

science summary



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Exploration of the reasonable needs for new licences brought about by the Water Act 2003

Science Summary SC040008

The Water Act 2003 introduces legislation that will require some previously exempt transfer activities to be licensed as abstractions. This will have significant impacts on numerous operations involved in abstraction for trickle irrigation, navigation and land drainage transfers. When applying for licences, applicants are expected to demonstrate that they have a reasonable requirement for water (WRA 1991 S38(3)(b)). They will also need to demonstrate that water has been used in an efficient manner.

The overall objective of this project was to provide increased knowledge of the reasonable needs of abstractors in previously exempt sectors to enable licensing staff to making valid technical judgements of licence applications. The following 3 outputs have been produced:

SC040008/SR1: Assessing optimum irrigation water use: additional agricultural and non-agricultural sectors.

The Water Act (2003) requires the Environment Agency to justify authorisations for water abstraction for irrigation purposes, whether for agricultural, horticultural, amenity, sports turf or other use.

In this study, water use was analysed for a range of sectors dependent on irrigation (other than those included in a previous study, *Optimum use of water for industry and agriculture* (W6-056)). The sectors considered included golf courses, racecourses, frost protection, horticultural nursery stock, and pot plant, bedding plant, glasshouse and turf grass production.

The approach used for each sector was to combine a review of published literature with information from site water audits, analyses of Environment Agency abstraction data, computer irrigation modelling and irrigation survey data.

This report provides best practice guidelines for each sector, with procedures to help the Environment Agency calculate 'reasonable' needs for abstraction licensing for some of these sectors. The findings were verified by consulting with experts in irrigation industry.

SC040008/SR2: Investigation into the quantities of water abstracted by currently exempt activities.

The Water Act 2003 introduces legislation that will require some previously exempt transfer activities to be licensed as abstractions. When considering applications, there will still be the requirement to comply with the enabling legislation, including considering the reasonable need of applicants. Applicants will also be required to assess the amounts

of water they wish to apply for. Currently exempt transfer activities have commonly been operated for a number of years with no regard to the measurement or assessment of the quantities required.

This investigation sought to identify what information/data is available on how transfers are being quantified across the internal drainage board, navigation and ports and harbours sectors and how this can be used as an aid to licence determination.

As a result of this investigation, it is apparent that the vast majority of applicants across the targeted sectors will not have made any direct measurements of the quantities of water being transferred for any purpose or have any methods of assessing what would be a reasonable volume for a given transfer activity. In the absence of any actual transfer quantity data, it has not been possible to establish any initial bench-marks on the range of volumes of water abstracted under typical scenarios. There are, however, a number of existing methods that have been or are being developed to assess the volume of water that would be needed to

achieve required water levels within water level dependent systems across the targeted sectors.

Pro formas have been developed that could be used by the applicant to ensure the provision of information required to support the licence determination process with respect to transfers and a number of further recommendations have been made regarding outstanding issues to be addressed and work that could be undertaken to inform and support the implementation of the new legislation.

SC040008/SR3: A comparative assessment of trickle and spray irrigation.

Abstraction licences are granted across a wide range of agricultural, horticultural, amenity and sports turf sectors. For abstractors with time-limited licences, demonstrating efficient use of water is one of three tests required by the Environment Agency to renew a licence. However, the definition of 'irrigation efficiency' has been the subject of widespread debate between academics, industry and abstractors. To improve our understanding of efficiency, and particularly the differences between overhead (spray) and micro (trickle) irrigation, this report compares the efficiency of water use with these contrasting irrigation systems.

In the study, a series of irrigation field audits were carried out on selected commercial farms in the UK. These assessed the performance (uniformity) and cost-benefits of overhead and micro-irrigation systems on maincrop potatoes grown under different soil and agroclimate conditions. The study combined field data with information from crop and irrigation computer modelling. Equipment/labour costs, crop productivity (inputs, yields and prices) and water use (metered records) were then integrated and used to assess the relative value of irrigated production (in pounds sterling per cubic metre) for each irrigation system. The three systems tested were trickle, a permanent set of sprinklers, and a hose reel fitted with a rain gun.

The study generated useful insight into the practicality of on-farm water audits, and should help guide future discussions on irrigation efficiency. This report's findings also have implications for abstraction licence renewal and time-limiting. However, in order to provide clear guidance to abstractors on how the tests for licence renewal should be applied, it is recommended that the Environment Agency consider carrying out further work on water auditing, particularly within the proposed CAMS risk-based framework.

This summary relates to information from Science Project SC040008 reported in detail in the following output(s):-

Science Report: SC040008/SR1

Title: Assessing optimum irrigation water use: additional agricultural and non-agricultural sectors.

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Science Report: SC040008/SR2

Title: Investigation into the quantities of water abstracted by currently exempt activities.

Internal Status: Restricted

External Status: Restricted

Science Report: SC040008/SR3

Title: A comparative assessment of trickle and spray irrigation.

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