




MONITORING WATER QUALITY

No single measurement can accurately measure the quality of water so a combination of biological, chemical and physical characteristics is used. Collectively these characteristics provide a description of the health of an aquatic ecosystem and indicate how suitable it is to conduct a variety of activities within it. While some measurements have to be made on-site, samples of water, sediment, or organisms may be taken back to a laboratory for analysis. Modern digital sampling equipment allows many tests that were once conducted only in laboratories to be performed in the field:

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|  <p>Data Logger Can be used with desktop computers in the lab or laptop computers or graphical calculators for field work.</p> |  <p>Clarity (Turbidity) Sensor Measures turbidity in NTU – the standard unit used by most water collection agencies and organisations.</p> |  <p>pH, Nitrate and Temperature Sensors Probes allow a fast response time and built in functions such as temperature compensation for better accuracy.</p> |
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| Variable | Importance | Measure | Desired Value | Standard | | | |
|------------------|---|------------|---|--------------------|-----------------------------------|----------|---------------------------------|
| Dissolved Oxygen | <ul style="list-style-type: none"> Essential for most aquatic life Indicates level of organic pollution Indication of photosynthesis | Field only | >80% saturation >5g/m ³ | F, FS, SG DW | | | |
| Temperature | <ul style="list-style-type: none"> Indicates mixing processes Organism tolerances | Field only | <25°C <3°C change along a stretch of river | F EP, F, FS, SG | | | |
| Conductivity | <ul style="list-style-type: none"> Measures total dissolved salts Indicates geothermal input | Field/Lab | | | | | |
| pH | <ul style="list-style-type: none"> Organism tolerances Indicator of industrial discharges, mining | Field/Lab | pH 5 to pH 9 | DW | | | |
| Clarity | <ul style="list-style-type: none"> Aesthetic/appearance Indicator of catchment condition, land use | Field/Lab | Turbidity: 2NTU Black Disc >1.6m | EP, RC, A | | | |
| Colour | <ul style="list-style-type: none"> Aesthetic/appearance Light available for plant growth Indicator of levels of organic matter | Lab | | | | | |
| Nutrients | <ul style="list-style-type: none"> Excessive plant growth Nutrient restriction of plant/algal growth | Lab | N: <0.100 g/m ³ (Dissolved Inorganic) P: <0.030 g/m ³ (Dissolved Reactive) NO ₃ : <10 g/m ³ | EP, A DW | | | |
| Major Ions | <ul style="list-style-type: none"> Indicator of catchment soil types and geology Water hardness (Mg, Ca) Buffering capacity for pH changes (HCO₃) | Lab only | Mg, Ca, Na, K, Cl, HCO ₃ , SO ₄ | | | | |
| Organic Carbon | <ul style="list-style-type: none"> Indicator of organic pollution Characteristics of catchment | Lab only | >5g/m ³ (Biochem. Oxygen Demand) | EP, RC, A | | | |
| Faecal Bacteria | <ul style="list-style-type: none"> Indicator of faecal contamination Disease risk | Lab only | <33/100mL (enterococci) <200/100mL (faecal coliform) | RC RC | | | |
| EP RC | Aquatic Ecosystem Protection Recreation Contact | A SG | Aesthetic Impact Shellfish Gathering | DW F | Drinking Water Fishery/Fishing | FS SW | Fish Spawning Stock Watering |

1. Explain why measurements of dissolved oxygen and temperature should be made in the field rather than a laboratory: _____

2. Suggest why faecal bacteria can only be measured in a laboratory: _____

3. Describe how our choice and location of land use has a huge effect on water quality: _____