

LOUGHS AGENCY OF THE FOYLE CARLINGFORD AND IRISH LIGHTS COMMISSION



Freshwater Pollution Response Implementation Plan

2016-2017

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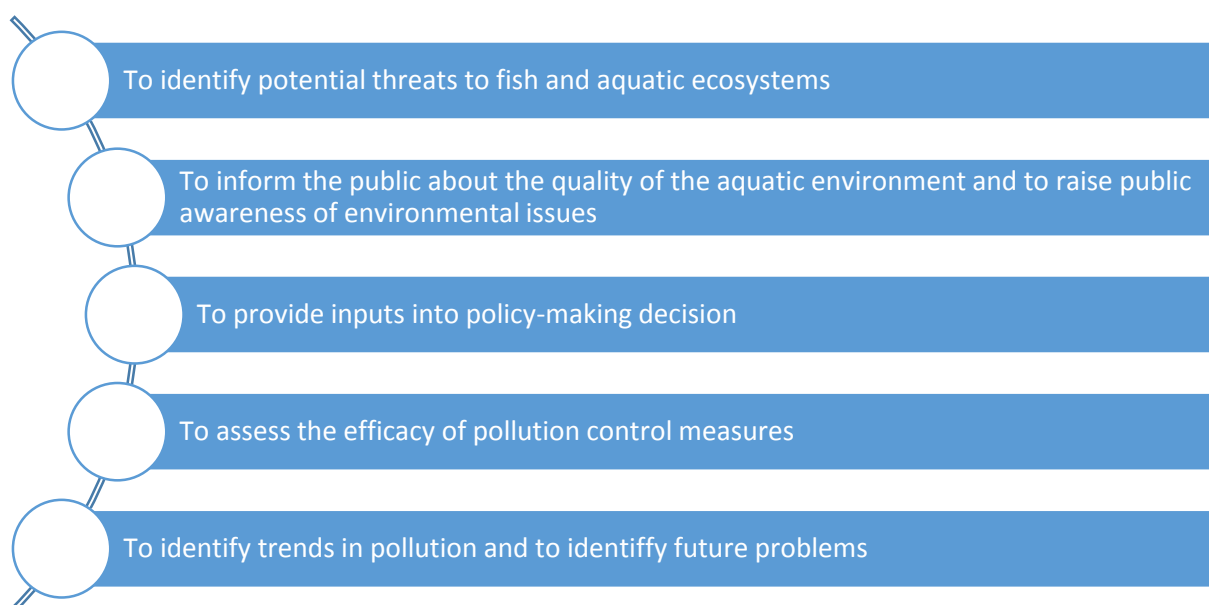
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1.0 INTRODUCTION

The Lough's Agency has implemented a Continuous Freshwater Monitoring and Telemetry Programme to enable real-time recording of water quality characteristics. The equipment is currently deployed in three rivers within the Foyle Catchment; the River Roe, River Finn and River Mourne (Map 1). A fourth suite of monitoring equipment is planned to be installed at Cloghan in early 2016, which will allow for a second monitoring station on the River Finn. Environmental data is recorded and reported continuously and can be accessed by Loughs Agency personnel and the general public. In addition, the Agency undertakes routine biological and chemical water sampling across the Foyle and Carlingford areas.

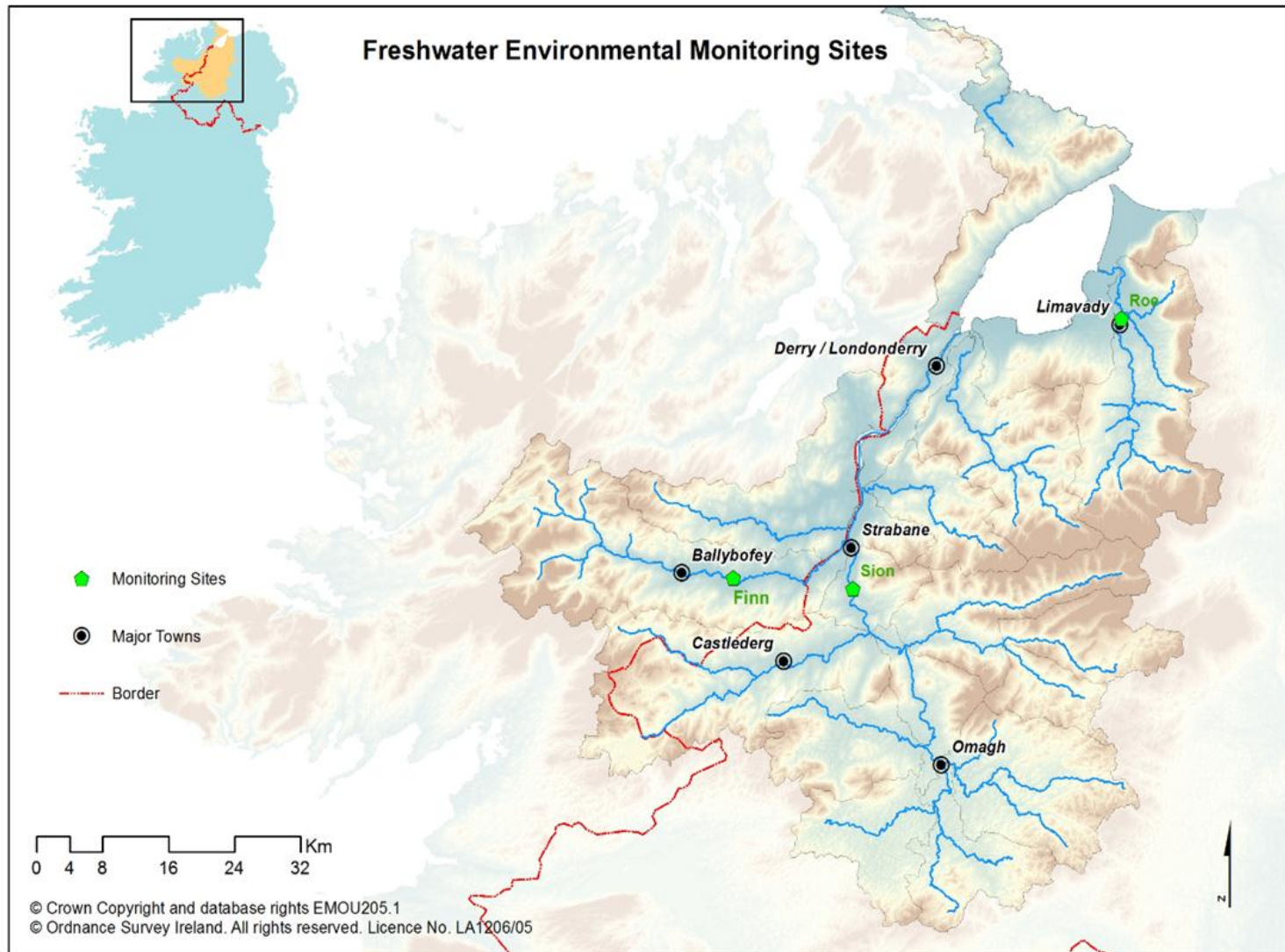
The programme has several key objectives:



The programme allows Loughs Agency scientists to better understand these ecosystems and discern the links between water quality, biological activity, and stress-induced events i.e. fish kills, harmful algae blooms, and low dissolved oxygen events.

Continuous monitoring of water quality conditions using real-time data collection techniques and telemetry, eliminates the need for frequent site visits and benefits scientists and managers by allowing them to track environmental conditions at any given moment. It allows personnel to respond to sporadic events as they happen which, in turn, can make possible more accurate planning and decision making.

This Implementation Plan outlines the proposed operational functionality of the Loughs Agency's existing continuous freshwater monitoring and telemetry programme from 2016 to 2017 and proposes to integrate this fully with routine water quality monitoring to assist in the day-to-day management of the fisheries.



Map 1: Location of Continuous Environmental Monitoring Stations

2.0 RATIONALE

The Loughs Agency's Continuous Freshwater Monitoring and Telemetry Programme has been operational since 2012. During the period 2012 to 2016 the equipment at the current three locations has been fully calibrated and maintained on a regular basis according to the manufacturer's specifications (see Section 7 for further details). This has resulted in a precise and accurate data set of the following parameters at each station:

- Specific Conductivity ($\mu\text{s}/\text{cm}$)
- Depth (m)
- Optical Dissolved Oxygen (mg/l)
- Optical Dissolved Oxygen (% Saturation)
- pH
- Temperature ($^{\circ}\text{C}$)
- Turbidity (NTU)

The telemetry programme follows on from, and fulfils the requirements of the Agency's Science Strategy in that it facilitates and supports the delivery of the Loughs Agency mission statement through the effective provision of scientific advice to the managers, staff, Board and Advisory Committee of the Loughs Agency and to disseminate this work to the wider public. The information obtained from the programme will also aid to inform our stakeholders of the data the Agency gathers and the scientific research and monitoring undertaken.

Furthermore, the freshwater telemetry programme can support the provision of high quality information to inform management decisions and policy development in addressing four priority themes:

- Long term sustainability of the natural resources including response to climate change
- Improving and maintaining healthy ecosystems, including enhancing natural habitats
- Increasing ecosystem benefits to local stakeholders and economies
- Development of sustainable aquaculture subject to legislation.

3.0 INCIDENT NOTIFICATION STRUCTURE AND PROCESS (TELEMETRY)

Figure 1 outlines the proposed structure and process in relation to following-up on alarm triggers received from the telemetry stations. Each stage of the process will be described in more detail.

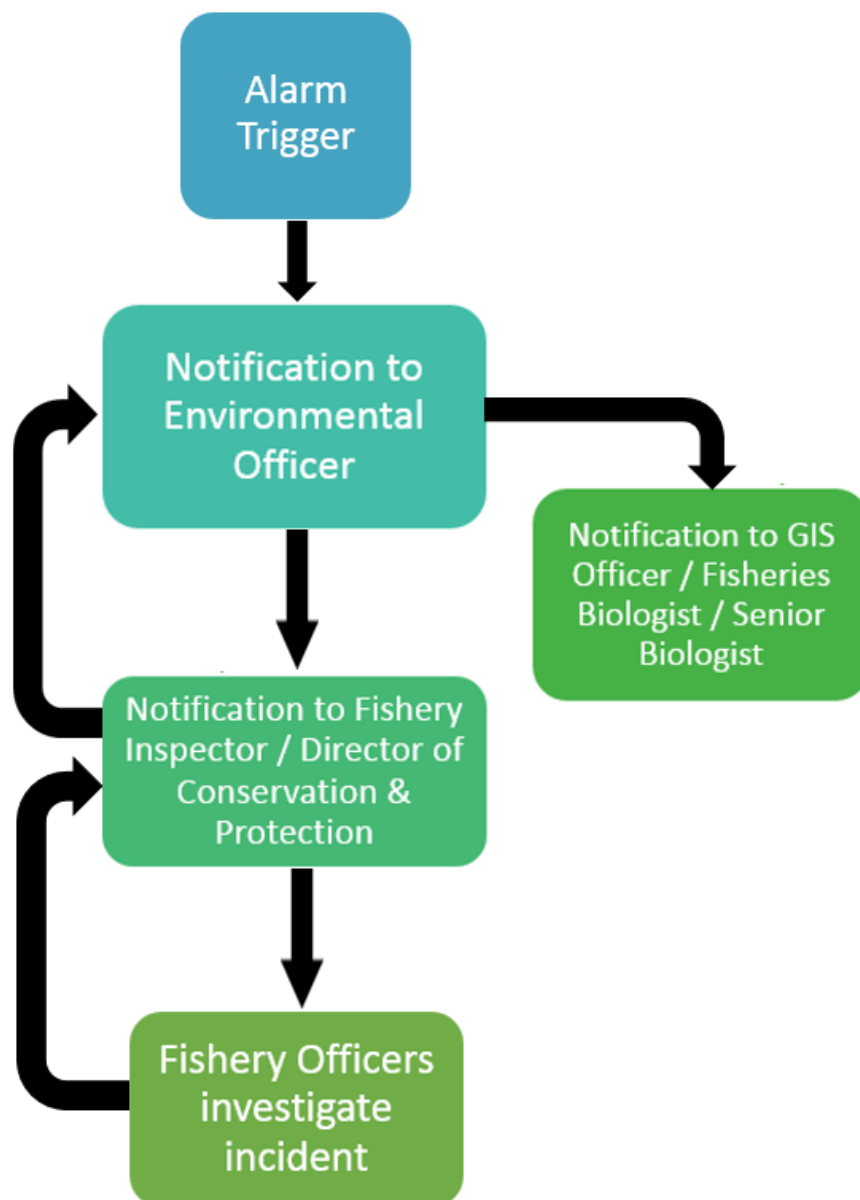


Figure 1: Notification process

STAGE 1 – ALARM TRIGGER

Sondes at each of the three sites are connected to the EcoNet™ platform which powers and controls the monitoring frequency of the equipment, as well as relaying the data back to YSI servers and key Loughs Agency staff via text messaging on mobile phones. The EcoNet™ system allows the Loughs Agency to set parameter ranges in order for alarm notifications to be triggered when there is a significant increase or decrease in pH, Temperature, Dissolved Oxygen or Depth levels (Table 1). Note that the alarm notification trigger range is site specific to the three rivers. This has been determined from using mean data since 2012 and using a range of + or – 10%.

Table 1: Parameter Alarm Notification Ranges

Parameter	Alarm Notification Trigger Range 2015	Proposed Alarm Notification Trigger Range 2016		
		Roe	Mourne	Finn
pH	<5.99 and >8.50	<6.77 and >8.27	<6.25 and >7.63	<5.94 and >7.26
Temperature*	<4 and >11	<4 and >11	<4 and >11	<4 and >11
ODO %	<90%	<97%	<97%	<95%
Depth	<0.1 and >1.0	<0.4 and >1.0	<0.4 and >1.0	<0.4 and >1.0

(* Temperature Notification Trigger Range will be set seasonally.)

STAGE 2 – NOTIFICATION TO ENVIRONMENTAL OFFICER

All alarm notifications will be received by the Environmental Officer and a unique incident code will be allocated. Focus will be on alarm triggers received for dissolved oxygen and pH. It is important that one staff officer is responsible

for coordinating the incident response process and will hopefully allow for a streamlined, efficient procedure.

STAGE 3 – NOTIFICATION TO FISHERY INSPECTOR

The Environmental Officer will assess the notification in accordance with the alarm notification trigger range for the relevant parameter and then notify the relevant Fishery Inspector, informing him of the nature of the alarm. The personnel to be notified in the event of an alarm notification are:

- Roe Site – Roly Wysner (Fishery Inspector) and John McCartney (Director of Conservation & Protection);
- Mourne Site – Wallace Kennedy (Fishery Inspector) and John McCartney (Director of Conservation & Protection);
- Finn Site – Seamus Cullinan (Fishery Inspector) and John McCartney (Director of Conservation & Protection).

Fishery Inspectors will have a standard template to complete and return to the Environmental Officer (see Fig. 2). Reporting Information Categories (see Fig. 3) are provided to assist Officers in completing the template. This template will provide necessary information on the incident and any subsequent action and will ultimately be copied to the GIS Officer, along with the Fisheries Biologist and

Senior Scientist, before being logged onto the pollution database for reporting and audit purposes.

Loughs Agency's Pollution Investigation Report

Incident No: 2251

Complaint

Complainant's Name: Received By:

Address Location Reported:

..... *Pollution Signs:

Postcode:

Telephone No:

Investigation Officer: Investigation Date:

Alleged Offender

Alleged Offender's Name:

Address:

Postcode:

Waterway:

Receiving Waterway:..... Catchment:.....

Grid Reference of Discharge Point: X:..... Y:.....

Grid Reference of the Premises:.....

Pollution

*Source of Pollution:..... *Severity:.....

*Category:..... *Fish-Kill:.....

*Sub-Category:.....

Comments:

.....

.....

.....

.....

.....

.....

.....

Sample

Sample Collected by:..... Date Collected:.....

Sample A Location:..... Date Delivered:.....

Sample B Location:..... Sample Delivered to lab

Sample C Location:..... by:.....

* SEE INSIDE FRONT PAGE FOR ASSISTANCE IN THESE CATEGORIES
- ALL CATEGORIES MUST BE COMPLETE

Figure 2: Pollution Investigation Reporting Template

Pollution Signs	Source of Pollution	Category	Sub-Category
Foam	Industry	Chemical	Silage Slurry
Dirty Water	Farm	Agriculture	Cattle Surry
Cloudy Water	N.I. Water	Sewage	Pig Waste
Oil	Domestic	Oil	Dairy Waste
Dead/Stressed fish	Transport	Non Agri/Waste	Yard Run-off
Smell	Other	Discharge	Sheep Dip
Sewage Fungus	No Pollution Found	No Pollution Found	Fallen animals
Slime/Algae			Chemicals
Dead Animals			General Farm
General Debris			Other
Biological Stress			
Sewage			
Farm Effluent			
Dye			
Other			

Severity	Fish Kill
Low	None
Medium	Slight <10
High	Moderate 10>100
	Major >100

Figure 3: Reporting Information Categories

STAGE 4 – INVESTIGATION BY FISHERY OFFICERS

On receiving notification from the Environmental Officer, the relevant Fishery Inspector will inform his crew of Fishery Officers. This will involve a follow-up investigation (depending on the severity of the incident) which may require the use of portable rugged probes to monitor water quality upstream of the stations

and/or the collection of additional water samples for further processing and analysis in the laboratory.

4.0 REPORTING PROCEDURE (TELEMETRY)

Currently, the reporting procedure in relation to the Loughs Agency's Continuous Freshwater Monitoring and Telemetry Programme has involved the preparation of weekly, monthly and annual reports as follows:

- Weekly Reporting: Data Reports (on each station)
- Monthly Reporting: Calibration Record (on each station)
- Annual Reporting: Annual reports for 2013, 2014 and 2015.

Looking forward, it is proposed that the reporting procedure will include the existing reporting formats with the addition of the following:

- Quarterly Report: providing a quarterly summary for stakeholders.
- Weekly Incident Report: logging all alarm triggers and subsequent action.

In the event of a significant pollution incident, a separate report will be generated for the attention of the Director of Conservation and Protection and the Senior Management Team (SMT).

5.0 INCIDENT NOTIFICATION STRUCTURE AND PROCESS (CHEMISTRY AND BIOLOGY)

108 routine water samples are obtained in the field from sites across the Foyle and Carlingford catchments (see Maps 3 & 4) and returned to the Agency's laboratory for processing. A traffic-light system has been adopted in order to report on the chemistry and biology of water samples. Table 2 outlines the ranges used to determine the choice of colour for each parameter and subsequent reporting. They generally follow guidelines for favourable conditions for salmonid rivers. However, some ranges (e.g. pH) have been devised by the Agency.




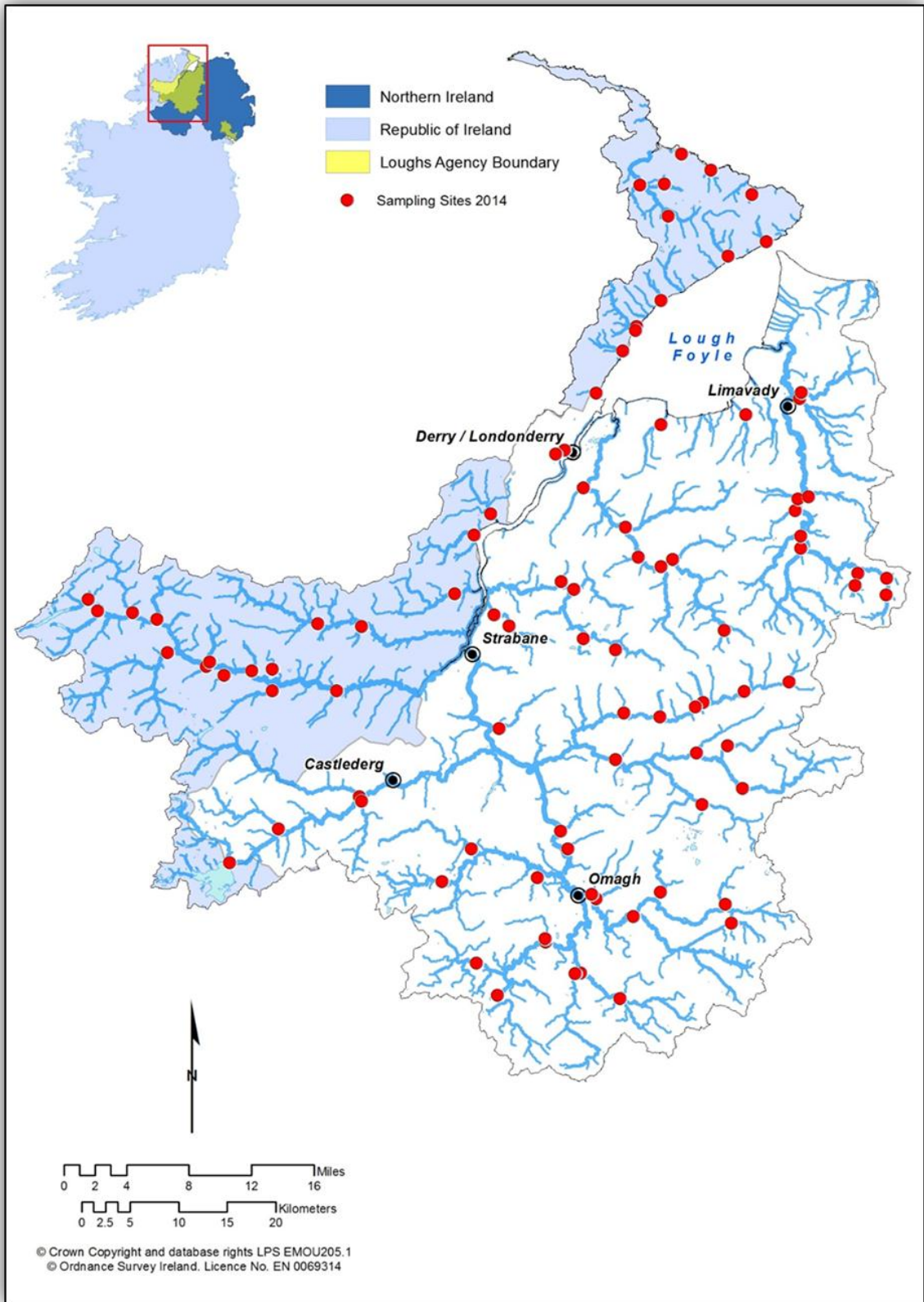
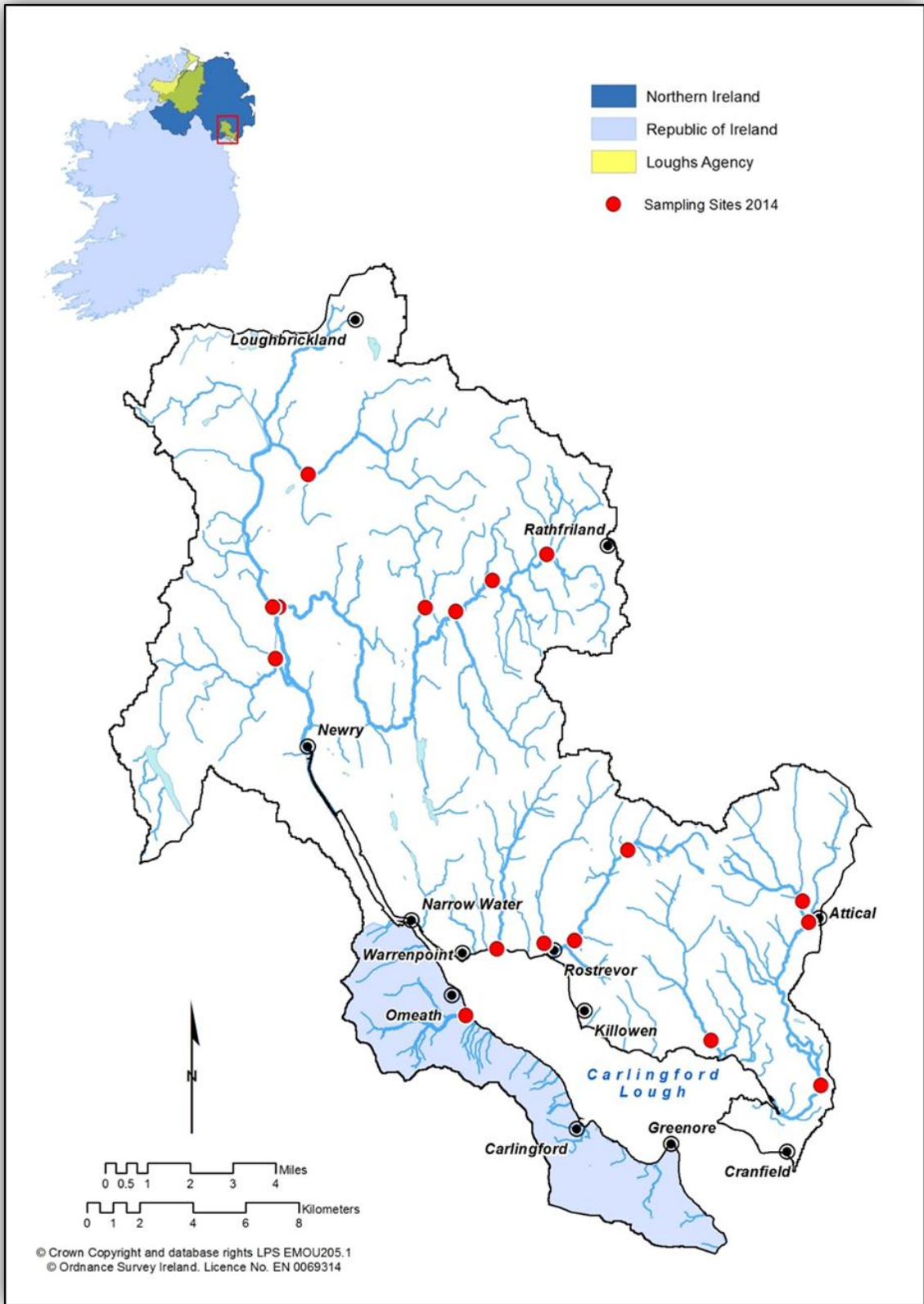
Parameter	Green 	Amber 	Red 
<i>pH</i>	6-7	4-5, 8-9	$\geq 10, \leq 3$
<i>Total Phosphorus</i>	0 – 0.03 mg/l	0.04 – 0.14 mg/l	≥ 0.15 mg/l
<i>Ammonia (NH₃)</i>	≤ 0.04 mg/l	0.05 – 0.06 mg/l	≥ 0.07 mg/l
<i>Suspended Solids</i>	≤ 10 mg/l	11 – 24 mg/l	≥ 25 mg/l
<i>BMWP</i>	≥ 70	41 - 69	≤ 40
<i>Biochemical Oxygen Demand (BOD)</i>	≤ 3 mg/l	4 – 9 mg/l	≥ 10 mg/l

Table 2: Traffic Light System Parameter Ranges



Map 2: Routine Water Sampling Sites - Foyle



Map 3: Routine Water Sampling Sites - Carlingford

During the summer period (June – September) weekly water samples are obtained from scheduled sub-catchments within the Foyle and Carlingford areas. The following triggers for investigating potential pollution incidents is proposed (based on biological and chemical results) (see Table 3):

Indicators	Action Required
6 Red indicators	Investigate the site and immediate area upstream and downstream
5 Red indicators	Investigate the site and immediate area upstream and downstream
4 Red indicators	Investigate the site and immediate area upstream and downstream
3 Red indicators	Investigate the site and immediate area upstream and downstream
2 Red indicators	Monitor the site*
1 Red indicator	Monitor the site*

Table 3: Indicators and Action Required (* If B.O.D. reading is red always investigate)

The levels of investigation will be determined on results from the laboratory and will be issued as soon as possible after all parameters have been reported on. Monitoring the site will require Fishery Officers to visit the site and conduct a visual inspection. A site investigation will require Fishery Officers (in liaison with the relevant Inspector and the Environmental Officer) to undertake a full in-river assessment. This may require the deployment of a rugged probe to collect

water quality data and/or the collection of further water samples for processing in the laboratory.

A weekly report (see Table 4) will be generated and issued from the laboratory by the Environmental Officer. This report will be circulated to the relevant Fishery Inspector, the Director of Conservation and Protection, as well as the GIS Officer, Fisheries Biologist and Senior Scientist.

Site ID	Trib	BOD	BMWP	Phosphorus	Ammonia	Suspended Solids	pH	Action
02-01	Altanagh	-	-	-	0.18 mg/l	-	-	Monitor
02-03	Drumnakilly	11 mg/l	-	-	0.14 mg/l	-	-	Investigate
06-01	Routing	-	-	-	0.20 mg/l	-	-	Monitor
07-03	Gillygooly	-	-	-	0.07 mg/l	-	-	Monitor

Table 4: Example of a weekly report

6.0 REPORTING PROCEDURE (CHEMISTRY & BIOLOGY)

Figure 4 outlines the proposed structure and process in relation to following-up potential pollution incidents as identified from laboratory results. Each stage of the process will be described in more detail. Fishery Inspectors will have a standard template to complete and return to the Environmental Officer (see Fig.2). This template will provide necessary information on the incident and any subsequent action and will ultimately be copied to the GIS Officer, along with

the Fisheries Biologist and Senior Scientist, before being logged onto the pollution database for reporting and audit purposes.



Figure 4: Follow up procedure – Chemistry and Biology

7.0 CALIBRATION AND MAINTENANCE OF MONITORING EQUIPMENT

The operational goal of the Freshwater Environmental Monitoring and Telemetry program is to obtain the most accurate and most complete data record possible. To maintain accuracy and ensure equipment is functioning within specifications, best practice recommends cleaning and calibrating the instruments at regular intervals.

Sondes are calibrated and deployed for two-week periods (see Fig. 5). At the end of the deployment period sondes are retrieved on a rotational basis, fully cleaned and calibrated to the manufacturer's specifications in the Loughs Agency laboratory and redeployed within 24 hours to minimise gaps in data recovery.

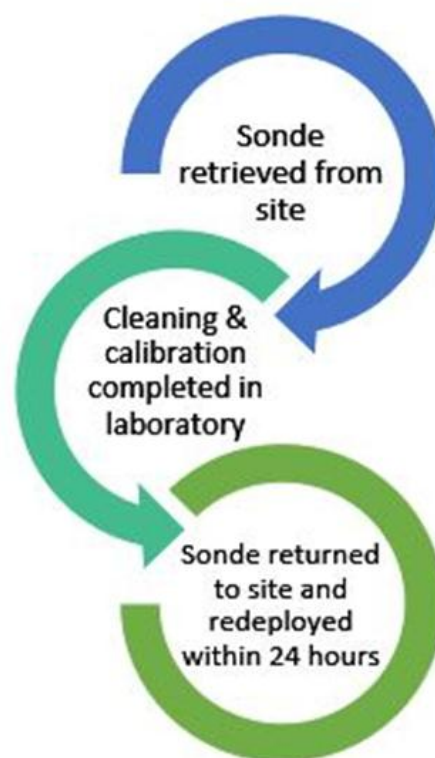


Figure 5: Sonde maintenance process



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