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Waters of LIFE Advisor Training

Module 3A: Intro to Catchment Science I - Pollutants

May 2025

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Pollutants of concern:

- Phosphate
- Nitrate
- Ammonium
- Biochemical Organic Demand (BOD)
- Sediment
- Pesticides
- Hydromorphology

The monitoring of specific pollutants contributes to the assessment of ecological status of waterbodies – WFD

Credit: LAWPRO

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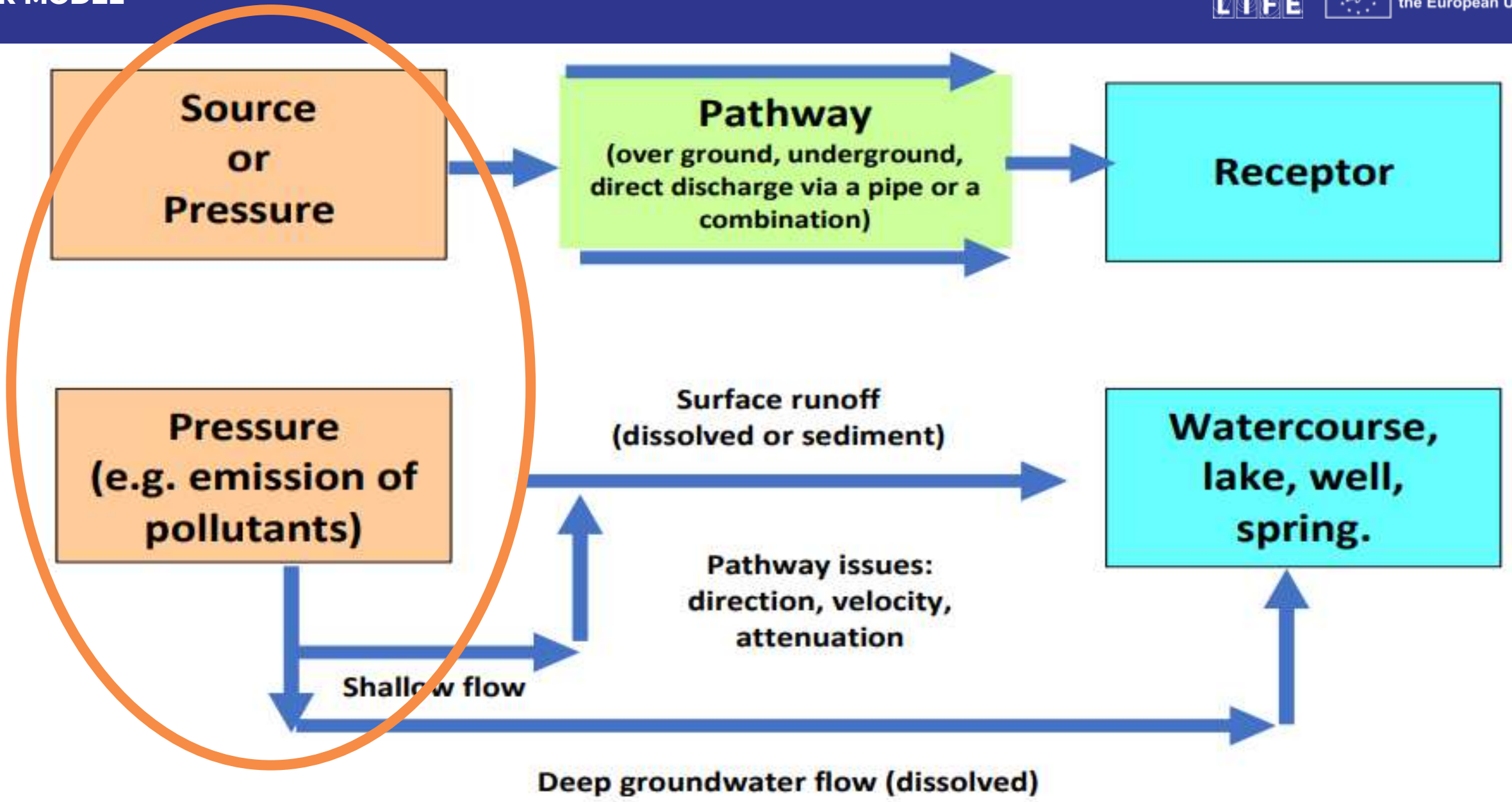

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Phosphate Source:

- Fertilisers (organic & chemical)
- Manure (application/timings)
- Soiled water (farmyards, roadways)
- Waste Water Treatment Plants (WWTP)
- Septic tanks

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Phosphate Impact

Eutrophication = reduced oxygen levels in water

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Nitrate Source:

- Fertilisers (organic & chemical)
- Grazing animals (urine patches & dung)
- Leguminous plants
- Atmospheric decomposition (ploughing)

Nitrate Impact:

Eutrophication – reduced oxygen levels

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Ammonium Source:

- Organic manure
- WWTP
- Plant debris or crop residue – localised source
- Peat soils - natural flushes from runoff/rain events

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Ammonium Impact:

Toxic to fish and other aquatic organisms

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BOD represents how much oxygen is needed to break down organic matter in water

BOD Source:

- Organic fertilisers
- Grazing animals (faeces & urine)
- Farmyards (grey water)
- Wastewater (WWTP, septic tanks)
- Domestic septic tanks
- Milk & silage effluent

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BOD Impact:
Depleted oxygen levels needed to support aquatic organisms

Examples of BOD Values For Common Pollutants	BOD mg/l of oxygen
Milk	100,000
Silage Effluent	65,000
Pig Slurry	25,000
Cattle slurry	17,000
Dilute dairy and parlour washings	1000 – 2000
Raw domestic sewage	300

Most polluting

Least polluting

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Sediment Source:

- Land drainage
- Drainage maintenance
- Channel maintenance
- Land reclamation
- Cattle poaching near watercourse
- Runoff from tillage fields
- Peat loss & poorly managed forest clear-felling
- Runoff from roads and concreted areas

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Sediment Impact:

- Decline in habitat quality – particularly spawning gravels

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Pesticide Sources:

- Sheep dip (Cypermethrin)
- Crop protection (Glyphosa
- Rush control (MCPA)

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Pesticide Impact:
Completely toxic – particularly invertebrates

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Hydromorphology Impacts: Changes in natural flow & direction of water (“energy”)

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1. There are multiple pollutants monitored under Water Framework Directive

2. Changes in the levels of these pollutants contribute towards changes water quality status in waterbodies.

3. Pollutants can have multiple sources – not always Agriculture!