RIVER BASIN MONITORING PLAN

WATER FRAMEWORK DIRECTIVE 1ST CYCLE CLASSIFICATION SUMMARY

2009-2015

Coastal Water Body – Rathlin Island

31/05/2015

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RIVER BASIN MANAGEMENT PLAN	
Department of the Environment www.doeni.gov.uk Marine Environment Division	**WFD COASTAL WATER BODY CLASSIFICATION** Rathlin Island
	Version Date: 31/05/2015
	MONITORING & ASSESSMENT TEAM

RATHLIN ISLAND

Water body Information

- River Basin District: North Eastern
- Water body type: CW2
- Water body code : UKGBNI6NE020
- Water body characteristics: Euhaline, mesotidal, exposed
- Water body area: 56.16 km^2
- Heavily Modified Water Body: No
- 2015 Classification Objective: High

FINAL CLASSIFICATION	GOOD	*PASS/FAIL 2015 OBJECTIVE*	FAIL

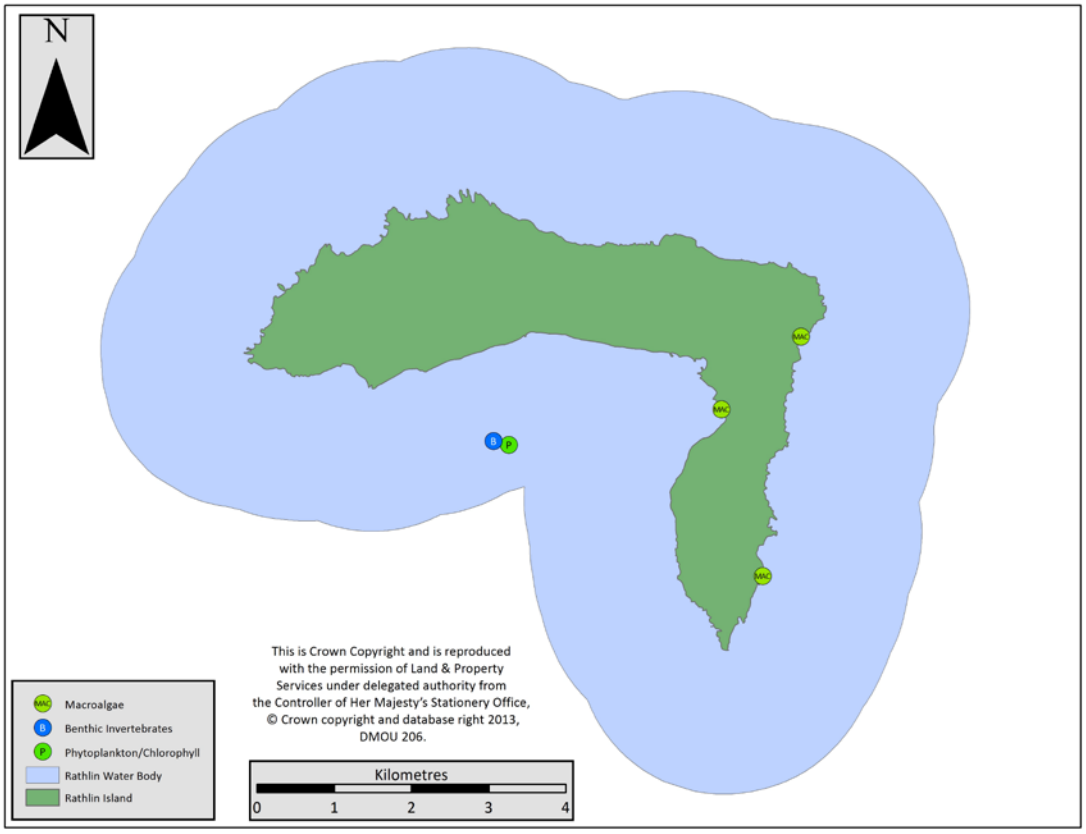

Figure 1: Waste water treatment pressures and monitoring points within Rathlin Island (Coastal Water).

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 (seaweeds)	Opportunistic Macroalgae	☒	Tool Not Applicable
	Reduced Species List	✓	
Angiosperms	Seagrass	☒	Tool Not Applicable
	Saltmarsh	☒	Tool Not Applicable
Benthic Invertebrates	Infaunal Quality Index	✓	
	Imposex	☒	No data available
Physico-Chemical (water)	General Conditions		
	-Dissolved Oxygen	✓	
	-Nutrients	✓	
	Specific Pollutants (Annex VIII subs)	☒	No data available
Hydromorphological Quality Elements	SEPA Rapid Designation	✓	
	TraC MIMAS	✓	
Chemical Status			
Priority Hazardous Substances (Annex X)	Annex X Substances	☒	No data available

Table 2: Sampling frequency for each quality element.

Monitoring Level: Surveillance

Quality Elements		Data years contributing to classification	No. of sites/samples
Biological			
Phytoplankton	Chlorophyll Biomass Index	2009-2010	4 sites 16 samples
Macroalgae	Reduced Species List	2012	3 sites 3 surveys
Benthic Invertebrates	Infaunal Quality Index	2010, 2012-2013	1 site 13 samples
Physico-chemical			
Nutrients		2009-2010	3 sites 4 samples
Dissolved Oxygen (DO)		2010, 2014	11 daily averages
Other polluting substances (Annex VIII)		ND	
Hydromorphology		2007	
Water chemistry			
(Annex X)		ND	

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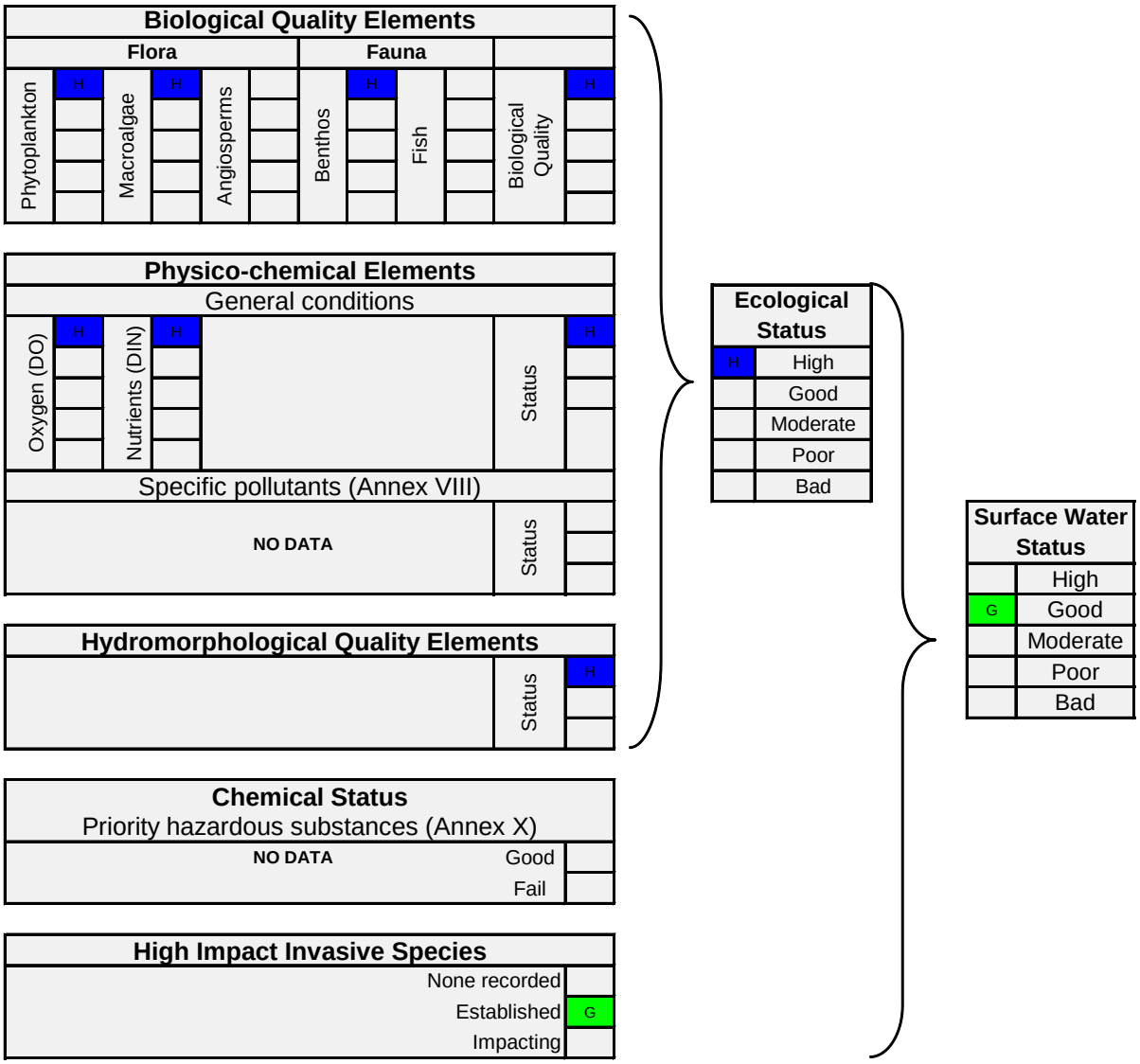

Figure 2: Overall classification of Rathlin Island (Coastal Water).

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ANNEX A: Classification of Biological Quality Elements

QE: Phytoplankton

QE Phytoplankton Classification (+ data confidence):	HIGH (100%)	

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\Rathlin classification 2015.XLS
M:\Projects 14\Phycology 2014\MM14-14 Phytoplankton and Chlorophyll\classification 15\Coastal data\Rathlin 90th Percentile.xls
Data Availability (spot & continuous samples): spot (*2009-2010) NIEA*

Thresholds:

Water Ref. Area		Status				
		High	Good	Moderate	Poor	Bad
North/Irish Sea	Chl µg 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
0.45	HIGH	0.98	2009-2010	4	16	100%

Data confidence: HIGH 100%

Data analysed for Confidence of Classification using M:\Projects 14\Phycology 2014\MM14-14 Phytoplankton and Chlorophyll\classification 15\2015CW_Phytoplankton_CoC_tool_v107_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):	**HIGH (98.0%)**	

Classification tools:
Reduced species list (RSL),
Macroalgal blooming tool (MBT) – 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
- 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**							**RSLEQR**	**Status**
	Shore desc.	**Sp. richness**	**Adj. Sp. Richness**	**% G**	**% R**	**ESG**	**% Opp**		
Bedagg 2012	12	53	64.13	18.87	49.06	1.04	13.21	0.839	HIGH
Doon Bay 2012	18	60	48.0	16.67	51.67	1.07	10.00	0.855	HIGH
Portawillin 2012	15	49	49.0	20.41	53.06	0.96	12.24	0.820	HIGH
							Mean	0.838 ±0.018	**HIGH**

Macroalgae (cont'd)

Confidence of Classification: High (98%)

- 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 (RSL completed; FSL carried out on three shores).
- Three shores (good spatial coverage) over one year (poor temporal trend assessment).

Alien taxa: *Sargassum muticum* present

QE: Angiosperms – tool not applicable

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QE: Benthic Invertebrates

QE benthic invertebrate assessment (+ Data confidence):	**HIGH (L)**	

Classification tools: 1. Infaunal Quality Index (IQI)

1. IQI (UKTAG v01 20140228)

Water body IQI assessment: **High (Low)**

WFD surveillance monitoring:

- **Data store:** ..\Rathlin Island water body\Rathlin Island 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&3 reps, 3 years, Day Grab, 1 mm sieve, n=13.

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	Annual Mean	Annual ± S.D	Status
2010	MM-Benthos	CHB (3)	3	0.81	0.02	High
2011	MM-Benthos	CHB (5)	-	-	-	-
2012	MM-Benthos	CHB (5)	5	0.80	0.02	High
2013	MM-Benthos	CHB (5)	5	0.84	0.01	High
2014	MM-Benthos	CHB (5)	-	-	-	-
2015	MM-Benthos	CHB (5)	-	-	-	-
Overall 6 year waterbody means			**4.3**	**0.82 (0.80*)**	**0.02**	**High**

* 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)

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

QE: Dissolved Oxygen

Dissolved oxygen (+ data confidence):	HIGH (100%)	

Classification tools: Comparison of 5% ile against reference standards

- **Data Availability:** 2010, 2014
- **Data Store:** ..\..\DO Classification 2012\Shortcut to DO FIELD VALUES 2006 -2010.lnk
- **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*)
7.93	HIGH	2010, 2014	**	11	12.5%

***** Proportion of possible months for which data are available

QE: Nutrients – N regulation

QE N regulation assessment (+ Data confidence):	HIGH (100%)	

- **Data stores** ..\Coastal WB inc AFBI 15.xls
- **Data Availability:** 2009 to 2010
  DIN & salinity (Nov to Feb)
- **Data Source (spot & continuous samples):** spot

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	18-30	30 +

Results:

Mean Winter DIN (uM) (Avg DIN)*	Winter DIN Daily average (n)	No. of samples (n)	No. of sites	Data Years	Data Quality	Status
8.33		4	3(inc con mon)	2009-2010	Database not yet QA'd	HIGH

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

Data confidence source: ..\CofCDINth.xlsx

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

Specific pollutants assessment (+data confidence)	NO DATA	

Classification tools: Comparison with EQS levels.

Data availability: No Data

ANNEX D: Hydromorphological quality elements

Overall hydromorphology assessment	$_{G}H$	

Classification tools:

1. TRaC Hydromorphology metrics
2. MIMAS

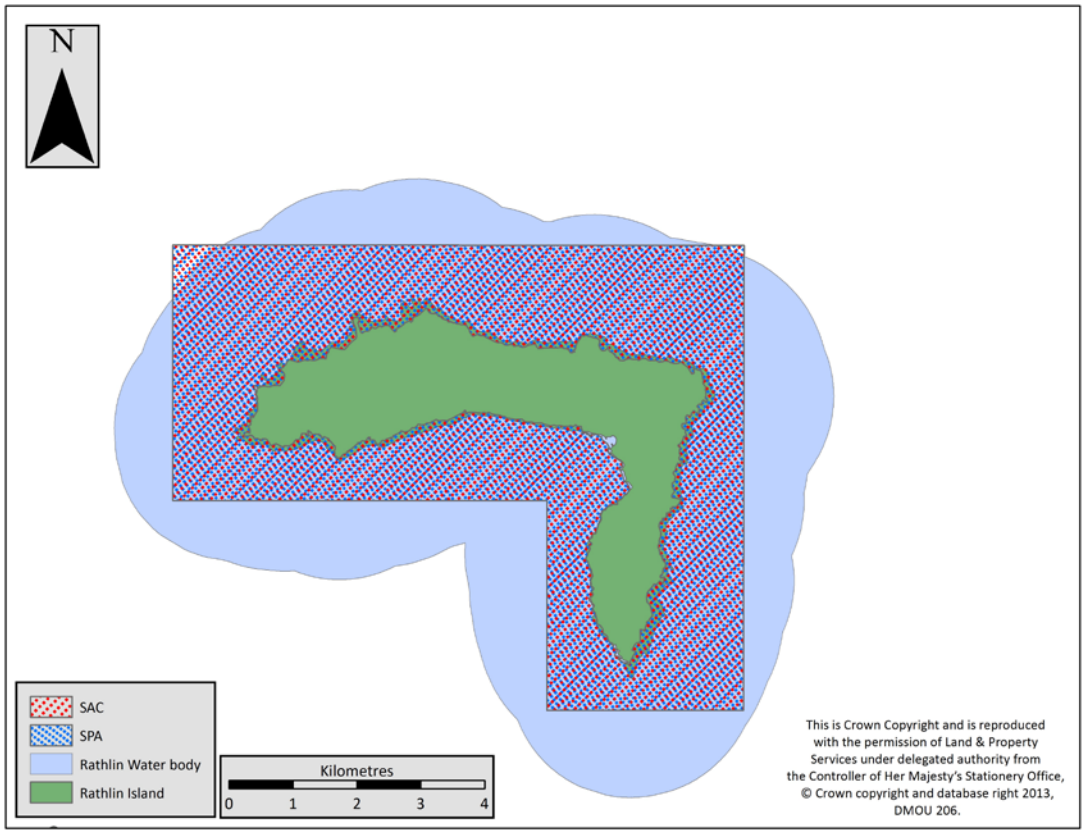
ANNEX E: Chemical Status – Annex X Chemicals

Priority hazardous substances (+data confidence)	NO DATA	

Classification tools: Comparison with EQS levels.

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

ANNEX F: Protected Areas



Protected Areas within Rathlin Island (Coastal Water).

The following Protected Areas are situated either wholly or partly within Rathlin Island 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
Rathlin SAC	Unfavourable	Submerged or partially submerged sea caves; Annual vegetation of drift lines; Reefs; Sandbanks which are slightly covered by sea water all the time; Vegetated sea cliffs of the Atlantic and Baltic coasts	Reefs; Sandbanks which are slightly covered by sea water all the time	Non marine water quality related
Rathlin SPA	Unfavourable	Guillemot; Peregrine; Razorbill; Seabird assemblage	Peregrine	Non marine water quality related

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ANNEX G: High Impact Invasive Species

QE High Impact Invasive Species assessment		GOOD

Ecoregion 17 Marine High Impact Invasive Species List

Phylum	Species	P	E	I	Record
Chordata	*Didemnum* spp.				
Chordata	*Styela clava*				
Crustacea	*Eriocheir sinensis*				
Mollusca	*Crassostrea gigas*				
Mollusca	*Crepidula fornicata*				
Phaeophyceae	*Sargassum muticum*		Y		W
Angiosperms	*Spartina anglica*				

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.

GLOSSARY

AFBI	Agri-Food and Biosciences Institute (under contract to NIEA)
AMBI	AZTI Marine Biotic Index
Annex X	Annex 10 Priority Hazardous Substances
Annex VIII	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
$_{G}$H	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