groin area which extends from the sides of the body down to the knees. They have webbed toes which make burrowing easier. This species can grow up to 40mm in length.



Dorsal view (Lydia Fackellfrogs.org.au)

**Tadpoles**  
Tadpoles are large, rotund across the abdomen and silvery-grey in colour, with clear fins and sometimes dark flecks.



Common Spadefoot Toad (Lydia Fackellfrogs.org.au)

**Eggs**  
The female Common Spadefoot Toad lays approximately 1000 pigmented eggs which are contained within long jelly strands, often wrapped around submerged vegetation. These will sink if disturbed. Eggs hatch 2 or 3 days after being laid.






### Eastern Gambusia

*Gambusia holbrooki*

DESCRIPTION AND CHARACTERISTICS

Eastern Gambusia, more commonly known as Mosquitofish, are a noxious fish species introduced into Australia in 1925 from North and Central America. They have a dorsoally flattened head, rounded tail and a single dorsal fin. Their back is green to brown, becoming grey with a bluish tinge down their sides, and silver on the belly. They also have an upturned mouth, large eyes, and a rounded belly.



Male (Lydia Fackellfrogs.org.au)

Eastern Gambusia are sexually dimorphic (females and males have different forms), with females reaching a much larger size of up to 6cm, compared to males, which only grow to around 3cm in length.



Female (Lydia Fackellfrogs.org.au)

Females also possess a deeper stomach and a distinguishing black spot near the rear of their abdomen, which becomes more pronounced when gravid (carrying eggs).

Males lack the prominent stomach bulge present in females, and possess a longer anal fin which is used as a breeding tool.

**BIOLOGY AND LIFE CYCLE**

Eastern Gambusia prefer warm, still or slow flowing water, but are found in a wide variety of habitats around Australia. They are extremely tolerant of adverse water conditions. Eastern Gambusia can tolerate a wide range of temperatures, from +5°C to 44°C and salinities (from freshwater to estuaries). They are also able to live in oxygen poor environments, and will gulp air from the surface to supplement their oxygen supply. Eastern Gambusia possess an extremely diverse

diet, and are known to voraciously graze a variety of native aquatic organisms, including aquatic bugs, beetles, frog and fish eggs/larvae, ants and flies. They also display aggressive fin-nipping behaviour, biting the fins of fish and tadpoles. Unlike many native fish, they give birth to live young. They can bear up to nine broods per year, averaging 30-50 young per brood. Young fish mature very quickly, reaching reproductive age at between 4 and 6 weeks.

## What you are provided with by the RIVER DETECTIVES program

- Training in the correct protocols for accurate water quality sampling and testing.
- The River Detectives Manual including river health information and monthly activities.
- A water quality monitoring kit to use for the school year.
- Access to, and support from, your local Waterwatch facilitator- to present on any topic related to river health.

And best of all.....it's **FREE!**

