Templeport PAA Deskstudy

AFA0171 Desk Study Report Version F01

3rd September 2019

(Border Region)

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1. Background

Templeport Lake Stream PAA is located south east of Bawnboy in The Erne catchment and flows into the Blackwater (Newtowngore)_020 catchment which recently dropped from High status (2010-2015) to Good Status (2013-2018). There are 2 waterbodies in the Templeport Lake Stream_010 Priority Area for Action. The Templeport Lake Stream and Bunerky Lough. There is one monitoring station on each waterbody. The Templeport Lake Stream Operational monitoring station RS36T010600 Bridge upstream of Templeport Lake stream is only monitored for Q and the most recent Q value was 3 in 2019, the same as when sampled in 2017 and 2013, it was Q4 in 2010. There are no chemistry results available for the Templeport Lake Stream. The current Ecological Status or Potential SW 2013-2018 of the catchment is *'Poor'*. The Templeport Lake Stream waterbody is currently At Risk and is failing to meet Good status as required by the objectives of the Water Framework Directive.

The biologist's notes for 2017 said, *'There were 0 sensitive mayfly and 0 sensitive stonefly found at the site. This absence of sensitive taxa is most often a key indicator of failure to achieve good ecological status or higher. The results of an examination of key tolerant taxa found: Simuliidae (Common), Gammarus (Dominant) and Baetis rhodani (Few). 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. This site had over 30% of the taxa list comprised by very tolerant taxa.'*

Bunerky Lough is located three kilometres south west of Bawnboy, Co. Cavan in the Erne Catchment. The lake has a surface area of 75ha, mean depth of 4.3m and maximum depth of 10.7m. Bunerky lake has been assigned a *'Moderate'* ecological status for the period 2013-2018. The operational Monitoring station is Midlake LS360012315100010. Bunerky lake is failing for-Macrophytes and Total Phosphorus which are all Moderate. Bunerky lake feeds into Lakefield lough, Bellaboy Lough and Templeport Lough before it joins the Blackwater (Newtowngore)_020 which is currently at Good ecological status (2013-2018) but dropped from High Ecological status in 2010-2015.

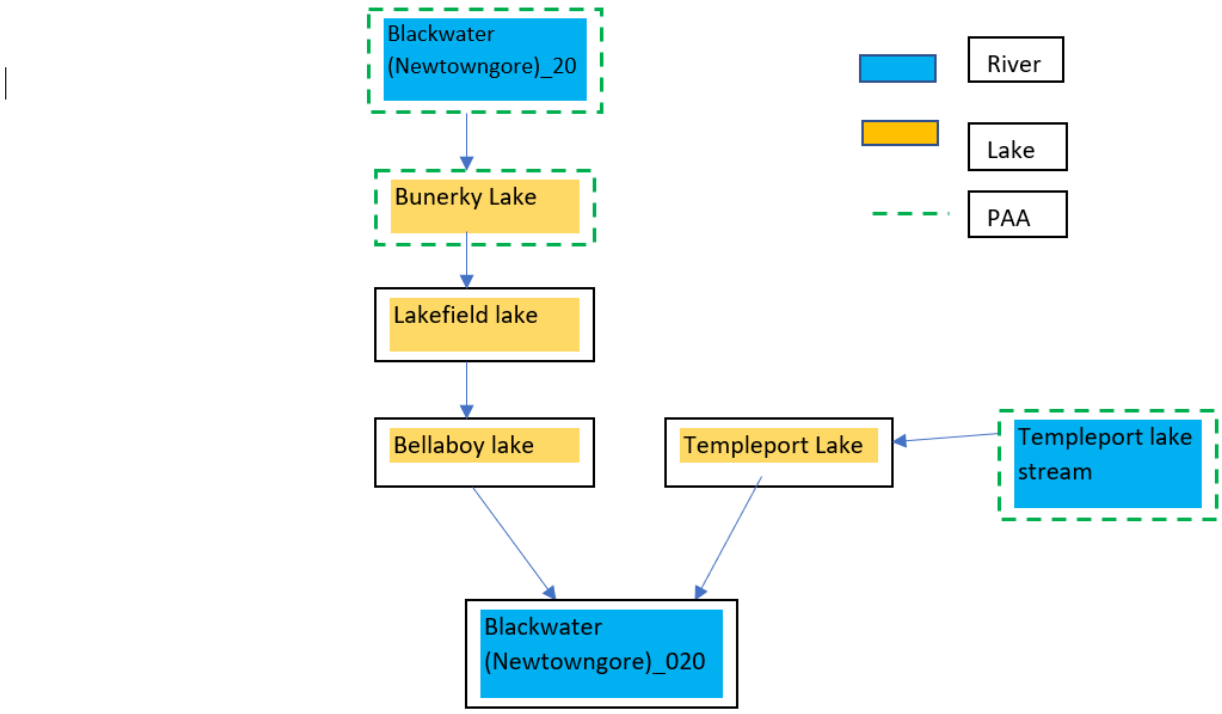


Figure 1 Flowchart of Templeport Lake Stream PAA

Reasons why the Area for Action was chosen:

- Build on recent action by Cavan Co. Council relating to a direct discharge to Templeport Lake Stream.
- Bunerky Lake included as it has similar pressures to the river water body.
- The two water bodies included in the recommended action area are the only water bodies that are less than 'Good' in this subcatchment.
- Improvements in these water bodies may protect the current High status in the Blackwater (Newtowngore)_020 river water body.

EPA characterisation data:

The initial characterisation sub-catchment assessment recommended that the following actions be undertaken: **Templeport Lake Stream** *Focus on sources of nutrients from agriculture. Start at the monitoring station, RS36T010600, walk upstream along the RWB and its associated tributaries. Identify point (drains, discharge pipes, farmyards, cattle access) and diffuse (inadequate buffer strips) sources of nutrients. Collect field parameters (DO, pH, temperature and conductivity). Use results to guide the selection of water quality and SSRS in order to identify critical source areas for nutrient*

Bunerky *Lough* *IA9 Focus on sources of nutrients from agriculture around the lake and on the tributaries feeding into the lake. Identify point (drains, discharge pipes, farmyards, cattle access) and diffuse (inadequate buffer strips) sources of nutrients. Collect field parameters (DO, pH, temperature, and conductivity). Use results to guide the selection of water quality and SSRS in order to identify critical source areas for nutrients.*

Information available:

- EPA Characterisation data
- Cavan Co Council
- Newtown Ballyconnell GWB: Summary of Initial Characterisation: GSI

Table 1 Summary of waterbodies within the Templeport PAA

WB Code	WB Name	WFD Risk	Status Obj.	Status				Bio 19	Pressure Category	Pressure Subcat.	Impact	Sig. Pressure	AA
				07-09	10-12	10-15	13-18						
IE_NW_36T010600	Templeport Lake Stream_010	*At Risk*	Good 2027	Unassigned	MES	PES	PES	Q3	Agriculture	Pasture	Nutrient pollution	Yes	Yes
IE_NW_36_624	Bunerky Lough	*At Risk*	Good 2027	MES	MES	MES	MES		Agriculture	Agriculture	Nutrient pollution	Yes	Yes
									Invasive species	Invasive species	Other signs of impacts	Yes	
IE_NW_36B040400	BLACKWATER (NEWTOWNGORE) _020	*Not at Risk*	Good	MES	GES	HES	GES	Q4					No

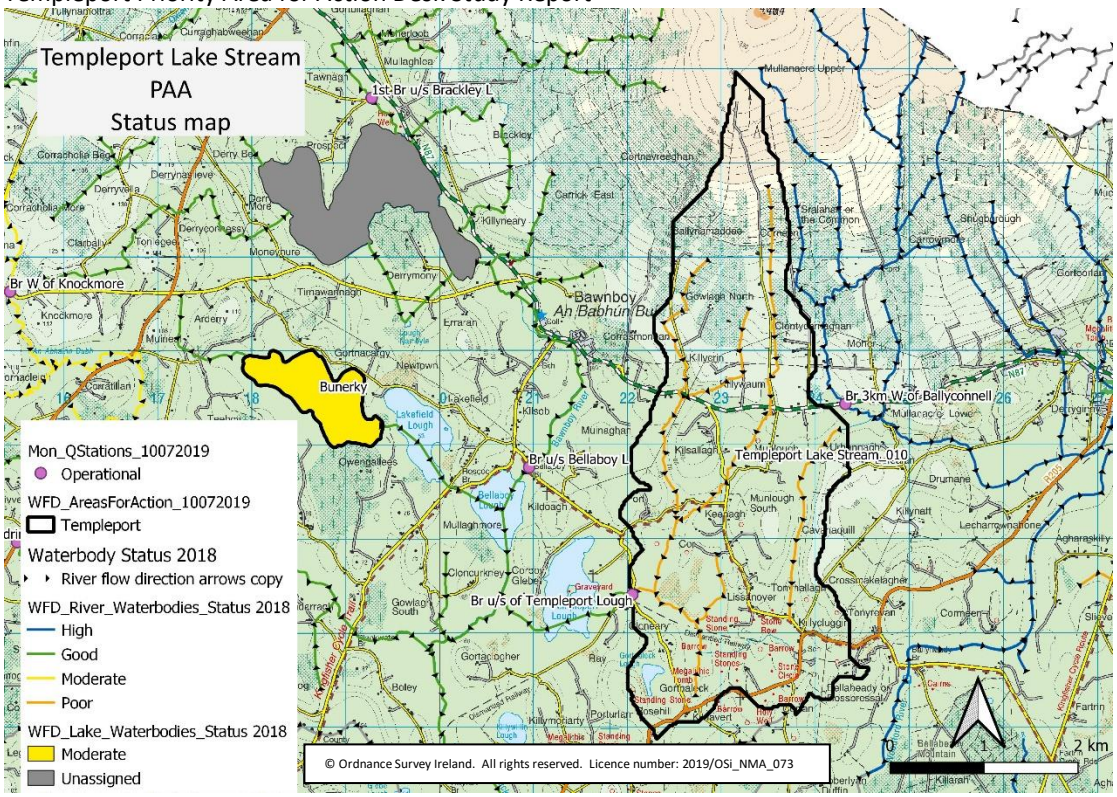


Figure 2 Location and Status of waterbodies within the PAA

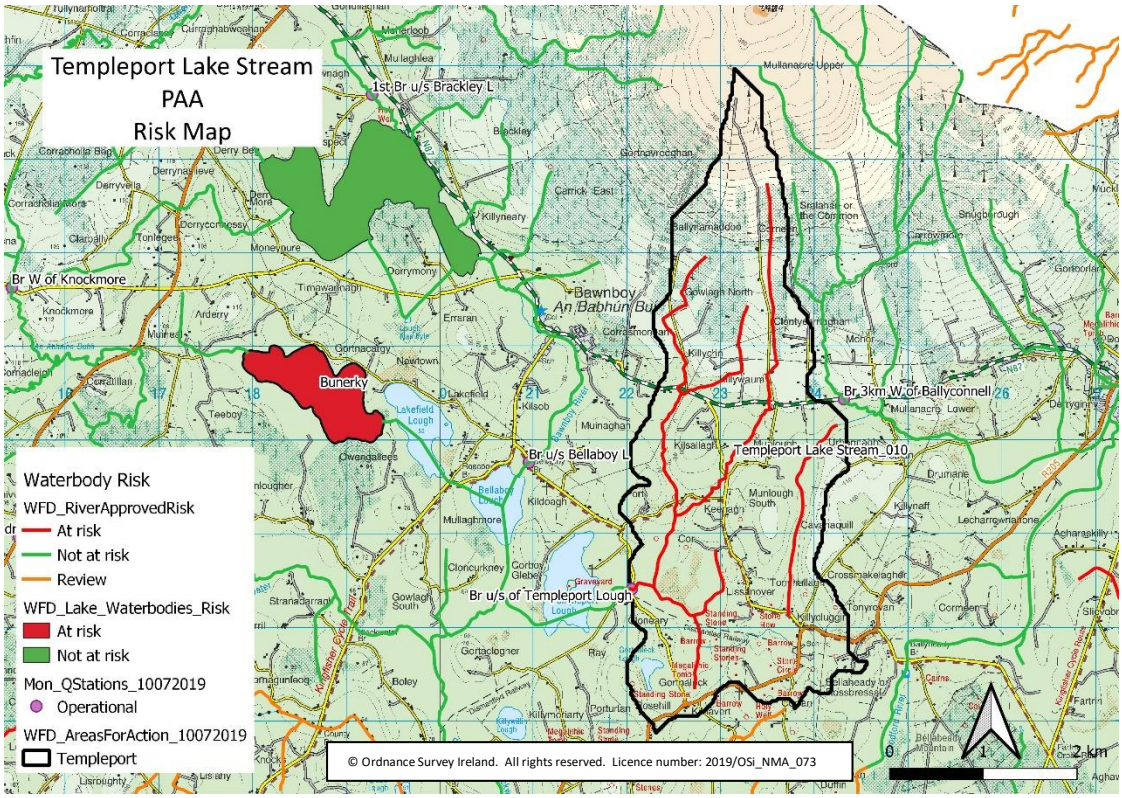


Figure 3 Risk of waterbodies with the Templeport PAA

2. Receptor information and assessment

Table 2 Receptor information for the 2 waterbodies

		IE_NW_36T010600_010 Templeport Lake Stream
Risk Category		*At Risk*
Biological Status	**2010-2015**	Poor
	2016-2018	Poor
	trends in Q values **2016-2018 Q value data** **Fish status (where rel)**	Q3-4 2010, Q3 2013 , Q3 2017
Hydrochemistry Data		**None**
Ortho-P (mg/l P)	**Baseline** **indicative quality** **Trends - significant?** **Dist to threshold**	No data
NH4-N (mg/l N)	**Baseline** **indicative quality** **Trends - significant?** **Dist to threshold**	No data
TON (mg/l N)	**Baseline** **indicative quality** **Trends - significant?** **Dist to threshold**	No data
Supporting Conditions	**Chemical conditions?** **Oxygenation Conditions** **Acidification Conditions**	No data
Hydromorphology		
RHAT score		n/a
Evidence of Arterial drainage		none
Ecological Status (2013–2018)		Poor
Trends (2010-2015)		
Protected Areas		Drinking water source ZOC for Newtown Ballyconnell GWB
WFD Objective		Good 2027
EPA biologist notes (if any)		A total of 13 invertebrate taxa were recorded. There were 0 sensitive mayfly and 0 sensitive stonefly found at the site. This absence of sensitive taxa is most often a key indicator of failure to achieve good ecological status or higher. The results of an examination of key tolerant taxa found: Simuliidae (Common), Gammarus (Dominant) and Baetis rhodani (Few). 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. This site had over 30% of the taxa list comprised by very tolerant taxa. The Q value assigned to this site was 3, indicative of poor conditions.
Significant issue/impact for receptor (e.g. PO_4)		Not known at this time, Q driving status. no chemistry available

Table 3 Data available for Bunerky Lake

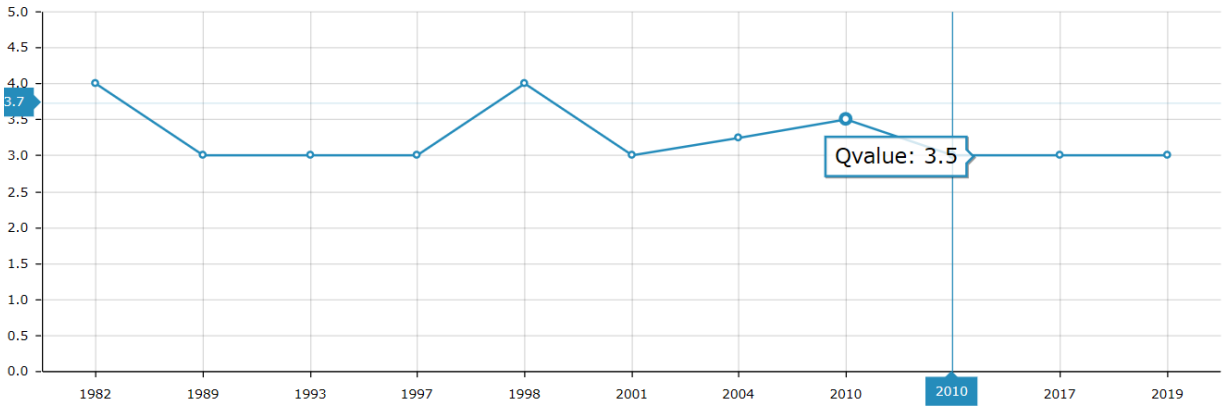
Waterbody		**Bunerky Lake (IE_WW_00_000)**	
Risk Category		***At Risk***	
Environmental Objective		**Good**	
Environmental Objective Date		2027	
Monitoring Type		Operational	
		Macrophytes	M_1to M_4
		Chemistry	Midlake LS360012315100010
Lake type		Type 8: <200m altitude, moderate alkalinity (between 20 – 100 mg/l CACO3) , an average depth of greater than 4 m and has an area greater than 0.5 km2	
Biological Status			
Phytoplankton	*2007-2009*	Good	
	2010-2012	Good	
	2010-2015	Moderate	
	2013-2018	Good	
Other Aquatic Flora			
Macrophytes	*2007-2009*	Moderate	
	2010-2012	Moderate	
	2010-2015	Moderate	
	2013-2018	Moderate	
Phytobenthos		Not monitored	
Invertebrate Status		Not monitored	
Fish Status		Not monitored	
Hydromorphological Conditions			
	2013-2018	**Good**	
Evidence of drainage		Not on the lake	
Comments			
Conceptual model required (Y/N)		Y	
Ecological Status			
2013-2018		Moderate	
Observations from Macrophyte Report		The 2016 plant status of Bunerky Lough is moderate and has been since the 2007 baseline survey. The lake plant community is characterised by: > the dominance of tolerant taxa > filamentous algae, which account for a third of all plant counts > the loss of nutrient sensitive taxa, specifically Nitella sp. This response is typical where a lake plant community is exposed to persistently eutrophic conditions. The plant community is perhaps better than expected given the levels of chlorophyll and this may be due to the filtering action of the zebra mussels. The EQR and moderate status appears to be an accurate reflection of the state of the plant community within Bunerky Lough. The macrophyte community is likely to deteriorate further if TP levels are not reduced.	
Estimated residence time		No data for Bunerky	
Protected Areas		None	
Significant issue: monitoring point		Total P	
Significant issue: Waterbody		Total P	

Table 4 Chemistry in Bunerky Lake

Monitoring Station		Mid lake
Water chemistry		
Total Phosphorus (mg P/l) **High status ≤ 0.010 (mean) Good status ≤ 0.025 (mean)**	*2007*	0.029
	2008	0.026
	2009	0.037
	2010	0.034
	2011	0.029
	2012	0.010
	2013	0.017
	2014	0.034
	2015	0.019
	2016	0.033
	2017	0.025
	2018	0.026
	2019	0.027
Baseline TP (2017-2019)		**0.026mg/l**
Total Ammonia (mg N/l) **High status ≤ 0.040 (mean) and ≤ 0.090 (95%ile) Good status ≤ 0.065 (mean) and ≤ 0.140 (95%ile)**	*2007*	0.026
	2008	0.028
	2009	0.01
	2010	0.017
	2011	0.023
	2012	0.023
	2013	0.02
	2014	0.027
	2015	0.025
	2016	0.02
	2017	0.013
	2018	0.025
	2019	0.014
Baseline NH_3 (2017-2019)		**0.017mg/l**
Chlorophyll a (µg/l) **<u>Lake type 8 10ug/l</u>**	*2007*	13
	2008	6.5
	2009	6.5
	2010	7.5
	2011	8
	2012	8.5
	2013	7
	2014	3.6
	2015	9.5
	2016	5.8
	2017	3.9
	2018	5.8
	2019	19.55
Baseline Chlorophyll a (2017-2019)		**9.75**
Significant issue: monitoring point		Total P,
Significant issue: waterbody		Total P
Comments		Zebra mussels could mask Total P

1.1. Templeport Lake Stream _10

Operational Monitoring Station 36T010600_010. Bridge upstream of Templeport Lough.
The Q value has not been at Good since 1998 and has fluctuated between Poor and Moderate. It currently remains at Poor since 2013. This waterbody is not on the operational monitoring programme for chemistry,



	1982	1989	1993	1997	1998	2001	2004	2010	2013	2017	2019
Result	4	3	3	3	4	3	3.25	3.5	3	3	3
Classification	Good	Poor	Poor	Poor	Good	Poor	Poor	Moderate	Poor	Poor	Poor
Q-Value	4	3	3	3	4	3	3/0	3-4	3	3	3

Figure 4 The biological trend and data for Station 36T010600_010 Br u/s of Templeport Lough

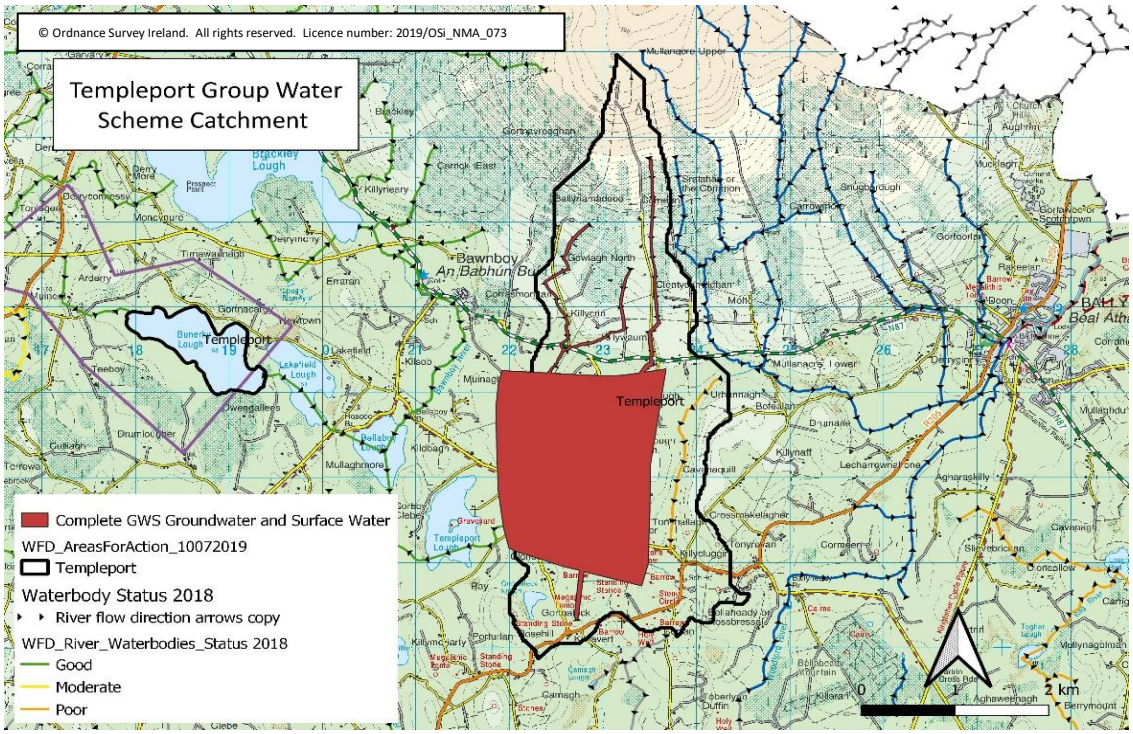


Figure 5 Catchment of Templeport GWS

Templeport Group Water Scheme abstracts drinking water from a borewell to serve 450 people and supply's 320m3 of water per day. When a borehole is being pumped, it draws down the water table

creating a cone of depression around the borehole. The cone of depression forms part of the zone of contribution (ZOC) or capture zone to the borehole. Establishing the ZOC of a borehole is a key step in protecting a GWS's drinking water source as it can highlight the groundwater vulnerability within the ZOC. By delineating or marking out the ZOC, a community knows where their water is coming from and can protect it. *(Source GSI)* The zone of contribution for Templeport is 3.95km^2 in area and outlined in Figure 5

1.2. Bunerky Lough

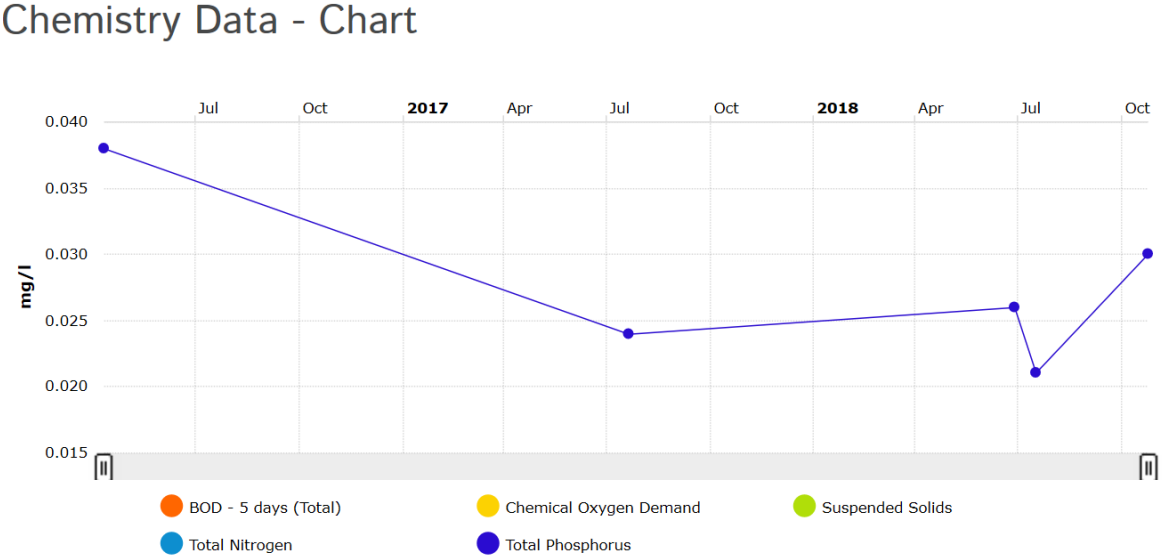


Figure 6 Chemistry data available on WFD app for Bunerky Lough for the years 2016 to 2018

Table 5 Summary of chemistry data at the midlake monitoring station within Bunerky Lake

Monitoring Station	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
NH3	0.024	0.027	0.01	0.017	0.019	0.019	0.010	0.022	0.013	0.02	0.013	0.022	0.02
Chlorophyll	6.5	6.5	7.5	6.5	9.5	5.5	5.5	35	8	5.8	3.9	5.8	19.55
Total Phosphorus	0.029	0.026	0.037	0.034	0.029	0.009	0.018	0.034	0.020	0.033	0.025	0.026	0.027

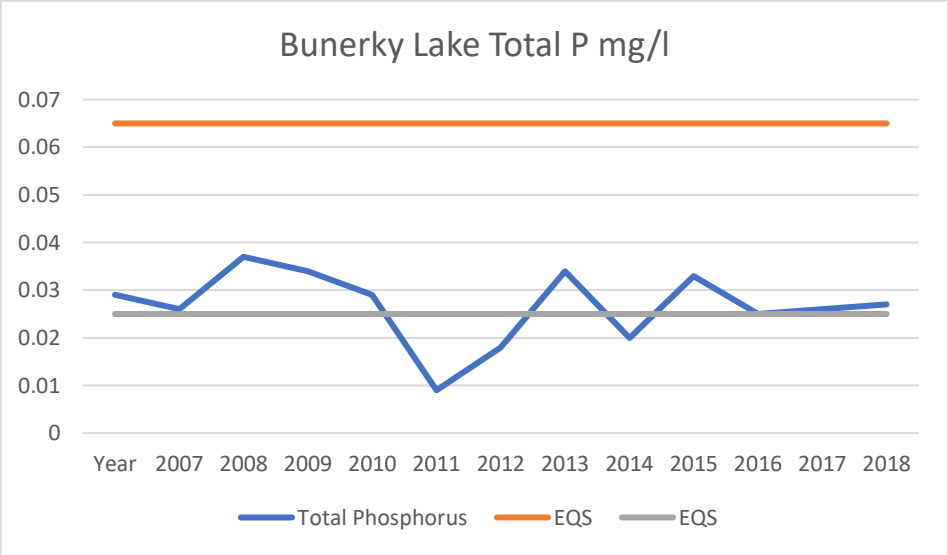


Figure 7 Total Phosphorus mg/l for Bunerky lake from 2007 to 2018

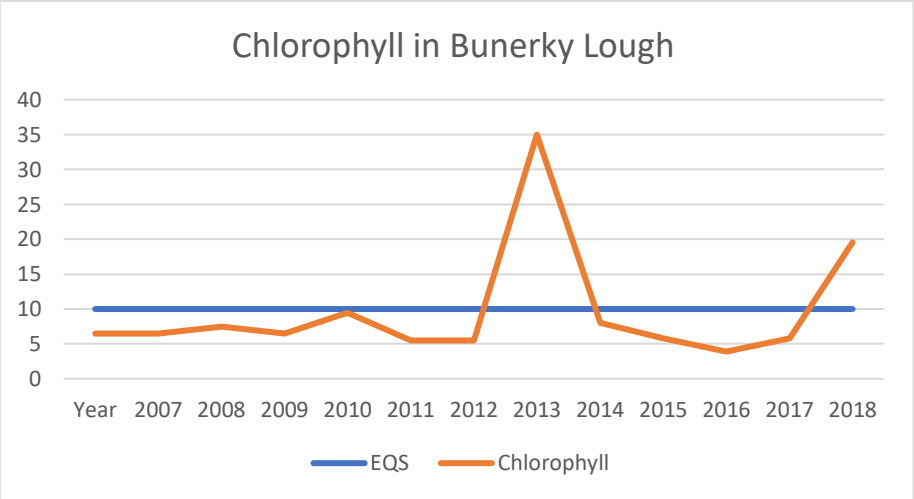


Figure 8 Chlorophyll µg/l for Bunerky lake from 2007 to 2018

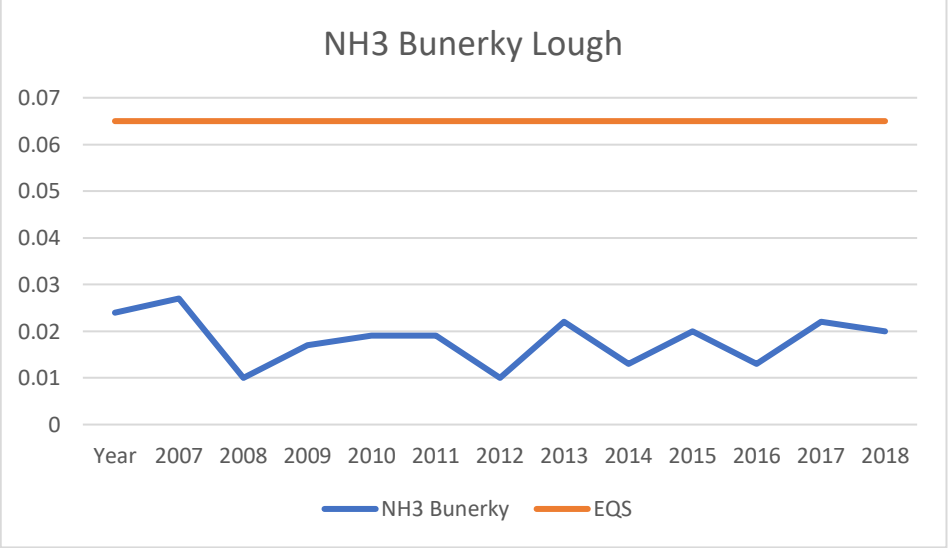


Figure 9 Ammonia in mg/l for Bunerky lake from 2007 to 2018

Total phosphorus and ammonia levels in Bunerky Lake are trending upwards. The environmental quality standard for Total phosphorus in lakes is ≤ 0.025 mg/l for Good status. In 2018 the average Total Phosphorus results was 0.026mg/l and in 2019 it was 0.027mg/l which is just above the EQS. The chlorophyll levels for 2018 and 2019 respectively were 5.8mg/l and 19.5mg/l. The Indicative quality lower threshold for chlorophyll is 10mg/l so the chlorophyll in 2019 was elevated. The plant community is perhaps better than expected given the levels of chlorophyll and this may be due to the filtering action of the zebra mussels. Bunerky Lough has a population of zebra mussels (Dreissena polymorpha) which is an invasive alien species. Zebra mussels thrive in calcium and nutrient rich conditions. They filter algae from the water reducing chlorophyll levels. This can cause water clarity to increase depending on the size of the zebra mussel population. This can lead to changes in the macrophyte community. Zebra mussels cannot be controlled or eradicated from a lake at present.

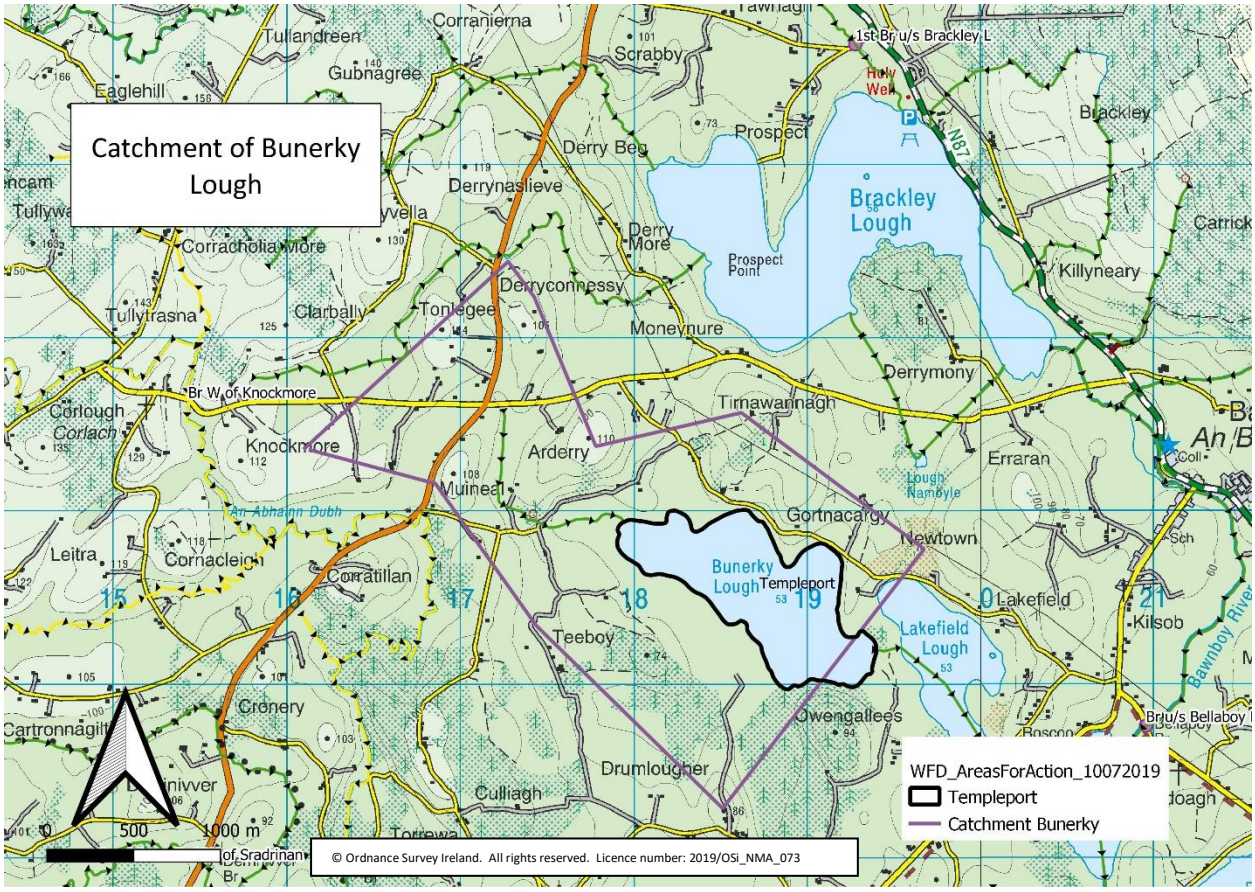


Figure 10 Catchment of Bunerky Lough

Findings in Macrophyte report 2016-2018

Comparison to Baseline Survey (2016 vs 2007)

Compared to the baseline year there has been a loss of taxa from ten to eight. The total plant counts were the same in both surveys. While the status hasn't changed there were two changes in the individual metric scores that are worth noting. The %RF tolerant taxa score decreased – this was because the nutrient sensitive taxa recorded in the baseline survey – Nitella sp. and Isoetes echinospora – were not recorded in 2016 nor were they replaced by any other nutrient sensitive taxa and therefore counts of this group were lower. The trophic score metric score increased. This was mostly because Potamogeton crispus – which has a high trophic score - was not recorded in 2016 and the overall

average score was therefore lower in 2016. The increase in one metric, however, cancels out the decrease in the other.

There is a small difference in the EQR between the two years and the overall status did not change. Different taxa were recorded at the maximum depth of colonisation indicating a lack of stability in the plant community The EQR and moderate status appears to be an accurate reflection of the state of the plant community within Bunerky Lough. The macrophyte community is likely to deteriorate further if TP levels are not reduced.

3 Significant pressures

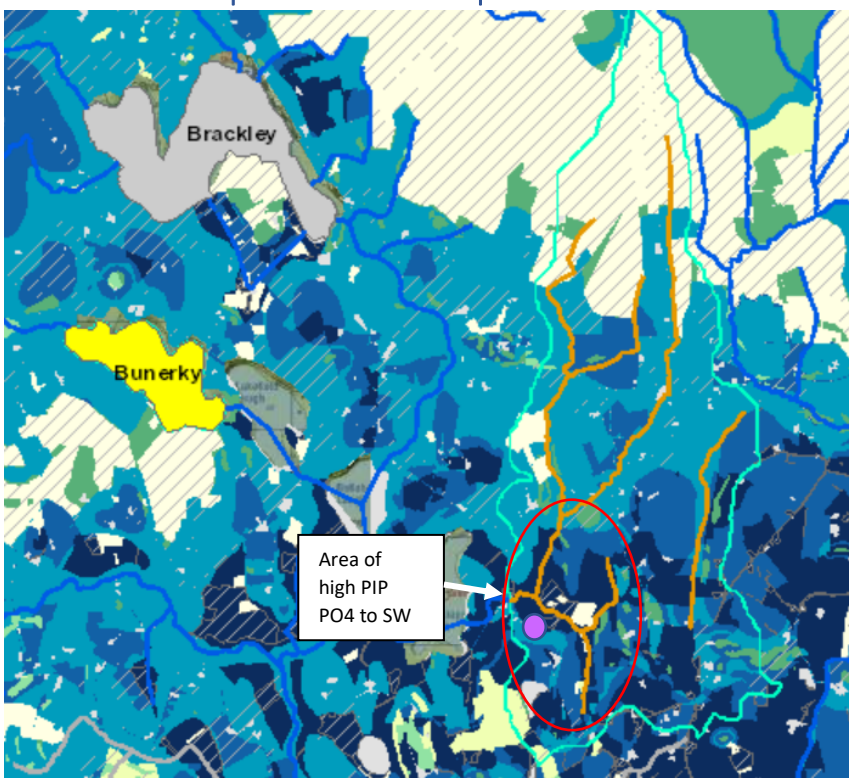
Any further additional information identified on the significant pressures detailed in Table 1 is outlined below

Table 6 Summary of waterbodies within the Templeport PAA

WB Name	Pressure Category	Pressure Subcat.	Impact	Sig. Pressure	AA	Further characterisation Actions
Templeport Lake Stream_010	Agriculture	Pasture	Nutrient pollution	Yes	Yes	*IA7 Focus on sources of nutrients from agriculture. Start at the monitoring station, RS36T010600, walk upstream along the RWB and its associated tributaries. Identify point (drains, discharge pipes, farmyards, cattle access) and diffuse (inadequate buffer strips) sources of nutrients. Collect field parameters (DO, pH, temperature and conductivity). Use results to guide the selection of water quality and SSRS in order to identify critical source areas for nutrients.*
Bunerky Lough	Agriculture	Agriculture	Nutrient pollution	Yes	Yes	*IA9 Focus on sources of nutrients from agriculture around the lake and on the tributaries feeding into the lake. Identify point (drains, discharge pipes, farmyards, cattle access) and diffuse (inadequate buffer strips) sources of nutrients. Collect field parameters (DO, pH, temperature and conductivity). Use results to guide the selection of water quality and SSRS in order to identify critical source areas for nutrients.*
	Invasive species	Invasive species	Other signs of impacts	Yes		

- Agriculture has been identified as a significant pressure in this waterbody with nutrient pollution from pasture identified as a source.
- There is potential in the Bunerky Lake catchment for loss of phosphate to the waterbodies as there are areas of Rank 3 and 5 PIP on the river flowing into the lake. (Fig 11)
- Bunerky lake has been known to have the invasive zebra mussels at least since 2006 which can mask nutrient issues. This is the second significant pressure identified along with Agriculture in the Bunerky Lake catchment
- The storyboard produced by the EPA's catchment unit mentions hydromorphology as an additional pressure in the Templeport Lake Stream catchment. Hymo- Reaches range predominately between High and Moderate hydro morphological quality. Q station within reach of Moderate hydro morphological quality, mainly driven by channel morphology (channel flowing through modified peatland).

3.2. Pollution Impact Potential Maps



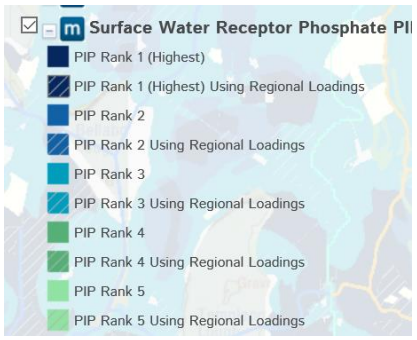
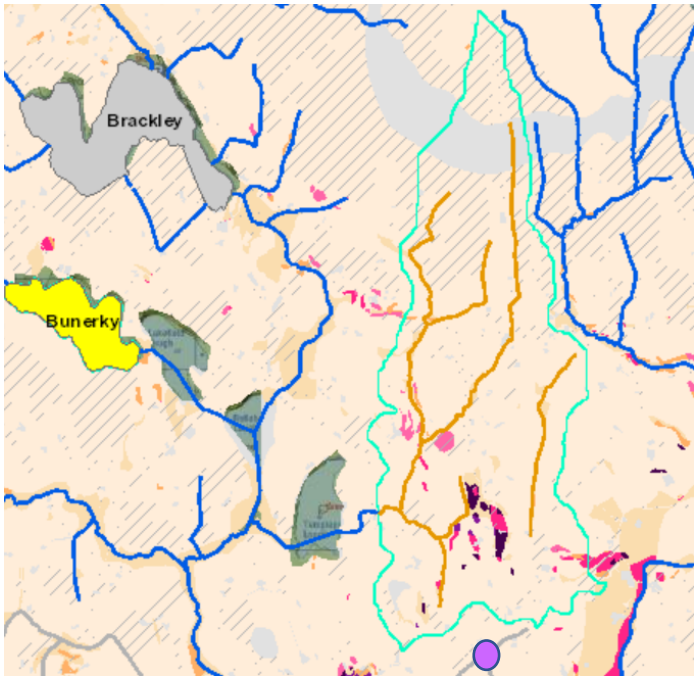


Figure 11 Surface water receptor phosphate Pollution Impact Potential Map for Templeport PAA

- There are some areas susceptible to phosphorous loss as illustrated in the Surface Water Receptor Phosphate PIP maps (Figure 11) with the dark blue area indicating the most susceptible areas located at the lower reaches of the catchment close to the monitoring point in purple.
- Further up the catchment there are areas of Rank 3 which is also potentially susceptible to Phosphate loss.



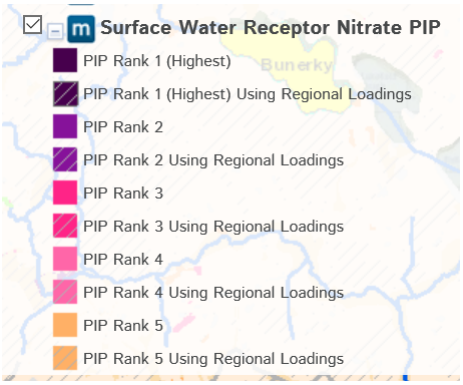
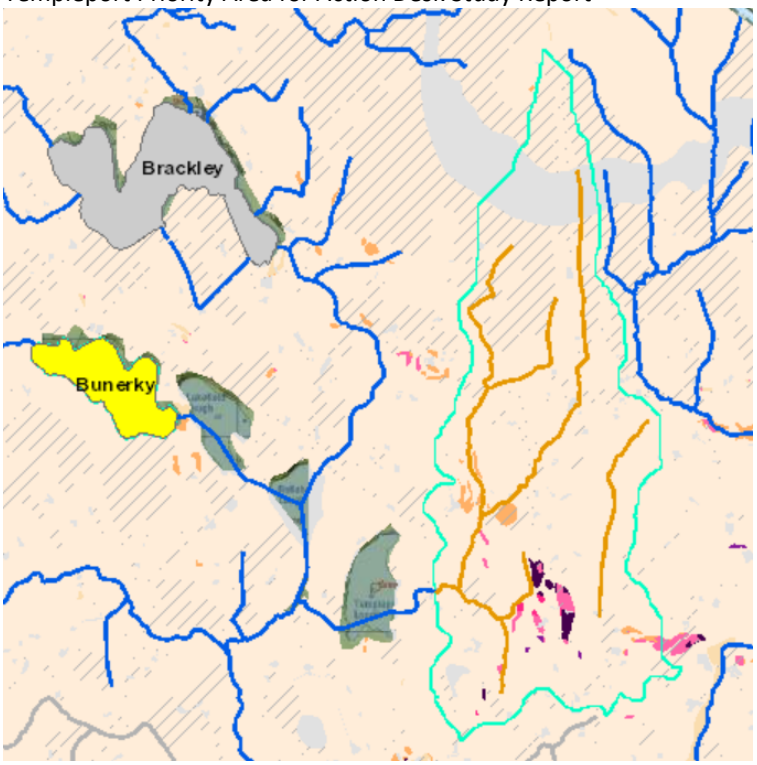


Figure 12 Surface water receptor for Nitrate Pollution Impact Potential map for Templeport PAA



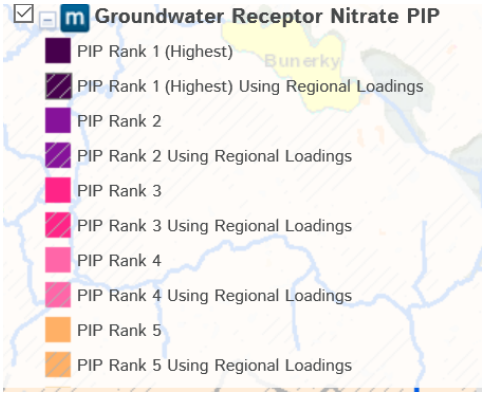


Figure 13 Groundwater Receptor Nitrate Pollution Impact Potential map for Templeport PAA

- There are only a few areas of surface water receptor NO_3 PIP in the Templeport Lake Stream_010 waterbody on the lower tributary to the east of the monitoring point.
- The groundwater receptor NO_3 PIP highlights the same areas to the East of the monitoring point where the surface water had high NO_3 PIP in the Templeport Lake Stream PAA (Fig 12)
- The Bunerky Lake catchment does not highlight any areas for Surface or Groundwater receptors NO_3 PIP. (Fig 12 and 13)

Licensed facilities

- Located on the edge of the catchment is an intensive pig farm producing 25,000m^3 of manure per annum from 390 sucking sows, 1480 dry sows, 4 boars, 210 gilts, 9,381 weaners and 7,102 finishing pigs- *(Source AER 2018)*. At the time of licensing by the EPA 200 farms were to import pig slurry from this unit and river catchments with significant concentrations of slurry spreading included Templeport Lake Stream. Proposed spreadlands adjacent the Templeport Lake Stream were excluded as a landbank for land spreading. *(Source EPA licence application).*
- There is also a poultry unit for up to 19,000 free range laying hens, that is not licensed, that has potential to produce manures up to 296m^3. Manures are to be exported off the farm by a licensed contractor, but it's not outlined in the Planning application whether this manure is spread within the catchment or not. This will be investigated during LCA work.

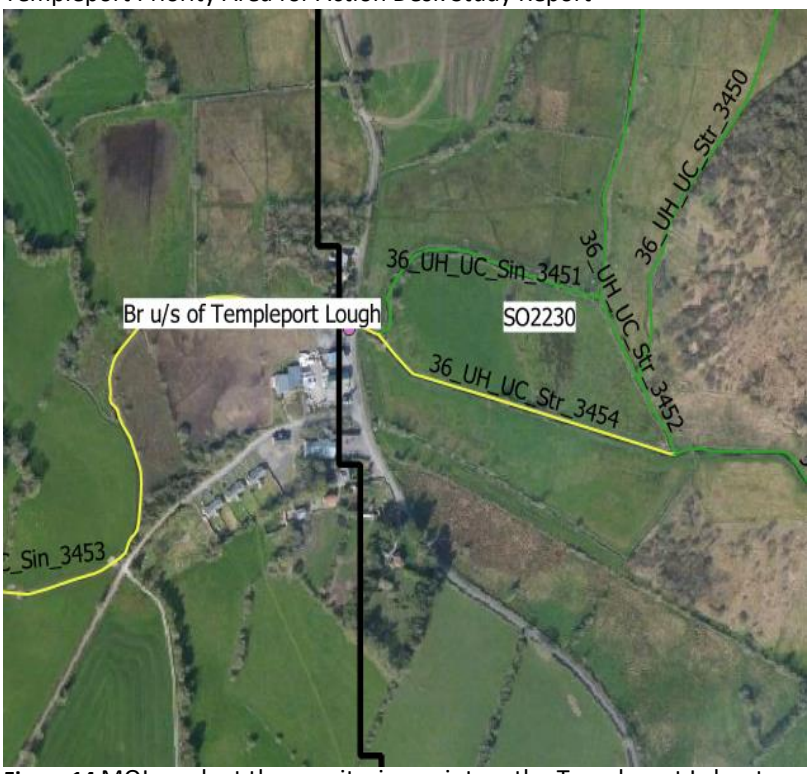


Figure 14 MQI reach at the monitoring point on the Templeport Lake stream.

The EPA have added hydromorphology as a pressure to the storyboards for the third round of the Water Framework Directive characterisation of the catchment. *Hymo: Reaches range predominately between High and Moderate hydro morphological quality. Q station within reach of Moderate hydro morphological quality, mainly driven by channel morphology (channel flowing through modified peatland).* Figure 16 above shows the kilometre above the Operational monitoring point at Br u/s of Templeport Lough as part of a drainage scheme.

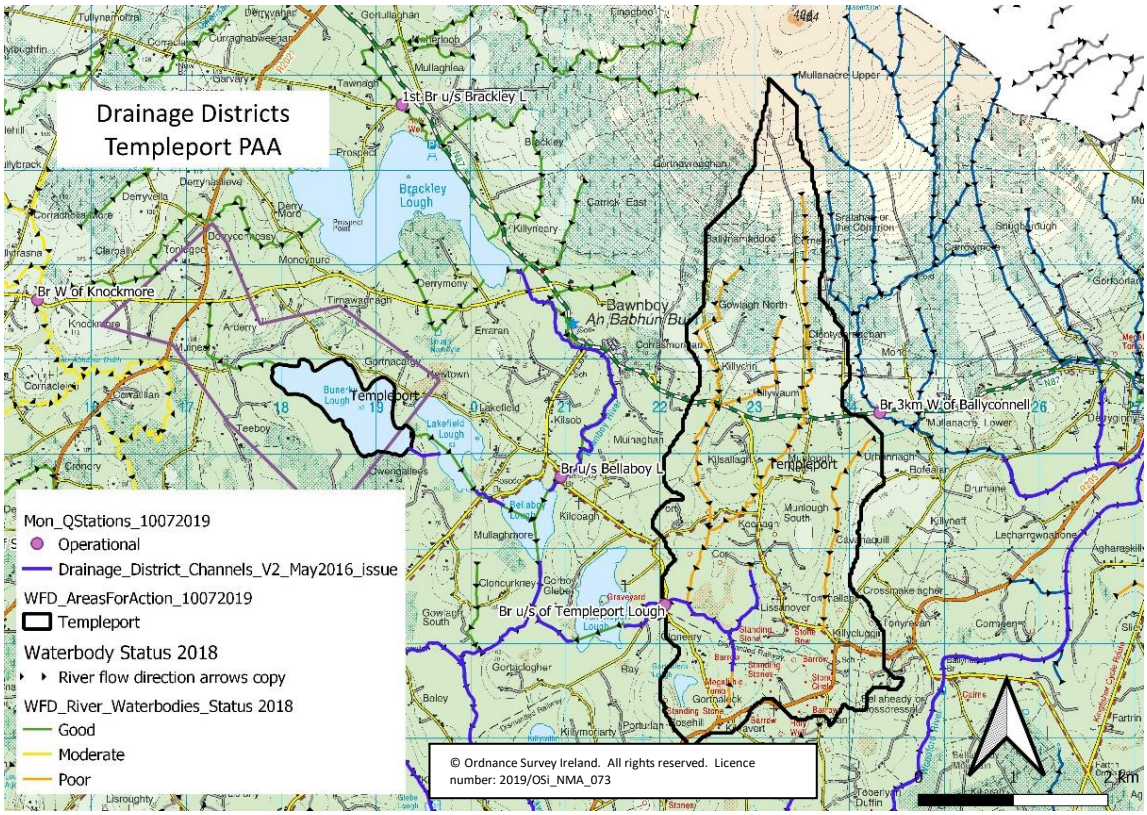


Figure 15 Drainage districts in the Templeport PAA

The EPA have added hydromorphology as a pressure to the storyboards for the third round of the Water Framework Directive characterisation of the catchment. *Hymo: Reaches range predominately between High and Moderate hydro morphological quality. Q station within reach of Moderate hydro morphological*

quality, mainly driven by channel morphology (channel flowing through modified peatland). Figure 16 above shows the kilometre above the Operational monitoring point at Br u/s of Templeport Lough as part of a drainage scheme.

4 Pathway information and analysis

4.1. Overview of Pathways within the PAA

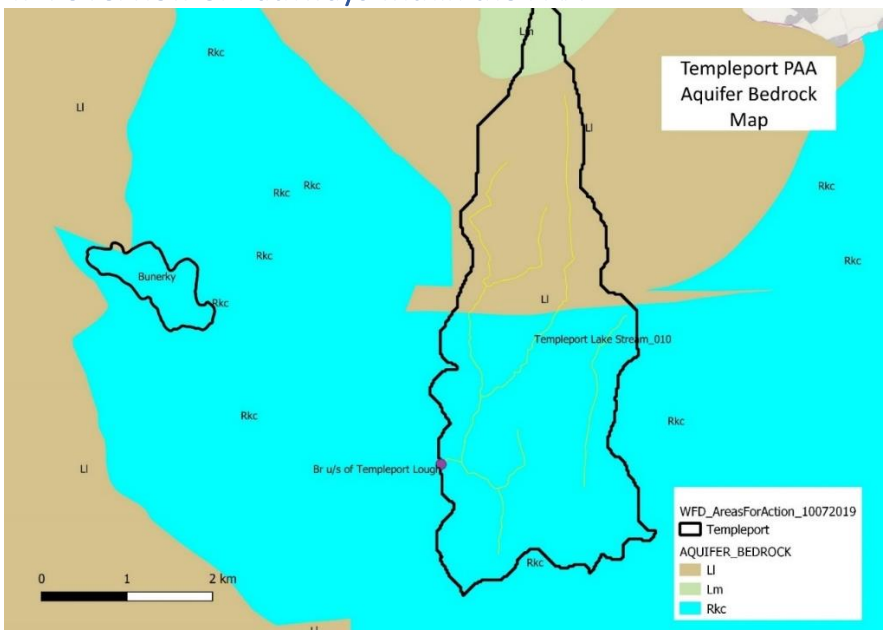


Figure 16 The aquifer bedrock for the Templeport Priority Area for Action (PAA)

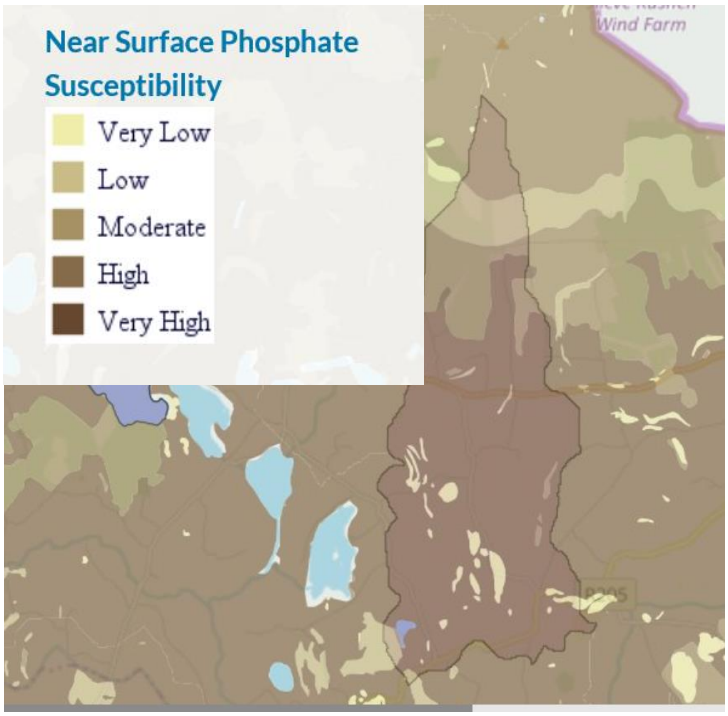


Figure 17 The near surface phosphate susceptibility map for the Templeport PAA

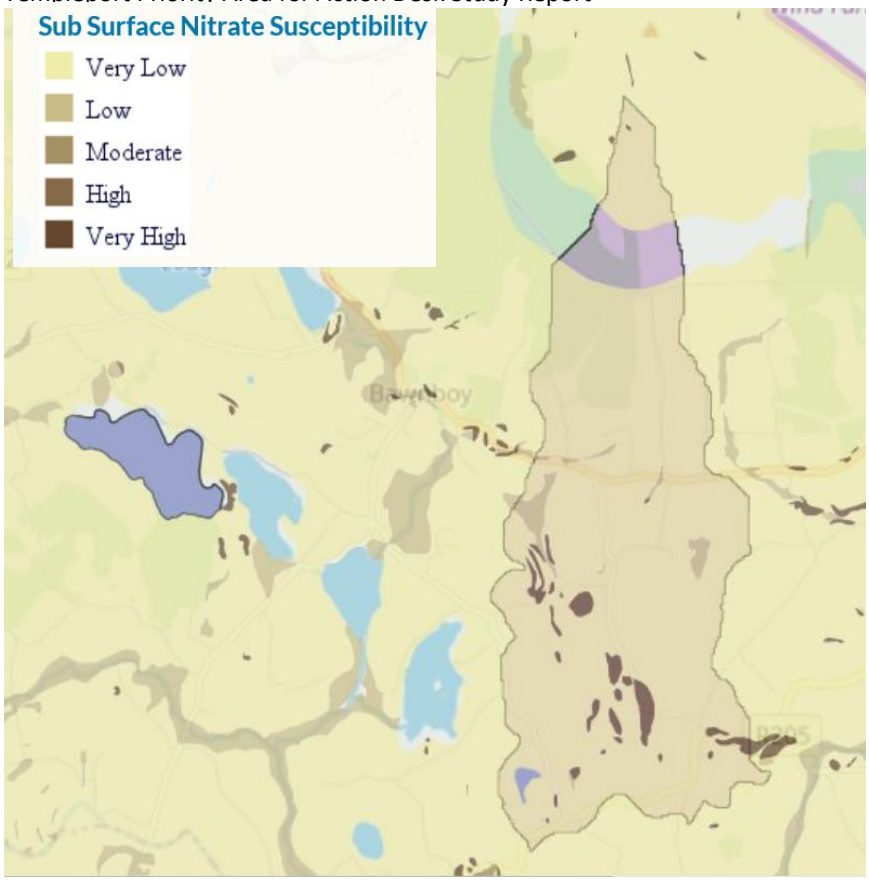


Figure 18 The sub surface Nitrate Susceptibility map for Templeport PAA

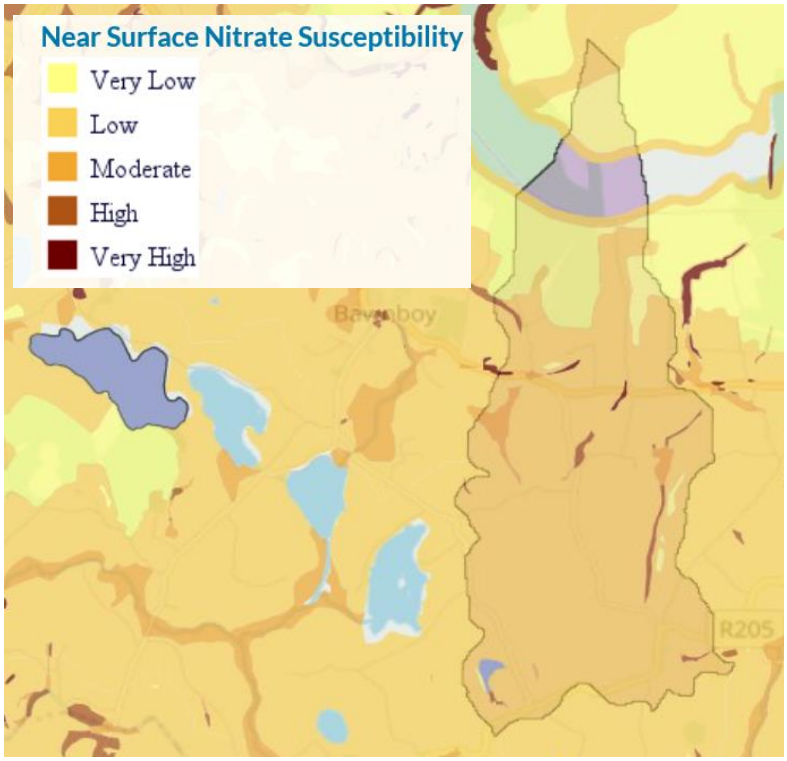


Figure 19 The near surface Nitrate Susceptibility map for Templeport PAA

Agriculture from pasture has been identified as the significant pressure in the Templeport Lake Stream_010 waterbody. The significant issues for this waterbody, however, are not determined as no

chemistry data is available for the monitoring station (St. RS36T010600) located at the outflow of the Templeport lake stream_010 waterbody. The most recent Q value of 3 was assessed in 2019 and the biologist's notes mention cattle access close to the monitoring point. The PIP and P susceptibility maps indicate PO4 to be an issue mainly along areas surrounding the river channel close to the monitoring point which lies within a karst limestone aquifer which some peat regions. In regard to the NO_3 PIP and susceptibility maps, nitrogen does not appear to be a significant issue for this waterbody, with the exception of a small area in the lower eastern section of the waterbody, which is susceptible to groundwater flow and has high groundwater vulnerability and rock outcrops. Another source of NO_3 are the areas of peat in the lower part of the catchment. Identification of farms importing pig slurry from the licensed facility in the east of the catchment and encouragement of nutrient management and soil testing on these farms.

Agriculture and invasive species have been identified as the significant pressures for the Bunerky lake. Based on the 2018 chemistry data at monitoring Stn LS360012315100010 midlake NH3, Total P and Chlorophyll have not been identified as a significant issue. Status is failing on biological status and macrophyte status. Zebra mussels have colonised the lake and can mask issues by altering the nutrient cycling in the lake. Nutrient conditions were characterised as 'Good' status. The trend for Chlorophyll and ammonia were upwards and the Total p trend is downwards. It is important to note that the monitoring station located midlake was not sampled for all of 2016, 2 out of 4 samples taken in 2017 and 1 sample in 2018. The lake was sampled at LS360012315100020 at surrogate shoreline location and also for 2019. Comparing midlake to shoreline results may not always be accurate. There is a quite small catchment involved with the Bunerky Lake 0.74km2 is the size of the lake. The main pathways identified for the Bunerky lake is waterbody is Surface water groundwater interactions (Karst Features) throughout the waterbody catchment.

Table 7 Conceptual model information for the pathways

	Compartment 1 Templeport Lake Stream	Compartment 2 Templeport Lake Stream		Compartment 3 Templeport Lake Stream			Compartment 1 Bunerky Lake
Direct[1]	n/a	n/a		n/a			n/a
Aquifer **(Fig. 13)**	Lm: Locally important aquifer, bedrock that is generally moderately productive	Ll: Locally important aquifer, bedrock which is moderately productive only in local zones.		RKc: Regionally important aquifer with Karstified bedrock.			RKc: Regionally important aquifer with Karstified bedrock and Locally important aquifer with bedrock which is moderately productive only in local zones
Rock Units	Dinantian Sandstones	Dinantian mixed sandstone, shales and limestones		Dinantian Pure bedded limestones			Dinantian shale and limestones and Dinantian pure unbedded limestones
		Sun-Compart 2A	Sub-Compart 2B	Sub-Compart. 3A	Sub-Compart 3B	Sub compact 3C	
Soil type**(Fig. 14)**	Peat Poorly drained	Clayey drift with siliceous stones Well drained	Peat Poorly drained	Peat Poorly drained	Fine loamy drift with siliceous stones Well drained	Fine loamy drift with siliceous stones Well drained	Fine loamy drift with siliceous stones Well drained
Subsoil	Blanket peat	Scree	Limestone sands and gravels(Carboniferous)	Cut bog	Karst,	Carboniferous sandstone and chert till	Limestone sands and gravels
Subsoil K	Low		High	Low			Good
Groundwater Vulnerability (**Fig.16)**	High/Extreme	Extreme	Moderate/High	Extreme/High	Low/Mod	Low/Mod	High-Extreme with some areas of rock outcrop
PO_4 Susceptibility **(Fig. 17)**	Low	Very low	Low-Mod	Mod	Mod-Very low	Mod- V low	Low-Mod
NO_3 Susceptibility **(Fig. 18)**	Very low	Very low	Very low	Mod-Very low	Low-Very low	Low-V Low	V low
PO_4 PIP (**Fig. 9**)	Very low	Very low	Low-Mod	High	High-Very high	High-V High	Low to Mod
NO_3 PIP (**Fig. 10 & 11**)	Very low	Very low	Very low	Mod-High	Very low	High	V low
Main Flow Paths	Overland, near surface flow	Near surface and groundwater flow	Overland, near surface flow	Overland, near surface flow	Surface water - groundwater interactions (Karst Features)	Surface water groundwater interactions (Karst Features)	Surface water groundwater interactions (Karst Features)

5 Interim 'story' of the Priority Area for Action

The desktop study for the Templeport PAA has identified agriculture to be the possible significant pressure. Ecological status is currently poor in the Templeport Lake stream_010 waterbody and increases to moderate ecological status in the Bunerky Lake waterbody.

5.1. Templeport Lake Stream IE_NW_36T010600-010

Risk category: At Risk
Status: Poor
Hydrochemistry summary: No data available
Baseline Concentration: n/a
Significant issue: Likely to be phosphate due to pathway.
Significant pressure: Diffuse pollution from Agriculture
Other pressures: none
Relevant pathways: Overland, nearsurface flow, Surface water-groundwater interactions due mainly to wet soils in 80% of the catchment and areas of peat near the monitoring point and at the top of the catchment.

5.2. Bunerky Lake, IE_NW_36_624

Risk category: At Risk
Status: Moderate
Hydrochemistry summary: NH3 0.022mg/l, Chlorophyll 5.8mg/l Total phosphorus 0.026mg/l
Baseline Concentration: NH3 0.018mg/l, Chlorophyll 5.18mg/l, Total phosphorus 0.028mg/l
Significant issue: Nutrients
Significant pressure: Nutrient pollution from Agriculture and the invasive zebra mussel.
Other pressures: none
Relevant pathways: Overland flow and Surface water groundwater interactions (Karst Features)

Communications Plan

A community information meeting will be held in early 2020 followed by a farmers meeting hosted by ASSAP. The key message in this PAA is that the Templeport Lake stream and Bunerky Lake waterbodies have a good status objective, and the likely significant issue is nutrients and the pressure is agriculture.

Review the finding of the desktop with Cavan County Council and any other interested organisation for their input and knowledge of the sub-catchment. Discuss with Cavan County Council on whether they have any additional information for the Templeport PAA, particularly in relation to the waterbodies.

Communicate and review the desk study findings and the planned local catchment assessment work with the Cavan Co Council and Templeport GWS and any source protection plans in progress.

6 Work plan

6.1 Consultation on the desk studies LA, IFI etc/ Further information required

- Further details required on the Public water scheme in the catchment.
- There is a stream in the east of the waterbody that disappears and is not connected to any other stream. This could be a sinking stream. Discuss with GSI and Cavan Co Council any knowledge that they have of this stream and whether it has ever been traced.

7 Further Characterisation Actions Assigned

Templeport Lake Stream _010

IA7 Multiple Sources in Multiple Areas. Focus on sources of nutrients from agriculture. Start at the monitoring station, RS36T010600, walk upstream along the RWB and its associated tributaries. Identify point (drains, discharge pipes, farmyards, cattle access) and diffuse (inadequate buffer strips) sources of nutrients. Collect field parameters (DO, pH, temperature and conductivity). Use results to guide the selection of water quality and SSRS in order to identify critical source areas for nutrients.

Bunerky Lake

IA9 Lake pressures. Focus on sources of nutrients from agriculture around the lake and on the tributaries feeding into the lake. Identify point (drains, discharge pipes, farmyards, cattle access) and diffuse (inadequate buffer strips) sources of nutrients. Collect field parameters (DO, pH, temperature and conductivity). Use results to guide the selection of water quality and SSRS in order to identify critical source areas for nutrients.

7.1 Local Catchment Assessment Work Plan

Templeport Lake Stream _010

- Carry out SSIS/RA on the tributaries entering the main channel as in map below and carry out riverwalks on any of these showing impact.
- Carry out an investigation to see what happens to the stream on the East of the catchment that disappears.
- Identify the Free-range poultry unit and check d/s and u/s for impact from the enterprise.
- Carry out SSIS below the felled forestry area for impact and direct drainage to the river.
- Carry out river walks on the areas identified on the Surface water receptor phosphate Pollution Impact Potential Map with high phosphate potential. Map below
- Carry out a SSIS/RA at the monitoring point Br u/s of Templeport Lough to monitor ecological status.
- Take samples for water chemistry analysis at the monitoring point and the impacted tributaries.

Bunerky Lough

- Carry out SSIS/RA on the inlet to the lake and carry out a Riverwalk of the inlet stream. Take repeated samples of conductivity/dissolved oxygen profile up the stream.
- Identify activities within the catchment of the lake and assess if they would have any impact on the lake.
- Walk/drive the catchment of the lake identifying CSA and potential for diffuse pollution to the lake
- Take samples 2-3 times for water chemistry analysis at inlet and outlet of the lake.

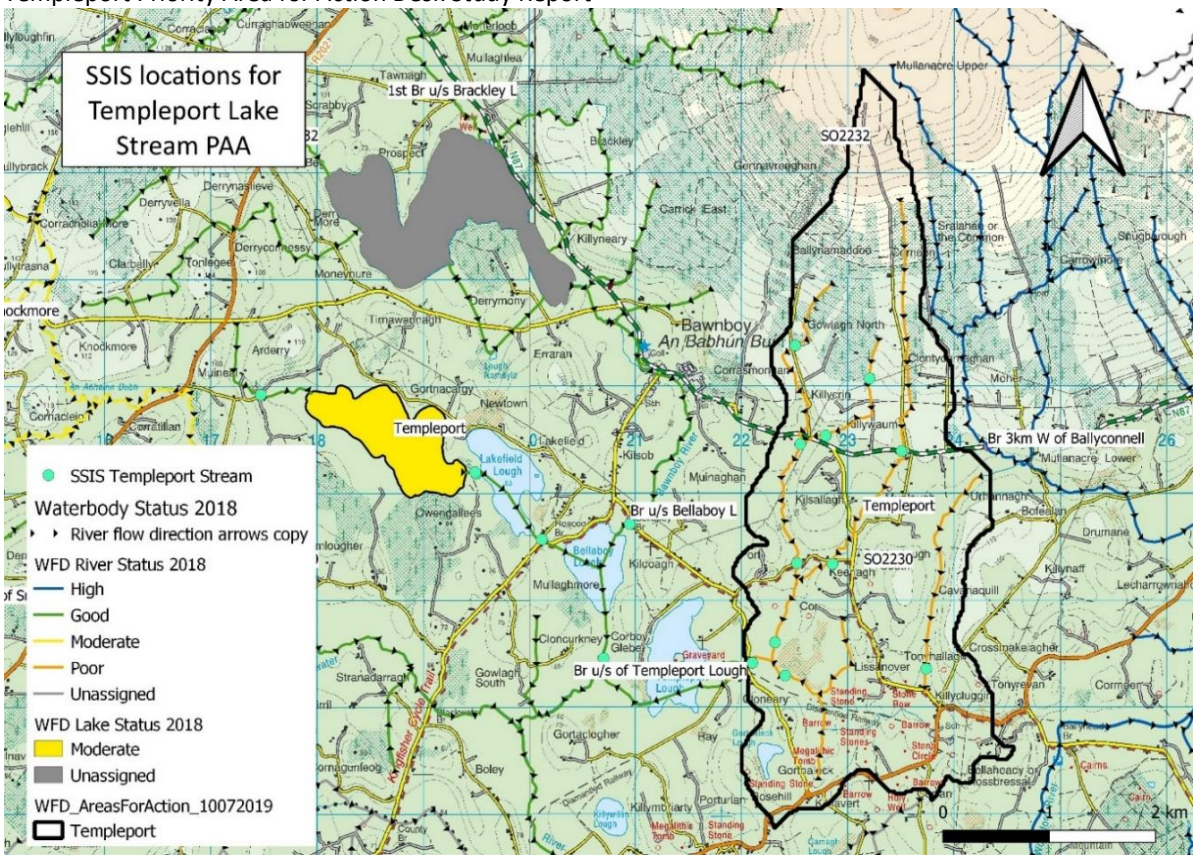


Figure 20 SSIS locations planned in Templeport Lake Stream AFA.

Deskstudy completion date: **03/09/20**

Appendix 1_ EPA Biology Reports

epaEcology Monitoring and Assessment

WFD Waterbody Code	WFD Waterbody Name	Station Name		
IE_NW_36T010600	TEMPLEPORT LAKE STREAM_010	Br u/s of Templeport Lough		
River code and year:	**River:**	**Easting:**	**Northing:**	**Sample date:**
36T010600 sampled in 2017	TEMPLEPORT LAKE STREAM	222049	316412	20/09/17 10:00 AM
Access and H&S rating:	Left Hand Side	Downstream	Low Hazard site	

Filamentous algae, macrophytes & shading		Station type, sediment, livestock access & erosion	
Cladophora		Station Type	Typical riffle-glide
Vaucheria		Substrate Features	Normal
Filamentous algae - Total		Substrate Siltation	Slight
Total Macrophytes	30%	Livestock Access	Cattle
		Livestock Access Impact	None
Shading	Light to Moderate	Bank Erosion	
		Bank Erosion Extent	
		Recent Flood	No
		Flow/Discharge	Normal

Overview of macroinvertebrate data

The site 36T010600 on the TEMPLEPORT LAKE STREAM river was sampled in 2017. A total of 13 invertebrate taxa were recorded. There were 0 sensitive mayfly and 0 sensitive stonefly found at the site. This absence of sensitive taxa is most often a key indicator of failure to achieve good ecological status or higher. The results of an examination of key tolerant taxa found: Simuliidae (Common), Gammarus (Dominant) and Baetis rhodani (Few). 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. This site had over 30% of the taxa list comprised by very tolerant taxa. The Q value assigned to this site was 3, indicative of poor conditions. 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
36T010600 sampled in 2017

Group	Taxon	Sensitivity	Abundance
Caddisfly	Glossosomatidae	**Less sensitive**	Common
Beetle	Elmis aenea	**Tolerant taxa**	Numerous
Beetle	Limnius volckmari	**Tolerant taxa**	Few
Blackfly larvae	Simuliidae	**Tolerant taxa**	Common
Chironomids	Chironomidae	**Tolerant taxa**	Few
Mayfly	Baetis rhodani	**Tolerant taxa**	Few
Shrimp	Gammarus	**Tolerant taxa**	Dominant
Snails	Potamopyrgus antipodarum	**Tolerant taxa**	Numerous
Water mites	Hydrachnidae	**Tolerant taxa**	Few
Hoglouse	Asellus	**Very tolerant taxa**	Common
Leeches	Erpobdella	**Very tolerant taxa**	Few
Leeches	Glossiphonia	**Very tolerant taxa**	Few
Worms	Tubificidae	**Most tolerant taxa**	Few

APPENDIX 2

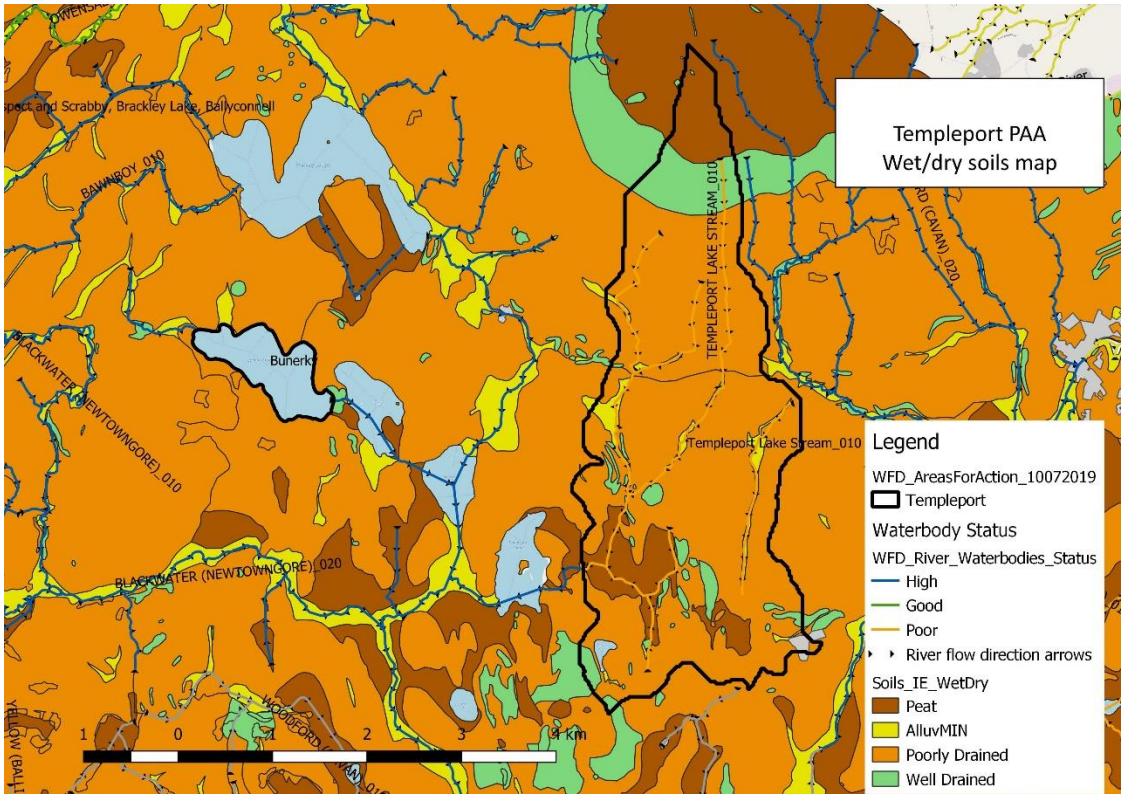


Figure 21 The wet and dry soils for the Templeport PAA

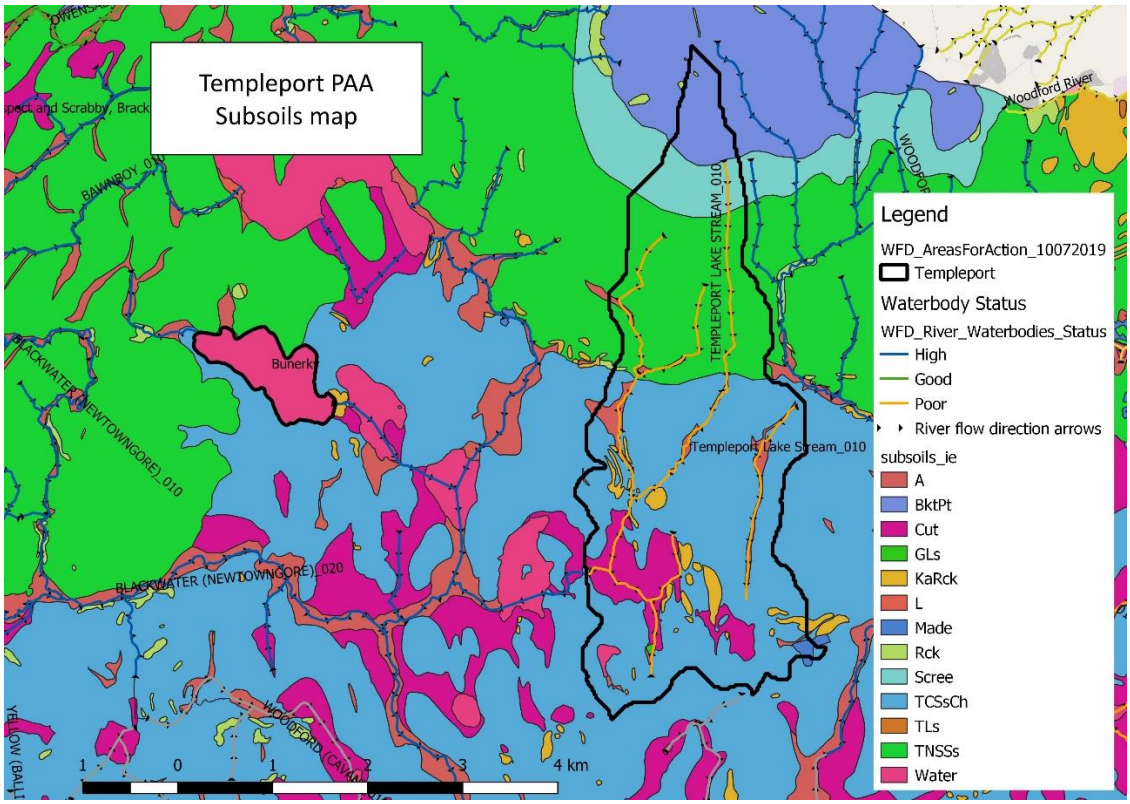


Figure 22 The subsoil type for the Templeport PAA

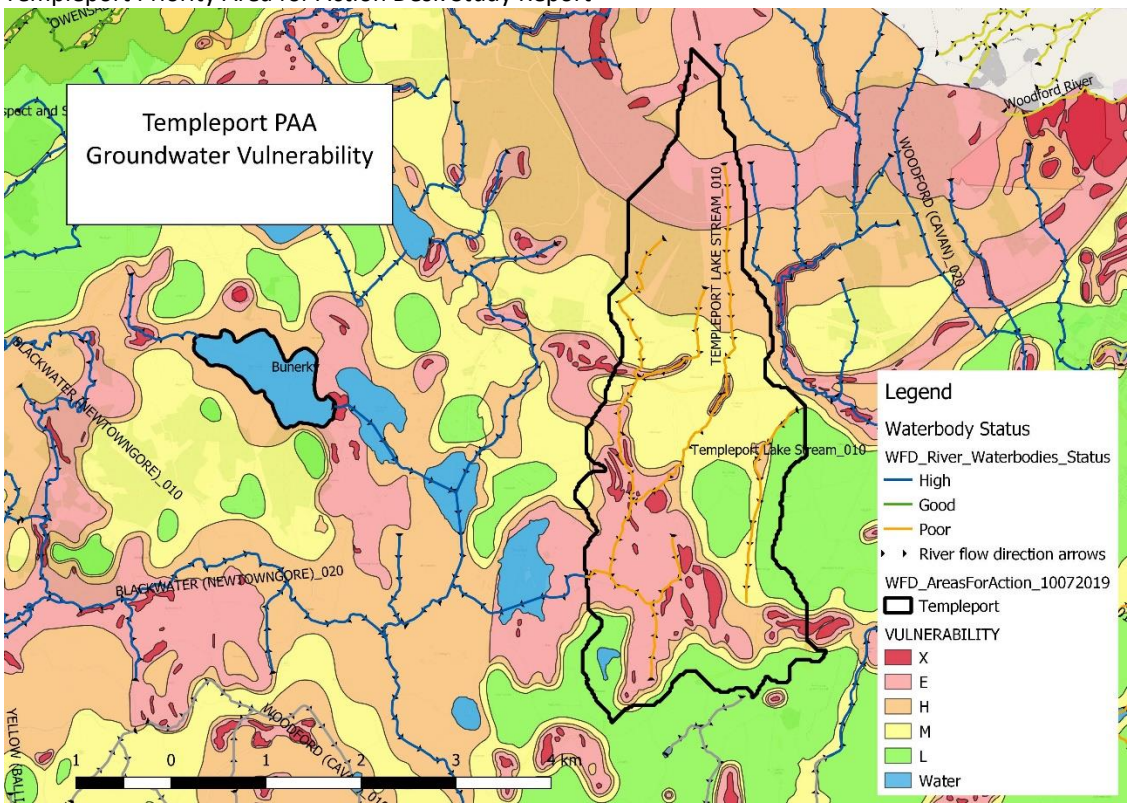


Figure 23 The groundwater vulnerability for the Templeport PAA