Biological indicators

There are two key biological indicators that can be monitored to measure the condition of waterways. The indicators you choose to monitor will depend on what questions are being asked about the health of water in a particular waterway.

Biological indicators are useful to asses the health of aquatic environments as a whole, as they can reflect impacts on both water quality and stream habitat. If monitored over time, they can also be used to detect long-term changes to the condition of waterways.

Detailed information on biological indicators, including why they are important, environmental factors that affect them, important details to consider when monitoring them, and monitoring methods are available from Chapter 6 of the *Queensland community waterway monitoring manual*.

Macro-invertebrates

Macro-invertebrates or 'water bugs' are animals without a backbone that spend all or part of their life in water, and are large enough to be seen by a naked eye.

Many macro-invertebrates are highly sensitive to environmental changes which makes them good indicators of the health of waterways. This is because they generally have a short breeding cycle (weeks rather than months or years) and spend most of their lives in the one geographical location.

For example, mayfly nymphs are very sensitive to water bourne pollutants. Finding them in a stream would indicate water quality in the location and upstream, at the time they were sampled, is likely to be good. If only freshwater snails, water boatmen and worms are present, this indicates poor water quality at the time of sampling. The results of macro-invertebrate monitoring provide a snapshot of current conditions.

Fish

The abundance and diversity of native fish can indicate the condition of a waterway not just where they are found during sampling. Use fish monitoring to provide a bigger picture of waterway because unlike most waterbound macro-invertebrates, fish do not tend to stay in one small localised area where they were born, but move within a waterway.

They also have a longer life cycle, one that tends to span more than one season. They can be affected not only by water quality, but also changes to flow of water, and obstructions or restrictions to their movement along a waterway. Therefore the presence or absence of certain species of fish at a site indicates something about conditions in the waterway over the lifespan of that species.