

RIVER BASIN MONITORING PLAN

WATER FRAMEWORK DIRECTIVE 1ST CYCLE CLASSIFICATION SUMMARY

2009-2015

Coastal Water Body – Maiden Islands

31/05/2015



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	Maiden Islands	
	Version Date:	31/05/2015
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MAIDEN ISLANDS

Water body Information

- *River Basin District:* North Eastern
- *Water body type:* CW5
- *Water body Code:* UKGBNI6NE040
- *Water body characteristics:* Euhaline, mesotidal, moderately exposed
- *Water body area:* 29.99 km²
- *Heavily Modified Water Body:* No
- *2015 Classification Objective:* High

FINAL CLASSIFICATION	HIGH	PASS/FAIL 2015 OBJECTIVE	PASS
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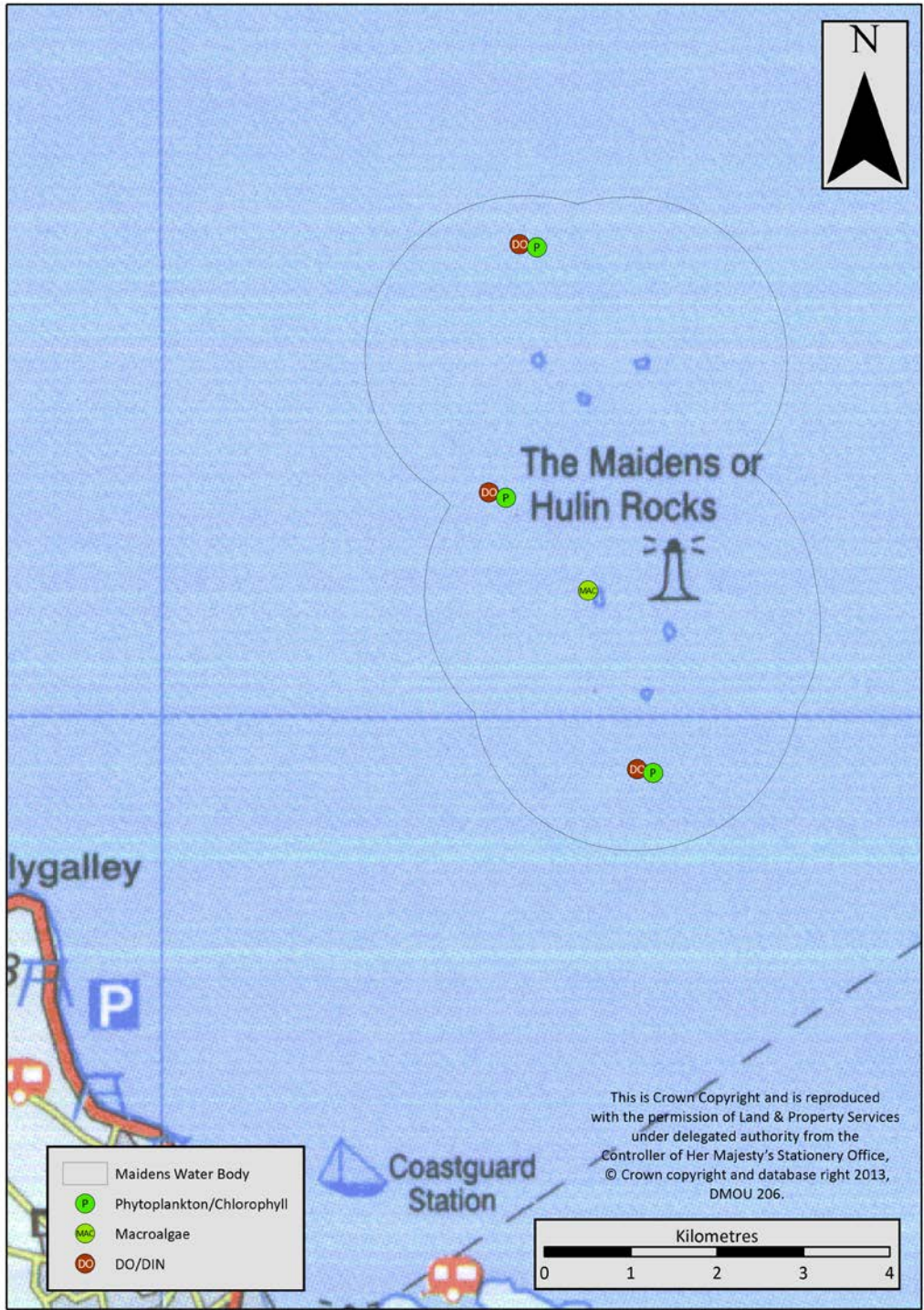


Figure 1: Monitoring points within Maiden Islands (Coastal Water).


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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			
Main Element	Sub-Element	Applied	Comment
Phytoplankton	Biomass	✓	
	Elevated Taxa Count Index	☒	Insufficient data
Macroalgae	Opportunistic Macroalgae	☒	Tool not applicable.
	Reduced Species List	✓	
Angiosperms	Seagrass	☒	Tool not applicable.
	Saltmarsh	☒	Tool not applicable.
Benthic Invertebrates	Infaunal Quality Index	☒	Tool not applied in this report.
	Imposex	☒	Tool not applicable.
Fish	Estuarine Multimetric Fish Index		
Physico-chemical	-Dissolved Oxygen	✓	
	-Nutrients	☒	
	Specific Pollutants (Annex VIII substances)	☒	
Hydromorphological Quality Elements	SEPA Rapid Designation	✓	
	TraC MIMAS	✓	
Chemical Status			
Priority Hazardous Substances	Annex X substances	☒	



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Table 2: Sampling frequency for each quality element

Monitoring Level: Surveillance

QUALITY ELEMENT		Year (if 1 in 3 yrs)	No. of sites
Biological			
Phytoplankton		2009-2010	3 sites, 15 samples
Macroalgae	Reduced Species List	2009-2010	1 site, 2 surveys
	MBT	n/a	
Angiosperms	Seagrass	n/a	
Benthic Invertebrates	Infaunal Quality Index	n/a	
	Imposex	n/a	
Physico-chemical			
Nutrients		2009-2010	2 sites, 4 samples
Dissolved Oxygen		2010, 2012	10 samples
Specific polluting substances (Annex VIII)		ND	
Hydromorphology		ND	
Water chemistry			
(Annex X)		ND	


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Biological Quality Elements																											
Flora					Fauna																						
Phytoplankton	H				Macroalgae	H				Angiosperms				Benthos			Fish			Biological Quality	H						
Physico-chemical Elements																											
General conditions																											
Oxygen (DO)	H				Nutrients (DIN)	H				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											H						
										Established																	
										Impacting																	

Ecological Status	
H	High
	Good
	Moderate
	Poor
	Bad

Surface Water Status	
H	High
	Good
	Moderate
	Poor
	Bad

Figure 2: Overall classification of Maiden Islands (Coastal Water).

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ANNEX A: Classification of Biological Quality Elements

QE: Phytoplankton

QE Phytoplankton assessment (+ data confidence):	HIGH (100%)	
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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 - 90%ile ($Chl \mu g l^{-1}$)

Data store <M:\Projects 14\Phycology 2014\MM14-14 Phytoplankton and Chlorophyll\classification 15\Coastal data\Maidens 90th Percentile.xls>
<M:\Projects 14\Phycology 2014\MM14-14 Phytoplankton and Chlorophyll\classification 15\QESHEETS\Maidens Chla & Phytoplankton Classification Doc.doc>

Data Availability (spot & continuous samples): spot (2009-2011) NIEA

Thresholds:

Water Ref. Area		Status				
		High	Good	Moderate	Poor	Bad
North/Irish Sea	Chl $\mu g l^{-1}$	<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
0.70	HIGH	0.97	2009-2010	3	15	100%


Data confidence: **High 100%**

1. Data analysed using M:\Projects 14\Phycology 2014\MM14-14 Phytoplankton and Chlorophyll\classification 15\2015CW_Phytoplankton CoC tool v10 7 UKTAG.xls

Temporal spread of data is low as the waterbody was only sampled in 2009 2010.
Waterbody status calculated on Chlorophyll biomass only.

2. Elevated Counts

Insufficient data for elevated counts to be calculated.

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QE: Macroalgae Maidens

QE macroalgal assessment (+ data confidence):	HIGH (92.4%)	
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Classification tools: Reduced species list (RSL),
Macroalgal Blooming Tool – not applicable
Angiosperms – not applicable

1. Reduced Species List (RSL)

- WFD surveillance monitoring: 2009 and 2010
- Data Availability (classification): 2009 and 2010, one site
- Data Store: [M:\Projects 14\Phycology 2014\MM14-12 Intertidal Rocky Shore\FSL-RSL Classification update 2015 \(09-14\)\Datasheet.xls](M:\Projects 14\Phycology 2014\MM14-12 Intertidal Rocky Shore\FSL-RSL Classification update 2015 (09-14)\Datasheet.xls)

Boundaries:

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. Richness	% G	% R	ESG	% Opp		
Old Lighthouse 09	16	46	42.78	17.39	56.52	1.00	15.22	0.848	HIGH
Maidens 10	17	44	38.28	15.91	52.27	1.10	13.64	0.82	HIGH
Mean								0.834 ±0.02	HIGH

Confidence of Classification: High (92.4%)

- 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](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 not yet carried out).
- One site (low spatial coverage) over two years (moderate temporal trend assessment).

Alien taxa: Not present

QE: Angiosperms Maidens – tool not applicable

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QE: Benthic Invertebrates

QE benthic invertebrate assessment (+ Data confidence):	NO DATA (LOW)	
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Classification tools:

1. Infaunal Quality Index (IQI)

1. *IQI (UKTAG v01 20140228)*

Water body IQI assessment:

NO DATA (Low)

WFD surveillance monitoring:

- **Data store:** N/A
- **Benthic invertebrates** UNICORN (NMMT) Database
- **Supporting Parameters** Water Quality Data Set
- **Digital images** AMAP Project folder
- **Data Availability (classification):** Day Grab, 1 mm sieve

Boundaries (Intercalibrated NEAGIG):

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

Results


Year	Survey	Station	n	Mean	± S.D	Status
Overall Mean				(*)		No Data

* 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 (single point with reps rather than spatial coverage)

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

QE: Dissolved Oxygen

Dissolved oxygen (+ data confidence):	HIGH (100%)	
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Classification tools: Comparison of 5% ile against reference standards

- **Data Availability:** 2010, 2012
- **Data Store:** [..DO FIELD VALUES 2013 update.xls](#)
- **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*)
8.17	HIGH	2010,2012	**	10	11.1%

* Proportion of possible months for which data are available

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QE: Nutrients - N regulation

QE N regulation assessment (+ data confidence):	HIGH (L)	
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- Data Store: [..\\..\\DIN Final 2012\\Coastal WB inc AFBI.xls](#)
- Data Availability: 2009 + 2010
DIN & salinity (Nov to Feb)
- Data Source (spot & continuous samples): spot

Thresholds:


Area	Salinity range	DIN (uM) Winter mean H/G	DIN (uM) Winter mean G/M	DIN (uM) Winter mean M/P	DIN (uM) Winter mean P/B
Coastal (at salinity 32)	30-34.5	<12	12-18	18-30	>40.5

Results:

Mean Winter DIN (uM) (Avg DIN)	Winter DIN Daily average (n)	No. of samples (n)	No. of sites	Data Years	Data Quality	Status
5.23	2	4	2	2009 - 2010	Database not yet QA'd	HIGH

Data confidence: Low

- Database not QA'd; once database checked we should be able to raise the confidence.


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

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

Data availability: No Data


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ANNEX D: Hydromorphological quality elements

Overall hydromorphology assessment	HIGH	
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Classification tools:

1. TRaC Hydromorphology metrics
2. MIMAS


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ANNEX E: Chemical Status – Annex X Chemicals

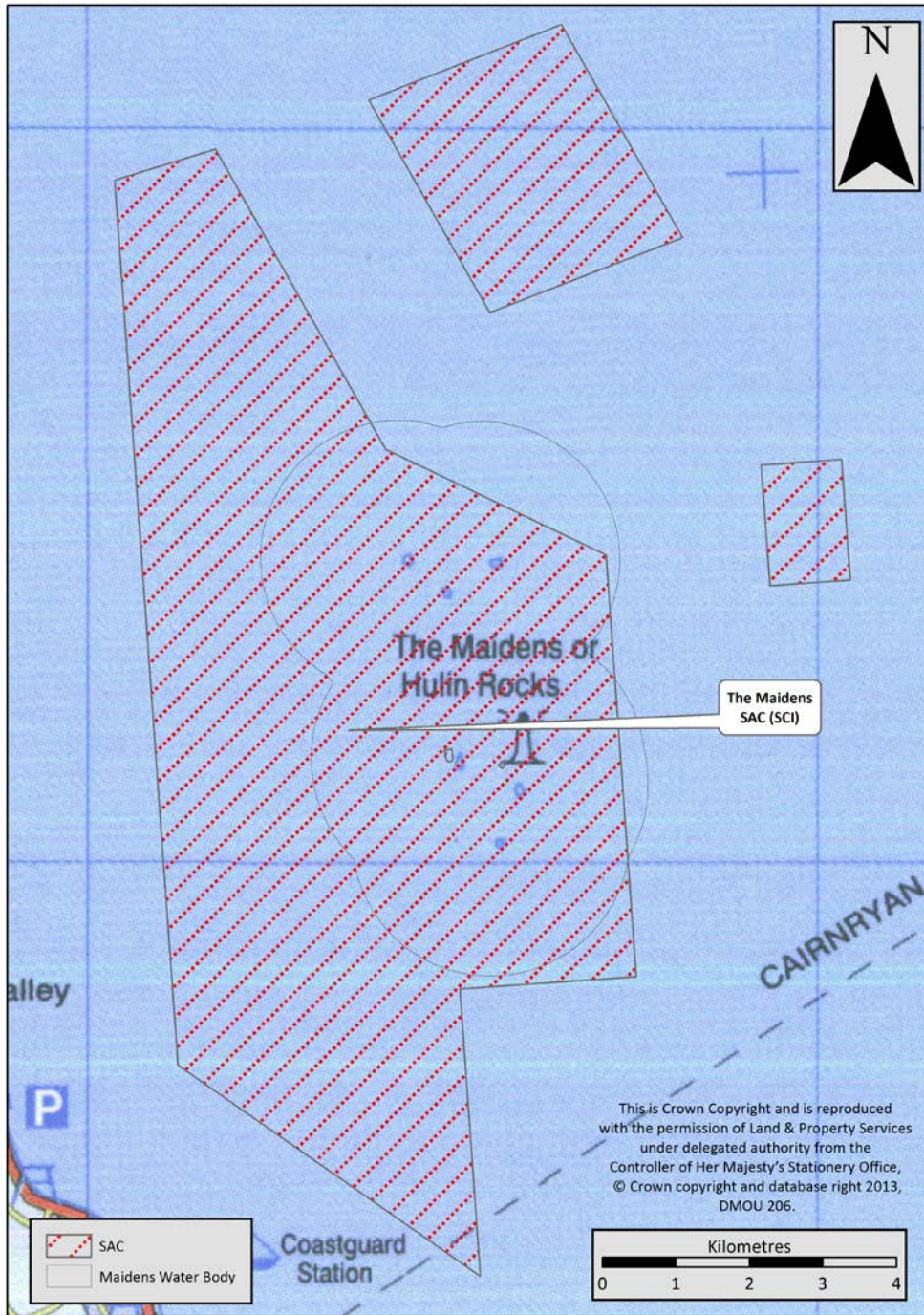
Priority hazardous substances (+data confidence)	NO DATA	
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Classification tools: Comparison with EQS levels.


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

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ANNEX F: Protected Areas




Protected areas within Maidens Water body

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The following Protected Areas are situated either wholly or partly within Maiden Islands water body:

Natura 2000 sites (Habitats Directive and Birds Directive):

Site Name	2014 Condition Status	Designated Water Dependant habitat/species	Feature(s) not meeting objective	Reason for not meeting objective
The Maidens SCI	Favourable	Sandbanks which are slightly covered by seawater all the time	None	n/a

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ANNEX G: High Impact Invasive Species

QE High Impact Invasive Species assessment	HIGH
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Ecoregion 17 Marine High Impact Invasive Species List

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

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