RIVER BASIN MONITORING PLAN

WATER FRAMEWORK DIRECTIVE 2ND CYCLE CLASSIFICATION SUMMARY

2015-2021

Coastal Water Body – Portstewart Bay

31/05/2015

PORTSTEWART BAY

Water body Information
- River Basin District: Neagh Bann
- Water body type: CW2
- Water body code : UKGBNI6NB010
- Water body characteristics: Euhaline, mesotidal, exposed
- Water body area: 122.09 km^2
- Heavily Modified Water Body: No
- 2021 Classification Objective: Good

2015 CLASSIFICATION	GOOD	*PASS/FAIL 2021 OBJECTIVE*	PASS
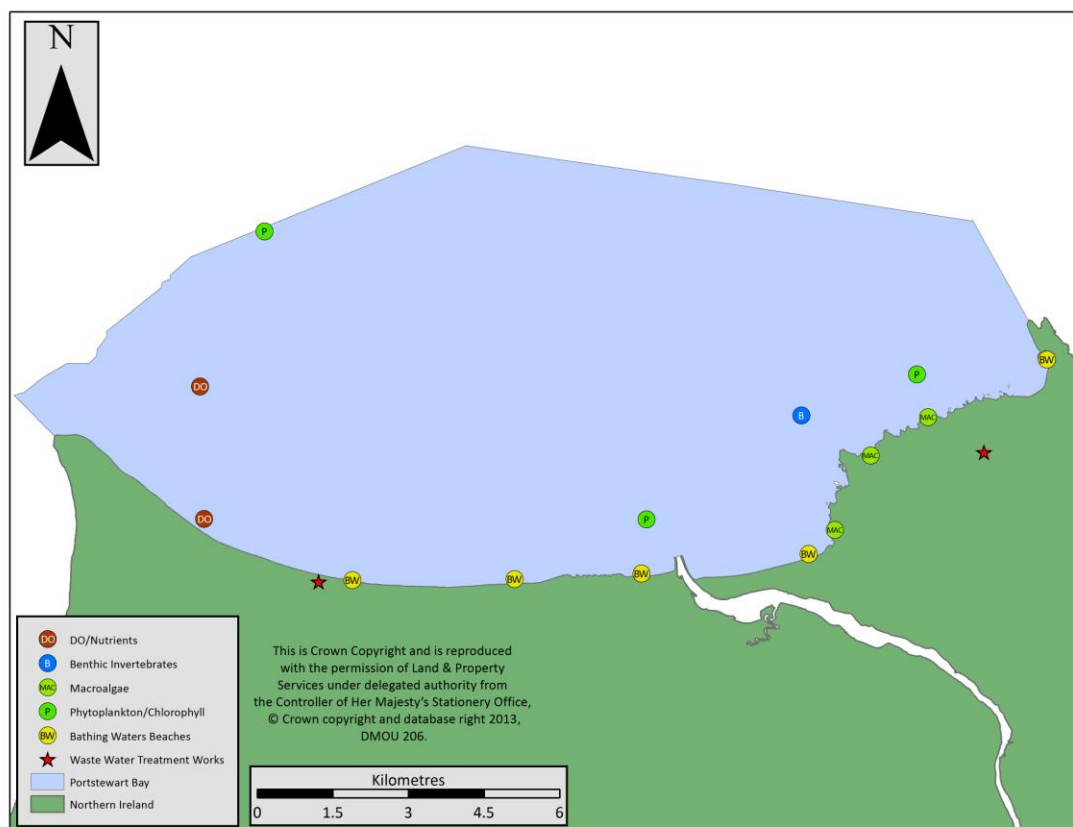
Figure 1: Waste water treatment pressures and monitoring points within Portstewart Bay (Coastal Water).

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)	Reduced Species List	✔	
Benthic Invertebrates	Infaunal Quality Index	☒	No Data
	Imposex	☒	Tool Not Applicable
Physico-Chemical (water)	General Conditions		
	-Dissolved Oxygen	✔	
	-Nutrients	✔	
	Specific Pollutants (Annex VIII subs)	☒	Data Not Available
Hydromorphological Quality Elements	SEPA Rapid Designation	✔	
	TraC MIMAS	✔	
Chemical Status			
Priority Hazardous Substances (Annex X)	Annex X Substances	☒	Data Not Available

	WFD COASTAL WATER BODY CLASSIFICATION Portstewart Bay	
Version Date:	31/05/2015	
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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
Biological			
Phytoplankton	Chlorophyll Biomass Index	2009-2011	
Macroalgae (seaweed)	Reduced Species List	2012	3 sites 3 surveys
Physico-chemical			
Nutrients		2010, 2012, 2014	67 samples, 6 site plus transect
Dissolved Oxygen (DO)		2010, 2014	24 daily averages
Other polluting substances (Annex VIII)		ND	
Hydromorphology		2007	
Water chemistry			
(Annex X)		ND	

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	Version Date: 31/05/2015
	MONITORING & ASSESSMENT TEAM

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 |

Ecological Status

H	High
	Good
	Moderate
	Poor
	Bad

Surface Water Status

	High
G	Good
	Moderate
	Poor
	Bad

Chemical Status
Priority hazardous substances (Annex X)

NO DATA	Good
	Fail

High Impact Invasive Species

None recorded	
Established	G
Impacting	

Figure 2: Overall classification of Portstewart Bay (Coastal Water)

ANNEX A: Classification of Biological Quality Elements

QE: Phytoplankton

QE Phytoplankton assessment (+ data confidence):	**HIGH (74.6%)**	

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: ..\Coastal data\Portstewart Bay 90th Percentile.xls

Data Availability (spot & continuous samples): spot *(2009-2011) 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	Data Years	Data Quality	No. of daily averages	No. of Sites	No. of Samples	Data Confidence (proportion of possible months with data*)
3.81	**HIGH**	2009-2011	Low	7	4	22	33.33%

* proportion of possible months (of growing season in years assessed) for which data are available

Data confidence: High 66.1%

Data analysed for Confidence of Classification using PUGWASH (V10 7).

..\2015CW_Phytoplankton_CoC_tool_v10 7_UKTAG.xls

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	Version Date: 31/05/2015
	MONITORING & ASSESSMENT TEAM

QE: Macroalgae Portstewart Bay

QE macroalgal assessment (+ data confidence):	**HIGH (93.3%)**	

Classification tools:

> Reduced species list (RSL),
> Macroalgal Blooming Tool **(**MBT) – 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**

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	Shore desc.	Sp. richness	Adj. Sp. Richness	% G	% R	ESG	% Opp	RSL EQR	Status
Portnahapple 2012	18	54	43.2	14.81	51.85	1.25	11.11	0.857	HIGH
Clubhouse 2012	16	53	49.29	18.87	47.17	0.89	11.32	0.821	HIGH
Rinagree Point 2012	18	53	42.4	18.87	47.17	1.04	13.21	0.812	HIGH
							Mean	0.830 ±0.024	HIGH

Macroalgae (cont'd)

Confidence of Classification: High (93.3%)

- Data analysed for Confidence of Class using PIRATES (V04) 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;
- Three shores (good spatial coverage) over one years (low temporal trend assessment).

Alien taxa: *Sargassum muticum, Heterosiphonia japonica*

QE: Angiosperms Portstewart Bay – tool not applicable

	WFD COASTAL WATER BODY CLASSIFICATION Portstewart Bay	
Department of the **Environment** www.doeni.gov.uk Marine Environment Division	**Version Date:**	31/05/2015
	MONITORING & ASSESSMENT TEAM	

QE: Benthic Invertebrates – Portstewart Bay

QE benthic invertebrate assessment (+ Data confidence):	**NO DATA (L)**	

Classification tools: 1. Infaunal Quality Index (IQI)

1. IQI (UKTAG v01 20140228)
Water body IQI assessment: **No data (Low)**

WFD surveillance monitoring:
- **Data store**   **..\Portstewart Bay water body\Portstewart Bay 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, 0 years , Day Grab, 1 mm sieve, n=0.

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	-	PSB (5)	-	-	-	-
2011	-	PSB (5)	-	-	-	-
2012	-	PSB (5)	-	-	-	-
2013	-	PSB (5)	-	-	-	-
2014	-	PSB (5)	-	-	-	-
2015	-	PSB (5)	-	-	-	-
Overall 6 year waterbody means			**0**	**0 (0*)**	**0**	**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)

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	Version Date: 31/05/2015
	MONITORING & ASSESSMENT TEAM

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*)
8.19	HIGH	2010,2014	**	24	22.5%

* Proportion of possible months for which data are available

	WFD COASTAL WATER BODY CLASSIFICATION Portstewart Bay
Department of the **Environment** www.doeni.gov.uk Marine Environment Division	**Version Date:** 31/05/2015
	MONITORING & ASSESSMENT TEAM

QE: Nutrients – N regulation

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

- **Data store:** ..\..\..\DIN Final 2012\Coastal WB inc AFBI.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
8.84		67	6 (inc con mon)	2010, 2012, 2014	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

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Department of the **Environment** www.doeni.gov.uk **Marine Environment Division**	**Version Date:** 31/05/2015
	MONITORING & ASSESSMENT TEAM

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

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Department of the **Environment** www.doeni.gov.uk **Marine Environment Division**	**Version Date:** 31/05/2015
	MONITORING & ASSESSMENT TEAM

ANNEX F: Protected Areas
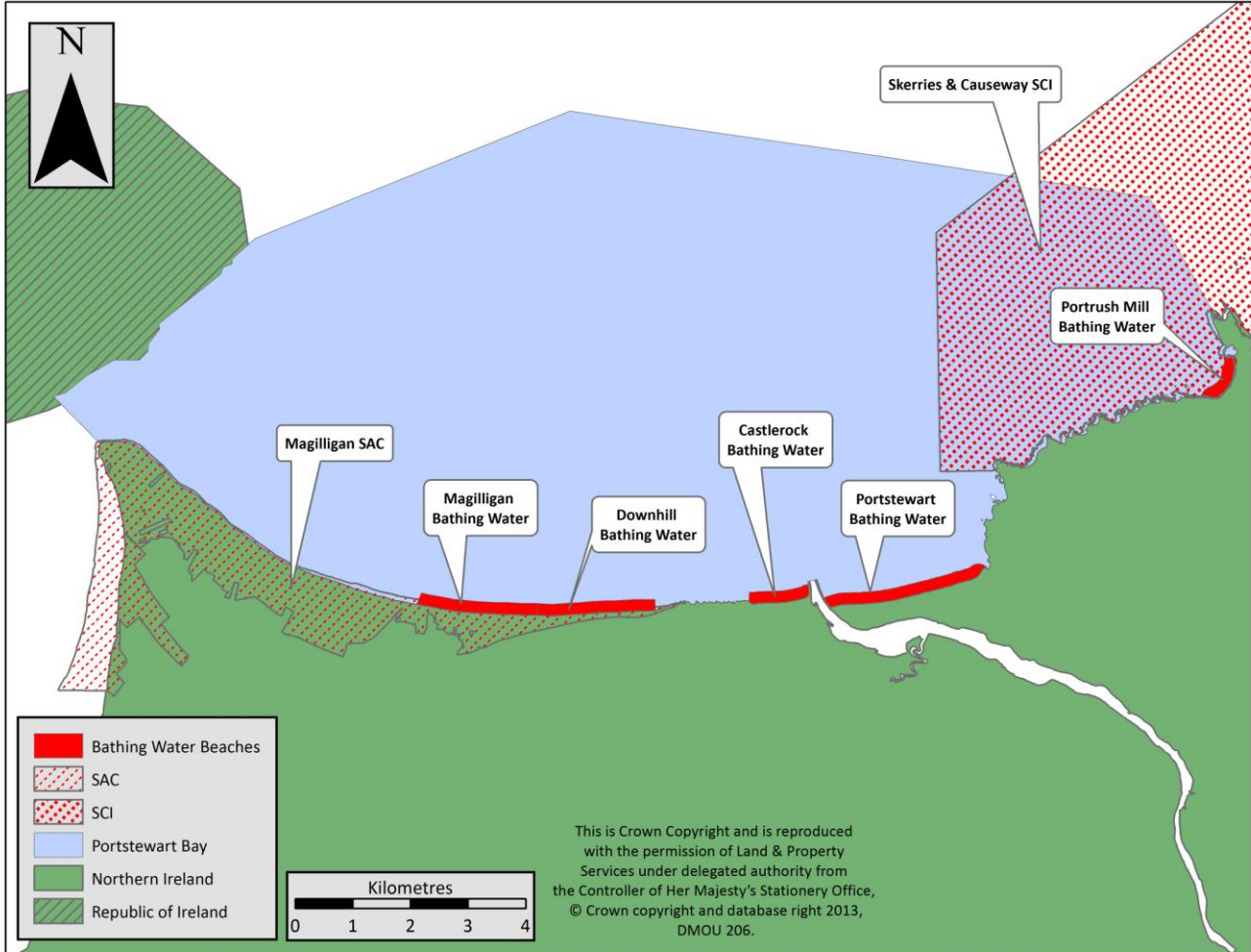
Protected areas in Portstewart Bay (Coastal Water).

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	Version Date:	31/05/2015
	MONITORING & ASSESSMENT TEAM	

The following Protected Areas are situated either wholly or partly within the Portstewart Bay 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
Skerries and Causeway SCI	Unfavourable	Submerged or partially submerged seacaves; Reefs; Sandbanks which are slightly covered by seawater all the time; *Phocoena phocoena*	Sandbanks which are slightly covered by seawater all the time	Non marine water quality related
Magilligan SAC	Unfavourable	Fixed dunes with Herbaceous vegetation ('grey dunes'); Humid dune slacks; Embryonic shifting dunes; Dunes with *Salix repens* ssp. *argentea* (*Salicion arenariae*) Shifting dunes along the shoreline with *Ammophila arenaria* ('white dunes')	Fixed dunes with Herbaceous vegetation ('grey dunes'); Humid dune slacks; Shifting dunes along the shoreline with *Ammophila arenaria* ('white dunes')	Non marine water quality related

Bathing Waters Directive Beaches:

Beach	2011-2014 Revised Bathing Waters Classification
Magilligan	Excellent
Downhill	Excellent
Castlerock	Excellent
Portstewart	Excellent
Portrush Mill	Excellent

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	Version Date: 31/05/2015
	MONITORING & ASSESSMENT TEAM

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