

draft RIVER BASIN MONITORING PLAN

CLASSIFICATION PAMPHLET

Coastal Waterbody, Larne Lough South

22nd December 2008

LARNE LOUGH SOUTH

Water body Information

- River Basin District: NE
- Water body type: CW8
- Water body characteristics: Euhaline, mesotidal, sheltered
- Water body area: 4.1 km²
- Heavily Modified Water Body: No

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

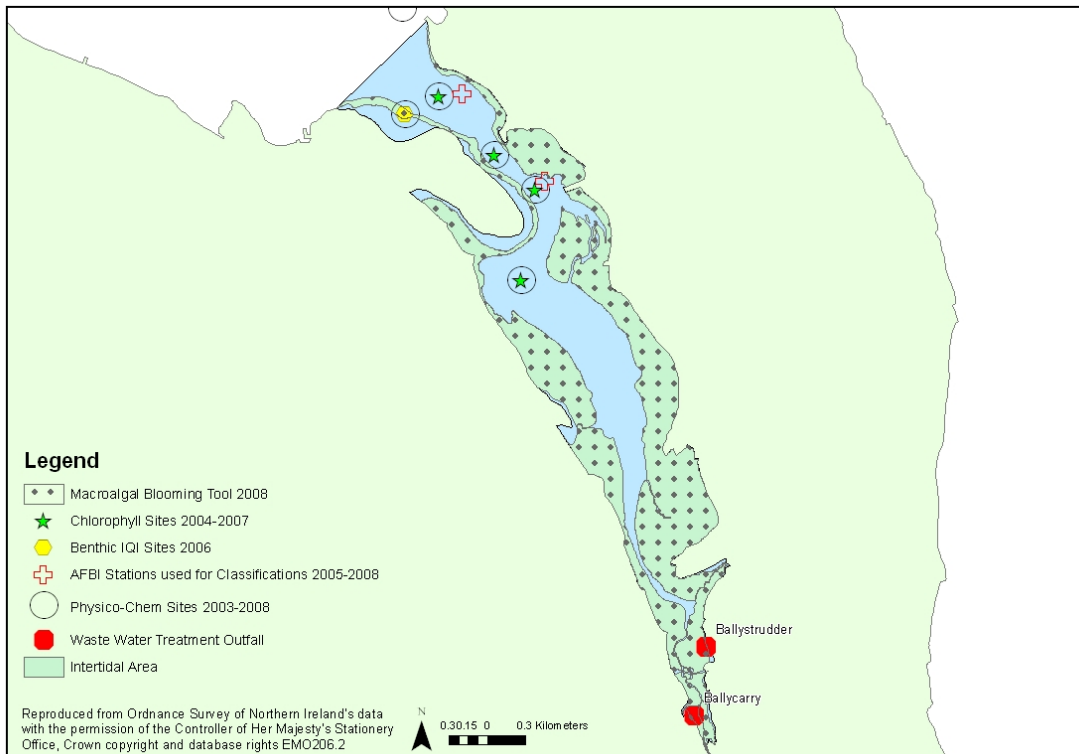


Figure of pressures and monitoring points within Larne Lough South (Coastal Water).

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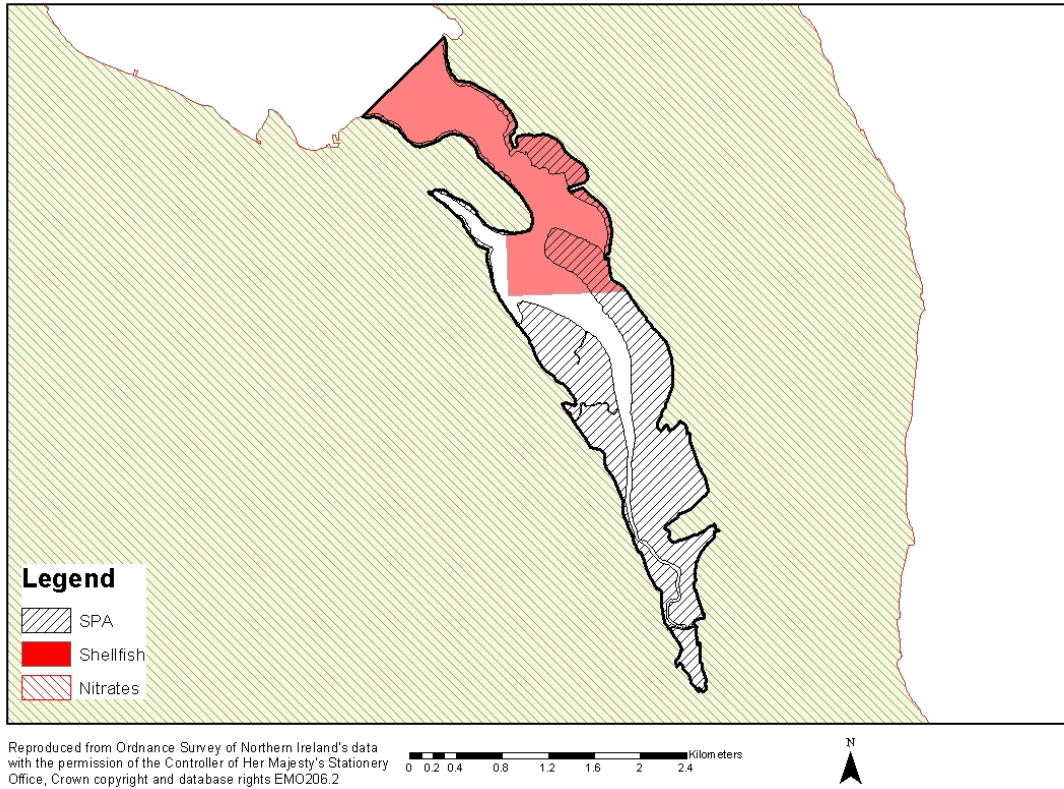



Figure of protected areas within Larne Lough South (Coastal Water), Annex F.

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PARAMETERS TABLE

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

Ecological Quality Element			
<i>Main Element</i>	<i>Sub-Element</i>	<i>Applied</i>	<i>Comment</i>
Plants	Macro Algae	✓	
	-Opportunistic Macroalgae	✓	
	-Reduced Species List	☒	Tool Not Applicable
	Angiosperms	☒	No data available
	Phytoplankton	✓	
Benthic Invertebrates	Infaunal Quality Index	✓	
	Imposex	☒	Tool Not Applicable
Fish	Transitional Fish Classification Index		
Physico-Chemical	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	✓	

Waterbody Classification

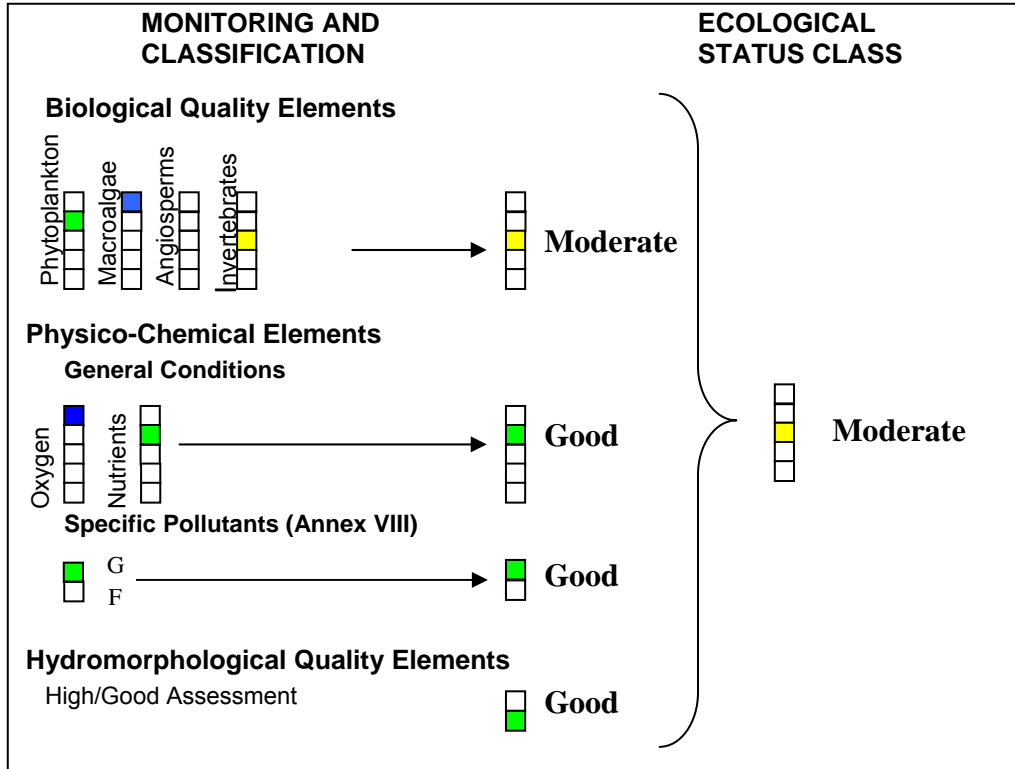


Figure showing ecological classification of Larne Lough South (Coastal Water)

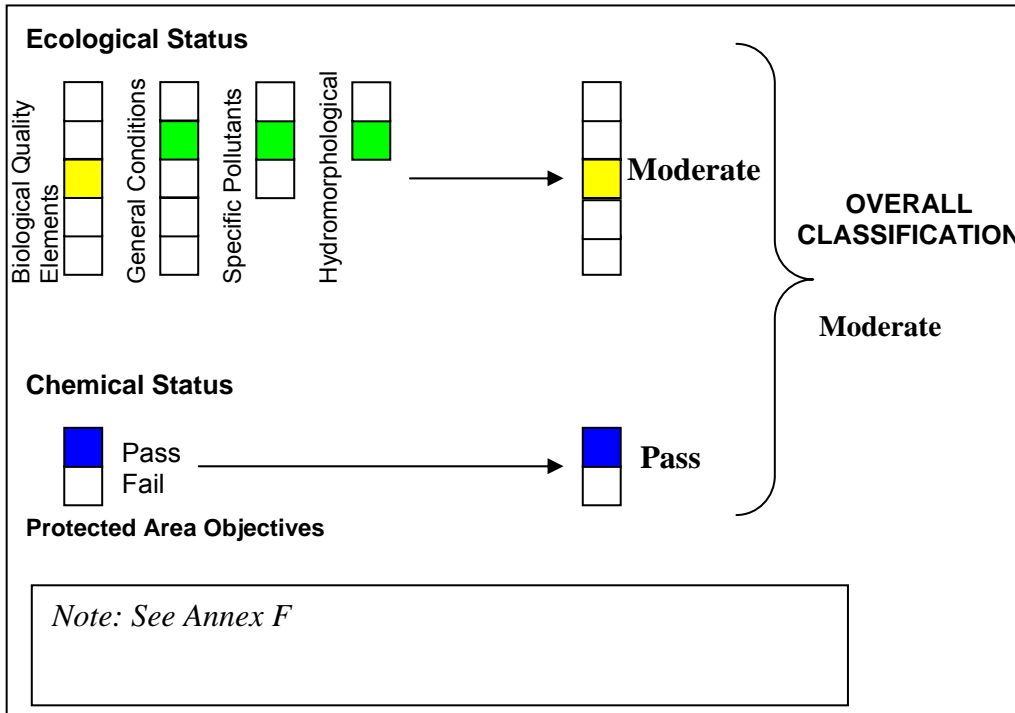


Figure showing overall classification of Larne Lough South (Coastal Water)

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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	2004-7		7 sites 48 samples
Macroalgae			
Angiosperms	MBT	2008	
	Seagrass	ND	
Benthic Invertebrates	Infaunal Quality Index	2006	1 1
Physico-chemical			
Nutrients	2004-2006		28 samples 6 sites
Salinity	2004-2006		
Temperature	2004-2006		
Dissolved Oxygen (DO)	2003-8		2
Suspended particulate matter (SPM)			
Light (Kd)			
Other polluting substances (Annex VIII)	2004-06	3	6
Hydromorphology			
Water chemistry			
(Annex X)	2004-06	3	6

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LARNE LOUGH SOUTH

ANNEX A: Classification of Biological Quality Elements

QE: Phytoplankton

QE phytoplankton assessment (+ Data confidence): **GOOD (M)**

Classification tools:

First round reporting now

1. Chlorophyll biomass index (90%ile)
2. Elevated taxa count index

- **Data store (classification):**

MARINEWater Framework Directive\DRAFT WFD CLASSIFICATION REPORTS\QE
Phytoplankton\Chlla 90th Percentile\Final 90th Percentile
Phytoplankton -

- **Data Availability (spot & continuous samples):**

Chl = spot (2004-2007) AFBINI & NIEA

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

Waterbody Chl. biomass assessment

GOOD (M)

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*)
5.49	GOOD	2004-2007	Medium	7	7	48	53.57%

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

Data confidence:

Medium

- The proportion of possible months sampled is moderate, yielding reasonable temporal coverage, spatial coverage is also relatively limited for the waterbody.
- Data from two different Agencies NIEA and AFBINI

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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

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QE Macroalgae Larne Lough South

QE Macroalgae assessment (+ Data confidence): HIGH (L)

Reduced Species List – Tool not applicable

Classification tools: Macroalgal Blooming Tool (MBT)

2. Macroalgal Blooming Tool

- Waterbody MBT assessment: HIGH (Low)
2008
- WFD surveillance monitoring: 2008
 - Data Store: G:\MARINE\Algae\algae images\Macrophytes\Survey Site Images\OGA site photos\Larne South
 - Data Availability Visual Inspection
 - Boundaries:


Parameters	Quality Status	High	Good	Moderate	Poor	Bad
	Sub-metric EQR	$\geq 0.8 - 1.0$	$\geq 0.6 - 0.8$	$\geq 0.4 - 0.6$	$\geq 0.2 - 0.4$	$0.0 - 0.2$
Available Intertidal Habitat (AIH) %		0 – 5	5 – 15	15 – 25	25 – 75	75 – 100
Affected Area (ha)		0 – 100	10 – 50	50 – 100	100 – 1000	1000 – 2000
Biomass of AIH (g m ²)		0 – 100	100 – 500	500 – 1000	1000 – 3000	3000 - 6000
Biomass of affected area (g m ²)		0 – 100	100 – 500	500 – 1000	1000 – 3000	3000 - 6000
Presence of entrained algae (% of quadrats)		0 – 5	5 – 20	20 – 50	50 – 75	75 – 100

Results

Sites	Sub-metric EQR					Mean EQR	Status
	% cover of AIH	Affected Area	Biomass of AIH	Biomass of affected area	Entrained algae		
LL South	<5%						
Mean							

Data Confidence: Low
 A visual assessment was made throughout the waterbody to identify if there was any evidence of macroalgal blooms accounting for >5% of the intertidal area. The assessment is a rough guide and needs to be repeated to increase data confidence. Satellite imagery or aerial photography may need to be considered as the area is unsafe for access by foot.

Alien taxa present (*Sargassum muticum*): No data

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QE: Benthic Invertebrates – Larne Lough South

Overall benthic invertebrate assessment:	Moderate (L)
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Classification tools: 1. Infaunal Quality Index (IQI)
2. Imposex tool (VDSI) -Tool not applicable

1. IQI (v4)

Water body IQI assessment: *Moderate (Low)*

- WFD surveillance monitoring:
- Data store:
 - Benthic invertebrates: UNICORN (NMMT)
 - Supporting Parameters: Particle Size Analysis (PSA), NIEA Water Quality.
 - Digital images: AMAP folder.
- Data Availability (classification): 1 site, 5 reps, 1 years, Day Grab, 1 mm sieve
- 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
2006	MM-benthos	LL2	5	0.59	0.03	Moderate
Overall Mean			1	0.59	0.03	Moderate

Data confidence: Low

- Sample analysis QA'd through NMBAQC (Good)
- Database QA'd (Good)
- Single point with 5 replicates rather than spatial coverage
- Only single year

Alien taxa present:

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

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Dissolved Oxygen

Waterbody DO assessment: HIGH (M)

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: 2003 to 2008
- 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*)
6.77	HIGH	03 to 08	**	16	21.7%

* 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)

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Nutrients – Winter DIN

Winter DIN assessment Good (L)

- **Data store:** \\marine on ehslis2k \Water Framework Directive\Nuala-Lesley Nutrients\DIN for Classification\Coastal Water
- **Data Availability:** 2004 to 2006, 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
16.04	6	28	6	2004 - 2006	Database not yet QA'd	Good

Data confidence: Low

- Database not QA'd.

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

Overall specific pollutants assessment	PASS
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Annex VIII: Overall Compliance	PASS(L)
Annex VIII: Pass/Fail	PASS(L)

Classification tools: Comparison with EQS levels.

Data Availability: 2004-06 Shellfish Waters Monitoring.

Data confidence: Low until 2008 data incorporated.

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ANNEX VIII	Value					EQS ug/l	Ecological Status
	2002	2003	2004	2005	2006		
111 tri	ND	ND	ND	ND	ND		
112 tri	ND	ND	ND	ND	ND		
24 D	ND	ND	ND	ND	ND		
2 chloro	ND	ND	ND	ND	ND		
4 chloro 3	ND	ND	ND	ND	ND		
ammonia	ND	ND	1.087	1.53	0.762	21	GH
As	ND	ND	1.191	1.018	ND	25	GH
Bentazone	ND	ND	ND	ND	ND		
biphenyl	ND	ND	ND	ND	ND		
boron	ND	ND	ND	ND	ND		
chlorine	ND	ND	ND	ND	ND		
chloronit	ND	ND	ND	ND	ND		
chloronit calc	ND	ND	ND	ND	ND		
Cr	ND	ND	ND	ND	0.154	0.6	GH
Cu	ND	ND	0.639	0.758	0.744	5	GH
Cy	ND	ND	ND	ND	ND		
Cyfluthrin	ND	ND	ND	ND	ND		
cyper	ND	ND	ND	ND	ND		
diazinon	ND	ND	ND	ND	ND		
dichlorvos	ND	ND	ND	ND	ND		
dimethoate	ND	ND	ND	ND	ND		
fenitrothion	ND	ND	ND	ND	ND		
Fe	ND	ND	ND	ND	ND		
linuron	ND	ND	ND	ND	ND		
malathion	ND	ND	ND	ND	ND		
Mn	ND	ND	ND	ND	ND		
mecoprop	ND	ND	ND	ND	ND		
permethrin	ND	ND	ND	ND	ND		
phenol	ND	ND	ND	ND	ND		
toluene	ND	ND	ND	ND	ND		
Vn	ND	ND	ND	ND	ND		
xylenes	ND	ND	ND	ND	ND		
Zn	ND	ND	0.859	4.45	3.556	40	GH

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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ANNEX D: Hydromorphological quality elements

Overall hydromorphology assessment:	Good
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Classification tools:

1. TRaC Hydromorphology metrics
2. MIMAS

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ANNEX E: Chemical Status – Annex X Chemicals

Overall water chemistry assessment:	Pass
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Annex X: Overall Compliance	PASS
Annex X: Pass/Fail	PASS

Classification tools: Comparison with EQS levels

Data Availability: 2004-06 Shellfish Waters Monitoring.

Data confidence: Low until 2008 data incorporated.

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ANNEX X	Value					EQS	Chemical Status	Ecological Status
	2002	2003	2004	2005	2006			
12 Dichloro	ND	ND	ND	ND	ND			
anthracene	ND	ND	ND	ND	ND			
atrazine	ND	ND	ND	ND	ND			
benzene	ND	ND	ND	ND	ND			
benzo	ND	ND	ND	ND	ND			
benzo a	ND	ND	ND	ND	ND			
Cadmium	ND	ND	0.0275	0.0255	0.02	0.2	G	GH
Chlorfenvos	ND	ND	ND	ND	ND			
Chlorpyr	ND	ND	ND	ND	ND			
Dichloro	ND	ND	ND	ND	ND			
Diuron	ND	ND	ND	ND	ND			
endosulphan	ND	ND	ND	ND	ND			
floranthene	ND	ND	ND	ND	ND			
hcb	ND	ND	<0.001	<0.001	<0.001	0.01	G	GH
hcbd	ND	ND	<0.002	<0.002	<0.002	0.1	G	GH
hch	ND	ND	<0.001	<0.001	<0.001	0.002	G	GH
hch calc	ND	ND	ND	ND	ND			
Hg	ND	ND	<0.01	0.0058	ND	0.05	G	GH
Indeno	ND	ND	ND	ND	ND			
ISP	ND	ND	ND	ND	ND			
Napthalene	ND	ND	ND	ND	ND			
Ni	ND	ND	0.435	0.546	0.595	20	G	GH
Nonyl	ND	ND	ND	ND	ND			
Octyl	ND	ND	ND	ND	ND			
Pb	ND	ND	0.271	0.078	0.087	7.2	G	GH
pcp	ND	ND	ND	ND	ND			
simazine	ND	ND	ND	ND	ND			
TBT	ND	ND	ND	ND	ND			
TCB	ND	ND	ND	ND	ND			
TCB calc	ND	ND	ND	ND	ND			
trichloromethan e	ND	ND	ND	ND	ND			
trifluralin	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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ANNEX F: Protected Area Objectives

Water body	Protected area	Designation	Status	Reason for non-compliance
Larne Lough South	Larne Lough	SPA	Favourable	
Larne Lough South	Larne Lough	Saltmarsh	Favourable-maintained	
Larne Lough Mid	Mill Bay	Shellfish Waters	Compliant	

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.

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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