

Awbeg (Buttevant) West Priority Area for Action Desk Study AFA 0013 South-West Region



Photograph of WFD operational monitoring point at Annagh Bridge, taken on 26th of April 2019

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Summary

The Awbeg Priority Area for Action (PAA) consists of two waterbodies: Awbeg (Buttevant)(West)_010 and Awbeg (Buttevant)(West)_020. Both waterbodies are failing to meet their WFD good status objective and both are *At Risk*. The river was selected as a PAA because of its value as a trout river and because it is failing to meet protected area objectives for crayfish; the lower reaches of Awbeg (Buttevant)(West)_020 fall within the Munster Blackwater (Cork/Waterford) SAC (Site Code 002170).

Awbeg (Buttevant)(West)_010

- River channel is 19.85km in length. Currently this waterbody is at poor ecological status with biology (invertebrates) driving status.
- The WFD App lists Agriculture as the significant pressure.
- There are no chemistry data available here but land use and soil type indicate that the significant issue may be phosphate and/or sediment from agriculture.
- Main flowpaths are via overland flow with some potential for groundwater flowpaths where karst features are present or where soils are thin with rock near surface.

Awbeg (Buttevant)(West)_020

- River channel is 28.22km in length. Ecological status for this waterbody has been consistently poor since 2012 with biology (invertebrates) driving status.
- The WFD App lists hydromorphology/channelization as the sole significant pressure but ammonia, phosphate and nitrate levels are periodically elevated, indicating that other significant pressures may also exist; land use and PIP maps suggest that agriculture may be a pressure here.
- Available information indicates that nutrients are the significant issue in this waterbody. Annual average ammonia and orthophosphate levels frequently exceed the relevant EQS and total oxidised nitrogen levels consistently exceed the recommended limit of 1.8ppm. Periodic spikes in ammonia and orthophosphate have been observed (up to 0.4 and 0.15ppm respectively).
- Sediment may also potentially be an issue in this waterbody.
- Main flowpaths for phosphate (and sediment) are the poorly draining and alluvial mineral soils. The areas of extreme x groundwater vulnerability which overly the Rkd aquifer also carry some risk of phosphate moving from point sources via groundwater flowpaths.

Recommended Actions:

- Undertake SSIS at Br SE of Sunfort on the Awbeg (Buttevant) (West)_010. Also take samples for ammonia, ortho-Phosphate and total oxidised nitrogen at this monitoring point.
- Take note of point sources of sediment from land drainage and/or forestry. Assess siltation upstream and downstream of any point sources. The results of this will inform if agriculture, land drainage and/or forestry is causing siltation in this PAA.
- Undertake SSIS assessments in the Awbeg (Buttevant) (West)_010 from tributaries upstream of Br SE of Sunfort as well as on the Awbeg (Buttevant) (West)_020.

Awbeg (Buttevant) (West) Priority Area for Action Desk Study

- Undertake SSIS upstream and downstream of the Liscarroll UWW. Also take sample for ammonia, ortho-Phosphate and total oxidised nitrogen here.
- Undertake SSIS at Annagh Br on the Awbeg (Buttevant) (West)_020.

Information from this first LCA will inform the extent of additional assessment and stream walks needed. Based on SSIS results, focus will be nutrient monitoring on impacted tributaries. All nutrient monitoring surveys will include assessment at the EPA WFD monitoring points. Nutrient monitoring of significant springs will also be undertaken to help inform re groundwater nutrient flowpaths.

1 Background

1.1 Location of Awbeg (Buttevant) West Priority Area for Action and Reasons for Selection

Table 1-1: Background information on the Awbeg (Buttevant) West Priority Area for Action

Priority Area for Action	Catchment Number	Catchment Name	Sub catchment	Region	Local Authority
Awbeg (Buttevant) West	18	Blackwater (Munster)	18_13 Awbeg[Buttevant]_SC_010	Southwest	Cork

Priority Area for Action	No of <i>At Risk</i> WBs	No of <i>Review</i> WBs	No of dRBMP Prioritised WBs	No of WBs for Status Improvement:		
				2021	2027	Beyond 2027
Awbeg (Buttevant) West	2	0	2	1	1	0

Reason for selection	<ul style="list-style-type: none"> • Test case for drainage issues. • Upper reaches of subcatchment, headwaters to <i>At Risk</i> water bodies. • Failing to meet protected area objectives for Crayfish. • The IFI reported this is a good trout river. • Two deteriorated water bodies.
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Awbeg (Buttevant) (West) Priority Area for Action Desk Study

A map of the Awbeg (Buttevant) West waterbodies is presented in figure 1.1 below:

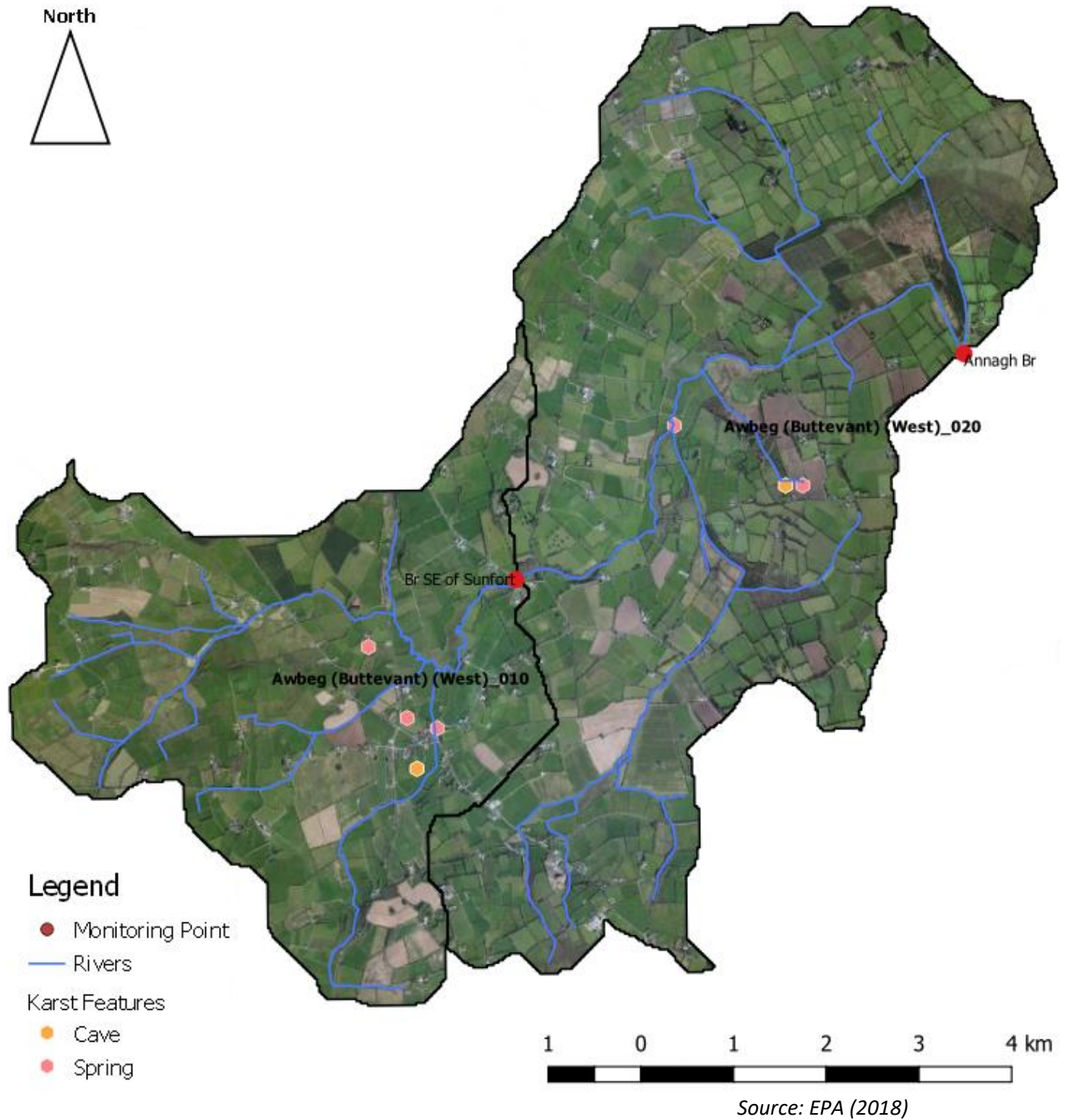


Figure 1-1: Awbeg (Buttevant) West Waterbodies

Awbeg (Buttevant) (West) Priority Area for Action Desk Study

The Awbeg (Buttevant) West River waterbody risk and status maps are shown on figures 1.2 and 1.3 respectively, with monitoring point locations.

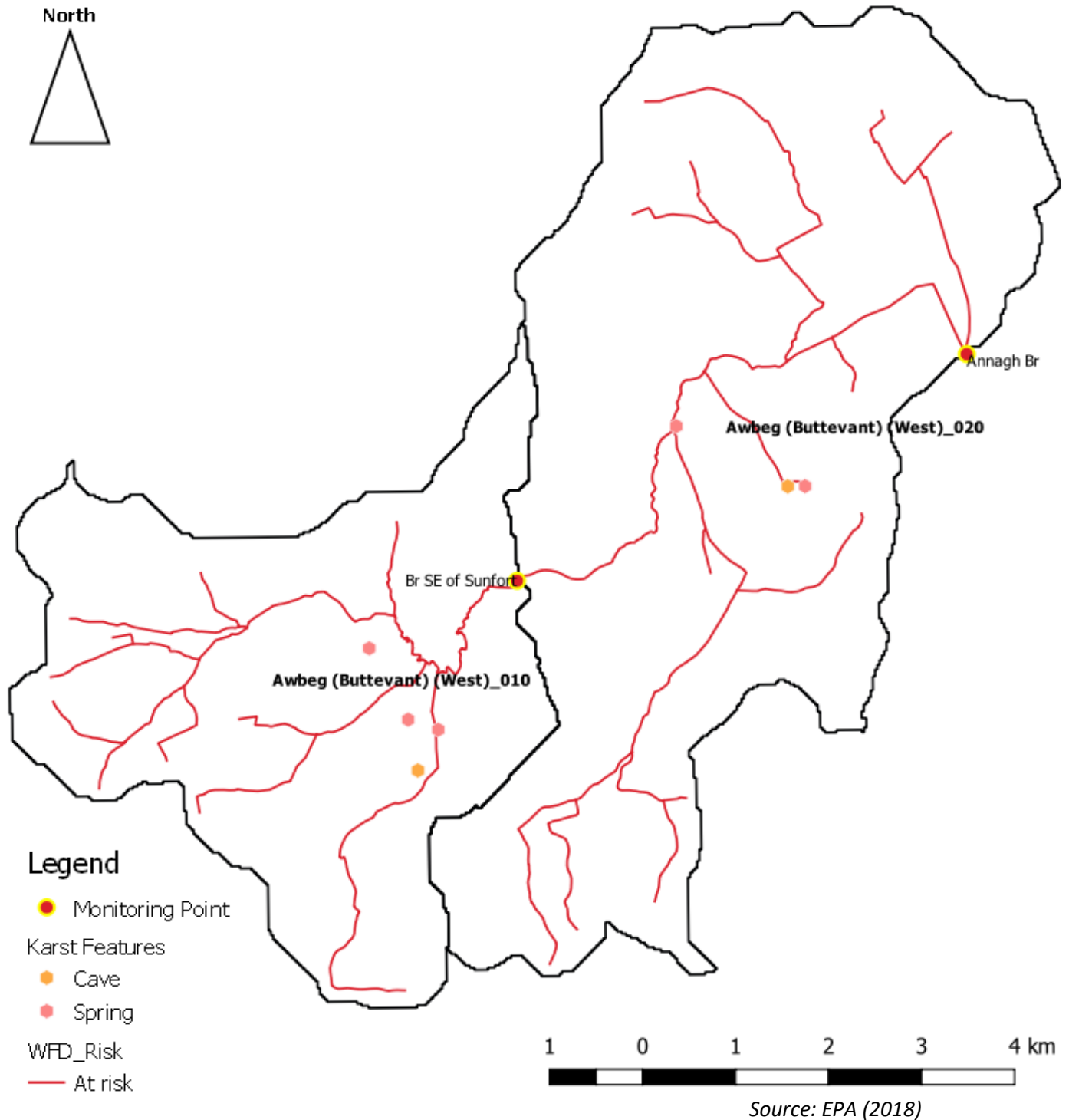


Figure 1-2: Awbeg (Buttevant) West Priority Area for Action WFD Risk Map

Awbeg (Buttevant) (West) Priority Area for Action Desk Study

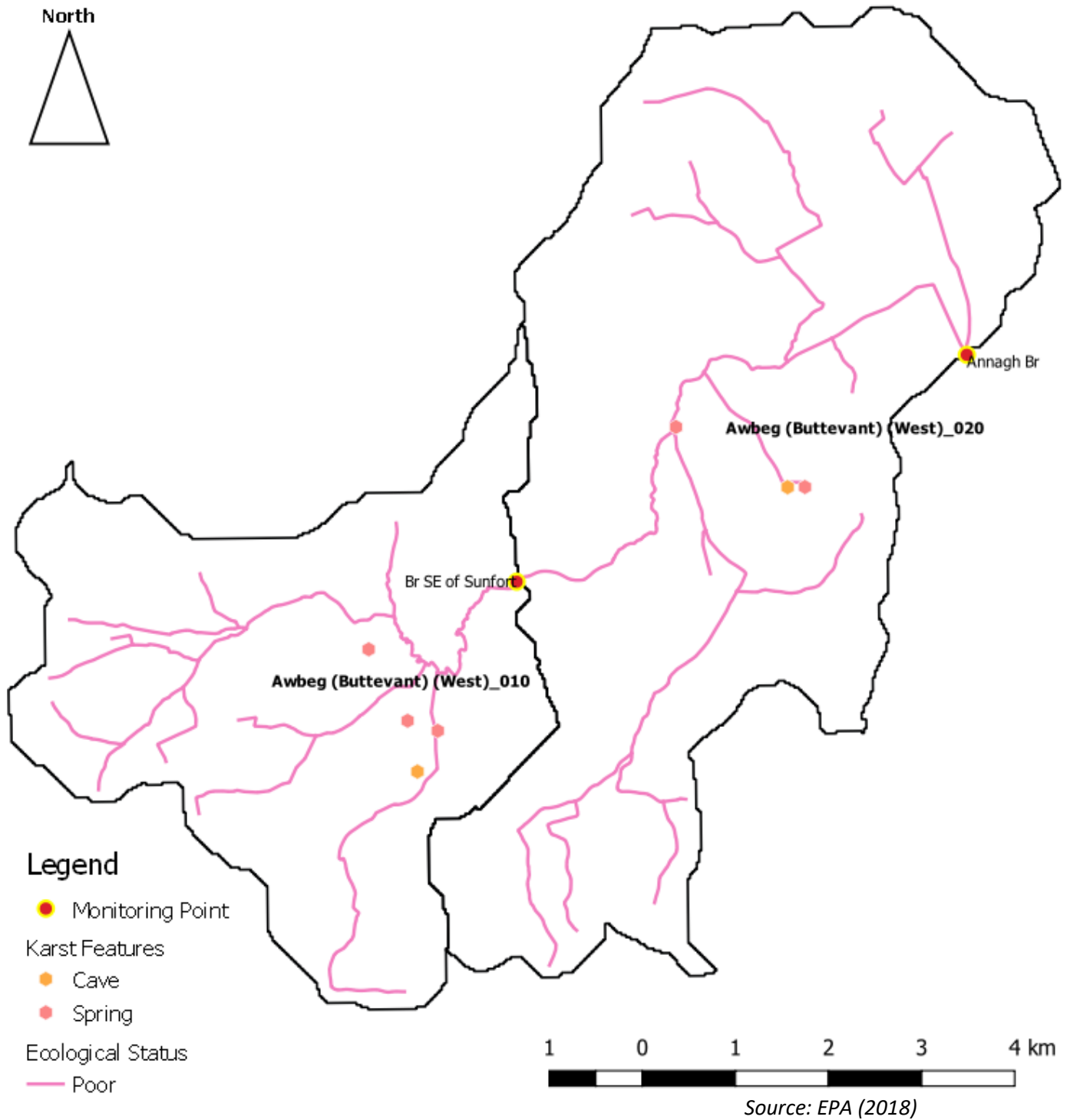


Figure 1-3: Awbeg (Buttevant) West Priority Area for Action Ecological Status

Awbeg (Buttevant) (West) Priority Area for Action Desk Study

1.2 Waterbody information

Table 1.2 outlines summary status and pressure information on each waterbody. Details of monitoring points on each waterbody are provided in table 1.3 and shown on the map in figure 1.1 above.

Table 1-2: Summary table of individual waterbodies within the Awbeg (Buttevant) (West) Priority Area for Action

Water body Code	Water body Name	Water body Type	Date to meet Environmental Objective	Risk	Status Objective	Ecological Status			Pressures		
						07-09	10-12	10-15	Category	Sub Category	Significant
IE_SW_18A090300	Awbeg (Buttevant) (West)_010	River	2021	At Risk	Good	Good	Good	Poor	Agriculture	Agriculture	Yes
IE_SW_18A090400	Awbeg (Buttevant) (West)_020	River	2027	At Risk	Good	Moderate	Poor	Poor	Agriculture	Agriculture	No
									Forestry	Forestry	No
									Hydromorphology	Channelisation	Yes

Source: EPA (2018)

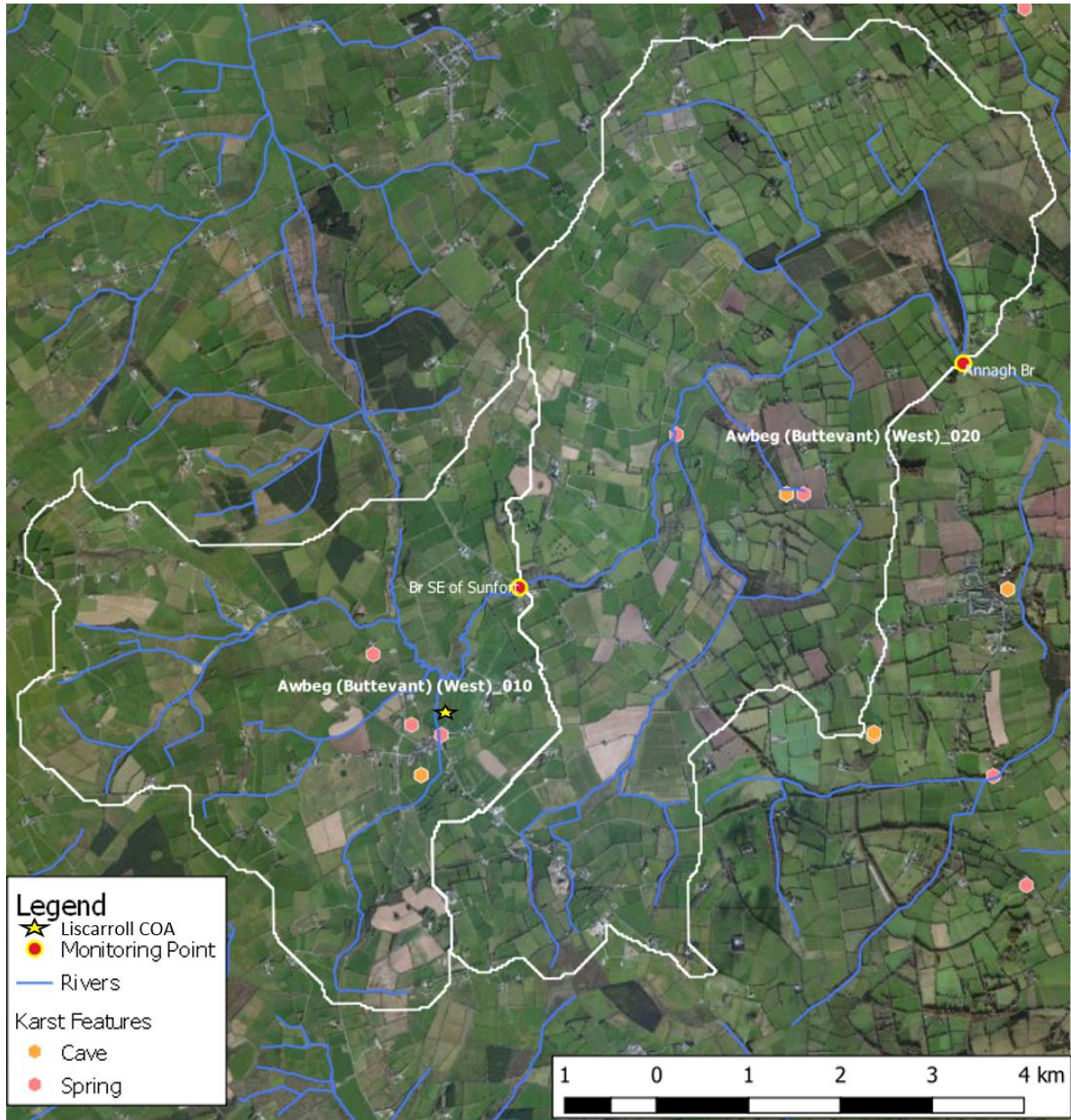
Table 1-3: Monitoring point locations

Waterbody	Monitoring Point Code	Name	Type	Comments
Awbeg (Buttevant) (West)_010	RS18A090300	Br SE of Sunfort	PreWfd	Includes Q data only
Awbeg (Buttevant) (West)_020	RS18A090400	Annagh Br	PreWfd	Includes Q data chemistry data

Source: EPA (2018)

2 Receptor Assessment

Monitoring stations are shown on the map below:



Source: EPA

Figure 2-1: WFD monitoring stations

Awbeg (Buttevant) (West) Priority Area for Action Desk Study

2.1 Overview table

Information on the receptor, including summary results for each operational monitoring point, is provided in table 2.1:

Table 2-1: Receptor information for Awbeg (Buttevant)(West)_010 and Awbeg (Buttevant)(West)_020

		Figures Tables	Awbeg (Buttevant)(West)_010	Awbeg (Buttevant)(West)_020
Risk Category		y	At risk	At risk
Monitoring station		y	RS18A090300	RS18A090400
Biological Status (Inverts)	2010-2015	Y	Poor (3)	Poor (3*)
	2013-2018 (preliminary results 2018)	y	Poor (3)	Poor (2-3)
	Trends in Q value		Good status in 2012.	Moderate status in 2009.
Biological Status (fish)			No data	No data
Hydrochemistry Data				
Ortho-P (mg/l P)	Baseline	y	No data	0.029ppm 2015 (Baseline 0.031)
	Indicative quality		No data	Good
	Trends - significant?		No data	No, upwards
	Distance to threshold		No data	Far
NH4-N (mg/l N)	Baseline	y	No data	0.022ppm 2015 (Baseline 0.060)
	Indicative quality		No data	Good
	Trends - significant?		No data	No, downwards
	Distance to threshold		No data	Near
TON (mg/l N)	Baseline	y	No data	2.05ppm 2015 (Baseline 2.117)
	Indicative quality		No data	Moderate
	Trends - significant?		No data	No, downwards
	Distance to threshold		No data	Far
Supporting Conditions	Chemical conditions		No data	Pass
	Oxygenation Conditions		No data	Pass
	Acidification Conditions		No data	Pass
Hydromorphology				
RHAT score			No data	No data
Evidence of arterial drainage			No	No
Ecological Status (2010-2015)			Poor	Poor
Trends (2010-2015)			Good status in 2012.	Poor status since 2012
Protected Areas			Blackwater River SAC	Blackwater River SAC
WFD Objective			Good	Good
EPA biologist notes (if any)			Liscarroll COA is operating under capacity but biology was poor in previous cycles and receiving waterbody has deteriorated to poor status.	Biological historically poor/moderate. Sediment issue in 2015. Monitoring data at pre-WFD station measured Ton in 2014 at 3.79 mg/l. BOD <3.3 mg/l over 2013-2014.
Significant issue/impact for receptor			Possibly phosphate and/or sediment	Sediment and nutrients (ammonia and orthophosphate)

Source: EPA (2018)

2.2 Q values

Awbeg (Buttevant)(West)_010

There is one WFD operational monitoring station on Awbeg (Buttevant)(West)_010: Br SE of Sunfort, RS18A090300. There are no chemistry data available for this station. Biological monitoring results at this location deteriorated from good (Q4) in 2012 to poor (Q3) in 2015. Q values are graphed below in figure 2.2. Preliminary results for 2018 indicate that biological status remains Poor(Q3).

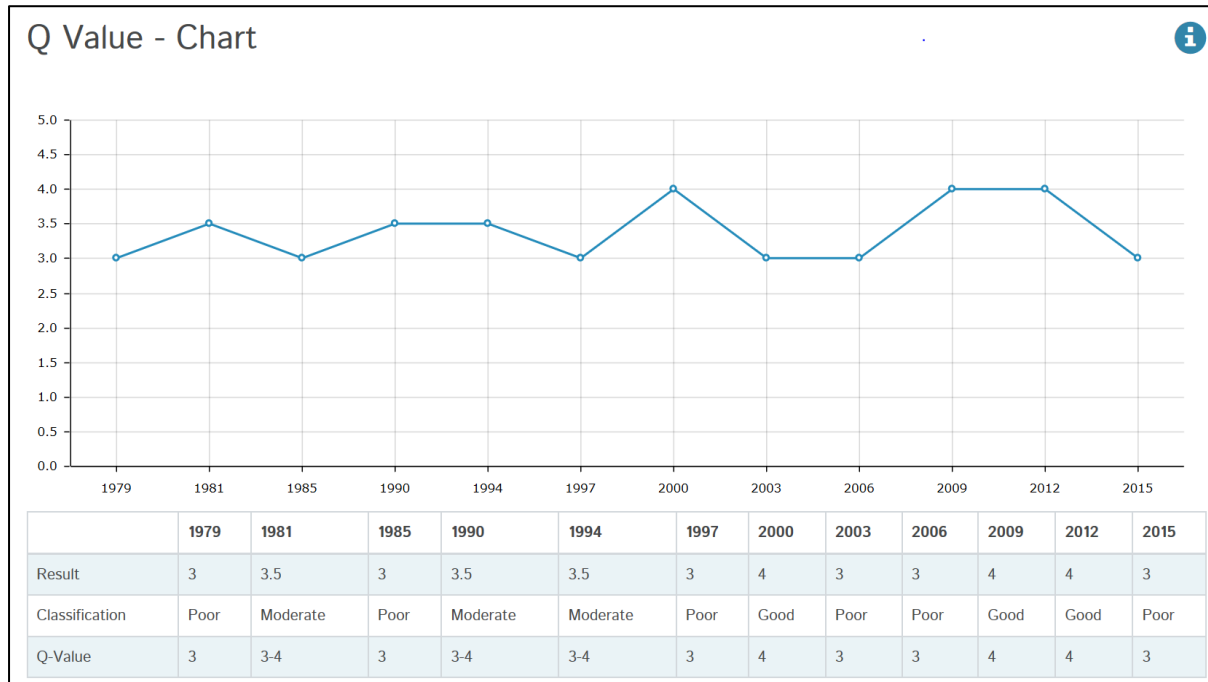


Figure 2-2:Q value at Br SE of Sunfort

Awbeg (Buttevant)(West)_020

There is one WFD operational monitoring station on Awbeg (Buttevant)(West)_020: Annagh Br, RS18A090400. Biological results for the monitoring point have been consistently poor since 2012 (see figure 2.3). Preliminary results for 2018 indicate that biological status remains poor at this station, with a drop in Q value to 2-3.

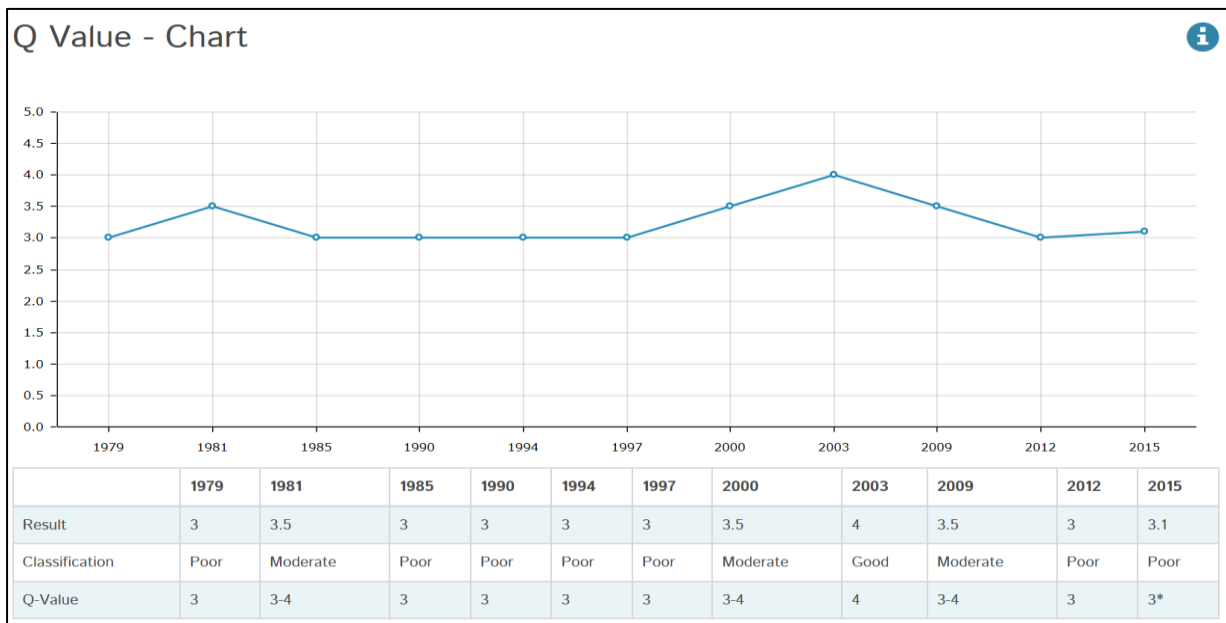


Figure 2-3: Q value at Annagh Br

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Table 2-2: Table of Q values

Water body Name	Monitoring Point	1979	1981	1985	1990	1994	1997	2000	2003	2006	2009	2012	2015	Preliminary results 2018
Awbeg (Buttevant) (West)_010	Br SE of Sunfort	Poor	Moderate	Poor	Moderate	Moderate	Poor	Good	Poor	Poor	Good	Good	Poor	Q3
Awbeg (Buttevant) (West)_020	Annagh Br	Poor	Moderate	Poor	Poor	Poor	Poor	Moderate	Good	-	Moderate	Poor	Poor	Q2-3

Source: EPA 2018

2.3 Hydrochemistry

Annual average TON levels from 2013 to 2018 have consistently exceeded the recommended limit of 1.8ppm (see below figure 2.4).

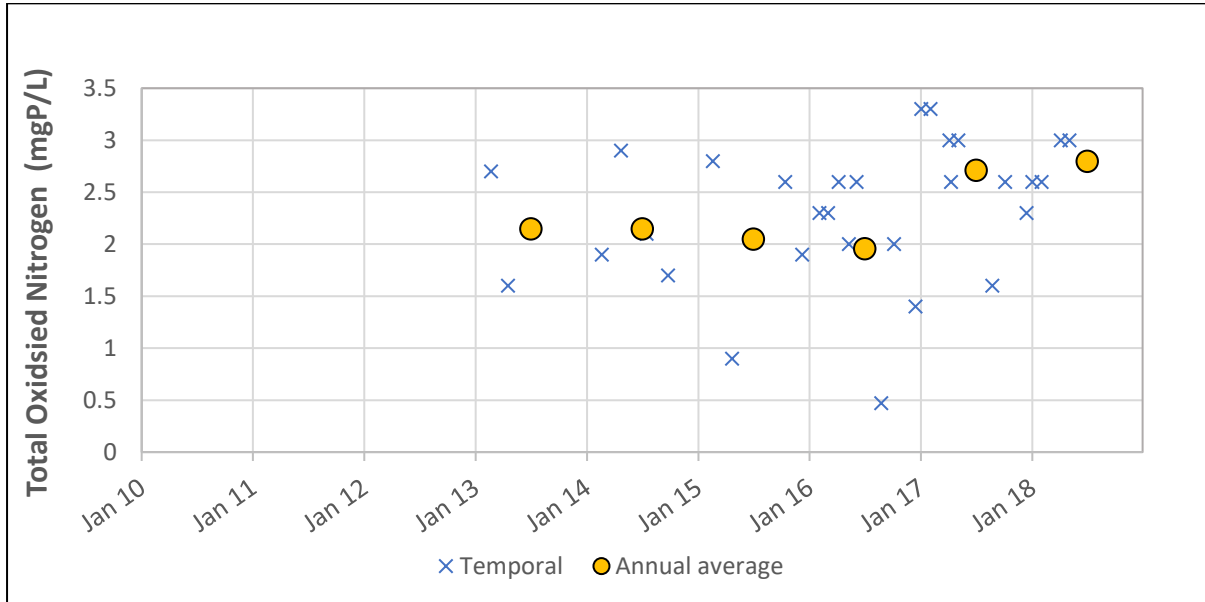


Figure 2-4: Annual average Total Oxidised Nitrogen levels (as N), at Annagh Br

Annual average ammonia results exceeded the 0.065mg/l mean EQS for Good Status waters in 2014, 2016 and 2018 (see figure 2.5 below). Mean results for 2013, 2015 and 2017 were satisfactory. The elevated 2014 mean was due mainly to two spikes, one in April 2014 (0.157ppm) and the second significant spike in September 2014 (0.416ppm). The elevated 2016 mean was also due mainly to two spikes, one in July 2016 (0.4ppm) and the second in August 2016 (0.31ppm).

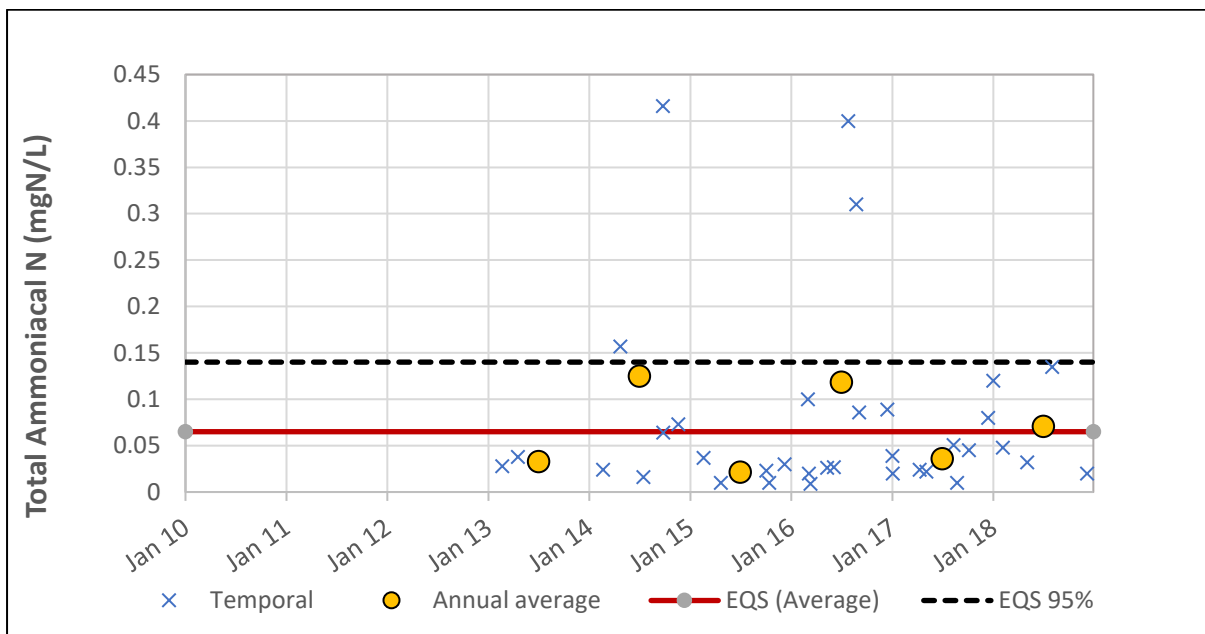


Figure 2-5: Annual average ammonia levels (as N), at Annagh Br

Annual average orthophosphate levels exceeded the 0.035mg/l mean EQS for Good status waters EQS in 2014, 2016 and 2018 (see below figure 2.6 below). Periodic spikes were observed in orthophosphate levels, with most elevated results detected in August and December 2016 and in July 2018.

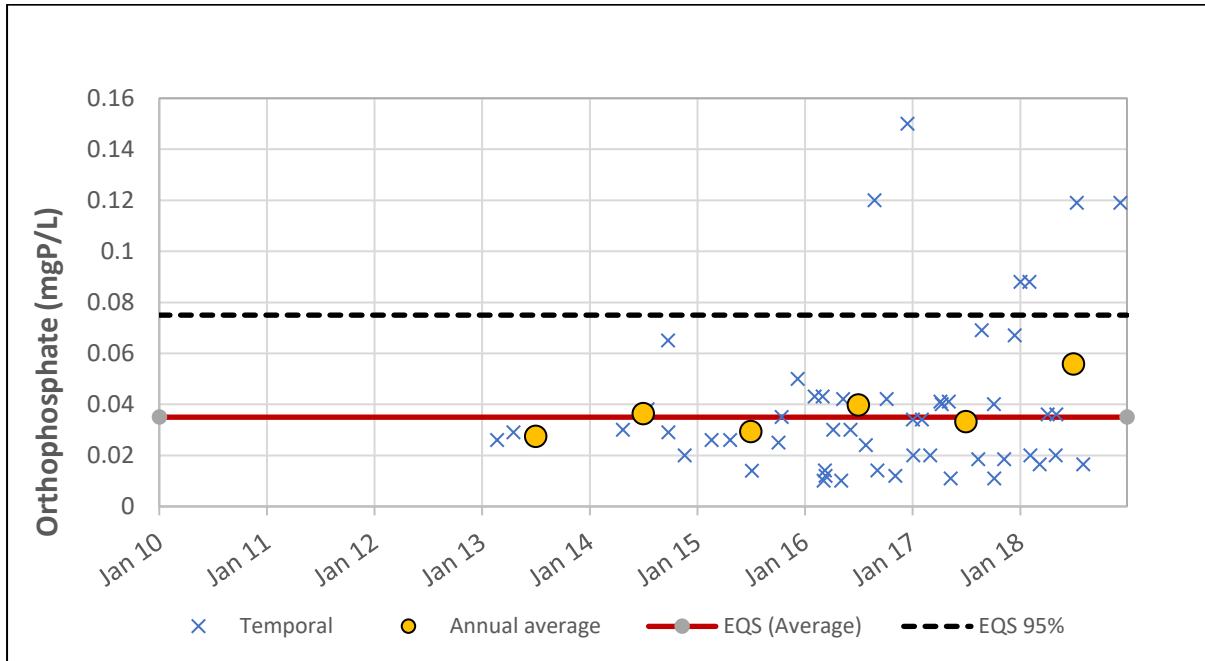


Figure 2-6: Annual average ortho-Phosphate levels (as P), at Annagh Br

BOD results are graphed below in figure 2.7. There are periodic spikes apparent, up to 6.6 mg/l, but these don't appear to be seasonal.

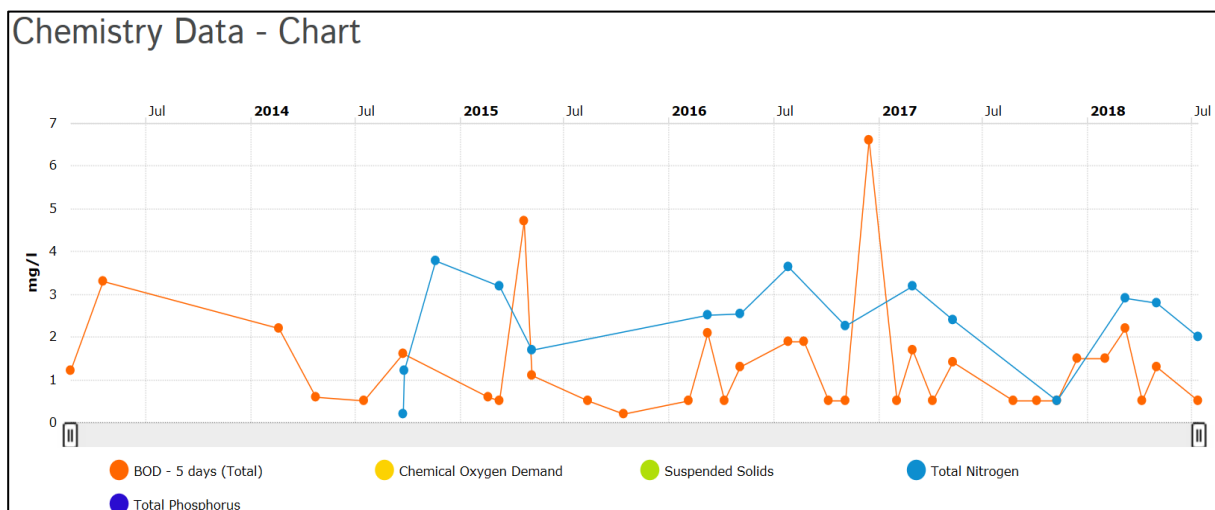


Figure 2-7: BOD results at Annagh Br

Spikes in orthophosphate and ammonia do not appear to be associated with high river flows (see figure 2.8 below). The orthophosphate concentration during the Summer 2018 low flows was very

Awbeg (Buttevant) (West) Priority Area for Action Desk Study

elevated at 0.19ppm. These results are potentially indicative of point source pollution (or significant groundwater flowpaths) in this waterbody.

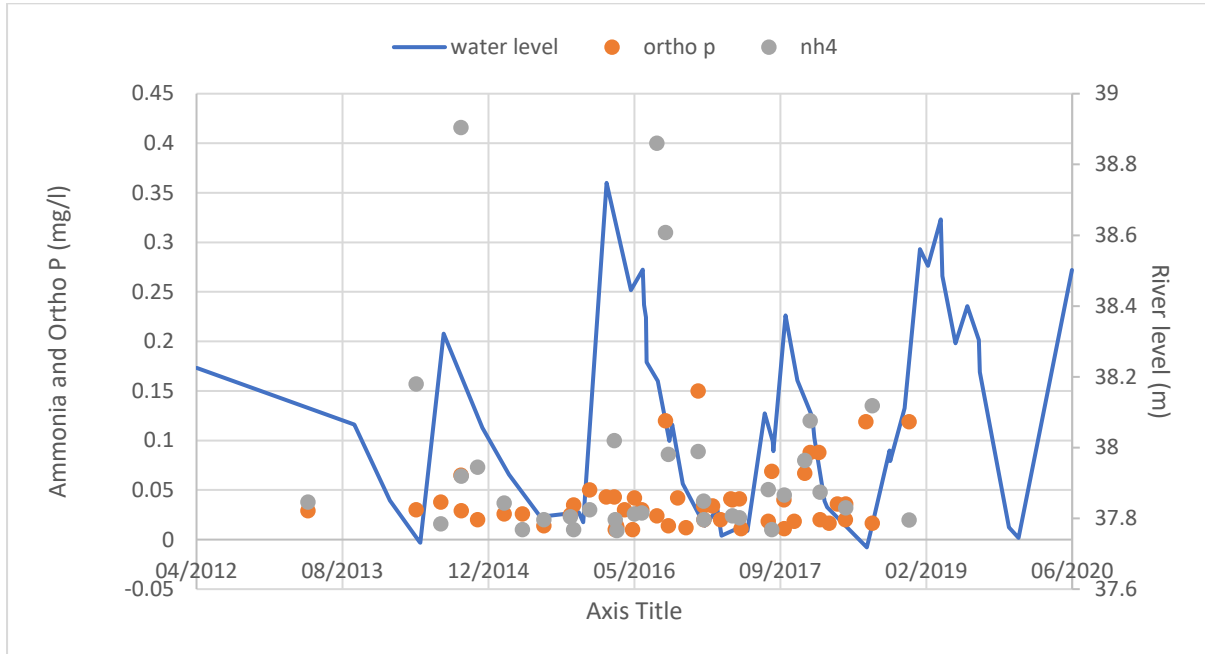


Figure 2-8: Water level data for Awbeg river, graphed with orthophosphate and ammonia results

2.4 Summary of Issues

Awbeg (Buttevant)(West)_010

Biological status has been poor on this waterbody since 2015. There are no chemistry data available but agriculture has been listed as the significant pressure and land use and soil type indicate that the significant issues may be phosphate and sediment. Also, PIP maps show areas of high surface P risk upstream of the EPA monitoring point. Liscarroll wastewater treatment plant (CoA) also needs to be assessed as a potential point source of phosphate and other nutrients.

Awbeg (Buttevant)(West)_020

Biological results for the monitoring point on this waterbody have been consistently Q3 (poor status) since 2012. Chemistry data indicate that nutrients may be the significant issue here; annual average ammonia and orthophosphate results exceeded the relevant EQS in 2014, 2016 and 2018. Significant spikes were recorded in both orthophosphate and ammonia in these three years, apparently unconnected with river flows. This is tentatively indicative of point source pollution and/or groundwater contribution. Annual average TON levels have also exceeded recommended limits since 2013. Nutrient pathways for diffuse pollution include both surface pathways for phosphate (see figure 9-1) and groundwater pathways for nitrate and (point source) phosphate. Land use maps indicate that sediment may also be an issue in this waterbody.

3 Significant pressures

3.1 Initial EPA characterisation

Table 3-1: Initial EPA characterisation

Waterbody Name	ID	Category	Sub Category	Name	Significant	Pressure & Impact details
AWBEG (BUTTEVANT) (WEST)_010	WBP0005725	Agriculture	Agriculture	n/a	Yes	Organic Pollution
AWBEG (BUTTEVANT) (WEST)_020	WBP0005726	Agriculture	Agriculture	n/a	No	
	WBP0006204	Forestry	Forestry	n/a	No	
	WBP0006205	Hydromorphology	Channelisation	n/a	Yes	Altered habitat due to Hydrological changes, Altered habitat due to Morphological changes

Source: EPA 2018

3.2 Conclusions on the Significant Pressures and Issues

Awbeg (Buttevant) (West)_010

The WFD app lists agriculture as the sole significant pressure on Awbeg (Buttevant) (West)_010. The Liscarroll CoA will also need to be assessed for possible impact to receiving waters; the EPA biologist noted that “Liscarroll COA is operating under capacity, but biology was poor in previous cycles and receiving waterbody has deteriorated to poor status”.

As there are no water chemistry data available, it is difficult to know which pollutant is impacting the invertebrates here. Corine land use, soil type and phosphate PIP maps indicate that the significant issues may be phosphate and sediment loss to surface waters. Also, it is worth noting that orthophosphate levels at the downstream monitoring station on Awbeg (Buttevant)(West)_020 are periodically elevated.

Awbeg (Buttevant)(West)_020

Initial characterisation information from the WFD App lists hydromorphology (channelisation) as the significant pressure on Awbeg (Buttevant)(West)_020. However, nutrient monitoring results and land use and PIP maps indicate that agriculture may also be a significant pressure here.

4 Pathways Information (diffuse pollution)

4.1 Conceptual Model Development

The conceptual model is based largely on a combination of aquifer type, groundwater vulnerability, soil type, PIP maps (and susceptibility maps). The inputs from larger point sources also need to be assessed in the LCA process. Available results indicate that phosphorus is the significant issue in the PAA. Flow paths for pollutant transfer are likely to be via diffuse overland flow and land drains with possible contribution from small point sources.

In terms of pathways for diffuse pollution, the PAA has been divided into two compartments: Compartment 1 corresponds to the unproductive aquifers (Rathmore West and Rathnacally Groundwater Bodies). Compartment 2 corresponds to the productive (Rkd) aquifer (Mitchelstown Groundwater Body). The conceptual model is shown in figure 4.1 below with details provided in table 4.1

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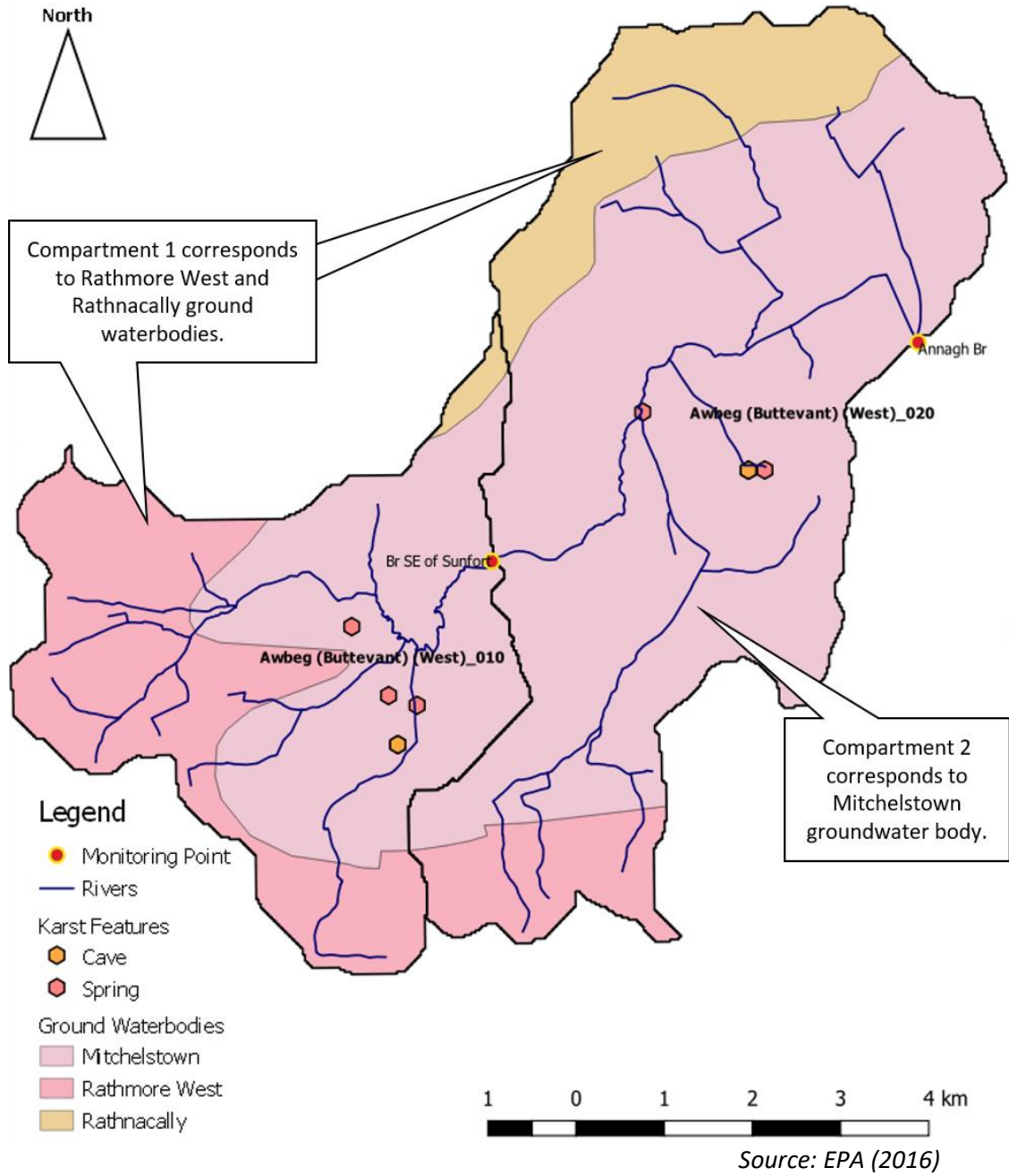


Figure 4-1: Conceptual Model

Compartment 1 corresponds to two unproductive/poorly productive aquifers (Rathmore West and Rathnacally groundwater bodies). Most of the area is covered by deep poorly draining soils. The main nutrient flow paths are diffuse overland flow of phosphate. The surface P PIP map (see figure 9.1) shows areas of very high risk for surface phosphate loss in this compartment and these areas should be the focus for stream walks in assessing phosphate loadings. Note that there are a few areas of well-draining soil in compartment 1, corresponding to the surface NO₃ PIP map but these are not likely to be significant in terms of either nitrate or phosphate loss.

Compartment 2 corresponds to a regionally important karstified aquifer (Rkd, Mitchelstown Groundwater Body). The well-draining soils overlying this aquifer are high risk areas for nitrate movement via groundwater flowpaths. Areas of thin soils, extreme groundwater vulnerability or where karst features exist, are also risk areas for point source phosphate loss via groundwater flowpaths.

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Table 4-1: Conceptual model

	Compartment 1	Compartment 2
Location	This compartment corresponds to Rathmore West and Rathnacally groundwater bodies.	This compartment corresponds to Mitchelstown groundwater body.
Direct	Liscarroll COA	
Topography Map Aerial imagery	Upland	low-lying
Soil type	AminPD, (deep poorly drained soils), AminDW (deep well drained soils), AminSW (shallow well drained soils), AlluvMIN (Mineral alluvium)	AminPD, (deep poorly drained soils), AminDW (deep well drained soils), AlluvMIN (Mineral alluvium), BminSW (shallow well drained soils), AminPDPT (Poorly drained soils with peaty topsoil)
Subsoil type	TNSSs (Namurian Shales and sandstones till), RckNca (Bedrock at surface-Non calcareous), A (Alluvium undifferentiated)	TNSSs (Namurian Shales and sandstones till), RckCa (Bedrock at surface-Calcareous), A (Alluvium undifferentiated), Made
Subsoil permeability	Subsoil less than 3 metres in Rathnacally groundwater body, mostly low; localised areas of subsoil less than 3 metres in Rathmore West groundwater body	Mostly moderate; localised areas of low and subsoil less than 3 metres
Soil drainage	Mostly poorly drained; some well drained areas	Mostly well drained; some poorly drained
Gwb	Rathmore West and Rathnacally	Mitchelstown
Gwb flowpath	Flow occurs along fractures, joints and major faults. Flows in the aquifer are generally concentrated in a thin zone at the top of the rock, although deeper groundwater flows along faults and major fractures. The water table can vary between a few metres up to more than 10 m below ground surface, depending upon topography. Groundwater is generally unconfined. Flow path lengths are generally short, ranging 30-300 m.	Groundwater flows through the many faults and joints formed by deformation that were subsequently enlarged by karstification. Most groundwater flow occurs in an upper shallow highly karstified weathered zone of a few metres thick in which groundwater moves quickly in rapid response to recharge. Below this is a deeper zone where there are two components to groundwater flow. Groundwater flows through interconnected, solutionally enlarged conduits and cave systems that are controlled by structural deformation. Groundwater flow paths can be up to several kilometres long, but may be significantly shorter in areas where the water table is very close to the surface. Overall groundwater flow is away from the surrounding uplands to the main rivers draining the valleys. Recharge to this groundwater body is both point and diffuse. The uplands surrounding this groundwater body provide runoff which supplies recharge to the limestone aquifer in the valley. Swallow holes, collapse features and sinking streams provide the means for point recharge to the karstified aquifer. Diffuse recharge will occur over the entire groundwater body via rainfall percolating through the subsoil. The lack of surface drainage in much of this groundwater body indicates that potential recharge readily percolates into the groundwater system. There is a high degree of interaction between surface water and groundwater in this groundwater body.
Bedrock unit	Namurian Undifferentiated, Namurian Shales, Namurian Sandstones	Dinantian Upper Impure Limestones, Dinantian Pure Unbedded Limestones, Dinantian Pure Bedded Limestones

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Aquifer type	LI (Locally important bedrock aquifers which are moderately productive only in local zones), PU (Generally unproductive bedrock)	Rkd (Regionally important karstified aquifer), LI (Locally important bedrock aquifers which are moderately productive only in local zones)
Groundwater vulnerability	Extreme in Rathnacally groundwater body, mostly low, moderate; localised areas of high and extreme in Rathmore West	Mostly low and moderate; some areas of high and extreme
Karst features		Caves and springs
PO4 susceptibility (surface)	Very High in Rathnacally groundwater body, Rathmore West groundwater body is generally low and moderate. Locally very high.	Mainly very low and low. Locally high on poorly drained soils and along alluvial river channels
NO3 susceptibility (sub surface)	Mainly very low	Mainly very low/low/moderate. Locally high on outcrops
NO3 susceptibility (surface)	Mainly low. Locally high on outcrops	Mainly low/moderate. Locally high on outcrops
Po4 PIP (Surface water)	Very high/high in Rathnacally groundwater body, Rathmore West groundwater body is generally low and moderate. Locally very high.	Mainly very low and low. Locally very high/high on poorly drained soils and along alluvial river channels
NO3 PIP (ground water)	Mainly very low	Mainly very low/low/moderate. Locally high on outcrops
NO3 PIP (Surface water)	Mainly low. Locally high on outcrops	Mainly low/moderate. Locally high on outcrops
Likely main pathway(s)	Mainly surface runoff. Some shallow groundwater in weathered and fractured zones Some recharge via outcrops. Overland flow and drains where poorly draining soils and subsoils.	Swallow holes and caves receive surface water, and groundwater is discharged to surface as springs or as baseflow to rivers crossing the groundwater body. Overland flow and drains where poorly draining soils and subsoils.

From Desk Studies for Areas for Action, EPA Recommendations. Version 3, January 2019

5 Interim conclusions on the PAA based on the desk study

Awbeg (Buttevant) (West)_010

- Awbeg (Buttevant) (West)_010 is a good WFD status objective site, currently at poor ecological status and categorised as *At Risk*.
- Biological status for the WFD operational monitoring point on the waterbody deteriorated from good (Q4) to poor (Q3) in 2015.
- As there are no water chemistry data available, it is difficult to conclude on the pollutant which is impacting on water quality here but land use, soil type and phosphate PIP maps indicate that the significant issues may be orthophosphate and possibly sediment.
- The EPA App characterises the sole significant pressure as agriculture on Awbeg (Buttevant) (West)_010. However, Liscarroll wastewater treatment plant also needs to be assessed as a possible point source of nutrient/organic pollution.
- There are areas of pasture on alluvium and poorly drained soils in the catchment, carrying the risk of phosphate loss to surface waters with the surface phosphate PIP map indicating very high/high risk areas for diffuse phosphate pathways upstream of the EPA monitoring point. These areas will be the focus for local catchment assessment.

Awbeg (Buttevant) (West)_020

- Awbeg (Buttevant) (West)_020 is a good WFD status objective site, currently at poor ecological status and categorised as *At Risk*.
- Biological status for the monitoring point has been consistently poor (Q3) since 2012.
- Chemistry data indicate that nutrients are the significant issue in this waterbody but landuse maps and the presence of hydromorphology pressures indicate that sediment may also be an issue.
- The EPA App characterises the sole significant pressure as hydromorphology but the elevated nutrient levels indicate that other significant pressures may also exist.
- Annual average ammonia and orthophosphate results exceeded the mean EQS for Good Status waters in 2014, 2016 and 2018 and significant spikes were recorded in orthophosphate and ammonia levels in these three years. These spikes do not appear to be linked to periods of high rainfall/river flow. TON levels consistently exceed recommended limits.
- Nutrient pathways include surface pathways for phosphate and groundwater pathways for nitrate and (point source) phosphate.
- There are areas of pasture on alluvium and poorly draining soils in the catchment, carrying the risk of phosphate and sediment loss to surface waters; the surface phosphate PIP map indicates very high/high risk areas for diffuse phosphate loss (and sediment pathways).
- The high PIP areas upstream of the EPA monitoring point will be the focus for assessment of diffuse phosphate pathways.
- Areas of extreme x groundwater vulnerability overlying the Rkd aquifer will be the focus for potential point sources of phosphate.
- Pathways for diffuse nitrate pollution arise in the well-draining soils overlying the Rkd aquifer.

6 Workplan

6.1 EPA further characterisation actions

Table 6-1: EPA further characterisation actions

WB Name	Id	Action	Responsible Organisation	Further Characterisation Action details
Awbeg (Buttevant) (West)_010	FC002881	IA7 Multiple Sources in Multiple Areas	Cork County Council	Focus on point sources from agriculture.
Awbeg (Buttevant) (West)_020	FC002882	IA7 Multiple Sources in Multiple Areas	Cork County Council	Focus on point and diffuse sources of sediment (forestry) and nutrients (agriculture). Liaise with the EPA in relation to hydromorphology.

The estimated resource for this local catchment assessment is 60 days.

6.2 Additional Information Requirements

- Talk to Cork County Council for information on identified pressures including agricultural, forestry and hydromorphology.
- Talk to local forest service regarding woodland management practices.
- Check for updates on Q values from EPA for all WFD monitoring points.

6.3 Local Catchment Assessment

Field investigations to be undertaken at the following locations as outlined below and as shown on figures 6.1 and 6.2. The focus is on phosphate, ammonia and/or sediment loadings in Awbeg (Buttevant) (West)_010 and elevated phosphate, ammonia and/or sediment loadings in Awbeg (Buttevant) (West)_020. Identification of tributary streams contributing possible phosphate, ammonia and/or sediment loadings will help to focus the work of ASSAP in this PAA.

Awbeg (Buttevant) (West)_010

- Start at point 1 monitoring site for this waterbody Br SE of Sunfort, RS18A090300. Carry out a SSIS assessment and take samples for ammonia, orthophosphate and total oxidised nitrogen at this monitoring point.
- Take note of point sources of sediment from land drainage and/or forestry. Assess siltation upstream and downstream of any point sources. The results of this will inform if agriculture, land drainage and/or forestry is causing siltation at Br SE of Sunfort, RS18A090300.
- Undertake SSIS upstream and downstream of the Lisscarroll UWW (point 2). Also take sample for ammonia, ortho-Phosphate and total oxidised nitrogen here.
- If biological status at point 2 is less than good, follow up with SSIS assessments at points 3. If the condition of point 3 is less than good, undertake SSIS assessments at point 4.

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- Undertake SSIS at point 5. If the condition of point 5 is less than good, undertake SSIS assessments at points 6 and 7.
- Undertake SSIS at points 8 and 9. If the condition of point 9 is less than good, undertake SSIS assessment at point 10. If the biological status of point 10 is less than good upstream, undertake SSIS assessments at points 11, 12 and 13. If the condition of point 12 is less than good, undertake SSIS assessment at point 14. Also, if the condition of point 11 is less than good, undertake SSIS assessment at point 15 and 16.

Awbeg (Buttevant) (West)_020

- Start at point 1 monitoring site for this waterbody at Annagh Br, RS18A090400.
- Take note of point sources of sediment from land drainage and/or forestry. Assess siltation upstream and downstream of any point sources. The results of this will inform if agriculture, land drainage and/or forestry is causing siltation at Annagh Br, RS18A090400.
- If biological status at point 1 is less than good, follow up with SSIS assessments at points 2-5. If the condition of point 5 is less than good, undertake SSIS assessment at points 6 and 7. If the biological status of point 7 is less than good upstream, undertake SSIS assessments at points 8 and 9.
- Undertake SSIS at point 10.
- Undertake SSIS assessment at points 11 and 12. If the biological status of point 12 is less than good upstream, undertake SSIS assessments at point 13. If the condition of point 13 is less than good, undertake SSIS assessment at point 14. If the biological status of point 14 is less than good upstream, undertake SSIS assessments at points 15, 16 and 17.

The initial information gathered by the local catchment assessment team will be updated to the desk study and focus efforts in the key areas to perform stream walks and targeted assessments. After carrying out SSIS assessments will rule tributaries in and out. Based on SSIS results, focus on chemistry on impacted tributaries. Carry out chemistry sampling on significant springs because of potential groundwater pathways. Also assess chemistry at the monitoring sites for comparison with the rest of the catchment. When significant issue(s) are identified, appropriate mitigation measures will be discussed and referred to the relevant agency.

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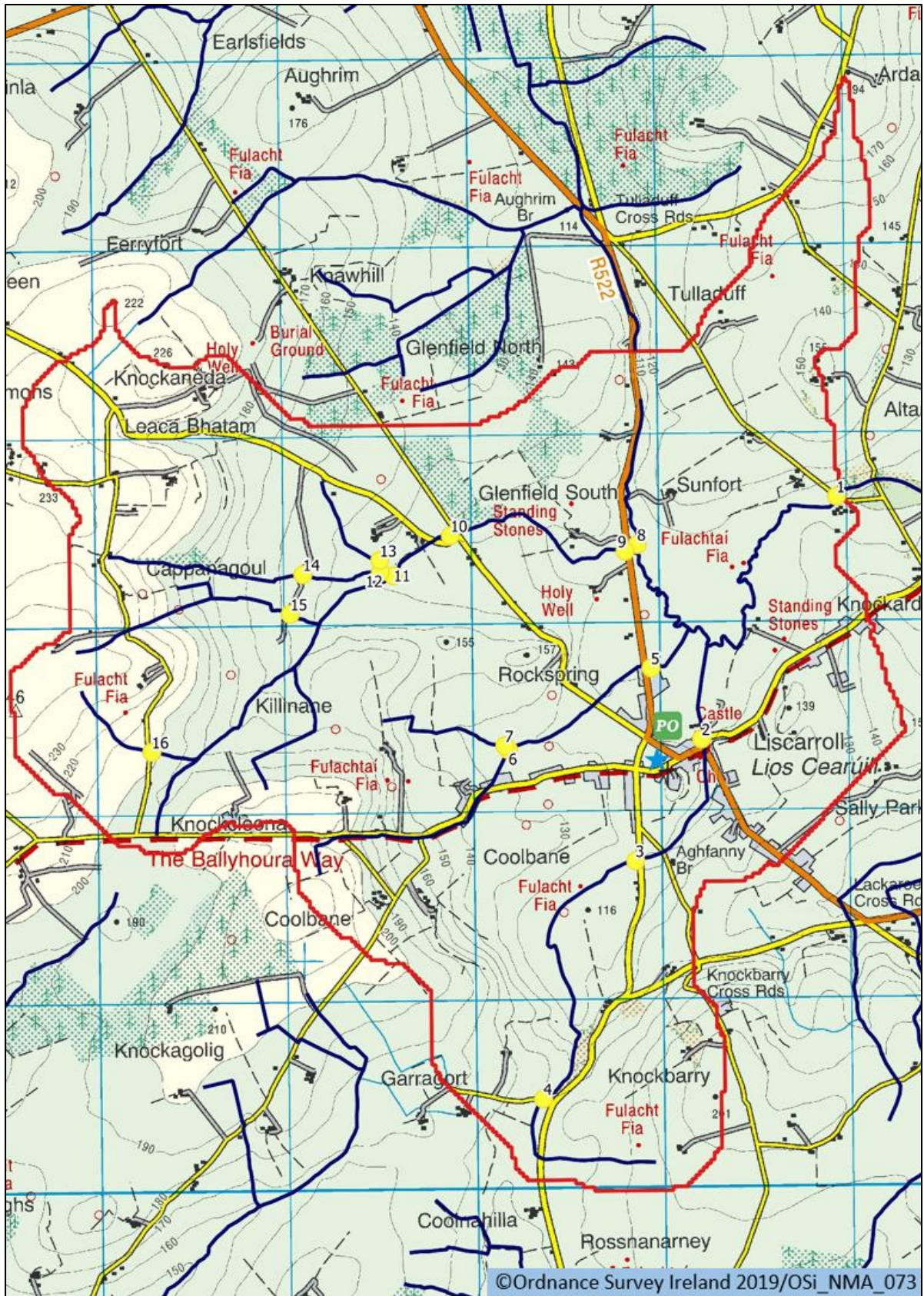


Figure 6-1: Sample locations for Awbeg (Buttevant) (West)_010

Awbeg (Buttevant) (West) Priority Area for Action Desk Study

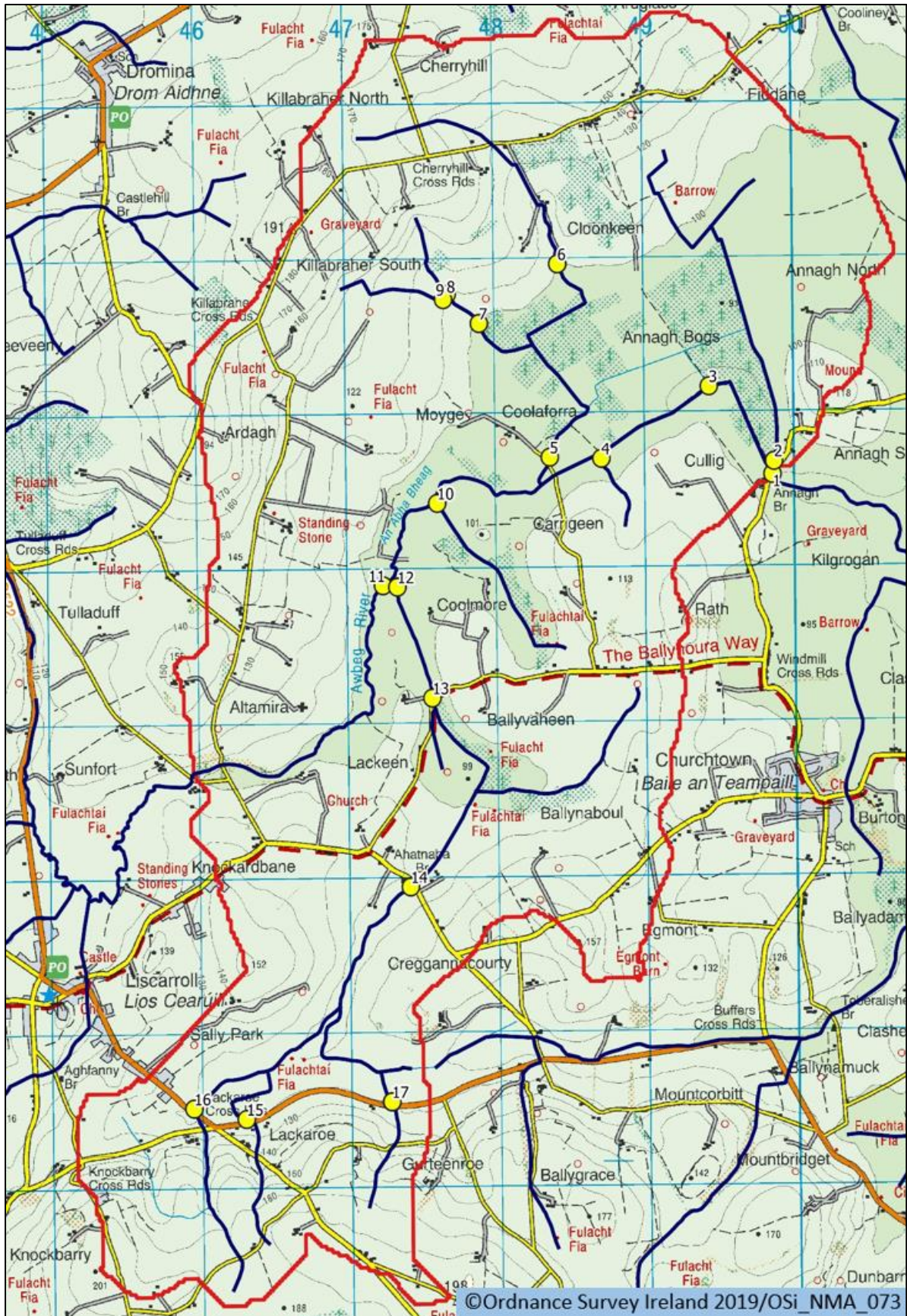


Figure 6-2: Sample locations for Awbeg (Buttevant) (West)_020

7 Review of possible mitigation options

According to the WFD app initial characterisation information, significant pressures include agriculture and hydromorphology. Consideration must be also given to forestry and potential point sources of pollution. In areas of poorly draining soils, measures should be focussed on breaking pathways for sediment and phosphate loss to the river. Source and mobilisation control measures will be needed if nitrate is identified as a significant issue in this PAA.

8 Communications

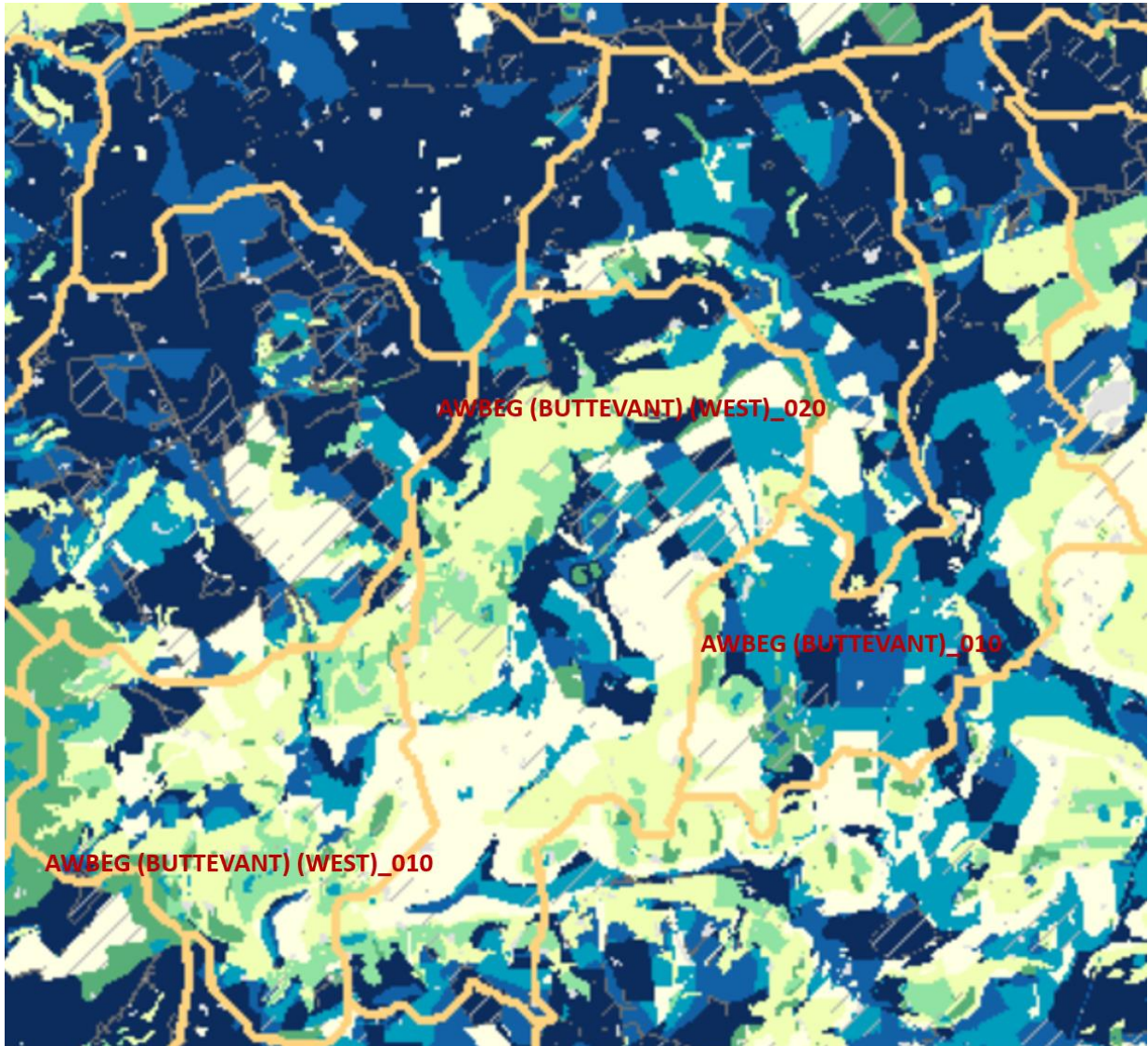
- Public meetings will be required for this PAA.
- According to the initial characterisation significant pressures include agricultural and hydromorphology. Consideration must be also given to forestry. As agriculture is a significant pressure for this catchment farm engagement will be needed. ASSAP will contact local farming community to attend public meeting.

Key messages for this PAA

The Local Authority Waters Catchment Assessment Team is to identify areas in the catchment where significant pressures are occurring and to recommend measures to address these. This will be done by reviewing all the information available and walking the key areas in the catchment. Hydromorphology has been identified as the significant pressure on the Awbeg (Buttevant)(West)_020. Consideration must be also given to agriculture and forestry. Phosphate via overland flow is the main risk to surface waters on poorly drained soils. Forestry and hydromorphology pressures may be causing the sedimentation issues. The lack of surface drainage in much of this PAA indicates that potential recharge readily percolates into the groundwater system. There are many areas of extreme vulnerability within this catchment as well as karst features. Subsoil depths in this PAA are highly variable within short distances. Caves receive surface water, and groundwater is discharged to surface as springs or as baseflow to rivers crossing the groundwater body. Next steps in the catchment assessment will be to undertake SSIS/RA and water quality samples assessments on the Awbeg (Buttevant)(West)_010. Initial assessments have identified the significant pressure from agriculture in this waterbody. If the significant pressure is confirmed to be agriculture, either point source (e.g. farmyards) or diffuse (e.g. slurry spreading), we will need to work with ASSAP and local farmers to address these. Catchment walks in the other sub catchment will most likely involve identifying the significant pressures. In areas of poorly draining soils, measures should be implemented to avoid the loss of phosphate and sediment. This information will then be presented to the local community, landowners, local authorities and other relevant groups, so that solutions can be put in place to improve water quality.

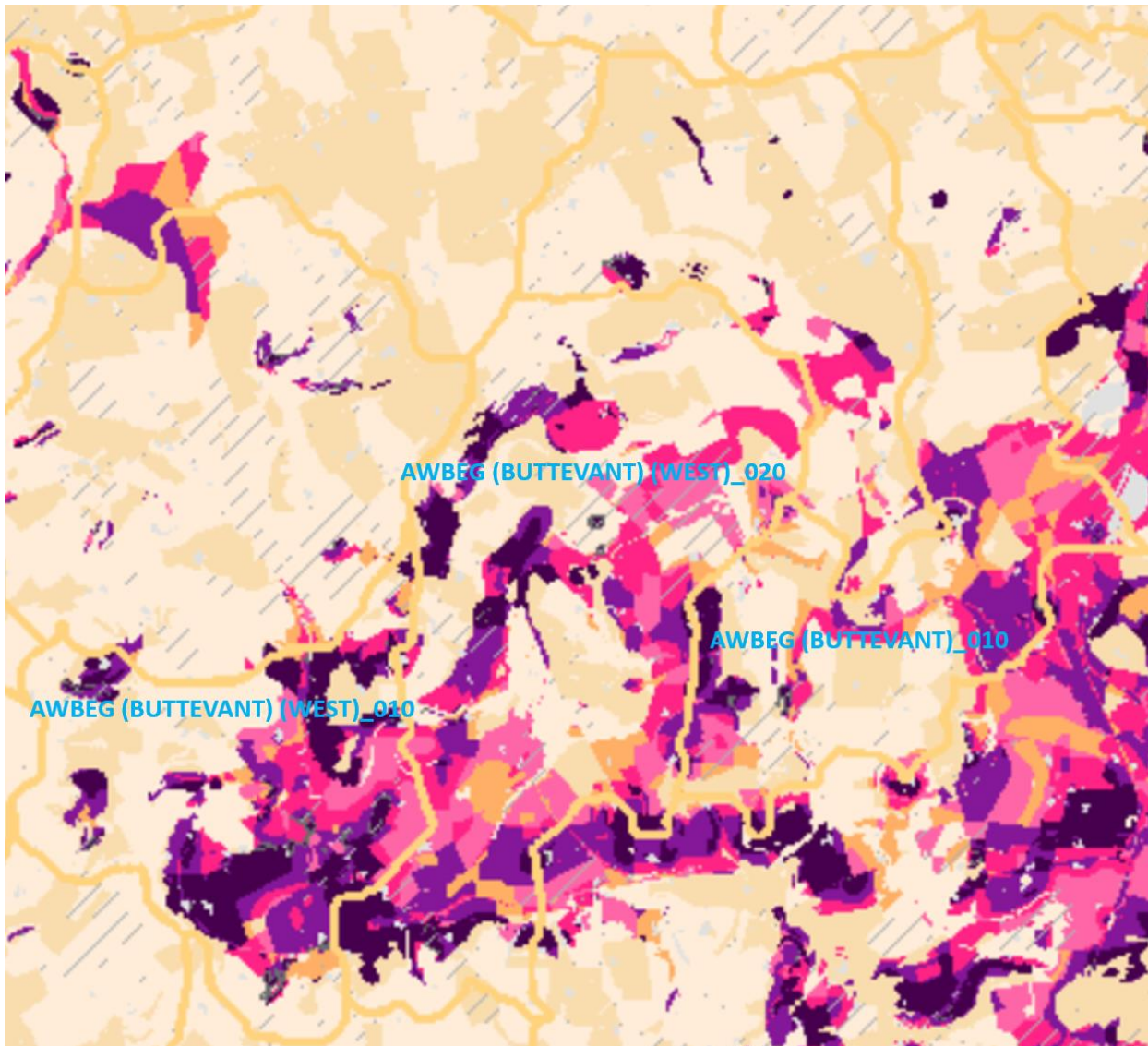
Date of completion of the desk study: 22 March 2019

9 Appendices



Source: EPA (2016)

Figure 9-1: Pollution impact potential: surface water receptor phosphate PIP Map



Source: EPA (2016)

Figure 9-2: Pollution impact potential: surface water receptor nitrate PIP Map

Awbeg (Buttevant) (West) Priority Area for Action Desk Study

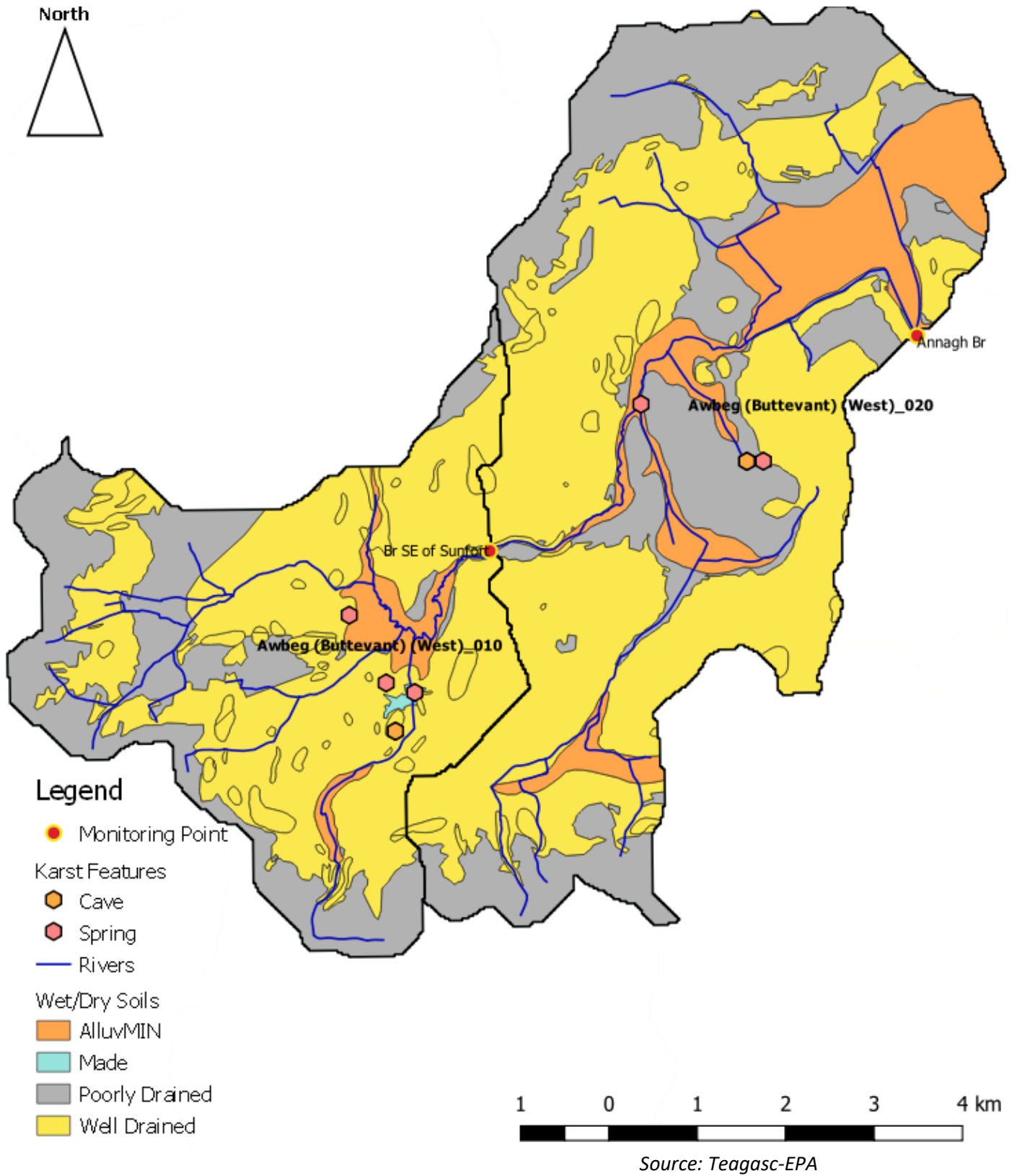


Figure 9-3: Soils Wet/Dry

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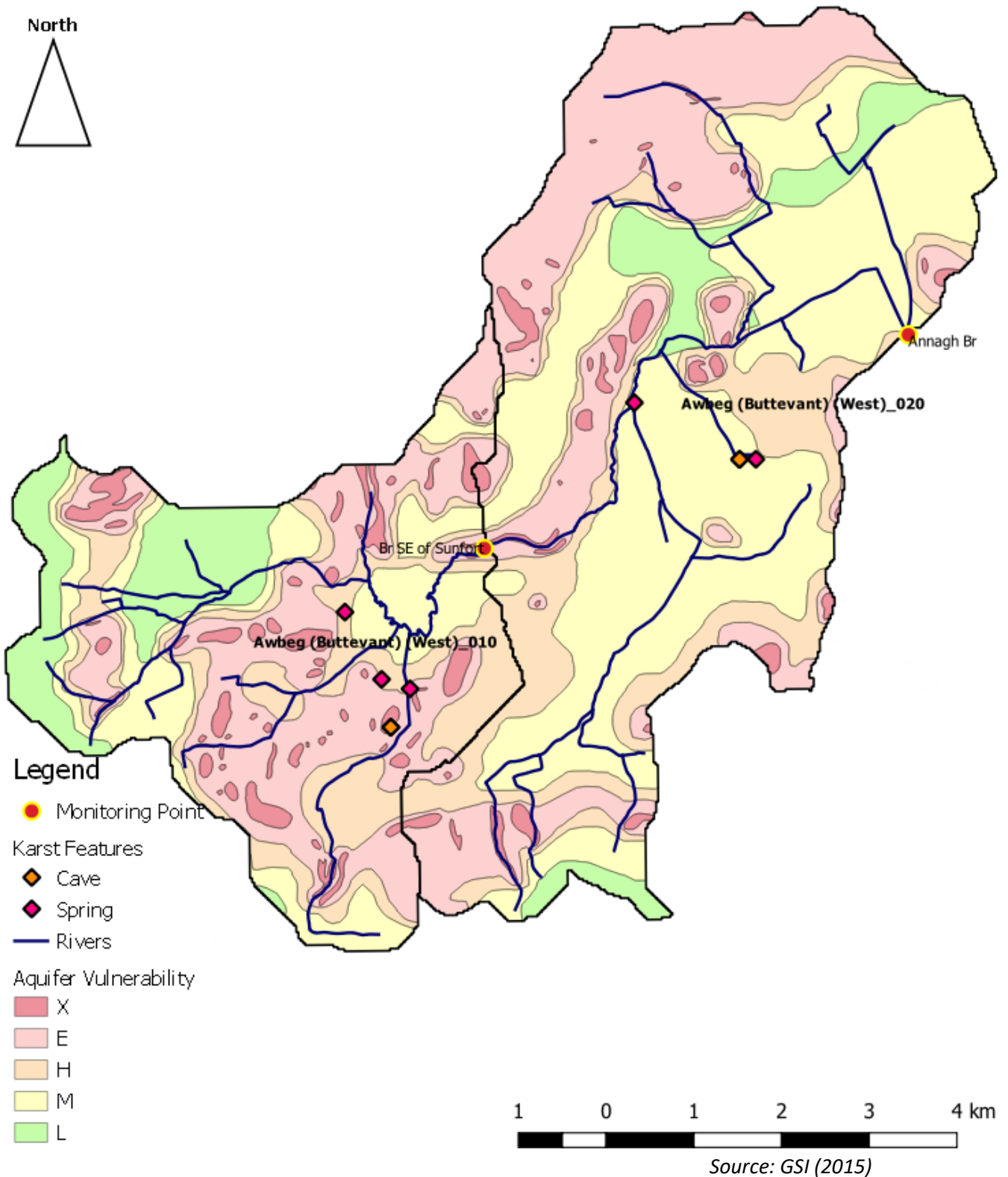


Figure 9-4: Aquifer Vulnerability

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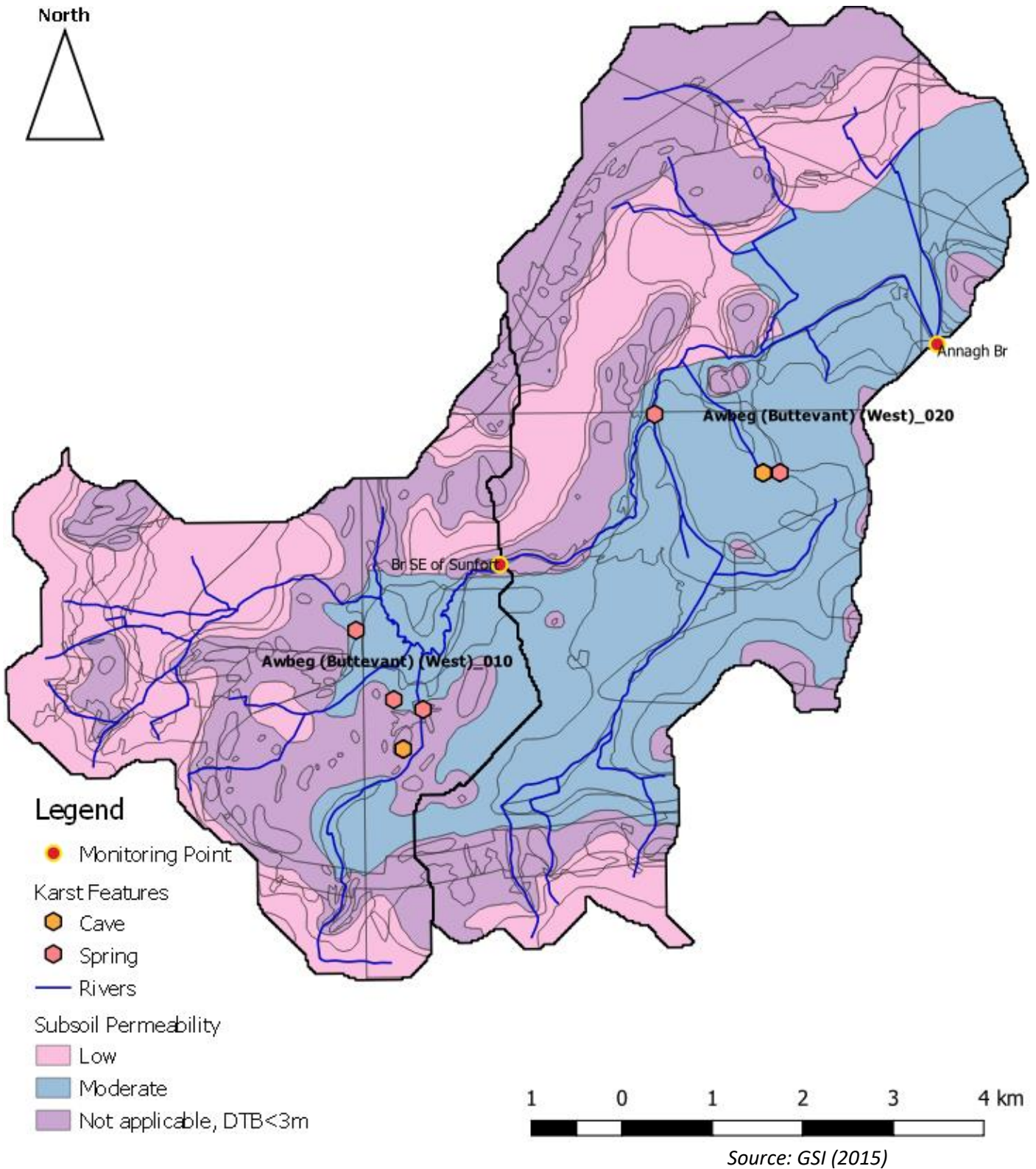


Figure 9-5: Subsoil Permeability

Awbeg (Buttevant) (West) Priority Area for Action Desk Study

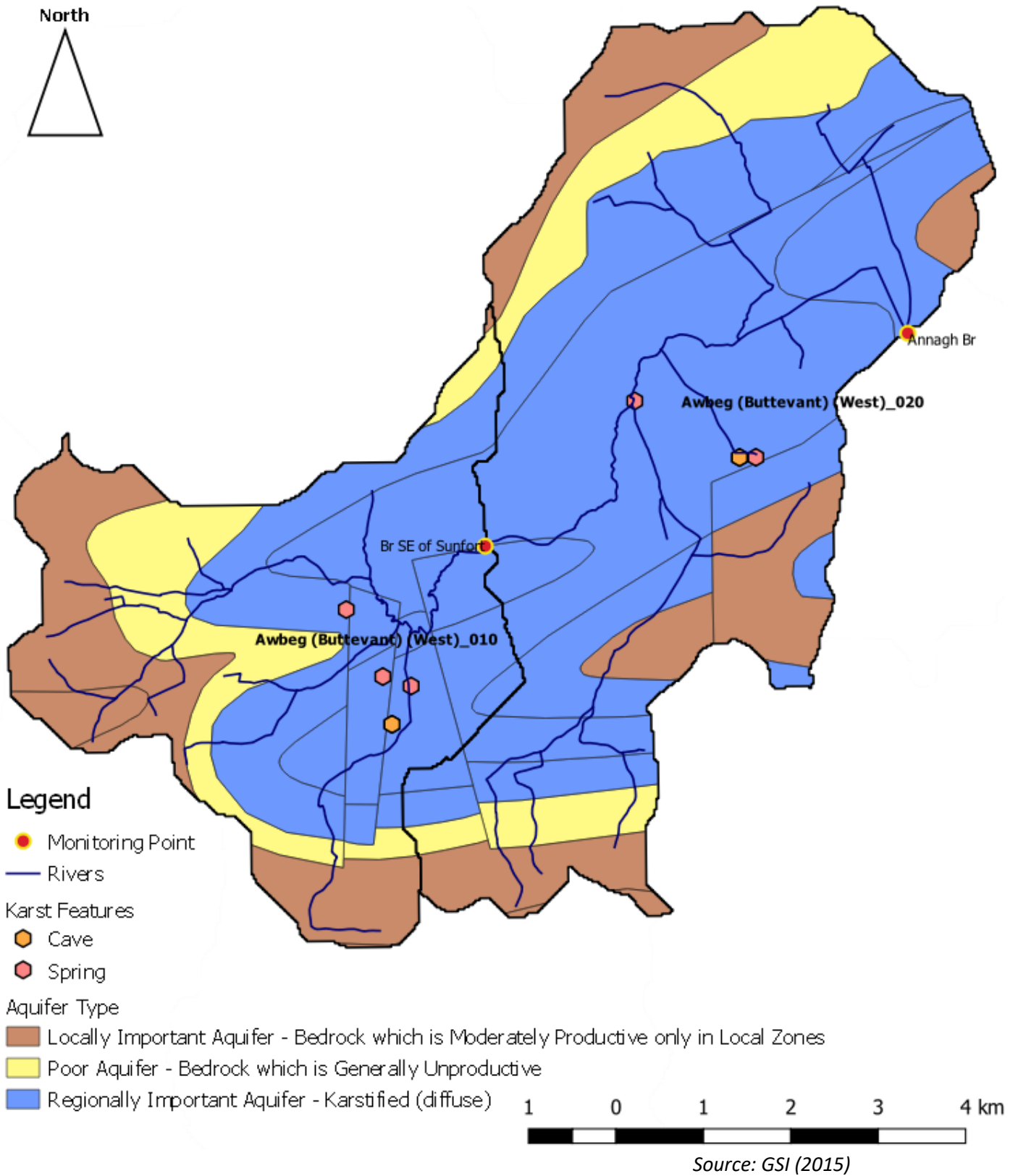


Figure 9-6: Aquifer Type

Awbeg (Buttevant) (West) Priority Area for Action Desk Study

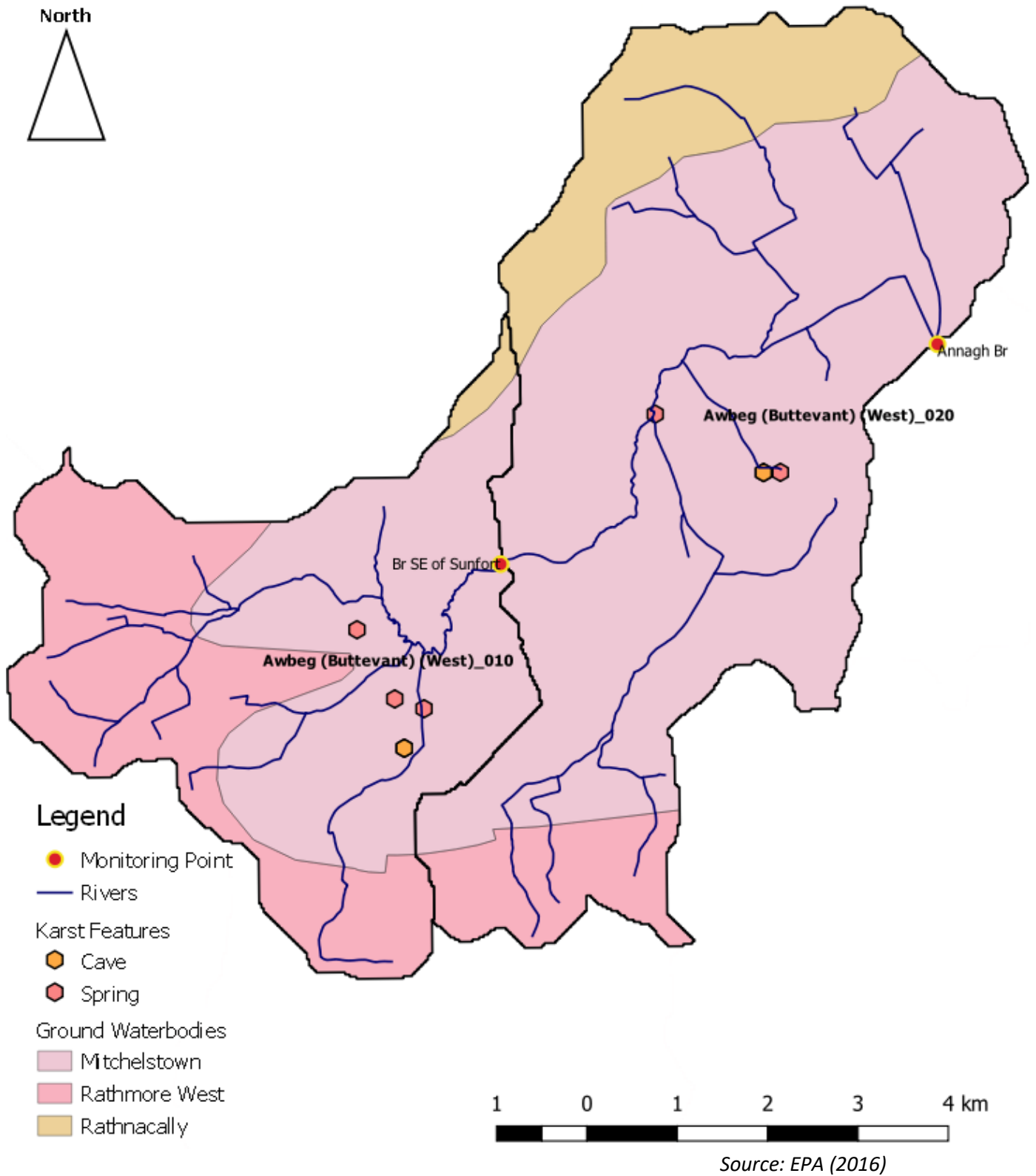


Figure 9-7: Ground Waterbodies

Awbeg (Buttevant) (West) Priority Area for Action Desk Study

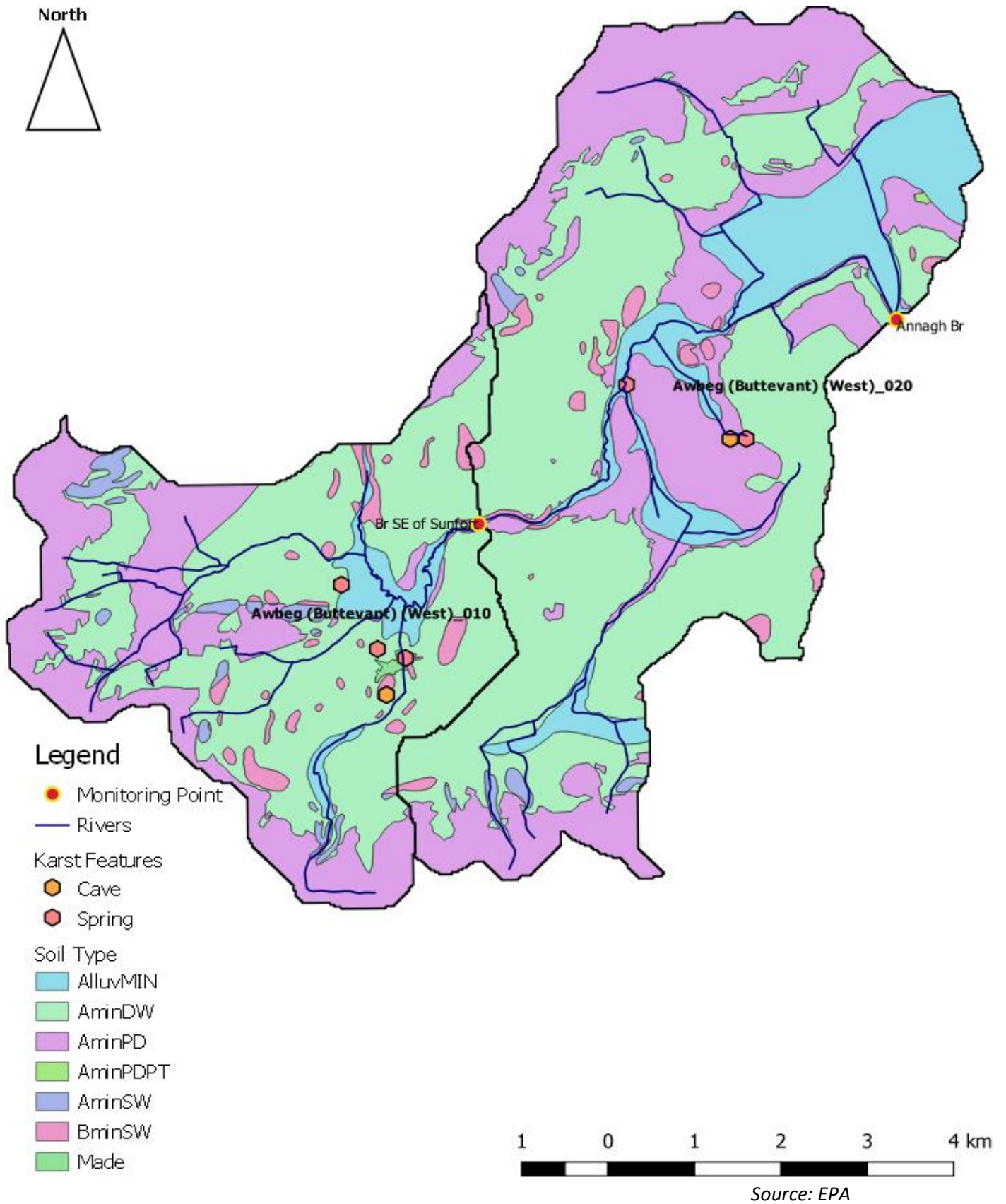


Figure 9-8: Soil Type

Awbeg (Buttevant) (West) Priority Area for Action Desk Study

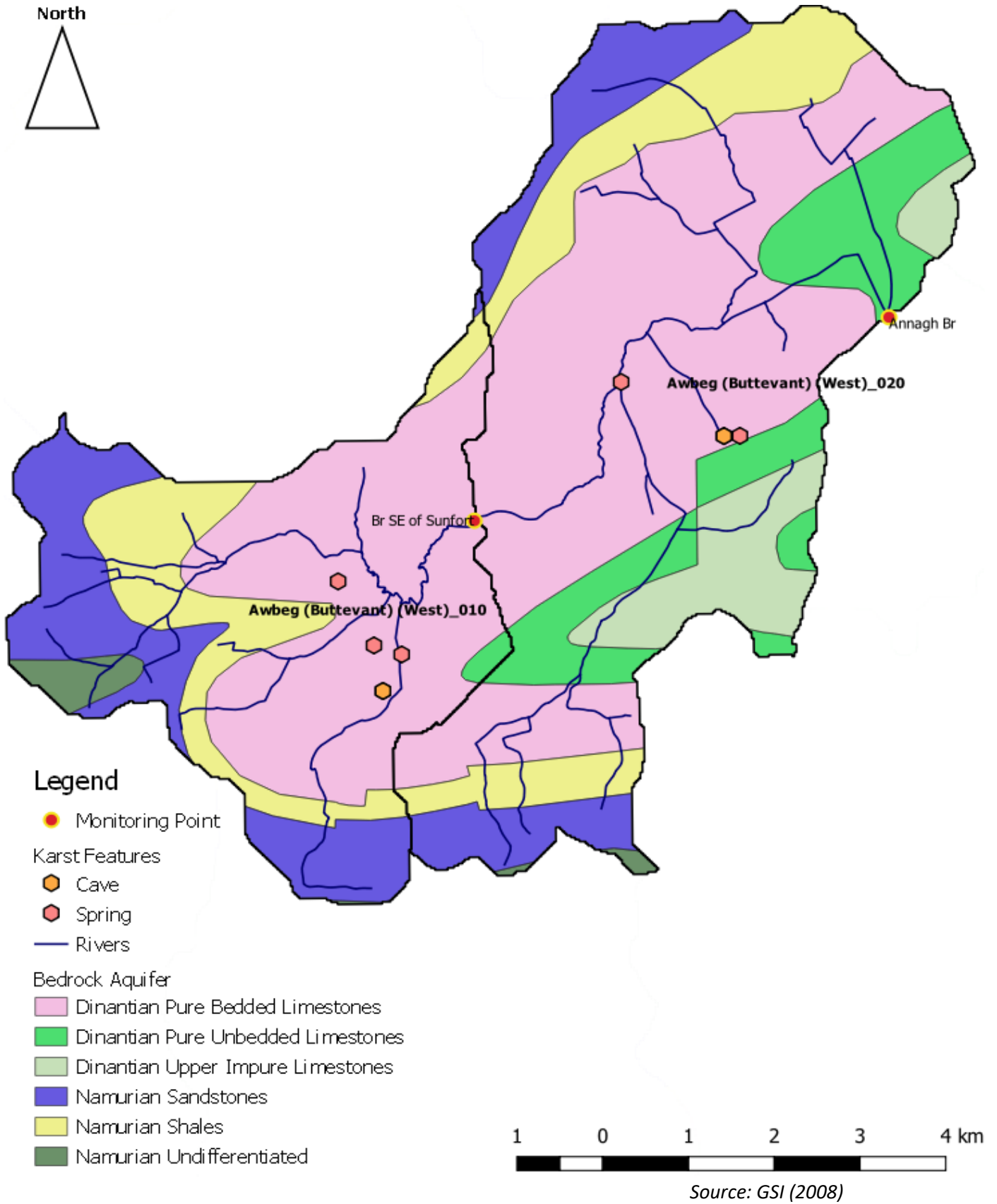
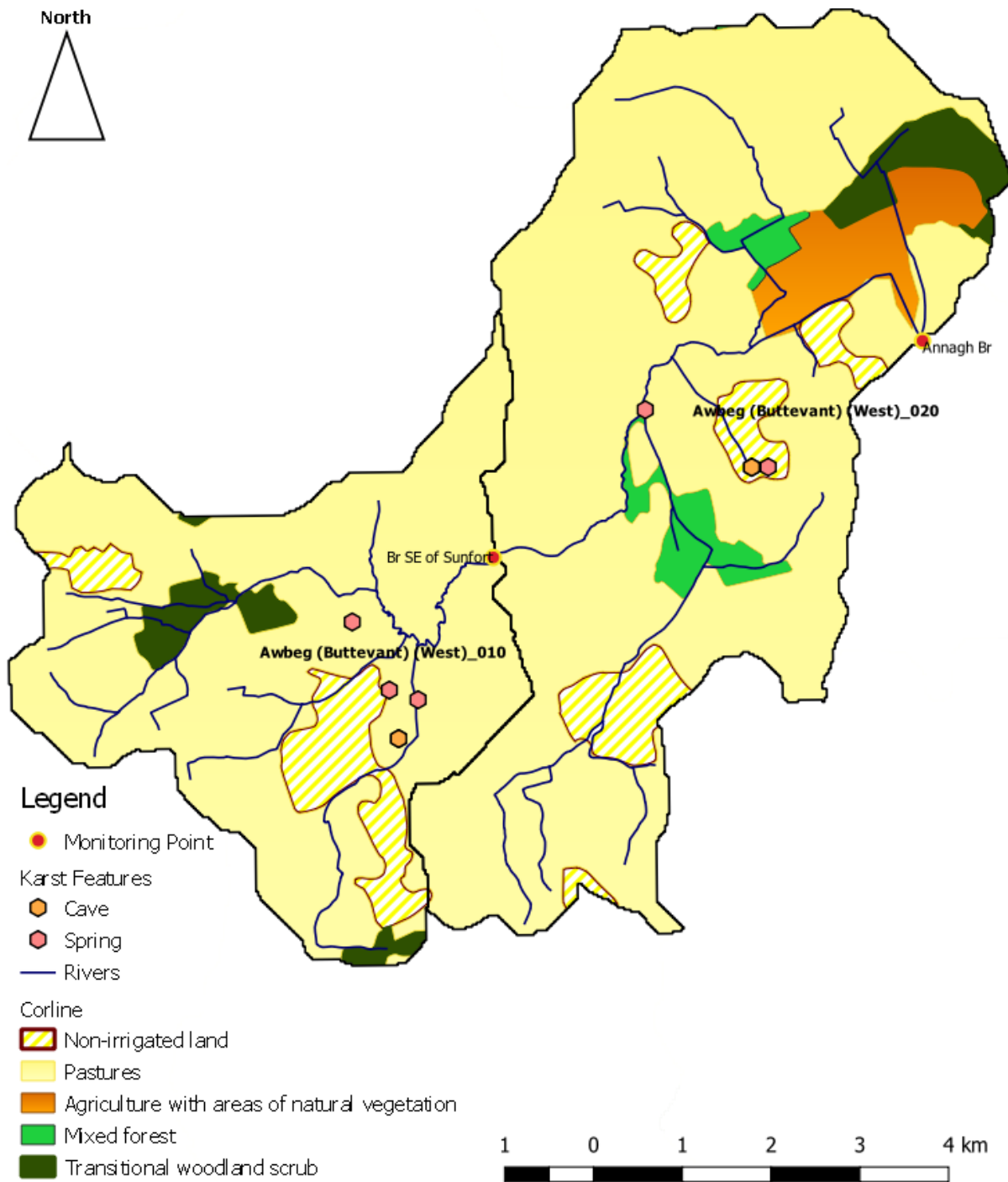


Figure 9-9: Bedrock Aquifer



Source: EPA (2018)

Figure 9-10: Land Use