



Northern Ireland Environment Agency  
Gníomhaireacht Comhshaoil Thuaisceart Éireann  
Norlin Airlan Environment Agency

# DPSIR Methodology



An Agency within the Department of  
**Agriculture, Environment  
and Rural Affairs**  
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Gníomhaireacht de chuid na Roinne  
**Talmhaíochta, Comhshaoil  
agus Gnóthaí Tuaithe**

An Agency w'in the Department o  
**Fairmin, Environment  
an' Kintra Matthers**

## Table of contents

Abbreviations .....	2
1 Introduction .....	3
2 DPSIR.....	5
2.1 Data collection .....	6
2.1.1 Combined Storm Overflows.....	6
2.1.2 Septic tanks .....	7
2.2 External stakeholder engagement .....	7
2.3 Data Analysis .....	7
2.3.1 Frequency of pressures .....	8
3 Next steps.....	8
Appendix 1: Driver categories.....	9
Appendix 2: Pressure categories.....	1
Appendix 3: Impact categories .....	1
Appendix 4: Key Type of Measures (KTMs) .....	2

## Abbreviations

<b>Abbreviation or acronym</b>	<b>full name</b>
<b>CSO</b>	Combined Storm Overflow
<b>KTM</b>	Key Type of Measure
<b>LMA</b>	Local Management Area
<b>NIW</b>	Northern Ireland Water
<b>RBD</b>	River Basin District
<b>RBMP</b>	River Basin Management Plan
<b>POMs</b>	Programme of Measures
<b>WFD</b>	Water Framework Directive
<b>WISE</b>	Water Information System Europe

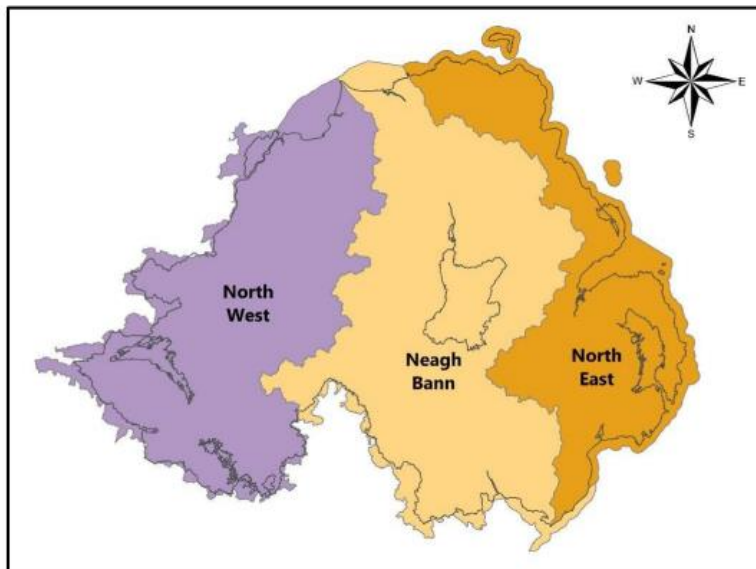
## 1 Introduction

This report is a supporting document to accompany Significant Water Management Issues 2025 Consultation document (SWMI 2025 consultation).

The SWMI consultation aims to identify the pressures affecting our water environment across NI at Local Management Area (LMA) level and at individual waterbody level.

Northern Ireland has three river basin districts (RBDs): North Western, Neagh Bann and North Eastern. North Western and Neagh Bann are international river basin districts shared with Ireland.

**Figure 1: River Basin Districts in Northern Ireland**



Each RBD is made up of several Local Management Areas (LMAs). LMAs, depending on size and geographical location, can be made up of a number of waterbody types.

Northern Ireland is made up of:

- 450 river waterbodies
- 21 lakes waterbodies
- 19 coastal waterbodies and 6 transitional waterbodies (also referred to as marine)
- 75 groundwater bodies

As set out in the Water Environment (Water Framework Directive) Regulations 2017<sup>1</sup>, where a waterbody fails to meet the relevant environmental objective for that waterbody or is at risk of failing to meet that objective, i.e. achievement of 'good' status, then the cause of this failure (i.e. the pressure or combination of pressures) must be identified.

Water body classification is available at [NIEA Catchment Data Map Viewer | Department of Agriculture, Environment and Rural Affairs](#)

Objectives for water bodies were set in the 3rd cycle RBMP and can be found in the supporting documents section<sup>2</sup> and will be available on the NIEA Catchment Data Map Viewer in due course.

This assessment of significant water management issues pressures has been completed using a Driver-Pressures-State-Impacts-Responses Framework (DPSIR).

Undertaking this pressure assessment was one of the recommendations in the Office for Environmental Protection's (OEP) review of the implementation of the Water Framework Directive Regulations and River Basin Management Planning in Northern Ireland<sup>3</sup>.

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<sup>1</sup> [The Water Environment \(Water Framework Directive\) Regulations \(Northern Ireland\) 2017](#)

<sup>2</sup> [Third River Basin Management Plan for Northern Ireland | Department of Agriculture, Environment and Rural Affairs](#)

<sup>3</sup> [The Office for Environmental Protection Urges DAERA to Implement Overdue Plan to Help Improve Water Quality | Office for Environmental Protection](#)

## 2 DPSIR

An assessment of pressures and impacts was undertaken as part of the European WFD WISE reporting in 2015. This dataset was used as a baseline to provide an updated pressure analysis. However, Key Type of Measures (KTMs) were not assigned at waterbody level in 2015.

The following terms have been defined below.

**Table 1 Definition of terminology used in DPSIR<sup>4</sup>**

Term	Definition
<b>Driver</b>	An anthropogenic activity that may have an environmental effect (e.g. agriculture, industry)
<b>Pressure</b>	The direct effect of the driver (for example, an effect that causes a change in flow or a change in water chemistry)
<b>State</b>	The condition of the water body resulting from both natural and anthropogenic factors (i.e. physical, chemical and biological characteristics)
<b>Impact</b>	The environmental effect of the pressure (e.g. fish killed, ecosystem modified)
<b>Response</b>	The measures taken to improve the state of the water body (e.g. restrict abstraction, limiting point source discharges, developing best practice guidance for agriculture)

State has been identified as the most recent classification result, identifying elements of the assessment which are at less than good status.

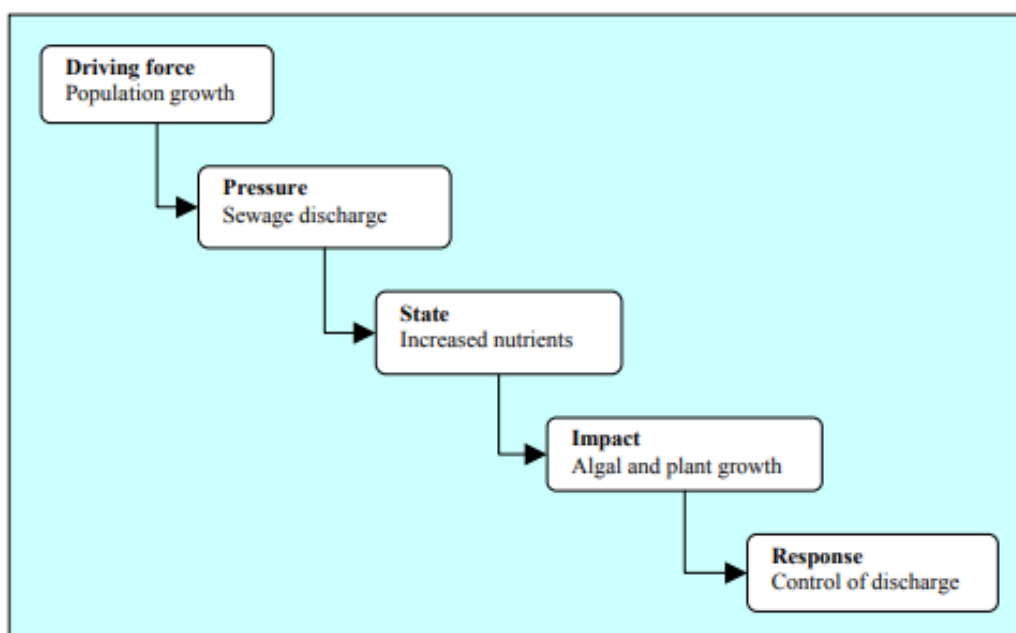
Response refers to the assignment of key type of measures (KTMs) which are high level strategic actions. They aid the design of an appropriate Programme of Measures (POMs) to protect, enhance and restore water bodies.

The initial list of DPSIR categories was extracted from WFD Reporting Guidance 2016<sup>5</sup> and has been supplemented with additional new pressures and KTMs. Some categories were combined following stakeholder feedback.

<sup>4</sup> [https://circabc.europa.eu/sd/a/7e01a7e0-9ccb-4f3d-8cec-aeef1335c2f7/Guidance%20No%203%20-%20pressures%20and%20impacts%20-%20IMPRESS%20\(WG%202.1\).pdf](https://circabc.europa.eu/sd/a/7e01a7e0-9ccb-4f3d-8cec-aeef1335c2f7/Guidance%20No%203%20-%20pressures%20and%20impacts%20-%20IMPRESS%20(WG%202.1).pdf)

<sup>5</sup> [Microsoft Word - WFD\\_ReportingGuidance.docx](#)

Figure 2 An illustration of the DPSIR analytical framework



## 2.1 Data collection

Internal workshops were held with monitoring & assessment teams, regulatory teams and Water Quality Inspectors to identify pressures impacting on waterbodies on an LMA basis. The pressures within each LMA were identified using monitoring and regulatory datasets, including data on land use and human activities in catchments.

The work was supported by geospatial datasets and pressures identified in 2015 served as a useful starting point for discussions.

Information was captured in table format using standardised categories for double-checking by attendees.

### 2.1.1 Combined Storm Overflows

Combined Storm Overflows (CSOs) are pressures identified by NI Water and can be divided into two categories;

- Unsatisfactory CSOs - unsatisfactory overflows that may directly impact water quality. These are captured in the urban wastewater category.
- To be determined CSOs - CSOs that have yet to be classified as either satisfactory or unsatisfactory and require modelling by NI Water to determine status. These are captured in the “Other” category.

### 2.1.2 Septic tanks

Under the Water (Northern Ireland) Order 1999, the discharge of trade or sewage waste to any waterway, or any water contained underground, requires a consent obtained from DAERA. This includes waste from any commercial, industrial or domestic premises not connected to the public sewer. Discharge consents contain site-specific conditions in relation to quality and volume parameters, as well as conditions relating to service and maintenance which the consent holder must meet, and information which should be adhered to.

An individual septic tank serving a household, if it is properly maintained, should not pose a significant threat to the environment. However, in an area with numerous septic tanks, the combined discharges could potentially have an effect on the quality of groundwater and on watercourses in that area.

NIEA maintain an online public register of all domestic discharge consents from 1992.

Records relating to the location of septic tanks constructed/ in use pre-1970's are not readily available. Septic tanks are not monitored for performance by NIEA. Consequently, septic tanks present a potential risk, with an unknown impact, to the water environment. In-house models have been used to take a risk-based assessment of potential septic tanks identifying properties with a postal address that are more than 30 m away from a main sewer line. Risk areas are mapped on several factors including: land class, groundwater vulnerability, flood areas, proximity to the river network and slope.

Hotspot analysis of this data allowed significant clusters of potential septic tanks to be identified. These were assigned risk categories (of Low, Medium, High and Very High). High and Very High categories represent clusters of potential septic tanks in high-risk areas and only these categories have been considered in the pressure assessment.

## 2.2 External stakeholder engagement

Initial pressure analysis results were presented to key stakeholders in a pre-consultation workshop on 24 October 2025. Attendees discussed the approach taken in assessing pressures, including the risk-based approach for septic tanks, and reviewed the pressures and KTM categories. Potential additional pressures, KTM categories and the potential to combine pressure categories were discussed. This resulted in a number of pressures and KTMs being grouped together to ensure that key pressures are identified.

## 2.3 Data Analysis

Following stakeholder feedback, a number of pressure categories were combined

- Agricultural pressures, including pesticide impacts, were identified using organic and nutrient datasets, pollution incidents and local knowledge from field staff.
- Urban wastewater pressures include pressures from Wastewater Treatment Works (WWTWs), unsatisfactory combined storm overflows (CSOs) and misconnections.
- Hydrology/ Hydromorphology pressure group includes; abstraction or flow diversion; pressures physical alteration of channel/bed/riparian area/shore; dams, barriers and locks; hydrological alteration and hydromorphological alteration.
- The “Other” pressures category includes CSOs where potential impacts have yet to be determined and other miscellaneous pressure types.
- Invasive Species: examples of species include Japanese Knotweed, Himalayan Balsam and zebra mussels
- Industry pressures include regulated activities, contaminated sites, waste disposal sites and mining.
- Urban Run-off: refers to pollution from towns and cities and run-off from the road network, includes local knowledge gathered through internal workshops.
- Forestry; includes sediment and nutrient release into the aquatic environment due to forestry operations of afforestation or felling etc.

### 2.3.1 Frequency of pressures

Following completion of the workshops, the most frequently identified pressures across NI were graphed. Each pressure may have more than one impact on a waterbody.

Consequently, a water body may require one or more KTMs for the same pressure. Despite this, the pressure has only been counted once to create the bar chart of most frequently identified pressures in Northern Ireland (Figure 4) in Significant Water Management Issues 2025 Consultation document.

## 3 Next steps

Collectively, each pressure is impacting on water quality and appropriate measures will need to be developed to ensure that the environmental objective of ‘good status’ can be achieved. Further analysis will need to be undertaken to quantify the impact each of these significant water management issues is having on water quality and to improve baseline data.

## Appendix 1: Driver categories

Driver	Description
<b>Agriculture</b>	Includes all farming activities, agriculture and livestock
<b>Climate change</b>	
<b>Energy - hydropower</b>	
<b>Energy - non hydropower</b>	Including cooling activities for thermal and nuclear plants
<b>Fisheries and aquaculture</b>	Commercial fishing and aquaculture (not recreational or sports angling, included in category "Tourism and recreation" below)
<b>Flood protection</b>	
<b>Forestry</b>	
<b>Industry</b>	All kinds of industry not included under other categories
<b>Tourism and recreation</b>	Includes bathing, leisure boating and sailing, sports fishing/angling. It does not include the urban development linked to tourism (under category "Urban development").
<b>Transport</b>	Road and rail traffic, shipping, aviation
<b>Urban development</b>	Includes urban development linked to household, non-manufacturing commercial activities, tourism.
<b>Unknown-other</b>	Driver is unknown

## Appendix 2: Pressure categories

Pressure	Description	Data sources used
<b>Agricultural</b>	Agricultural practices can result in nutrient enrichment of waterways, increased sedimentation and chemical pollutions. This category captures all potential impacts of agriculture including organic pollution, nutrient pollution from nitrogen and phosphorous, as well as chemical impacts.	Internal datasets identifying organic and nutrient pollution based on environmental indicators. SRP data, Nitrite, Nitrate, Phosphate and Ammonium datasets. As source of organic and nutrient pressure could not be determined, it was applied to both WWTW and agriculture. 2024 classification data that indicate waterbody failure for agricultural chemical. Field staff added local knowledge.
<b>Forestry</b>	Water quality issues arising from forestry and associated activities relate to the release of sediment and nutrients to the aquatic environment, hydromorphological impacts (physical alteration to aquatic habitats) and acidification. These impacts are often a result of forestry operations such as afforestation, deforestation and/or thinning.	Identified through local knowledge at internal SWMI workshops
<b>Groundwater</b>	Many of the pressures identified impacting a surface water body have the potential to impact groundwater bodies due to the movement of water throughout the environment. Surface water to groundwater interactions are particularly important in karst geology areas, groundwater dependent terrestrial ecosystems (GWDTEs), superficial groundwater bodies and where conceptual models indicate surface water interactions may be high. This category includes activities to alter the level of groundwater to carry out an underground activity (typically	Identified through local knowledge at internal SWMI workshops

## DPSIR Methodology

	mining). It does not include the alteration of the water level due to current or past overexploitation of the groundwater resources- this is captured under abstraction which is part of the Hydrology/ Hydromorphology category.	
<b>Hydrology/Hydromorphology</b>	Includes abstractions, physical alteration of channel/bed/riparian area/shore for various uses including flood protection, agriculture, navigation etc. Also includes pressure from dams and barriers for flood protection, drinking water provision, hydroschemes, navigation, recreation and industry purposes. It also includes hydrological alteration for agriculture, drinking water provision, transport and hydropower etc.	Many pressures will have been identified from WFD 2016 reporting dataset and carried through into 2025 pressures assessment in absence of any further information. This often identified the specific pressure e.g. navigation or agriculture or drinking water etc. 2024 hydromorphology and hydrology classification was used to update this dataset. In addition, local knowledge by operational staff was used to capture pressures in this category.
<b>Industry</b>	Includes industrial activities which are regulated under Industrial Emissions Directive (IED) which has been brought into effect by the Pollution Prevention and Control Regulations (Northern Ireland) 2013 (the PPC Regulations). The regulations apply to some industrial processes and activities that can cause harm to the surrounding environment. These activities must operate under a permit. Includes activities regulated by PPC, Industrial consents and IPRI. Industries may include poultry houses, quarries, intensive farming, some AD plants (depending on size). This category also includes contaminated sites/ waste legacy sites and mining pressures.	Data (were available) and local knowledge from NIEA regulatory teams
<b>Invasive species</b>	Includes invasive non-native species (INNS) such as Japanese Knotweed, Himalayan Balsam, zebra mussels and others.	Data provided by Freshwater Monitoring and Assessment team. Does not include records

## DPSIR Methodology

		registered via Invasive Species Northern Ireland website/ INNS team.
<b>Other</b>	Category includes Combined Storm Overflows (CSOs) which have yet to be determined by NIW. It includes anthropogenic pressures where an impact is evident, particularly chemical pollution, but the source is unknown.	CSO datasets provided by NIW. 2024 classification data indicating element level failures, particularly for chemicals, including Priority Hazardous Substances and Priority Substances and Specific Pollutants. Discussions with regulatory teams and field staff.
<b>Septic tanks</b>	Pollution resulting from urban wastewater not connected to sewers and identified as a diffuse source. This category covers septic tank discharges.	In house modelled data on septic tank hotspots.
<b>Urban run-off</b>	This category includes surface water run-off from urban areas which would include road run off.	This category was applied to towns and larger urban areas by default with its impact assessed as unknown, as no data is available.
<b>Urban wastewater</b>	Under the Urban Wastewater Treatment Regulations (NI) 2017, “urban wastewater” means domestic wastewater or the mixture of domestic wastewater with industrial wastewater and/or run-off rainwater. In addition, this category also includes Combined Sewer Overflows (CSOs) which NIW have assessed as unsatisfactory as well as identified misconnections	Discharges from WWTW identified through workshop discussions and data provided by other NIEA teams. Internal datasets identifying organic and nutrient pollution based on environmental indicators. SRP data, Nitrite, Nitrate, Phosphate and Ammonium datasets. As source of organic and nutrient pressure could not be determined it was applied to both WWTW and agriculture. In addition, local knowledge by operational staff was used to capture pressures in this category.

## Appendix 3: Impact categories

Impacts	Applicable to surface waterbodies Y/N	Applicable to groundwater bodies Y/N
ACID – Acidification	Y	N
CHEM – Chemical pollution	Y	Y
ECOS – Damage to groundwater – dependent terrestrial ecosystems for chemical / quantitative reasons	N	Y
HHYC – Altered habitats due to hydrological changes	Y	N
HMOC – Altered habitats due to morphological changes (includes connectivity)	Y	N
INTR – Alterations in flow directions resulting in saltwater intrusion	N	Y
LITT – Litter (an impact under the MSFD)	Y	N
LOWT – Abstraction exceeds available groundwater resource (lowering water table)	N	Y
MICR – Microbiological pollution	Y	Y
NOSI – No significant impact	Y	Y
NOTA – Not applicable	Y	Y
NUTP – Nutrient pollution- P	Y	Y
NUTN – Nutrient pollution- N	Y	Y
ORGA – Organic pollution	Y	Y
OTHE – Other significant impact type	Y	Y
QUAL – Diminution of quality of associated surface waters for chemical / quantitative reasons	N	Y
SALI – Saline pollution/intrusion	Y	Y
TEMP – Elevated temperatures	Y	Y
UNKN – Unknown impact type	Y	N



## Appendix 4: Key Type of Measures (KTM)

EU KTM	Grouped KTM category
1 – Wastewater treatment network and plant construction/ upgrades	Upgrades to wastewater infrastructure.
2 - Reduce agricultural nutrient pollution	Reduce agricultural nutrient pollution
3 - Reduce agricultural pesticide pollution	
4 - Remediation of contaminated sites	
5 - Improve river longitudinal continuity	Improve hydrology/ hydromorphology
6 - Improve river hydromorphology other than longitudinal continuity	Improve hydrology/ hydromorphology
7 - Improve flow regime or establish ecological flows	Improve hydrology/ hydromorphology
8 - Water efficiency measures for irrigation, industry, energy, and households	Water efficiency measures for irrigation, industry, energy, and homes
9 - Water pricing policy measures for the implementation of the recovery of cost of water services from households	Water pricing policy and measures
10 -Water pricing policy measures for the implementation of the recovery of cost of water services from industry	Water pricing policy and measures
11 - Water pricing policy	Water pricing policy and measures
12 - Advisory services for agriculture	
13 - Drinking water protection measures	
14 - Research, improvement of knowledge base reducing uncertainty	Combined into Research, improvement of knowledge base reducing uncertainty
15 - Reduction or phasing out of Priority Hazardous Substance/ Priority Substances emissions	
16 – Upgrades/ improve industrial wastewater plants	
17 - Reduction of sediment from erosion and surface run-off	
18 - Prevent/control impacts of introduced diseases/species	
19 - Prevent/control impacts of recreation, including angling	
20 - Prevent/control impacts of fishing and plant/animal removal	
21 - Prevent/control input pollution from transport, built infrastructure, urban areas	



<b>22 - Prevent/control input pollution from forestry</b>	
<b>23 - Natural water retention measures</b>	
<b>24 - Adaption to climate change</b>	
<b>25 - Measures to counteract acidification</b>	

<b>Added KTM</b>	<b>Grouped KTM category</b>
<b>26 - Reduce pesticide pollution from urban areas and amenities.</b>	
<b>27 - Unknown</b>	
<b>28 - Update/ improve domestic wastewater treatment systems</b>	
<b>30 - Protected areas- Site specific measure for water dependent feature in protected area (includes peatland)</b>	
<b>31 - Sustainable outlay for anaerobic digestate.</b>	
<b>32 - Reduce misconnections (urban areas)</b>	Upgrades to wastewater infrastructure.
<b>33 - Education and awareness</b>	
<b>35- Protect groundwater</b>	
<b>36- Address undetermined CSOs</b>	
<b>37 - Other</b>	
<b>38 - Improve performance of unsatisfactory CSO's</b>	Upgrades to wastewater infrastructure.
<b>39 – Investigation/ upgrade of CSO's yet to be determined</b>	Combined into Research, improvement of knowledge base reducing uncertainty.





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