NIEA: Water Management Unit

2019-20 Catchment Investigations

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NIEA Northern Ireland Environment Agency
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An Agency within the Department of Agriculture, Environment and Rural Affairs
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Introduction

Within Northern Ireland, the European Water Framework Directive (2000/60/EC) (WFD) is transposed through the Water Environment (Water Framework Directive) Regulations (Northern Ireland) 2017. This is the primary driver for assessing our local waters and achieving good ecological status for our water environment. In accordance with these regulations, the Catchment Team selected a number of waterbodies for investigation in year 2019 to 2020.

The rationale for this selection process included the following criteria:

- Deteriorations in the Water Body Classification
- Bathing water failures
- Investigations in Dundrum Bay
- Waterbodies flagged by the Border Regional Operations Committee

Waterbodies selected for investigation

Map 1 below shows the distribution of the selected priority waterbodies across Northern Ireland and associated upstream water bodies in the catchment that also were investigated. Priority bathing waters catchments investigated are also illustrated.

Map 1: Location of the 2019-10 Priority Water Bodies

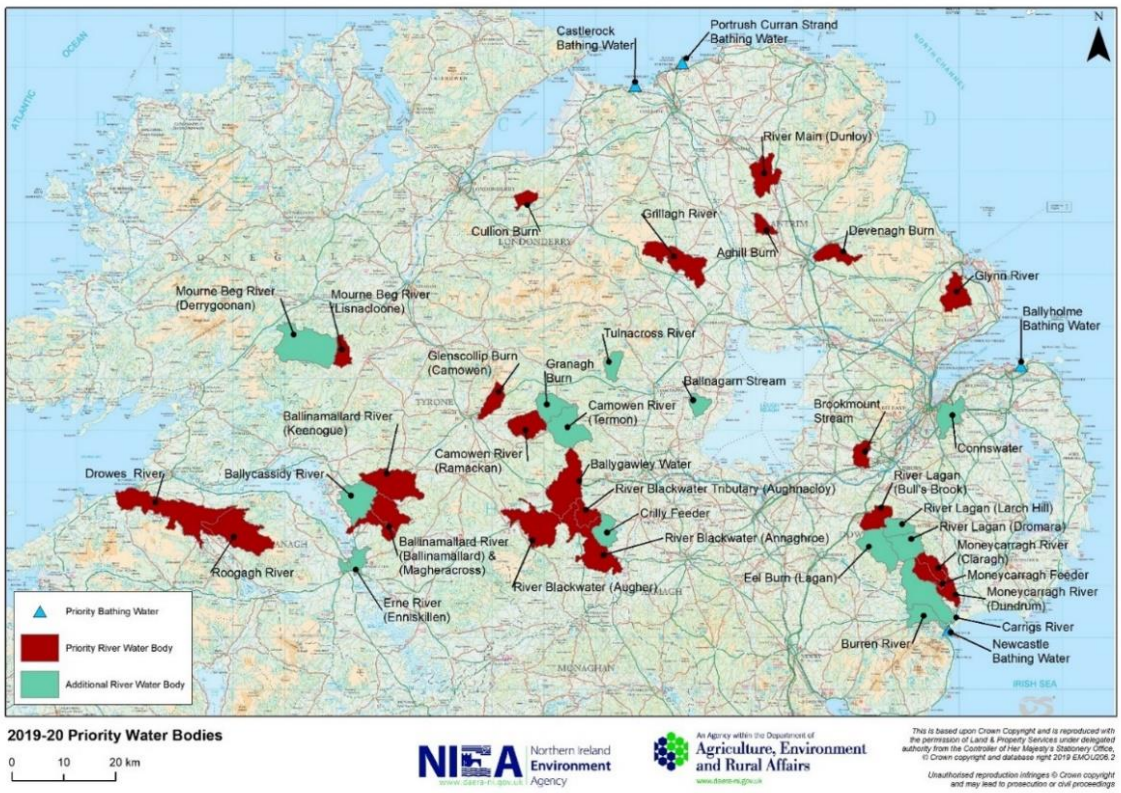

Table 1 below lists the waterbodies selected for investigation in each catchment management area, with a hyperlink to the relevant waterbody report.

Table 1: List of waterbodies selected for investigation in 2019-20

Catchment Management Area	Waterbody ID	Waterbody Name
Neagh Bann Upper	GBNI1NB030308223	River Blackwater Augher
Neagh Bann Upper	GBNI1NB030307041	Blackwater Tributary Aughnacloy
Neagh Bann Upper	GBNI1NB030307175	Ballygawley Water
Neagh Bann Upper	GBNI1NB030308201	River Blackwater Annaghroe
Neagh Bann Lower	GBNI1NB030302021	Devenagh Burn
Neagh Bann Lower	GBNI1NB030302157	Aghill Burn
Neagh Bann Lower	GBNI1NB030308234	Grillagh River
Neagh Bann Lower	GBNI1NB030308244	River Main, Dunloy
North East	GBNI1NE050503046	River Lagan (Bull's Brook)
North East	GBNI1NE050503106	Brookmount Stream
North East	GBNI1NE050505067	Moneycarragh River Claragh
North East	GBNI1NE050505063	Moneycarragh River Dundrum
North East	GBNI1NE050505059	Moneycarragh Feeder
North West	GBNI1NW020204025	Cullion Burn
North West	GBNI1NW010102092	Camowen River Ramackan
North West	GBNINW010102039	Glenscollip Burn
North West	GBNI1NW010102064	Mourne Beg River Lisnacloone
North West	GBNI1NW353504082	Drowse River
North West	GBNI1NW363601046	Ballinamallard River, Magheracross
North West	GBNINW363604039	Ballinamallard River, Kennogue
North West	GBNI1NW363601042	Ballinamallard River, Ballinamallard

Waterbody Investigation Summaries

Neagh Bann Upper

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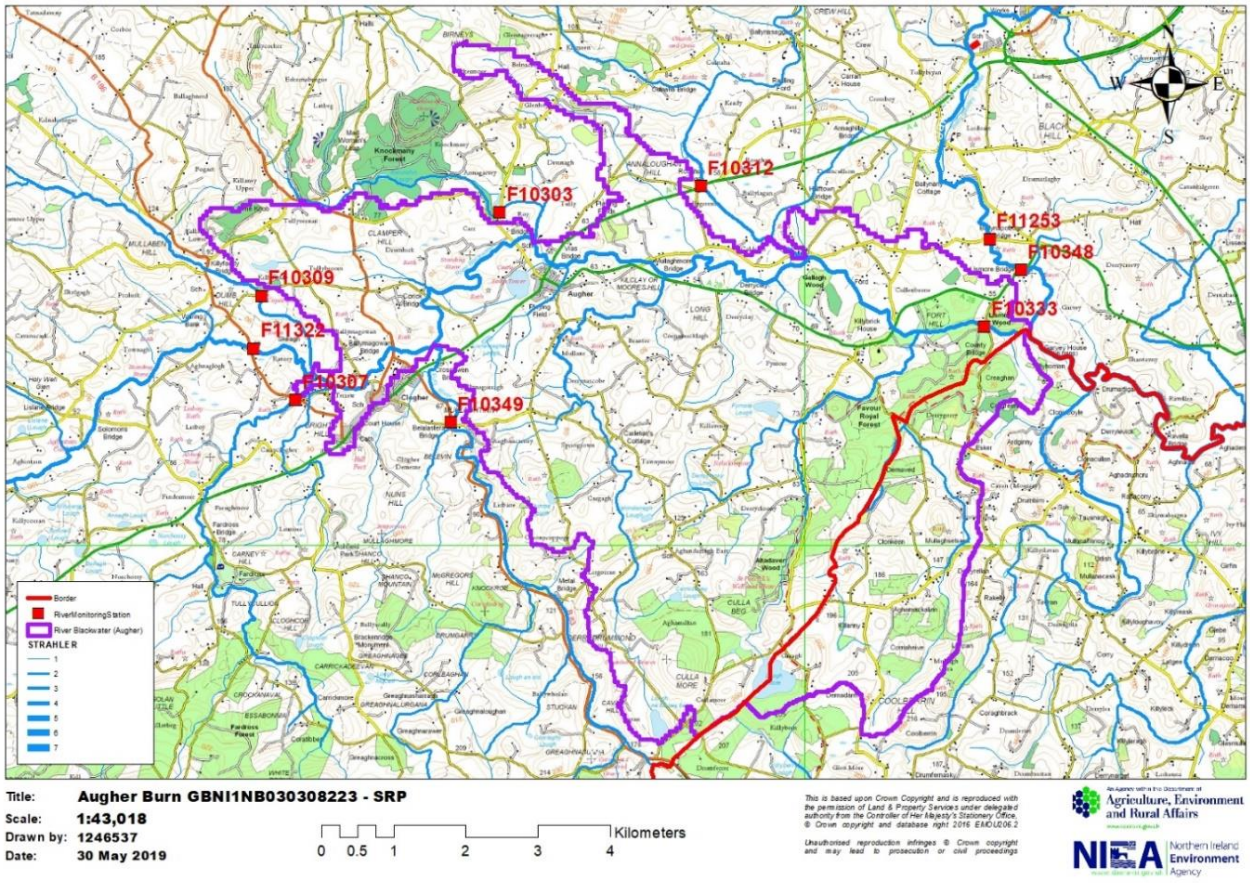
River Blackwater (Augher) GBNI1NB030308223

Background

River Blackwater (Augher) GBNI1NB0303082232 (Map 2), is situated within the Blackwater Local Management Area. The highest land cover type in this 51.63 km^2 water body is improved grassland which makes up 53% and 3.5% arable farming indicating that the area is intensively farmed. WFD classification published in 2015 assessed this river water body as Good Overall Status, however in the WFD 2018 classification the water body had deteriorated to Moderate Overall Status.

Map 2: Location of the River Blackwater (Augher) Water body



The issues

The deterioration was due to a deterioration in macrophyte status from Good to Moderate i.e. a single element failure and as such this water body has been selected as a priority water body for investigation.

Our actions

1. A desktop study to determine sample sites.
2. A bridge overview survey at each sample site.
3. A Dissolved Oxygen % (DO%) survey at each sample site.
4. A water sample to determine Soluble Reactive Phosphorus (SRP) levels at each site.
5. A macrophyte survey will be completed by Water Management Unit Ecology Team.

The outcomes

Results from the 2019 catchment investigations show that of the 15 sites surveyed on this water body there were only 2 sites that showed a slight decline in DO% (72.9% and 69.5% saturation). WFD environmental quality standards (EQS) state that a DO% of >75% is classed as Good status. Both of these sites were visited by the Water Quality Inspector and no visible evidence of pollution was found and only 2 sites showed a slight elevation in SRP levels.

Results from the macrophyte survey completed by WADE gave an outstanding result and now show that the status of this single failing element is High with a confidence in class of 100%. Macrophyte status at this monitoring point has therefore improved by two classes from Moderate in 2015 to High in 2019. The improvement is due to the reduction of 3 eutrophic indicator taxa and the introduction of 2 bryophyte species.

Conclusion and Recommendations

Due to the additional monitoring that took place in this waterbody it is now no longer considered a deteriorated water body. The macrophyte survey completed in 2019

resulted in this element producing High Status and in conjunction with all of the other WFD elements surveyed within this water body it is now back to an overall status of GOOD. The positive change in macrophyte Species Cover Values (SCVs) may be attributed to an improvement in SRP levels between 2015 and 2019. Thirteen routine chemistry samples were taken during 2018 and 2019 and 11 of them were classed as high or good and only 2 were classed as moderate during June and August 2018.

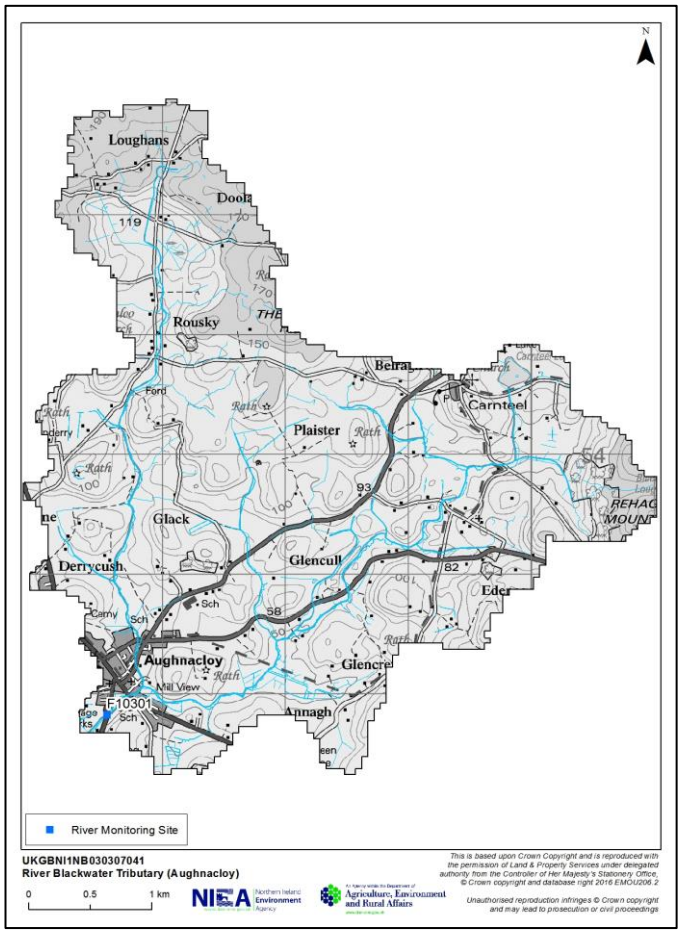
Given that this water body is now meeting the WFD objective status of Good, no further additional investigations are required. However, all of the WFD required elements will continue to be routinely monitored and assessed in River Blackwater (Augher).

Blackwater Tributary at Aughnacloy GBNI1NB0303087041

Background

River Blackwater Tributary at Aughnacloy GBNI1NB0303087041 (Map 3), is situated in the Blackwater Local Management Area (Map 1). It has an area of 30.01 Km^2 and the highest land cover type is improved grassland which makes up 76%, indicating that the area is intensively farmed. WFD classification published in 2015 and 2018 assessed this water body as Moderate overall status and in 2018 the failing element was SRP. This water body has been selected as a priority water body for investigation as it feeds in to the deteriorated water body GBNI1NB030308201 River Blackwater (Annaghroe). The aim is to detect any pollution issues that Blackwater Tributary at Aughnacloy may be causing on the downstream River Blackwater at Annaghroe.

Map 3: Location of River Blackwater Tributary Aughnacloy Waterbody



The issues

This water body has not deteriorated, however it has been prioritised for additional investigation as it feeding in to the deteriorated Water Body River Blackwater (Annaghroe) GBNI1NB030308201, which is failing for Dissolved Oxygen.

Our actions

1. A desktop study to determine sample sites.
2. A bridge overview survey at each sample site.
3. A Dissolved Oxygen % (DO%) survey at each sample site.
4. A water sample to determine Soluble Reactive Phosphorus (SRP) levels at each site.
5. An invertebrate survey upstream and downstream of Aughnacloy Waste Water Treatment Works (WWTW)

The outcomes

There were 2 sites surveyed for investigatory DO% and SRP by the Catchment Management Officer (CMO) and Water Quality Inspector (WQI). Both sites had DO% which was >75% and this is considered as Good under the WFD Environmental Quality Standard. This suggests that there were no negative impacts affecting dissolved oxygen at the time of sampling. The SRP results were also low with the highest value of 0.11mg/l found at site 1. It is important to note that this water body is not routinely sampled for WFD chemistry and so there are no environmental quality standards for comparison. Results from the invertebrate survey at Aughnacloy WWTW however show a change from moderate to poor between the upstream and downstream sample points with sewage fungus present at both sample points.

Conclusion and Recommendations

The results from the CMO investigation do not show a significant impact based on the DO and SRP results in this water body and there was no sewage fungus noted at the time of sampling. However, there was a notable amount of sewage fungus present

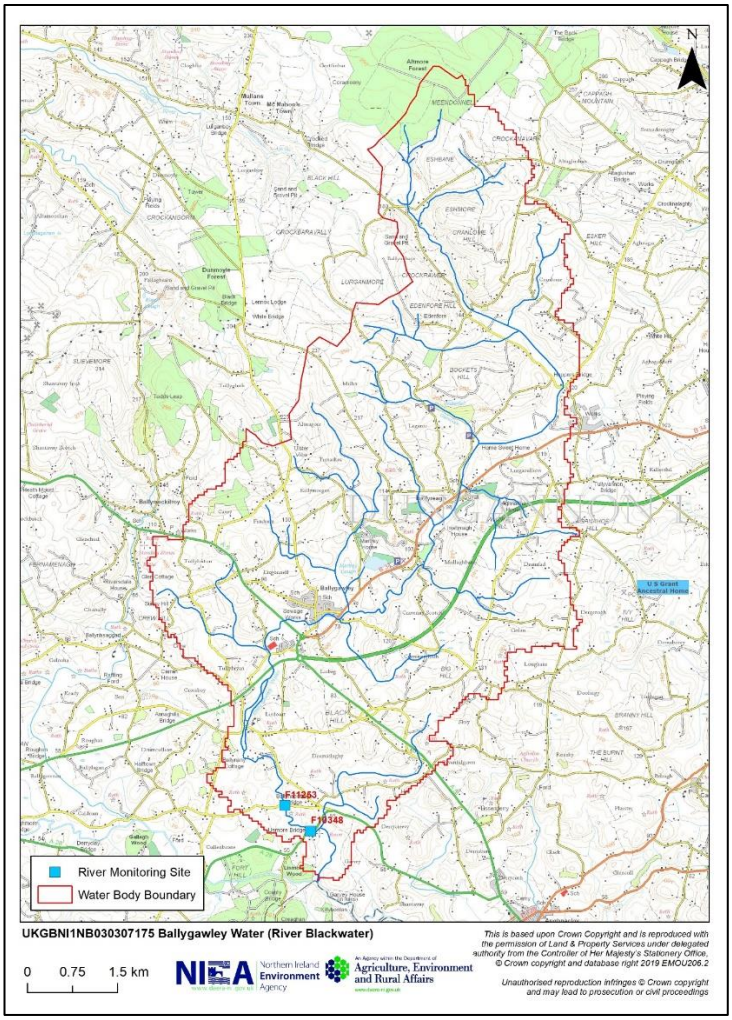
upstream and downstream of the WWTW. The WWTW is located downstream of the WFD biological sampling point and therefore whilst this isn't impacting the WFD classification in this water body, it may be having an impact on the downstream water body River Blackwater at Annaghroe. Further investigation is required upstream and downstream of Aughnacloy WWTW and this will be completed by the CMO and WQI. It is also recommended that work should be completed on riparian zones within this water body. Recommendations for this work will be forwarded for possible uptake through the Environmental Farming Scheme. It is hoped that further investigation in to Aughnacloy WWTW, as well as upstream of the WWTW and riparian zone work will mitigate any detrimental issues that are impacting this water body and the downstream water body at Annaghroe.

Ballygawley Water GBNI1NB030307175

Background

Ballygawley Water GBNI1NB030307175 (Map 4), is situated in the Blackwater Local Management Area. It has an area of 53.3 Km ^{2} and the highest land cover type is improved grassland which makes up 68%, indicating that the area is relatively intensively farmed. WFD classification published in 2015 assessed this river water body as Good overall status however in WFD 2018 classification the water body had deteriorated to Moderate overall status.

Map 4: Location of Ballygawley Water Priority Waterbody



The issues

The deterioration was due to a decline in Soluble Reactive Phosphorous (SRP) status from Good to Moderate i.e. a single element failure and as such this water body has been selected as a priority for investigation.

Our actions

1. A desktop study to determine sample sites.
2. A bridge overview survey at each sample site.
3. A Dissolved Oxygen % (DO%) survey at each sample site.
4. A water sample to determine Soluble Reactive Phosphorus (SRP) levels at each site.
5. An invertebrate survey upstream and downstream of Ballygawley WWTW

The outcomes

There were 18 sites surveyed for investigatory DO% and SRP by the Catchment Management Officer (CMO) and Water Quality Inspector (WQI). A total of 17 sites had a DO% which was >75% and this is considered as Good status under the WFD Environmental Quality Standard. Only 1 site (Site 1) had a DO% of < 75%. The SRP results were also good with 14 sites showing low SRP levels and 4 sites (including Site 1 mentioned above) had slightly elevated SRP levels. The increase in SRP coupled with the drop in DO% at site 1 would suggest that there is an issue upstream that is having a negative impact on the waterway. As the land cover is in mainly composed of improved grassland and arable farming and the majority of historical pollution incidents are related to agricultural matters, it may suggest that the deterioration of the SRP at the other 3 sites are influenced by agricultural practice in the area. Results from the invertebrate survey at Ballygawley Waste Water Treatment Works (WWTW) show a change from good to moderate status between the upstream and downstream sample points. However the results of both samples are close to the Good/ Moderate boundary of the Environmental Quality Standard and there is very little difference in the biotic score, number of taxa and the species found at each site. This suggests that there is a slight decline in water quality downstream of the WWTW discharge pipe and whilst the WWTW

did not appear to be having a great detrimental impact on the waterway at the time of sampling it may be a contributing factor to the failure of SRP in this water body.

Conclusion and Recommendations

The results from the CMO and WQI investigations show that the source of the SRP deterioration is likely to be linked to a combination of agriculture and Ballygawley WWTW. The results of these initial surveys already completed on the Ballygawley Water require further investigation by the Catchment Management Officer and Water Quality Inspector. River walks will be completed upstream of those sites showing an increase in SRP and it is hoped that this will give an insight into the cause of this impact. Upstream of Site 1, which showed a decrease in DO% and a slight increase in SRP level, has already been inspected by the Water Quality Inspector and any issues found have been dealt with in the appropriate manner. A river walk downstream of Ballygawley WWTW will also be completed. Any issues arising from the completed river walks will be passed on to the relevant teams for mitigation.

It is also recommended that work should be completed on riparian zones within this water body. Recommendations for this work will be forwarded for possible uptake through the Environmental Farming Scheme.

It is hoped that with completion of the recommendations above that this water body will meet its 2021 objective of Good.

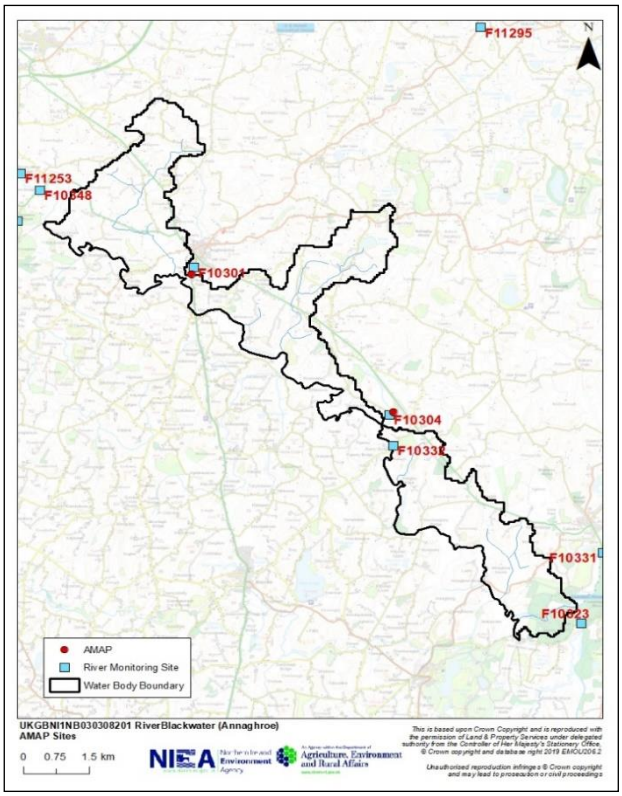
River Blackwater (Annaghroe) GBNI1NB030308201

Background

River Blackwater (Annaghroe) GBNI1NB030308201 (Map 5), is situated in the Blackwater Local Management Area. The River Blackwater (Annaghroe) WFD classification published in 2015 assessed this river water body as Good Overall Status however in WFD 2018 interim classification the water body had deteriorated to Moderate Overall Status.

The highest land cover type in this 30km waterbody is improved grassland which makes up 76% and neutral grassland covers 7% indicating that agriculture is dominant in this area.

Map 5: Location of the River Blackwater (Annaghroe) Waterbody



As all of the other WFD elements are at Good or High status for 2018 in River Blackwater (Annaghroe), it can be assumed they are not having an impact on the Dissolved oxygen. Upstream watercourse Crilly Feeder GBNI1NB030307042 (WFD status poor) has a poor quality of invertebrates, macrophytes, SRP and Dissolved Oxygen and it was considered that this waterbody may be having a detrimental effect on the water quality of River Blackwater (Annaghroe). The routine monitoring stations for both of these waterbodies are only approximately 1.5km apart. A catchment action survey of the Crilly Feeder was completed in 2017 where a number of pollution issues had been discovered causing a decline in DO%. These issues had been followed up by the NIEA Water Quality Inspector in 2017 and mitigation measures put in place. A follow up DO survey was completed on Crilly Feeder in 2019 and an improvement was noted at 2 out of the 3 sites that were failing for DO in 2017 giving results of >75% DO saturation.

The issues

The deterioration was due to a decline in dissolved oxygen status from Good to Moderate i.e a single element failure and as such this water body has been selected as a priority water body for investigation in order to determine reasons for decline.

Our actions

1. A desktop study determined sample sites.
2. A bridge overview survey at each sample site
3. A DO survey at each sample site
4. A water sample to determine SRP levels at each site was collected.

There is one follow up investigation planned for Crilly Feeder

1. A DO survey at each sample site.

The outcomes

Results from the 2019 CMO investigations show that of the 4 sites surveyed on this water body there was only 1 site that showed both a slight decline in DO% (72.4% saturation)

and an elevated SRP level of 0.31mg/l. This site has been recommended for further investigation in 2020.

Results from the 2019 CMO follow up DO investigation at upstream water body Crilly Feeder show an improvement in DO% at 2 of the 3 sites that were failing for DO in 2017. The site that showed no improvement has been recommended for further investigation.

Conclusion and Recommendations

The deterioration of this water body is likely to be linked to a combination of intensive agriculture, representing 76% of the land cover and pollution from upstream Crilly Feeder. Most of the past pollution incidents were also related to agriculture.

The surveys completed on the River Blackwater (Annaghroe) are initial surveys and require further investigation out in the field by the Catchment Management Officer (CMO). A river walk will be completed upstream of the site that was failing for DO and SRP and it is hoped that findings from this will determine the source/ sources of pollution that are impacting on these elements. Results from this river walk will enable the CMO to pass on any issues found to the relevant teams for mitigation.

A river walk is also required upstream of the site at Crilly Feeder that has shown a continued decline in investigatory DO in 2017 and 2019. On initial inspection at the site the Water Quality Inspector was unable to find any clear evidence of pollution in the waterway. Completion of a more in depth river walk upstream will hopefully determine any issues that are causing a detrimental impact on the DO% saturation.

It is also recommended that work should be completed on riparian zones within this water body. Recommendations for this work will be forwarded for possible uptake through the Environmental Farming Scheme.

These recommendations will be completed in 2020 and it is hoped, as a result of the mitigation measures that will be imposed, that this deteriorated water body will improve in status from Moderate back to Good.

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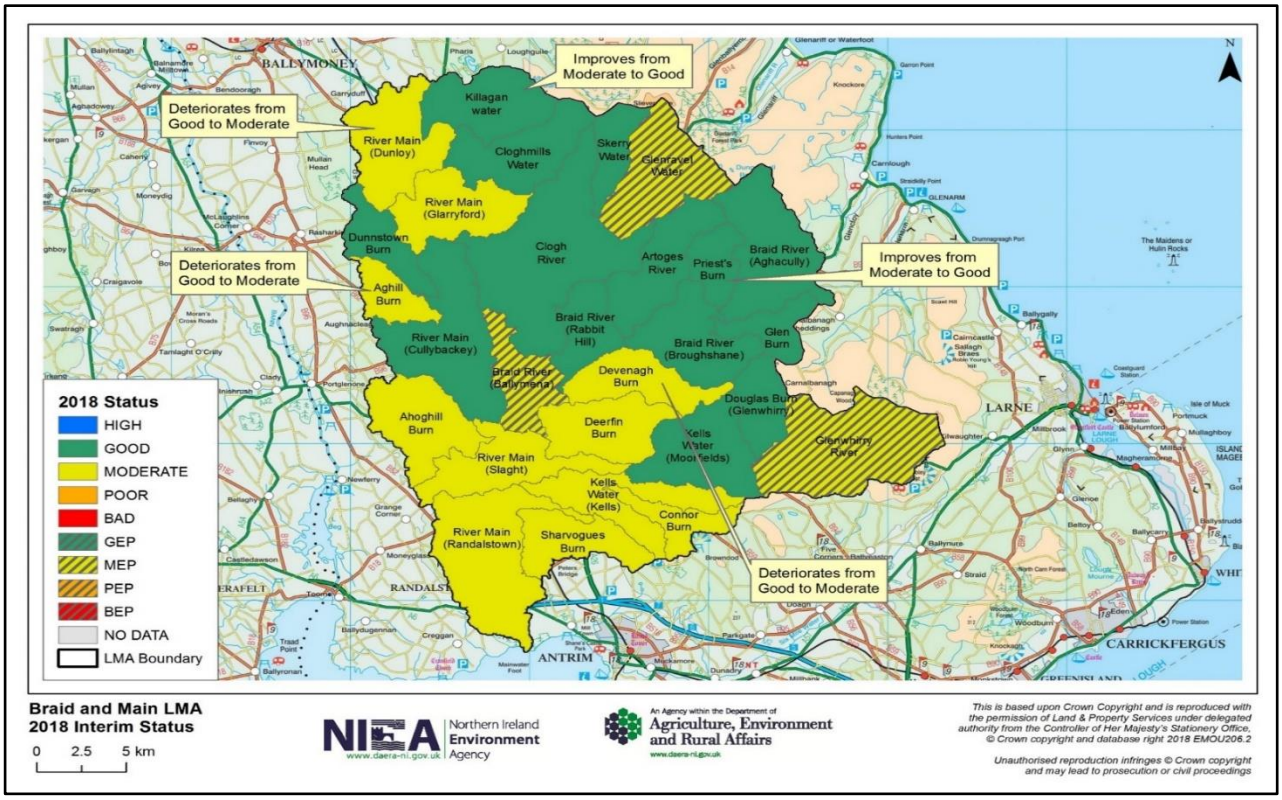
Devenagh Burn, Braid and Maine (GBNI1NB030302021)

Background

The Devenagh Burn water body (GBNI1NB030302021), is located near Ballymena, Co. Antrim (Map 6). The river rises south of Broughshane, flowing west and joins the Braid River near Ballymena town.

Map 6: Location of Devenagh Burn with the Braid and Maine catchment, annotated with information on WFD status changes.



The issues

The overall status for the Devenagh Burn under the Water Framework Directive (WFD) was 'Moderate' in 2018 (interim status). This was due to one single failing element -

Soluble Reactive Phosphorus (SRP). This meant that the status of the overall water body under the WFD had deteriorated from 'Good' in 2015 to 'Moderate' in 2018. For this reason the Devenagh Burn was chosen as a priority water body in 2019 – 2020 in order to investigate and address the reasons for this decline. The 2021 objective for this water body is 'Good'.

Our actions

As the water body is failing for SRP, investigations were undertaken to identify areas of elevated SRP and nutrient loading and identify any water quality issues.

Investigation undertaken included:

- Initial desktop study
- SRP sampling
- Dissolved oxygen surveys
- River walk over surveys
-

The Devenagh Burn water body is 20km^2 and is predominately made up of 'Improved Grassland'. The farming industry is the dominant land user. There is an area of 'Built-Up Areas and Gardens' to the North West of the site, which can be identified as a large factory and an industrial estate. There are no WWTWs within the water body. There is a sewage system in the industrial area to the north west of the site. The majority of previously reported pollution incidents were farming incidents. There is extensive river modifications such as channelisation and over deepening.

The outcomes

The Devenagh Burn water body was classed as High for dissolved oxygen in 2009, 2015 and 2018 classification. Dissolved oxygen levels in this investigation were found to be healthy throughout the catchment, ranging from 85% to 93.8% saturation. It should be noted the SRP and DO surveys in this investigation are not directly comparable to routine

continuous WFD monitoring and should only be viewed as a means of prioritising specific areas for further investigation.

Five sites were sampled for SRP along the main channel and main tributaries of the Devenagh Burn. All sites had similar SRP levels, however the most downstream site (also the WFD monitoring site F10197) had a slightly elevated SRP result. Soluble Reactive Phosphorus is monitored monthly at the WFD monitoring site F10197. In recent years there have been failures in SRP in the winter and summer months, with more consecutive failures occurring over the summer months in 2017 and 2018. Maps from the 'Tellus Project' show there are areas within the water body (especially around the WFD monitoring point and upstream river sections) that are high in soil phosphorus. Fertiliser application and slurry spreading on phosphate-rich soils, combined with a number of other factors, such as high rainfall, may have contributed to increased run off.

A large amount of sewage fungus (90% coverage) was found on an upstream tributary in November 2019. The Water Quality Inspector for the area traced the source to an overflowed silage effluent tank and the issue was resolved. Given that there were failures at the WFD monitoring site in January 2017, 2018 and 2019, winter storage of silage and slurry may be an issue in the catchment.

The downstream stretch of the Devenagh Burn lies within an industrial estate. The WFD monitoring site is directly downstream of the industrial area. There was evidence of a number of discharges to the waterway within the complex that were enriched with what looked like domestic sewage, and it seems likely there are domestic misconnections to the storm system which can result in chronic low-level enrichment. Water connectivity maps of this area shows that this area is prone to flooding, which may further facilitate the passage of pollution to the river, particularly in time of increased rainfall.

Conclusion and Recommendations

This water body is under pressure from agricultural, domestic and industrial pressures. The industrial site has been highlighted for Pollution Prevention visits by NIEA staff. Further river walks are to be carried out to identify areas of nutrient loading and possible misconnections upstream of the WFD monitoring point.

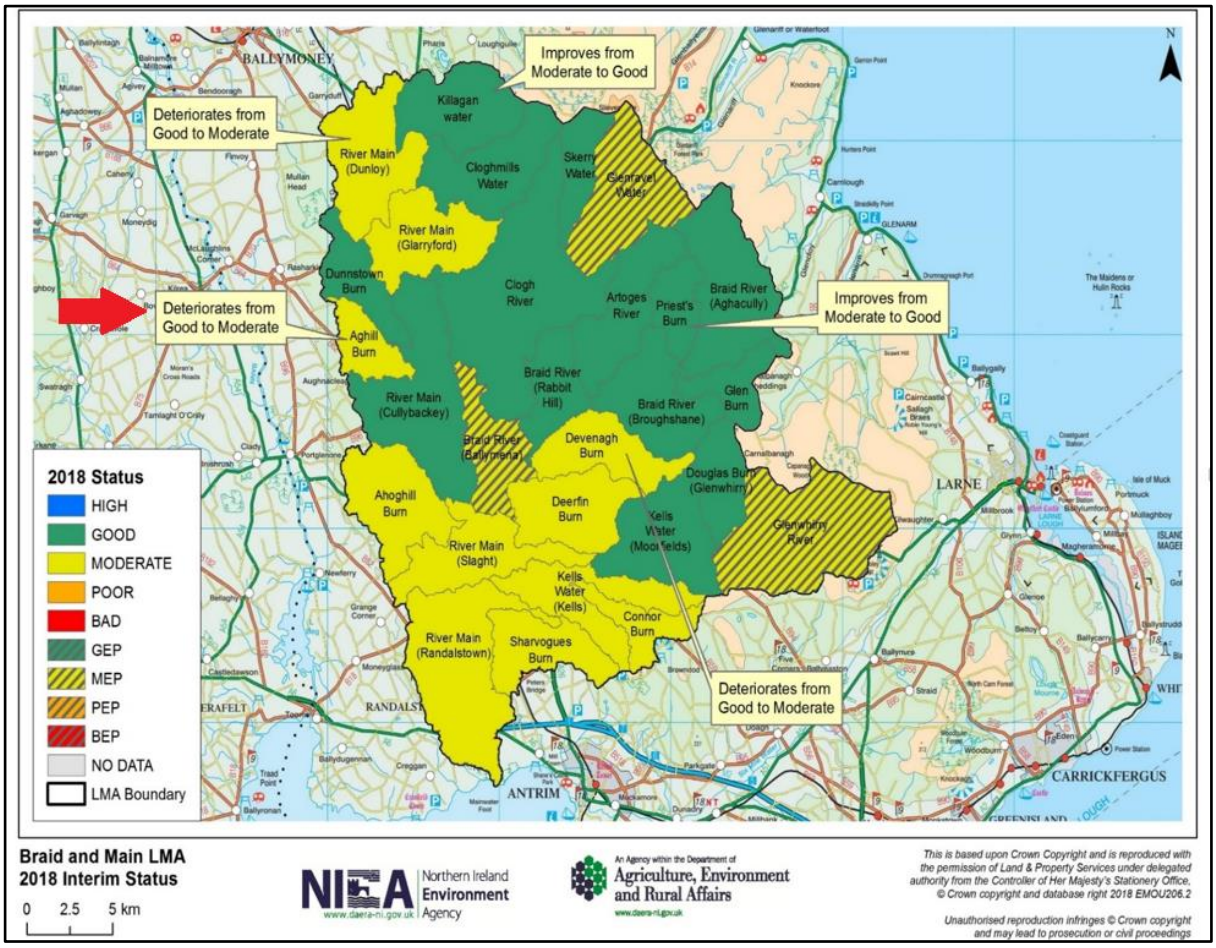
As a priority water body, all of the farms in the water body are given an additional weighting in the NIEA Cross Compliance risk selection and specific farms have been recommended for Cross Compliance visits. Specific locations have also been identified as areas that would benefit from the DAERA Environmental Farming Scheme (EFS) to help to address diffuse pollution issues identified in this investigation.

Aghill Burn (GBNI1NB030302157)

Background

The Aghill Burn (GBNI1NB030302157), is located within the Braid and Maine catchment, near Cullybackey, County Antrim (Map 7). The river rises near Rasharkin, County Antrim, flowing east towards the River Maine. The overall status of Aghill Burn, under the Water Framework Directive (WFD) was 'Moderate' in 2018 (interim status) due to a single failing element – Soluble Reactive Phosphorous (SRP). As this river had deteriorated in overall water body status from 'Good' in 2015, Aghill Burn was selected as a priority water body.

Map 7: Location of Aghill Burn Waterbody within the Braid and Maine Local Management Area (highlighted with red arrow)



The issues

As the water body is failing for SRP, investigations were undertaken identify areas of increased SRP and nutrient loading and identify any water quality issues.

Our actions

- Initial desktop study
- SRP sampling
- Dissolved oxygen surveys
- River walk over surveys

The Aghill Burn water body is 114 km^2. The majority of the catchment is improved grassland, with pockets of bog and rough grassland. There are no Waste Water Treatment Works within the water body and no septic tank hotspots. There is little sewage infrastructure other than a sewage system, pumping station and sewage outfall downstream of the monitoring point. Recorded point source pollution incidents have been septic tank discharges. Sections of the river are channelized (straightened and deepened), with other sections more natural.

The outcomes

The Aghill Burn water body was classed as High for Dissolved Oxygen in 2009, 2015 and 2018 classification. Dissolved oxygen levels in this investigation were found to be healthy throughout the catchment, ranging from 77.5% to 96% saturation. It should be noted the SRP and DO surveys in this investigation are not directly comparable to routine continuous WFD monitoring and should only be viewed as a means of prioritising specific areas for further investigation.

In the 2019 investigation, seven investigative sample points where chosen throughout the catchment focusing on the tributaries in an effort to establish tributaries which are

contributing most to the SRP failure. All sites had similar SRP levels, with the exception for one site on the Carclinty Road which had elevated levels of SRP.

Soluble Reactive Phosphorous is monitored monthly at Craig's Bridge. These monitoring results from 2009 to 2018 have shown the majority of samples for SRP being 'High/Good' in 2019, but the majority of samples declined to 'Moderate' in 2018. Peaks in SRP values occur in the summer months, suggesting winter nutrient storage on farm is adequate and the issues arise through the summer months when the stock are in field and chemical fertilizer and slurry applications are made.

Tellus data indicates the levels of Phosphate within the soil are elevated in the south-east, close to the monitoring point. The results from this investigation showed one tributary contributing more SRP (and lower dissolved oxygen) compared to other tributaries, which may be impacting on the water body's sample point. This tributary was targeted with river walk over surveys to identify water quality issues. Biological indicators of enrichment within this tributary vary along its length, with no point sources of pollution identified. From the investigations carried out on Aghill Burn, diffuse pollution from agriculture is the main issue identified, with few fields fenced and no buffers between agricultural practices and the river.

Conclusion and Recommendations

Agriculture is the key pressure in this catchment, with the investigation not discovering point source pollution and few reported pollution incidents. Mitigation measures are required to address the diffuse pollution issue. These measures would include riparian buffer strips, ideally planted to address the nutrients run off. Advice from the Knowledge Advisory Service (KAS) is available to all farms and with the DAERA Agri-environment Scheme incentivising implementation of these solutions.

As a priority water body, all of the farms in the water body are to be given an additional weighting in the cross compliance selection, with farms in this catchment added to the

risk selection layer for Agricultural Regulation teams to inspect. It is also recommended that the entire catchment is highlighted to KAS for advisory visits, focusing on diffuse pollution issues. Promotion of the Environmental Farming Scheme (EFS), in the area, is also recommended. These recommendations would help to address the diffuse pollution issues identified in this investigation.

Grillagh River, Lower Bann (GBNI1NB030308234)

Background

The Grillagh River water body (GBNI1NB030308234) (Map 8) is located near Maghera, Co. Londonderry, rising in the Sperrins and flowing east. It is a tributary of the Lower Bann. The Grillagh River catchment is 46 km^2 in size. Land use is predominantly agricultural; the dominant land cover type is improved grassland (50.4%), with other areas of arable/horticulture (10.9%), bog (10.2%), woodland (8.35%) and rough grassland (6.8%) amongst others.

Map 8: Location of the Grillagh River Water Body

The issues

The overall Water Framework Directive status for the Grillagh River in 2015 was Good. This status deteriorated to Moderate in the 2018 interim classification due to a single

failing element - Dissolved Oxygen (DO). All other quality elements monitored were at Good or High Status. The water body was selected as a priority water body to investigate the reasons for the deterioration in DO. The Grillagh River is sampled for both chemistry and biology at the monitoring site at Curdian Bridge. The 2021 objective for this water body is Good.

Prior to 2015, the waterbody had failures in diatoms and a deterioration in Soluble Reactive Phosphorus (SRP), indicating that nutrient issues may have been a problem. Trend analysis shows there is a significant downward trend in Ammoniacal-Nitrogen suggesting that ammonia is not a factor in the DO suppression.

Our actions

Investigations were undertaken to identify areas of low dissolved oxygen and nutrient loading and to identify any water quality issues. Surveys carried out in this investigation included;

- DO surveys,
- SRP water chemistry surveys
- Targeted river walk over surveys.

There are a number of pressures within the water body. There are two Waste Water Treatment Works (WWTW) within the water body at Gulladuff and Beagh. Gullladuff WWTW discharges to a different river (Moyola River). At the time of reporting, these WWTWs were found to be consistently compliant with their discharge standards. There are a number septic tank hotspots with the key area in the centre of the catchment. The majority of previously reported pollution events in this water body were farming and domestic incidents. From the DO monitoring results for the waterbody over the past ten years, there was a particular low score in winter of 2016 which would have lowered the average score to produce the failure in DO status published in 2018.

For this investigation, ten river sites were sampled for SRP (June 2019) and DO (August 2019) throughout the main channel and tributaries. For this type of water body, DO

values above 75% saturation are considered High status and values between 65 – 75% are considered to be Good, with values less than 65% considered a failure in DO.

The outcomes

This investigation showed that the DO levels were greater than 80% at all sites, except for one tributary which had a reduced DO ranging between (63 – 73%). It should be noted that the DO and SRP results in this investigation are not directly comparable to routine continuous WFD monitoring and should only be viewed as a means of prioritising specific areas for further investigation. The investigative SRP results showed a fairly consistent SRP of 0.10 mg/l across sites, except for one tributary which had increased SRP ranging from 0.11 – 0.45 mg/l. This particular tributary was the same tributary that showed lower DO results, and was therefore targeted with a river walk over survey to help identify any issues. The river walks survey highlighted a section of the river with particularly modified habitat, with deepened and straightened sections. In one section livestock access and poaching was observed. There was also significant nutrient enrichment along some of the river section walked, with evidence of organic enrichment in the form of sewage fungus and filamentous algae (up to 100% sewage fungus cover in one area).

Due to elevated SRP and evidence of enrichment farm businesses upstream of this area have been highlighted for environmental protection advice.

Farms have been identified and details sent to the Agricultural Regulations Team for assessment.

Conclusion and Recommendations

The organic loading was traced and details forwarded to the WMU Water Quality Inspectors and the WMU Agriculture Regulation Unit with actions put in place to address the organic enrichment.

Farms were recommended for cross compliance agricultural visits and the entire water body was added into the NIEA Agricultural Regulations Risk Selection for additional visits

that were undertaken in 2020. A number of farms were also put forward as areas that would benefit from DAERA Environmental Farming Scheme (EFS) to help address and prevent diffuse agricultural pollution.

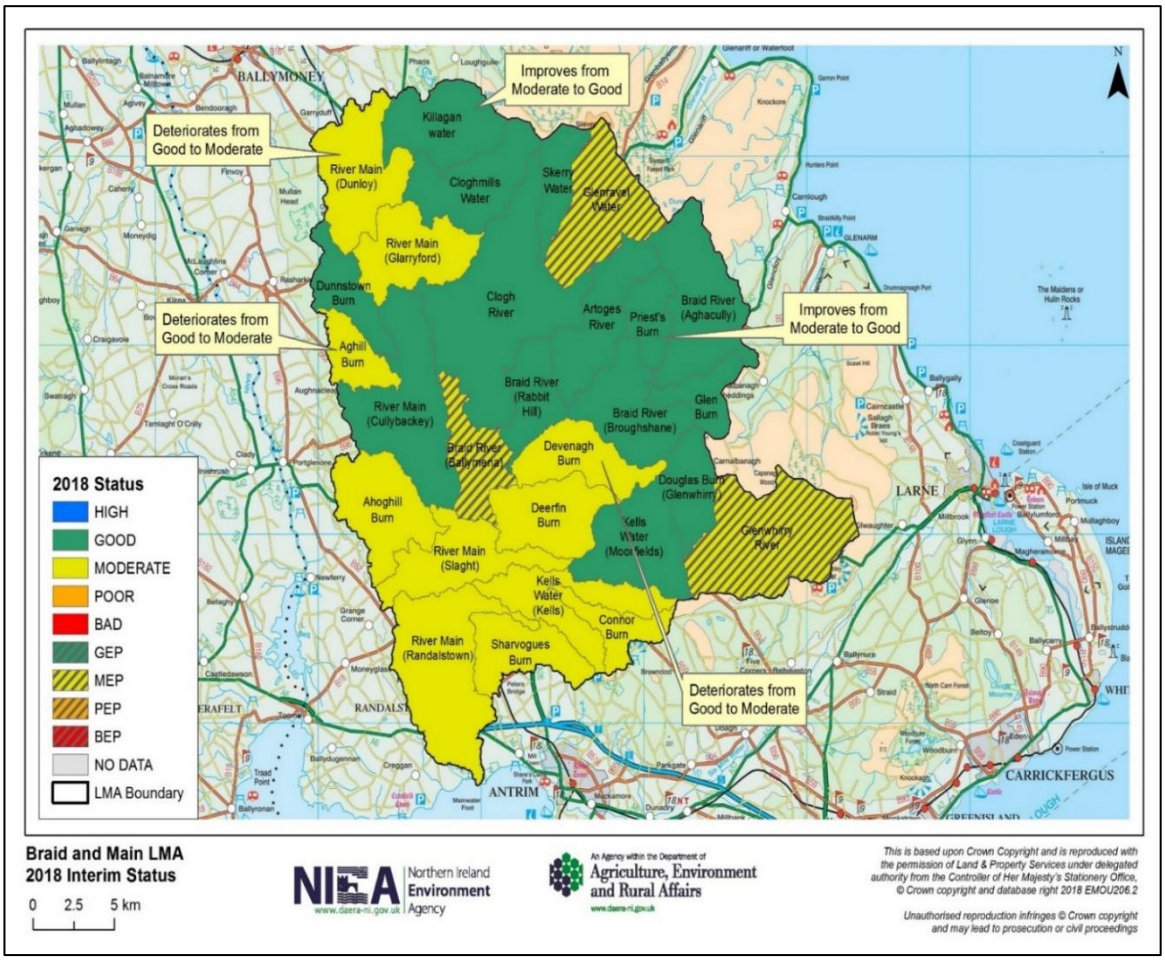
These measures along with immediate pollution prevention action by Water Quality Inspectors, have contributed to improving the water quality in the Grillagh River water body. Monthly sampling at the WFD monitoring site in 2019 has shown that the DO levels are healthy and indicate a return to High status for DO.

River Main (Dunloy) (GBNI1NB030308244)

Background

The River Main Dunloy water body (GBNI1NB030308244) (Map 9), is situated within the Braid and Main catchment, near the village of Dunloy, Co. Antrim. The main channel rises to the north-east of Dunloy, with a secondary main tributary rising to the south of Dunloy, flowing east to join the River Main. The overall status of River Main (Dunloy), under the Water Framework Directive (WFD) was 'Moderate' in 2018 (interim status) due to a single failing element – Dissolved Oxygen (DO). As this river deteriorated in overall water body status from 'Good' in 2015, River Main (Dunloy) was selected as a priority water body.

Map 9: 2018 status of waterbodies within the Braid and Main catchment - River Main (Dunloy) Waterbody located in the north west of the catchment.



The issues

As the water body is failing for DO, investigations were undertaken to identify areas of reduced DO and nutrient loading, to identify any water quality issues.

Our actions

A number of investigations were carried out focused on the failing element – dissolved oxygen and the nutrient loading

- Initial desktop study

- Dissolved oxygen surveys

- Soluble Reactive Phosphate (SRP) sampling

- Bridge overview surveys

- River walk over surveys

- A hydromorphological survey

The River Main (Dunloy) water body is 30km^2 and the land use is predominantly related to intensive agriculture with 'Improved Grassland' and 'Arable and Horticulture' accounting for 71% of the land use. The Special Areas of Conservation 'Main Valley Bogs' (designated active raised bog) is located north east of Dunloy town. There are Waste Water Treatment Works (WWTW) within the water body and septic tank hotspot areas of medium and low risk upstream of the WFD monitoring point F11452. The water body has a high number of domestic sewage consents. Previously recorded point source pollution incidents have included Farm, domestic and industrial discharges. Large sections of the river are channelised (straightened and deepened).

The outcomes

During this investigation, three sets of dissolved oxygen surveys were carried out throughout the catchment in June, August and October 2019. Dissolved oxygen levels were found to be consistently healthy in the tributary south of Dunloy village ranging from

91.4% to 98% saturation. However in the east, and especially in the northern half of the catchment, consistently low DO levels were recorded as well as elevated SRP levels.

River walk surveys were carried out on the tributary with the worst SRP and DO levels. Observations included channelisation and sewage fungus covering vegetation, indicating enrichment. This tributary was under pressure both morphologically and from nutrient enrichment.

The results in this investigation would suggest that the main channel (north of Dunloy) is under more pressure than the secondary channel (south of Dunloy). One tributary flowing into the main channel in particular (sites RMD 3 and RMD 9) was shown to have low DO levels and elevated levels of SRP.

It should be noted the SRP and DO surveys in this investigation are not directly comparable to routine continuous WFD monitoring and should only be viewed as a means of prioritising specific areas for further investigation.

Within the River Main Dunloy water body, SRP is monitored monthly at the WFD site F11452 at Killagan Road Bridge. The majority of SRP failures from 2015 to 2019 (Moderate or below) occurred during the summer months and into the autumn. These would suggest that the issues arise when stock are out in the fields, and slurry and fertiliser spreading is a contributing factor to the elevated SRP levels found in this water body.

Conclusions and Recommendations

Agriculture and domestic sewage are the key pressures in this catchment. Results from the investigations would suggest that the main channel and tributary (north of Dunloy) is under more pressure than the secondary channel (south of Dunloy). Results from the DO and SRP sampling show there are problems with nutrient enrichment within this area of the catchment. The overview from the river walks show that these channels are under pressure in terms of morphology with channelisation and over deepening.

This entire water body has also been added into the NIEA Agricultural Regulations Risk Selection for visits to be undertaken in 2020. Immediate pollution prevention action by

the NIEA staff has already taken place where a potential source of pollution was identified, along with follow up visits to ensure the initial problems have been resolved. A number of locations suffering from diffuse pollution issues have been highlighted for potential DAERA Knowledge Advisory Service visits.

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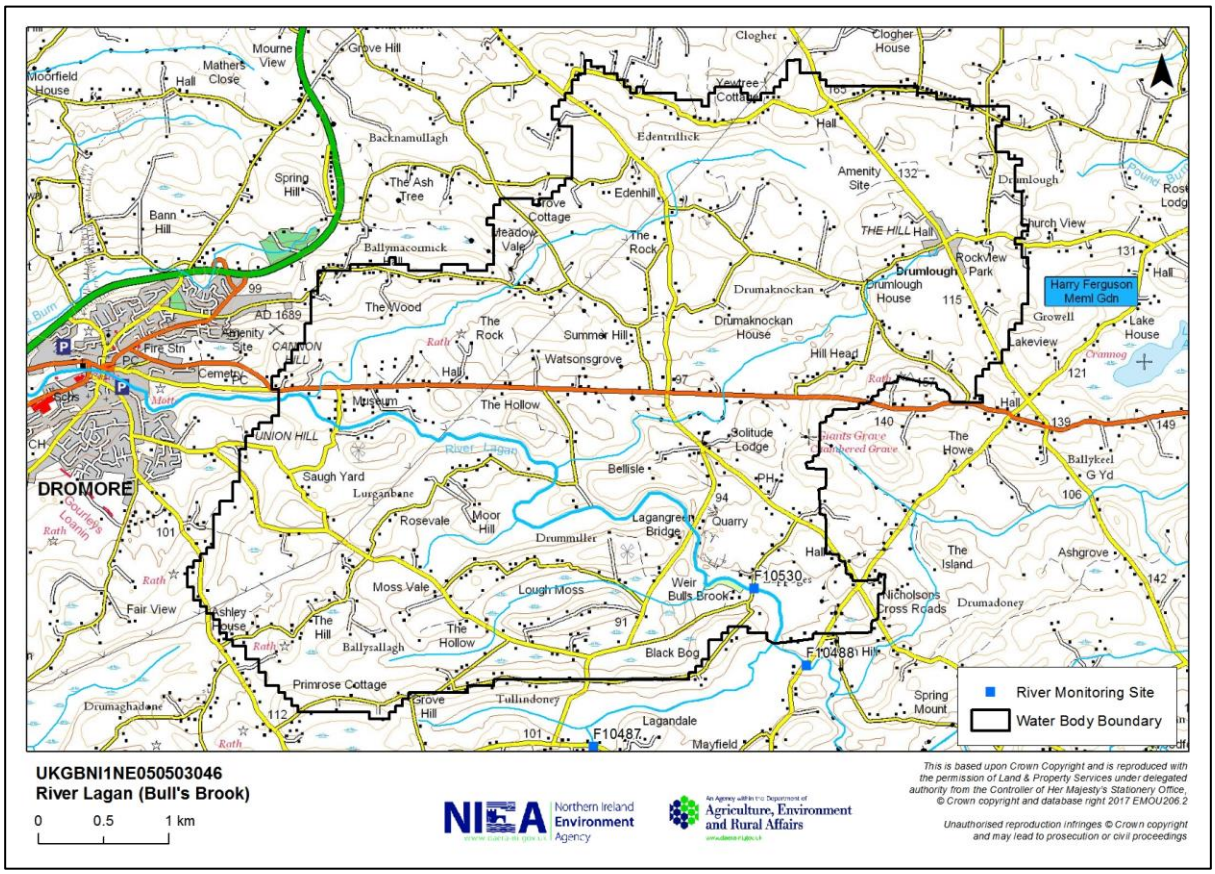
River Lagan (Bull's Brook) (GBNI1NE05050304)

Background

The Lagan Local Management Area (LMA) is within the North Eastern River Basin District and covers an area of approximately 566km². River Lagan (Bull's Brook) (Map10), is in the main channel of the Lagan LMA and runs into River Lagan (Lisburn). This entire system flows into Belfast Lough.

Map 10: Location of the River Lagan (Bull's Brook) Water Body



The issues

During the first cycle of WFD (2009 – 2014) the waterbody was classified as Moderate due to multiple elements. During the second WFD cycle (2016 – 2021) a mid-cycle classification took place in 2018 and discovered that the waterbody has unfortunately

deteriorated to Poor status, with Invertebrates dropping to 'Poor', SRP remaining at 'Poor' and ammonia dropping from 'Good' to 'Moderate'.

Our actions

The aims of the investigation of River Lagan (Bull's Brook) was to look at any catchment pressures and if possible determine the source of deterioration. As the deterioration in class occurred at the monitoring station, this investigation looked at the area above the monitoring station (Site F10530). This covers a small section of the Bull's Brook, River Lagan (Larch Hill), River Lagan (Dromara) and Eel Burn (Lagan). The downstream water body monitoring should be used to assess any improvements here after works are carried out.

A desktop study was carried out on ArcGIS and the landscape is dominated by improved grassland. On the ground surveys were carried out. SRP has been on an upward trend in Northern Ireland Rivers since 2012, caused by excess phosphate entering the waterways either from point or diffuse pollution sources. SRP results and a bridge survey which took place in the spring were used to identify areas to target within the catchment.

The outcomes

Since this survey was carried out, the routine monitoring at the sampling point (F11298) achieved a classification of Moderate for invertebrates. Kinallen Wastewater Treatment Works (WwTW) - upstream and downstream monitoring of invertebrates suggest that there is no impact from the discharge from Kinallen WwTW.

High levels of Ammonia (1.10 mg/l) and SRP (0.15mg/l) were found at site EB1, which would contribute to the ammonia and SRP failures at the Bulls Brook WFD monitoring site. Another site EB5 had high SRP in both Spring (0.15mg/l) and Autumn (0.15mg/l).

Results from the investigations revealed that one site in particular may be a key source of pollution. The most likely reason for failing SRP is from agriculture as the main land use activity within this waterbody is grazing/improved grassland.

Conclusion and Recommendations

Following this study it was recommended that further river surveys and farm investigations should be focussed upstream of the area discovered with high SRP and Ammonia, to inspect the river and tributaries feeding into this area. Drumlough WwTW invertebrate investigation will be carried out when Covid-19 restrictions are lifted.

Brookmount Stream, Lagan (GBNI1NE050503106)

Background

Brookmount Stream GBNI1NE050503106 (Map 11), joins the Lagan Local Management Area (LMA) at the River Lagan (Lisburn), and this entire system drains into Belfast Lough. The Lagan LMA is within the North Eastern River Basin District and covers an area of approximately 566km². This waterbody is to the North East of Lisburn and flows into the River Lagan upstream of Young's Bridge.

Map 11: Location of the Brookmount Stream Water Body

Pasture, cultivated and arable land dominate the riparian zone of this waterbody, with a few small patches of urban areas. There are some reaches with a narrow tree line along the river but on other sections, the land is worked to the river's edge. The river follows

its historic course with some minor alterations on a stream in the middle of the water body near Magheragall for a corn mill.

The issues

The 2018 interim Water Framework Directive (WFD) results show that the waterbody had returned to Poor status, with Invertebrates dropping to Poor and Soluble Reactive Phosphorus (SRP) and diatoms remaining at Moderate. The WFD target for this cycle is to achieve 70% of waterbodies at least “Good” water quality status by 2021. In addition, a decline in the status should be prevented, which is why the NIEA Catchment Management Team chose the Brookmount Stream as a priority water body for the 2019 - 2020 work program. SRP levels have been on an upward trend in Northern Ireland Rivers since 2012. This is caused by excess phosphorous entering the waterways, either from point or diffuse pollution sources. This can also have a negative impact on invertebrates. The SRP level within the waterbody is very close to the WFD boundary of Poor, which has been a downward trend. Brookmount Stream is an isolated catchment indicating that pressures are wholly within the waterbody and not influenced by upstream catchments. The 2007 land use data shows that 76% of water body is covered by Improved Grassland and Arable farming with the remainder of the land being a mixture of urban, rough grassland and woodland. Invertebrates have deteriorated from Moderate to Poor which may be exacerbated by poor morphology at the monitoring station. Morphology survey shows sedimentation, poor bankside habitat, culverts, and cattle poaching.

Our actions

A desktop study was carried out on ArcGIS looking at the water network connectivity layer, the erosion risk, the agricultural risk layers, industrial and domestic consents, WWTW and Tellus P in soils, sediment and water. SRP results and a bridge survey carried out in the spring were used to identify areas to target within the catchment.

The outcomes

A further river survey was carried out during the summer once SRP results were obtained. The Good / Moderate boundary for SRP is 0.085mg/l. Our sampling confirmed the main pressures were upstream of site BM1 with SRP 0.14mg/l in spring and 0.13mg/l in autumn. None of the sites downstream exceeded 0.14mg/l. Therefore the area above BM1 was targeted for a more in depth investigation. The upstream survey in the summer, showed cattle accessing the river. Cattle accessing rivers can contribute to increase pollutants including SRP, as it leads to bank damage and causes a channelling effect allowing a non restricted flow of runoff into the river as well as direct input from the animals themselves. The main land use in this water body is improved grassland. Routine monitoring of invertebrates suggested a moderate classification and investigations at the industrial estate showed no significant issues. The issues of barriers in the waterway causing reduced upstream and downstream continuity, was passed to NIEA Fish Group to investigate further.

Due to SRP and ammonia problems farm businesses upstream of the problem have been identified to receive further guidance on nutrient management.

Conclusion and Recommendations

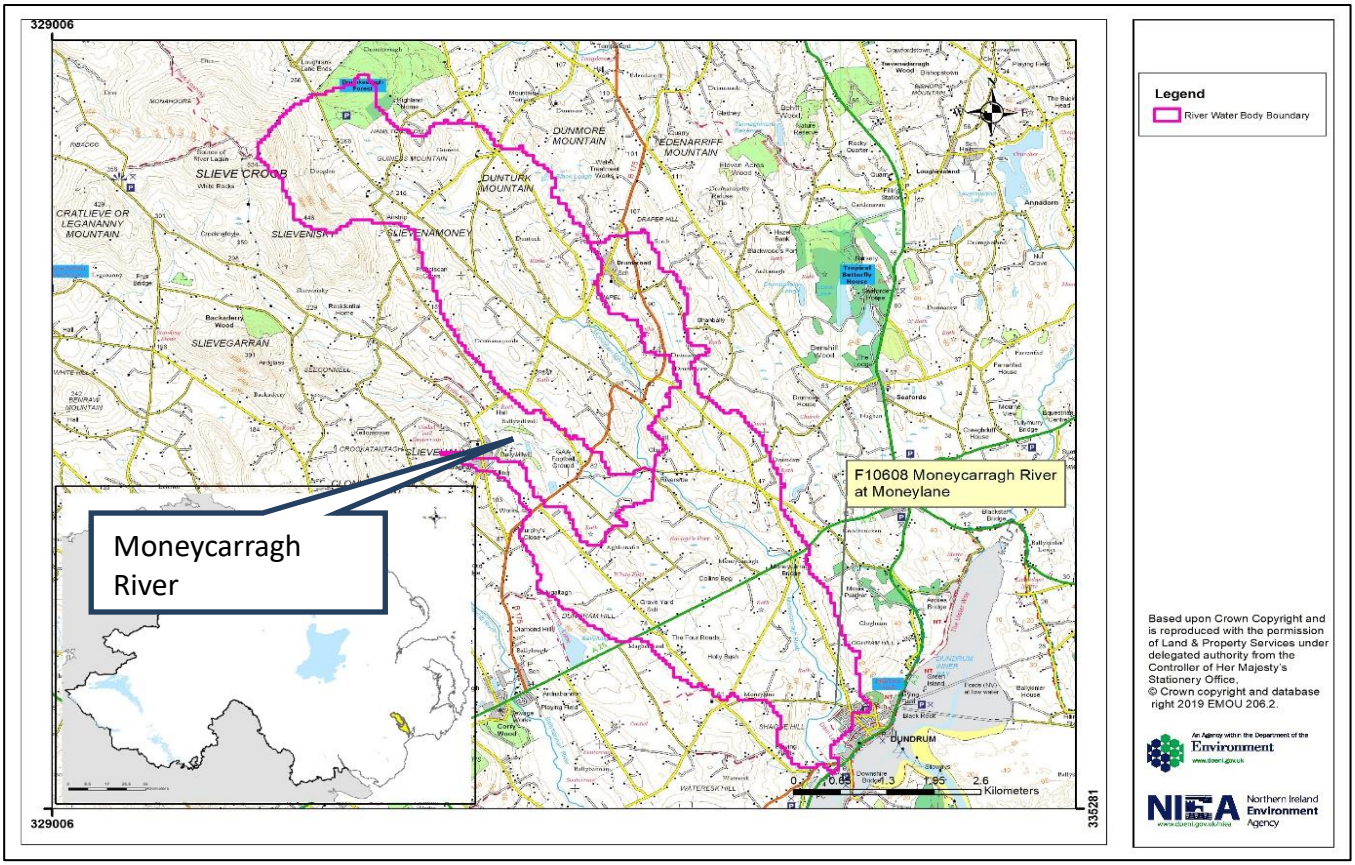
A further investigation into farming practices will be requested upstream from the site with the highest SRP values. NIEA Catchment Management Team will continue chemistry monitoring to detect any change in SRP levels. NIEA will also monitor invertebrate sampling results from the designated monitoring point to ensure the classification remains at Moderate and over time improves. If a decline is detected, an invertebrate water body investigation will be carried out.

Moneycarragh River Claragh (UKGBNI1NE050505067)

Background

The Moneycarragh River (Claragh) GBNI1NE050505067 (Map 12), flows directly into the Moneycarragh River (Dundrum) where it is monitored at Moneylane for both chemistry and biology. From 2009 – 2014, during the first cycle of WFD, the waterbody was classified as Moderate due to an unsatisfactory variety of the benthic invertebrates, however, in 2015 it was re-classified as Good with benthic invertebrates improving. During the second WFD cycle (2016 – 2021) a mid-cycle classification took place in 2018 and discovered that the waterbody had unfortunately returned to Moderate status, this time for an exceedance of the environmental quality standard for dissolved zinc.

Map 12: Location of the Moneycarragh River (Claragh) Water Body



Since WFD monitoring began in 2009, bioavailable zinc has always been recorded at very low levels in the Moneycarragh River (Dundrum) and hence received a pass until an unexpected breach in 2016. Given this unexpected breach of zinc levels in this waterbody, and the corresponding deterioration in 2018 WFD status, a review was undertaken of the historic zinc results.

Our actions

A review of the classification data was carried out

The outcomes

From the 26th February 2015 to the 25th September 2018 there was only one sample that failed the environmental quality standard which was taken on the 1st September 2016. The failed sample had a dissolved zinc result of 685.7 µg/L and a bioavailable zinc concentration of 263.7 µg/L. Apart from this sample the dissolved zinc was typically less than 5 µg/L and passed WFD environmental standards.

The one zinc failure is causing a skew in the overall WFD classification results. Although it cannot be confirmed, a potential cause of the elevated zinc result recorded on 1 September 2016, may have been contamination at the sampling point, possibly due to sampling technique. Barring any further positive zinc results, in all likelihood the 2020 assessment will give a pass assessment for dissolved zinc.

Conclusions and Recommendations

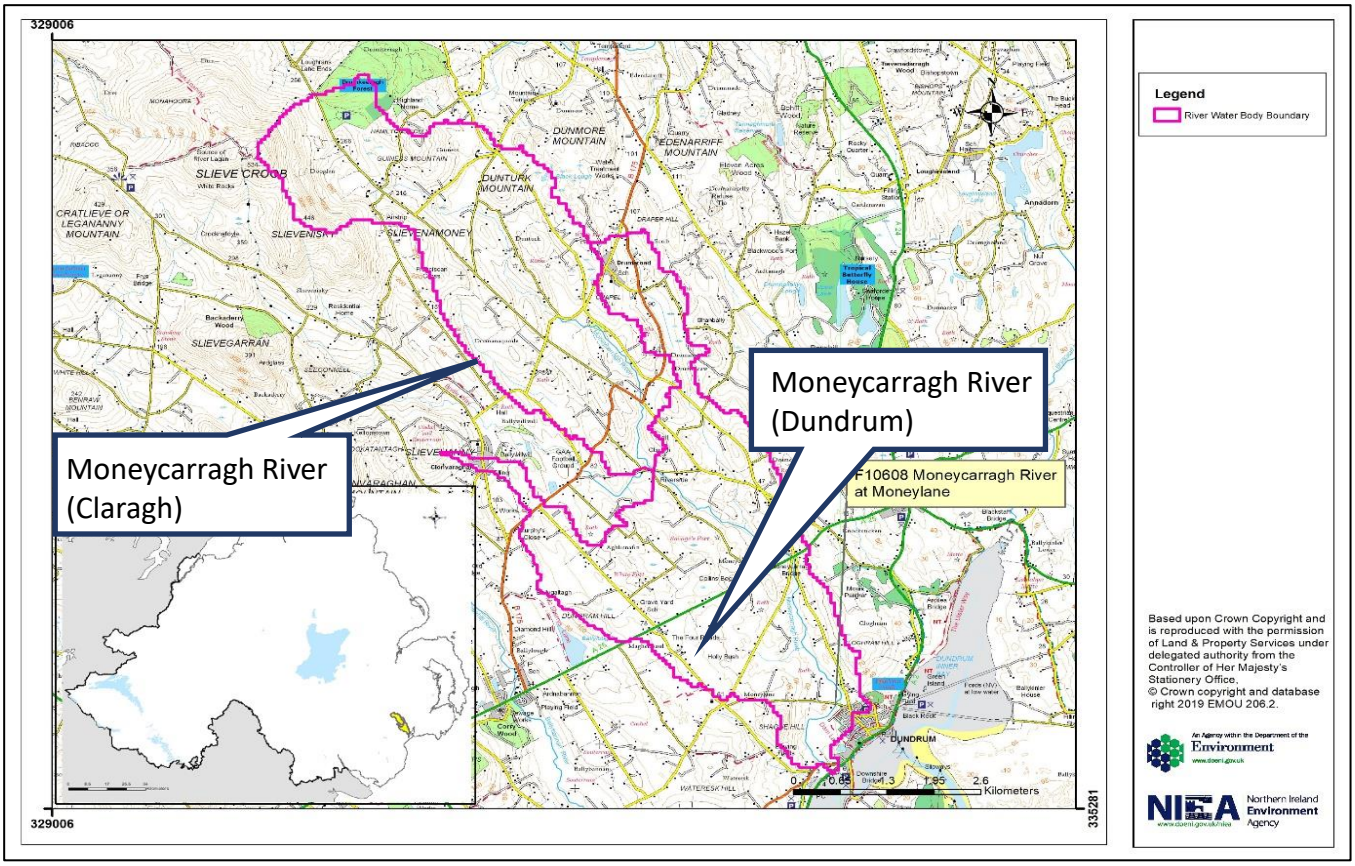
Following the investigation outcomes it is recommended that no further investigations of this zinc failure are required.

Moneycarragh River (Dundrum) GBNI1NE050505063

Background

The Moneycarragh River (Dundrum) (Map 13), flows directly into Dundrum Bay. It is monitored at the bottom of the waterbody (site F10608 at Moneylane) for both chemistry and biology. From 2009 – 2014, during the first cycle of WFD, the waterbody was classified as Moderate due to an unsatisfactory variety of benthic invertebrate taxa, however, in 2015 it was re-classified as Good with benthic invertebrates improving. During the second WFD cycle (2016 – 2021) a mid-cycle classification took place in 2018 and discovered that the waterbody had unfortunately returned to Moderate status, this time for an exceedance of the environmental quality standard for dissolved zinc.

Map 13: Location of the Moneycarragh River (Dundrum) Water Body



The issues

Since WFD monitoring began in 2009, bioavailable zinc has always been recorded at very low levels in the Moneycarragh River (Dundrum) and hence received a pass until an unexpected breach in 2016. Given this unexpected breach of zinc levels in this waterbody, and the corresponding deterioration in 2018 WFD status, a review was undertaken of the historic zinc results.

Our actions

A review of the classification data was carried out

The outcomes

From the 26th February 2015 to the 25th September 2018 there was only one sample that failed the environmental quality standard which was taken on the 1st September 2016. The failed sample had a dissolved zinc result of 685.7 µg/L and a bioavailable zinc concentration of 263.7 µg/L. Apart from this sample the dissolved zinc was typically less than 5 µg/L and passed WFD environmental standards.

The one zinc failure is causing a skew in the overall WFD classification results. Although it cannot be confirmed, a potential cause of the elevated zinc result recorded on 1 September 2016, may have been contamination at the sampling point, possibly due to sampling technique. Barring any further positive zinc results, in all likelihood the 2020 assessment will give a pass assessment for dissolved zinc.

Conclusions and Recommendations

Following the investigation outcomes it is recommended that any further investigations of this zinc failure are not required.

Moneycarragh Feeder (UKGBNI1NE050505059)

Background

The Moneycarragh Feeder GBNI1NE050505059 (Map 14), flows into the main Moneycarragh River which then drains into the Dundrum Bay. During the first cycle of WFD (2009 – 2014) the waterbody was classified as Moderate due to an unsatisfactory diversity of benthic invertebrates, however, in 2015 it was re-classified as Good with benthic invertebrates showing improvement. During the second WFD cycle (2016 – 2021) a mid-cycle classification took place in 2018 and discovered that the waterbody has unfortunately returned to Moderate status, this time for Soluble Reactive Phosphorous (SRP). SRP has been on an upward trend in Northern Ireland waterbodies since 2012 as a result from an excess of phosphorous entering the waterways, either from point or diffuse pollution sources. There are no upstream water bodies and the downstream Moneycarragh River (Dundrum) is classified as good for SRP, indicating that at present it is an issue specific to the Moneycarragh Feeder.

Map 14: Location of the Moneycarragh Feeder Water Body

The issues

The aims of this investigation were to determine the catchment pressures of SRP deterioration within the Moneycarragh Feeder. The main land use activity within this waterbody is grazing/improved grassland.

Our actions

1. A desktop study was carried out using existing data including agricultural risk areas, water network connectivity, Tellus phosphorus data, erosion and sedimentation risk areas.
2. A river survey upstream from the monitoring station to ascertain any point source pollution
3. SRP investigation at key points within the catchment
4. Investigate possible pollution within in areas of high agricultural risk
5. Mapping and surveying of areas that would be susceptible to high levels of poaching
6. An overview survey of the whole catchment

The outcomes

Results from the SRP investigations revealed that one site in particular matches the desktop data trend analysis for SRP and may be the source of the problem. Cattle poaching and forestry felling are taking place within the catchment, whilst these may have a contributing effect on the monitoring point, they are unlikely to be the source of the SRP decline.

Conclusions and Recommendations

Following this study it was recommended that further river surveys and farm investigations should be focussed upstream of the discovered high SRP site, to inspect the river and tributaries feeding into this area.

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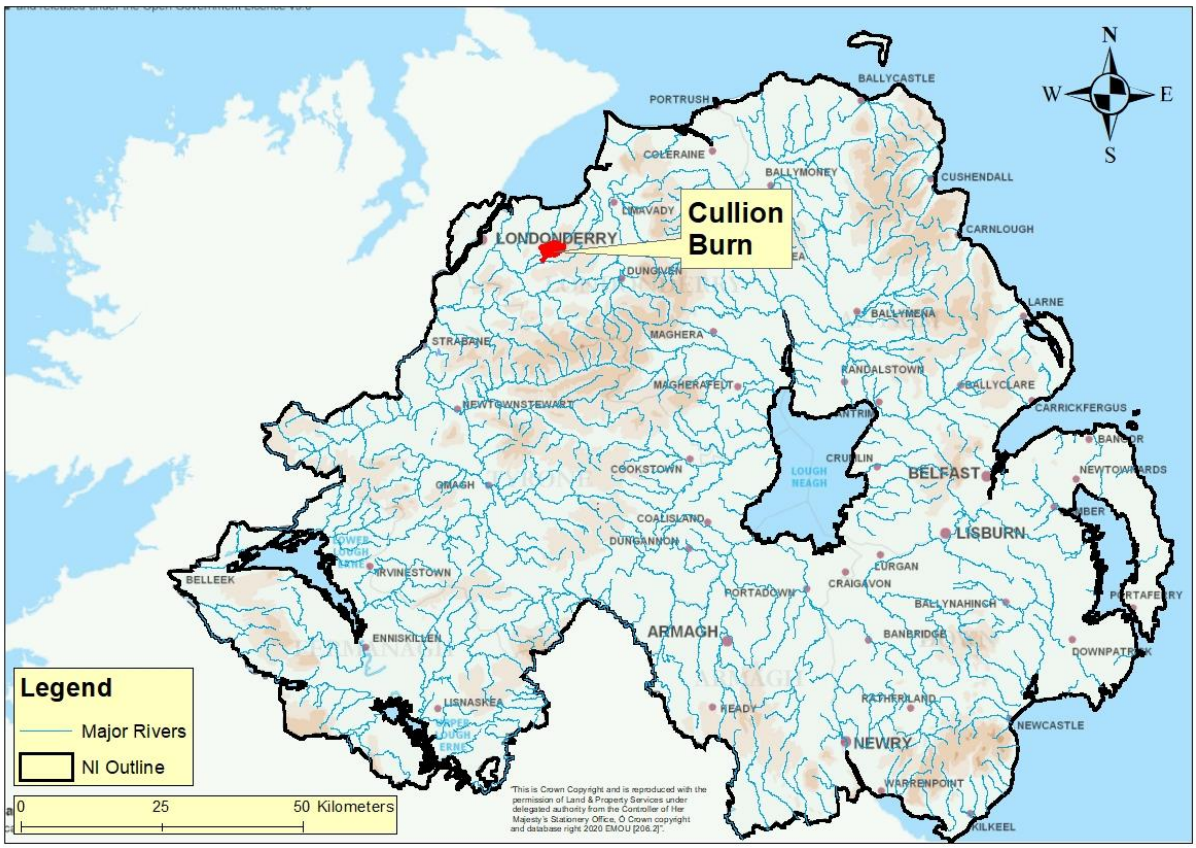
Cullion Burn GBNI1NW020204025

Background

The Cullion Burn (GBNI1NW020204025), is situated 5 km to the north of the village of Claudy, Co. Londonderry (Map 15). It flows for approximately 4 km from its source, within the boundary of Loughermore Forest, before joining the Burntollet River. This then joins the main channel of the River Faughan a further 6 km downstream. It has one main tributary called the Meenarnet Burn.

Map 15: Location of Cullion Burn Water Body



Cullion Burn was classified under the Water Framework Directive (WFD) as “Good” status in both 2009 and 2015. Metal data, including iron, was not available for assessment in 2009 and 2015. Results for iron were available for 2015 – 2018 and the

environmental quality standard was exceeded, returning an interim “Moderate” status for dissolved iron. This technically constituted a deterioration under WFD, and lead to its selection as a priority waterbody for investigation through the NIEA Catchment Management Team 2019 - 2020 work programme.

The issues

This upland catchment covers an area of 10.4 km^2, with the main land uses being 37% bog, 28% coniferous forest and 28% improved grassland. The catchment pressures within the water body include agriculture, forestry and septic tanks.

Our actions

- An initial desktop study was carried out
- Two sets of iron water chemistry samples collected in late spring/summer and autumn 2019.
- Two sets of pH readings were taken during summer and autumn 2019, with field survey notes being taken at the same time.
- Finally, a hydro-morphological survey was conducted in August 2019.

The outcomes

The results of the 2019 dissolved iron chemistry survey show elevated levels throughout the catchment. The annual average WFD environmental quality standard (EQS) for dissolved iron is set at <1000µg/l and out of 12 sites that were all monitored at least twice, 11 exceeded the average EQS. The sites located on the Meenarnet Burn tributary had the lowest values, while those in the upper reaches of the Cullion Burn had the highest levels. These results closely mimic the findings of the “Tellus” all Ireland geochemical and geophysical survey from 2004-2008.

The highest values all relate to an area covered by Loughermore forest. Loughermore Forest is an upland, coniferous forest covering over 1,340 hectares and is one of the

largest Forest Service plantations in the Sperrins. The dissolved iron values in some of the smaller feeder streams at the top of the catchment are exceptionally high. Overall, the dissolved iron levels decrease from high levels in the upper reaches of the Cullion Burn to lower levels 4km further downstream at the monitoring site. It is possible that the high levels of iron being mobilised into the water column in the upper reaches is a factor in the WFD failure at the monitoring site situated downstream.

The Cullion Burn water body has been assessed as humic under WFD, i.e. the average Dissolved Organic Carbon (DOC) is greater than 10mg/l, which indicates that the river could be prone to acidification. However, Cullion Burn is currently not failing the WFD for pH. The majority of sites surveyed had pH values in water close to neutral, with only a few of the small feeders having pH levels that could be described as acidic. Excluding dissolved iron failure, all other WFD parameters such as freshwater invertebrates and aquatic plants are currently at good status. The high dissolved iron values are currently not having an impact on the ecological status of the Cullion Burn.

However, the conditions within the soil are actually acidic and high levels of iron are found within the soils of the upper catchment (as well as a slight increase in levels at the monitoring site). Scientific research has shown that a low soil pH can mobilise certain metals into solution, which is then flushed into the surrounding river network during rainfall events. The actual underlying geology is psamite and semi-pelite rock, which do not contain iron so the dissolved iron is being mobilised purely out of the soil in this water body. A scientific paper (MacIntosh, K. A. and Griffiths, D. 2013) that focused on the elevated metal concentrations within upland streams in the Sperrins showed that they were a natural phenomenon related to peat/humic soil sourced acidity and the low neutralising abilities of these base-poor metamorphic rocks.

Meenarnet Burn tributary is shown to have elevated levels of dissolved iron but the influence from forestry within its catchment is minimal. There is only a small plantation of coniferous forest situated in the middle reaches of this tributary. This again suggests that high dissolved iron levels in the Cullion Burn water body are due to natural conditions

from the mobilisation of geological depositions. However, the large area of coniferous forest located in the upper reaches of the main channel could potentially be adding to the problem.

Conclusion and Recommendations

Forest Service has been made aware of the potential issues within Loughermore Forest and have agreed to include recommendations in the consultation response for the new "Forestry Plan for North West Forests and woodland". The design of older plantations, such as the area of forest at the top of the Cullion Burn catchment will take a bit more time to remedy as the rate of clear felling is subject to a NI-wide programme. However, the situation has been improving and new forest design and regeneration plans are underway.

Another recommendation is that the WFD iron classification for this water body could potentially be set as a "Less Stringent Objective" by NIEA, due to natural conditions.

Two locations have been earmarked as areas that would benefit from the DAERA Environmental Farming Scheme (EFS), and this data has been passed onto that team ahead of Tranche 5.

The overall conclusion for this report is that the high dissolved iron levels in the Cullion Burn water body are due to natural conditions from the mobilisation of geological depositions. However, the large plantation of coniferous forest in the upper reaches of the water body could potentially be exacerbating the problem further.

Camowen River (Ramackan) GBNI1NW010102092

Background

The Camowen River (Ramackan) GBNI1NW010102092 (Map 16), rises in the hills above Cappagh village, Co. Tyrone and flows for approximately 32 kilometres before it joins with the Drumragh River in Omagh town to form the River Strule. The Camowen River (Ramackan) water body lies within the middle reaches, and two other water bodies are situated upstream of it – Camowen River (Termon) and Granagh Burn.

Map 16: Location of Granagh burn and Camowen River (Ramackan) and (Termon) Waterbodies

The 2018 interim Water Framework Directive (WFD) results show that Camowen River (Ramackan) water body deteriorated from “Good” to “Moderate” status, due to a soluble reactive phosphorus (SRP) failure. Granagh Burn was classified as “Good” WFD status, while Camowen River (Termon) remained as “Moderate”. The WFD states that 70% of all waterbodies in a given country should achieve at least “Good” water quality status by 2021. In addition, a decline in the status should be prevented, which is why the NIEA Catchment Management Team chose the Camowen River (Ramackan) as a priority water body for the 2019 - 2020 work programme.

The issues

This individual water body covers an area of 27.4 km^2, with the main land use being 49% improved grassland, 16% bog, 14% rough low-productivity grassland and 7% arable and horticulture. The significant pressures found within the water body include agriculture, quarries and sewage management from WwTW’s and septic tanks.

Our actions

- An initial desktop study was carried out followed by bridge overview and dissolved oxygen surveys.
- Three separate sets of SRP water chemistry samples were taken for analysis in June 2019, October 2019 and January 2020.
- Four targeted river walks were then undertaken in January and February 2020.
- A riverfly invertebrate survey was also carried out in this area in May 2019 under a separate project, and the results have also been included in this survey.

The outcomes

The surveys carried out during the course of this investigation discovered three significant pollution incidents involving silage effluent, six locations where silage bales were within the allotted 10m distance of the water way, over a dozen areas of cattle poaching and/ or access to the stream, as well as three locations that possibly showed

evidence of diffuse pollution. Two polluting septic tank systems were also noted during fieldwork.

The SRP results from June 2019 show that elevated SRP levels in the upstream Camowen River (Termon) water body are causing increased levels at the downstream WFD monitoring site in the Camowen River (Ramackan) water body. Maps and studies of planning applications show the Granagh Burn and Camowen River (Termon) waterbodies have a higher proportion of intensive agriculture, compared to downstream in Camowen River (Ramackan).

An incident involving an extremely turbid discharge from a quarry that was affecting a nearby stream was uncovered during the course of this investigation, and quickly resolved by local NIEA Water Quality Inspectors (WQI'S). Similarly, unauthorised instream works on the Granagh Burn that were causing severe turbidity downstream at a WFD monitoring site were reported to the local WQI's. This issue was also swiftly resolved and enforcement action taken.

Diffuse pollution sources can be individually minor when compared to point source discharges. Such pollution on a catchment scale can be significant when considering the cumulative effect these separate discharges can have on the environment. Activities such as slurry spreading, ploughing, seedbed preparation, crop and fertiliser spraying and yard & road run-off may all contribute to diffuse pollution. The January 2020 SRP results (sampled at the end of the slurry spreading closed period) in most cases show the lowest set of levels found throughout the investigation. The majority of sites would have returned a "Good" classification, thus suggesting that slurry spreading is a contributing factor to the elevated SRP levels found in these water bodies.

Conclusion and Recommendations

The main land use in all three water bodies is improved grassland. In the Camowen River (Ramackan) catchment many of the agricultural risk areas are located downstream of the

WFD monitoring point. This, along with the results of this investigation, leads to the conclusion that the cause of the WFD SRP deterioration in this water body is predominately agriculture. With some of the sources definitely coming from the upstream Camowen River (Termon) water body.

As a result of this investigation, immediate pollution prevention action by the NIEA staff has taken place at six locations where a potential source of pollution was identified, including follow up visits to ensure the initial problems have been resolved. Almost all other minor issues have also been acted upon. In addition, five farms have been identified for full cross compliance inspections with a further eleven farms and locations for potential DAERA Knowledge Advisory Service visits. This water body was added into the NIEA Agricultural Regulations Risk Selection for visits undertaken in 2020. Finally, fifteen locations have been identified as areas that would benefit from the DAERA Environmental Farming Scheme (EFS), and this data has been collated for the relevant team ahead of Tranche 5.

Glenscollip Burn, Strule (UKBGNI1NW010102039)

Background

Glenscollip Burn (GNI1NW010102039) (Map 17), is situated to the north east of Omagh town (Map 1). It rises on the slopes of Mullaghcarn Mountain and flows for 8 km before it joins the Camowen River on the outskirts of Omagh. It has one main tributary called the Glencurry Burn.

Map 17: Location of the Glenscollip Burn Water Body

In 2018, the interim Water Framework Directive (WFD) classification was “Moderate”, due to a soluble reactive phosphorus (SRP) failure. This constituted a deterioration from

the 2015 overall classification of “Good”, and as such, it was chosen as a priority water body for the 2019 – 2020 Catchment Management Team work program.

The issues

This catchment covers an area of 17.8 km^2, with the land use being improved grassland (51%), followed by rough, low productivity grassland (18%), dwarf shrub (11%) and bog (5%). This shows that the farming industry is by far the dominant land user in this water body. The two most significant pressures on water quality are farming, and sewage management through WwTW’s and septic tanks. A large area of coniferous plantation is also located in the uppermost reaches of the catchment.

Our actions

- An initial desktop survey was carried out
- Followed by bridge overview and dissolved oxygen surveys.
- Three separate sets of SRP water chemistry samples were taken for analysis in June 2019, October 2019 and January 2020 respectively.
- Six targeted river walks were then undertaken in November 2020.
-

The outcomes

The findings of the bridge overview surveys and river walks showed quite a few point source discharges that could potentially be causing elevated SRP levels. To a certain extent, the elevated levels found in the middle reaches, especially in October 2019, can be attributed to corresponding point source discharges located upstream. Farmyard management issues, which include problems associated with silage effluent collection and dirty yard water, were the most common sources of significant water quality issues found during fieldwork within the Glenscollip Burn catchment. Other farming issues included poaching due to animal access to the river and silage bales positioned close to waterways.

No issues were found that related to slurry or slurry spreading. Equally, an increased growth of aquatic plants and algae is usually associated diffuse pollution from elevated SRP levels in waterways. However, during this investigation only a relatively small number of sites exhibited the tell-tale signs of an over-abundance of SRP i.e. high percentage coverages of both filamentous and diatomaceous algae, as well as enhanced aquatic plant growth. The spate nature of this water body may partly explain this ecological aspect.

The results of the desktop survey and fieldwork also showed that the low-density levels of domestic sewage treatment systems (e.g. septic tanks) within the catchment are unlikely to be the major source of elevated SRP levels within the Glenscollip Burn.

Conclusion and Recommendations

In conclusion, this survey has shown that point source agricultural discharges, mainly relating to silage effluent storage and located within in the middle reaches of this catchment, are likely contributing to the WFD SRP failure. The results showed remarkably little difference in values between the three most downstream SRP sites over the three sampling dates, as opposed to the fluctuations seen in the reaches further upstream, both on the main channel and the Glencurry tributary.

Diffuse pollution sources were harder to identify. Although individually minor, such pollution on a catchment scale can be significant; considering the cumulative affect which these separate discharges can have on the environment. Activities such as ploughing, seedbed preparation, crop spraying, fertiliser spreading, applying slurry and yard & road run-off can all contribute to diffuse pollution. As global warming increases the likelihood of extreme weather (drought and flooding), such as in the summer of 2017, the potential for phosphorus that has been locked in soils to be mobilised into watercourses can only increase. It can therefore be assumed that diffuse pollution is also contributing to the trend for increasing SRP levels in the Glenscollip Burn.

Actions taken to address the above included farm visits and follow ups by the local Water Quality Inspectors to address any ongoing pollution issues. A number of farms were

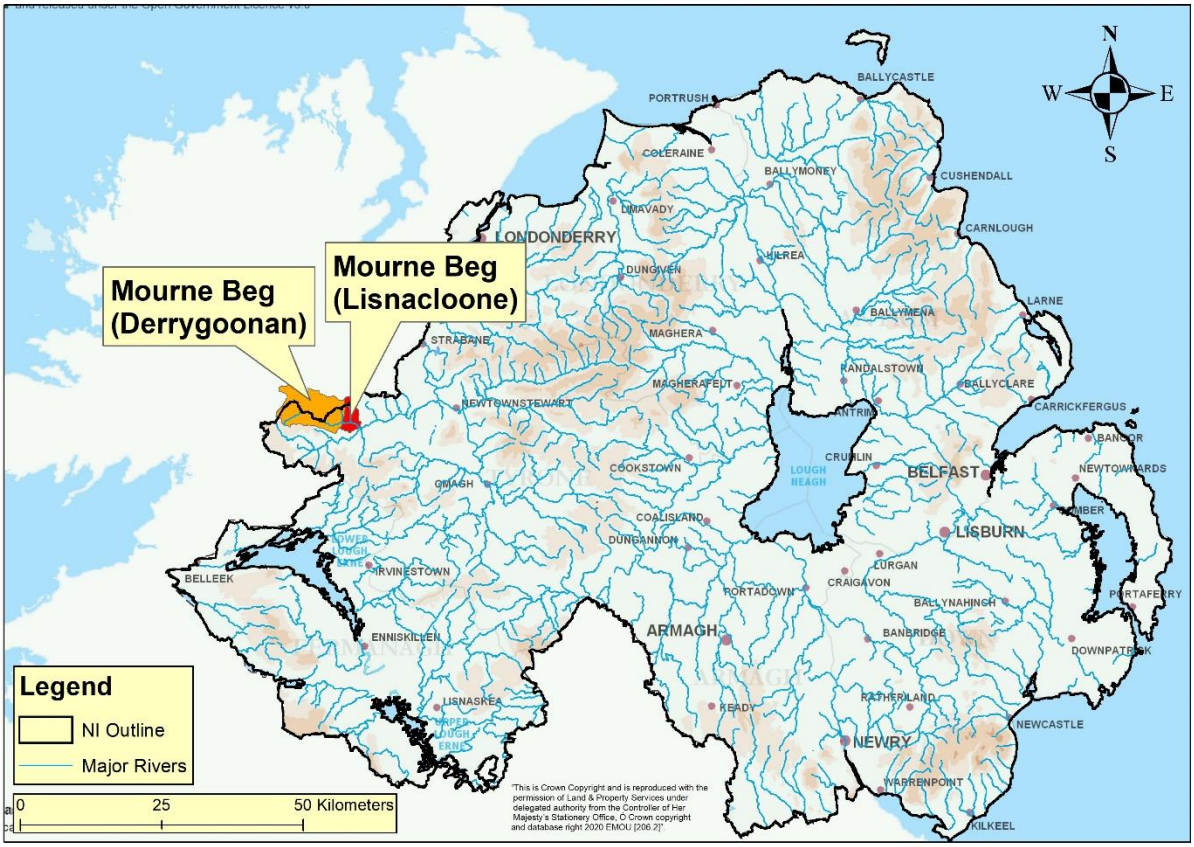
submitted for cross compliance agricultural visits and the entire water body has also been added into the NIEA Agricultural Regulations Risk Selection for additional visits that were undertaken in 2020. Individual farms were also recommended for the DAERA Environmental Farming Scheme (EFS) to help address and prevent diffuse agricultural pollution, and this data has already been passed onto that team ahead of the next tranche of EFS. Similarly, a number of farms have been put forward for potential DAERA Knowledge Advisory Service visits.

Mourne Beg (Lisnacloone) GBNI1NW010102064

Background

The Mourne Beg River (Lisnacloone) GBNI1NW010102064 (Map 18), rises in the Donegal hills near Lough Mourne and flows for approximately 22 kms before it joins the River Derg 4 km west of Castlederg town, Co. Tyrone. There are two UK Water Framework Directive (WFD) water bodies on this section of river: Mourne Beg (Derrygoonan) is located upstream of Mourne Beg (Lisnacloone). Both waterbodies have areas that are cross border and are in the Republic of Ireland. Northern Ireland data is used to classify both water bodies.

Map 18: Location of the Mourne Beg (Derrygoonan) & (Lisnacloone) Water Bodies



The issues

The Mourne Beg (Lisnacloone) River water body was classified as “Good” for WFD2015. For 2018 classification soluble reactive phosphorus (SRP) and dissolved iron have been assessed as “Moderate” status. Metal data, including dissolved iron, was not available for assessment in 2015. For the 2018 classification, the dissolved iron annual average environmental quality standard was exceeded returning a “Moderate status” for dissolved iron. In addition, the individual 2018 interim results from the separate WFD monitoring sites within this waterbody had shown that the Dreenan Burn tributary was source of the dissolved iron and SRP failures.

This individual water body covers an area of 14.4 km2, with the main land use being 43% improved grassland, 32% rough low-productivity grassland, 11% dwarf shrub heath, 4% bog, 4% broad leaved, mixed & yew woodland and 3% coniferous woodland. The significant pressures and key areas of investigation include agriculture, forestry, peatland management, a fish farm and domestic sewage treatment systems.

Our actions

- An initial desktop study was carried out;
- Followed by three sets of SRP water chemistry samples in June and October 2019 and January 2020;
- Followed by two sets of iron water chemistry samples in June and October 2019;
- A pH survey was completed in February 2020;
- Two targeted river walks were then undertaken in January and February 2020.

The outcomes

The results of the 2019 dissolved iron survey show elevated levels throughout both water bodies. The three sites on the main channel of the Dreenan Burn have the highest levels, with the uppermost site returning the two highest results of both monitoring rounds. The WFD Monitoring site on the Croagh Burn tributary also returned very high levels from

both the summer and autumn results. It is possible that the high levels of iron being mobilised into the water column in the upper reaches is a factor in the WFD failure at the monitoring site.

The three sets of SRP results are very close to the good moderate boundary levels, with no significant indicators of a significant point source polluting discharge. Equally, the dissolved oxygen results suggest that there were no sources of biodegradable organic pollution on the day of monitoring. Investigations are continuing into source of elevated SRP levels in this very remote area.

River walks identified most of the high /medium agricultural risk areas are located in the centre of the water body. Some high-risk patches are observed near the Mourne Bridge monitoring site (F10048) as well as above the medium risk areas around Dreenan Wood. There is a high-risk area situated along the Dreenan Burn watercourse on the west side of Leanymore, in the upper middle area of the water body. High septic tank hotspot areas are also located close to the river monitoring sites (F10038) and (F10048). The investigation work identified three locations where silage bales were within the allotted 10m distance of the waterway, three areas of cattle poaching and/ or access to the stream, as well as two locations that possibly showed evidence of diffuse pollution and agricultural enrichment. The findings also pinpointed an area of the Upper Mourne Beg River that suggests an input, possibly caused by poor farming practice along the border, is causing enrichment in the river.

As a result of this catchment investigation, immediate pollution prevention action by the local Water Quality Inspectors and Catchment Management Officer has already taken place at all locations where a source of pollution was identified. Follow up visits are also planned during 2020/2021. An additional full cross compliance inspection at a specific identified farm, will improve water quality within these two catchments. A further four farms have been put forward for potential DAERA Knowledge Advisory Service visits. This water body has also been added into the NIEA Agricultural Regulations Risk Selection for visits to be undertaken in 2020. Finally, three locations have been

earmarked as areas that would benefit from the DAERA Environmental Farming Scheme (EFS) to address diffuse pollution issues.

Conclusion and Recommendations

The conclusion of this report in respect to the high dissolved iron levels in the Mourne Beg (Lisnacloone) water body is that they are due to natural conditions from the mobilisation of geological depositions. However, large plantations of coniferous forest and areas of historically worked peat bog within the water body have the potential to exacerbate the problem further. The Forest Service has been made aware of the potential issues and have agreed to include recommendations in the consultation response for the new “Forestry Plan for West Tyrone Forests and woodland” document.
The main cause of the WFD deterioration for SRP in this water body appears to be agriculture, with a lesser input from domestic sewage treatment systems.
Following discussion with Local Authorities Water Programme (LAWPRO), the Mourne Beg (Derrygoonan) water body has also been proposed as a Prioritised Area for Action in the WFD 3rd cycle 2021-2027.

Finally the INTERREG funded Northern Ireland Water (NIW) Source to Tap project has been using the Derg catchment for a pilot scheme to install geotextile barrier dams within forested areas to reduce the sediment load in the river. One of the pilot sites was on the Croagh Burn, and the barrier dam was shown to reduce sediment loads in the stream, which also has the potential to reduce levels of iron in the waterways.

Drowes River GBNI1NW353504082

Background

The Drowes River GBNI1NW353504082 (Map 19), is located within the Lough Melvin and Arney Local Management Area. The Drowes River is a cross border river, which feeds directly into Lough Melvin, with the border running through Lough Melvin. Classification for the Drowes is carried out by IE. Whilst no waterbodies feed directly into the Drowes in NI, the Roogagh River and County River (Carran West) flow into Lough Melvin from the NI side of the border.

Map 19: Location of the Drowes River Water Body

The issues

Improved grassland and rough low productivity grassland represents 56 % of the territory. The majority of the Drowse water body has a low/moderate agricultural risk. To the west of Drowes River near Drumnasreane there are a few patches classified as high agricultural risk. The East side also has some lands with high risk between Kelly beg area and Finn. Domestic and industrial consents are present in the west of the water body near Lough Melvin

Lough Melvin and Drowes were selected by the Local Authorities Water Programme (LAWPRO) in ROI as a Priority Area for Action due to the failure of the Drowes for invertebrates. But more significantly the long term failure of Lough Melvin for macrophytes and more recently Total Phosphorous (since 2018). Lough Melvin and Drowes are cross border water bodies. Therefore, to enable a full investigation of the Priority Area for Action, NIEA also selected the Drowes River as a Priority Waterbody to complete the investigation. In NI, the additional waterbodies feeding into Lough Melvin are the Roogagh River and the County River (Carran West) were also considered for prioritisation. The Roogagh River has deteriorated in status from GOOD - MODERATE, failing only for fish. This was therefore selected as a priority waterbody. Unfortunately, due to weather conditions in the appropriate survey season in 2019, a fish survey was unable to be completed. Restrictions on working brought 2020 Covid Pandemic further delayed the work and it has now been added to the 2021 work programme. The County River (Carran West) is already at GOOD. No catchment work was therefore considered necessary in this river.

Our actions

In order to establish the water quality of the Drowes River from the tributaries draining from NI, monthly sampling for dissolved oxygen (DO) and soluble reactive phosphorous (SRP) was carried out on three tributaries between May and November 2019. Garrison wastewater treatment works (WWTW) discharges directly into Lough Melvin and therefore the Melvin/Drowes Catchment, and is subject to routine monthly monitoring. These combined monitoring results were used as part of this catchment investigation.

The outcomes

The short-term data gathered from the Melvin/Drowes catchment tributaries in NI indicate that the Drowes River in Northern Ireland is healthy in terms of DO and SRP, and is not contributing to deteriorations in Total Phosphorous in Lough Melvin.

Garrison WWTW was classed as overloaded. Long-term data gathered between 2015 and 2020 showed ten results from the 71 samples exceeded the discharge standard for Total Phosphorous across a range of months. There have been no failures since February 2018, and the works seem to be operating within design capacity.

Conclusions and Recommendations

Short-term data gathered from the Melvin/Drowes catchment tributaries in NI indicate that the Drowes River in Northern Ireland is not contributing to deteriorations in Total Phosphorous. Garrison WWTW seems to be operating within design capacity.

Reported incidents of foam on Lough Melvin will be further investigated by NIEA in conjunction with Leitrim County Council and the Local Authorities Water Programme, with chemistry testing as future incidents occur.

Ballinamallard River (Magheracross) GBNI1NW363601046

Background

The Ballinamallard River (Magheracross) GBNI1NW363601046 (Map 20), is located within the Lower Lough Erne Local Management Area. The Ballinamallard River (Magheracross) is fed by the Ballinamallard River (Keenogue) and Trillick Tributary and feeds into the Ballinamallard River (Ballinamallard) and ultimately Lower Lough Erne.

Map 1: Showing the Location of the Ballinamallard River (Magheracross) Water Body

The issues

The Ballinamallard River (Magheracross) was failing under the Water Framework Directive for the 2018 interim status for diatoms and Soluble Reactive Phosphorous (SRP). This catchment investigation has aimed to identify the sources of pollution, particularly SRP in this water body. The greatest land cover type across the Ballinamallard River (Magheracross) waterbody area is improved grassland at 65.96% and rough low productivity grassland at 17.38%. The farming industry is by far the biggest land use in this area. The most significant pressures on water quality are from release of phosphorous and nitrogen from agricultural sources.

Concentrations of SRP have been recognised as a key indicator for measuring agricultural pollution in waterbodies. This catchment investigation measuring SRP on all tributaries in the waterbody has therefore been beneficial in highlighting problematic areas. In many instances, further targeted investigations have identified point sources causing deteriorations in water quality.

Our actions

There were four aspects to the fieldwork side of this investigation. They included initial bridge overview surveys, dissolved oxygen (DO) surveys, SRP water chemistry surveys and targeted river walks.

Chemistry samples for SRP and DO were taken from all tributaries of the Ballinamallard River (Magheracross) during three rounds of sampling in May, September and November 2019. The results of the chemistry sampling were used to determine where further investigatory work was required. In total 12 SRP results across the three rounds of sampling fell outside of the GOOD classification. Consistent failures were recorded in the lower reaches of the waterbody. Consequently, further investigations were concentrated in these areas. No seasonal trends were identified in this water body across the three sets of results.

It should be noted that the analysis of collected water samples were not validated below 0.10mg/l P for SRP. The method may therefore not be capable of accurately distinguishing results below these values. However, the most significant problems were identified within the waterbody where sample results were greater than 0.10mg/l P, and are therefore validated. Most of the river walks or other further investigations undertaken occurred where SRP results exceeded 0.10mg/l. Therefore whilst confidence in all results would have been preferable, most of the follow up work was carried out on stretches where results were accurate, and in support of this, very often sources of pollution causing water quality deteriorations were identified.

The outcomes

Pollution incidents at two large farms in the waterbody were identified during river investigations which were impacting on water quality in this catchment. Several minor domestic tank issues were identified and resolved in this waterbody. Diffuse pollution sources were harder to identify. Although individually minor, such pollution on a catchment scale can be significant; considering the cumulative effect which these separate discharges can have on the environment. Activities such as ploughing, seedbed preparation, crop spraying, fertiliser spreading, applying slurry and yard and road run-off may all contribute to diffuse pollution. It can therefore be assumed that diffuse pollution is also contributing to the trend for increasing SRP levels in the Ballinamallard River (Magheracross).

One large area was identified as inadequately fenced to the watercourse and would benefit greatly from riparian buffers and fencing. Recommendations have been made to the Environmental Farming Scheme regarding this area and other similar areas identified during catchment investigations that can be targeted for specific enhancement works.

Conclusions and Recommendations

In conclusion, agriculture is the largest pressure in this water body, both in terms of point source pollution from a number of large farms, and in terms of diffuse pollution and high

levels of phosphorous likely to have been locked in the soils, only mobilising into the water environment in recent years.

As a result of this investigation, immediate pollution prevention action by the Water Quality Inspectors has occurred. In addition, enhancement works under Agri-Environment Schemes at identified locations, and further cross compliance inspections at identified farms should assist to improve water quality within this water body to Good status.

Ballinamallard River (Keenogue) GBNINW363604039

Background

The Ballinamallard River (Keenogue) GBNINW363604039 (Map 21), is located within the Lower Lough Erne Local Management Area. The Ballinamallard River (Keenogue) is a source river, feeding into the Ballinamallard River Magheracross, the Ballinamallard River (Ballinamallard), and ultimately Lower Lough Erne.

Map 21: Location of the Ballinamallard River (Keenogue) Water Body

The issues

The Ballinamallard River (Keenogue) was failing at the 2018 Interim Classification Status for diatoms and Soluble Reactive Phosphorous (SRP). This catchment investigation has aimed to identify the sources of failures, particularly SRP in this water body.

The greatest land cover type across the Ballinamallard River (Keenogue) waterbody area is improved grassland at 65.41% and rough low productivity grassland at 25.44%. The farming industry is by far the biggest land use in this area. The most significant pressures on water quality from the farming industry are from release of phosphorous and nitrogen. Concentrations of SRP have been recognised as a key indicator for measuring agricultural pollution in waterbodies. This catchment investigation measuring SRP on all tributaries in the waterbody has therefore been beneficial in highlighting problematic areas. In many instances, further targeted investigations have identified point sources causing deteriorations in water quality.

Our actions

There were four aspects to the fieldwork side of this investigation. They included initial bridge overview surveys, dissolved oxygen (DO) surveys, SRP water chemistry surveys and targeted river walks.

Chemistry samples for SRP and DO were taken from all tributaries of the Ballinamallard River (Keenogue) during three rounds of sampling in May, September and November 2019. The results of the chemistry sampling were used to determine where further investigatory work was required. In total 22 SRP results across the three rounds of sampling fell outside of the GOOD classification. Many of these were a failure repeated across two or all three of the sampling rounds, indicating a definite issue in certain tributaries. As a result six river walks were carried out on tributaries of elevated SRP levels.

General trends were identified across the three sets of results. The May results were mostly GOOD. 12 out of 18 tributaries were recorded as GOOD water quality in terms of SRP during this period. The September results were significantly poorer than any other ones. Only two tributaries were recorded as GOOD during this period. This is likely due to increased slurry spreading towards the end of the spreading season. All results except for one in November were GOOD. Again, this is likely to be linked to the slurry-spreading season. No slurry should have been spread at this time.

It should be noted that the analysis of collected water samples were not validated below 0.10mg/l P for SRP. The method may therefore not be capable of accurately distinguishing results below these values. However, the most significant problems were identified within the waterbody where sample results were greater than 0.10mg/l P, and are therefore validated. Most of the river walks or other further investigations undertaken occurred where SRP results exceeded 0.10mg/l. Therefore whilst confidence in all results would have been preferable, most of the follow up work was carried out on stretches where results were accurate, and in support of this, very often sources of pollution causing water quality deteriorations were identified.

The outcomes

Several minor domestic septic tank issues were identified within the water body, as well as potentially one larger scale trade septic tank, which is currently being investigated further.

Several large farms were identified as causing water quality deterioration. One in particular is highly likely to be impacting the status of the waterbody due to its proximity to the monitoring station. Pollution prevention action already underway, and cross compliance inspection to resolve issues causing pollution will undoubtedly improve water quality at these locations.

Diffuse pollution sources were harder to identify. Although individually minor, such pollution on a catchment scale can be significant; considering the cumulative effect which these separate discharges can have on the environment. Activities such as ploughing, seedbed preparation, crop spraying, fertiliser spreading, applying slurry and yard and road run-off may all contribute to diffuse pollution. It can therefore be assumed that diffuse pollution is also contributing to the trend for increasing SRP levels in the Ballinamallard River (Keenogue).

Conclusions and Recommendations

In conclusion agriculture is the largest pressure in this water body, both in terms of point source pollution from a number of large farms, and in terms of high levels of phosphorous likely to have been locked in the soils, only mobilising into the water environment in recent years.

As a result of this catchment investigation, immediate pollution prevention action by the Water Quality Inspectors has already taken place. This, in addition to full cross compliance inspections at the identified farms will improve water quality within this water body, hopefully to the standard where status returns to GOOD.

Ballinamallard River (Ballinamallard) GBNI1NW363601042

Background

The Ballinamallard River (Ballinamallard) GBNI1NW363601042 (Map 22), is located within the Lower Lough Erne Local Management Area. The Ballinamallard River (Ballinamallard) is located downstream of Ballinamallard River (Magheracross), Ballinamallard River (Keenogue), Trillick Tributary, Salry River and Ballycassidy River and feeds directly into Lower Lough Erne.

Map 22: Location of Ballinamallard River (Ballinamallard) Water Body

The issues

The Ballinamallard River (Ballinamallard) was failing at the 2018 Interim Status classification for fish, diatoms, soluble reactive phosphorous (SRP), hydromorphology and cypermethrin. This catchment investigation has aimed to identify the sources of pollution, particularly SRP and cypermethrin in this water body.

The greatest land cover type across the Ballinamallard River (Ballinamallard) waterbody area is improved grassland at 67.36% and rough low productivity grassland at 9.94%. The farming industry is by far the biggest land use in this area. The most significant pressures on water quality are from release of phosphorous and nitrogen from agricultural sources. Concentrations of SRP have been recognised as a key indicator for measuring agricultural pollution in waterbodies.

Our actions

There were six aspects to the fieldwork side of the investigation into this waterbody. They included initial bridge overview surveys, dissolved oxygen (DO) surveys, three sets of SRP water chemistry surveys, three sets of cypermethrin water chemistry surveys, targeted river walks, and an invertebrate survey up and downstream of a waste water infrastructure.

The outcomes

No point source pollution incidents were identified during river walk investigations, but diffuse pollution and high levels of phosphorous likely to have been locked in the soils; only mobilising into the water environment in recent years is likely to be an issue. Several areas were identified as being inadequately fenced to the watercourse. Recommendations have been forwarded to the Environment and Farming Scheme regarding these areas and other similar areas identified during catchment investigations that can be targeted for specific enhancement works.

Other issues have been highlighted as a result of this investigation such as a requirement for Oil Storage Regulation checks at several sites, and advice to be provided on reducing the potential sources of cypermethrin in the Ballinamallard River (Ballinamallard).

The upstream Ballycassidy River has already been identified for improvement works through North Atlantic Salmon Conservation Organization (NASCO aims to conserve wild Atlantic salmon). NASCO works are managed in NI by DAERA Inland Fisheries. Recommendations have also been put forward as a result of this investigation for targeted farm inspections within the Ballycassidy River. These proposals will greatly benefit the catchment overall.

Conclusions and Recommendations

In conclusion, recommendations for targeted farm improvements within both the investigated waterbody and the problematic upstream Ballycassidy River through the Environment Farming Scheme and the Knowledge Advisory Service will undoubtedly improve water quality within this catchment. Recommended Oil Storage Regulation inspections at targeted sites in the Ballinamallard River (Ballinamallard), combined with recommended farm Cross Compliance inspections and proposed NASCO river enhancement works in the Ballycassidy River should also improve water quality within these water bodies, hopefully to the standard where status returns to GOOD.

Northern Ireland Environment Agency
www.daera-ni.gov.uk

For further information:

Northern Ireland Environment Agency
Northern Ireland Catchment Management
Water Management Unit
17 Antrim Road
Lisburn BT28 3AL

Email: RiverBasinPlanning@daera-ni.gov.uk
www.daera-ni.gov.uk

Agriculture, Environment and Rural Affairs
www.daera-ni.gov.uk

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