


North Eastern River Basin Management Plan

Larne Lough South Classification

December 2009


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

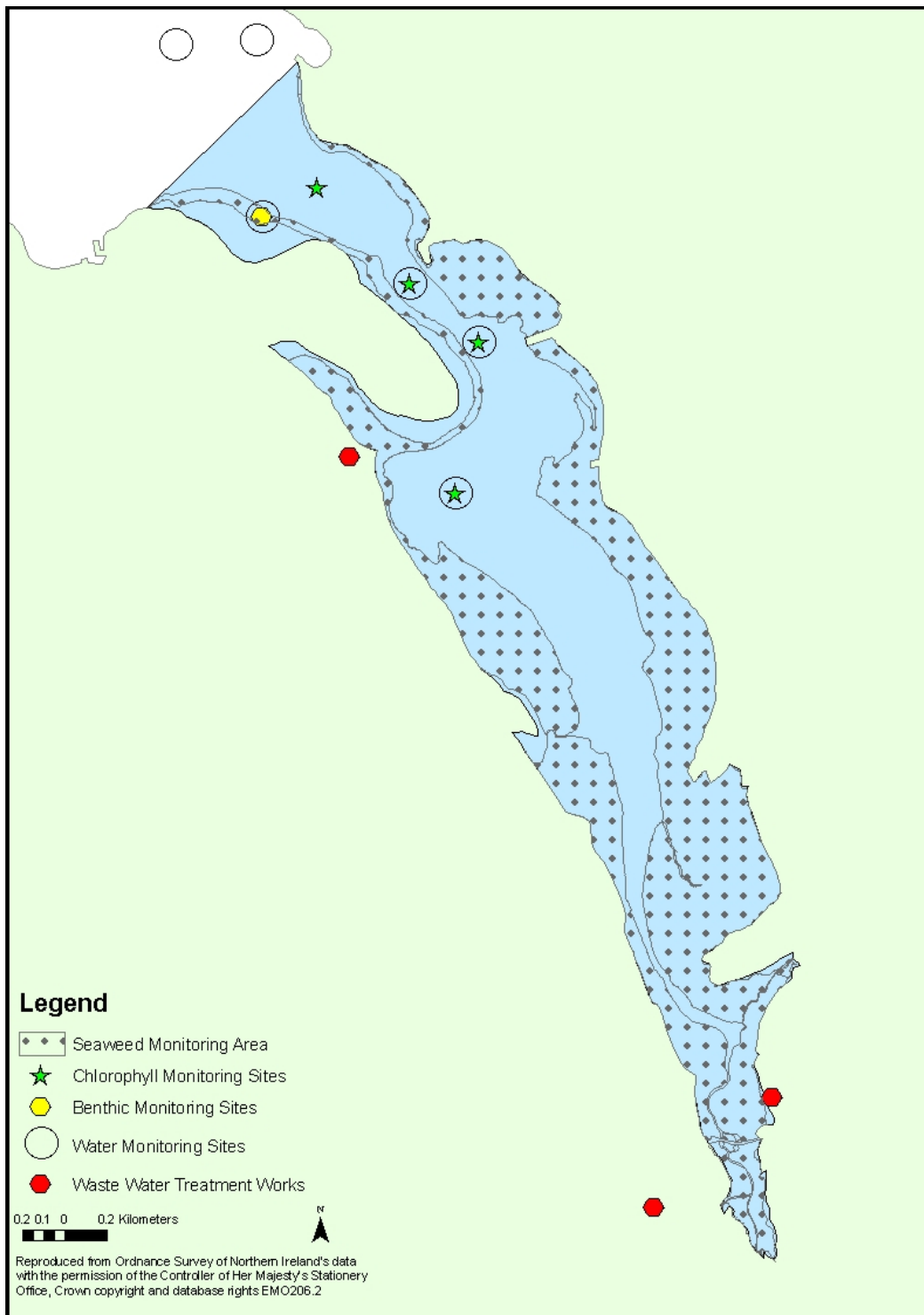
LARNE LOUGH SOUTH

Water body Information


- River Basin District: North Eastern
- Water Body: UKGBNI6NE070
- Water body type: CW8
- Water body characteristics: Euhaline, mesotidal, sheltered
- Water body area: 4.1 km²
- Heavily Modified Water Body: No

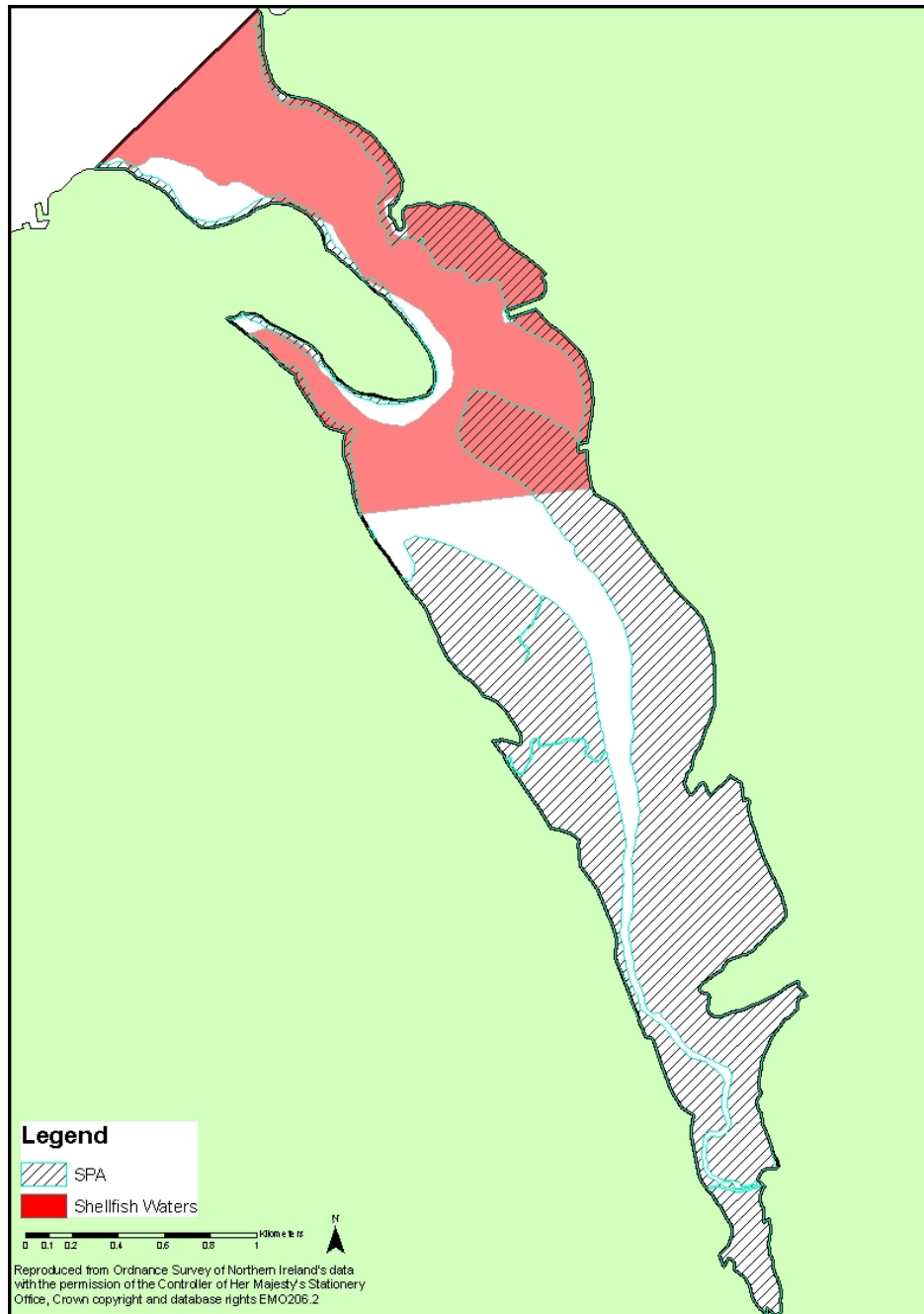
OVERALL WATERBODY CLASSIFICATION	(H/G/M/P/B): (PASS/FAIL):	MODERATE FAIL	
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Map of pressures and monitoring points within Larne Lough South (Coastal Water).

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Map 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. 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	✓	
Macroalgae (Seaweed)	Opportunistic Macroalgae	✓	
	Reduced Species List	☒	Tool not applicable
Angiosperms	Seagrass	☒	No data available
	Saltmarsh	Assessed under protected areas.	See Annex F
Benthic Invertebrates	Infaunal Quality Index	✓	
	Imposex	☒	Tool Not Applicable
Physico-chemical	-Dissolved Oxygen	✓	
	-Nutrients	✓	
	Specific Pollutants (Annex VIII substances)	✓	
Hydromorphological Quality Elements	SEPA Rapid Designation	✓	
	TraC MIMAS	✓	
Chemical Status			
Priority Hazardous Substances	Annex X substances	✓	

Waterbody Classification

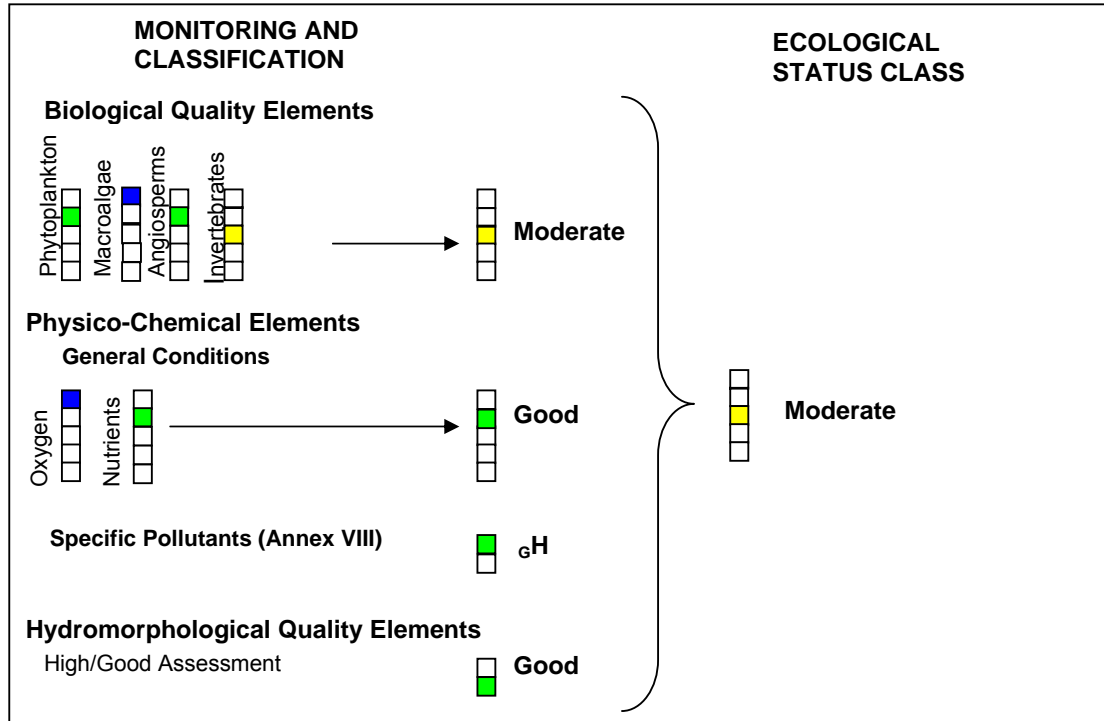


Figure showing ecological classification of Larne Lough South (Coastal Water).

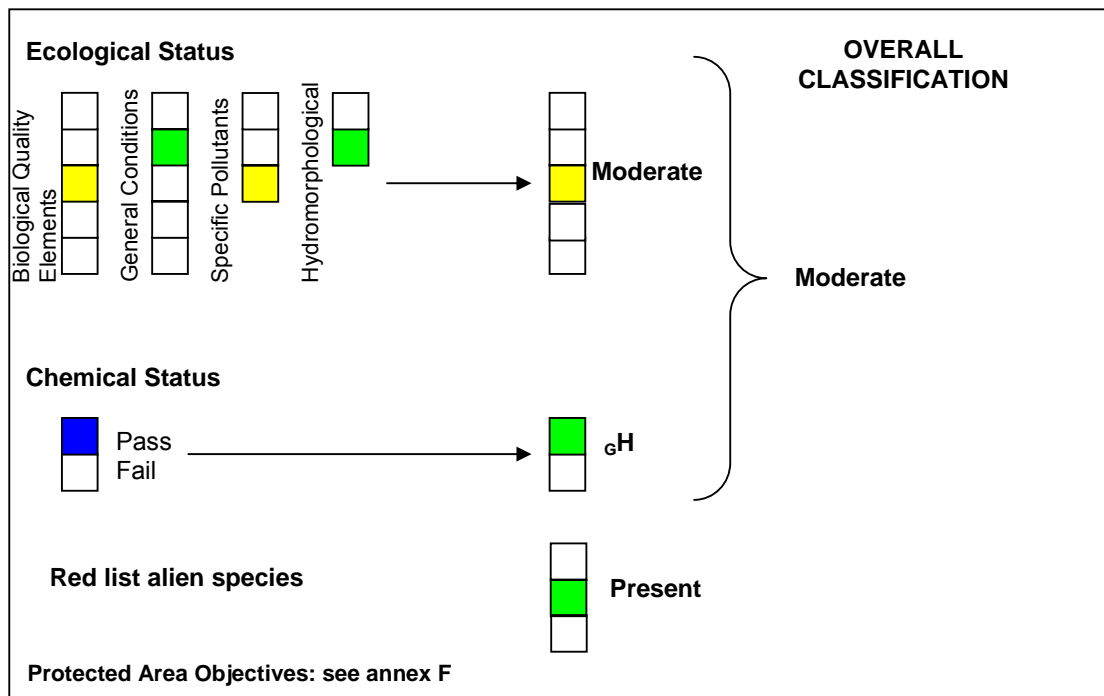




Figure showing overall classification of Larne Lough South (Coastal Water).

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Sampling frequency for each quality element

Quality Elements		Year (if 1 in 3 yrs)	No. of sites
Biological			
Phytoplankton		2004-7	7 sites 48 samples
Macroalgae (Seaweed)	MBT	2008	
Benthic Invertebrates	Infaunal Quality Index	2006	1 site 5 samples
Physico-chemical			
Nutrients		2004-2008	40 samples 7 sites
Salinity		2004-2008	
Temperature		2004-2008	
Dissolved Oxygen (DO)		2003-8	16
Other polluting substances (Annex VIII)		2004-06	6
Hydromorphology		2007	
Water chemistry			
(Annex X)		2004-06	6

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LARNE LOUGH SOUTH

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 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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QE Macroalgae Larne Lough South

QE macroalgal assessment (+ data confidence):	HIGH (L)
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Classification tools:

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

Macroalgal Blooming Tool

- 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:

Parameter	Quality Status Sub-metric EQR	High $\geq 0.8 - 1.0$	Good $\geq 0.6 - 0.8$	Moderate $\geq 0.4 - 0.6$	Poor $\geq 0.2 - 0.4$	Bad $0.0 - 0.2$
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%						HIGH
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 preliminary and needs to be repeated to increase data confidence.

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

QE: Angiosperms – Larne South - GOOD (ND)

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QE: Benthic Invertebrates – Larne Lough South

QE benthic invertebrate assessment (+ Data confidence):	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				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

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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*)
6.77	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 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:** 2003 to 2008, DIN & salinity (November to February)
- **Data Availability (spot & continuous samples):** spot


Area	Salinity range	DIN (uM) HIGH	DIN (uM) GOOD	DIN (uM) 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
14.44	7	40	7	2003 - 2008	Database not yet QA'd	Good

Data confidence: Low

- Spot samples.

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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: 2004-07 Shellfish Waters 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	Value					EQS ug/l	Ecological Status
	2003	2004	2005	2006	2007		
111_tri	ND						
112_tri	ND						
24_D	ND						
2_chloro	ND						
4_chloro_3	ND						
ammonia	ND	19.72	*	13.94	19.89	21	GH
As	ND	1.2	1.00	NR	0.76	25	GH
Bentazone	ND						
biphenyl	ND						
boron	ND						
chlorine	ND						
chloronit	ND						
chloronit_calc	ND						
Cr	ND			0.16	0.29	0.6	GH
Cu	ND	0.62	0.8	0.79	0.86	5	GH
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	0.83	5.06	3.87	7.45	40	GH

G
F
GH
M

Good
Fail
Good or better and is normally treated as high
Moderate

Mean includes LOD data
Mean based on actual values


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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)	gH (L)	
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Classification tools: Comparison with EQS levels.

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

Data Availability: 2004-07 Shellfish Waters 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							
anthracene							
atrazine							
benzene							
benzo							
benzo_a							
Cadmium	0.02	0.02	0.04	0.04	0.2	G	GH
Chlorfenvos							
Chloropyrifos							
Dichloro							
Diuron							
endosulphan							
floranthene							
hcb	0.001	0.001	0.001	0.001	0.01	G	GH
hcbd	0.002	0.002	0.002	NR	0.1	G	GH
hch	0.001	0.001	0.001	0.001	0.002	G	GH
hch_calc							
Hg	0.01	0.01	NR	0.01	0.05	G	GH
Indeno							
ISP							
Napthalene							
Ni	0.44	0.56	0.63	0.78	20	G	GH
Nonyl							
Octyl							
Pb	0.25	0.078	0.091	0.668	7.2	G	GH
pcp							
simazine							
TBT							
TCB							
TCB_calc							
trichloromethane							
trifluralin							

G
F
GH
M

	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.

ANNEX G: Alien Species

Styela clava is present in Larne Lough.

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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
GEF	Good Ecological Potential
H/G/M/P/B	High/Good/Moderate/Poor/Bad (Classification Status)
GH	Good/High
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

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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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