UKTAG – Biological Status Methods
Coastal & Transitional Waters
Benthic Invertebrate Fauna

What do we use as an Indicator?
Benthic invertebrate fauna (animals without backbones that live on or in the seabed sediments).

Why do we use benthic invertebrates?
Benthic invertebrate communities are good indicators of a range of pollutants and other forms of disturbance. They are ideally suited to biological monitoring as they are sedentary and either feed upon sediment dwelling animals or the sediment. Most are also relatively long-lived (more than one year) so will react to contaminant effects over time. This method is based on the principle that different benthic invertebrates have different tolerances to pollutants.

Sampling
Samples are collected in areas of soft sediments. A 0.1 m^2 grab for sub-tidal samples is used, while intertidal samples are taken by using a hand corer. After collection, samples are sorted in the laboratory and identified to the lowest practical taxonomic level (usually species).

What do we measure?
We measure three things:

Number of taxa[1]
This is a general measure of the richness in different types (taxa) of invertebrate and generally increases with improved ecological condition.

AZTI Marine Biotic Index (AMBI)
The AZTI Marine Biotic Index (AMBI) is a measure of the overall pollution sensitivity of a benthic assemblage. Individuals are put into one of five ecological sensitivity groups (from disturbance sensitive to pollution tolerant or opportunistic species) and the AMBI is calculated as a weighted average of the sensitivity scores. Assemblages with high proportions of sensitive taxa are indicative of areas with low levels of disturbance, whilst sites dominated by opportunistic taxa reflect impacted areas. The AMBI was developed to indicate disturbance by organic enrichment, but has since been demonstrated to respond to a range of other sources of disturbance such as smothering and hazardous substances.

Simpson's Evenness
This is a measure of the evenness of the abundance distribution of different taxa within an assemblage. Invertebrate assemblages where the population is dominated by few taxa or a single taxon, are generally indicative of disturbed areas, while assemblages with the population balanced more evenly over a relatively higher number of taxa are generally found in areas with low levels of disturbance.

A sample of benthic invertebrates

How do we decide the Biological Status?
The above three measures are combined in the Infaunal Quality Index (IQI) where the observed values are compared to those expected under undisturbed conditions. IQI values close to one indicate benthic invertebrate communities are close to their natural state; those near to zero indicate a high level of pollution or disturbance. To decide the Biological Status the IQI range from zero to one is divided into the five bands required by the Water Framework Directive see the table below:

Biological Status Boundary Values

Status	EQR Values
High	0.75
Good	0.64
Moderate	0.44
Poor	0.24
Bad	0

For more details see the UKTAG Infaunal Quality Index Method Statement

[1] taxon (pl.taxa) taxonomic unit e.g. family, genus, species