

# Irish Water Strategy on the Control of Pesticides in Drinking Water

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# **“Pesticides” means...** (European Union (Drinking Water) Regulations 2014)

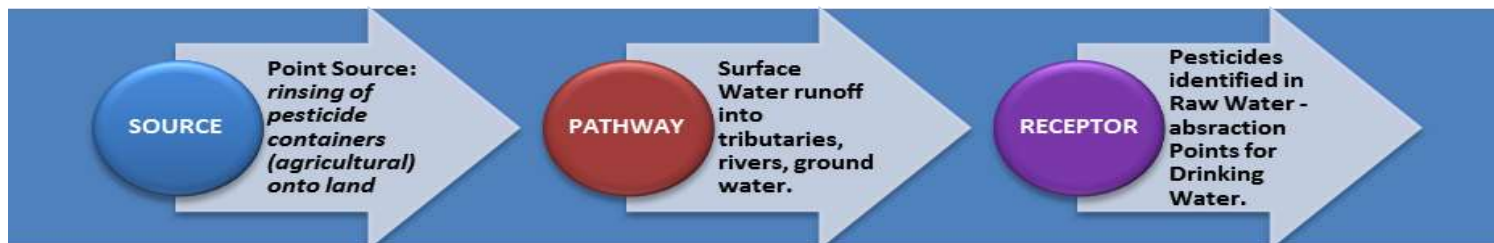
- insecticides
- herbicides
- fungicides
- nematocides
- acaricides
- algicides
- rodenticides
- slimicides
- ... Related products (inter alia, growth regulators)
- ... And their relevant metabolites, degradation and reaction products

# Managing Pesticides requires understanding

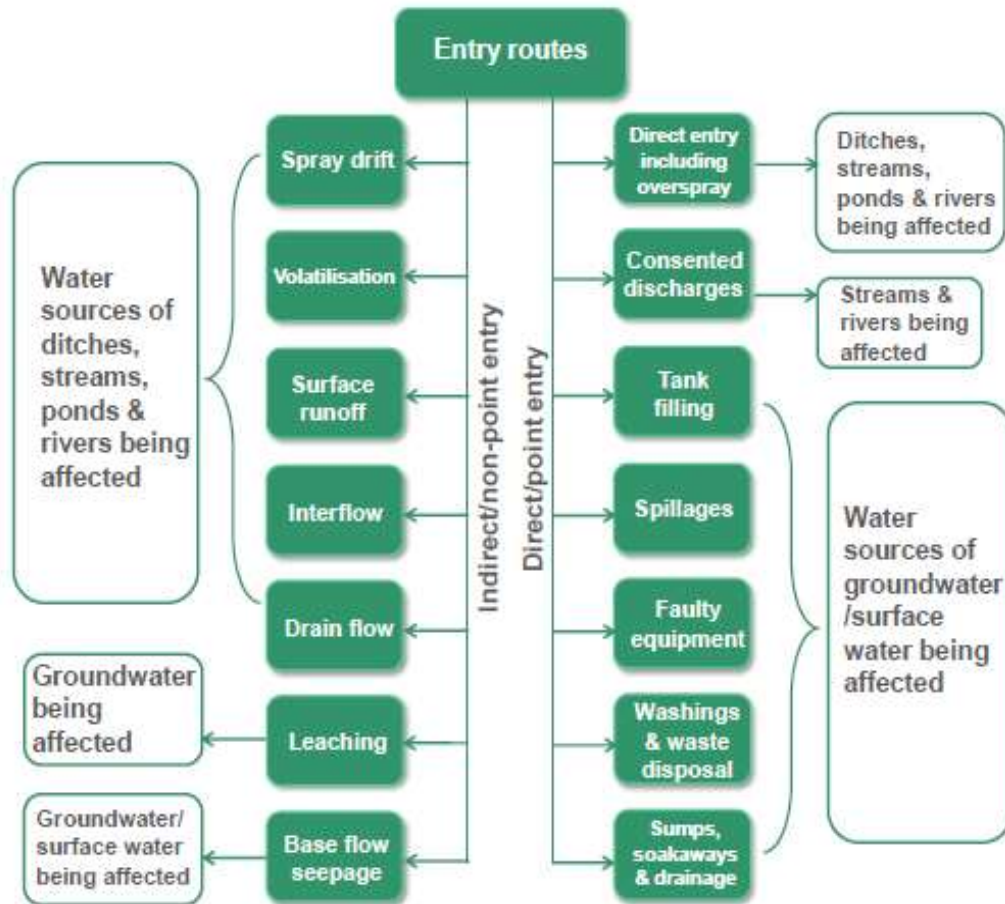
- Understand the pesticide source in relation to the water supply
- Targeted sampling programmes to understand:
  - Where?
  - Which?
  - When?

Note 5 Only those pesticides which are likely to be present in a given supply require to be monitored.

Note 6 The parametric value applies to each individual pesticide. In the case of aldrin, dieldrin, heptachlor and heptachlor epoxide the parametric value is 0.030 µg/l.



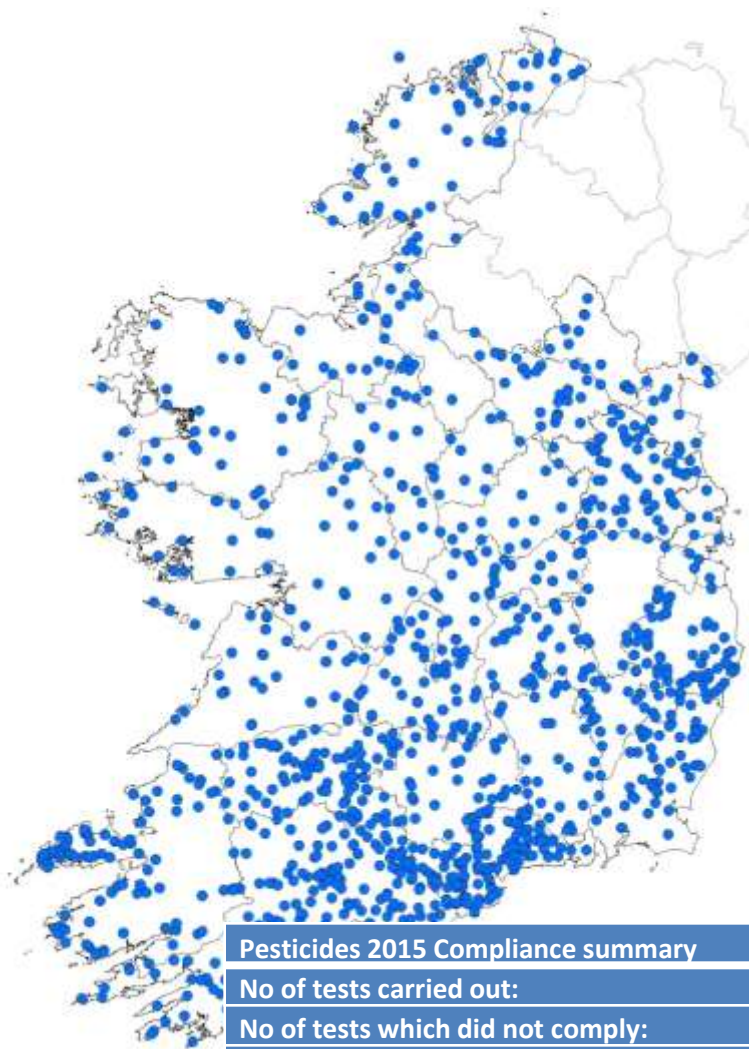
# Pesticide Diffuse & Point Source Pathways



Source Research Repository UCD: Current status of pesticides application and their residue in the water environment in Ireland, Figure 5, A model showing pesticides entering waters via diffuse and point pathways (International Journal of Environmental Studies, 70 (1):59-72)

# The scale of the challenge

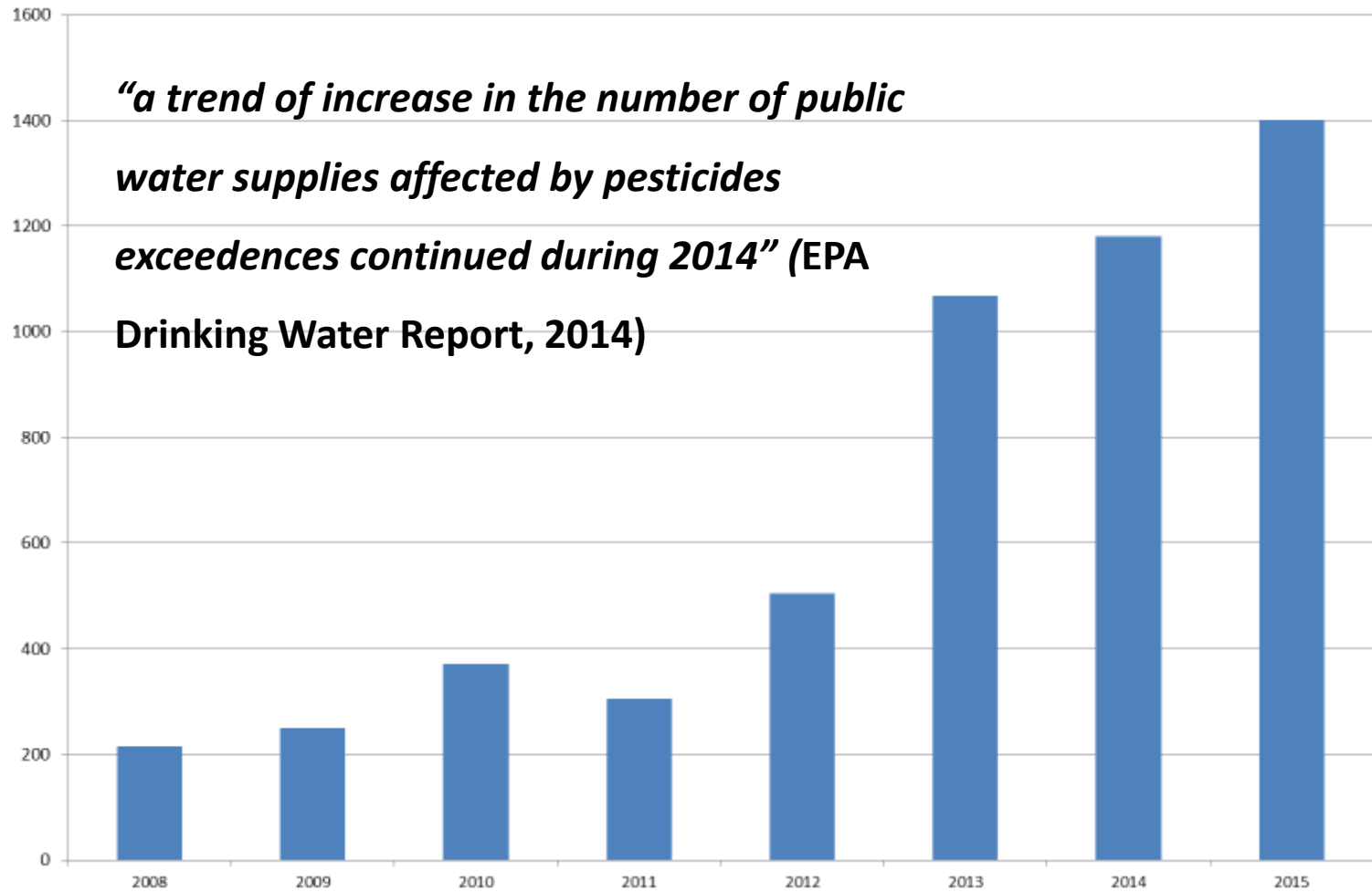
- Over 50% of the water supplies have had pesticide detections
- 178 compliance samples showed pesticide exceedences (2007 to 2015)
- 28 public water supplies across
- 26 Local Authorities



| Pesticides 2015 Compliance summary | Individual pesticides | Total Pesticides test | MCPA   |
|------------------------------------|-----------------------|-----------------------|--------|
| No of tests carried out:           | 52,191                | 1,319                 | 1,027  |
| No of tests which did not comply:  | 58                    | 17                    | 44     |
| Percentage Compliance:             | 99.89%                | 98.71%                | 95.72% |

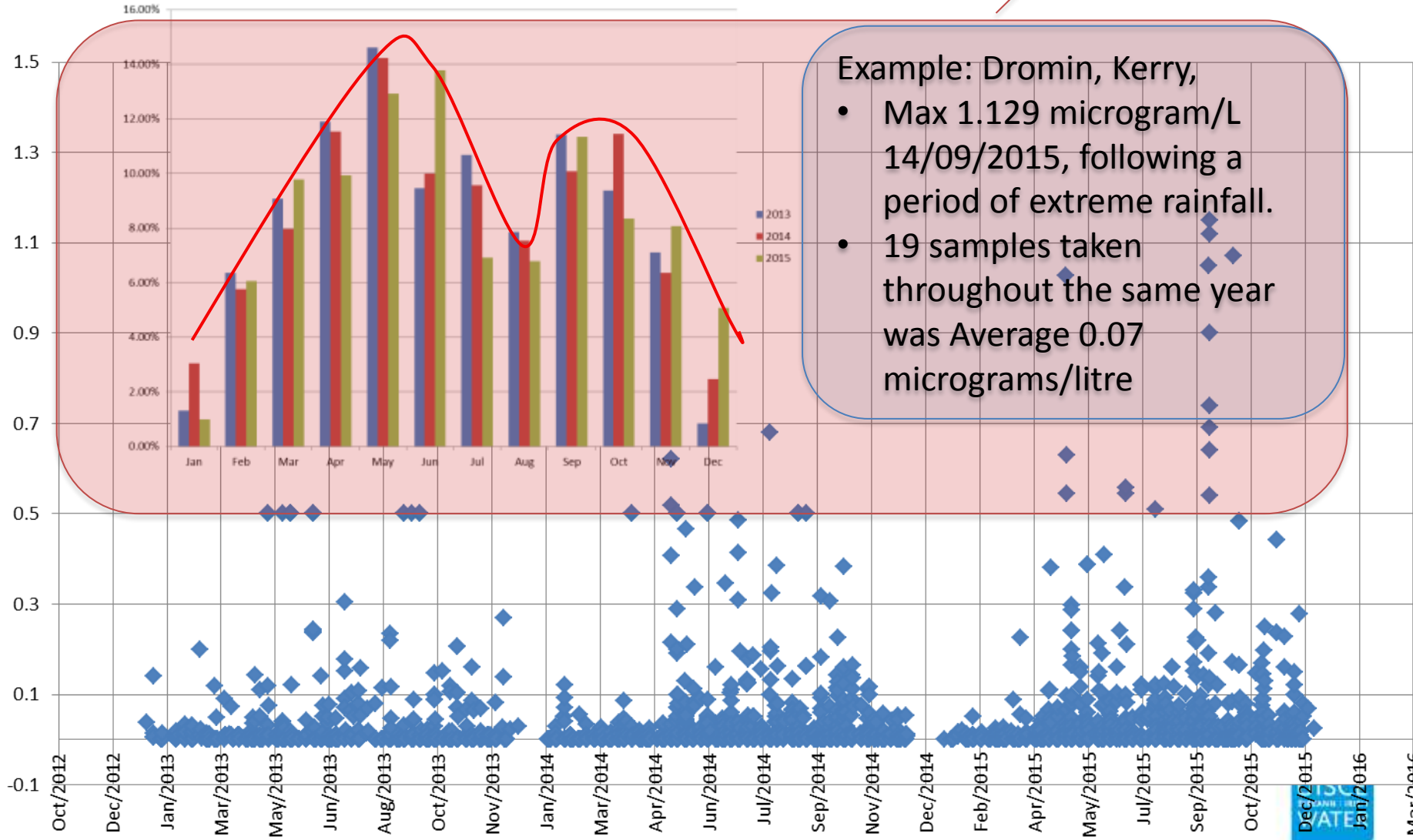
# Adequate Sampling:

## Total Pesticides - Number of samples by year



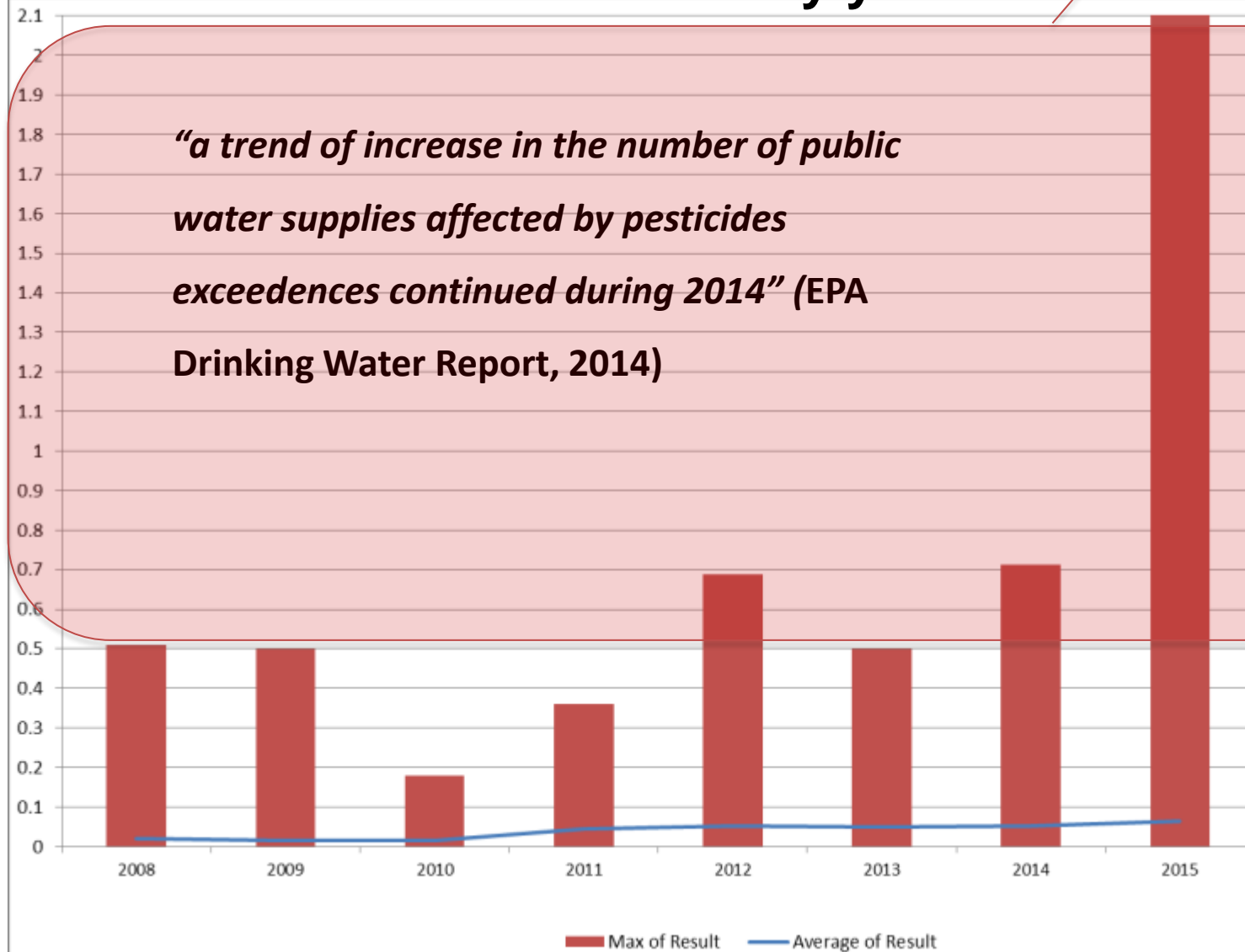
# Pesticides are seasonal: Total Pesticides by time of year

Total Pesticides  
Limit

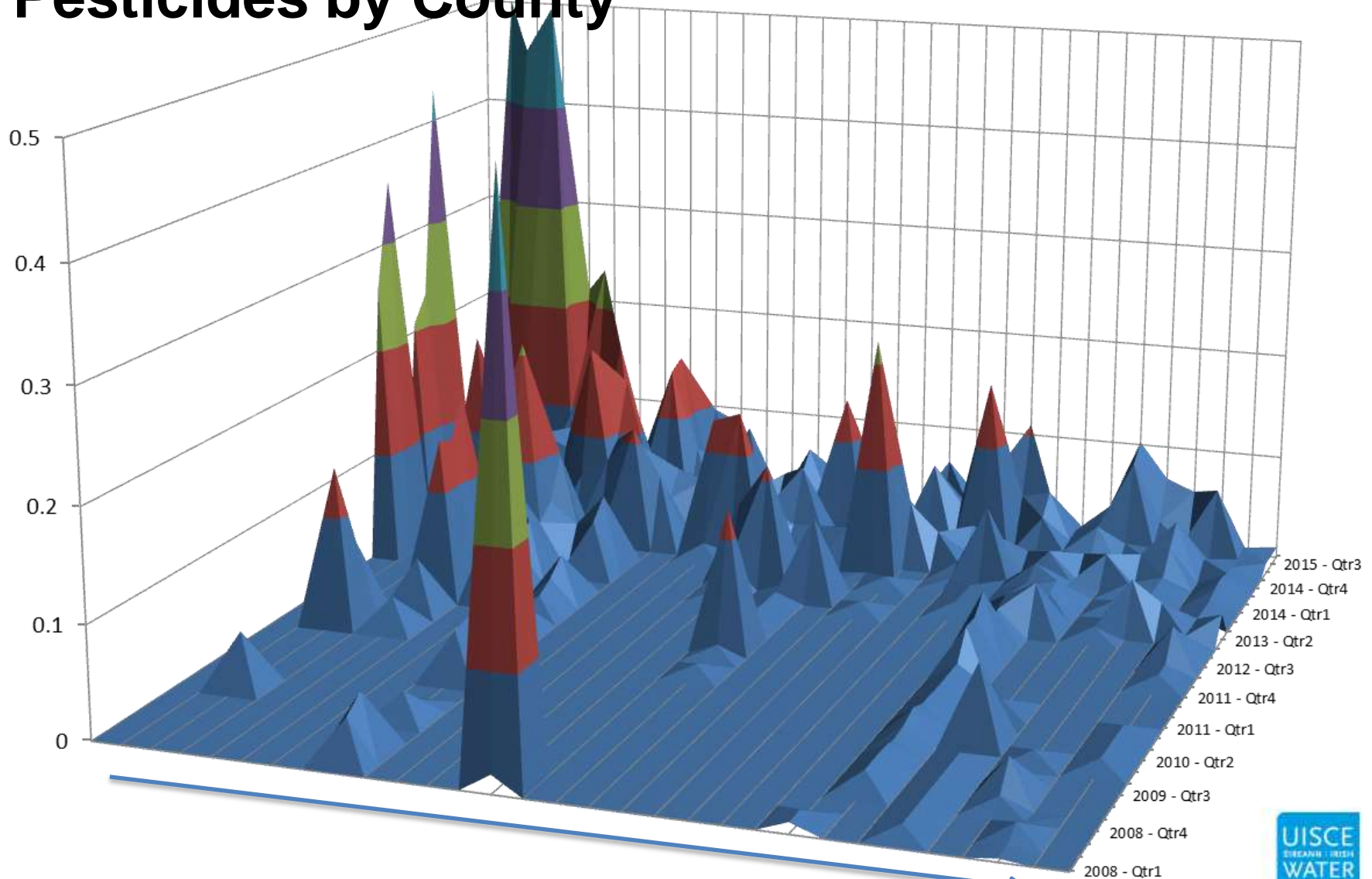


# Improved Sampling programmes are finding more issues: Total Pesticides by year

Total Pesticides  
Limit

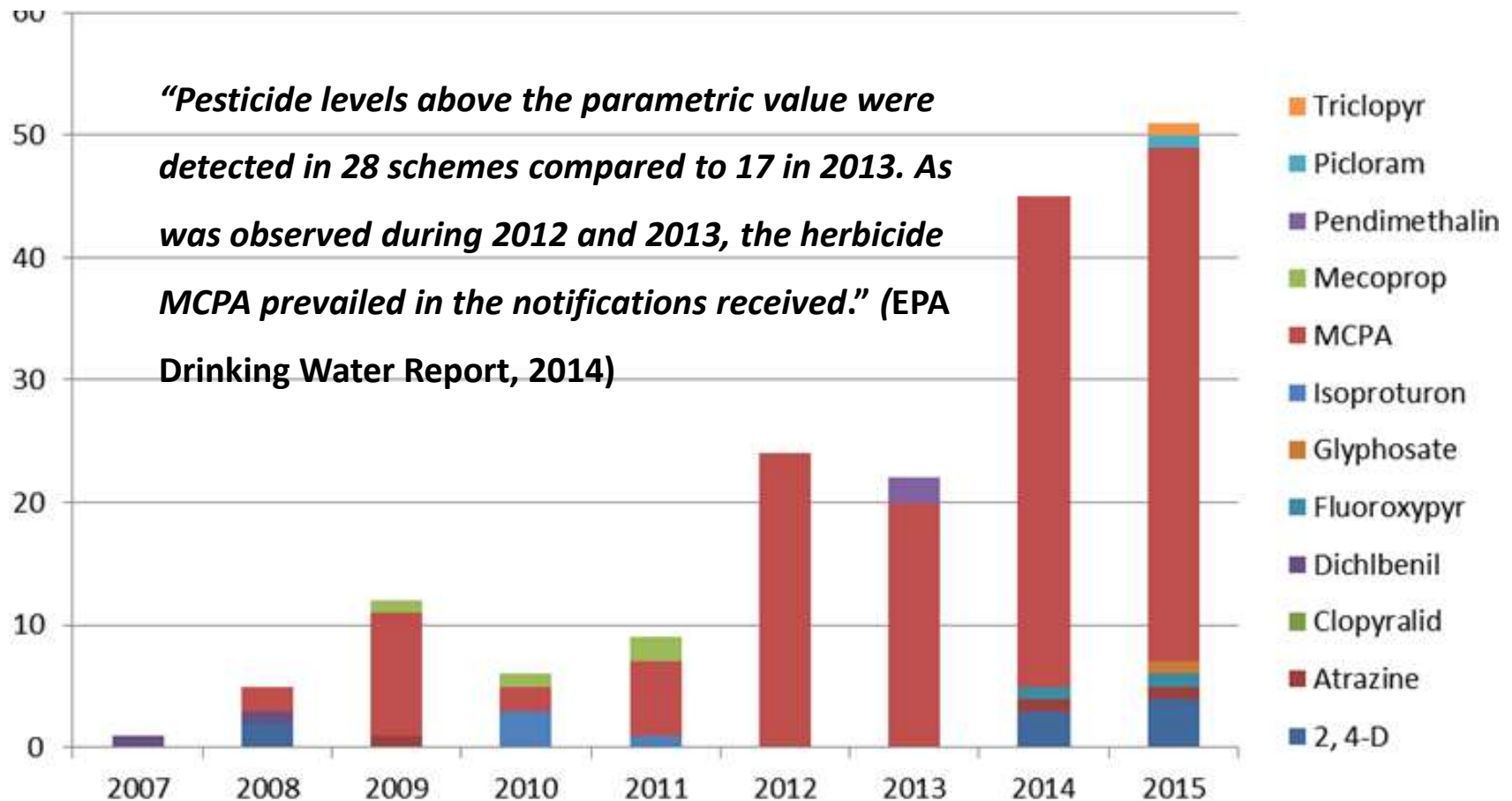


# What is the pattern? where to focus? Total Pesticides by County



Significant variations by county, year and water supply

# What to focus on? Which pesticides are we dealing with?: Exceedences by year



# Summary

- **Limited data** Sampling was not consistent, across counties, water supply zones and time of year
- **Unclear** if increasing trend is as a result of changes to monitoring programmes or a significant upward trend in contamination.

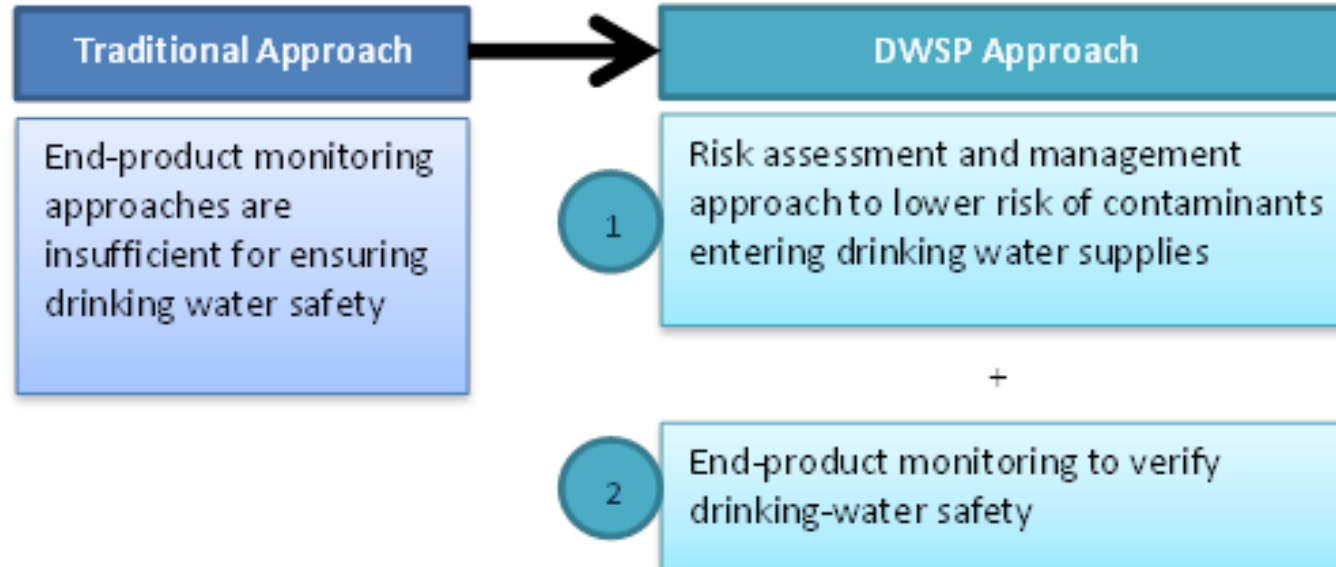
# Strategic Planning Context

(Compliance with Water Services Act 2)



# What Irish Water is doing about it?

- *“for pesticides and other source-protection-related contaminants, an entirely new series of catchment-based engagement efforts needs to be devised and take place, organised and instructed by a national strategy”* (EPA Drinking Water Report, 2014)



# What Irish Water is doing about it?

- Improving data
- Standardising Exceedence Response
- National Stakeholder Engagement
- Examining Treatment Options
- Water Resource Planning
  - development of alternative sources

# What Irish Water is doing about it?

- **Risk/evidence based approach:**
  - Review of all historic Pesticide monitoring data from the EPA & Engagement/Collaboration with LA – pesticides specific to certain Water Supplies
  - **Outcome:** consistency of pesticide analysis
- **More Targeted Monitoring:**
  - Compliance team engagement with the Department of Agriculture Food and the Marine – Pesticides Registration Division
  - **Outcome:** improved understanding of which pesticides should include/omit

# What Irish Water is doing about it?

## Irish Water

### Eastern Midlands Region: 2016 Pesticide Sampling Programme

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| Level of Risk        | Low | Med                       | Med to High               | High | High | High | Med  | Med to High               | High | High | High | Low |   |
|----------------------|-----|---------------------------|---------------------------|------|------|------|------|---------------------------|------|------|------|-----|---|
| No. of Audit Samples | Jan | Feb                       | Mar                       | Apr  | May  | June | July | Aug                       | Sept | Oct  | Nov  | Dec | Comments:   |
| 1                    |     |                           | ← Sole Audit →            |      |      |      |      |                           |      |      |      |     | Sole Audit sample is collected either in March, April, June or July – with preference for the months with the highest risk.   |
| 2                    |     |                           | ← 1 <sup>st</sup> Audit → |      |      |      |      | ← 2 <sup>nd</sup> Audit → |      |      |      |     | 1 <sup>st</sup> Audit sample is collected either in March, April, June or July and the 2 <sup>nd</sup> Audit sample collected in August, September or October – with preference for the months with the highest risk.                   |
| 3                    |     |                           |                           | X    |      | X    |      |                           |      | X    |      |     | The three Audit samples required collected during months marked by an X.  |
| 4                    |     |                           |                           | X    |      | X    |      |                           | X    |      | X    |     | The four Audit samples required collected during months marked by an X.   |
| 5                    |     | ← 1 <sup>st</sup> Audit → |                           |      | X    | X    |      | ← 4 <sup>th</sup> Audit → |      | X    |      |     | 1 <sup>st</sup> Audit sample collected either in February, March or April and the 4 <sup>th</sup> Audit sample collected either in July, August or September. The remaining three Audit samples collected during months marked by an X. |
| 6                    |     | ← 1 <sup>st</sup> Audit → |                           |      | X    | X    |      | ← 4 <sup>th</sup> Audit → |      | X    | X    |     | 1 <sup>st</sup> Audit sample collected either in February, March or April and the 4 <sup>th</sup> Audit sample collected either in July, August or September. The remaining four Audit samples collected during months marked by an X.  |
| 7                    |     |                           | X                         | X    | X    | X    |      |                           | X    | X    | X    |     | The seven Audit samples required collected during months marked by an X.  |
| 8                    |     |                           | X                         | X    | X    | X    |      | X                         | X    | X    | X    |     | The eight Audit samples required collected during months marked by an X.  |
| 9                    |     | X                         | X                         | X    | X    | X    |      | X                         | X    | X    | X    |     | The nine Audit samples required collected during months marked by an X.   |
| 10                   |     | X                         | X                         | X    | X    | X    | X    | X                         | X    | X    | X    |     | The ten Audit samples required collected during months marked by an X.  |
| 11                   | X   | X                         | X                         | X    | X    | X    | X    | X                         | X    | X    | X    |     | The eleven Audit samples required collected during months marked by an X.   |

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ÉIREANN : IRISH  
WATER

# Baseline and Non-Baseline Pesticides

| Baseline Pesticides       |
|---------------------------|
| 2,4-D                     |
| Atrazine                  |
| Bentazone                 |
| Clopyralid                |
| Chlorfenvinphos           |
| Cypermethrin              |
| Dichlobenil               |
| Diiflufenican             |
| Dichlorprop               |
| Diuron                    |
| Glyphosate                |
| Isoproturon               |
| Linuron                   |
| MCPA                      |
| MCPP (Mecoprop)           |
| Metaldehyde               |
| Pendimethalin             |
| Propyzamide               |
| Simazine                  |
| 236 Trichlorobenzoic Acid |
| Triclopyr                 |

| Non Baseline Pesticides |                    |                     |
|-------------------------|--------------------|---------------------|
| Fluoroxypyr             | Dieldrin           | Aldrin              |
| Picloram                | Dimethoate         | alpha-BHC           |
| Dicamba                 | Mancozeb           | delta - BHC         |
| MCPB                    | Lindane            | Endosulfan I        |
| Benazolin               | op DDT             | Endosulfan Sulphate |
| Malathion               | Sulfotep           | Endrin              |
| Propiconazole           | Triadimefon        | Endrin Aldehyde     |
| Chlorotoluron           | Heptachlor epoxide | Heptachlor          |
| Bromacil                | Boscalid           | Pentachlorophenol   |
| Fenpropidin             | Diazinon           | 2,4-DB              |
| 2,6-Dichlorobenzamide   | Kresoxim-Methyl    | Asulam              |
| Metoxuron               | Metazachlor        | beta- HCH           |
| beta-BHC                | Chlorothalonil     | Carbaryl            |
| Endosulfan II           | Chlorpropham       | Carbetamide         |
| Bromoxynil              | Cyproconazole      | Fenoprop            |
| Propazine               | Metalaxyl          | Flutriafol          |
| Quinmerac               | Mevinphos          | Hexachlorobenzene   |
| Epoxiconazole           | Oxadixyl           |                     |
| Fenproimorph            | Parathion-ethyl    |                     |
| Tebuconazole            | Permethrin - trans |                     |
| Metamitron              | Tri-allate         |                     |
| Monuron                 | 2,4,5-T            |                     |

Standardised to 21 “baseline pesticides”

“Non-baseline pesticides” - additional pesticides detected over the past 4 years in a particular Water Supply

# What Irish Water is doing about it?

- **National Raw Water Monitoring:**
  - 21 baseline pesticides @ 100+ abstractions
- **Trend analysis at high risk locations:**
  - monthly baseline monitoring over 12 months
  - Increased frequency during the pesticide season as required
  - weather observations to identify links to surface water runoff

# What Irish Water is doing about it?

- **Standardising Exceedence Response**
  - Local Authority consult with HSE on health risk
  - Notify EPA via ODWNS
  - Irish Water seek advice from the Pesticides Control and Registration Division of the Dept. of Agriculture, Food, and the Marine (DAFM)
  - Irish Water consult with EPA/HSE as required
  - Action Plan
    - Follow up sampling (including the catchment), followed by a defined operational monitoring program
    - Engagement with statutory and non statutory stakeholders, e.g. LA Environment Section, Dept. of Agriculture, Teagasc, EPA catchment management team
    - Communication to Landowners in catchment regarding obligations under GAP Regs and Sustainable Pesticide Use (via LA Environment Section)
    - IW Comms Initiatives
  - File closure: Demonstrate compliance

# What Irish Water is doing about it?

## Treatment Options

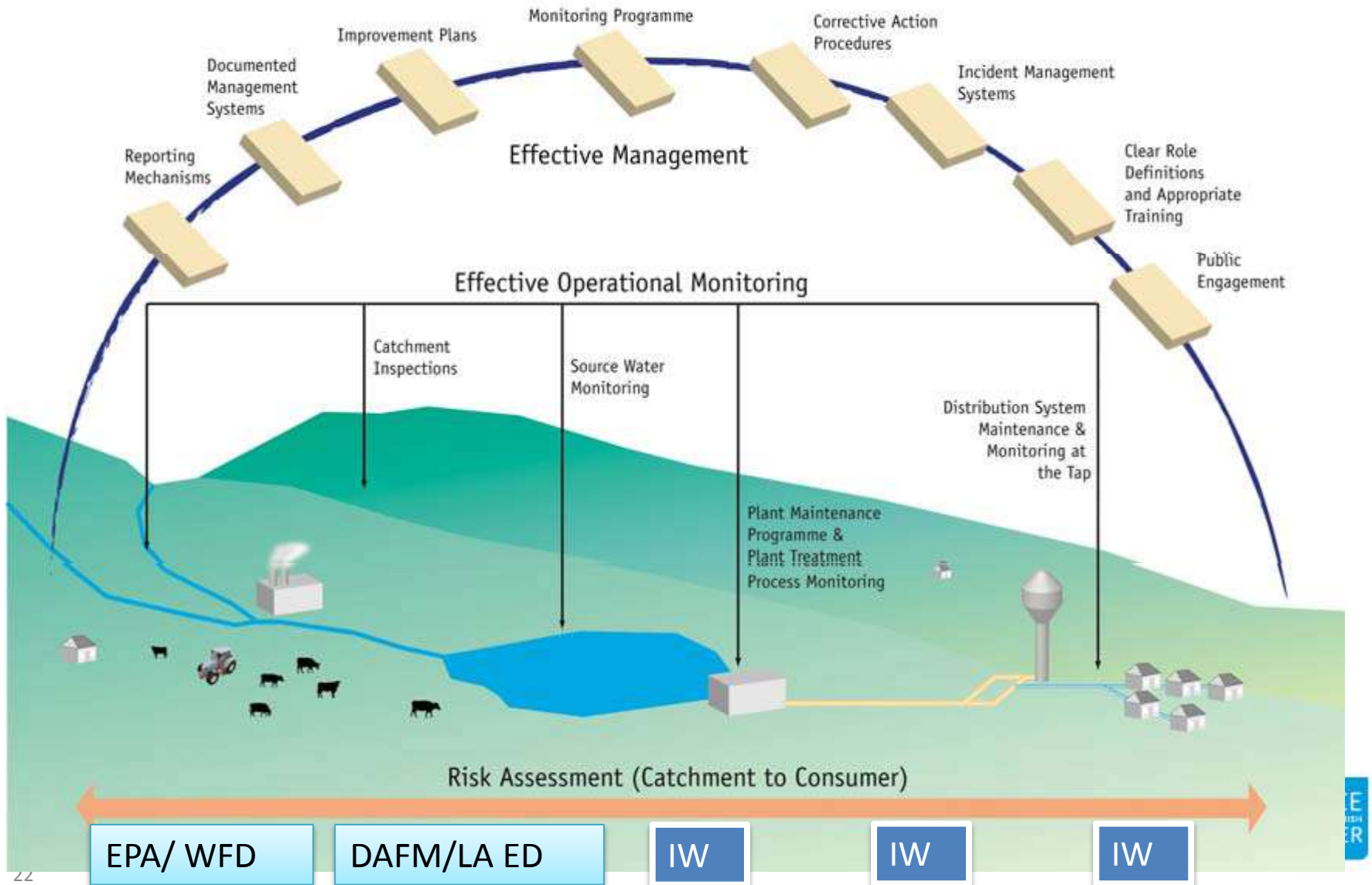
- Review of international research and practices
  - GAC/PAC/Oxidation/UV
- PAC/GAC trials:
  - Identify the most suitable PACA/GAC treatment for MCPA removal
  - Develop a treatment selection matrix
  - Issues:
    - Seasonal requirement, high installation and operation cost
    - Changes in land use may require changes to the treatment process
    - Difficult to achieve compliance under peak conditions
    - Reactive to pollution rather than addressing the root cause

# What Irish Water is doing about it?

- Collaborate with the EPA Catchments Team:
  - **Sharing Knowledge:** Link catchment characterisation information with Irish Waters drinking water safety plans
  - **Improve Knowledge:** Strive Project to modify and update the EPA Pathways models to address the movement of pesticides through the catchment.
  - **Use Knowledge:** focus resources on the priority risk areas and inform stakeholder engagements

# Drinking Water Safety Plans

Safe & Secure Drinking Water



# What Irish Water is doing about it?

- **Stakeholder engagement**
  - Identifying key stakeholders and responsibilities
  - Build on experience and established relationships (e.g. N/W region)
  - Develop national improvement measures and programmes



# Example Measures:

Ten areas highlighted as key risks:

## In the yard



**Storage –**  
a small leak can soon cause a serious pollution incident.



**Sprayer maintenance –**  
a leaking pipe, or loose connection, means lost product and a threat to water quality.



**Filling areas –**  
the washings from a single foil cap can lead to excess pesticide levels some 30km downstream.



**Washing –**  
soon generates large volumes of dilute solution. This must be trapped for safe disposal.



**Disposal –**  
empty containers need to be cleaned and disposed of through a waste or recycling contractor.

## In the field



**Cracked soils –**  
allow chemical movement down the soil profile to drains and aquifers.



**Run off and soil erosion –**  
remove products in solution and attached to soil particles.



**Tramlines –**  
should run across slopes to avoid run-off carrying pesticides to water.



**Application timing –**  
Rainfall within 48 hours of application increases run-off and drain flow risks.



**Drift –**  
not only poses threats to water quality, but also to aquatic life.

**Source:** Crop Protection Association, Every Drop Counts: Advice on pesticides and water protection for farmers and sprayer operators.

# Example Measures:

- **Sustainable Use of Pesticides Directive (2009/128/EC):**
  - Specific measures to restrict the use of pesticides near drinking water abstraction points, in the form of safeguard zones
  - Prohibitions on pesticides near aquatic environment and drinking water
  - Enforced by Department of Agriculture, Fisheries and the Marine (Pesticides Registration and Control Division)

| Water Source   | Distance |
|--|----------|
| Abstraction point of any surface waters, borehole, spring or well used for the abstraction of water for human consumption in a water scheme supplying 100 m <sup>3</sup> or more of water per day or serving 500 or more persons | 200 m    |
| Abstraction point of any surface waters, borehole, spring or well used for the abstraction of water for human consumption in a water scheme supplying 10 m <sup>3</sup> or more of water per day or serving 50 – 500 persons     | 100 m    |
| Abstraction point of any surface waters, borehole, spring or well used for the abstraction of water for human consumption in a water scheme supplying 1-10 m <sup>3</sup> of water per day or serving 10-50 persons              | 25 m     |
| Abstraction point of any surface waters, borehole, spring or well used for the abstraction of water for human consumption in a water scheme supplying 1m <sup>3</sup> or less of water per day or serving 10 or less persons     | 5 m      |

**Schedule 2** (Table indicating distance from open wells, open boreholes, water abstraction points)

# The Challenge!

- The Pesticides problem is complex and requires not only multi-stakeholder involvement, but commitment!

# Summary

- Risk (DWSP) based approach underpinned by improved knowledge
- Strategic National response leveraging resources, skills and legislated responsibilities of multiple stakeholders
- Irish Water intends to engage with the EPA and other key stakeholders over the next 12- 18 months to further develop the strategy

**THANK YOU**