UKTAG Consultation on phosphorus standards in rivers.

Introduction
The NFU Watercress Association represents more than 95% of UK watercress production covering 30 farms principally in the upper catchments of high quality rivers such as the Itchen, Test, Hampshire Avon, Dorset Frome and Piddle, with a few outlying farms in other areas. Some of these rivers are nationally or internationally designated due to their high conservation status.

Phosphorus is an essential nutrient for watercress. Levels must be supplemented not only to achieve economic production, but also, to achieve the quality, including colour, required by customers (phosphorus deficient watercress becomes tinged with blue). The watercress industry itself has funded a costly independent study of phosphorus fertiliser application rates carried out by ADAS and supported by Environment Agency sampling and analysis, to ascertain the agronomically necessary rates. The study found that the industry was already at the lowest levels of phosphorus use consistent with economic production.

Watercress is unique amongst UK outdoor cropping systems in that it takes place in flowing water. Borehole/spring water is used, which is discharged to rivers after it has left the production beds. (Water of high microbiological quality is necessary since watercress is a salad crop likely to be consumed raw.) The discharges from watercress farms play an important and recognised role in river augmentation at periods of low flow, and some watercress sources are legally incorporated into Environment Agency flow augmentation schemes such as the Candover scheme on the River Itchen.

The industry has long been conscious of its duty to protect the environment and understands that careful management of production is essential to avoid impacts on river quality. It has close relationships with both the Environment Agency and Natural England, and until recently had regular twice-yearly liaison meetings with both agencies, which have been reduced to an 'as and when needs justify' basis at the request of the agencies themselves.

Phosphorus has not been a major concern with watercress discharges in the past, with no standard having been introduced to discharge consents which have been in place for over 15 years, *nor adverse impacts associated with P use by growers been reported*. Discussions between the Environment Agency and the industry about the introduction of a phosphorus standard are under way as at the time of writing. Aspects of these discussions are reflected in the comments below.

Tone of the consultation
We welcome the openness of the consultation regarding the uncertainties surrounding the setting of phosphorus standards. This helps to build confidence in the process and those operating it; such open-ness is essential to properly informing how the standards are used to achieve the most cost effective use of available resources.

Uncertainty in the relationship between phosphorus levels and ecological status
UKTAG recognises the poor relationships between existing phosphorus standards and the principal objective of the WFD, that of the biology/ecology achieving good status. Also, that while the relationship between the proposed new standards and the biology/ecology would be improved on average, it would remain a rather poor relationship.

It is UKTAG's view that the reasons for this poor relationship are likely to include other factors affecting the biology/ecology, sunlight and nitrogen in particular being cited, and this appears probable to us. Another factor which we understand is established as being critical regarding the potential for elevated P to have an impact is low flow velocity* - and headwaters are generally narrow and consistently fast flowing. Unfortunately, it appears that UKTAG is not yet in a position to identify and relate the various contributing factors which appear to be confounding the phosphorus/biology relationship.

Whilst effectively acknowledging that a multi-factorial relationship may exist, at least at some sites, the consultation makes no reference to the academic disagreement surrounding its approach of seeking to establish a simple relationship between phosphate and biology/ecology. We understand that a multi-factorial approach is usual in mainland Europe, and a similar approach may be appropriate for the UK.

We note that the consultation includes a peer review element, but we are unsure whether the four peer reviewers consulted by UKTAG are genuinely representative of the range of academic opinion. It would be helpful if UKTAG addressed this issue.

Chemical standards under WFD are largely, but not exclusively, a means to the end of achieving appropriate ecological objectives rather than being objectives in themselves. The consultation recognises this and we support UKTA|G's recommendation that expensive measures are not incurred on the basis of chemical standards alone without supporting biological information.

Cost implications of the proposals

The general tightening of phosphorus standards which would result from adoption of UKTAG's proposals would clearly raise WFD compliance costs. There is already a tension emerging between the objective of good status and the public's willingness to pay, in part as a result of the public participation as required under Article 14. A significant increase in compliance costs would be expected to bring this tension to greater prominence, and hence to a need for greater clarity on affordability and proportionality issues.

Natural sources of 'elevated' phosphorus concentrations

The methodology for setting phosphorus standards described in the consultation seems not to recognise that some rivers naturally contain 'elevated' concentrations of phosphorus. One example is the Hampshire Avon, parts of which have attracted international designation (SAC) for its ecological interest and value, despite the natural phosphorus. A source of phosphate in the Avon catchment is the greensand aquifer within the Wylie tributary. Levels of phosphate released from greensand have been studied and reported on by Giles Bryan (Environment Agency).

Given that reference conditions for such rivers are likely to vary from that predicted by UKTAG's generalised approach, the apparent lack of adequate understanding of natural conditions in individual rivers is at risk of leading to misclassification of water bodies and hence the setting of inappropriate objectives.

Since this risk of misclassification could be biological as well as chemical, UKTAG's recommendation that expensive measures are not incurred on the basis of chemical standards

alone without supporting biological information offers insufficient protection. Both the chemistry and the biology may be impacted by natural phosphorus even when in reference condition.

Filtration of samples
We welcome the recommendation at Box 1 that samples be filtered for accuracy.

We have long been concerned that Agency standard procedure does not involve filtration of samples when analysing for reactive phosphate. The inclusion of lighter particulate suspended matter in the analysis can cause individual results to substantially exceed results for filtered samples, as has been demonstrated by members of the Association in data which has been shared with the Agency.

We understand the argument sometimes made that not filtering samples results in the inclusion of additional biologically active phosphorus. We do not dispute this but consider it superficial. Phosphorus speciation is complex and no one parameter separates all phosphorus which may become biologically available from inactive forms. It is necessary to select a parameter which provides an informative indicator of biologically active phosphorus.

In its previous consultation on phosphorus standards UKTAG explicitly advocated the use of SRP (ie filtered). We recognise there are cost implications of including filtration, but we understand that Agency practice is out of line with that of other environmental regulators in Europe.

Accordingly we take the firm view that if the Agency persists in using unfiltered determinations, the results should be considered indicative and should not be used for setting standards or for enforcement where accuracy is required. This would be in accordance with the UKTAG recommendation that samples be filtered where necessary to ensure the accuracy of the method.

We would also point out that in the past the Agency have repeatedly informed the watercress industry that phosphorus would be regulated as SRP. As a consequence, growers have adopted regimes to accommodate SRP, not TRP.

Responses to Questions

Principle 1.
Yes, but they should be used as a basis for action only after taking uncertainty fully into account.

Principle 2.
Yes, the standards should be adjusted and used to assess status and for taking decisions on discharge controls but ONLY in the following circumstances:

- Where the biology is better than the phosphorus indicates, or

- If biology is poorer than the phosphorus indicates, where other causes of the biology being poorer than the phosphorus have been eliminated.

* effect of flow velocity summarised by Alex Poynter of University of Birmingham at Vitacress Conservation Trust conference 16th November 2012.