

North Eastern River Basin Management Plan

# Belfast Harbour Classification

December 2009



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Northern Ireland  
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Agency

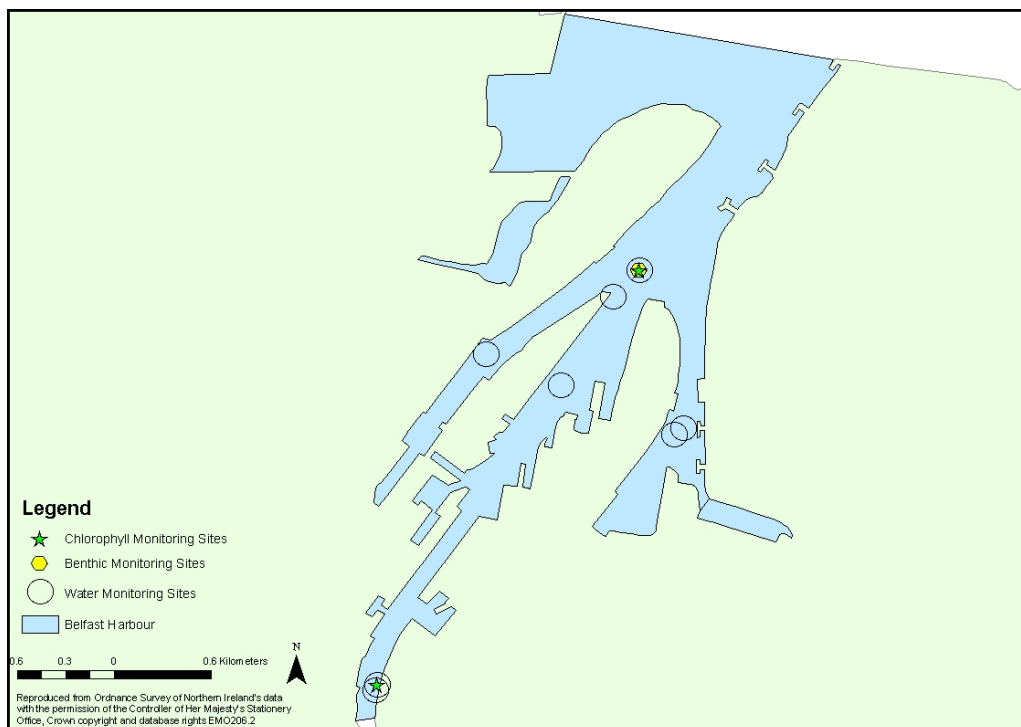
RIVER BASIN MANAGEMENT PLAN		
	WFD COASTAL WATER BODY CLASSIFICATION Belfast Harbour	
	Version Date:	22/12/09
	MARINE ASSESSMENT AND LICENSING TEAM	

## **BELFAST HARBOUR**


### Water body Information

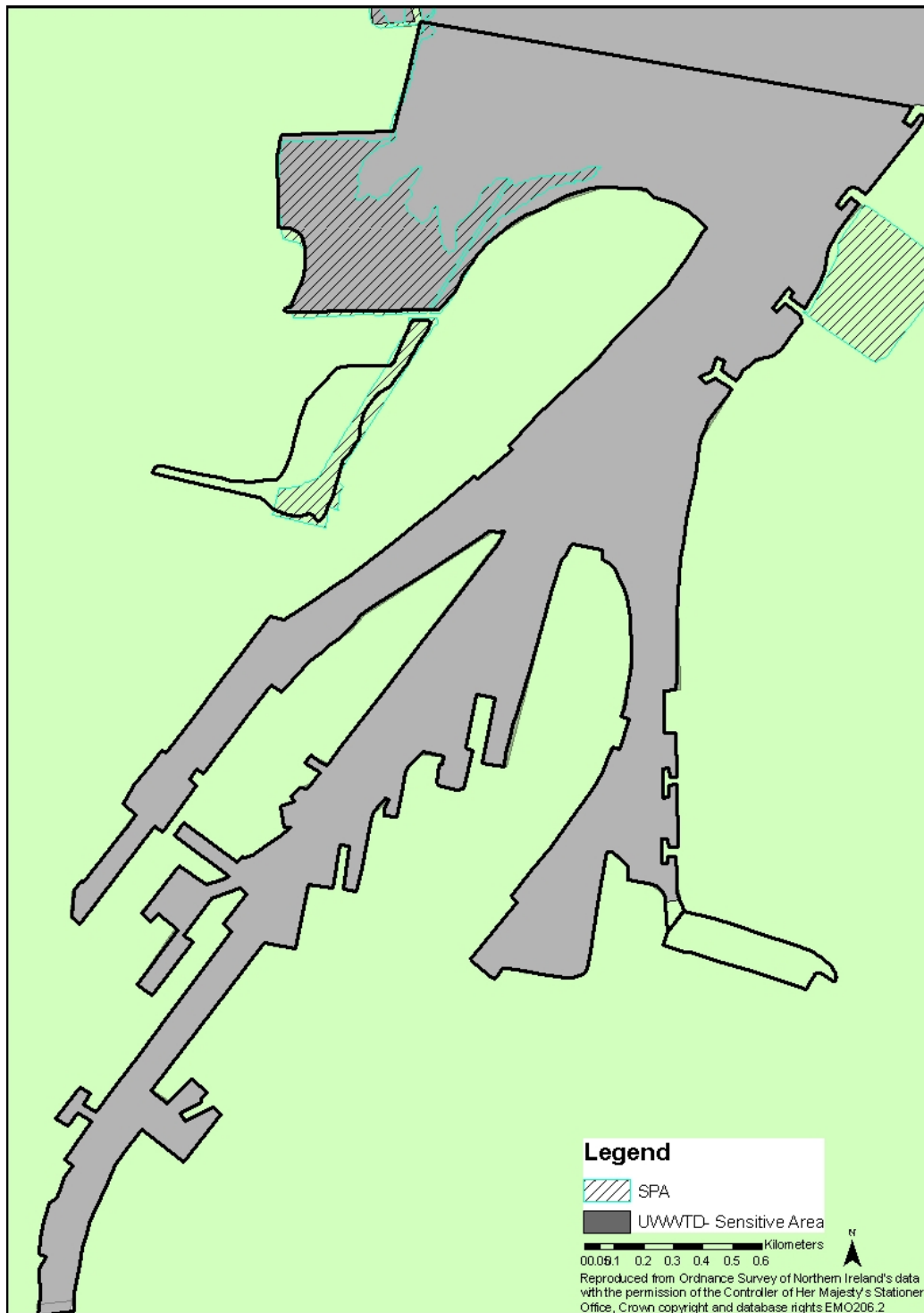
- River Basin District: North Eastern
- Water body type: CW8
- Water Body Code: UKGBNI6NE100
- Water body characteristics: Euhaline, mesotidal, sheltered
- Water body area: 3.44 km<sup>2</sup>
- Heavily Modified Water Body: Yes

<b>OVERALL WATERBODY CLASSIFICATION (ECOLOGICAL POTENTIAL - EP)</b>	<b>MODERATE or worse</b>	
<b>(PASS/FAIL):</b>	<b>FAIL</b>	
<p>In this round of classification HMWBs can only be classified as 'good EP or better' or 'moderate EP or worse'.</p> <p>Belfast Harbour has BAD classification for dissolved inorganic nitrogen (DIN) and phytoplankton has POOR classification.</p> <p>The hydromorphological assessment for the water body is that it could meet Good Ecological Potential (GEP) due to management and mitigation measures undertaken within the harbour. As the biological and supporting elements do not pass the assessment it does not reach GEP at this time.</p>		




Map of monitoring points within Belfast Harbour (Coastal Water).

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Map of protected areas within Belfast Harbour (Coastal Water), see Annex F.

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#### PARAMETERS TABLE

Parameters for which classification systems are available and have been used in the first 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
Macroalgae (seaweed)		<input checked="" type="checkbox"/>	Tool Not Applicable
Angiosperms		<input checked="" type="checkbox"/>	Tool Not Applicable
Phytoplankton	Biomass	✓	
Benthic Invertebrates	Infaunal Quality Index	✓	
	Imposex	<input checked="" type="checkbox"/>	Data not available
Physico-chemical (water)	General Conditions	✓	
	-Dissolved Oxygen	✓	
	-Nutrients	✓	
	Specific Pollutants (Annex VIII subs)	✓	
Hydromorphological Quality Elements	SEPA Rapid Designation	✓	
	TraC MIMAS	✓	
Chemical Status			
Priority Hazardous Substances (Annex X)	Annex X Substances	✓	

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### Waterbody Classification

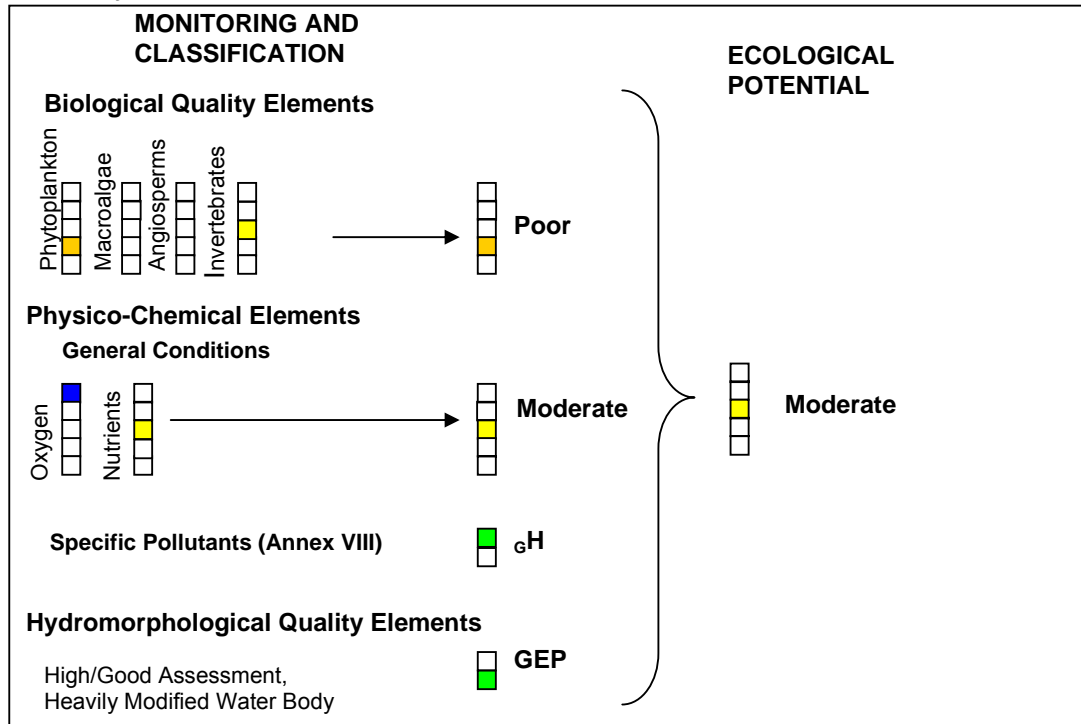


Figure showing ecological classification of Belfast Harbour (Coastal Water)

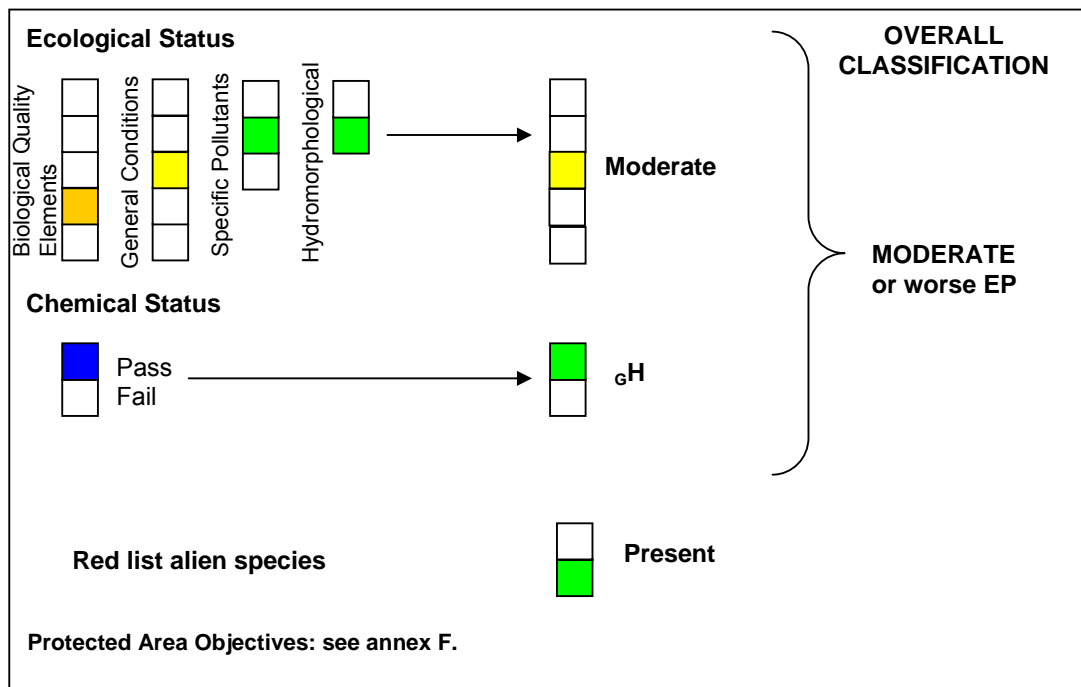



Figure showing overall classification of Belfast Harbour (Coastal Water).


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First River Basin Cycle (2004 – 2008)

*Monitoring Level: Surveillance*

Sampling frequency for each quality element

Quality Elements		Year (if 1 in 3 yrs)	No. of sites
Phytoplankton		2006-2007	2 sites 9 samples
Benthic Invertebrates	Infaunal Quality Index	2003-2006	1 site 5 replicates
<b>Physico-chemical</b>			
Nutrients		2002-2008	2 sites 5 samples
Salinity		2002-3, 2007-8	3
Temperature		2002-3, 2007-8	3
Dissolved Oxygen (DO)		2002-3, 2007-8	12
Other polluting substances (Annex VIII)		2007	1
<b>Hydromorphology</b>		2007	
<b>Water chemistry</b>			
(Annex X)		2007	1

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## BELFAST HARBOUR

### ANNEX A: Classification of Biological Quality Elements

#### QE: Phytoplankton

QE phytoplankton assessment (+ Data confidence):	POOR (L)	
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Classification tools:

1. Chlorophyll biomass index (90%ile).
  2. Species composition, abundance and bloom frequency will be reported in the next classification round.
- Data store (classification):  
MARINE\Water Framework Directive\DRAFT WFD CLASSIFICATION REPORTS\QE Phytoplankton\Chl-a 90th Percentile\Final 90th Percentile Phytoplankton-
  - Data Availability (spot & continuous samples): spot

1. *Chlorophyll Biomass Index - 90%ile (Chl  $\mu\text{g l}^{-1}$ )*  
(Growing Season 1<sup>st</sup> Mar – 30<sup>th</sup> Sept)

Waterbody Chl. biomass assessment: POOR (L)

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	Status	Data Years	Data Quality	No. of daily averages	No. of Sites	No. of Samples	Data Confidence (proportion of possible months with data*)
19.1	POOR	2006-2007		3	2	9	LOW


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

Data confidence: Low

- The proportion of possible months sampled yielded a low confidence in data confidence.

QE: Macroalgae Belfast Lough Harbour – Tools not applicable

QE: Angiosperms Belfast Lough Harbour –Tool not applicable

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#### QE: Benthic Invertebrates – Belfast Harbour

<b>QE Benthic invertebrate assessment (+ Data confidence):</b>	<b>MODERATE (L)</b> <b>On the moderate/poor boundary</b>	
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Classification tools:

1. Infaunal Quality Index (IQI)
2. Imposex tool (VDSI) – ND

#### 1. IQI (v4)

Water body IQI assessment: Moderate (Low)

Within a zone of influence for physical disturbance (channel dredging).

- **WFD surveillance monitoring:**
- **Data store:**
  - **Benthic invertebrates:** UNICORN NIEA Database
  - **Supporting Parameters:** Water Quality NIEA, Particle size analysis
  - **Digital images:** AMAP Project folder
- **Data Availability (classification): BL2 2003-2006**
- **Habitat max values (sub-tidal mud):** 1-(AMBI/7) = 0.78, 1-Lambda' = 0.72, Taxa = 24
  - **Boundaries (Intercalibrated NEAGIG):**

Class	Bad	Poor	Moderate	Good	High
<b>IQI</b>	>0.0 ≤0.24	≥0.24 <0.44	≥0.44 <0.64	≥0.64 <0.75	≥0.75


#### Results

Year	Survey	Station	n	Mean	± S.D	Status
2003		BL2	5	0.47	0.04	MODERATE
2004		BL2	5	0.40	0.03	POOR
2005		BL2	5	0.48	0.06	MODERATE
2006		BL2	5	0.42	0.12	POOR
<b>Overall Mean</b>			<b>4</b>	<b>0.44</b>	<b>0.04</b>	<b>Moderate</b>

Data confidence: Low, within a zone of influence for physical disturbance (channel dredging).

Alien taxa present: *Crepidula fornicata* (Slipper limpet)



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

### Dissolved Oxygen

Dissolved oxygen (+ data confidence):	HIGH (M)	
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Classification tools: Comparison of 5% ile against reference standards

- Data store: \\marine on ehslis2k \Water Framework Directive\DRAFT WFD CLASSIFICATION REPORTS\Dissolved Oxygen
- Data Availability: 02,03,07,08
- Data Availability (spot & continuous samples): Spot

### Thresholds:

WFD Status	Marine 5%ile	Objectives
HIGH	$\geq 5.7$ mg/L	All life stages of salmonids and transitional fish
GOOD	$\geq 4.0 < 5.7$ mg/L	Presence of salmonids and transitional fish
MODERATE	$\geq 2.4 < 4.0$ mg/L	Most life stages of non-salmonid adults
POOR	$\geq 1.6 < 2.4$ 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*)
6.29	HIGH	02,03 07,08	**	12	25.0%

\* Proportion of possible months for which data are available

\*\*Data Quality: Medium

- Instruments subject to regular calibration checks and quality assurance programme.
- Medium = 5 – 10 (daily averages) x n (no. of assessment years in reporting cycle)

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#### Nutrients – Winter Dissolved Inorganic Nitrogen DIN

Winter DIN (+ Data confidence):	MODERATE (L)	
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- **Data store:** \\marine on ehslis2k \Water Framework Directive\Nuala-Lesley Nutrients\DIN for Classification\Coastal Water
- 
- **Data Availability:** 2002 to 2008, DIN & salinity (November to February)
- **Data Availability:** (spot & continuous samples): spot

#### Winter DIN thresholds:


Area	Salinity range	DIN (uM)	DIN (uM)	DIN (uM)
		HIGH	GOOD	MODERATE
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
49.22	2	5	2	2002 - 2008	Database not yet QA'd	Moderate

#### Data confidence: Low

- Low sample number

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

Specific pollutants assessment (+data confidence)	gH (L)	
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Classification tools: Comparison with EQS levels.

**Data Availability:** 2007 WFD Dedicated monitoring data only

**Data confidence:** Low until 2008 data incorporated.

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ANNEX VIII		EQS ug/l	Ecological Status
	2007		
111_tri	<0.025	100	GH
112_tri	<0.75	300	GH
24_D	ND		
2_chloro	ND		
4_chloro_3	ND		
ammonia	ND		
As	ND		
Bentazone	ND		
biphenyl	ND		
boron	ND		
chlorine	ND		
chloronit	ND		
chloronitcalc	ND		
Cr	ND		
Cu	ND		
Cy	ND		
Cyfluthrin	ND		
cyper	ND		
diazinon	ND		
dichlorvos	ND		
dimethoate	ND		
fenitrothion	ND		
Fe	ND		
linuron	ND		
malathion	ND		
Mn	ND		
mecoprop	ND		
permethrin	ND		
phenol	ND		
toluene	ND		
Vn	ND		
xylenes	ND		
Zn	ND		

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#### ANNEX D: Hydromorphological quality elements


Overall hydromorphology assessment	HMWB-GEP	
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Classification tools:

1. TRaC Hydromorphology metrics
2. MIMAS

**Alternative approach assessment (CIS guidance 2006):** Good Ecological Potential

The hydromorphological assessment for the water body is that it could meet Good Ecological Potential (GEP) due to management and mitigation measures undertaken within the harbour. As the biological and supporting elements do not pass the assessment it does not reach GEP at this time.

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#### ANNEX E: Chemical Status – Annex X Chemicals

Specific pollutants assessment (+data confidence)	gH (L)	
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Classification tools: Comparison with EQS levels.

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


Data Availability: 2007 WFD Dedicated Monitoring  
Data confidence: Low

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ANNEX X		EQS	Chemical Status	Ecological Status
	<b>2007</b>			
12_Dichloro	<2	<b>10</b>	<b>G</b>	<b>GH</b>
anthracene	ND			
atrazine	ND			
benzene	ND			
benzo	ND			
benzo_a	ND			
Cadmium	ND			
Chlorfenvos	ND			
Chlorpyr	ND			
Dichloro	ND			
Diuron	ND			
endosulphan	ND			
floranthene	ND			
hcb	ND			
hcbd	<0.01	<b>0.1</b>	<b>G</b>	<b>GH</b>
hch	ND			
hch_calc	ND			
Hg	ND			
Indeno	ND			
ISP	ND			
Napthalene	ND			
Ni	ND			
Nonyl	ND			
Octyl	ND			
Pb	ND			
pcp	ND			
simazine	ND			
TBT	ND			
TCB	<0.15	<b>0.4</b>	<b>G</b>	<b>GH</b>
TCB_calc	ND			
trichloromethane	ND			
trifluralin	ND			

<b>G</b>
<b>F</b>
<b>GH</b>
<b>M</b>

	Mean includes LOD data
	Mean based on actual values

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#### ANNEX F: Protected Area Objectives

Water body	Protected area	Designation	Status	Reason for non-compliance
Belfast Lough Harbour	Belfast Lough	SPA	Favourable	
Belfast Lough Harbour	Belfast Lough	UWWTD	Sensitive area	


#### Nitrates Directive

Until 1 January 2007, Northern Ireland had designated seven NVZs on the basis of elevated nitrate levels in groundwaters. These NVZs were very small and covered less than 1% of Northern Ireland's area. However, Northern Ireland also has a widespread problem of eutrophication of surface waters and a large proportion of this nutrient enrichment is attributable to agriculture. Following extensive consultation, the total territory of Northern Ireland was established as the area to which an action programme would be applied under the Protection of Water Against Agricultural Nitrate Pollution Regulations (Northern Ireland) 2004 with effect from 29 October 2004.

#### Annex G: Red list alien species

*Crepidula fornicata* has been recorded from this water body (AFBINI, 2009 survey).



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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 10</b>	Annex 10 Priority Hazardous Substances
<b>Annex 8</b>	Annex 8 Specific Pollutants
<b>Article 5</b>	Characterisation, typology, pressures and impacts analysis
<b>ASSI</b>	Area of Special Scientific Interest
<b>CIS</b>	Common Implementation Strategy
<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
<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

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Our aim is to protect, conserve and promote  
the natural environment and built heritage for  
the benefit of present and future generations.

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