


North Eastern River Basin Management Plan

Larne Lough Mid Classification

December 2009

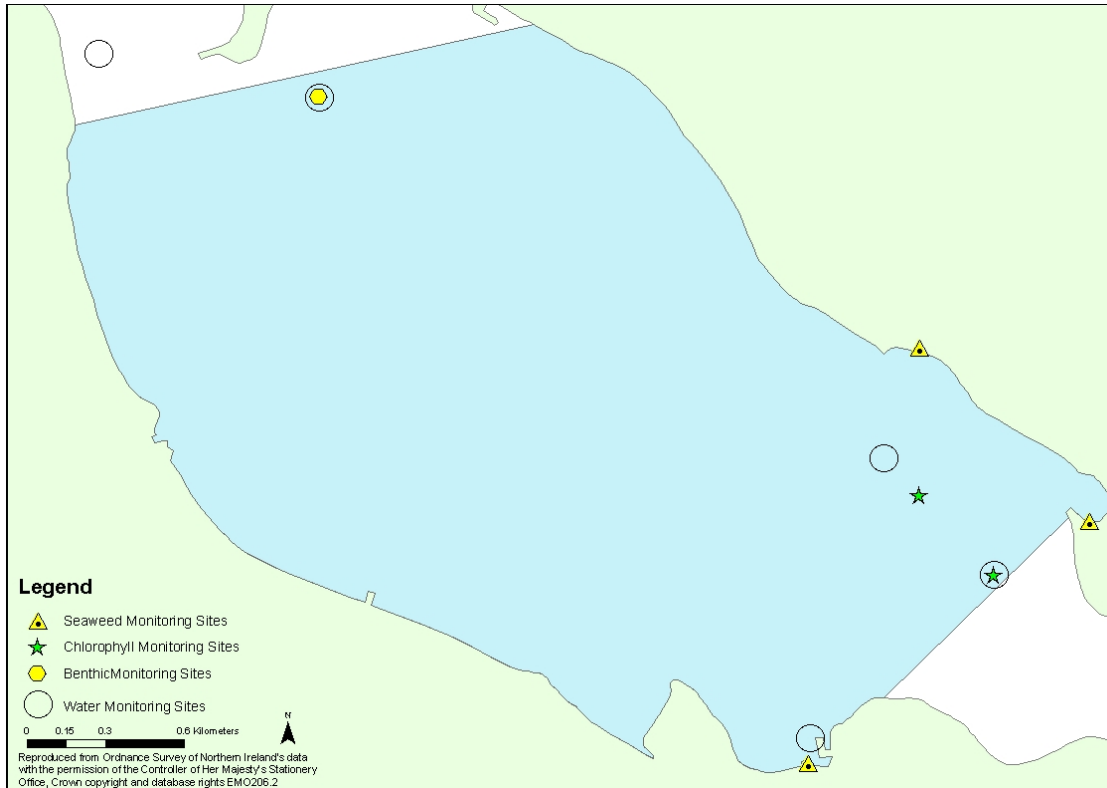
RIVER BASIN MANAGEMENT PLAN	
	WFD COASTAL WATER BODY CLASSIFICATION Larne Lough Mid
	Version Date: 22/12/09
	MARINE ASSESSMENT AND LICENSING TEAM

LARNE LOUGH MID


Water body Information

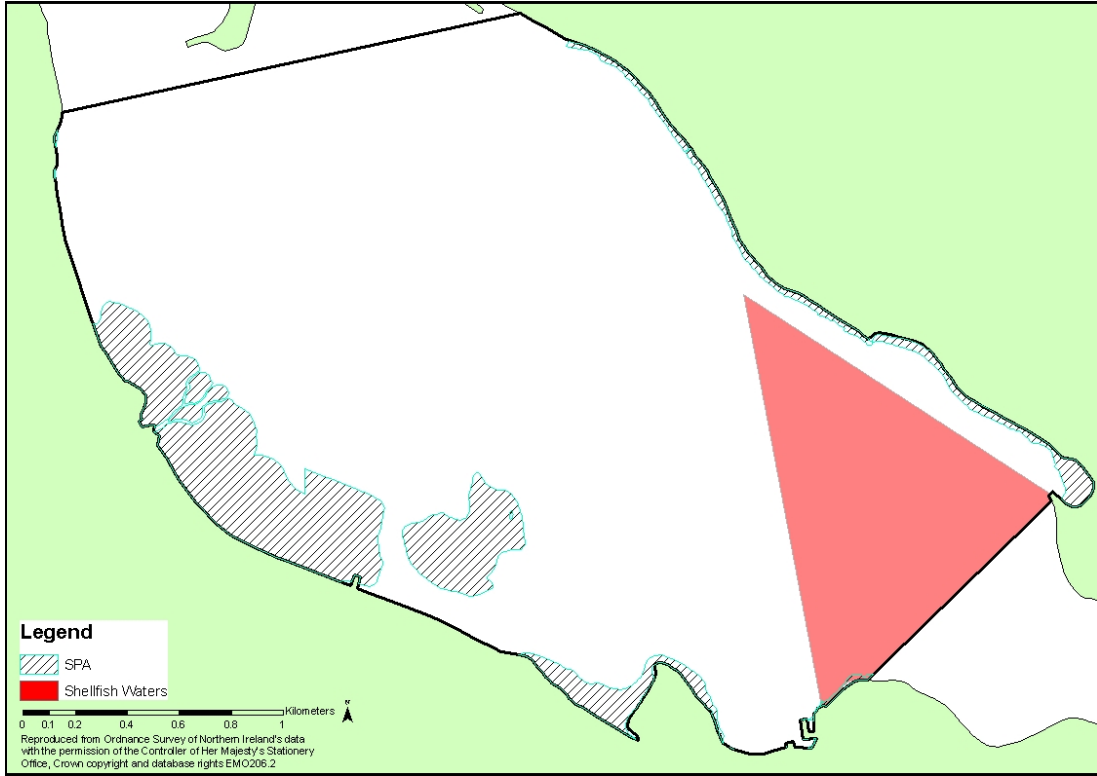
- *River Basin District:* North Eastern
- *Water Body Code:* UKGBNI6NE060
- *Water body type:* CW8
- *Water body characteristics:* Euhaline, mesotidal, sheltered
- *Water body area:* 6.5 km²
- *Heavily Modified Water Body:* No

OVERALL WATERBODY CLASSIFICATION	(H/G/M/P/B): (PASS/FAIL):	MODERATE FAIL	
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Map showing pressures and monitoring points within Larne Lough – Mid.

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Map showing protected areas within Larne Lough - Mid, 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			
<i>Main Element</i>	<i>Sub-Element</i>	<i>Applied</i>	<i>Comment</i>
Macroalgae (Seaweeds)	Opportunistic Macroalgae	<input checked="" type="checkbox"/>	Tool Not Applicable
	Reduced Species List	✓	
Phytoplankton	Biomass	✓	
Angiosperms	Saltmarsh	<input checked="" type="checkbox"/>	Tool Not Applicable
	Seagrass	<input checked="" type="checkbox"/>	Tool Not Applicable
Benthic Invertebrates	Infaunal Quality Index	✓	
	Imposex	<input checked="" type="checkbox"/>	
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	✓	

Waterbody Classification

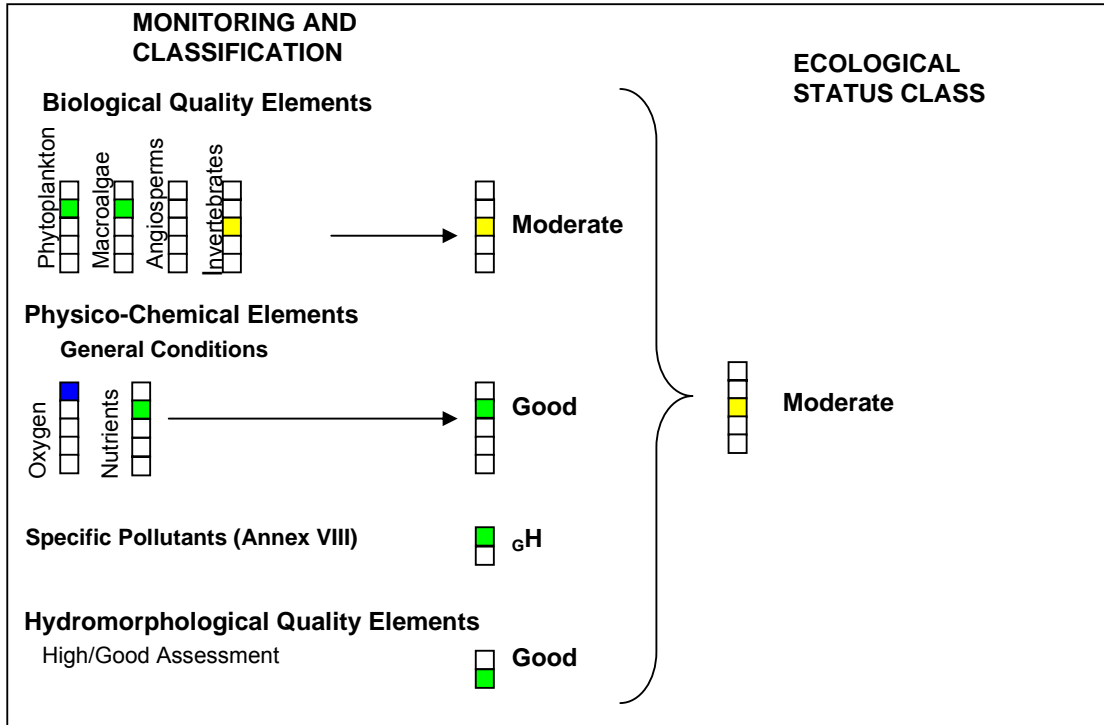


Figure showing ecological classification of Larne Lough Mid (Coastal Water).

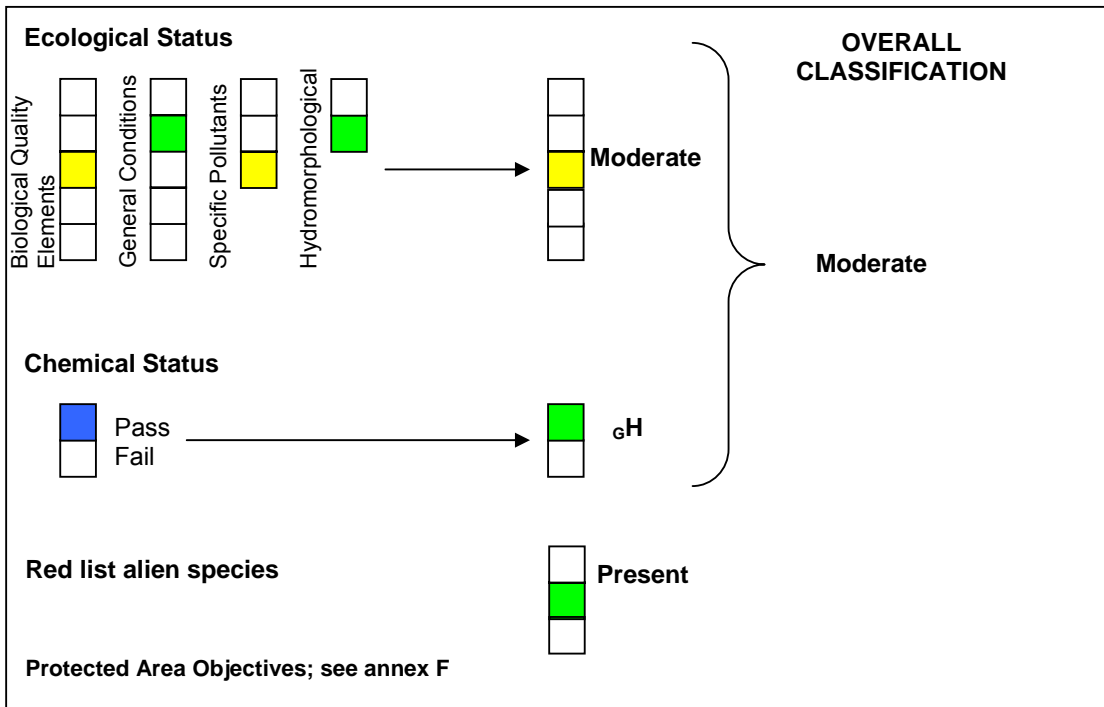



Figure showing overall classification of Larne Lough Mid (Coastal Water).


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First River Basin Cycle (2004 – 2008)

Monitoring Level: Surveillance

Sampling frequency for each quality element

QUALITY ELEMENT		Year (if 1 in 3 yrs)	No. of sites
Biological			
Phytoplankton		2004-7	8 sites 45 samples
Macroalgae (Seaweed)	Reduced Species List	2008	3 sites
Benthic Invertebrates	Infaunal Quality Index	2004-2006	1 site 15 samples
Physico-chemical			
Nutrients		2004-2008	7 sites 31 samples
Dissolved Oxygen		2004-2008	24 samples
Specific polluting substances (Annex VIII)		2007	3
Hydromorphology		2007	
Water chemistry		2007	
(Annex X)		2007	3

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ANNEX A: Classification of Biological Quality Elements

QE: Phytoplankton

QE phytoplankton assessment (+ data confidence):	GOOD (M)	
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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\Chlla 90th Percentile\Final 90th Percentile

- **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*)
5.22	GOOD	2004-7	Medium	4	8	45	57.14%

* 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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QE: Macroalgae Larne Lough mid

QE macroalgal assessment (+ data confidence):	GOOD (M)	
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Classification tools:

1. Reduced species list (RSL).
2. Macroalgal Blooming Tool (MBT) – not suitable.

Waterbody RSL assessment: GOOD (Medium)

- WFD surveillance monitoring: 2008
- Data Availability (classification): 2008, 3 sites
- Data Store: G:\MARINE\Projects 08\Marine Macrophytes

Boundaries:

Parameters	Quality Status	Bad	Poor	Moderate	Good	High
	Sub-metric quality status	0.0 – 0.2	0.21 – 0.4	0.41 – 0.6	0.61 – 0.8	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		
Millbay 2008	10	35	40.6	11.4	51.4	1.06	14.29	0.829	HIGH
Ballydown 2008	9	42	60.5	16.7	50.0	1.21	9.50	0.883	HIGH
Blue Circle Boatclub 2008	12	32	38.7	25.0	37.5	0.68	21.88	0.665	GOOD
Mean								0.79 ±0.11	GOOD

Data Confidence:

Medium

- Data QA (expert team).
- WFD specific data (Reduced species list completed; Full species list not yet carried out, tool not yet completed).
- 3 shores (good spatial coverage) over single year (poor temporal trend assessment).
- FSL not yet carried out.

Alien taxa present (*Sargassum muticum*): Not present

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QE: Angiosperms Larne Lough mid – tool not applicable

QE: Benthic Invertebrates – Larne Mid

QE benthic invertebrate assessment (+ Data confidence):	Moderate (M)	
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Classification tools: 1. Infaunal Quality Index (IQI)
2. Imposex tool (VDSI) –Not applied

1. *IQI (v4)*

- WFD surveillance monitoring:
 - Data store: Benthic invertebrates: UNICORN (NMMT) Database
 - Supporting Parameters: Particle Size Analysis (PSA), Water Quality Data Set
- Digital images: AMAP Project folder
- Data Availability (classification): 1 site, 5 reps, 3 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
2004	MM-benthos	LL4	5	0.57	0.01	Moderate
2005	MM-benthos	LL4	5	0.64	0.02	Moderate
2006	MM-benthos	LL4	5	0.61	0.03	Moderate
Overall Mean				0.60	0.01	Moderate

Data confidence: Medium

- Sample analysis QA'd through NMBAQC (Good)
- Database QA'd (Good)
- Single point with 5 replicates rather than spatial coverage
- 3 years, one site.
- Site moved in 2006 to a more stable area as a subtidal channel had moved.

Alien taxa present: *Styela clava*

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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: 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*)
6.53	HIGH	03 to 08	**	24	27.8%

* Proportion of possible months for which data are available

**Data Quality: HIGH

- Instruments subject to regular calibration checks and quality assurance programme, but databases not QA'd.

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Nutrients – Winter Dissolved Inorganic Nitrogen (DIN)

Winter DIN (+ Data confidence):	GOOD (L)	
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- **Data store:** \\marine on ehslis2k \Water Framework Directive\Nuala-Lesley Nutrients\DIN for Classification\Coastal Water
- **Data Availability:** 2004 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 ≤30

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
17.06	7	31	7	2004 - 2008	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)

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

Data Availability:

2004-2007 Shellfish Waters Monitoring

2007 WFD Dedicated Monitoring, determinants are being assessed on a rolling programme.

Data confidence: Low

* Data previous to 2006 was not considered in the assessment due to improvements to adjacent waste water treatment works.

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ANNEX VIII					EQS ug/l	Ecological Status
	2004	2005	2006	2007		
111_tri	ND	ND	ND	<0.025	100	GH
112_tri	ND	ND	ND	<0.75	300	GH
24_D	ND	ND	ND	ND		
2_chloro	ND	ND	ND	ND		
4_chloro_3	ND	ND	ND	ND		
ammonia	12.54	*	8.16	16.20	21	GH
As	1.15	1.10	ND	1.16	25	GH
Bentazone	ND	ND	ND	ND		
biphenyl	ND	ND	ND	ND		
boron	ND	ND	ND	ND		
chlorine	ND	ND	ND	ND		
chloronit	ND	ND	ND	ND		
chloronit_calc	ND	ND	ND	ND		
Cr	ND	ND	0.14	0.475	0.6	GH
Cu	0.705	0.62	0.6	0.63	5	GH
Cy	ND	ND	ND	ND		
Cyfluthrin	ND	ND	ND	ND		
cyper	ND	ND	ND	ND		
diazinon	ND	ND	ND	0.001	0.01	GH
dichlorvos	ND	ND	ND	ND		
dimethoate	ND	ND	ND	ND		
fenitrothion	ND	ND	ND	0.002	0.01	GH
Fe	ND	ND	ND	ND		
linuron	ND	ND	ND	ND		
malathion	ND	ND	ND	0.0025	0.02	GH
Mn	ND	ND	ND	ND		
mecoprop	ND	ND	ND	ND		
permethrin	ND	ND	ND	ND		
phenol	ND	ND	ND	<4	7.7	GH
toluene	ND	ND	ND	ND		
Vn	ND	ND	ND	ND		
xylenes	ND	ND	ND	ND		
Zn	0.985	1.40	2.45	3.935	40	GH

G		Mean includes LOD data
F		Mean based on actual values
GH		
M		


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ANNEX D: Hydromorphological quality elements

Overall hydromorphology assessment	gH	
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Classification tools:

1. TRaC Hydromorphology metrics
2. MIMAS

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ANNEX E: Chemical Status – Annex X Chemicals

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

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

Data Availability:

2004-2007 Shellfish Waters monitoring

2007 WFD dedicated monitoring, determinants are being assessed on a rolling programme.

Data confidence: Low

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ANNEX X					EQS ug/l	Chemical Status	Ecological Status
	2004	2005	2006	2007			
12_Dichloro	ND	ND	ND	<2	10	G	GH
anthracene	ND	ND	ND	ND			
atrazine	ND	ND	ND	0.001	0.6	G	GH
benzene	ND	ND	ND	ND			
benzo	ND	ND	ND	ND			
benzo_a	ND	ND	ND	ND			
Cadmium	0.029	0.039	0.04	0.04	0.2	G	GH
Chlorfenvos	ND	ND	ND	ND			
Chloropyrifos	ND	ND	ND	0.0013	0.03	G	GH
Dichloro	ND	ND	ND	ND			
Diuron	ND	ND	ND	ND			
endosulphan	ND	ND	ND	ND			
floranthene	ND	ND	ND	ND			
hcb	0.001	0.001	0.001	0.001	0.01	G	GH
hcbd	0.002	0.002	0.002	<0.01	0.1	G	GH
hch	0.001	0.001	0.001	0.001	0.002	G	GH
hch_calc	ND	ND	ND	ND			
Hg	0.01	0.01	ND	0.01	0.05	G	GH
Indeno	ND	ND	ND	ND			
ISP	ND	ND	ND	ND			
Napthalene	ND	ND	ND	ND			
Ni	0.425	0.51	0.48	0.5	20	G	GH
Nonyl	ND	ND	ND	ND			
Octyl	ND	ND	ND	ND			
Pb	0.3785	ND	0.074	0.438	7.2	G	GH
pcp	ND	ND	ND	ND			
simazine	ND	ND	ND	0.001	1	G	GH
TBT	ND	ND	ND	ND			
TCB	ND	ND	ND	<0.15	0.4	G	GH
TCB_calc	ND	ND	ND	ND			
trichloromethane	ND	ND	ND	ND			
trifluralin	ND	ND	ND	ND			



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 Mid	Larne Lough and Swan Island	SPA	Favourable	
Larne Lough Mid	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.

ANNEX G: Alien Species

Styela clava is present in Larne Lough.

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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
GH	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

Northern Ireland Environment Agency
17 Antrim Road
Lisburn
BT28 3AL

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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