

Automated In-Situ Water Quality Monitoring Report - January 2015

Issued by the North of Ireland Joint Agency Coastal Monitoring Programme. For further information and data access please visit our website at:

www.afbini.gov.uk/coastal-monitoring.htm



Date of issue: 01 Feb 2015

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The Loughs Agency purchased the 6 Environmental Monitoring hardware currently operating in the sea Loughs Foyle and Carlingford and the system in the freshwater Lough Fad East, Co. Donegal. Four of these were purchased under the EU INTERREG III fund. The Agency has contracted the management and maintenance of these to AFBI.

NIEA contributed towards the Environmental Monitoring hardware currently operating in Belfast and Strangford Lough and the impoundments of the rivers Lagan, and the Quoile. The Agency has contracted the management and maintenance of these to AFBI.

***In Situ* Water Quality Monitoring Report: Belfast Lough**

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Data report start date: 01-Jan-15
Data report finish date: 31-Jan-15
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Belfast Lough is a shallow semi-enclosed marine bay situated at the mouth of the River Lagan on the eastern coast of Northern Ireland and has a catchment of 900 km².

The inner area of the Lough comprises a series of mudflats and lagoons whilst the outer area is composed of mainly rocky shores with some small sandy bays.

The inner area of the Lough has historically been identified as being hypereutrophic (as a result of anthropogenic impacts) and subject to eutrophication.

A modified SeaBird 19+ instrument is moored in the inner lough close to the navigation channel, this package is occasionally supplemented with a remote access water sampler for nutrient sampling.

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Table 1. Descriptive statistics for *in situ* variables for current reporting period (last 7 days of data).

Parameter	Mean	Variance	Minimum	Maximum
Salinity	33.17	1.57	0	33.8448
Temperature	7.21	0.76	0	9.1135
Fluorescence	0.10	0.00	0	0.2926
Turbidity (seapoint)	0.16	0.15	0	4.8

Table 2. Data points above and below OSPAR and ADRIS threshold values for current reporting period only.

Values within range	Surface		% surface	
Chlorophyll <i>a</i> conc. < 10 ug/l				
Chlorophyll <i>a</i> conc. > 10 ug/l				

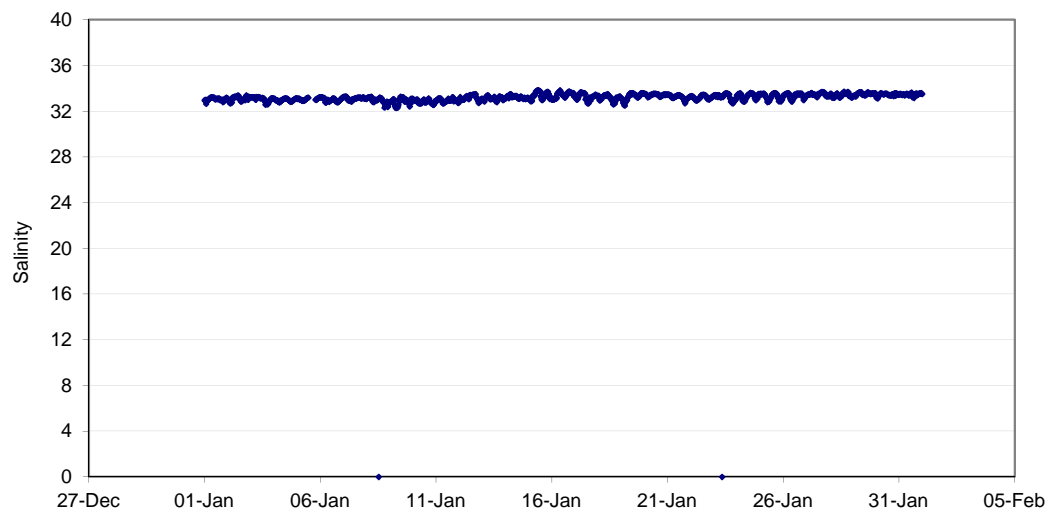


Figure 1. Salinity series for week -3, week -2, week -1 and current reporting period.

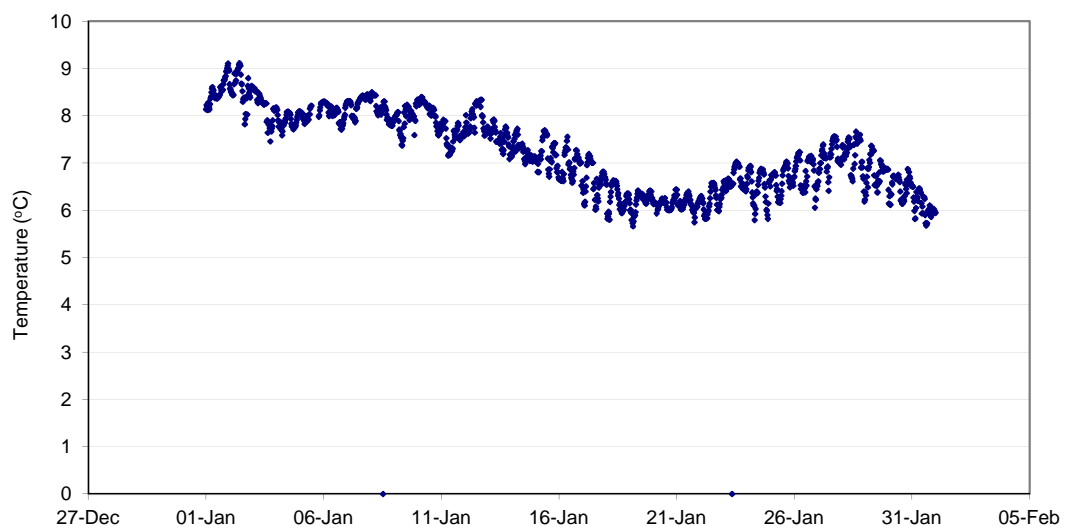


Figure 2. Temperature series for week -3, week -2, week -1 and current reporting period.

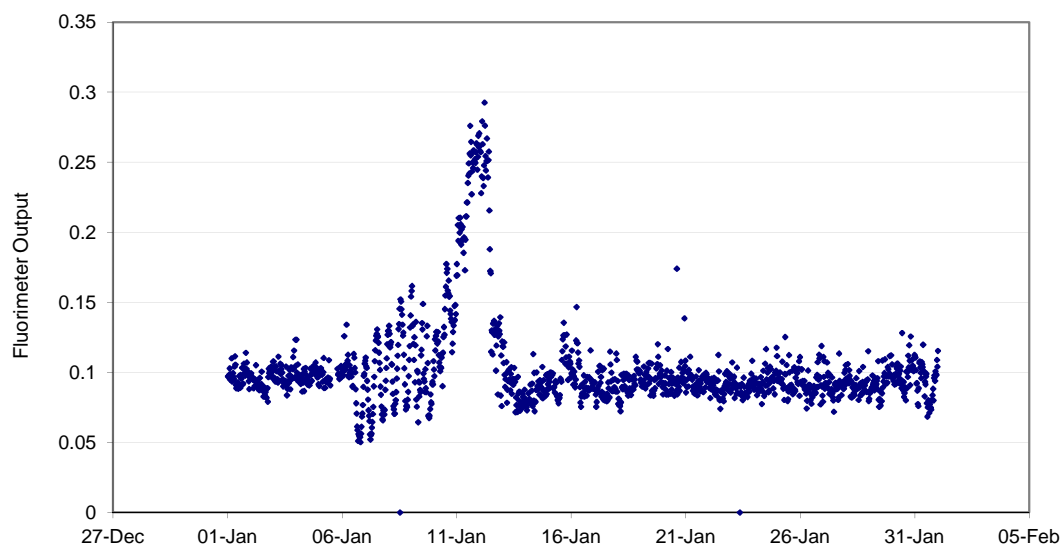


Figure 3. Fluorimeter output for week -3, week -2, week -1 and current reporting period.

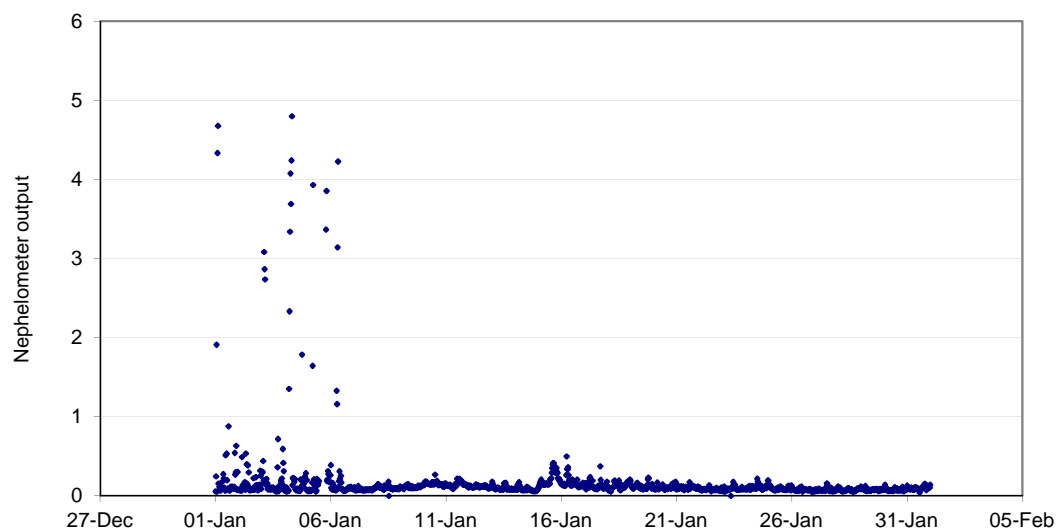


Figure 4. Nephelometer output for week -3, week -2, week -1 and current reporting period.

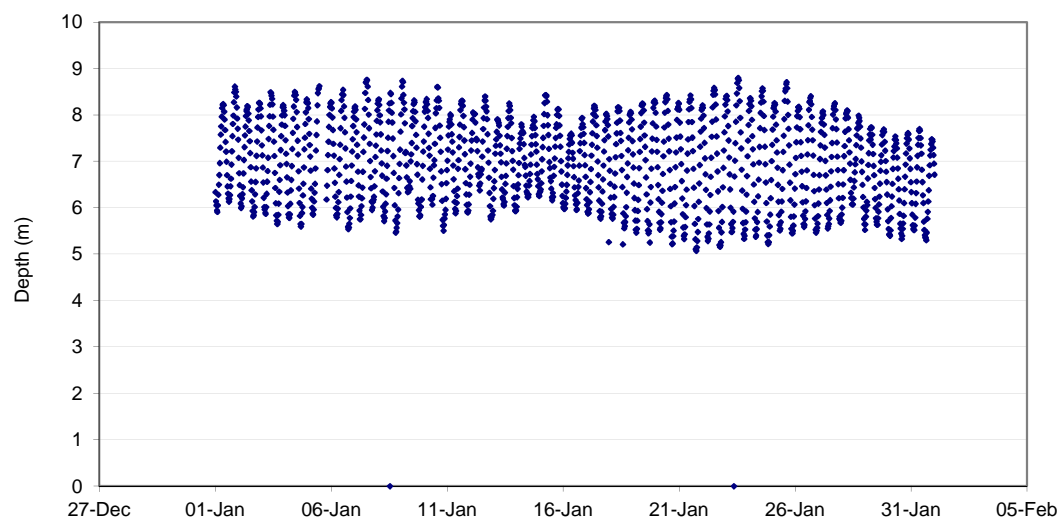


Figure 5. Instrument depth for week -3, week -2, week -1 and current reporting period.

In Situ Water Quality Monitoring Report: Carlingford Lough North

Issued by the North of Ireland Joint Agency Coastal Monitoring Programme. For further information and data access please visit our website at: <http://www.afbini.gov.uk/index/services/specialist-advice/coastal-monitoring.htm>

Data report start date: 01-Jan-15
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Carlingford Lough is a sea lough at the mouth of the Newry (or Clanrye) River on the east coast of Ireland with a total area of approximately 51 km².

The lough borders both the Irish Republic and Northern Ireland and has a catchment of approximately 474 km². Carlingford lough is generally shallow with depths between 2 and 5 meters, but depths within the narrow navigable channel can extend to 36 meters.

Freshwater inputs from the Newry (Clanrye) river are relatively small and generally do not affect the salinity of the Lough - the water seems to be well mixed and turned over due to the small input and the large tidal influence.

A YSI6600 EDS instrument is located inside the northern basin near Killowen.

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Table 1. Descriptive statistics for *in situ* variables for current reporting period (last 7 days of data).

Parameter	Mean	Variance	Minimum	Maximum
Salinity (surface)	31.88	0.28	29.82	32.88
Temperature (surface)	6.08	0.85	3.95	7.84
DO % saturation (surface)	100.79	1.40	97.3	103.5
DO conc' mg/L ⁻¹ (surface)	10.14	0.02	9.82	10.56
Fluoresence (surface)	21.94	983586.65	-1.3	50149
Turbidity (surface)	4.57	59.71	1.5	381.5

Table 2. Data points above and below OSPAR and ADRIS threshold values for current reporting period only.

Values within range	Surface	% surface
Dissolved oxygen > 6 mg/l	2557	100.0%
Dissolved oxygen < 6 mg/l	0	0.0%
Chlorophyll a conc. > 10 ug/l	64	2.5%
Chlorophyll a conc. < 10 ug/l	2493	97.5%
ADRIS Class A	2557	100.0%
ADRIS Class B	0	0.0%
ADRIS Class C	0	0.0%
ADRIS Class D	0	0.0%

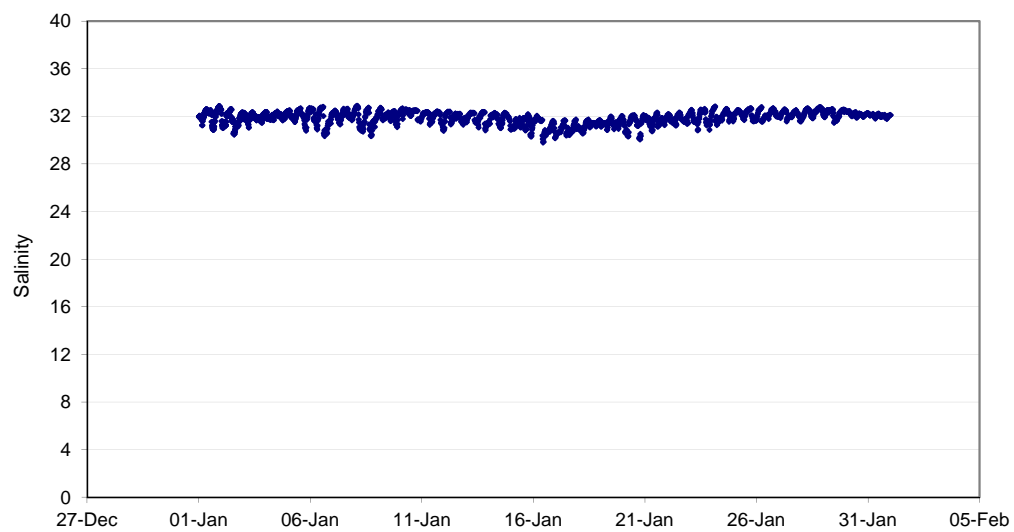


Figure 1. Surface salinity series for week -3, week -2, week -1 and current reporting period.

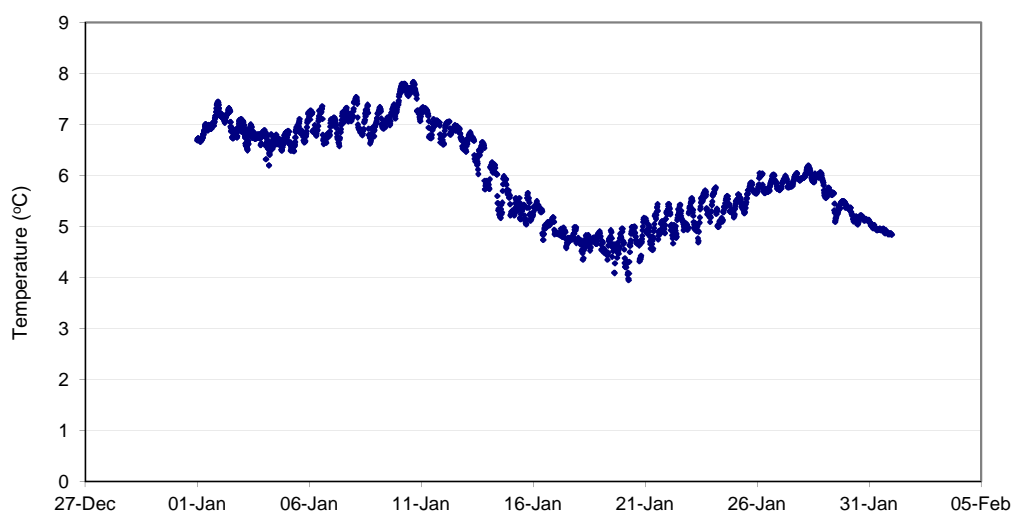


Figure 2. Surface temperature series for week -3, week -2, week -1 and current reporting period.

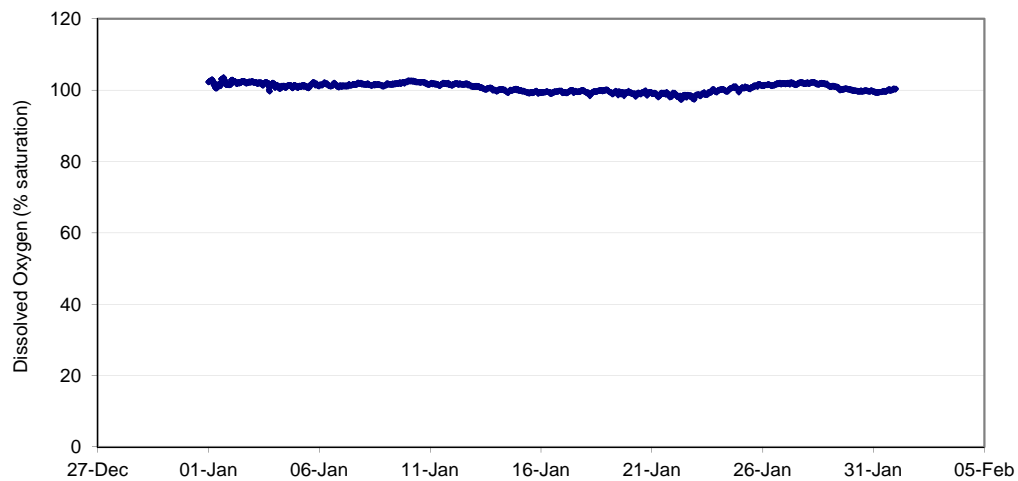


Figure 3. Surface DO (% saturation) series for week -3, week -2, week -1 and current reporting period.

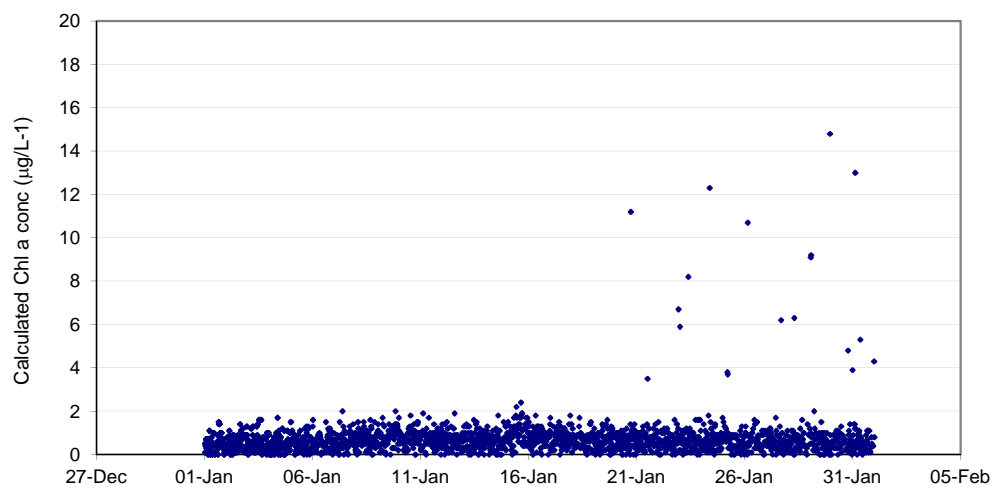


Figure 4. Fluorescence calculated chlorophyll a concentration for week -3, week -2, week -1 and current reporting period.

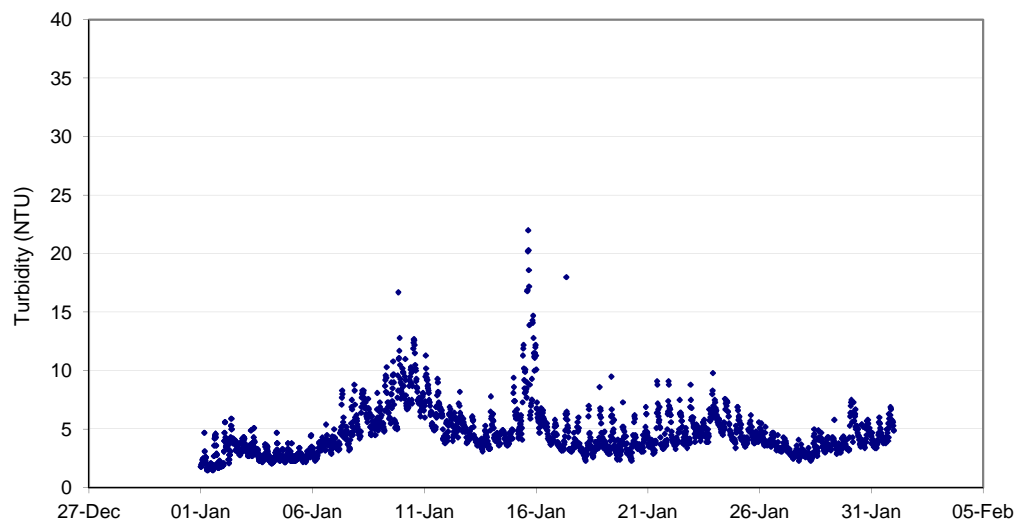


Figure 5. Surface turbidity series for week -3, week -2, week -1 and current reporting period.

In Situ Water Quality Monitoring Report: Carlingford Lough South

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Table 1. Descriptive statistics for *in situ* variables for current reporting period (last 7 days of data).

Parameter	Mean	Variance	Minimum	Maximum
Salinity (surface)	34.03	0.32	32.36	35.38
Temperature (surface)	5.66	1.06	3.64	7.69
DO % saturation (surface)				
DO conc' mg/L ⁻¹ (surface)				
Fluoresence (surface)	683.01	25.29	660.9	689.2
Turbidity (surface)	2.27	0.02	2	2.9

Table 2. Data points above and below OSPAR and ADRIS threshold values for current reporting period only.

Values within range	Surface	% surface	
Dissolved oxygen > 6 mg/l	0	#DIV/0!	
Dissolved oxygen < 6 mg/l	0	#DIV/0!	
Chlorophyll a conc. > 10 ug/l	2517	100.0%	
Chlorophyll a conc. < 10 ug/l	0	0.0%	
ADRIS Class A	0	#DIV/0!	
ADRIS Class B	0	#DIV/0!	
ADRIS Class C	0	#DIV/0!	
ADRIS Class D	0	#DIV/0!	

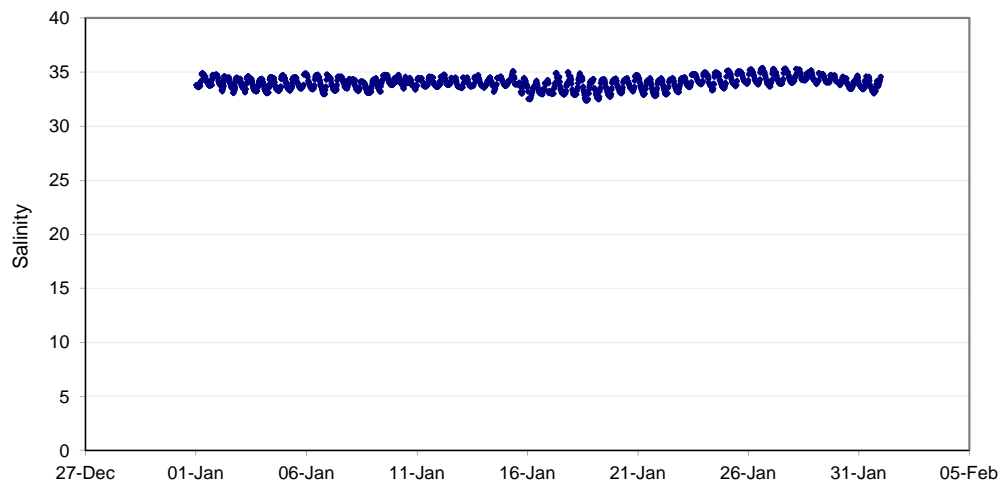


Figure 1. Surface salinity series for week -3, week -2, week -1 and current reporting period.

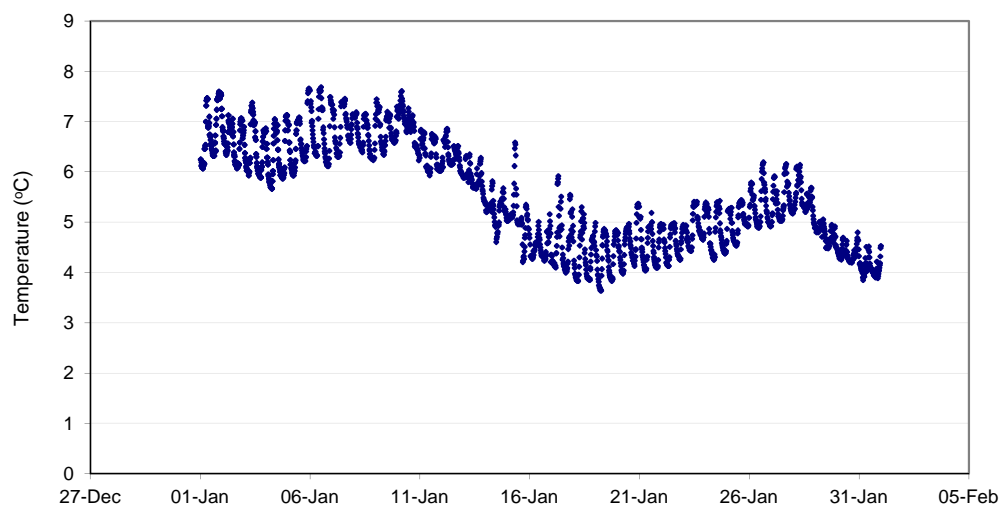


Figure 2. Surface temperature series for week -3, week -2, week -1 and current reporting period.

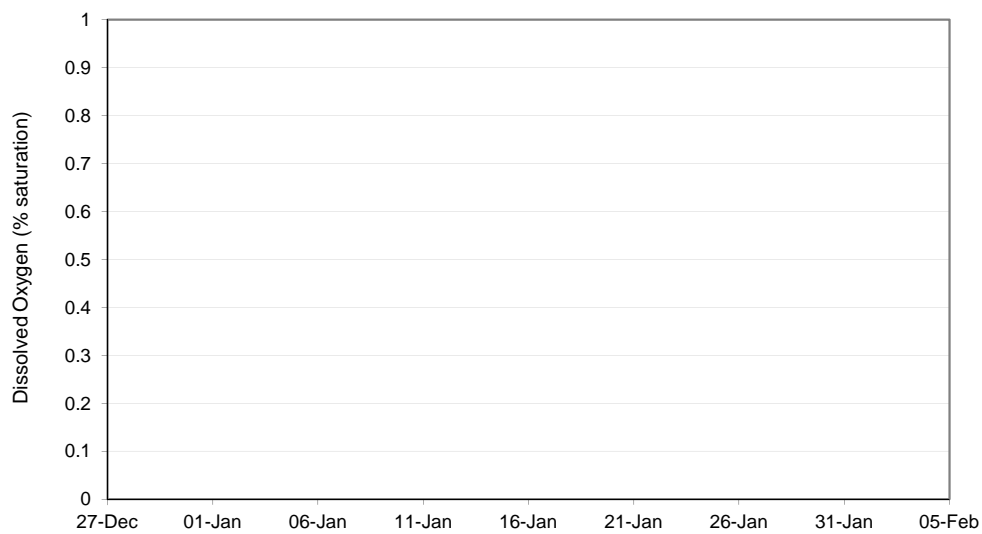


Figure 3. Surface DO (% saturation) series for week -3, week -2, week -1 and current reporting period.

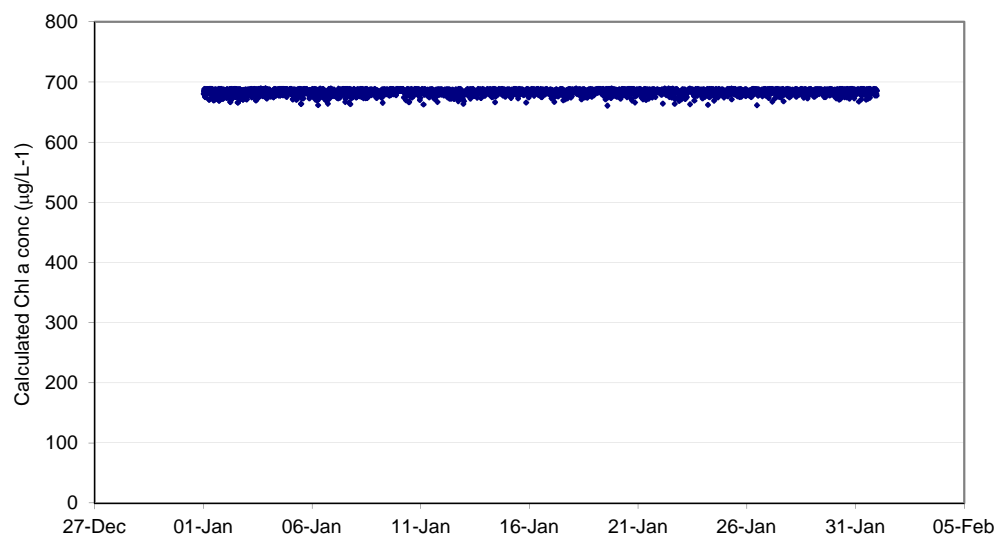


Figure 4. Fluorescence calculated chlorophyll a concentration for week -3, week -2, week -1 and current reporting period.

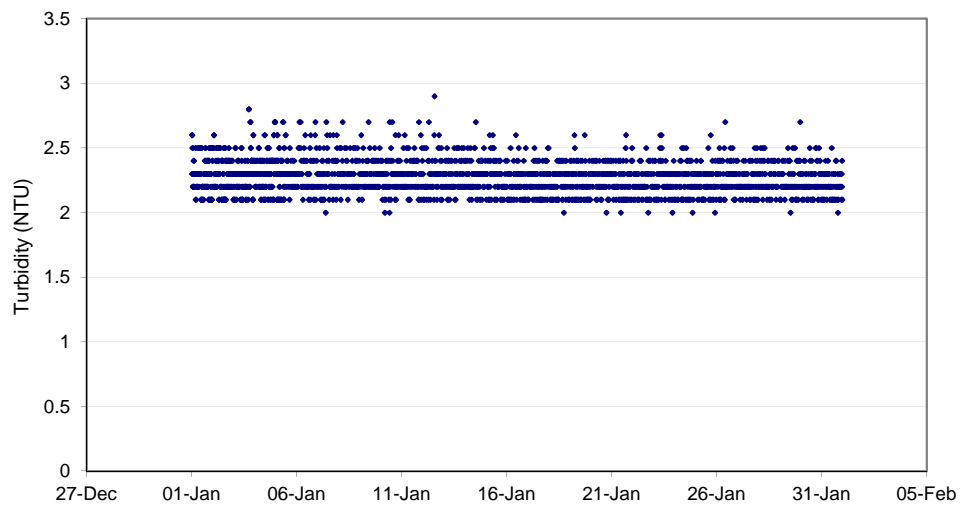


Figure 5. Surface turbidity series for week -3, week -2, week -1 and current reporting period.

***In Situ* Water Quality Monitoring Report: Lagan**

Issued by the North of Ireland Joint Agency Coastal Monitoring Programme. For further information and data access please visit our website at: <http://www.afbini.gov.uk/index/services/specialist-advice/coastal-monitoring.htm>

Data report start date: 01-Jan-15
Data report finish date: 31-Jan-15
Date of issue: 01-Feb-15

Natural tidal fluctuations in the Lagan impoundment are modified by the Lagan Weir. The estuary is periodically stratified, accentuated by the saline water trapped as a layer under the freshwater flow. Two Valeport 606 monitoring instruments are deployed under a communication buoy in the vicinity of the Ormeau Bridge; one instrument is near surface whilst the other is near-bottom.

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Table 1. Descriptive statistics for *in situ* variables for current reporting period (last 7 days of data).

Parameter	Mean	Variance	Minimum	Maximum
Salinity (surface)	5.96	50.83	0.20	27.46
Salinity (bottom)	22.95	54.50	0.15	38.01
Temperature (surface)	5.16	1.76	0.00	7.65
Temperature (bottom)	6.40	1.69	0.00	8.19
DO % saturation (surface)	138.81	1970.08	2.00	347.48
DO % saturation (bottom)	62.93	148.19	2.00	85.62
DO conc (surface)				
DO conc (bottom)				
Fluoresence (surface)	9.41	3.40	4.88	16.44
Fluoresence (bottom)	12.78	181.55	-0.25	336.63

Table 2. Data points above and below OSPAR and ADRIS threshold values for current reporting period only.

Values within range	Surface	Bottom	% surface	% bottom
Dissolved oxygen > 6 mg/l	0	0	#DIV/0!	#DIV/0!
Dissolved oxygen < 6 mg/l	0	0	#DIV/0!	#DIV/0!
ADRIS Class A	0	0	#DIV/0!	#DIV/0!
ADRIS Class B	0	0	#DIV/0!	#DIV/0!
ADRIS Class C	0	0	#DIV/0!	#DIV/0!
ADRIS Class D	0	0	#DIV/0!	#DIV/0!

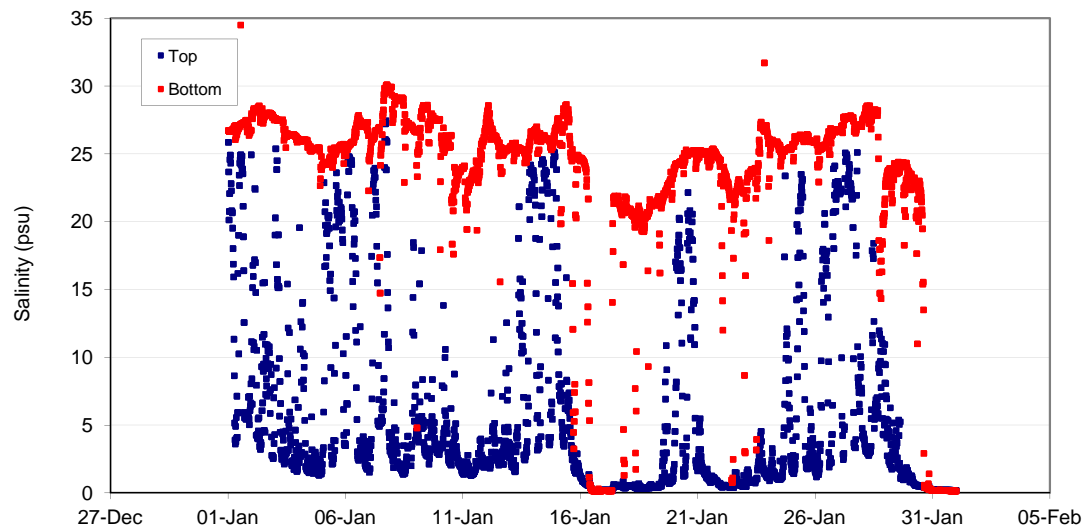


Figure 1. Surface and bottom salinity series for week -3, week -2, week -1 and current reporting period.

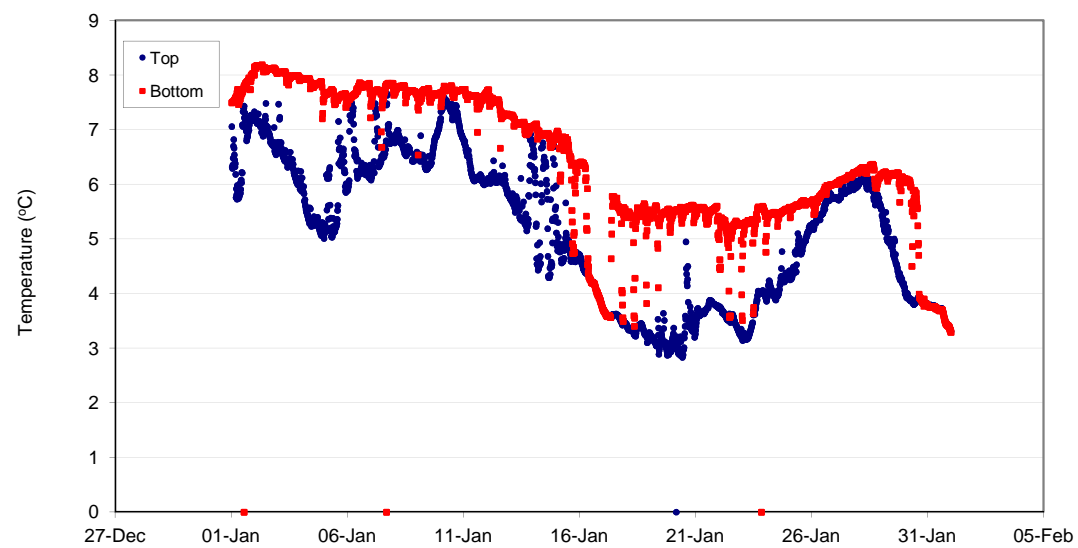


Figure 2. Surface and bottom temperature series for week -3, week -2, week -1 and current reporting period.

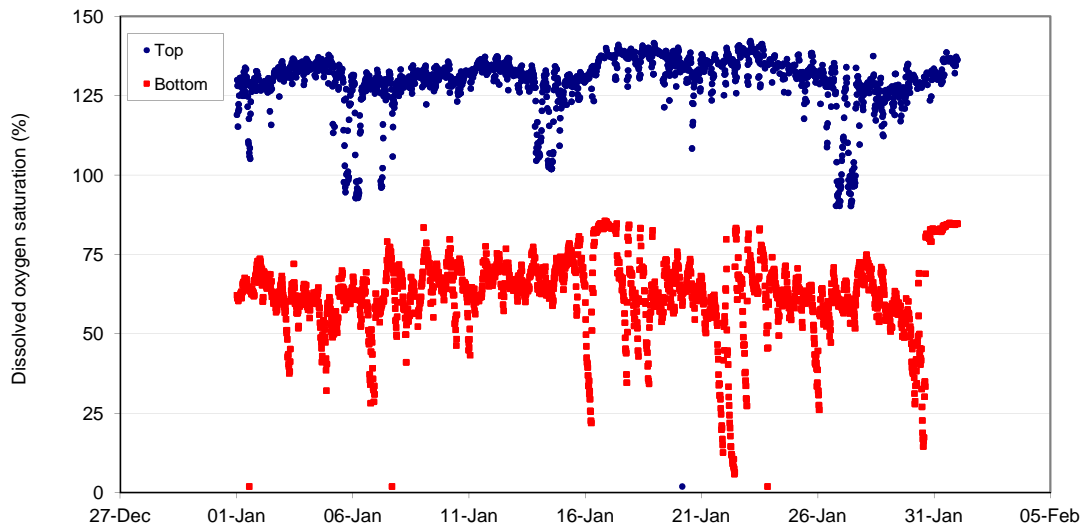


Figure 3. Surface and bottom DO (% saturation) series for week -3, week -2, week -1 and current reporting period.

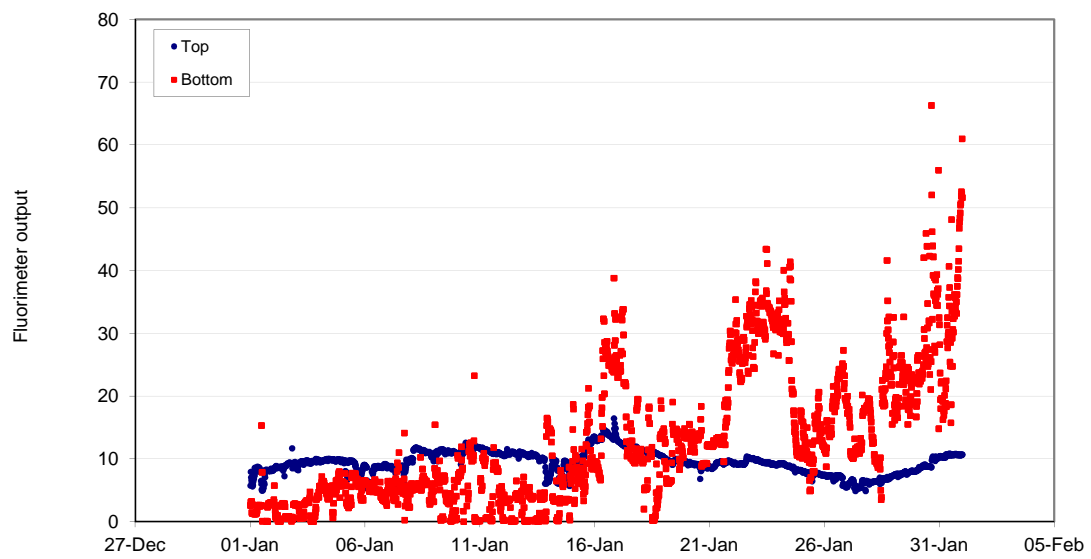


Figure 4. Chlorophyll fluorescence for week -3, week -2, week -1 and current reporting period.

In Situ Water Quality Monitoring Report: Lough Foyle South

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Lough Foyle is a shallow coastal embayment at the mouth of the River Foyle on the north coast of Ireland. The lough borders both the Irish Republic and Northern Ireland and has one of the largest catchments of all Irish sea-loughs at 3,700 km².

Lough Foyle is approximately 179 km² in size with an average depth of 5m - intertidal mudflats cover 20% of its area.

Two moored YSI6600 EDS instruments are located near the Foyle estuary at Black Brae; one located near-surface and the other located near-bottom.

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Table 1. Descriptive statistics for *in situ* variables for current reporting period (last 7 days of data).

Parameter	Mean	Variance	Minimum	Maximum
Salinity (surface)	17.22	27.75	0.17	29.13
Salinity (bottom)				
Temperature (surface)	5.15	1.55	1.17	7.59
Temperature (bottom)				
DO % saturation (surface)	96.37	3.70	91.1	101.9
DO % saturation (bottom)				
DO conc' mg/L ⁻¹ (surface)	10.95	0.27	9.83	14.39
DO conc' mg/L ⁻¹ (bottom)				
Fluorescence (surface)	4.16	2.88	1.4	66.6
Fluorescence (bottom)				
Turbidity (surface)	17.16	153.71	4.9	83.6
Turbidity (bottom)				

Table 2. Data points above and below OSPAR and ADRIS threshold values for current reporting period only.

Values within range				
Dissolved oxygen > 6 mg/l	2233	0	100.0%	#DIV/0!
Dissolved oxygen < 6 mg/l	0	0	0.0%	#DIV/0!
Chlorophyll a conc. > 10 ug/l	1	0	0.0%	#DIV/0!
Chlorophyll a conc. < 10 ug/l	2232	0	100.0%	#DIV/0!
ADRIS Class A	2233	0	100.0%	#DIV/0!
ADRIS Class B	0	0	0.0%	#DIV/0!
ADRIS Class C	0	0	0.0%	#DIV/0!
ADRIS Class D	0	0	0.0%	#DIV/0!

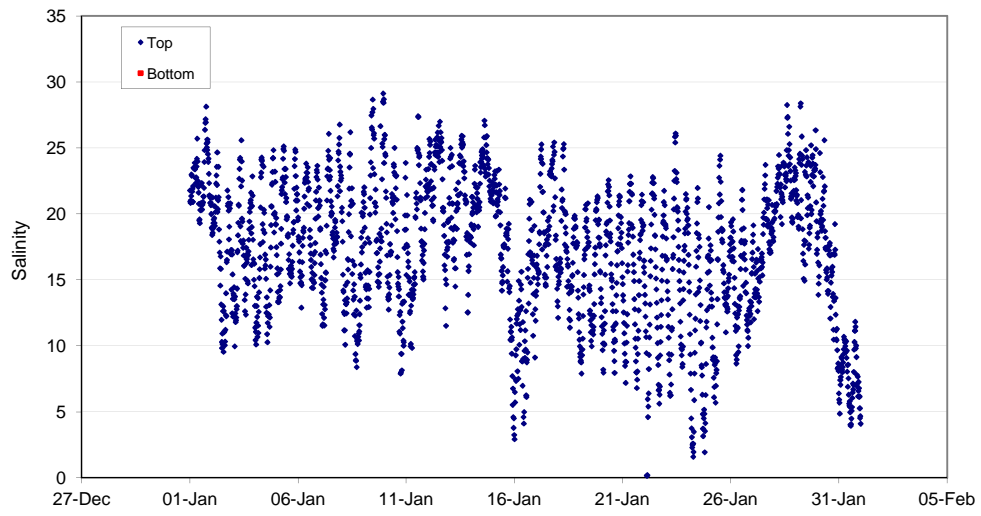


Figure 1. Surface and bottom salinity series for week -3, week -2, week -1 and current reporting period.

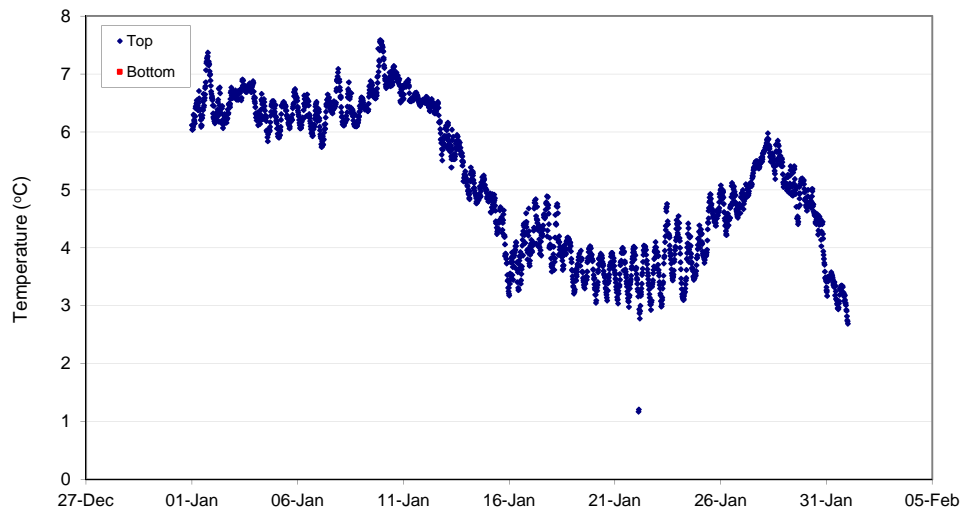


Figure 2. Surface and bottom temperature series for week -3, week -2, week -1 and current reporting period.

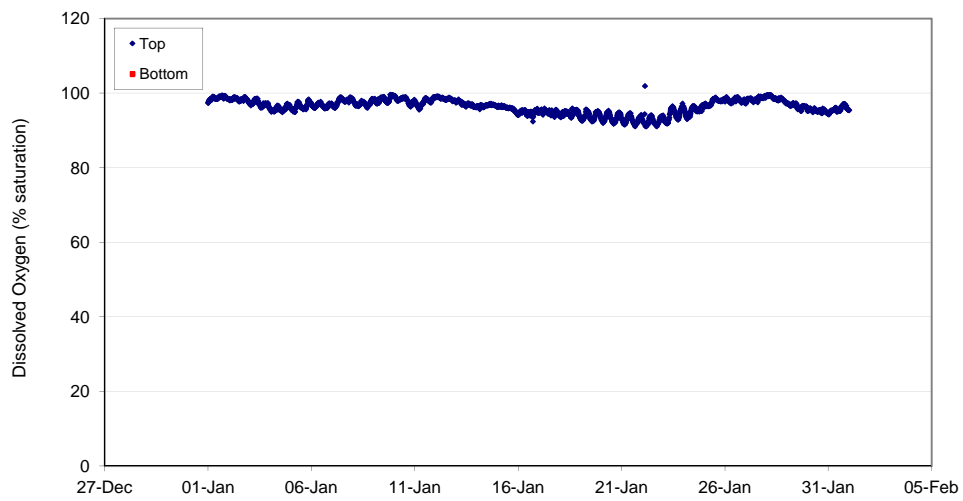


Figure 3. Surface and bottom DO (% saturation) series for week -3, week -2, week -1 and current reporting period.

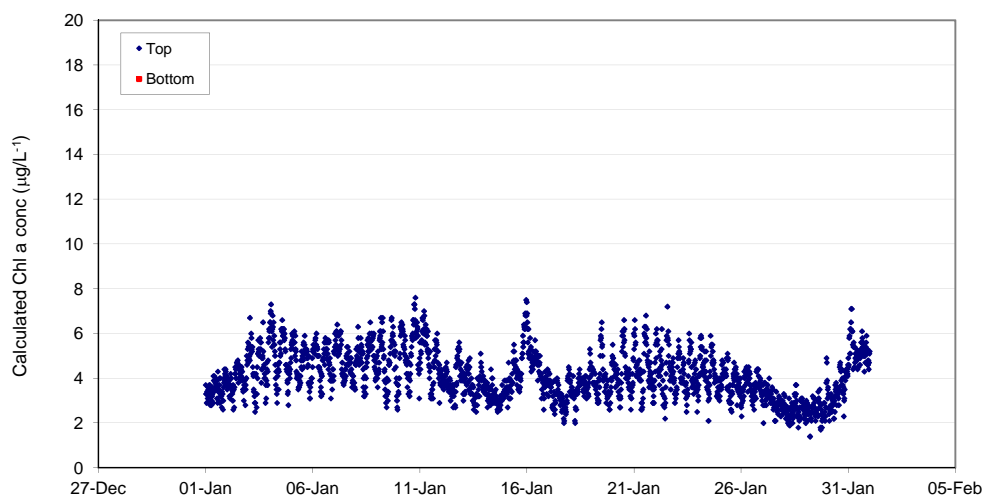


Figure 4. Fluorescence calculated chlorophyll a concentration for week -3, week -2, week -1 and current reporting period.

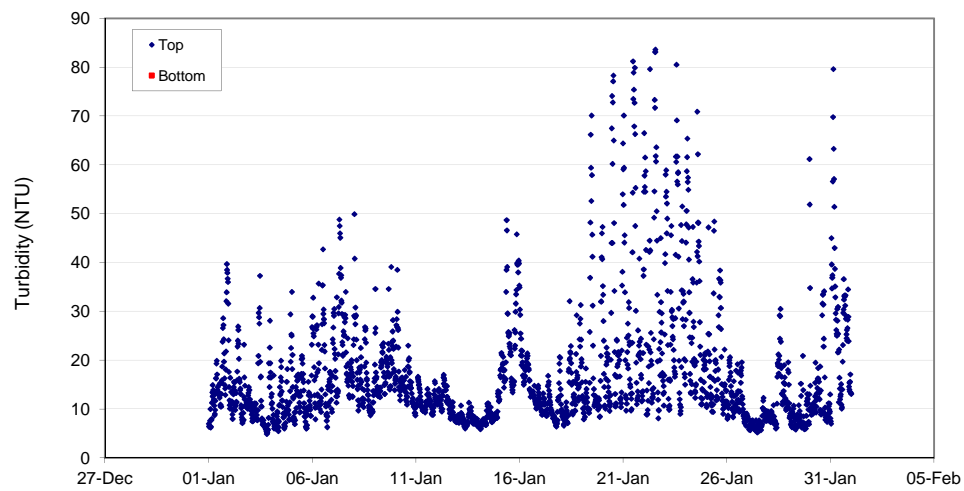


Figure 5. Surface and bottom turbidity series for week -3, week -2, week -1 and current reporting period.

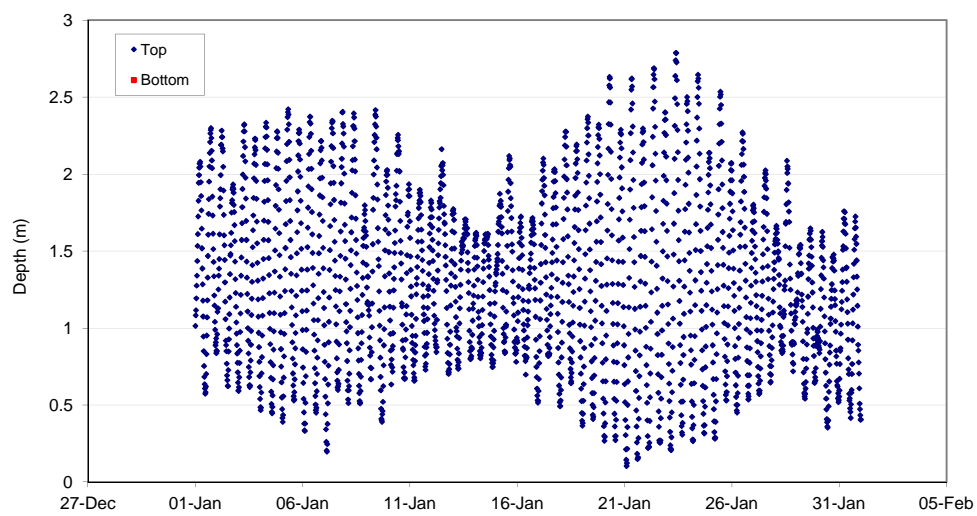


Figure 6. Surface and bottom depth series for week -3, week -2, week -1 and current reporting period.

In Situ Water Quality Monitoring Report: Strangford Narrows

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Strangford Narrows is an 8 km long, deep (40 + m) and fast flowing (8 + knots) channel connecting Strangford Lough to the open sea. This large almost land-locked marine lough is situated on the east coast of Northern Ireland.

The Lough has a high-water area of 182.8 Km² of which approximately 30% is intertidal. The Lough serves a catchment of 771.5 Km² with two main freshwater inputs at Comber and Downpatrick. Depths range from around 10m to over 60 m, with the northern end of the Lough having large areas of sand and mud flats. A YSI 6000 instrument is moored under a buoy near Portaferry and is serviced and downloaded manually approximately once a month.

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Table 1. Descriptive statistics for *in situ* variables for current reporting period (last 7 days of data).

Parameter	Mean	Variance	Minimum	Maximum
Salinity	32.40	0.00	32.28	32.52
Temperature	9.91	0.06	9.46	10.45
DO % saturation	91.56	0.09	90.86	92.72
DO concentration	8.42	0.00	8.33	8.51
Fluorescence	0.18	0.00	0	0.3

Table 2. Data points above and below OSPAR and ADRIS threshold values for current reporting period only.

Values within range	Surface	% surface
Dissolved oxygen > 6 mg/l	323	100.0%
Dissolved oxygen < 6 mg/l	0	0.0%
Chlorophyll <i>a</i> conc. > 10 ug/l	0	0%
Chlorophyll <i>a</i> conc. < 10 ug/l	323	100%
ADRIS Class A	323	100.0%
ADRIS Class B	0	0.0%
ADRIS Class C	0	0.0%
ADRIS Class D	0	0.0%

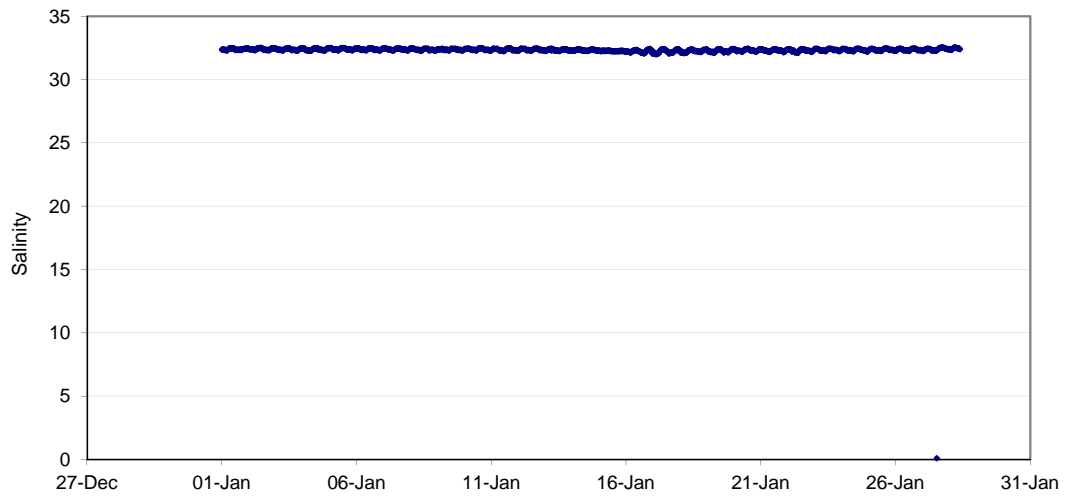


Figure 1. Salinity series for week -3, week -2, week -1 and current reporting period.

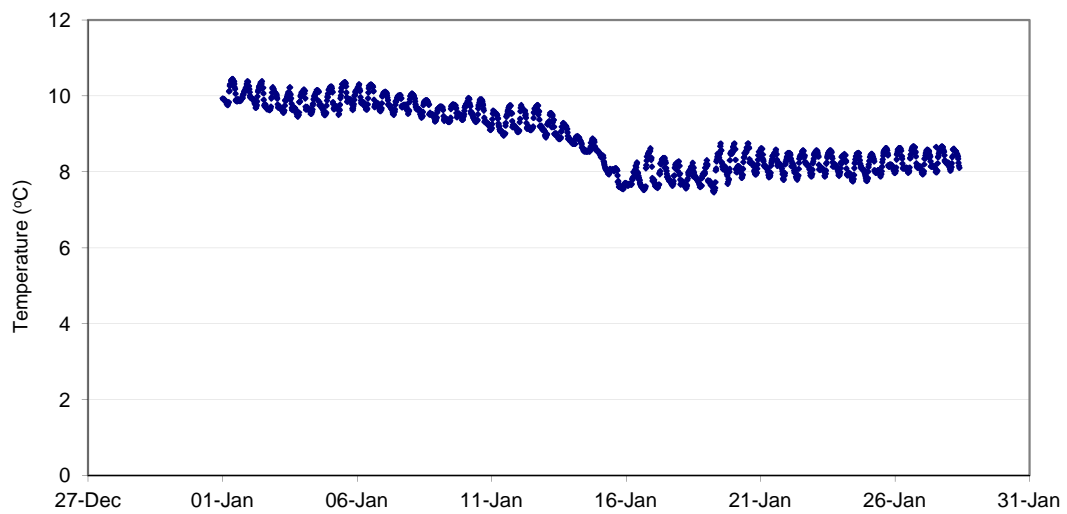


Figure 2. Temperature series for week -3, week -2, week -1 and current reporting period.

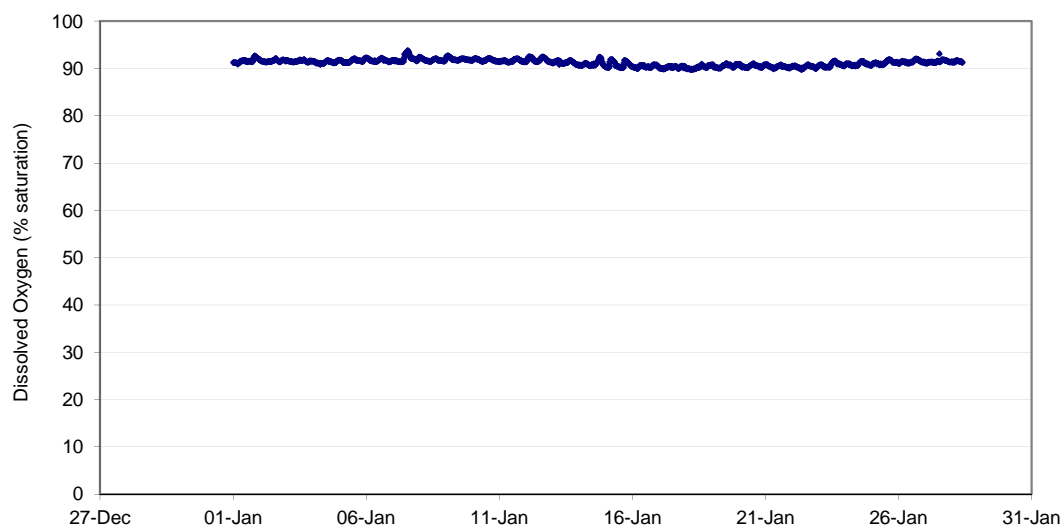


Figure 3. Dissolved Oxygen (% saturation) series for week -3, week -2, week -1 and current reporting period.

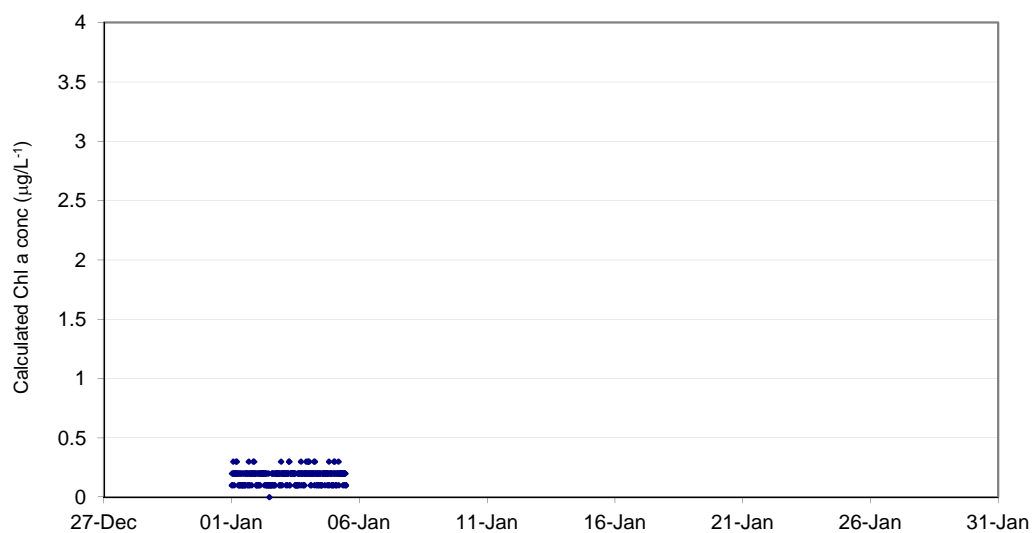


Figure 4. Fluorescence calculated chlorophyll a concentration for week -3, week -2, week -1 and current reporting period.