

RIVER BASIN MONITORING PLAN

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

2009-2015

Coastal Water Body - Ards Peninsula

31/05/2015




An Agency within the Department of the  
**Environment**  
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	<b>Version Date:</b>	31/05/2015
	<b>MONITORING AND ASSESSMENT TEAM</b>	

**ARDS PENINSULA**

Water body Information

- River Basin District: North Eastern
- Water Body Code: UKGBNI6NE110
- Water body type: CW5
- Water body characteristics: Euhaline, mesotidal, moderately exposed
- Water body area: 185.73 km<sup>2</sup>
- Heavily Modified Water Body: No
- 2015 Classification Objective: Good

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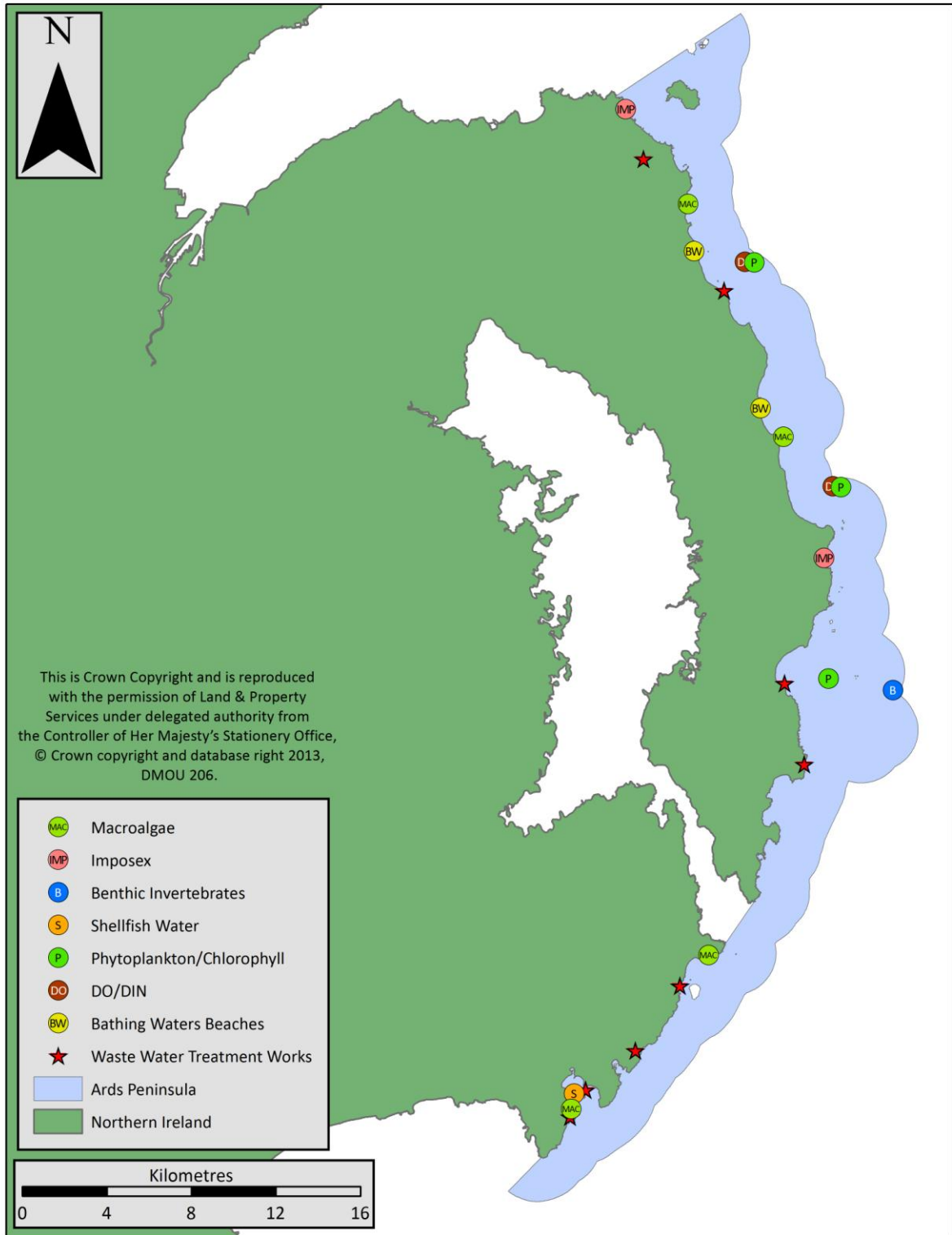


Figure 1: Waste water treatment pressures and monitoring sites within Ards Peninsula (Coastal Water)


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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.

<b>Ecological Quality Element</b>			
<b>Main Element</b>	<b>Sub-Element</b>	<b>Applied</b>	<b>Comment</b>
<b>Phytoplankton</b>	Biomass	✓	
	Elevated Taxa Count Index	✓	
<b>Macroalgae (Seaweeds)</b>	Opportunistic Macroalgae	☒	Tool not suitable.
	Reduced Species List	✓	
<b>Angiosperms</b>	Seagrass	☒	Tool not suitable.
	Saltmarsh	☒	
<b>Benthic Invertebrates</b>	Infaunal Quality Index	✓	
	Imposex	✓	
<b>Physico-chemical (Water)</b>	-Dissolved Oxygen	✓	
	-Nutrients	✓	
	Specific Pollutants ( Annex VIII substances)	✓	
<b>Hydromorphological Quality Elements</b>	SEPA Rapid Designation	✓	
	TraC MIMAS	✓	
<b>Chemical Status</b>			
<b>Priority Hazardous Substances</b>	Annex X substances	✓	


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Table 2: Sampling frequency for each quality element.

*Monitoring Level: Surveillance*

QUALITY ELEMENT		Data years contributing to classification	No. of sites/samples
<b>Biological</b>			
Phytoplankton		2009,2010,2013,2014	3
Macroalgae (Seaweeds)	Reduced Species List	2010,2011	4
	MBT	n/a	
Angiosperms	Seagrass	n/a	
Benthic Invertebrates	Infaunal Quality Index	2010-2013	1
	Imposex	2010,2013	2 sites 2 samples
<b>Physico-chemical</b>			
Nutrients		2009-2014	8 sites plus transect 92 samples
Dissolved Oxygen		2010-2014	44 daily averages
Specific polluting substances (Annex VIII)		2012-2014	
<b>Hydromorphology</b>		2007	
<b>Water chemistry</b>			
(Annex X)		2012-2014	

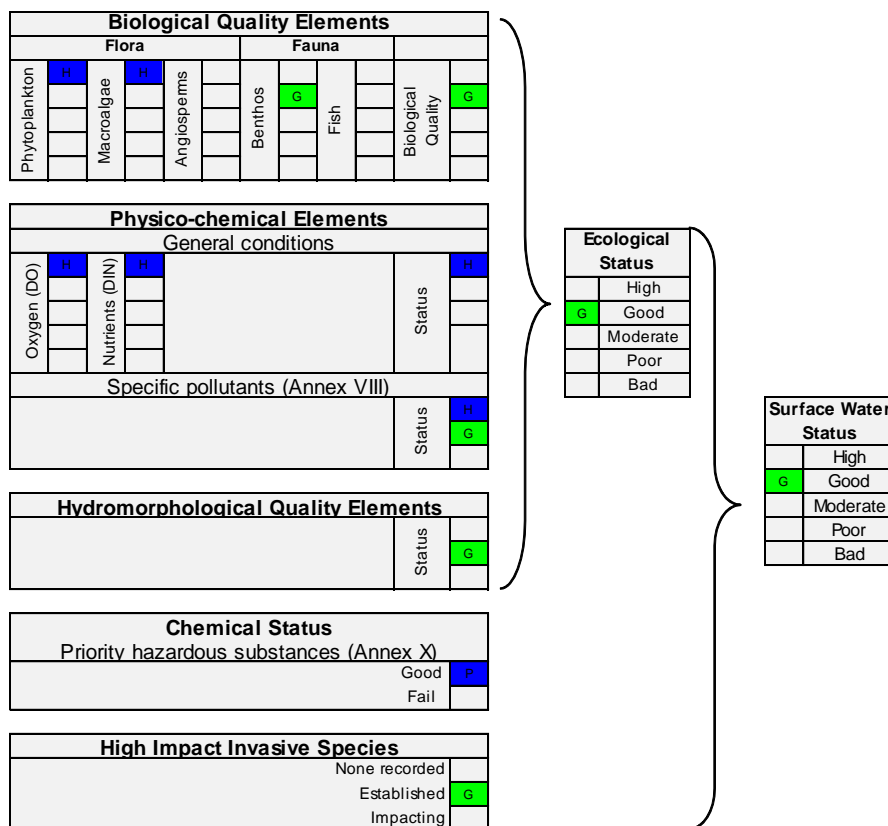



Figure 2: Overall classification of Ards Peninsula (Coastal Water).

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## ANNEX A: Classification of Biological Quality Elements

### QE: Phytoplankton

<b>QE Phytoplankton assessment (+data confidence):</b>	<b>HIGH (100%)</b>	
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#### Classification metrics:

1. Chlorophyll biomass index (90%ile)
2. Elevated taxa count index:
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\ARDS\\_Coastal\\_2015\\_-\\_Copy.XLS](M:\Projects_14\Phycology_2014\MM14-14_Phytoplankton_and_Chlorophyll\classification_15\Coastal_data\ARDS_Coastal_2015_-_Copy.XLS)

[M:\Projects\\_14\Phycology\\_2014\MM14-14\\_Phytoplankton and Chlorophyll\classification\\_15\Coastal\\_data\Ards\\_Penninsula\\_90th\\_Percentile.xls](M:\Projects_14\Phycology_2014\MM14-14_Phytoplankton_and_Chlorophyll\classification_15\Coastal_data\Ards_Penninsula_90th_Percentile.xls)

**Data Availability (spot & continuous samples):** spot samples (2009, 2010, 2013 2014)  
NIEA/MD

#### 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	EQR	Status	Data Years	No. of Sites	No. of Samples	Data Confidence
1.30	0.95	<b>HIGH</b>	2009,10/13/14	5	30	100%

**Data confidence: High (100%)**

No samples were collected during 2011 or 2012.

Data analysed for Confidence of Class using [M:\Projects\\_14\Phycology\\_2014\MM14-14\\_Phytoplankton and Chlorophyll\classification\\_15\2015CW\\_Phytoplankton\\_CoC\\_tool\\_v107\\_UKTAG.xls](M:\Projects_14\Phycology_2014\MM14-14_Phytoplankton_and_Chlorophyll\classification_15\2015CW_Phytoplankton_CoC_tool_v107_UKTAG.xls)

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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 (excl. Phaeocystis) (%)	500,000 (cells l <sup>-1</sup> )	
I <sub>2</sub> - Total Taxa Count (%)	10 <sup>7</sup> (cells l <sup>-1</sup> )	
I <sub>3</sub> - Elevated Biomass Count (%)	>10 (µg l <sup>-1</sup> )	>5 (µg l <sup>-1</sup> )

- EQR Boundaries:**

% exceedances (Face value range)	Metric range (0-1)	Class
0 - <10	≥0.8 - 1.0	High
≥10 - < 20	≥0.6 - < 0.8	Good
≥20 - < 40	≥0.4 - < 0.6	Moderate
≥40 - <60	≥0.2 - < 0.4	Poor
≥60 - 100	≥0 - < 0.2	Bad

### Results: % Exceedence

I <sub>1</sub>	I <sub>2</sub>	I <sub>3</sub>	Elevated Count Mean	Status	Data Years	No. of phytoplank ton samples	Data confidence
0	0	0	1.0	HIGH	2009-2014	32	50%

Data confidence: 50% High 50% Good

50% confidence between the two classes based on a small amount of samples.


Data analysed using [M:\Projects 14\Phycology 2014\MM14-14 Phytoplankton and Chlorophyll\classification 15\2015CW Phytoplankton CoC tool v10 7 UKTAG.xls](#)

Presence of alien/nuisance species: *none*

### Overall Waterbody Status

High (100%)



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**QE: Macroalgae: Ards Peninsula**

<b>QE macroalgal assessment (+ data confidence):</b>	<b>HIGH (99.8%)</b>	
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Classification tools:

1. Reduced species list (RSL).
2. Macroalgal Blooming Tool (MBT) – not applicable
3. Angiosperms – not applicable

*Reduced Species List (RSL)*

- **WFD surveillance monitoring:** 2010 2011
- **Data Availability (classification):** 2010, 1 site & 2011, 3 sites
- **Data Store:** [M:\Projects 14\Phycology 2014\MM14-12 Intertidal Rocky Shore\FSL-RSL Classification update 2015 \(09-14\)\Datashet.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							EQR	
	Shore description	Species richness	Adj. Sp. Rich.	% G	% R	ESG	% Opp.		
Craiglewy 2010	14	64	68.48	14.06	53.13	1.00	10.94	0.847	HIGH
Galloway Rocks 2011	18	62	49.60	14.52	50.00	1.00	11.29	0.843	HIGH
Wallace Rocks 2011	16	55	51.15	12.73	52.73	1.20	10.91	0.873	HIGH
Killough 2011	18	61	48.80	13.11	52.46	1.18	9.84	0.875	HIGH
<b>Mean</b>								0.860 ±0.016	<b>HIGH</b>


**Confidence of Classification: High (99.8%)**

- 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; full species list not yet carried out).
- Three shores (good spatial coverage) over one year and one site another year (low temporal trend assessment).

**Alien taxa:** *Sargassum muticum* present

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**QE Angiosperms: Ards Peninsula – tool not applicable**

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**QE: Benthic Invertebrates**

<b>QE benthic invertebrate assessment (+ Data confidence):</b>	<b>GOOD (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:

High (Low)

WFD surveillance monitoring:

- **Data store:** [WFD Benthic invert QE Ards Peninsula 2008-2013.docx](#)
- **Benthic invertebrates:** UNICORN (NMMT) Database
- **Supporting Parameters:** Water Quality Data Set
- **Digital images:** AMAP Project folder
- **Data Availability (classification):** 8 sites, 5, 3& 1 reps, 4 years, Day Grab, 1 mm sieve, n=25.

**Thresholds (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	SRK (3)	3	0.81	0.03	High
2011	MM- Benthos	SRK (5)	5	0.78	0.02	High
2012	MM- Benthos	SRK (5), 120611, 12, ,13,18,19, 20,20A	12	0.82	0.04	High
2013	MM- Benthos	SRK (5)	5	0.79	0.02	High
2014	MM- Benthos (not analysed)	SRK (5)	-	-	-	-
2015	MM- Benthos (no resources)	SRK (5)	-	-	-	-
Overall 6 year waterbody means			6.3	0.80 (0.77*)	0.03	High

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

Data confidence:

- Sample analysis QA'd through NMBAQC (Good)
- Database QA'd (Good)
- No specific WFD data (single point with reps with some additional spatial coverage in 2012 with 7 sites)

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## 2. VDSI (*Nucella lapillus*)

Waterbody VDSI assessment:

**Good (M)**

- **Data store:** <..\\..\\BIOEFFECTS\\Imposex\\Imposex 2013\\Report\\IMPOSEX MASTER DATA SHEET TEMPLATE.xls>
- **Data availability:** 2004/2007/2010/2013 NI survey

### Thresholds:

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	Portavogie	2.35	0.61	Good
2013	Sandy Bay	0.00	1.00	High
	Mean	1.18		Good

Data confidence:

Medium

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

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

### QE: Dissolved Oxygen

<b>Dissolved oxygen (+ data confidence):</b>	<b>HIGH (High 100%)</b>	
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Classification tools: Comparison of 5%ile against reference standards.

- Data Availability: 2010-2014
- Data Store: [..\DO Classification 2015 AL Update.xls](#)
- Data source (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*)
7.62	HIGH	2010-2014	**	44	35%

\* 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 DIN 2015-2021.xls](#)
- **Data Availability:** 2010 to 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
6.91	0	268	11 (inc con mon)	2010 - 2014	Database not yet QA'd	<b>HIGH</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: Specific Pollutants  
(Annex VIII)**

Specific pollutants assessment (+data confidence)	<b>GOOD/HIGH</b>	
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**Classification tools:** Comparison with EQS levels.

**Data assessed for 2013 Update:**

**Specific Pollutants:**

Suite	Parameter	Data Availability
Trace Metals	Chromium	SWMP 2012
Trace Metals	Iron	SWMP 2012
Trace Metals	Copper	SWMP 2012
Trace Metals	Zinc	SWMP 2012
Trace Metals	Arsenic	SWMP 2012
Nutrients (Winter Nutrients)	Unionised Ammonia (at pH8)	WIN NUTS 2012-2013

**Link to Data, Assessment and EQSs**

<G:\MARINEWater Framework Directive\WFD ANNUAL CLASSIFICATION UPDATE 2013\Chemistry>

**Data assessed for 2014 Update:**

Suite	Parameter	Data Availability
Trace Metals	Chromium	SWMP 2013
Trace Metals	Copper	SWMP 2013
Trace Metals	Zinc	SWMP 2013
Trace Metals	Arsenic	SWMP 2013

No EQS Failures

**Link to Data, Assessment and EQSs**

<..\Data>


**Data Assessed for 2015 update:**

Suite	Parameter	Data Availability
Trace Metals	Chromium	Sept 2014 – Dec 2014
Trace Metals	Copper	Sept 2014 – Dec 2014
Trace Metals	Zinc	Sept 2014 – Dec 2014
Trace Metals	Arsenic	Sept 2014 – Dec 2014

No EQS Failures

**Link to Data, Assessment and EQSs**

<G:\MARINEWater Framework Directive\WFD ANNUAL CLASSIFICATION UPDATE 2015\2015 QE sheets>

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### ANNEX D: Hydromorphological quality elements

Overall hydromorphology assessment	gH	
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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)	<b>GOOD</b>	
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**Classification tools:** Comparison with EQS levels.

Annex X: Overall Compliance	Pass
Annex X: Pass/Fail	Pass

#### Data Assessed for 2013 Update:

Suite	Parameter	Data Availability
Trace Metals	Nickel	SWMP 2012
Trace Metals	Cadmium	SWMP 2012
Trace Metals	Lead	SWMP 2012
Trace Metals	Mercury	SWMP 2012

**Link to Data, Assessment and EQSs**

[G:\MARINE\Water Framework Directive\WFD ANNUAL CLASSIFICATION UPDATE 2013\Chemistry](#)

#### Data Assessed for 2014 Update:

Suite	Parameter	Data Availability
Trace Metals	Nickel	SWMP 2013
Trace Metals	Cadmium	SWMP 2013
Trace Metals	Lead	SWMP 2013
Trace Metals	Mercury	SWMP 2013

No EQS failures

**Link to Data, Assessment and EQSs**

[..\Data](#)

#### Data Assessed for 2015 Update:

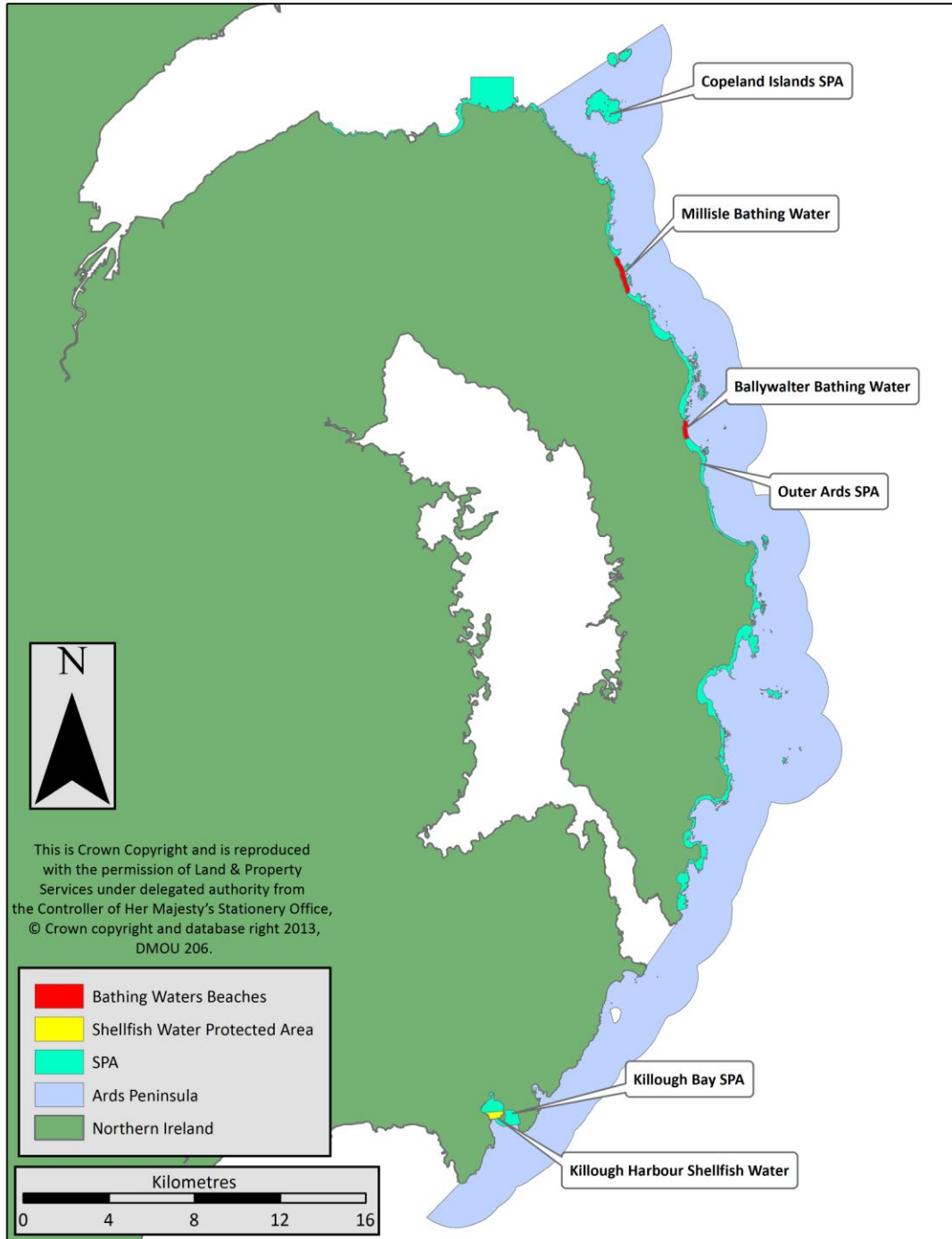
Suite	Parameter	Data Availability
Trace Metals	Nickel	Sep 2014 – Dec 2014
Trace Metals	Cadmium	Sep 2014 – Dec 2014
Trace Metals	Lead	Sep 2014 – Dec 2014
Trace Metals	Mercury	Sep 2014 – Dec 2014

No EQS failures


**Link to Data, Assessment and EQSs**

[G:\MARINE\Water Framework Directive\WFD ANNUAL CLASSIFICATION UPDATE 2015\2015 QE sheets](#)

**ANNEX F: Protected Areas**



Protected areas within Ards Peninsula (Coastal Water).

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The following Protected Areas are situated either wholly or partly within the Ards Peninsula 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
Outer Ards SPA	Unfavourable	Arctic Tern; Golden Plover; Light Bellied Brent Goose; Ringed Plover Turnstone	Ringed Plover	Non marine water quality related
Copeland Islands SPA	Favourable	Arctic Tern; Manx Shearwater	None	n/a
Killough Bay SPA	Favourable	Light Bellied Brent Goose	None	n/a


**Bathing Waters Directive Beaches:**

Beach	2011-2014 Revised Bathing Waters Classification
Millisle	Good
Ballywalter	Good

**Shellfish Water Protected Areas:**

Shellfish Water Protected Area	Met Guideline Microbiological Standard* in 2014
Killough Harbour (Oysters)	No (n=13)

\*75% of samples contain  $\leq 230$  *E. coli* /100ml of shellfish flesh and intervalvular liquid

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### ANNEX G: High Impact Invasive Species

High Impact Invasive Species check	<b>GOOD</b>
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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>		Y		W
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

<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