

This Guidance Paper is a final report defined by the UKTAG. It documents the principles to be adopted by agencies responsible for implementing the Water Framework Directive (WFD) in the UK.

Working Paper Version:	final	Status	For release
WFD Requirement:	Drinking Water Protected areas	UKTAG Review	March 2009 UKTAG and UK Administrations sign-off

Assessing the achievement of Drinking Water Protected Area objectives

Requirements

1. Drinking water protected areas are bodies of surface water or groundwater:
 - (i) used, or planned to be used, for the abstraction of water intended for human consumption; and
 - (ii) providing, or planned to provide, a total of more than 10 cubic metres of water per day on average, or serving, or planned to serve, more than 50 people.
2. Drinking water protected areas have to comply with the requirements of Article 7 of the Water Framework Directive (WFD): They have to be protected with the aim of avoiding deterioration in their quality which would compromise a relevant abstraction of water intended for human consumption.
3. This paper provides guidance to the UK environment agencies on assessing whether deterioration in the quality of water within a drinking water protected area has compromised, or poses a risk of compromising, one or more supplies (or planned supplies) of water intended for human consumption. It does not provide guidance on protective measures for avoiding deterioration.
4. A supply intended for human consumption would be compromised if, as a result of deterioration in the quality of water in a drinking water protected area:
 - (i) an abstraction (or planned abstraction) of water intended for human consumption has to be abandoned and an alternative used to provide the supply;
 - (ii) water abstracted (or planned to be abstracted) has to be blended with water abstracted from another source;
 - (iii) additional purification treatment has to be applied; or
 - (iv) the operating demand on the existing purification treatment system has to be significantly increased.
5. "Deterioration in the quality of water" means an upward trend (resulting from anthropogenic causes) in numbers or concentrations, or an increase (resulting from anthropogenic causes) in the variability of the numbers or concentrations, of any micro-organisms, parasites or substances constituting a potential danger to human health.
6. The chemical status of a body of groundwater that is also a drinking water protected area is dependent on whether the body is achieving its drinking water protected area objective. A body of groundwater failing its drinking water protected area objective cannot be classed as being at good groundwater chemical status.

7. The surface water status class assigned to a body of surface water identified as a drinking water protected area is not dependent on whether the body is failing to achieve, or achieving, its drinking water protected area objective. In principle, a surface water body may be at good status but be failing to achieve its drinking water protected area objective or vice versa.

Assessment of risks to Drinking Water Protected Areas

8. Water utilities are undertaking work to identify the risks to raw water quality. The results of these risk assessments will be used to inform the development of drinking water safety plans. The utilities' risk assessments will include work aimed at identifying water supplies that have been, or are likely to be, compromised by deterioration in the quality of the water environment. This work may be undertaken jointly with the relevant environment agency.
9. Where equivalent risk assessments are undertaken for private supplies and the owner of the supply provides information on supply chain risks, the relevant environment agency will be able to work jointly with the local authority to assess whether, as relevant:
 - (a) the private supply has been compromised by deterioration in the quality of water within the drinking water protected area; or
 - (b) there is risk of deterioration in the quality of water within the drinking water protected area that could lead to the drinking water supply being compromised in the future.
10. Where a risk assessment indicates that water quality is, or may be, deteriorating but a supply has not yet been compromised, the protected area will be identified as being at risk of failing to achieve the objective of Article 7 of the Directive.
11. To confirm that water quality is deteriorating, UKTAG recommends that monitoring data is used to assess trends in the concentration of relevant substances or micro-organisms in the protected area. The data for this purpose may be obtained from monitoring programmes undertaken by the water utility, local authorities, the owners of private supplies or the relevant environment agency.
12. If a trend assessment identifies the presence of:
 - (a) a statistically significant upward trend in the concentration, or in the variability of the concentration, of a substance or micro-organism for which standards are set under the Drinking Water Directive; and
 - (b) the trend is predicted to compromise a supply for human consumption in the future.

the protected area will be confirmed as being at risk of failing to achieve its objective.
13. UKTAG recommends that drinking water protected areas in which supplies have been compromised and drinking water protected areas in which a risk of supplies

being compromised has been identified are prioritised for appropriate and proportionate action aimed at preventing the supplies from being compromised.

14. UKTAG recommends that, in respect of surface water bodies, a Mann Whitney method is the most suitable test for trend assessment, though the T-test for the mean, Fisher's exact test, and linear regression work well too (see Annex A). For groundwater, UKTAG recommends that the method or methods used take account of the results of on-going work at EU-level.

Annex A

Mann Whitney Test for change in water quality

1. The test compares one set of data with another and determines whether they are statistically different at defined probabilities. We should use a 95% probability for deciding to investigate action for improvements.
2. Even so this produces a result that 5% of tests will produce a trend where none has occurred. Follow-up work should cover checking the extent of deterioration that has high confidence, and checking whether the trend is matched at neighbouring sites.
3. The key factor in this test is availability of data. We recommend that the Mann-Whitney test is only done where there are two sets of 12 samples – one for the initial period and one for the period it is being compared with. The periods should span three years to produce these sample numbers and give a set of data that is representative in terms of year-to-year changes.
4. The data should be representative in respect of time of year in which samples are taken.
5. Clusters of failed sites in a catchment region gives greater statistical significance that real change is happening. Statistical tests are available to assess this confidence.