UKTAG – Biological Status Methods Transitional Waters – Macroalgae (Fucoid Extent)

What do we use as an Indicator?

Macroalgae (Seaweeds belonging to the group known as 'wracks', and principally members of the genus *'Fucus'*)

Why do we use macroalgae?

This method has been designed primarily to detect the impact of toxic substances on the distribution of certain species of macroalgae. This method monitors the upstream limit of three brown seaweed species; horned wrack, *Fucus ceranoides*, spiral wrack, *Fucus spiralis* and bladderwrack, *Fucus vesiculosus*. It works on the basis that toxic substances can limit the upstream colonisation of estuarine habitats by these species of seaweed. It also takes into account variations of fucoid penetration of the estuary owing to natural factors such as the ranges of salinity and turbidity. With little toxic stress they can penetrate almost to the freshwater inflows.

A typical upper estuarine shore with an upper green band and a lower fucoid band (*Fucus spiralis*) with a very sparse understorey of other species, Tees estuary.

Sampling

A survey along the estuary is carried out to identify the most up-stream (nearest the freshwater) location of *Fucus*; the average salinity of the water covering these plants is measured and the presence of any other species of macroalgae is noted. This type of intertidal survey can take place at any time of year.

What do we measure?

We measure two things:

Presence of any of the three species of fucoids
This is a measure of the presence or absence of the three indicator fucoid species or, if those species are absent from the survey, the presence or absence of any other macroalgal species. In high status waters the lower estuary may be dominated by fucoid communities (where habitat allows) while the upper estuary will have one species of fucoid which will extend almost to the freshwater limit (0 to <6 median salinity). In less than good status estuaries fucoids may be present in the lower parts of the estuary only. If algae are present in poor status conditions they are likely to be mat and slime producing species.

The median annual salinity at the upstream fucoid site
This is the median salinity of the overlying water where the indicator species are found at the upstream extent. Measurement should cover both wet and dry seasons and spring and neap tides.

Fucoids on sand and mud flat of a small, completely flushed lower estuary showing a mixed fucoid community, further upstream only *F.ceranoides* is present, Ffraw estuary.

How do we decide the Biological Status?

For the two measures values were calculated to determine what these would be for undisturbed waters. The observed results are then compared with these values to calculate the Ecological Quality Ratio (EQR). EQR values close to one indicate macroalgae 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 two measures are combined and the range from one to zero divided into the five bands required by the Water Framework Directive see the table below:

Biological Status Boundary Values

Status	EQR Values
High	0.80
Good	0.60
Moderate	0.40
Poor	0.20
Bad	0

For more details see the UKTAG Fucoid Extent Tool Method Statement