

RIVER BASIN MONITORING PLAN

# WATER FRAMEWORK DIRECTIVE 2<sup>ND</sup> CYCLE CLASSIFICATION SUMMARY

2015-2021

## Transitional Water Body - Upper Foyle

31/05/2015



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**Environment**  
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	<table border="1"> <tr> <td><b>Version Date:</b></td> <td>31/05/2015</td> </tr> </table>	<b>Version Date:</b>	31/05/2015
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<b>MONITORING AND ASSESSMENT TEAM</b>			

**UPPER FOYLE TRANSITIONAL WATER**

Water body Information

- River Basin District: NW
- Water body type: Transitional Water 2 (TW2)
- Water body code : UKGBNI5NW250030
- Water body characteristics: Partly mixed/stratified, mesotidal, sand and mud, mesohaline
- Water body area: 13.08 km<sup>2</sup>
- Heavily Modified Water Body: No
- 2021 Classification Objective: Moderate

<b>2015 CLASSIFICATION</b>	<b>MODERATE</b>	<b>PASS/FAIL 2021 OBJECTIVE</b>	<b>PASS</b>
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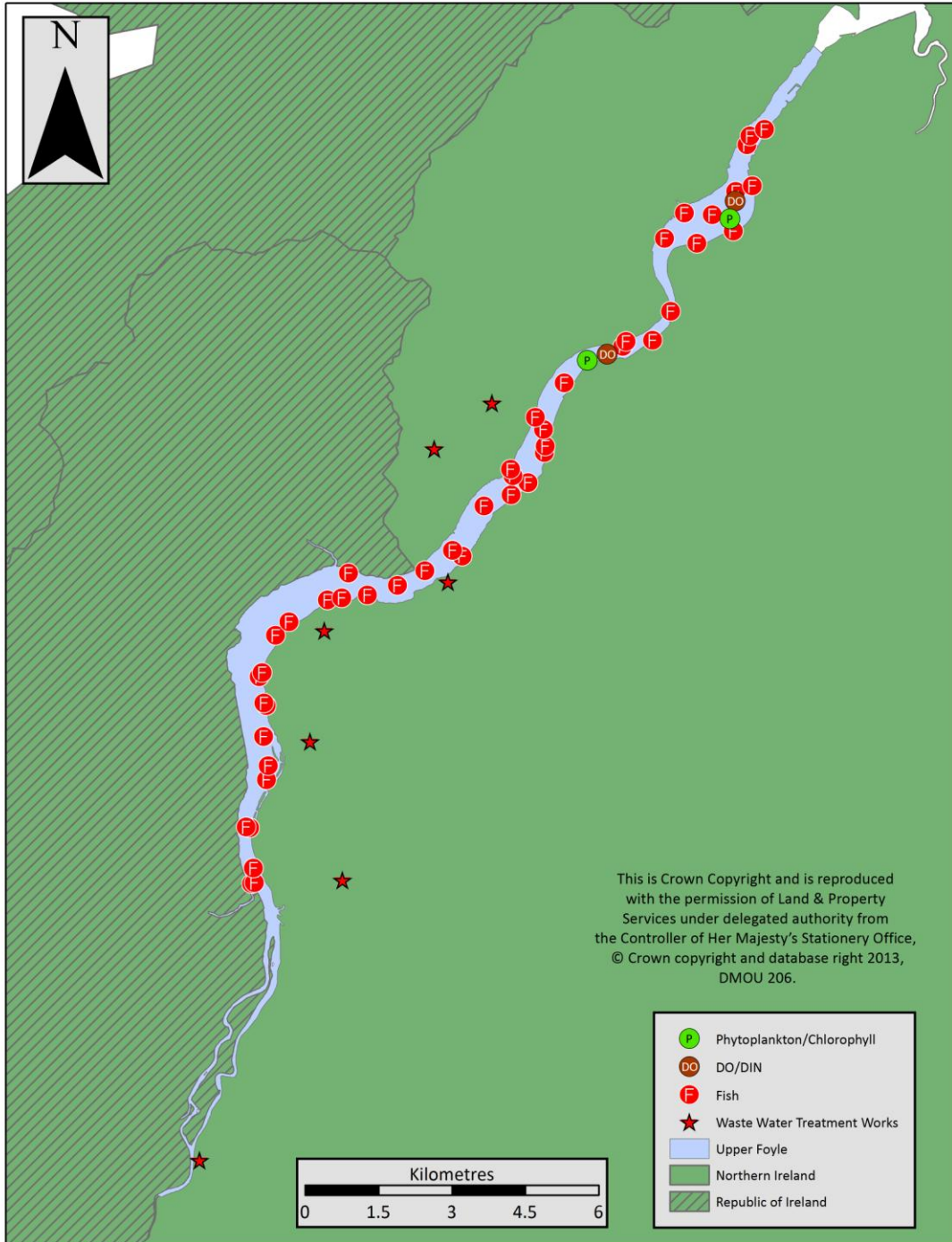
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CLASSIFICATION  
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Map of water quality pressures and monitoring sites within the Upper Foyle (Transitional Water).

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Table 1: Parameters for which classification systems are available and have been used in the previous round of classification. Some biological assessment tools are not suitable for all water bodies due to habitat type.

<b>Ecological Quality Element</b>			
<i>Main Element</i>	<i>Sub-Element</i>	<i>Applied</i>	<i>Comment</i>
<b>Phytoplankton</b>	<b>Chlorophyll Biomass Index</b>	✓	
	<b>Elevated Taxa Count Index</b>	✓	
<b>Benthic Invertebrates</b>	<b>Infaunal Quality Index</b>	☒	Tool Under Development: not signed off for transitional waters
<b>Fish</b>	<b>Estuarine Multi-metric Fish Index</b>	✓	
<b>Physico-Chemical</b>	<b>General Conditions</b>		
	-Dissolved Oxygen	☒	
	-Nutrients	✓	
	<b>Specific Pollutants</b> (Annex VIII subs)	☒	
<b>Hydromorphological Quality Elements</b>	SEPA Rapid Designation	✓	
	TraC MIMAS	✓	
<b>Chemical Status</b>			
<b>Priority Hazardous Substances</b> (Annex X)	Annex X Substances	☒	

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Table 2: Sampling frequency for each quality element.

Monitoring Level: *Surveillance*

Quality Elements		Data years contributing to classification	No. of sites/samples
Phytoplankton	Chlorophyll Biomass Index	2009-2014	4 sites 31 samples
	Elevated Taxa Count Index	2011-2014	4 sites 27 samples
Fish		2009-2014	38 samples
<b>Physio-chemical</b>			
Nutrients		2010-2015	7 sites 24 samples
Dissolved Oxygen		2010, 2012-2015	
Specific polluting substances (Annex VIII)		2010-2014	
<b>Hydromorphology</b>		2007	
<b>Water chemistry (Annex X)</b>			
Priority hazardous substances		2010-2014	

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Biological Quality Elements											
Flora					Fauna						
Phytoplankton	G	Macroalgae		Angiosperms	Benthos	Fish	G	Biological Quality	G		

Physico-chemical Elements										
General conditions										
Oxygen (DO)	H	Nutrients (DIN)		Specific pollutants (Annex VIII)	Status		NO DATA	Status		M
			P							

Hydromorphological Quality Elements										
								Status	G	

Chemical Status										
Priority hazardous substances (Annex X)										
NO DATA								Good		
								Fail		

High Impact Invasive Species										
								None recorded	H	
								Established		
								Impacting		

Ecological Status	
	High
	Good
M	Moderate
	Poor
	Bad

Surface Water Status	
	High
	Good
M	Moderate
	Poor
	Bad

Overall classification of Upper Foyle (Transitional Waterbody)

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### ANNEX A: Classification of Biological Quality Elements

#### QE: Phytoplankton

QE Phytoplankton assessment (+data confidence):	<b>GOOD (53.0%)</b>	
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#### Classification metrics:

1. Chlorophyll biomass index (Transitional Waters)
2. Elevated taxa count index:

#### 1. Chlorophyll Biomass Index

Data store (classification): <M:\Projects 14\Phycology 2014\MM14-14 Phytoplankton and Chlorophyll\classification 15NEW WATERBODIES\FOYLE UPPER .xls>  
<M:\Projects 14\Phycology 2014\MM14-14 Phytoplankton and Chlorophyll\classification 15NEW WATERBODIES\FOYLE UPPER ELEVATED.XLS>

Data Availability (spot & continuous samples): Spot samples –2009, - 2014 NIEA/MD

#### Thresholds:

		<i>EA Proposed Transitional Boundaries</i>				
		High	Good	Moderate	Poor	Bad
10 (5 submetrics for each zone) (2 salinity zones present) 1-25psu & >25-35psu	Face Value (passes)	9	7	5	3	<3
	EQR	0.9	0.7	0.5	0.3	0
5 (only 1salinity zone present)	Face Value (passes)	4	3	2	1	0
	EQR	0.8	0.6	0.4	0.2	0

#### Results:

EQR	Status	Data Years	No. of Sites	No. of Samples	Data Confidence
1	<b>High</b>	2009-2014	4	31	56.2%

#### Data confidence:

Data analysed for Confidence of Class using CUTLASS

<M:\Projects 14\Phycology 2014\MM14-14 Phytoplankton and Chlorophyll\classification 15\2015TW Phytoplankton CofC tool CUTLASS v1.8 UKTAG.xls>

The calculation of EQR is based on one salinity band only due to the removal of previous sites included in this new waterbody.

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## 2. Elevated Taxa Count Index

### Waterbody Elevated Taxa Assessment

- Thresholds:**

Tool	Thresholds	
	North/Irish Sea	Atlantic
I <sub>1</sub> - Individual Species Count%	500,000 (cells l <sup>-1</sup> )	
I <sub>2</sub> - Total Taxa Count%	10 <sup>6</sup> (cells l <sup>-1</sup> )	

- EQR Boundaries:**

Class	% Exceedance	EQR
High	0-15	0.67-1.0
Good	15-30	0.33-0.67
Moderate	30-40	0.28-0.33
Poor	40-50	0.20-0.33
Bad	>50	0-0.20

### Results (% Exceedance)

I <sub>1</sub>	I <sub>2</sub>	EQR	Status	Data Years	No. of Julian months	No. of phytoplankton samples	Data confidence
25.9%	22.2%	0.559	Moderate	2011-2014	14	27	77.5%

## 3. Combined Chlorophyll and Elevated Count Tool for Waterbody

Good (53.0%)

## 4. Presence of High impact Species.

None



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**QE: Fish**

<b>QE transitional fish assessment (+ Data confidence):</b>	<b>GOOD (99%)</b>	
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Classification tools: Estuarine Multi-metric Fish Index (EMFI)

Data store:

- **Fish:** [..\..\..\FISH\DATA\WFD\Classification\EMFIclass\EMFIi2014TH\EMFI\\_2014\\_Analysis.xlsx](file:///C:/Users/.../FISH/DATA/WFD/Classification/EMFIclass/EMFIi2014TH/EMFI_2014_Analysis.xlsx)
- **Supporting Parameters:** [Chemistry](#)

Data Availability:

- WFD surveillance monitoring 2005-2014; one survey in 2005, two surveys per annum from 2006 to 2011, one (autumn) survey in 2012, 2013 and 2014. Sampling methods include seine net, fyke net, and beam trawl.

EQR boundaries:

	Bad	Poor	Moderate	Good	High
EQR	<0.10	≥0.10; < 0.35	≥0.35; <0.65	≥0.66; < 0.92	≥0.92

Results:

Estuarine Multi-metric Fish Index (EMFI) – 2014 data

Metric Number	Metric	Score
1	Species richness	5
2	Number of introduced species	3
3	Species composition	5
4	Species abundance	4
5	Dominance	4
6	Number of diadromous species	3
7	Estuarine species richness	5
8	Marine migrant species richness	5
9	Estuarine species abundance	3
10	Marine migrant species abundance	4
11	Zoobenthivore species richness	5
12	Piscivore species richness	4
13	Zoobenthivore abundance	4
14	Piscivore abundance	3
	<b>EMFI</b>	<b>57</b>
	<b>EQR</b>	<b>0.77</b>

Percent Confidence of Class (bias corrected bootstrap method)

Bad	Poor	Moderate	Good	High
0.0	0.0	1.2	98.8	0.0

**Data confidence: High**

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**Fish cont'd**

- Survey methodologies and protocols (High)
- Realistic type-specific reference conditions (High)
- Data QA (High)
- Statistical testing and intercalibration (High)

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### ANNEX B: Classification of physico-chemical quality elements

#### QE: Dissolved Oxygen

<b>QE Dissolved oxygen (+ data confidence):</b>	<b>HIGH (94%)</b>	
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Classification tools: Comparison of 5% ile against reference standards.

- Data Availability: 2010, 2012-15. [..\DO Classification 2012\Shortcut to DO FIELD VALUES 2006 -2010.Ink](#)
- Data Availability (spot & continuous samples): Spot

Thresholds:

WFD Status	Marine 5%ile	Objectives
HIGH	≥5.7 mg/L	All life stages of salmonids and transitional fish
GOOD	≥4.0 <5.7 mg/L	Presence of salmonids and transitional fish
MODERATE	≥2.4 <4.0 mg/L	Most life stages of non-salmonid adults
POOR	≥1.6 <2.4 mg/L	Presence of non-salmonids, poor survival of salmonids
BAD	<1.6 mg/L	No salmonids present, marginal survival of resident species

Results:

5% ile DO (mg/L)	Status	Data years	Data Quality	No. of daily averages	Data Coverage (proportion of possible months with data*)
7.36	High	2010, 2012-15	**		

\* Proportion of possible months for which data are available

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**QE: Nutrients - N regulation**

<b>N regulation assessment (+ Data confidence):</b>	<b>POOR (42%)</b>	
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- Data store [..\CofCDINth 2015-2021.xlsx](#)
- Data Availability: 2010 to 2015  
DIN & salinity  
(November to February)
- Data Availability (spot & continuous samples): spot

**N regulation thresholds:**

Area	Salinity range	DIN (uM) Winter mean H/G	DIN (uM) Winter mean G/M	DIN (uM) Winter mean M/P
Transitional (at salinity 25)	5-25	20-30	30-45	45-67.5

**Results:**

Mean Winter DIN (uM) (normalised to salinity 25)*	Winter DIN Daily average (n)	No. of samples (n)	No. of sites	Data Years	Data Quality	Status
64.06		24	7	2010 to 2015	Database not yet QA'd	<b>POOR</b>

\*Average DIN used as  $r^2$  value of regression model is less than 0.75

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**ANNEX C: Classification of physico-chemical quality elements: Other specific Pollutants**

<b>Specific pollutants assessment (+data confidence)</b>	<b>NO DATA</b>	
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**Classification tools:** Comparison with EQS levels.

**Data assessed:** NO DATA

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**ANNEX D: Hydromorphological quality elements**

<b>Overall hydromorphology assessment</b>	<b>GH</b>	
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**Classification tools:**

1. TRaC Hydromorphology metrics
2. MIMAS

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**ANNEX E: Chemical Status – Annex X Chemicals**

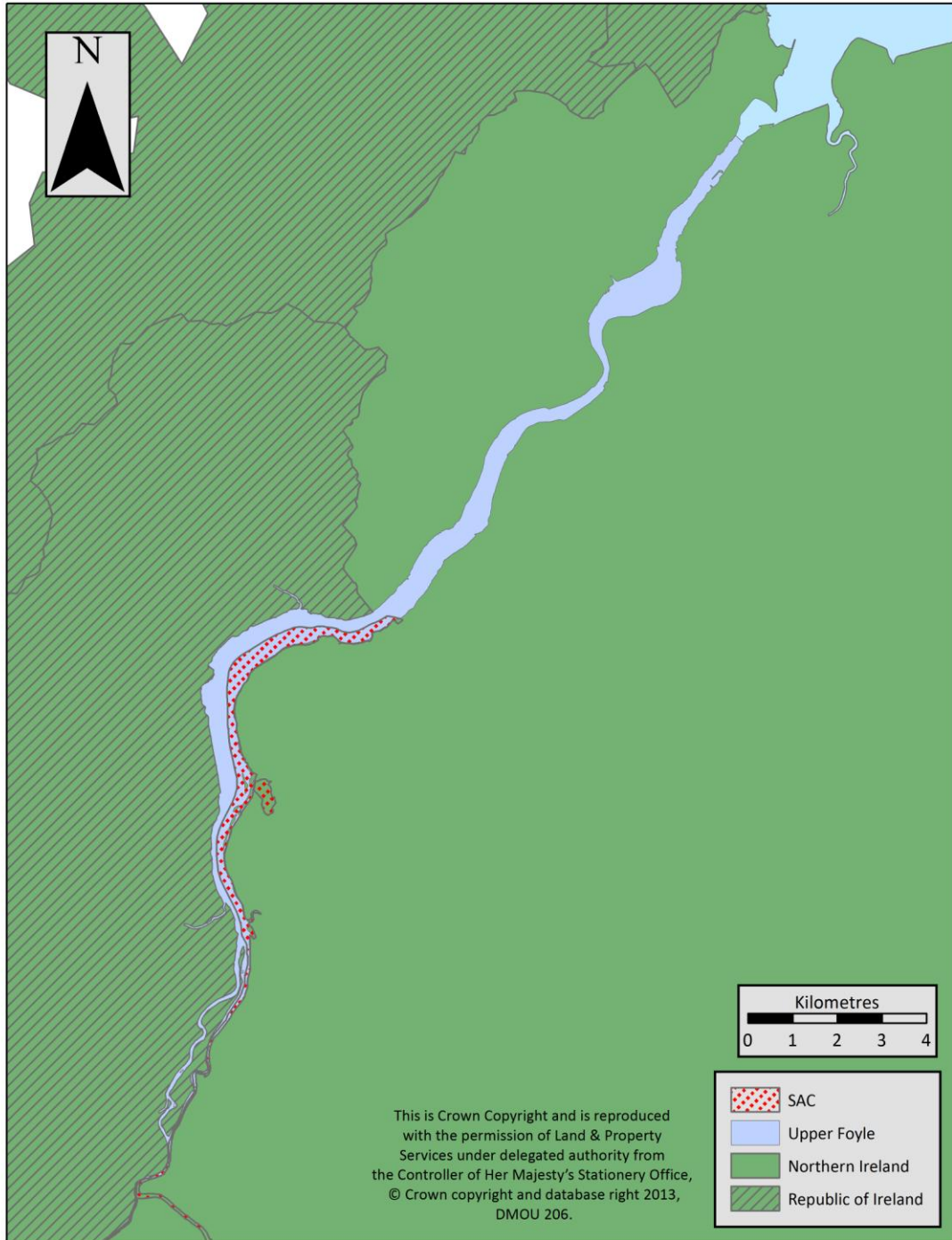
<b>Priority hazardous substances (+data confidence)</b>	<b>NO DATA</b>	
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**Classification tools:** Comparison with EQS levels.

Annex X: Overall Compliance	No Data
Annex X: Pass/Fail	No Data

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**ANNEX F: Protected Areas**



Map of Protected Areas within Upper Foyle (Transitional Water).



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The following Protected Areas are situated either wholly or partly within the Upper Foyle water body:

**Natura 2000 sites (Habitats Directive and Birds Directive):**

<b>Site Name</b>	<b>2014 Condition Status</b>	<b>Designated Water Dependant habitat/species</b>	<b>Feature(s) not meeting objective</b>	<b>Reason for not meeting objective</b>
River Foyle and Tributaries SAC	Unfavourable	Otter; Salmon; Water course <i>Ranunculion fluitantis</i> and <i>Callitricho-Batrachion</i>	Water course <i>Ranunculion fluitantis</i> and <i>Callitricho-Batrachion</i>	Non marine water quality related

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### ANNEX G: High Impact Invasive Species

<b>QE High Impact Invasive Species assessment</b>	<b>HIGH</b>
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#### Ecoregion 17 Marine High Impact Invasive Species List

<b>Phylum</b>	<b>Species</b>	<b>P</b>	<b>E</b>	<b>I</b>	<b>Record</b>
<i>Chordata</i>	<i>Didemnum spp.</i>				
<i>Chordata</i>	<i>Styela clava</i>				
<i>Crustacea</i>	<i>Eriocheir sinensis</i>				
<i>Mollusca</i>	<i>Crassostrea gigas</i>				
<i>Mollusca</i>	<i>Crepidula fornicata</i>				
<i>Phaeophyceae</i>	<i>Sargassum muticum</i>				
<i>Angiosperms</i>	<i>Spartina anglica</i>				

P= Present; E= Established; I= Impacting

NB Established populations of high impact species automatically downgrade overall surface water classification from 'high' to 'good'.

Record should be inputted as follows. PO= personal observation outside of surveys; W= WFD survey; M= museum / institute records.

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## GLOSSARY

<b>AFBI</b>	Agri-Food and Biosciences Institute (under contract to NIEA)
<b>AMBI</b>	AZTI Marine Biotic Index
<b>Annex X</b>	Annex 10 Priority Hazardous Substances
<b>Annex VIII</b>	Annex 8 Specific Pollutants
<b>Article 5</b>	Characterisation, typology, pressures and impacts analysis
<b>ASSI</b>	Area of Special Scientific Interest
<b>DIN</b>	Dissolved Inorganic Nitrogen
<b>DO</b>	Dissolved Oxygen
<b>EQR</b>	Ecological Quality Ratio
<b>EQS</b>	Ecological Quality Status
<b>EUNIS</b>	European Nature Information System
<b>FSL</b>	Full Species List
<b>GEP</b>	Good Ecological Potential
<b>gH</b>	Good/High status
<b>H/G/M/P/B</b>	High/Good/Moderate/Poor/Bad (Classification Status)
<b>H/M/L</b>	High/Medium/Low (Confidence)
<b>HMWB</b>	Heavily Modified Water Body
<b>IQI</b>	Infaunal Quality Index
<b>IRBD</b>	International River Basin District
<b>LOD</b>	Limit of Detection
<b>MBT</b>	Macroalgal Blooming Tool
<b>MEP</b>	Moderate Ecological Potential
<b>NB</b>	Neagh Bann
<b>ND</b>	No data
<b>NE</b>	North Eastern
<b>NEAGIG</b>	North Eastern Atlantic Geographical Intercalibration Group
<b>NIEA</b>	Northern Ireland Environment Agency
<b>N-regs</b>	Nitrogen Regulation
<b>NVZ</b>	Nitrate Vulnerable Zone
<b>NW</b>	North Western
<b>Physico-chem</b>	Physical and chemical monitoring
<b>RSL</b>	Reduced Species List
<b>SAC</b>	Special Area of Conservation
<b>SEPA</b>	Scottish Environment Protection Agency
<b>SPA</b>	Special Protected Area
<b>TNA</b>	Tool Not Applicable
<b>TraC MImAS</b>	Transitional and Coastal Morphology Impact Assessment System
<b>TUD</b>	Tool Under Development
<b>UKAS</b>	United Kingdom Accreditation Service
<b>UKTAG</b>	United Kingdom Technical Advisory Group for Water Framework Directive
<b>UNICORN</b>	Database for marine organisms.
<b>UWWTD</b>	Urban Waste Water Treatment Directive (91/271/EEC)
<b>VDSI</b>	Vas Deferens Sequence Index
<b>WFD</b>	Water Framework Directive
<b>WWTW</b>	Waste water treatment works