

North Eastern River Basin Management Plan

Strangford South Classification

December 2009




An Agency within the Department of the
Environment
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NIEA Northern Ireland
Environment
www.ni-environment.gov.uk Agency

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

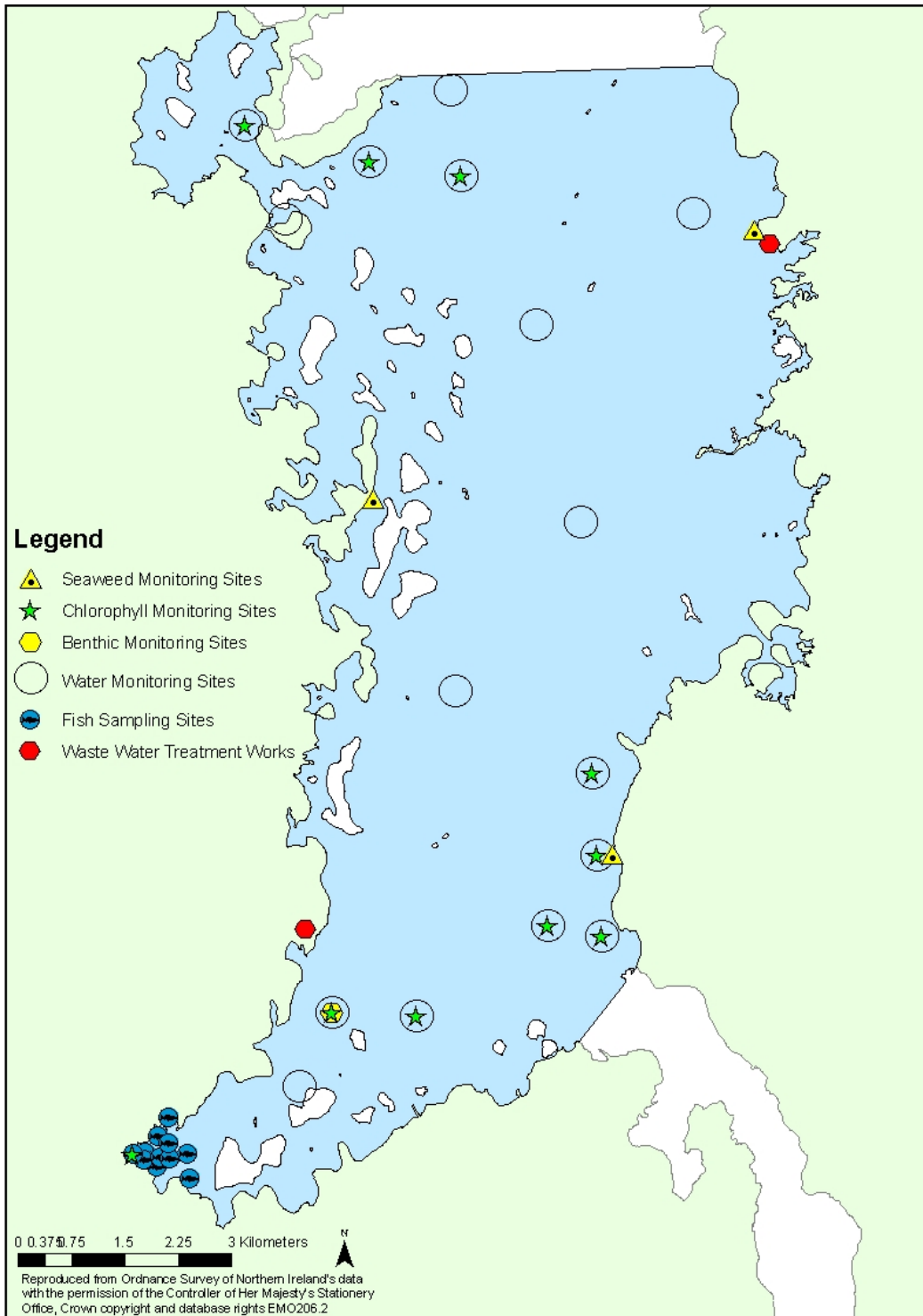
STRANGFORD SOUTH

Water body Information

- River Basin District: North Eastern
- Water body type: CW8
- Water body code : UKGBNI6NE130
- Water body characteristics: Euhaline, mesotidal, sheltered
- Water body area: 86.33 km²
- Heavily Modified Water Body: No

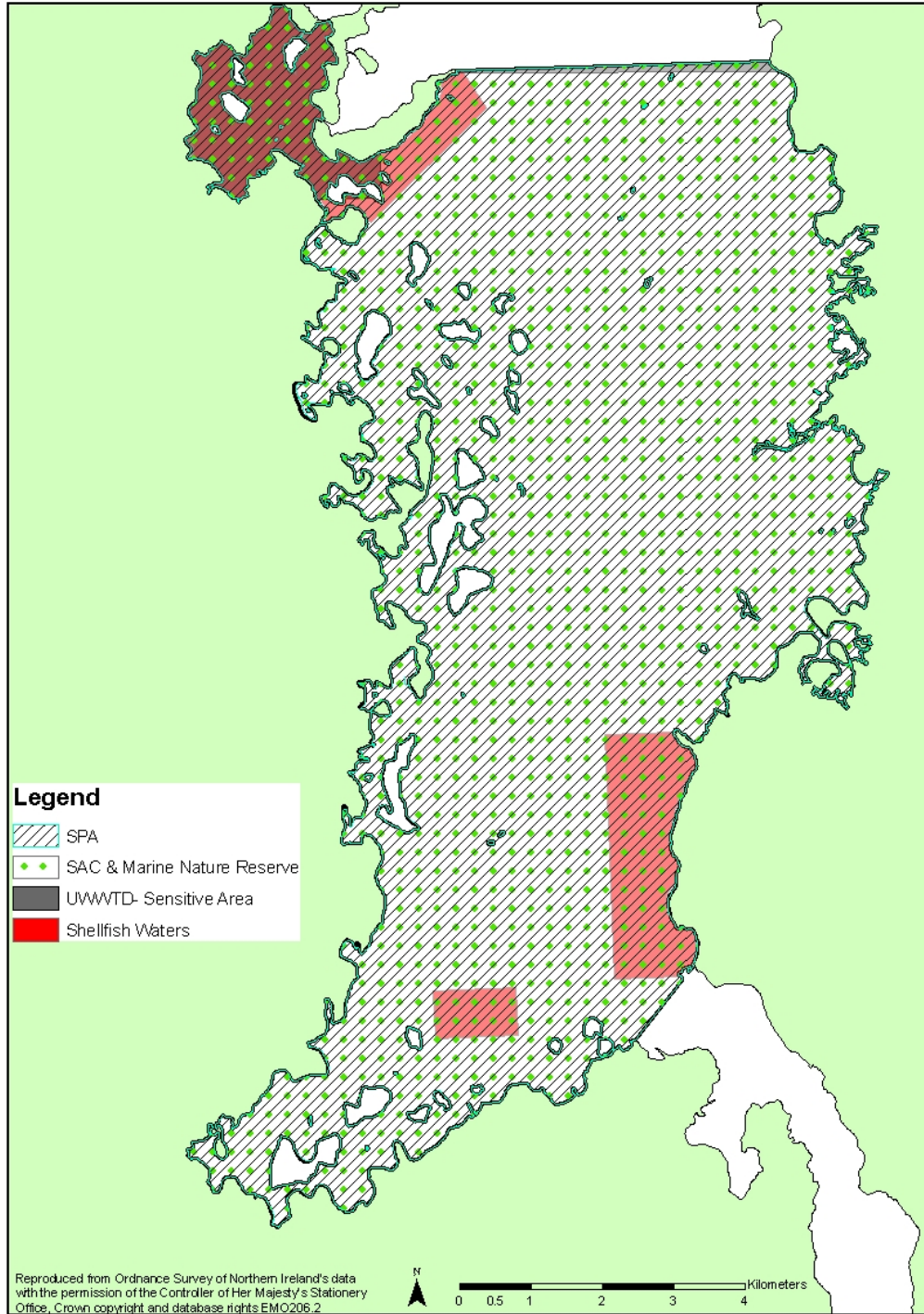
OVERALL WATERBODY CLASSIFICATION	(H/G/M/P/B): (PASS/FAIL):	MODERATE FAIL	
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RIVER BASIN MANAGEMENT PLAN




Map showing pressures and monitoring points within Strangford South (Coastal Water).

RIVER BASIN MANAGEMENT PLAN



Map showing protected areas within Strangford South (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)	- <i>Opportunistic Macroalgae</i>	<input checked="" type="checkbox"/>	No data available
	- <i>Reduced Species List</i>	✓	
Angiosperms	Seagrass	<input checked="" type="checkbox"/>	No data available
	Saltmarsh	<input checked="" type="checkbox"/>	
Phytoplankton	Biomass	✓	
Benthic Invertebrates	Infaunal Quality Index	✓	
	Imposex	<input checked="" type="checkbox"/>	No data available
Physico-Chemical (water)	General Conditions	✓	
	- <i>Dissolved Oxygen</i>	✓	
	- <i>Nutrients</i>	✓	
	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

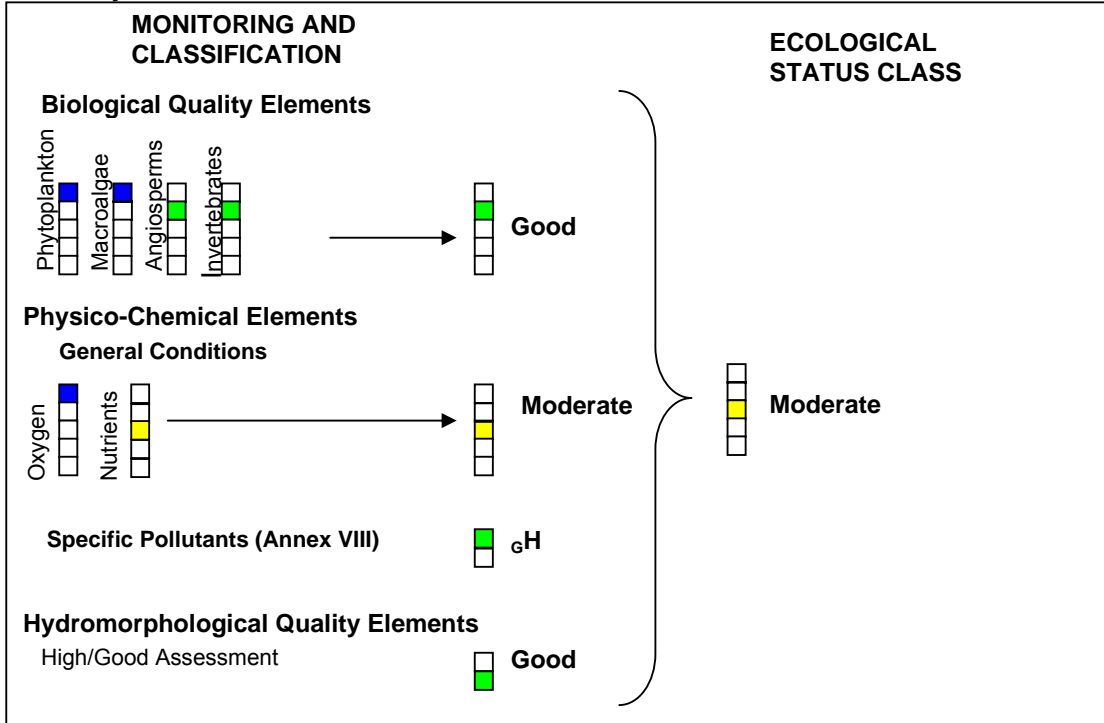


Figure showing ecological classification of Strangford South (Coastal Water)

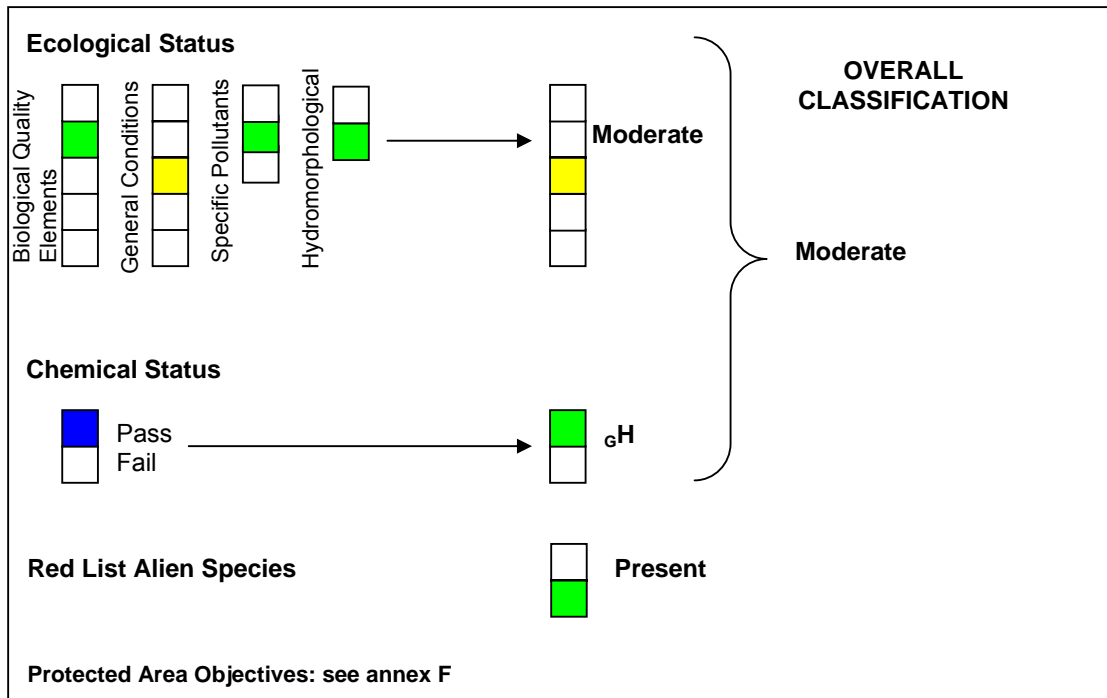



Figure showing overall classification of Strangford South (Coastal Water)


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First River Basin Cycle (2004 – 2008)

Monitoring Level: Surveillance

Table of sampling frequency for each quality element

Quality Elements		Year (if 1 in 3 yrs)	No. of sites
Biological			
Phytoplankton		2004-8	19 sites 107 samples
Macroalgae	Reduced Species List	2007	3
Benthic Invertebrates	Infaunal Quality Index	2004-2006	1 site, 15 replicates
Physico-chemical			
Nutrients		2003-2008	21 sites 79 samples
Salinity		2003-2008	
Temperature		2003-2008	
Dissolved Oxygen (DO)		2003-2008	6
Other polluting substances (Annex VIII)		2002-07	5
Hydromorphology		2007	
Water chemistry			
(Annex X)		2002-07	5

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STRANGFORD LOUGH SOUTH

ANNEX A: Classification of Biological Quality Elements

QE: Phytoplankton

QE phytoplankton assessment (+ data confidence):	HIGH (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\Chlla 90th Percentile\Final 90th Percentile
Phytoplankton- MARINE\Water Framework Directive\DRAFT WFD CLASSIFICATION REPORTS\QE Phytoplankton\Elevated Taxa\SL phytotools2004-2007
 - 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)

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*)
4.30	HIGH	2004-2007	Medium	20	19	107	60.7%

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

Data confidence: Medium

- The proportion of possible months sampled and number of daily averages carried out over the 6 year reporting period yielded reasonable temporal and spatial coverage.
- Although data was collected from two sources, NIEA and AFBINI.

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QE: Macroalgae Strangford South

QE macroalgal assessment (+ data confidence):	High (M)	
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Classification tools: Reduced species list (RSL) 2008 - High
Macroalgae Blooming Tool (2008) – No Data

Reduced Species List (RSL)

- **WFD surveillance monitoring:** 2007
- **Data Availability (classification):** 2007, 3 sites
- **Data Store:** G:\MARINE\Projects 07\MM07-03 Marine Plants\Macrophyte Survey 07

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		
Kircubbin Bay 07	12	45	54.5	15.56	51.11	1.05	8.89	0.866	HIGH
Ringhaddy Rapids 07	7	37	58.5	18.92	51.35	0.95	16.22	0.805	HIGH
Marfield Rocks 07	15	48	48.0	14.58	50.00	1.09	10.42	0.856	HIGH
Mean								0.84 ±0.03	HIGH


Data Confidence: Medium

- Standard Deviation (±) are included with the mean EQR.
- Data QA (expert team).
- WFD specific data (Reduced species list completed; Full species list not yet carried out, tool not yet completed).
- Three shores (good spatial coverage) over single year (poor temporal trend assessment).
- FSL not yet carried out.

Alien taxa present (*Sargassum muticum*): Yes

QE: Angiosperms – Strangford South, GOOD (ND)

Alien taxa present (*Spartina anglica*): Yes

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QE: Benthic Invertebrates – Strangford Lough South

QE macroalgal assessment (+ data confidence):	Good (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 NIEA Database
 - Supporting Parameters; Particle Size Analysis, Water Quality Data Set
 - Digital images; AMAP Project folder
- Data Availability (classification): 3 years, 1 sites (5 reps), Day grab (0.1m²), 1mm mesh
- 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	ECWMP	SL4	5	0.74	0.01	Good
2005	ECWMP	SL4	5	0.72	0.02	Good
2006	ECWMP	SL4	5	0.75	0.03	High
Overall Mean				0.74	0.02	Good

Data confidence: Medium

- Sample analysis QA'd through NMBAQC (Good)
- Database QA'd (Good)
- Single point with 5 replicates rather than spatial coverage
- All data used for classification falls within EUNIS boundaries

Aliens species present: *Crassostrea gigas*.

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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: 2002 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*)
6.63	HIGH	02/08	**	20	22.6%

* Proportion of possible months for which data are available

**Data Quality: Medium

- High - 11 (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:** 2003 to 2007, 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) (normalised to salinity 32)	Winter DIN Daily average (n)	No. of samples (n)	No. of sites	Data Years	Data Quality	Status

Data confidence: Low

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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.

Classification tools: Comparison with EQS levels.

Data Availability: 2002-07 Shellfish waters monitoring.
2007 WFD Dedicated Monitoring.
Determinants are assessed on a rolling programme.

Data confidence: Low

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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	<0.02 5	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	14.18	8.347	17.68	13.26	13.43	21	GH
As	<2	1.225	1.275	1.14	1.42	1.23	25	GH
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		
chloronit_calc	ND	ND	ND	ND	ND	ND		
Cr	ND	ND	ND	ND	0.11	<0.5	0.6	GH
Cu	1.058	0.708	0.448	0.58	1.77	0.78	5	GH
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	4.646	1.963	0.615	3.41	7.06	5.65	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	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)	σ H (L)	
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Classification tools: Comparison with EQS levels.

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

Classification tools: Comparison with EQS levels.

Data Availability: 2002-07 Shellfish waters monitoring.
2007 WFD Dedicated Monitoring.
Determinants are assessed on a rolling programme.

Data confidence: Low

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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	0.116	0.019	0.0253	0.040	0.025	0.022	0.2	G	GH
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	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.01	G	GH
hcbd	0.0012	<0.002	<0.002	<0.002	<0.002	<0.001	0.1	G	GH
hch	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.002	G	GH
hch_calc	ND	ND	ND	ND	ND	ND			
Hg	<0.05	0.0168	0.0054	0.01	ND	0.02	0.05	G	GH
Indeno	ND	ND	ND	ND	ND	ND			
ISP	ND	ND	ND	ND	ND	ND			
Napthalene	ND	ND	ND	ND	ND	ND			
Ni	0.4315	0.3208	0.3238	0.41	0.42	0.46	20	G	GH
Nonyl	ND	ND	ND	ND	ND	ND			
Octyl	ND	ND	ND	ND	ND	ND			
Pb	0.4138	0.3808	0.2108	0.156	0.105	0.453	7.2	G	GH
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

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ANNEX F: Protected Area Objectives

Water body	Protected area	Designation	Status	Reason for non-compliance
Strangford Lough South	Strangford Lough	SPA	Favourable	
Strangford Lough South	Strangford Lough	SAC	Unfavourable	<i>Modiolus</i> reefs
Strangford Lough South	Strangford Lough	Saltmarsh	Unfavourable	Vegetation composition - indicators of negative change (<i>Spartina</i>)
Strangford Lough South	Ardmillan	Shellfish waters	Compliant. Single sample exceedance in cadmium 2002 and copper in 2006. Not repeated.	
Strangford Lough South	Skate Rock	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.

SAC

Strangford Lough is designated as a Special Area of Conservation under the Habitats Directive. One of the designation features of the Lough is the *Modiolus* (Horse Mussel) reefs. These are in unfavourable condition. Although an 'unfavourable condition' assessment is not an automatic downgrade under WFD, in this case, status has been downgraded because the unfavourable condition relates directly to the ecological structure and function, and therefore status of this waterbody.

ANNEX G: Red List Alien Species

Sargassum muticum, *Spartina anglica* and *Crassostrea gigas* are all present in this water body.

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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
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

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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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