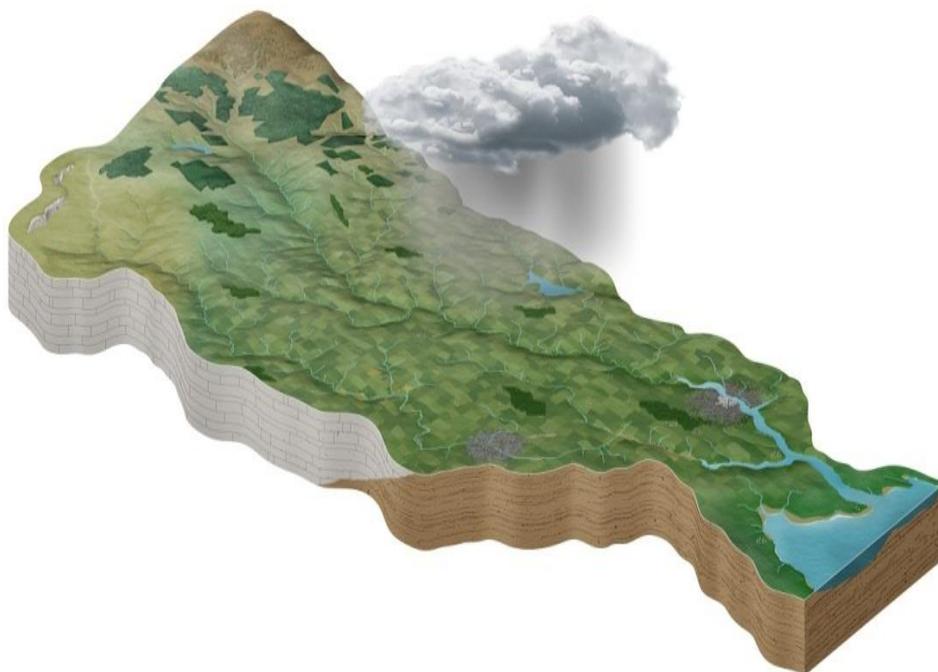


# Lower Shannon (Little Brosna) Catchment Assessment 2010-2015 (HA 25B)



**Catchment Science & Management Unit**

**Environmental Protection Agency**

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## Preface

This document provides a summary of the characterisation outcomes for the water resources of the Lower Shannon (Little Brosna) Catchment, which have been compiled and assessed by the EPA, with the assistance of local authorities and RPS consultants. The information presented includes status and risk categories of all water bodies, details on protected areas, significant issues, significant pressures, load reduction assessments, recommendations on future investigative assessments, areas for actions and environmental objectives. The characterisation assessments are based on information available to the end of 2015. Additional, more detailed characterisation information is available to public bodies on the EPA WFD Application via the EDEN portal, and more widely on the [catchments.ie](http://catchments.ie) website. The purpose of this document is to provide an overview of the situation in the catchment and help inform further action and analysis of appropriate measures and management strategies.

This document is supported by, and can be read in conjunction with, a series of other documents which provide explanations of the elements it contains:

1. An explanatory document setting out the full characterisation process, including water body, subcatchment and catchment characterisation.
2. The Final River Basin Management Plan, which can be accessed on: [www.catchments.ie](http://www.catchments.ie).
3. A published paper on Source Load Apportionment Modelling, which can be accessed at: <http://www.jstor.org/stable/10.3318/bioe.2016.22>
4. A published paper on the role of pathways in transferring nutrients to streams and the relevance to water quality management strategies, which can be accessed at: <http://www.jstor.org/stable/pdf/10.3318/bioe.2016.19.pdf>
5. An article on Investigative Assessments which can be accessed at: <https://www.catchments.ie/download/catchments-newsletter-sharing-science-stories-june-2016/>

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## 1 Introduction

This catchment covers an area of 982 km<sup>2</sup> and is characterised by a wide flat limestone plain, and an upland region of sandstones in the east comprising the western slopes of the Slieve Bloom Mountains and the low hills to the southwest of Roscrea. There are extensive sand and gravel deposits around Roscrea and Birr that form groundwater aquifers.

The River Shannon flows into the catchment at Shannonbridge, and heads southeast until it is joined from the northeast by the Blackwater (Shannonbridge) at Derryholmes, and the River Brosna near Banagher. The Rapemills River flows in from the east, and the Fynagh River then joins the Shannon before the Shannon flows south and around the islands of the Shannon Callows, where it is joined by the Little Brosna River.

This tributary consists of the Keeloge Stream, and the Kilcomin Stream, the Bunnow and Golden Grove River and the Camcor River, which enters at Birr. The Little Brosna then turns northwest, being joined by the Pallas River, before flowing into the Shannon at Friars Island.

The Shannon flows onward from the Callows to the southwest, entering the northern end of Lough Derg near Portumna.

The Upper Shannon (Little Brosna) catchment comprises seven subcatchments with 44 river water bodies (Table 1, Figure1). There are 12 groundwater bodies and no lakes, transitional or coastal water bodies.

Table 1. List of subcatchments in the Lower Shannon (Little Brosna) catchment

Subcatchment ID	Subcatchment Name
25B_1	Shannon[Lower]_SC_040
25B_2	Shannon[Lower]_SC_030
25B_3	Camcor_SC_010
25B_4	Shannon[Lower]_SC_050
25B_5	Shannon[Lower]_SC_060
25B_6	LittleBrosna_SC_010
25B_7	LittleBrosna_SC_020

## Overview

### Lower Shannon Catchment (25B)

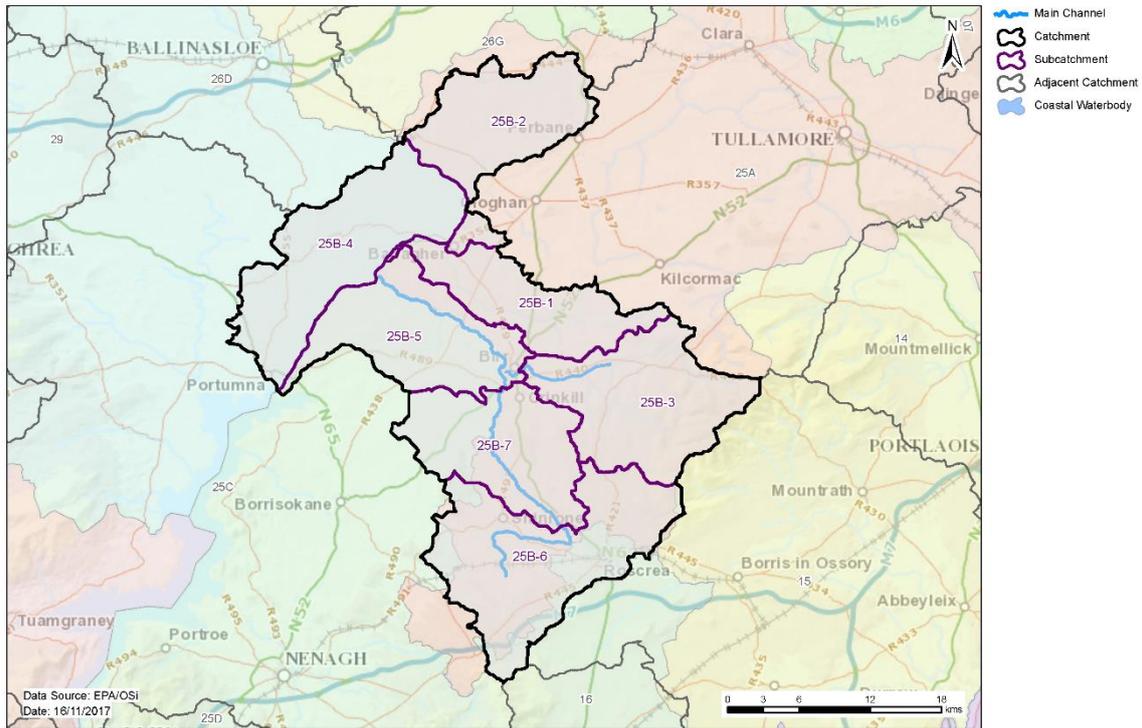


Figure 1. Subcatchments in the Lower Shannon (Little Brosna) catchment

## 2 Water body status and risk of not meeting environmental objectives

### 2.1 Surface water ecological status

#### 2.1.1 Rivers and lakes

- ◆ There were 18 (41%) river water bodies at Good or High status, and 15 (34%) at less than Good status in 2015 (Table 2, Figure 2). Eleven (25%) river water bodies are Unassigned. There are no lake water bodies in the catchment.
- ◆ Two river water bodies have a high ecological status objective (Camcor\_010 and Roscomore Stream\_010). In 2015, both water bodies were at High status (Figure 3, Appendix 1).
- ◆ The numbers of river water bodies at each status class in 2007-09 and 2010-15 are shown in Figure 4.
- ◆ Eleven river water bodies have an improved status and none have deteriorated since 2007-09 (Figure 5).
- ◆ The variation in nutrient concentrations and loads in the Little Brosna main channel is illustrated in Appendix 2.

Table 2. Summary of surface water body status and risk categories

	Number of water bodies	2010-15 Status						Risk Categories		
		High	Good	Mod	Poor	Bad	Unassigned	Not at Risk	Review	At Risk
Rivers	44	2	16	12	3	0	11	22	7	15

## WFD Surface Water Body Status 2010 - 2015

Lower Shannon Catchment (25B)

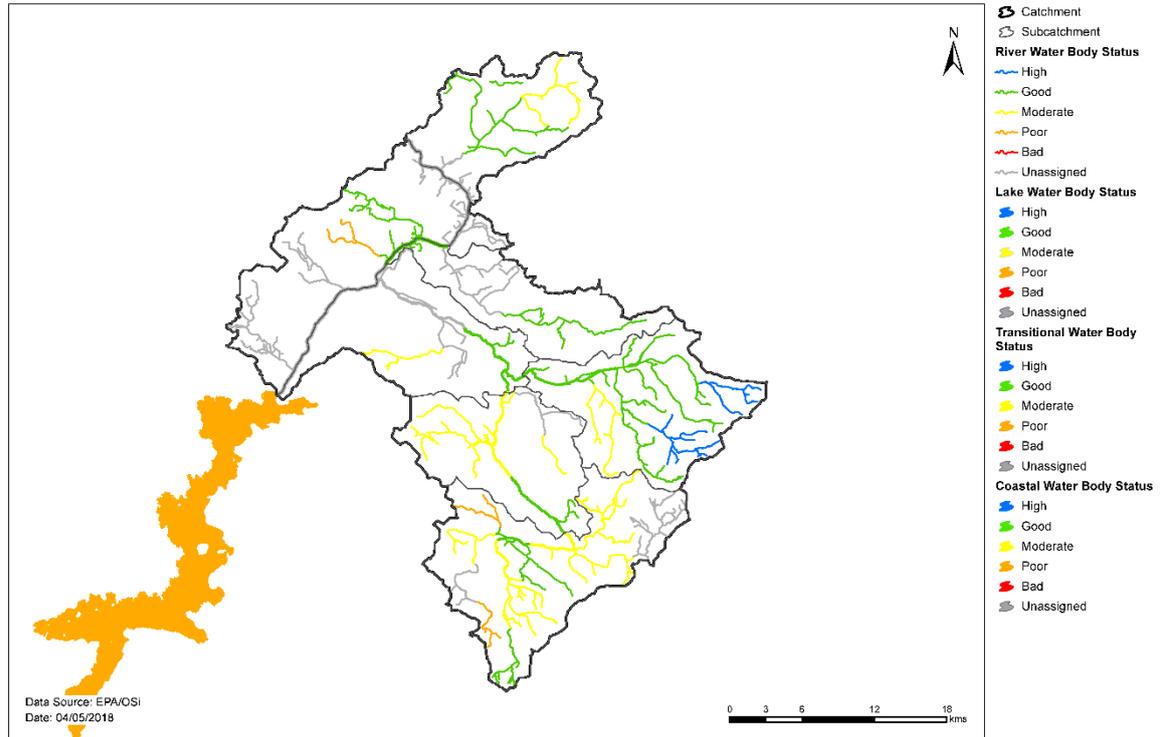


Figure 2. Surface water ecological status

## High Status Objective Water Bodies and Sites

Lower Shannon Catchment (25B)

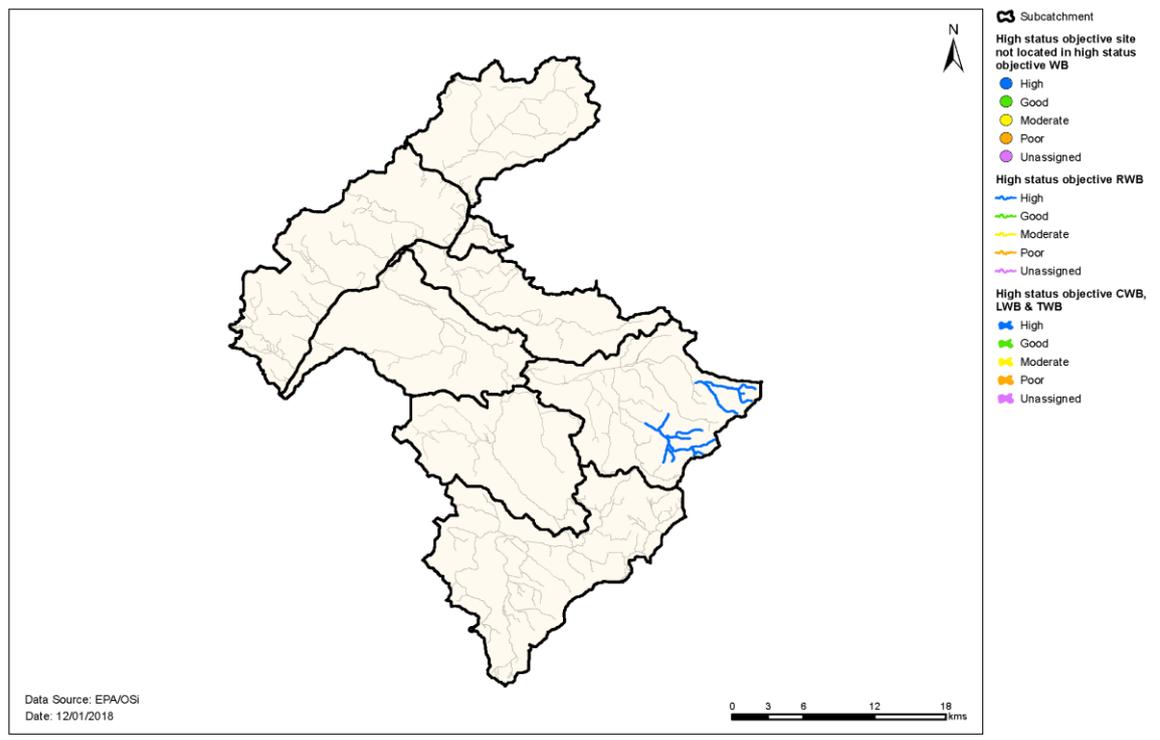


Figure 3. High ecological status objective water bodies

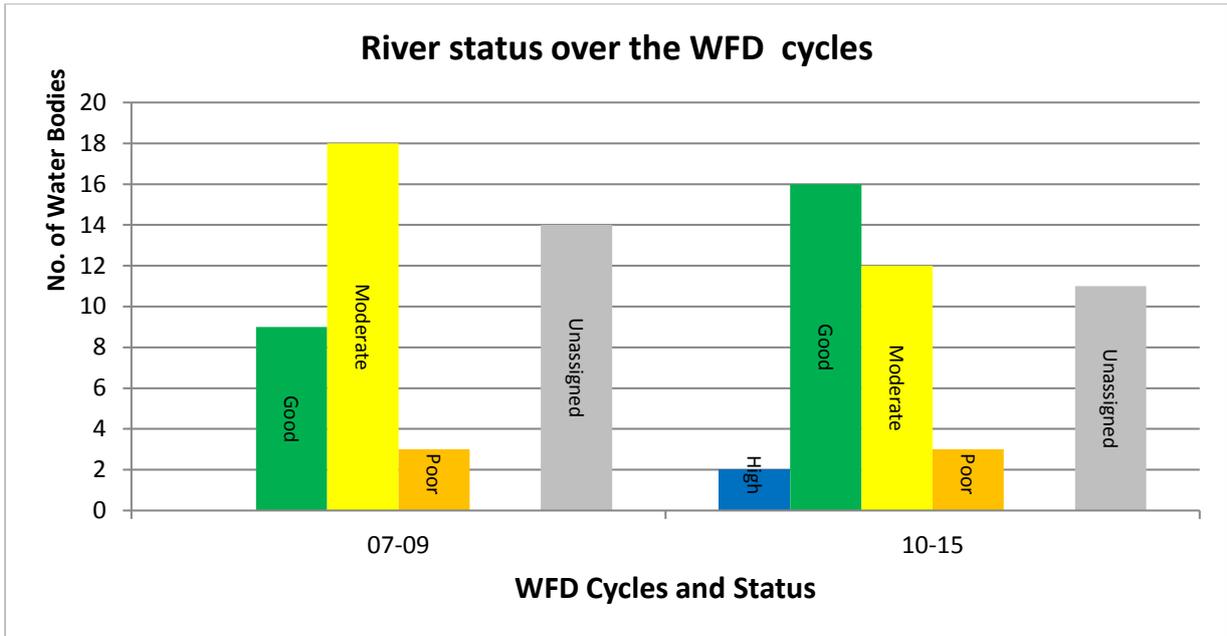


Figure 4. Number of rivers at each status class in 2007-09 and 2010-15

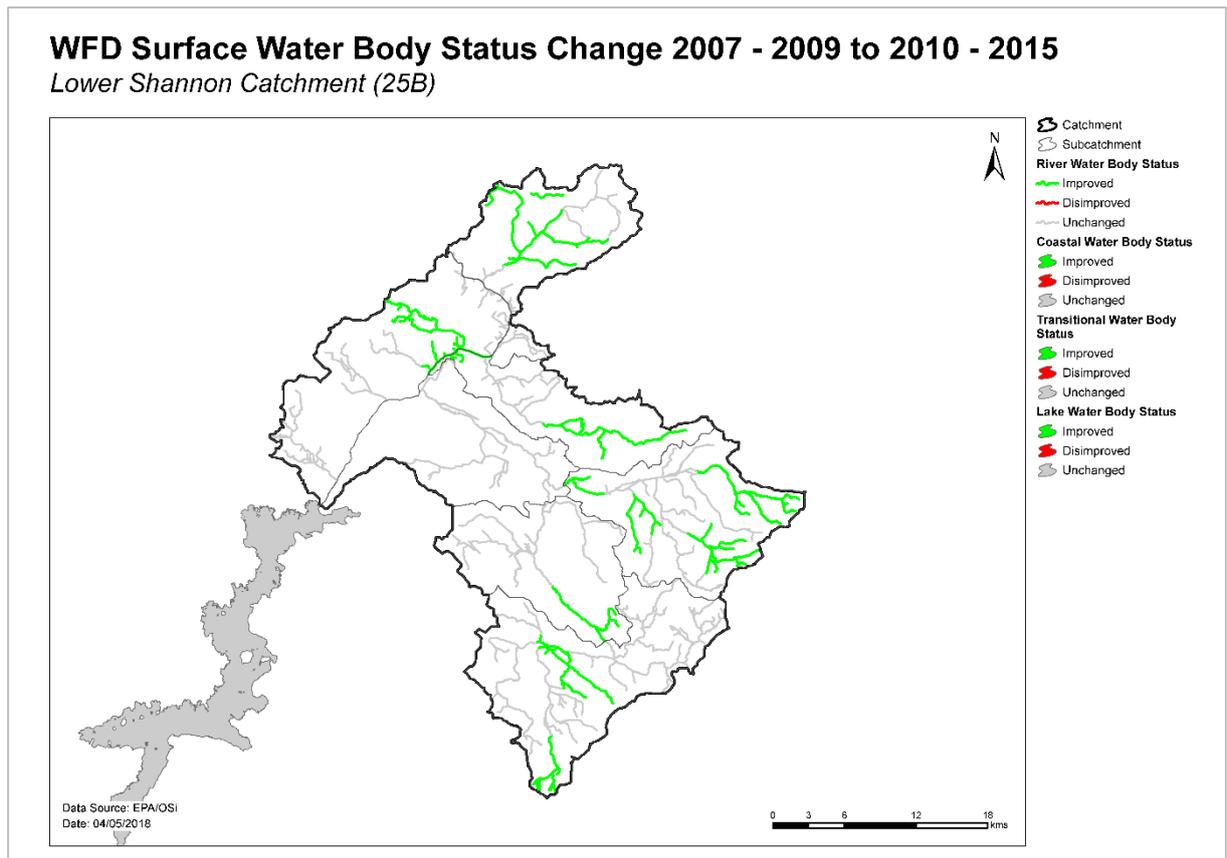


Figure 5. Surface water body status changes from 2007-09 to 2010-15

## 2.2 Groundwater status

- ◆ All 12 groundwater bodies were at Good status in 2015 (Table 3).

Table 3. Summary of groundwater body status and risk categories

	Number of water bodies	2010-15 Status		Risk Categories		
		Good	Poor	Not at Risk	Review	At Risk
Groundwater	12	12	0	6	6	0

## 2.3 Risk of not meeting surface water environmental objectives

### 2.3.1 Rivers

- ◆ There are 22 *Not at Risk* river water bodies (Figure 6, Table 2) which require no additional investigative assessment or measures to be applied, other than those measures that are already in place.
- ◆ There are seven river water bodies in *Review*. This applies to one water body where more information is required and six water bodies where measures have recently been implemented and improvements have not yet been realised.
- ◆ Fifteen surface water bodies in the catchment are *At Risk* of not meeting their water quality objectives. Measures will be needed in these water bodies to improve the water quality outcomes. Summary information for the *At Risk* water bodies is given in Appendix 3.

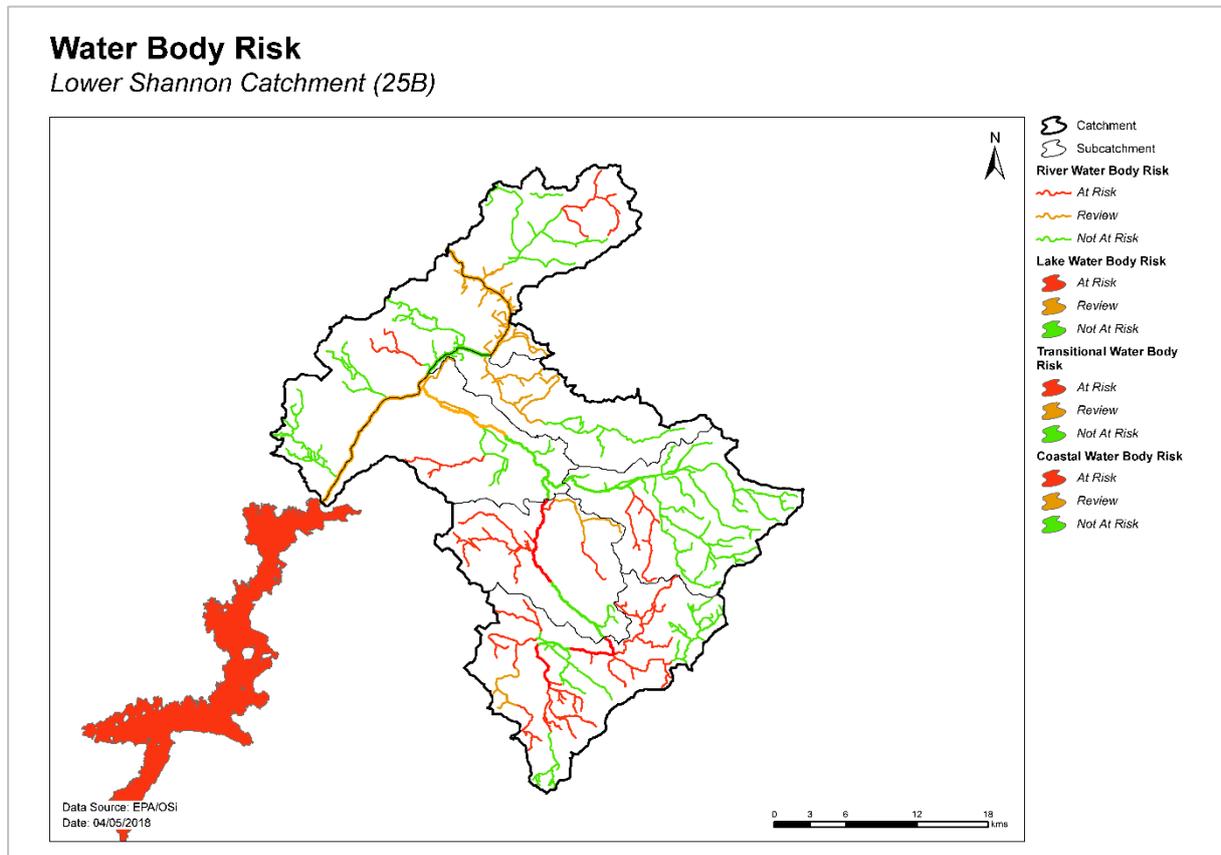


Figure 6. Surface water body risk

## 2.4 Risk of not meeting groundwater environmental objectives

- ◆ Six groundwater bodies are *Not at Risk* (Figure 7, Table 3) and require no additional investigative assessment or measures to be applied, other than those measures that are already in place.
- ◆ Six groundwater bodies are in *Review* (Figure 7) primarily due to elevated nitrate concentrations (6-year average) for Birr, Birr Gravels, Roscrea Gravels and Cloughjordan-Moneygall Gravels. Bredagh is in *Review* due to the potential of groundwater contribution of phosphate to associated surface water bodies, while GWDTE-Fin Lough Fen (SAC000571) is in *Review* due to drainage.
- ◆ No groundwater bodies are *At Risk* of not meeting their water quality objectives.

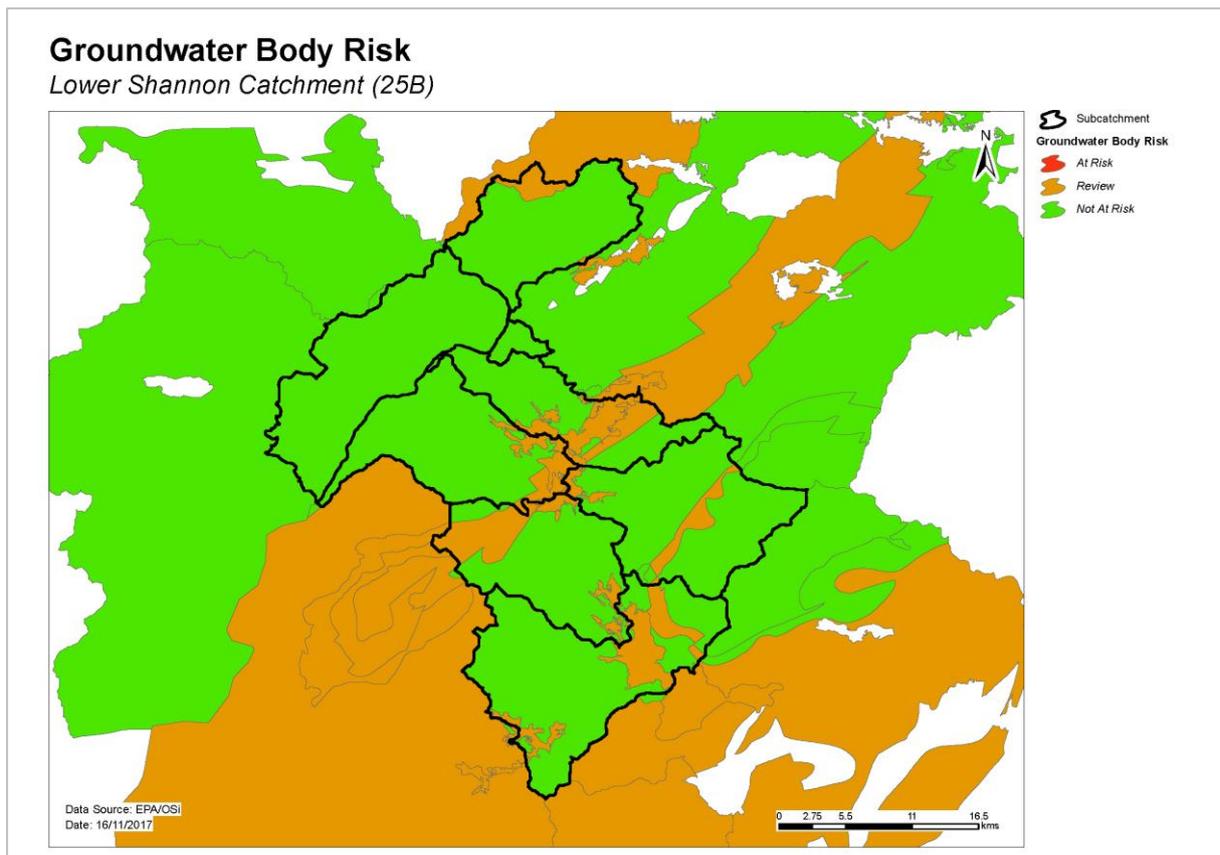


Figure 7. Groundwater body risk

## 2.5 Protected areas

### 2.5.1 Drinking water abstractions

- ◆ There are 25 abstractions in the Lower Shannon (Little Brosna) catchment comprising 10 public water schemes and seven private group scheme supplies (Appendix 4).
- ◆ Twenty-one of the abstractions are from 10 groundwater bodies and the remainder are from four river water bodies. The list of the public supplies and the associated water bodies is provided in Appendix 4.
- ◆ All sources were compliant with the standard for nitrate in 2015.
- ◆ All sources were compliant with the standard for pesticides in 2015.

### 2.5.2 Bathing waters

- ◆ There are no designated bathing waters in the catchment.

### 2.5.3 Shellfish areas

- ◆ There are no designated shellfish areas in the catchment.

### 2.5.4 Nutrient Sensitive Areas

- ◆ There is one designated Nutrient Sensitive Area (NSA) (Little Brosna (River)) in the catchment.
- ◆ The NSA is associated with Roscrea urban waste water treatment plant which has tertiary treatment and, therefore, is compliant with environmental objectives for NSAs.
- ◆ The details of the NSA, associated agglomeration and intersecting water bodies are provided in Table 4.

Table 4. Nutrient sensitive areas in the catchment

Nutrient Sensitive Area		Agglomeration		Intersecting water body		Objective met?		Comment
Name	Code	Name	Code	Name	Code	Yes	No	
Little Brosna (River)	IERI_SH_2001_0021	Roscrea	D0025	LITTLE BROSNA_020	IE_SH_25L020400	✓		Tertiary treatment is in place.
				LITTLE BROSNA_030	IE_SH_25L020600			

### 2.5.5 Natura 2000 Sites

- ◆ There are 16 Special Areas of Conservation (SACs) in the catchment (Table 6), not all of which have water quality and/or quantity conservation objectives for their qualifying interests.
- ◆ All three water bodies (Shinrone GWB, Banagher GWB, GWDTE-Fin Lough Fen (SAC000571)) with water dependent qualifying interests within these SACs have met their WFD Protected area objectives (Table 6).
- ◆ There are seven Special Protected Areas (SPAs) in the catchment:
  - All Saints Bog SPA
  - Dovegrove Callows SPA
  - Lough Derg (Shannon) SPA
  - Middle Shannon Callows SPA
  - Mongan Bog SPA
  - River Little Brosna Callows SPA
  - Slieve Bloom Mountains SPA

As there are no specific water quality and quantity supporting conditions identified in the site-specific conservation objectives for these SPAs, the intersecting water bodies are not assigned priority action for WFD protected area purposes in the second cycle.

## 2.6 Heavily modified water bodies

- ◆ There are no heavily modified water bodies (HMWBs) in the catchment.
- ◆ There are no artificially modified water bodies (AWBs) in the catchment.

## 3 Significant issues in *At Risk* water bodies

- ◆ Excess phosphorus leading to eutrophication is the dominant issue in the rivers.

- ◆ Alteration of hydromorphological (or physical) conditions are impacted including the input of excessive fine sediment. Such impacts have altered the morphology of water bodies and in turn, altered habitat conditions. This can occur because of activities including extensive modification, drainage schemes and unauthorised drainage works.
- ◆ No groundwater bodies are *At Risk* of not meeting their WFD objectives.

## 4 Significant pressures

### 4.1 Water bodies

- ◆ Where water bodies have been classed as *At Risk*, significant pressures have been identified.
- ◆ Figure 8 shows a breakdown of the number of *At Risk* water bodies in each significant pressure category for rivers.
- ◆ The significant pressure affecting the greatest number of water bodies is agriculture, followed by hydromorphological pressures, urban waste water, mines and quarries, other (aquaculture and unknown), industry, peat and forestry.

#### 4.1.1 River water bodies

- ◆ Significant pressures have been identified through the initial characterisation process in 15 river water bodies, nine of which have multiple pressures. The significant pressures will be refined as further characterisation is carried out. There are no lakes in the catchment.

#### 4.1.2 Groundwater

There are no groundwater bodies *At Risk* in the catchment.

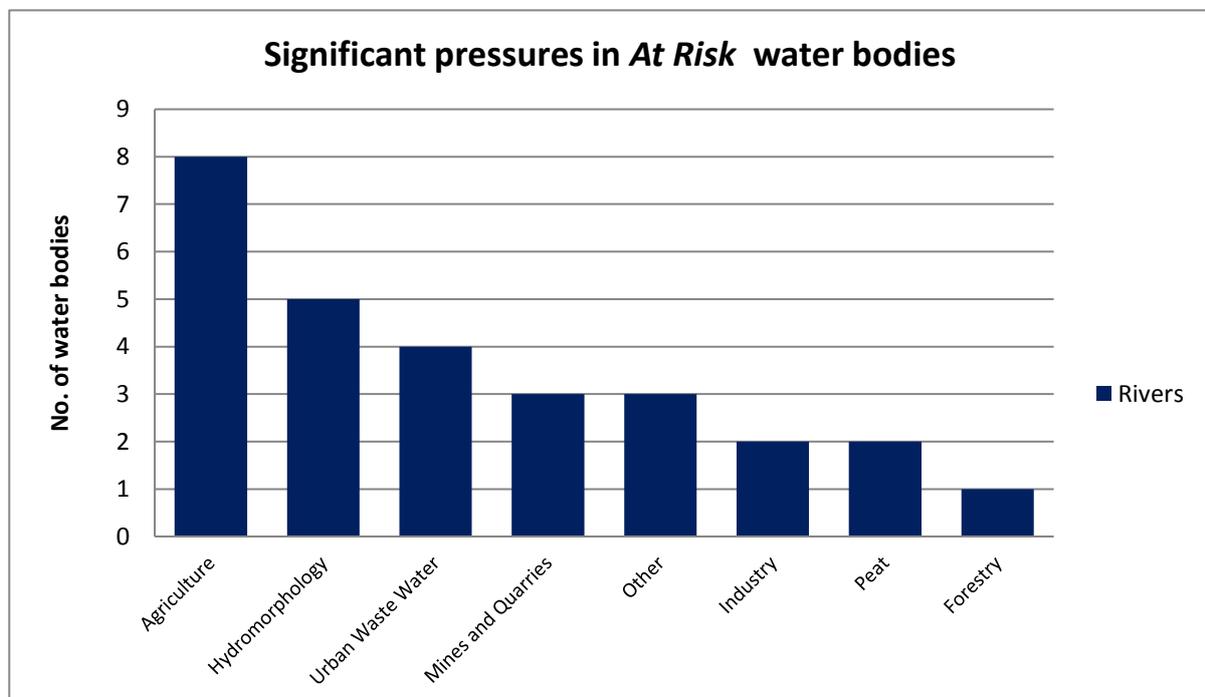


Figure 8. Significant pressures impacting on *At Risk* water bodies

## 4.2 Pressure type

### 4.2.1 Agriculture

- ◆ Agriculture is a significant pressure in eight water bodies (Figure 9, Appendix 3). The issues related to farming in this catchment are predominantly due to phosphorus loss to surface waters from, for example, direct discharges; or runoff from yards, roadways or other compacted surfaces, or runoff from poorly draining soils. Sediment can also be a problem from land drainage works or tillage, bank erosion from animal access or stream crossings. The pollution impact potential map showing areas of relative risk for phosphorus loss from agriculture to surface water is given in Appendix 6.

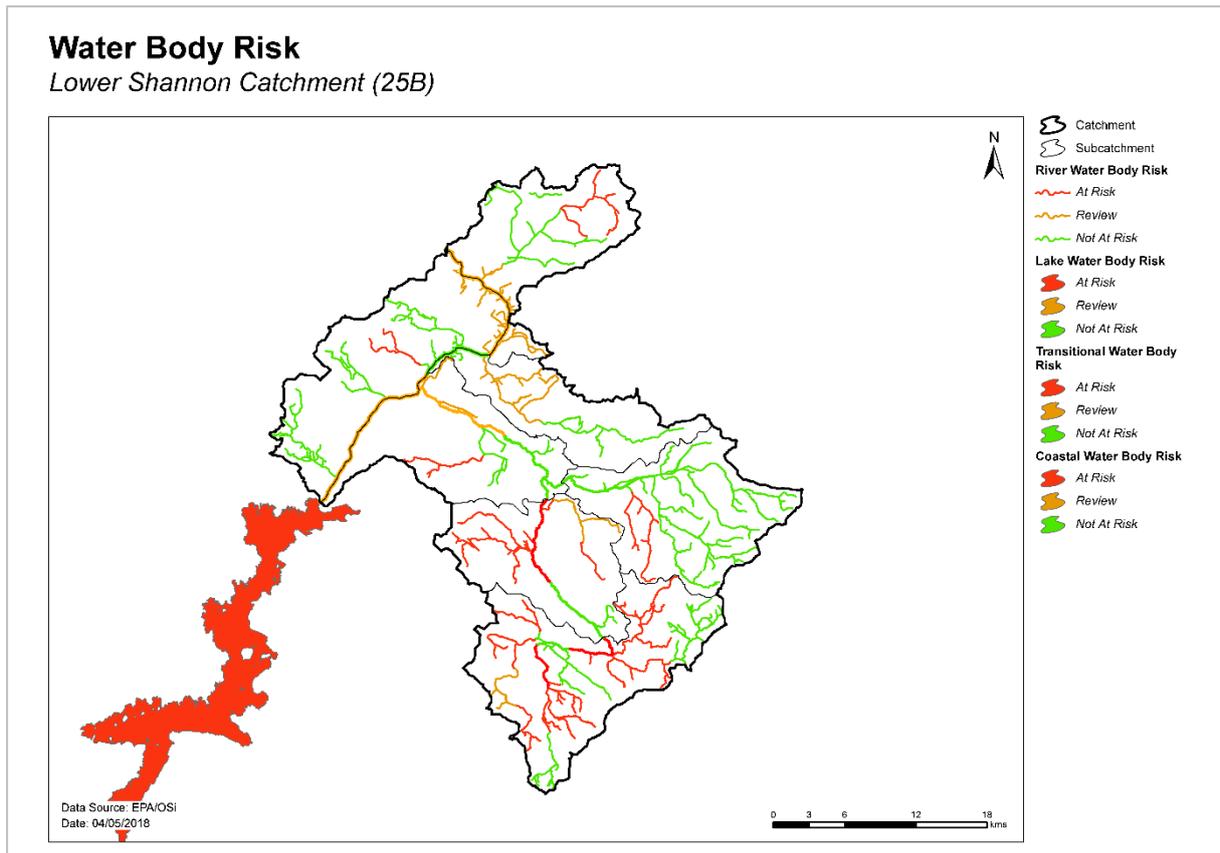


Figure 9. Water bodies that are *At Risk* and are impacted by agricultural activities

### 4.2.2 Hydromorphology

- ◆ Hydromorphology is a significant pressure in five water bodies, Eyrecourt Stream\_010, Kilcomin Stream\_030, Bunow\_020, Rock (Birr)\_010 and Little Brosna\_040. Extensive modification has occurred within three river water bodies of the Shannon [Lower] and Little Brosna subcatchments due to drainage schemes, and within one river water body of the Little Brosna sub catchment due to unauthorised drainage works. Such activities have led to excessive siltation. The degradation of bank protection has also contributed to the excessive input of fine sediment within a river water body of the Little Brosna sub catchment. Water bodies that are *At Risk* and impacted by hydromorphological pressures are shown in Figure 10 and listed in Appendix 3.

**At Risk Water Bodies where Hydromorphology is a significant pressure**  
Lower Shannon Catchment (25B)

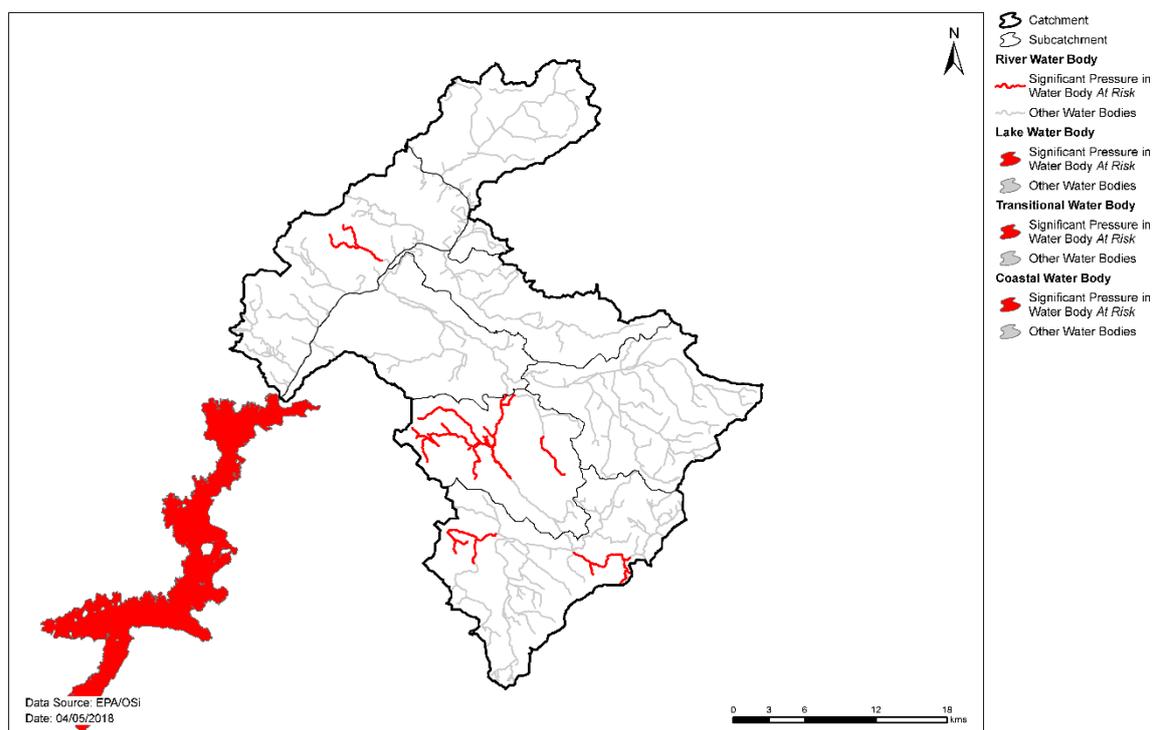


Figure 10. Water bodies that are *At Risk* and are impacted by hydromorphological pressures

#### 4.2.3 Urban waste water treatment plants

- ◆ Urban waste water treatment plants (WWTPs) have been highlighted as a significant pressure in four *At Risk* river water bodies; details are given in Table 5 and Figure 11. Eyrecourt Stream\_010, which is impacted by the Eyrecourt WWTP, is scheduled to be upgraded by 2023. Roscrea agglomeration network is scheduled to be upgraded by 2022, however, the WWTP, rather than the agglomeration network, has been identified as a significant pressure impacting Bunow\_020 and Little Brosna\_020.

Table 5. Waste Water Treatment Plants identified as Significant Pressures in *At Risk* water bodies and expected completion dates for associated upgrade works, where applicable.

Facility name	Facility Type	Water Body	2010-15 Ecological Status	Expected Completion Date
Eyrecourt D0375	500 to 1,000 p.e.	Eyrecourt Stream_010	Poor	2023
Roscrea D0025	> 10,000 p.e.	Bunow_020	Moderate	2022 <sup>1</sup>
Roscrea D0025	> 10,000 p.e.	Little Brosna_020	Moderate	2022 <sup>1</sup>
Coolderry A0166	< 500 p.e.	Rock (Birr)_010	Moderate	NA <sup>2</sup>

<sup>1</sup> Roscrea agglomeration network is scheduled to be upgraded by 2022, however, the WWTP, rather than the agglomeration network, has been identified as a significant pressure impacting Bunow\_020 and Little Brosna\_020.

<sup>2</sup> Currently not specified in improvement plans.

**At Risk Water Bodies where Urban Waste Water is a significant pressure**  
 Lower Shannon Catchment (25B)

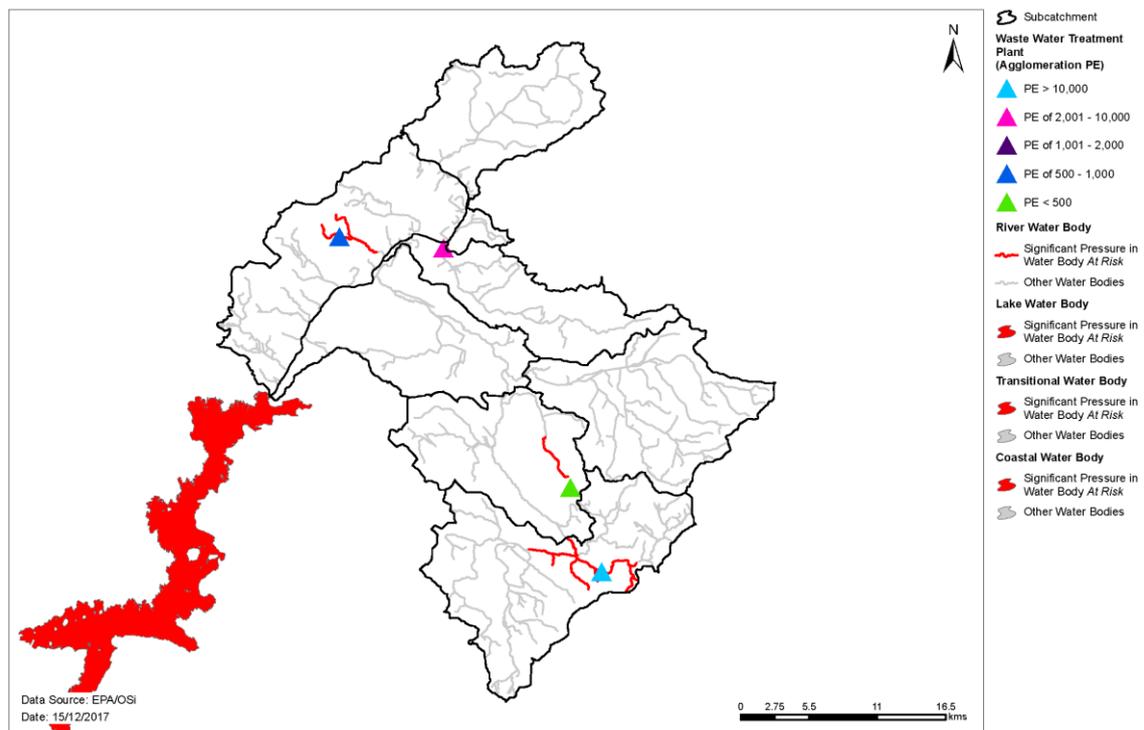


Figure 11. Water bodies that are *At Risk* and are impacted by urban waste water

#### 4.2.4 Extractive industry

##### ◆ *Mines & Quarries*

Quarries have been identified as a significant pressure in three water bodies, Clareen Stream/Fuarawn\_010, Clareen Stream/Fuarawn\_020 and Golden Grove Stream\_020. The quarries on the Clareen Stream/Fuarawn\_010 and \_020 have been known to cause extreme siltation with moderate to heavy siltation recorded at the monitoring site in 2014. The substrate is also calcareous. The quarry impacting the Golden Grove Stream\_010 is active and appears to be responsible for intermittent siltation issues (Figure 12).

##### ◆ *Peat*

Peat harvesting and drainage have been identified as significant pressures in two water bodies, Blackwater (Shannonbridge)\_010 and Little Brosna\_040 respectively (Figure 12). There has been intensive peat cutting in the Blackwater Bog which is contributing elevated phosphate. In the Little Brosna\_040 it is noted that there is some peat extraction however there is an extensive drainage network which has resulted in increased sediment loads, which alters habitats, morphology and hydrology.

**At Risk Water Bodies where *Extractive Industry* is a significant pressure**  
*Lower Shannon Catchment (25B)*

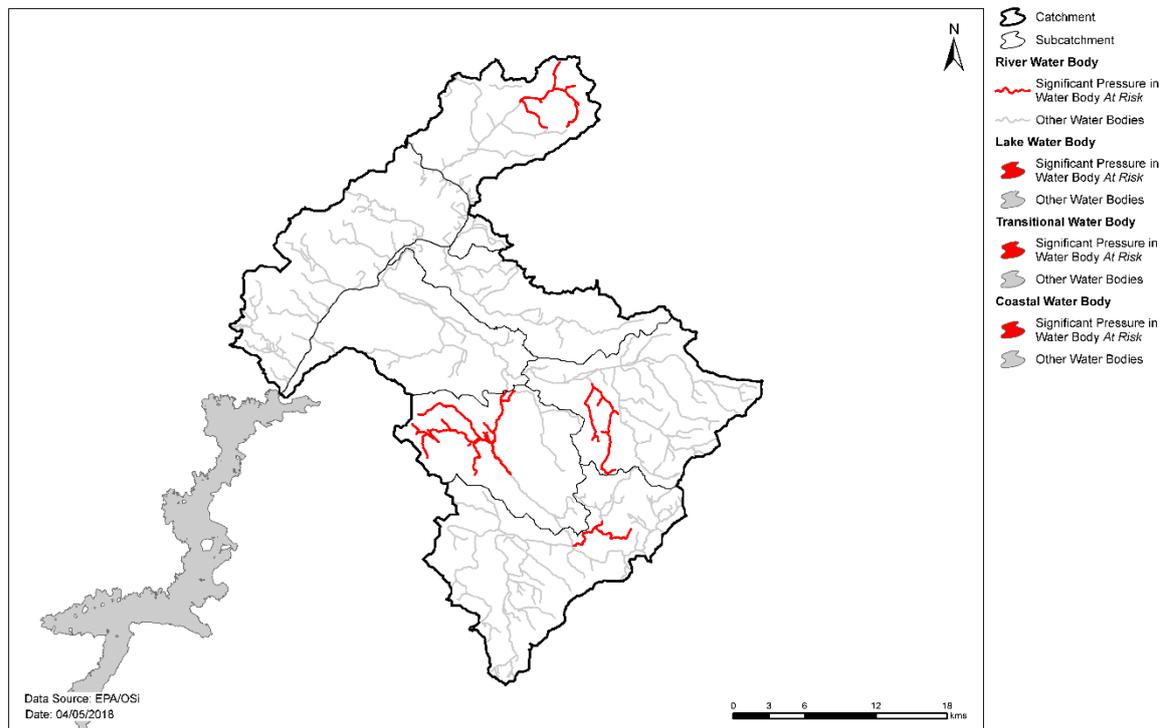


Figure 12. Water bodies that are *At Risk* and are impacted by extractive industry

#### 4.2.5 Other

##### *Aquaculture*

- ◆ Aquaculture has been identified as a significant pressure in two rivers, Golden Grove Stream\_020 and Bunow\_020 (Figure 13). There are two fish farms which have contributed to elevated concentrations of ammonia in the rivers.

##### *Anthropogenic unknown*

- ◆ There is an unknown significant pressure(s) on the Shinrone Stream\_010 river water body, which failed due to poor biology (Figure 14). This is notwithstanding that forestry has also been identified as a pressure.

#### 4.2.6 Industry

- ◆ Industrial discharges have been identified as a significant pressure in two rivers, Little Brosna\_020 and Bunow\_020 (Figure 15), with nutrient and organic concentrations being the main issues of concern.

#### 4.2.7 Forestry

- ◆ Forestry has been identified as a significant pressure in one water body, Shinrone Stream\_010 (Figure 16). The significant issue in the river is from silt due to general forestry activities in the upper reaches.

**At Risk Water Bodies where Aquaculture is a significant pressure**  
 Lower Shannon Catchment (25B)

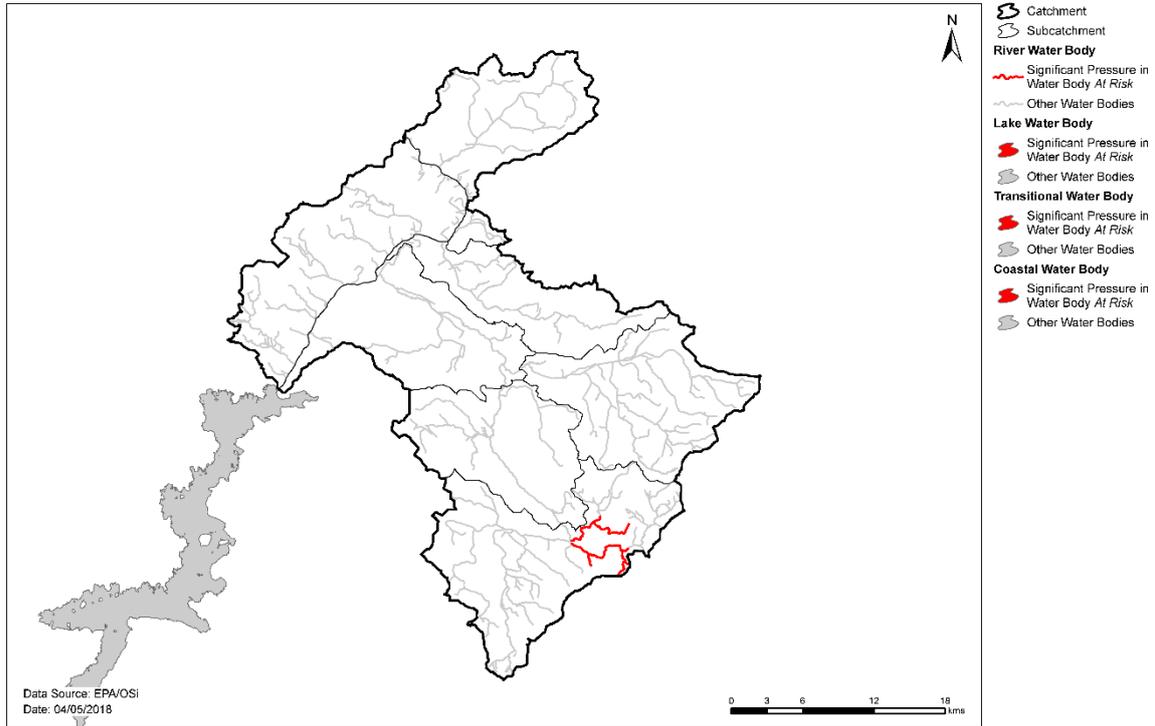


Figure 13. Water bodies that are *At Risk* and are impacted by aquaculture

**At Risk Water Bodies where Other Anthropogenic Pressures is a significant pressure**  
 Lower Shannon Catchment (25B)

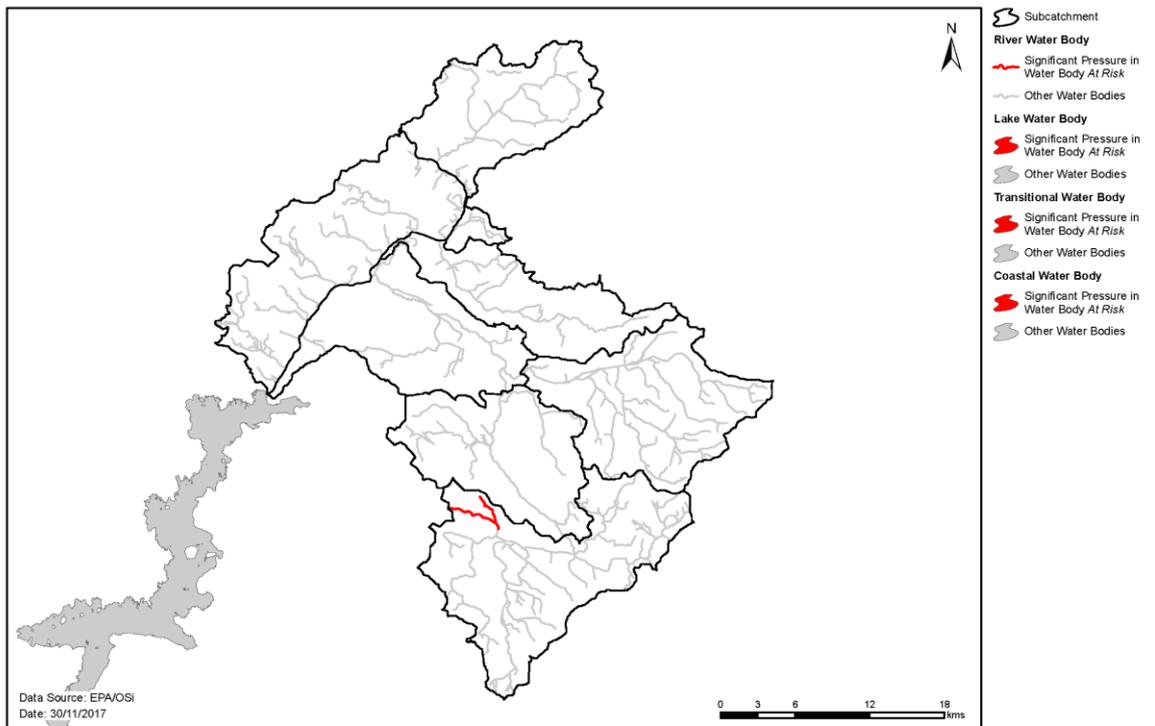


Figure 14. Water bodies that are *At Risk* and are impacted by other anthropogenic pressures

**At Risk Water Bodies where Industry is a significant pressure**  
 Lower Shannon Catchment (25B)

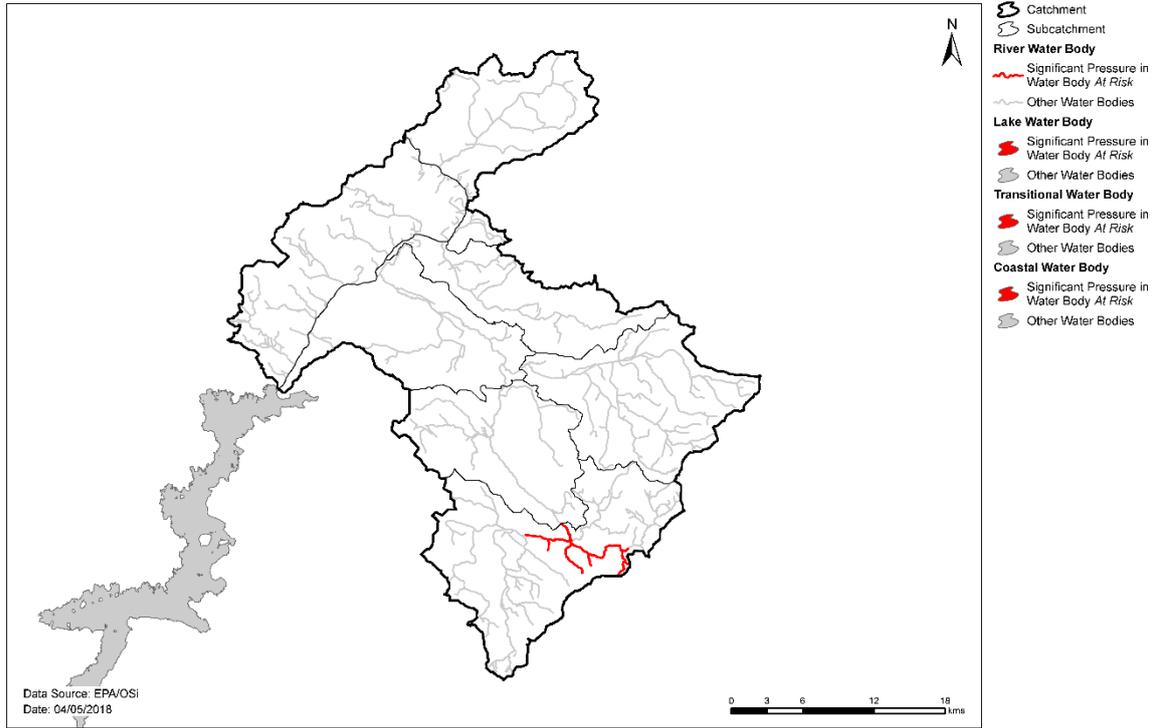


Figure 15. Water bodies that are *At Risk* and are impacted by industry

**At Risk Water Bodies where Forestry is a significant pressure**  
 Lower Shannon Catchment (25B)

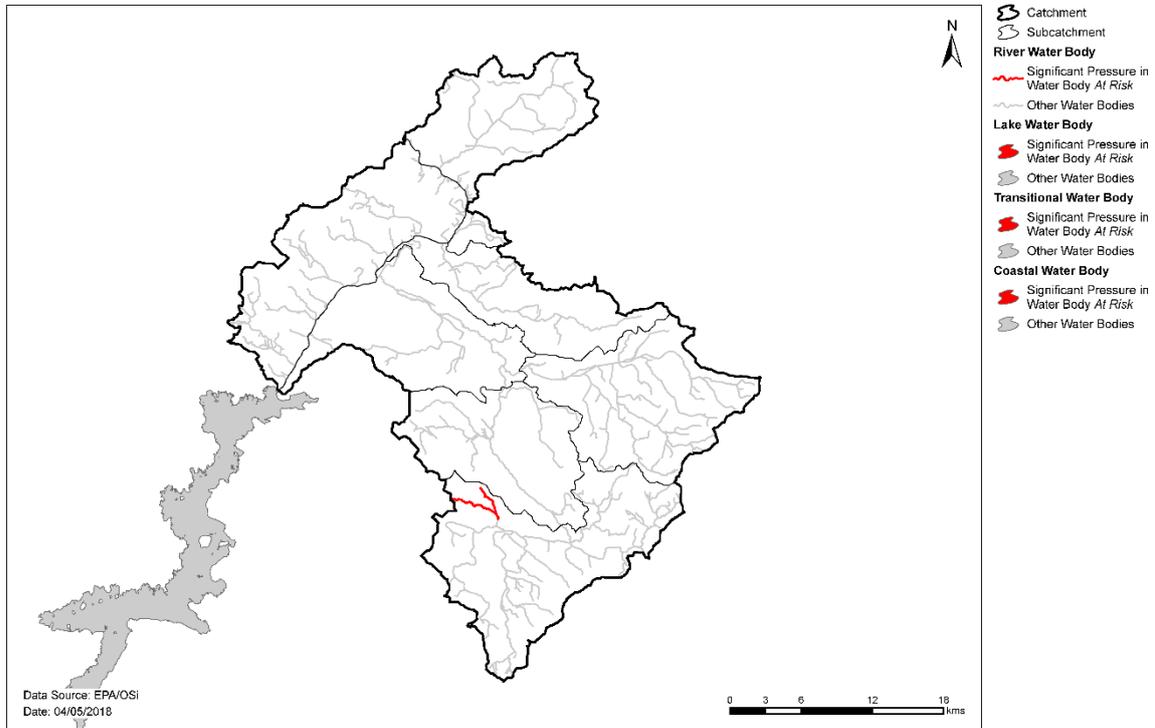


Figure 16. Water bodies that are *At Risk* and are impacted by forestry

## 5 Load reduction assessment

### 5.1 River water body load reductions

- ◆ For water bodies where phosphorus monitoring data are available, the reduction in P load that would be required to bring the mean concentration back to the EQS of 0.035 mg/l as P, can be estimated using a simple method based on the average 2013 to 2015 concentration and the average flow, or the estimated 30<sup>th</sup> percentile flow (Q30) where flow data are not available. The relative load reductions are ranked on a national scale from Very High (>1 kg/Ha/y), to High (0.5-1 kg/Ha/y), to Medium (0.25-0.5 kg/Ha/y) to Low (<0.25 kg/Ha/y). Note that P load reductions may also be required in other water bodies, but without chemistry monitoring data a quantitative estimate cannot be calculated.
- ◆ In the Lower Shannon (Little Brosna) catchment, water chemistry data are available for 12 stations within the 17 main channel water bodies. The available data indicate that load reductions are required in one river water body (Table 7).

Table 7. Relative load reductions required in monitored water bodies that are *At Risk*.

Water Body	P Load Reduction Required
Pallas_010	Low

## 6 Further Characterisation and local catchment assessments

- ◆ Further characterisation through local catchment assessments is needed in 15 of the *At Risk* river water bodies to refine the understanding of the significant pressures at the site/field scale so that specific and targeted measures can be identified.
- ◆ Further characterisation through local catchment assessments is needed in seven *Review* water bodies to refine the understanding of the significant pressures at the site/field scale so that specific and targeted measures can be identified.
- ◆ Brief definitions on the 10 IA assessment scenarios are given in Appendix 7 and the number of IAs required for each scenario are given in Table 7.

Table 8. Local catchment assessment allocation for *At Risk* and *Review* river water bodies

Risk	IA 1	IA 2	IA 3	IA 4	IA 5	IA 6	IA 7	IA 8	IA 9	IA 10	Total
<b>At Risk</b>	6	0	4	0	2	0	9	0	0	0	<b>21</b>
<b>Review</b>	3	0	6	0	0	1	0	0	0	0	<b>10</b>

Note water bodies may have multiple categories of Local Catchment Assessments

## 7 Catchment summary

- ◆ Of the 44 river water bodies, 15 are *At Risk* of not meeting their WFD objectives.
- ◆ Excess nutrient loss, mainly phosphate, leading to eutrophication is an issue for rivers in the catchment. The significant pressures relating to excess nutrients are primarily agricultural (diffuse), but also urban waste water, peat, industrial discharges, aquaculture and forestry. In the case of Shinrone Stream\_010 there is also an unknown pressure which is causing an impact to invertebrates.
- ◆ Hydromorphological (or physical) conditions (including the input of high levels of fine sediment and poor habitat quality) are also a major issue for several surface water bodies.

- ◆ There are no *At Risk* groundwater bodies in the catchment. Six groundwater bodies are in *Review*, primarily due to elevated nitrate concentrations but also drainage and potential contribution of phosphate to *At Risk* surface waters.

## 8 Areas for Action

The characterisation outcomes described above have highlighted that there is significant work to do in the catchment to protect and restore water quality, and meet the objectives of the WFD. During the development of the draft river basin management plan it became apparent that there would be a need to prioritise areas for collective action so that the best return on investment could be achieved. 190 Areas for action have been selected nationally in a process as described below. There are 3 areas for action in the Lower Shannon/Little Brosna catchment.

### 8.1 Process of selection

Following the publication of the draft river basin management plan in early 2017, the EPA and the Local Authority Waters and Communities Office (LAWCO) jointly led a collaborative regional workshop process to determine where, from a technical and scientific perspective, actions should be prioritised in the second cycle. The prioritisation process was based on the priorities in the draft river basin management plan, the evidence from the characterisation process, and the expertise, data and knowledge of public body staff with responsibilities for water and the different pressure types. The recommended areas for action selected during the workshops were then agreed by the Water and Environmental Regional Committees.

The recommended areas for action are an initial list of areas where action will be carried out in the second cycle. All water bodies that are *At Risk* still however, need to be addressed. As issues are resolved, areas for action will be removed from the list and new areas will be added. If additional monitoring shows that new issues have arisen, new areas may become a priority and may need to be added to the work programme.

The initial list of areas for action is not therefore considered as a closed or finite list; it simply represents the initial areas where work will be carried out during the second WFD planning cycle from 2018 to 2021.

### 8.2 Outcomes of process

The outcomes for the Lower Shannon (Little Brosna) catchment are summarised below.

- ◆ Three recommended areas for action (Table 9, Figure 17) were selected.
- ◆ These are the Clareen, Little Brosna\_040 and Bunow.
- ◆ These include four *At Risk* river water bodies.
- ◆ One groundwater bodies, which is in *Review* due to groundwater contribution of nutrients to surface water bodies, intersects with one of the recommended areas for action, see Table 10. Actions taken to improve surface water will need to take account of the groundwater contribution to surface water.

The remaining 18 *At Risk* and *Review* surface water bodies were not included in the recommended areas for action for the second cycle. The distribution of these is presented in Figure 18. These include:

- ◆ eighteen river water bodies – 11 *At Risk* and seven *Review*

Table 9. Recommended Areas for Action in the Lower Shannon (Little Brosna) Catchment

Recommended area for action	Number of water bodies	SCs	Local authority	Reason for Selection
Clareen	2	25B_3	Offaly	<ul style="list-style-type: none"> <li>• Building on existing knowledge from works completed by Offaly County Council.</li> <li>• Manageable area.</li> <li>• Large Group water scheme in the area.</li> </ul>
Little Brosna_040	1	25B_7	Offaly	<ul style="list-style-type: none"> <li>• Little Brosna_040 returned to good in 2010-12.</li> <li>• Sharavoge Bog is in the area; important raised bog.</li> <li>• Riverstown drinking water abstraction in area.</li> </ul>
Bunow	1	25b_6	Tipperary Laois Offaly	<ul style="list-style-type: none"> <li>• Build on ongoing work by Tipperary County Council.</li> <li>• Important for rural town (Roscrea) that it flows through.</li> </ul>

Table 10. Groundwater bodies intersecting with surface water bodies in recommended areas for action

Groundwater body			Intersecting water body		Recommended Area for Action
Code	Name	Risk	Code	Name	
IE_SH_G_045	Bredagh	Review	IE_SH_25C130200	CLAREEN STREAM/FUARAWN_010	Clareen Project

## 9 Environmental Objectives

The environmental objectives are the target status for each *At Risk* or *Review* water body and the date by which that status is expected to be achieved (Appendix 3). Where a water body is *Not at Risk* and is already at its target status, the environmental objective is deemed to have been met.

### 9.1 Surface Water

- ◆ Assuming resources are available and actions are taken in the recommended areas for action, of the four *At Risk* river water bodies, it is predicted that all four will achieve their objective by 2027, see Table 11.

Table 11. Environmental objective dates for river water bodies in the Areas for Action

<b>Risk Category</b>	<b>No. of Water Bodies</b>	<b>No. of WBs for 2021 Improvement</b>	<b>No. of WBs for 2027 Status Improvement</b>
<i>At Risk</i>	4	0	4
<i>Review</i>	0	0	0
<i>Not at Risk</i>	0	0	0
<i>Total</i>	4	0	4

- ◆ Twenty-two water bodies have met their 2015 environmental objective.
- ◆ As action is not yet planned to be taken in the remaining 11 *At Risk* surface water bodies, a 2027 date is applied to these water bodies.
- ◆ For the seven *Review* surface water bodies, the absence of information on these water bodies means that there is no scientific basis to quantify an environmental objective date and therefore a 2027 date is applied, see Table 12.

Table 12: Environmental objectives dates in the *At Risk* and *Review* surface water bodies not included in Areas for Action

<b>Risk Category</b>	<b>No. of Water Bodies</b>	<b>No. of WBs for 2021 Improvement</b>	<b>No. of WBs for 2027 Status Improvement</b>
<b>Rivers</b>			
<i>At Risk</i>	11	0	11
<i>Review</i>	7	0	7
<b>Total</b>	18	0	18

## 9.2 Groundwater

- ◆ All twelve groundwater bodies in the catchment are Good status and, therefore, have met their environmental objectives.

## 10 Acknowledgements

This Lower Shannon (Little Brosna) Catchment Assessment (Version 1) has been produced by the Catchment Science & Management Unit, EPA, with the assistance of the following:

- Offaly County Council.
- Tipperary County Council.
- Galway County Council.
- Inland Fisheries Ireland.
- Local Authorities Waters & Communities Office.
- Irish Water.
- RPS Group.
- Ecological Monitoring & Assessment Unit, EPA.
- Hydrometric & Groundwater Section, EPA.
- Informatics Section, EPA.
- Laboratories, EPA.
- Office of Environmental Enforcement, EPA.
- Department of Housing, Planning and Local Government.

- DAFM Forest Service.
- DAFM Agriculture.
- Bord Na Mona.
- Coillte.
- Teagasc.
- Geological Survey Ireland.
- National Federation of Group Water Schemes.
- National Parks and Wildlife Service.
- National Water Forum.
- Waterways Ireland.

## Recommended Areas for Action Lower Shannon Catchment (25B)

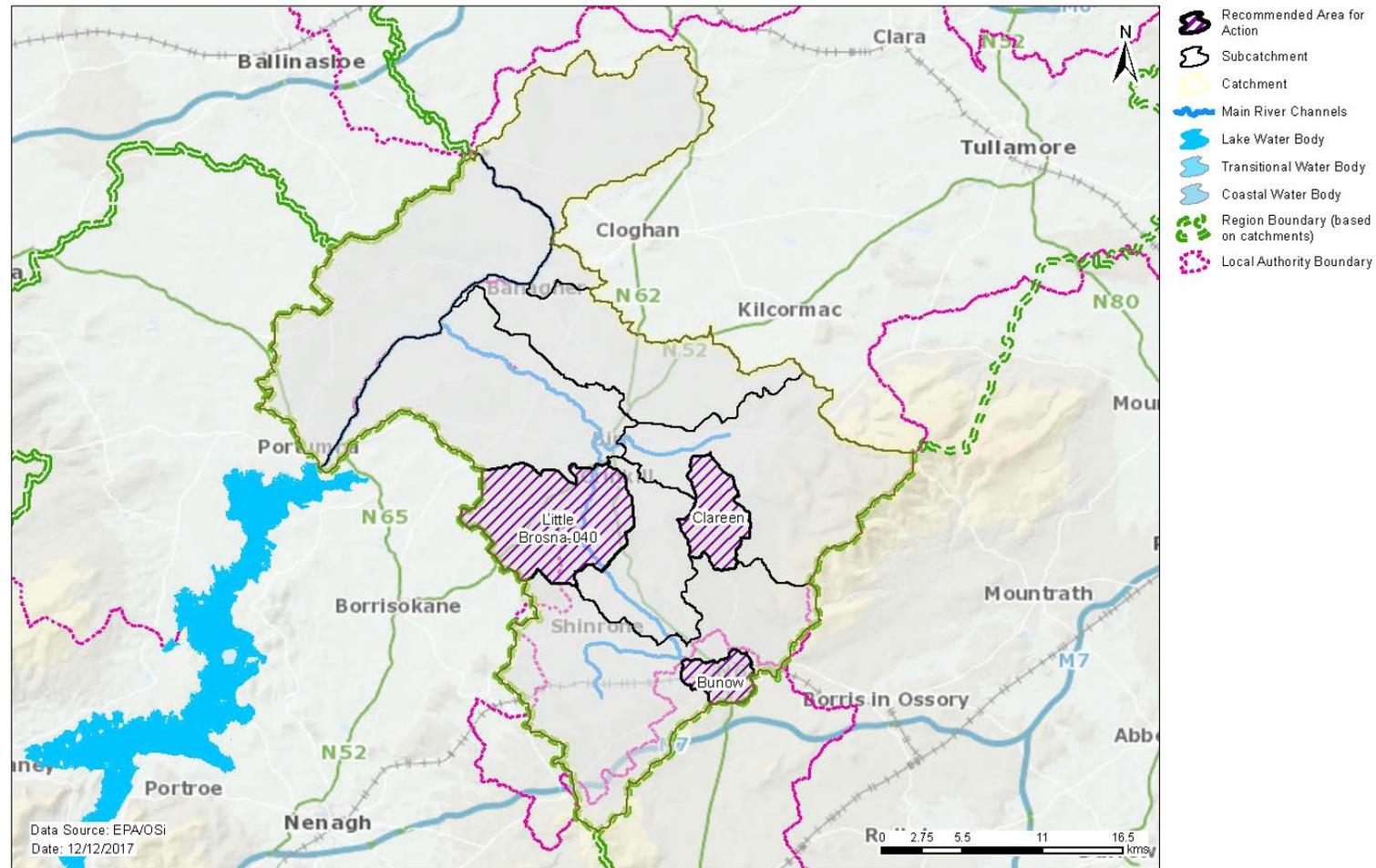


Figure 17. Location of Recommended Areas for Action in the Lower Shannon (Little Brosna) Catchment

## Remaining *At Risk* and *Review* Water Bodies

### Lower Shannon Catchment (25B)

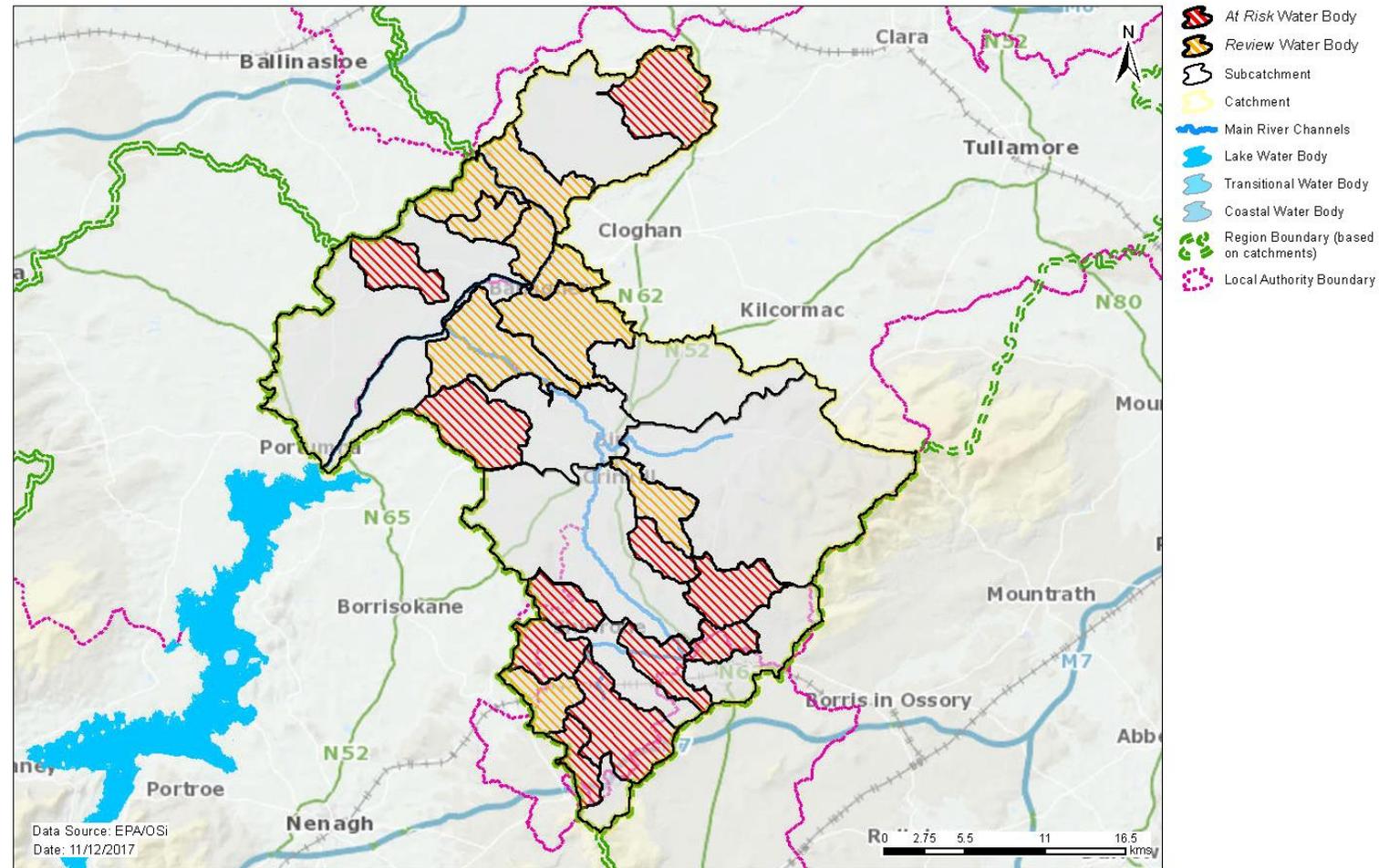


Figure 18. Location of *At Risk* and *Review* water bodies located outside Recommended Areas for Action in the Lower Shannon (Little Brosna) Catchment

## Appendix 1 High ecological status objective water bodies and sites

Water body/Site	Type	Codes	2015 Status
Camcor_010	River	IE_SH_25C020100	High
Roscomore Stream_010	River	IE_SH_25R050100	High

# Appendix 2 Catchment scale nutrient concentrations and in-stream loads

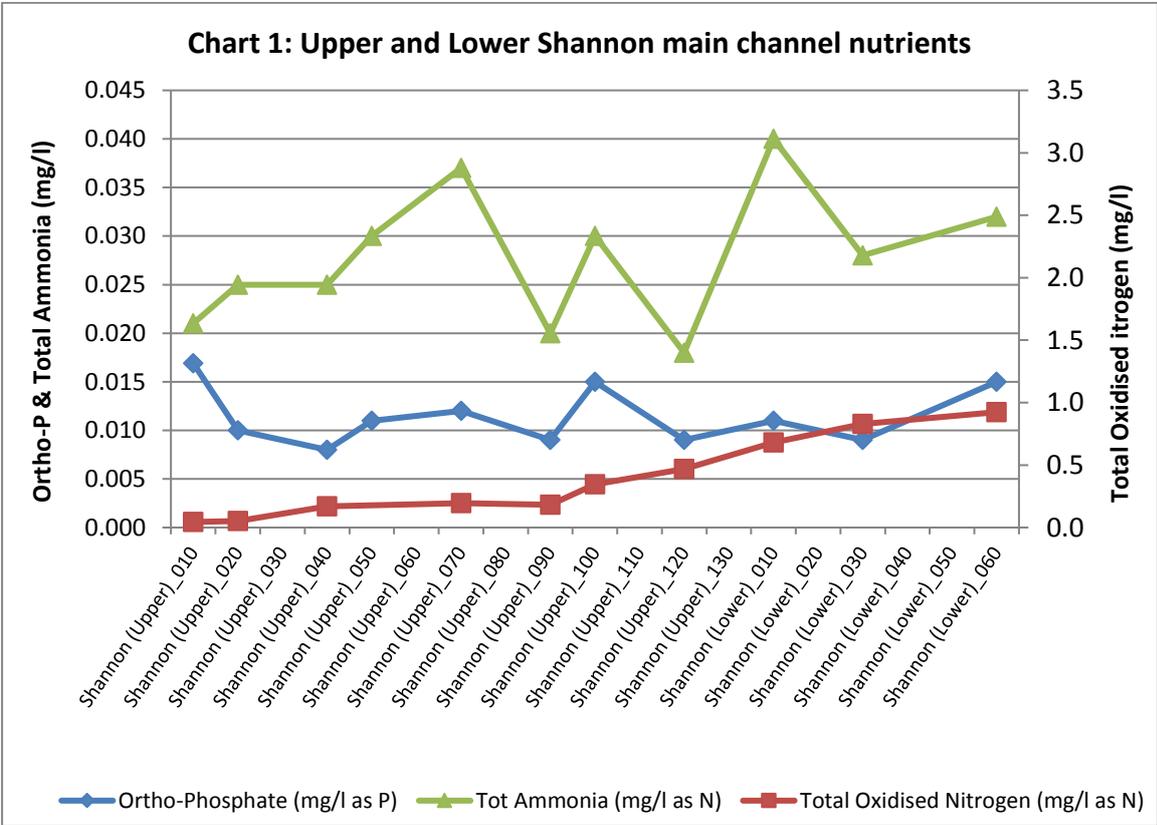
## River Shannon Main Channel Nutrient Trends

The results of the instream water quality assessment for the Shannon (Upper and Lower) main channel are illustrated in Chart 1. Only 12 of the 17 main channel water bodies have water quality data associated with them. The assessment is based on the mean concentrations between 2013 and 2015 at each monitoring site available.

The results show that average nutrients concentrations in the Shannon main channel are below their corresponding threshold values. Concentrations of orthophosphate range from 0.008 to 0.017mg/l, with the highest concentration observed in the headwater SHANNON (UPPER)\_010. Small spikes of orthophosphates are observed in the SHANNON (UPPER)\_100, which receives water from the FEORISH (TARMONBARRY)\_020 of poor ecological status, and the SHANNON (LOWER)\_060 which is the receives the primary discharge from the Castleroy Waste Water Treatment Plant (WWTP).

Ammonia concentrations show no significant trend along the main channel and range from 0.018 to 0.037mg/l. The small concentration spikes of ammonia are observed in SHANNON (UPPER)\_070 and SHANNON (LOWER)\_010. The SHANNON (UPPER)\_070 is the receiving water body for several small WWTPs including Dromod, Drumsna, Jamestown and Roosky & Environs. The SHANNON (LOWER)\_010 is the receiving water body for the Banagher WWTP.

TON concentrations are low at the head waters but increase from 0.018mg/l in the SHANNON\_090 (Upper)\_090 to 0.92mg/l in the SHANNON (LOWER)\_060. TON remains well below the 2.6mg/l threshold value throughout the channel.

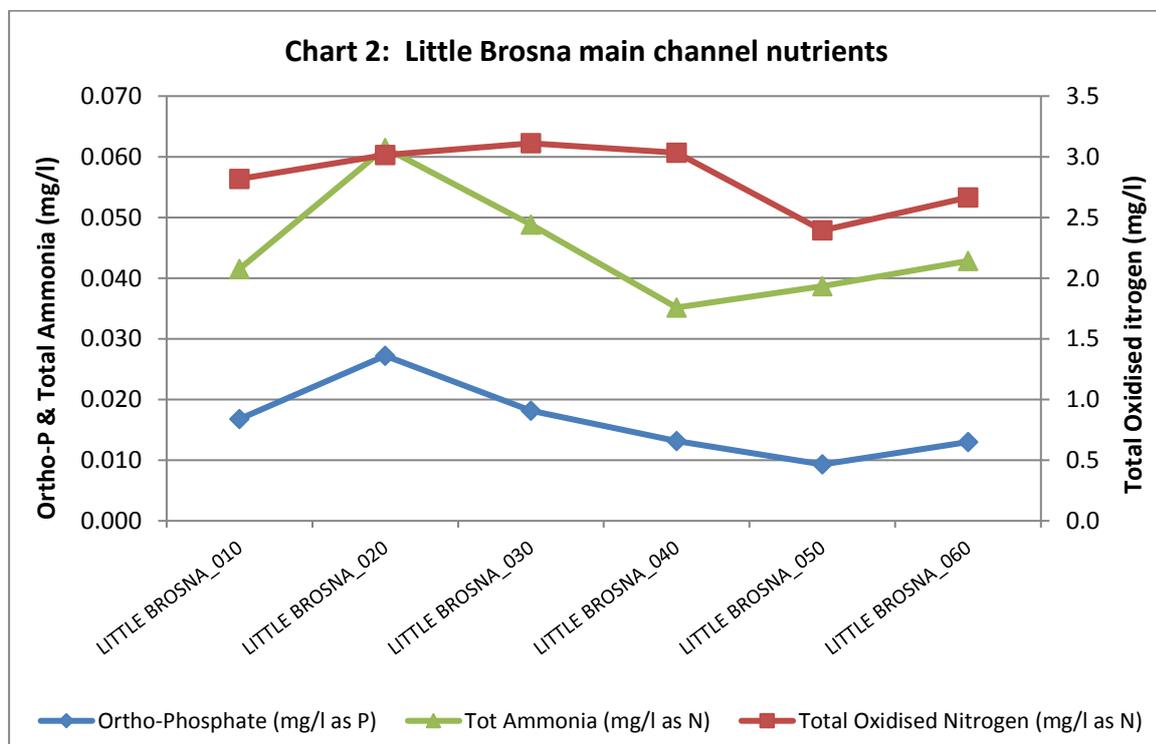


## 25B Lower Shannon Main Channel Nutrient Trends

The Little Brosna River is the main river in the 25B Lower Shannon catchment which flows into the INCHERKY\_010. INCHERKY\_010 flows into SHANNON (LOWER)\_030 which is also the receiving water body for SHANNON (LOWER)\_020, GORTAHA\_010 and CARROWNAFINNOGE\_010.

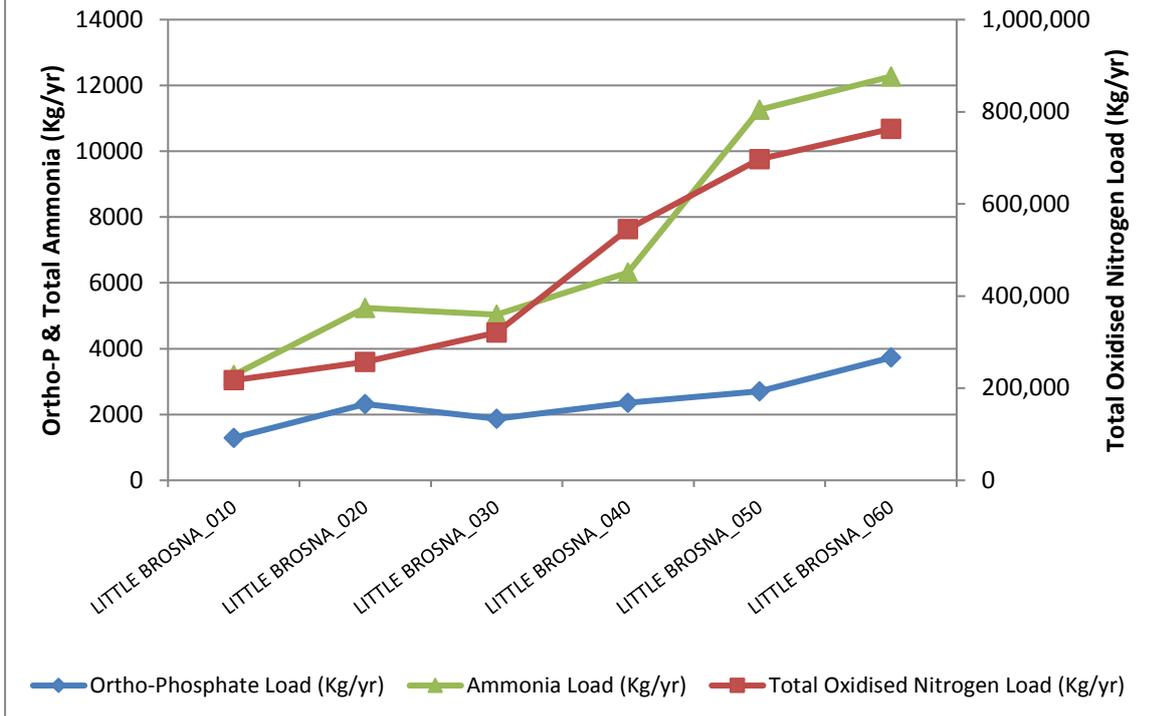
The results for the Little Brosna water quality trend assessment are presented in Chart 2. Average orthophosphate concentrations throughout the main channel are moderately low ranging from 0.009 to 0.027mg/l and remain below the Environmental Quality Standard (EQS) of 0.035mg/l. Average ammonia baseline concentrations range from 0.035 to 0.061mg/l and do not exceed the EQS of 0.065mg/l. A relative spike in both orthophosphate and ammonia occurs at LITTLE BROSNA\_020.

TON concentrations are moderately elevated ranging from 2.39 to 3.11mg/l and are consistently above the 2.6mg/l threshold value. The highest concentration of TON corresponds to Little Brosna\_030.



The results for the Little Brosna nutrient loading trend assessment are presented in Chart 3. In the Little Brosna channel, stream discharge increases from the headwaters at LITTLE BROSNA\_010 to BROSNA\_060, ranging from 2.4 to 9.1m<sup>3</sup>/sec. Orthophosphate, TON and ammonia loads typically increase downstream corresponding to increasing flow along the channel. Despite a general trend of decreasing nutrient concentrations downstream of LITTLE BROSNA\_020, the relative increase in stream discharge was greater than the decrease in concentration. As a result, orthophosphate, TON and ammonia loads increased downstream.

**Chart 3: Little Brosna main channel nutrient loading**



### Appendix 3 Summary information on *At Risk* and *Review* surface water bodies

Subcatchment code	Water body code	Water body name	Water body type	Risk	Ecological Status 07-09	Ecological Status 10-15	High Ecological Status Objective Water Body Y/N	Significant Pressures	Date to Meet Environmental Objective	Recommended Area for Action Name
25B_1	IE_SH_25R010500	Rapemills_020	River	Review	Unassigned	Unassigned	N		2027	
25B_2	IE_SH_25B270110	Blackwater (Shannonbridge)_010	River	At Risk	Moderate	Moderate	N	Peat	2027	
25B_2	IE_SH_25S012000	Shannon (Lower)_010	River	Review	Unassigned	Unassigned	N		2027	
25B_3	IE_SH_25C130200	Clareen Stream/Fuarawn_010	River	At Risk	Moderate	Moderate	N	Ag,M+Q	2027	Clareen
25B_3	IE_SH_25C130600	Clareen Stream/Fuarawn_020	River	At Risk	Poor	Moderate	N	Ag,M+Q	2027	Clareen
25B_4	IE_SH_25E010200	Eyrecourt Stream_010	River	At Risk	Poor	Poor	N	Hymo,UWW	2027	
25B_4	IE_SH_25S012350	Shannon (Lower)_030	River	Review	Unassigned	Unassigned	N		2027	
25B_4	IE_SH_25Y150770	Derryholmes_010	River	Review	Unassigned	Unassigned	N		2027	
25B_5	IE_SH_25I020930	Incherky_010	River	Review	Unassigned	Unassigned	N		2027	
25B_5	IE_SH_25P010500	Pallas_010	River	At Risk	Moderate	Moderate	N	Ag	2027	
25B_6	IE_SH_25B250400	Bunow_020	River	At Risk	Moderate	Moderate	N	Hymo,Ind,Other,UWW	2027	Bunow
25B_6	IE_SH_25G060080	Golden Grove Stream_010	River	At Risk	Moderate	Moderate	N	Ag	2027	
25B_6	IE_SH_25G060200	Golden Grove Stream_020	River	At Risk	Moderate	Moderate	N	M+Q,Other	2027	
25B_6	IE_SH_25K140027	Keeloge Stream_020	River	At Risk	Moderate	Moderate	N	Ag	2027	
25B_6	IE_SH_25K150040	Kilcomin Stream_010	River	At Risk	Unassigned	Poor	N	Ag	2027	
25B_6	IE_SH_25K150052	Kilcomin Stream_020	River	Review	Moderate	Unassigned	N		2027	
25B_6	IE_SH_25K150085	Kilcomin Stream_030	River	At Risk	Unassigned	Moderate	N	Hymo	2027	
25B_6	IE_SH_25L020400	Little Brosna_020	River	At Risk	Moderate	Moderate	N	Ind,UWW	2027	
25B_6	IE_SH_25S110100	Shinrone Stream_010	River	At Risk	Poor	Poor	N	For,Other	2027	

Subcatchment code	Water body code	Water body name	Water body type	Risk	Ecological Status 07-09	Ecological Status 10-15	High Ecological Status Objective Water Body Y/N	Significant Pressures	Date to Meet Environmental Objective	Recommended Area for Action Name
25B_7	IE_SH_25L020700	Little Brosna_040	River	At Risk	Moderate	Moderate	N	Ag,Hymo,Peat	2027	Little Brosna_040
25B_7	IE_SH_25R020050	Rock (Birr)_010	River	At Risk	Unassigned	Moderate	N	Ag,Hymo,UWW	2027	
25B_7	IE_SH_25R020200	Rock (Birr)_020	River	Review	Unassigned	Unassigned	N		2027	

**Ag:** Agriculture

**M+Q:** Mines and Quarries

**DWW:** Domestic Waste Water

**Peat:** Peat Drainage and Extraction

**For:** Forestry

**DU:** Diffuse Urban

**Hymo:** Hydromorphology

**UWW:** Urban Waste Water

**Ind:** Industry

**Note:** Significant Pressures for Review water bodies have not been included as they will need to be confirmed as part of an Investigative Assessment.

**Protected Area:** If a water body is one or more of the following: Drinking Water Protected Area; Bathing Water; Shellfish Area; Nutrient Sensitive Area or; a Natura 2000 site with a water dependent qualifying interest with a water quality and/or quantity conservation objective, then it has been highlighted as a protected area in this table.

## Appendix 4 Drinking water supplies in the catchment

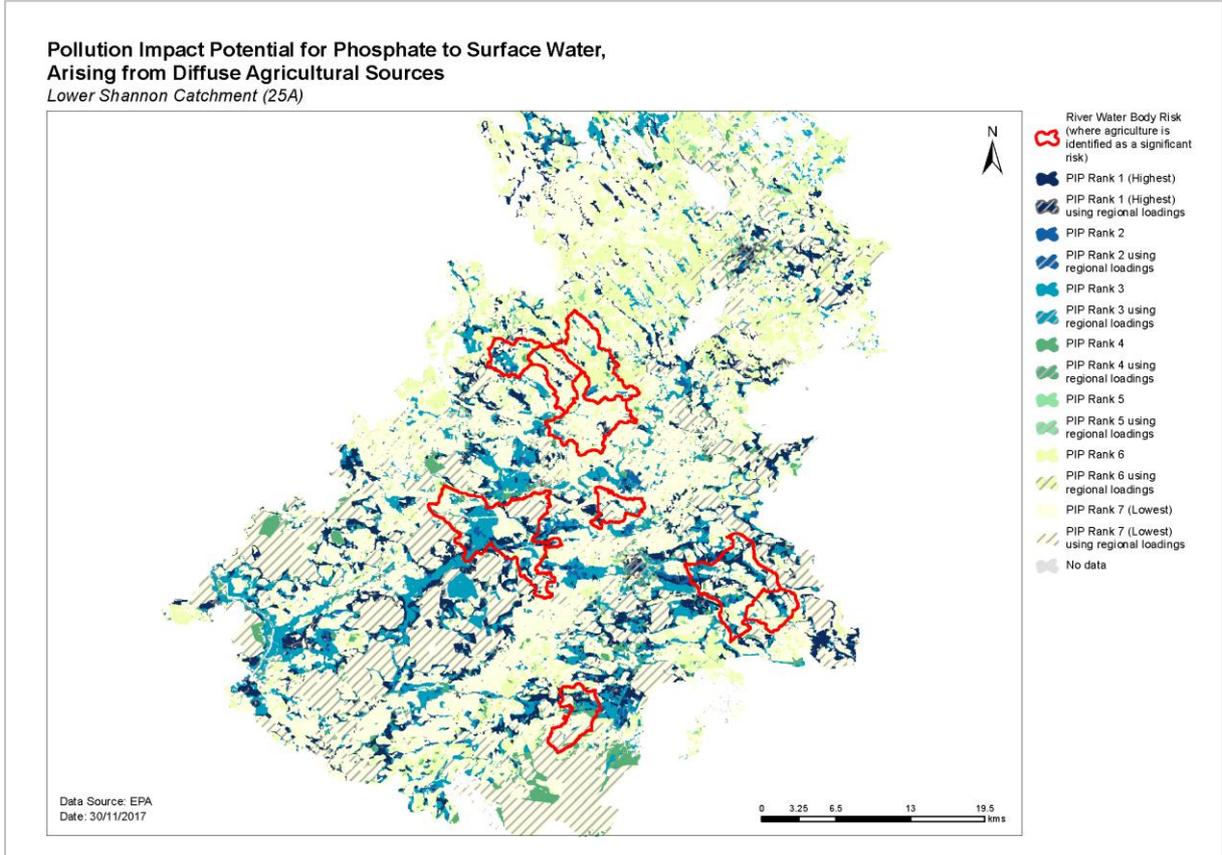
Scheme Code	Scheme Name	Water Body	Water Body Code	Objective met? Yes /No
2500PUB1001	Banagher RWSS P.W.S.	Banagher (GWB)	IE_SH_G_040	Yes
	Banagher RWSS P.W.S.			
	Banagher RWSS P.W.S.			
2800PRI2156	Abbeyville G.W.S.			
2500PRI2027	Rath G.W.S.	Birr (GWB)	IE_SH_G_041	Yes
2800PRI2071	Lacka G.W.S.			
2800PUB1003	LRC P.W.S.			
2500PUB1012	Kinnitty P.W.S.	Bredagh (GWB)	IE_SH_G_045	Yes
None	Clonfanlough	GWDTE-Fin Lough Fen (SAC000571)	IE_SH_G_060	Yes
2500PRI2001	Aghancon	Shinrone (GWB)	IE_SH_G_205	Yes
2500PUB1019	Shinrone/Brosna P.W.S.			
	Shinrone/Brosna P.W.S.			
2500PUB1007	Dunkerrin P.W.S.	Cloughjordan –Moneygall Gravels (GWB)	IE_SH_G_251	Yes
	Dunkerrin P.W.S.			
	Dunkerrin P.W.S.			
2500PUB1013	Moneygall P.W.S.			
2500PRI2010	Clareen	Slieve Bloom South (GWB)	IE_SH_G_211	Yes
1200PRI0312	Esker/Eyrecourt	Tynagh (GWB)	IE_SH_G_236	Yes
2500PRI2011	Clondelara	Clara (GWB)	IE_SH_G_240	Yes
2500PUB1005	Coolderry P.W.S.	Roscrea Gravels (GWB)	IE_SH_G_247	Yes
2800PUB1009	Roscrea P.W.S.			
	Roscrea P.W.S.	Little Brosna_020	IE_SH_25L020400	Yes
2500PUB1001	Banagher RWSS P.W.S.	Shannon (Lower)_010	IE_SH_25S012000	Yes
2500PUB1002	Birr P.W.S.	Glenfelly Stream_010	IE_SH_25G210090	Yes
	Birr P.W.S.	Camcor_050	IE_SH_25C020700	Yes

## Appendix 5 Prioritisation of water bodies with Natura 2000 site qualifying interests

SAC Name	Relevant Qualifying interests	Target status	Water body type	Water bodies	Status (risk)	Prioritise?	Code	Survey data?
All Saints Bog and Esker SAC 000566	none							
Ardgraique Bog SAC 002356	none							
Ballyduff/Clonfinane Bog SAC 000641	none							
Ferbane Bog SAC 000575	none							
Fin Lough (Offaly) SAC 000576	7230	Good GW level	Groundwater	GWDTE-Fin Lough Fen (SAC000571)	Good (R)	No	IE_SH_G_060	No
Island Fen SAC 002236	7231	Good GW level	Groundwater	Shinrone GWB	Good (NAR)	No	IE_SH_G_205	No
Lisduff Fen SAC 002147	7220	Good GW level	Groundwater	Shinrone GWB	Good (NAR)	No	IE_SH_G_205	No
	7230	Good GW level	Groundwater	Shinrone GWB	Good (NAR)	No	IE_SH_G_205	No
Lough Derg, North-East Shore SAC 002241	7230	Good GW level	Groundwater	Banagher GWB	Good (NAR)	No	IE_SH_G_040	No
Mongan Bog SAC 000580	none							
Moyclare Bog SAC 000581	none							
Pilgrim's Road Esker SAC 001776	none							
Redwood Bog SAC 002353	none							
Ridge Road, SW of Rapemills SAC 000919	none							
River Shannon Callows SAC 000216	none							
Sharavogue Bog SAC 000585	none							
Slieve Bloom Mountains SAC 000412	none							

# Appendix 6 Pollution Impact Potential (PIP) Map for Phosphate

For areas where agriculture is deemed as the significant pressure, areas of high risk to surface water can be targeted. The map below shows relative risk of loss of phosphate to surface water. The risk of phosphate losses is strongly correlated on whether the land is poorly draining or free draining and the loadings applied i.e. significant loadings applied on poorly draining areas result in a high potential risk to surface water. However, this figure does not imply that actual losses from these areas are occurring but is a useful tool for informing where resources should be focused (i.e. by allowing high risk areas to be identified and prioritised for further investigation). PIP maps are available online at a scale of 1:20,000 and can be accessed by public bodies via the EDEN process.



## Appendix 7 Local catchment assessment categories

Category	Assessment & Measures Evaluation Details
IA1	Further information provision (e.g. from IFI, LAs, EPA)
IA2	Point source desk-based assessment
IA3	Assessment of unassigned status water bodies, requiring field visit(s)
IA4	Regulated point sources, requiring field visit/s
IA5	Stream (catchment) walk to evaluate multiple sources in a defined (1 km) river stretch (used as the basis for estimating resource requirements)
IA6	Stream (catchment) walk in urban areas
IA7	Stream (catchment) walk along >1 km river stretches
IA8	Stream (catchment) walk along high ecological status (HES) objective rivers
IA9	Lakes assessment, requiring field visits
IA10	Groundwater assessments, requiring field visits