



Yellow (Ballinamore) PAA

AFA0189 Desk Study F01



28th November 2019

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(Border Region)

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1. Background

The Yellow River rises in the glens of Bencroy and Slievenahila and flows westwards into Lough Allen. Part of the uplands are included in the Cuilcagh - Anierin Uplands SAC and pNHA.

There is only 1 waterbody in the Yellow (Ballinamore) _10 river and there are 2 monitoring stations on the river monitoring biology only. There are no chemistry results available for the Yellow_010.

Yellow (Ballinamore)_10 has 2 Operational monitoring stations. The first station is RS36YO10050 Stralongford Bridge that had a Q 3-4 in 2013 and Q 3-4 /0 in 2017

The second station at Mill Bridge SE of Greaghglass which was Q4 in 2013 and Q3-4/0 in 2017.

The biologist's notes said, *'Both sites on Yellow (Ballinamore)_10 appear to have been impacted by a toxicity event, possibly from pesticides evidenced by the severe reduction in overall diversity and density of invertebrate types in an otherwise apparent suitable habitat with a good mix of boulder, cobble and gravels.'*

Ecological status of Yellow (Ballinamore)_10 is Moderate for 2010-2015, driven by invertebrate status.

Reasons why the Area for Action was chosen:

- Water body was at Good status in the 10-12 monitoring cycle.
- Single significant pressure identified.

EPA characterisation data:

The initial characterisation sub-catchment assessment recommended that the following actions be undertaken: *IA7 Local catchment assessment needed with a focus on nutrients and sediment (considering both point and diffuse sources).*

Information available:

- EPA Characterisation data
- Leitrim Co Council
- Data from the forest service
- Data available on SAC
- Sliabh an Iarainn GWS ZOC report

Yellow(Ballinamore)_010 Priority Area for Action Desk Study Report

Table 1 Summary of waterbodies within the Yellow (Ballinamore)_10 PAA

WB Code	WB Name	WFD Risk	Status Obj.	Status			Bio 17	Pressure Category	Pressure Subcat.	Sig. Pressure	AA
				07-09	10-12	10-15					
IE_NW_36Y010200	Yellow (Ballinamore)_010	At Risk	Good 2021	P	G	M	Q3-4/0	Forestry	Forestry	Yes	Yes

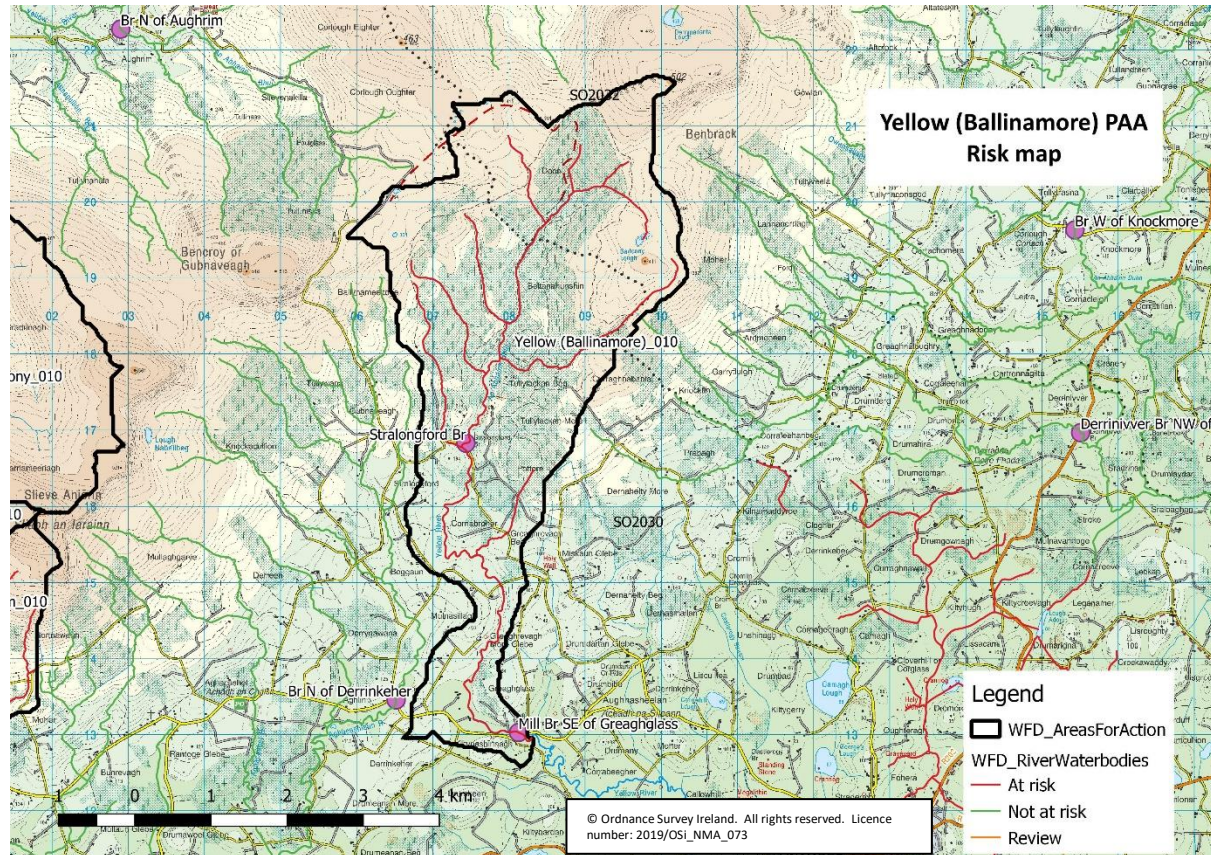


Figure 1 Showing location and Risk Status of waterbodies within the Yellow (Ballinamore) PAA

The Sliah an Iariann GWS supply source is located in the townland of Derrynawana, approximately 7 km northwest of Ballinamore, Co Leitrim. The GWS comprises one production borehole and one unused trial hole. Daily abstraction ranges from 230 to 280 m³/day

The borehole abstracts from a fissured and karstified bedrock aquifer, comprised of rocks belonging to the Dinantian pure bedded limestone rock unit group. Most of the groundwater flows into the borehole from a single fissure/fracture zone/conduit, encountered at approximately 135m in limestone. The water transmitting capacity of this fissure or fracture zone is very high. This pure bedded limestone aquifer is classified as being regionally important and karstified (Rkc).

At the borehole location, the regionally important limestone aquifer is overlain by layered limestones, evaporites and shales belonging to the Dinantian Mixed Sandstones, Shales and Limestones rock unit. Due to the confining bedrock layer above the karstified limestone aquifer supplying the borehole, the groundwater system supplying the borehole has low vulnerability to pollution over most of the ZOC BR_Rp0001_FO1

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Due to the presence of this confining bedrock unit, a Management Unit has been defined, to focus attention on the part of the ZOC which is most vulnerable to pollution. The area within the Management Unit comprises the distance, on the up-gradient side of the borehole, equal to the likely flow path length in the upper aquifer (which supplies recharge to the lower supply aquifer). On the down-gradient side, it comprises a buffer distance of 30 m. Within this area polluting activities may impact on supply quality. Outside of this Management Unit, it is probably that only highly polluting activities (e.g. landfill) may impact on supply quality. *Source of information Sliabh an Iarainn GWS ZOC report*

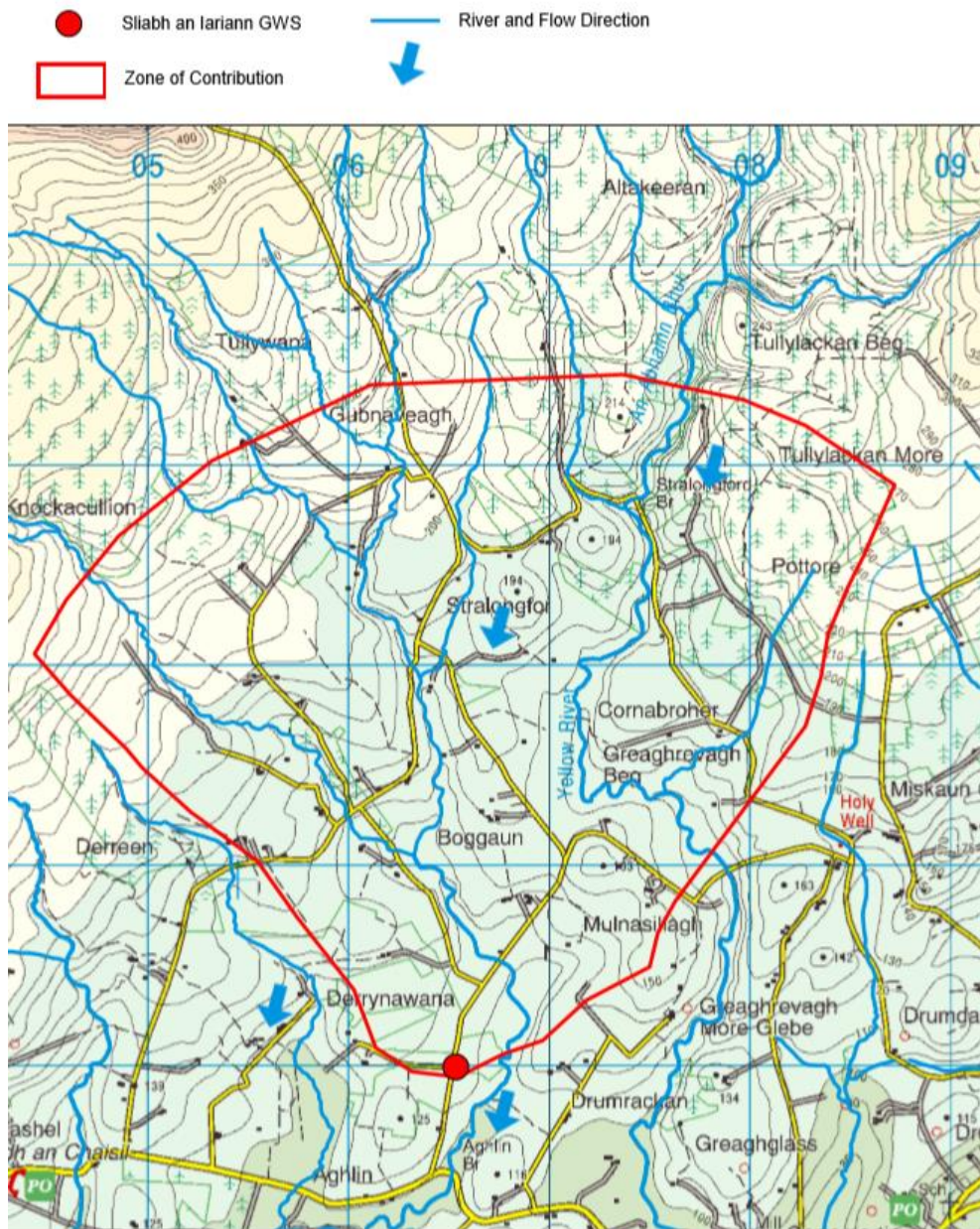


Figure 2 Sliabh and Iarainn GWS Borehole catchment. Map supplied by Tynan Environmental

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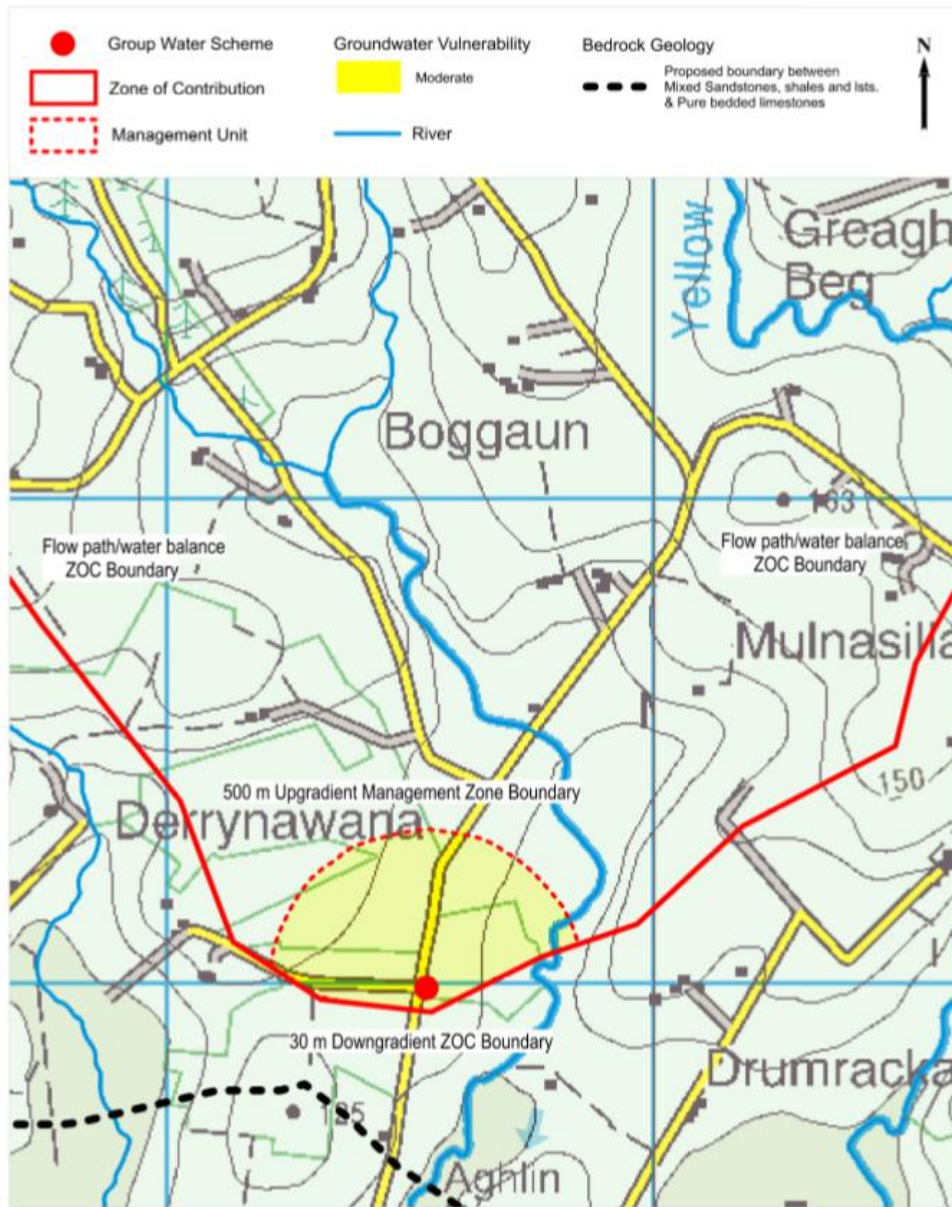


Figure 3 Zone of Contribution boundaries map supplied by Tynan Environmental

2. Receptor information and assessment

Table 2 Receptor information for the Yellow (Ballinamore) PAA waterbodies

Factor	IE_NW_36YO10200 Yellow (Ballinamore)_010	
Risk Category	<i>At Risk</i>	
Biological Status Monitoring Station(s) with Q-Values 2009-2015 Status Trends in Q value since 2009 2016-2018 Q value data	Stralongford 2010 Q4 2013 Q3-4 2017 Q3-4/0 Down N/a	Mill Br SE of Greahglass Q4 Q4 Q3-4/0
Hydrochemistry Data Monitoring Station(s) with data Existing New	No data	No data
Summary & Trends in PO₄, NH₃ and NO₃ In App All available data Other water quality data Baseline Concentration (mg/l) Other relevant values Distance to threshold Indicative Quality	No data	No data
Supporting Conditions Chemical conditions Oxygenation Conditions Acidification Conditions	No data	No data
Hydro morphology RHAT Score Evidence of arterial drainage	No RHAT None	No RHAT None
Ecological Status (2010-2015) Trends 2010-2015	Down	Down
Protected Areas	Cuilcagh-Anierin Uplands SAC and pNHA. selected for the following habitats and/or species listed on Annex I / II of the E.U. Habitats Directive Oligotrophic Waters containing very few minerals, Dystrophic Lakes, Wet Heath Dry Heath Alpine and Subalpine Heaths Species-rich Nardus Grassland* Blanket Bogs (Active)* Transition Mires Petrifying Springs* Siliceous Scree, Siliceous Rocky Slopes, Slender Green Feathermoss	
WFD Objective	Good	Good
EPA biologist notes (if any)	<i>Both sites on Yellow (Ballinamore)_10 appear to have been impacted by a toxicity event, possibly from pesticides evidenced by the severe reduction in overall diversity and density of invertebrate types in an otherwise apparent suitable habitat with a good mix of boulder, cobble and gravels.</i>	
Significant issue	Chemicals, toxic effect on macroinvertebrates	

*Available in WFD app.

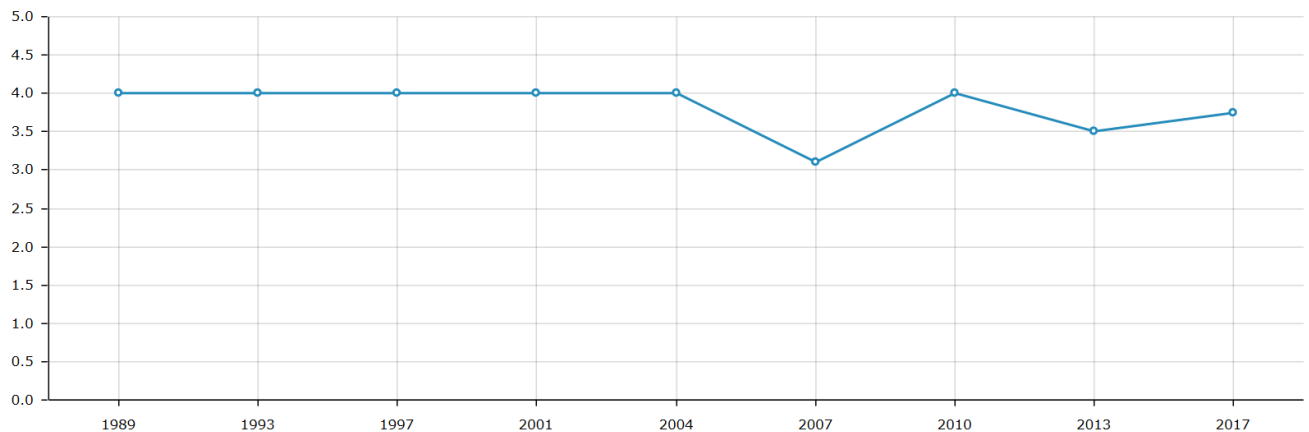
Yellow (Ballinamore)_010 IE_NW_36YO10200

2.1 Stralongford RS36YO10050

Data summary:

This monitoring station does not have any chemistry monitoring data. The Q in 2010 was Q4, in 2013 had dropped to Q3-4 and in 2017 was Q3-4/0 meaning there was some toxic event having occurred which affected the invertebrates. Siltation was noted during biological sampling in 2007.

Q Value - Chart



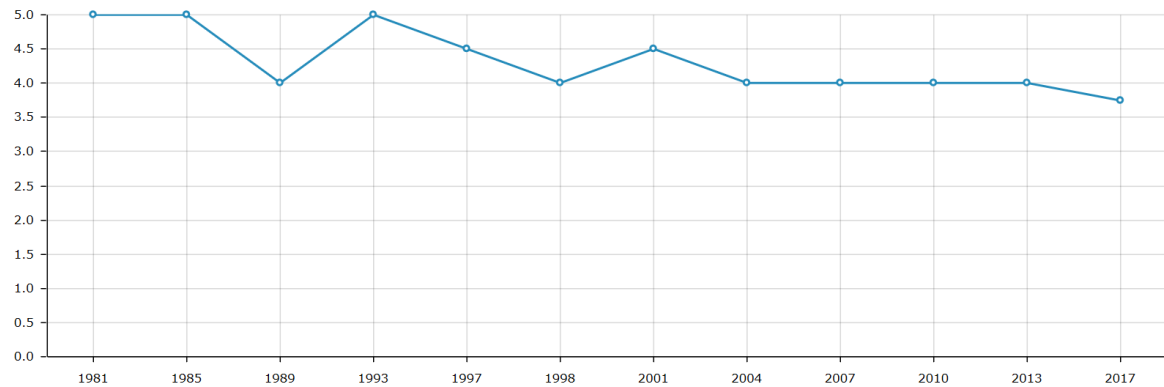
	1989	1993	1997	2001	2004	2007	2010	2013	2017
Result	4	4	4	4	4	3.1	4	3.5	3.75
Classification	Good	Good	Good	Good	Good	Poor	Good	Moderate	Moderate
Q-Value	4	4	4	4	4	3*	4	3-4	3-4/0

Figure 4 The biological trend and data for Stralongford RS36YO10050 monitoring point.

Mill Bridge SE of Greaghglass RS36YO10200

This monitoring station does not have any chemistry monitoring data. The Q in 2010 was Q4, in 2013 it remained good as Q4 and in 2017 dropped to Q3-4/0 meaning there was some toxic event having occurred which affected the invertebrates, as the monitoring station above this one is also impacted the area of toxicity is likely to be above Stralongford RS36YO10050 monitoring point.

Q Value - Chart



	1981	1985	1989	1993	1997	1998	2001	2004	2007	2010	2013	2017
Result	5	5	4	5	4.5	4	4.5	4	4	4	4	3.75
Classification	High	High	Good	High	High	Good	High	Good	Good	Good	Good	Moderate
Q-Value	5	5	4	5	4-5	4	4-5	4	4	4	4	3-4/0

Figure 5 The biological trend and data for Mill Bridge SE of Greaghglass RS36YO10200 monitoring point.

3. Significant pressures

Table 3 Summary of waterbody characterisation from the WFD app

WB Code	WB Name	WFD Risk	Status Obj.	Pressure Category	Pressure Subcategory	Impact	Sig. Pressure
IE_NW_36Y 010200	Yellow(Ballinamore)_010	At Risk	Good 2021	Forestry	Forestry	Altered habitat due to morphological changes Nutrient Pollution	Yes

3.1 Forestry

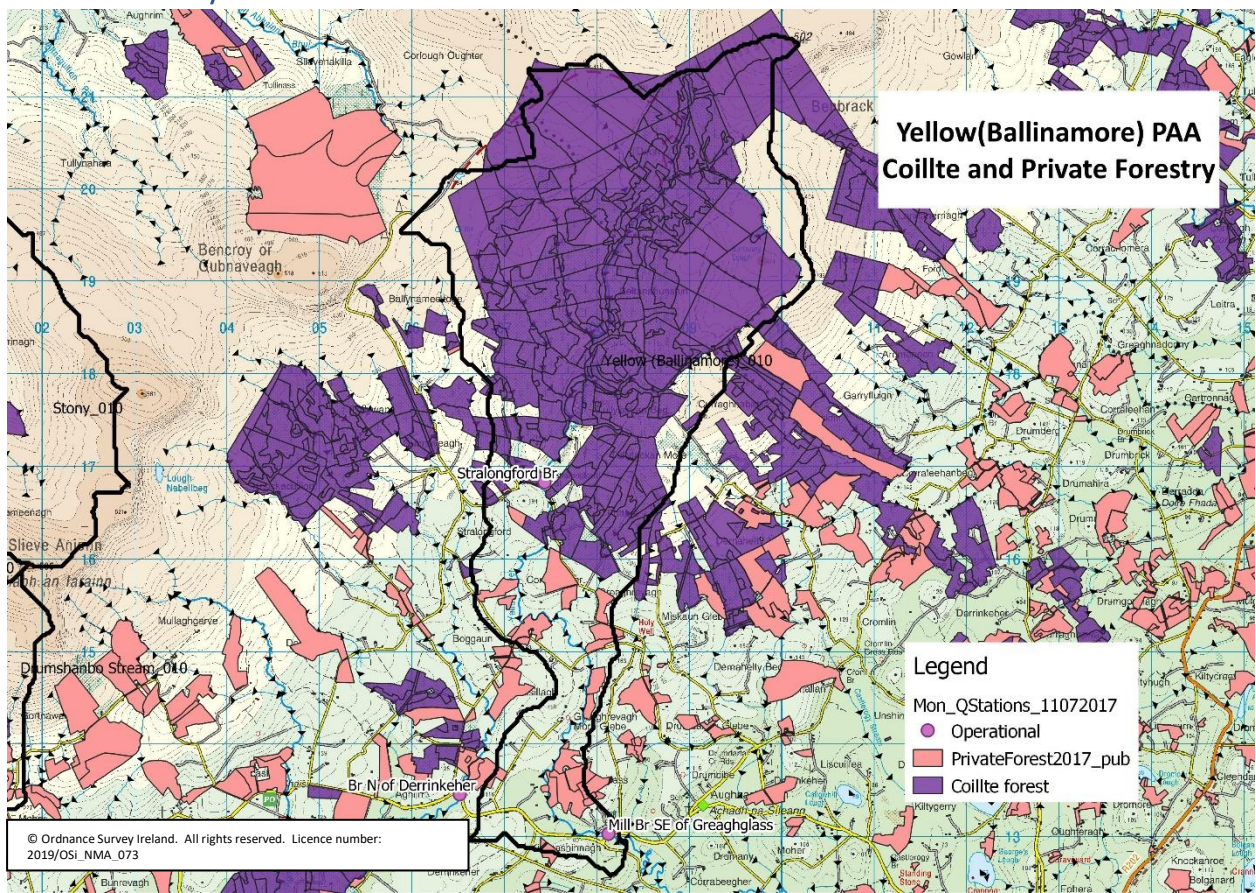


Figure 6 Coillte and Privately-owned Forestry in the Yellow (Ballinamore)_10 PAA

The WFD characterisation identifies Forestry as the significant pressure in the Yellow (Ballinamore)_010 catchment. Above the monitoring point at Stralongford Bridge all the forestry is Coillte owned and operated. Forestry services have confirmed there have been significant amounts of clear-felling in the Coillte plantations. Figures 7 and 8 are maps where clear-felling by Coillte took place and the map also shows areas replanted. Figure 9 show licenses applied for to thin forestry in 2019 and there's 1 licence to clear-fell in Lough in 2020. Figure 10 shows licences applied for afforestation in the Yellow (Ballinamore)_010 catchment. This would be for private afforestation and not all may actually be planted. The EPA Biologists recorded a toxicity event in 2017 at Stralongford Bridge which followed downstream to the monitoring point at Mill Bridge SE of Greaghglass. Pesticides can be used in replanting and afforestation and there can be a release of phosphorous for a few years after clear-felling.

Just above and below Stralongford bridge monitoring point there is some agricultural land other than forestry. A walk of the river is needed here and some Local Catchment Assessment looking for point sources that could relate to toxicity is recommended.

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The surface water Pollution Impact Potential maps for Nitrate (Fig 12) shows there is a negligible risk of Nitrates being polluted in this catchment.

The surface water Pollution Impact Potential maps for Phosphate (Fig 11) shows mid ranking between the two monitoring points. There is moderate risk to surface waters from pollution by phosphate.

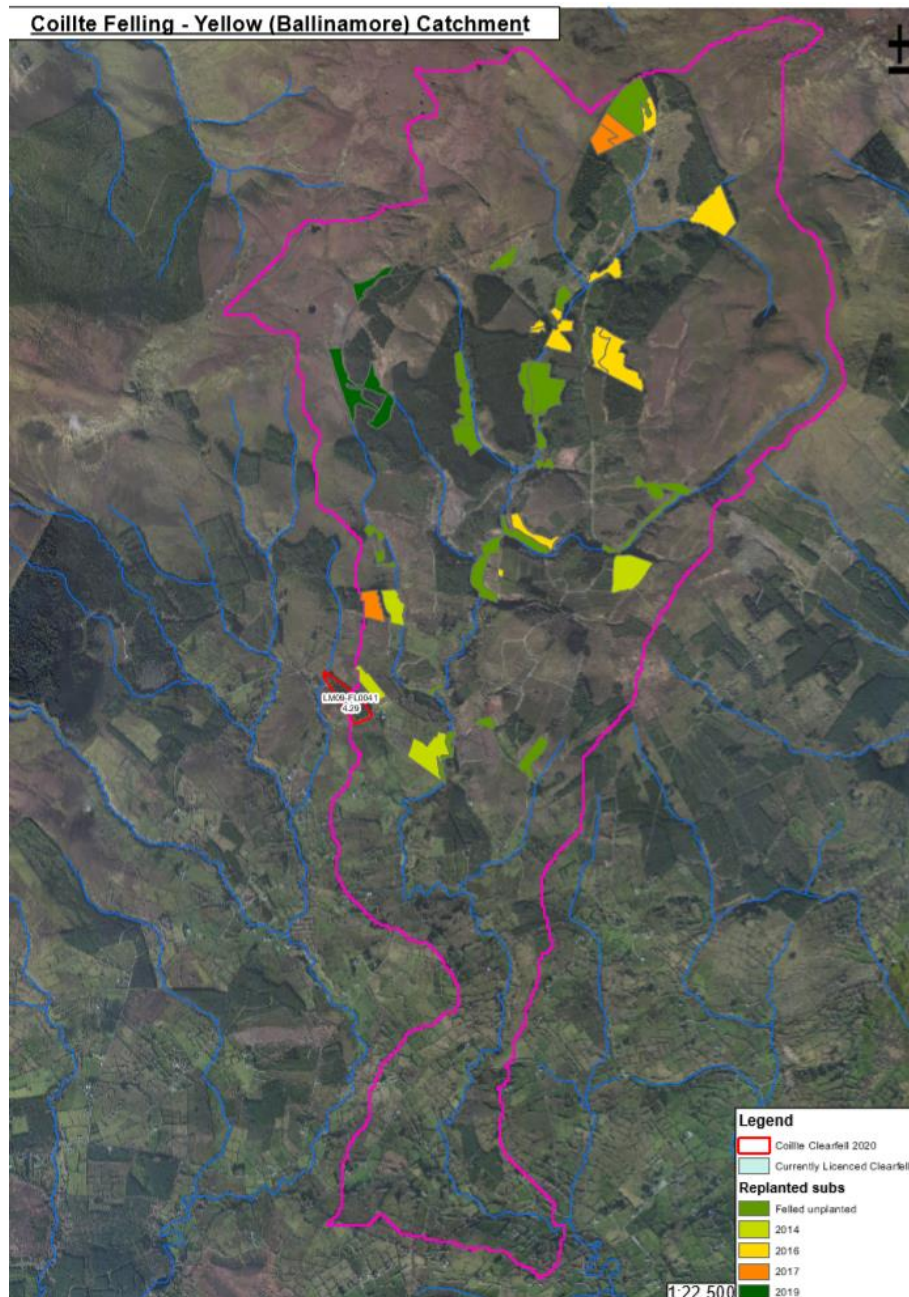


Figure 7 Coillte felling map in Yellow (Ballinamore)_10

Map supplied by The Forestry Service

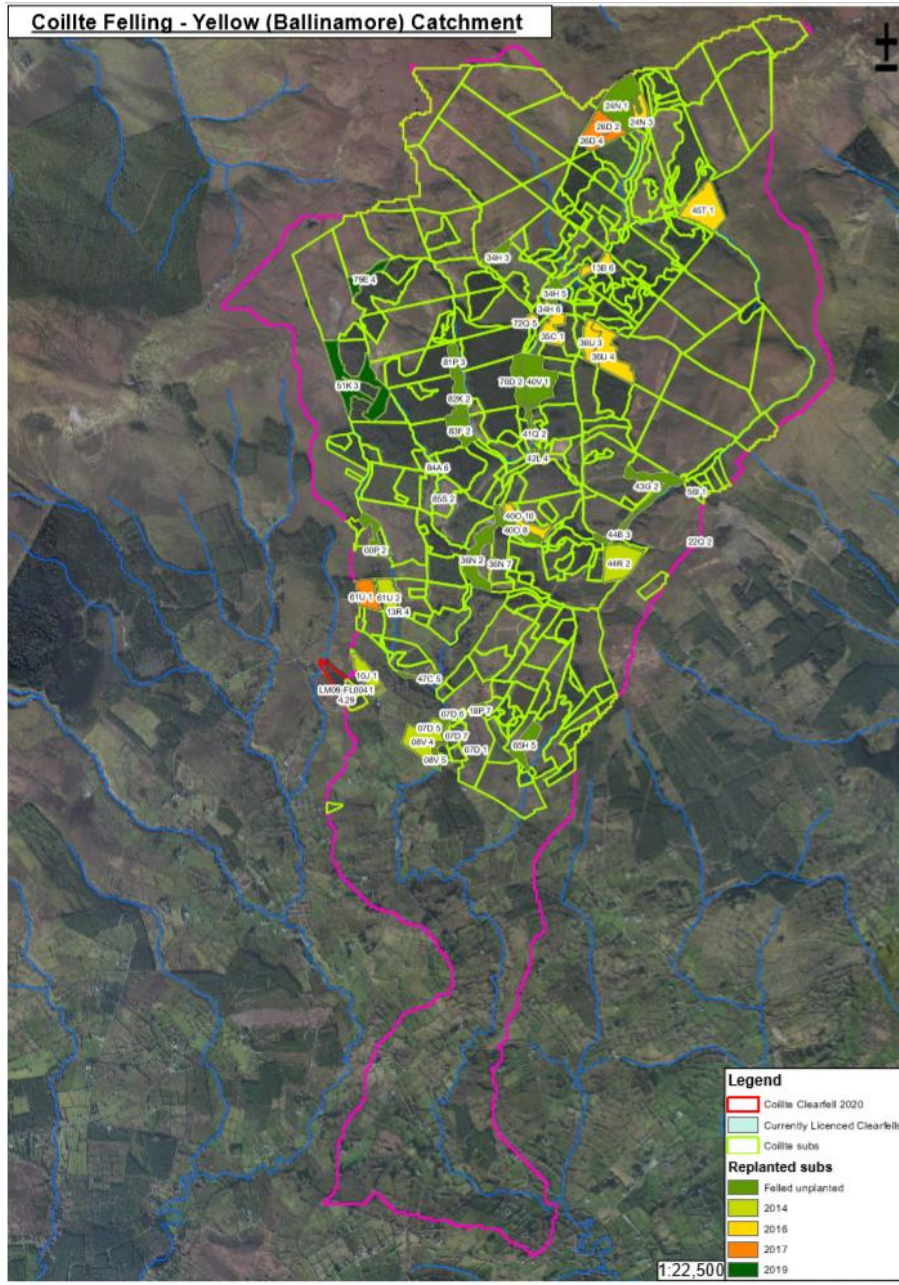


Figure 8 Coillte clear-felling and replanting the Yellow (Ballinamore) catchment.
 Map supplied by The Forestry Service

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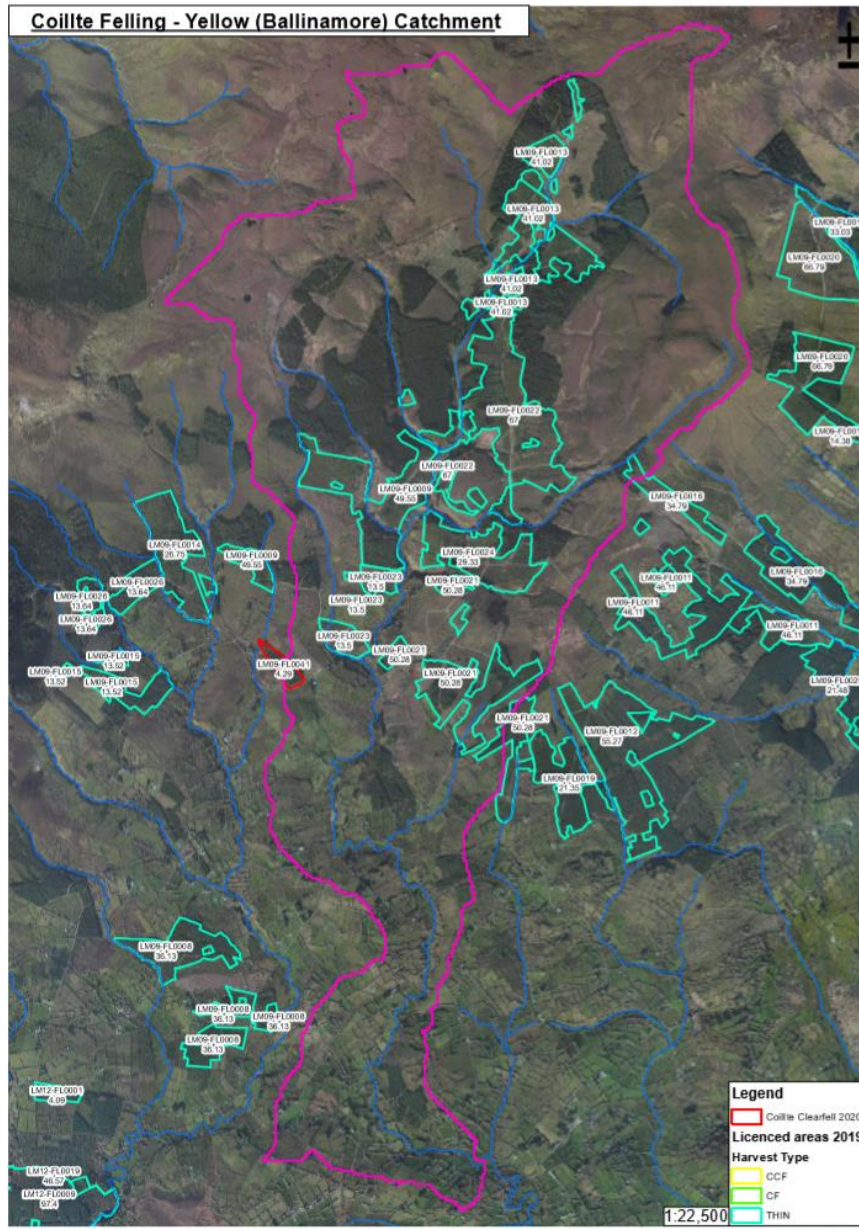


Figure 9 Coillte planned sites for thinning and clear-felling in 2019 and 2020.
 Map supplied by The Forestry Service

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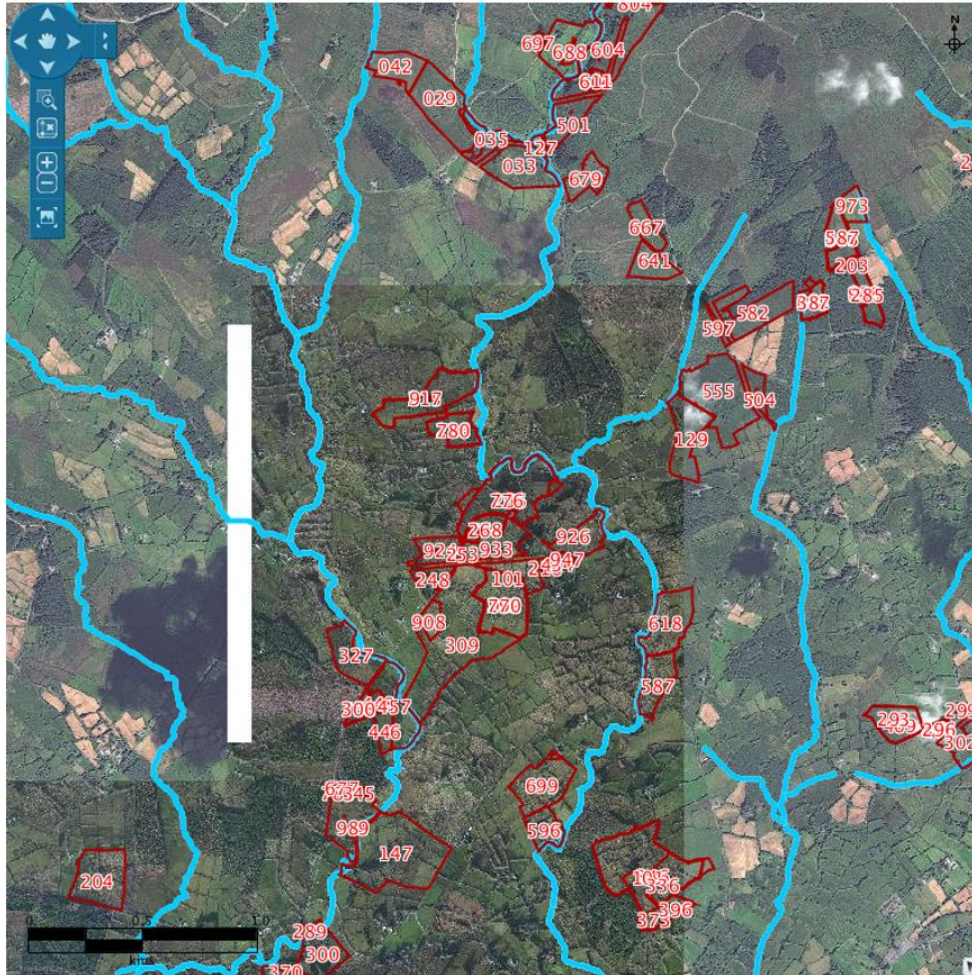


Figure 10 Licences granted for afforestation in Yellow (Ballinamore)_10

Map supplied by The Forestry Service

3.2 Other pressures

3.2.1 Pollution Impact Potential Maps

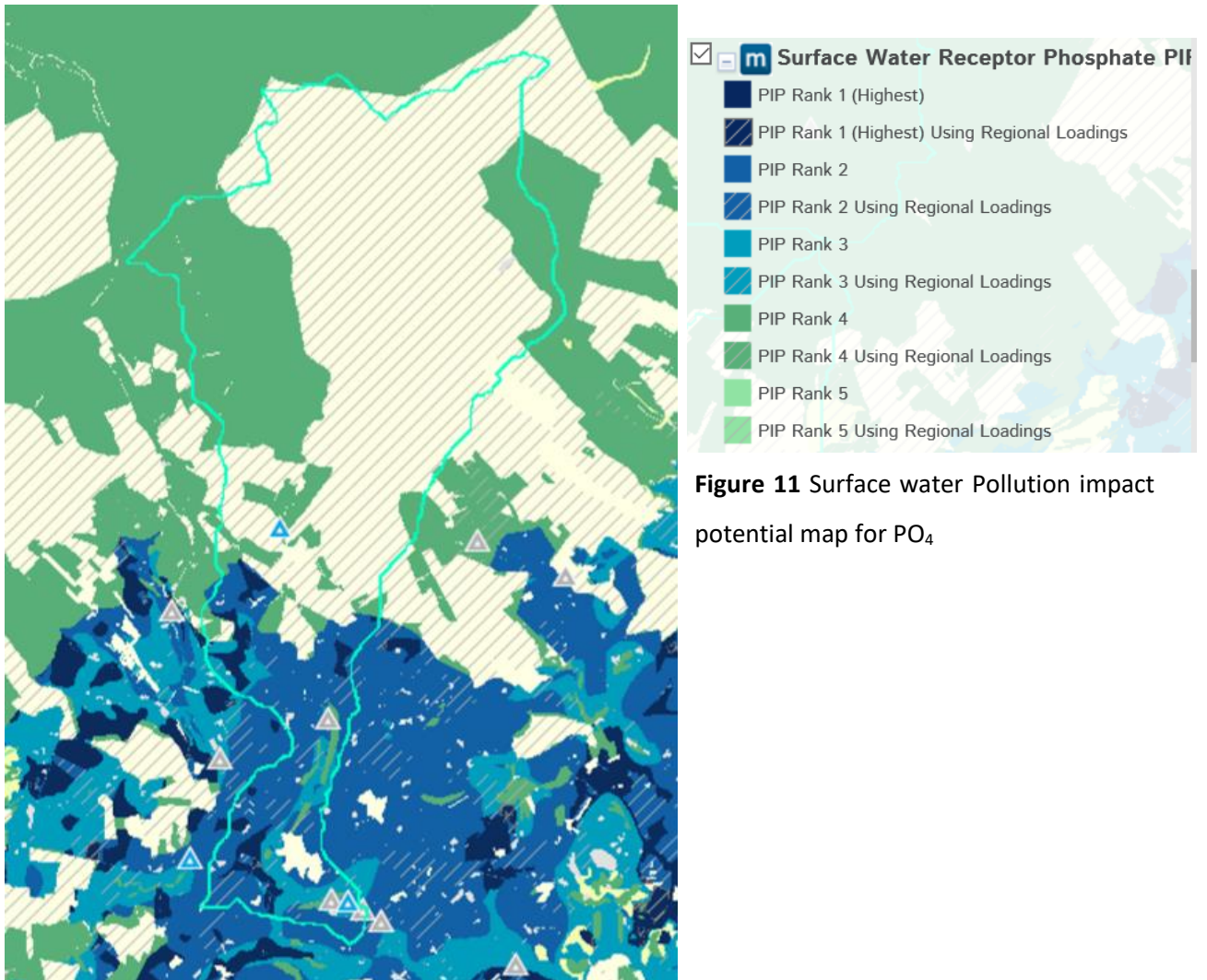


Figure 11 Surface water Pollution impact potential map for PO₄

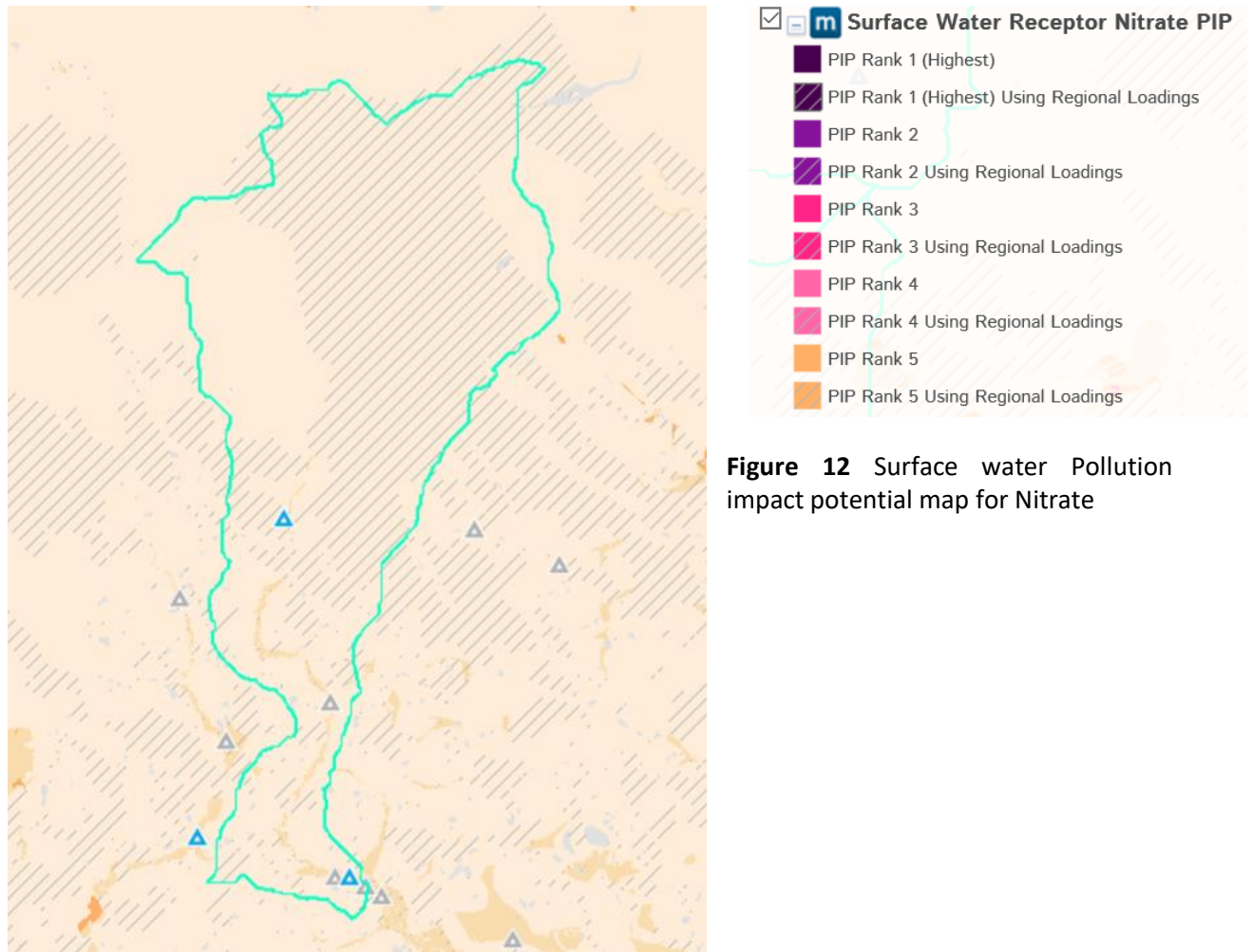


Figure 12 Surface water Pollution impact potential map for Nitrate

4 Pathway information and analysis

4.1 Overview of Pathways within the PAA

The aquifer above Stralongford Bridge monitoring point is a Poor Aquifer and generally unproductive. Soils here are peat and poorly drained. Subsoils are blanket peat and Shale and sandstones till.

The aquifer at the monitoring point at Mill Bridge is a Regionally important aquifer- Karstified but this is only for a short distance above the monitoring point. A Locally Important Aquifer is the main aquifer within the 1km upstream of Mill Bridge.

The groundwater vulnerability above the monitoring point Stralongford Bridge is low and the top of the catchment is moderate to high. Above Mill Bridge the vulnerability of groundwater is also low to moderate.

Near surface phosphate susceptibility is low above Stralongford Bridge and reaches moderate susceptibility above the second monitoring point at Mill Bridge.

The pathways in all the catchment is 'Overland and near surface overland flow'

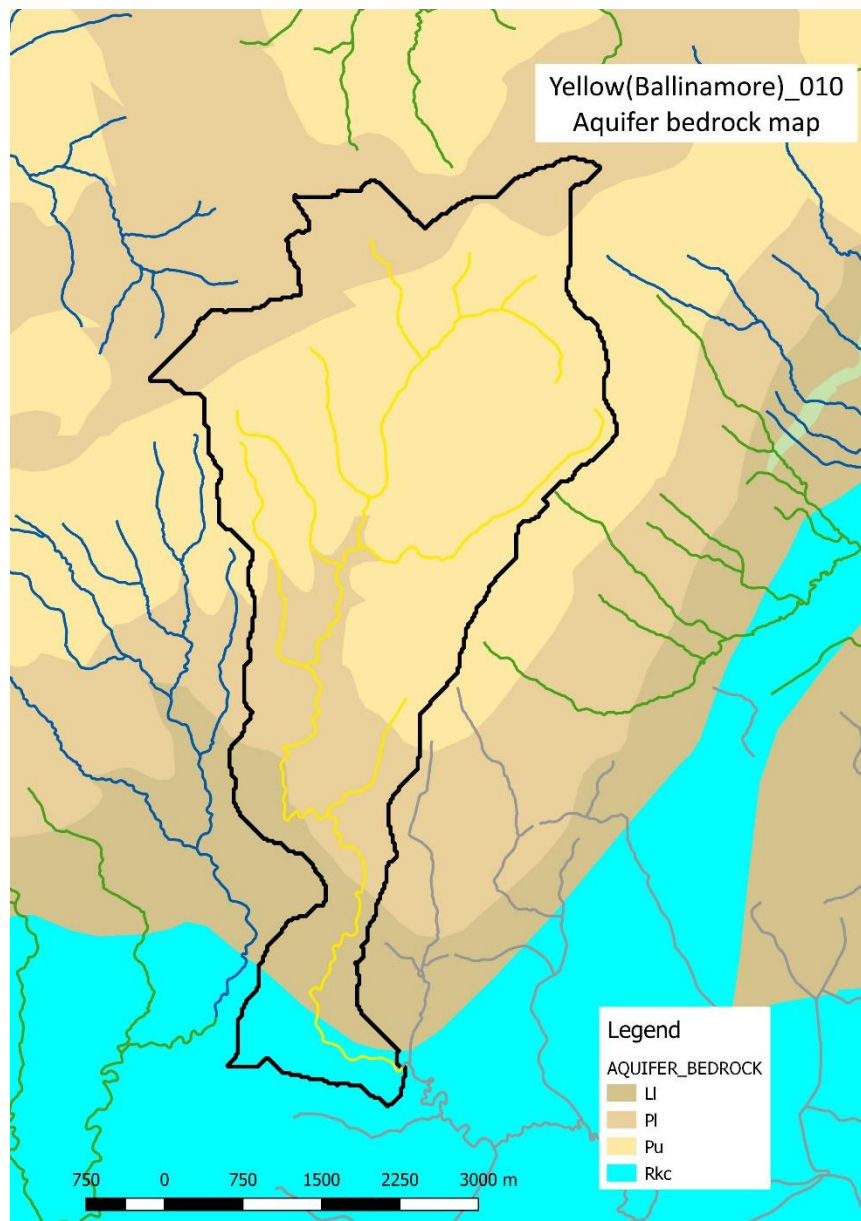


Figure 13 The aquifer bedrock for the *Yellow (Ballinamore)_010 PAA*.

There are 4 aquifer categories in the Yellow PAA:

Moderately Productive only in Local Zones (LI)

Generally Unproductive except for Local Zones (PI)

Karstified bedrock (Rk)

Generally Unproductive (Pu)

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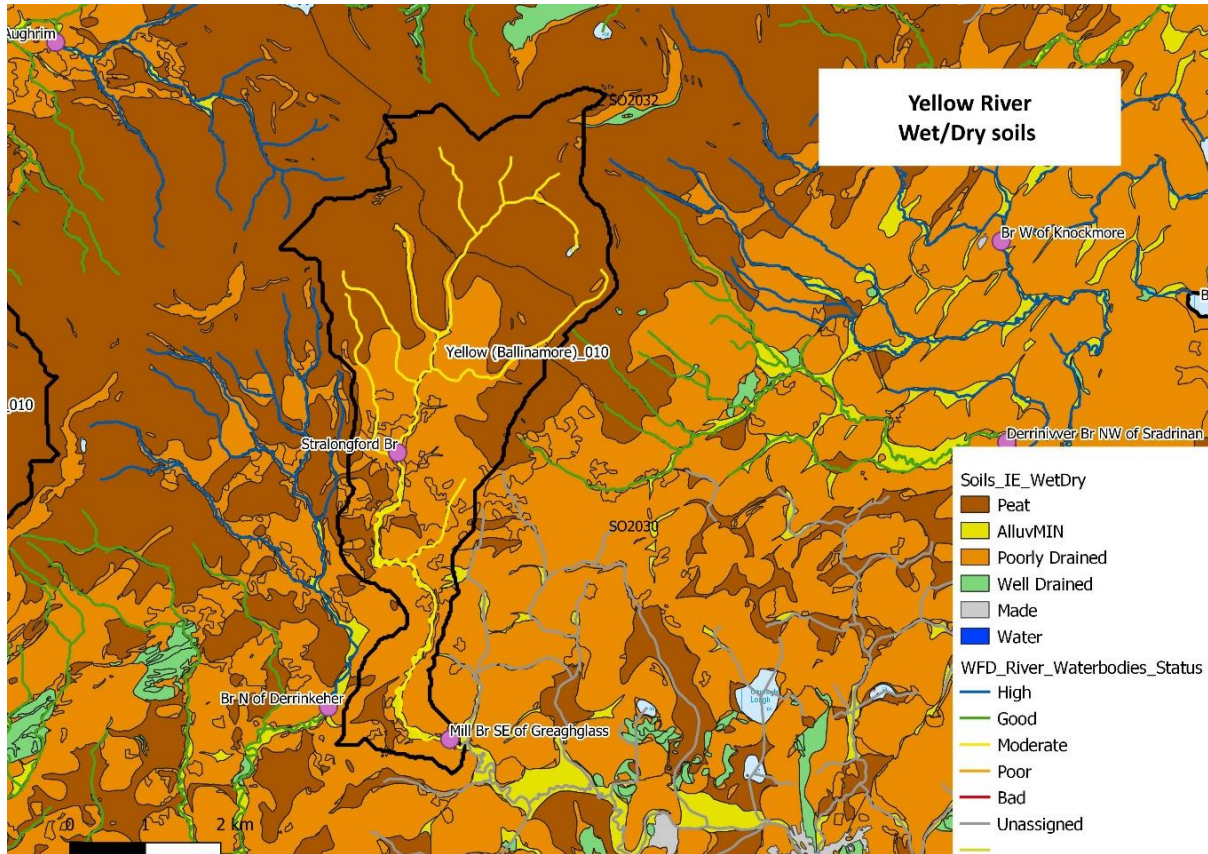


Figure 14 The wet and dry soils for the Yellow (Ballinamore)_10 PAA

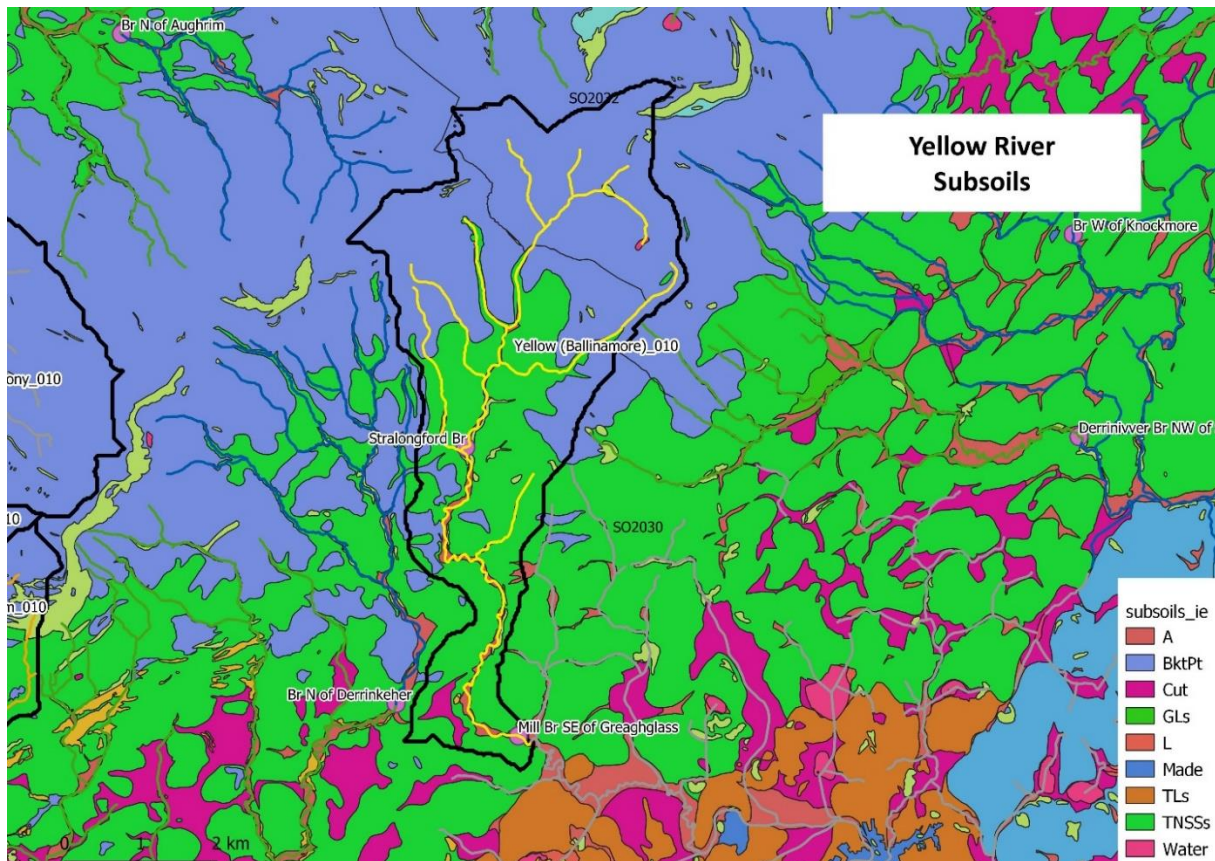


Figure 15 The subsoil type for the Yellow (Ballinamore)_10 PAA.

Yellow(Ballinamore)_010 Priority Area for Action Desk Study Report

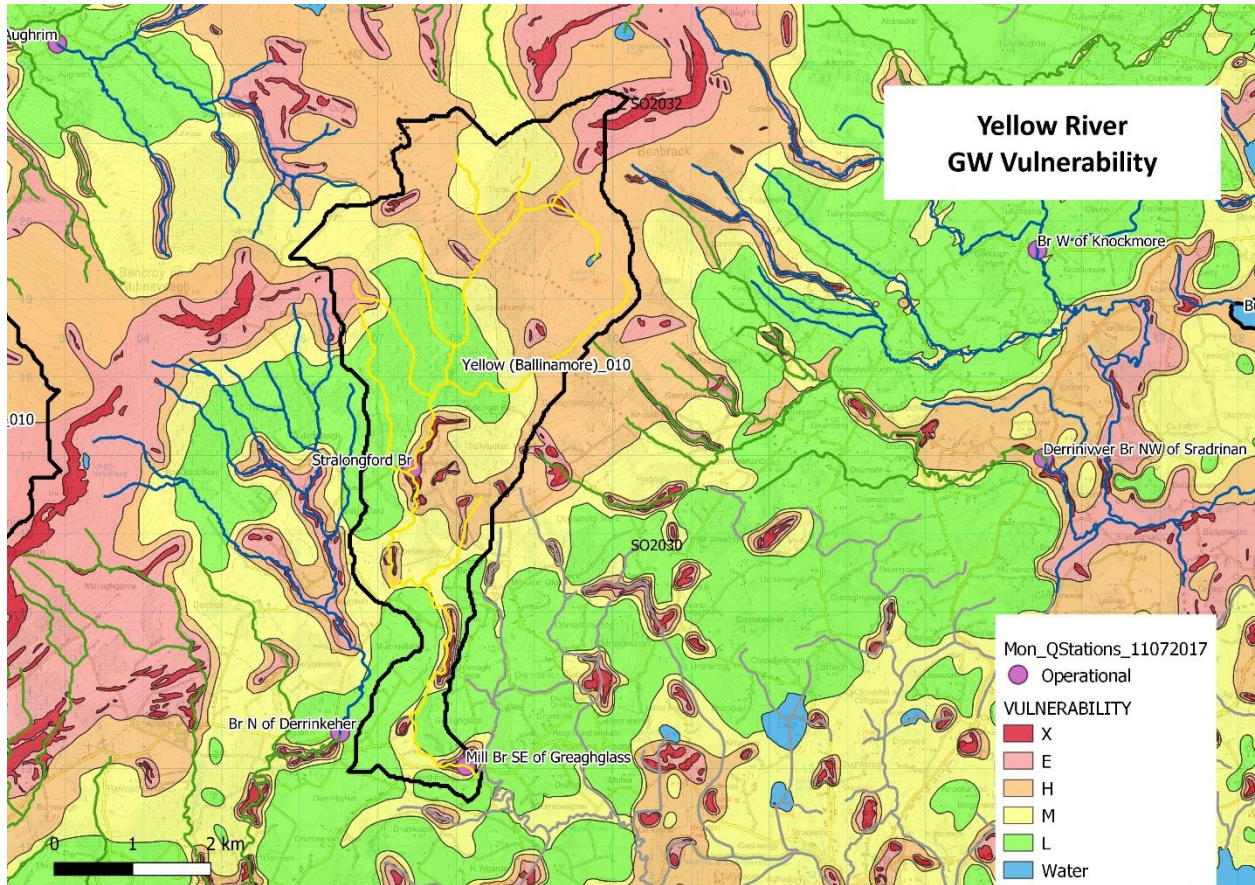


Figure 16 The groundwater vulnerability for the Yellow (Ballinamore)_10 PAA

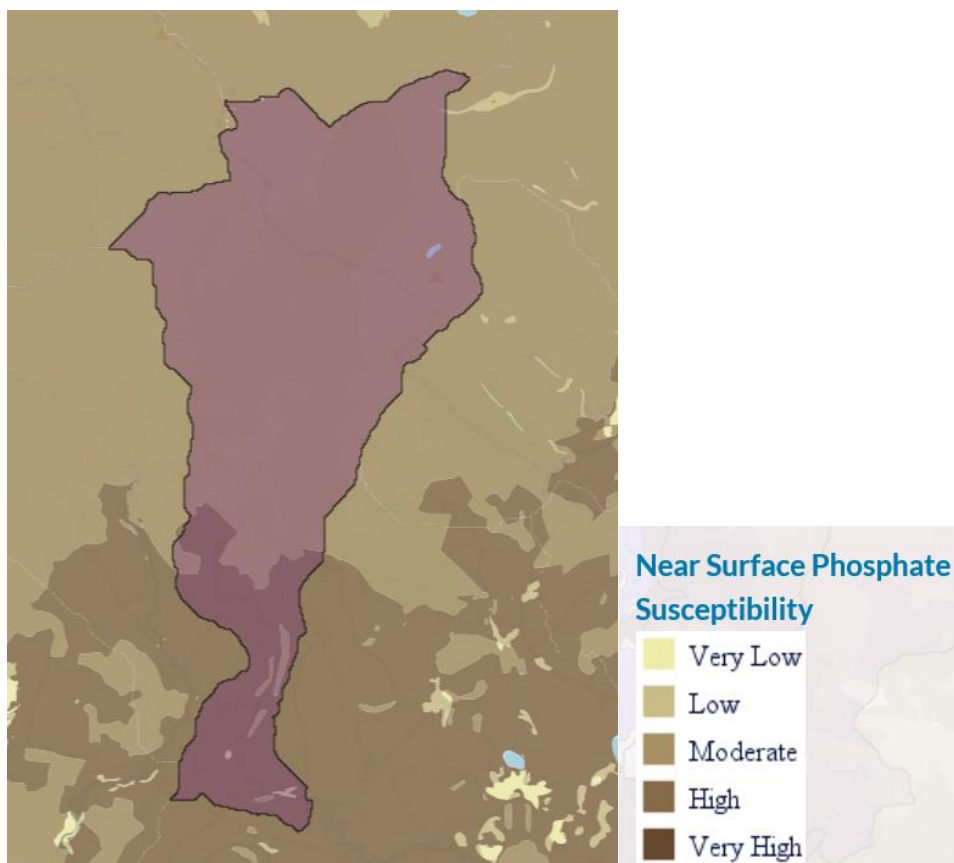


Figure 17 Yellow (Ballinamore)_10 Near Surface PO₄ susceptibility map.

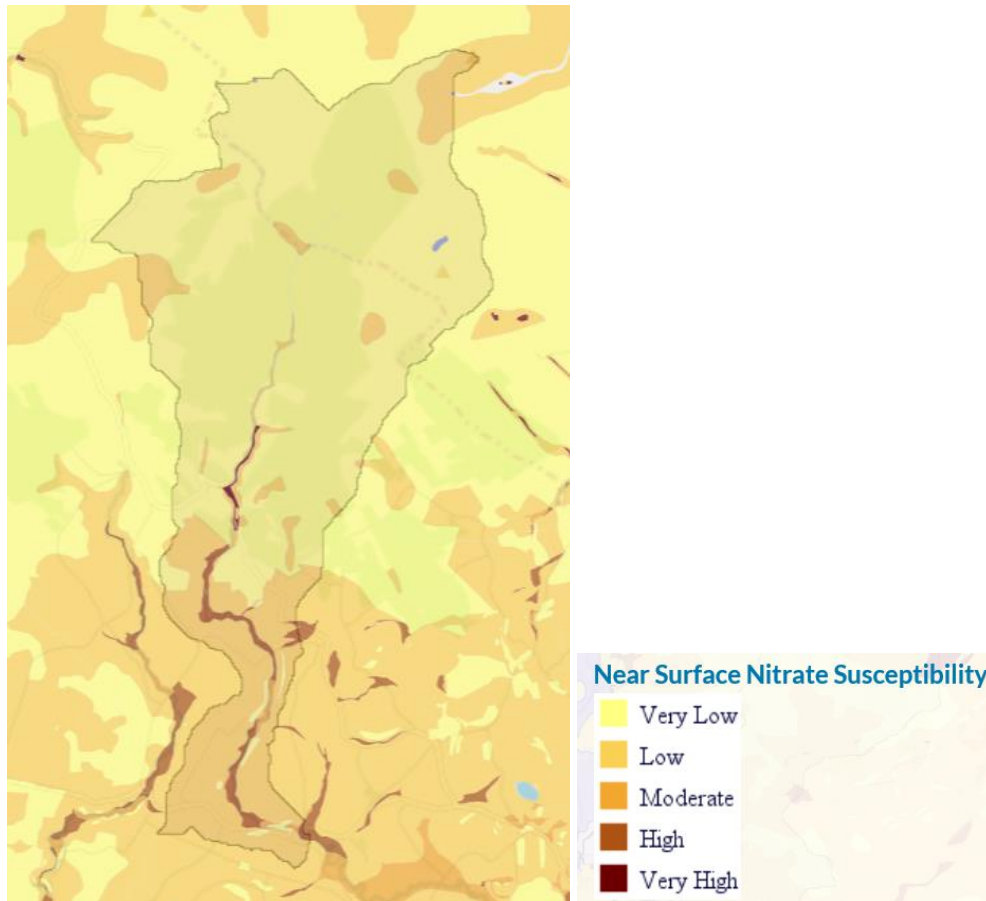


Figure 18 Yellow (Ballinamore)_10 Near Surface Nitrate Susceptibility.

Table 4 Conceptual model information for the pathways

	Compartment 1		Compartment 2	
Aquifer (Fig. 7)	Poor aquifer bedrock which is generally unproductive. The northern two thirds of the catchment in yellow and hatched yellow.		Locally important aquifer bedrock which is moderately productive. The remaining southern one third area of the catchment.	
Rock Units	Namurian Sandstones, Namurian Shales, Dinantian Shales and Limestones		Dinantian mixed sandstones, shale and limestones, Dinantian pure bedded limestones	
	Sub-Compartment. 1A	Sub-compartment 1B	Sub-Compartment 2A	Sub-compartment 2B
Soil type	BkPt	BkPt, AminPDpt	AminPDpt, AminPD	Cut, AminPD
Subsoil (Fig 10)	BkPt	BKPt, GLs	GLs,	Cut, GLs
Subsoil K				
Groundwater Vulnerability (Fig. 10)	High, Moderate	High, Moderate, Low	Moderate to Low	Moderate to Low
PO ₄ Susceptibility	Low	Low	Moderate	Moderate
NO ₃ Susceptibility	Very Low	Very Low	Moderate to high along the river	Moderate to high along the river
PO ₄ PIP (Fig. 5)	Rank 4 to 6	Rank 4 to 6	Rank 3 and 2	Mainly Rank 3 and 2 with small pockets of Rank 1
NO ₃ PIP (Fig. 6)	Rank 6-7	Rank 6-7	Rank 6-7	Rank 6-7
Main Flow Paths	Overland and near surface overland flow	Overland and near surface overland flow	Overland and near surface overland flow	Overland and near surface overland flow

5.0 Interim 'story' of the Priority Area for Action

5.1 IE_NW_36YO10200

Risk category: At risk

Status: The catchment currently has 'Moderate Status' under the Water Framework Directive and requires restoration to 'Good Status' which the waterbody was for the last period 2010-2012.

Hydrochemistry summary: There are no chemistry monitoring results for the catchment.

Baseline Concentration: Not available

Significant issue: Pesticides/Chemicals. There are two monitoring points in the Yellow (Ballinamore)_10 PAA which has only 1 waterbody. Invertebrate monitoring at Stralongford Bridge was Q4 in 2010, dropped to Q3-4 in 2013 and when assessed in 2017 was Q3-4/0 indicating a toxicity event. This toxicity was also seen at the monitoring station as it leaves the catchment at Mill Bridge NE of Greaghglass

Significant pressure: Forestry/Sheep dip 95% of the catchment upstream of the Stralongford Bridge monitoring point is conifer forestry operated by Coillte. There's a small amount of pastureland above the monitoring point which needs to be walked to look for use of pesticides or other chemical use

Other pressures: There is a possibility that agriculture could be a significant pressure which will be determined during the Local Catchment Assessments.

Relevant pathways: Overland and near surface flow. The pathway from the source to the receptor is overland and near surface overland flow in all compartments due to the poorly drained soils due to the poorly draining soils.

6 Communications plan

- Consult with Leitrim Co. Council, IFI and ASSAP advisors for existing knowledge of the catchment and discuss the desktop study.
- Consult with NPWS on SAC's, are any of these water dependant SAC's?
- From the initial characterisation forestry has been identified as the sole significant pressure in this waterbody. The lands above the monitoring point are predominantly Collite owned. It is planned to carry out some local catchment assessment work in conjunction with the forest service prior to deciding if a public meeting is warranted in this PAA. There are no dwellings and a small area of agricultural land u/s of the upstream monitoring point.

1 day of field work with the Forestry Service was carried out in June 2019.

7 Work plan

7.1 Further Characterisation Actions Assigned

Local catchment assessment needed with a focus on nutrients and sediment (considering both point and diffuse sources)

7.3 Local Catchment Assessment

- Undertake an SSIS biological monitoring at the two monitoring points.
- Carry out a bridge hop visual assessment and SSIS to try and narrow down the possible source of the toxicity event. See Figure 19.
- Carry out a stream walk above Stralongford Bridge monitoring point to identify point sources and possible sources of the toxicity event.
- Work with ASSAP advisors and Forestry Service Officers to identify farmers/forestry owners for targeted water advisory services.
- Chemistry sampling following bridge hop SSIS at the 2 monitoring points and any tributaries showing an impact from the SSIS assessment.

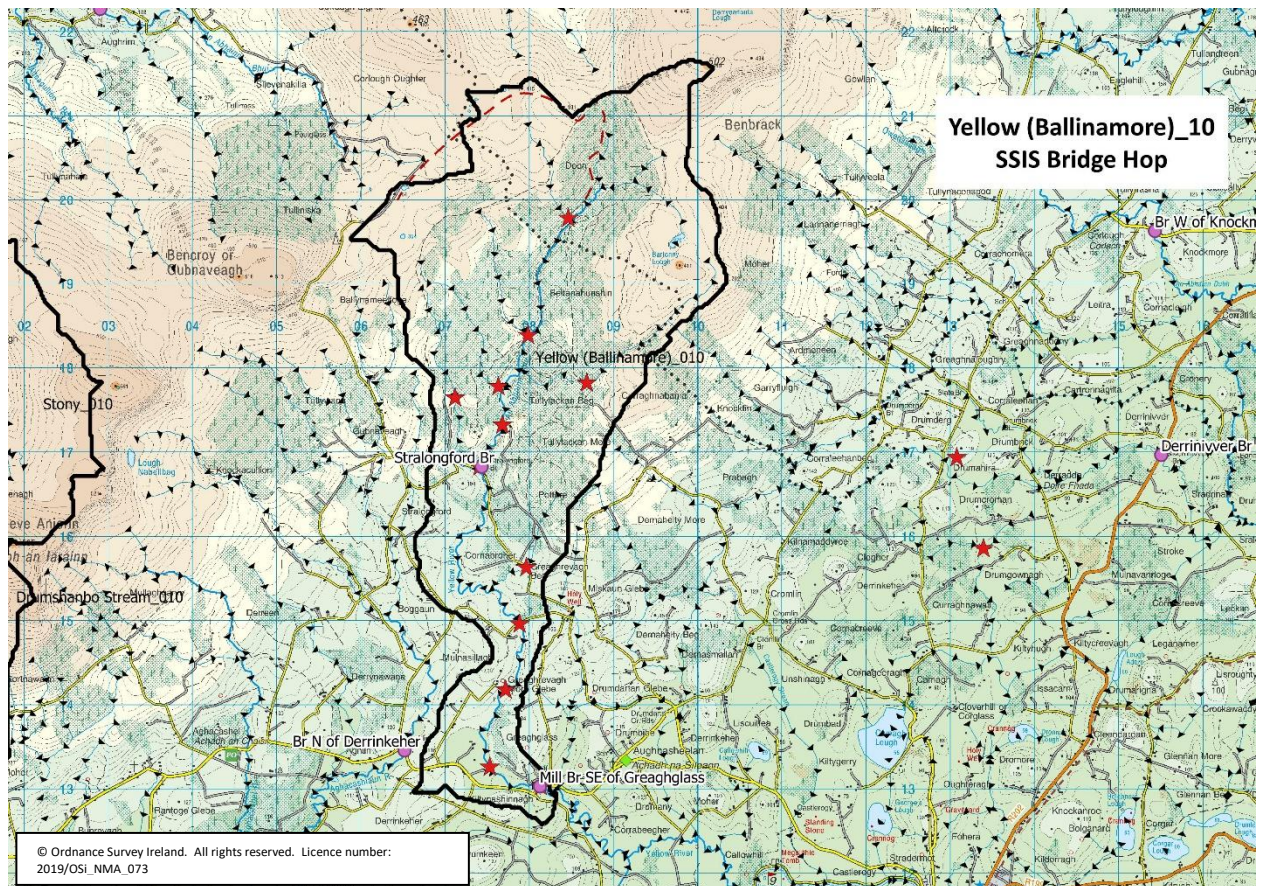


Figure 19 Map of SSIS sites planned for Yellow (Ballinamore)_10 river

8 Review of mitigation options

The pathway is for 'Overland and near surface overland flow' for all compartment of the catchment.

Agricultural measures should address run off risk and pathway interception if it's on agricultural land.

If the location is upstream of Stralongford Bridge, within the Coillte forestry and coming from the blanket peat it could be possible to block forestry drains and intercept the pathway of nutrients and or sediment. Local Catchment assessment to address this.

Date of completion of Deskstudy: 28/11/19

Appendix 1

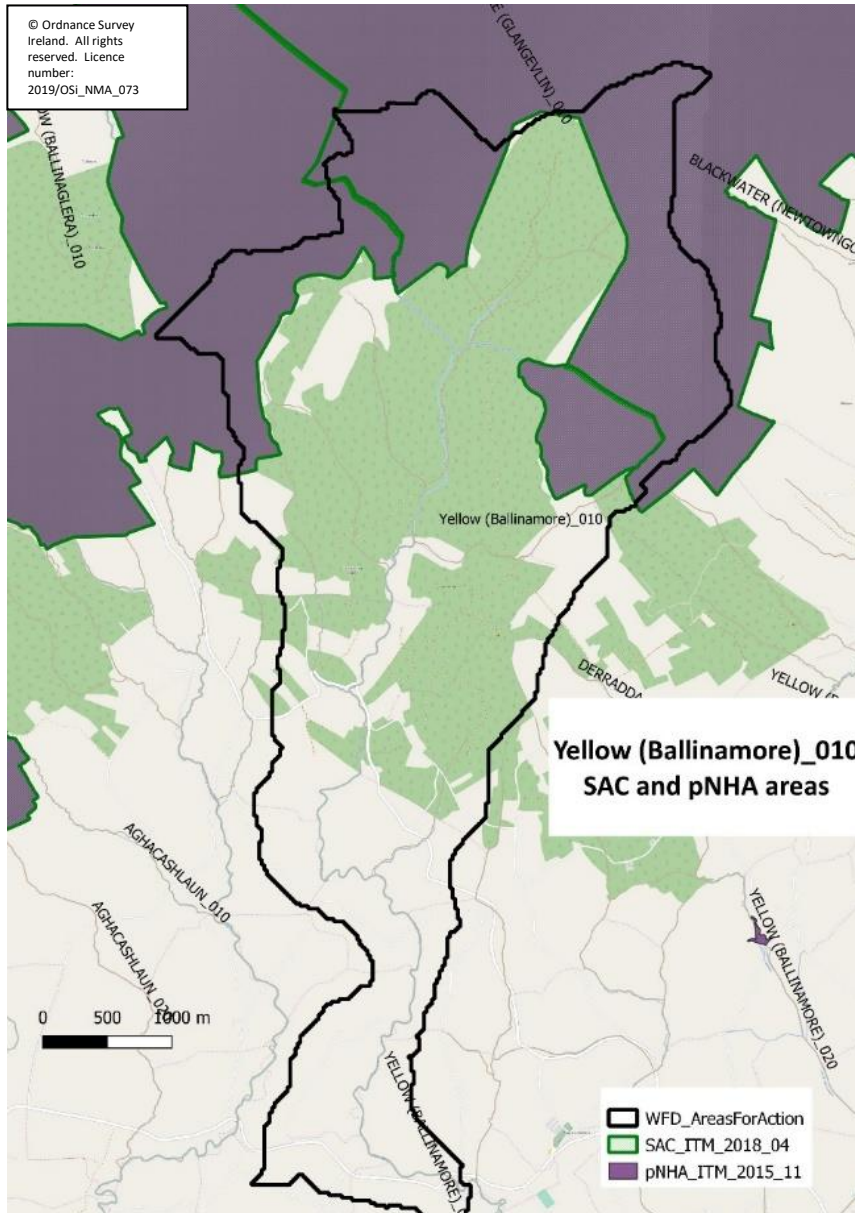


Figure 1
Map of pNHA and SAC within the Yellow(Ballinamore)_010 PAA

Appendix 2

Planned Monitoring Frequency

Quality Element	Additional Descriptor	2019	2020	2021
Chemical Surface Water Status		0	0	0
Fish Status or Potential		0	0	0
General Conditions		0	0	0
Hydromorphological Conditions		0	0	0
Invertebrate Status or Potential	AWIC	0	0	0
Invertebrate Status or Potential	Q-Value	1	0	0
Macrophyte Status or Potential		0	0	0
Phytobenthos Status or Potential		0	0	0
Specific Pollutant Conditions		0	0	0

Figure 2. Planned monitoring by the EPA of the Yellow(Ballinamore)_010 waterbody under the Water Framework Directive.

Yellow(Ballinamore)_010 Priority Area for Action Desk Study Report



WFD Waterbody Code IE_NW_36Y010200	WFD Waterbody Name YELLOW (BALLINAMORE)_010	Station Name Mill Br SE of Greaghglass		
River code and year: 36Y010200 sampled in 2017	River: YELLOW (BALLINAMORE)	Easting: 208125	Northing: 313033	Sample date: 18/09/17 05:30 PM
Access and H&S rating:	Right Hand Side	Downstream	Low Hazard site	

Filamentous algae, macrophytes & shading		Station type, sediment, livestock access & erosion	
Cladophora	#N/A	Station Type	Typical riffle-glide
Vaucheria	#N/A	Substrate Features	Normal
Filamentous algae - Total	#N/A	Substrate Siltation	Slight
Total Macrophytes	#N/A	Livestock Access	Cattle
		Livestock Access Impact	Mild
Shading	Light	Bank Erosion	D/S Both Banks
		Bank Erosion Extent	Mild
		Recent Flood	Yes
		Flow/Discharge	Normal

Overview of macroinvertebrate data

The site 36Y010200 on the YELLOW (BALLINAMORE) river was sampled in 2017. A total of 8 invertebrate taxa were recorded. There were 1 sensitive mayfly and 0 sensitive stonefly found at the site. Sensitive taxa were found in good numbers. The results of an examination of key tolerant taxa found: Simuliidae (Common), Gammarus (Common) and Baetis rhodani (Dominant). When high numbers of tolerant taxa are found like this, especially when combined with a low density or absence of sensitive taxa, it is usually indicative of moderate or lower status. The Q value assigned to this site was 3-4/0, indicative of moderate conditions. A suffix /0 was assigned to the Q-Value assessment indicating something worthy of special attention, typically a suspected toxic effect. Trend data and river summary assessments are available at <http://www.epa.ie/QValue/webusers/>. Text is autogenerated, represents a simplification and adjustments for specific typologies/habitat/atypical conditions are not represented (e.g. acidified sites / non-riffle-glide habitats).

River code and year
 36Y010200 sampled in 2017

Group	Taxon	Sensitivity	Abundance	
Mayfly	Rhithrogena	Sensitive	Numerous	██████████
Beetle	Elmis aenea	Tolerant taxa	Few	██████
Blackfly larvae	Simuliidae	Tolerant taxa	Common	██████████
Caseless Caddis	Rhyacophila	Tolerant taxa	Few	██████
Chironomids	Chironomidae	Tolerant taxa	Few	██████
Mayfly	Baetis rhodani	Tolerant taxa	Dominant	██████████
Shrimp	Gammarus	Tolerant taxa	Common	██████████
Worms	Tubificidae	Most tolerant taxa	Few	██████

Figure 3 EPA biologists report for Mill Br SE of Greaghglass monitoring station.