

Recess Priority Area for Action Desktop Assessment

(AFA0156)

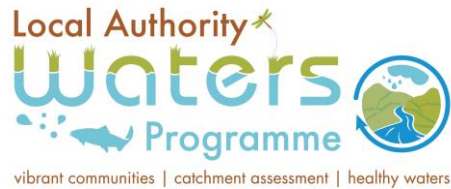
Version F01

10th September 2019

Western Region



Picture upstream of the EPA monitoring station (RS31R010100) at Bunsannive Bridge on the N59



Acknowledgements

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

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Table of Contents

LIST OF APPENDICES	ii
1 Introduction	1
1.1 Background to PAA	1
1.2 Information sources consulted	1
1.3 PAA Summary.....	2
2 Receptor information and assessment	4
2.1 Context and setting.....	4
2.2 Receptor information.....	8
2.3 Conclusions	9
3 Significant pressures	10
3.1 Forestry	10
3.2 Extractive peat	13
3.3 Agriculture	13
4 Pathways information.....	14
4.1 Conceptual model.....	14
5 Interim story of PAA.....	19
6 Work Plan.....	20
7 Review of Mitigation Options	22
8 Communications	22
Appendix 1	23
Appendix 2	25

List of Figures

Figure 1: PAA boundary showing EPA monitoring stations	5
Figure 2: Waterbody Risk in the PAA	6
Figure 3: Waterbody Status in the PAA	7
Figure 4: CORINE land use map within the Recess_010 waterbody.....	11
Figure 5: Forestry within the Recess_010 waterbody	11
Figure 6: Coillte forestry above the EPA monitoring station (RS31R010100) showing year planted... 12	12
Figure 7: Coillte forestry upstream of the EPA station RS32R010100 showing species planted..... 12	12
Figure 8: Aerial imagery highlighting improved agricultural land.	13
Figure 9: PIP Phosphate to surface water.....	16
Figure 10: Phosphate surface water susceptibility in the PAA	17
Figure 11: Conceptual model compartments map	18
Figure 12: Potential locations for LCA survey work	21

List of Tables

Table 1: Summary of risk, ecological status, known pressures and significance for the water bodies within the Recess PAA.....	3
Table 2: Receptor information for the Recess_010 Waterbody : Outline of parameters influencing water quality in the Recess_010 waterbody	8
Table 3: Conceptual model for the waterbody	15

LIST OF APPENDICES

Appendix 1: EPA chemistry data for Recess_010
Appendix 2: Soils, Subsoils, vulnerability and aquifer mapping

1 Introduction

1.1 Background to PAA

The Recess Priority Area for Action (PAA) is located in County Galway and stretches from Recess village in the west to Bunsannive in the West (**Figure 1**). The PAA is 54km² in area. The PAA lies within the Galway Bay North Catchment, and within the Recess_SC_010 subcatchment. The Recess river includes a number of lake water bodies along its course including Loughs Ooid, Illion, Tawnagh Park, and Garroman or Glendollagh. Recess_010 flows into Recess_020 river water body, which is currently unassigned. The Recess river eventually discharges into Roundstone Bay via Recess_030 and Recess_040 river water bodies.

There is one waterbody in the PAA, Recess_010 which is *At Risk* (**Figure 2**). There are two EPA operational monitoring stations within Recess_010: Bunsannive Bridge (RS31R010100) and Weir Bridge (RS31R010400) (see **Figure 1**).

There are two European sites in the PAA - Maumturk Mountains SAC for the most part and Connemara Bog complex SPA which encroaches from the south of the PAA.

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), the Local Authority Waters and Communities Office (LAWCO), Irish Water, Inland Fisheries Ireland (IFI), Forest Service, Coillte, National Parks and Wildlife Service (NPWS), Teagasc, Geological Survey of Ireland (GSI), Department of Agriculture, Food and the Marine (DAFM), Marine Institute and the Environmental Protection Agency (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 in the Western Region, of which the Recess PAA was one. The Recess PAA was selected for the following reasons:

- Possible quick win if the EPA monitoring point was moved.
- Limited extent of pressures with only one being considered significant, i.e: anthropogenic.
- One deteriorated water body.
- Potential issues at headwaters to be investigated.

1.2 Information sources consulted

- WFD web application – EPA characterisation data
- Irish National River types based on geology and river slope (EPA, 2005). *Hannigan and Kelly-Quinn* (2013-W-FS-15)
- Directive 2000/60/EC of The European Parliament and of the council of 23 October 2000, establishing a framework for Community action in the field of water quality.
- EDEN DWWA App for DWWTS.

1.3 PAA Summary

A summary of risk, ecological status, known pressures and associated significance for the Recess_010 water body is presented in **Table 1**. The RWB dropped from good ecological status in the monitoring cycle covering 2010 to 2012, to moderate ecological status in 2013 to 2015 (**Figure 3**). It is therefore is *At Risk* of failing to achieve its WFD objective of Good Ecological Status. The EPA's most recent biological assessment carried out in 2018 at Bunsannive Bridge shows a further decline in biological status to Q3/0, with /0 representing a suspected toxic impact. Results at the second monitoring site in the water body, at Weir Bridge, found that a Q4 or good status was achieved yet again. Therefore, the focus of further characterisation assessments in this PAA will be from Bunsannive Bridge upstream.

The significant pressure identified for the RWB during initial characterisation was anthropogenic - unknown. The following local catchment assessment was recommended:

- IA7 Multiple sources in multiple areas. Walk along the RWB upstream of RS31R010100. Focus on sources of nutrients and sediment.

Recess PAA Desktop Assessment

Table 1: Summary of risk, ecological status, known pressures and significance for the water bodies within the Recess PAA

WB Name	WB Code	WB Type	Risk	WFD Status objective	Date to meet Env. objective	Ecological Status				Pressure Category	Pressure Subcategory	Sig. Pressure	Investigative Assessment
						2007-2009	2010-2012	2010-2015	2013-2018				
Recess_010	IE_WE_31R010400	River	At Risk	Good	2021	High	High	Moderate	Poor	Anthropogenic	Unknown	Yes	IA7: Multiple sources in multiple areas
										Agriculture	Pasture	No	
										Forestry	Forestry	No	
										Extractive Industry	Peat	No	

2 Receptor information and assessment

2.1 Context and setting

The PAA intersects approximately 16 townlands from Garroman in the west to Bunsannive in the east of the PAA. The N59 runs through the middle of the PAA. There seven unassigned lakes in the PAA, Lough Oorid and Glendollagh lake being the largest.

There are two EPA monitoring stations for this PAA, Bunsannive Bridge as a stretch of the Recess_010 discharges to L. Oorid and Weir Bridge station is over to the far east of the PAA as the Recess_010 outputs to Recess_020 which is currently unassigned. Owentooey_010 is an inputting river waterbody to the north of the PAA which inputs at the EPA monitoring station "Tullywee Bridge". Owentooey_010 is currently at Good status and *Not At Risk* at meeting it's WFD objective.

Water quality for this waterbody has decline from High (Q4-5) in 2006 to Moderate (Q3-4) in 2015 at the EPA monitoring station located at Bunsannive Bridge. There was a further decline in status in 2018 to Poor (Q3/0), indicating a toxic effect. The main land use of interest upstream of this EPA station include coniferous forestry and commonage pasture.

Recess_010 predominantly lies within the Maumturk Mountains SAC. It also intersects the Connemara Bog Complex SAC. The waterbody is a *Margaritifera* sensitive catchment comprising of extant populations. National Parks & Wildlife Services records show that Freshwater Pearl Mussels are present within the waterbody, however populations are not expected to be present in the eastern section of the PAA where the focus in this waterbody will be.

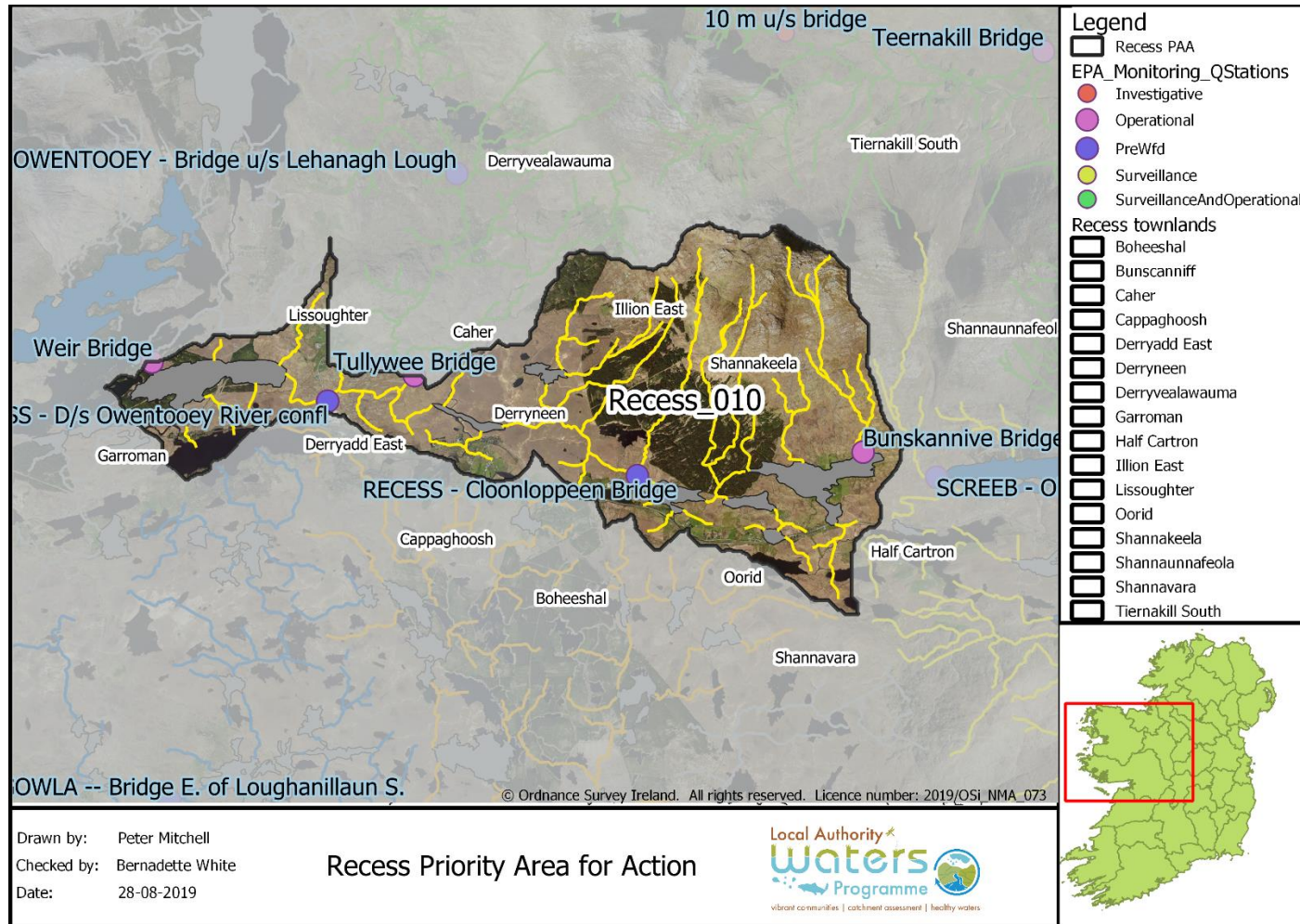


Figure 1: PAA boundary showing EPA monitoring stations

Recess PAA Desktop Assessment

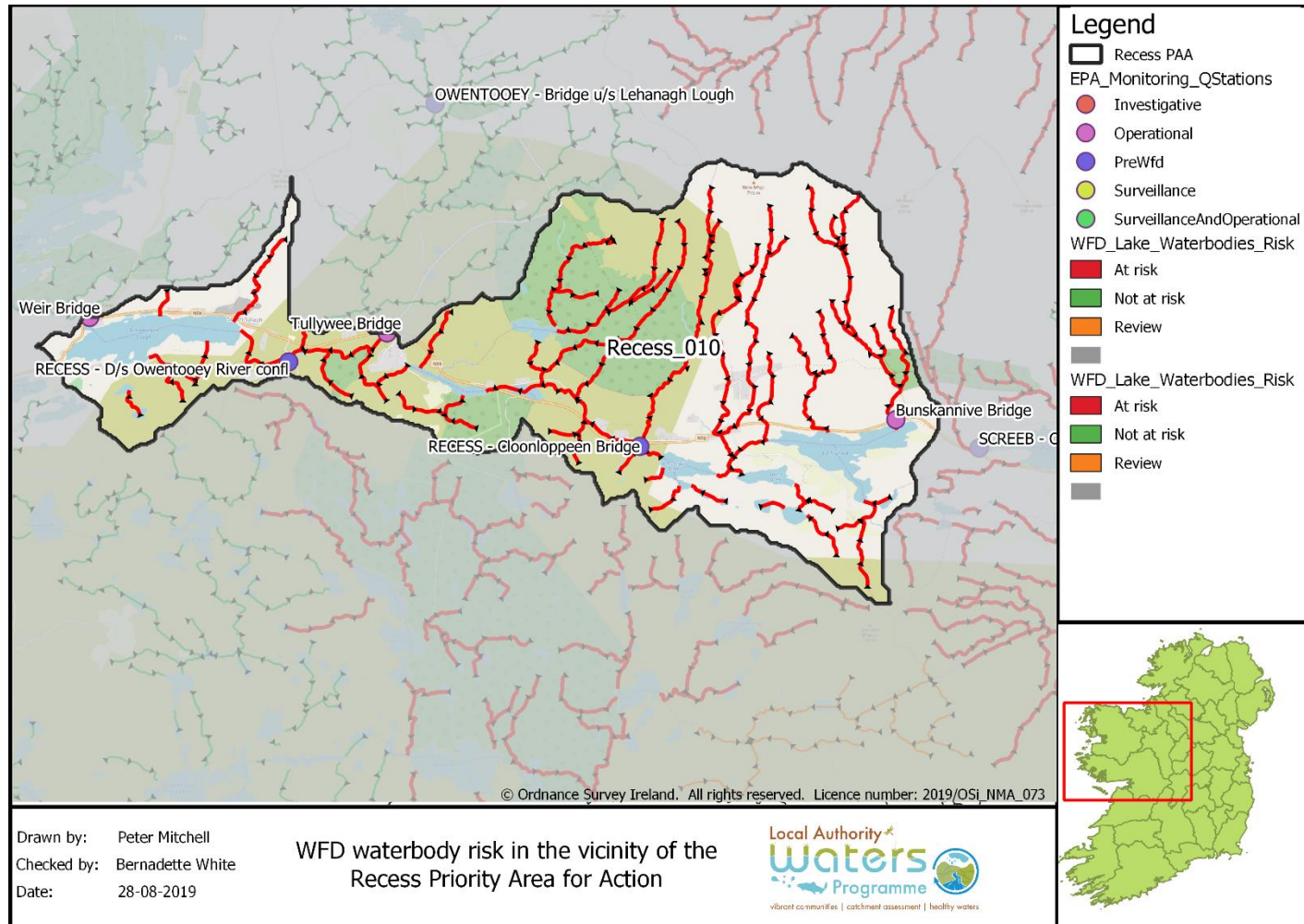


Figure 2: Waterbody Risk in the PAA

Recess PAA Desktop Assessment

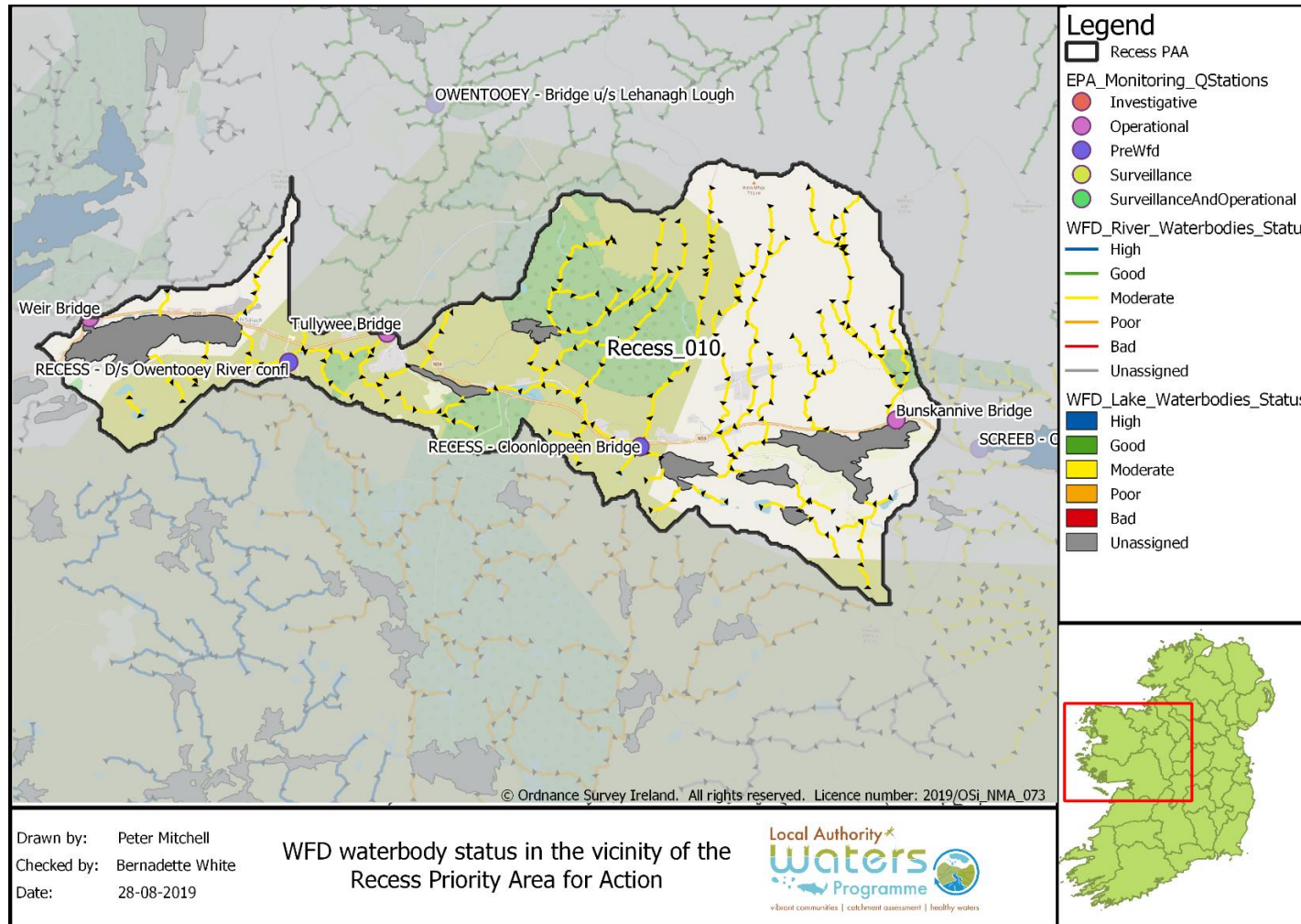


Figure 3: Waterbody Status in the PAA

2.2 Receptor information

Table 2 presents water quality information on the Recess_010 water body including the status and trends of the quality elements monitored for the RWB, the significant pressures and impacts on the RWB and the local catchment assessment type recommended to be undertaken.

Water chemistry provided in the **Table 2** below indicates that nutrients are statistically not significant. Total phosphorus and total nitrogen (2017) are available from the WFD App. While the nutrient parameters (Ortho-phosphate, Ammonia and Nitrate) were received via direct correspondence with the EPA dealing with the regional chemical monitoring programme. The full data set is provided in **Appendix A.1**.

Table 2: Receptor information for the Recess_010 Waterbody: Outline of parameters influencing water quality in the Recess_010 waterbody

Waterbody	Recess_010	
Monitoring station	RS31R010100 Bunsannive Bridge	RS31R010400 Weir Bridge
Risk Category	<i>At risk</i>	<i>At risk</i>
Monitoring station type	Operational	Operational
Biological Status		
Q-values		
	2003	4
	2006	4-5
	2009	4-5
	2012	4-5
	2015	3-4
	2018	3/0
Fish	-	-
WFD Objective	Good	Good
Water Chemistry		
Ortho-phosphate (as P) (mg/l)	0.021mg/l (2017) (Not significant)	No Data
Ammonia-Total (as N) (mg/l)	0.045mg/l (2016) Good status	No Data
Nitrate (as N) (mg/l)	<0.2mg/l (2016 & 2017) (Not significant)	No Data
Total Phosphorus (as P)	0.005 mg/l (2017)	
Total Nitrogen (as N)	0.25 mg/l (2017)	
Supporting conditions: Chemical oxygenation conditions and acidification conditions	No available data	Not monitored at this station
Protected areas	There are two European sites in the PAA - Maumturk Mountains SAC for the most part and Connemara Bog complex SPA which encroaches from the south of the PAA.	
HYMO	No Data	No Data
RHAT (2013 – 2015)	No Data	No Data

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Waterbody	Recess_010	
Monitoring station	RS31R010100 Bunsannive Bridge	RS31R010400 Weir Bridge
Evidence of arterial drainage	None	None
Conceptual model required (Y/N)	Y	
Biological Status (2013 - 2015)	3-4 Moderate	4 Good
Water body overall Ecological Status (2010 – 2015)	Moderate	Good
Comments		
EPA Biologist comments from 2015	No change observed for the lower stations in the lower Recess river maintaining a long term Good (0400) and High (0700) ecological quality in 2015. However, the upper tributary of L. Oorid at Bunsannive Br. (0100) declined from high to moderate condition owing to a proliferation of algae and decline in the number of sensitive taxa typically expected there.	
Significant issue	Unknown, however potential issues include sediment and nutrients.	

2.3 Conclusions

- EPA biological assessments over the past two monitoring cycles (2015 and 2018) have shown a continual deterioration in water quality at Bunsannive Bridge. A very sparse macroinvertebrate community was observed leading to suspected toxicity following a recent chemical pollution event(s).
- In light of deteriorating water quality at Bunsannive Bridge, this focusses LAWPRO's attention to the land use activities upstream of this location specifically. The suggested significant pressure from the initial EPA's characterisation stage is anthropogenic, however the precise pressure type is unknown.
- The main land uses at the location above the EPA monitoring station are Coillte forestry and low intensity agricultural commonage with pasture on blanket peat with sheep grazing. Forestry activities (previous and planned) will be explored as well as agricultural activities in this catchment.

3 Significant pressures

The significant pressure affecting water quality in the Recess PAA and identified at initial characterisation stage was anthropogenic (unknown). Landuse activities in the PAA include forestry, agriculture and peat cutting, which may be potential sources of significant pressure at Bunsconnive Bridge. **Figure 4** below illustrates Corine landuse mapping in the catchment area of interest above EPA station RS31R010100 which is predominantly peat bogs and coniferous forestry.

3.1 Forestry

Figure 5 illustrates the coverage of forestry within the PAA boundary. The vast majority of forestry within the PAA is Coillte plantations. **Figures 6** and **7** highlight the Coillte plantation upstream of Bunsconnive Bridge (RS31R010100).

National GIS forestry layers from the DAFM indicates that the Coillte forestry at this location was planted in 2002 and the species planted is predominantly Sitka spruce. There are also two small distinct areas with Japanese larch within the same compartment. Aerial photography suggests that forestry is sparsely planted and buffer zones (GRS: any grass species except Molinia) throughout headwaters seem to be adhered to. The Coillte plantation extends beyond the boundary of the PAA and is larger than the other private forestry plantations within the PAA at other locations which can be characteristic of public over private plantations. A request for information has been lodged with the Forest Service which will hopefully inform of any previous forestry activity such as early fertilisation of the grounds with rock phosphate or any later aerial fertilisation. Information is also sought on previous thinning and if the Forest Service are aware of any clear-felling applications in the near future.

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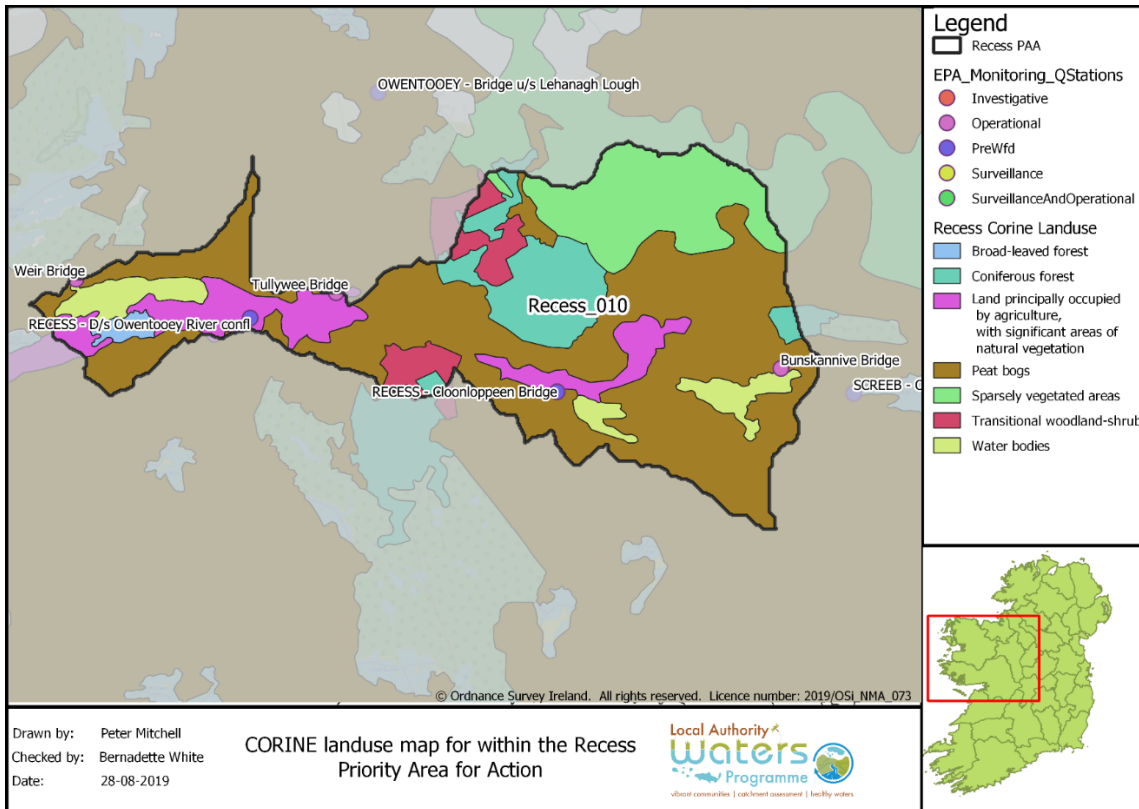


Figure 4: CORINE land use map within the Recess_010 waterbody

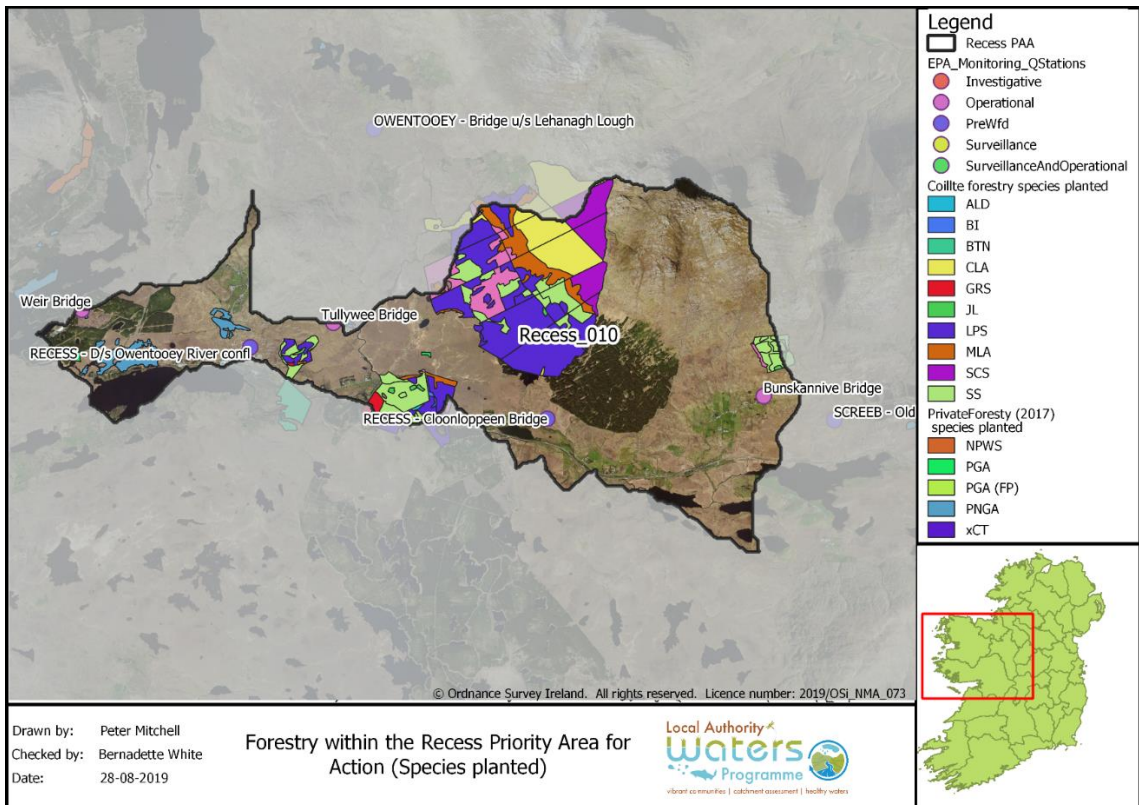


Figure 5: Forestry within the Recess_010 waterbody

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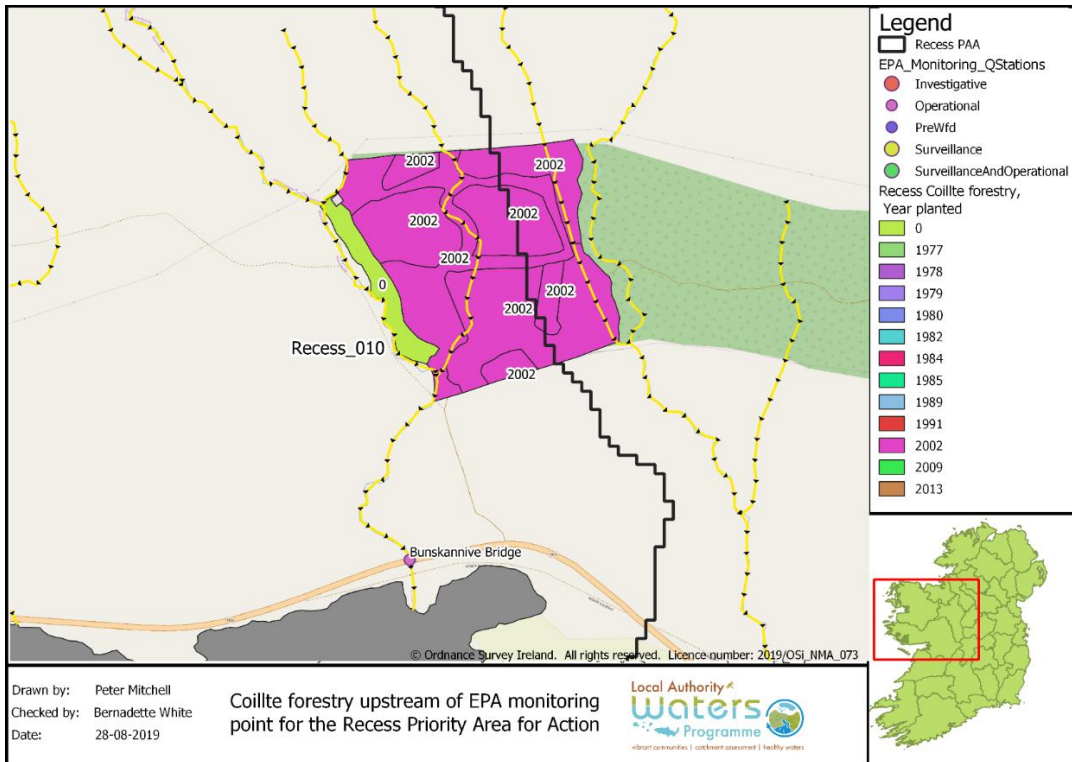


Figure 6: Coillte forestry above the EPA monitoring station (RS31R010100) showing year planted

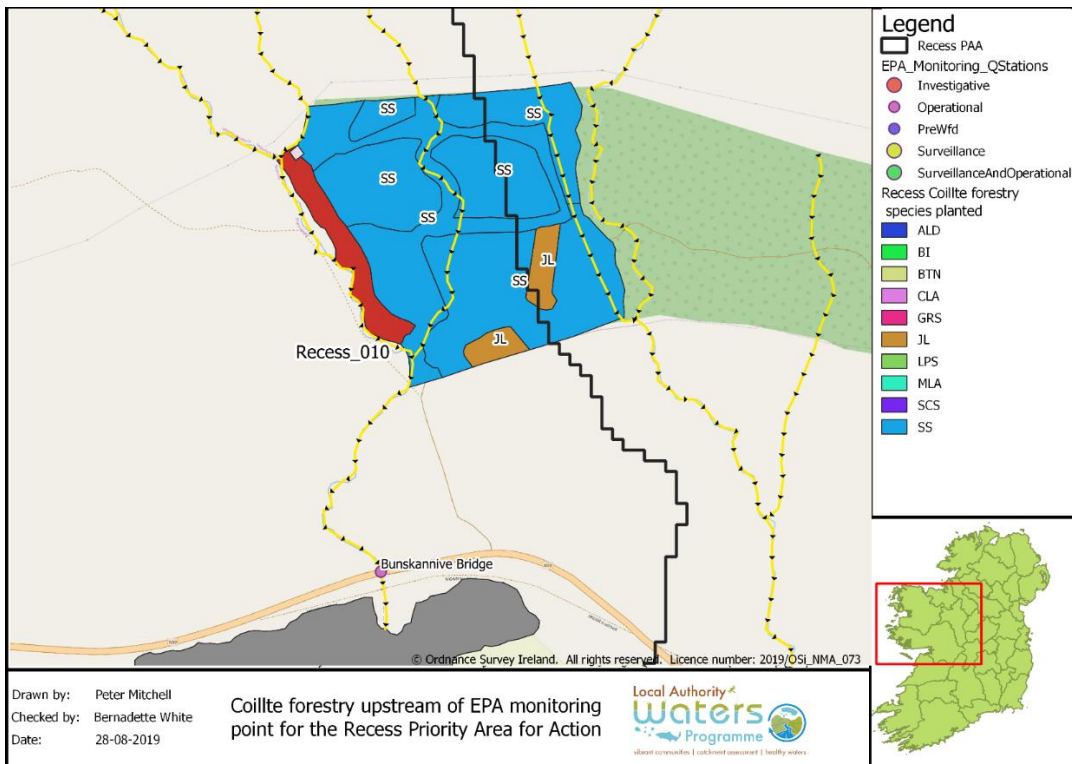


Figure 7: Coillte forestry upstream of the EPA station RS32R010100 showing species planted

3.2 Extractive peat

There is a small area of cut away peat evident from aerial photography just west of the forestry land and in close proximity to a stream confluencing upstream of the monitoring point. This activity could be a potential source of sediment and ammonia. However, it appears to be a very low scale activity for domestic purposes, and it does not appear to be carried out by machinery.

3.3 Agriculture

Aerial photography also highlights a small area of obvious improved agricultural land over blanket peat soils adjacent to an area of forestry which may be a potential source of nutrients (P and N). A catchment drive and interactions with ASSAP may shed some light on the importance here in terms of pressures. The area appears to be largely sheep commonage and redacted LPIS data from 2014 highlights that there is a total of three landowners in the vicinity above the EPA monitoring station (RS31R010100). LPIS data also shows that there is virtually no application of nutrients (kg of Nitrogen per hectare) in the area of agricultural commonage land to the west of the Coillte forestry. The purpose of the land improvement maybe for stocking cattle, which will need to be discussed with ASSAP. The location of the improved agricultural land is circled in red in **Figure 8** below.

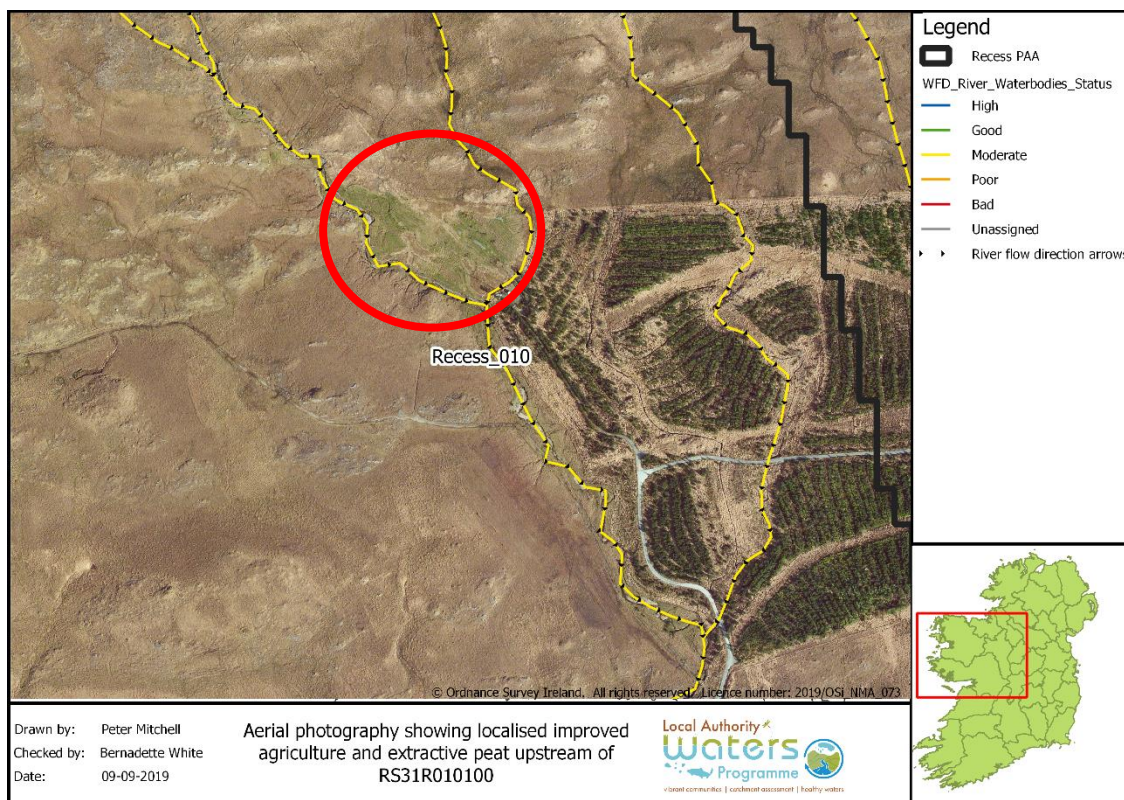


Figure 8: Aerial imagery highlighting improved agricultural land.

4 Pathways information

4.1 Conceptual model

The PAA is made up of one main compartment based on its aquifer. It is predominantly made up of a poor aquifer which is poorly productive but possibly moderately productive in local zones.

The main compartment is then sub divided into two sub compartments based primarily on soils and subsoils (**Table 3 & Figure 11**). Sub-compartment 1 is for the peat soils which is the majority of the PAA and underlain by blanket peat. Sub-compartment 2 is made up of poorly drained soils to the north of the PAA which is underlain by bedrock at surface (Rck) to the north of the PAA.

Groundwater vulnerability for the PAA comprises of areas of X-extreme (bedrock outcrop), extreme, high, moderate and low. However, the X-extreme is largely contained within sub-compartment 1, while the area above the EPA monitoring station which is the main focus of LCA work is comprised of predominantly high groundwater vulnerability with flecks of X-extreme vulnerability.

The main pathways for both sub-compartment will be by overland, near surface flows or flows in drainage and forestry ditches. With the overland pathway there is potential for the mobilisation of nutrients (phosphate and ammonia), pesticides and sediment to the river.

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Table 3: Conceptual model for the waterbody

Conceptual model		Compartment 1	
		Poorly productive aquifer	
Pathway Information	Direct (e.g. pipe)	None	
	Aquifer	PI - poor bedrock aquifer, poorly productive but possibly moderately productive in local zones	
	Topography	Medium slope (0.0108%). Lowland altitude (19.7 meters)	
		Sub- Compartment 1	Sub- Compartment 2
	Soil	Peat (Appendix B)	Poorly drained (Appendix B)
	Subsoil	Mostly peat (Appendix B)	Bedrock outcrop and sub-crop (Appendix B)
	Subsoil K	Low	Mostly soil depth <3 meters
	Rock Unit	Mixture of Precambrian quartzites, Gneisses & Schists, Precambrian marbles and small area of Granites and other Igneous Intrusive rocks (Appendix B)	Almost all Precambrian quartzites, Gneisses & Schists (Appendix B)
	Groundwater vulnerability	Mixture of high and extreme with small areas of low (Appendix B)	Mostly bedrock at surface and small areas of extreme (Appendix B)
	PO4 Near Surface Susceptibility	Rank 3 Moderate (Figure 12)	Rank 3 Moderate (Figure 12)
	NO3 Near Surface Susceptibility	Rank 4 Low to moderate-	Rank 4 Low to moderate-
	NO3 Sub Surface Susceptibility	Very low	Very low
	PO4 PIP	Mostly low, small areas of high (Figure 11)	Mostly low, small areas of high (Figure 11)
	NO3 PIP	Low	Low
	Flow paths	Poorly drained soil on low transmissivity bedrock	Poorly drained soil on low transmissivity bedrock
Overland runoff is flashy		Overland runoff is flashy	
Groundwater is likely to contribute < 20% of average flows in rivers.		Groundwater is likely to contribute < 20% of average flows in rivers.	
Location of Monitoring Point	Figure 1. Bunsannive Bridge.	Figure 1. Bunsannive Bridge.	
Significant pressures	Unknown anthropogenic pressures		Unknown anthropogenic pressures

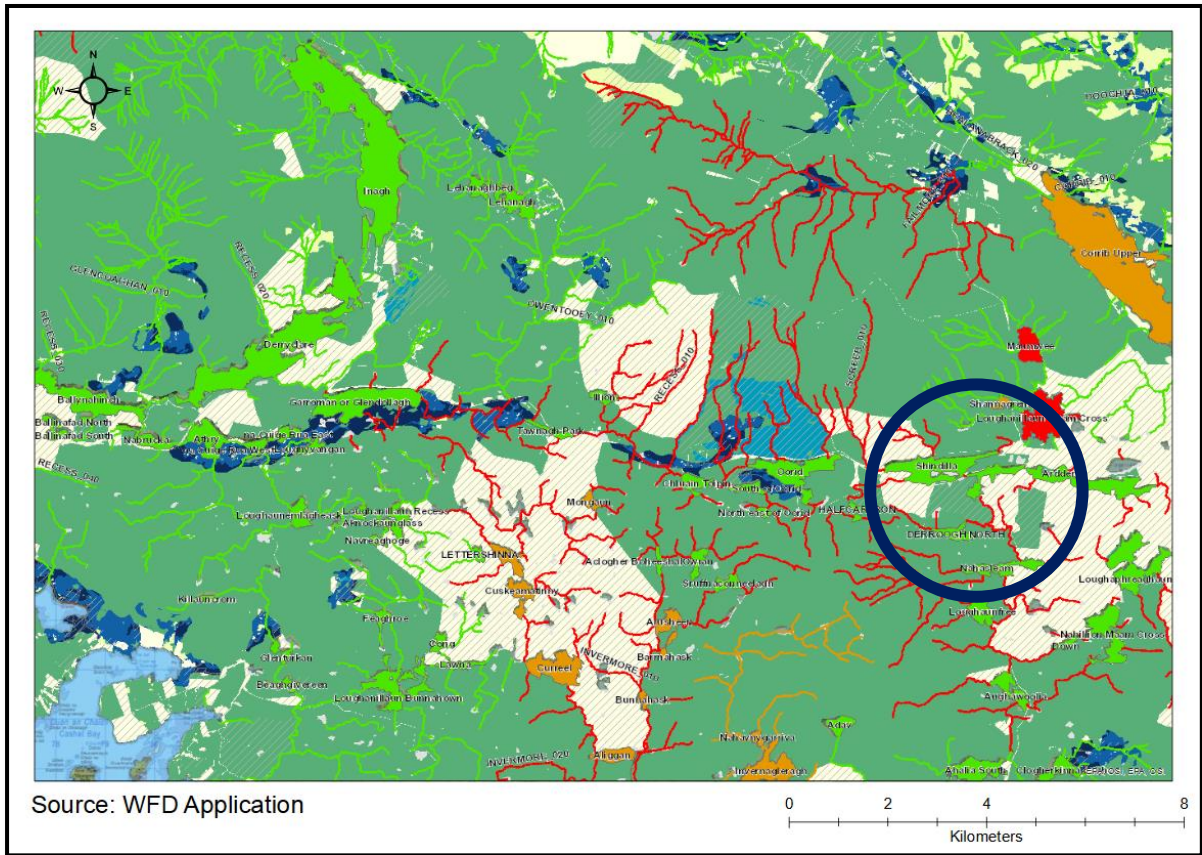


Figure 9: PIP Phosphate to surface water

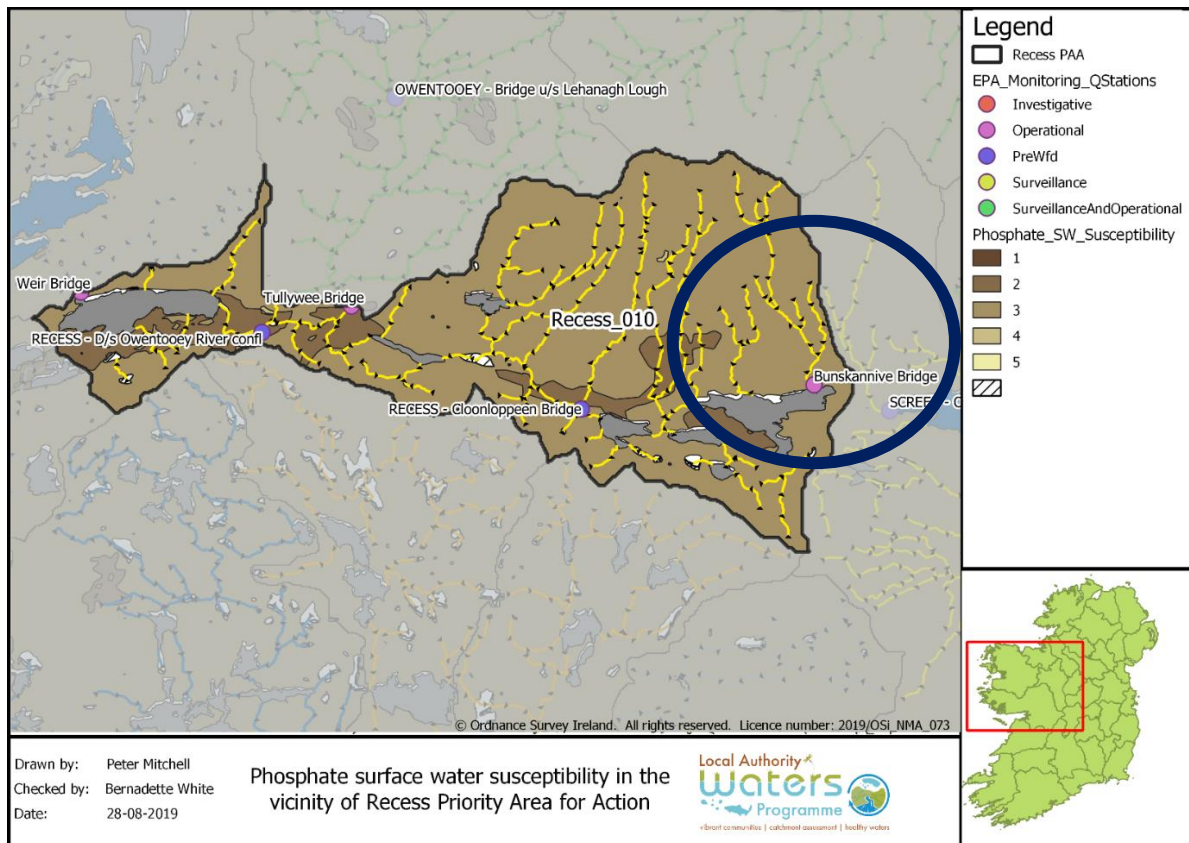


Figure 10: Phosphate surface water susceptibility in the PAA

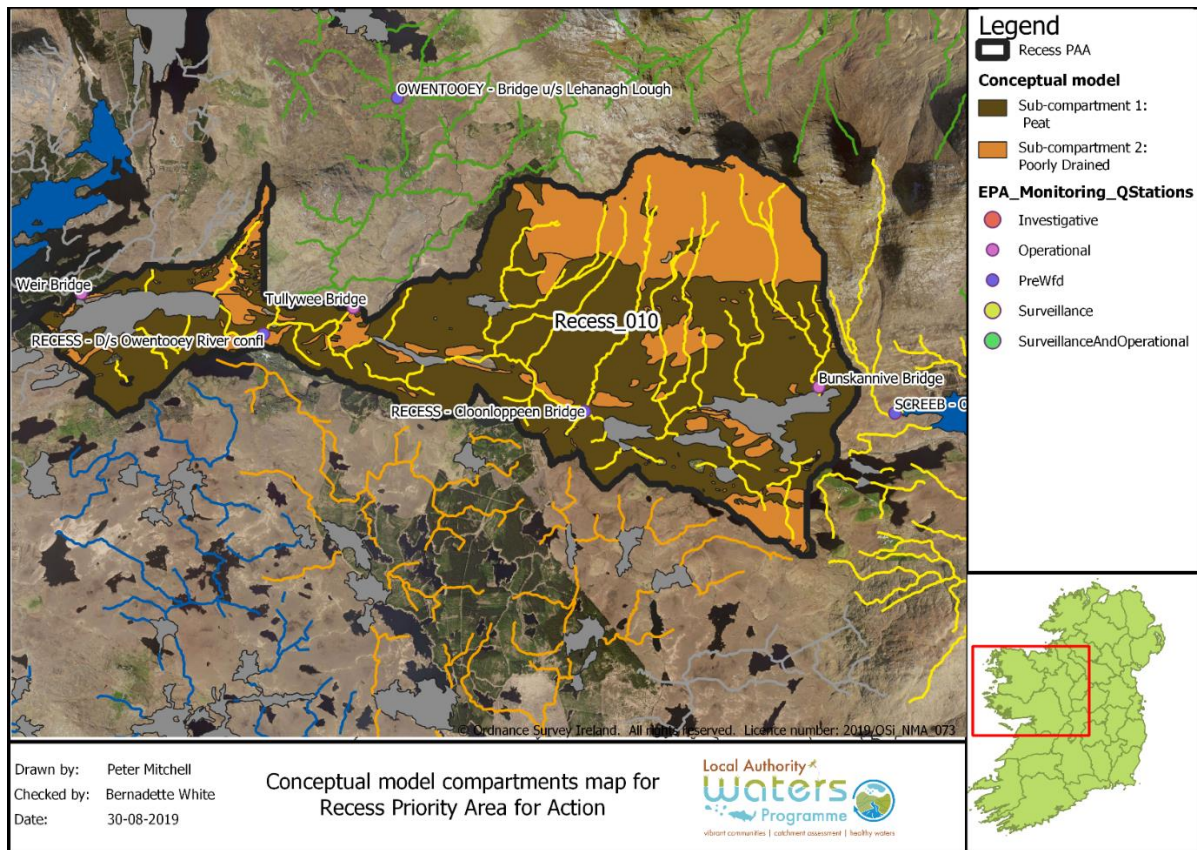


Figure 11: Conceptual model compartments map

5 Interim story of PAA

- Recess is a one waterbody PAA. The river waterbody, Recess_010 is *At Risk* of not achieving its WFD objective of good status. The ecological status of Recess_010 was moderate (Q3-4) based on 2015 data which led to its selection as a Priority Area for Action. A 2018 biological survey showed further deterioration to poor status with evidence of a toxic impact (Q3/0). Waterbodies outside of the PAA boundary namely: Recess_020, Recess_030 and Recess_040 are *Not At Risk*.
- There are two EPA Operational monitoring stations within the PAA: at Weir Bridge, and Bunsannive Bridge. The site at Weir Bridge has consistently achieved a Q4 or good status for several monitoring periods, therefore the survey results at Bunsannive Bridge are leading to the Recess_010 water body as a whole to be downgraded in status below good.
- The Regional EPA biologist has provided some commentary from 2018 monitoring at Bunsannive Bridge. *“When sampling was carried out in August 2018, the community was very depauperate”*. The EPA biologist further added that we may expect improvements in the future, given how energetic the channel can be. There was insufficient reliable data to support the identification of a reliable suspected cause for the deterioration according to a number of EPA surveys. The EPA biologist further added that the very low invertebrate density may be due to a suspected toxic chemical pollution event.
- 2016 and 2017 chemical monitoring for this waterbody at EPA station (Bunsannive Bridge) which was provided by the EPA show that: orthophosphate, nitrate and ammonia levels are low. The full data set is provided in **Appendix 1**.
- There are two tributaries upstream of Bunsannive Bridge which confluence prior to the monitoring point. One of the tributaries flows through an area of Coillte forestry plantation. There may be some forestry drains which feed into the tributary which stretches through the plantation. Aerial imagery suggests that there is an acceptable riparian buffer between the forestry and the stream, however this will be investigated further during survey work.
- The significant pressure outlined in the WFD App based on EPA initial characterisation is anthropogenic (unknown). The EPA biologist’s comments from 2018 monitoring may suggest that the significant issue may be a toxic effect coupled with sediment mobilisation. The significant pressures associated may be agricultural practices or treatment of sheep, as well as forestry activities if chemicals have been used.

6 Work Plan

- **Figure 12** below outlines the proposed work plan for this PAA.
- Follow up with the EPA biologist to get official Q value report for 2018.
- This waterbody would benefit from a stream walk, to assess information on recent management (if any) of the plantation just upstream of the monitoring station. Aerial photography of the forestry area shows patches of sparse planting and acceptable buffers strips seem to be adhered to along stream banks. A detailed stream walk would confirm whether any clearfelling or thinning has taken place in more recent times, along with discussions with the Forestry Inspector for County Galway.
- Carry out biological (SSIS) and water chemistry sampling on both tributaries that confluence upstream of the EPA operational monitoring station at Bunsannive Bridge. One of the tributaries flows through an area of forestry so it is intended to carry out an additional biological assessment upstream of the forestry area should the downstream location show impact.
- There is a yard or premises with a pylon visible from aerial photography immediately above the Coillte forestry plantation, therefore a stream walk will investigate this further.
- As the monitoring point at Bunsannive Bridge is on a national secondary route (N59) prior to discharge to L Oorid, it would be advisable to walk the area in the vicinity and note any evidence of discharges from road maintenance, road drainage etc.

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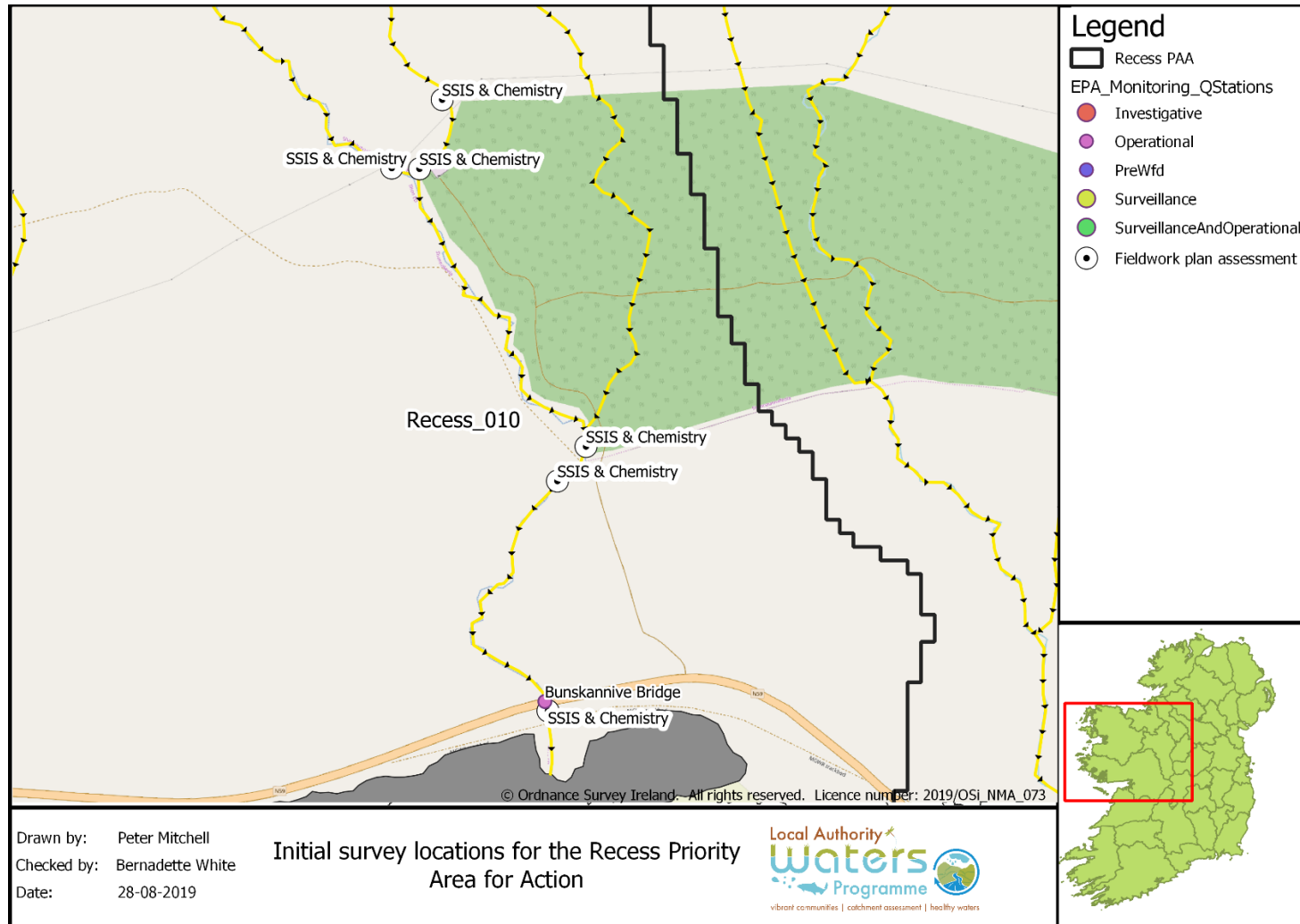


Figure 12: Potential locations for LCA survey work

7 Review of Mitigation Options

Potential measures may include:

- One tributary of the Recess river flows through the Coillte forestry upstream of the monitoring point and will need to be protected during any further forestry activities, in order to protect the monitoring point at Bunsannive Bridge.
- Coordination with the relevant ASSAP Advisor will be required to raise awareness with the local commonage farmers in terms of good farming treatment practices around the use of insecticides with sheep dip in particular which may be high risk of contributing to a toxic event in this catchment. Education and encouragement of behavioural changes in the appropriate design and location of sheep dipping tubs.
- Broaden awareness for the best practice when storing and handling pesticides. Follow label instructions.

8 Communications

- The focus of LCA work will be centred upstream of the EPA monitoring point at Bunsannive Bridge (RS31R010100). There are three identified commonage owners in the area of interest. There are no domestic dwellings upstream of Bunsannive Bridge. On this basis, a community information meeting is not deemed required, and direct communication with the landowners will be undertaken.
- Maintain regular contact with ASSAP Advisor for County Galway to develop a better understanding of agricultural practices within the area. **Figure 4** (CORINE landuse map) suggest that agriculture is low intensity and mostly likely sheep commonage.
- While the GIS National forestry shapefiles give information on area of Coillte forestry planted as well as species and year of planting, it will be necessary to link in with the County forestry inspector to find out about any previous or planned forestry activities within the PAA such as fertilisation or clearfelling.

Date of completion: 10th September 2019

Appendix 1

Table 1: EPA chemistry data for Recess_010

Waterbodytype	MonitoringStationCode	MonitoringStationName	SampleDate	ParameterName	ParameterUnit	TextResult	LimitOfDetection
River	RS31R010100	Buskannive Bridge	03/08/2016 13:00	Ammonia-Total (as N)	mg/l	<0.02	0.02
River	RS31R010100	Buskannive Bridge	04/05/2017 15:16	Ammonia-Total (as N)	mg/l	0.045	0.02
River	RS31R010100	Buskannive Bridge	02/08/2017 00:00	Ammonia-Total (as N)	mg/l	<0.02	0.02
River	RS31R010100	Buskannive Bridge	03/08/2016 13:00	ortho-Phosphate (as P) -	mg/l	<0.01	0.01
River	RS31R010100	Buskannive Bridge	04/05/2017 15:16	ortho-Phosphate (as P) -	mg/l	0.021	0.01
River	RS31R010100	Buskannive Bridge	02/08/2017 00:00	ortho-Phosphate (as P) -	mg/l	<0.01	0.01
River	RS31R010100	Buskannive Bridge	03/08/2016 13:00	Nitrate (as N)	mg/l	<0.2	0.2
River	RS31R010100	Buskannive Bridge	04/05/2017 15:16	Nitrate (as N)	mg/l	<0.2	0.2
River	RS31R010100	Buskannive Bridge	03/08/2016 13:00	BOD - 5 days (Total)	mg/l	<1	1
River	RS31R010100	Buskannive Bridge	02/08/2017 00:00	Total Nitrogen	mg/l	<0.5	0.5
River	RS31R010100	Buskannive Bridge	02/08/2017 00:00	Total Phosphorus (as P)	mg/l	<0.01	0.01

Appendix 2

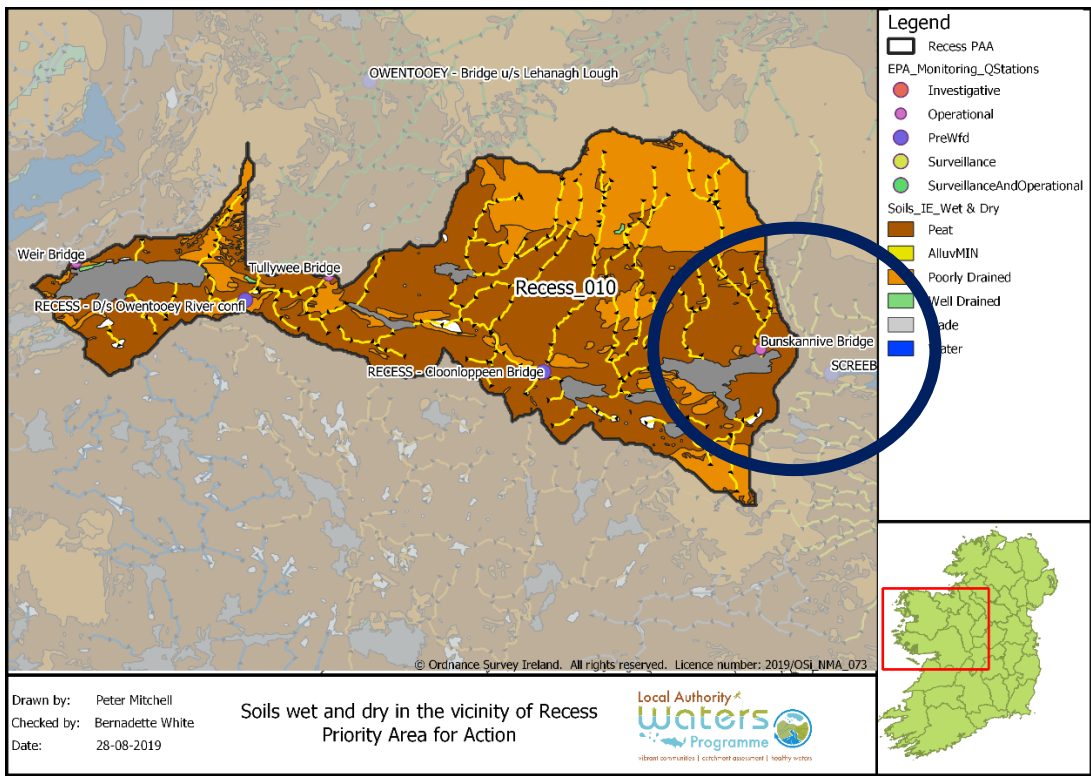


Figure 1: Well drained and poorly drained soils within the PAA

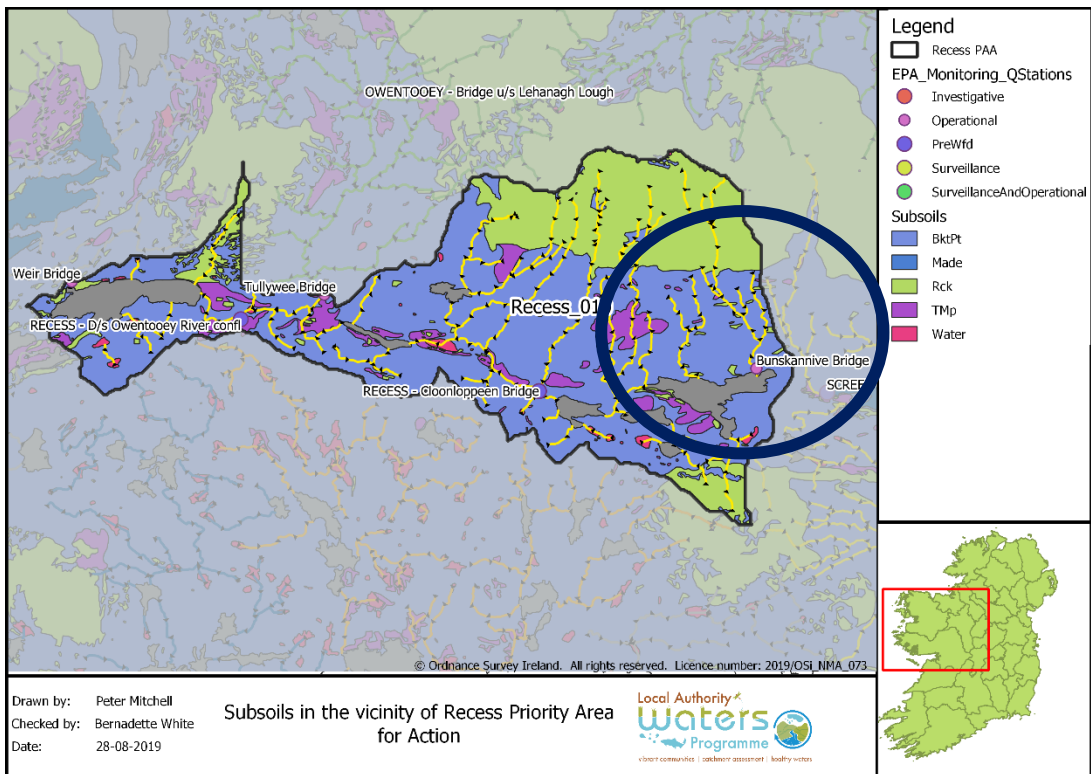


Figure 2: Subsoils within the PAA

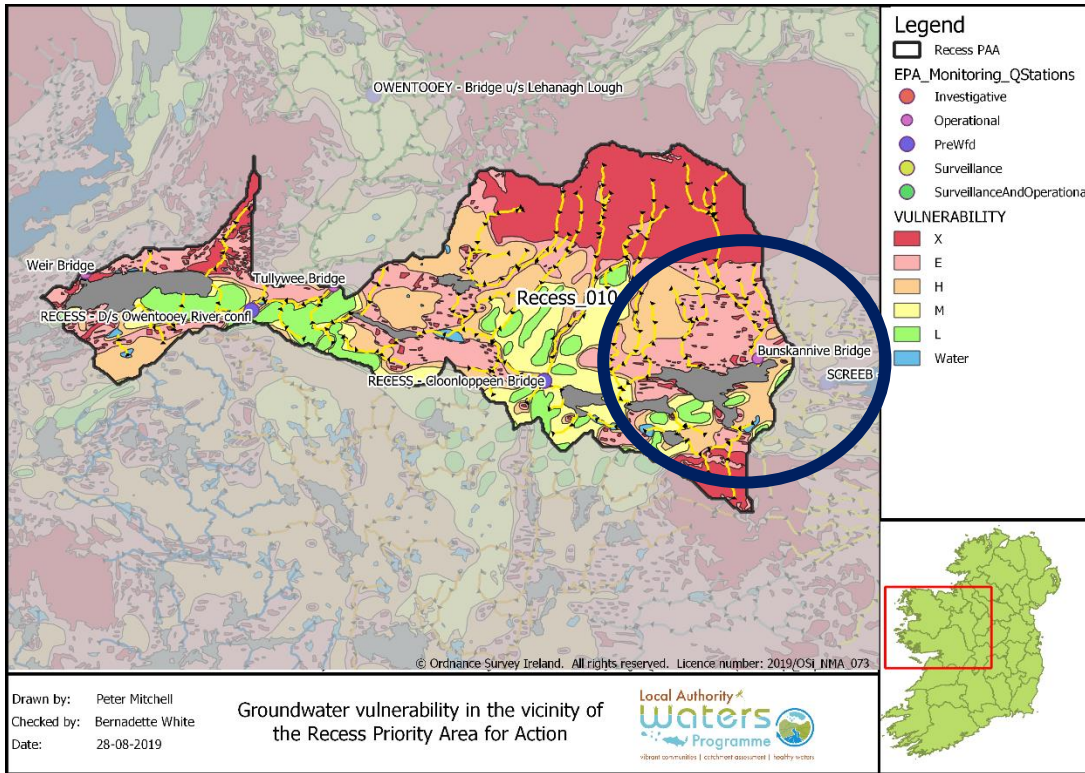


Figure 3: Groundwater vulnerability within the PAA

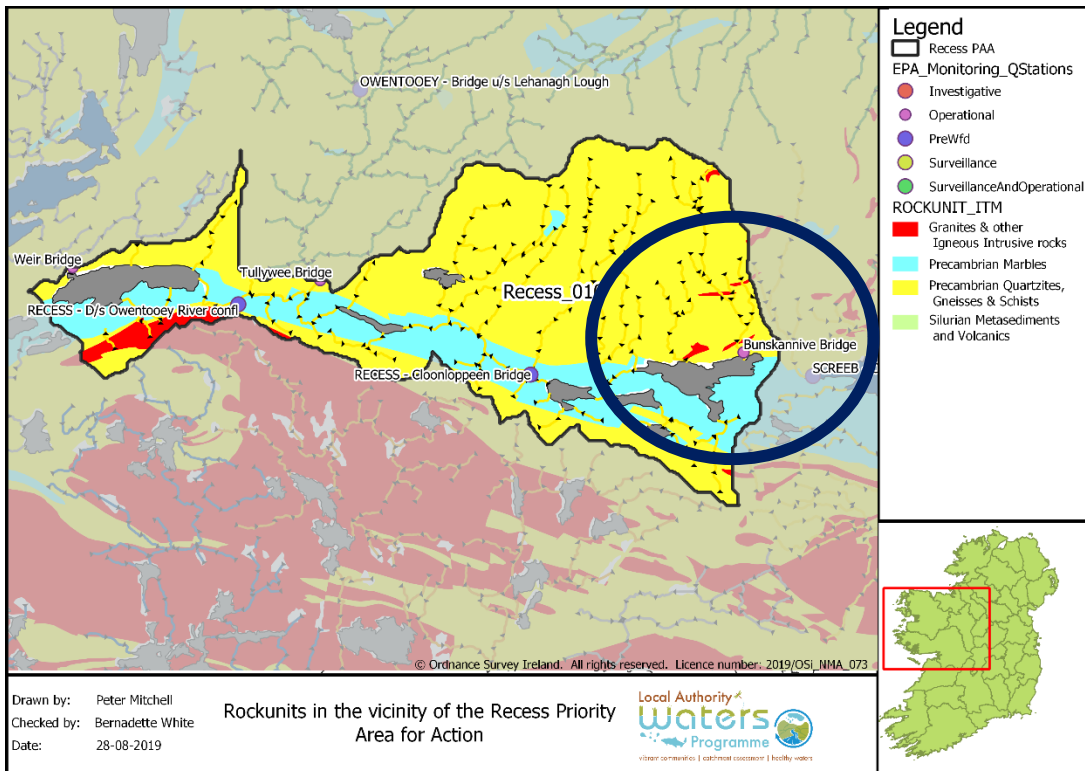


Figure 4: Rock units within the PAA