

draft RIVER BASIN MONITORING PLAN

CLASSIFICATION PAMPHLET

Coastal Waterbody Belfast Harbour

22nd December 2008



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Northern Ireland
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draft RIVER BASIN MANAGEMENT PLAN



WFD COASTAL WATER BODY CLASSIFICATION Belfast Harbour

Version Date: 22/12/08

MARINE ASSESSMENT AND LICENSING TEAM

BELFAST HARBOUR

Water body Information

- River Basin District: NE
- Water body type: CW8
- Water body characteristics: Euhaline, mesotidal, sheltered
- Water body area: 3.44 km²
- Heavily Modified Water Body: Yes

**OVERALL WATERBODY CLASSIFICATION. (H/G/M/P/B):BAD
(PASS/FAIL):FAIL**

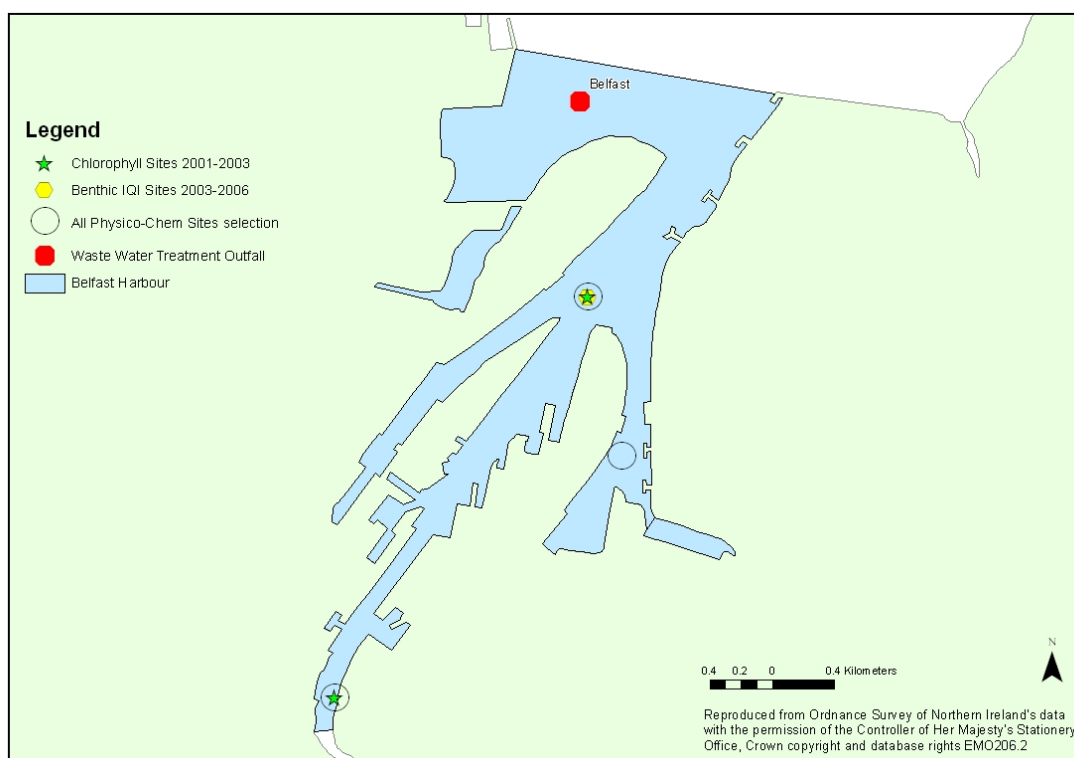


Figure of pressures and monitoring points within Belfast Harbour (Coastal Water).

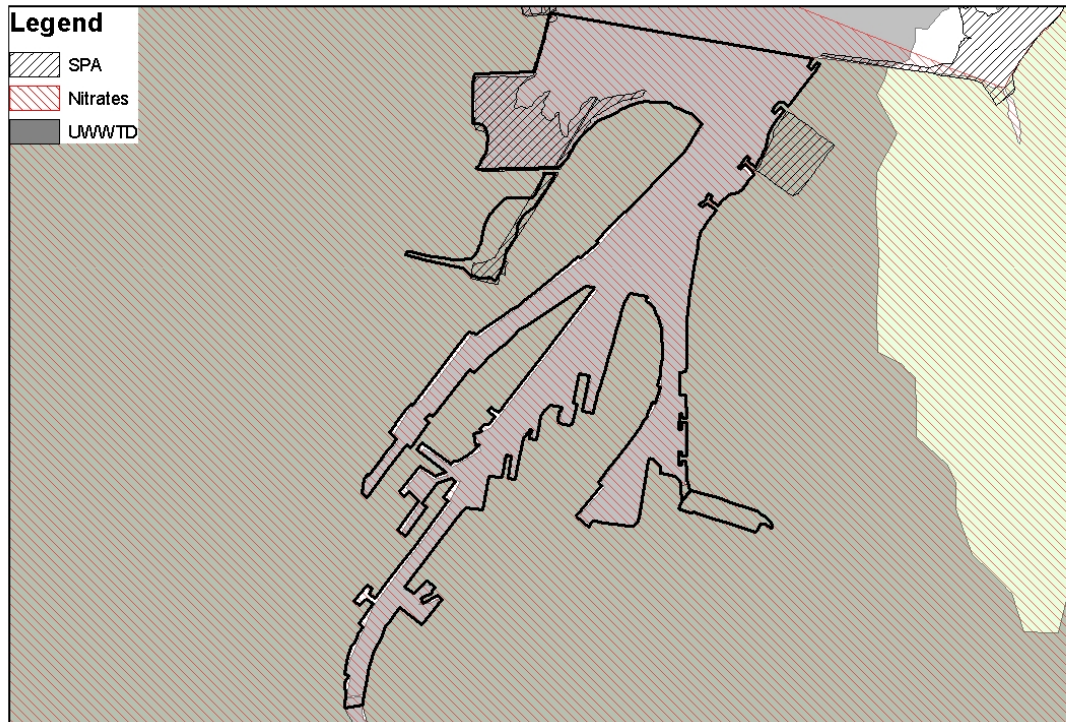
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WFD COASTAL WATER BODY CLASSIFICATION Belfast Harbour

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0 0.125 0.25 0.5 0.75 1 1.25 1.5 Kilometers



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

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**WFD COASTAL WATER BODY CLASSIFICATION
Belfast Harbour**

Version Date: 22/12/08

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PARAMETERS TABLE

(Parameters for which classification systems are available and have been used in the first round of classification. Note: for some parameters data is not yet available hence the tools have not been applied).

Ecological Quality Element			
Main Element	Sub-Element	Applied	Comment
Plants	Macro Algae	<input checked="" type="checkbox"/>	Tool Not Applicable
	-Opportunistic Macroalgae	<input type="checkbox"/>	
	-Reduced Species List	<input type="checkbox"/>	
	Angiosperms	<input checked="" type="checkbox"/>	Tool Not Applicable
	Phytoplankton	<input checked="" type="checkbox"/>	
Benthic Invertebrates	Infaunal Quality Index	<input checked="" type="checkbox"/>	
	Imposex	<input checked="" type="checkbox"/>	Data not available
Fish	Transitional Fish Classification Index	<input type="checkbox"/>	
Physico-Chemical	General Conditions	<input checked="" type="checkbox"/>	
	-Dissolved Oxygen	<input checked="" type="checkbox"/>	
	-Nutrients	<input checked="" type="checkbox"/>	
	Specific Pollutants (Annex VIII subs)	<input checked="" type="checkbox"/>	2007 Data only.
Hydromorphological Quality Elements	SEPA Rapid Designation	<input checked="" type="checkbox"/>	
	TraC MIMAS	<input checked="" type="checkbox"/>	
Chemical Status			
Priority Hazardous Substances (Annex X)	Annex X Substances	<input checked="" type="checkbox"/>	2007 Data only.

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**WFD COASTAL WATER BODY CLASSIFICATION
Belfast Harbour**

Version Date: 22/12/08

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Waterbody Classification

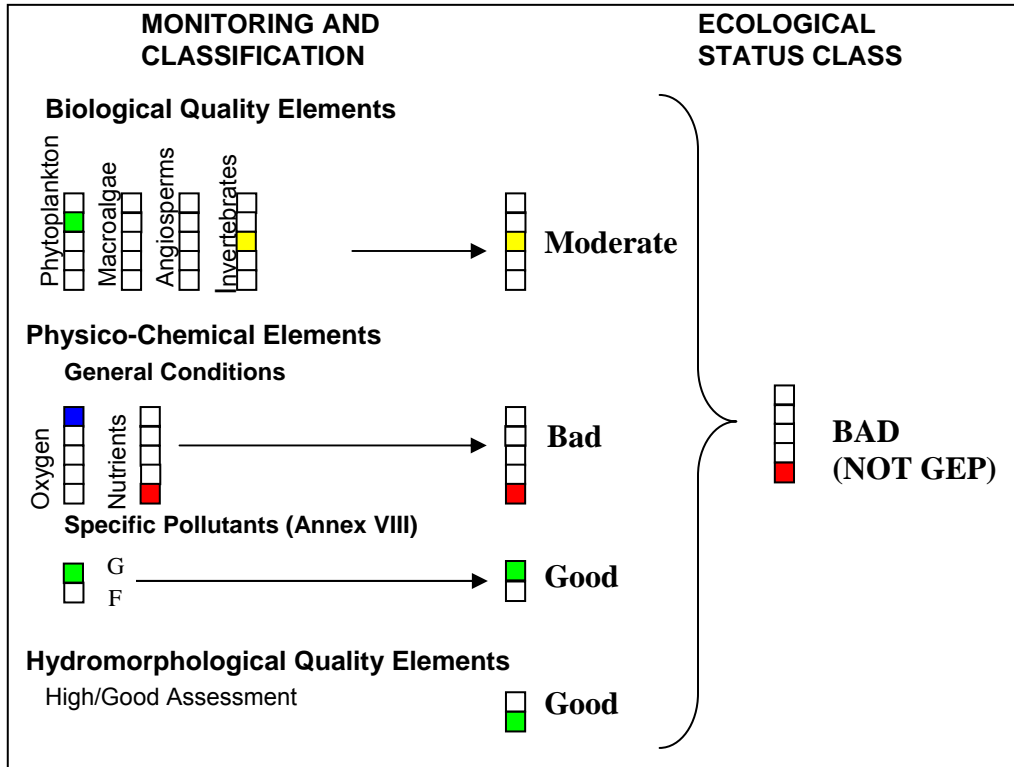


Figure showing ecological classification of Belfast Harbour (Coastal Water)

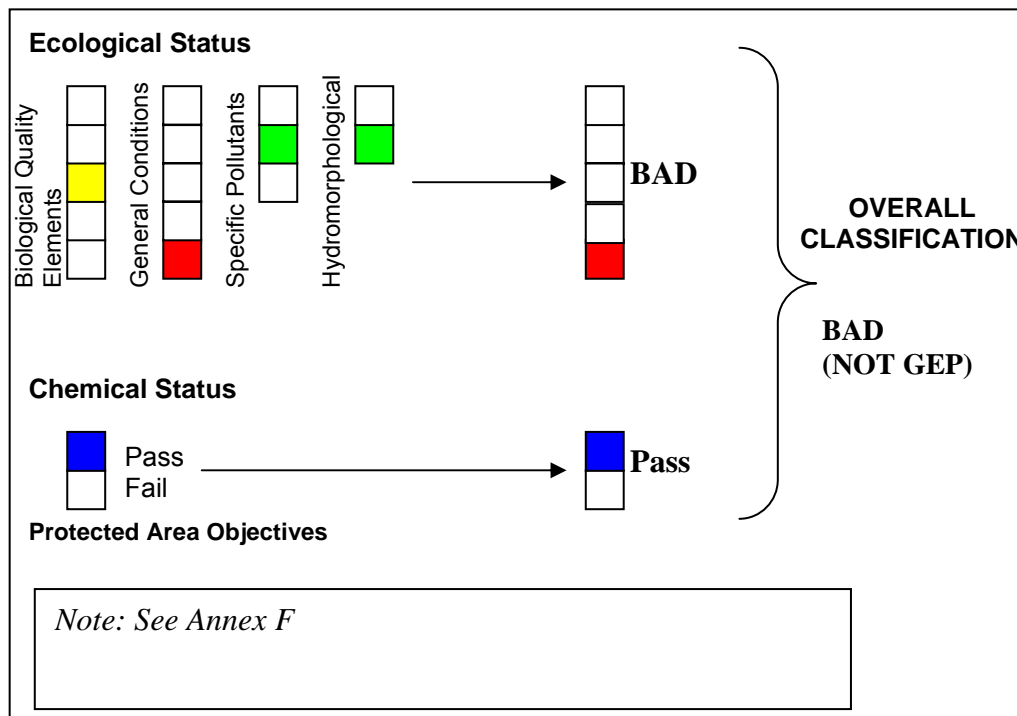


Figure showing overall classification of Belfast Harbour (Coastal Water)

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**WFD COASTAL WATER BODY CLASSIFICATION
Belfast Harbour**

Version Date: 22/12/08

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First River Basin Cycle (2004 – 2008)

Monitoring Level:

Surveillance

Sampling frequency for each quality element

Quality Elements	Surveillance		
	Year (if 1 in 3 yrs)	Frequency (if p.a.)	No. of sites
Biological			
Phytoplankton	2004-8		2 sites 13 samples
Benthic Invertebrates	Infaunal Quality Index	2003-2006	1
	Imposex	ND	
Physico-chemical			
Nutrients	2002-2003		2 sites 6 samples
Salinity	2002-3, 2007-8		3
Temperature	2002-3, 2007-8		3
Dissolved Oxygen (DO)	2002-3, 2007-8		3
Suspended particulate matter (SPM)			
Other polluting substances (Annex VIII)	2007		1
Hydromorphology			
Water chemistry			
(Annex X)	2007		1

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WFD COASTAL WATER BODY CLASSIFICATION Belfast Harbour

Version Date: 22/12/08

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ANNEX A: Classification of Biological Quality Elements

QE: Phytoplankton

QE phytoplankton assessment (+ Data confidence): GOOD (L)

Classification tools:

First round reporting now index (90%ile)

1. Chlorophyll biomass

2. Elevated taxa count index

- Data store (classification):
MARINE\Water Framework Directive\DRAFT WFD CLASSIFICATION REPORTS\QE Phytoplankton\Chlla 90th Percentile\Final 90th Percentile Phytoplankton-
- Data Availability (spot & continuous samples):
Phytoplankton =
Chl = spot (2001-2003) NIEA

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

Waterbody Chl. biomass assessment

GOOD (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*)
7.23	GOOD	2001-2003	Low	2	2	13	19.05%

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

Data confidence:

Low

- The proportion of possible months sampled and the number of spatial samples collected yielded a low confidence in data confidence. No records are available post 2003 although this will be addressed during the coming 2008-2009 period.

draft RIVER BASIN MANAGEMENT PLAN	
	WFD COASTAL WATER BODY CLASSIFICATION Belfast Harbour
	Version Date: 22/12/08
	MARINE ASSESSMENT AND LICENSING TEAM

2. Elevated Taxa Count Index

Waterbody Elevated Taxa Assessment

GOOD (ND)

- Thresholds:**

Tool	Thresholds	
	North/Irish Sea	Atlantic
I ₁ - Individual Species Count (excl. Phaeocystis) (%)	250,000 (cells l ⁻¹)	
I ₂ - Phaeocystis Counts (%)	10 ⁶ (cells l ⁻¹)	
I ₃ - Total Taxa Count (%)	10 ⁷ (cells l ⁻¹)	
I ₄ - Elevated Biomass Count (%)	>10 (µg l ⁻¹)	>5 (µg l ⁻¹)

Waterbody Elevated count (%) = [I₁ (%) + I₂ (%) + I₃ (%) + I₄ (%)] / 4

- EQR Boundaries:**

Class	% Exceedance	EQR
High	0-15	0.67-1.0
Good	15-30	0.33-0.67
Moderate	30-40	0.28-0.33
Poor	40-50	0.20-0.33
Bad	>50	0-0.20


Results

I ₁	I ₂	I ₃	I ₄	Elevated Count Mean	Status	Data Years	No. of sampling occasions	No. of phytoplankton samples

Data confidence: No data

QE: Macroalgae Belfast Lough Harbour – Tools not applicable

QE: Angiosperms Belfast Lough Harbour –Tool not applicable

draft RIVER BASIN MANAGEMENT PLAN	
	WFD COASTAL WATER BODY CLASSIFICATION Belfast Harbour
	Version Date: 22/12/08
	MARINE ASSESSMENT AND LICENSING TEAM

QE: Benthic Invertebrates – Belfast Harbour

Overall benthic invertebrate assessment: Moderate (Low)

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
IQI	>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
Overall Mean			4	0.44	0.04	Moderate

Data confidence: Low

Alien taxa present: No

Alien taxa present:

<i>Eriocheir sinensis</i> (Chinese mitten crab)	Not present
<i>Crepidula fornicata</i> (Slipper limpet)	Not present

draft RIVER BASIN MANAGEMENT PLAN



**WFD COASTAL WATER BODY CLASSIFICATION
Belfast Harbour**

Version Date: 22/12/08

MARINE ASSESSMENT AND LICENSING TEAM

Belfast Harbour

2. VDSI (*Nucella lapillus*)

Waterbody VDSI assessment:

Good (ND)

- **Data store:**
- **Data availability:**

Boundaries:


Class	Moderate	Good	High
VDSI	≥4.0	≥0.3 <4.0	<0.3
EQR	<0.33 -0	≥0.33 <0.95	0.95 – 1.0

Results:

Year	Shore	VDSI	EQR	Status

Data confidence:

No data

draft RIVER BASIN MANAGEMENT PLAN	
	WFD COASTAL WATER BODY CLASSIFICATION Belfast Harbour
	Version Date: 22/12/08
	MARINE ASSESSMENT AND LICENSING TEAM

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

Dissolved Oxygen

Waterbody DO assessment:	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	≥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*)
6.21	HIGH	02,03 07,08	**	9	17.8%

* Proportion of possible months for which data are available

**Data Quality

Medium

- Instruments subject to regular calibration checks and quality assurance programme, but databases not QA'd.
- Medium = 5 – 10 (daily averages) x n (no. of assessment years in reporting cycle)

draft RIVER BASIN MANAGEMENT PLAN	
	WFD COASTAL WATER BODY CLASSIFICATION Belfast Harbour
	Version Date: 22/12/08
	MARINE ASSESSMENT AND LICENSING TEAM

Nutrients – Winter DIN

Winter DIN assessment **Bad (L)**

- Data store:
\\marine on ehslis2k \Water Framework Directive\Nuala-Lesley Nutrients\DIN for Classification\Coastal Water
- Data Availability: 2002 to 2003, DIN & salinity (November to February)
- Data Availability (spot & continuous samples): spot

N regulation thresholds:

Area	Salinity range	DIN (uM) Winter mean H/G	DIN (uM) Winter mean G/M	DIN (uM) Winter mean M/P	DIN (uM) Winter mean P/B
Coastal (at salinity 32)	30-34.5	12-18	18-30	30-40.5	>40.5


Results:

Mean Winter DIN (uM) (normalised to salinity 32)	Winter DIN Daily average (n)	No. of samples (n)	No. of sites	Data Years	Data Quality	Status
74.40	2	6	2	2002 - 2003	Database not yet QA'd	Bad

Data confidence:

Low

- Database not QA'd.

draft RIVER BASIN MANAGEMENT PLAN	
	WFD COASTAL WATER BODY CLASSIFICATION Belfast Harbour
	Version Date: 22/12/08
	MARINE ASSESSMENT AND LICENSING TEAM

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

Overall specific pollutants assessment gH

Annex VIII: Overall Compliance **Good (L)**

Annex VIII: Pass/Fail **Good (L)**

Classification tools: Comparison with EQS levels.

Data Availability: 2007 WFD Dedicated monitoring data only

Data confidence: Low until 2008 data incorporated.

draft RIVER BASIN MANAGEMENT PLAN



WFD COASTAL WATER BODY CLASSIFICATION Belfast Harbour

Version Date: 22/12/08


MARINE ASSESSMENT AND LICENSING TEAM

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ANNEX VIII	Value						EQS ug/l	Ecological Status
	2002	2003	2004	2005	2006	2007		
111 tri	ND	ND	ND	ND	ND	<0.025	100	GH
112 tri	ND	ND	ND	ND	ND	<0.75	300	GH
24 D	ND	ND	ND	ND	ND	ND		
2 chloro	ND	ND	ND	ND	ND	ND		
4 chloro 3	ND	ND	ND	ND	ND	ND		
ammonia	ND	ND	ND	ND	ND	ND		
As	ND	ND	ND	ND	ND	ND		
Bentazone	ND	ND	ND	ND	ND	ND		
biphenyl	ND	ND	ND	ND	ND	ND		
boron	ND	ND	ND	ND	ND	ND		
chlorine	ND	ND	ND	ND	ND	ND		
chloronit	ND	ND	ND	ND	ND	ND		
chloronitcalc	ND	ND	ND	ND	ND	ND		
Cr	ND	ND	ND	ND	ND	ND		
Cu	ND	ND	ND	ND	ND	ND		
Cy	ND	ND	ND	ND	ND	ND		
Cyfluthrin	ND	ND	ND	ND	ND	ND		
cyper	ND	ND	ND	ND	ND	ND		
diazinon	ND	ND	ND	ND	ND	ND		
dichlorvos	ND	ND	ND	ND	ND	ND		
dimethoate	ND	ND	ND	ND	ND	ND		
fenitrothion	ND	ND	ND	ND	ND	ND		
Fe	ND	ND	ND	ND	ND	ND		
linuron	ND	ND	ND	ND	ND	ND		
malathion	ND	ND	ND	ND	ND	ND		
Mn	ND	ND	ND	ND	ND	ND		
mecoprop	ND	ND	ND	ND	ND	ND		
permethrin	ND	ND	ND	ND	ND	ND		
phenol	ND	ND	ND	ND	ND	ND		
toluene	ND	ND	ND	ND	ND	ND		
Vn	ND	ND	ND	ND	ND	ND		
xylenes	ND	ND	ND	ND	ND	ND		
Zn	ND	ND	ND	ND	ND	ND		

G	Good
F	Fail
GH	Good or better and is normally treated as high
M	Moderate

	Mean includes LOD data
	Mean based on actual values

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	WFD COASTAL WATER BODY CLASSIFICATION Belfast Harbour		
	<table border="1"> <tr> <td style="background-color: #cccccc;">Version Date:</td> <td>22/12/08</td> </tr> </table>	Version Date:	22/12/08
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ANNEX D: Hydromorphological quality elements

Overall hydromorphology assessment:	HMWB Good
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Classification tools:

1. TRaC Hydromorphology metrics
2. MIMAS

draft RIVER BASIN MANAGEMENT PLAN



**WFD COASTAL WATER BODY CLASSIFICATION
Belfast Harbour**

Version Date: 22/12/08


MARINE ASSESSMENT AND LICENSING TEAM

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ANNEX X	Value						EQS	Chemical Status	Ecological Status
	2002	2003	2004	2005	2006	2007			
12 Dichloro	ND	ND	ND	ND	ND	<2	10	G	GH
anthracene	ND	ND	ND	ND	ND	ND			
atrazine	ND	ND	ND	ND	ND	ND			
benzene	ND	ND	ND	ND	ND	ND			
benzo	ND	ND	ND	ND	ND	ND			
benzo a	ND	ND	ND	ND	ND	ND			
Cadmium	ND	ND	ND	ND	ND	ND			
Chlorfenvos	ND	ND	ND	ND	ND	ND			
Chlorpyr	ND	ND	ND	ND	ND	ND			
Dichloro	ND	ND	ND	ND	ND	ND			
Diuron	ND	ND	ND	ND	ND	ND			
endosulphan	ND	ND	ND	ND	ND	ND			
floranthene	ND	ND	ND	ND	ND	ND			
hcb	ND	ND	ND	ND	ND	ND			
hcbd	ND	ND	ND	ND	ND	<0.01	0.1	G	GH
hch	ND	ND	ND	ND	ND	ND			
hch calc	ND	ND	ND	ND	ND	ND			
Hg	ND	ND	ND	ND	ND	ND			
Indeno	ND	ND	ND	ND	ND	ND			
ISP	ND	ND	ND	ND	ND	ND			
Napthalene	ND	ND	ND	ND	ND	ND			
Ni	ND	ND	ND	ND	ND	ND			
Nonyl	ND	ND	ND	ND	ND	ND			
Octyl	ND	ND	ND	ND	ND	ND			
Pb	ND	ND	ND	ND	ND	ND			
pcp	ND	ND	ND	ND	ND	ND			
simazine	ND	ND	ND	ND	ND	ND			
TBT	ND	ND	ND	ND	ND	ND			
TCB	ND	ND	ND	ND	ND	<0.15	0.4	G	GH
TCB calc	ND	ND	ND	ND	ND	ND			
trichloromethane	ND	ND	ND	ND	ND	ND			
trifluralin	ND	ND	ND	ND	ND	ND			

G	Good
F	Fail
GH	Good or better and is normally treated as high
M	Moderate

	Mean includes LOD data
	Mean based on actual values

draft RIVER BASIN MANAGEMENT PLAN	
	WFD COASTAL WATER BODY CLASSIFICATION Belfast Harbour
	Version Date: 22/12/08
	MARINE ASSESSMENT AND LICENSING TEAM

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.

draft RIVER BASIN MANAGEMENT PLAN



WFD COASTAL WATER BODY CLASSIFICATION Belfast Harbour

Version Date: 22/12/08

MARINE ASSESSMENT AND LICENSING TEAM

GLOSSARY

AFBI	Agri-Food and Biosciences Institute (under contract to NIEA)
AMBI	AZTI Marine Biotic Index
Annex 10	Annex 10 Priority Hazardous Substances
Annex 8	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
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