RIVER BASIN MONITORING PLAN

WATER FRAMEWORK DIRECTIVE 1ST CYCLE CLASSIFICATION SUMMARY

2009-2015

Coastal Water Body – Mourne Coast

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** Mourne Coast	
	Version Date:	31/05/2015
	MONITORING & ASSESSMENT TEAM	

MOURNE COAST

Water body Information

- River Basin District: NE, NBIRBD
- Water body type: CW5
- Water Body Code UKGBNI6NB020
- Water body characteristics: Euhaline, mesotidal, moderately exposed
- Water body area: 47.38 km^2
- Heavily Modified Water Body: No
- 2015 Classification Objective: Moderate

FINAL CLASSIFICATION	**MODERATE**	***PASS/FAIL 2015 OBJECTIVE***	**PASS**

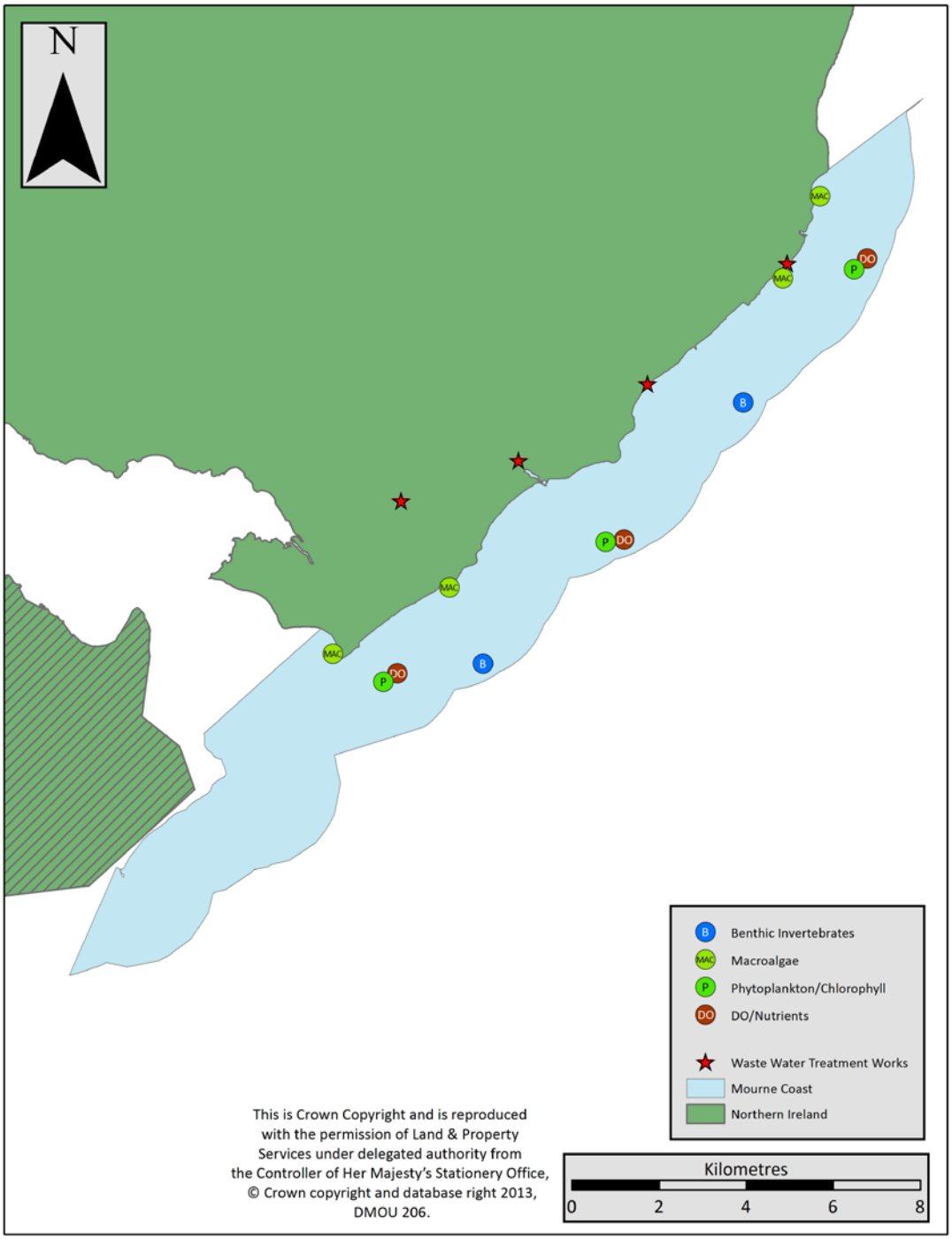

Figure 1: Waste water treatment pressures and monitoring points within Mourne Coast (Coastal Water).

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	☒	
	Reduced Species List	✓	
Angiosperms	Seagrass	☒	
	Saltmarsh	☒	
Benthic Invertebrates	Infaunal Quality Index	✓	
	Imposex	☒	
Physico-chemical (Water)	-Dissolved Oxygen	✓	
	-Nutrients	✓	
	Specific Pollutants (Annex VIII substances)	☒	
Hydromorphological Quality Elements	SEPA Rapid Designation	✓	
	TraC MIMAS	✓	
Chemical Status			
Priority Hazardous Substances	Annex X substances	☒	

Table 2: Sampling frequency for each quality element

Monitoring Level: Surveillance

QUALITY ELEMENT		Data years contributing to classification	No. of sites/samples
Biological			
Phytoplankton		2009-2014	6 sites 29 samples
Macroalgae	Reduced Species List	2010-2012	4 sites 7 surveys
	MBT	n/a	
Angiosperms	Seagrass	n/a	
Benthic Invertebrates	Infaunal Quality Index	2010-2013	1 site 18 samples
	Imposex	n/a	
Physico-chemical			
Nutrients		2010-2014	7 sites, 24 samples
Dissolved Oxygen		2010-2014	40 daily averages
Specific polluting substances (Annex VIII)		ND	
Hydromorphology		2007	
Water chemistry			
(Annex X)		ND	

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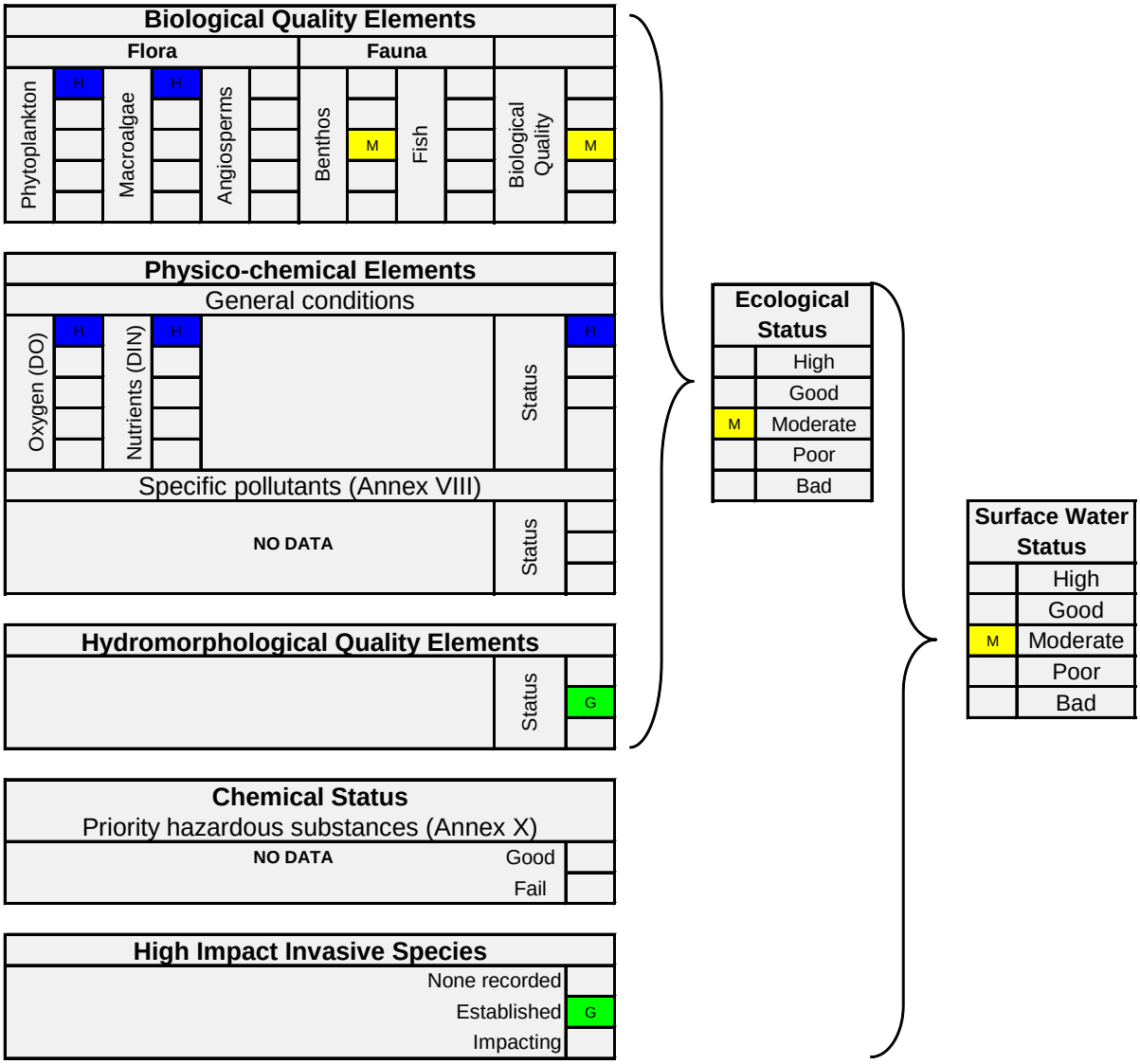

Figure 2: Overall classification of Mourne Coast (Coastal Water)

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ANNEX A: Classification of Biological Quality Elements

QE: Phytoplankton

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

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\Mourne Coast 90th Percentile.xls

M:\Projects 14\Phycology 2014\MM14-14 Phytoplankton and Chlorophyll\classification 15\Coastal data\MOURNE COAST 2015 - Copy - Copy.XLS
Data Availability (spot & continuous samples): spot (*2009-2014) 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
3.49	HIGH	0.86	2009-2014	6	29	100%

Data confidence: **High 100%**

Data analysed for Confidence of Class 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
0%	0	0%	1.0	HIGH	2009-2014	28	50.0%

Data confidence: 50.0%

Data confidence is 50% for High and good this is due to the low amount of sampls.

.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 (100%)

QE: Macroalgae Mourne Coast

QE macroalgal assessment (+ data confidence):	HIGH (99.9%)	

Classification tools:

Reduced species list (RSL)
Macroalgal Blooming Tool (MBT) – tool not applicable
Angiosperms – tool not applicable

1. *Reduced Species List (RSL)*

- **WFD surveillance monitoring**: 2010, 2011 & 2012
- **Data Availability (classification)**: 2010 - 3 sites, 2011 & 2012 -1 site, 2013 -2 site

- **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 / 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		
Russels Pt 10	18	57	45.6	15.79	50.88	1.04	10.53	0.846	HIGH
Cranfield 10	13	52	59.28	15.38	50.00	1.08	11.54	0.858	HIGH
Nicholsons Pt 10	13	44	53.24	15.91	47.73	1.10	13.64	0.833	HIGH
Cranfield Point 2011	13	56	63.84	16.07	51.79	0.93	10.71	0.855	HIGH
Glassdrum man 2012	13	49	55.86	18.37	46.94	0.88	16.33	0.794	GOOD
Glassdrum man 2013	14	49	52.43	16.33	57.14	1.04	10.20	0.86	HIGH
Cranfield 2013	13	39	60.42	15.09	50.94	0.89	13.21	0.83	HIGH
							Mean	0.843 ±0.023	**HIGH**

Macroalgae (cont'd)

Confidence of Classification: High (99.9%)

- 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 carried out at one site.
- Three shores (good spatial coverage) over four years (good temporal trend assessment).

Alien taxa: *Sargassum muticum*

QE: Angiosperms – tool not applicable

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QE: Benthic Invertebrates

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

Classification tools: 1. Infaunal Quality Index (IQI)

1. IQI (UKTAG v01 20140228)
Water body IQI assessment: **Moderate (Low)**

WFD surveillance monitoring:

- **Data store:** **..\Mourne Coast water body\Mourne coast water body 08-13 fauna data.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	ANA (3)	3	0.58	0.01	Moderate
2011	MM-Benthos	ANA (5)	5	0.66	0.04	Good
2012	MM-Benthos	ANA (5)	5	0.68	0.02	Good
2013	MM-Benthos	ANA (5)	5	0.64	0.01	Good
2014	MM-Benthos	ANA (5)	-	-	-	-
2015	MM-Benthos	ANA (5)	-	-	-	-
Overall 6 year waterbody means			**4.5**	**0.64 (0.62*)**	**0.02**	**Moderate**

* IQI derived from data averaged minus Standard Deviation (see issues with tools paper).
This figure is used for classification. ** Data fell outside set parameters, results discarded.

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 (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*)
7.97	HIGH	2010-2014	**	40	15%

* 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
9.47		24	7 (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

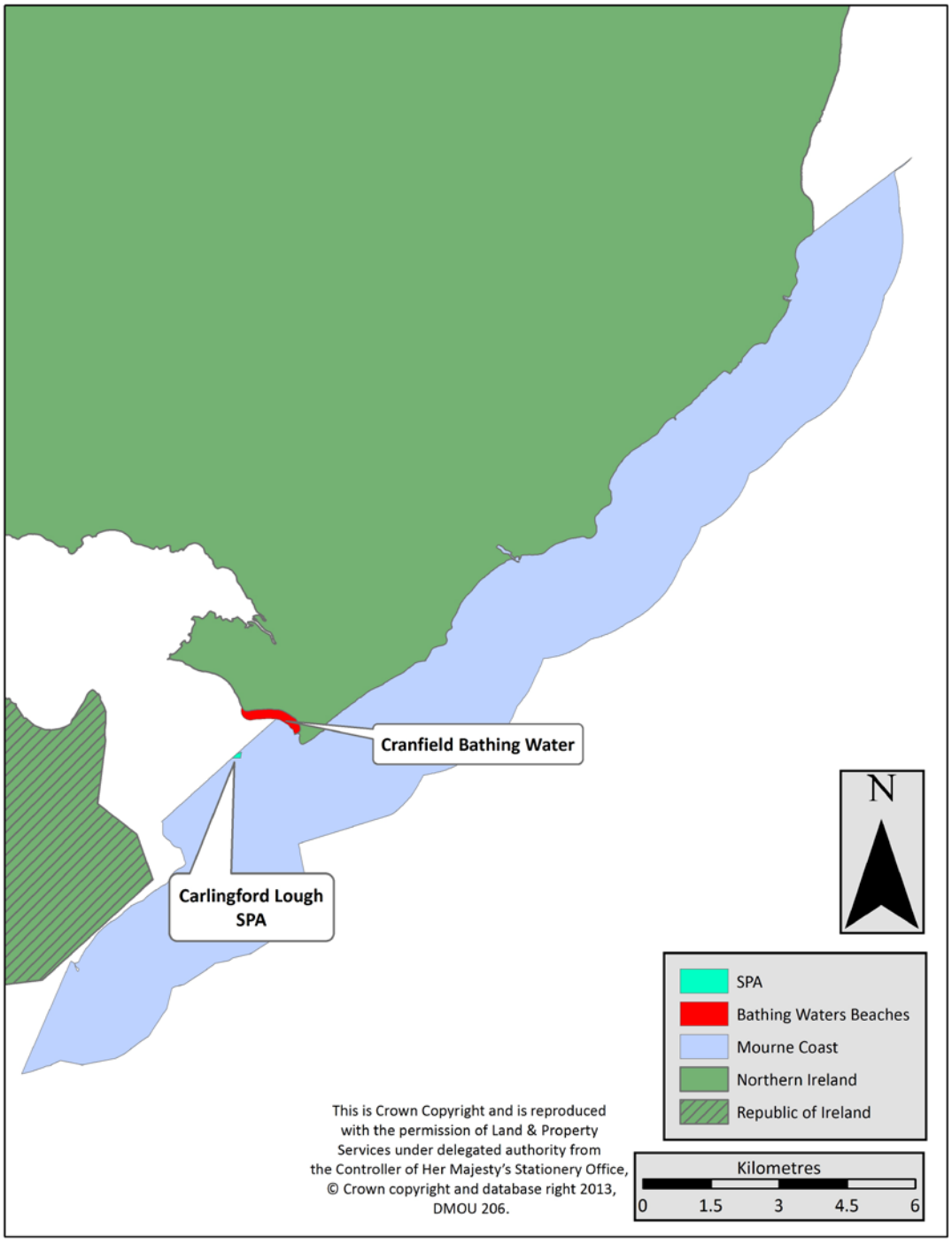
ANNEX E: Chemical Status – Annex X Chemicals

Priority hazardous substances (+data confidence)	NO DATA	

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 Mourne Coast (Coastal Water).

The following Protected Areas are situated either wholly or partly within the Mourne Coast 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
Carlingford Lough SPA	Unfavourable	Sandwich Tern; Common Tern; Light Bellied Brent Goose	Common Tern; Sandwich Tern	Non marine water related

Bathing Waters Directive Beaches:

Beach	2011-2014 Revised Bathing Waters Classification
Cranfield	Excellent

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