

UKTAG – Biological Status Methods Transitional Waters – Phytoplankton

What do we use as an Indicator?

Phytoplankton¹

Why do we use phytoplankton?

Phytoplankton utilise sunlight energy and dissolved nutrients converting these into organic materials which are often consumed by higher life forms such as fish. As phytoplankton are short lived and derive their nutrients from the water; they are an ideal indicator of changing nutrient conditions and therefore useful for assessing pollution of transitional waters.

This method is based on the principle that additional nutrients (especially nitrogen) can alter the amount of phytoplankton in transitional waters. Persistent and high counts of phytoplankton taxa are also seen as a measure of disturbance in the phytoplankton community.

Sampling

Phytoplankton samples are collected in transitional waters from close to the water surface, avoiding any surface film and without disturbing bottom sediments. There are two areas of an estuary that are sampled (inner and outer areas of the estuary) which have differing salinity zones.



What do we measure?

We measure two things:

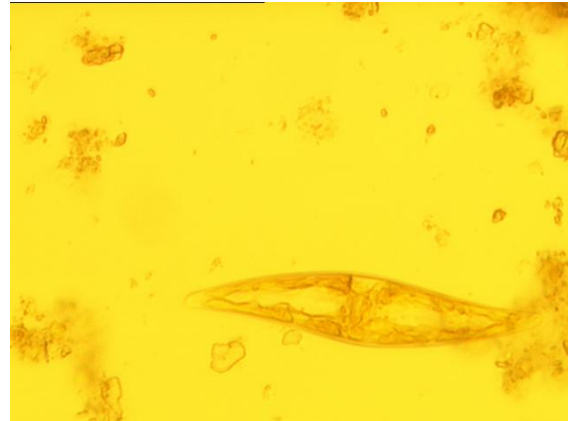
Phytoplankton biomass during the year

This is measured using the concentration of chlorophyll a (a pigment found in all phytoplankton species) over the year. It is a direct measure of phytoplankton abundance. Several summary statistics

are calculated for chlorophyll in both salinity zones of the estuary

Elevated counts of phytoplankton

This measure assesses the number of occasions that phytoplankton counts (individual taxa cells and the total phytoplankton cells) exceed a threshold. Too many nutrients in the water may cause an increase in the number and severity of blooms.



How do we decide the Biological Status?

For the above two measures values were calculated to reflect what these would be for undisturbed waters. The observed results are then compared with these 'reference' results to calculate the Ecological Quality Ratio (EQR). EQR values close to one indicate phytoplankton 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 three 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 Transitional Water Phytoplankton Tool Method Statement](#).

¹ microscopic floating plants