

# IASIS Grassland Pesticide Seminars

## November 2015

### Pesticides and Water Quality Issues





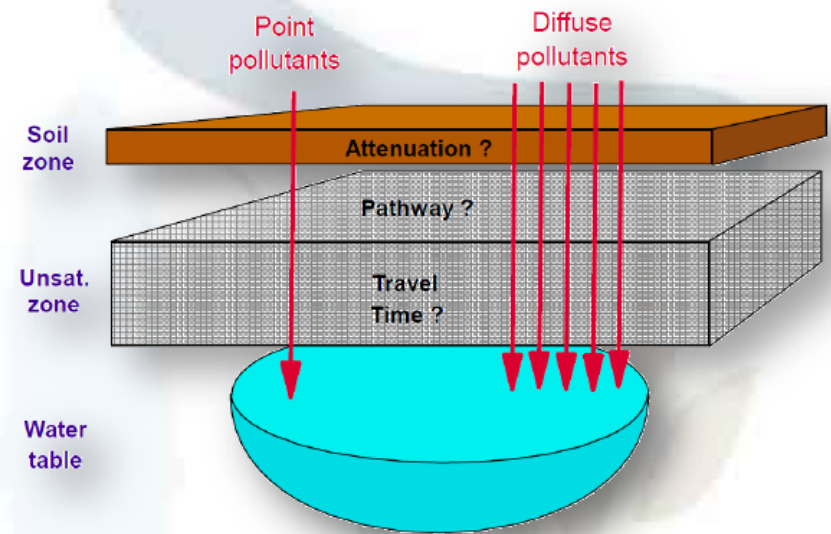
- **Pesticide evaluation process**
- **WFD and sustainable use of pesticides (SUD)**
- **Drinking water monitoring**
- **Issues**
- **Minimising exposure**
- **Take-home messages**



# Pesticide evaluation process – Reg. 1107/2009

## Groundwater

- Use EU leaching models to calculate realistic worst-case PEC (at 1 m depth below the soil surface).
- Comparison against regulatory limit of 0.1 microgram/L.

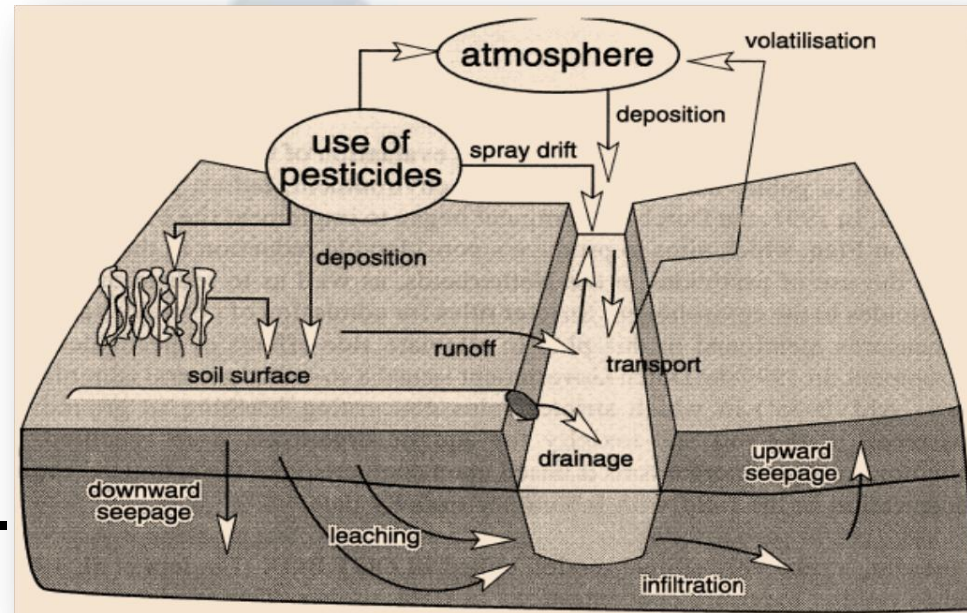




# Pesticide evaluation process – Reg. 1107/2009

## Surface water

- Use EU aquatic exposure models to calculate PEC in surface water and sediment.
- Aim is to calculate realistic worst-case PEC, for use in aquatic risk assessment.
- Assess exposure in edge-of-field water bodies: ditches, streams, ponds.





# Pesticide evaluation process – Reg. 1107/2009

- **Spray drift**

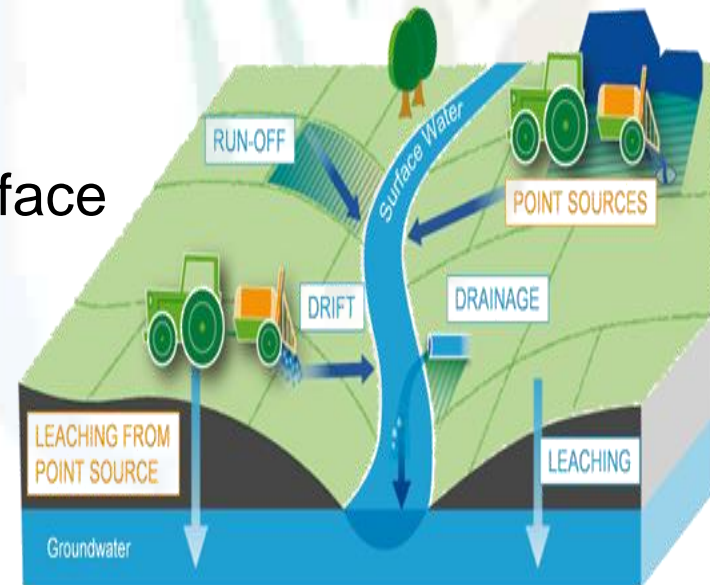
Downwind movement of airborne spray droplets beyond the intended area of application, originating from spraying operations.

- **Runoff**

Transport of water and sediment from the surface of an agricultural field, by overland flow, to a non-target area such as a stream, due to a precipitation event.

- **Drainage**

Removal of surplus water from land to surface water by the use of within-field drains.





## Buffer zones

- No-spray strip of a specified minimum width between the edge of a water body and the edge of the treated area.
- **Legal requirement to comply with buffer zone specified on product label.**
- Applies to all types of surface water body, e.g. ditches, streams, ponds, rivers and lakes.

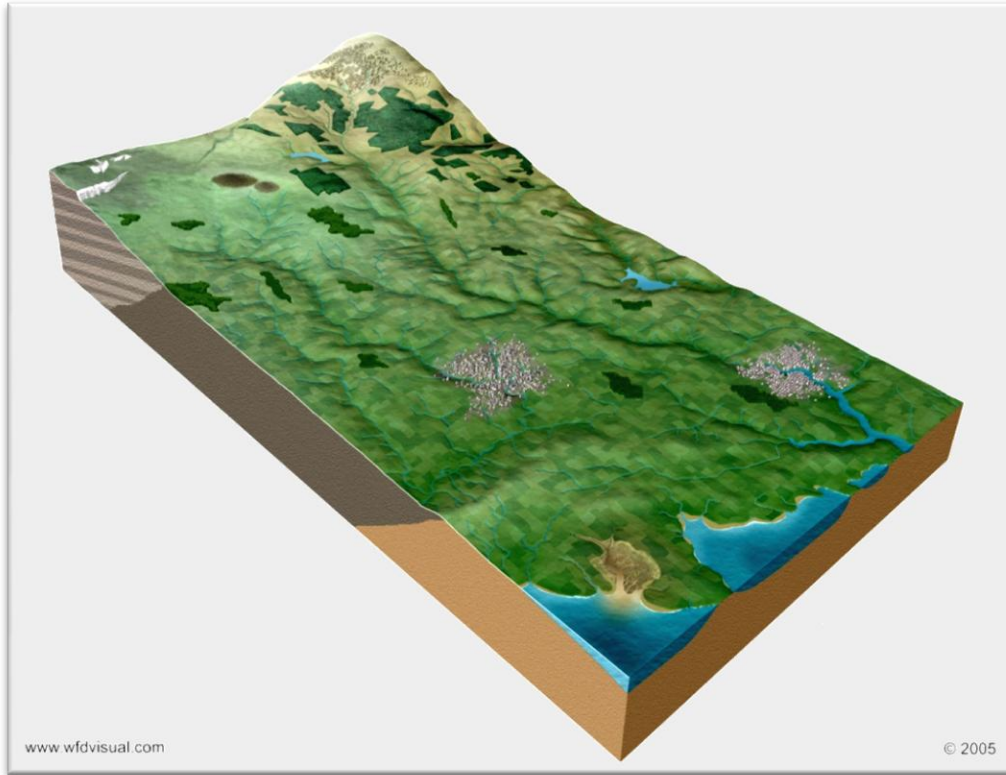




# Water Framework Directive (Directive 2000/60/EC)

- Aim to achieve good status in WFD water bodies.
- Prevent deterioration in the status of surface waters, groundwater bodies, estuaries and coastal waters.
- Reduce/eliminate pollution from priority/priority hazardous substances (Environmental Quality Standards).
- Prevent/limit the input of pollutants to groundwater.
- Comply with relevant standards and objectives for protected areas (e.g. Natura 2000 sites).





- **Catchment-based approach – River Basin Districts (instead of edge-of-field)**
- **Rivers and lakes (rather than ditches, streams and ponds)**



# WFD Governance Structures

## Tier 1: National Management & Oversight (DECLG)

- Led by DECLG
- Policy, regulations and resources
- Sign-off of River Basin Management Plans

## Tier 2: National Technical Implementation and Reporting (EPA)

- Led by EPA
- Monitoring, assessment and reporting
- Evaluation and implementation of measures
- Template for River Basin Management Plans
- Monitoring of enforcement tasks and environmental outcomes

## Tier 3: Regional Implementation via Water Networks (Local Authorities)

- Led by the lead Coordinating Authority
- Local authority monitoring, licensing and enforcement actions
- Detailed River Basin Management Plans
- Implementation of Programme of Measures by relevant public bodies, tracking and reporting, in consultation with EPA



## **Two main areas of concern for pesticides**

**River Basin Management Plans  
(controls on pesticide use)**

**Monitoring programmes  
(compliance with EQS values)**



# River Basin Management Plans (RBMPs)

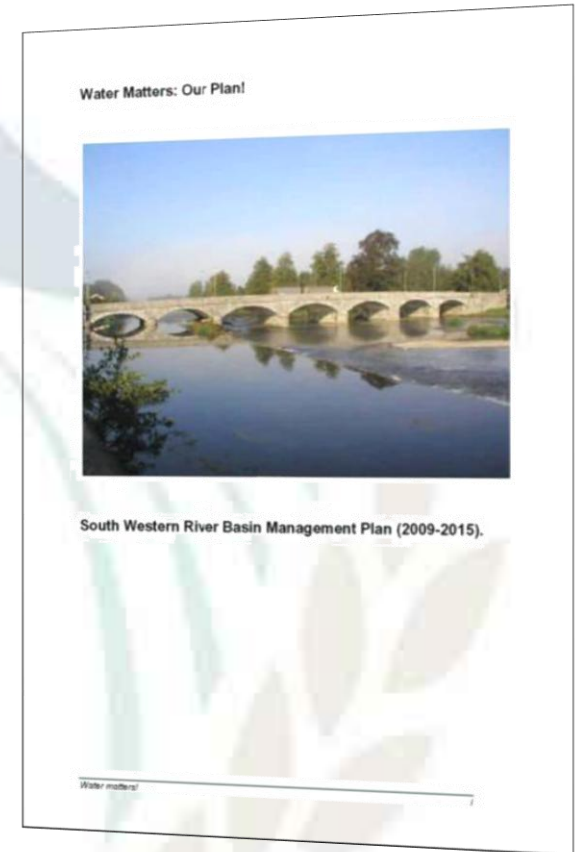
Measures for pesticides included –

- Good Plant Protection Practice
- Sustainable Use National Action Plan
- Supplementary measures for forestry (reduce usage, pre-dip plants, develop biological controls)

Due to be updated by 2017.

Could be pressure to restrict/prohibit pesticide use in designated areas if there is a problem.

**WFD could impact on regulatory status of pesticides.**





## WFD surface water monitoring

- **Results compared against Environmental Quality Standards (EQS values)**
- **EU-specified pesticides**  
**Comparison against EU EQS values (Directive 2013/39/EU).**
- **National pesticides**  
**Results compared against national EQS values.**
- **National EQS values (S.I. 272 of 2009) established for –**  
**dimethoate, glyphosate, linuron and mancozeb.**

**EQS is cut-off point for designation of good chemical status.**



# **Sustainable Use Directive (SUD)**

## **Directive 2009/128/EC**

- **Reduce risks and impacts of pesticide use on human health and the environment.**
- **Member State National Action Plans with targets.**
- **NAP addresses training and education, inspection of application equipment, controls on storage, supply and use, and adoption of integrated pest management (IPM) principles.**
- **Focus on protection of aquatic environment and drinking water supplies.**

**SU NAP is the main measure to deliver WFD pesticide-related objectives.**





**SUD specifies that measures to protect aquatic environment and drinking water supplies must be compatible with the WFD.**

## **Two main SUD water protection measures**

**Buffer zones (untreated area adjacent to water body)**

**Safeguard zones (areas around drinking water abstraction points in which pesticide use is prohibited)**



## Safeguard zones (Regulation 11 of S.I. No. 155 of 2012)

**5 m – 200 m** depending on supply capacity of water source

Abstraction point of a water scheme supplying **100 m<sup>3</sup> or more of water per day or serving 500 or more persons**: distance of **200 m**

Abstraction point of a water scheme supplying **10 m<sup>3</sup> or more of water per day or serving 50-500 persons**: distance of **100 m**

Abstraction point of a water scheme supplying **1-10 m<sup>3</sup> of water per day or serving 10-50 persons**: distance of **25 m**

Abstraction point of a water scheme supplying **1 m<sup>3</sup> or less of water per day or serving 10 or less persons**: distance of **5 m**

**No use within 15 metres of a landscape feature that is known to be a ground water vulnerable area including karst areas, sinkholes and collapse features.**



## ! Safeguard Zones !

Statutory 'no-use' zones (called safeguard zones) apply around drinking water abstraction points, ranging from 5 metres to 200 metres depending on the size of the supply. Your Local Authority or The National Federation of Group Water Schemes can advise on this.



## Monitoring of tap water

- **Drinking Water Directive – 98/83/EC (S.I. No. 122 of 2014)**
- **Conducted by Irish Water/local authorities. Results reported to EPA.**
- **Responsibility of Irish Water/local authorities to decide which pesticides to monitor, and to organise sampling and analysis.**
- **Drinking water standard for individual pesticides = 0.1 microgram/L.**





- **0.1 microgram/L = 0.1 ppb  
(1 part in 10 billion)**
- **Equivalent to one drop in an Olympic-sized swimming pool  
(1 stem in 111,000 hay bales, 1 baked bean in 21 million cans, 1 second in 317 years)**
- **Not a health-based standard  
(Political decision from 1980 to use 0.1 ppb as a surrogate for zero.)**





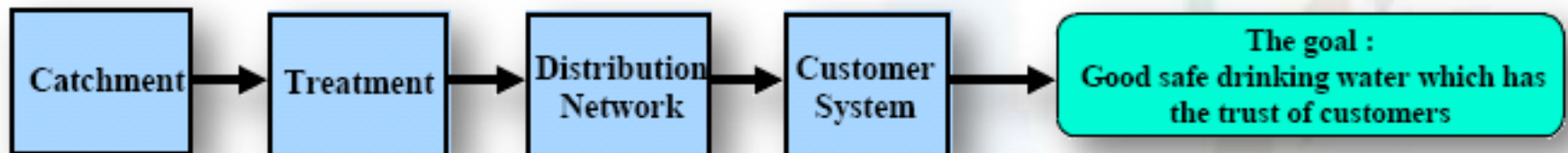
## Issues to consider

Agricultural use of pesticides

Amenity uses  
(parks, sports grounds, golf courses, roadside verges,

Amateur use  
(home gardens)

**Substances most likely to be detected are high-use, water-soluble and relatively persistent in water.**





## Prevention better than treatment

One foil seal contains enough pesticide to breach 0.1 microgram/L level along **30 km** of a typical stream (width = 1 m, depth = 0.3 m)



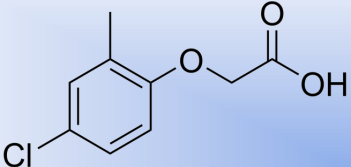


## Prevention better than treatment

- Requirement to take remedial action if there is an ongoing problem.
- Source control measures  
Restrict/prohibit pesticide use in affected areas.
- Removal options  
Fit water treatment plants with activated carbon adsorption filters (very expensive).

**Potential for regulatory action in event of an ongoing problem.**





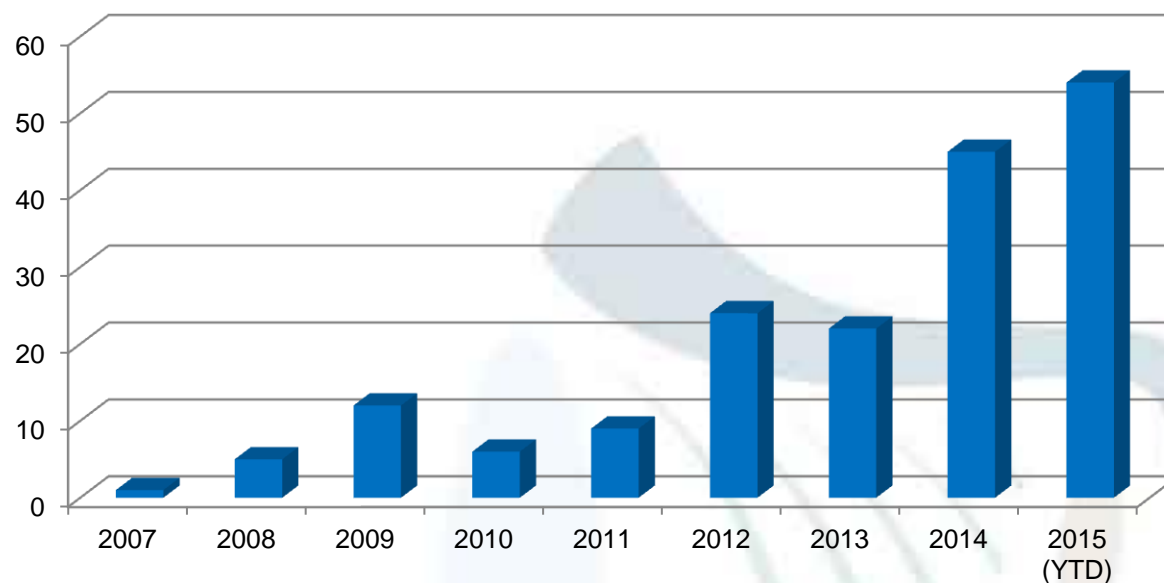
- Multiple exceedances for **MCPA** in drinking water sources. Other herbicides also detected.
- Possibility of national EQS values for MCPA, mecoprop and 2,4-D under the WFD.
- MCPA and rushes (land eligibility issue).
- Increased emphasis on information and advice for users. Product stewardship programmes may also be needed.





## Drinking water exceedances

MCPA accounts for more than 80% of exceedances in 2014-2015.



MCPA

2,4-D

Mecoprop, Isoproturon

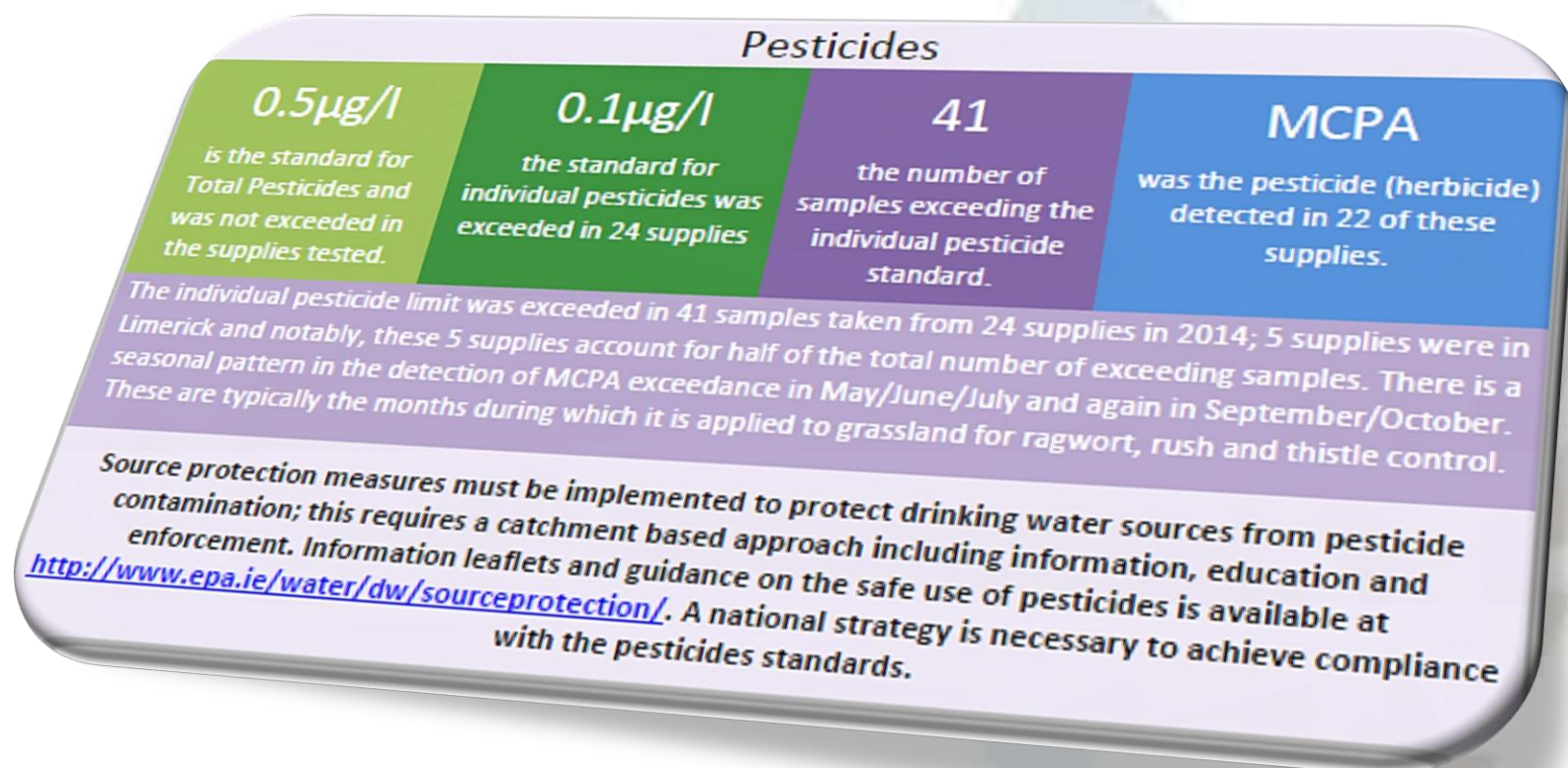
Atrazine

Dichlobenil, Fluoroxypyr, Pendimethalin

Picloram, Glyphosate



## EPA Drinking Water Report 2014





# WFD 2010-2012 (Rivers)

Pesticide	No. of samples	% detect	No (%) of rivers where detected
<b>2,4-D</b>	910	2.5%	18 (25.7%)
2 6-Dichlorobenzamide	316	2.2%	7 (10%)
AMPA	870	0.2%	1 (1.4%)
Chlorpyrifos	151	0%	0%
Clopyralid	11	0%	0%
Dichlobenil	587	0.7%	4 (5.7%)
Dichlorprop	11	0%	0%
Epoxiconazole	131	0%	0%
Malathion	149	1.3%	2 (2.8%)
<b>MCPA</b>	910	7.9%	29 (41.4%)
MCPB	5	0%	0%
<b>Mecoprop</b>	879	10.9%	40 (56%)
Triclopyr	10	0%	0%



## Rush control requirements

- **Single Farm Payment**  
Uncontrolled rushes could be regarded as a breach of Good Agricultural and Environmental Condition (GAEC).
- **Basic Payment Scheme**  
Possibility of deductions from eligible area if rushes proliferate to the extent that land is not in a grazeable condition.



**Farmers fear penalties if rushes not controlled.**



# Focus on MCPA and rush control

**BEWARE!** Spraying rushes can very easily lead to breaches of the drinking water standard for pesticides, particularly if using MCPA products.

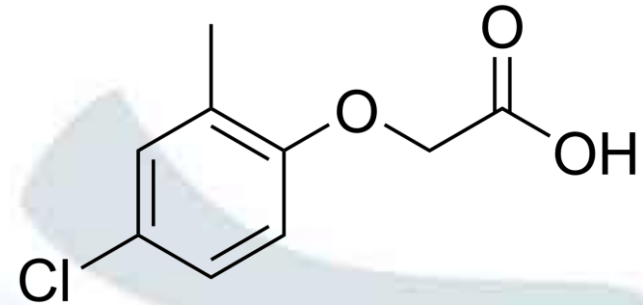
## Why?

- MCPA is water soluble and takes several weeks to break down.
- Rushes thrive in poorly drained areas (with a water table near the surface) which are prone to runoff to nearby water bodies.

## What to do?

- Use non-chemical control methods e.g. cutting, drainage, sward improvement.
- If spraying, target only the rush affected areas.
- If spraying, cut rushes one month before or one month after spraying to improve the effect of the spray.
- Consider weed wiping with an appropriate herbicide as a rush control option.

# Issues



MCPA  
(4-chloro-2-methylphenoxy) acetic acid





## **Weed control in grassland – new regulatory measure for MCPA**

**New revised maximum individual dose of 1350 g  
active per ha (straight MCPA products)**



## Product use

- **Must be registered with DAFM.**
- **Must be approved for intended use.**
- **Must be used in accordance with label instructions.**
- **Buffer zones must be respected.**
- **Application rates must not be exceeded.**
- **Must be applied at the correct time.**



# How pesticides get into water

## Storage

Pesticides stores hold a lot of concentrated chemical; a fire or a leak at chemical store can have a huge impact downstream.

## Sprayer Filling

Drips and spills of concentrated pesticides or pellets can have a big effect on water quality.

## Cleaning

Large quantities of dilute spray solution are generated during container cleaning and sprayer washing; this can easily reach water through farm drains.

## Disposal

Burying pesticide wastes in a tip is illegal and results in long term damage to water quality.

## Drift

Drift can concern neighbours and harm aquatic life and water quality.

## Over Spray

Spraying over watercourse can kill aquatic life as well as jeopardising water quality.

## Surface Run-Off

Pesticides can leave the field during soil erosion and in surface run-off.

## Drain Flow

Pesticides attached either to soil particles or in solution can reach water when drains are flowing.

Source: Adapted from Water Protection Advice for farmers and advisers (UK Voluntary Initiative, 2011)



## Diffuse pollution (sprayer use)



Entry routes (surface water) - **spray drift, drainage, runoff**



## Point source pollution (pesticide handling areas)



Entry routes – **mixing, filling, washing, spillage, leaks**



## Diffuse pollution

- Read and follow the label instructions (buffer zones).
- Be aware of the location of nearby water bodies and their proximity to the intended treatment area.
- Find out the location of any nearby drinking water abstraction points and ensure compliance with safeguard zones.
- Ensure application equipment is well maintained and properly calibrated.
- Consider alternative treatments (IPM).





## Diffuse pollution

- Do not apply if heavy rain forecast within 48 hours.
- Do not spray in windy conditions.
- Do not apply on waterlogged or poorly draining soils that slope steeply towards a water body, drain or well or on any other vulnerable area leading directly to water.
- Do not apply if field drains are flowing.
- Keep the spray boom as low as possible and use the coarsest appropriate spray quality.
- Consider use of drift-reducing nozzles.





## Point source pollution

- **Read and follow the label instructions.**
- **Be aware of the location of nearby water bodies and their proximity to the intended treatment area.**
- **Find out the location of any nearby drinking water abstraction points and ensure compliance with safeguard zones.**
- **Ensure application equipment is well maintained and properly calibrated.**





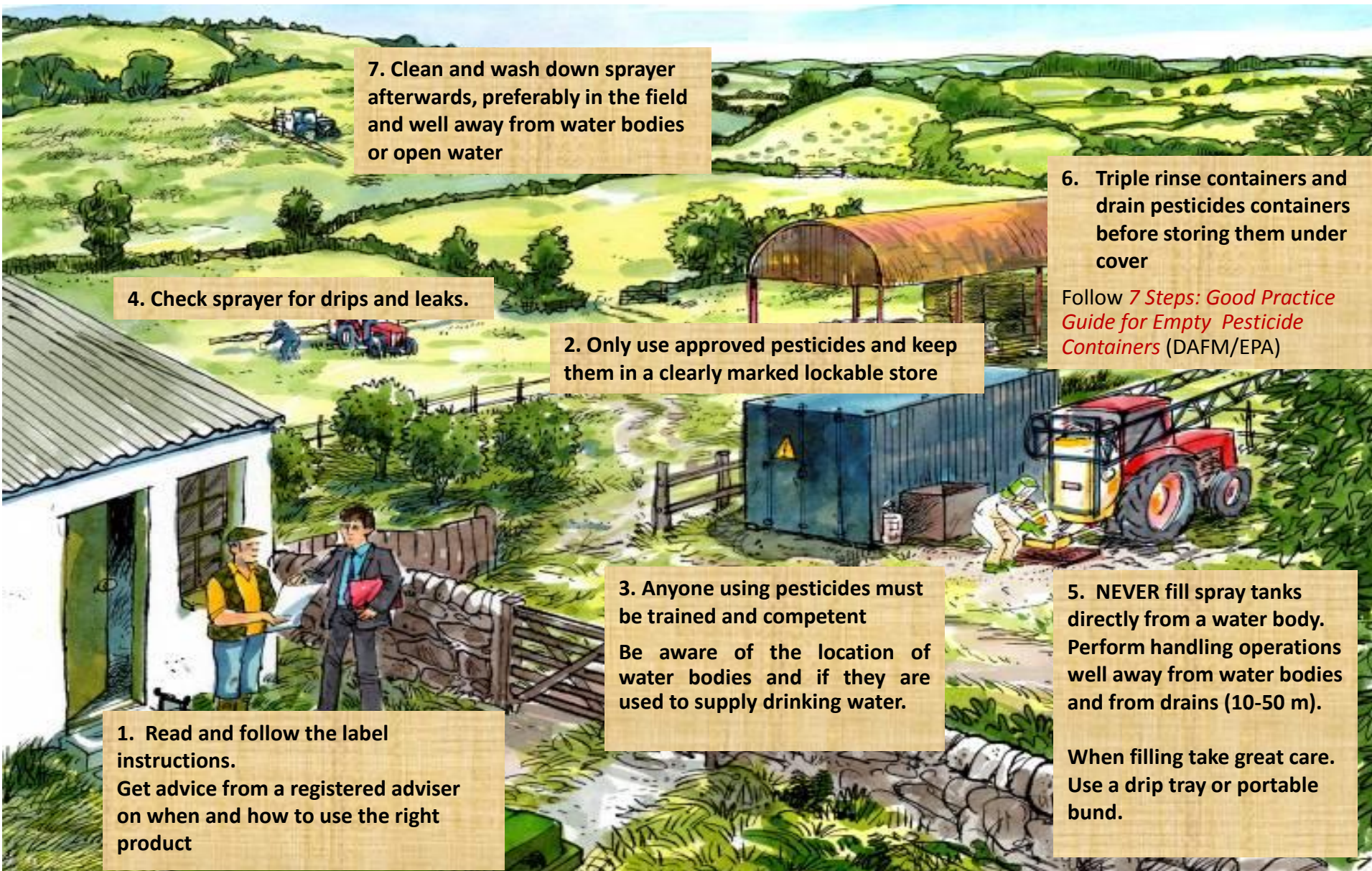
## Point source pollution

- **NEVER** fill spray tank directly from a water body.
- Perform handling operations well away from water bodies and from drains (10-50 m).
- Take great care to avoid spills. Consider using a containment system to catch spills (e.g. a bund or lip around filling area).
- Minimise water volumes (rain and washings) on handling area.





# Minimising exposure



7. Clean and wash down sprayer afterwards, preferably in the field and well away from water bodies or open water

4. Check sprayer for drips and leaks.

2. Only use approved pesticides and keep them in a clearly marked lockable store

6. Triple rinse containers and drain pesticides containers before storing them under cover

Follow *7 Steps: Good Practice Guide for Empty Pesticide Containers* (DAFM/EPA)

3. Anyone using pesticides must be trained and competent

Be aware of the location of water bodies and if they are used to supply drinking water.

5. NEVER fill spray tanks directly from a water body. Perform handling operations well away from water bodies and from drains (10-50 m).

When filling take great care. Use a drip tray or portable bund.

1. Read and follow the label instructions.  
Get advice from a registered adviser on when and how to use the right product



**Advice leaflets – Protecting Drinking Water  
from Pesticides (EPA, DAFM, Teagasc, HSE)**  
**[www.epa.ie/water/dw/sourceprotection](http://www.epa.ie/water/dw/sourceprotection)**



## Focus on MCPA and rush control

**BEWARE!** Spraying rushes can very easily lead to breaches of the drinking water standard for pesticides, particularly if using MCPA products.

### Why?

- MCPA is water soluble and takes several weeks to break down.
- Rushes thrive in poorly drained areas (with a water table near the surface) which are prone to runoff to nearby water bodies.

### What to do?

- Use non-chemical control methods e.g. cutting, drainage, sward improvement.
- If spraying, target only the rush affected areas.
- If spraying, cut rushes one month before or one month after spraying to improve the effect of the spray.
- Consider weed wiping with an appropriate herbicide as a rush control option.

## REMEMBER!

💧 A **SINGLE** drop of pesticide lost to a water body such as a typical small stream (1 metres wide, 0.3 metres deep), for example, can be enough to breach the legal limit for pesticides in drinking water of 0.1 part per billion along 30 km of its length.

💧 Always read and follow the product label.

💧 Be aware of how near water bodies (ditches, streams, ponds, rivers, lakes, etc.), drains or wells are to where you are working.

💧 Find out if the treatment area is in the vicinity of a drinking water abstraction point or well.

**For further information** on related topics such as container storage, triple rinsing, Integrated Pest Management or a list of approved Pesticide Advisors visit:

[www.pcs.agriculture.gov.ie](http://www.pcs.agriculture.gov.ie), [www.teagasc.ie](http://www.teagasc.ie)  
or [www.epa.ie](http://www.epa.ie)

A  
**SINGLE**  
drop of  
herbicide can  
breach the  
drinking water  
limit in a small  
stream for  
30 km

## Protecting Drinking Water from Pesticides

# Herbicide Use in Grassland

Promoting best practice in the use of pesticides to protect drinking water





## Herbicides\* and drinking water

Drinking water monitoring results for Ireland show that a number of herbicides commonly used on grassland, such as MCPA, are being detected more frequently in recent years. Careless storage, handling or use of pesticides can easily cause breaches of the legal limit for pesticides in drinking water.

It is essential to take great care and follow best practice procedures when using any pesticide and particularly so in the case of herbicides used on grassland.

## How do herbicides get into drinking water?

Herbicides can enter water bodies from:

- **Point sources** (mainly in the farm or farmyard) – leaks from storage areas; spills or drips from handling operations such as mixing, filling and washing; or
- **Diffuse sources** (mainly in the field) – inputs arising during or after application from processes such as spray drift, runoff and drainage.

## Weeds in Grassland

Low levels of weeds do not affect grass production and are beneficial to the environment.

A vigorously growing grass sward can out-compete weeds and prevent new weeds growing.

Don't underestimate basic grassland husbandry such as lime, fertiliser, topping or reseeding as weed control measures.

Spraying at the right time doubles the effect of the spray.

## DOs when using herbicides:

- DO** read the product label instructions carefully and plan the treatment in advance, taking care to ensure strict compliance with the specified conditions of use. Follow all health and safety instructions.
- DO** inform yourself of the location of all nearby water bodies (ditches, streams, ponds, rivers, lakes and springs).
- DO** find out if any groundwater body or surface water body in your locality is used as a drinking water source and, if so, the location of the nearest abstraction point. Ensure compliance with the safeguard (no-use) zones around drinking water abstraction points.
- DO** ensure that pesticide products are stored in a secure, dry area which cannot result in accidental leaks or spills. Empty, triple-rinsed containers should be disposed of in accordance with the Good Practice Guide for Empty Pesticide Containers.
- DO** ensure that application equipment is properly calibrated and in good working order.
- DO** take every precaution during mixing and preparation to avoid spills and drips. Minimise water volumes (rain and washings) on the handling area.
- DO** consider using drift-reducing nozzles if spraying. Keep the spray boom as low as possible to the ground and use the coarsest appropriate spray quality.
- DO** clean and wash down the sprayer at the end of the day, preferably in the field and well away from water bodies or open drains. Tank washings should be sprayed onto the previously sprayed area, on a section far away from any water body, observing the maximum dose for that area.

\* Herbicides are one of a number of pest control agents encompassed by the broad term 'pesticides'. The term also covers various other agents such as fungicides, insecticides, seed dressings and rodenticides.

## DON'Ts when using herbicides:

- DON'T** perform handling operations (filling, mixing or washing the sprayer) near water bodies, open drains or well heads. Maintain a distance of at least 10 metres and preferably 50 metres, where possible.
- DON'T** fill the sprayer directly from a water body.
- DON'T** spray if the grass is wet or if heavy rain is forecast within 48 hours after application. DON'T spray during windy conditions.
- DON'T** spray near open drains, wells or springs.
- DON'T** spray on waterlogged or poorly draining soils that slope steeply towards a water body, drain, well or on any other vulnerable area that leads directly to water.
- DON'T** discard sprayer washings down a drain or onto an area from which they can readily enter a water body.

## ! Safeguard Zones !

Statutory 'no-use' zones (called safeguard zones) apply around drinking water abstraction points, ranging from 5 metres to 200 metres depending on the size of the supply. Your Local Authority or The National Federation of Group Water Schemes can advise on this.



## REMEMBER!

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- 💧 Be aware of how near water bodies (ditches, streams, ponds, rivers, lakes, etc.), drains or wells are to where you are working.
- 💧 Find out if the treatment area is in the vicinity of a drinking water abstraction point or well.



# Take-home message



It's in your hands now.



**Thank you for your attention**



**[www.pcs.agriculture.gov.ie](http://www.pcs.agriculture.gov.ie)**