Association of Irish Local Government

Dr Matthew Craig
Manager
Hydrometric & Groundwater Unit
Office of Evidence & Assessment
EPA, Dublin

AILG Workshop
Ballinasloe
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Septic Tanks, Ground Water & Water Pollution

Outline of Presentation:

- About the EPA
- Water Framework Directive
- Groundwater
- Surface Water
- Drinking Water
- Septic Tanks
- Access to EPA Information

Acknowledgements:

✓ *Darragh Page*

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✓ *Donal Daly*

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About the Environmental Protection Agency (EPA)

- Established in 1993
- Government sponsor is the Department of Environment, Community and Local Government (DECLG)
- EPA is an independent public body

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EPA Locations

~365 Staff in 8 Locations

Headquarters

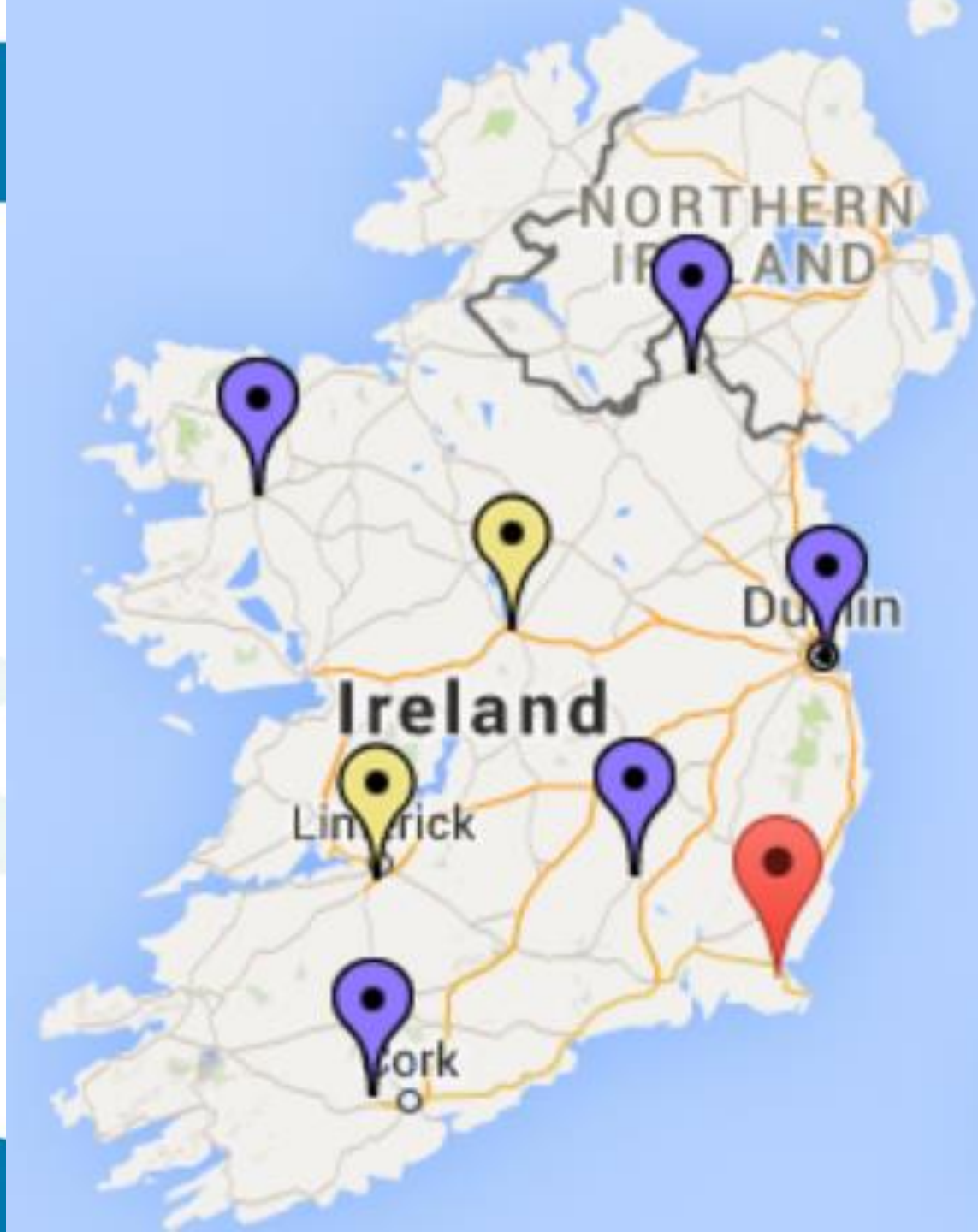
- **Wexford**

Inspectorates

- **Dublin**
- **Cork**
- **Castlebar**
- **Monaghan**
- **Kilkenny**

Regional Offices

- **Athlone**
- **Limerick**



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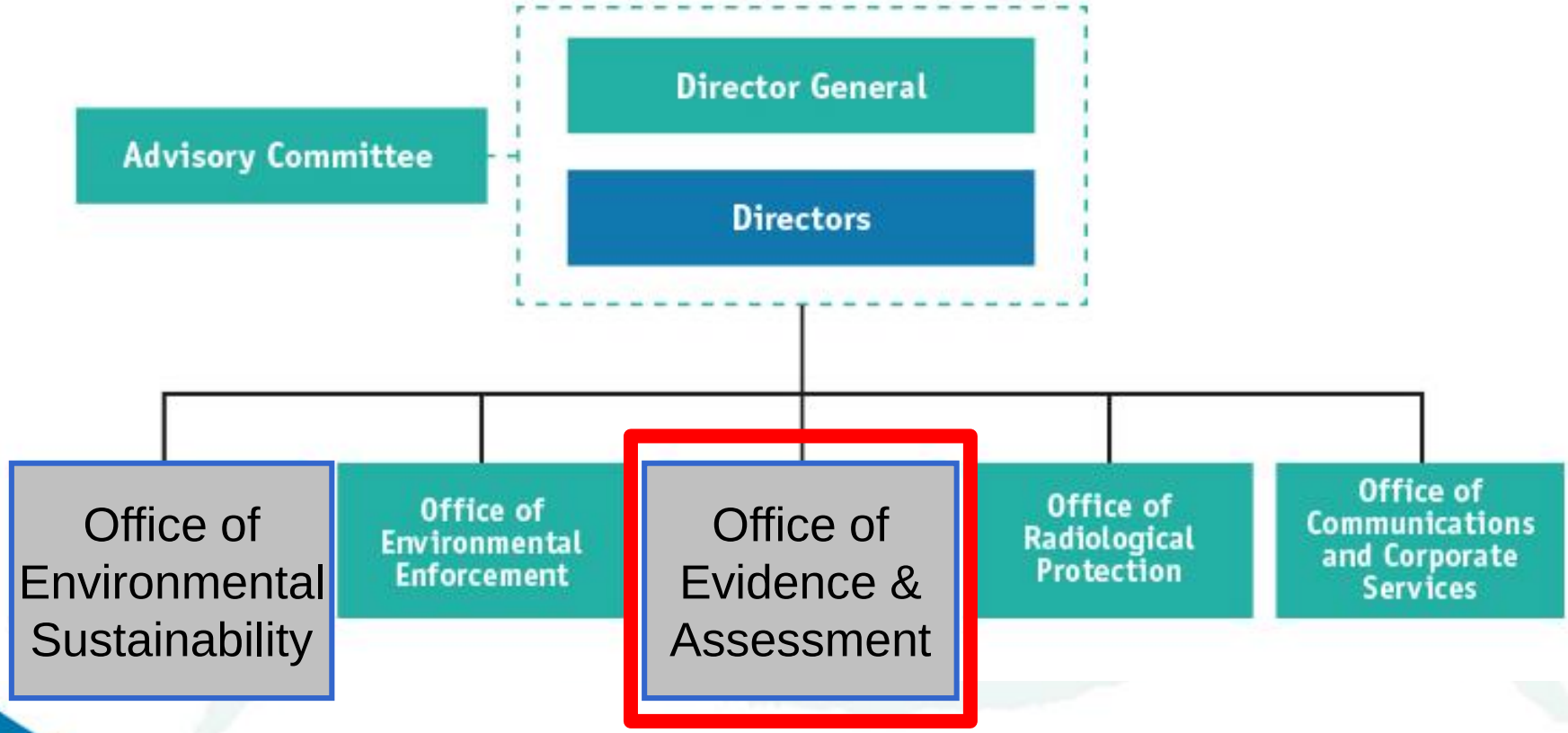
EPA Structure



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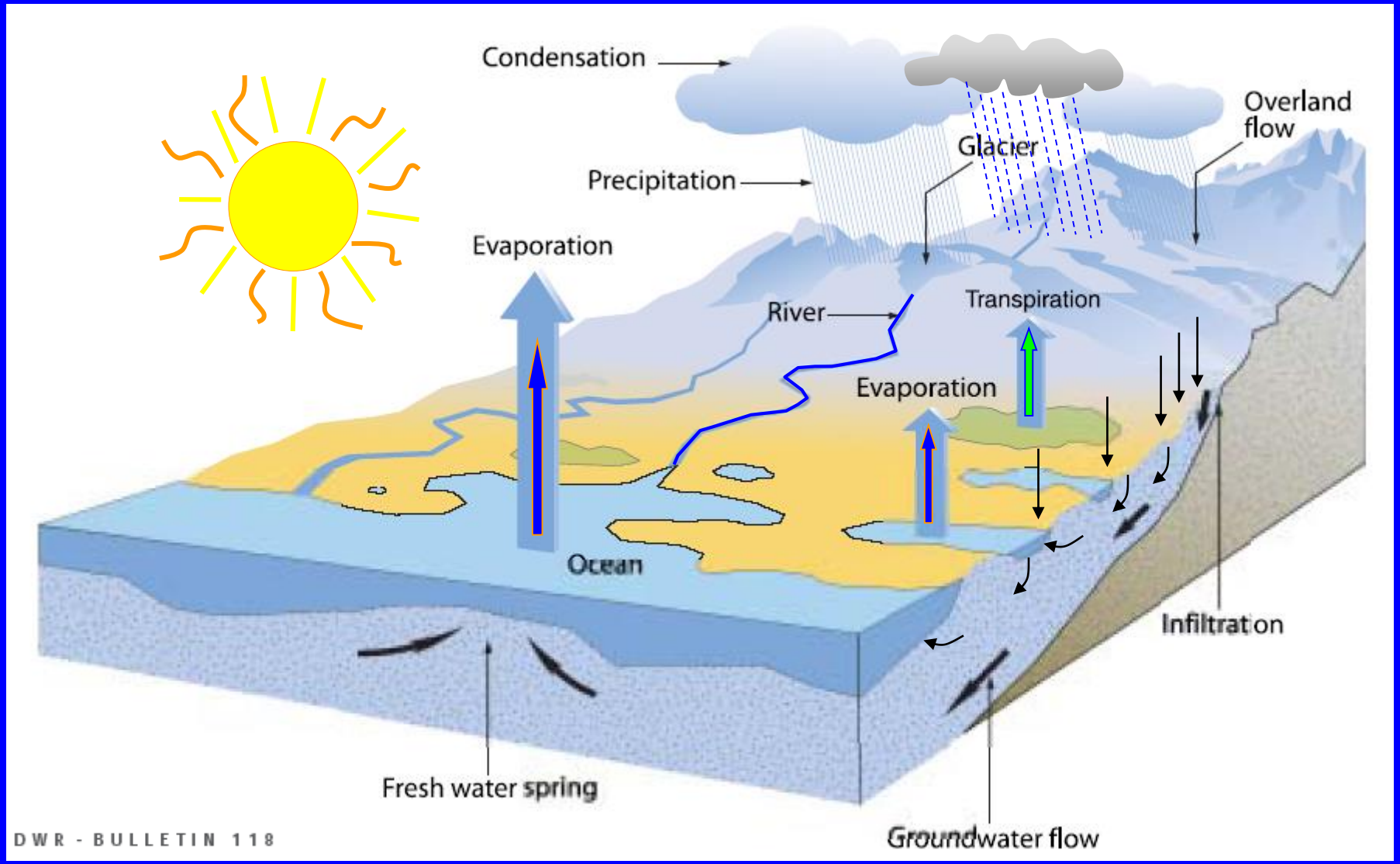
EPA Vision


Limiting and Adapting to Climate Change
Ireland will achieve major reductions in greenhouse gas emissions and will be prepared for the unavoidable impact of climate change.
Clean Air
Our air will be healthy and clean. Ireland's emissions to the atmosphere will meet all international and national targets.
2020 VISION:
Protecting and Improving Ireland's Environment
Protected Water Resources
Our surface water and groundwater will not be depleted and will be of excellent quality, meeting all national and international standards.
Protected Soil and Biodiversity
The soil of Ireland will be protected from contamination and loss and will support dependent plants and animals. Our biodiversity will be protected and managed for future generations to enjoy.
Sustainable Use of Resources
The overall goal is a more efficient use of resources (water, energy and materials). Waste will be prevented and minimised, with the balance safely collected, recycled or recovered. Final disposal will be completed in a way that does not harm the environment.
Integration and Enforcement
Environmental considerations will be at the heart of policy-making and decision-making. Responsible environmental behaviour will be the norm across all sectors of society and those who flout environmental laws will be held to account.

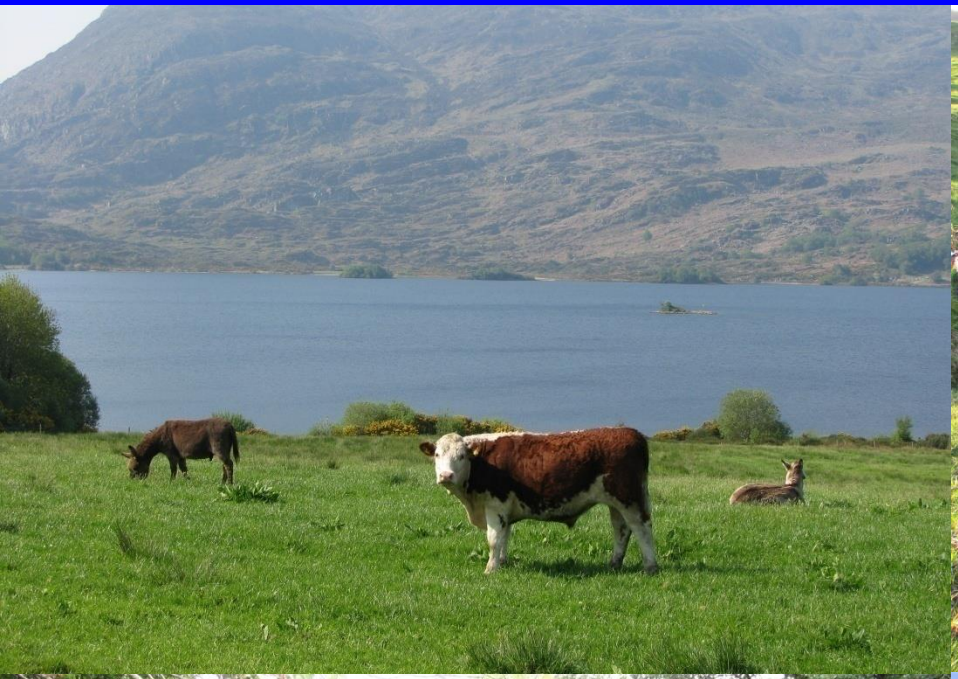
Water Framework Directive

Photo: P. Duggan (DECLG)

Hydrological Cycle



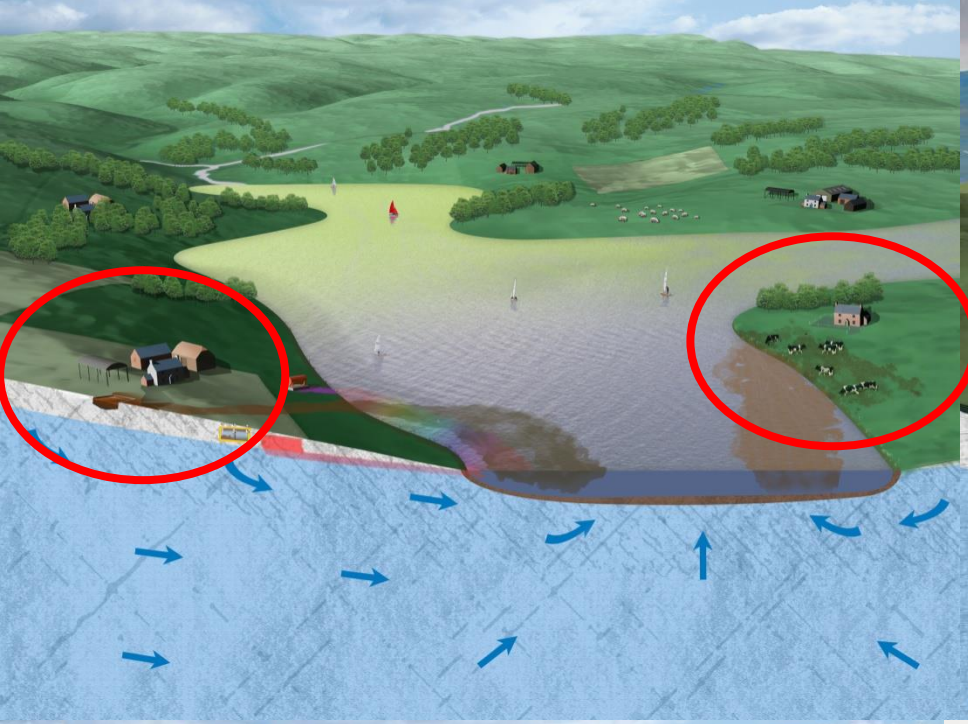
LAKES - Lough Guitane, Co Kerry. Photo: D. Daly, EPA

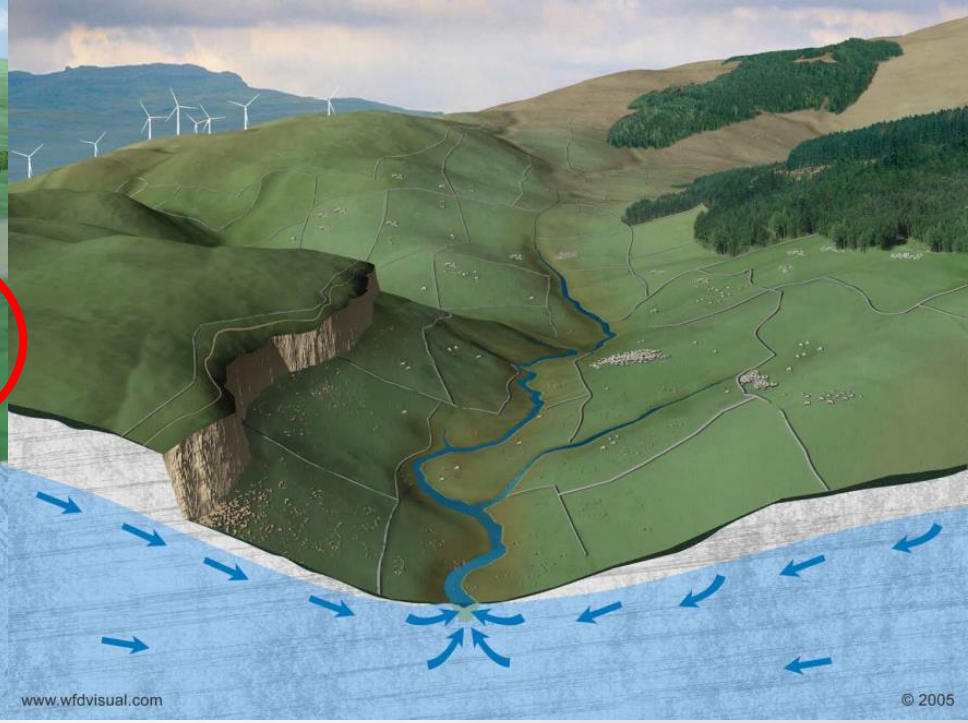


GROUNDWATER - Kilmaine Spring, Co. Mayo

RIVERS - Owenglin River, Cliften, Co. Galway. Photo: Castlebar Hydrometric Office

ESTUARIES - Doovilra strand, Killary Harbour, Co Galway. Photo: Shane O'Boyle, EPA




www.wfdvisual.com
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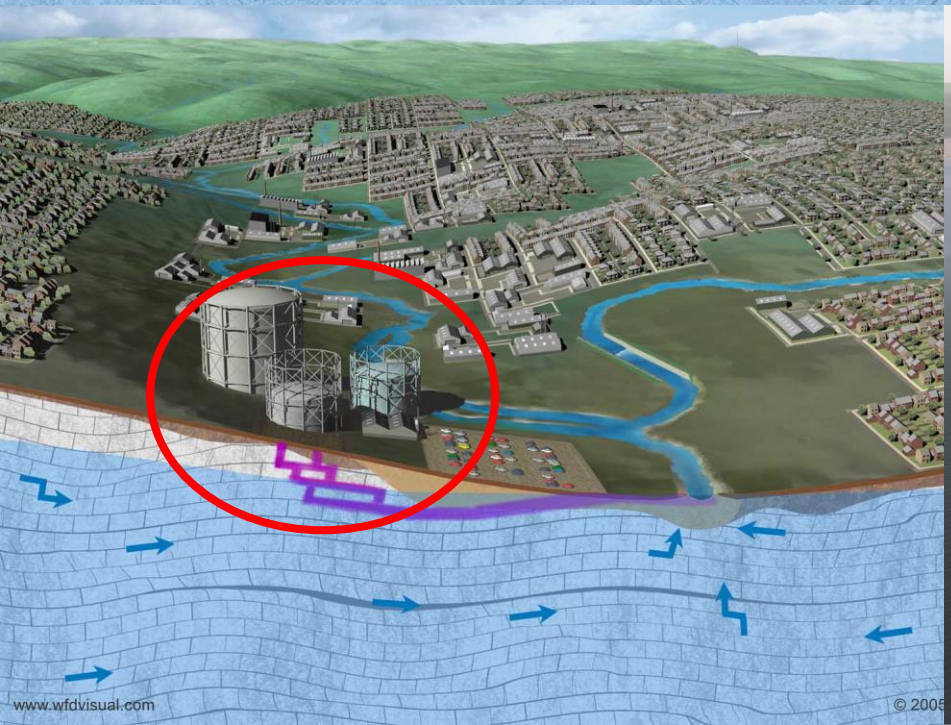
www.wfdvisual.com

Primary Water Legislation

- Water Framework Directive (WFD) – 2000/60/EC
- Water Policy (S.I. 722 of 2003 / S.I. 350 of 2014)
- Groundwater (S.I. 9 of 2010)
- Surface Water (S.I. 272 of 2009 / S.I. 386 of 2015)
- Water elements of other Directives e.g. Habitats, IPPC, Waste, Drinking Water, Nitrates, Urban Wastewater etc.

Key Regulatory Stakeholders

- Dept Environment (DECLG) & Dept Agriculture (DAFM)
- Local Authorities
- Irish Water
- Inland Fisheries
- National Parks and Wildlife Service
- Marine Institute
- Waterways Ireland
- OPW
- The Public

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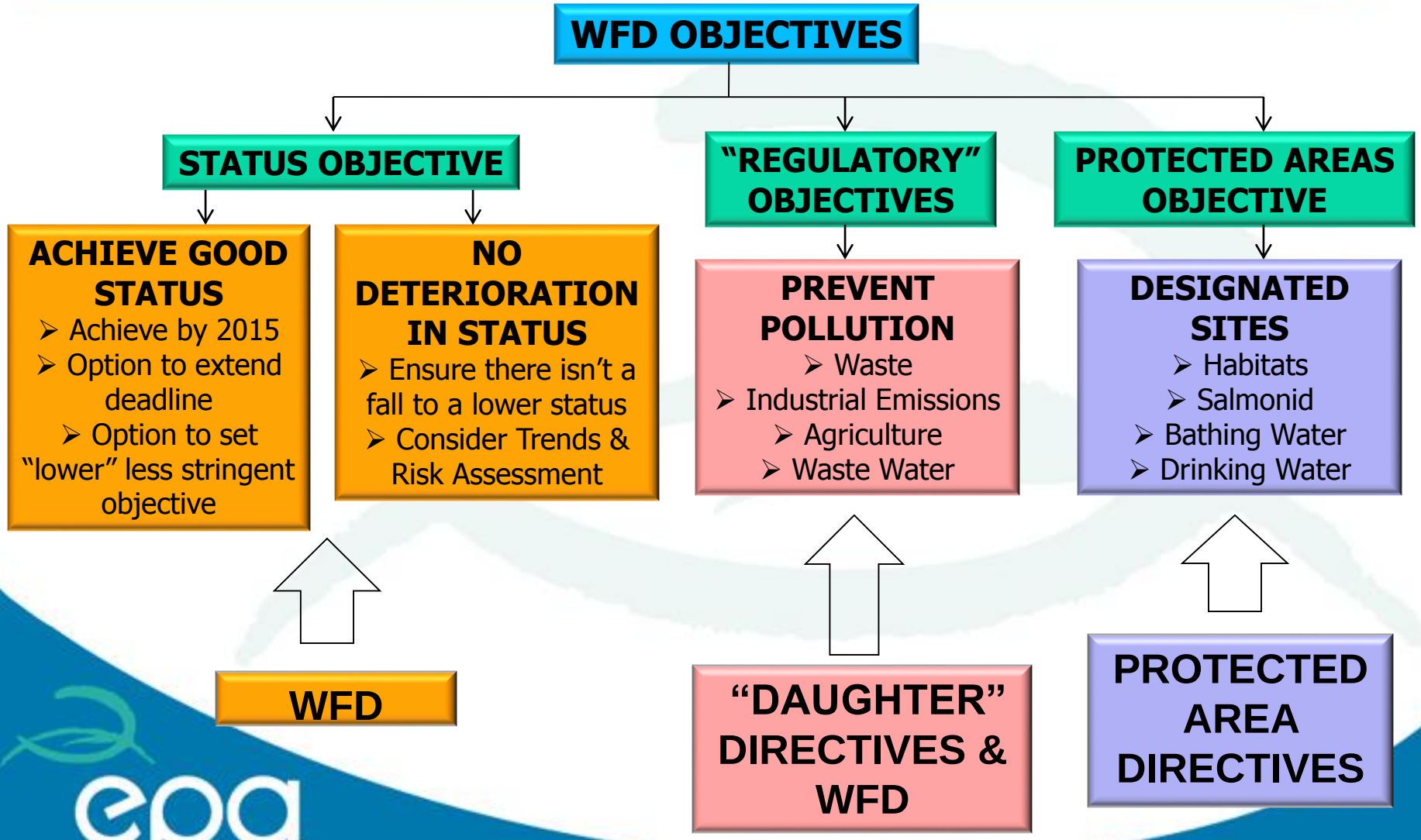
The Water Framework Directive Objectives



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The story so far ...

- WFD operates on a 6 year cycle:
  - 1st Cycle was 03-08 with reporting in '09 (via River Basin Plans)
  - 2nd Cycle was 09-14; reporting is due in Dec. 2015, but two year extension sought and granted by EU
- Within each WFD cycle are two distinct phases:
  - Characterisation
    - Review implementation and outcomes of previous actions
    - Identify the issues / where WFD objectives will not be met
    - Propose actions to address the issues
  - Classification
    - EU wide approach to benchmark "condition" of water
    - Action / explanation needed for water bodies not achieving good status

S.I. 350 of 2014 (amended Water Policy Regulations)

- Role of Local Authorities has changed somewhat
- Local Authorities are to:
  - Provide support & assistance to the Minister and EPA on:
    - Characterisation
    - Establishment of Objectives for Water Bodies
    - Drafting River Basin Management Plans
    - Development of Measures / Actions
- Specified Local Authorities to act as coordinating authorities – being led by Kilkenny / Tipperary
- EPA continues to lead on Classification

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Revised WFD Governance Structures

Tier 1: National Management & Oversight

- Led by DECLG
- Policy, regulations and resources
- Sign-off of river basin management plans

Tier 2: National Technical Implementation and Reporting

- Led by EPA
- Monitoring, assessment and reporting
- Evaluation and implementation of measures
- Draft template for river basin management plans
- Monitoring of enforcement tasks and environmental outcomes

Tier 3: Regional Implementation via Water Networks

- Led by the lead Coordinating Authority
- Local authority monitoring, licensing and enforcement actions
- Implementation of Programmes of Measures by relevant public bodies, tracking and reporting, in consultation with EPA

Tier 2: Role of EPA

- Link and coordinate the various EPA Offices involved in water management.
- Lead and manage a network for cooperation, communication and consultation with stakeholders.
- Undertake catchment characterisation.
- Coordinate the evaluation of existing measures / actions with relevant stakeholders.
- Produce the template river basin management plan (RBMP).

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WFD Characterisation Process (At Risk or Not At Risk?)

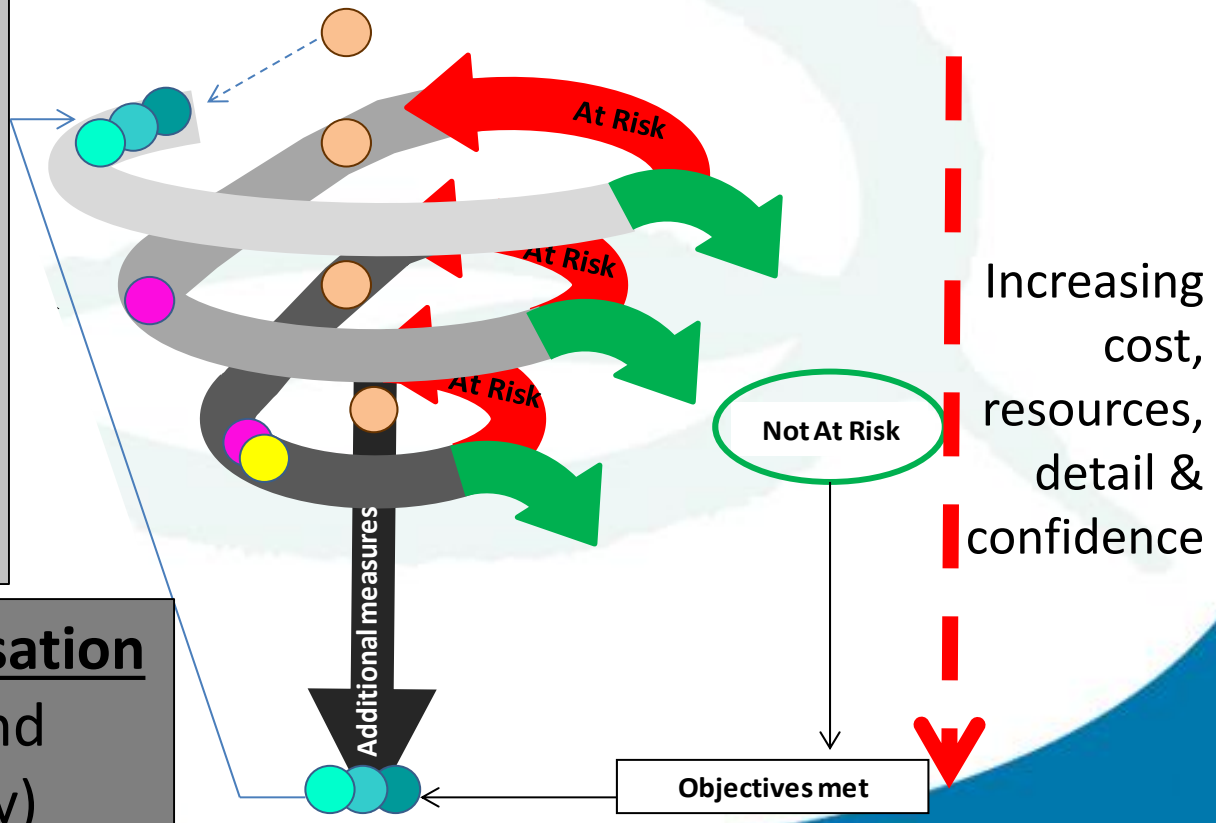
1st : Preliminary Screening (Identify water bodies where objectives are already met) Complete

2nd : Initial Characterisation
(Confirm which water bodies are failing objectives and identify those requiring further validation)

Ongoing

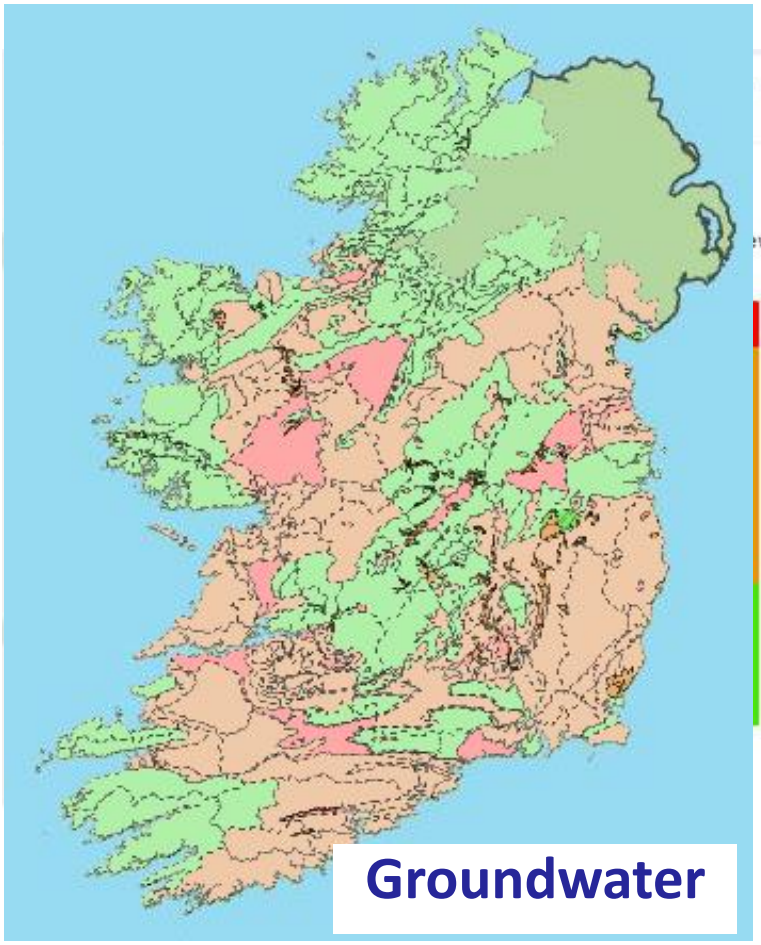
3rd : Further Characterisation
(Boots on the ground and validation of uncertainty)

Next Steps



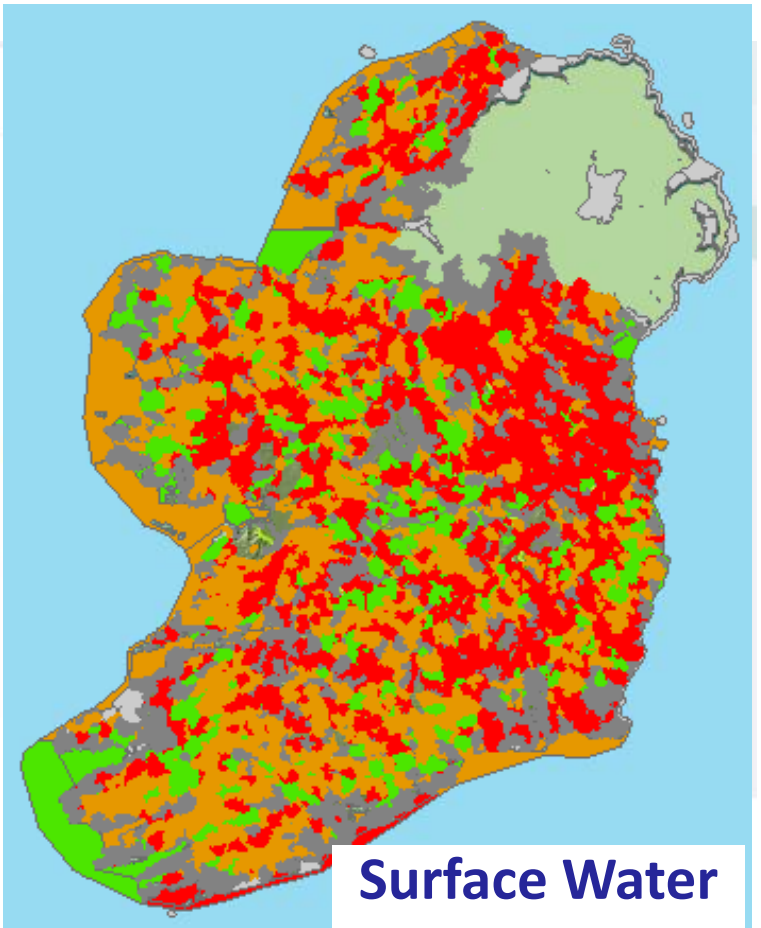
Preliminary risk screening

Existing Status + Trends + 'Headroom' = Risk



Groundwater

At Risk
Review
Not at Risk

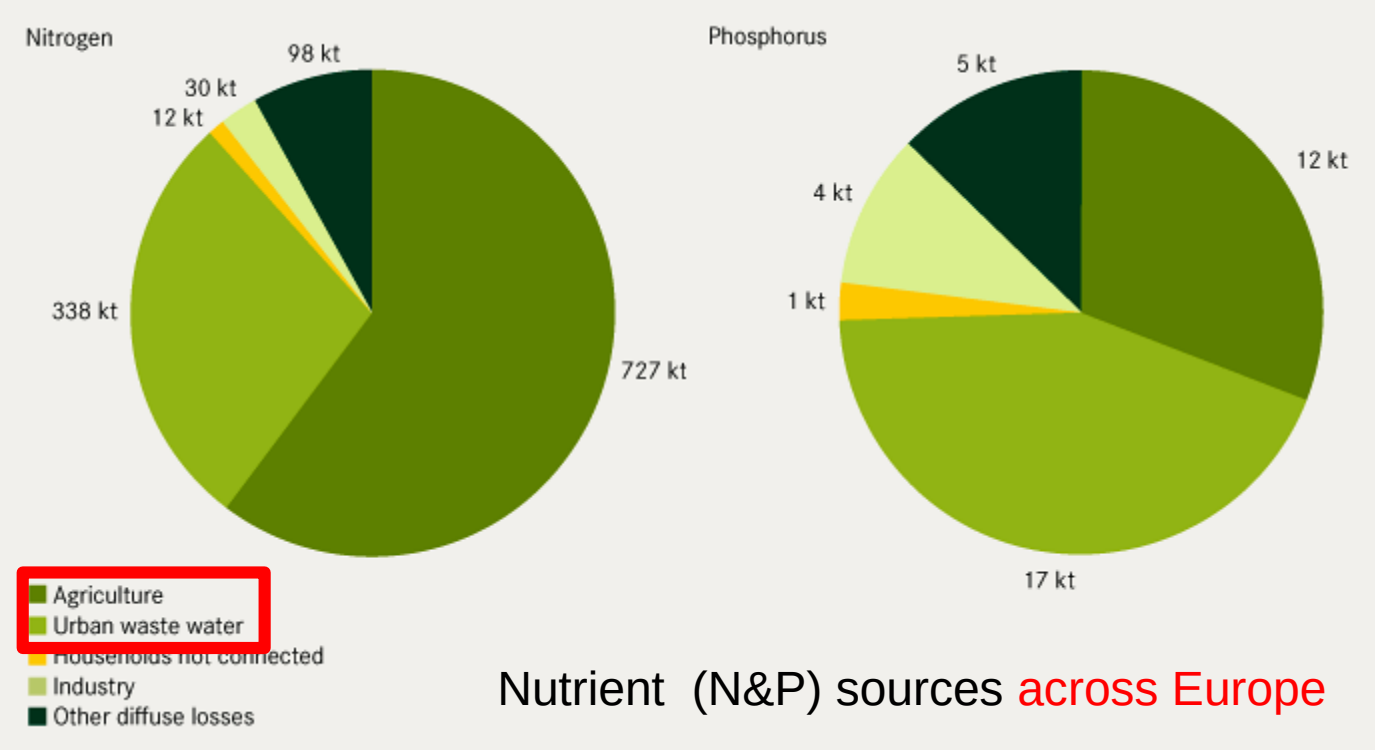


Surface Water

Initial Characterisation - Key water management issues

1. Urban Wastewater & Industrial discharges
   a) 534 urban waste water treatment plants serving a Population Equivalent (PE) > 500
   b) 600 IPPC licenses granted by EPA
   c) 1,090 discharges to sewer and 1,120 to water authorised by local authorities
2. Agriculture
   a) Two-thirds of Irelands land area (90% grassland / 10% arable)
   b) 128,000 farms
   c) Nutrient enrichment (N and P) is the main water quality issue
   d) Too few tailored farm management programmes that consider the environment (over reliance on "one size fits all")

Initial Characterisation - Key water management issues



Nutrient (N&P) sources across Europe

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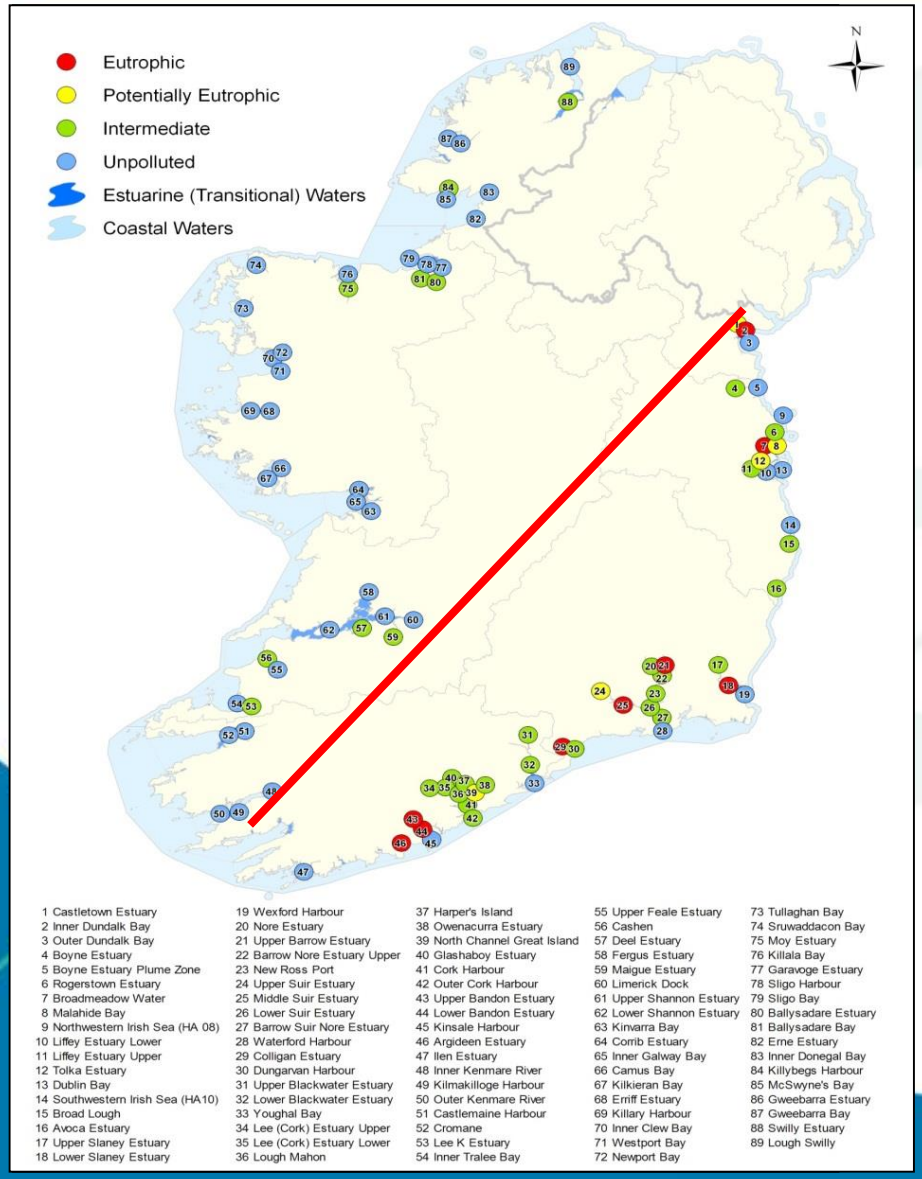
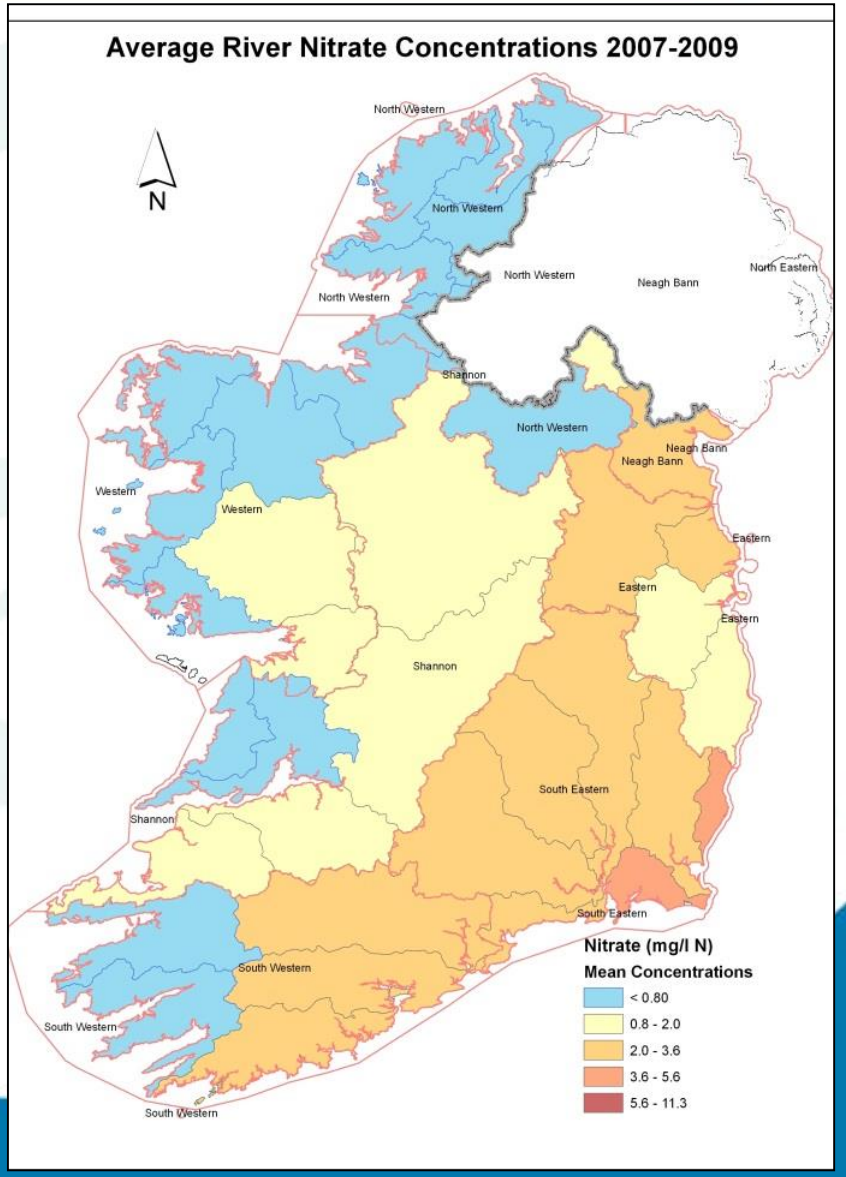
Initial Characterisation – Nitrate as an example



1 Castletown Estuary
2 Inner Dundalk Bay
3 Outer Dundalk Bay
4 Boyne Estuary
5 Boyne Estuary Plume Zone
6 Rogerstown Estuary
7 Broadmeadow Water
8 Malahide Bay
9 Northwestern Irish Sea (HA 08)
10 Liffey Estuary Lower
11 Liffey Estuary Upper
12 Tolka Estuary
13 Dublin Bay
14 Southwestern Irish Sea (HA10)
15 Broad Lough
16 Avoca Estuary
17 Upper Slaney Estuary
18 Lower Slaney Estuary
19 Wexford Harbour
20 Nore Estuary
21 Upper Barrow Estuary
22 Barrow Nore Estuary Upper
23 New Ross Port
24 Upper Suir Estuary
25 Middle Suir Estuary
26 Lower Suir Estuary
27 Barrow Suir Nore Estuary
28 Waterford Harbour
29 Colligan Estuary
30 Dungarvan Harbour
31 Upper Blackwater Estuary
32 Lower Blackwater Estuary
33 Youghal Bay
34 Lee (Cork) Estuary Upper
35 Lee (Cork) Estuary Lower
36 Lough Mahon
37 Harper's Island
38 Owenacurra Estuary
39 North Channel Great Island
40 Glashaboy Estuary
41 Cork Harbour
42 Outer Cork Harbour
43 Upper Bandon Estuary
44 Lower Bandon Estuary
45 Kinsale Harbour
46 Argideen Estuary
47 Ilen Estuary
48 Inner Kenmare River
49 Kilmakilloge Harbour
50 Outer Kenmare River
51 Castlemaine Harbour
52 Cromane
53 Lee K Estuary
54 Inner Tralee Bay
55 Upper Feale Estuary
56 Cashen
57 Deel Estuary
58 Fergus Estuary
59 Maigue Estuary
60 Limerick Dock
61 Upper Shannon Estuary
62 Lower Shannon Estuary
63 Kinvarra Bay
64 Corrib Estuary
65 Inner Galway Bay
66 Camus Bay
67 Kilkieran Bay
68 Erriff Estuary
69 Killary Harbour
70 Inner Clew Bay
71 Westport Bay
72 Newport Bay
73 Tullaghan Bay
74 Sruwaddacon Bay
75 Moy Estuary
76 Killala Bay
77 Garavoge Estuary
78 Sligo Harbour
79 Sligo Bay
80 Ballysadare Estuary
81 Ballysadare Bay
82 Erne Estuary
83 Inner Donegal Bay
84 Killybegs Harbour
85 McSwyne's Bay
86 Gweebarra Estuary
87 Gweebarra Bay
88 Swilly Estuary
89 Lough Swilly




Drifting Ulva blooms
aka 'sea lettuce'!!
south Cork coast
Photo: S. O'Boyle (EPA)

Further Characterisation – Inspect for Poor Practice

Photos: J. O'Gorman (Roscommon CoCo)

Photos: EPA OEE files

Further Characterisation – Promote Good Practice

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Photos: J. O'Gorman (Ros CoCo)

Bottom Line...

- 50% surface water bodies < Good Status
- Reduction in pristine High Status rivers, lakes & estuaries
- Phosphate the key water quality issue – ecological status
- Pollution sources: ~53% agriculture; 33% WWTPs
- 2 years late with our River Basin Plans.
- ~€8Bn spent in last 15 years on water: for 5% improvement!
- **TARGETED WFD INVESTMENT NEEDED**

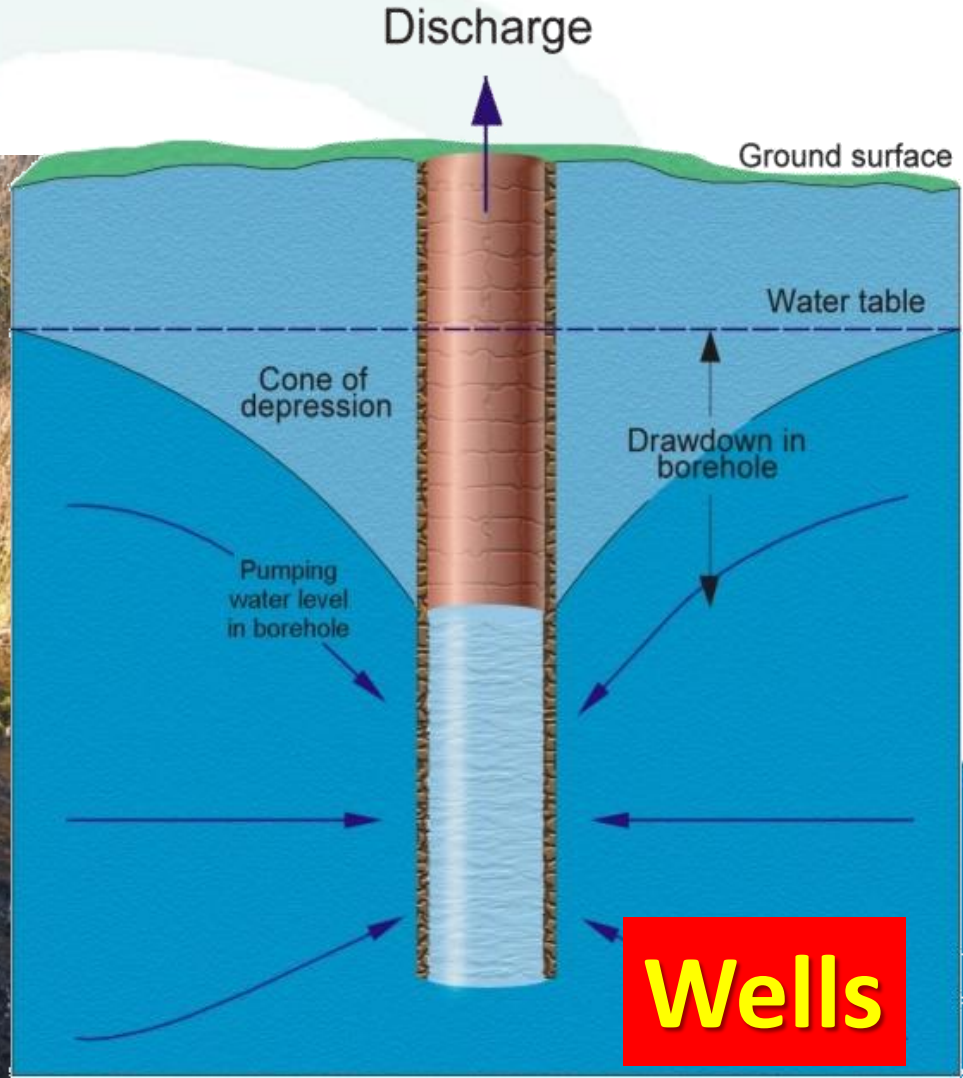
Slieve Carr, County Mayo

What is Groundwater?

Photos: D. Daly (EPA)

Groundwater – not <u>just</u> a source of drinking water from wells / springs

Springs

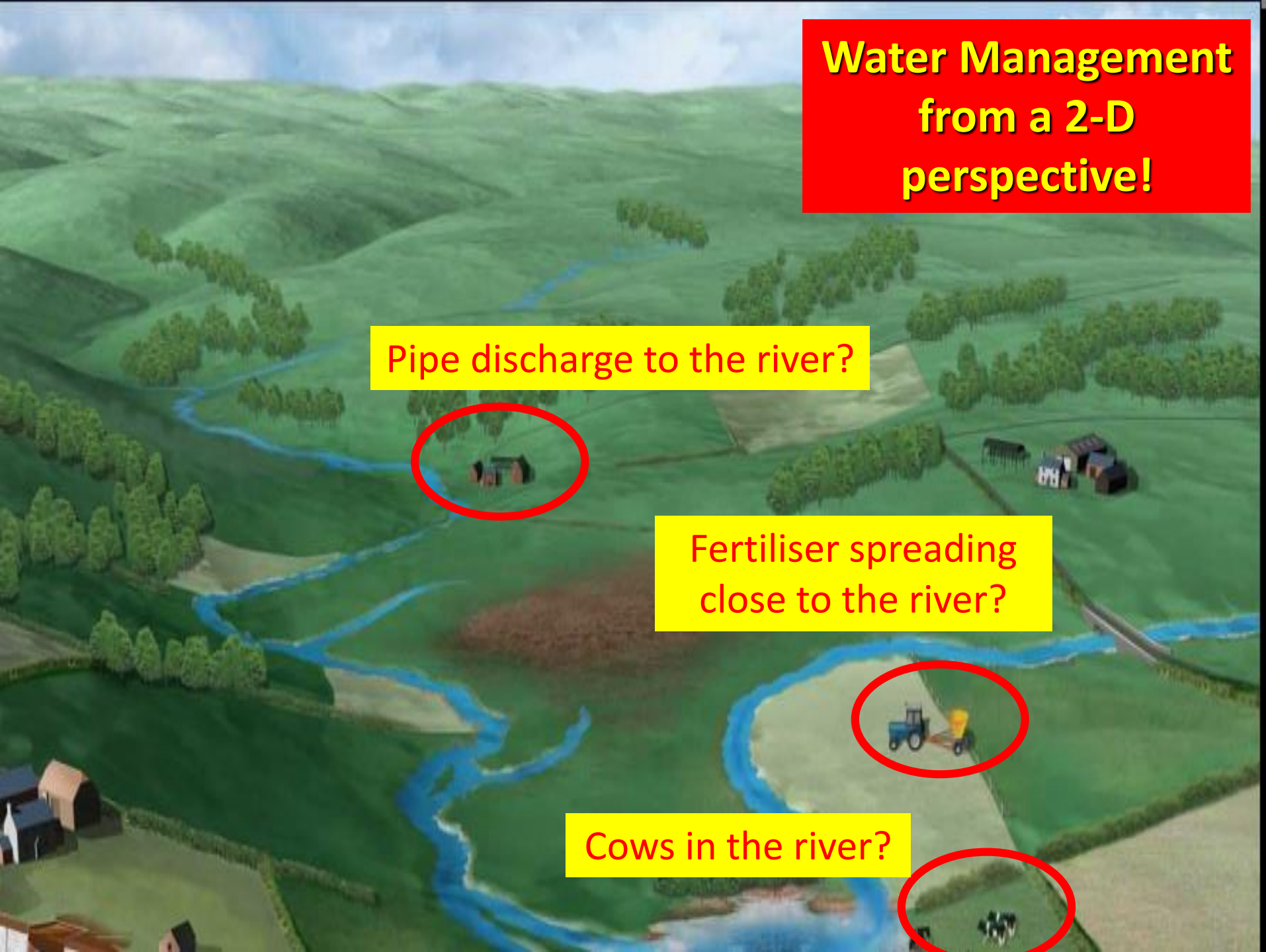


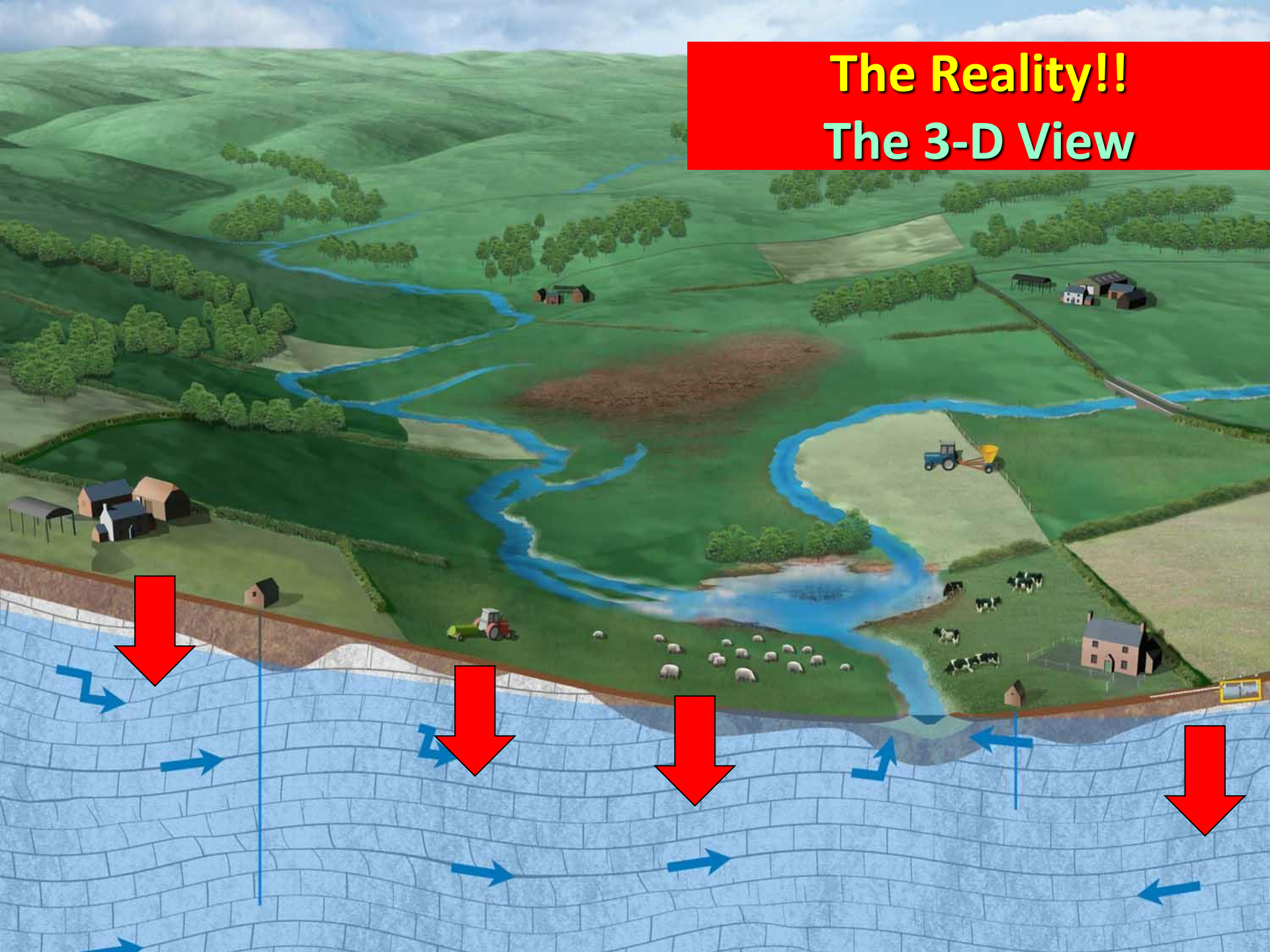
Wells

Groundwater contributes to surface water flow

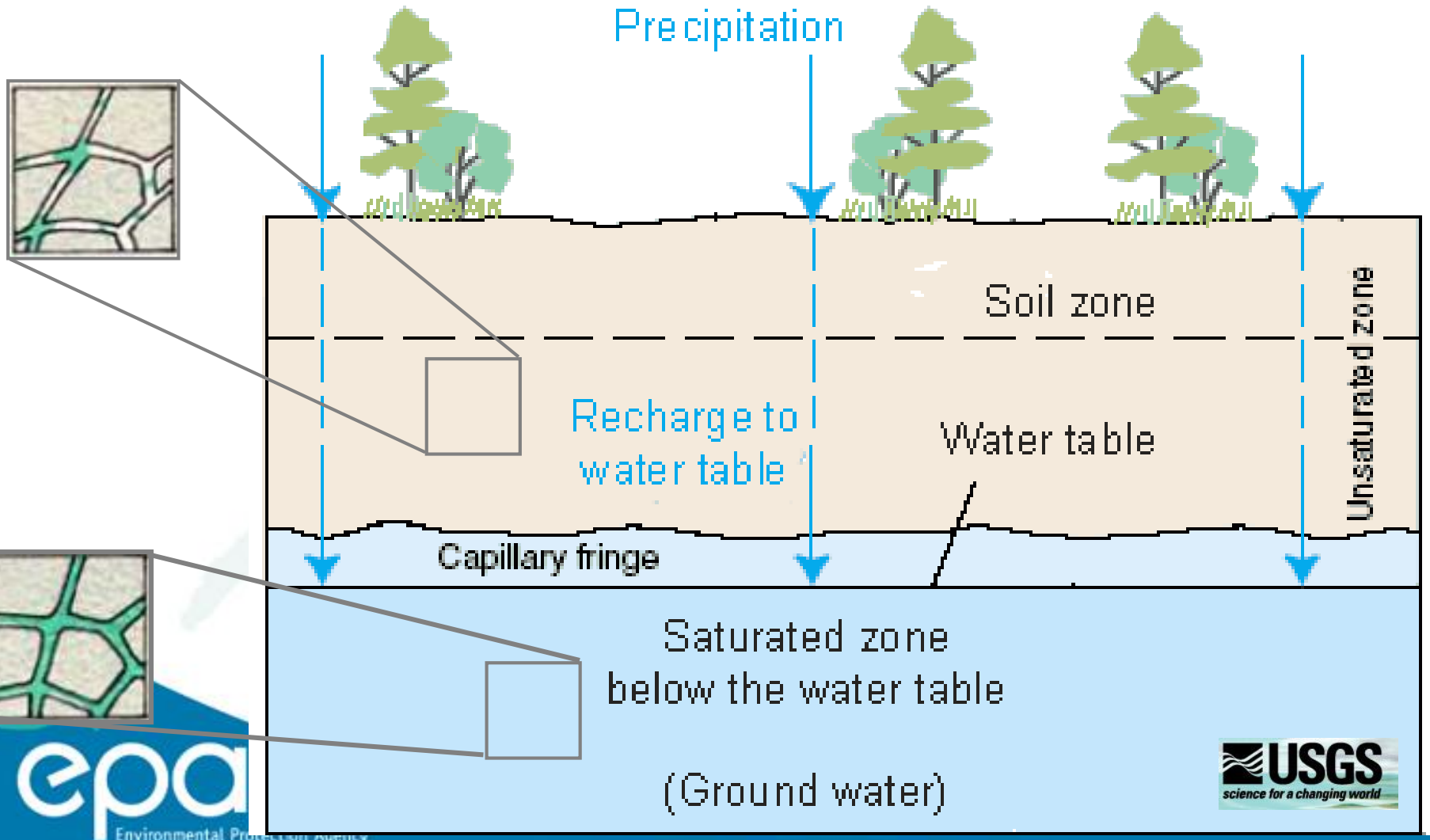
Photo: D. Daly (EPA)

Groundwater contributes to wetlands
e.g. Fens, Bogs & Turloughs


Water Management from a 2-D perspective!
Pipe discharge to the river?
Fertiliser spreading close to the river?
Cows in the river?


The Reality!!
The 3-D View

So ... What is Groundwater?



So ... What does that mean?

- **Not** a network of underground rivers and lakes!

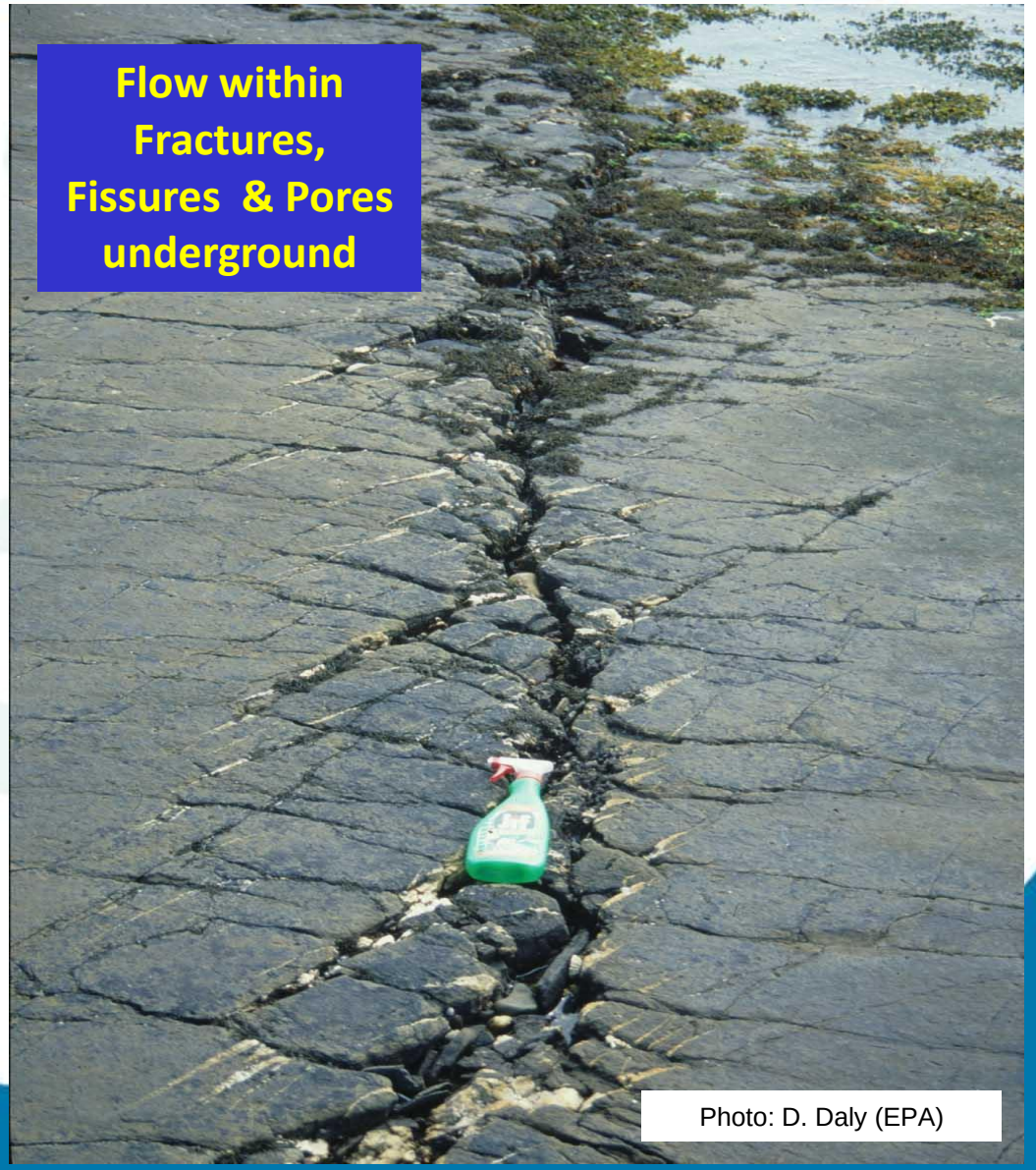


Photo: D. Daly (EPA)

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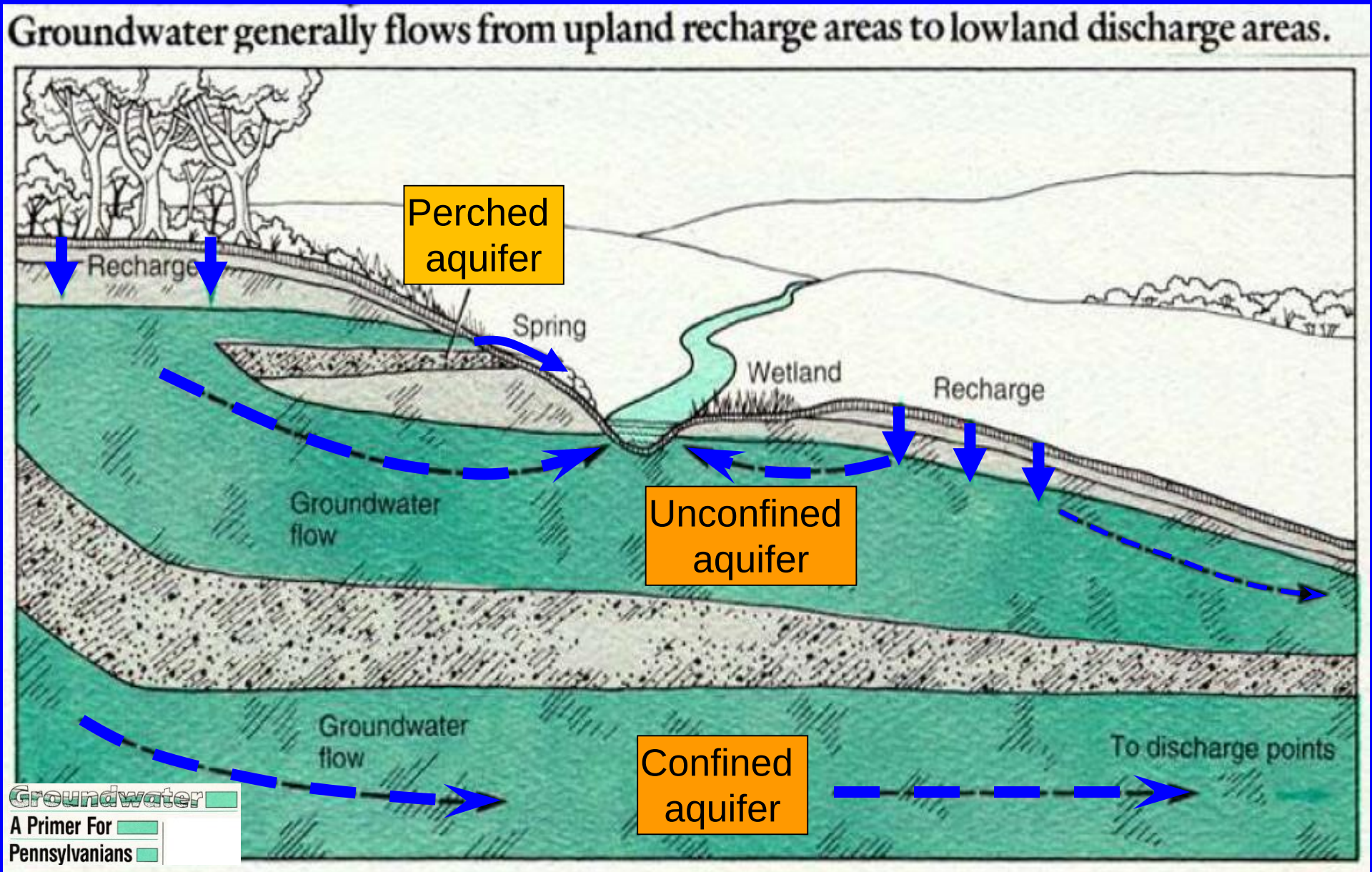
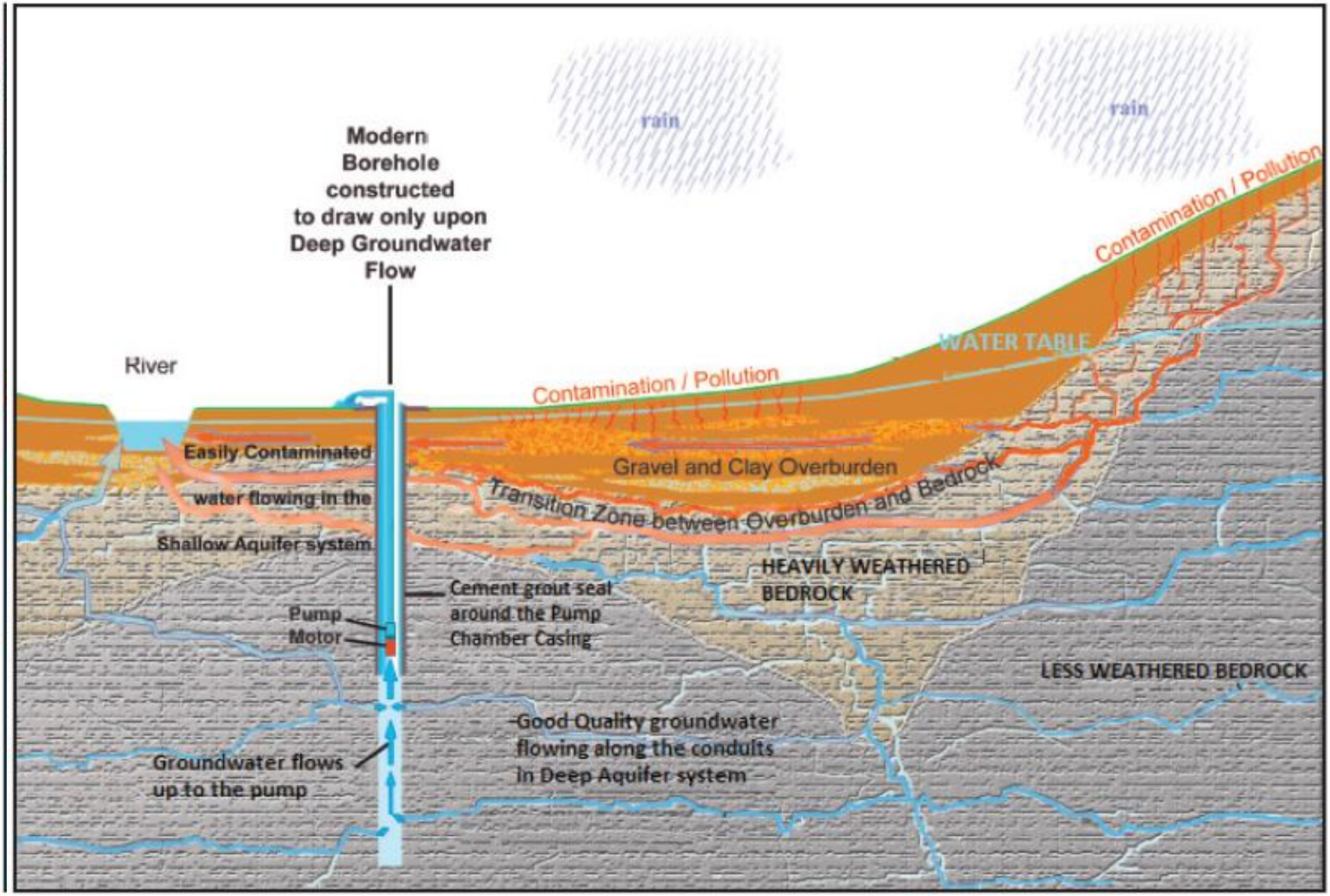
Aquifers

- Bedrock that contain sufficient voids to store water and are permeable enough to allow water to flow through them in “significant” quantities are called aquifers
- The Geological Survey of Ireland have also delineated Sand & Gravel deposits **> 1 km²** in extent & **> 5 m thickness** as aquifers
- In Ireland **all** bedrock and large sand & gravel deposits are called aquifers, since they are an important source of water supply and maintain flow to surface water and wetlands.

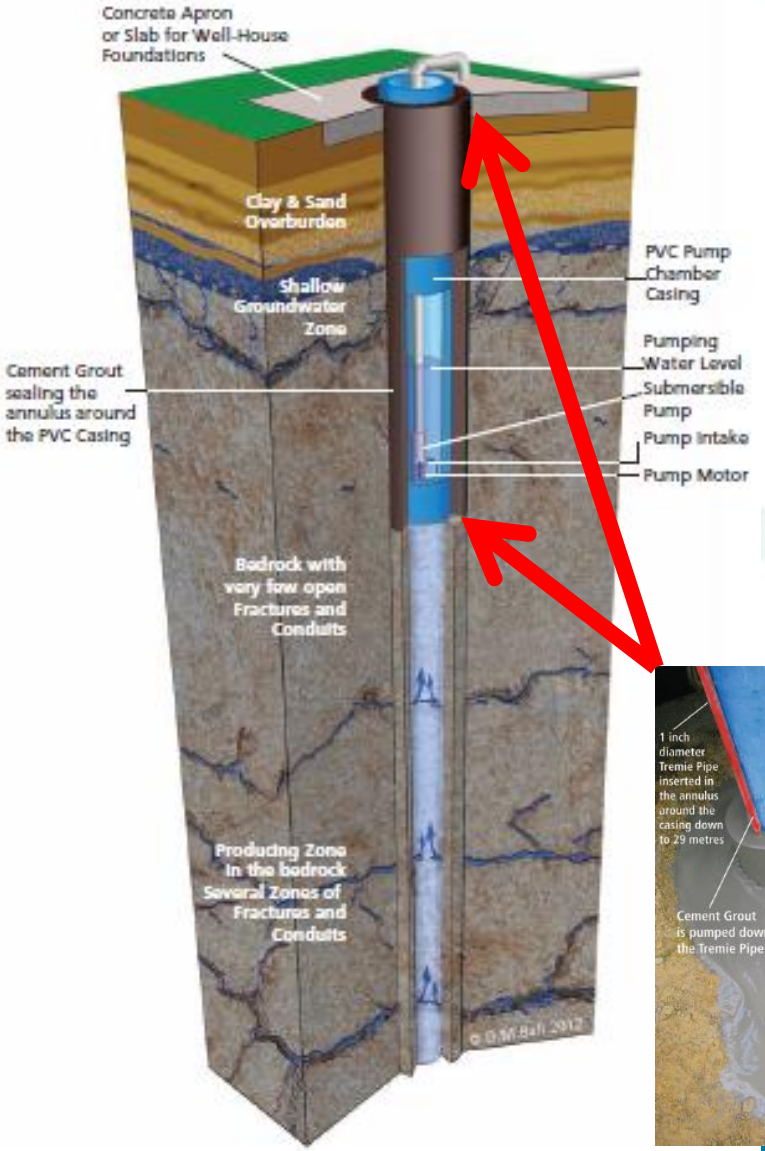
Groundwater flow in aquifers

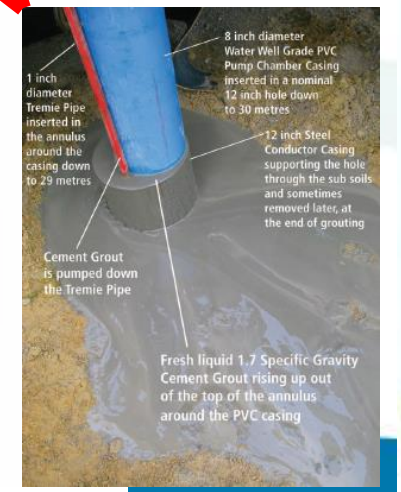


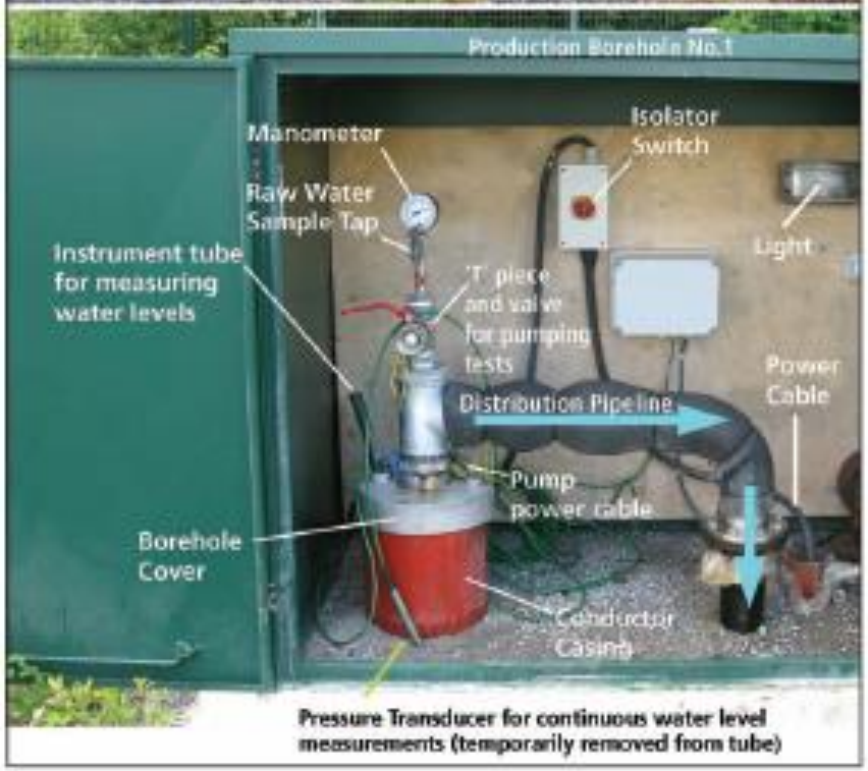
Groundwater flow in fractured / fissured aquifers?



Properly Constructed Borehole







Karst - Flow from Springs (e.g. Galway & Mayo)

Photo: D. Daly (EPA)

Karst – Groundwater Flooding (e.g. Gort, Galway)

Photo:s D. Daly (EPA)

Surface Water

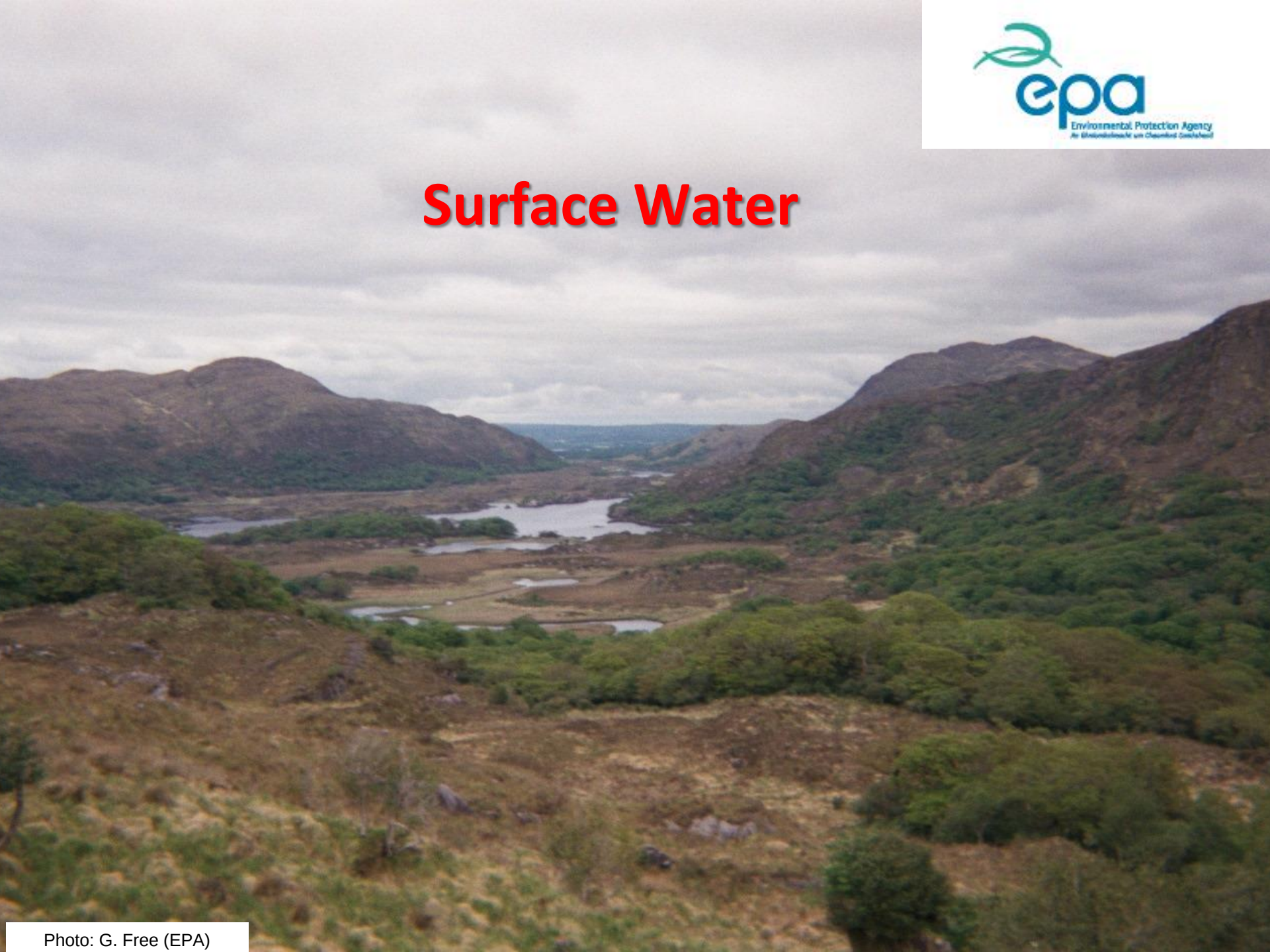
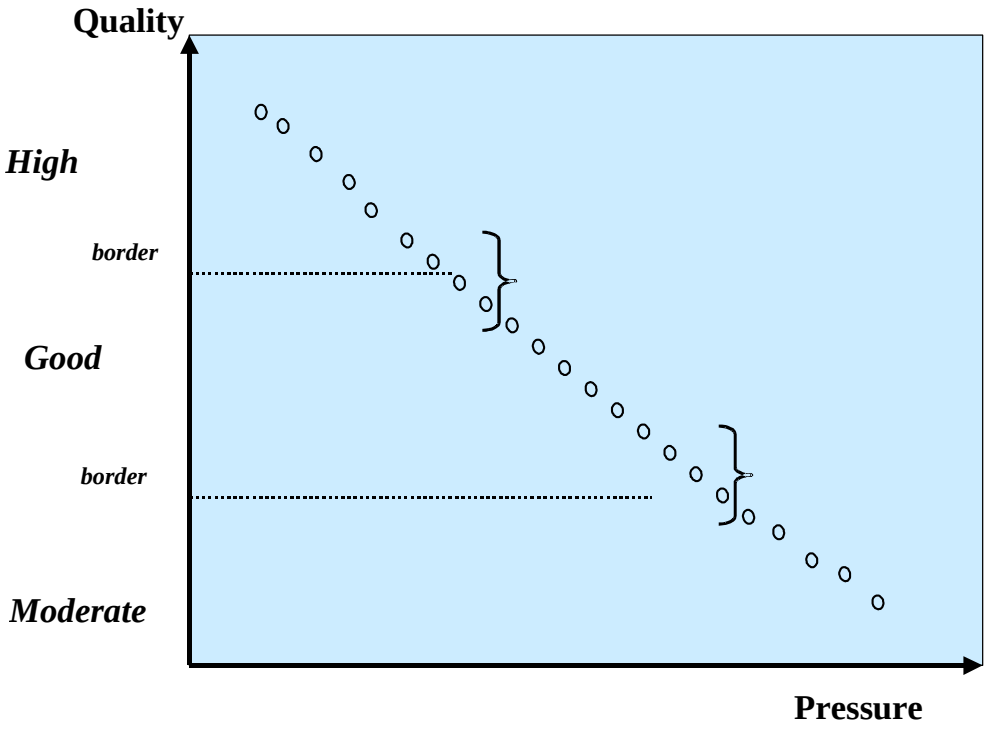


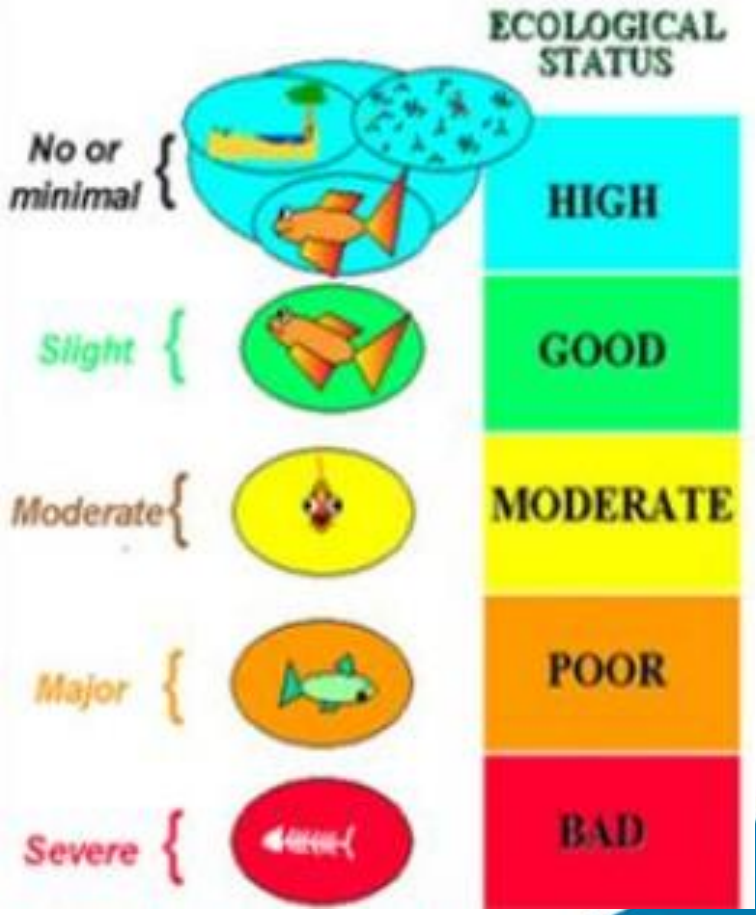
Photo: G. Free (EPA)

Ecological Water Quality Drivers

- The WFD has radically shifted emphasis from chemical measures of water quality to those based on ecology
- The biological elements to be monitored are:
  - phytoplankton
  - macrophytes
  - phytobenthos
  - benthic invertebrates
  - fish
- Key ecological assessment components benchmarked across EU

EU Harmonisation (5 ecology classes)





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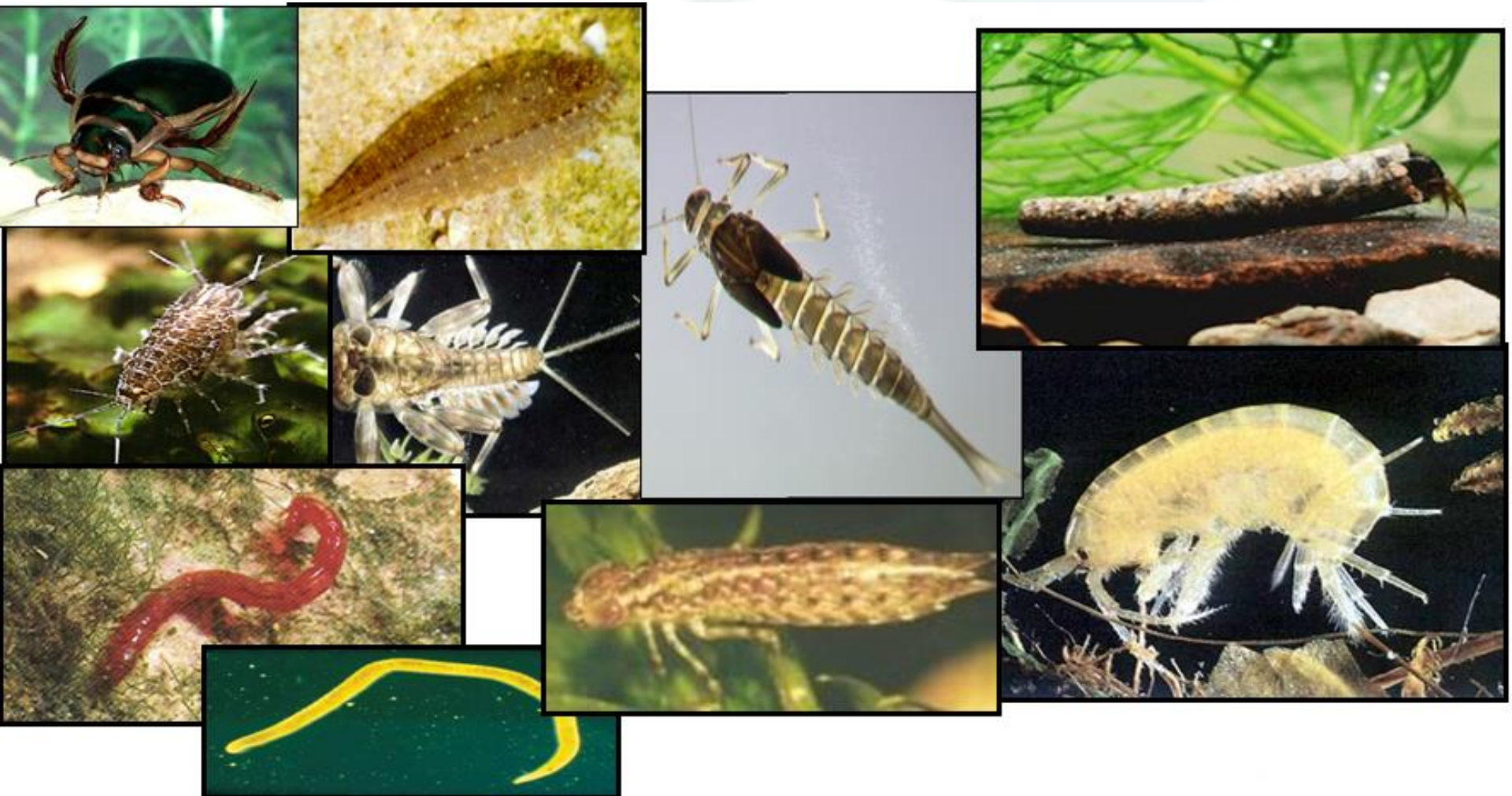
Ecological Assessment (Macrophytes)

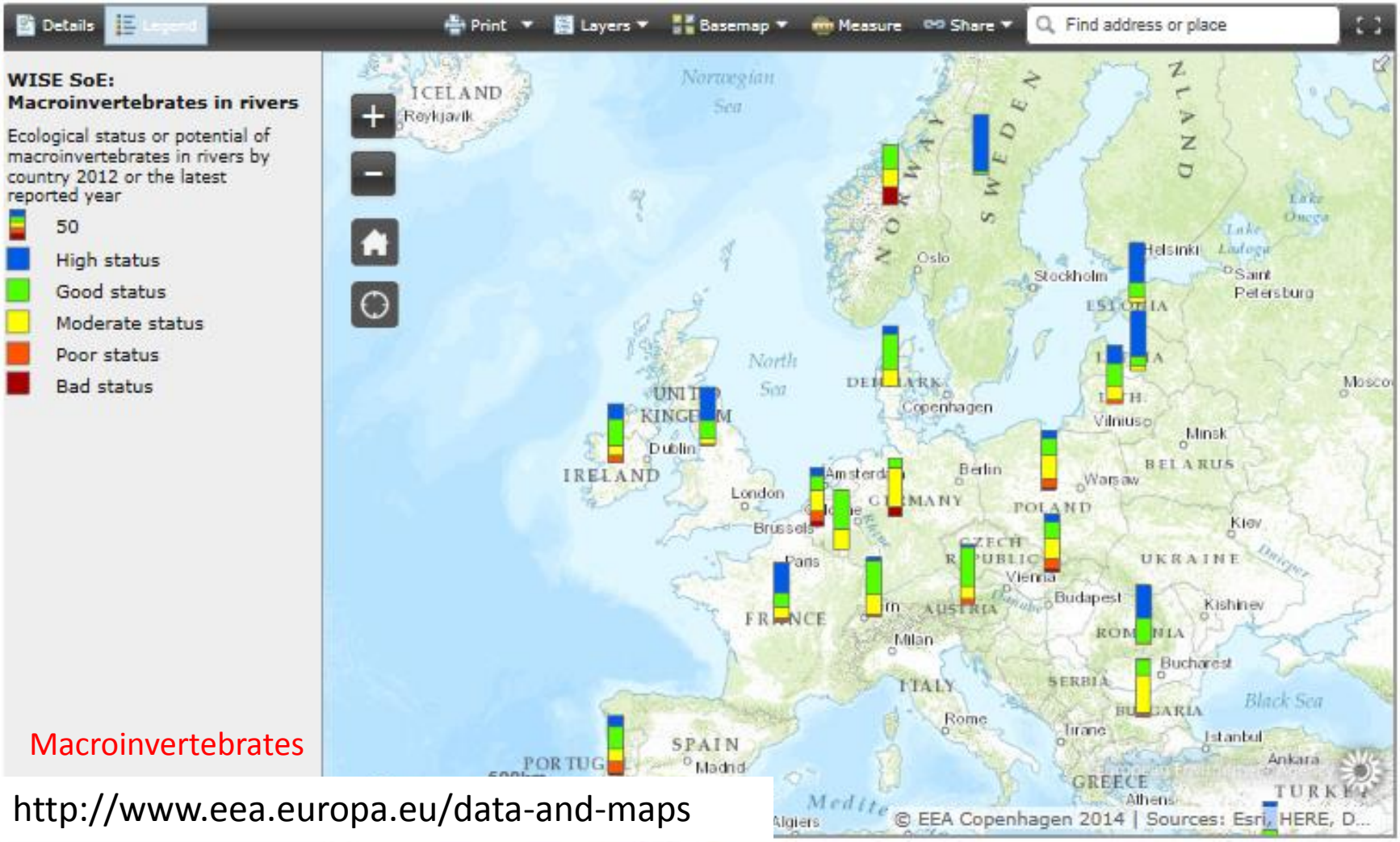
Photos: G. Free (EPA)

Ecological Assessment (Invertebrates)




Eutrophication

Ecological Condition



Macroinvertebrates

http://www.eea.europa.eu/data-and-maps

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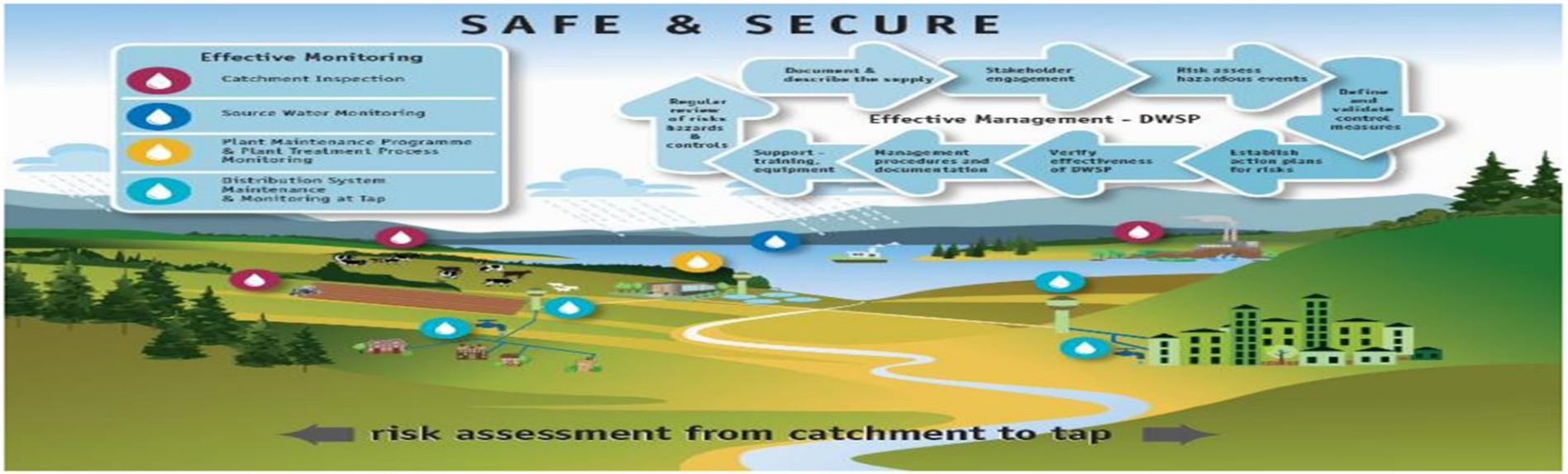
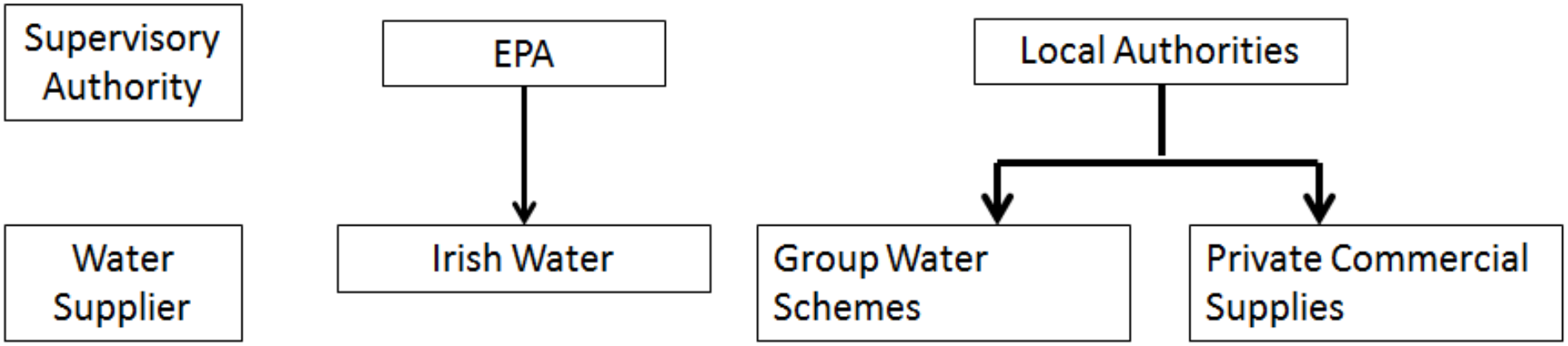


Drinking Water

Governance



Drinking Water Supply Types in Ireland

Supply Type	*Supplier/Supplying*	*No. of Supplies*	*Population (%)*	*Supervisory Authority*
Public Water Supplies	Irish Water	973	81.9	EPA
Public Group Schemes	Local Group	512	1.9	Local Authorities
Private Group Schemes	Local Group	421	4.2	Local Authorities
Small Private Supplies	Commercial/public activity	1,758	0.9	Local Authorities
Exempted Supplies[1]	Individual supplier	170,000*	11.1	Exempted

2691

*estimated number of private wells or boreholes

Key Issue – Large number of small supplies

What is the EPAs role?

European Union (Drinking Water) Regulations, 2014:

- EPA the supervisory authority over public water supplies (PWSs) and must ensure that appropriate corrective action is being undertaken
- EPA must be notified of a failure to meet a DW quality standard within one day
- EPA can issue legally binding Directions to Irish Water
- Failure to comply with a Direction can result in prosecution
- EPA must produce legally binding guidance on monitoring, sampling and corrective actions

❖EPA also responsible for producing an annual report on DW Quality

❖EPA produces best practice “Advice Notes” on DW management

Local Authority has <u>same powers</u> in respect of private supplies

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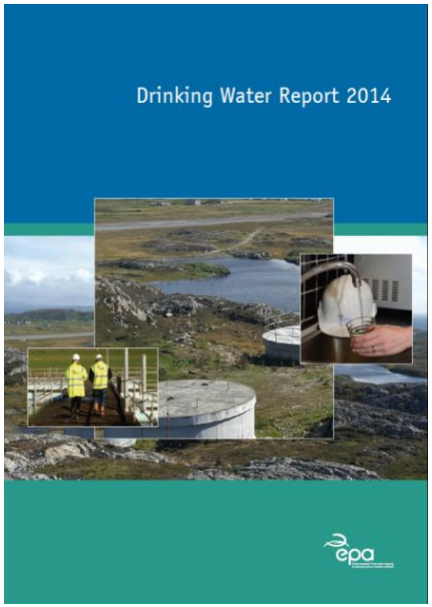

Key Points:

- Microbiological and chemical compliance is high in public water supplies
- 112 supplies "at risk" at the end of Sept 2015
- Microbiological contamination is a problem in private supplies
- Irish Water:
  - need to improve remaining "at risk" supplies
  - need to prepare and implement national strategies for key issues like lead, pesticides and disinfection

Key Actions for Irish Water?

- Eliminate long term boil water notices and the risk of other ones being put in place (6,000 people currently on a Boil Water Notice)
- Implement the national lead strategy
- Optimise chemical dosing and improve treatment to reduce THM exceedances
- Prioritise “at risk” supplies for improvement / investment
- Protect existing sources and abstraction points
- Develop drinking water safety plans

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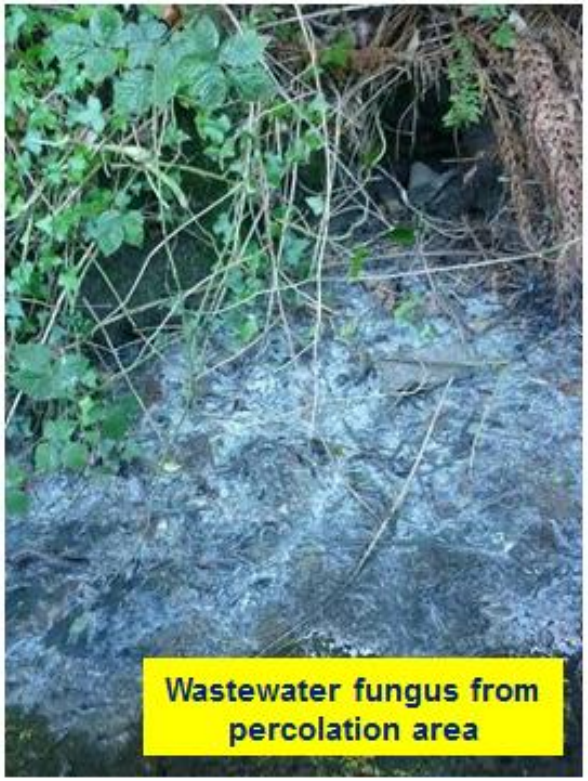
An example of Actions taken to improve DW Quality

Boyle Water Treatment Plant, Co. Roscommon

- Source is a shallow spring which fluctuates in quality depending on the weather
- Previously no treatment in place other than chlorination (which doesn't kill *Cryptosporidium*)
- Water supply regularly discoloured (Turbidity issue)
- Boil Water Notice issued in April 2012 due to detection of *Cryptosporidium*
- Following EPA Direction, Irish Water completed upgrade of WTP to include coagulation, filtration, UV and chlorine disinfection
- EPA reviewed plant performance which showed dramatic improvement in quality
- Boil Water Notice lifted in May 2015

Newly completed treatment plant at Boyle, Roscommon (courtesy of Glan Agua Ltd).

Septic Tanks



Photos: Michael Smietanka

Wastewater: Urban WWTP v Domestic WWTS

- Urban wastewater treatment plants (WWTPs) now controlled by Irish Water
- 534 WWTPs are subject to licensing by the EPA
- 94% of national wastewater load has secondary treatment
- 4.6% with no treatment or preliminary treatment only

- Almost 500,000 domestic wastewater systems in Ireland
- Serve 30% Ireland's population – up to 75% in rural areas
- Discharge 46 million gallons of wastewater per day into the ground
- Owner is responsible for proper operation and maintenance

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Domestic Wastewater Systems / Septic Tanks

Water Services (Amendment) Act 2012

- Obligations on:
  - Home owners to:
    - Operate and maintain their system
    - Repair their systems if fail inspection
    - Register their systems
  - Local Authority to:
    - Maintain a register of treatment systems
    - Implement the National Inspection Plan
  - EPA to:
    - Develop National Inspection Plan
    - Supervise its implementation by Local Authorities
    - Appoint Inspectors

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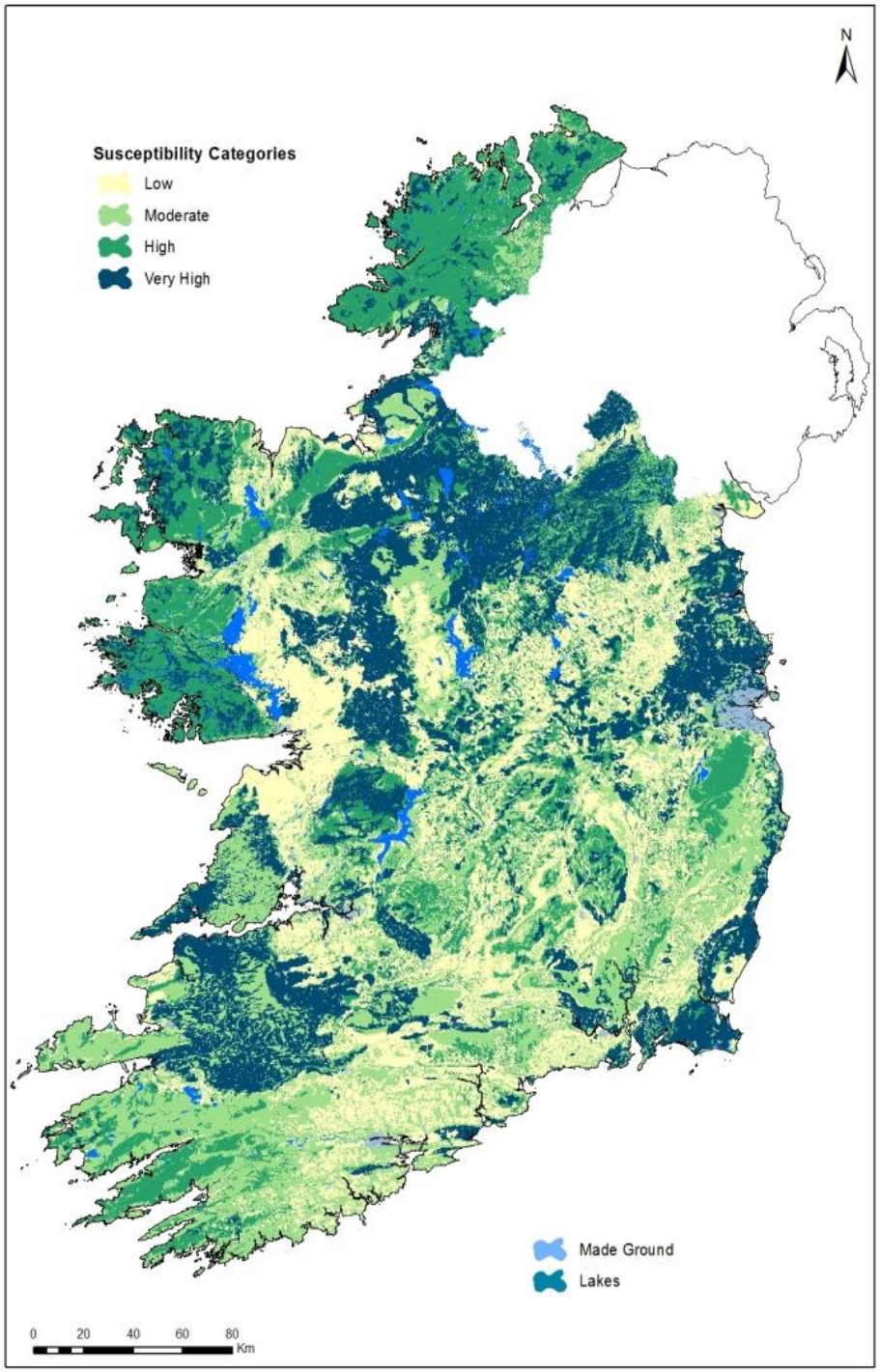
Basic info on Domestic Wastewater Systems (DWWTSs)

- DWWTSs that are located, constructed and installed in accordance with best practice guidance generally provide adequate treatment and disposal of domestic waste water
- However, wastewater poses a potential threat to human health primarily because of the presence of microbial pathogens, where systems are improperly sited, installed and operated
- **40 -50 %** of the country has hydrogeological characteristics that can be problematical due to:
  1. inadequate percolation
  2. inadequate attenuation before the wastewater enters groundwater

Inadequate Percolation

Photos: Donal Daly (EPA)

Inadequate Percolation?



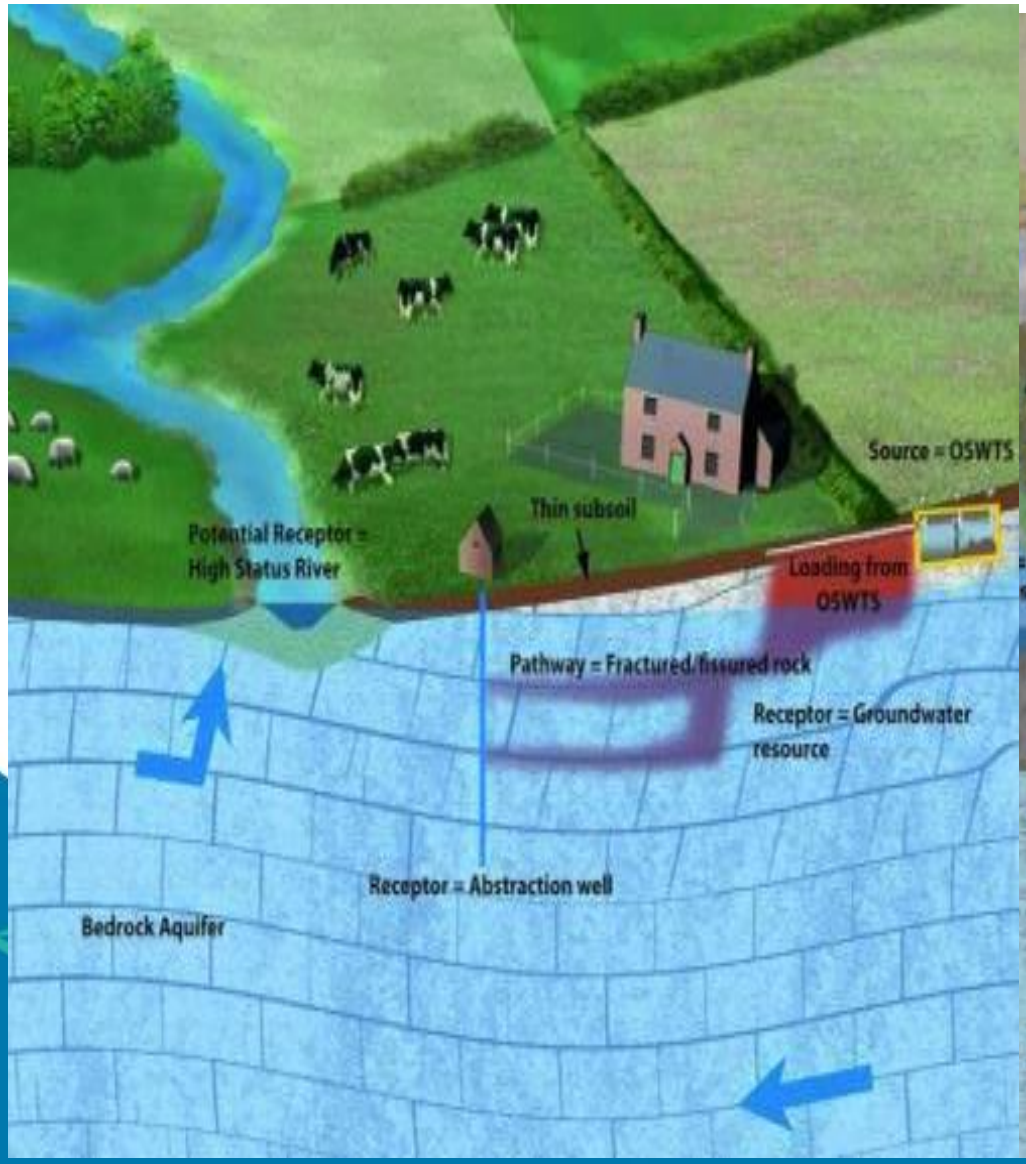
Distribution of susceptibility categories for inadequate percolation (1:40,000)

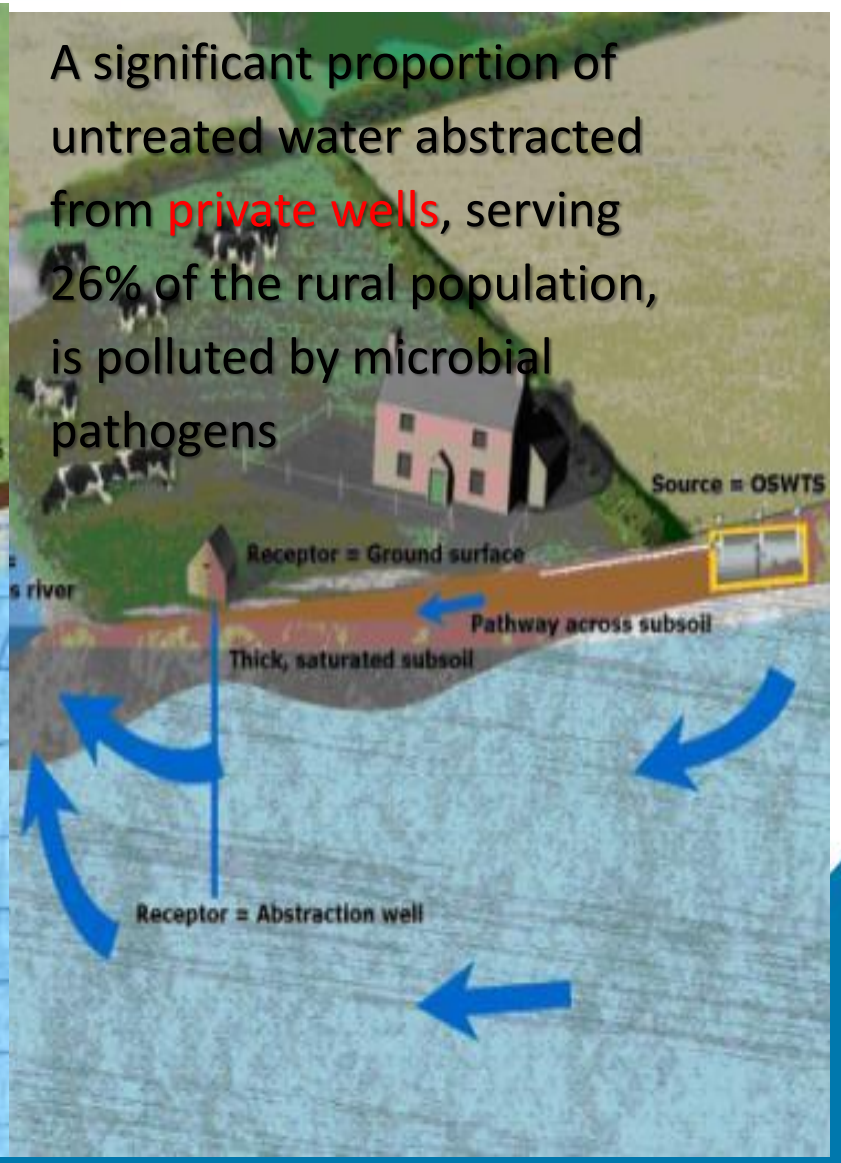
Susceptibility Category	Percentage (%) Land Area	Overall National Likelihood of Inadequate Percolation (%)
Low	25.8	**39**
Moderate	25.7	
High	22.0	
Very High	25.2	
Made Ground	1.3	

Inadequate Attenuation

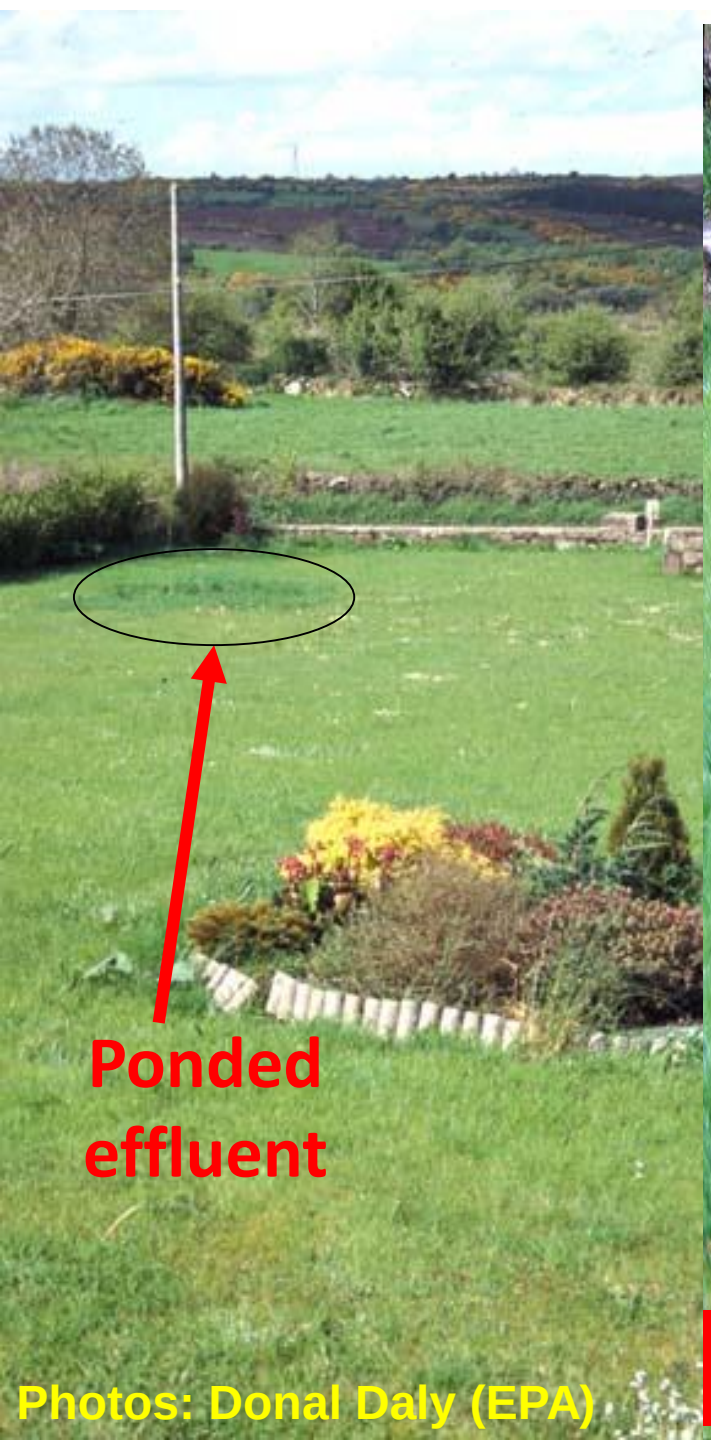
Photos: Donal Daly (EPA)

Potential Impact from Domestic Wastewater Systems





A significant proportion of untreated water abstracted from private wells, serving 26% of the rural population, is polluted by microbial pathogens



Photos: Donal Daly (EPA)

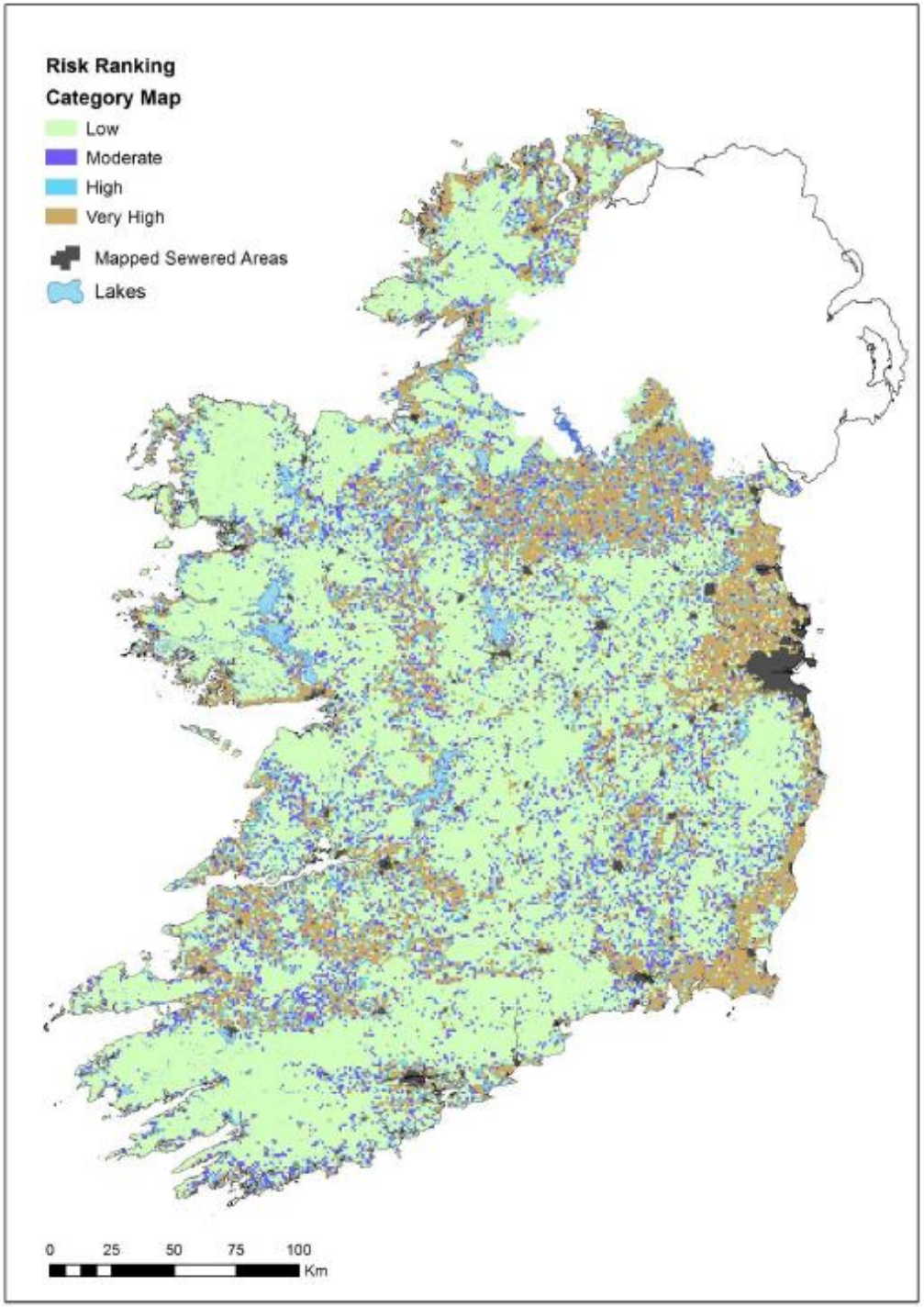
Impacts on Human & Animal Health

Impacts on Water Quality

Photo: Robbie Meehan

Risk Assessment to Focus Inspections

To help target inspections a septic tank **impact potential risk map** has been created by overlaying the location of septic tanks onto the inadequate percolation map



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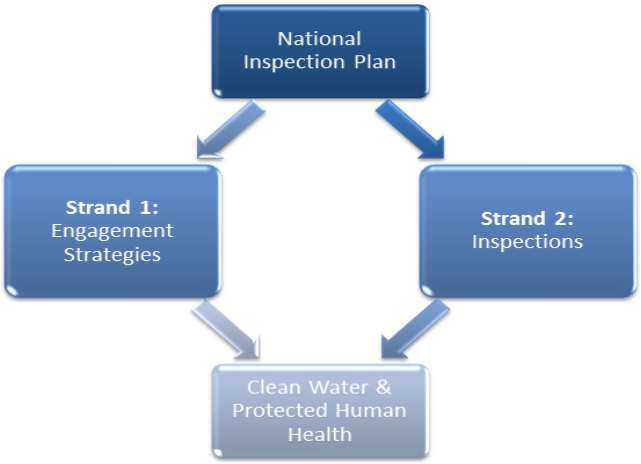
National Inspection Plan (2015-2017)

- **Engagement strategies** - focussing on promoting best practice relating to the operation and maintenance of DWWTs and encourage registration by homeowners
- **Site inspection strategies** – Risk-Based site inspections focussing primarily on operation and maintenance of DWWTs
- **Inspections**:
  - Are non-intrusive
  - Focus on compliance with Act and Regulations
  - Consider if components are in working order
  - Look for unauthorised discharges
  - Look to see if rainwater /clean surface water gets into systems
  - Check for maintenance and operation records
  - Check if de-sludging occurs at regular frequency
  - **Determine if they pose a risk to human health or the environment**



- If a system fails then an Advisory Notice is issued by LA and owner may be eligible for a grant, if the system is registered

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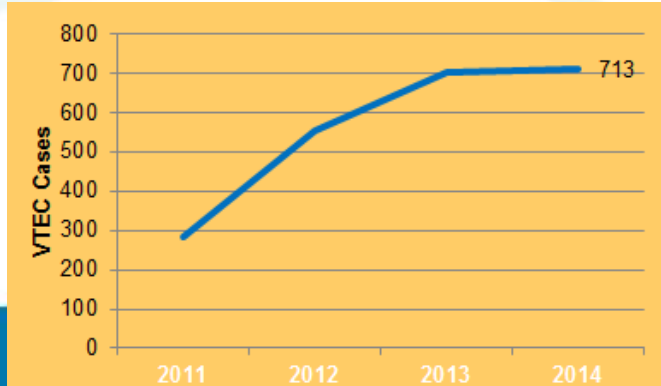
Inspection Findings

- 46% of domestic wastewater treatment systems failed the inspection
  - 25% of all systems inspected failed due to lack of de-sludging
  - 23% of all systems inspected failed due to operation and maintenance issues
  - 16% of all systems inspected failed due to unlicensed discharges to surface water/ inadequate soil thickness, which are difficult and/or expensive to correct
  - 12% of all systems inspected failed due to leakage from the system, which may require a replacement of the system
  - 11% of all systems inspected failed due to clean water entering the system, which may flush solids out to the percolation area
- 26% of all systems inspected also had a private well on-site.

Half of these systems failed the inspection!

Risks to Private Wells

- Ireland has the highest rate of VTEC (**nasty** form of E.Coli) in Europe *Ref: HSE reports*
  - VTEC cases are 4 times more likely where private well water consumed
  - 100% increase in VTEC in 2012 (over 700 cases in 2014)
- Estimated that up to 30% of private wells contaminated by E. coli *Ref: EPA Water Quality Report*
- Many well owners are unaware of the risks posed to their health from private well water. A recent survey in Ireland indicated that:
  - 24% unaware of the potential threat of adjacent septic tank systems
  - In 40% of cases, the well water was not regularly tested
  - Most wells do not have any form of treatment; only 32% of private well supplies had some form of treatment



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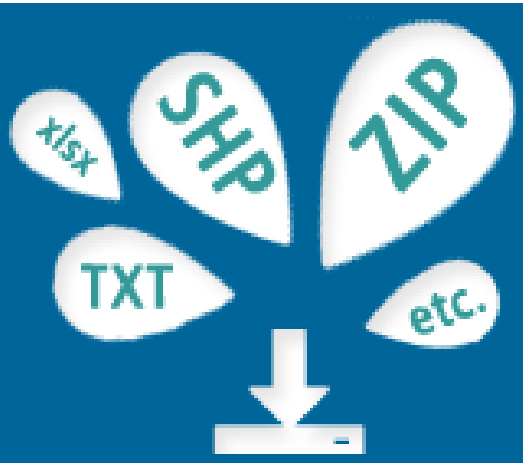
Key Messages on Septic Tanks

- Proper siting, construction and operation of systems is critically important to protect human health and the environment.
- Need to increase awareness of risks posed by septic tanks particularly, where there is also a private well on site.
- System owners have a responsibility to protect their own health and the local environment

Accessing EPA Information



EPA DATABASE

SEE MAPS

CONNECT

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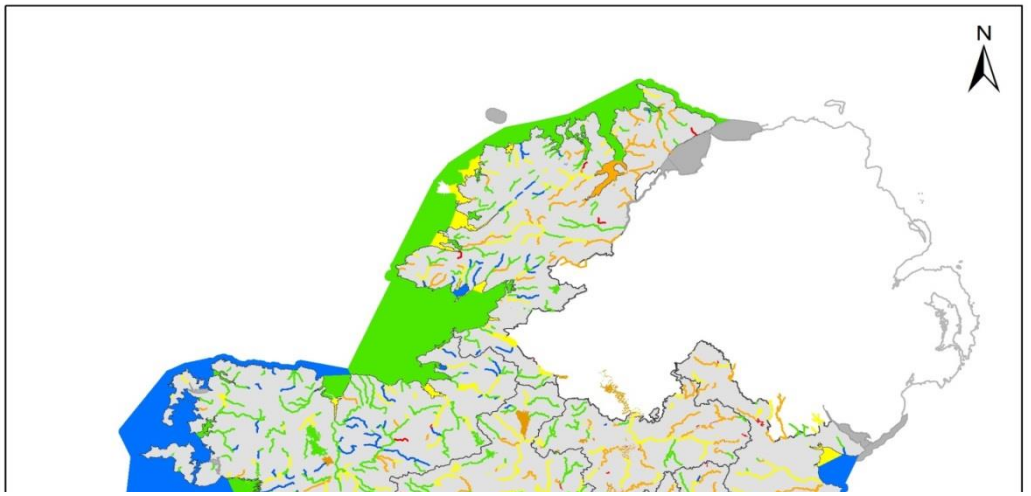
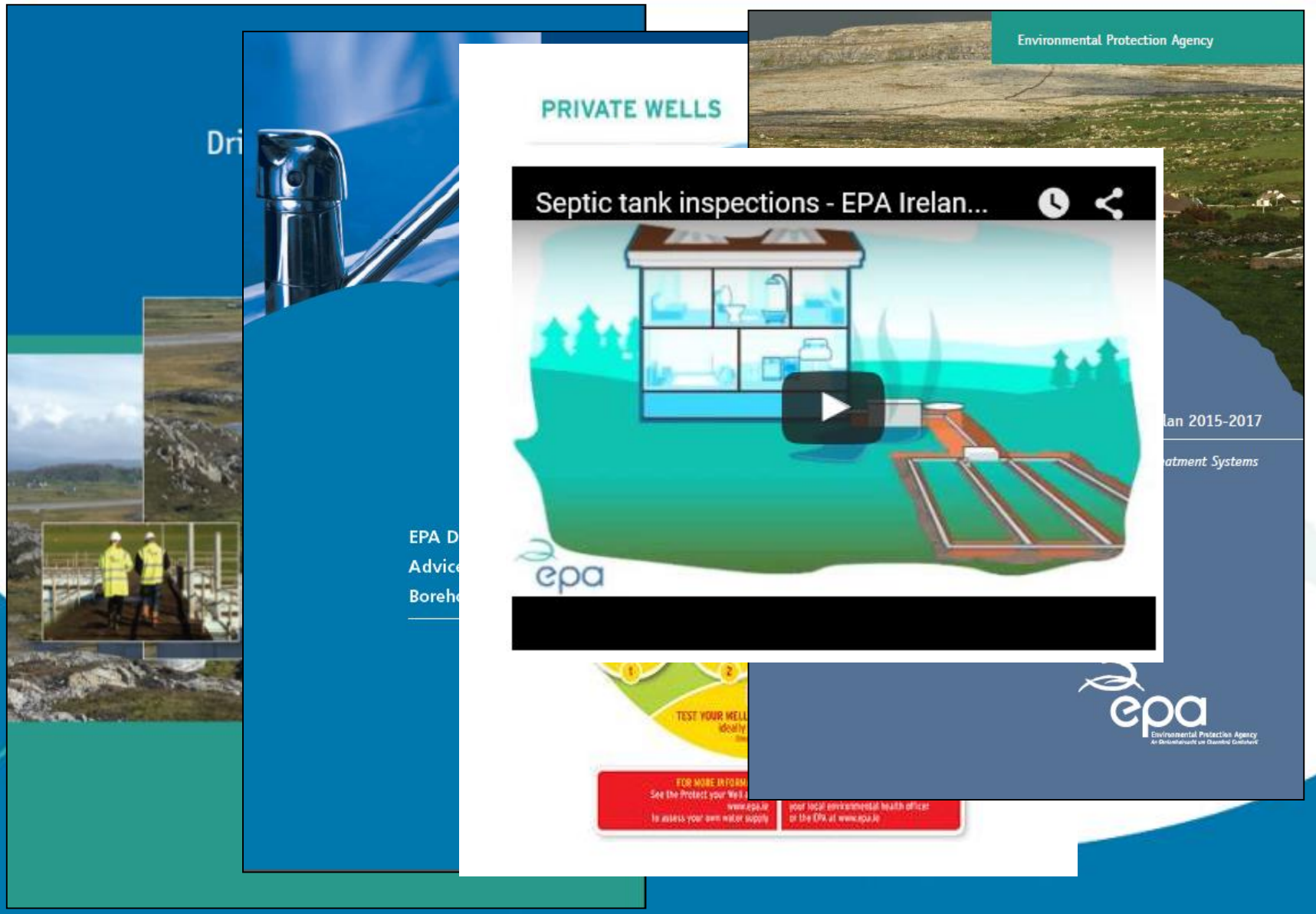
Water Quality in Ireland report



Status of Irish Water 2010-2012	High	Good	Moderate	Poor	Bad
Groundwater (% area) (interim status)	n/a	99	n/a	1	n/a
Rivers (% water bodies)	12	41	29	18	0.7
Lakes (% water bodies)	8	34	33	16	8
Transitional (% area)	3.6	41.1	43.4	11.4	0.5
Coastal (% area) *	63	30	4.4	<0.01	<0.01

Drinking Water & Septic Tank Information



More Info?

http://www.epa.ie

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Thank You for Listening