

draft RIVER BASIN MONITORING PLAN

CLASSIFICATION PAMPHLET

Transitional Waterbody Lagan

22nd December 2008



An Agency within the Department of the
Environment
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LAGAN ESTUARY (TRANSITIONAL WATER)

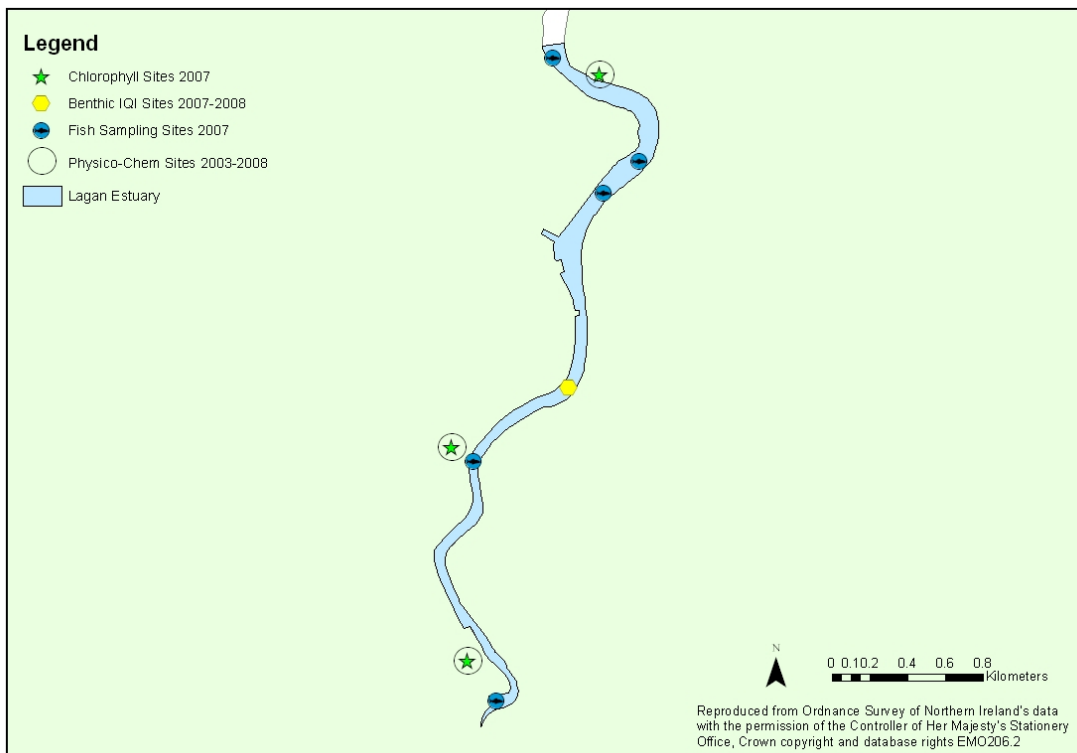
Water body Information

- River Basin District: NE
- Water body type: Transitional Water 2 (TW2)
- Water body characteristics: Partly mixed/stratified, mesotidal, sand and mud, mesohaline
- Water body area: 0.33 km²
- Heavily Modified Water Body: YES

WATERBODY CLASSIFICATION: BAD (FAIL)

Transitional waters are recognised across Europe as being difficult to classify as each one is unique. Transitional environments are naturally stressed systems with high spatial and temporal variability. Tools for assessment are not well developed for this classification. However additional tools may be available for March 2009.

As this water body is heavily modified, ecological potential has to be determined. This stage has not yet been completed, and this classification is based on ecological status.



Pressures and monitoring points (historic and planned) within Lagan Estuary (Transitional Water)

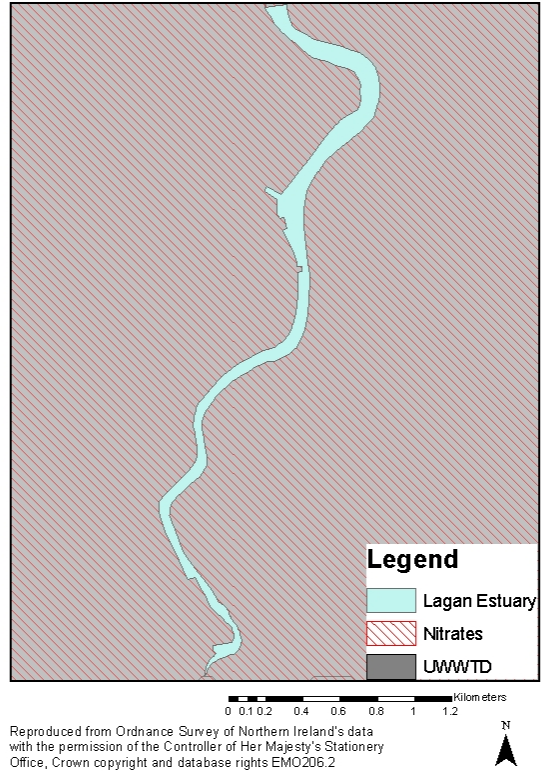
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Lagan Estuary

Version Date: 22/12/08

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Protected areas within Lagan Estuary (Transitional Water).

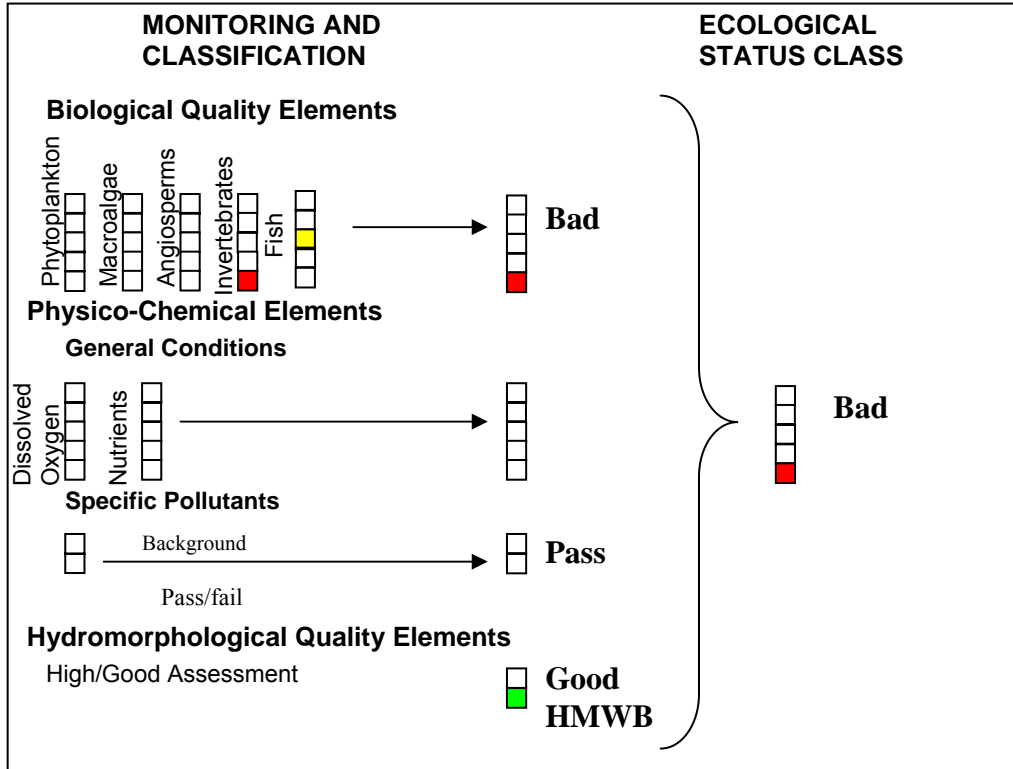
Parameters Requiring Assessment (for this exercise)

PARAMETERS TABLE

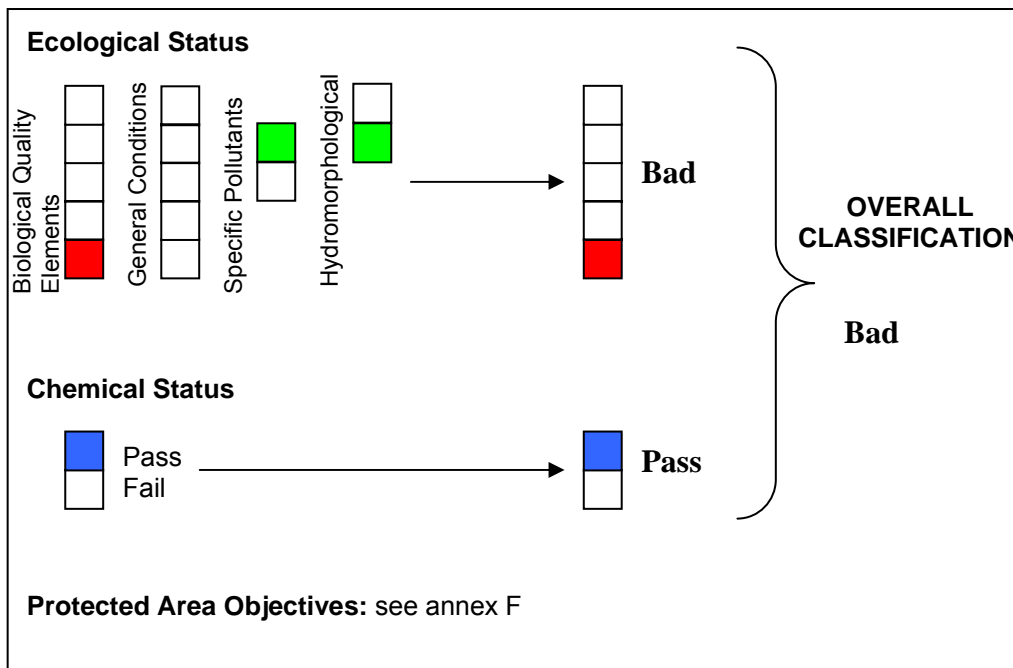
(Parameters for which classification systems are available and have been used in the first round of classification)

Ecological Quality Element			
Main Element	Sub-Element	Applied	Comment
Plants	Macro Algae		
	-Opportunistic Macroalgae	<input checked="" type="checkbox"/>	Tool not applicable
	-Reduced Species List	<input checked="" type="checkbox"/>	Tool not applicable
	Angiosperms	<input checked="" type="checkbox"/>	Tool not applicable
	Phytoplankton	<input checked="" type="checkbox"/>	Tool under development
Benthic Invertebrates	Infaunal Quality Index	<input checked="" type="checkbox"/>	Tool under development
	Imposex	<input checked="" type="checkbox"/>	Tool not applicable
Fish	Transitional Fish Classification Index	<input checked="" type="checkbox"/>	
Physico-Chemical	General Conditions		
	-Dissolved Oxygen	<input checked="" type="checkbox"/>	
	-Nutrients	<input checked="" type="checkbox"/>	Tool not applicable (salinity)
	Specific Pollutant (Annex VIII subs)	<input checked="" type="checkbox"/>	
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"/>	


Waterbody Classification



Ecological classification of Lagan (Transitional Water)



Overall classification of Lagan (Transitional Water)


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	WFD TRANSITIONAL WATER BODY CLASSIFICATION Lagan Estuary
	Version Date: 22/12/08
	MARINE ASSESSMENT AND LICENSING TEAM

First River Basin Cycle (2004 – 2008)

Monitoring Level: Surveillance

Sampling frequency for each quality element.

Quality Elements		Surveillance		
		Year (if 1 in 3 years)	Frequency (if p.a.)	No. of sites
Ecological				
Phytoplankton - 90 %ile		2004-8		5 sites 78 samples
Macroalgae	Fucoid extent	TUD		
	MBT	TNA		
Angiosperms	Seagrass	TNA		
	Saltmarsh	TUD		
Benthic Invertebrates	Infaunal Quality Index	2007-8	1	1
Fish	Spring	2007		
	Autumn	2007		
Physio-chemical				
Nutrients		TNA		
Salinity				
Temperature				
Dissolved Oxygen		2003-4, 2006-7		3
Suspended Particulate Matter				
Light (Kd)				
Specific pollutants (Annex VIII)				
Hydromorphology		Yes		
Water chemistry (Annex X)				
Priority hazardous substances				

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	WFD TRANSITIONAL WATER BODY CLASSIFICATION Lagan Estuary
	Version Date: 22/12/08
	MARINE ASSESSMENT AND LICENSING TEAM

ANNEX A: Classification of Biological Quality Elements

QE: Phytoplankton NO CURRENT REF CONDITIONS FOR TWs

QE: Macroalgae – tool not applicable/ tool under development

QE Angiosperms: – tool not applicable

QE: Benthic Invertebrates – tool under development for transitional waters

Overall benthic invertebrate assessment: BAD (L)

Classification tools: 1. Infaunal Quality Index (IQI)
2. Imposex tool (VDSI) – N/A

1. IQI (v4)

Water body IQI assessment: *BAD*

The sediment grab for this water body was anoxic and devoid of life.


- WFD surveillance monitoring: 2008
- Data store:
 - Benthic invertebrates, UNICORN NIEA database
 - Supporting Parameters, Particle Size Analysis, Water Quality Dataset
 - Digital images, AMAP folder.
- Data Availability (classification):
- Habitat max values (sub-tidal mud): $1-(AMBI/7) = 0.78$, $1-\text{Lambda} = 0.72$, Taxa = 24
- Boundaries (Intercalibrated NEAGIG):

Classes	Bad	Poor	Moderate	Good	High
IQI	$>0.0 \leq 0.24$	≥ 0.24 < 0.44	≥ 0.44 < 0.64	≥ 0.64 < 0.75	≥ 0.75

Results

Year	Survey	Station	n	Mean	± S.D	Status
2007		ORBR				BAD
2008		ORBR				BAD
Overall Mean						BAD

Data confidence: **Low**

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	WFD TRANSITIONAL WATER BODY CLASSIFICATION Lagan Estuary
	Version Date: 22/12/08
	MARINE ASSESSMENT AND LICENSING TEAM

QE: Transitional Fish – Lagan

Overall transitional fish assessment: Moderate (M)

Classification tools: Transitional Fish Classification Index (TFCI)

Data store:

- Fish: NIEA fish data – MS Excel
- Supporting Parameters: NIEA physico-chemical parameters – MS Excel

Data Availability:

- WFD surveillance monitoring 2005-2007; one survey in 2005, two surveys in 2006 and 2007; sampling methods – seine netting & fyke nets.

EQR boundaries:

	Bad	Poor	Moderate	Good	High
EQR	<0.2	≥0.2; <0.4	≥0.4; <0.6	≥0.6; <0.8	≥0.8

Results:


Transitional Fish Classification Index (TFCI) – 2007 data

Metric Number	Metric	Score
1	Species composition	3
2	Presence of Indicator species	2
3	Species relative abundance	2
4	No. of taxa making up 90% of the abundance	5
5	No. of estuarine resident taxa	2
6	No. of estuarine-dependent marine taxa	2
7	Functional guild composition	4
8	No. of benthic invertebrate feeding taxa	2
9	No. of piscivorous taxa	3
10	Feeding guild composition	4
	TFCI	29
	EQR	0.48

Data confidence:

Medium

- Survey methodologies and protocols (Medium)
- Realistic type-specific reference conditions (Medium)
- Data QA (Medium)
- Statistical testing and intercalibration (Low)

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	WFD TRANSITIONAL WATER BODY CLASSIFICATION Lagan Estuary
	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)**

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:** 02,03,04,06,07
- **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*)
6.17	HIGH	02,03,04,06,07	**	25	35%

* 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.
- High = 11 (daily averages) x n (no. of assessment years in reporting cycle)



Nutrients – Winter DIN

N regulation assessment (+Data confidence) GOOD (ND)
 The data collected for this assessment was outside the current salinity limits of this tool.

- Classification tools:
- Data store:
- Data Availability:
- Data Availability (spot & continuous samples):


- N regulation thresholds:

Area	Salinity range	DIN (uM) Winter mean H/G	DIN (uM) Winter mean G/M
Transitional (at salinity 25)	<30	20	30

Results:

Mean Winter DIN (uM) (normalised to salinity 25)	Winter DIN Daily average (n)	SPM	SPM (n)	Data Years	Data Quality	Status

- Data confidence: No data

draft RIVER BASIN MANAGEMENT PLAN	
	WFD TRANSITIONAL WATER BODY CLASSIFICATION Lagan Estuary
	Version Date: 22/12/08
	MARINE ASSESSMENT AND LICENSING TEAM

ANNEX C: Classification of physico-chemical quality elements: Other specific Pollutants


Overall specific pollutants assessment	Good (ND)
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Annex VIII: Overall Compliance	Pass(ND)
Annex VIII: Pass/Fail	Pass(ND)

Classification tools: Comparison with EQS levels

Data Availability: 2008 data available for 2009 classification

Data confidence: low.


draft RIVER BASIN MANAGEMENT PLAN			
	WFD TRANSITIONAL WATER BODY CLASSIFICATION Lagan Estuary		
	<table border="1"> <tr> <td>Version Date:</td> <td>22/12/08</td> </tr> </table>	Version Date:	22/12/08
	Version Date:	22/12/08	
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ANNEX D: Hydromorphological quality elements

Overall hydromorphology assessment: Heavily Modified Water Body (HMWB)

Classification tools:

1. TRaC Hydromorphology metrics
2. MIMAS

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	WFD TRANSITIONAL WATER BODY CLASSIFICATION Lagan Estuary		
	<table border="1"> <tr> <td>Version Date:</td> <td>22/12/08</td> </tr> </table>	Version Date:	22/12/08
	Version Date:	22/12/08	
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ANNEX E: Chemical Status

Overall water chemistry assessment:	PASS (NO DATA)
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Annex X: Overall Compliance

Pass No Data


Annex X: Pass/Fail

Pass

Classification tools: Comparison with EQS levels.

Data Availability: 2008 data available for 2009 classification.

Data confidence: No data.


draft RIVER BASIN MANAGEMENT PLAN	
	WFD TRANSITIONAL WATER BODY CLASSIFICATION Lagan Estuary
	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
Lagan Estuary	Tidal Lagan	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.

	WFD TRANSITIONAL WATER BODY CLASSIFICATION Lagan Estuary	
	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