

# IMPACT OF PESTICIDES ON WATER SUPPLY ABSTRACTIONS

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# PESTICIDES LEACHING INTO WATER

- Damage ecosystems and wildlife



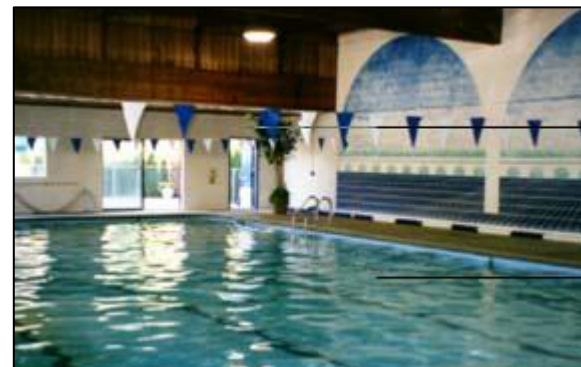
- Have major impacts on water suppliers



# THE EU PESTICIDE STANDARD FOR PESTICIDES IN DRINKING WATER

- Drinking water standard originally set in 1980
- 0.1 ug/l (1 part in 10 billion)
- Also covers relevant metabolites
- Politically *not* scientifically based - a surrogate for zero
- Reaffirmed by current 1998 drinking water directive
- Unlikely to change during negotiations for updated directive

**One small pill in a swimming pool !!!**



# IMPACT OF PESTICIDES ON WATER SUPPLIERS

- High capital and operating costs of existing treatment
- Significant energy requirement, and thus greenhouse gas emissions
- Pesticide pollution events exceeding treatment capacity
- Trigger for new treatment plant
- Resource loss if cheaper to abandon polluted sources



This is not a sustainable solution

# PRIVATE SUPPLIES

- The drinking water directive only applies to supplies >10m<sup>3</sup>/day or less than 50 people-unless commercial or public activity
- Small supplies currently covered by separate regulations but broadly reflect the directive
- Growing concern across Europe about state of many private supplies
- Usually operated by inexperienced people and often with no or very limited treatment
- Likely to be tougher controls in revised drinking water directive based on a risk assessment approach

Risks to private supplies not well understood but could be locally significant



WHAT IS THE SCALE OF  
THE PROBLEM?

# IF USED CORRECTLY MOST PESTICIDES DO NOT CAUSE WATER PROBLEMS



- There are over 300 different pesticides licensed for use in Europe
- Only around 9-12 are regularly found in water at levels of concern
- But these cause serious problems which need to be addressed

# PESTICIDES REGULARLY FOUND IN WATER

- The former top nine

- ~~IPU\*~~
- Mecoprop
- ~~Diuron\*~~
- MCPA
- ~~Simazine\*~~
- 2.4.D
- Chlortoluron
- Dichlorprop
- ~~Atrazine\*~~

- and some significant new ones

- Carbetamide
- Propyzamide
- Clopyralid
- Metaldehyde

- as well as occasionally

- Glyphosate/AMPA
- Metazochlor
- Asulam
- ??????

\* **Already on WFD Priority Substance list**

**Atrazine, simazine, IPU and diuron approval being withdrawn in the UK**

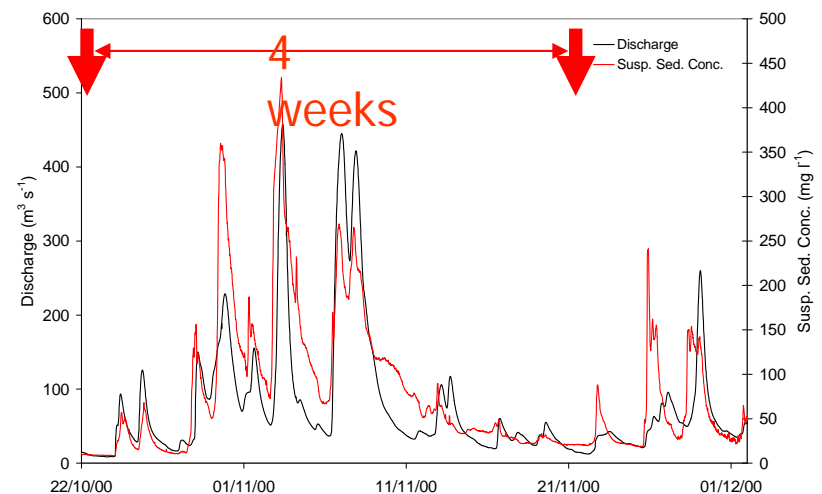
# RAW WATER MONITORING BY WATER COMPANIES

- New regulations now require all companies to
  - Carry out a risk based water safety plan (see later)
  - Introduce risk based raw water monitoring programmes
- Risk based monitoring:
  - Collects data on use of pesticides in catchment
  - Assesses risk of detection at intake based using GIS models or other means
- Many companies already use this approach but the extent will increase
- The EA will be using a similar approach for environmental monitoring

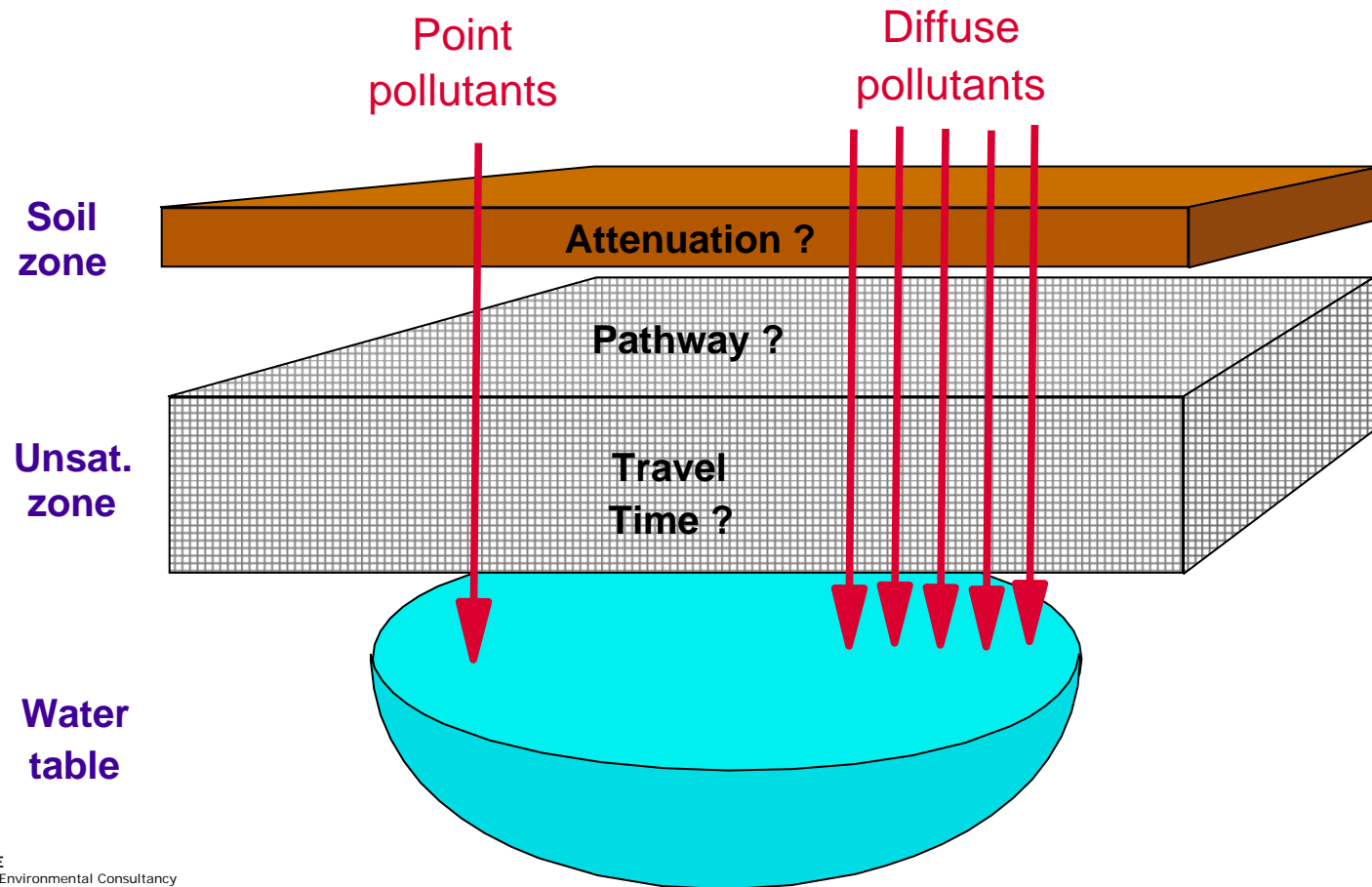
Increased risk based monitoring could highlight new non-compliance issues

# DEALING WITH THE PEAKS IS THE MAIN CHALLENGE FOR SURFACE WATER

- ❑ Pesticides move via drains and surface routes triggered by critical rainfall events
- ❑ Delivery to rivers depends on size and timing of event in relation to agronomic cycle
- ❑ Events and delivery are very seasonal and highly variable
- ❑ Applies to other pollutants as well e.g. sediment/phosphate



# FOR GROUNDWATER WATCH OUT FOR ROUTES WHICH BYPASS NATURAL SOIL ATTENUATION MECHANISMS

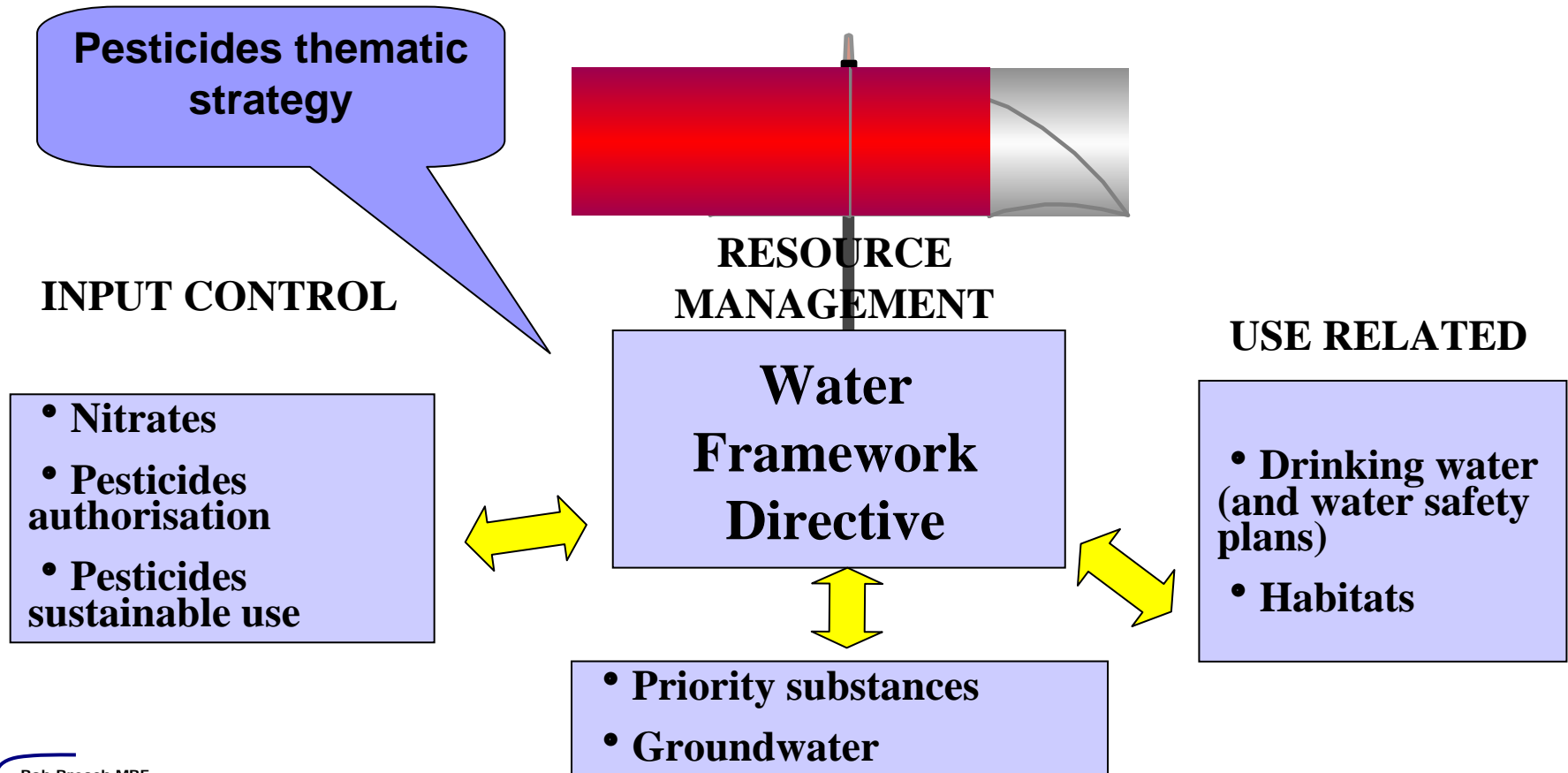




# THE LEGISLATIVE BACKGROUND

# WATER FRAMEWORK DIRECTIVE (WFD)

## A new type of umbrella directive



# NEW REGULATORY PRESSURES FOR PESTICIDES

Upstream

**Pesticides Authorisation Directive**

*Tighter control of products entering market*

*Nearly agreed*



Midstream

**Sustainable Use Directive**

*New controls on distribution and use*

*Nearly agreed*



Downstream

**Water Framework Directive  
Priority Substances Directive  
Groundwater Directive**

*New tighter environmental requirements*

*PS nearly agreed*



# MAIN OBJECTIVES

The primary goal of “good” status

- Defined objectives for all water bodies
  - Surface water
    - Good (quality) status
    - Prevent deterioration
    - Defined actions for **priority (hazardous) substances**
  - Groundwater
    - **Good (quality and quantity) status**
    - Prevent deterioration
    - **Reverse upward trends**
    - Prevent and limit entry of pollutants
- Establishing a number of “Special protection areas”

**Will be further defined in daughter directives**

# WFD PROTECTED AREAS

- WFD also requires the designation of “protected areas”
- These may require even higher standards than good status in order to protect identified use
  - Drinking water production (Article 7)
  - Economically significant species (e.g. shellfish)
  - Recreational waters (76/271/EEC)
  - Nutrient sensitive
  - Habitats and species (92/43/EEC)
  - Birds (79/409/EEC)

# WHAT DOES WFD ARTICLE 7 REQUIRE ?

## Member States

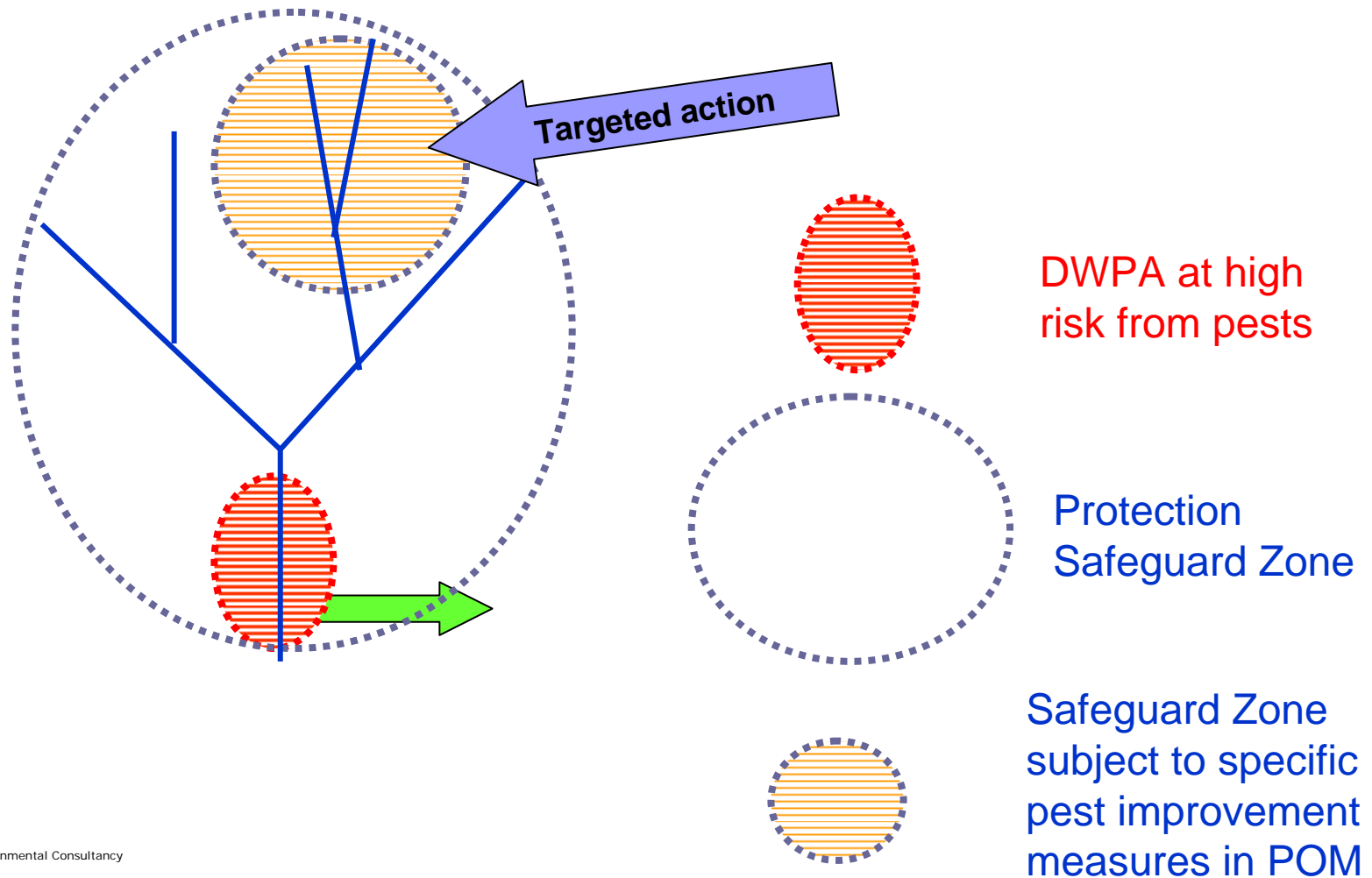
- Shall identify all bodies of water used for the abstraction of water intended for human consumption providing more than 10 m<sup>3</sup>
- And shall ensure the necessary protection for the bodies of water with the aim of **avoiding deterioration in their quality in order to reduce the level of purification treatment** required in the production of drinking water.
- May establish “safeguard” zones for those bodies of water.
- Basic measures (POMs) are the minimum requirements to be complied with and shall consist of:
  - Measures to meet the requirements of Article 7, including measures to safeguard water quality in order to reduce the level of purification treatment required for the production of drinking water (Art 11.3.d)



# UNDERSTANDING THE TERMINOLOGY

- The drinking water protected area (DrWPA) is the water body from which the abstraction takes place
  - For groundwater the “whole catchment”
  - For surface water the stretch of river or canal from which the abstraction occurs
  - For reservoirs the “lake” from which the abstraction occurs
- The Programme of Measures required to meet the objectives of article 7 may be focussed in specific “safeguard zones”
- These may be:
  - Smaller than the DrWPA (groundwaters)
  - Larger than the DrWPA (surface water)
  - In a different DrWPA u/s (surface water)

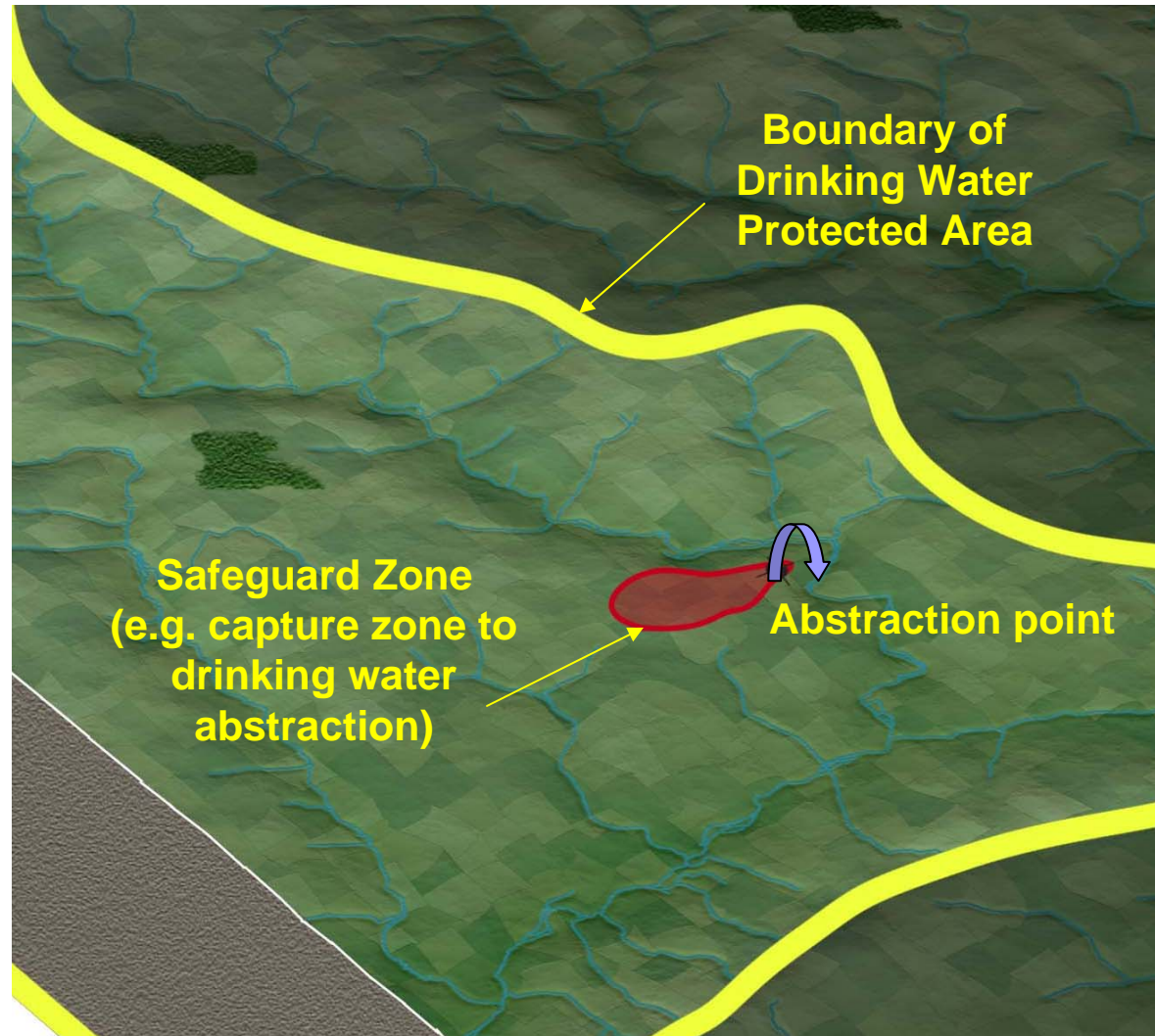
# HOW MIGHT THIS WORK FOR PESTICIDES IN SURFACE WATER ?



# ALL GROUNDWATER BODIES (E&W) ARE DESIGNATED AS DrWPAs



Groundwater safeguard zones can be any size but would usually be based on the abstraction capture zones.

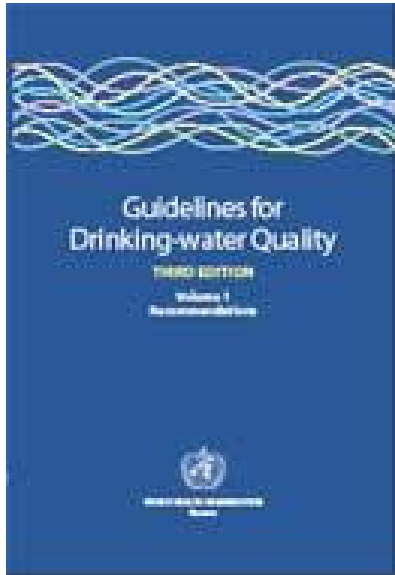




# WATER SAFETY PLANS

# 3<sup>RD</sup> EDITION WHO GUIDELINES

Latest edition of WHO guidelines place high importance on the implementation of WSPs



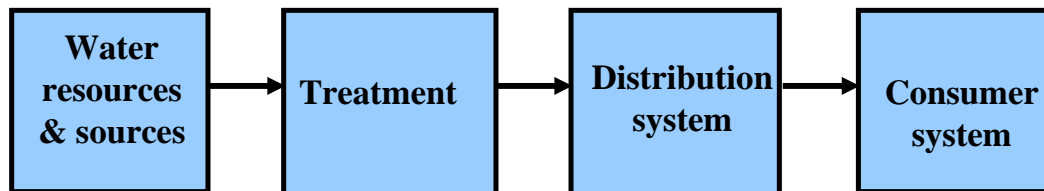
- Dr Kerstin Leitner, WHO Assistant Director-General
  - “an extremely important change in orientation from a public health point of view”
  - “will allow public health management to focus on prevention of microbial and chemical contamination of water supplies”
  - “a paradigm shift in advice on how to manage the provision of drinking water, both in the developed and developing world”
- WSPs will feature in the upcoming review of the drinking water directive

# THE NEW APPROACH

Integrated management of the  
water supply process from  
source to tap

=

**Water  
Safety Plan  
(WSP)**



# WHAT IS A WSP ?

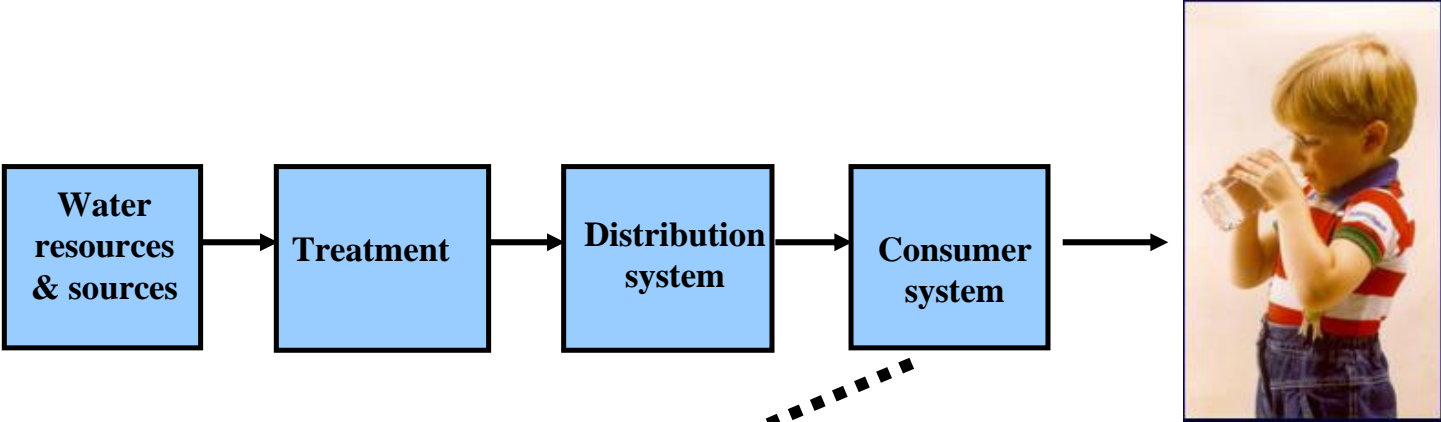
A documented plan that

- identifies risks from catchment to consumer
- puts in place controls
- and verifies their effectiveness

Simply

- Good management based on knowledge
- A preventative rather than reactive approach

# WHY WSP's ?



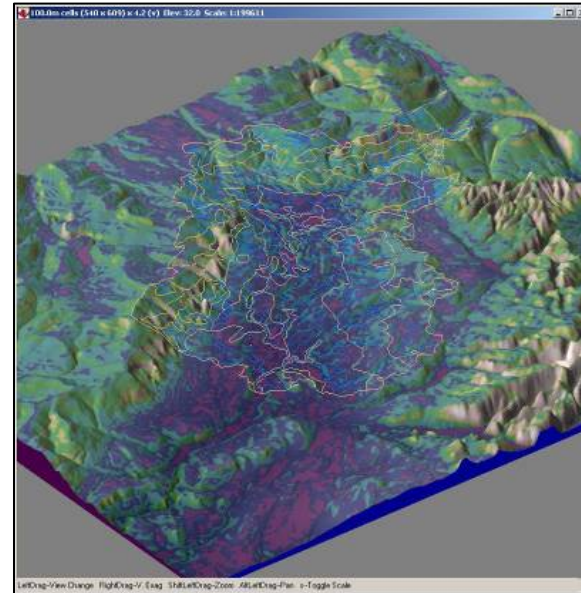
Up to 24 hours later



SOME SOLUTIONS?

# CATCHMENTS VARY IN RISK

- Spatially
  - Topography
  - Soil type/condition
  - Water use
  - Ecosystems
- Over time
  - Weather
  - Crop type
  - Land use



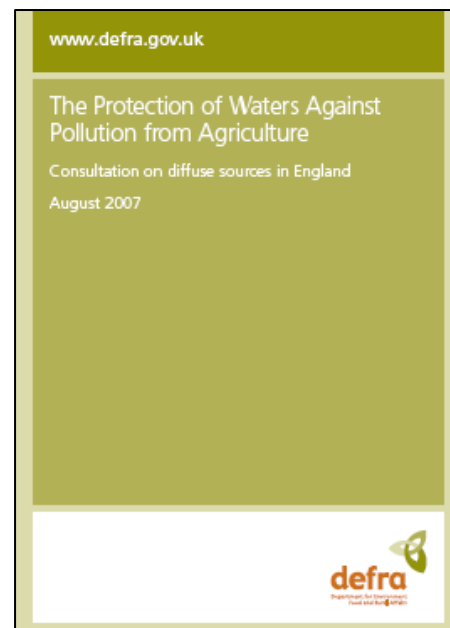
Hence

- Routes for pesticides to enter water vary
- Mitigation measures must take account of local conditions and be dynamic to reflect weather variability

# DIFFUSE POLLUTION FROM AGRICULTURE- Govt response

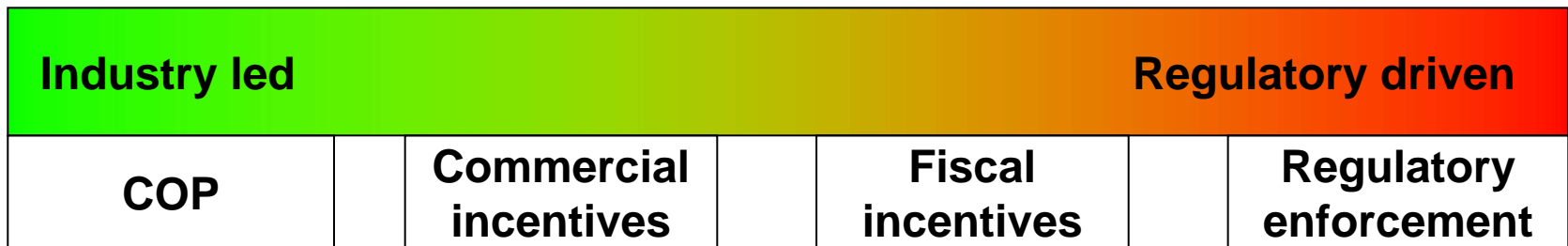
**“...voluntary measures are unlikely, on their own, to be sufficient to tackle the problem in all catchments at risk. It is therefore necessary to proceed to put in place the amending legislation to enable a targeted regulatory approach to be applied where necessary, as a last resort, through WPZs.”**

- Future policy for diffuse agricultural pollution will be a combination of:
  - Advice: extension of catchment sensitive farming initiative
  - Scheme: more water quality options in Environmental stewardship
  - WPZ: New statutory water protection zones
- Draft legislation consultation on NVZs due soon to be in place by early 2009



# WATER PROTECTION MEASURES- DELIVERY AND UPTAKE

- We mostly know what measures are necessary
- Incentivising consistently high levels of adoption by all users is key
- But must have proper targeted incentives:
  - Proper incentives to reward the good guys
  - Regulatory penalties to deter the bad guys



# SUMMARY

- Protection of drinking water is one of the key issues for pesticides in WFD implementation
- Asulam is not the current major pesticide problem for water suppliers but
  - Does cause localised problems for some public supplies
  - Potentially presents real risk for some small private supplies
- Increased risk based monitoring may identify additional risks
- Many well established mechanisms for promoting best practice and asulam should be included