RIVER BASIN MONITORING PLAN

WATER FRAMEWORK DIRECTIVE 2ND CYCLE CLASSIFICATION SUMMARY

2015-2021

Coastal Water Body – Dundrum Bay Outer

31/05/2015

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NIEA Northern Ireland Environment Agency
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Department of the Environment www.doeni.gov.uk Marine Environment Division	WFD COASTAL WATER BODY CLASSIFICATION Dundrum Bay Outer	
	Version Date:	31/05/2015
	MONITORING AND ASSESSMENT TEAM	

DUNDRUM BAY OUTER

Water body Information

- River Basin District: North Eastern
- Water Body Code: UKGBNI6NE190
- Water body type: CW5
- Water body characteristics: Euhaline, mesotidal, moderately exposed
- Water body area: 59.43 km^2
- Heavily Modified Water Body: No
- 2021 Classification Objective: Good

2015 CLASSIFICATION	**GOOD**	***PASS/FAIL 2021 OBJECTIVE***	**PASS**

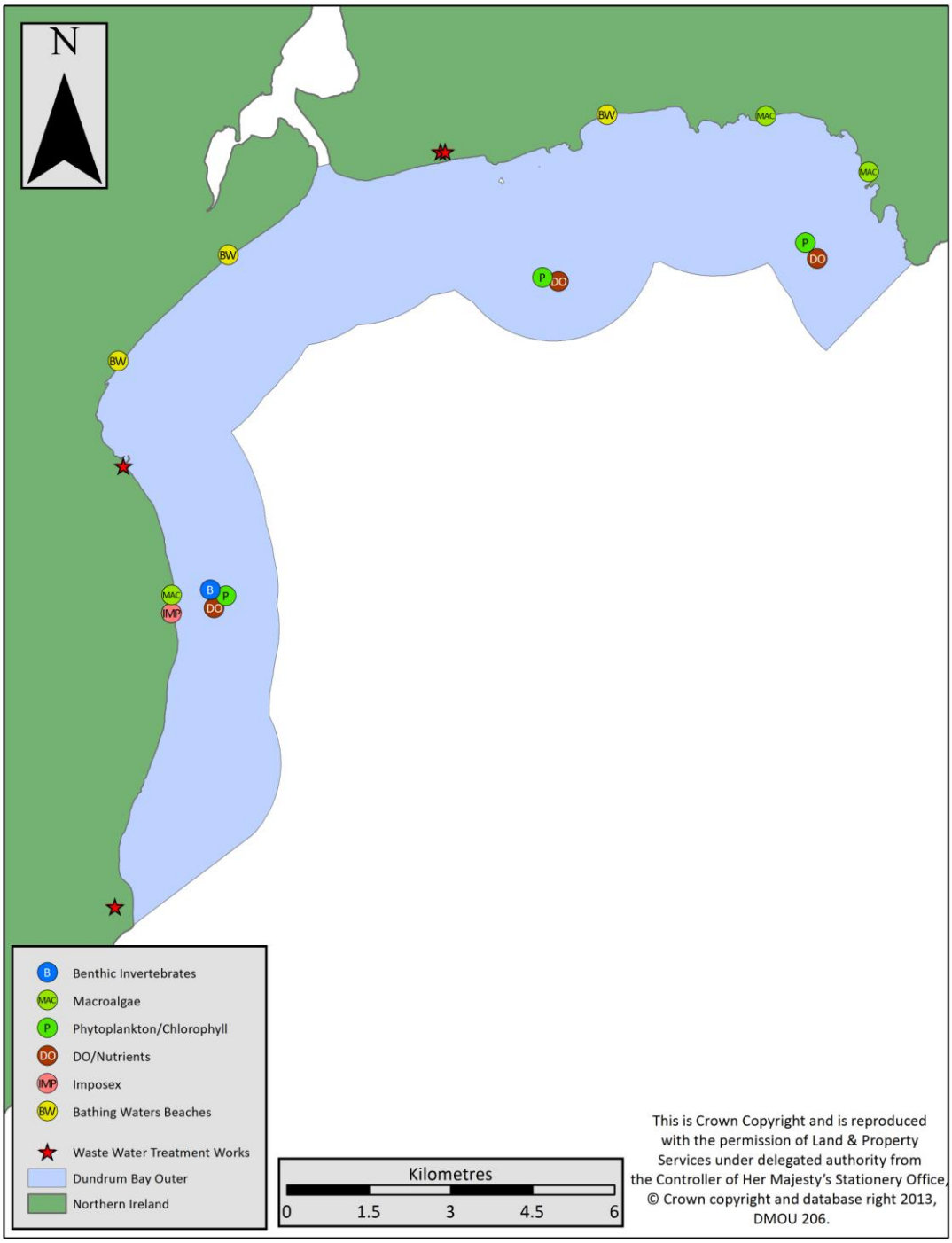


Figure 1: Waste water treatment pressures and monitoring points within Dundrum Bay Outer (Coastal Water).

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	✓	
Macroalgae (Seaweeds)	Opportunistic Macroalgae	☒	Tool Not Applicable
	Reduced Species List	✓	
Angiosperms	Saltmarsh	☒	Tool Not Applicable
	Seagrass	☒	Tool Not Applicable
Benthic Invertebrates	Infaunal Quality Index	✓	
	Imposex	✓	
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	2009-2014	5 sites 22 samples
	Elevated Taxa Count Index	2009-2014	5 sites 21 samples
Macroalgae (Seaweeds)	RSL	2010, 2013	3 sites 6 surveys
Benthic Invertebrates	Infaunal Quality Index	2010-2013	1 site 18 samples
	Imposex	2010, 2013	1 site
Physico-chemical			
Nutrients		2010-2014	9 sites 25 samples
Dissolved Oxygen (DO)		2010-2014	41 daily averages
Other polluting substances (Annex VIII)		ND	
Hydromorphology		2007	
Water chemistry			
(Annex X)		ND	

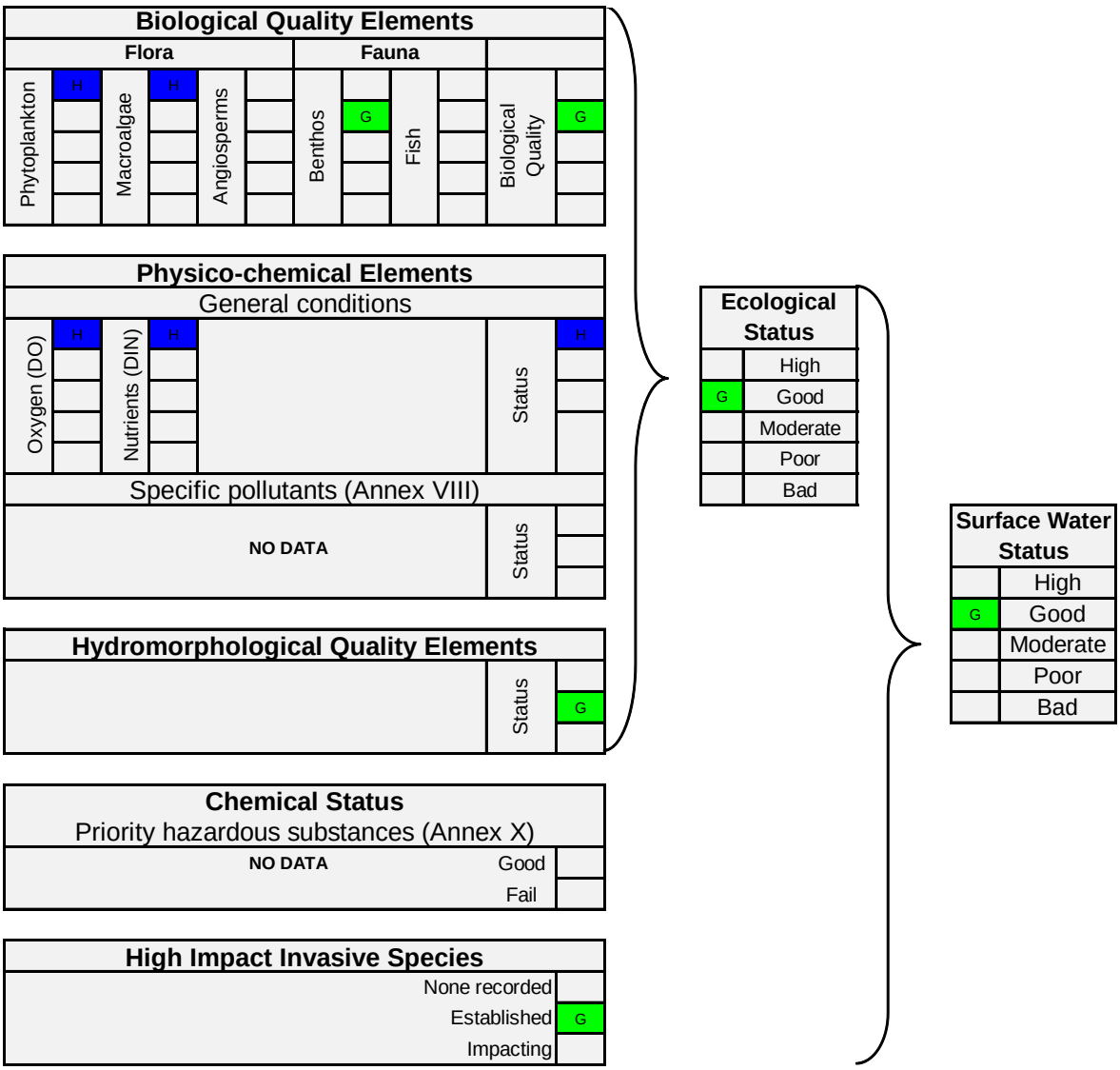


Figure 2: Overall classification of Dundrum Bay Outer (Coastal Water)

ANNEX A: Classification of Biological Quality Elements

QE: Phytoplankton

QE phytoplankton assessment (+ Data confidence):	HIGH (94.3%)	

ANNEX A: Classification of Biological Quality Elements

Classification tools:

1. Chlorophyll biomass index (90%ile)
2. Elevated taxa count index- not applied

Data store (classification): M:\Projects 14\Phycology 2014\MM14-14 Phytoplankton and Chlorophyll\classification 15\Coastal data\DUNDRUM OUTER 2015 - Copy - Copy.XLS

M:\Projects 14\Phycology 2014\MM14-14 Phytoplankton and Chlorophyll\classification 15\Coastal data\Dundrum Bay Outer 90th Percentile.xls

- **Data Availability (spot & continuous samples):**
  Phytoplankton = NA
  Chl = spot (*2009-2014) NIEA*

1. Chlorophyll Biomass Index - 90%ile (Chl $\mu g\ l^{-1}$)
(Growing Season 1st Mar – 31st Oct)

Waterbody Chl. biomass assessment ***GOOD (62.0%)***

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
5.10	GOOD	0.8	2009,10, 13,14	5	22	62.0%

Data confidence: **62.0%**

Temporal spread of data is low as the waterbody wasn't sampled in 2011 and 2012, EQR calculated on low 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

2. Elevated Taxa Count Index

Waterbody Elevated Taxa Assessment

Thresholds:

Tool	Thresholds	
	North/Irish Sea	Atlantic
I_1 - Individual Species Count (excl. Phaeocystis) (%)	500,000 (cells l^{-1})	
I_2 – Total Taxa Count (%)	10^7 (cells l^{-1})	
I_3– Elevated Biomass Count (%)	>10 (µg l^{-1})	>5 (µg l^{-1})

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_1	I_2	I_3	Elevated Count EQR	Status	Data Years	No. of phytoplankton samples	Data confidence
9.5%	0%	0%	0.937	HIGH	2009-2014	21	91.5%

Data confidence: 93.5%

Data analysed using M:\Projects 14\Phycology 2014\MM14-14 Phytoplankton and Chlorophyll\classification 15\2015CW_Phytoplankton_CoC_tool_v10 7_UKTAG.xls

Prescence of alien/ nuisance species: *none*

Overall Waterbody Status

HIGH (94.3%)

QE: Macroalgae: Dundrum Bay Outer

QE macroalgal assessment (+ data confidence):	HIGH (94.6%)	

Classification tools:

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

1. RSL assessment:

- Data Availability (classification): 2010 – 3 sites, 2013 – 3 sites
- Data StoreM:\Projects 14\Phycology 2014\MM14-12 Intertidal Rocky Shore\FSL-RSL Classification update 2015 (09-14)Datasheet.xls
- **Boundaries:**

Parameters	Quality Status / Sub-metric quality status	Bad 0.0 – 0.2	Poor 0.21 – 0.4	Moderate 0.41 – 0.6	Good 0.61 – 0.8	High 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		
Corels Pt 2010	13	49	55.9	16.3	57.1	1.23	8.16	0.889	HIGH
Bloody Bridge 2010	14	40	42.8	17.5	47.5	0.74	15.0	0.765	GOOD
Ringmore Point 2010	14	46	49.22	15.2	50.0	1.19	10.8	0.863	HIGH
Bloody Bridge 2013	16	42	39.06	14.29	52.38	1	7.14	0.85	HIGH
Ringmore Point 2013	18	56	44.8	16.07	48.2	52.7	10.9	0.8	HIGH
Corels Point 2013	14	55	58.85	12.73	52.73	0.96	10.91	0.86	HIGH
							Mean	**0.839 +/- 0.046**	**HIGH**

Macroalgae (cont'd)

Confidence of Classification: **High** (94.6%)

- 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 not yet carried out).
- Three shores (good spatial coverage) over two years (moderate temporal trend assessment).

Alien taxa: None present.

QE: Angiosperms Dundrum Outer – tool not applicable

QE: Benthic Invertebrates

QE benthic invertebrate assessment (+ Data confidence):	GOOD (L)	

Classification tools: 1. Infaunal Quality Index (IQI) – good no data.
2. Imposex tool (VDSI).

1. IQI (UKTAG v01 20140228)

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

WFD surveillance monitoring:

- **Data store:..\Dundrum bay Outer water body\Dundrum Bay Outer waterbody 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, 4 years, Day Grab, 1 mm sieve, n=18.

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	BLBR (3)	3	0.70	0.01	Good
2011	MM-Benthos	BLBR (5)	5	0.70	0.02	Good
2012	MM-Benthos	BLBR (5)	5	0.69	0.02	Good
2013	MM-Benthos	BLBR (5)	5	0.71	0.02	Good
2014	MM-Benthos	BLBR (5)	-	-	-	-
2015	MM-Benthos	BLBR (5)	-	-	-	-
Overall 6 year waterbody means			**4.5**	**0.70 (0.68*)**	**0.02**	**Good**

* 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 points with reps)

2. VDSI (Nucella lapillus)

Waterbody VDSI assessment: *High (M)*

- **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	Bloody Bridge	0.00	1.00	High
	Mean	**0.00**		**High**

Data confidence: **Medium**

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

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

QE: Dissolved Oxygen

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

Classification tools: Comparison of 5% ile against reference standards

- Data Availability: 2010-14.
- 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*)
7.92	HIGH	2010-14	**	41	18.6%

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

QE: Nutrients – N regulation

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

- **Data store:** ..\Coastal WB inc AFBI 15.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
8.06	0	25	9 (inc con mon)	2010-2014	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.

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

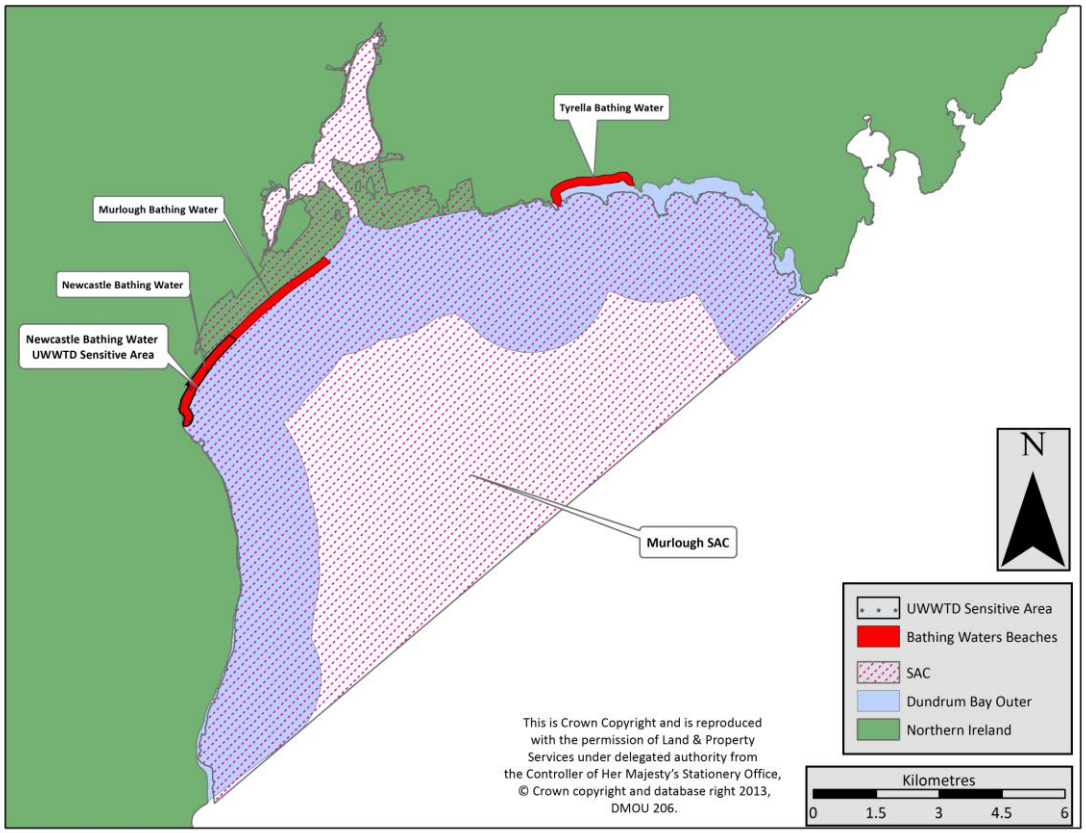
Priority hazardous substances (+data confidence)	**NO DATA**	

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

Classification tools: Comparison with EQS levels

Data Availability: No data.

ANNEX F: Protected Areas



Protected areas within Dundrum Bay Outer (Coastal Water).

The following Protected Areas are situated either wholly or partly within the Dundrum Bay Outer 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
Murlough SAC	Unfavourable	Atlantic Decalcified fixed dunes (*Calluno-Ulicetea*); Fixed dunes with herbaceous vegetation ('grey dunes'); Atlantic salt meadows (*Glauco-Puccinellitalia maritimae*); Mudflats and sandflats not covered by seawater at low tide; *Phoca vitulina*; Sandbanks which are slightly covered by seawater all the time Dunes with *Salix repens* ssp. *argentea* (*Salicion arenariae*) Shifting dunes along the shoreline with *Ammophila arenaria* ('white dunes')	Atlantic decalcified fixed dunes (Calluno-Ulicetea) Mudflats and sandflats not covered by seawater at low tide Fixed dunes with herbaceous vegetation ('grey dunes') Atlantic salt meadows (*Glauco-Puccinellitalia maritimae*) Shifting dunes along the shoreline with *Ammophila arenaria* ('white dunes') Dunes with *Salix repens* ssp. *argentea* (*Salicion arenariae*)	Mudflats and sandflats: Loss of *Zostera*, smothering from opportunistic green algae and invasive species. All other features non marine water quality related.

Bathing Waters Directive Beaches:

Beach	2011-2014 Revised Bathing Waters Classification
Tyrella	Excellent
Murlough	Excellent
Newcastle	Good

Nitrates Directive/ Urban Waste Water Treatment Directive Sensitive Areas:

- Newcastle Bathing Water UWWTD Sensitive Area

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*				
Angiosperms	*Spartina anglica*		Y		W

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 status
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
WWTW	Waste water treatment works