



Water Quality Monitoring Network Volunteer Pack

Aims & Objectives of the Water Quality Monitoring Network

Anglers are passionate about the places they fish and have been working on the preservation and restoration of freshwater habitats since many of the clubs and syndicates they belong to were founded. Whether it's club work parties, volunteering on River's Trust projects, undertaking riverfly monitoring, litter picks or bailiffing, anglers are a potent force for good and often unsung heroes.

The Water Quality Monitoring Network (WQMN) harnesses the power of angling clubs and anglers to understand the quality of water across England and to establish a solid foundation of data.

This solid foundation of data will be used to better understand the factors affecting water quality, aid in the development of effective solutions to improve water quality and will provide the Angling Trust with evidence to support its campaigning.

Methodology

The WQMN is formed from angling clubs, anglers and other volunteers who undertake regular monitoring activities on rivers across England and Wales. Angling clubs recruit and organise teams of local monitors who are allocated monitoring sites. On a regular and consistent basis monitors gather a range of data for each site. This will include as a minimum:

- Phosphates
- Nitrates
- Electrical Conductivity
- Temperature
- Ammonia (selected sites only)

Monitors will also be asked to note:

- Water levels and Flow rates
- Presence of algal blooms and presence of pollution

Monitors record data in situ using the Epicollect5 data gathering platform on their mobile phone with the option to record data at home using a PC. Epicollect5 is a proven solution which is free and easy to use.

The methodology is based upon a proven approach developed by the Wye Salmon Association with the help and support of Cardiff University. A range of resources to support volunteers are available on the Wye Catchment Partnership website courtesy of Cardiff University and the Wye Catchment Partnership - [Wye Catchment Collaborative Monitoring Network](#)

Selecting a sampling site

Location

Your local WQMN Coordinator / club will give you a general location within which to sample.

You will need to identify a specific site within that location for your monitoring.

When choosing a specific site think about:

- **Access**
You need to have permission to access the site.
- **Safety**
Is there somewhere stable with a good footing to take the sample?
Is there a safe area to complete the water quality tests, away from the water and other hazards such as livestock or traffic?
- **Avoid**
Sites directly below sewage outflows, wastewater pipes, combined sewer overflows should be avoided.

On rivers you will need a site where you can take a sample safely from the main flow.

If you are looking to test water quality for a specific site where pollution is suspected (such as a Sewage Treatment Works outflow, Combined Sewer Overflow, tributary etc) then aim to test at least 100m above and at least 100m below the suspected origin in order to isolate any effect.

On still waters it is best to focus on inlets that feed the waterbody. Testing at inlets and outlets is also an option.

Risk assessment

A risk assessment must be undertaken before the first sampling session, see appendix 1. This can be undertaken by the you and/or the volunteer. If you don't undertake the risk assessment you should check to see it has been completed by the volunteer.

Risk assessment process

There are many variations of the basic steps of good risk assessment, but the following will provide a straightforward approach:

1. Identify the Risk
2. Evaluate the Risk
3. Treat the Risk
4. Record the Risk
5. Review the Risk

1. Identify the Risk

Walk the riverbank and record what you consider may be a hazard that could result in harm. Similarly, review any activities that are likely to take place under your control.

2. Evaluate the Risk

Decide the severity of the hazard, 'risk status', before action is taken. Should you take action to remove (high risk) or reduce the hazard (medium risk) or simply raise awareness (low risk).

3. Treat the Risk

Determine what action, mitigating actions, you could take to remove or reduce the hazard to an acceptable level, the residual severity of the hazard, 'risk status', after mitigation. Who is responsible for that action, 'action owner'.

4. Record the Risk

Record the risks and actions to address them on the Risk Register, see appendix 1.

5. Review the Risk

Rivers are dynamic environments. River levels will vary over time. Floods will erode banks and deposit materials. So, risk assessments should be reviewed on each visit and updated if things have significantly changed.

Hazards

When working or volunteering on or near water, there is a danger that persons might slip or fall into the water, be swept off their feet by strong currents, wave action, tide action or swell from passing water traffic. Adverse weather can also be a factor and result in rapidly changing conditions. Whether or not a person is injured by falling in the water, there is an immediate risk of drowning and/or being carried away by water currents.

Sound precautions must be taken, firstly to prevent persons accidentally entering the water, and secondly to ensure that they will float and are rescued in the shortest possible time. It is essential, when working on near water that safe systems of work are in place based on a thorough risk assessment and that employees and volunteers are properly trained and instructed.

Consideration should also be given to the health implications of falls into the water, due to water pollution or leptospirosis (Weil's disease).

Precautions

- Appropriate use of gates, stiles, bridges, platforms, edges, gangways, etc.
- Observe warning signs
- Store equipment where it will not cause a trip hazard
- Avoid slippery areas (caused by water weed, slime, bird droppings, etc.)
- Take into account dangerous weather conditions (rain, rising winds, fog, mist, snow, ice)
- Wear appropriate footwear
- Observe relevant directives e.g. Environment Agency, Rivers Trust

Substances Hazardous to Health

In addition to the above considerations, there may also be extra hazards when working close to, or in the water.

These may include:

- Needles – may be present in the field. Possible control measures:
 - ✓ Wear suitable footwear
 - ✓ Avoid handling sharp objects and wear suitable gloves in the field
- Chemicals – Employees and volunteers should avoid handling chemicals. Where it is unavoidable, only trained staff or volunteers should use them and only in accordance with manufacturer's instructions
- Lyme Disease – A bacterial infection transmitted from animals to humans by the bite of an adult sheep tick. Hosts include deer, foxes, squirrels, sheep, gulls, mice, and other rodents. A rash and fever may indicate infection and medical advice should be sought. To minimise the likelihood of infection:
 - ✓ Keep arms and legs covered as much as possible
 - ✓ Remove any ticks found on the skin
- Tetanus – Can affect anyone whose work involves contact with the soil and may enter the body through cuts, abrasions, or puncture wounds. People should keep immunity up to date with boosters every 5-10 years. Check with your GP.
- Bites and Stings – People bitten by dogs, rats or other animals should seek medical advice due to risk of infection. In the case of a snake bite or an unusual or extreme reaction to any other kind of bite or sting, immediate medical advice should be sought.
- Weil's Disease – Leptospirosis is carried in rat urine which can contaminate water and wet banks. Infection can occur via breaks in the skin and through the lining of the mouth eyes or nose. Symptoms of infection include a flu-like illness which may lead to meningitis, jaundice, or death. Reduce risks by:

- ✓ Covering cuts with waterproof dressings and avoiding further contact with water until healed
- ✓ Washing thoroughly before eating or smoking
- ✓ Wearing boots if working in water to reduce the risks
- Toxicaria Canis – A micro-organism in dog faeces which can cause blindness. Avoid contact and wash hands thoroughly before eating or smoking.
- Plants - Bracken is toxic if ingested and has spores which may be harmful if inhaled in large quantities. Avoid contact with the sap and avoid working amongst bracken during the summer spring season from July to September.
Some plants can cause skin rashes either by contact with the outer cells or the sap. Giant hogweed is easily recognised, but other less obvious plants may also cause rashes. In general, wear gloves and keep arms and legs covered when walking through dense vegetation.

Monitoring frequency

You will need to take a sample, at each location (if you have been allocated more than one site), at least once a month. You can take samples more frequently but bear in mind that you will use more consumables the more frequently you sample.

The Water Quality Monitoring Kit

Checklist

You will need as a minimum:

- Sampling Vessel
- Electrical Conductivity & Temperature Probe*
- Hanna Phosphate Checker and reagent*
- Nitrate Strips*
- Hanna Ammonia Checker (selected sites only)
- Syringe*
- Scissors
- Hand sanitiser and/ or waterproof gloves
- Paper towels and lint free cloth
- Waste bag
- Phone for recording data on Epicollect/ emergency contact
- Paper form/ notepad and pen (in case your phone fails) – see Appendix 2.

* included in the starter kits. Starter kits and additional consumables are available from the Angling Trust.

Sampling Vessel

You will need to provide your own sampling vessel. Whatever you use, make sure it is dedicated to your sampling and not used for other activities i.e. painting!

Ideally sampling containers should:

- be made from reusable plastic
- be wide-necked or open topped
- hold at least 1 litre of water
- be easy to handle and transport

There are a few ideas of vessels you could use given here, but it is up to you to decide what will suit you best:

1. Paint pot - These can be easily obtained from your local DIY store. It doesn't need to be big. These are ideal if you are sampling from a bridge or steep bank as you can attach a rope to the handle.
2. Milk bottle sampler - You can make your own sampler from a leftover plastic milk bottle. Just cut an L shape in the top and attach a bamboo cane to the back of the bottle. This sampler is best used when sampling from a low bank, as it gives good reach into the main flow of the river.
3. Kitchen jug - If you have a jug in the kitchen you can sacrifice to sampling then they can be a good option for collecting a sample from the river if you can easily access the water.



Electrical Conductivity & Temperature Probe

Electrical Conductivity is a measure of the Total Dissolved Solids (TDS) in the water. The more minerals, salts and metals that are dissolved in the water the more conductive it gets.

Water Type	Typical Conductance Range
Distilled Water	0.5 – 3 ($\mu\text{S}/\text{cm}$)
Snow Melted	2 – 42 ($\mu\text{S}/\text{cm}$)
Tap Water	50 – 800 ($\mu\text{S}/\text{cm}$)
Freshwater Streams	50 – 1,500 ($\mu\text{S}/\text{cm}$)
Chalk Streams	100 - 2,000 ($\mu\text{S}/\text{cm}$)

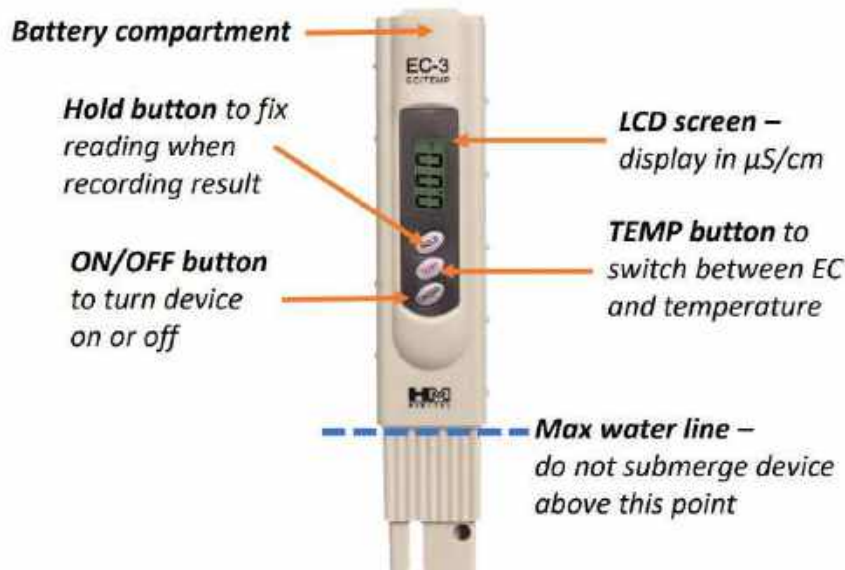


Low levels of dissolved solids in waters, typical in the upper reaches of the catchment, are a result of very low levels of input from the surrounding landscape. As the river runs down to the sea it collects material from many different inputs, some natural and some man-made such as farms, sewage plants, factories, and residential areas. This typically increases the amount of solids dissolved in the water leading to a higher reading. Harmful pollution from things like sewage, slurry and factory discharge will usually elevate the Electrical Conductivity reading.

However, some pollutants such as oil can lower conductivity, therefore it should be used as a general indicator of water quality - not a specific measure of toxicity. Geology will influence the normal level of conductivity in a watercourse (e.g. Areas dominated by granite generally give a lower conductivity than those with limestone). Regular monitoring will allow the detection of changes in conductivity which can indicate pollution.

Temperature is a vital parameter within the river ecosystem as it controls many of the aquatic species life cycles. Water temperature controls the rate of many chemical, physical and biological processes in a river. Water temperature determines whether a river habitat is suitable for different aquatic species to survive. Warm water can hold less dissolved oxygen than cold water. Another important reason to measure temperature is to track the impact of our warming climate on our waterbodies.

Temperature fluctuates with the seasons; however, you do get variation within that, particularly in small rivers and streams.

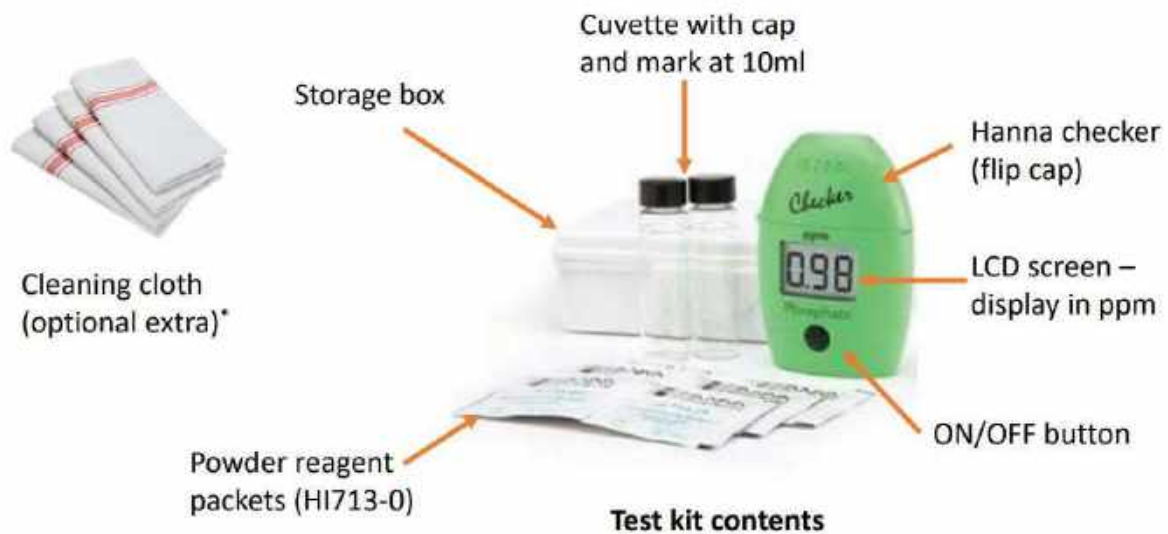


Hanna Phosphate Checker

Phosphate occurs naturally within the river ecosystem, but in very low levels under 0.05 parts per million (ppm). Therefore, higher levels may indicate anthropogenic input. Phosphate is found in animal and human waste, cleaning chemicals, industrial runoff, and fertiliser so this can be a good indicator of pollution. Having raised levels of phosphate can lead to increases in plant growth within the watercourse. This leads to a depletion of oxygen due to the plant's aerobic respiration during the night.

Without oxygen aquatic species cannot survive and the river ecosystem collapses. (It is important to note that phosphate is taken up by plants. You may get a low reading but high plant growth, indicating eutrophication.)





*not included in test kit

Nitrate Strips

High levels of **Nitrates** in water are a problem because, like Phosphate, they cause oxygen depletion which is harmful to humans and biodiversity. Nitrates are connected to wider nitrogen pollution because of the nitrogen cycle, including nitrogen oxides and ammonia, powerful airborne air pollutants which when deposited in water and soil can raise acidity levels.

Key sources of nitrate pollution are farming (artificial fertilisers and animal waste leaching into water) and domestic and industrial sewage. Farming is the main source of ammonia and nitrous oxide emissions.



Hanna Ammonia Checker

Ammonia is present in all natural waters, even if at only very low concentrations, and is derived either from the breakdown of organic nitrogen or by the reduction of nitrate. Although ammonia is produced in the natural nitrogen cycle, other sources such as sewage treatment and industrial effluents, and run-off from agricultural land are major contributors to the ammonia present in the aquatic environment.

Total Ammonia (TAN), as measured in the Water Framework Directive, is made up of Unionised Ammonia (NH_3) and Ammonium (NH_4^+). Unionised Ammonia (NH_3) is toxic to aquatic life. Toxic levels are dependent on alkalinity (pH) and temperature and will vary over the day, due to plant photosynthesis and respiration, and through the year, as temperatures increase though summer and decrease in winter.



Kit care and maintenance

Although the kit is designed for fieldwork and for getting wet, it does still require some care and attention to allow it to last the test of time.

Electrical Conductivity & Temperature Probe

The HM Digital EC-3 is robust (and comes with a 3-year warranty) but needs to be looked after to continue to perform well

- Make sure the device is clean and dry every time you put it away after testing.
- Store somewhere cool and dry place between trips to the field.
- You may need to change the batteries in your device at some point – follow the instructions provided by the manufacture.
- The device is factory calibrated, but after a while may benefit from recalibration – your group coordinators will advise if this is necessary.
- More information about the HM Digital EC-3 meter can be found in the manufacturer's instructions provided with the meter.

Nitrate Strips

- Keep the unused strips as dry as possible. Make sure you are not putting wet fingers in the pot.

Hanna Checkers

- The Hanna Checker should be recalibrated periodically to ensure the accuracy of the measurements your group coordinators will advise if this is necessary.
- The battery will need to be replaced after approximately 5000 measurements.

[Things To Bring Video](#)

Safety guidelines

Before You Go

1. Make sure it is **safe** and **legal** for you to access the river, stream, or lake.
2. Is someone going with you? If not, **let someone know where you are going** and when you will be back.
3. Do you have a **mobile phone** or way to call for help?
4. Are you wearing the right **footwear**? Waterproof with good grip is best!
5. Check the **weather**: you will need sun cream, a hat and some water in hot weather, several layers of clothing in cold weather – and waterproofs if it looks like it is going to rain! Also consider whether recent heavy rain might have made river or riverbank conditions more dangerous.

When you first arrive at a new site

1. Part of the reason for an initial observation survey is to ensure you would be happy taking a sample of water using a bucket or other container. So, when you first arrive at your site, plan how you will safely collect the 1.5 litres of water needed.
2. The survey site should enable a small sample to be collected **without the need to enter the watercourse**. Making a **milk bottle sampling vessel** is a good way to take a water sample safely from the riverbank.
3. Are you standing somewhere stable with **good footing**?
4. Is there a **safe area** to complete the water quality tests, away from the water and other hazards such as livestock or traffic?

When carrying out the survey

1. If the **water level** is too high or fast to allow safe sampling, you can always just do the observational measurements. Even if you are sampling from a bridge, you may feel unsafe collecting a sample in high flows.
2. Ensure that you **do not disturb the riverbed** when sampling as this will affect the sample.
3. River water can contain **harmful bacteria** that can cause ill health and potentially serious diseases such as Weil's disease (also known as Leptospirosis). You should be aware of Weil's disease and, if you feel unwell, should mention it to your doctor. For this reason – and for sample integrity – try to **minimise personal contact with water** to be tested. By using a suitable sample container (such as a small paint bucket on a rope) and the syringe provided there should be no need to immerse hands or fingers in the sample.
4. **Do not carry out sampling with open cuts or wounds** and make sure to **wash hands and/or use hand sanitiser gel** thoroughly between sampling and handling food.

Collecting and analysing a water sample

Collecting a water sample

1. Identify a safe place to collect your sample, where water is free flowing - this could be from a riverbank, a bridge, or from within the river channel.
2. Before sampling ensure you rinse out the sampling vessel with the river water at least twice to wash out any unwanted residue (tap water usually has very high phosphate so if you have washed your kit make sure it is rinsed thoroughly with your sample water before testing).
3. Collect your sample.

- Sampling from the riverbank:
 - Collect a sample from a location where:
 - You can access the water safely and easily
 - The water is free flowing, not stagnant, or slow-moving
 - The water is deep enough for your sampling container

Take care not to disturb bankside or riverbed sediment as you collect your sample.

- Sampling from a bridge:
 - Choose a location on the bridge where you can safely and easily access the middle of the river channel with your sampling container (attached to cord) – here water will be deepest and fastest flowing
 - Collect your sample from the upstream side of the bridge
 - Discard any rinse water on the downstream side of the bridge (if safe to do so)

Take care not to disturb any material attached to the bridge, or the riverbed sediment, as you lower your container to collect a sample.

- Sampling from within the river channel:
 - Only use this approach if agreed with your local coordinator and it is safe to do so
 - Collect the sample upstream of where you are standing in the river channel
 - Discard any rinse water downstream of where you are standing

Take care not to disturb sediment as you enter the river

4. Transport your sample to a suitable site nearby to conduct water quality tests.

Good Practice

- Collect your sample upstream of where you are standing
- Discard water downstream of where you are collecting it from
- Triple rinse your sampling container before collecting a sample for analysis
- Rinse your other monitoring equipment (syringes, test tubes etc.) in river water before conducting tests

Warnings

- Take care not to disturb riverbed or bank side sediment – with either your body or your sampling container - as you collect your sample
- Avoid taking your sample from stagnant or very slow-moving areas within the river

[Taking A Bankside Sample Video](#)



Angling Trust Water Quality Monitoring Network: River Sampling Process



Order of Testing

1. Sensor Measurements

- Electrical Conductivity (EC)
- Temperature

2. Nutrient Tests

- Phosphate
- Nitrate
- Ammonia (*selected sites*)

Sensor Measurements – HM Digital EC-3 Meter

Step	Instruction
Remove	Remove the protective cap from the device → Check the device is clean and dry
Turn on	Turn the meter on (ON/OFF Button) and lower the probe into the water sample → Take care to only submerge to the max submersion level
Stir	Gently stir the meter in the sample and wait for the reading to stabilise. This could take some time
Press	Press the HOLD Button to fix the reading so that you can view it out of the water
Record	Record the EC value displayed (in $\mu\text{S}/\text{cm}$) → If X10 is displayed, multiply the value displayed by 10
Release	Press the HOLD Button again to release the fixed reading
Temp	Press the TEMP Button and lower the probe into the water sample a second time → Take care to only submerge to the max submersion level
Wait	Wait for the temperature reading to stabilise and press the HOLD Button again
Record	Record the temperature value displayed (in $^{\circ}\text{C}$) → Press the TEMP Button twice to switch back to EC
Dry	Gently shake excess water off, use a lint cloth or soft paper towel to ensure the sensor is dry and clean before replacing the cap for storage

Nutrient Test 1 – Hanna Phosphate Checker

Step	Instruction
Rinse	Rinse the cuvette, and syringe if using, with river water at the sample site
Fill	Fill the cuvette from your sampling vessel to the 10ml mark and replace the cap. Ensure it's exactly on the mark to get an accurate test.
Wipe	Wipe the outside of the cuvette to remove any water, dirt marks or fingerprints with a lint-free cloth or soft tissue → This is cuvette 1 (C1, aka your blank sample) prepared
Power On	Press the ON/OFF Button to turn the checker on → 'Add C1' will appear with the word 'Press' blinking
Insert C1	Insert the cuvette (C1) into the checker and close the cap → Hold the top of the cuvette to avoid smearing the glass sides
Zero	Press the ON/OFF Button again → 'Add C2' will appear with the word 'Press' blinking → The device is now zeroed
Remove C1	Remove the cuvette from the checker
Open	Carefully open the powder reagent packet by tapping the powder to one corner, cutting the opposite corner, and pinching the packet to open it
Add	Unscrew the cap of the cuvette and carefully tip in the entire contents of the packet
Mix	Replace the cap and shake gently for two minutes until the powder is completely dissolved
Wipe	Wipe down the outside of the cuvette again → This is cuvette 2 (C2, aka your reacted sample) prepared
Insert C2	Insert the cuvette (C2) into the checker and close the cap
Start Timer	Press and HOLD the ON/OFF Button until the three-minute counter begins
Record	Record the reading that displays immediately after the timer ends (in ppm) → The device will turn off automatically after two minutes

Readings & Unit Conversions

- **Phosphate Checker Range:** 0.00 – 2.5 ppm
 - 0.00 ppm means between 0.00 and 0.04 ppm
 - 2.5 ppm means in excess of 2.5 ppm
- **Conversions:**
 - 1 ppm = 1 mg/L = 1000 ppb
 - 1 mg/L = 1000 µg/L

Nutrient Test 2 – Simplex Health Nitrate Strips

Step	Instruction
Remove	Remove the test strip from the bottle and immediately replace the bottle cap
Dip	Dip the test strip into your sample for 2 seconds without motion. Do not shake off excess water.
Wait	Hold the strip horizontally with the pad facing up for 1 minute.
Compare	Match the end pad to the top colour chart on the bottle (labelled NO ₃ -N)
Record	Record the value on Epicollect
Compare	Match the pad nearest handle (NO ₂ -N) to the bottom colour chart
Record	Records the value on Epicollect

Nutrient Test 2 – Hach Nitrate Strips

Using the Hach Nitrate Test Strips

Step	Instruction
Remove	Remove the test strip from the bottle and immediately replace the bottle cap
Dip	Dip the strip into your sample for one second → Do not shake off excess water
Wait	Hold the strip horizontally with the pad facing up for 30 seconds
Compare	Compare the colour of the top pad with the top colour chart (labelled Nitrate Nitrogen ppm) on the bottle
Record	Select the matching colour and record the associated nitrate concentration

Interpreting the 2 kits:

The Hach Nitrate strips have now been discontinued in the UK, so as of October 2025, we have switched to Simplex Nitrate Strips. If your site is switching to the new strips, then to compare the results, you need to add both Nitrate and Nitrite values recorded on the Simplex Health strips to compare with the 'Nitrate Nitrogen' value recorded using the Hach Strips.

This is because the Hach strips 'Nitrate Nitrogen ppm' value actually measured the sum of both nitrate nitrogen and nitrite nitrogen. Whereas, the new strips measure nitrate nitrogen and nitrite nitrogen separately, so they must be added to get the equivalent Hach reading.

Note: The nitrite value on the Simplex strips will often be very low or 0, as nitrite is unstable in water and if usually quickly converted to Nitrate.

Nutrient test 3 – Hanna Ammonia Checker

Using the Hanna Ammonia Checker – Part 1

Step	Instruction
Rinse	Rinse the cuvette and syringe (if using) with river water
Fill	Fill the cuvette to the 10ml mark and replace the cap
Wipe	Wipe the outside of the cuvette clean
Power On	Press the ON/OFF Button → 'Add C1' will appear, with the word 'press' blinking → The device is now ready for your blank sample to be added
Insert C1	Insert the cuvette and close the lid, holding the top of the cuvette to avoid touching the sides
Press	Press the ON/OFF Button again → 'Add C2' will appear blinking → The device is now zeroed
Add A	Remove the cuvette, take off the cap and add 4 drops of Reagent A → Replace cap and swirl to mix
Add B	Unscrew the cap again and add 4 drops of Reagent B → Replace cap and swirl to mix
Insert C2	Wipe the cuvette clean, removing any fingerprints → Insert the cuvette and close the cap
Press & HOLD	Press and HOLD the ON/OFF Button until the 3 min 30 sec counter begins
Record	Record the reading in ppm → Device turns off automatically after two minutes

Tips for Phosphate & Ammonia Checkers

- Filter turbid samples before analysis
- Remove bubbles by swirling or tapping
- Always clean and dry cuvettes before inserting
- Wipe off fingerprints
- In cold weather, reagent may dissolve slower
- Use separate cuvettes for blank and reacted samples
- Avoid letting samples settle too long before testing

Settling Warning

Avoid leaving samples to stand before analysis. Phosphate may react or settle out, leading to inaccurate results. If a sample is left for more than one hour, note this clearly in your survey.

Interpreting your results



Phosphate^{*1} - Orthophosphate (PO_4^{3-}) as measured by Hanna Colorimeter

High	Good Ecological Status	Moderate / Poor
< 0.077 ppm	0.077 – 0.306 ppm	> 0.306 ppm

Nitrate^{*2} - as measured by Hach Nitrate Test Strips

Natural	Elevated	Excessive
< 1 ppm	1 – 4.9 ppm	≥ 5 ppm

Ammonia^{*1} - as nitrogen as measured by Hanna Colorimeter

High	Good Ecological Status	Moderate / Poor
< 0.3 ppm	0.3 – 0.6 ppm	> 0.75 ppm

^{*1} Water Framework Directive (WFD) standards set as annual means.

Standards are site specific, hence there is a range for good ecological status.

^{*2} There is no WFD standard set for Nitrate in rivers.

Interpreting your results

Electrical Conductivity

Significantly elevated electrical conductivity (EC) can indicate that pollution has entered the river. A measure of EC cannot tell you what the pollutant is, but it can help identify that there is a problem that may harm invertebrates and/or fish. EC may be high in a river without any visible effects on the clarity of the river water. Any human activity that adds inorganic, charged chemicals to a river will alter the EC.

Water Type	Typical Conductance Range
Distilled water	0.5 – 3 (µS/cm)
Snow Melted	2 – 42 (µS/cm)
Tap Water	50 – 800 (µS/cm)
Freshwater Streams	50 – 1,500 (µS/cm)
Chalk Streams	100 - 2,000 (µS/cm)

For example, EC may be higher in a river downstream of a sewage treatment works due to chemicals such as chloride and phosphate from household products. Winter road runoff, containing salt, can be very high in electrical conductivity. If this runoff reaches rivers, then it may, depending on the quantity of water, temporarily elevate the EC in the river.

Phosphate

Standards for Phosphorus in UK Rivers were introduced under the Water Framework Directive (WFD) and associated Regs/Directions. The standards are site-specific and depend upon the altitude and alkalinity of the site. The standards for good ecological status (close to natural) in Rivers are broadly in the range 0.077 – 0.306 ppm of Orthophosphate (PO₄ 3-), as annual means, as measured by the Phosphate Colorimeter. The Phosphate Colorimeter upper limit is 2.5 ppm, the lower test limit is 0.00 ppm with an accuracy of ± 0.04 ppm. So, a 0.00 ppm reading does not mean there is no phosphate present, it will be between 0.00 and 0.04 ppm. A 2.5 ppm reading means that it is in excess of 2.5 ppm.

Nitrate

There are no ecological status standards for Nitrogen in Rivers. The Environment Agency's approach is to focus on Phosphate as the main cause of river eutrophication and the nutrient they are most able to reduce to levels that will improve the ecology. There is a standard for Lakes and Reservoirs, which is 0.75 – 1.5 mg/l (ppm). Natural levels of Nitrate in freshwater are typically low, generally well below 5 ppm.

Ammonia

Standards for Ammonia in UK Rivers are also set out in the Water Framework Directive (WFD). As with Phosphate, standards are site-specific and depend upon the altitude and alkalinity of the site. The standards for good ecological status (close to natural) in rivers and lakes are broadly in the range 0.3 – 0.6 ppm for Ammonia, as annual means, as measured by the Ammonia Colorimeter. The Ammonia Colorimeter upper limit is 9.99 ppm, the lower test limit is 0.00 ppm with an accuracy of ± 0.05 ppm ± 5%. So, a 0.00 ppm reading does not mean there is no ammonia present, it will be between 0.00 and 0.05 ppm ± 5%. A 9.99 ppm reading does not mean that is the total phosphate, it means that it is in excess of 9.99 ppm. **Your local EA Fisheries Team should be able to tell you what your local standards are for Phosphate and Ammonia. Contact aap@anglingtust.net to be put in touch.**

Using Epicollect5 to record your measurements and test results

You will be using Epicollect to record information relating to the samples you take.



So, why are we using Epicollect?

- It is completely free!
- It allows us to create our own projects and forms
- It allows total customisation of forms
- It is user friendly
- It has all the key features we need
- It has a smartphone app as well as a web browser interface
- It does not require a mobile phone signal to record data so can be used in remote places

What does Epicollect do?

- Allows you to collect, store, view, and download geolocated data
- Can be used as an app on your mobile smart phone
- Can be accessed on a computer via a web browser

Creating a free Epicollect account

You will need to create a free account online to get started:

- Go to: <https://five.epicollect.net/>
- Select log in in the top right-hand corner
- Currently Epicollect makes signing up easier for those with Google accounts, but it is also possible to use an Apple account or another email address. You do not need a Gmail address to create a free Google account

More information about registering with Epicollect can be found here:

<https://docs.epicollect.net/web-application/manage-users>

You can learn more about Epicollect's privacy policy here:

<https://docs.epicollect.net/about/privacy-policy>

Downloading the Epicollect App

Once you have created your Epicollect account you will need to download the App. Versions are available for both Apple and Android phones.



Epicollect support phones and tablets on Android 5.1 onwards - [Download from Play Store](#)
Epicollect support iPhones and iPads with iOS 13+ - [Download from App Store](#)

Recording information using the Epicollect App

Before you go to take your first sample

1. Open the Epicollect App
2. Select '+Add Project'
3. Search for 'Water Quality Monitoring Network' and add it.



Note: To access the WQMN Project in Epicollect you will need to have been given permission by your local coordinator. If you are unable to access the WQMN Project, check with your local coordinator that you have been given permission. Check this before you go to take your first sample.

Familiarise yourself with the WQMN Project in Epicollect before you go to take your first sample. You can 'test' it beforehand. You can enter data and delete your entries at any time, so do not worry about submitting 'test' entries.

Recording your sample data

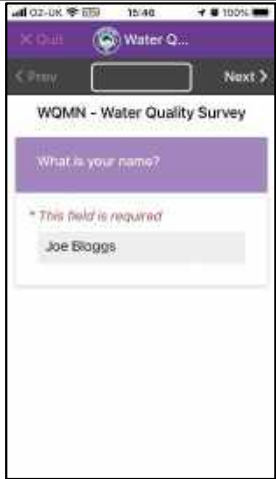
Remember, it is best to use the smartphone app in situ, at the sampling site.


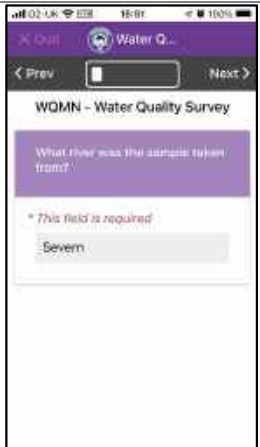
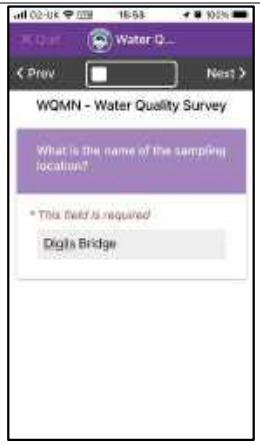

1. Before you take your water sample open the Epicollect App and check it is working okay. **You do not need to have a mobile phone or wi-fi connection to record data, only to upload it.** If there is a problem with the App you can always record your data using paper and pen or taking photos and add the data later using the web browser.



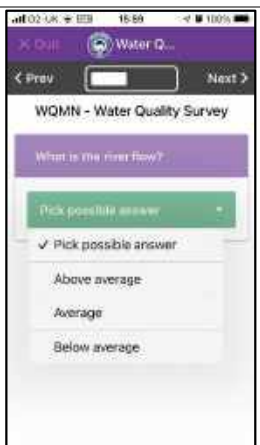
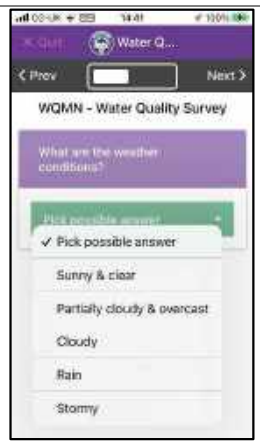
2. Select '+Add entry'


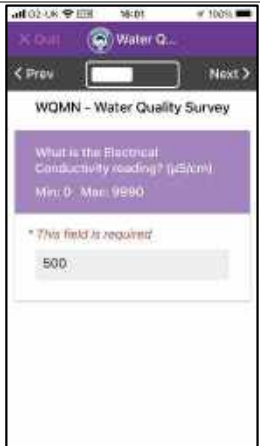
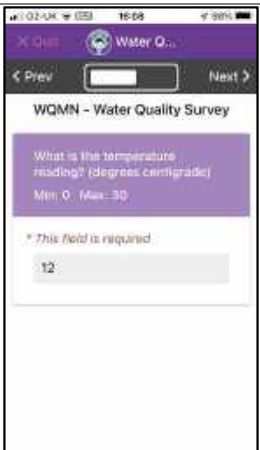
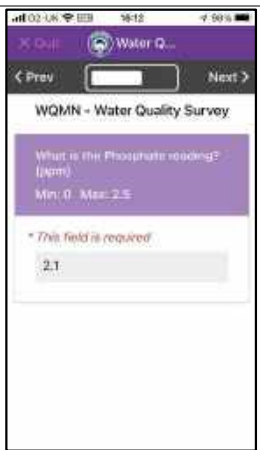


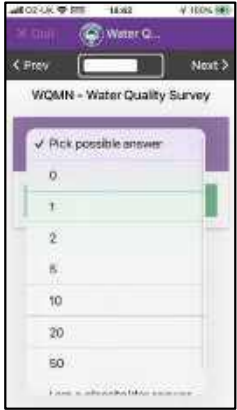

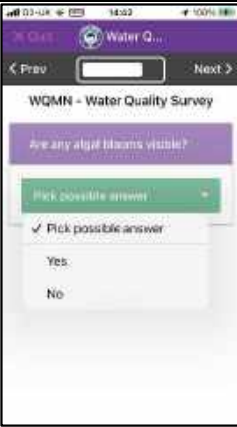

3. Start completing the questions





The questions are:	Your response:	Epicollect:
What is your name?	Add your name.	

<p>On what date was the sample taken?</p>	<p>It will default to that day's date. To change this, click on X then click on the field and a calendar will pop up. Select the required date by clicking on it and press 'Done'.</p>	
<p>What river was the sample taken from?</p>	<p>Type in the name of the river.</p>	
<p>What is the name of the sampling location?</p>	<p>Type in the name of the location.</p>	
<p>Where was the sample taken?</p>	<p>Click on 'Update location' to automatically populate the Latitude and Longitude of the sampling site.</p> <p>Make sure you click on 'update location' before you progress.</p> <p>Note: You may need to give Epicollect permission to access your location data.</p>	

<p>At what time was the sample taken?</p>	<p>It will default to the current time. To change this, click on X then click on the field and a clock will pop up. Select the required time by scrolling hours and minutes and press 'Done'.</p>	
<p>What is the river level?</p>	<p>Click on 'Pick possible answer' and select the most appropriate answer from the drop-down list.</p>	
<p>What is the river flow?</p>	<p>Click on 'Pick possible answer' and select the most appropriate answer from the drop-down list.</p>	
<p>What are the weather conditions?</p>	<p>Click on 'Pick possible answer' and select the most appropriate answer from the drop-down list.</p>	

<p>Has it rained in the last 24 hours?</p>	<p>Select either Yes or No</p>	
<p>What is the Electrical Conductivity reading?</p>	<p>Enter the EC reading from the HM Digital EC-3 Meter.</p> <p>If X10 is displayed, multiply the value displayed by 10</p>	
<p>What is the temperature reading?</p>	<p>Enter the temperature reading from the HM Digital EC-3 Meter.</p>	
<p>What is the Phosphate reading?</p>	<p>Enter the Phosphate reading from the Hanna Phosphate Checker.</p>	

<p>What is the Nitrate reading?</p>	<p>Select the score that matches the Hach Nitrate Test Strip (0, 1, 2, 5, 10, 20 or 50)</p>	
<p>What is the Ammonia reading?</p>	<p>Enter the Ammonia reading from the test device. This is at selected sites only.</p> <p>Do not enter any value unless you have tested for ammonia using the Hanna H-715 Ammonia Checker, otherwise leave blank.</p>	
<p>Are any algal blooms visible?</p>	<p>Select either Yes or No (take a photo if there is)</p>	
<p>Is any pollution visible?</p>	<p>Select either Yes or No (take a photo if there is)</p>	

<p>Is there anything else you need to tell us?</p>	<p>Record any relevant additional information.</p>	
<p>Please add a photo if necessary to support your report.</p>	<p>Take or upload a photo.</p>	
<p>4. Having answered all the questions, click on 'Save entry'.</p>		
<p>5. You can scroll down to check your answers. Once you are happy with your report click 'Upload now'.</p>		

6. Click on 'Upload data'. If you have taken any photos click on 'Upload photos'.



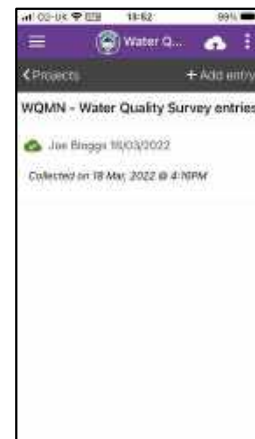
7. If there is no phone signal or you are not connected to wi-fi Epicollect will tell you that "You have unsynced entries". Click on 'Upload now' to synchronise and then




8. You have now uploaded your report.



9. To see your entries, go to Projects and click on 'Water Quality Monitoring Network'



10. You can edit any of the answers, just click on the  icon

11. If necessary, you can delete your entry. Select the entry you want to delete and click on 'Delete entry .



Taking immediate action if necessary

If you see any of the following:

- Pollution to water or land
- Damage or danger to the natural environment,
- Dead fish or fish gasping for air
- Collapsed or badly damaged riverbanks
- Main rivers blocked by a vehicle or fallen tree causing risk of flooding
- Poaching or illegal fishing
- Unusual changes in river flow

If you are in England - Call the Environment Agency 24-hour Incident Hotline 0800 80 70 60

If you are in Wales - Call the Natural Resources Wales 24-hour Hotline on 0300 065 3000

If the source is a water company asset call the water company emergency hotline

If you are monitoring for ammonia and you get a result of over 5 ppm then you should also call the EA Hotline. Ammonia in certain conditions is toxic to fish and high levels should be reported immediately.

Reporting general concerns

If you record consistently high levels of phosphate and/or nitrate and/or ammonia ...

- report it to the EA/NRW Hotline
- also let the local EA/NRW Fisheries Team know about your results
- and if the source is a water company asset contact the water company.

Also consider letting other interested parties know:

- Local Rivers Trust
- Wildlife Trust
- Parish/Local Council
- Newspapers/Radio Stations
- Campaign groups
- Other water users
- Use social media to build awareness of your concerns

Appendix 1. – Risk Register

Activity		Location		Brief Description of the Activity		
Risk No	Risk Description	Cause	Risk Status	Mitigation	Action Owner	Risk Status
Water quality monitoring				Collection, analysis and recording of water samples		
e.g.	Risk of falling into river and drowning	Steep slippery banks	High	Avoid steep slippery areas and keep well back from the edge	Myself	Low
1.						
2.						
3.						
4.						
5.	Risk of Phosphate Reagent causing burns and eye damage.	Contact of Potassium Disulfate with skin, eyes or if swallowed.	Low	Read Safety Data Sheet. Do not breathe the dust and avoid contact with skin and eyes. Do not smoke or eat whilst using. Have first aid measures to hand.	Myself	Low

Assessment Carried Out By	Signature	Date Issued

Appendix 2. – Manual Record Sheet

Question:	Your response:
What is your name?	
On what date was the sample taken? (dd/mm/yyyy)	
What river was the sample taken from?	
What is the name of the sampling location?	
Where was the sample taken?	Latitude = Longitude =
At what time was the sample taken? (mm/hh)	
What is the river level?	High Normal Low
What is the river flow?	Above average Average Below Average
What are the weather conditions?	Sunny & Clear Partially Cloudy & Overcast Cloudy Rain Stormy
Has it rained in the last 24 hours? (Yes/No)	
What is the Electrical Conductivity reading? ($\mu\text{S}/\text{cm}$)	
What is the temperature reading? ($^{\circ}\text{C}$)	
What is the Phosphate reading? (ppm)	
What is the Nitrate reading? (ppm)	Select the score that matches Hach Nitrate Test Strip 0 1 2 5 10 20 50
What is the Ammonia reading? (ppm) Selected Sites Only	
Are any algal blooms visible? (Yes/No)	
Is any pollution visible? (Yes/No)	
Is there anything else you need to tell us?	



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