


RIVER BASIN MONITORING PLAN

# WATER FRAMEWORK DIRECTIVE 1<sup>ST</sup> CYCLE CLASSIFICATION SUMMARY

2009-2015

## Coastal Water Body – North Coast

31/05/2015

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	<b>Version Date:</b> 30/03/2015
<b>MONITORING AND ASSESSMENT TEAM</b>	

**NORTH COAST**

Water body Information

- *River Basin District:* NE
- *Water body type:* CW2
- *Water body code:* UKGBNI6NE010
- *Water body characteristics:* Euhaline, mesotidal, exposed
- *Water body area:* 88.62 km<sup>2</sup>
- *Heavily Modified Water Body:* No
- *2015 Classification Objective:* Good

<b>FINAL CLASSIFICATION</b>	<b>MODERATE</b>	<b>PASS/FAIL 2015 OBJECTIVE</b>	<b>FAIL</b>
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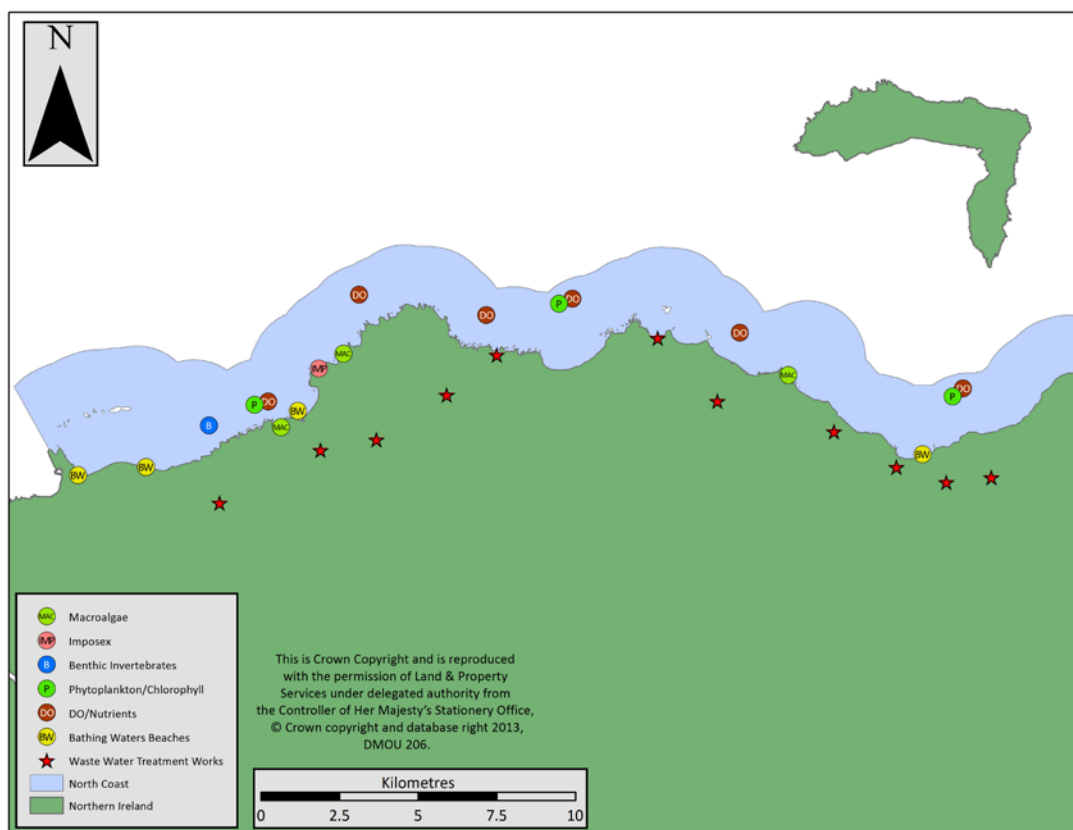


Figure 1: Waste water treatment pressures and monitoring points within North Coast (Coastal Water).


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

Ecological Quality Element			
<i>Main Element</i>	<i>Sub-Element</i>	<i>Applied</i>	<i>Comment</i>
<b>Phytoplankton</b>	Biomass	✓	
	Elevated Taxa Count Index	☒	
<b>Macroalgae (seaweed)</b>	-Opportunistic Macroalgae	☒	
	-Reduced Species List	✓	
<b>Benthic Invertebrates</b>	Infaunal Quality Index	✓	
	Imposex	✓	
<b>Physico-Chemical (water)</b>	General Conditions		
	-Dissolved Oxygen	✓	
	-Nutrients	✓	
	Specific Pollutants (Annex VIII subs)	☒	
<b>Hydromorphological Quality Elements</b>	SEPA Rapid Designation	✓	
	TraC MIMAS	✓	
<b>Priority Hazardous Substances (Annex X)</b>	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
<b>Biological</b>			
Phytoplankton	Chlorophyll biomass	2009-2010	3 sites 14 samples
Macroalgae	Reduced Species List	2012	3 sites 3 surveys
Benthic Invertebrates	Infaunal Quality Index	2011-2013	1 site 15 samples
	Imposex	2010, 2013	1
<b>Physico-chemical</b>			
Nutrients		2010, 2012, 2014	124 samples 7 sites
Dissolved Oxygen (DO)		2008, 2010, 2014	146 samples
Specific polluting substances (Annex VIII)		ND	
<b>Hydromorphology</b>		2007	
<b>Water chemistry</b>			
(Annex X)		ND	

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Biological Quality Elements											
Flora					Fauna						
Phytoplankton	H				Benthos				Biological Quality		
						M					M
Macroalgae					Fish						
Angiosperms											
Physico-chemical Elements											
General conditions											
Oxygen (DO)	H				Nutrients (DIN)				Status		
										H	
Specific pollutants (Annex VIII)											
NO DATA									Status		
Hydromorphological Quality Elements											
									Status		
									H		
Chemical Status											
Priority hazardous substances (Annex X)											
NO DATA									Good		
									Fail		
High Impact Invasive Species											
									None recorded		
									Established		
									Impacting		


  

Ecological Status	
	High
	Good
M	Moderate
	Poor
	Bad

Surface Water Status	
	High
	Good
M	Moderate
	Poor
	Bad

Figure 2: Overall classification of North Coast (Coastal Water)

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### ANNEX A: Classification of Biological Quality Elements

#### QE: Phytoplankton

QE Phytoplankton assessment (+ data confidence):	<b>HIGH (96.3%)</b>	
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#### Classification metrics:

1. Chlorophyll biomass index (90%ile)
2. Elevated taxa count index: Not applied, insufficient data.
3. Seasonal succession: Not applied, insufficient data.

#### 1. Chlorophyll Biomass Index

**Data store:** <M:\Projects 14\Phycology 2014\MM14-14 Phytoplankton and Chlorophyll\classification 15\Coastal data\North Coast 90th Percentile.xls>  
<M:\Projects 14\Phycology 2014\MM14-14 Phytoplankton and Chlorophyll\classification 15\Coastal data\North Coast 09-present.xls>

**Data Availability (spot & continuous samples):** spot (2009-2010) NIEA

#### Thresholds:

Water Ref. Area		Status				
		High	Good	Moderate	Poor	Bad
North/Irish Sea	Chl $\mu\text{g l}^{-1}$	<5	5-10	10-15	15-20	>20
	EQR	0 -1.0	1.0-0.8	0.8-0.6	0.6-0.4	0.4-0.2

#### Results:

90%ile	Status	EQR	Data Years	No. of Sites	No. of Samples	Data Confidence (proportion of possible months with data*)
0.88	<b>HIGH</b>	0.96	2009-2010	3	14	100%

**Data confidence: HIGH 96.3%**

Data analysed for Confidence of Classification using <M:\Projects 14\Phycology 2014\MM14-14 Phytoplankton and Chlorophyll\classification 15\2015CW Phytoplankton CoC tool v10 7 UKTAG.xls>

Low temporal trend as the site was only sampled in 2009 and 2010.  
 Waterbody classification based on chlorophyll biomass only.

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**QE: Macroalgae**

QE macroalgal assessment (+ data confidence):	<b>HIGH (97.9%)</b>
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**Classification tools:**

Reduced species list (RSL),  
Macroalgal Blooming Tool – not applicable  
Angiosperms – Tool not applicable

**1. Reduced Species List (RSL)**

- WFD surveillance monitoring: 2012
- Data Availability (classification): 2012 - 3 sites
- Data Store: [M:\Projects 14\Phycology 2014\MM14-12 Intertidal Rocky Shore\FSL-RSL Classification update 2015 \(09-14\)\Datasheet.xls](#)

Parameters	Quality Status	Bad	Poor	Moderate	Good	High
	Sub-metric quality status	0.0 – 0.2	0.21 – 0.4	0.41 – 0.6	0.61 – 0.8	0.81 – 1.0
Species richness (adj. for shore)		0 – 3	3 – 10	10 – 20	20 – 34	34 – 68
Proportion of Chlorophyta (% G)		80 – 100	45 – 80	30 – 45	20 – 30	0 – 20
Proportion of Rhodophyta (% R)		0 – 10	10 – 25	25 – 35	35 – 45	45 – 100
Ecological Status Group ratio (ESG)		0.0 – 0.2	0.2 – 0.4	0.4 – 0.6	0.6 – 0.8	0.8 – 1.2
Proportion of opportunists (% opp)		50 – 100	35 – 50	25 – 35	15 – 25	0 – 15

**Results:**

Shore	Sub-Metric EQR							RSL EQR	Status
	Shore desc.	Sp. richness	Adj. Sp. Rich.	% G	% R	ESG	% Opp		
Portballintrae 2012	12	62	75.02	17.74	50.00	0.94	11.29	0.860	HIGH
Great Stookan 2012	15	61	61	16.39	50.82	0.97	11.48	0.848	HIGH
Kinbane Head 2012	15	52	52	19.23	53.85	1.00	13.46	0.821	HIGH
<b>Mean</b>								<b>0.843 ±0.020</b>	<b>HIGH</b>

**Confidence of Classification: High (97.9%)**


- Data analysed for Confidence of Class using [M:\Projects 14\Phycology 2014\MM14-12 Intertidal Rocky Shore\PIRATES\\_v04 - Class update 2015 \(09-14\) for UKTAG.xls](#)
- Standard Deviation (±) is included with the mean EQR.
- Data QA (expert team).
- WFD specific data (reduced species list completed; FSL carried out at three sites).
- Three shores (good spatial coverage) over one year (poor temporal trend assessment).

**Alien taxa: *Sargassum muticum* present at all three sites in 2012.**

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**QE: Angiosperms – Tool not applicable**



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**QE: Benthic Invertebrates**

<b>QE benthic invertebrates (+ data confidence):</b>	<b>MODERATE (L)</b>	
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Classification tools: 1. Infaunal Quality Index (IQI)  
2. Imposex tool (VDSI)

**1. IQI (UKTAG v01 20140228)**

Water body IQI assessment:

**Moderate (Low)**

**WFD surveillance monitoring:**

- **Data store:** [...\\North Coast water body\North Coast Water Body 08-13 fauna data 1mm.xlsx](#)
  - **Benthic invertebrates** UNICORN (NMMT) Database
  - **Supporting Parameters** Water Quality Data Set
  - **Digital images** AMAP Project folder
- Data Availability (classification):**  
1 site, 5 reps, 3 years,  
DayGrab, 1mm sieve, n=15.

**Boundaries (Intercalibrated NEAGIG):**

Class	Bad	Poor	Moderate	Good	High
<b>IQI</b>	>0.0 ≤0.24	≥0.24 <0.44	≥0.44 <0.64	≥0.64 <0.75	≥0.75

**Results:**


Year	Survey	Station	n	Annual Mean	Annual ± S.D	Status
2010	MM-Benthos	DUN (5)	-	-	-	-
2011	MM-Benthos	DUN (5)	5	0.65	0.03	Good
2012	MM-Benthos	DUN (5)	5	0.57	0.02	Moderate
2013	MM-Benthos	DUN (5)	5	0.58	0.06	Moderate
2014	MM-Benthos	DUN (5)	-	-	-	-
2015	MM-Benthos	DUN (5)	-	-	-	-
<b>Overall 6 year waterbody means</b>			<b>5</b>	<b>0.60 (0.56*)</b>	<b>0.04</b>	<b>Moderate</b>

\* IQI derived from data averaged minus Standard Deviation (see issues with tools paper).  
This figure is used for classification.

**Data confidence:**

**Low**

- Sample analysis QA'd through NMBAQC (Good)
- Database QA'd (Good)
- No specific WFD data (1 single points with reps)

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## 2. VDSI (*Nucella lapillus*)

Waterbody VDSI assessment:

**High (L)**

- **Data store:** [..\\..\\BIOEFFECTS\\Imposex\\Imposex 2013\\Report\\IMPOSEX MASTER DATA SHEET TEMPLATE.xls](#)
- **Data availability:** 2004/2007/2010/2013 NI survey

**Boundaries:**

Class	Good	High
VDSI	≥0.3 to <4.0	<0.3
EQR	≥0.34 to <0.95	≥0.95


**Results:**

Year	Shore	VDSI	EQR	Status
2013	Giants Causeway	0.13	0.98	High
	<b>Mean</b>	<b>0.13</b>		<b>High</b>

**Data confidence:**

**Low**

- Sample analysis QA through QUASIMEME (High)
- <3 sites (Low)

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## ANNEX B: Classification of physico-chemical Quality Elements: General

### QE: Dissolved Oxygen

<b>DO assessment (+ data confidence):</b>	<b>HIGH (100%)</b>	
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**Classification tools:** Comparison of 5% ile against reference standards

- **Data Availability:** 2008, 2010, 2014.
- **Data Store:** [.\\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*)
7.95	HIGH	2008, 2010, 2014	**	146	37.84%

\* Proportion of possible months for which data are available

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**QE: Nutrients – N regulation**

<b>QE N regulation assessment (+ data confidence):</b>	<b>HIGH (100%)</b>
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- **Data store** [..\Coastal WB inc AFBI 15.xls](#)
- **Data Availability:** 2010, 2012, 2014  
DIN & salinity (Nov to Feb)
- **Data Source (spot & continuous samples):** spot and continuous

**Thresholds:**


Area	Salinity range	DIN (uM) Winter mean H	DIN (uM) Winter mean G	DIN (uM) Winter mean M
Coastal (at salinity 32)	30-34.5	<12	12-18	18 +

**Results:**

Mean Winter DIN (uM) (Avg DIN)*	Winter DIN Daily average (n)	No. of samples (n)	No. of sites	Data Years	Data Quality	Status
8.06		124	7 (inc con mon)	2010, 2012, 2014	Database not yet QA'd	<b>HIGH</b>

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

**Data confidence source:** [..\CofCDINth.xlsx](#)

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**ANNEX C: Classification of physico-chemical quality elements: Specific Pollutants  
(Annex VIII)**

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

Data availability: No Data

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**ANNEX D: Hydromorphological quality elements**

Hydromorphology (+ data confidence):	<b>gH (L)</b>	
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**Classification tools:**

1. TRaC Hydromorphology metrics
2. MIMAS

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

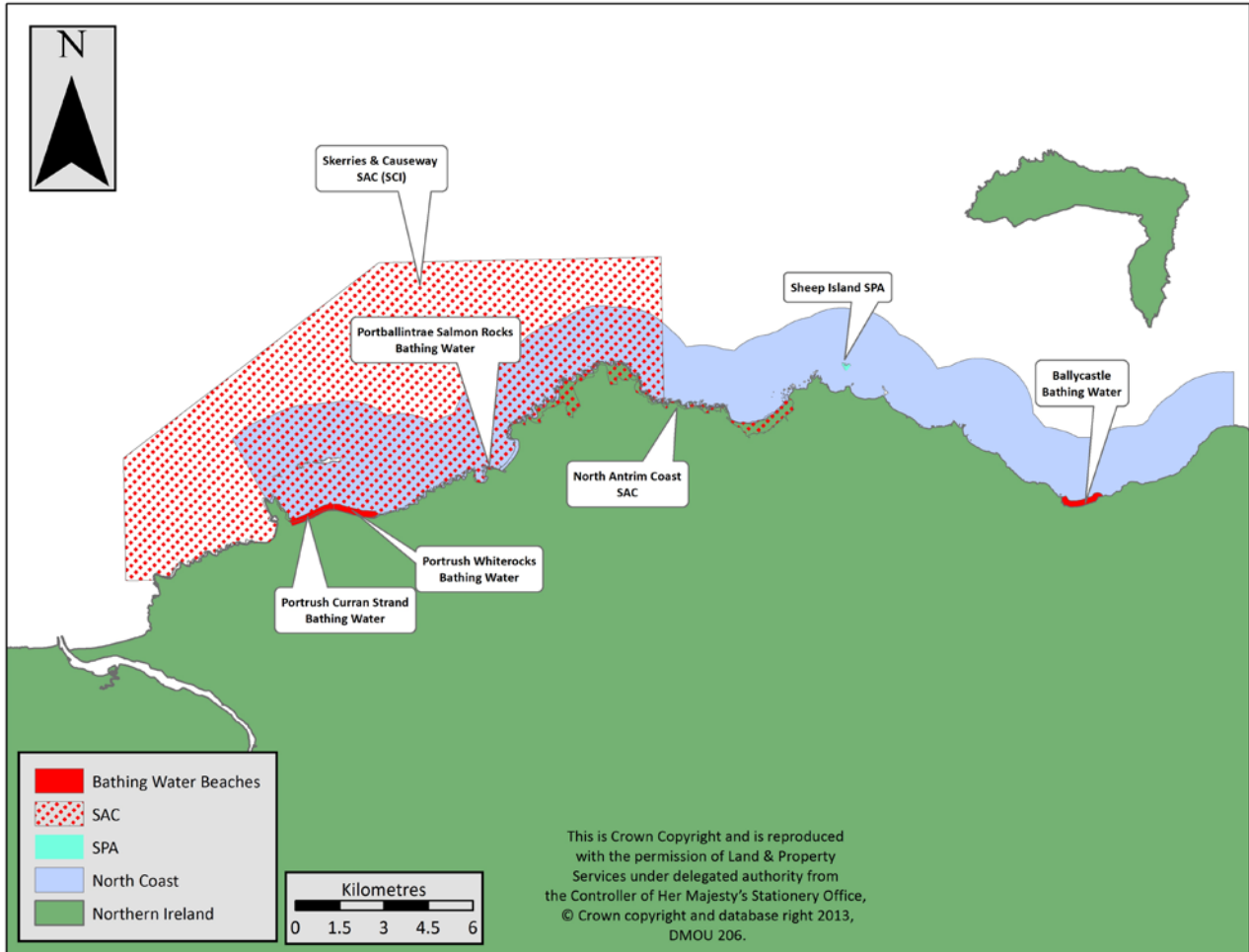
<b>Priority hazardous substances (+data confidence)</b>	<b>NO DATA</b>	
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**Classification tools:** Comparison with EQS levels.

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


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### ANNEX F: Protected Areas



Protected areas within North Coast (Coastal Water).



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The following Protected Areas are situated either wholly or partly within the North Coast water body:

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

Site Name	2014 Condition Status	Designated Water Dependant habita/species	Feature(s) not meeting objective	Reason for not meeting objective
Skerries and Causeway SCI	Unfavourable	Submerged or partially submerged seacaves; Reefs; Sandbanks which are slightly covered by seawater all the time; <i>Phocoena phocoena</i>	Sandbanks which are slightly covered by seawater all the time	Non marine water quality related
North Antrim Coast SAC	Unfavourable	Fixed dunes with herbaceous vegetation ('grey dunes'); Annual vegetation of drift lines; Atlantic salt meadows ( <i>Glauco-Puccinellietalia maritimae</i> ); Vegetated sea cliffs of the Atlantic and Baltic coasts; <i>Vertigo angustior</i>	Fixed dunes with herbaceous vegetation ('grey dunes')  Vegetated sea cliffs of the Atlantic and Baltic coasts	Non marine water quality related
Sheep Island SPA	Unfavourable	Cormorant	Cormorant	Non marine water quality related

**Bathing Waters Directive Beaches:**

Beach	2011-2014 Revised Bathing Waters Classification
Portrush Curran	Good
Portrush Whiterocks	Excellent
Portballintrae Salmon Rocks	Excellent
Ballycastle	Good

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### ANNEX G: High Impact Invasive Species

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


Phylum	Species	P	E	I	Record
<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>		Y		W
<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
<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