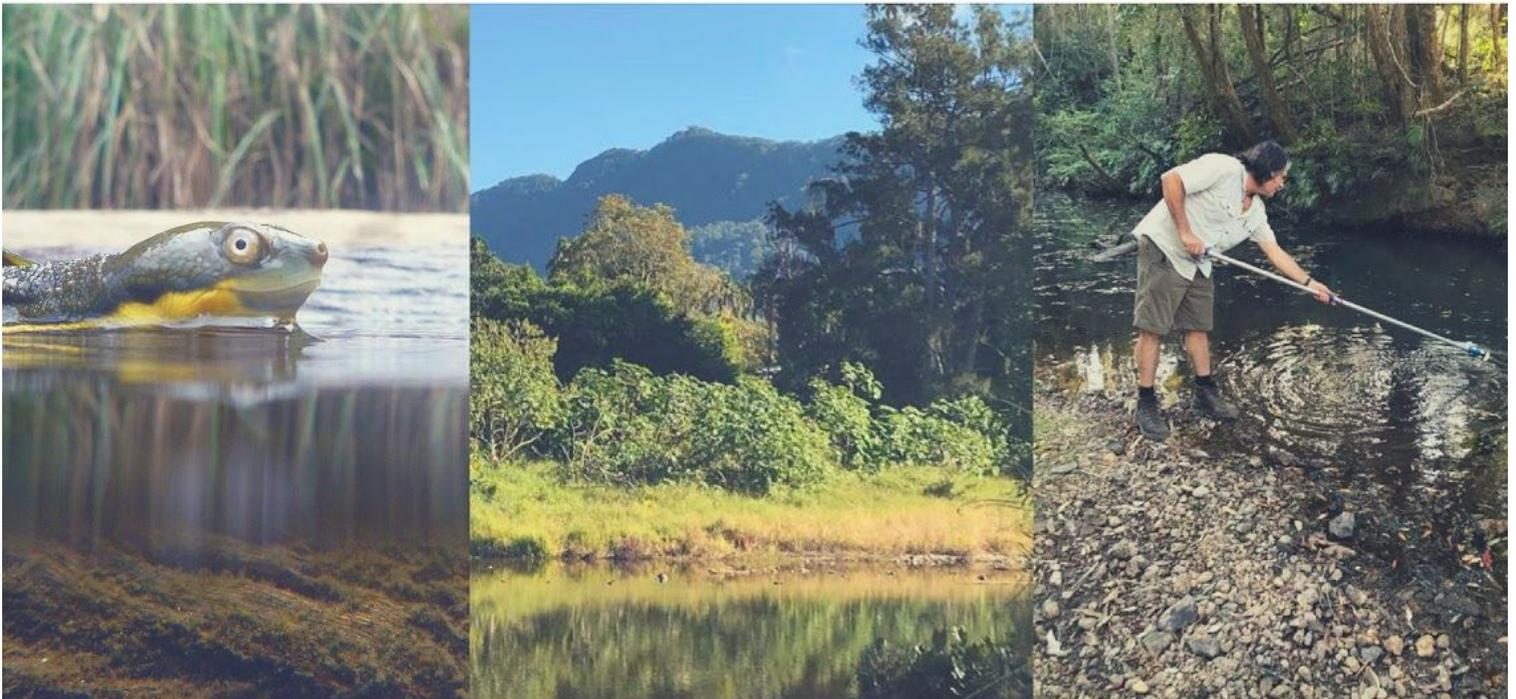


**BELLINGEN
RIVERWATCH**
Our rivers, our future

VOLUNTEER MANUAL

COMMUNITY WATER MONITORING MANUAL
FOR BELLINGEN RIVERWATCH VOLUNTEERS



CONTACT US - AMY DENSHIRE

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WWW.OZGREEN.ORG.AU/BELLINGEN_RIVERWATCH

Project Partners



IN PARTNERSHIP WITH
SAVING OUR SPECIES



Prepared for project: October 2018 - 3rd Edition

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Bellingen River Snapping (George's) Turtle, taken by Dr Ricky Spencer, University of Western Sydney

Gordonville Crossing, Gleniffer, taken by Sue Lennox, OzGREEN

Andy Core sampling at Spicketts Creek, taken by Sue Lennox, OzGREEN

Icons made by [Freepik](https://www.freepik.com) from www.flaticon.com

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What is Bellingen Riverwatch?

In February 2015, the Bellingen River Snapping Turtle (*Myuchelys georgesi*) suffered a significant mortality event due to a disease outbreak in the Bellingen River in northern NSW. Since the mortality event a disease investigation has identified a virus (Bellingen River Virus or BRV), previously not known to science, as the agent most likely to be responsible for the mortality event. Prior to this event, the population size for the species was estimated at 1600 – 4500 individuals. The current Bellingen River Snapping Turtle population is estimated to be between 200 and 300 individuals and predominantly juveniles.



Photo credit: Shane Ruming, OEH NSW

The Bellingen River Snapping Turtle (or George's Turtle) was recently declared '**Critically Endangered**' in NSW under the *Threatened Species Conservation Act 1995* (TSC Act), and nationally under the *Commonwealth Environment Protection and Biodiversity Conservation Act 1999*. Main threats to this species include poor water quality, predation by foxes, and the past disease outbreak.

In September 2016, following a request from OzGREEN, the Office of Environment & Heritage (OEH) in association with Saving our Species program, started the motion to design a community driven citizen science project. It was quickly apparent that the project will be long-term and needed a model which can sustain itself past any funding periods. To achieve this, it was important to work together collaboratively with the groups and agencies in the area and, leverage expertise and available resources.

Our current partners include Bellingen Shire Council, NSW Waterwatch (via EnviroComm Connections Pty Ltd), Bellingen Landcare, North Coast Local Land Services, Western Sydney University, Taronga Zoo Sydney, Eco Logical Australia, Earthwatch Institute, Jaliigirr Biodiversity Alliance. All the partners were consulted and continue to contribute significantly in shaping the [Bellingen Riverwatch – Our Rivers, Our Future](#) project's success. Our key message is that everyone plays a role in catchment health and biodiversity.

The project engages the local community, along with schools, to collect monthly water quality data. Scientists from OEH will carry out a comprehensive bi-annual water quality and macroinvertebrate survey, and assist with data analysis and interpretation. Together, the aim is to build an evidence based approach to monitoring the river health and facilitate further research to support conservation actions for the Bellingen River Snapping Turtle.

Why test the Bellinger & Kalang Rivers?

River health and water quality can change due to a wide range of factors, such as geology, rainfall, vegetation cover, gradient/steepness and size of the catchment, human impacts through land use, natural disasters, climate, and much more. To help build a picture of a catchments' health, ongoing and regular monitoring of water quality is required to build what's called 'baseline data' - a long-term picture of what's considered *normal conditions* for that particular waterway. By gathering this data, it can contribute towards:

- building a picture of the aquatic and riverine health of the Bellinger and Kalang River catchments,
- helping researchers identify issues and/or impacts in both rivers,
- providing a photographic, scientific and anecdotal history of our waterways; and
- potentially providing information to facilitate research into the Bellinger River Snapping Turtle (or George's Turtle) in the Bellinger catchment.

How was the program designed?

One of the identified knowledge gaps about the Bellinger River Snapping Turtle (or George's Turtle) disease outbreak, was related to water quality – whether water quality conditions may, or may not have, contributed to the event. Whilst some annual water quality testing was being completed in the Bellinger catchment, it was recognised that the frequency and consistency of the water quality testing needed to be increased to get a more accurate picture of water quality and catchment health in the Bellinger and Kalang Rivers – i.e. baseline condition data.

With already strong community interest for supporting both the health of the rivers and the freshwater turtle species, a **citizen science** project – [Bellingen Riverwatch – Our Rivers, Our Future](#), was designed, with the aim of collecting *scientifically rigorous long-term data* which can be used to inform management decisions and aid the recovery of the Bellinger River Snapping Turtle, as well as catchment health monitoring in general.

To ensure there was input from all partners, scientists and the community for a holistic approach to this citizen science project, the water testing program was developed so that:

- monthly water quality data would be collected by local residents and schools.
- every six months the OEHL Scientific Division Aquatic Ecologists would complete their full suite of testing.

Water testing completed by both groups can be collated and compared to assess the water quality in the Bellinger and Kalang catchments over time, as some of their tests (or parameters) are the same. See Table 1 (next page) for a comparison between what the citizen scientists and the scientists are testing and how.

Table 1: Comparison of citizen scientist and OEH Scientist monitoring programs for Bellinger Riverwatch project.

Category	Local Residents & Schools	OEH Scientists
Water Quality tests	<ul style="list-style-type: none"> • Temperature • pH • Electrical Conductivity • Turbidity • Available Phosphate • Dissolved Oxygen 	<ul style="list-style-type: none"> • Temperature • pH • Electrical Conductivity • Turbidity • Phosphate – Available & Total (TP) • Nitrogen (TN, NOx, Ammonia) • Dissolved Oxygen • Total Suspended Solids
Additional items recorded	<ul style="list-style-type: none"> • Site photos – upstream, downstream, across stream (where possible) • Site observations of conditions on the day. 	<ul style="list-style-type: none"> • Site photos – upstream, downstream, across stream • Record physical habitat characteristics – in detail • Collect and identify aquatic macroinvertebrates (water bugs) from edge and riffle habitats.
Regularity	<ul style="list-style-type: none"> • Monthly – 2nd Tues & Wed of each month 	<ul style="list-style-type: none"> • Every 6 months
Equipment	<ul style="list-style-type: none"> • Waterwatch kits (see page 10) 	<ul style="list-style-type: none"> • Water quality multi-probe & other testing apparatus. • NATA accredited laboratory testing of nutrient samples.
Data storage – uploaded to...	<ul style="list-style-type: none"> • NSW Waterwatch database by volunteers (on Atlas of Living Australia portal) 	<ul style="list-style-type: none"> • OEH SEED database – by OEH Scientists • NSW Waterwatch database – by NSW Waterwatch

In addition to water quality testing, other long-term citizen science activities may be included in the future for monitoring riparian vegetation, reporting turtle sightings and evidence of turtle nests as well as water bug surveys (turtles rely on macroinvertebrates as their primary food source).

What do the results mean for the turtles?

How were the water testing sites selected and the schedule designed?

OEH Scientist gathered information on where other monitoring that had been previously completed in the Bellinger and Kalang catchments by OEH, Bellinger Shire Council, University of Western Sydney, University of New England, other NSW agencies, and the MyRiveR project which OzGREEN completes with local high school students. These locations could help guide where Bellinger Riverwatch monitoring could take place.

Sites were selected where some previous monitoring locations overlapped, as well as criteria to ensure that easy to find location (bridges, causeways, major landmarks), and where access was safe and easy for volunteers.

See [page 13](#) of this Guide for the list of sites and [page 14](#) for a map of the Bellinger Riverwatch sites which were strategically selected for this project.

How often do we do the water testing?

For our Bellinger Riverwatch project, participants will be required to test water quality on a monthly basis, on a determined day, at their local assigned site (location on the river or stream).

Why so often? ...If citizen scientists (like you) would like councils, researchers and government organisations to be able to actively utilise the data, monthly data collection is the minimum requirement.

The Bellinger Riverwatch project aims to see the citizen scientists of the Bellinger and Kalang catchments help to collect both water quality and other data (photos and observations) on a monthly basis for the next three years.

Don't Test After Floods!

Important Note - Do not carry out your testing after moderate & major flooding. Wait approximately 2 weeks for the river to return to normal before going out again.

Testing Schedule

Bellingen Riverwatch **testing MUST be carried out within a 48-hour period** across both the Kalang & Bellinger catchments, and data uploaded within 5 days.

The calendar for testing will be provided to Bellingen Riverwatch volunteers and schools each year for the second Tuesday and Wednesday of each month. Reminder emails will be circulated to volunteers and schools to alert you that your monthly Bellingen Riverwatch testing is coming up.

If you are unable to complete the monthly testing at your nominated site, please contact Amy Denshire, the Bellingen Riverwatch Coordinator on 0490 068 685 or riverwatch@ozgreen.org.au to arrange an alternative volunteer.

FAQ

What time should I test?

You need to test within the two day period (second Tuesday and Wednesday of the month), but it doesn't matter what time you choose within that period. Just try and be consistent with the time you choose as this is most helpful for the scientists.

What if I know someone that want to become a volunteer?

I missed the Waterbug Blitz training - what is it?

The National Waterbug Blitz was Australia's first nationwide waterway monitoring event in Spring 2018. Australians are encouraged to become 'citizen scientists' and investigate how healthy their local waterways and wetlands are, simply by exploring and identifying what waterbugs they contain. Anyone can participate!

You can download the Waterbug app anytime to start using it for identification of waterbugs. This equipment is available from OzGREEN - contact Amy on riverwatch@ozgreen.org.au.

You can have a go at doing [Waterbug Blitz](#) anytime yourself - you just need a net, large white tray, ice cube trays, spoons & pipettes and the app.

Check out the [NSW Waterwatch how-to-video on Youtube](#). The sweep net sample technique is slightly different but will give you a start.

You can also view existing results sheets and other information about the method at <http://www.thewaterbug.net/ALT.html>

There may be another Waterbug Blitz training session in 2019 if funding is available for it. Any other questions, please contact Ingrid Garland from NSW Waterwatch on ingrid@envirocommconnections.com.au. And, don't forget to ask some of the volunteers that attended the training to show you through the steps if you want some extra help.

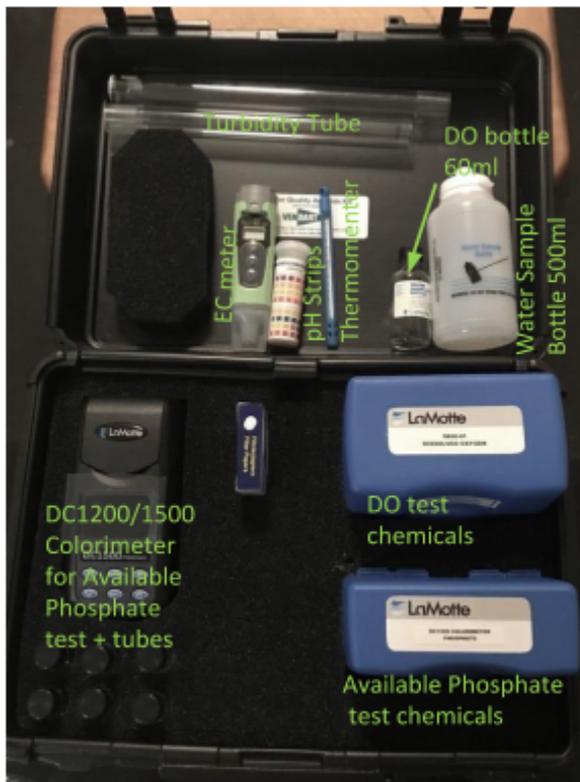
Volunteer Resources

All water testing procedures, result sheets, informative resources, as well as instructions and links to 'how to' videos can be accessed by the NSW Waterwatch website at www.nswwaterwatch.org.au

If you wish to volunteer for Bellingen Riverwatch, contact and be trained on using the monitoring kit, taking site photos and uploading your data, contact:

Amy Denshire, Bellingen Riverwatch Coordinator
riverwatch@ozgreen.org.au | 0490 068 685

What Equipment is Used?



NSW Waterwatch has standardised sets of equipment and procedures that are used by all registered Waterwatch groups in NSW. Waterwatch kits will be 'on-loan' to Bellingen Riverwatch participants from OEH until such time as the project is completed, or if the kit is not being regularly used (i.e. data not uploaded).

You will be trained in use of the kit, care for equipment, Workplace Health & Safety (WHS), and information on each of the testing parameters: temperature, pH, electrical conductivity, turbidity, available phosphate and dissolved oxygen (DO).

Uploading Your Data - ESSENTIAL!!

NSW Waterwatch has an online database which stores all Waterwatchers data, which they can upload via a login for their group. Once data has been uploaded and verified, it will be available to the public via our Atlas of Living Australia portal.

Simply go to the NSW Waterwatch database at:

<http://root.ala.org.au/bdrs-core/nswwww/home.htm> to upload your water quality data within 5 days of testing. Login with:

Username: **BellingenRiverwatch** (all one word & case sensitive)

Password: **P@ssw0rd** (capital P, @ for 'a', zero for 'o')

Detailed instructions on [how to upload your water quality data](#) can be found on [page 42](#).

Who will be using the data that volunteers collect?

Data collected by Bellingen Riverwatch volunteers and schools will add to other scientific data being collected by scientists involved in this project. Determining end-users (i.e. who's going to use it) is essential when designing a project such as this. Some examples of 'end-users' whom will be utilising Bellingen Riverwatch data include:

- **Bellingen Shire Council** – to help to contribute to the EcoHealth Report Card assessments for both rivers, which occurs in partnership with OEH for estuary monitoring, as well as ongoing assessment of river health that can help guide management decisions for on-ground projects.
- **OEH's Saving Our Species program scientists and aquatic ecologists** – to add to existing river health data for catchment health both locally and for state wide reporting, and related to the Bellinger River Snapping Turtle research.
- **University of Western Sydney researchers & Taronga Zoo** – to provide water quality data which might have a clue to the conditions under which the 2015 disease breakout occurred.

What help and support is available?

(If I need to ask questions about water testing)

Local contacts for Bellingen Riverwatch (schools and community) participants are:

General Questions:

Amy Denshire, Bellingen Riverwatch Coordinator, OzGREEN

riverwatch@ozgreen.org.au | 0490 068 685 (2 days per week)

Equipment questions, refills, IT troubleshooting when uploading data & testing support.

Science and Volunteer Training:

Sue Lennox, OzGREEN

slennox@ozgreen.org.au | 0408 027 995

Ingrid is NSW Waterwatch's representative and can help to provide online and phone support for for any additional questions or training (where possible).

Bellingen Riverwatch Strategic Monitoring Sites

Site name	Location	Latitude	Longitude	Site Notes
Bellinger 1	Bellinger River, downstream of old Brinerville Farm, Brinerville (New England NP)	-30.4669	152.57861	NPWS access
Bellinger 2	Bellinger River at Cool Creek, Darkwood	-30.44673	152.61882	
Bellinger 3	Bellinger River at Richardson's Bridge Crossing, Darkwood Rd, Darkwood	-30.43015	152.66685	
Bellinger 4	Bellinger River, Darkwood Rd Bridge near Chrysalis School, Thora	-30.43327	152.72290	Sampled on upstream side & across bridge
Bellinger 5	Bellinger River at 1st bridge on Darkwood Road, near Thora Saw Mill	-30.42877	152.77063	
Bellinger 6	Bellinger River at Gordonville Crossing, Bellingin	-30.41767	152.84782	
Bellinger 7	Bellinger River at Lavenders Bridge, Bellingin (township)	-30.45071	152.89885	Sample at either stairs behind council (end of Ford St), or at Lavender Bridge Park
Never Never 1	Never Never River at Promised Land Road, Tuckers Nob	-30.36033	152.90439	Sample either just upstream or downstream of bridge
Never Never 2	Never Never River at Arthur Keoghs Reserve, Promised Land Road, Bellingin	-30.38719	152.88414	Park in Reserve & sample upstream of bridge
Rosewood 1	Rosewood River at bridge on Summervilles Road, Thora	-30.41669	152.77766	
Kalang 1	Kalang River at Ford at Kalang Fire Trail, off Kalang Rd, Kalang	-30.49768	152.74919	
Kalang 2	Kalang River at Pearn's Bridge, Kalang Road, Kalang	-30.46203	152.83791	Access from southern side of bridge.
Kalang 3	Kalang River at Sunny Corner Road bridge	-30.48153	152.87105	
Kalang 4	Kalang River at Brierfield Bridge, Bowraville	-30.50199	152.89571	Near Hains Lane intersection
Spicketts 1	Spicketts Creek at Bowraville Road Bridge	-30.50528	152.89383	Near 853 Bowraville Rd

Bellingen Riverwatch Monitoring Sites Map



General First Aid : For Field Work



Take a Buddy or Inform Someone of your Trip

- Always call or text someone where you are going, and provide a departure & arrival back time, so if something happens and you don't return on time, they can send for help.
- Work in pairs on the water's edge.
- One person collects the water sample, while their buddy holds on to their clothing at the back or their belt – whichever way the person collecting prefers. This helps the person collecting the water to reach further away from the water's edge without fear of losing balance or falling in.



Traffic & Road Safety (if you sample near a road or bridge)

- Ensure you park in a safe position, and leave lights flashing whilst parked there.
- Wear your high visibility vest during sampling to highlight to nearby motorists you are there.
- For those that have traffic cones and are sampling from a bridge, park your car somewhere safe, put your vests on, put your cones out on the bridge at either end (off to the side of the road) and then conduct your sampling. Take your water sample & photos as quick as possible, then move off the bridge.
- Stay aware of other traffic – so no phone calls or music to be listened to whilst there.



Wear Personal Protective Clothing & Items

- Wear gumboots or shoes that you are happy to get wet. This prevents against standing on a bullrout, bits of glass or a wire.
- Always wear personal protective clothing when out in the field (boots, long pants, long sleeves, shoes & hat) and conducting water testing (covered shoes).



First Aid Kit

- Be sure that the first aid kit is in your clear box. This contains:
 - Lyclear Cream
 - Band-aids
 - Snake Bandage
 - Betadine
 - Tweezers
 - Cotton pads



Tick Bites

- **Freeze don't squeeze!** Ticks can be dangerous for causing allergy and serious disease. **Kill the tick where it is and remove it later.**
- There is Lyclear Cream to kill the tick in your first aid kit.

What To Do

- Apply a pea sized blob of Lyclear Cream (from your first aid kit bag) directly onto each tick without rubbing it in.
- Leave for at least one hour.
- Scrape the cream and the dead tick off as if shaving. If all the parts of the dead tick don't come out, use tweezers to extract the rest.
- If the tick is close to the eyes or genitals don't attempt to remove it yourself but seek medical assistance.
- If you are experiencing any allergic reactions or symptoms, even minor ones, you should immediately seek medical help.

What **NOT** To Do

- Do not try to scratch or pull it out with your fingernails while it is alive (kill it with Lyclear first!). Also, don't scratch something you can't see if there's any chance it might be a tick.
- Do not try to burn it with a match or lighter.
- Do not apply any substance to it other than Lyclear Cream.



DO NOT Test After Floods

- **DO NOT** carry out your testing after moderate & major flooding. Wait approximately 2 weeks for the river to return to normal before going out again.



Snake Bites

- Beware of snakes, particularly in the warmer months. Bang the sample pole at the extension handle end on the ground as you walk along to create noise & vibrations to scare snakes away.
- If bitten by snake, follow the instructions below:

Snake bite



St John

IN A MEDICAL EMERGENCY CALL TRIPLE ZERO (000) FOR AN AMBULANCE.

DRSABCD Danger ▶ Response ▶ Send for help ▶ Airway ▶ Breathing ▶ CPR ▶ Defibrillation

The DRSABCD Action Plan is the first step when providing first aid. Use this to assess the immediate situation.

All known or suspected snake bites must be treated as potentially life-threatening, and medical aid should be sought urgently.

WARNING

Do not wash venom off the skin or clothes because it may assist identification.

SIGNS AND SYMPTOMS

Signs of a snake bite are not always visible and, in some cases, the patient may not have felt anything. Symptoms may not appear for an hour or more after the person has been bitten.

Depending on the type of snake, signs and symptoms may include some or all of the following:

- immediate or delayed pain at the bite site
- swelling, bruising or local bleeding
- bite marks (usually on a limb) that may vary from obvious puncture wounds to scratches that may be almost invisible
- swollen and tender glands in the groin or armpit of the bitten limb
- faintness, dizziness
- nausea and vomiting
- headache
- abdominal pain
- oozing of blood from the bite site or gums
- double or blurred vision
- drooping eyelids
- difficulty in speaking or swallowing
- limb weakness or paralysis
- difficulty in breathing
- occasionally, initial collapse or confusion followed by partial or complete recovery.

WHAT TO DO

- 1 Follow DRSABCD.
- 2 Call triple zero (000) for an ambulance.
- 3 Lie the patient down and ask them to keep still. Reassure the patient.
- 4 If on a limb, apply an elasticised roller bandage (10–15 cm wide) over the bite site as soon as possible.
Apply a further elasticised roller bandage (10–15 cm wide), starting just above the fingers or toes and moving upwards on the bitten limb as far as can be reached.
- 5 Immobilise the bandaged limb using splints.
- 6 Keep the patient lying down and completely still (immobilised).
- 7 Write down the time of the bite and when the bandage was applied. If possible, mark the location of the bite site (if known) on the skin with a pen, or photograph the site.
- 8 Stay with the patient until medical aid arrives.



General First Aid : For Water Testing



Wear Gloves

- So you don't contaminate yourself with polluted water or with chemicals used for testing.
- So you don't contaminate the samples water.
- BE CAREFUL – gloves are very slippery when wet.
- If a glove tears put it in the solid waste bag and get a new one.
- Leave the gloves on the whole time you are at the creek.
- BUT make sure you take the gloves off and wash your hands prior to eating or touching your skin.



Wear Safety Glasses

- Wear safety glasses at all times when you are handling the chemicals so that your eyes are protected from any chemicals which may flick or spray into your eyes.



Solid Waste Container

- Place all used gloves used paper towels, empty reagent packaging and any other rubbish from the testing into your solid waste container to stop any toxic chemical leaking (Senior Tests only).
- Leave the site cleaner and tidier than when you found it – pick up and transport out any rubbish from the site.



Liquid Waste Container

- Hold all test bottles over the liquid waste container while adding the liquid and powder reagents.
- Pour rinse water into liquid waste container after each piece of used equipment has been rinsed with distilled water.
- Do not put solid waste into the liquid waste container.
- Do not concentrate the liquid waste.
- To dispose of liquid waste dilute it with twice the volume of tap water and then flush it down the toilet. In this diluted form, the combination of chemicals in the liquid waste is harmless.
- If you have a septic system, further dilute the liquid to flush down the toilet. If you're concerned about the septic system, just flush ½ cup of yoghurt down the toilet at the same time.

What to do in an Emergency?

What to do in case of a Safety Incident?

1. **Apply or seek first aid** (see page 12 of your Monitoring Manual for first aid measures relating to test kit chemicals)
2. **Notify emergency services** as appropriate (i.e. Fire Service, Police, Ambulance) on 000
3. **Record as much detail as possible** – time, date, location, any witnesses and description of the incident. Include details of type of medical attention received.
4. **Report it** to one of the contacts listed below as soon as possible.
5. **Complete an 'Incident Report Form'** and return to Amy Denshire at riverwatch@ozgreen.org.au
6. Please ensure that you have signed and returned your **OEH Volunteer 'Statement of Duty' forms.**
7. If you received medical treatment for your injuries, please ensure you **keep all receipts.**

Who to Call?

Primary Contact:

Amy Denshire, Bellingen Riverwatch Coordinator, OzGREEN - 0490 068 685

Secondary Contact:

Sue Lennox, CEO, OzGREEN - 0408 027 995

If Amy or Sue aren't available, please contact:

Geetha Ortac, Scientist – Citizen Science, Office of Environment and Heritage
Phone: 9995 6009, Mobile: 0432 959 449

Reporting Fish Kills

To report a fish kill, please ring the Fisheries Watch Hotline on 1800 043 536.

Reporting Turtle Sightings and Nesting Sites

To report any turtle sightings, nesting sites or turtle health issues, please ring Enviroline on 6659 8200.

Turtles can be mapped using Turtle SAT.

www.turtlesat.org.au/turtlesat

[How to Use Turtle Sat PDF](#)

First Aid Information for Chemicals

Senior DC1500 Waterwatch Kits contain the following chemicals, please see below for first aid information for using these chemicals. For full safety information on each chemical, see full Material Safety Data Sheets (MSDS) at www.lamotte.com.

Safety equipment including eye glasses and gloves MUST be worn.

All use of chemicals MUST occur over the liquid waste container.

<p>Manganous Sulfate Solution</p> <p>(LaMotte Product Code: 4167)</p> <p>Eye Contact: Immediately flush with water for 15 minutes. Consult a physician.</p> <p>Skin Contact: Immediately flush with water for 15 minutes while removing affected clothing. Consult physician.</p> <p>Ingestion: Induce vomiting immediately. Consult a physician.</p> <p>Inhalation: N/A</p>	<p>Starch Indicator Solution</p> <p>(LaMotte Product Code: 4170)</p> <p>Eye Contact: Flush with water.</p> <p>Skin Contact: Flush with water.</p> <p>Ingestion: Solution is acidic (pH3) and may irritate stomach if large amount is swallowed. Drink water or milk. Consult physician.</p> <p>Inhalation: N/A</p>
<p>Sulfuric Acid 1:1</p> <p>(LaMotte Product Code: 6141)</p> <p>Eye Contact: Immediately flush with water for 15 minutes. Call a doctor immediately.</p> <p>Skin Contact: Immediately flush with water for 15 minutes while removing affected clothing. Get medical attention if skin appears to be severely irritated or burned.</p> <p>Ingestion: Do not induce vomiting. Rinse mouth, drink plenty of water. Get medical attention immediately!</p> <p>Inhalation: Remove to fresh air. Give artificial respiration if not breathing. If breathing is difficult, give oxygen.</p>	<p>Phosphate Acid Reagent</p> <p>(LaMotte Product Code: V-6282)</p> <p>Eye Contact: Immediately flush with water for 15 minutes. Get prompt medical attention.</p> <p>Skin Contact: Immediately flush with water for 15 minutes while removing affected clothing. Consult a physician.</p> <p>Ingestion: Do not induce vomiting. Rinse mouth. Drink plenty of water. Call a doctor immediately.</p> <p>Inhalation: Remove to fresh air. If breathing is difficult, give oxygen.</p>
<p>Alkaline Potassium Iodide</p> <p>(LaMotte Product Code: 7166)</p> <p>Eye Contact: Immediately flush with water for 15 minutes. Get medical attention immediately.</p> <p>Skin Contact: Immediately flush with water while removing affected clothing and rinse skin thoroughly for 15 minutes. Consult physician.</p> <p>Ingestion: Do not induce vomiting. Rinse mouth, drink plenty of water and call a doctor immediately.</p> <p>Inhalation: Remove to fresh air.</p>	<p>Phosphate Reducing Reagent</p> <p>(LaMotte Product Code: V-6283)</p> <p>Eye Contact: Flush with water for 15 minutes.</p> <p>Skin Contact: Rinse skin. Wash with soap and water.</p> <p>Ingestion: Rinse out mouth. Drink plenty of water.</p> <p>Inhalation: Remove to fresh air.</p>

**13 11 26 - POISONS INFORMATION CENTRE
CALL FROM ANYWHERE IN AUSTRALIA 24 HOURS A DAY**

NSW Office of Environment & Heritage (OEH) Volunteer Duties Statement

All Bellingen Riverwatch participants are required by to be aware and understand WHS requirements of participating in this water testing project, and follow the instructions provided through your training and in this manual. To ensure you are covered by NSW OEH NPWS volunteer insurance, you must have signed and completed this form to participate. Copies will be kept by your local Riverwatch Coordinator.

 NSW GOVERNMENT	Office of Environment & Heritage NSW National Parks & Wildlife Service	 NATIONAL PARKS & WILDLIFE SERVICE NSW
Statement of Volunteer Duties <i>To be completed by OEH and signed off by volunteer (individual or group leader)</i>		
Project name	Bellingen Riverwatch - Our River, Our Future	
Project aim	Collect monthly water quality data to monitor ongoing river health. Data from project will support threatened species conservation actions, river management and Bellingen River Snapping Turtle recovery program. - Collate monthly scientifically rigorous water quality data - Participate in macroinvertebrate surveys - Participate in basic data transformation	
Location	- Some on park work possible in this project. Bellingen River and its tributaries.	
Volunteer job title	Riverwatch Citizen Scientist	
Volunteer project supervisor		
Name: Geetha Ortac	Phone: 02 9995 6009	
Volunteer time requirement		
Hours per week / month: 4.00	Day(s) of week: 1	Start / finish times: -
Volunteer duties	Volunteer duties will include recording of water quality data and assist with collection of macroinvertebrate assemblage data. Assist with data entry (if required). Assist with data management and records management (if required). Hours to be worked to be negotiated with volunteer as and when volunteer is available and when assistance is required.	
Health and safety requirements	<ul style="list-style-type: none"> * Report all hazards to the Volunteer Supervisor * Report all injuries or accidents to the Volunteer Supervisor * Attend required training in safe working practices and procedures * Use and care for any equipment provided for health and safety purposes * Take reasonable care to protect the health and safety of yourself and others while volunteering * Other 	
Training requirements	Water quality sampling techniques, safe use of water quality testing equipment, field safety, data entry into online portal	
Dress requirements	For office and lab based work closed shoes are preferable. For field based activities personal protective equipment include long-sleeved shirts, long trousers, walking boots, sun hat, insect repellent and sunscreen.	
Equipment requirements	Water quality testing equipment provided by OEH, and managed by NSW Waterwatch.	
Other conditions: (eg. agreed reimbursement of costs)	Volunteer to cover costs of travel to survey sites in Bellingen NSW and care for the equipment provided.	
Note: Volunteers do not engage in law enforcement activities.		
Statement of understanding:	I understand and will abide by the statement of Volunteer Duties, outlined above.	
Volunteer's name	_____	Date: ____ / ____ / ____
Volunteer's signature	_____	

List of Observations to Record

(On the Results Sheet)

On the [result sheet](#) (see [page 47](#) in this Guide), you are asked to record observations of what conditions are like on the day of sampling. This information helps to add context to the water quality testing results.

You should describe and record information about what you see, hear, feel and smell at your river/stream location during your sampling visit. Examples of observations to include are:

- **Are there any wildlife present today?** – Saw ducks, turtles, fish, wading birds, wallabies; heard birds calling...
- **What's the weather conditions today?** – Clear, sunny, overcast, raining, hot, warm, cold, windy, humid...
- **What does the water look like today?** – Clear, dirty or turbid, coloured, muddy...
- **Does the water smell at all today?** – No odour, earthy odour, noxious sulfur odour...
- **What is the flow like today?** - Flood, fast, medium, slow, dry isolated pools, no flow.
- **Is there any algae present?** - No algae, some algae on rocks, thick filamentous algae, blue-green algae present (looks like green paint & smells)...

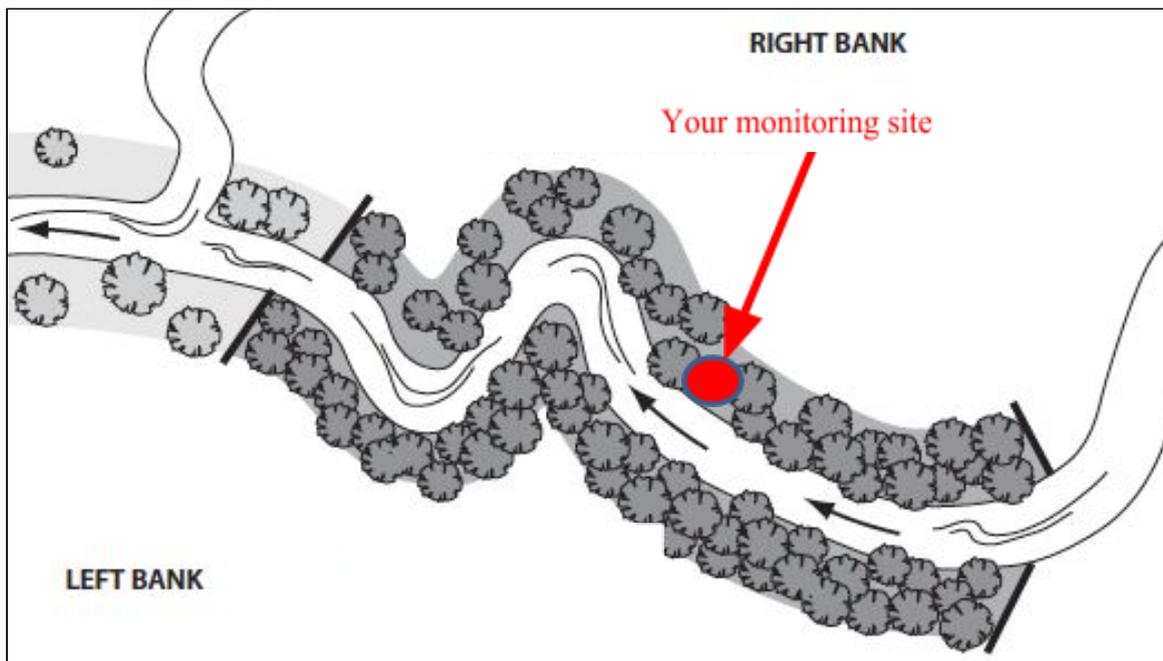
Also, when approaching your site, try to **BE QUIET**
so as to maximise your chance of seeing any wildlife there...

Site Photos - Upstream, Downstream & Across

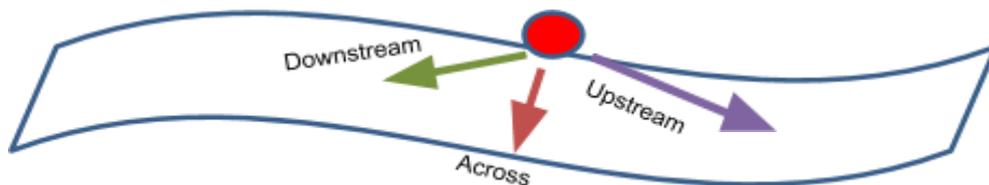
As well as collecting their monthly water quality sample, please use your digital devices (either camera, smartphone or iPad) to take photos of what conditions are like on the day at your site.

Most sites are located at bridges, so pick a spot around the centre of the bridge, or just next to it, to take your upstream or downstream photographs.

Remember to return to the same spot each time!



Your Site – view for taking photos upstream, across and downstream



For upstream and downstream photos, aim your camera to the centre of the stream to take your photo.

Across photos should take the view directly across from where you sample – including river & opposite bank in view.

Handy Tip:

Match your frame with the original ones – look for a key feature in the landscape upstream, downstream & across. Refer to previous photos taken at your site – we need to replicate them!

AMY & AMANDA TO ADD NEW SITE PHOTOS INFO HERE

For example: Kalang River – Kalang 2



Upstream



Across



Downstream

Google Drive folders have been set up for each group/participant to upload their monthly photos to for the project. Simply take your photos, rename them for your site, and upload. Please follow the site naming protocol of: **Year-Month-Site Number – view** (e.g. 2017-08 – Bellinger 1 – upstream).

If you're photographing off a bridge, you may not be able to take a photo 'across'. But if you have access next to the river, take an extra photo and upload it with the 'Across' at the end of the file name.

Having trouble uploading your site photos?

If you're having trouble uploading your photos, Amy Denshire, Bellinger Riverwatch Coordinator is happy to upload them for you. Email them to her at riverwatch@ozgreen.org.au

Can't see the Google Drive folder?

If you need Amy to share the Google Drive folder shared with you, contact her at riverwatch@ozgreen.org.au.

Steps to Collect Water Samples

1. Sample on the correct dates

Ensure you sample on the correct dates as allocated in the Bellingen Riverwatch calendar – **every 2nd Tuesday or Wednesday each month.**

2. Try to sample at the same time each month

Wherever possible, please try to sample at the same time of day each month.

3. What to take

Remember to take **3 THINGS** to your sampling location:

1. Thermometer
2. Sample pole (with adaptor) with (500ml) sample bottle
3. Dissolved oxygen (60ml glass) bottle

4. What to collect

Remember to collect **3 THINGS**:

1. Air temperature
2. Water temperature
3. Water samples in both 500ml & 60ml bottles

Which tests do I take from which sample bottle?

For your water quality testing, test from:

1. 500ml Sample bottle – pH, electrical conductivity (EC), available phosphate & turbidity
2. 60ml glass bottle – dissolved oxygen (DO)

What if I need to finish my testing later on in the day?

PRIMARY SCHOOLS - Follow this if you can't take your students to the river

Collect your water samples (on the way to school) and then:

1. **Fix the DO and record water and air temperatures**
2. Put 500ml water sample in an esky and then put them in the fridge
3. Bring samples back up to room temperature and then test.

(This is because the phosphate levels change with temperature (by putting it in the fridge it stops the phosphate levels from changing)).

Water Testing Steps

This is a summary of the process for completing your Bellingen Riverwatch testing each month. Following are the detailed instructions for each test, as well as uploading your data to NSW Waterwatch database.

1. Complete your **pH** test (with pH strips)
2. Calibrate your **EC** meter, then test the sample water for EC.
3. Complete your **available phosphate** test, using your DC1200/1500 colorimeter & chemical blue box marked Phosphate.
4. Complete **DO** test, via Winkler Titration Method – chemicals in blue box marked Dissolved Oxygen.
5. Complete **Turbidity** test with turbidity tube.
6. Empty out remaining sample water & ensure all equipment has been washed and cleaned with distilled/deionized water, and put away in the correct place in the kit & box.
7. Alert the Bellingen Riverwatch Coordinator if any chemicals or equipment need replacement.
8. **Upload your data** to the NSW Waterwatch database via <http://root.ala.org.au/bdrs-core/nswwww/home.htm> with the Login:
 - a. Username: **BellingenRiverwatch**
 - b. Password: **P@ssw0rd**
9. Upload your **site photos** taken upstream, downstream, and across (where possible) to Google Drive folder – link will be emailed to all volunteers & schools to access. File naming protocol is: **Year-Month-Site Number – view** (e.g. 2017-08 – Bellinger 1 – upstream)

Email Amy Denshire, Bellingen Riverwatch Coordinator on riverwatch@ozgreen.org.au to obtain the share link for the Google Drive Site Photos Folder.

WATER QUALITY TESTING INSTRUCTIONS

How to Collect a Surface Water Sample

CAUTION: Never carry or lift the pole above your head, as touching power lines could cause electrocution.

- Work with a buddy where possible
- Ensure you are standing on a stable, level surface away from the edge of the bank
- Collect your rinse sample downstream of your collection site.
- To prevent stirring up the sediment, tip the rinse water onto the bank.

Equipment: Long arm sample pole, snap adaptor and 500ml sample bottle

IMPORTANT NOTE: Collect the water from the pool, rather than the rapids and face the bottle upstream.

1. To loosen the extension handle of the long arm sample pole, turn to the left. Extend the pole, with the sample bottle in place. Make sure the pole is not too long and difficult to handle. Twist handle to the right to lock the pole into place.
2. Turn the bottle face down over the water and fully submerge the bottle.
3. Once the bottle is fully submerged, turn it upwards and allow it to fill.
4. Bring the sample in and tip it onto the bank. Repeat this to rinse the bottle twice.
5. Using the same collection methodology a third time, collect your sample to test.
6. Close the extension pole and twist right to lock in. Take sample bottle out of the snap adaptor. Continue with temperature test.

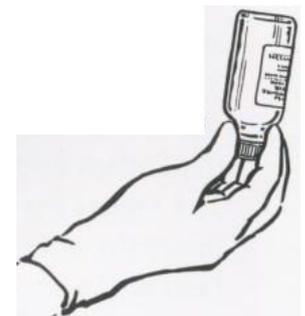
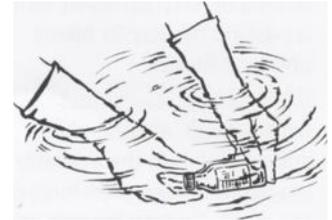


How to collect a Dissolved Oxygen Sample

For the Modified Winkler Titration Method (glass bottle)

Equipment: 60ml glass sample bottle

1. Take the water sample at the same time and same place each testing day.
2. There may be two glass sample bottles in the Dissolved Oxygen Kit box. The larger 'bottle-shaped' one is to be used when doing the titration method. The smaller 'glass tube' is to be used for the colorimetric method.
3. Do not collect sample water below a waterfall as the higher level of oxygen will not be representative of the waterbody.
4. Do not collect sample water from stagnant pools or backwaters as this water will have a lower level of dissolved oxygen.
5. Collect the sample water from a flowing section of the water body (if possible) as far away from the bank as you can safely reach with the aid of your buddy.
6. Rinse the appropriate ('glass bottle' or 'glass tube') DO bottle with 'creek' water before collecting the water sample in it.
7. To avoid surface scum entering the bottle remove the lid from the sample bottle only when the bottle is below the surface.
8. Turn the bottle on its side and lower it into the water until the surface of the water reaches your wrists.
9. When the bottle is below the surface slowly unscrew the lid allowing the water to enter.
10. Turn the bottle vertically the right way up while it is below the surface to allow it to completely fill and release all trapped air.
11. Recap the bottle while underwater.
12. Remove the bottle from the water and invert the bottle to check that no bubbles have been trapped inside
13. When the DO bottle is filled take a water temperature reading at the same time and place.



The black lids have an inverted plastic cone inside which stops air bubbles being trapped within the water sample (this would distort the DO result by adding more oxygen).

Test 1: Temperature

Notes:

- Ensure the thermometer is completely dry before taking the air temperature.
- Make sure you keep the thermometer in the water while taking the water temperature reading, otherwise the result is inaccurate.

Equipment: Thermometer

1a: Air Temperature

1. Hold the thermometer at waist height by the top of the thermometer in the shade of your body.
2. Wait for at least one minute before reading the thermometer.
3. Ask another person to check the result.
4. Record your result.



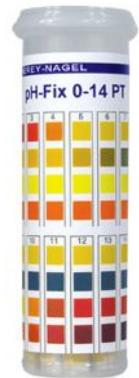
1b: Water Temperature

1. You should take the temperature from the actual waterway as close as possible to where you took the sample. If you can't reach the water then test water in the sample bottle immediately after taking the sample.
2. Lower the base of the thermometer into the water and hold for one minute. Read the thermometer while it is still in the water and when the reading stabilises.
3. Ask another person to check the result.
4. Rinse the thermometer with distilled water to remove any contaminants, dry and place back into the kit.
5. Record your result. Return to a safe location to test your sample.

Test 2: pH

Equipment: MN pH strips (tube with coloured squares), small container, distilled water

1. You can either test your pH in a small container or the sample bottle. Ensure there is enough water to cover the 4 coloured squares on the pH strip.
2. Take one pH strip, being careful not to touch the coloured squares.
3. Place the coloured squares in the water and leave in for 5 minutes.
4. Take the strip out of the water. The colours will have changed depending on the acidity or alkalinity of the sample water.
5. Hold the box in your left hand, making sure the numbers are up the right way, and the strip in your right hand.
6. Run the strip up and down the box until you match the colours of the strip to the colour chart on the side of the pH strip container.
7. The pH will be the closest match to ALL colours. You may estimate between the two colours in 0.5 increments.
8. Pass the strip to others to verify, and record your result.
9. Empty the contents of the small container. Rinse the small container with distilled water and put the strip aside to dispose of later – it can only be used once!



Helpful Hint : Look to the blue square to match it the pH.

Test 3. Electrical Conductivity (EC)

3a(1). Calibrating the Meter - Eutech Green ECScan

Equipment: Electrical Conductivity Meter (low range), specimen container, distilled water.

First check to see if your meter needs calibrating by dipping the electrodes into the conductivity standard and swirling. If the meter reads the same as the standard it does not need calibrating.

Low meter = 500 μ S/cm standard; High meter = 12.9 mS/cm standard

1. Pour enough 500 μ S/cm calibration solution into clean beaker to cover probes (a depth of approx 3cm or 30mL in your small beaker).
2. Take bottom cap off the EC meter and turn on (by pressing 'on/off' button).
3. Dip the probes into the calibration solution and swirl the container, meter and solution.
4. Wait several seconds until the number stabilises. If the reading matches your calibration solution, you can stop here & rinse off the meter. If not, go to Step 5.
5. Press the CAL button to put into calibrate mode & the numbers on the screen will flash. Quickly then use the HOLD/ENT button to scroll up & around to come back 500.
6. Then, wait 3 seconds without pressing any buttons; the display will flash 3 times then shows 'Ent'. The meter is now calibrated. Note: If it doesn't read 500 on the screen after calibrating, repeat the process from Step 5.
7. Take the meter out of the solution, rinse probes with distilled water.
8. You can now continue on with your EC test on sample water, or turn off & put away if you'll use it later for testing. The meter is now calibrated.



Discard the calibration solution after use. Never return it to the container.

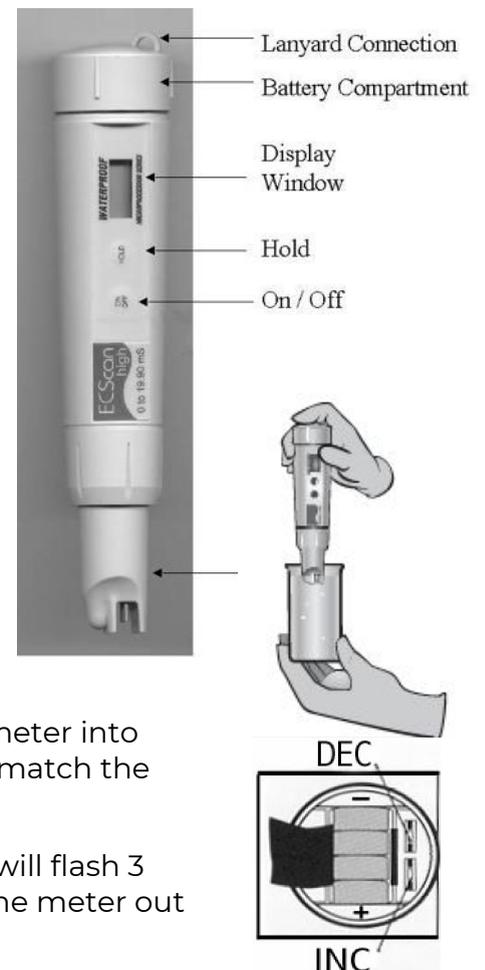
3a(2). Calibrating the Meter - Eutech **Beige** ECScan

Equipment: Electrical Conductivity Meter (low or high range), specimen container, distilled water.

First check to see if your meter needs calibrating by dipping the electrodes into the conductivity standard and swirling. If the meter reads the same as the standard it does not need calibrating. **Make sure you calibrate your EC Meter a minimum of every second time you test.**

Low meter = 500 μ S/cm standard; High meter = 12.9 mS/cm standard

1. Rinse a clean calibration specimen jar with shaken calibration solution. Pour approx 3cm of calibration solution into the beaker.
2. Unscrew the top of the meter (battery compartment) and identify the white buttons (DECREASE-INCREASE buttons).
3. Orientate the battery compartment as shown in the diagram.
4. Turn on the meter (by pressing the 'on/off' button).
5. Remove cap and dip the electrodes into the beaker of calibration solution
6. Swirl the meter with the electrodes submerged in the solution but not touching the bottom.
7. Wait several seconds until the number stabilises.
8. Press the DEC or INC key once (number will flash) to put meter into calibration mode, then use the buttons to adjust reading to match the calibration standard value.
9. Wait 3 seconds without pressing any buttons; the display will flash 3 times then shows 'ENT'. The meter is now calibrated. Take the meter out of the solution.
10. Turn off the meter and replace the battery compartment top. Rinse the electrodes in **deionised/demineralised water**, dry and replace the cap. The meter is now calibrated.

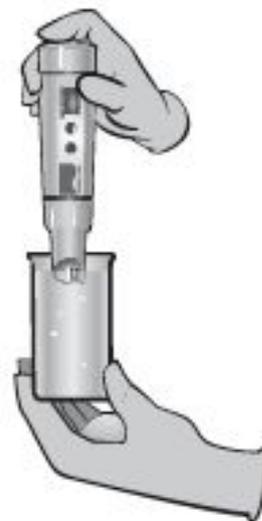


Discard the calibration solution after use. Never return it to the container.

3b. Measuring Electrical Conductivity with an ECScan Meter

Equipment: Electrical Conductivity Meter (low range), specimen container, distilled water.

1. Rinse out a specimen container with sample water at least twice, or test straight from the sample bottle.
 2. Pour sample water into the specimen container to a depth of about 3 cm.
 3. Remove the cap from the meter and turn it on. Wait until a 0 appears.
 4. Dip the meter into the container so that the probes are covered. Only immerse the probes of the meter in the water. Do not rest the probes on the base of the container as this will give an inaccurate reading.
 5. Hold the meter in the sample water and swirl gently, so that the sample water, container and meter move. Allow time for the number value to display and stabilise on one reading. If the reading doesn't stabilise, record the result as the number that was displayed most frequently.
 6. Read the result from the meter screen.
 7. Identify the unit of measurement that the meter is reading ($\mu\text{S}/\text{cm}$ or mS/m).
- Note: If the reading reads 'Or' this means over range – contact your Coordinator to find out how to do a dilution with distilled water.**
8. Pass to others to verify the result.
 9. Rinse the probes in distilled water. Do not wipe the probes of the meter – blow on the probes or allow to dry in the air.
 10. Replace the cap on the meter. Turn the meter off and record your result.



Rain water is around $200\mu\text{S}/\text{cm}$. Humans can taste it easily at $800\mu\text{S}/\text{cm}$. In estuarine environments, salinity varies significantly depending on tidal influences and amount of freshwater entering the system. Ocean water is approximately $65\,000\mu\text{S}/\text{cm}$.

Test 4: Available Phosphate with DC1500 colorimeter

(All Bellinghen Riverwatch kits have DC1500 colorimeters)

SAFETY

Gloves and goggles must be worn. Do not conduct tests over your lap. All tests must be performed over the waste container.

CHEMICALS

Phosphate Acid Reagent and Phosphate Reducing Reagent are considered hazardous substances. **EXTREME CAUTION MUST BE TAKEN!**

Notes:

- If the filter clogs, replace it with a new filter and continue.
- The colorimeter may appear to switch off but it will have only defaulted to energy saving mode.
- Carefully wipe colorimeter tubes clean and dry before inserting into the DC1200/DC1500 colorimeter chamber
- If there is sufficient sample water left in your sample bottle, start from step 3.

Equipment: DC1500 colorimeter, Phosphate Low Range Box, 60ml syringe, filter and filter holder, colorimeter tube, safety glasses, gloves, distilled water, paper towel and liquid waste container

1. Shake the sample bottle.
2. Draw some water into the 60ml syringe and rinse.
3. Using the 60ml syringe draw up 40ml of sample water.
4. Place a 0.45 micron filter paper in the filter holder and attach to the syringe. Gently expel a small amount of water through the filter.
5. Holding the filter and syringe over the colorimeter tube (no dot on lid), rinse the colorimeter tube twice with filtered sample water. Fill to 10ml line with filtered sample water.
6. Repeat Step 5, by adding 10ml to line in colorimeter tube with blue dot on the lid. You should now have two colorimeter tubes filled with filtered sample water to 10ml line.

7. Cap and wipe the both colorimeter tubes dry.

8. In one of the tubes (with blue dot on lid), use 1.0mL syringe to add 1.0mL of Phosphate Acid Reagent to the colorimeter tube. Cap and invert to mix.

Available Phosphate DC1500 test – Cont'd

9. Then, use the 0.1g spoon to add one level spoon of Phosphate Reducing Reagent to the colorimeter tube. Cap and shake until powder dissolves. Wipe tube dry.

10. Wait 5 minutes for full colour development. Solution will turn blue if phosphates are present.

Scanning the Blank

11. Insert the tube which has not had chemicals added to it (no dot on lid) into the colorimeter chamber, being sure to align the index (vertical) line with the arrow on the meter.

12. Close the lid. We now blank or zero the DC1500 with filtered sample water.

13. Push and hold the Power (bottom right) button to turn the meter on.



14. Press ENTER to select the Testing Menu.

15. Scroll to and select 081 Phosphate LR from menu.

16. Close the lid. Press ENTER to select Scan Blank. Then remove the colorimeter tube.

Scanning the Treated Water Sample

17. Insert the tube which has chemicals added to it (blue dot on lid) into the colorimeter chamber, being sure to align the index (vertical) line with the arrow on the meter

18. Push the ENTER button to select Scan Sample.

19. Record results as ppm of Available Phosphate. Record this number as ___ mg/L. (ppm and mg/L are equivalent measurements)

20. Remove tube from colorimeter and pour contents into liquid waste container.

21. Remove filter from filter holder and dispose.

22. Rinse all equipment with distilled water and dry.

23. Press and hold Power button to turn the colorimeter off.

24. Empty contents of waste container down the toilet.



Remember to always wipe & dry the colorimeter tube, and close the lid.

Test 5. Dissolved Oxygen by Winkler Titration Method

SAFETY

Gloves and goggles must be worn. Do not conduct tests over your lap. All tests must be performed over the waste container.

CHEMICALS

- Reagent No. 1. Manganous Sulfate - can irritate eyes and skin
- Reagent No. 2. Alkaline Potassium Iodide Azide - can cause severe burns and is poisonous if swallowed.
- Reagent No. 3. Sulfuric Acid - will cause severe burns, ingestion may be fatal and inhalation can cause coughing and chest problems.

The 8 drops of each chemical need to be added by holding chemical container upside down vertically.

Note: If you cannot test your DO sample straight away, fix the sample by following Steps 1-7. This fixes the amount of DO in the bottle. Sample can then be tested at a later time, continuing on with procedures as listed.

Collecting the DO sample — See [page 30](#) for collecting the water sample in the 60ml glass bottle. Don't forget to take the temperature at the same time!

Equipment: Glass DO sampling bottle, DO titration box, safety glasses, gloves, distilled water, paper towel and liquid waste container

1. Remove lid from glass DO sampling bottle.
2. Add 8 drops Reagent No. 1 (Manganous Sulfate)
3. Add 8 drops Reagent No. 2 (Alkaline Potassium Iodide Azide)
4. Recap the glass sample bottle and invert several times.
5. Stand bottle for precipitate to fall below shoulder of bottle.
6. Add 8 drops Reagent No. 3 (Sulfuric Acid).
7. Recap and invert bottle until precipitate dissolves. If precipitate does not dissolve after 5 minutes, leave the precipitate to fall below the shoulder of the bottle.
8. Fill the small glass vial to the 20mL white line with yellow/golden solution.
9. Put 1mL green syringe from the DO box into the top of the Sodium Thiosulfate bottle. Invert bottle and syringe.
10. Draw 1mL of this liquid. If there is a bubble, depress plunger and repeat. Re-invert bottle and remove 1mL syringe.
11. Insert syringe in hole in cap of glass vial. Add one drop at a time. Swirl solution vigorously after each drop.
12. When solution turns pale yellow, add 8 drops of Starch- yellow solution will turn deep blue when starch is added.
13. Continue adding drops of Sodium Thiosulfate and swirling each time. Stop when the solution becomes clear.
14. Read off TOTAL amount of Sodium Thiosulfate USED - this is equivalent to the mg/L of Dissolved Oxygen in the water.
15. Calculate % Saturation using the scale (see over page).
16. Record both results – mg/L and %.
17. Empty all chemicals into liquid waste container.
18. Wash and dry all equipment used and replace in the DO Titration Box.
19. Empty contents of the waste container down the toilet.
20. Rinse files and syringes for phosphate and DO test in **deionised/demineralised water**. Rinse sample bottle with **tap water**.

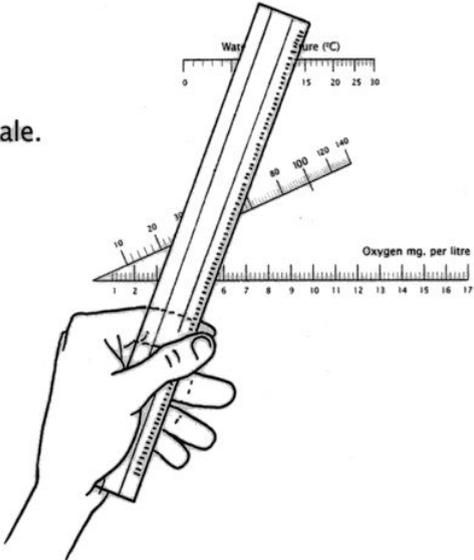
Calculating % Saturation of Dissolved Oxygen

When uploading your data to the NSW Waterwatch online database, it will automatically convert your water temperature and mg/L of DO (from titration test) to produce a % saturation result.

However, to manually calculate % saturation, follow the steps below:

Calculation of results

- 1 Plot temperature on upper scale.
- 2 Plot oxygen concentration on lower scale.
- 3 Hold a ruler between the two points.
- 4 The point where the ruler crosses the middle scale is the % saturation.
- 5 Record this result on your test results worksheet.

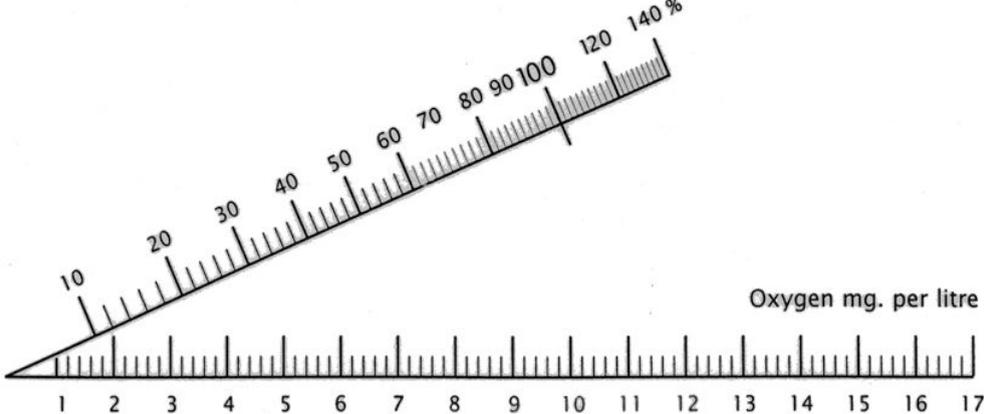


The diagram shows a hand holding a ruler vertically. The ruler is positioned between two scales. The upper scale is labeled 'Water temperature (°C)' and has markings from 0 to 30. The lower scale is labeled 'Oxygen mg. per litre' and has markings from 1 to 17. A horizontal line is drawn across the ruler, intersecting the upper scale at approximately 15°C and the lower scale at approximately 10 mg/L. The middle scale, which is not explicitly labeled but represents % saturation, has a marking at 100% corresponding to the intersection point.

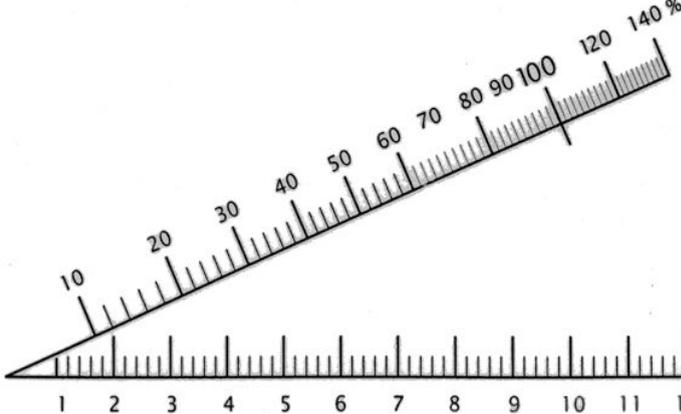
Water temperature (°C)



Oxygen mg. per litre



Oxygen mg. per litre



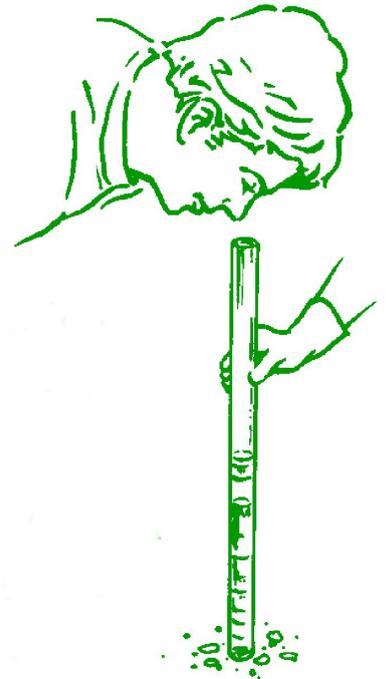
Test 6: Turbidity

Notes

- The test must be conducted in the shade of your body. Put your back to the sun and the tube should be in the shadow.
- When looking into the tube, the top of the turbidity tube should be at least 15cm from your eye for safety and quality assurance.
- Ensure you shake the bottle to disperse any sediment that has settled before beginning this test.
- **DO NOT estimate between the lines.**

Equipment: Turbidity tube

1. Assemble the turbidity tube by sliding the two pieces together.
2. Shake the water sample in the sample bottle.
3. Pour a little bit of water into the tube. Holding the tube vertically, look down into the tube. You may need to wait for the water to stop swirling to see if lines can be observed clearly. If you can still see them clearly, continue pouring a little at a time.
4. Stop pouring when the three distinct black lines at the bottom of the tube cannot be seen clearly. Ask another person to verify your result.
5. Measure the turbidity by recording the last marked point on the tube **below** the level of the water. **DO NOT ESTIMATE BETWEEN THE LINES.**
6. If you can still see the lines when the water has reached the top of the tube, record the result as 7 NTUs (means the result was <10NTUs).
7. Record your result. Rinse the tube and sample bottles **with tap water** and place back in the kit.



Water Quality Senior Result Sheet

Name: _____ Date sampled: _____

Site Name: _____

Time sampled: _____ No. of volunteers: _____

Last rainfall: within 24 hours 1-7 days > 7 days
 Rainfall description: light medium heavy

Site Observations: (flow, weather conditions, visible pollution, wildlife present, odour, algae etc.) _____

Site Photos taken: Upstream Across Downstream

Test	Units	Results	Results according to the ANZECC guidelines (tick the box)
Temperature	°C	Air: _____ Water: _____	-
pH	pH units		<6 <input type="checkbox"/> POOR
			7 <input type="checkbox"/> IDEAL
			6 - 8 <input type="checkbox"/> GOOD
			>8 <input type="checkbox"/> POOR
Electrical Conductivity (Salinity)	µS/cm		< 400 µS/cm <input type="checkbox"/> VERY GOOD
			400 – 800 µS/cm <input type="checkbox"/> FAIR
			> 800 µS/cm <input type="checkbox"/> POOR
Turbidity	NTU		≤ 10 NTU <input type="checkbox"/> VERY GOOD
			15 – 30 NTU <input type="checkbox"/> FAIR
			>30 NTU <input type="checkbox"/> POOR
Available Phosphate	mg/L (Same as ppm)		< 0.02 mg/L <input type="checkbox"/> LOW (Excellent)
			0.02 - <0.15 mg/L <input type="checkbox"/> MEDIUM
			0.15 - <0.45 mg/L <input type="checkbox"/> HIGH
			≥ 0.45 mg/L <input type="checkbox"/> VERY HIGH (Very Poor)
Dissolved oxygen	mg/L	* calculated when you upload data	<80 % sat. <input type="checkbox"/> POOR (water quality decrease further as % sat. decreases)
	% saturation		80 – 110% sat. <input type="checkbox"/> VERY GOOD
			>110% sat. (super saturation) <input type="checkbox"/> POOR

Uploads to complete within 5 days of testing water quality:

- Water quality data to: <http://root.ala.org.au/bdrs-core/nswwww/home.htm>
- Your 3 site photos to Google Drive (link provided by email)

Freshwater Water Quality Guidelines & Ratings

Water Quality Parameter	Unit	Water Quality Ratings			
		Very good	Good	Fair	Poor
pH	pH units	-	6-8	-	< 6 and > 8
Conductivity**	µS/cm	< 300	300 - 500	500 - 800	> 800
Salinity**	ppm	< 200	200 - 350	350 - 500	> 500
Turbidity	NTU	< 7	7 - 10	10 - 30	> 30
Available phosphate as P	mg/L	< 0.02	0.02 - 0.05	0.05 - 0.15	> 0.15
Dissolved Oxygen saturation	%	80 - 90	90 - 100	60 - 80 and 100 - 110	< 60 and > 110
Suspended solids	mg/L	<10	10 - 30	30 - 50	> 50
Faecal Coliform bacteria	CFU/100 mL	DRINKING WATER 0	PRIMARY CONTACT (swimming) < 150	SECONDARY CONTACT (boating & fishing) < 1000	NO CONTACT > 1000

These water quality guidelines are based on ANZECC (Australian and New Zealand Environment Conservation Council Guidelines for Fresh and Marine Water Quality) 2000. These guidelines give a rough indication of what water quality monitoring results indicate about water quality.

Note:

1. Water Quality Ratings above for ** Salinity and ** Conductivity are NOT applicable to estuarine ecosystems and are only applicable to freshwater ecosystems.
2. µS/cm = micro Siemens per centimeter
ppm = parts per million
3. Conductivity = 5000 µS/cm = 5.00 mS/cm
4. Salinity = 350 ppm = 0.35 ppt (ppt = parts per thousand)

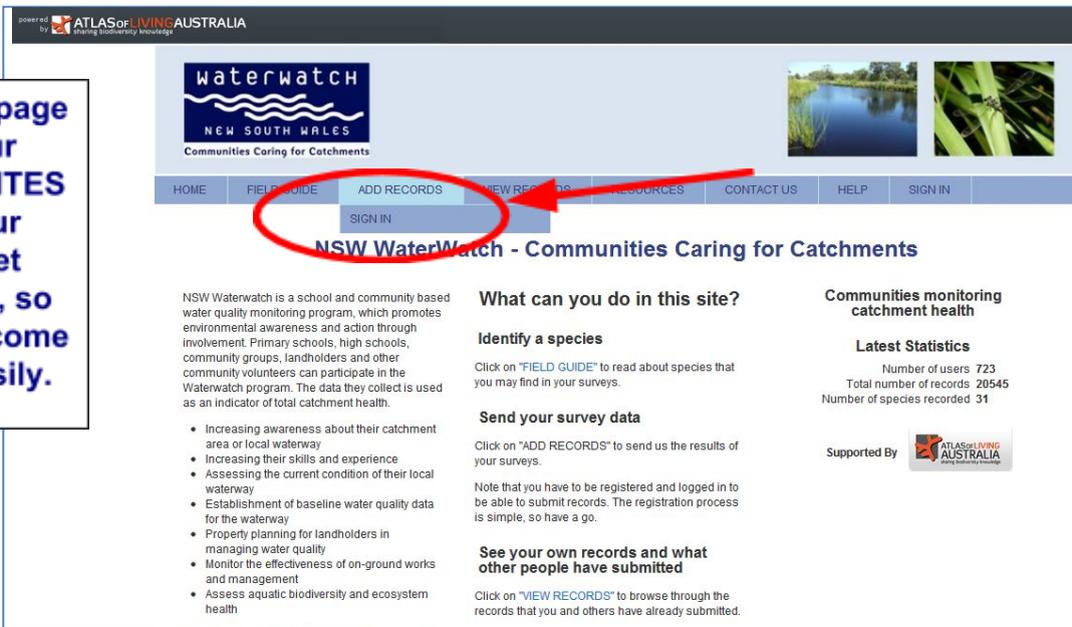
Uploading Data to the NSW Waterwatch Database

To ensure you can view the new ALA Database format correctly, please use Google Chrome or Safari as an Internet search program.

STEP 1: Log onto the NSW Waterwatch database via the Atlas Of Living Australia at: <http://root.ala.org.au/bdrs-core/nswwww/home.htm>

STEP 2: Click on **ADD RECORDS**, then click on **SIGN IN**.

Add this page to your FAVOURITES on your internet browser, so you can come back easily.



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Sharing biodiversity knowledge

waterwatch
NEW SOUTH WALES
Communities Caring for Catchments

HOME FIELD GUIDE **ADD RECORDS** VIEW RECORDS RESOURCES CONTACT US HELP SIGN IN

NSW WaterWatch - Communities Caring for Catchments

NSW Waterwatch is a school and community based water quality monitoring program, which promotes environmental awareness and action through involvement. Primary schools, high schools, community groups, landholders and other community volunteers can participate in the Waterwatch program. The data they collect is used as an indicator of total catchment health.

- Increasing awareness about their catchment area or local waterway
- Increasing their skills and experience
- Assessing the current condition of their local waterway
- Establishment of baseline water quality data for the waterway
- Property planning for landholders in managing water quality
- Monitor the effectiveness of on-ground works and management
- Assess aquatic biodiversity and ecosystem health

What can you do in this site?

Identify a species
Click on "FIELD GUIDE" to read about species that you may find in your surveys.

Send your survey data
Click on "ADD RECORDS" to send us the results of your surveys.
Note that you have to be registered and logged in to be able to submit records. The registration process is simple, so have a go.

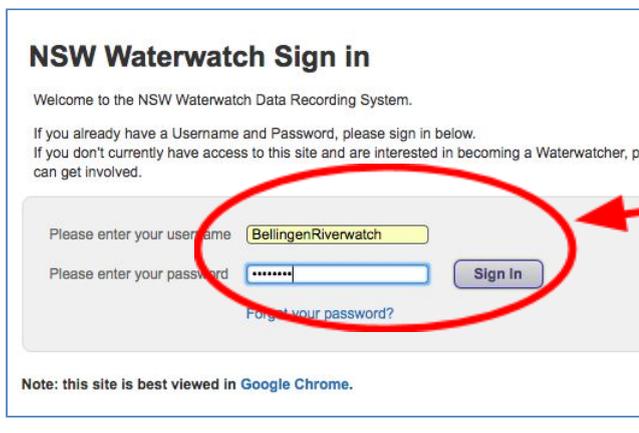
See your own records and what other people have submitted
Click on "VIEW RECORDS" to browse through the records that you and others have already submitted.

Communities monitoring catchment health

Latest Statistics
Number of users 723
Total number of records 20545
Number of species recorded 31

Supported By ATLASofLIVING AUSTRALIA

STEP 3: Then enter your Username and Password (P@ssw0rd), and click **Sign In** *PLEASE NOTE - USERNAMES & PASSWORDS ARE CASE SENSITIVE!



NSW Waterwatch Sign in

Welcome to the NSW Waterwatch Data Recording System.

If you already have a Username and Password, please sign in below.
If you don't currently have access to this site and are interested in becoming a Waterwatcher, you can get involved.

Please enter your username:

Please enter your password:

[Forgot your password?](#)

Note: this site is best viewed in [Google Chrome](#).

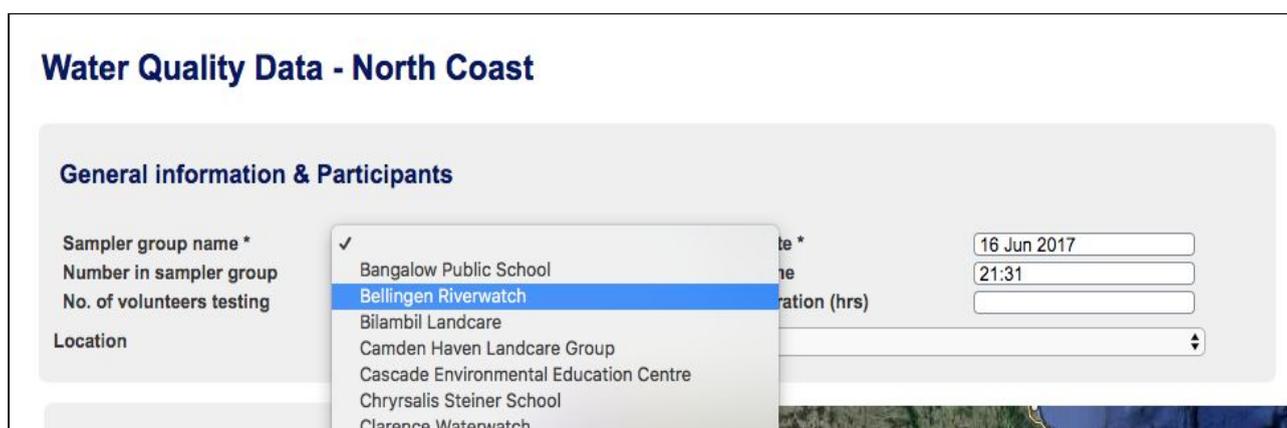
Username: BellingenRiverwatch
Password: P@ssw0rd

Note: If you forget your password, click on the link at the bottom, which will asks you for an email address for your reset password to be sent to.

STEP 4: Go to **ADD RECORDS**, and click on the **Water Quality Data – North Coast** option for your region.



STEP 5: Click in the **SAMPLE GROUP NAME** field box, and find you Waterwatch Group Name in the list & select it. *You can type the first letter of your Group name in to find it faster!*

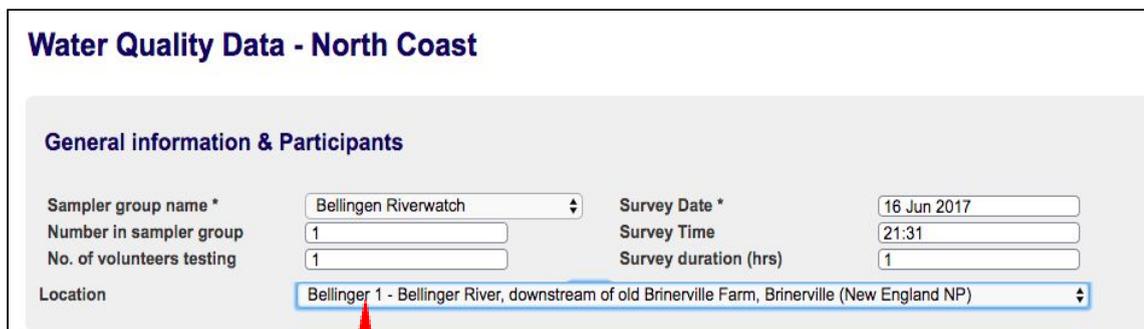


STEP 6: Fill in boxes for:

- Number in sampling group (No. of volunteers/people in your group)
- No. of volunteers testing
- Survey Date & Survey Time – time & date of sampling/monitoring
- Survey duration (hrs) – how long it took to do sampling & testing.

STEP 7: Next, click in the **LOCATION** box (at left end), and find your site and click to select.

If you need help with selecting the correct site, please contact your Coordinator.



Water Quality Data - North Coast

General information & Participants

Sampler group name * Survey Date *

Number in sampler group Survey Time

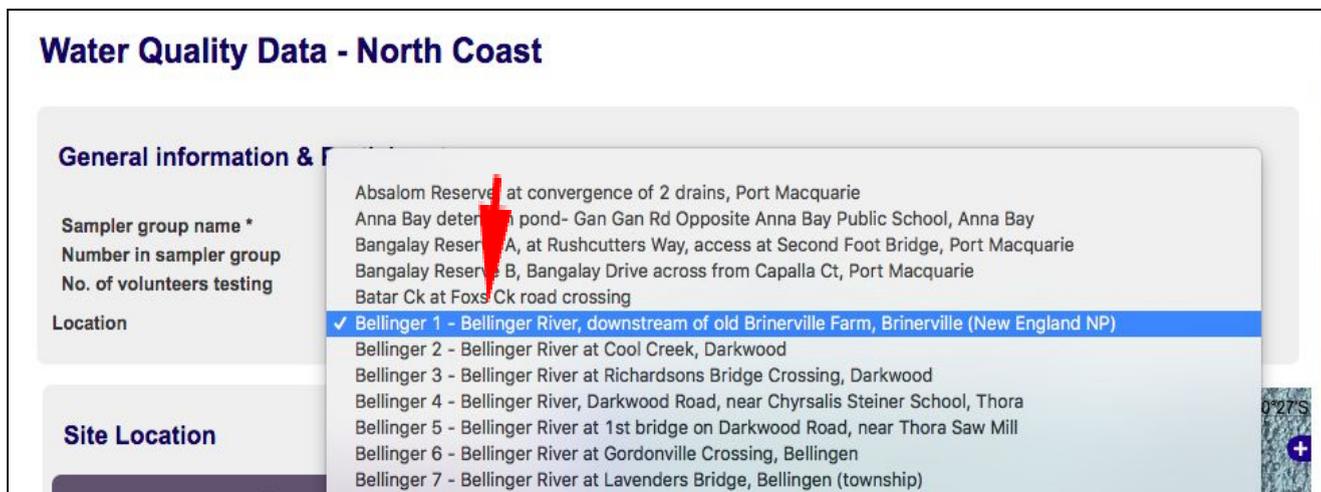
No. of volunteers testing Survey duration (hrs)

Location

When you select the Location, the map will zoom to your site, and the longitude and latitude will autofill.

- If your site marker (orange circle) is slightly off where it should be, contact your Coordinator to correct it.

- Click on the left-hand side of the dropdown box to show all sites, and type letter your site name begins will to be taken to that section of the list (e.g click B for Bellinger).



Water Quality Data - North Coast

General information & Participants

Sampler group name *

Number in sampler group

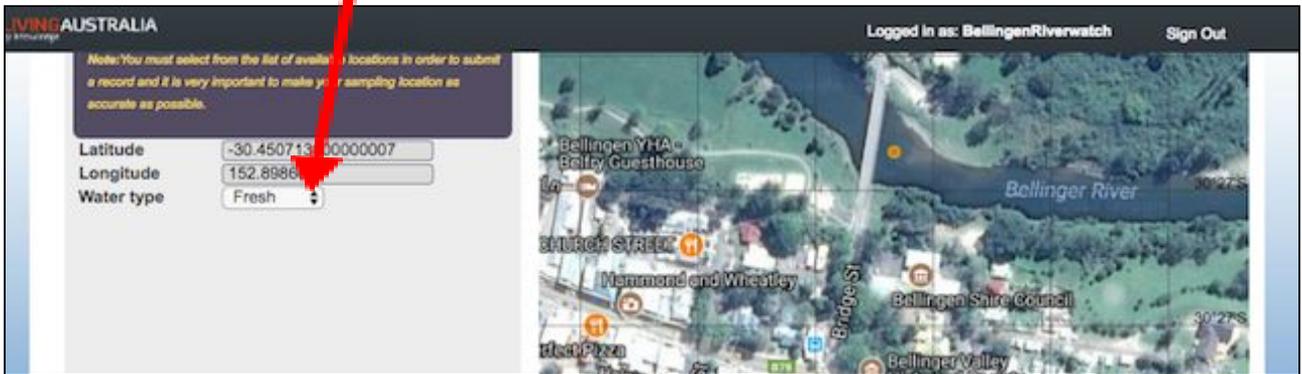
No. of volunteers testing

Location

Site Location

- Absalom Reserve at convergence of 2 drains, Port Macquarie
- Anna Bay detention pond- Gan Gan Rd Opposite Anna Bay Public School, Anna Bay
- Bangalay Reserve A, at Rushcutters Way, access at Second Foot Bridge, Port Macquarie
- Bangalay Reserve B, Bangalay Drive across from Capalla Ct, Port Macquarie
- Batar Ck at Foxs Ck road crossing
- Bellinger 1 - Bellinger River, downstream of old Brinerville Farm, Brinerville (New England NP)
- Bellinger 2 - Bellinger River at Cool Creek, Darkwood
- Bellinger 3 - Bellinger River at Richardsons Bridge Crossing, Darkwood
- Bellinger 4 - Bellinger River, Darkwood Road, near Chyrnalis Steiner School, Thora
- Bellinger 5 - Bellinger River at 1st bridge on Darkwood Road, near Thora Saw Mill
- Bellinger 6 - Bellinger River at Gordonville Crossing, Bellingen
- Bellinger 7 - Bellinger River at Lavenders Bridge, Bellingen (township)

STEP 7: Use the drop down menu to the left side of the map, to select **FRESH** or **ESTUARINE**.



STEP 8: Fill in the boxes with information (data & observations) from your result sheet with the sample/survey information.

Environmental Information at the Time of Sampling

Rainfall in last 7 days: Light
 Rainfall (mm) (optional):
 Water level or flow: Medium
 Rate of Flow (optional):
 Site observations: River flowing, clear water with some turbidity below bridge. Weather clear & sunny. Some ducks padding around. No odour or discolouration of water. Water sampled from stairs behind Council.

Water Quality Measurements

Air Temperature (deg C)	20	Dissolved Oxygen (mg/L)	8.6
Water Temperature (deg C)	15	Dissolved Oxygen (% sat)	85
pH (pH units)	7	Faecal Coliforms (CFU/100mL)	
Electrical Conductivity (µS/cm)	250	E. coli (CFU/100mL)	
Turbidity (NTUs)	7	Total Phosphate (mg/L)	
Available Phosphate (mg/L)	0.05	Nitrates (mg/L as N)	

Did you calibrate your EC meter?
 Water Testing Notes/Issues:

Submit and Add Another Submit

NOTES:

- Remember to only enter numbers into the **Water Quality Measurements** boxes for the tests that you have completed. Leave the others blank – do not enter zero!

- When entering data make sure you have if you're entering a decimal <1, you must put a zero before decimal point & 2nd digit.



- **Dissolved Oxygen % saturation is auto calculated** at this stage when you've entered temperature & DO mg/L. Write the % on your result sheet if you wish.

STEP 9: Click **SUBMIT**.

If you have more results to add, then click **SUBMIT and ADD ANOTHER**.

STEP 10: You'll then be taken to a screen, confirming you have **UPLOADED SUCCESSFULLY!**

NOTE: If you wish to edit anything, click on the **UNLOCK FORM FOR EDITING** lock, and edit & re-submit.



STEP 11: Then, you can **SIGN OUT** if you have completed your data uploads.



Thank you for your participation and ongoing monitoring through Bellingen Riverwatch.

**Don't forget to order chemical refills with Amy!
Check when the next monitoring round is scheduled and mark it in your diary!**