

draft RIVER BASIN MONITORING PLAN

# CLASSIFICATION PAMPHLET

## Transitional Waterbody Bann Estuary

22<sup>nd</sup> December 2008

## **BANN 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: 2.50 km<sup>2</sup>
- Heavily Modified Water Body: YES

### **WATERBODY CLASSIFICATION: Moderate (FAIL)**

Downgraded to MODERATE on previous eutrophication status of adjacent upstream water body.

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.

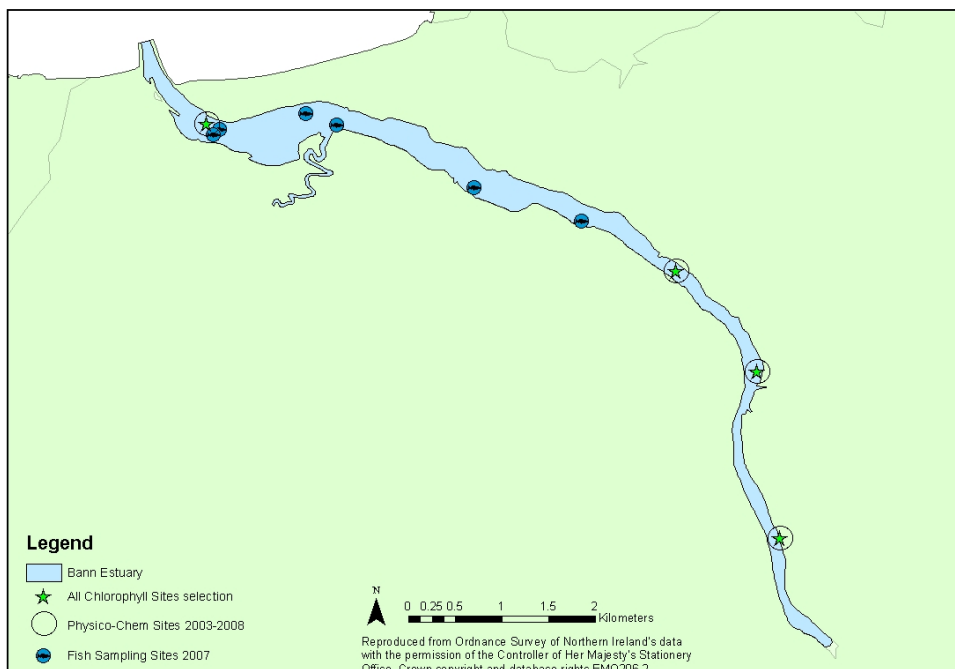


Figure of pressures and monitoring points within Bann Estuary (Transitional Water).

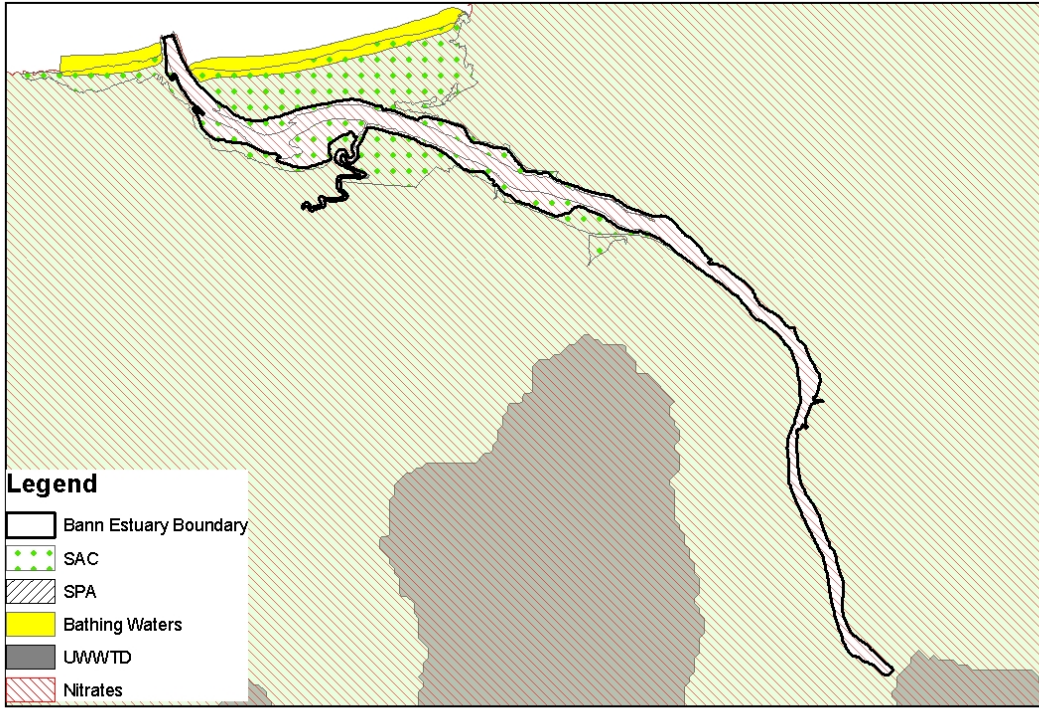
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Version Date: 22/12/08

MARINE ASSESSMENT AND LICENSING TEAM



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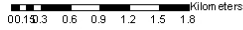


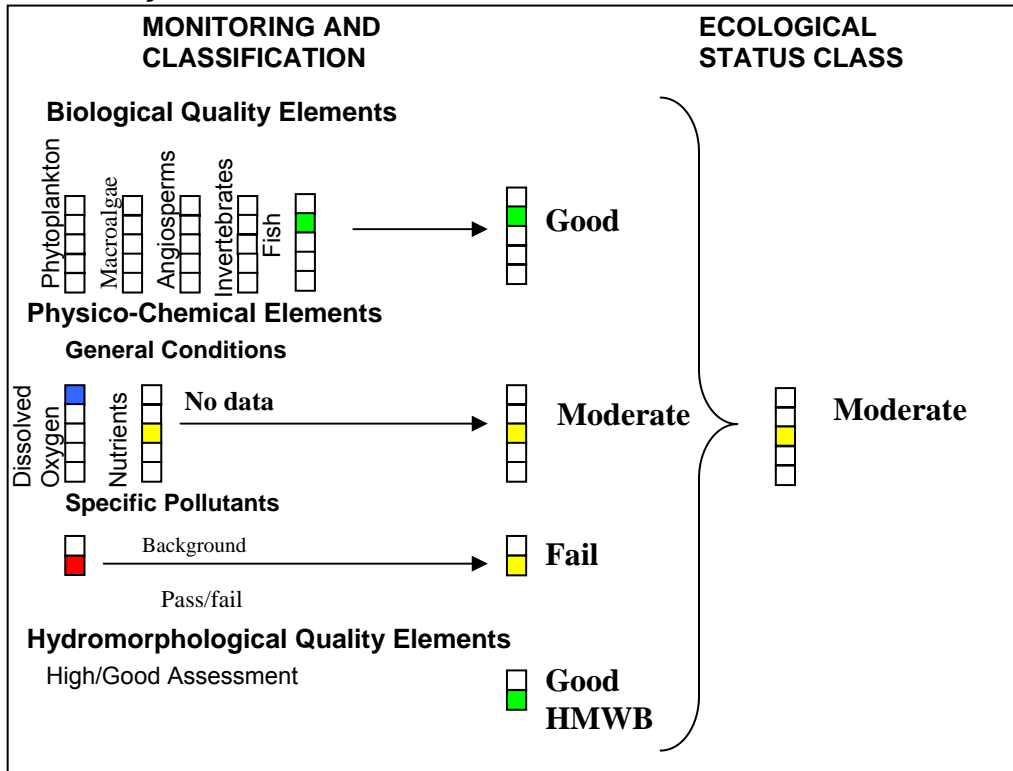
Figure of protected areas within Bann Estuary (Transitional Water).

**Parameters Requiring Assessment (for this exercise)****PARAMETERS TABLE**

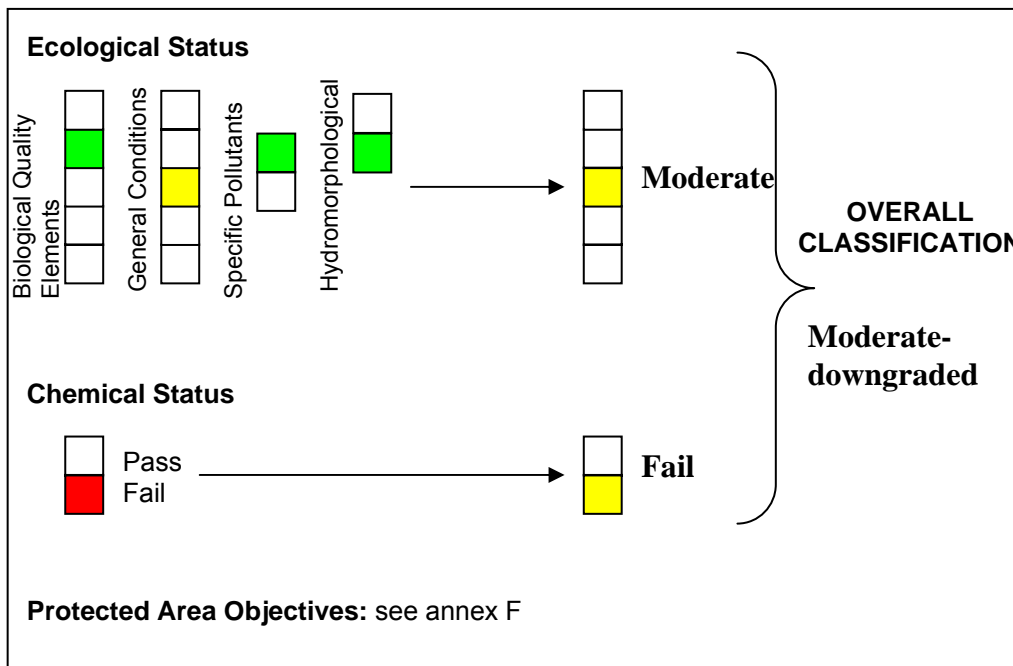
(Parameters for which classification systems are available and have been used in the first round of classification)

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	✓	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	✓	
Physico-Chemical	General Conditions		
	-Dissolved Oxygen	✓	
	-Nutrients	<input checked="" type="checkbox"/>	Tool not applicable (salinity)
	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



Ecological classification of Bann Estuary (Transitional Water)



Overall classification of Bann Estuary (Transitional 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 years)	Frequency (if p.a.)	No. of sites
<b>Ecological</b>			
Phytoplankton - 90 %ile	2004-7		6 sites 26 samples
Macroalgae	Fucoid extent	TUD	
	MBT	TNA	
Angiosperms	Seagrass	TNA	
	Saltmarsh	TUD	
Benthic Invertebrates	Infaunal Quality Index	TUD	
Fish	Spring	2007	
	Autumn	2007	
<b>Physio-chemical</b>			
Nutrients	TNA		
Salinity			
Temperature			
Dissolved Oxygen	2000-8		4
Suspended Particulate Matter			
Light (Kd)			
Specific polluting substances (Annex VIII)	2005-2007		
<b>Hydromorphology</b>	HMWB		
<b>Water chemistry (Annex X)</b>	2005-2007		
Priority hazardous substances	2005-2007		

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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

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**QE: Transitional Fish – Bann**

**Overall transitional fish assessment: Good (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.
- CSSEG fish monitoring 1993-2006; between one and three surveys per year; sampling method – beam trawling.


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	4
2	Presence of Indicator species	2
3	Species relative abundance	4
4	No. of taxa making up 90% of the abundance	5
5	No. of estuarine resident taxa	3
6	No. of estuarine-dependent marine taxa	5
7	Functional guild composition	4
8	No. of benthic invertebrate feeding taxa	4
9	No. of piscivorous taxa	5
10	Feeding guild composition	4
<b>TFCI</b>		<b>40</b>
<b>EQR</b>		<b>0.75</b>

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	<table border="1"> <tr> <td><b>Version Date:</b></td> <td>22/12/08</td> </tr> </table>	<b>Version Date:</b>	22/12/08
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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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## 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: 2000 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*)
7.74	HIGH	00/08	**	23	18.3%

\* 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 (+Data confidence) MODERATE (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

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

**Overall specific pollutants assessment FAIL**

<b>Annex VIII: Overall Compliance</b>	Fail
<b>Annex VIII: Pass/Fail</b>	Fail

**Classification tools:** Comparison with EQS levels

**Data Availability:** CSSEG/NMMP monitoring data 2005-2007.

**Data confidence:** Low until 2008 data assessed.

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ANNEX VIII	Bann Estuary						EQS ug/l	Ecological Status
	Value							
	2002	2003	2004	2005	2006	2007		
111 tri	ND	ND	ND	ND	ND	<0.025	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	ND	ND	7.1575	ND	1.6775	21	GH
As	ND	ND	ND	0.3375	0.6	<1	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	0.3546	0.76	0.6	M
Cu	ND	ND	ND	1.1375	1.4025	1.865	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	4.05	0.667	<2	0.01	M
dichlorvos	ND	ND	ND	<1	1	<4	0.04	M
dimethoate	ND	ND	ND	ND	ND	ND		
fenitrothion	ND	ND	ND	<5	3	1.5	0.01	M
Fe	ND	ND	ND	ND	ND	ND		
linuron	ND	ND	ND	ND	ND	ND		
malathion	ND	ND	ND	<5	2	2.125	0.02	M
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	ND	ND	ND	ND	3.23	5.12	40	GH

<b>G</b>	Good
<b>F</b>	Fail
<b>GH</b>	Good or better and is normally treated as high
<b>M</b>	Moderate

	Mean includes LOD data
	Mean based on actual values

Bann Estuary Transitional Water


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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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## ANNEX E: Chemical Status

**Overall water chemistry assessment: FAIL**

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

Classification tools: Comparison with EQS levels

Data Availability: CSSEG/NMMP Monitoring data 2005-2007.

Data confidence: Low until 2008 data assessed.

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ANNEX X	Bann Estuary						EQS	Chemical Status	Ecological Status
	2002	2003	2004	2005	2006	2007			
<b>12 Dichloro</b>	ND	ND	ND	ND	ND	<2	10	<b>G</b>	<b>GH</b>
anthracene	ND	ND	ND	ND	ND	ND			
atrazine	ND	ND	ND	22.275	10.63	7.1625	0.6	<b>F</b>	<b>M</b>
benzene	ND	ND	ND	ND	ND	ND			
benzo	ND	ND	ND	ND	ND	ND			
benzo a	ND	ND	ND	ND	ND	ND			
<b>Cadmium</b>	ND	ND	ND	<0.035	0.21	0.0255	0.2	<b>F</b>	<b>M</b>
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			
<b>hcb</b>	ND	ND	ND	<1	<1	<1	0.01	<b>F</b>	<b>M</b>
<b>hcbd</b>	ND	ND	ND	ND	<2	ND	0.1	<b>F</b>	<b>M</b>
<b>hch</b>	ND	ND	ND	<1	<1	<1	0.002	<b>F</b>	<b>M</b>
hch calc	ND	ND	ND	ND	ND	ND			
<b>Hg</b>	ND	ND	ND	12.5	ND	<10	0.05	<b>F</b>	<b>M</b>
Indeno	ND	ND	ND	ND	ND	ND			
ISP	ND	ND	ND	ND	ND	ND			
Napthalene	ND	ND	ND	ND	ND	ND			
<b>Ni</b>	ND	ND	ND	1.13	1.6775	2.0925	20	<b>G</b>	<b>GH</b>
Nonyl	ND	ND	ND	ND	ND	ND			
Octyl	ND	ND	ND	ND	ND	ND			
<b>Pb</b>	ND	ND	ND	0.0865	0.323	0.467	7.2	<b>G</b>	<b>GH</b>
pcp	ND	ND	ND	<0.04	<0.04	<0.04	0.4	<b>G</b>	<b>GH</b>
simazine	ND	ND	ND	5.6625	4.933	4.25	1	<b>F</b>	<b>M</b>
TBT	ND	ND	ND	ND	ND	ND			
<b>TCB</b>	ND	ND	ND	ND	ND	<0.15	0.4	<b>G</b>	<b>GH</b>
TCB calc	ND	ND	ND	ND	ND	ND			
trichloromethane	ND	ND	ND	ND	ND	ND			
trifluralin	ND	ND	ND	<2	<2	<2	0.03	<b>F</b>	<b>M</b>

<b>G</b>	Good
<b>F</b>	Fail
<b>GH</b>	Good or better and is normally treated as high
<b>M</b>	Moderate

Grey	Mean includes LOD data
Cyan	Mean based on actual values


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### ANNEX F: Protected Area Objectives

Water body	Protected area	Designation	Status	Reason for non-compliance
Bann Estuary	Bann Estuary	Saltmarsh	Unfavourable	Vegetation composition and structure - sward height

#### **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

<b>AFBI</b>	Agri-Food and Biosciences Institute (under contract to NIEA)
<b>AMBI</b>	AZTI Marine Biotic Index
<b>Annex 10</b>	Annex 10 Priority Hazardous Substances
<b>Annex 8</b>	Annex 8 Specific Pollutants
<b>Article 5</b>	Characterisation, typology, pressures and impacts analysis
<b>ASSI</b>	Area of Special Scientific Interest
<b>DIN</b>	Dissolved Inorganic Nitrogen
<b>DO</b>	Dissolved Oxygen
<b>EQR</b>	Ecological Quality Ratio
<b>EQS</b>	Ecological Quality Status
<b>EUNIS</b>	European Nature Information System
<b>FSL</b>	Full Species List
<b>GEP</b>	Good Ecological Potential
<b>H/G/M/P/B</b>	High/Good/Moderate/Poor/Bad (Classification Status)
<b>H/M/L</b>	High/Medium/Low (Confidence)
<b>HMWB</b>	Heavily Modified Water Body
<b>IQI</b>	Infaunal Quality Index
<b>IRBD</b>	International River Basin District
<b>LOD</b>	Limit of Detection
<b>MBT</b>	Macroalgal Blooming Tool
<b>MEP</b>	Moderate Ecological Potential
<b>NB</b>	Neagh Bann
<b>ND</b>	No data
<b>NE</b>	North Eastern
<b>NEAGIG</b>	North Eastern Atlantic Geographical Intercalibration Group
<b>NIEA</b>	Northern Ireland Environment Agency
<b>N-regs</b>	Nitrogen Regulation
<b>NVZ</b>	Nitrate Vulnerable Zone
<b>NW</b>	North Western
<b>Physico-chem</b>	Physical and chemical monitoring
<b>RSL</b>	Reduced Species List
<b>SAC</b>	Special Area of Conservation
<b>SEPA</b>	Scottish Environment Protection Agency
<b>SPA</b>	Special Protected Area
<b>TNA</b>	Tool Not Applicable
<b>TraC MImAS</b>	Transitional and Coastal Morphology Impact Assessment System
<b>TUD</b>	Tool Under Development
<b>UKAS</b>	United Kingdom Accreditation Service
<b>UKTAG</b>	United Kingdom Technical Advisory Group for Water Framework Directive
<b>UNICORN</b>	Database for marine organisms.
<b>UWWTD</b>	Urban Waste Water Treatment Directive (91/271/EEC)
<b>VDSI</b>	Vas Deferens Sequence Index
<b>WFD</b>	Water Framework Directive