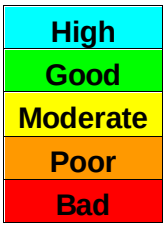
Classification of the water environment explained

This paper provides a brief summary of the most important aspects of this complex process.

We monitor water across Scotland and report the classification results through River Basin Management Planning, under the Water Framework Directive.

The monitoring data are used to classify the condition of our waters, this process is carried out in line with EU and UK guidance. This common approach to classification means a comparison can be made with other countries across Europe.[1]

Classification is reported as one of five classes for **surface waters**:



Where the water environment is in a near natural condition[2] it is described as being at High status while areas whose ecological quality has been severely damaged will be classified as Bad status.

These assessments involve detailed analyses of a wide variety of different physical, chemical and biological parameters including the:

- water quality (chemistry) e.g. amounts of phosphorus and nitrates, presence of toxic pollutants;
- flows and levels of waters (hydrology);
- physical condition of the habitats bed, banks and shores (morphology);and,
- abundance and type of plants and animals living in and around the waters (ecology).

Groundwaters are classified as either “Good” or “Poor” based on the level of chemicals in the water, the amount of water and whether the groundwater is causing any damage to surface waters, such as polluted minewater flowing into rivers or abstraction from the groundwater drying out wetlands.

We divide the water environment up into separate management units, termed **water bodies**, and report a classification for each. These units can relate to whole or parts of rivers, canals, lochs, estuaries, ground or coastal waters. For practical purposes we use size thresholds set by the Water Framework Directive; we include rivers with catchments equal to or larger than 10km^2 and lochs with surface area equal to or larger than 0.5km^2. Where it is deemed necessary we can also monitor and assess water bodies that do not meet this size criteria but that require management for a specific reason.

[1] UKTAG have interpreted and refined the rules for use here in Scotland and the UK

[2] Reference conditions are set based on biology, hydro-morphology and physio-chemistry of a water body that is undisturbed by human activity.

Some surface water bodies have been substantially changed in character for important social and economic purposes, such as

- flood protection;
- hydropower generation;
- navigation;
- land drainage;
- water storage for drinking water supply;
- or for purposes relating to rural land management.

These are termed **Heavily Modified Water Bodies (HMWB)**. Some surface water bodies (such as canals) have been created by people – these we describe as **Artificial Water Bodies (AWB)**. Both heavily modified water bodies and artificial water bodies are assessed on their ecological potential to support plants and animals, and whether the water bodies are managed (as far as is reasonably possible) to support wildlife. HMWBs and AWBs are reported as High, Good, Moderate, Poor or Bad potential.

We don't have the resource available to monitor every water body in Scotland. To **monitor and report classification efficiently** we group the monitoring of some surface waters and groundwaters, with one water body being monitored, and the classification produced is used for the other water bodies in that group. The groups contain water bodies of similar types (such as size, altitude etc), and are affected by similar pressures (such as acidification, diffuse pollution etc). Grouping of water bodies can be used for chemistry and ecology parameters, but not hydrology or morphology.

Alongside the classification, we also report the confidence we have in the assessment - high, medium or low. This allows us to target resources for further monitoring and also determines where best to direct the programme of measures i.e. where we have high confidence in our classification results.

The **pressures** that impact on water bodies and can result in downgrades in the classification include:

- **Impacts on water quality** (chemistry and/or ecology) – this can be as a result of **point source pollution** from one known source such as effluent from waste water treatment works and industrial discharges or as a result of **diffuse source pollution** which is when pollutants from various sources enter the water environment e.g. run-off from farmland, urban areas or acid rain;
- **Impacts on flows and levels** (hydrology) – including taking water for water supply, manufacturing processes, and impoundments and dams and weirs which hold water back or slow waters down for a range of uses such as hydropower and recreational fishing purposes;
- **Changes to physical condition** (morphology) – for example straightening and channelisation, land claim for ports or housing, structures for coastal protection;
- **Barriers to the movement of fish** (morphology) – weirs, dams, bridges and other structures may let water flow but restrict the migration of fish; and,
- **Invasive non-native species** – introduced plant or animal species which can result in a loss of natural wildlife. These can downgrade a water body to good or moderate status.

The classification process is also informed by our **characterisation** of water bodies, supported by the monitoring programme. The main steps of characterisation are:

- identifying the **type** of water bodies by their physical and chemical characteristics;
- identifying **protected areas** (such as Bathing Waters);
- assessing **the current pressures and potential impacts**;
- identifying which water bodies are **at risk** of not achieving the Water Frameworks Directive's objectives; and,
- **economic analysis** of water users and services the water environment provides in the district (such as capacity to sustain aquaculture or recreation).

This information is used as part of a risk assessment exercise to identify those water bodies at risk of not achieving the environmental objectives set out in the Directive. It is also used to identify significant water management issues, or challenges, which must be considered in the review of the programme of measures.

Once all of this information is considered we work with others to create the **programme of measures,** our "to do" list, for each river basin district.

Further information is available at;

- SEPA
- Scotland's Environment Website
- Scottish Government
- UKTAG
- European Commission