Desk Top Assessment

Glenree Priority Area for Action

(AFA0086)

Version F01

12/08/2019

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Western Region

Acknowledgements

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

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1. Introduction

1.1. Background to the Priority Area for Action

Glenree Priority Area for Action (PAA) is a one water body PAA in the Western Region. The PAA is in between Bellawaddy PAA to the North and Tubbercurry PAA to the East (Figure 1). Glenree_010 is an upland water body consisting mainly of first order streams. The Glenree_010 river water body is located in the 34_9 Glenree_SC_010 sub-catchment of the 34 Moy and Killala Bay catchment. Under the Water Framework Directive (WFD) Monitoring Programme, the Glenree_010 is a water body delineated as first to third order streams. The Glenree_010 is monitored at one location i.e. the Bridge near Carrownaglogh (RS34G010020), at the downstream end of the water body.

The Glenree _010 was classified in the period 2010 – 2015 at Good Ecological Status and *At Risk* of failing to achieve its WFD environmental objective which is High Ecological Status. Forestry, Extractive Industry and Anthropogenic pressures were identified as significant pressures on the Glenree _010. Historically, from 1993 to 2010, the biological survey data indicated High Status (Q4-5) however in 2013, ecological status dropped to Good Status (Q4). The Q value recorded for 2013 may reflect a transient impact on the invertebrate community within the Glenree _010.

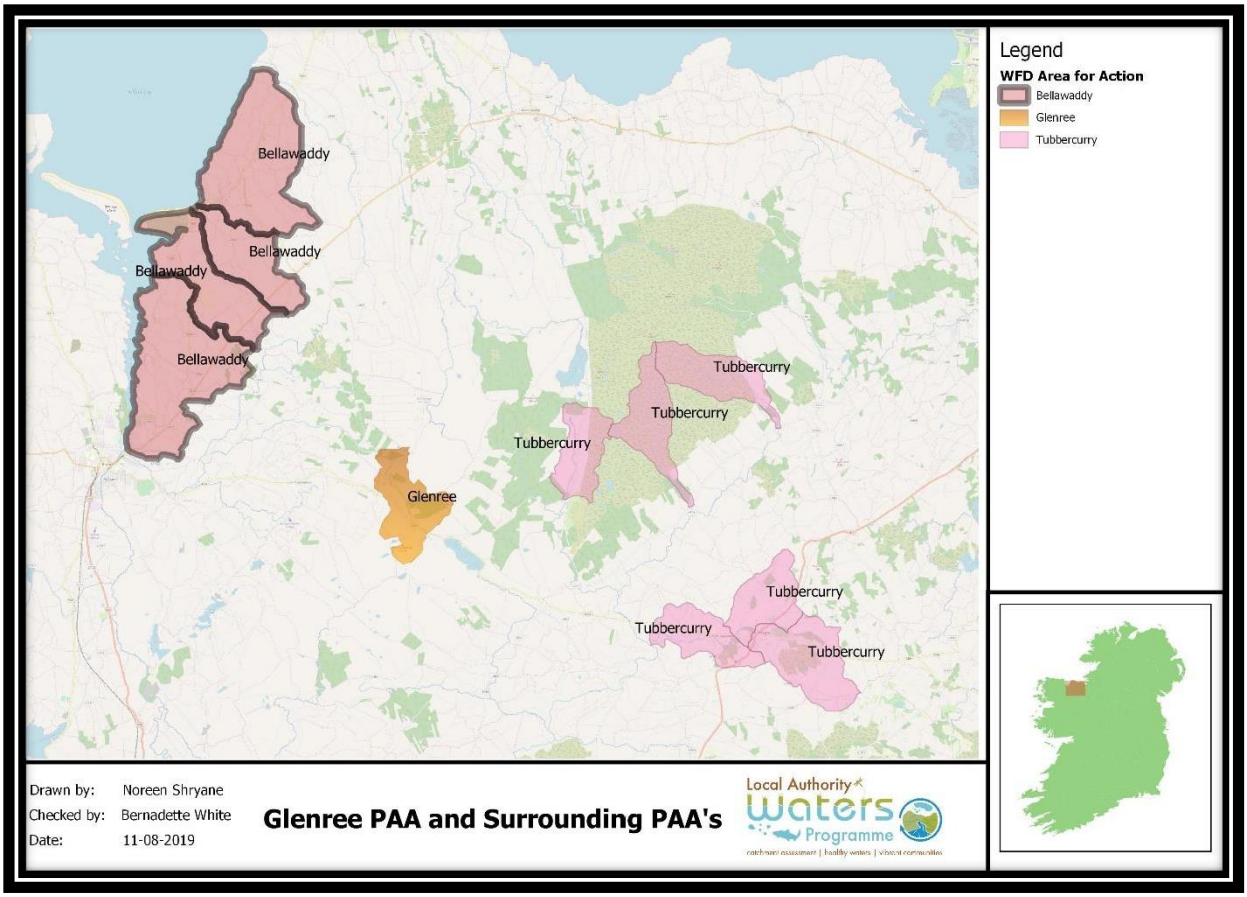


Figure 1 Glenree PAA and the surrounding PAA's

A catchment assessment workshop was held in Castlebar on 26th to 28th April 2017. It was attended by representatives of local authorities (Mayo, Galway, Roscommon, Leitrim, Sligo), LAWCO, Irish Water, IFI, Forest Service, Coillte, NPWS, Teagasc, GSI, DAFM, Marine Institute and EPA. Based on the draft River Basin Management Plan priorities, a set of agreed principles and the local priorities of the workshop attendees, 34 areas were recommended for action for the Western Region (see Appendix 2 of RBMP 2018 – 2021), of which the Glenree PAA was one. The Glenree PAA was selected, for the following reasons:

- It is suspected that deterioration was event based and that focussed efforts should be able to return the water body to high status relatively quickly.
- One *At Risk* High Ecological Status objective deteriorated water body.
- Headwater to *Not at Risk* High Ecological Status objective water body (Glenree_020).

Table 1 summarises the risk classification, environmental objective, ecological status, significant pressures (and sub-category) and local catchment assessment (LCA) action proposed. Figures 2 and 3 illustrate the risk classification and status classification for Glenree_010. The LCA assigned to this water body on the basis of initial characterisation undertaken by the EPA is:

IA8 High status RWB pressures: Full investigative assessment required to identify source of pressures. Focus on wind farm development, peat extraction and forestry.

A review of additional EPA Q value monitoring has found that in 2016, and again in 2018, the biological status returned to High (Q4-5) at monitoring station RS34G010020 and is therefore the Glenree_010 is now achieving its high-status objective. In light of this, the focus of this deskstudy and the local catchment assessment is to determine, if possible, what led to the deterioration of the site between the sampling years 2010 and 2013.

Table 1 Summary of waterbodies in the PAA

WB Code	WB Name	WB Type	Risk	High status obj.	2009 Ecological	2012 Ecological	2015 Ecological	2016 Biological	Pressure Category	Pressure Subcategory	Significant Pressure	LCA Action[1]
IE _WE_ 34G010020	Glenree_010	RWB	*At Risk*	Yes	H	H	G	H	Extractive Industry	Peat	Yes	IA8 High Status RWB Pressures
									Forestry	Forestry	Yes	
									Anthropogenic Pressures	Unknown	Yes	

1.2 Information Sources Consulted

Several information sources were consulted during the preparation of this desk study for the Glenree PAA including:

- WFD web application – EPA characterisation data
- Foxford GWB: Summary of Initial Characterisation -https://jetstream.gsi.ie/iwdds/delivery/GSI_Transfer/Groundwater/GWB/FoxfordGWB.pdf
- NPWS Site Synopsis – River Moy SAC
- Workshop with Mayo County Council on Wednesday 26th of September 2018.
- Satellite Imagery for analysing the land use- https://www.planet.com
- Google earth for time lapse aerial imagery

[1] See Appendix 3 for further information

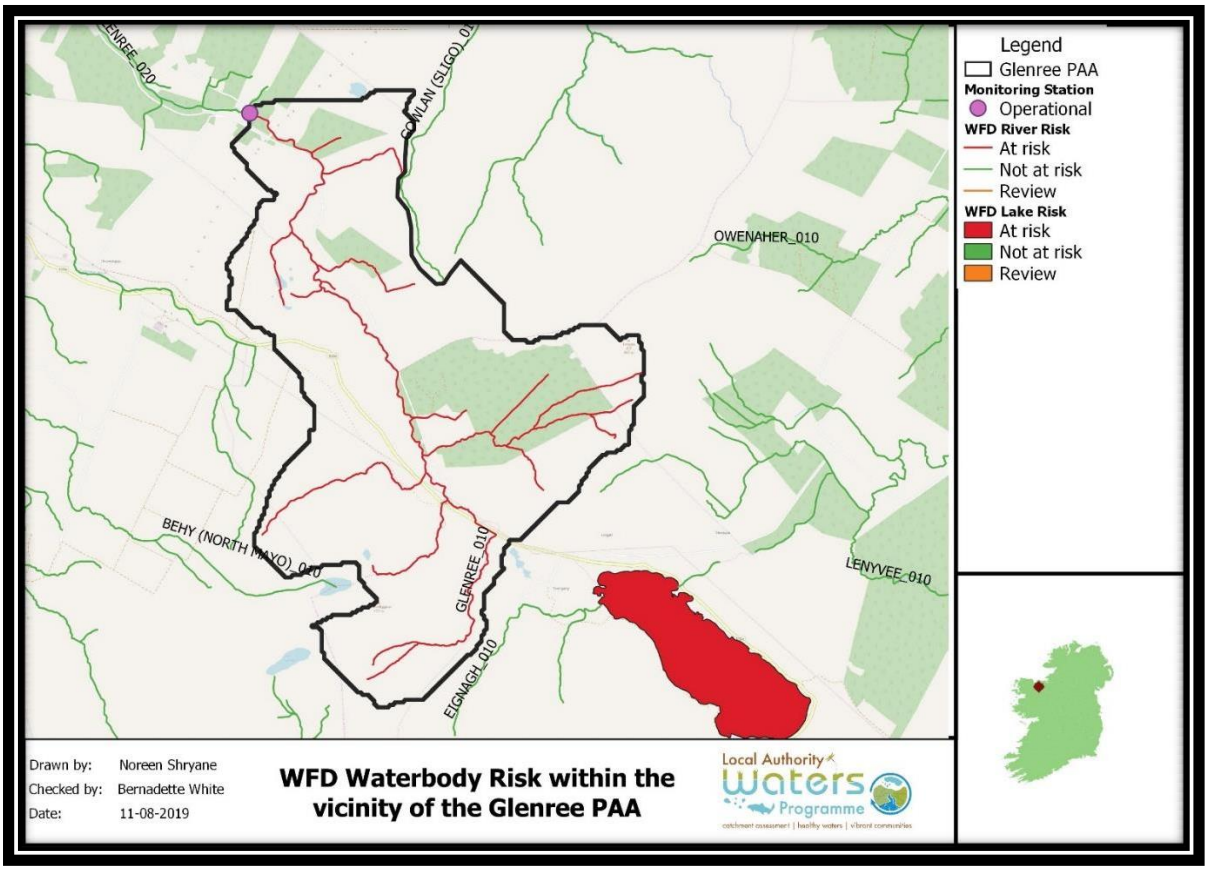


Figure 2 River and Lake Risk in the vicinity of the PAA

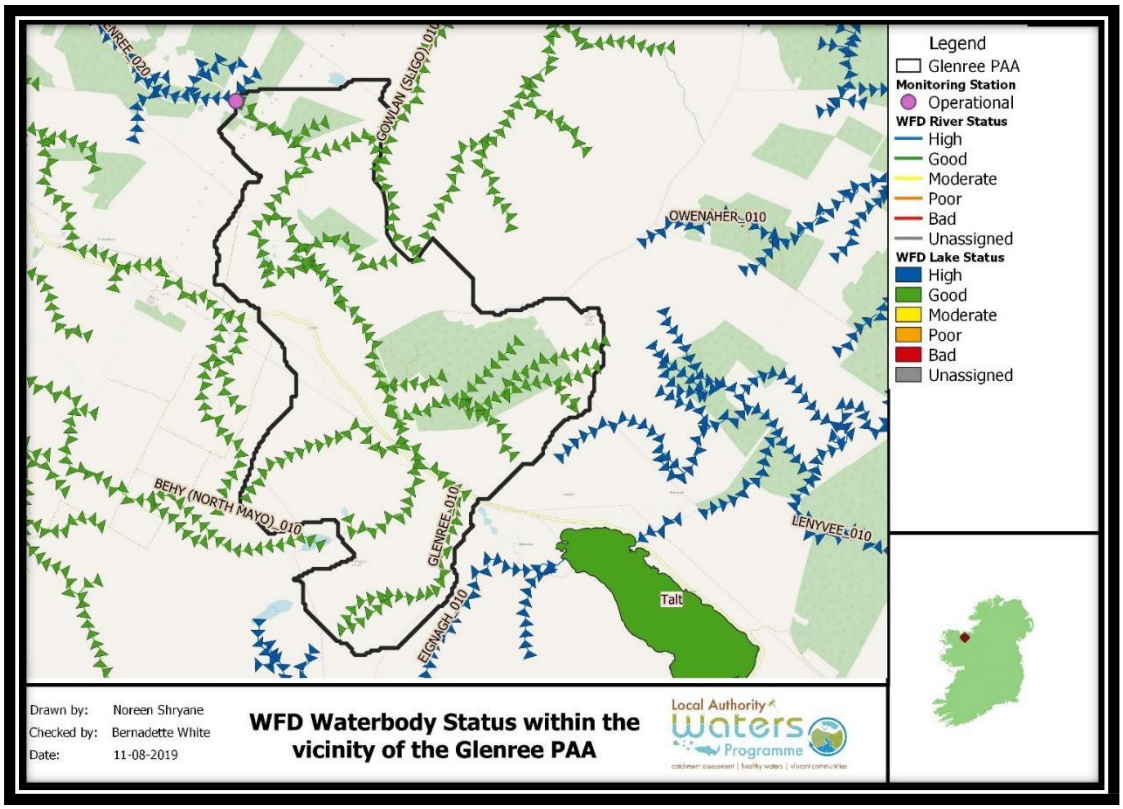


Figure 3 Waterbody Status in the vicinity of the PAA[2]

[2] Note that arrows indicate the direction of flow of the Glenree River i.e. south-west.

2 Receptor information and assessment

2.1 Context and Setting

The Glenree_010 is a headwater water body, which flows into Glenree_020, Glenree_030, and finally discharging into the Moy estuary downstream of Bunree Bridge in Ballina. Bunniconlon village is to the West and Tubbercurry is the East of the Glenree PAA. It is in the shadow of the Ox mountains and close to the Mayo / Sligo county border. The main land use activities in the PAA are coniferous forestry (Coillte) and peat extraction. Glenree_020 also has a high-status objective and is currently meeting its environmental objective. Glenree_030 has a good status objective and is currently meeting its environmental objective, while the Moy Estuary is currently at moderate status and failing to achieve its good status environmental objective. There is a slight overlap between this PAA and two SACs – the Ox Mountains Bogs SAC and Lough Hoe Bog SAC (Figure A2 Appendix 1).

2.2. Receptor Information Table

Table 2 below presents water quality information on the Glenree_010 including the status and trends of the quality elements monitored and the significant issues that may be impacting on the river.

Table 2 Outline of parameters influencing water quality Glenree _010

Waterbody		Glenree_010
Risk Category		**At risk**
Monitoring station		Bridge near Carrownaglogh RS34G010020
Monitoring station type		Operational
Biological Status (2013 – 2015)		**Good status Q4** (See Figure A1 Appendix 1)
Q values	*2009*	
	2010	4-5
	2011	
	2012	
	2013	4
	2014	
	2015	
	2016	4-5
	2017	
	2018	4-5
Water chemistry		
Monitoring station		Bridge near Carrownaglogh
	2010	
	2011	

Waterbody		Glenree_010
PO4+ mg/l (Annual average)	*2012*	
	2013	
	2014	
Environmental Quality Standard 0.025 mgP/L	*2015*	
	2016	0.005
	2017	0.005
	2018	
Baseline PO4		**0.005**
NH4+ mg/l (Annual average)	*2010*	
	2011	
	2012	
	2013	
	2014	
	2015	
Environmental Quality Standard 0.040 mgN/L	*2016*	0.010
	2017	0.010
	2018	
Baseline NH4		**0.010**
NO3- mg/l (Annual average)	*2010*	
	2011	
	2012	
	2013	
	2014	
	2015	
Indicative Quality Standard for assessment purposes (not an EQS) 3.5 mgN/L	*2016*	0.100
	2017	0.100
	2018	
Baseline NO3		0.10
HYMO		0.9375 Hydromorphology Score (2016) (High)
Comments		Return to high status Q value. Chemistry all within high status EQSs.
Conceptual model required (Y/N)		Y
Ecological Status		Good
EPA Biologist comments		The Glenree continued to be of high ecological condition with improvements recorded in the upper three stations and

Waterbody	Glenree_010
	lowermost station surveyed in September 2016 and again in 2018.
Suspected Significant issue	Unknown[3]

[3] Based on information available during the Deskstudy

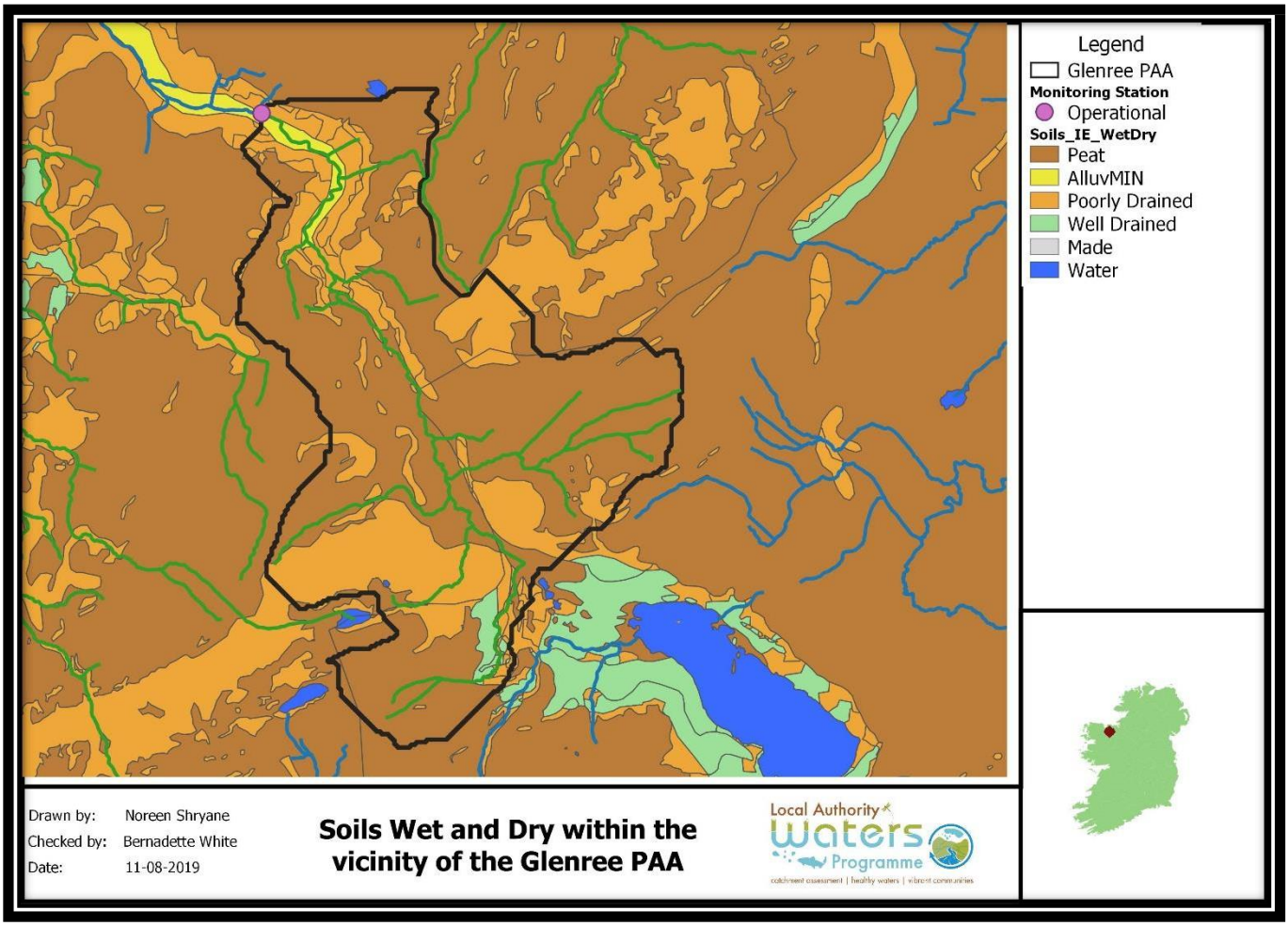


Figure 4 Wet and Dry soils within the PAA

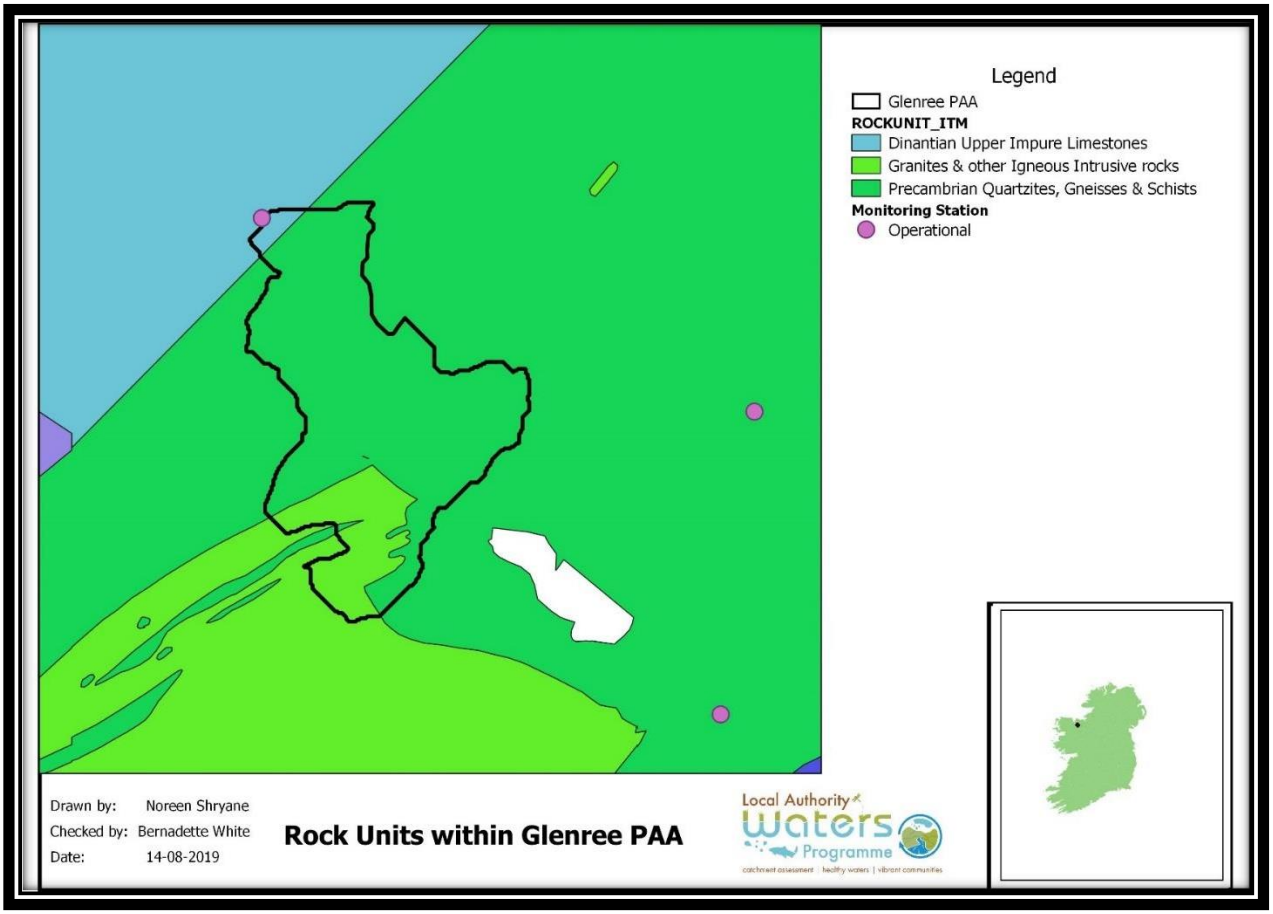


Figure 5 Rock Units within Glenree PAA

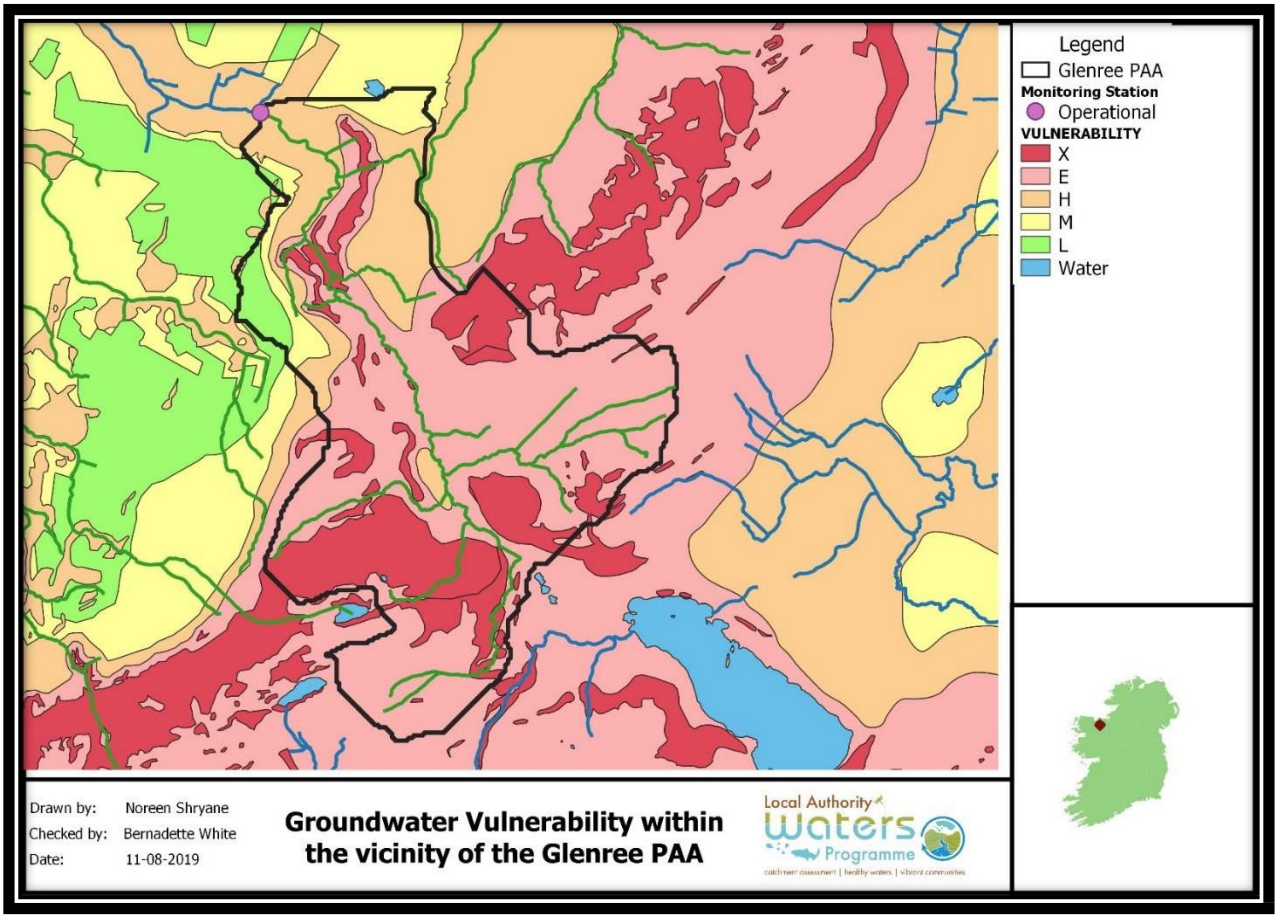


Figure 6 Groundwater Vulnerability within the PAA

3 Significant pressures

3.1 Significant pressures from the EDEN App

The significant pressures identified by the EPA as part of the characterisation process was peat, forestry and anthropogenic pressures (with a focus on windfarm development). The impact associated with these pressures are altered habitat due to morphological pressures. The land use in the PAA is predominately peat extraction and forestry. There has also been significant windfarm development in close proximity to the PAA, with some ancillary works occurring within the PAA e.g. pylon construction and access roads. The primary pathways in this PAA are overland flows, near surface flows and drains. There is approximately 135 Hectares of Coillte owned forestry and 19 hectares of privately-owned forestry versus a total area of 855 hectares in the PAA (18% of the water body).

3.2 Significant Pressures Feedback from Mayo County Council

A workshop was held between LAWPRO and Mayo Council on Wednesday 26th of September to discuss the Glenree PAA. This is a sparsely populated area with a sharp drop along a glaciated valley. Significant clear felling took place on the Sligo side of the PAA near Lough Talt sometime between 2005 to 2013, however this is in a separate hydrological unit to the Glenree PAA and would therefore have had no potential for impact to the Glenree headwaters. Coillte owns the large plantation within the Glenree PAA (Figure 7). There has been some land reclamation within the PAA for agricultural purposes. There are 8 houses in the PAA. Based on the population density of the catchment and the SANICOSE model, DWWTS were not identified during initial characterisation as being a significant pressure. It was suggested by Mayo County Council that a “Whole area plan” for forestry should be implemented for the Glenree _010, _020 and _030.

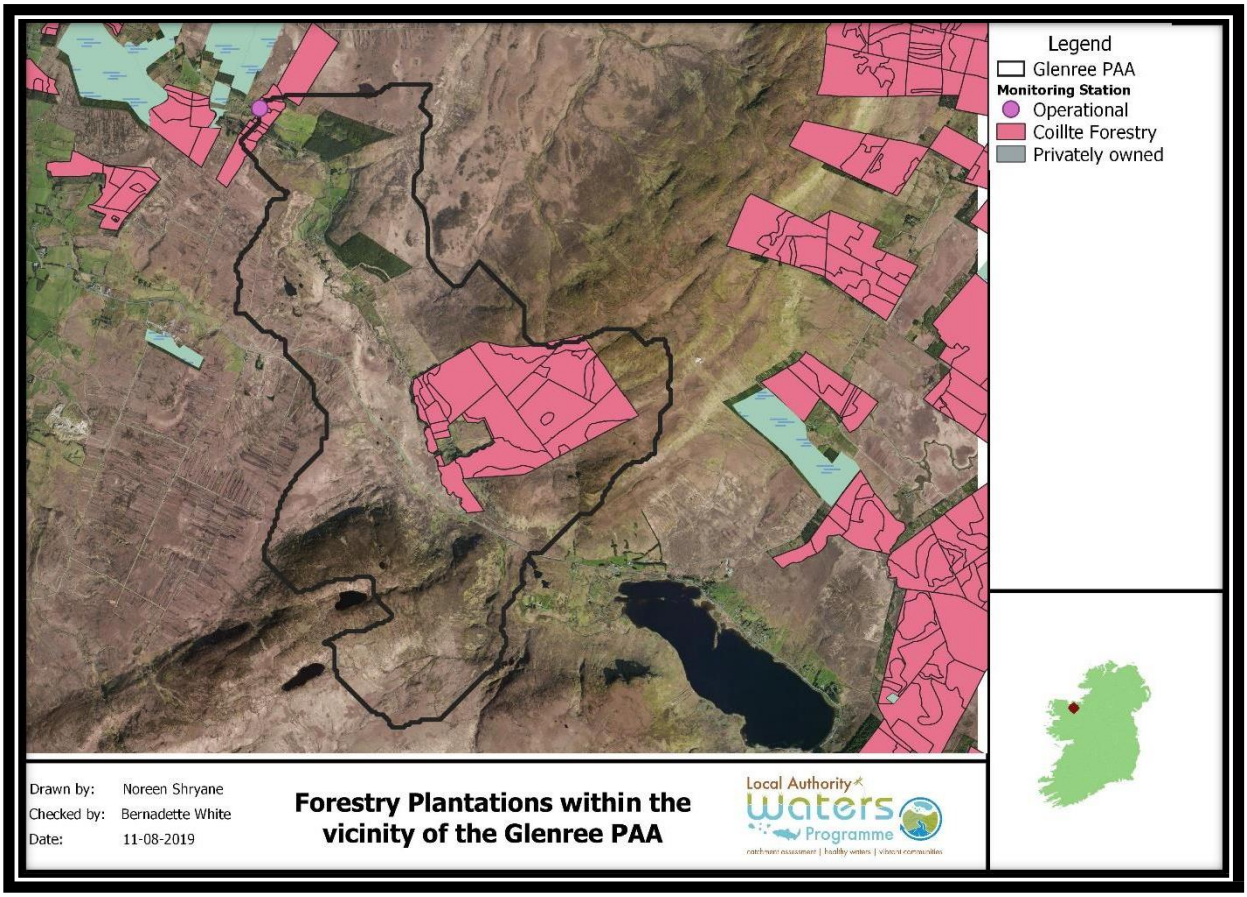


Figure 7 Forestry cover within the PAA

Table 3 Pressures and Impacts identified in the catchment assessment workshop was held in 2017

Pressure Category Name	Pressure Subcategory Name	Waterbody Name	Significant Pressure	Impact Assessment
Extractive Industry	Peat	GLENREE_010	TRUE	Biological status declined from High to Good. Peat is mapped across the sub basin and the LAM indicates a 28% P contribution from peat. During the workshops, it was reported that peat cutting is carried out on a relatively large scale. The method of cutting went from hand cutting, to sausage, to JCB (see Figure 8 below).
Forestry	Forestry	GLENREE_010	TRUE	Biological status declined from High to Good. Forestry is mapped along the water body (see Figure 7). Aerial imagery indicates possible clear felling in upper reaches (see Figure 9 below).
Anthropogenic Pressures	Unknown	GLENREE_010	TRUE	Two large windfarms have gone up in the area which has involved significant activity. Activity is on-going at present. The windfarm is downstream of the PAA (Figure 10) [4]

[4] https://wfd.edenireland.ie/characterisation/tier2/assessment/sbc0000515

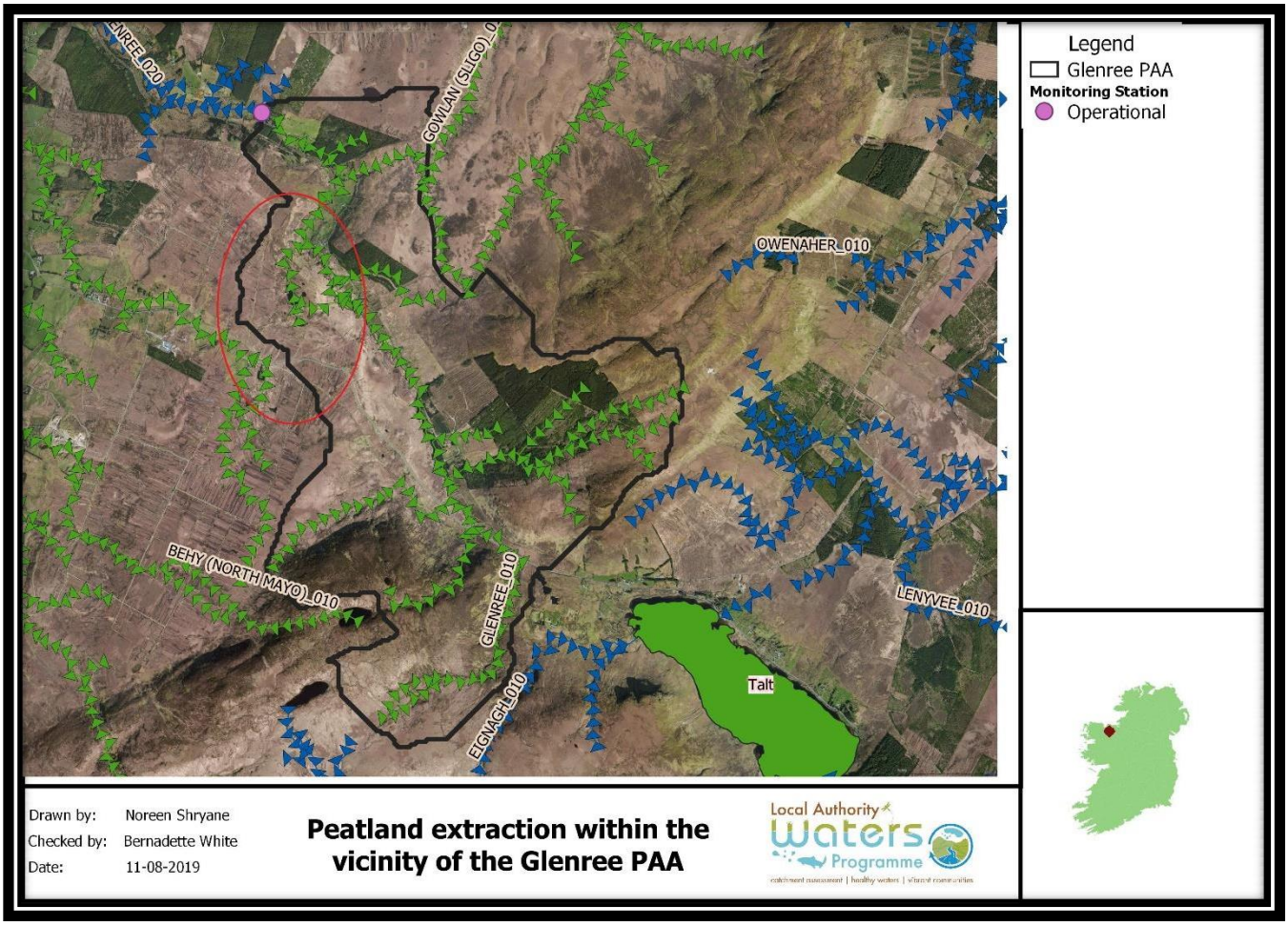


Figure 8 Peat extraction with the PAA

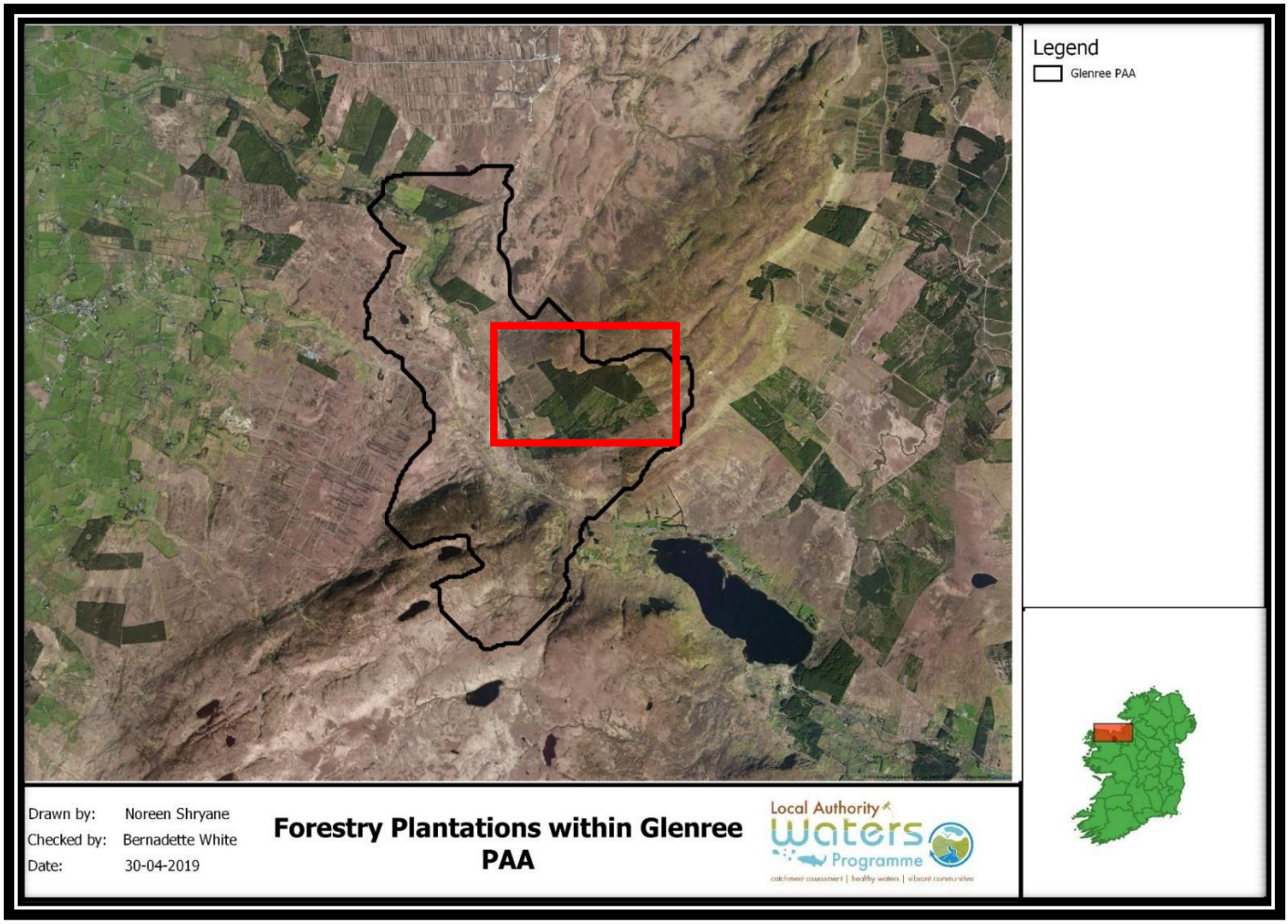


Figure 9 Clear felling within the PAA

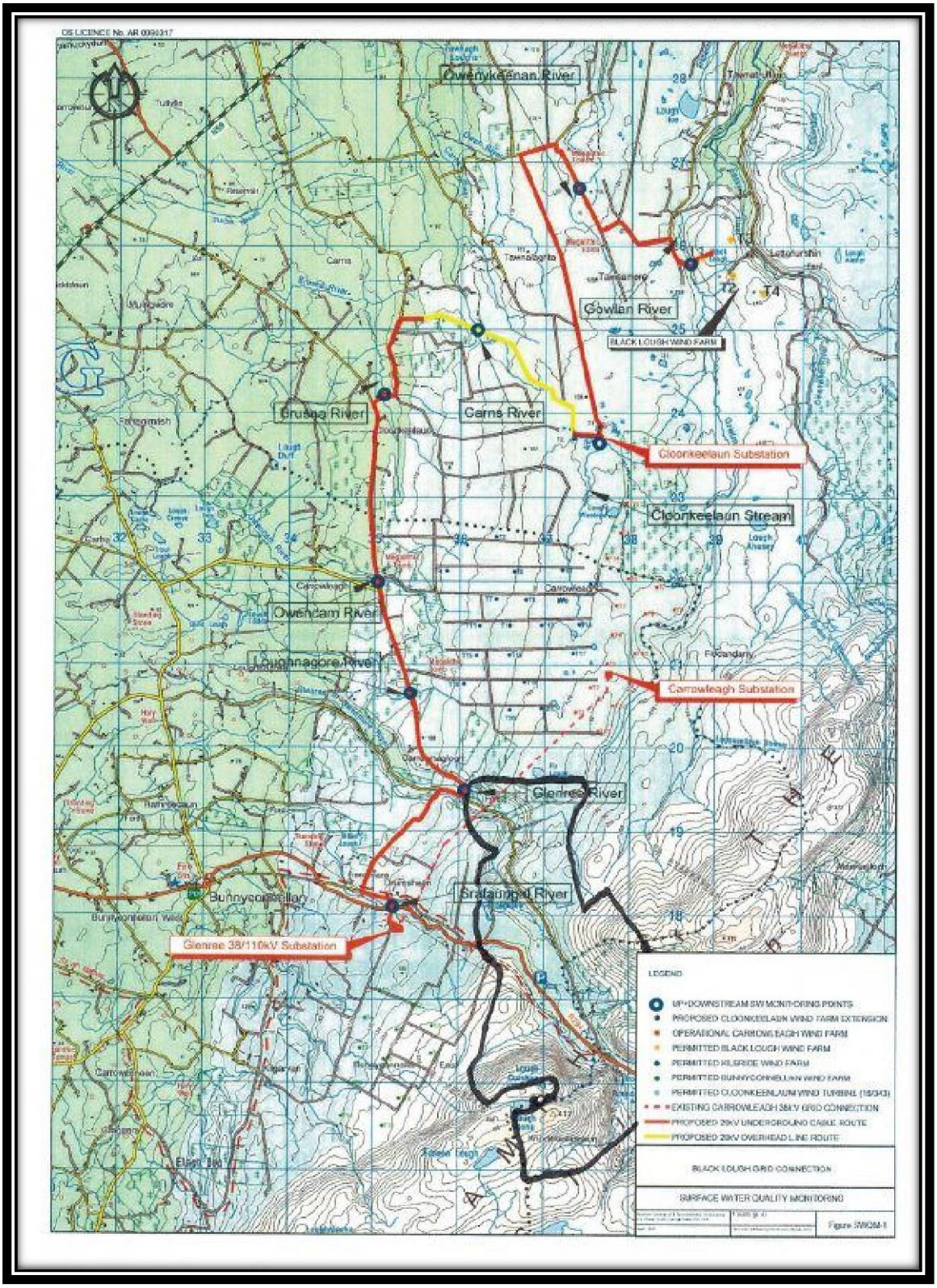


Figure 10 Windfarm locations within the vicinity of the PAA

4 Pathway Information and analysis /Conceptual Model

4.1 Overview of Pathways in the PAA

The Regional pathway framework is provided by the aquifer in the PAA. One compartment is identified; low transmissivity - Poor Aquifer- Bedrock which is generally unproductive except for local zones. The majority of the catchment is poorly draining or peat soils, therefore the transport of phosphate will be a risk throughout the PAA (Figure 4). A small pocket of well drained soils is evident in the southern section of the PAA. The monitoring point sits on a different setting to the majority of the PAA i.e. it is on a section with alluvium mineral soils, where subsoil permeability is moderate and the aquifer changes to a locally important aquifer.

Table 4 Compartments within the PAA

		Compartment 1	Compartment 2
		Poorly drained	Poorly drained
Pathway Info.	Direct (e.g. pipe)	No	No
	Aquifer	Poor Aquifer (Pl)	Locally important (Ll)
	Topography	High gradient	Low gradient
	Soil	Peat and poorly drained (Figure 4)	Alluvium mineral
	Subsoil	BkPt (Blanket Peat) Rck	Metamorphic till (TMp) Alluvium undifferentiated (A)
	Subsoil K	Not Applicable Soil permeability: DTB <3m	Moderate
	Rock Unit	GII (Granites and other Igneous Intrusive rocks) PQGS (Precambrian Quartiztes, Gneisses and Schists) (Figure 5)	DUIL (Dinantian Upper Impure Limestones)
	Groundwater vulnerability	Mainly Extreme (E) with areas of Rock near surface or karst (X) (Figure 6)	High (H)
	PO4 Susceptibility	Predominately PIP Rank 4	Predominately PIP Rank 4
	NO3 susceptibility	Pip Rank 7	Pip Rank 7
	PO4 PIP	Rank 4 (Figure 12)	Rank 4 (Figure 12)
	NO3 PIP	Rank 7 (Lowest)	Rank 7 (Lowest)
	Flowpaths	Poorly drained soil on low transmissivity bedrock Overland and shallow flows dominant Drains	Poorly drained soil on low transmissivity bedrock Overland and shallow flows dominant
Location of Monitoring Point			Bridge near Carrownaglogh (RS34G010020) at the base of the Catchment
Significant pressures		Forestry and Peat	Forestry, windfarm development

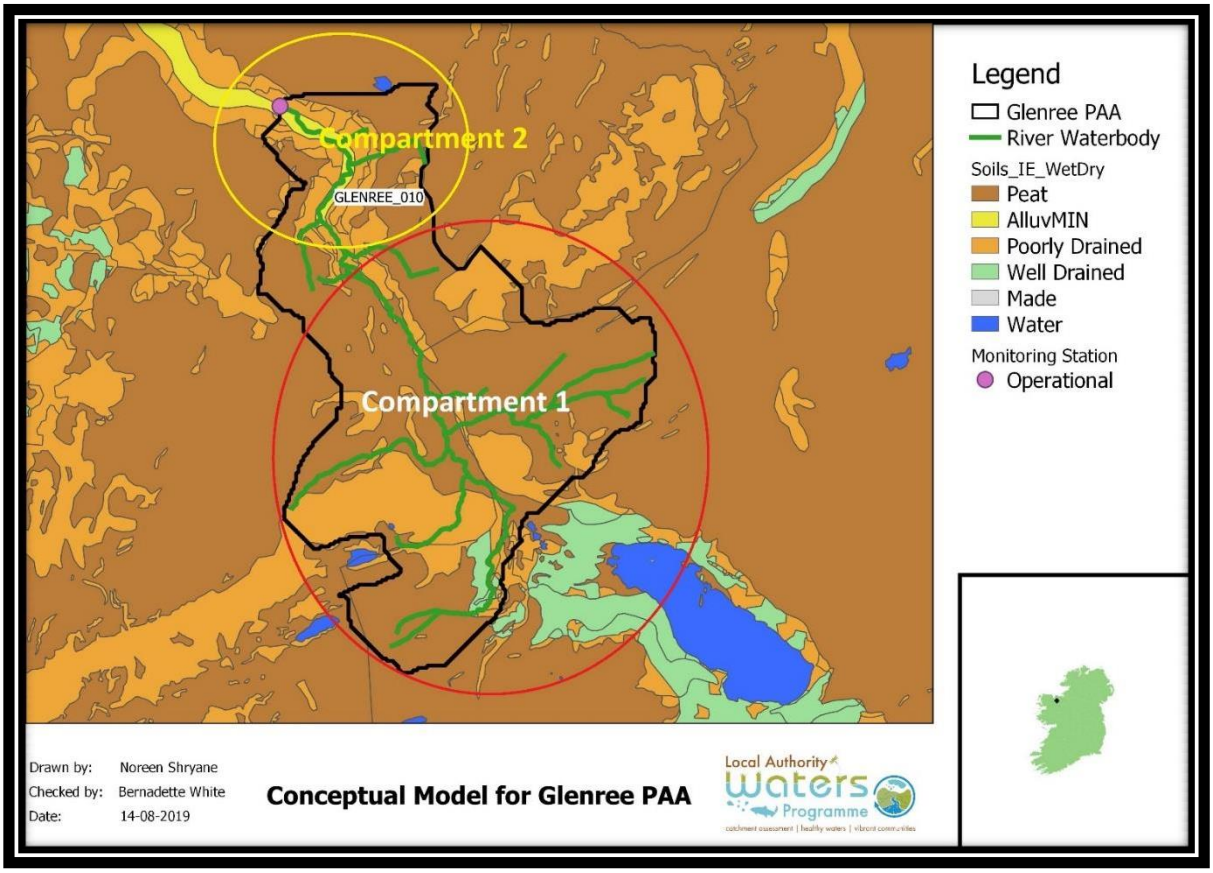


Figure 11 Conceptual Model for the Glenree PAA

5 Interim Story of the PAA

The significant pressures identified by the EPA during initial characterisation were peat, forestry and anthropogenic pressures (with a focus on windfarms). The impact associated with each of these pressures was altered habitat due to morphological pressures. The land use in the PAA is predominately peat extraction, windfarm development and forestry. The majority of the Glenree_010 water body is poorly draining or peat soils, therefore the transport of phosphate will be a risk throughout the PAA although PIP ranking for P is low (Figure 12). A small pocket of well drained soils is evident in the southern section of the PAA at the monitoring point. The monitoring point sits on a different setting to the majority of the water body i.e. it is on a section with alluvium mineral soils, where subsoil permeability is moderate and the aquifer changes to a locally important aquifer. The main pathways for nutrients and sediment to reach the Glenree river in this water body is via overland flow. While the Glenree_010 was chosen as a PAA given it had deteriorated from high to good status between the 2010 and 2013 monitoring periods, the water body has since recovered and achieved high biological status as determined using the Q value by the EPA i.e. it achieved Q4-5 in 2016 and again in 2018. Local Catchment Assessment work proposed for this PAA will be minimal, but with a focus on establishing the potential significant pressures which might have led to the decline in status in 2013.

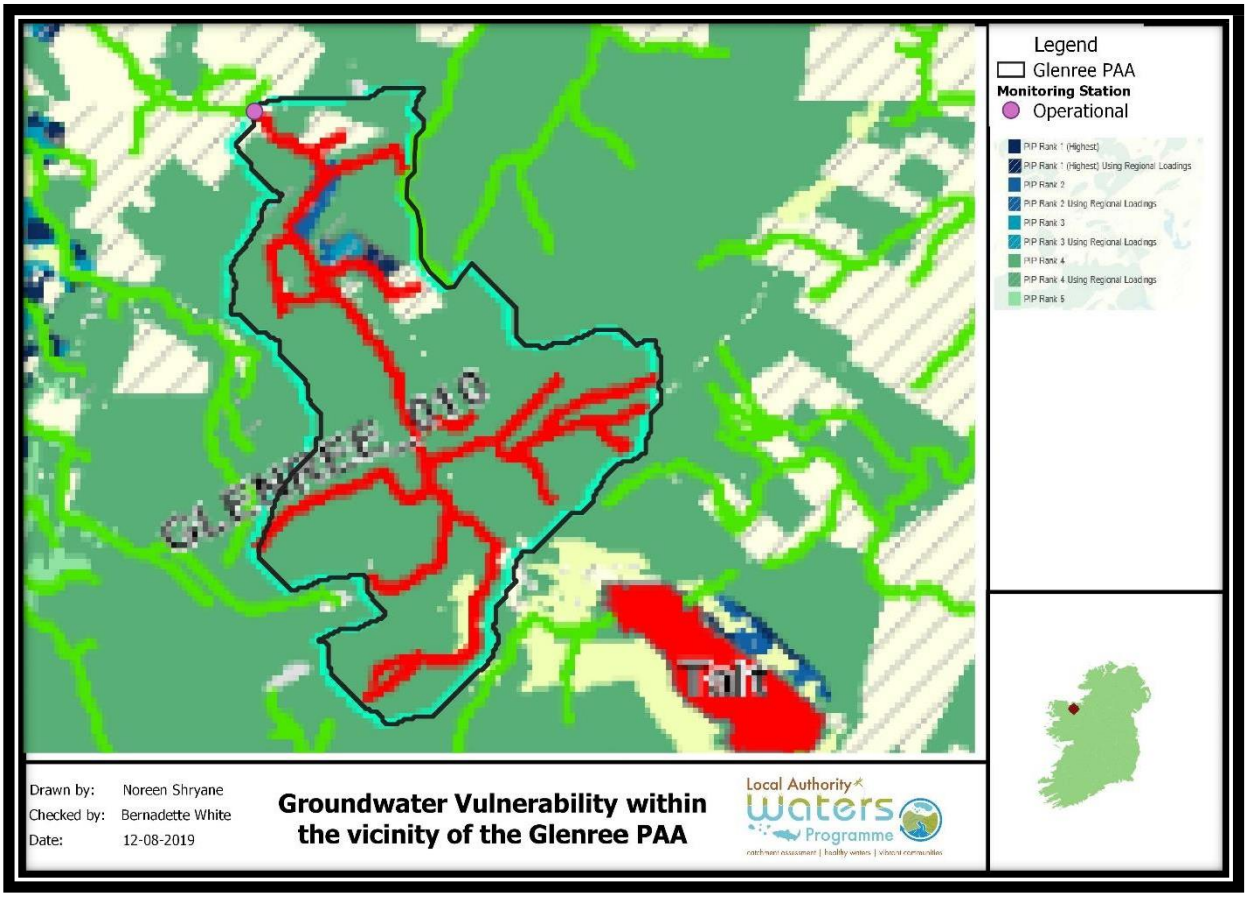


Figure 12 Surface Water Receptor Phosphate PIP

6 Workplan

- It should be confirmed that the waterbody is no longer significantly impacted at the monitoring point using SSIS to ascertain if the improvements noted in 2016 and 2018 by the EPA, has been sustained.
- If the waterbody is deemed to not be significantly impacted, then a catchment drive should be undertaken to take note of land use activities completed between 2010 and 2013, or ongoing since 2010.
- Establish the timeline for when or if forestry felling (or other forestry activity), peat extraction and windfarm development was undertaken, specifically between 2010 and 2013. A response is awaited from the Forestry Service on the timeline of activities in the PAA.
- Undertake catchment walks where required, to examine works undertaken between 2010 and 2013. Document findings with photographs, mapping and descriptions on observations.
- The objective of the assessment will be to generate discussion on the activities which are suspected to have contributed to or caused the decline in 2013. It is unlikely that the precise cause of the decline will be possible to identify retrospectively.

High Status Objective Water Bodies

- The possible need for further measures in high status objective waterbodies such as larger buffer zones, silt traps on peat harvesting areas or more water friendly felling operations may be required. This guidance will evolve for these water bodies via the Blue Dot Catchments Programme, in the coming months.

Figure 13 below outlines the work plan for carrying out a local catchment assessment in the Glenree PAA. Round 1 of sampling will include 4 sites for local catchment assessments to obtain a representative sample of the catchment and will take place in Spring 2019. It is recommended that a second round of sampling will take place in the summer months to verify findings and undertake any catchment walks which may be required. The following catchment walks have been identified:

- Walk along river upstream of monitoring point to the location of a newly constructed pylon.
- Forestry walk. Check for drains and recent felling.
- Catchment drive in and around the forestry plantations to identify any activities since 2010.
- Investigate peatland harvesting activity- is there large-scale extraction? The peatland within the boundary of the PAA is not registered as an extractive industry. It is privately owned peatland.

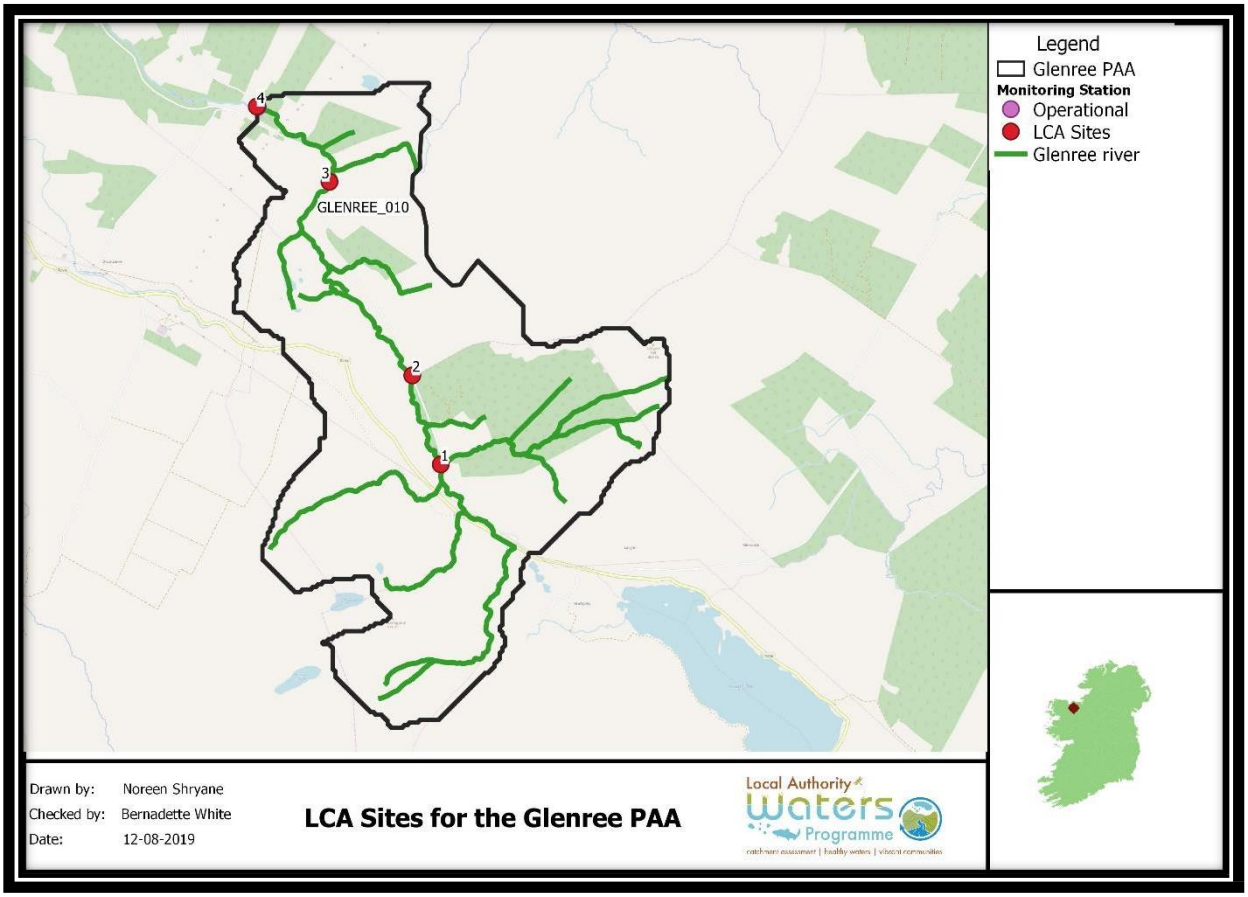


Figure 13 Round 1 LCA Survey Sites

7 Review of Mitigation Options

Mitigation options cannot be identified at this time as there is no evidence from the deskstudy to strongly suggest which of the three significant pressures identified during initial characterisation, might have led to the temporary decline in status at the monitoring point. Should forestry, or windfarm construction be identified as the significant pressures, a discussion with the Forest Service and Mayo County Council will be required, to ensure future planning and licencing in the PAA does not lead to further temporary or indeed complete loss of high status at this sensitive site. Should the pressure be peat extraction, discussions with peatland owners will be required.

8 Communications

The need for a community information meeting in this PAA is not deemed required at this stage, based on information collated in this desk study. The PAA is sparsely populated and should LCA work deem forestry, or windfarms or peat extraction to be the sole pressure, a direct interaction with the pressure owner will be required. Should peat cutting be deemed the key significant pressure, the need for a

community information meeting could be justified. It is not expected that ASSAP will be required to undertake assessments within this PAA given the water body has recovered.

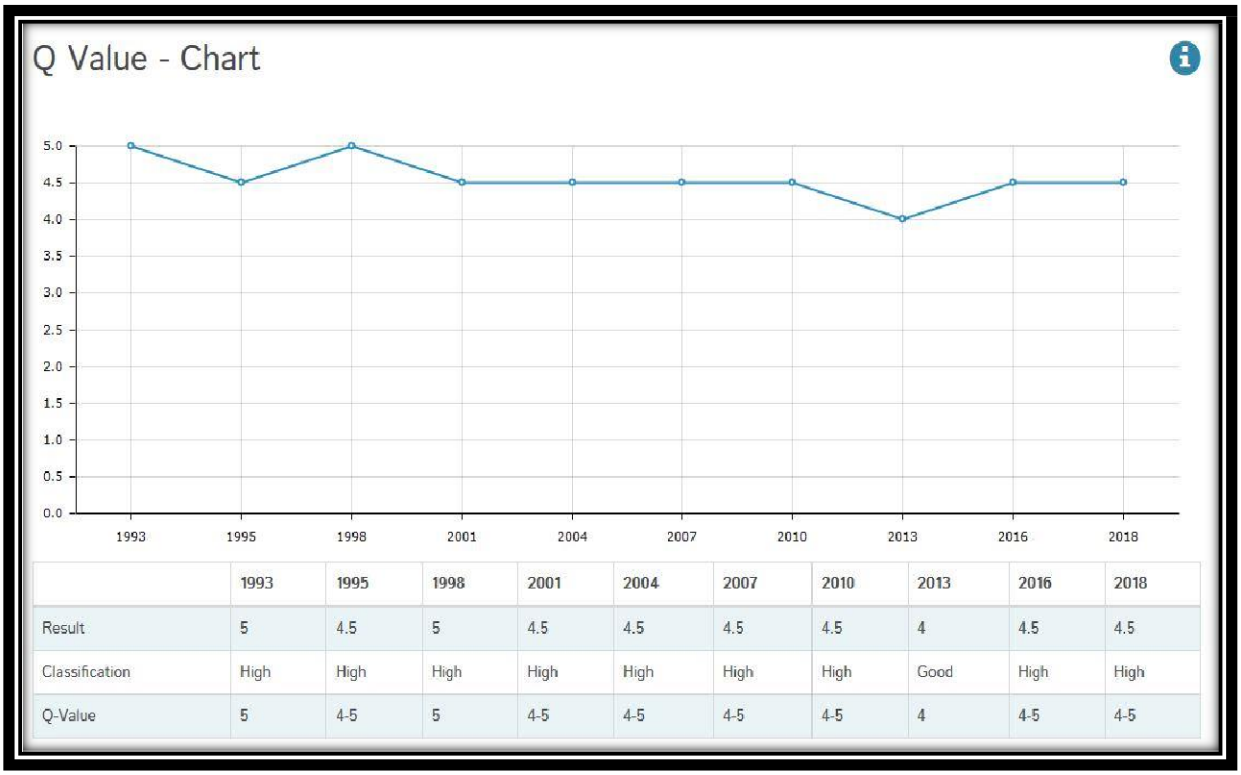
9 Conclusions

- The desktop assessment has revealed that this high-status objective water body has recovered in the period between 2013 and 2016 /2018 and is therefore now achieving its high-status ecological objective.
- The objective of the assessment will be to generate discussion on the activities which are suspected to have contributed to or caused the decline in 2013.

Date of Completion: 12th August 2019

Appendices

Appendix 1 Biological Information



	1993	1995	1998	2001	2004	2007	2010	2013	2016	2018
Result	5	4.5	5	4.5	4.5	4.5	4.5	4	4.5	4.5
Classification	High	High	High	High	High	High	High	Good	High	High
Q-Value	5	4-5	5	4-5	4-5	4-5	4-5	4	4-5	4-5

Figure A1 Biological Q Value Data from 1993 to 2018

Appendix 2 European and Heritage Sites

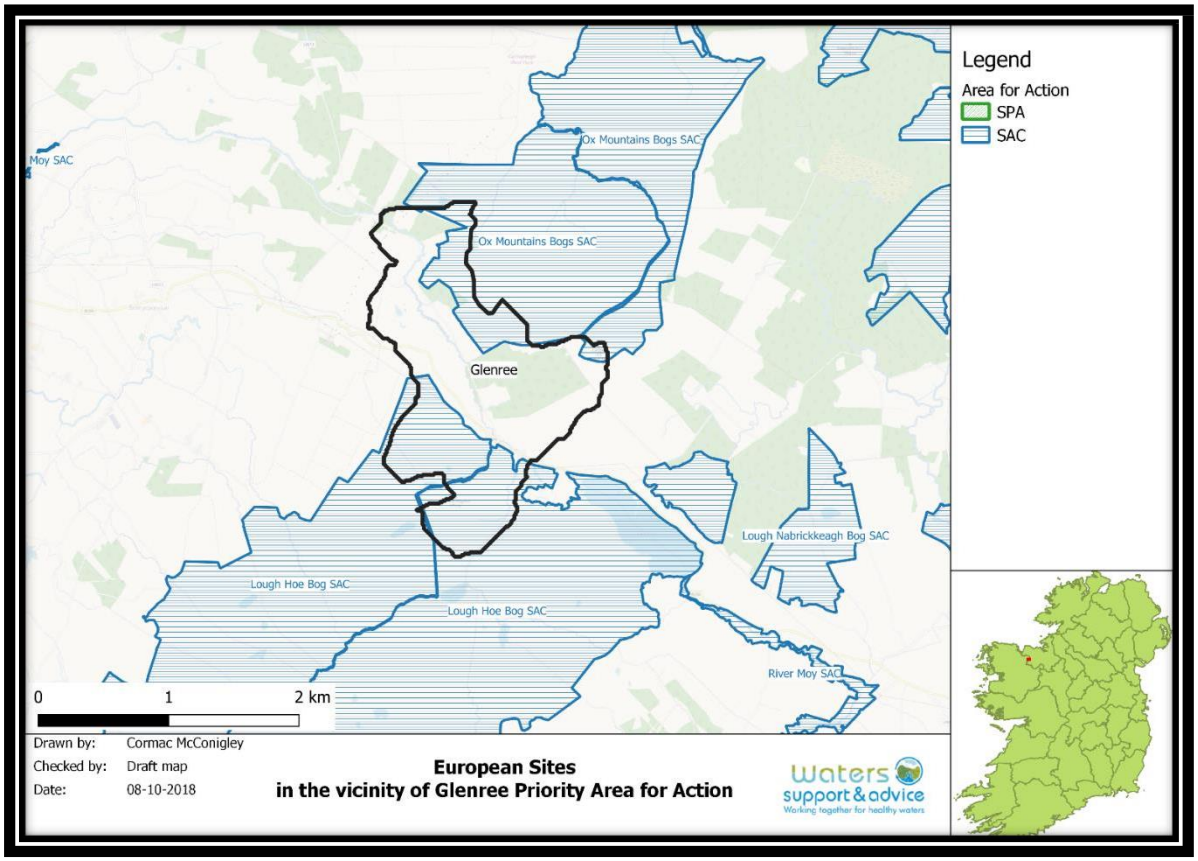


Figure A2 European Sites within the PAA