Owveg Priority Area for Action

Desk Study

(AFA0152)

Table of Contents

List of Figures

List of Tables

Acknowledgements

The authors would like to acknowledge the contribution of Laois County Council staff and thank them for their support of the Local Authority Waters Programme. The Council has carried out a significant amount of work in the Owveg catchment in recent years.

1. Background

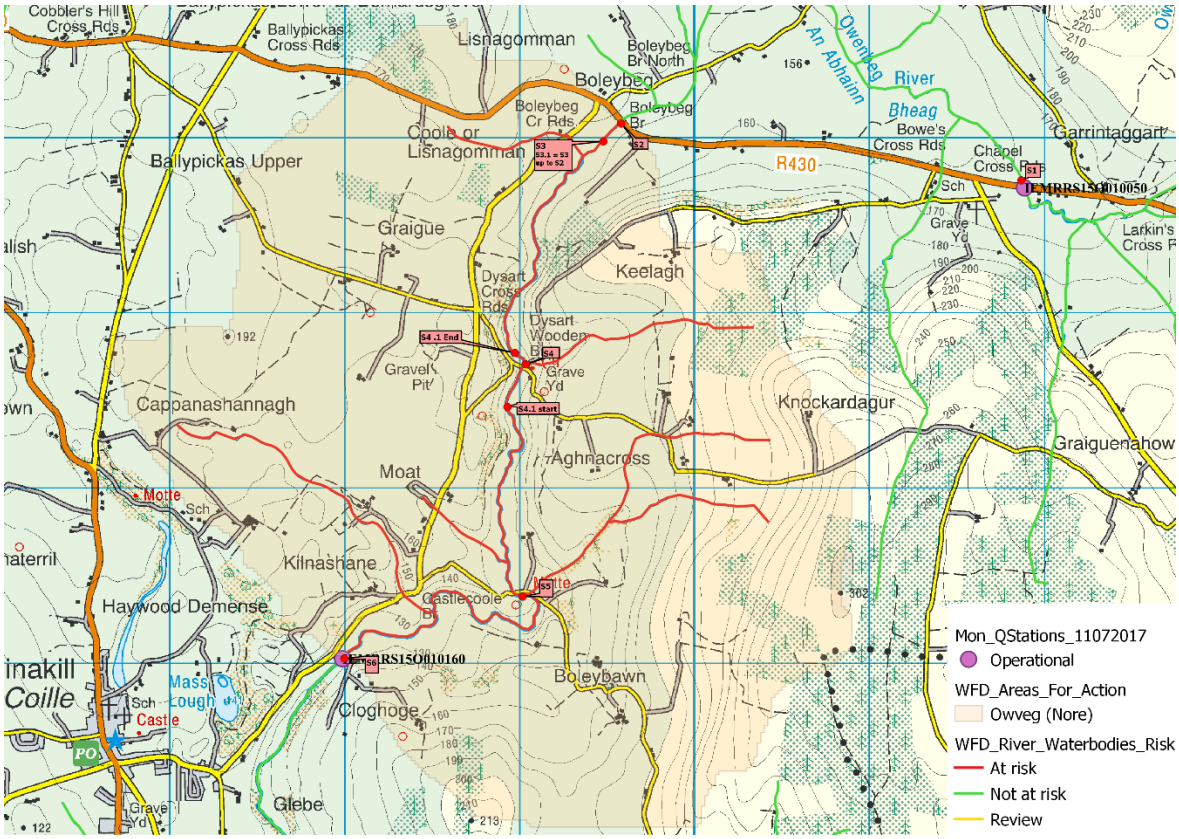


Figure 1-1 PAA map with monitoring points.

The Owveg Prioritised Area for Action (PAA)) is located just outside of Ballinakill and Abbeyleix in Co. Laois. It is located within the Nore catchment.

1.1 Reason for selection

Regional workshops were held in Roscrea on 6-9 June 2017 and were attended by representatives of local authorities (Kilkenny, Tipperary, Waterford City and County, Kildare, Laois, Offaly, Carlow, Wexford & Wicklow), and other agencies (Bord Iascaigh Mhara, DHPCLG, EPA, National Dairy Sustainability Forum, National Federation for Group Water Schemes, Sea Fisheries Protection Authority, Waterways Ireland, LAWCO, Irish Water, IFI, Forest Service, Coillte, NPWS, Teagasc, GSI, DAFM, Marine Institute and EPA). Based on the draft River Basin Management Plan priorities, a set of agreed principles and the priorities of the workshop attendees, 34 areas were recommended for action in the South East region and the Owveg was selected for the following reasons:

- One deteriorated water body.
- Will restore all water bodies in the sub-catchment to Good status
- One potential quick win.

The Owveg PAA consists of one river water body Owveg(Nore)_030 The waterbody has shown a drop in Q value from Q4 in 2010 to Q3-4 in 2013 before returning to Q4 in 2016. The EPA Characterisation of the waterbody also shows an upward trend for ortho phosphate. The trend data shows an increase

in ortho phosphate levels with peaks in 2009 (0.043 mg/l P), 2012 (0.045 mg/l P) and 2014 (0.33 mg/l P) and 0.017 mg/l P in 2013 and 0.023 mg/l P in 2015.

1.2 EPA Characterisation and Recommendations

The characterisation and further assessment carried out by the EPA also identifies sediment as an issue to be considered in this fresh water pearl mussel catchment. Sediment was identified in the EPA biologists notes, with an asterisk (indicating sediment) beside the 2013 results.

The initial characterisation sub-catchment assessments undertaken by the Environmental Protection Agency (EPA) recommended that the following further actions be undertaken by LAWPRO:

- **Owveg (Nore)_030**: IA7 Multiple Sources in Multiple Areas to determine sources of nutrients in the area.

Table 1 Summary Table of Owveg (Nore)_030 water quality

WB Code WB Name	WB Type	Risk	Status Obj.	2007-2009	2010-2012	2010-2015	Pressure Category	Pressure Subcategory	Significant Pressure
IE_SE_15O010160 Owveg (Nore)_030	River	At Risk	Good	Good	Moderate	Good	Agriculture Industry Extractive Industries Domestic Waste Water Forestry Extractive Industry	Pasture IPC (Piggery) Quarries Waste water discharge Forestry Peat	YES No No No No No

Table 2 Significant Pressures, Impacts identified in 2018 for Owveg (Nore)_030

Waterbody	Pressure Category	Sub-category	Significant Pressure	Impact
Owveg (Nore)_030	Agriculture	Pasture	Yes	Yes

2. Receptor Information and Assessment

2.1. Water body information

The Owveg Priority Area for Action contains one waterbody, Owveg (Nore)_030. The following is an overview of its current status and monitoring.

Q values declined from Q4 to Q3-4 in the period 2010 to 2015 but ecological status recovered in 2016 from Q3-4 to Q4 and now achieves good status. The phosphate levels had dropped overall up to 2015 however the results for 2016, 2017 and 2018 show averages over the good status threshold limit of 0.035mg/l P with a 2015 result of 0.023mg/l, 2016 of 0.037 mg/l, 2017 of 0.063 mg/l and 2018 of 0.039 mg/l.

The EPA further characterisation actions recommend a review of P sources from land spreading from the piggery and other agricultural activities in the catchment. The waterbody is in a SAC which is a habitat to fresh water pearl mussel. The characterisation report also raised concern of the effect of sediment on the catchment. However, at the time of writing this report the catchment has now met the ecological and physio chemical requirements for good status. Notwithstanding, an assessment will be needed to confirm that this status condition is being maintained.

2.2. Inputting waters

As shown in map 1 above this waterbody is fed from Owveg (Nore)_20 (WFD code IE_SE_15O010080). This waterbody has two EPA Q value monitoring points with the Graiguenasmuttan Bridge site not active since 1991 and the Boleybeg bridge (RS15O010080) active with results from 1995 to 2016. The current Q value results are stable at Q4 since 2007, rising from a previous Q3.

There is no chemical data available for this site and based on the biological Q value information this waterbody is classified as not as risk.

Table 3 Receptor information for the Owveg (Nore) 030

Factor	Figure/ Table	Comment/Description
Risk Category	Fig 1	*At Risk*
Biological Status Monitoring Station(s) with Q-Values 2009-2015 Status Trends in Q value since 2009 2016-2018 Q value data		Br WNW of Boleybawn (Cloghoge) Q4 2010 and Q3-4 2013 Downwards Q4 2016
Hydrochemistry Data Monitoring Station(s) with data Existing New		Br WNW of Boleybawn (Cloghoge) NH_4, PO_4, TON & BOD None
Summary & Trends in PO_4, NH_3 and NO_3 In App All available data Other water quality data Baseline Concentration (mg/l) Other relevant values Distance to threshold	Fig 2.1, 2.2 & 2.3 Up to end 2018 Table 2.2	PO_4 trend upwards with spikes in 2017, NH_4 and TON downwards. BOD for water body 2018 average 1.14 mg/l spike 3.2mg/l Just above PO_4 EQS and well below NH_4 and NO_3 EQS Just above PO4 EQS and well below NH4 and NO3 EQS
Supporting Conditions Chemical Conditions Oxygenation Conditions Acidification Conditions		Pass Pass D.O %, other High Pass
Hydromorphology RHAT Score Evidence of arterial drainage		None None
Ecological Status (2010-2015) Trends 2010-2015	Fig 2.4	Good 2010 and Moderate 2013 Downwards but returned to Good
Protected Areas		Yes Barrow/Nore SAC Fresh water pearl mussel area
WFD Objective		Good Status

EPA biologist notes (if any)		With an improvement at Station 0160 and maintenance of Good ecological conditions at all other site, the entire Owveg has returned to satisfactory condition. Elevated opportunistic algal cover and a prevalence of higher densities of some tolerant taxa at some stations suggests some residual impact, but with the habitat just maintaining an overall resilience to this pressure nevertheless. (Year of assessment: 2016)
Significant issue		Ortho-phosphate, suspected diffuse agricultural source, possible land spreading.

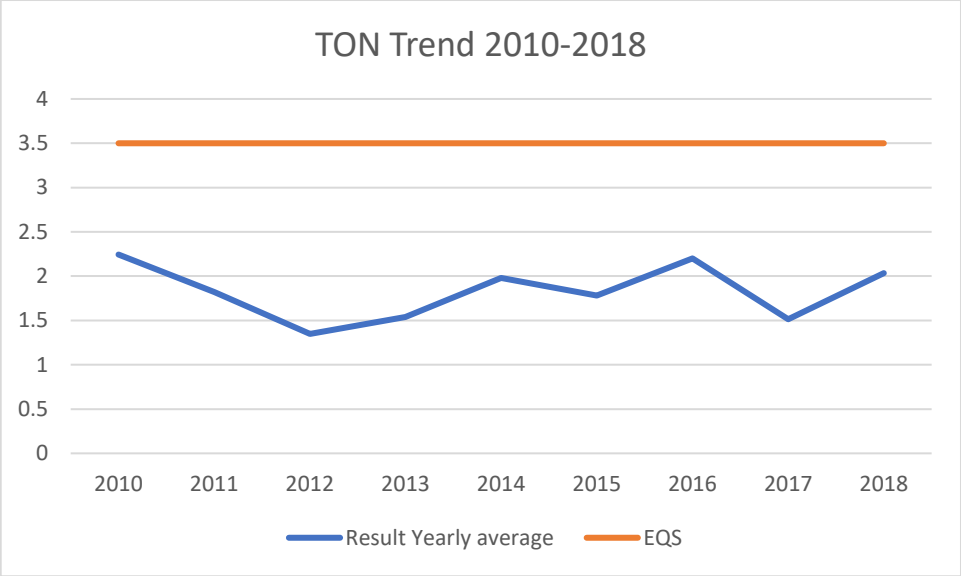


Figure 2-1 TON Mean (as N) results vs EQS for Owveg (Nore)_030

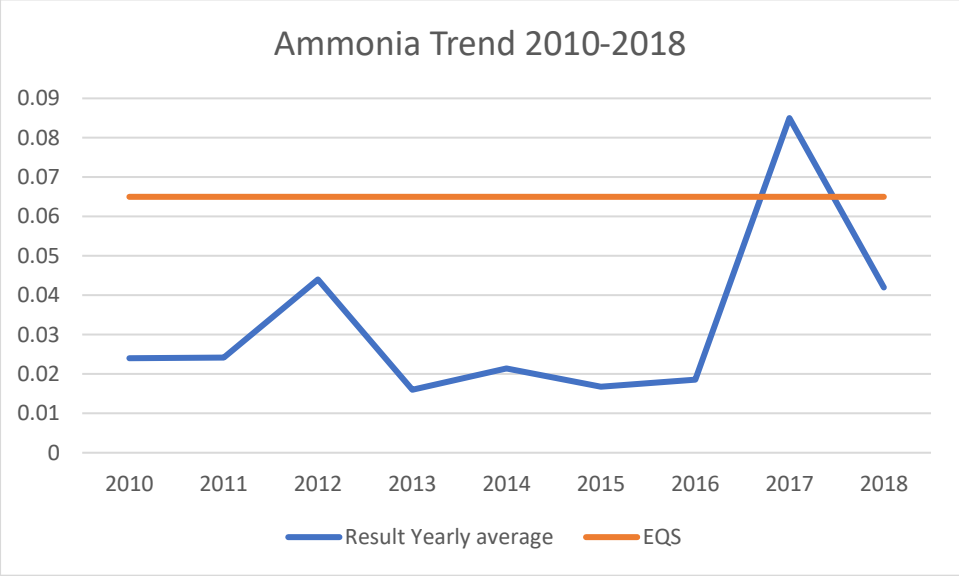


Figure 2-2 Total Ammonia (as N) Mean results vs EQS for Owveg (Nore)_030

Owveg PAA

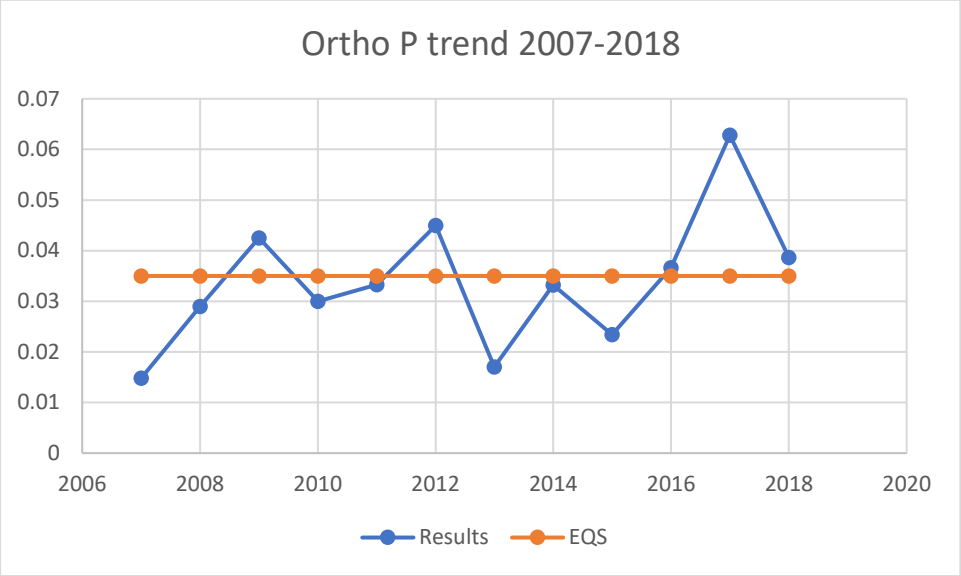


Figure 2-3 Phosphate (as P) Mean results vs EQS for Owveg (Nore)_030

The 2017 average results are linked to a spike on 27th June in BOD, Ammonia and Ortho Phosphate which has dramatically increased the yearly average for these parameters. The B.O.D. level was 7.5mg/l. These results followed heavy rain in the previous 24 hours with 27.8mm recorded on 26th June 2017. The high BOD following rainfall together with high ortho-p may point towards a diffuse source such as runoff after landspreading.

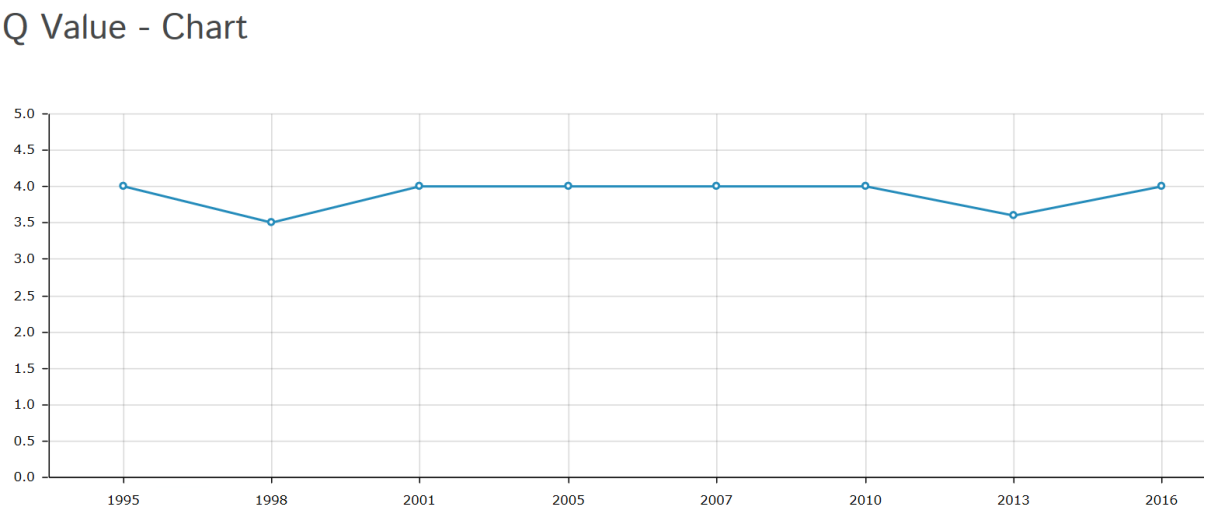


Figure 2-4 Q value Results 1995-2016 for Br WNW of Boleybawn (Cloghoge) 15O010160

Table 4 Baseline concentrations for Owveg (Nore) 030

Parameter	Period	Concentration mg/l	Annual average EQS mg/l	Distance to Threshold
Ammonia	2010-2018	0.032	0.065	Far Below
Ortho Phosphate	2010-2018	0.036	0.035	Above
TON (as N)	2010-2018	1.8729	3.5	Far below

2.3. Receiving Waters

The Owveg (Nore)_30 waterbody flows into the Owveg (Nore)_040 waterbody. This waterbody is at good ecological status. It has one inactive monitoring site at Ironmills Bridge and one active site at Castlemarket Bridge (RS15O010280) which has been at Q 4 status for the period 2010-2016. This waterbody has no physio chemical data at present and based on the ecological assessment this waterbody is deemed to be not at risk and at good status.

2.4. Protected Areas

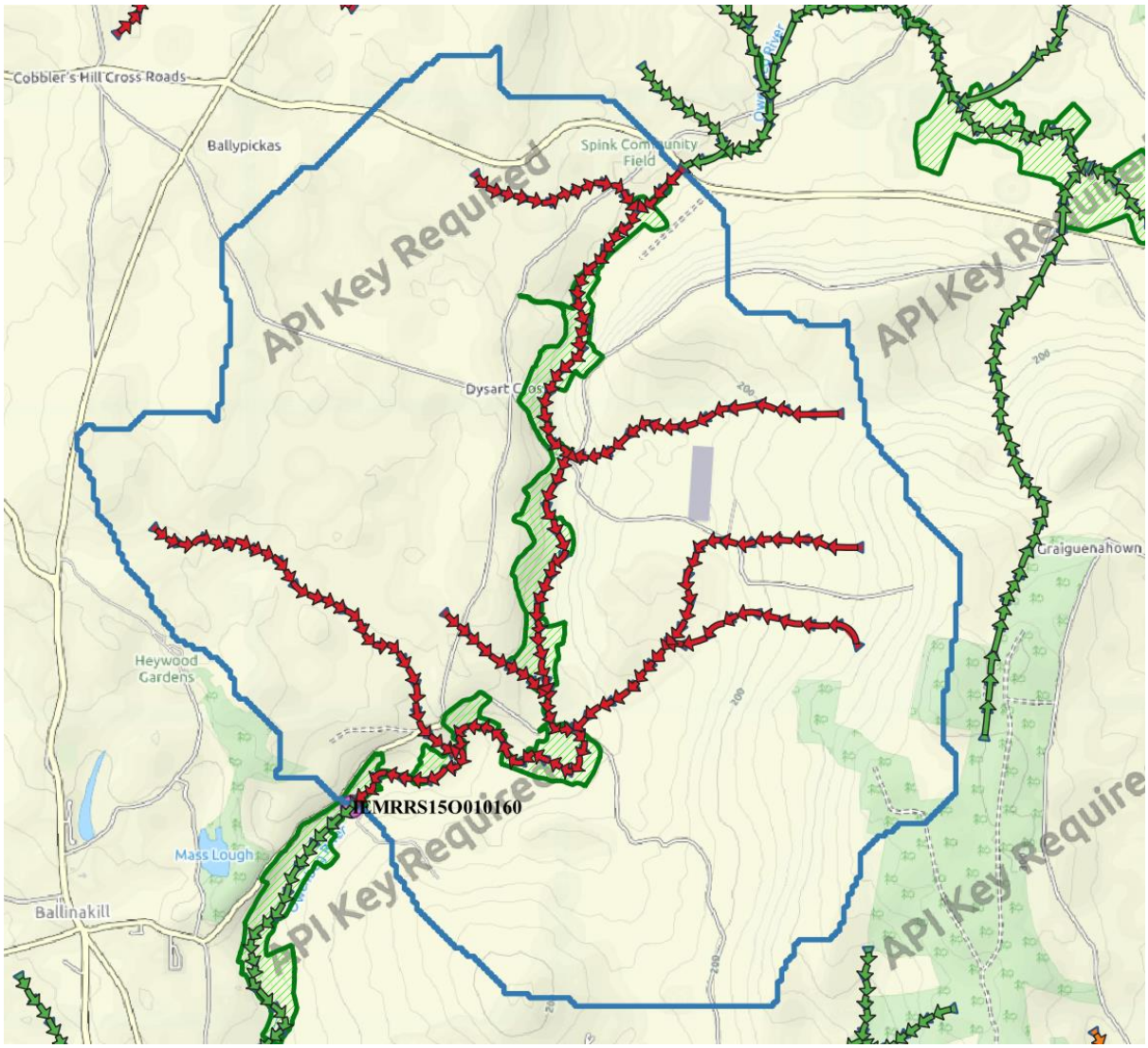


Figure 2-5- Protected area with PAA Owveg (Nore)_030.

The Owveg is within the Barrow/ Nore SAC as outlined in the map above. This is a Freshwater Pearl Mussel catchment.

3. Pressures and Impacts

3.1 Pressures Owveg (Nore)_030.

The characterisation of the PAA as carried out by the EPA has identified the following pressures in the catchment:

Table 5 Significant Pressures identified for the (Owveg (Nore)_030) PAA by the Initial Characterisation process

Waterbody	Pressure Category	Sub-category	Significant Pressure
Owveg (Nore) 030	Extractive Industry	Peat	No
	Forestry	Forestry	No
	Domestic Waste Water	Waste Water discharge	No
	Extractive Industry	Quarries	No
	Industry	IPC	No
	Agriculture	Pasture	Yes

As can be seen in Table 5 above not all the pressures in the PAA represent significant pressures on water quality. The initial characterisation assessment for Owveg (Nore)_030 by the EPA has identified pasture based agriculture as a significant pressure in the catchment. The initial characterisation also recommends the further characterisation actions required to be carried out by LAWPRO, in the case of Owveg (Nore)_030 an IA7 (Investigative Assessment 7) is recommended. This involves an assessment of multiple sources throughout the catchment to determine the sources of nutrients.

The Pollution Impact Potential (PIP) maps for the Owveg (Nore) _030 areas are outlined in Figures 3.1 for Nitrogen and Figure 3.2 for Phosphate. The High PIP area for Nitrate corresponds to the area for the sand/gravel aquifer shown in Figure 3.1 below. The High PIP area for phosphate is located to the eastern side of the catchment, which is also some of the more sloping areas.

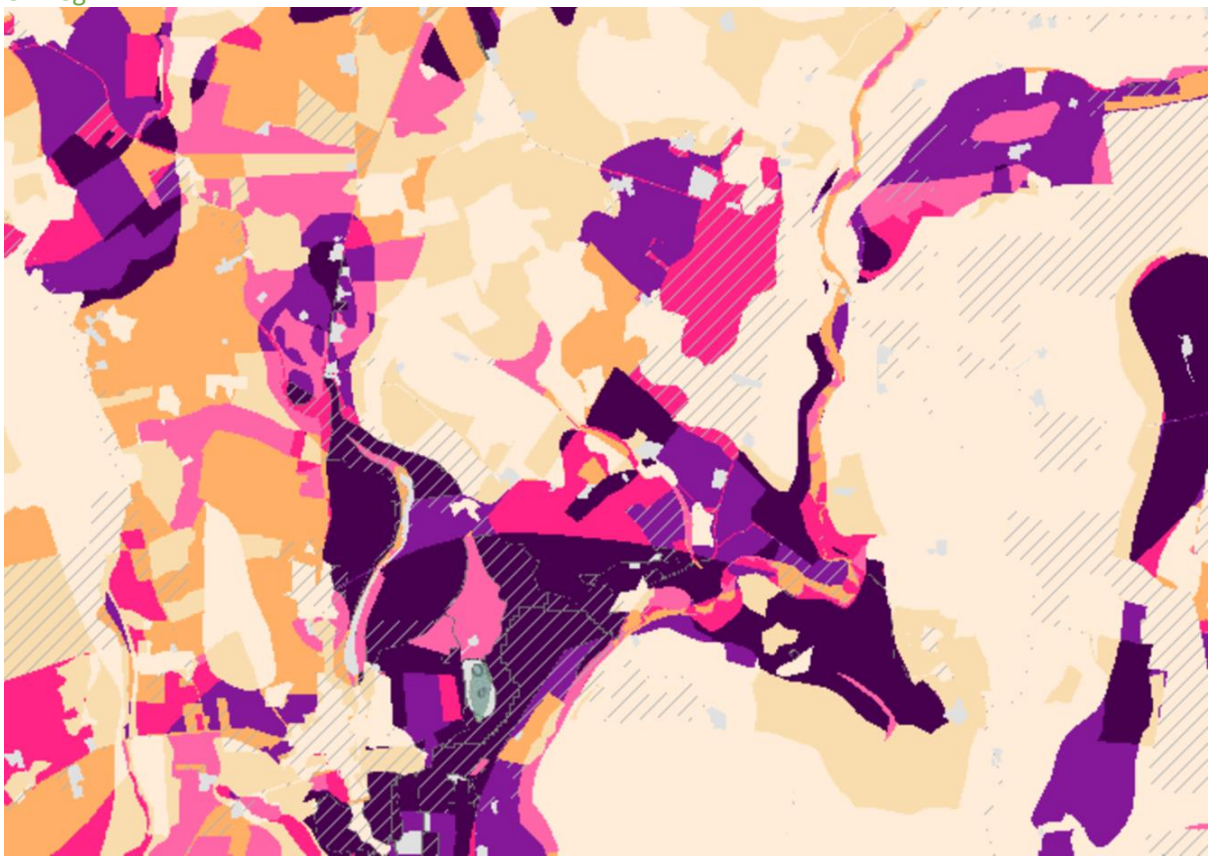


Figure 3.1 Pollution Impact Potential (Nitrate) Surface Water for Owveg (Nore)_030

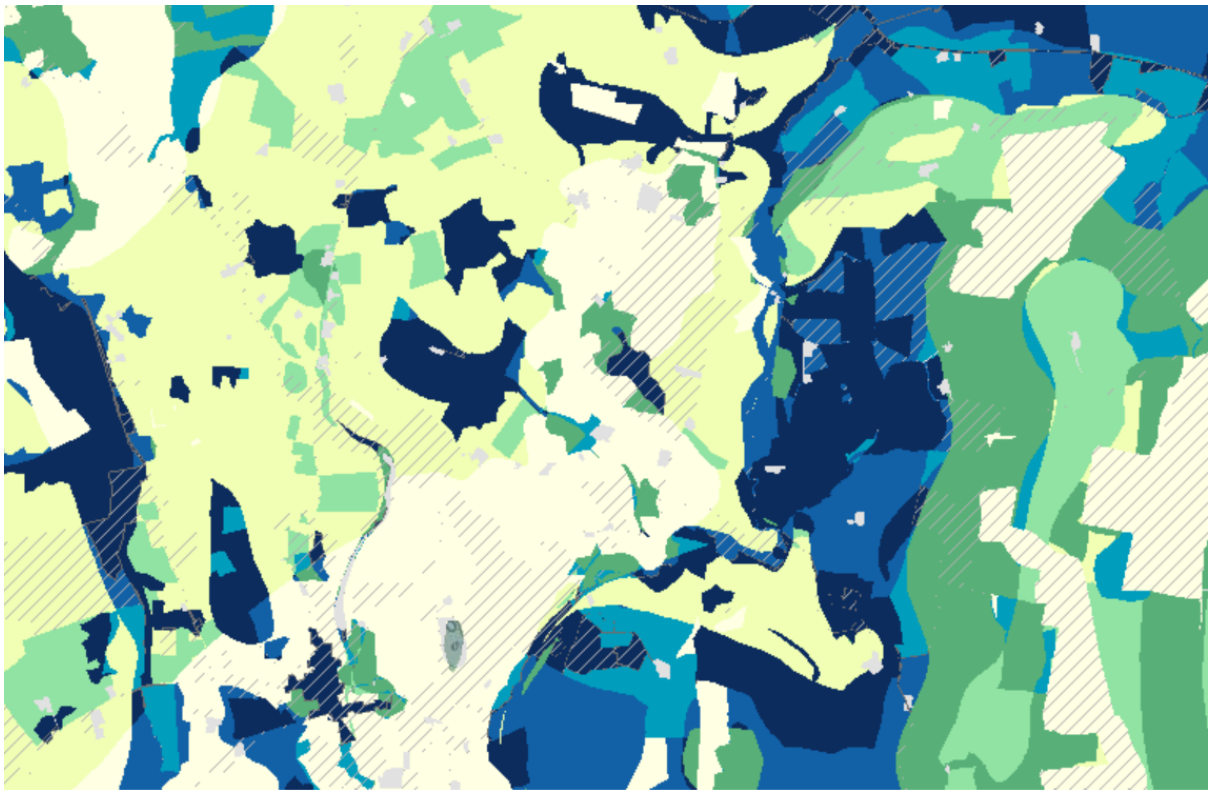


Figure 3.2 Pollution Impact Potential (Phosphate) Surface Waters for Owveg (Nore)_030

4. Pathway Information and Analysis

4.1. Overview of Pathways in the PAA

The PAA is made up of one waterbody Owveg (Nore)_30. This waterbody has been divided into three compartments and two sub compartments. Details are as follows:

- Compartment One is on a poorly productive local aquifer with two sub compartments. One that has a sand and gravel aquifer and one that has poorly drained soils in its eastern area.
- Compartment two is a regionally important productive aquifer with free draining soils.
- Compartment three is a poorly productive aquifer with well drained soils.
- There is no clear issue in this waterbody but as the baseline levels for phosphate is over the EQS the areas of overland and near surface flow are the areas of concern.

4.2. Owveg (Nore)_030 PAA

Compartment 3 is a small area based on wesphalien shale and has a slight flow with several areas that are extreme or extreme x vulnerability. The principal pathway is overland and near surface flow, but it has a number of pockets for groundwater flow.

- identifies the main pathways for impact in the Owveg (Nore)_030. The three compartments identified (Compartment 3 is a small area based on wesphalien shale and has a slight flow with several areas that are extreme or extreme x vulnerability. The principal pathway is overland and near surface flow, but it has a number of pockets for groundwater flow.

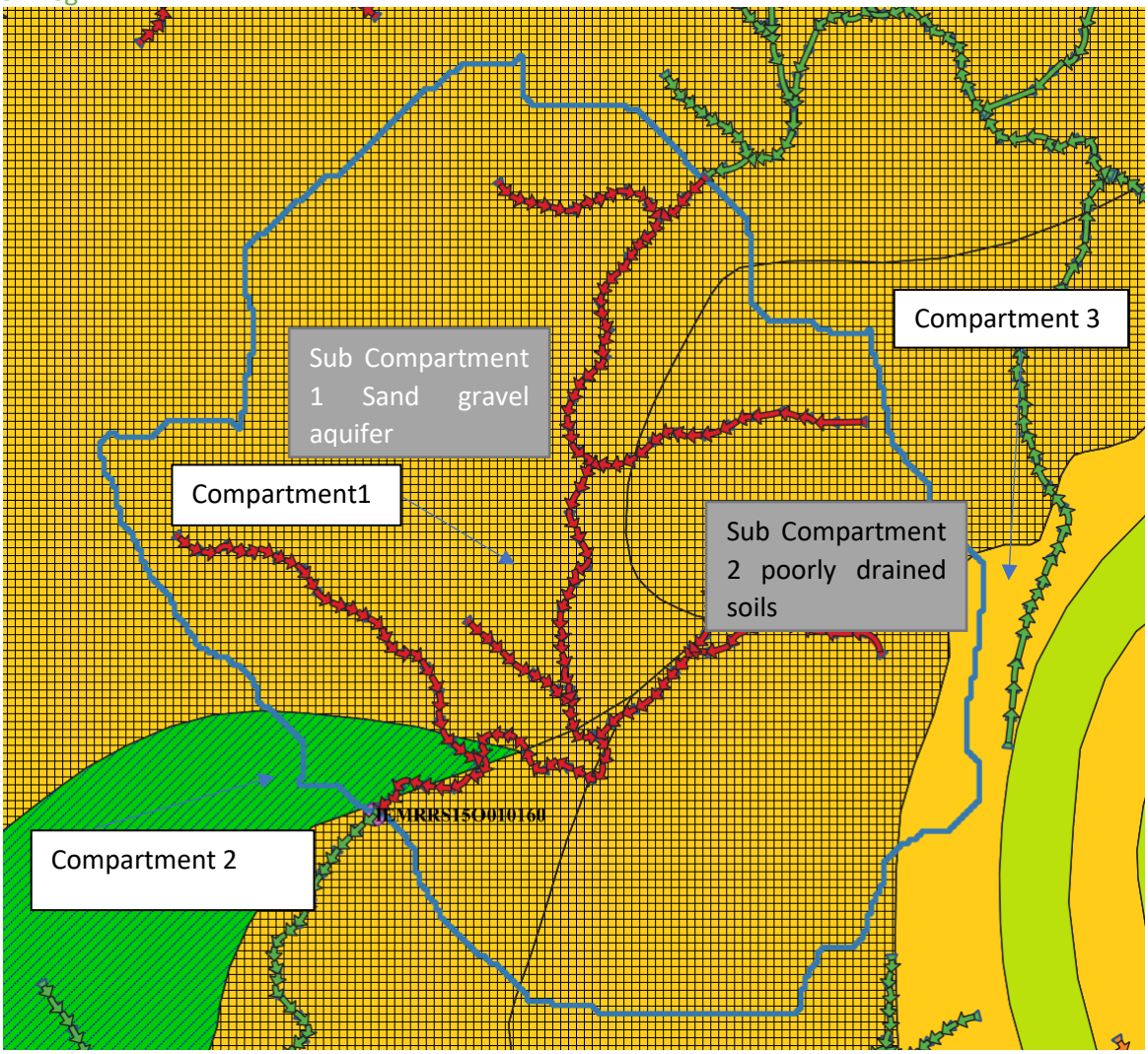


Figure 4-1 Conceptual model PAA compartments for Owveg (Nore)_030.

Compartment 4

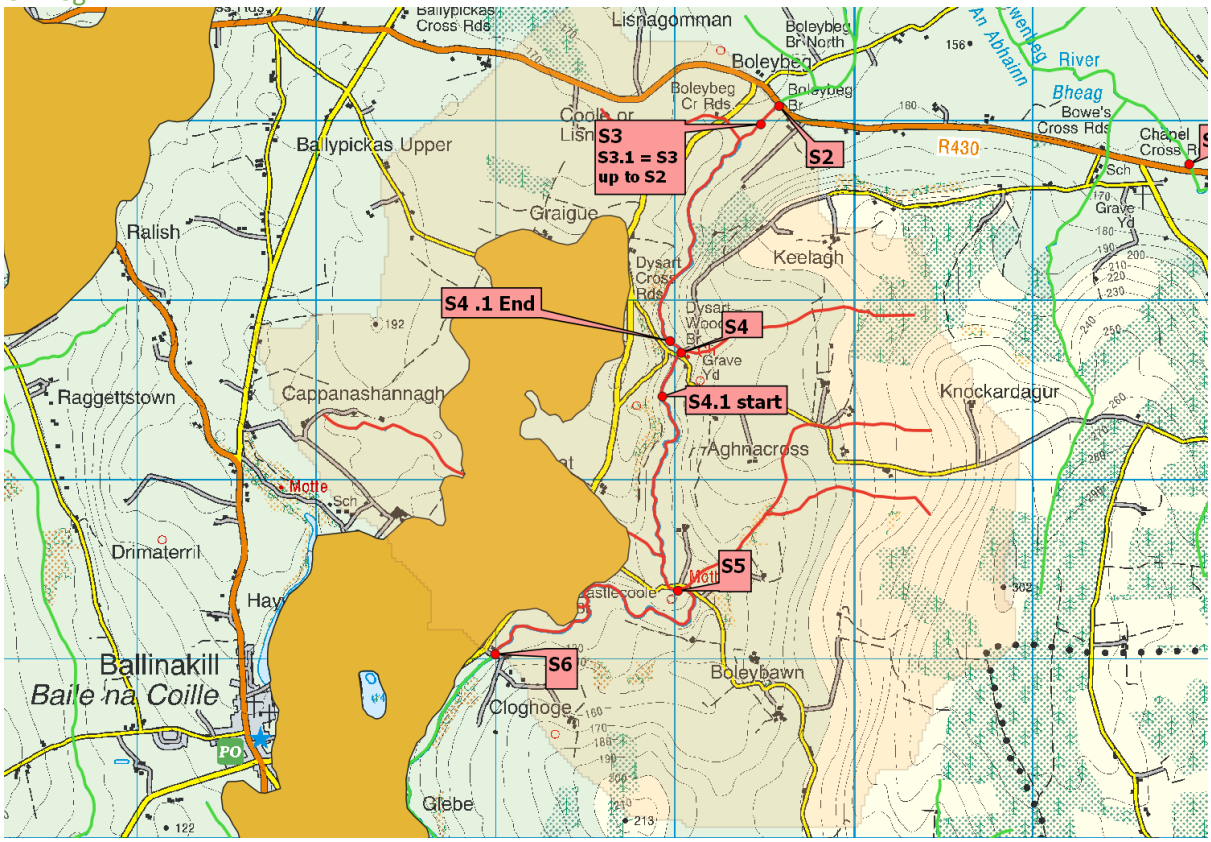


Figure 4.2 Sand/gravel Aquifer for Owveg PAA.

The compartment for this prioritised area for action is based on the rock units for the area. They have been divided into three compartments as seen in Figure 4-1 above:

- Compartment 1 is based on the Numarian shales and sandstones that covers most of the area of the PAA, which is generally level with a slight gradient to the west and has a sloped area on the eastern side. The principal pathway here is overland flow and near surface flow. However, the western side of the compartment sub compartment one has a large sand/gravel aquifer running through it. This is seen in Figure 4.2 and means a higher vulnerability for groundwater to Nitrate. Sub compartment two is the heavier poorly drained soils.
- Compartment 2 is based on Dimarian Pure Bedded limestone and is free flowing with a fall towards the river. Its main pathway is to groundwater.
- Compartment 3 is a small area based on wesphalien shale and has a slight flow with several areas that are extreme or extreme x vulnerability. The principal pathway is overland and near surface flow, but it has a number of pockets for groundwater flow.

5. Interim Story of the PAA

The Owveg (Nore)_030 has inputting waters and receiving waters both of which are deemed *Not at Risk*. The PAA has one active monitoring point and both chemical and biological data are available for the PAA. This area is a freshwater pearl mussel area for the Barrow/ Nore SAC.

The ecological data shows the PAA has had a Q rating of either Q4 or Q3-4 over the last 20 years. The results for the period 2010 to 2015 shows a drop from a Q4 to Q3-4. The 2016 results show a return to Q4. The chemical results for the catchment show some elevated levels of PO_4, Ammonia and BOD. The trend data shows an increase in annual average for ortho-phosphate exceeding the EQS in 2012, 2016 and 2017. The results for 2017 also show a higher average for Ortho Phosphate, Ammonia and BOD which are linked to a very high result in June 2017 and coinciding with a heavy rain event. Spikes of BOD measuring 3.2mg/l were again noted in 2018. This may indicate an intermittent source or surface runoff.

5.1 Owveg (Nore)_030 overview

The PAA has been dived into three compartments which indicated two pathways dominant in the PAA. In compartments one and three, surface and near surface flow is seen as the primary pathway. The soil and rock type for compartment two and compartment one shows more free draining conditions where the primary pathway is more likely to be discharging to ground. However, activities on the slope near the monitoring point may need to be examined.

The primary source for any water quality issues is agriculture as the significant pressure in the PAA. Investigation of the pasture based agriculture will be a source of potential diffuse pollution. The PAA also has an intensive agricultural enterprise and the landspreading from this may also need to be examined. The initial characterisation report flags sediment as an issue to be considered and the outfall if any from the two quarries in the PAA may need to be examined. The issue of point sources of pollution cannot be assessed on the current data.

6. Work Plan

The most recent biological and ecological results for the PAA shows a return to Q4. However, as the Q value has dropped previously an initial assessment is warranted to ensure consistent good status and also to look at any potential sediment impact on the catchment. The inputting water has no chemical data and it is proposed to carry out a suite of chemical analysis and biological assessment at the start of the catchment as well as a serious of SSIA's and catchment walks at the locations outlined in Figure 6-1 below.

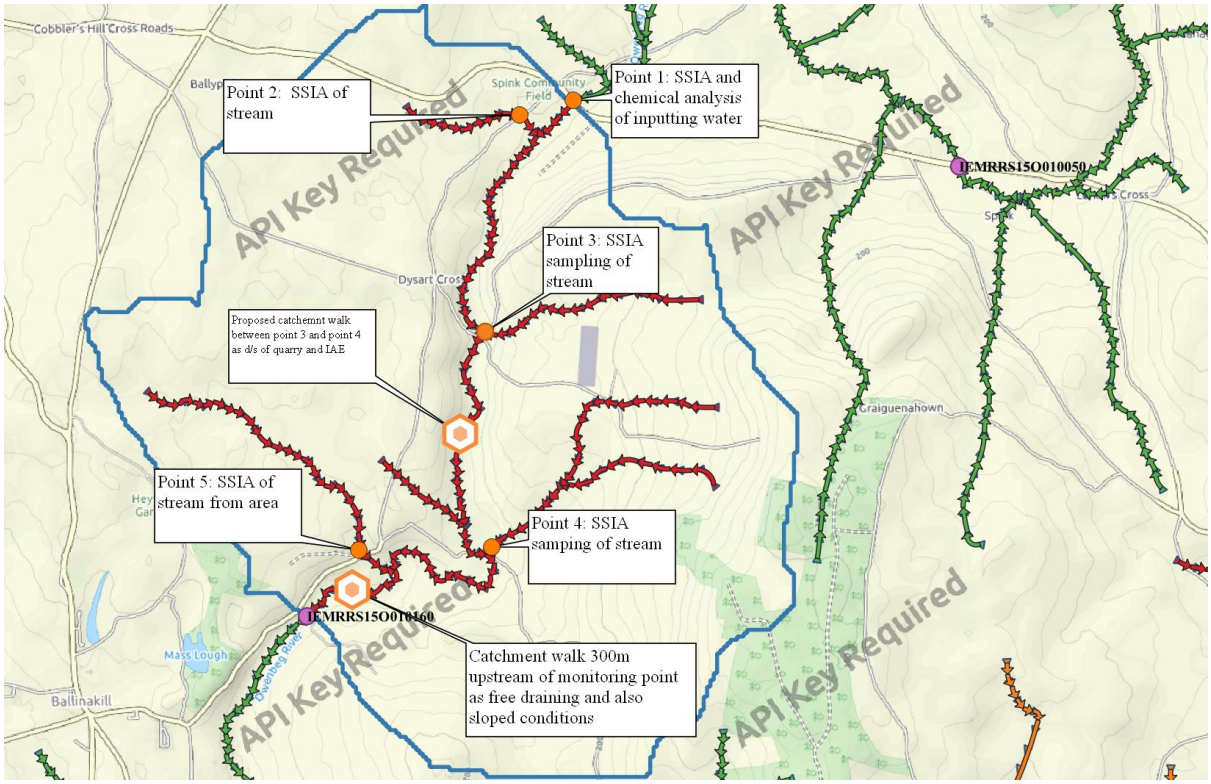


Figure 6-1 Map of proposed are work plan locations.

The proposed investigative measures at the above locations are summarised as follows:
Point1: The inputting waters have no chemical data and a monitoring point that is a distance from the catchment, so it is proposed to carry out an assessment of the inputting waters.
Points 2, 3,4 and 5 are sampling tributary streams from areas where overland flow has been identified as the primary pathway. This will help identify areas of possible diffuse pollution.

Catchment walks are proposed at two locations. The first is between point 3 and point 4 and is chosen as it is downstream of a quarry and is part of the sediment assessment of the PAA. The second is upstream of the EPA monitoring point RS15O010160. This area is expected to be a free draining area with a to ground pathway. However, the area above the monitoring point appears to be steely sloping and a river walk for signs of point or possible diffuse pollution is proposed for a stretch of 300m.

If an issue is identified following SSIA then a catchment/river walk will be undertaken at the rank 1 PIP sites for sources of Phosphorus.

7. Possible Mitigation Options

The PAA is largely agricultural and a focus on the farm and nutrient management practices in the area may be needed. This may take the form of farm advise and awareness from ASSAP and depending on farm visits possible facility upgrades. Possible works on the quarry and its silt management may need reviewing depending on the results of the investigation.

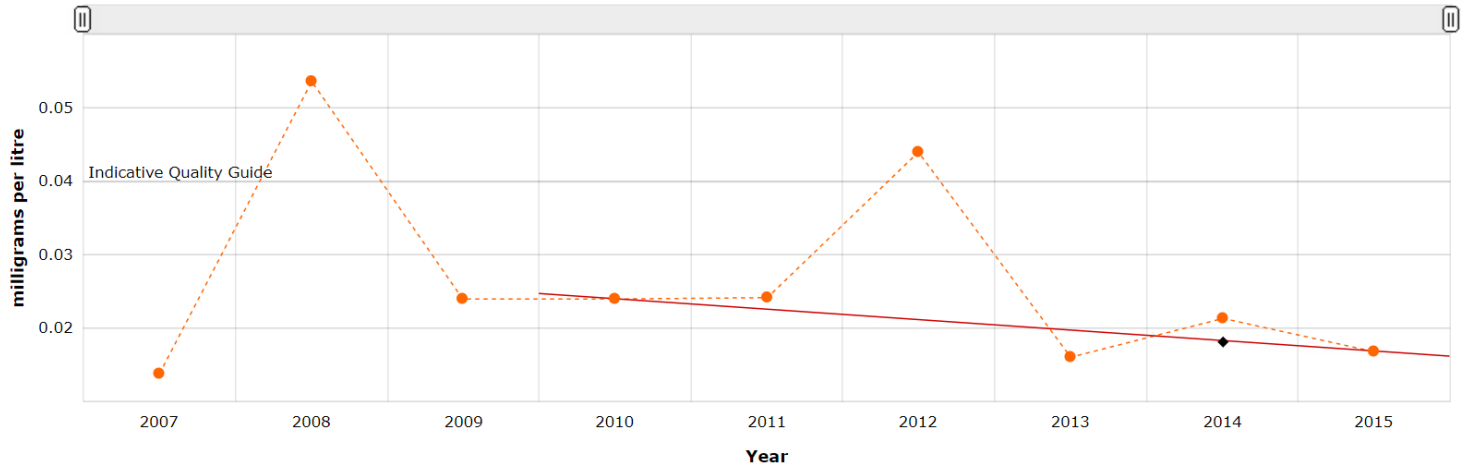
Appendix (Supporting Information)

Biological Information

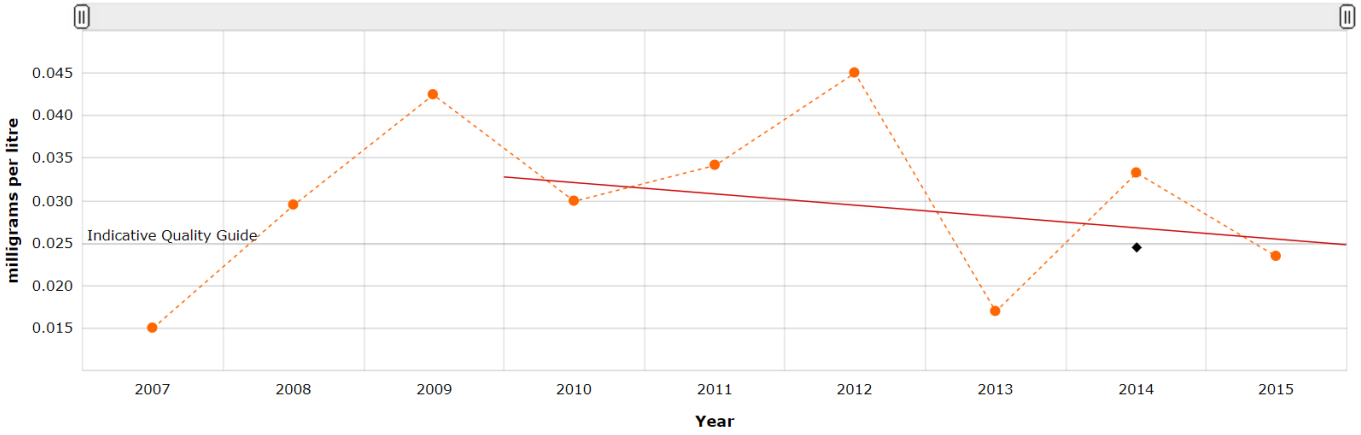
	1995	1998	2001	2005	2007	2010	2013	2016
Result	4	3.5	4	4	4	4	3.6	4
Classification	Good	Moderate	Good	Good	Good	Good	Moderate	Good
Q-Value	4	3-4	4	4	4	4	3-4*	4

Station RS15O010160 Br WNW of Boleybawn (Cloghoge)

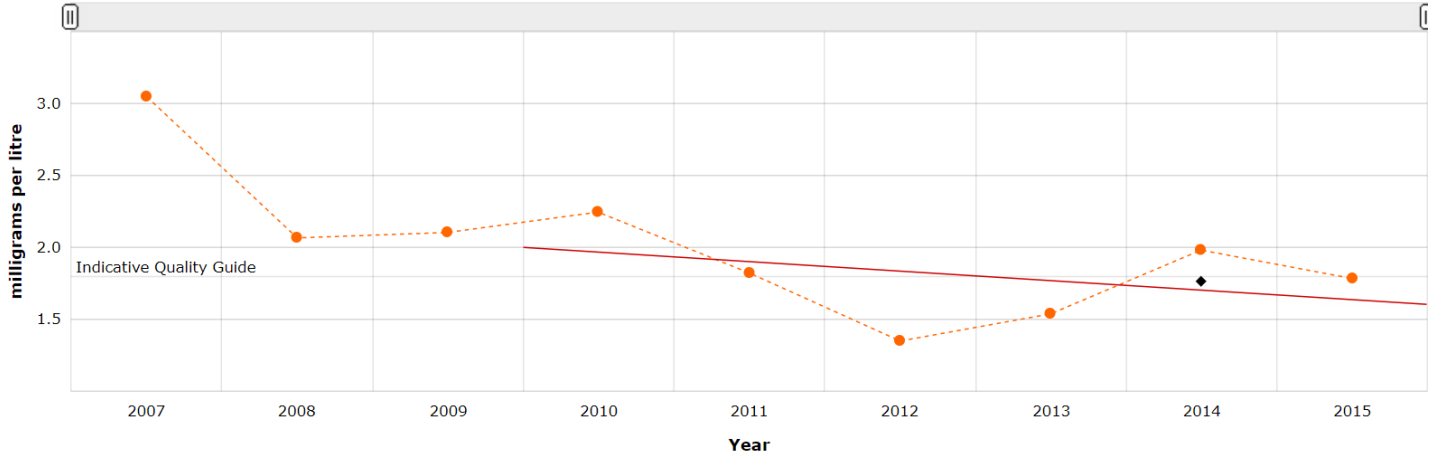
Chemistry Data



Ammonia Results (as N) for Br WNW of Boleybawn (Cloghoge)



Phosphate results (as P) at Br WNW of Boleybawn (Cloghoge)



TON results (as N) at Br WNW of Boleybawn (Cloghoge)