Observatory monitoring framework – indicator data sheet

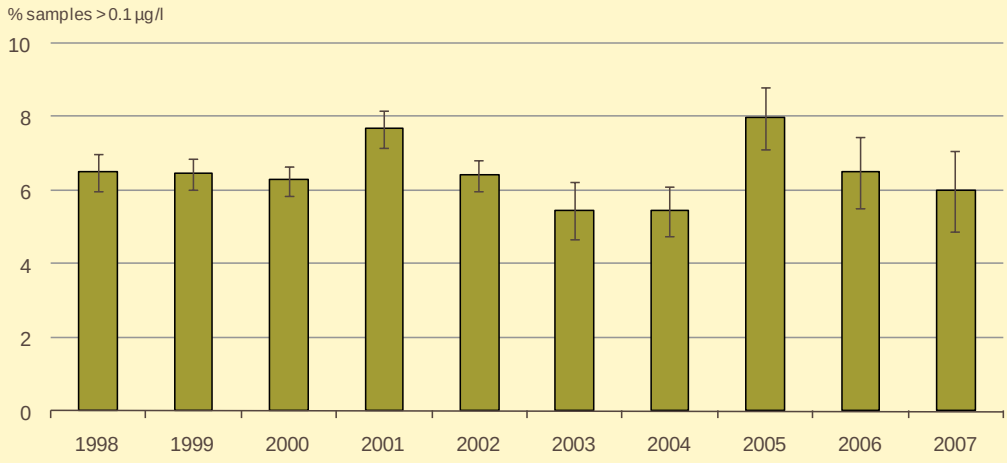
Environmental Impact: Water

Indicator DA4: Pesticides in Water

Pesticides are of concern because of their unacceptability in drinking water, but certain pesticides such as pyrethroid insecticides, can have devastating effects on aquatic fauna. This indicator is based on nine pesticides that are most commonly found in surface waters at relatively high levels. Monitoring the levels of these pesticides in surface waters consistently over a period of time enabled changes to be tracked and analysed. However, this indicator can no longer be updated due to changes in the Environment Agency monitoring programme and the withdrawal of 4 of the 9 substances (atrazine, diuron, isoproturon and simazine). The content of this indicator will be reviewed and updated when new data are available. Pesticide levels in water can vary every year for a variety of reasons depending on the crops grown, choice of product used and weather patterns.

The EC Drinking Water Directive sets Maximum Allowable Concentrations of 0.1 µg/l for any pesticide and 0.5 µg/l for total pesticides in drinking water irrespective of toxicity.

DA4 Percentage of surface water samples exceeding 0.1 µg/l for the most commonly found pesticides in England and Wales

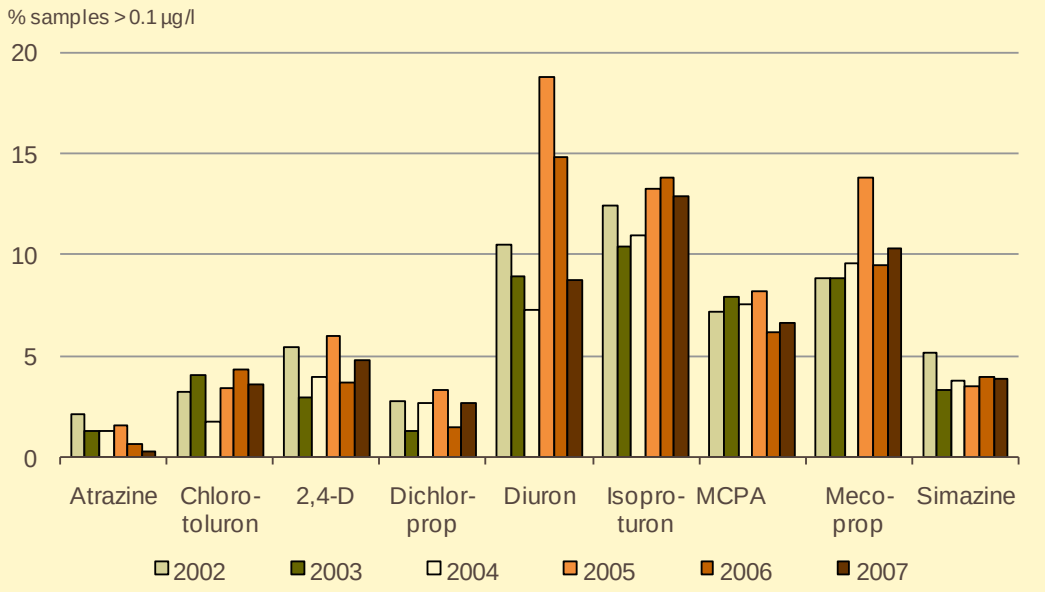


Source: Environment Agency

In 2007, 6.0% of the indicator samples contained pesticide concentrations above 0.1 µg/l. This is a reduction from 2006 and is typical of levels seen over previous years.

It is thought that the weather may have been an important contributory factor in 2005. Wet weather in autumn 2004 may have delayed applications until late in the year, resulting in higher levels being picked up in water in 2005.

DA4a Percentage of surface water samples exceding 0.1 µg/l for the most commonly found pesticides in England and Wales



Source: Environment Agency

All the pesticides most commonly found in water are herbicides that are mobile and persistent.

In 2007 there was increased detection for Dichlorprop, MCPA, 2,4-D and Mecoprop. MCPA, 2,4-D and Mecoprop are herbicides used frequently in cereals for the control of broad leaved weeds.

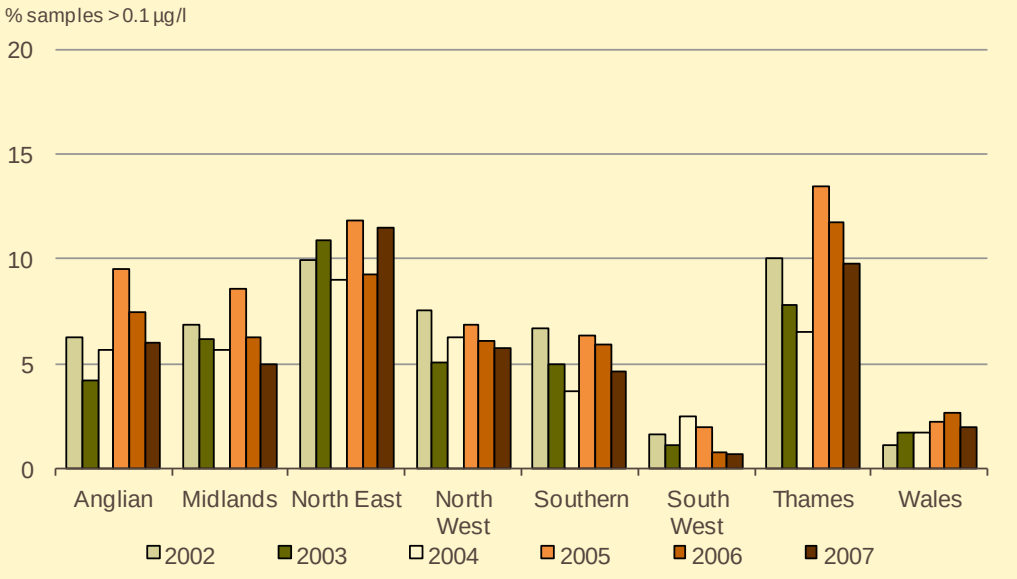
In 2007, Isoproturon was the most frequently found pesticide in rivers although detection was reduced from 2006. It is mainly applied to cereals for grass weed control. Data from the 2006 Pesticide Usage survey show that Isoproturon was the second most widely used herbicide for arable crops (after glyphosate). Isoproturon was withdrawn in 2009.

There was a reduction in the detection of Diuron. This pesticide is only used by the amenity sector (eg local authorities) and not in agriculture. Diuron has been withdrawn from the market.

Simazine and Atrazine were subject to restricted use in 2006 and were withdrawn completely in 2007.

Pesticides were most frequently found in the North Eastern and Thames regions in 2007. There was decreased detection in all regions except for the North East.

DA4b Percentage of surface water samples exceding 0.1 µg/l for the most commonly found pesticides in England and Wales



Source: Environment Agency

Further information and contact

Background information can be found in the accompanying fact sheet.

For queries or information on this indicator contact Defra's Observatory team on +44 (0) 1904 455229 or email observatory@defra.gsi.gov.uk

Observatory monitoring framework – indicator fact sheet

Environmental Impact: Water

Indicator DA4: Pesticides in Water

Indicator	Pesticides in water
Data	Mean percentage of samples of top nine pesticides in surface freshwater samples exceeding 0.1µg/l (or the limit of detection).
Geographic coverage	England and Wales
Years	1998 – 2007
Source	Environment Agency
Origin of data	Environment Agency
Updates	This indicator will be reviewed and updated when new data are made available.
Background	Pesticides are of concern because of their unacceptability in drinking water but certain pesticides, such as pyrethroid insecticides, can also have devastating effects on aquatic fauna. Changes in cropping patterns stimulated by CAP reform and other factors such as the Voluntary Initiative could alter patterns of pesticide use and change the risk of water contamination. The Voluntary Initiative has been set up to achieve the environmental benefits sought by Government as an alternative to a proposed tax on pesticides used in agriculture and horticulture. Pesticide levels in surface (and also ground) water are monitored by the Environment Agency in order to monitor compliance with the EU Drinking Water Directive. Levels of individual pesticides should not exceed 0.1µg/l and total pesticides should not be above 0.5µg/l. These levels are not based upon scientific findings. The value of 0.1 µg/l is a substitute for zero, not present in water or below the detection limit. Total pesticides, being the sum of all pesticides that are present in concentrations above the detection limit (0.1 µg/l), should not exceed 0.5 µg/l. In the European Union all pesticides used to protect plants (such as herbicides) are presently being reviewed, to make sure they meet modern standards of safety and efficacy. As a result, some pesticides (including simazine, atrazine, and diuron) are being taken off the market for certain uses, or altogether. This indicator is not a measure of environmental damage. To understand whether levels of pesticides may be causing damage to river life an alternative approach is used – breaches of Environmental Quality Standards (EQSs). Each EQS is a concentration set for an individual pesticide above which it may be toxic to river organisms (follow the link below for more information).
Statistical & methodological information	The Environment Agency routinely monitors pesticide concentrations in rivers. In 2004, as part of the work under the Voluntary Initiative, the Environment Agency reviewed the basis for the indicators of pesticide levels in surface waters. This identified that nine pesticides cause the vast majority of contamination of surface water. A dataset was established for these nine pesticides that only includes data from sites that have been monitored at least 4 times a year, every year since 1998. This “consistent” dataset

	overcame concerns that the indicator might be influenced by changes in monitoring frequency or location that may have taken place over time. As such, it more truly reflected changes in levels of pesticides in surface waters over time and allowed for better analysis of trends. In 2005 work was undertaken by the Environment Agency to further improve the indicator. A number of sites were removed from the dataset where it was shown pesticide concentrations were due to discharges from manufacturing plants. This was done in an effort to make the indicator more representative of contamination arising from the use (rather than the production) of pesticides. The nine pesticides used for this indicator are atrazine, chlorotoluron, 2,4-D, dichlorprop, diuron, isoproturon, MCPA, mecoprop amd simazine. The Environment Agency are currently reviewing the monitoring of pesticides in rivers under requirements for the Water Framework Directive. 2007 is the last year for which data are available. The Environment Agency's monitoring programme has changed, driven by the Water Framework Directive, and four of the nine substances the indicator uses have now been withdrawn from the market (atrazine, diuron, isoproturon and simazine). The Environment Agency will instead base future national indicators on the number of surface and groundwater bodies non-compliant with WFD objectives because of pesticides.
Further information	Further information can be found on the Environment Agency website at: http://www.environment-agency.gov.uk/research/library/data/34239.aspx Information on the Voluntary Initiative can be found at: http://www.voluntaryinitiative.org.uk The Voluntary Initiative Annual Report can be found at: http://www.voluntaryinitiative.org.uk/_Attachments/Resources/1211_S4.PDF