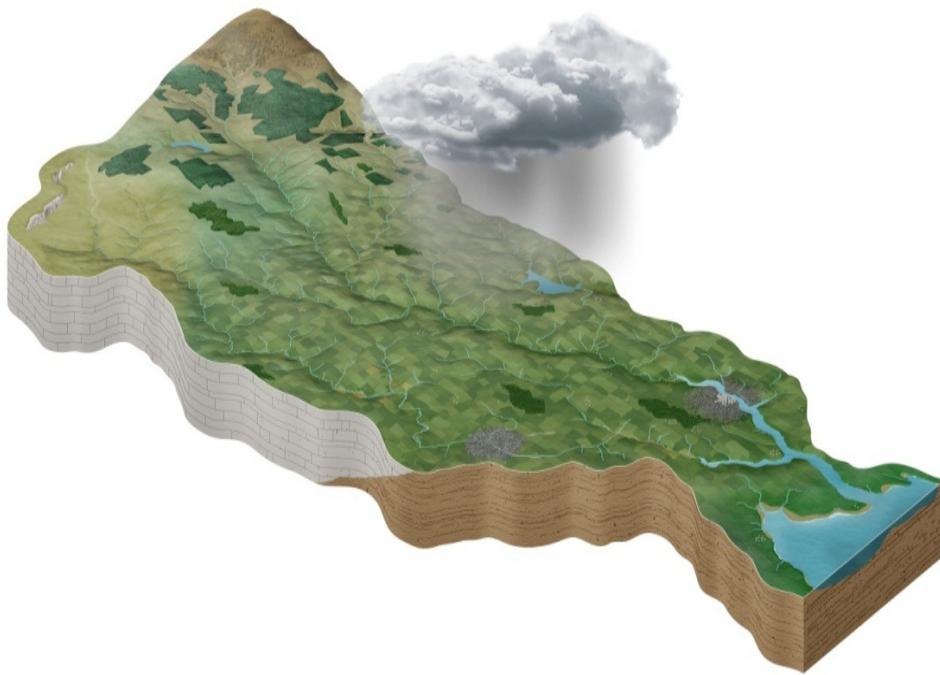


Shannon South Estuary Catchment Assessment 2010-2015 (HA 24)



Catchment Science & Management Unit

Environmental Protection Agency

December 2018

Version no. 3

Preface

This document provides a summary of the characterisation outcomes for the water resources of the Shannon South Estuary 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://www.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.
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 includes the area drained by the Rivers Deel and Maigue, and all streams entering tidal water in the Shannon Estuary between Kilconly Point and Thomond Bridge, Limerick, draining a total area of 2,033km². The largest urban centre in the catchment is the southern part of Limerick City. The other main urban centres are Newcastle West, Charleville, Kilmallock Rathkeale and Mungret. The total population of the catchment is approximately 112,430 with a population density of 55 people per km².

This catchment is predominantly low lying, flat and underlain by limestones with the exception of a few isolated hills. This geology provides a significant groundwater resource in the catchment.

The River Deel rises in the hills south of Dromina, flowing north and towards Newcastlewest, where it is joined by the Bonoke, Arra and Daar Rivers from the west. Continuing generally north past Rathkeale, the Deel flows into the southern side of the Shannon Estuary 2 km north of Askeaton (where the river becomes tidal).

The Maigue River rises 2 km north of Milford and flows east before meeting the River Loobagh. The River Loobagh drains the south-eastern part of the catchment, North of Bruree, the Maigue is joined from the east by the Morningstar River, which drains the region from the western end of the Glen of Aherlow. The Maigue is next joined by the Camoge River, which drains the area from Emly and Hospital in the east to Lough Gur.

It then flows north through Croom and into Adare, where it becomes tidal. Continuing north, the Maigue is joined by the Greanagh from the west and then the Barnakyle from the east before flowing into the southern side of the Shannon Estuary opposite Bunratty.

The western part of the catchment is drained by small northerly flowing rivers, the largest of which are the Owvane, near Ballyhahill and the Ballylongford Rivers.

The Shannon South Estuary catchment comprises 18 subcatchments (Table 1, Figure 1) with 95 river water bodies, 17 lakes, seven transitional water bodies, one coastal water body and 28 groundwater bodies. There are two heavily modified and no artificial water bodies in the catchment.

Table 1. List of subcatchments in the Shannon South Estuary catchment

Subcatchment ID	Subcatchment Name
24_1	Deel [Newcastlewest]_SC_040
24_2	Drumcomoge_SC_010
24_3	Morningstar_SC_010
24_4	Deel [Newcastlewest]_SC_030
24_5	Shanagolden [Stream]_SC_010
24_6	Maigue_SC_010
24_7	Owvane [Limerick]_SC_010
24_8	Maigue_SC_040
24_9	Astee_West_SC_010
24_10	Ballynaclogh_SC_010
24_11	Maigue_SC_020
24_12	Drumcomoge_SC_020
24_13	Maigue_SC_050
24_14	Deel [Newcastlewest]_SC_020
24_15	Deel [Newcastlewest]_SC_010
24_16	Greanagh_SC_010
24_17	Maigue_SC_030
24_18	Deel [Newcastlewest]_SC_050

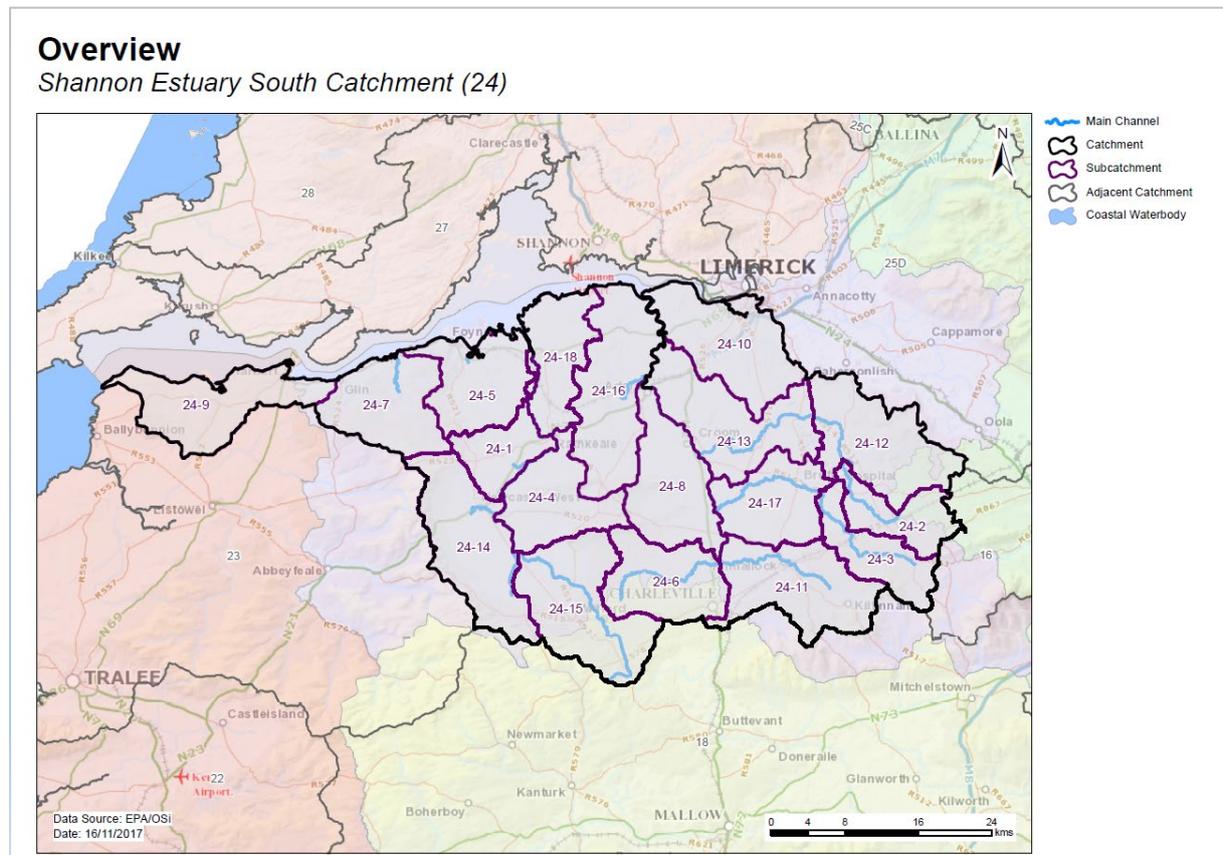


Figure 1. Subcatchments in the Shannon South Estuary catchment

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 22 (23%) river and lake water bodies at Good or High status, and 37 (38%) at less than Good status in 2015 (Table 2, Figure 2). Thirty-eight (39%) river and lake water bodies are unassigned.
- ◆ One lake water body has a high ecological status objective (Bleach). In 2015 this water body was 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.
- ◆ Since 2007-09 when WFD monitoring began, 12 river water bodies and two lake water bodies have an improved status whereas 10 river water bodies have deteriorated (Figure 5).
- ◆ The variations in nutrient concentrations and loads in the Maigue and Deel (Newcastlewest) main channels are illustrated in Appendix 2.

2.1.2 Transitional and coastal (TraC)

- ◆ None of the transitional or coastal water bodies in the Shannon South Catchment were at Good status in 2015 (Table 2, Figure 2). Six were less than Good (75%) and two (25%) are unassigned.
- ◆ The net change in numbers of TraC water bodies at each status class in 2007-09 and 2010-15 are shown in Figure 5.

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	<i>Not at Risk</i>	<i>Review</i>	<i>At Risk</i>
Rivers	95	0	21	14	22	0	38	15	37	43
Lakes	2	1	0	0	1	0	0	1	0	1
TraCs	8	0	0	5	1	0	2	0	3	5

WFD Surface Water Body Status 2010 - 2015

Shannon Estuary South Catchment (24)

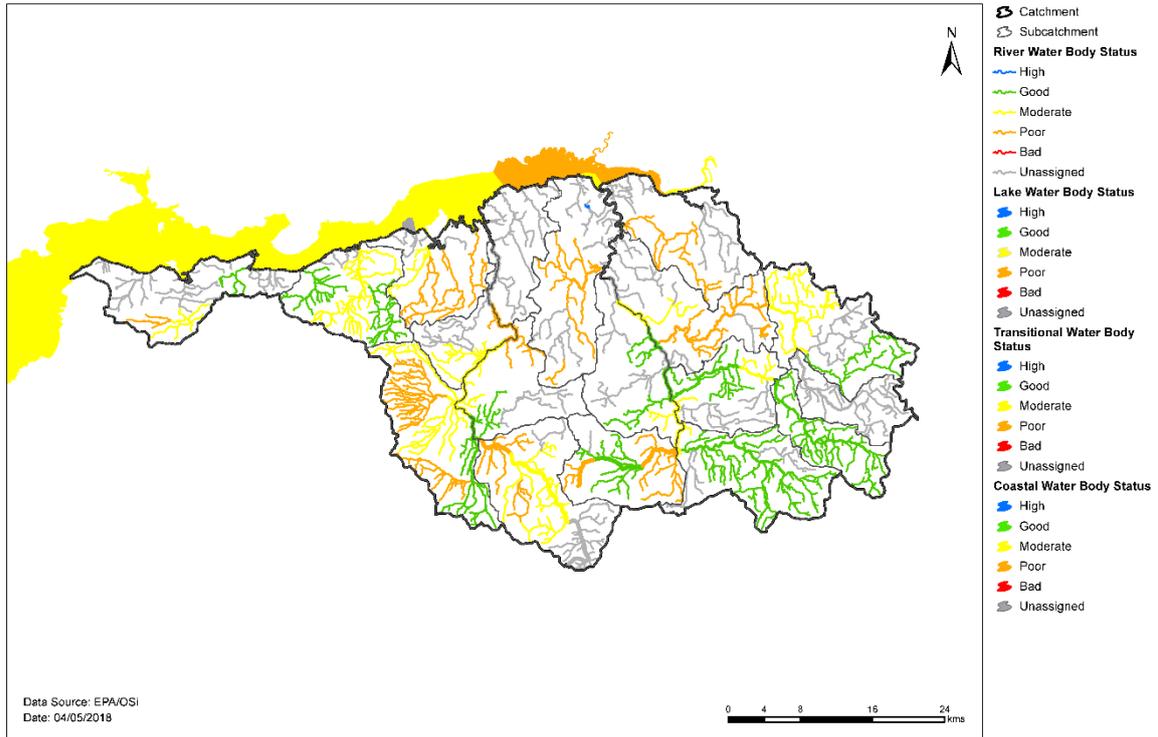


Figure 2. Surface water ecological status

High Status Objective Water Bodies and Sites

Shannon Estuary South Catchment (24)

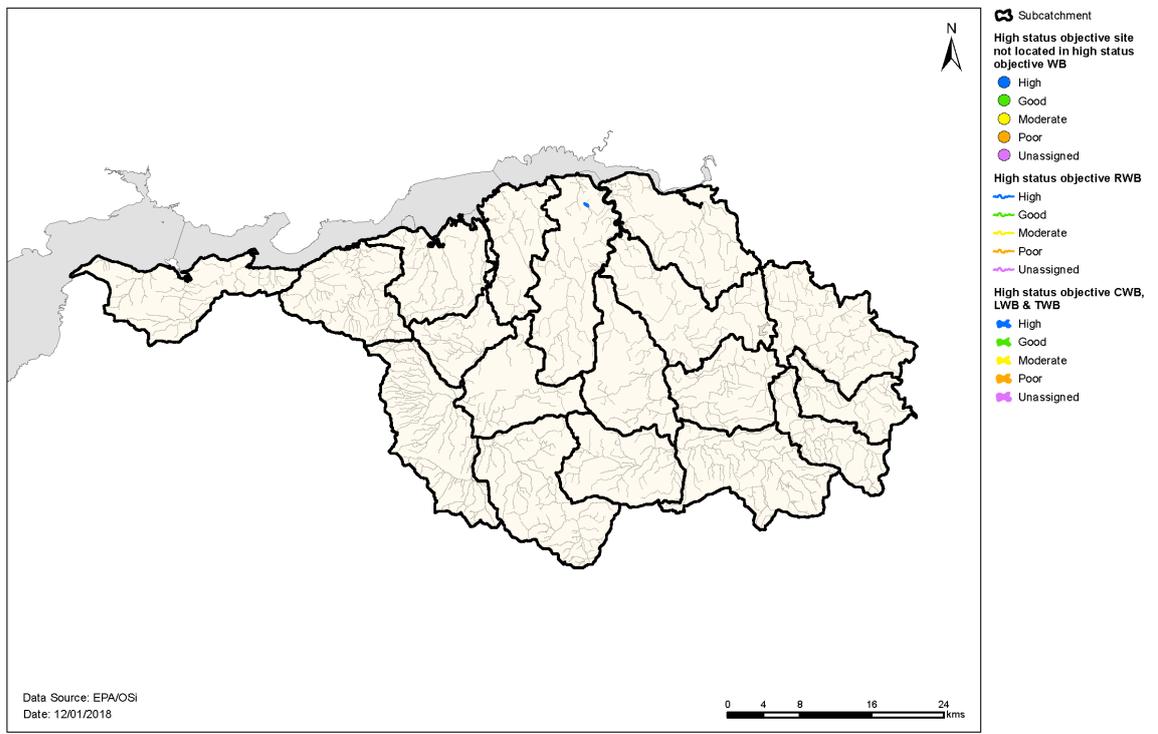


Figure 3. High ecological status objective water bodies and sites

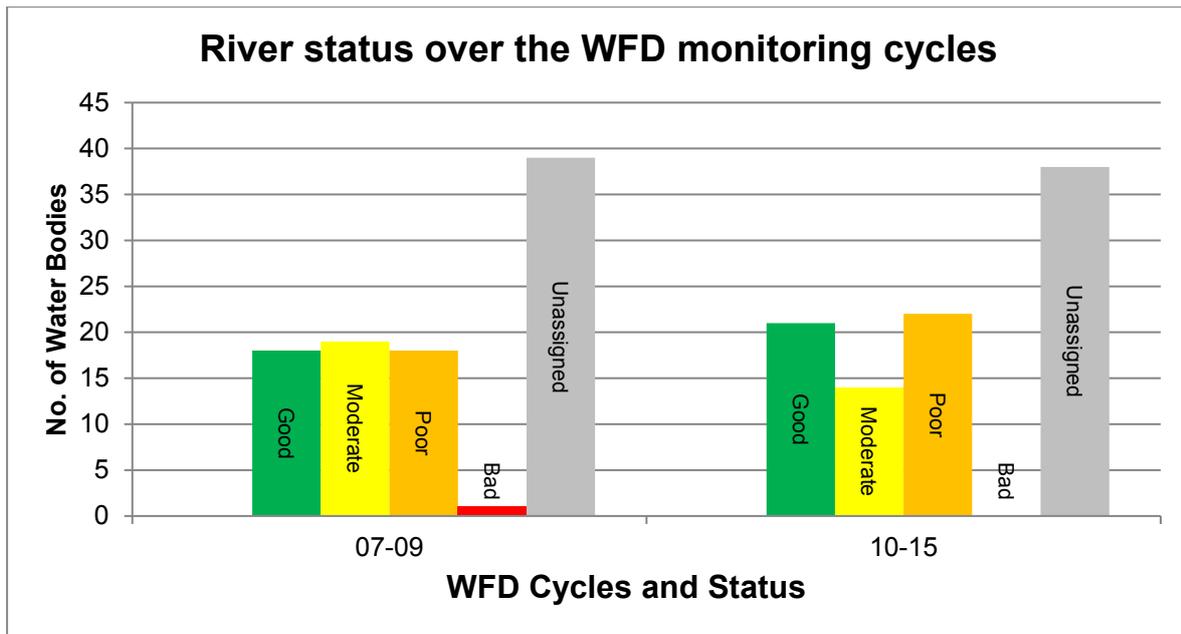


Figure 4. Number of rivers at each status class in 2007-09 and 2010-15

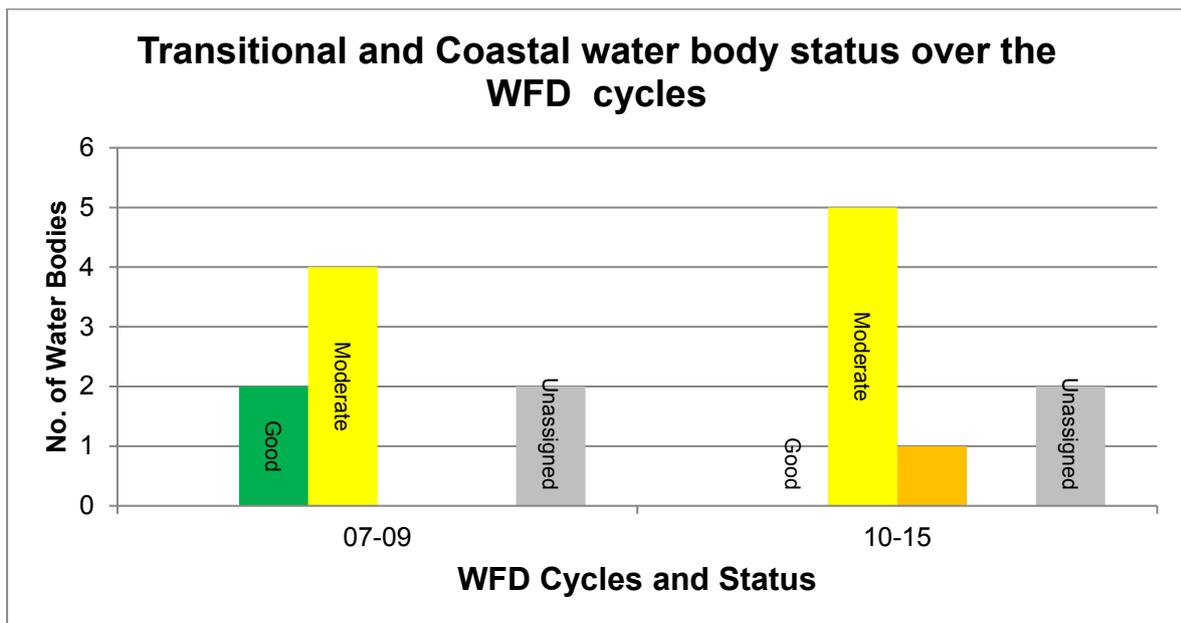


Figure 5. Number of TraCs at each status class in 2007-09 and 2010-15

WFD Surface Water Body Status Change 2007 - 2009 to 2010 - 2015

Shannon Estuary South Catchment (24)

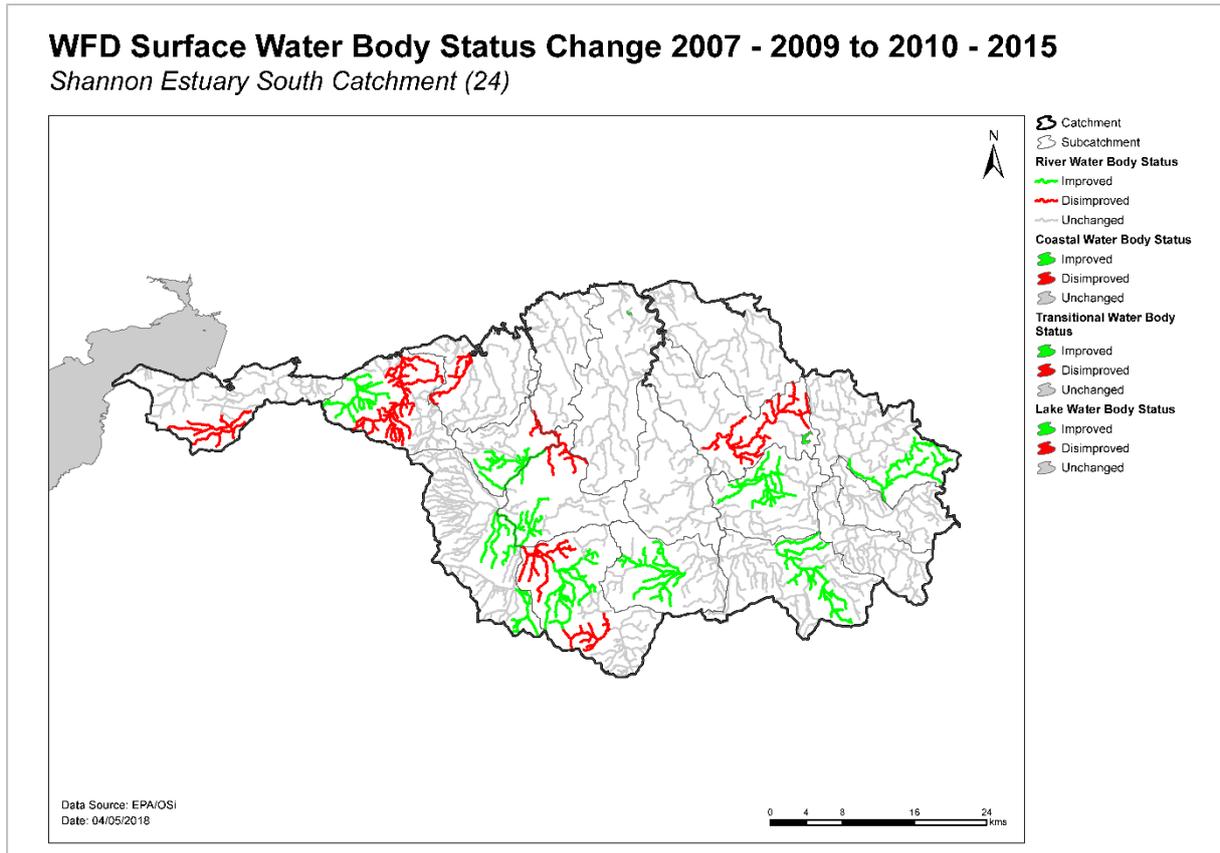


Figure 6. Surface water body status change from 2007-09 to 2010-15

2.2 Groundwater status

- ◆ There were 25 groundwater bodies at Good status and three at Poor status in 2015 (Table3, Figure 7).
- ◆ Twenty-seven water bodies were at Good status in 2007-12 and one at Poor status.
- ◆ Herbertstown has previously been Poor status. Limerick City has deteriorated to Poor Status and Industrial Facility (P0035-04) has been classified at Poor status due to improved information being available and the development of technical assessment approaches, rather than there being deterioration in water quality in this water body between 2007-12 and 2010-15.

Table 3. Summary of groundwater body status and risk categories

	Number of water bodies	2010-15 Status		Risk Categories		
		Good	Poor	<i>Not at Risk</i>	<i>Review</i>	<i>At Risk</i>
Groundwater	28	25	3	8	11	9

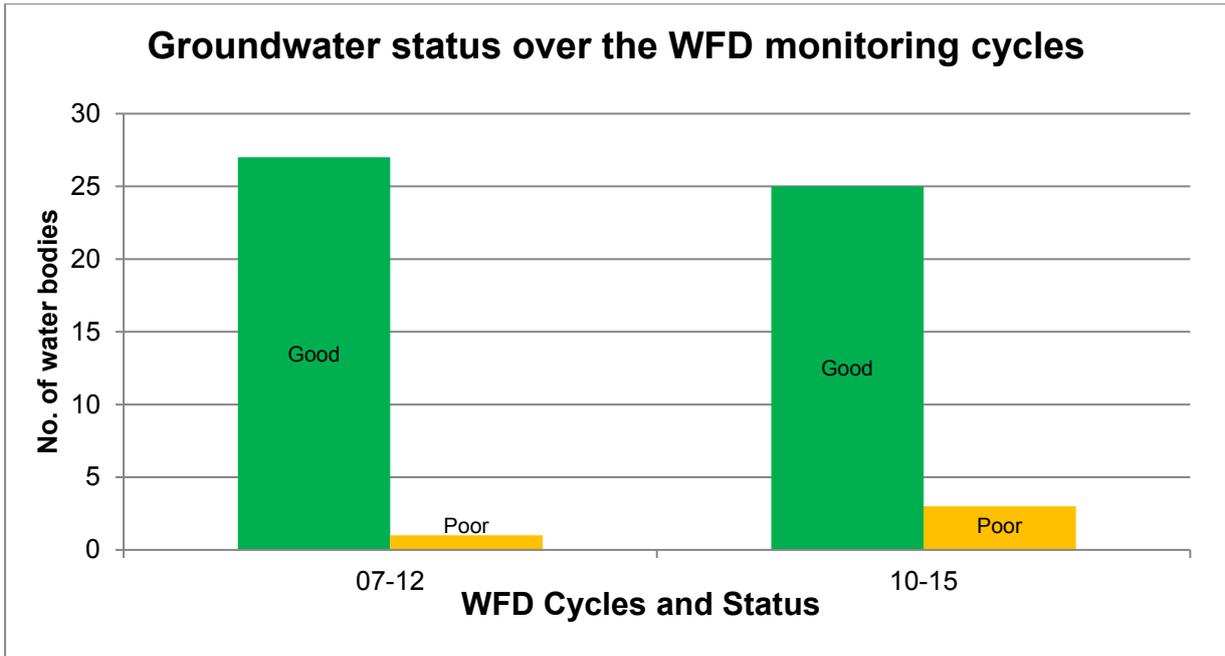


Figure 7. Number of groundwater bodies at each status class in 2007-12 and 2010-15

Groundwater Body Status 2010 - 2015

Shannon Estuary South Catchment (24)

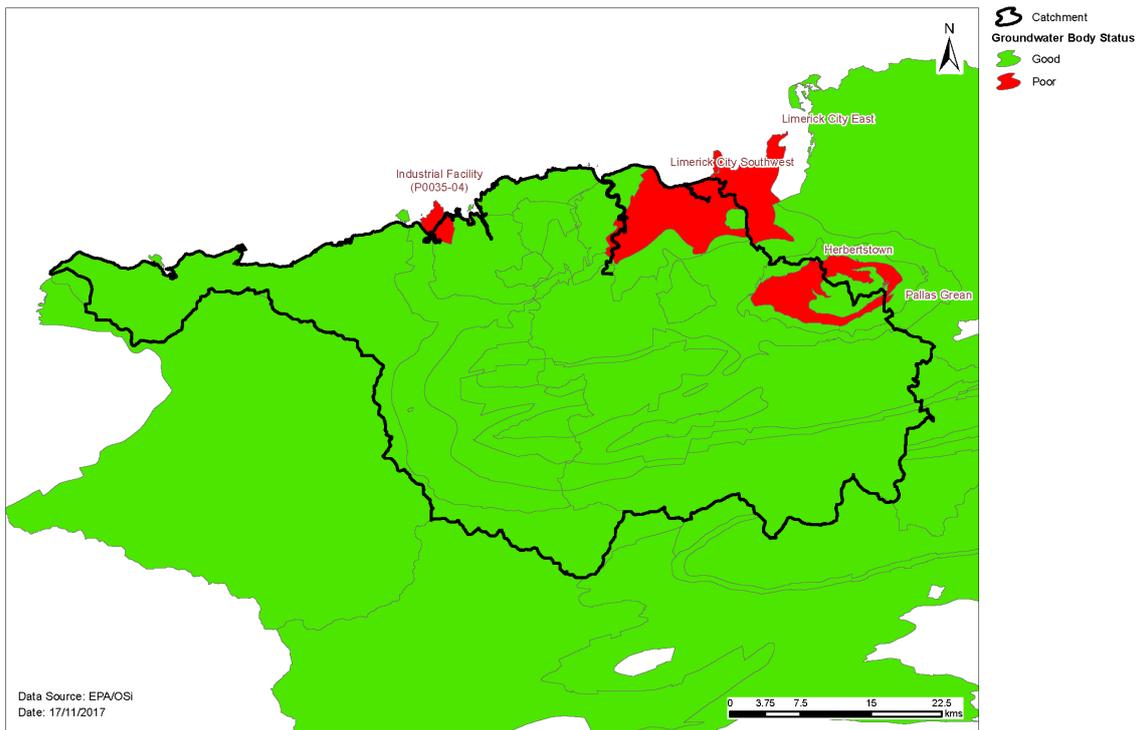


Figure 7a- Groundwater body status

2.3 Risk of not meeting surface water environmental objectives

2.3.1 Rivers and lakes

- ◆ There are 15 river water bodies and one lake water body *Not at Risk* (Figure 8, Table 2) and these require no additional investigative assessment or measures to be applied, other than those measures that are already in place.
- ◆ There are 37 river water bodies in *Review*. There are no lake water bodies in *Review*. This applies to 32 water bodies where more information is required and five water bodies where measures have recently been implemented and improvements have not yet been realised.
- ◆ Forty-three river water bodies and one lake water body 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.

2.3.2 Transitional and coastal (TraC)

- ◆ There are no TraC water bodies in this catchment that are *Not at Risk*.
- ◆ Two of the transitional and one coastal water body are in *Review* (Foynes Harbour and Poulaweala Lough / Quayfield Lough and Mouth of the Shannon (HAs 23;27)). The two transitional water bodies are unassigned and further information is required.
- ◆ Five transitional water bodies are *At Risk* – Deel Estuary, Limerick Dock, Upper and Lower Shannon Estuaries and Maigue Estuary (Table 2). Measures will be needed in these water bodies to improve the water quality outcomes.

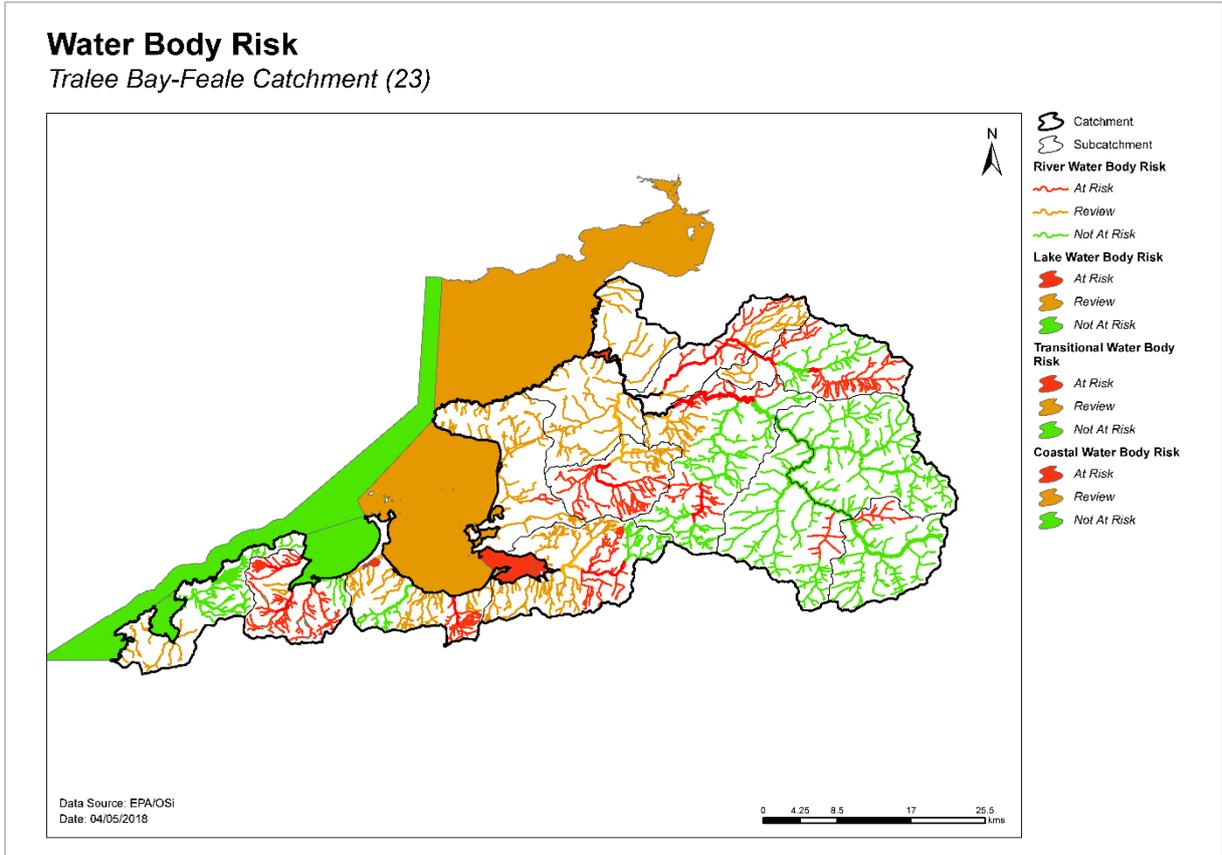


Figure 8. Surface water body risk

2.4 Risk of not meeting groundwater environmental objectives

- ◆ Eight groundwater bodies are *Not at Risk* (Figure 9, Table 3) and require no additional investigative assessment or measures to be applied, other than those measures that are already in place.
- ◆ Eleven groundwater bodies are in *Review*:
 - Askeaton, Ballylongford, Ballysteen, Kildimo, GWDTE-Tory Hill Fen (SAC000439) and Shanagolden groundwater bodies are in *Review* as they are hydrologically linked to surface water bodies and may be contributing phosphate to the associated bodies (Figure 9, Table 3).
 - Fedamore and Newcastlewest groundwater bodies are in *Review* due to groundwater contribution of phosphate to associated surface water bodies, but also due to elevated nitrate concentrations.
 - GWDTE-Askeaten North Fens (SAC002279) and GWDTE-Askeaten South Fens (SAC002279) are in *Review* due to groundwater contribution of phosphate to associated surface water bodies that are in *Review* and due to drainage, agricultural pressures and septic tank systems.
 - Historic Waste Facility (S22-02816) is in *Review* due to a historic landfill site.
- ◆ Nine groundwater bodies are *At Risk*, and measures will be needed in these water bodies to improve water quality outcomes (Table 4).
 - Ballingarry, Bruree, Kilmeedy, Knockaderry and North Kilmallock are all at Good status but are *At Risk* due to groundwater contribution of phosphate to associated surface water bodies that are *At Risk*, and also due to elevated nitrate concentrations.
 - Charleville is at Good status however they are *At Risk* due to groundwater contribution of phosphate to associated surface water bodies that are *At Risk*.
 - Herbertstown and Limerick City Southwest are *At Risk* as they are at Poor status and are contributing phosphate to associated river water bodies that are at less than Good status.
 - Industrial Facility (P0035-04) is *At Risk* as the groundwater body is at Poor status due to aluminium from an industrial facility.

Table 4. Summary of *At Risk* surface water bodies where phosphate from groundwater may contribute to an impact.

Groundwater body name	Receiving water body code	Receiving water body name
Ballingarry	IE_SH_24C010600	Camoge_030
Ballingarry	IE_SH_24C030300	Clonshire_010
Ballingarry	IE_SH_24C280480	Coolagowan_010
Ballingarry	IE_SH_24M020800	Morningstar_060
Bruree	IE_SH_24C020800	Charleville Stream_020
Bruree	IE_SH_24M010300	Maigue_030
Bruree	IE_SH_24M010400	Maigue_040
Bruree	IE_SH_24M020800	Morningstar_060
Charleville	IE_SH_24C020780	Charleville Stream_010
Charleville	IE_SH_24C020800	Charleville Stream_020
Charleville	IE_SH_24D040400	Drumcomoge_010
Charleville	IE_SH_24M010020	Maigue_010
Charleville	IE_SH_24M010300	Maigue_030
Herbertstown	IE_SH_24C010400	Camoge_020
Kilmeedy	IE_SH_24D020400	Deel (Newcastlewest)_060
Kilmeedy	IE_SH_24O010790	Owenskaw_010
Knockaderry	IE_SH_24D021000	Deel (Newcastlewest)_100
Knockaderry	IE_SH_24D021100	Deel (Newcastlewest)_110
Knockaderry	IE_SH_24O010790	Owenskaw_010
Limerick City Southwest	IE_SH_24B050600	Barnakyle_020
North Kilmallock	IE_SH_24C020800	Charleville Stream_020
North Kilmallock	IE_SH_24D040400	Drumcomoge_010
North Kilmallock	IE_SH_24M010020	Maigue_010

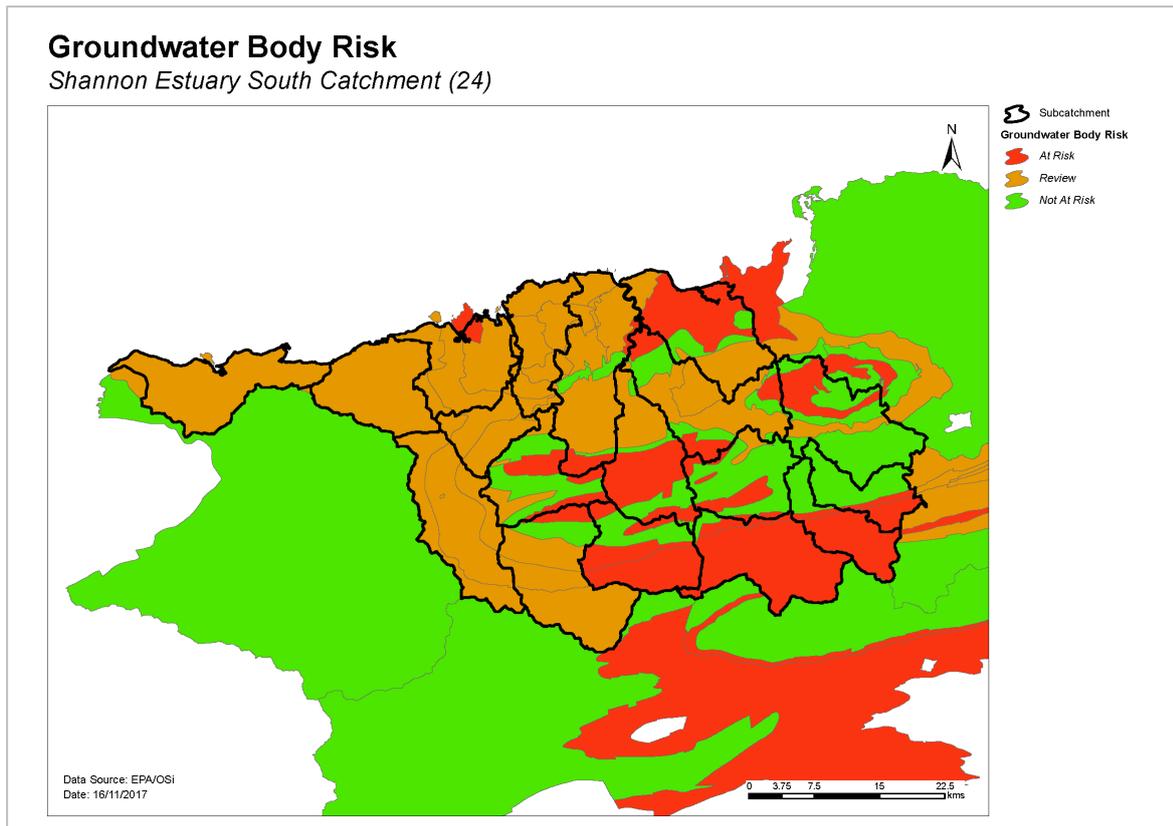


Figure 9. Groundwater body risk

2.5 Protected areas

2.5.1 Drinking water protected areas

- ◆ There are 89 abstractions in the Shannon South Estuary Catchment comprising 31 private water supplies, 25 public supply schemes and one regional water supply (South West Regional Water Supply) (Appendix 4).
- ◆ Eighty-five of the abstractions are from 20 groundwater bodies (Appendix 4). The remaining four (Adare Public DWS, Foynes/Shannon Estuary PUB DWS, Kilmallock Public DWS and Castlemahon Public supply) are from four river water bodies (Maigne_080, Deel (Newcastlewest)_140, Loobagh_030 and Deel (Newcastlewest)_070 respectively). The list of the public supplies and the associated water bodies is provided in Appendix 4.
- ◆ All drinking water sources were compliant with the standards for nitrate in 2015.
- ◆ Most drinking water sources were compliant with the standards for pesticides in 2015, with the following exceptions:
 - Foynes/Shannon Estuary Public DWS (1900PUB1027), which is abstracted from Deel (Newcastlewest)_140, was non-compliant for 2,4-D, clopyralid, MCPA and mecoprop in 2013. The source was non-compliant for MCPA in 2015.
 - Kilmallock Public DWS (1900PUB1036) was compliant with the standards in 2015, however was non-compliant for MCPA and clopyralid in 2013. This was recorded for treated water at Kilmallock WTP.

- Castlemahon Public Water Scheme (1900PUB1042) was non-compliant for 2,4-D, clopyralid, MCPA and mecoprop in 2013. This is abstracted from Deel (Newcastlewest)_070.

2.5.2 Bathing waters

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

2.5.3 Shellfish areas

- ◆ There is one designated shellfish area in the catchment, West Shannon Ballylongford (IEPA2_0061) which is in the Lower Shannon Estuary (IE_SH_060_0300). This shellfish area has achieved its water quality objective.

2.5.4 Nutrient sensitive areas

- ◆ There are no nutrient sensitive areas in the catchment.

2.5.5 Natura 2000 sites

- ◆ There are seven Special Areas of Conservation (SACs) in the catchment (Appendix 5), not all of which have water quality and/or quantity conservation objectives for their qualifying interests.
- ◆ One transitional water body (Poulaweala Lough/Quayfield Lough) has been prioritised for action as the water conservation objectives for its habitat and/or species may not be being supported by its ecological status (Appendix 5).
- ◆ There are two Special Protected Areas (SPAs) in the catchment:
 - River Shannon and River Fergus Estuaries SPA.
 - Stack's to Mullaghareirk Mountains, West Limerick Hills and Mount Eagle 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 two designated heavily modified water bodies (HMWB) in the catchment – Limerick Dock and Foynes Harbour due to port facilities. Limerick Dock was classified as having Moderate Ecological Potential in 2013-15, while Foynes Harbour was Unassigned.
- ◆ There are no artificially modified water bodies (AWB) in the catchment.

3 Significant issues in *At Risk* water bodies

- ◆ Excess phosphate leading to eutrophication is the dominant issue in river and lake water bodies, while excess ammonia is also of concern, but not to the same extent.
- ◆ Hydromorphological (or physical) conditions are also an issue of concern in rivers and lakes in Shannon South Estuary Catchment due to drainage and impacts by excess sediment. Such impacts have altered the morphology of water bodies and in turn, altered habitat conditions.
- ◆ There are five *At Risk* TraC water bodies with significant issues in the Shannon South Estuary catchment. The Deel and Mague Estuaries are at Moderate status due to MRP and DO. The

upper Shannon Estuary is at Moderate status due to benthos and the Lower Shannon Estuary and Limerick dock are at Moderate due to fish status.

- ◆ Of the 28 groundwater bodies, nine are *At Risk*. Aluminium from an industrial site is a significant issue on one groundwater body. In the remaining groundwater bodies, the dominant issue is elevated nutrient concentrations which are contributing to their associated surface water bodies.

4 Significant pressures

4.1 Water bodies

- ◆ Where water bodies have been classed as *At Risk*, by water quality or survey data, significant pressures have been identified.
- ◆ Figure 10 show a breakdown of the number of *At Risk* water bodies in each significant pressure category.

4.1.1 Rivers, lakes Transitional and coastal (TraC)

- ◆ Significant pressures have been identified through the initial characterisation process in 43 river water bodies, 25 of which have multiple pressures. The significant pressures will be refined as further characterisation is carried out. There is one *At Risk* lake water body (Lough Gur), which is impacted by both hydromorphological pressures and domestic waste water.
- ◆ The significant pressure affecting the greatest number of the river water bodies is agriculture, followed by urban waste water, domestic waste water, hydromorphological pressures, industry, peat, diffuse urban, mines and quarries and forestry (Figure 10).
- ◆ The significant pressures affecting the Maigne, Deel estuaries and the Upper Shannon is agriculture. Hydromorphology has been identified as the significant pressure in Limerick Dock. Further work is required to determine the significant pressures impacting on the fish and benthos in the Upper and Lower Shannon Estuary.

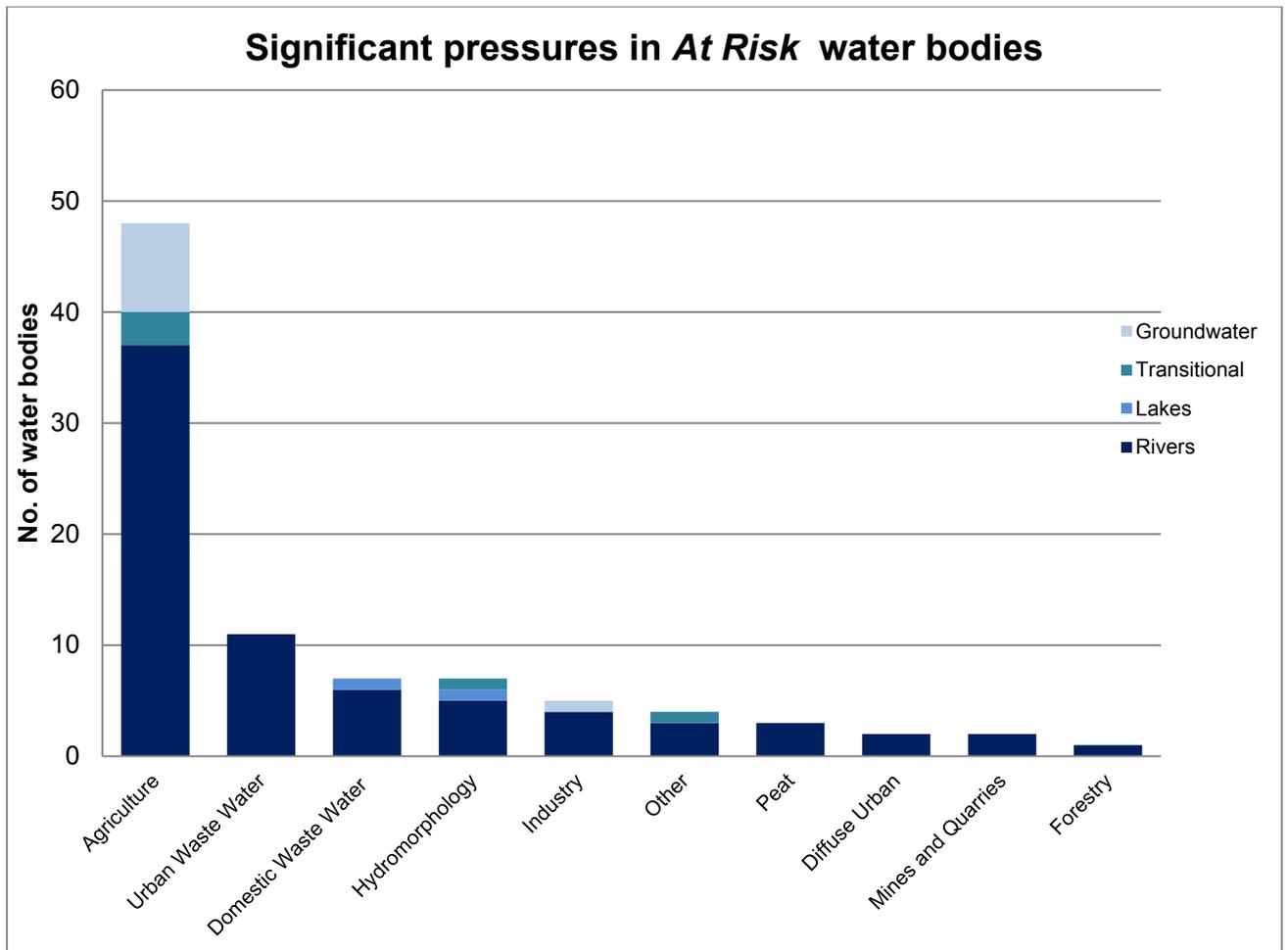


Figure 10. Significant pressures impacting on *At Risk* water bodies

4.1.2 Groundwater

- ◆ The significant pressure affecting the Industrial Facility (P0035-04) IE_SH_G_252 groundwater body is an industrial facility. The key parameter of concern is aluminium. The significant pressure in the eight other *At Risk* groundwater bodies is due to groundwater contribution of phosphate to associated surface water bodies that are *At Risk*, and due to elevated nitrate concentrations, in some cases.

4.2 Pressure type

4.2.1 Agriculture

- ◆ Agriculture is a significant pressure in 40 surface water bodies and eight groundwater bodies (Figure 11). The issues related to agriculture in this catchment is diffuse phosphorus loss to surface waters mainly occurring in areas of poorly draining soils and nutrient losses from impermeable areas, such as farmyards, tracks and storage areas, resulting in excess nutrients (phosphate and ammonia) in surface waters.
- ◆ Another issue from agriculture is sedimentation, due to animal access (poached banks), tilled soils and land drainage.
- ◆ Specific acute pollution due to issues such as slurry or silage leaks causing fish kills. In 2015 there was a slurry discharge to a tributary of the Camoge which resulted in >4000 fish

mortalities. On the Drumcomoge there was also a fish kill between Knocklong and Hospital in 2015. Investigation identified the cause to be farms with direct discharges and poor slurry containment. In Ballylongford, IFI noted similar types of pollution incidents.

- ◆ The pollution impact potential map showing areas of relative risk for phosphorus loss from agriculture to surface water is given in Appendix 6.

4.2.2 Urban waste water treatment plants

- ◆ Urban Waste Water Treatment Plants (WWTPs) and agglomeration networks have been highlighted as a significant pressure in 11 *At Risk* water bodies; details are given in Table 5 and Figure 12. The Charleville WWTP, which impacts Charleville Stream_010 and Charleville Stream_020, is scheduled to be upgraded in 2024, while Dromcollagher WWTP, which impacts Ahavarraga Stream_010, is scheduled to be upgraded in 2021. Upgrade works at Tarbert WWTP, which impacts Tarbert_010, have already been completed.

4.2.3 Domestic waste water

- ◆ Domestic waste water has been identified as a significant pressure in six river water bodies and one lake (Lough Gur) (Figure 13). This is due to a combination of factors including domestic waste water treatment systems located on poorly draining soils in close proximity to the water bodies, with poor percolation capacity. This is particularly noticed in the Lough Gur area. There is also evidence of direct discharges on the Morningstar_060. The significant issue is excess nutrients entering surface waters leading to decreased water quality.

Table 5. Waste Water Treatment Plants and agglomerations 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
Hospital D0314	1,001 to 2,000 p.e.	Mahore_020	<i>Good</i> ¹	<i>NA</i> ²
Herbertstown A0224	< 500 p.e.	Camoge_010	Moderate	<i>NA</i> ¹
Milford A0321	< 500 p.e.	<i>Deel (Newcastlewest)_040</i> ³	Moderate	<i>NA</i> ¹
Kilmeedy A0212	< 500 p.e.	Deel (Newcastlewest)_060	Poor	<i>NA</i> ¹
Dromcollagher D0316	1,001 to 2,000 p.e.	Ahavarraga Stream_010	Poor	2021
Ballingarry D0507	500 to 1,000 p.e.	Clonshire_010	Poor	<i>NA</i> ¹
Shanagolden A0219	< 500 p.e.	Shanagolden Stream_010	Moderate	<i>NA</i> ¹
Charleville D0204	2,001 to 10,000 p.e.	Charleville Stream_010	Poor	2024
Charleville D0204	2,001 to 10,000 p.e.	Charleville Stream_020	Poor	2024
Croom D0307	1,001 to 2,000 p.e.	Maigne_080	Moderate	<i>NA</i> ¹

¹ *Mahore_020 and Tarbert_010 returned Good Ecological Status in 2010-2015, however, both water bodies are At Risk of not meeting their environmental objectives due to an upward trend in phosphate concentrations.*

² *Currently not specified in improvement plans.*

³ *The agglomeration network, rather than the WWTP, has been identified as a significant pressure impacting Deel (Newcastlewest)_040.*

Tarbert D0283	1,001 to 2,000 p.e.	Tarbert_010	<i>Good</i> ¹	Complete
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4.2.4 Hydromorphology

- ◆ Table 5a shows the extent of hydromorphological pressures and impacts in the Shannon South catchment. Five subcatchments are significantly affected, containing nine water bodies, two of which have multiple hydrological impacts. One transitional water body within the Ballynaclogh (SC24_10) subcatchment is impacted by embankments.

Table 5a – Hydromorphological pressures in the Shannon South Estuary Catchment

Pressure	Sub-Catchment	Water body Code
Modification due to Drainage Schemes (Channelisation)	Maigue (SC24_13)	Gur
		Camoge_030
		Maigue_080
	Ballynaclogh (SC24_10)	Barnakyle_010 & 020
Land Drainage (Embankments)	Deel [Newcastle] (SC25_15)	Deel (newcastlewest)_040
	Maigue (SC24_17)	Morningstar_050
	Maigue (SC24_13)	Camoge_020
	Ballynaclogh (SC24_10)	Limerick dock
In River Structures	Maigue (SC24_13)	Maigue_080
Bank Erosion	Shanagolden [Stream] (SC24_5)	Ahacronane_020
	Maigue (SC24_13)	Gur

4.2.5 Industry

- ◆ Point source discharges from two industrial facilities have been identified as significant pressures in three water bodies, Deel (Newcastlewest)_120, Charleville Stream_010 and Charleville Stream_020, while one point source discharge from a single facility was identified as a significant pressure impacting Maigue_040. Elevated orthophosphate and total ammonia are the significant issues related to these point source discharges (Figure 15). One industrial facility has been identified as the significant pressure on the groundwater body IE_SH_G_252.

4.2.6 Other

Anthropogenic pressures unknown

- ◆ The significant pressures in two of the river water bodies Barnakyle_020 and Deel (Newcastlewest)_090 are not known. This is also the case with the transitional water body the Lower Shannon Estuary (Figure 16).

Invasive Species

- ◆ The significant pressure in Deel (Newcastlewest) _120 an invasive species, crayfish plague (Figure 17).

4.2.7 Extractive industry

◆ *Peat*

Peat drainage and working has been identified as a significant pressure in three water bodies – Dooncaha Stream_010, Ballylongford_010 and Ballylongford_020. Elevated nutrient concentrations and increased sedimentation are the significant issues (Figure 18).

◆ *Mines & Quarries*

Two quarries have been identified as a significant pressure in Deel (Newcastlewest)_030 and Ahacronane_020. Excess siltation impacting on habitat morphology is the significant issue (Figure 18).

4.2.8 Diffuse urban

◆ Diffuse urban pressures, caused by misconnections, leaking sewers and runoff from paved and unpaved areas, have been identified as a significant pressure in two river water bodies – Arra_010 and Morningstar_050 (Figure 19). Bridge works on Arra_010 may have also impacted during 2010-12.

4.2.9 Forestry

◆ Forestry has been identified as a potentially significant pressure in one water body – Deel (Newcastlewest)_030 (Figure 20). The significant issues relate to forestry activity such as clearfelling, with increased siltation.

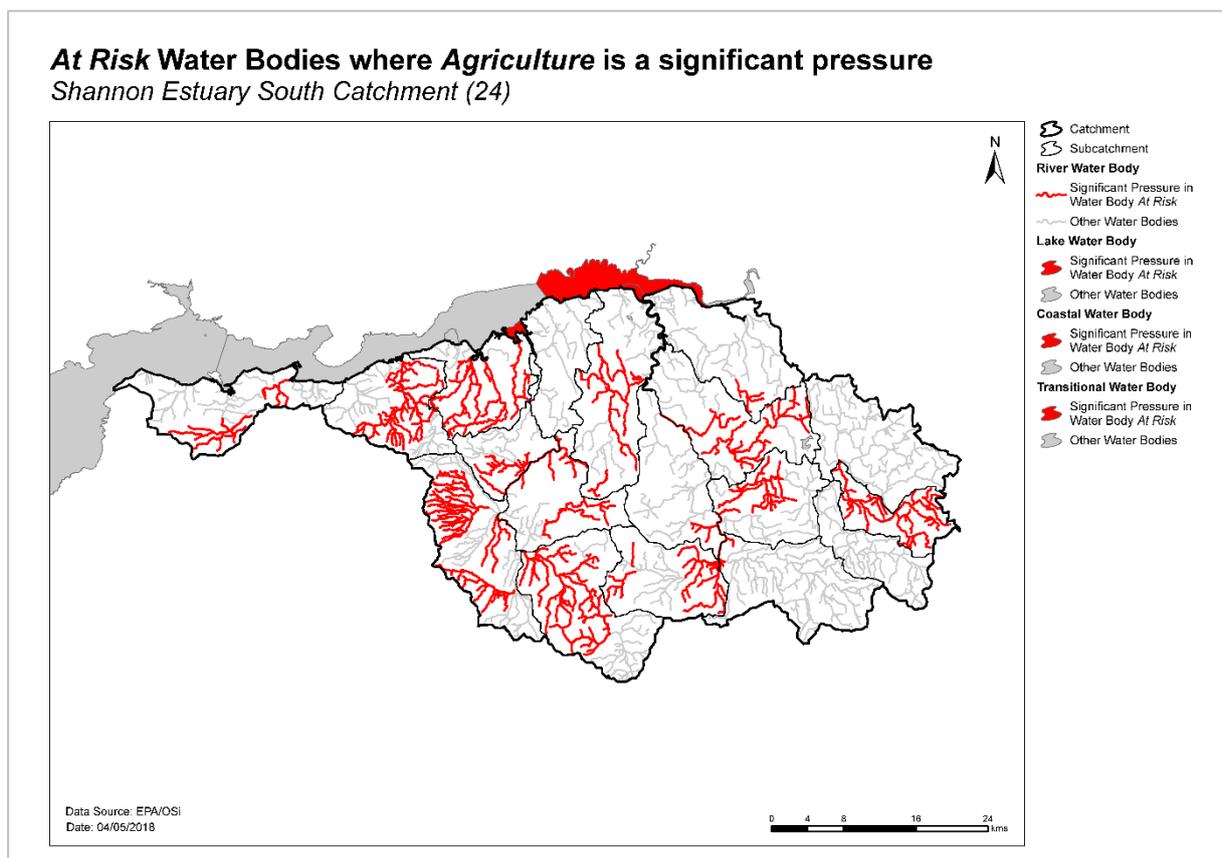


Figure 11. Water bodies that are *At Risk* and are impacted by agricultural activities

At Risk Water Bodies where Urban Waste Water is a significant pressure
 Shannon Estuary South Catchment (24)

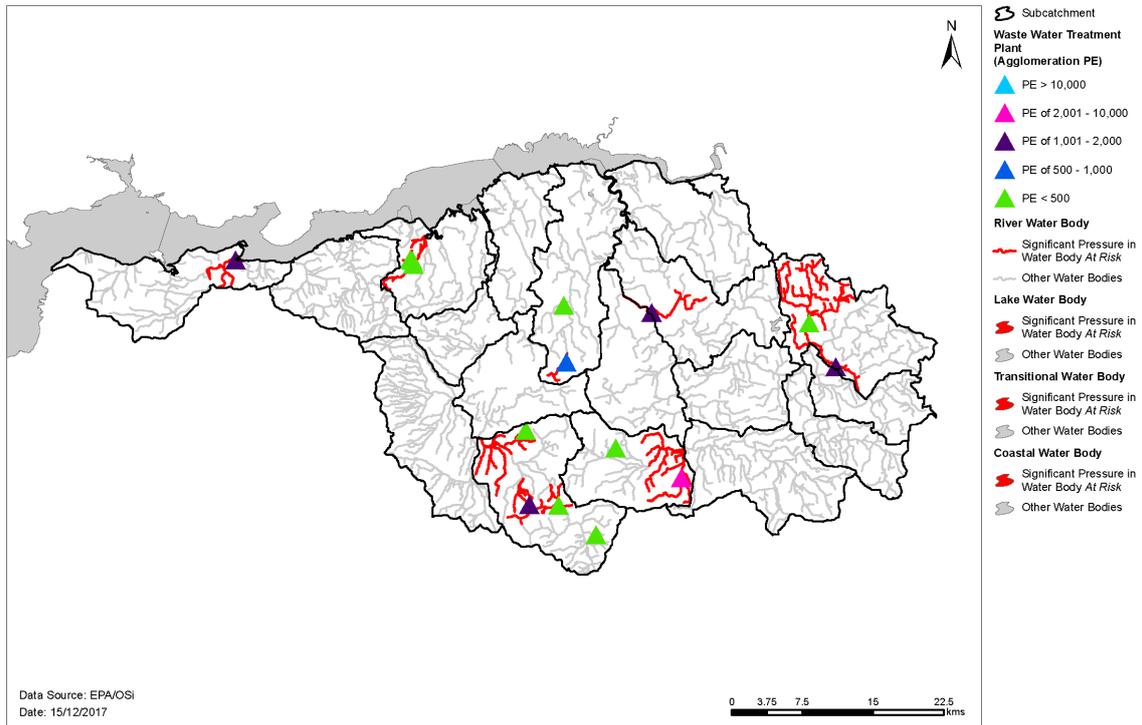


Figure 12. Water bodies that are *At Risk* and are impacted by urban waste water

At Risk Water Bodies where Domestic Waste Water is a significant pressure
 Shannon Estuary South Catchment (24)

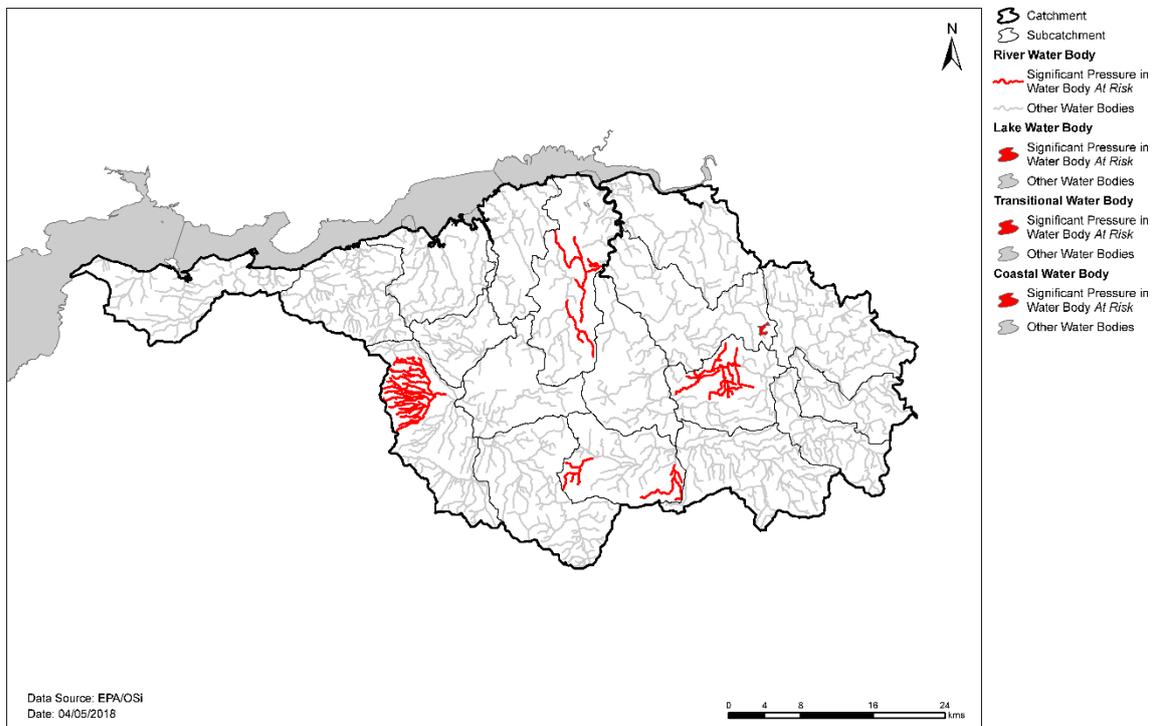


Figure 13. Water bodies that are *At Risk* and are impacted by domestic waste water

At Risk Water Bodies where Hydromorphology is a significant pressure
 Shannon Estuary South Catchment (24)

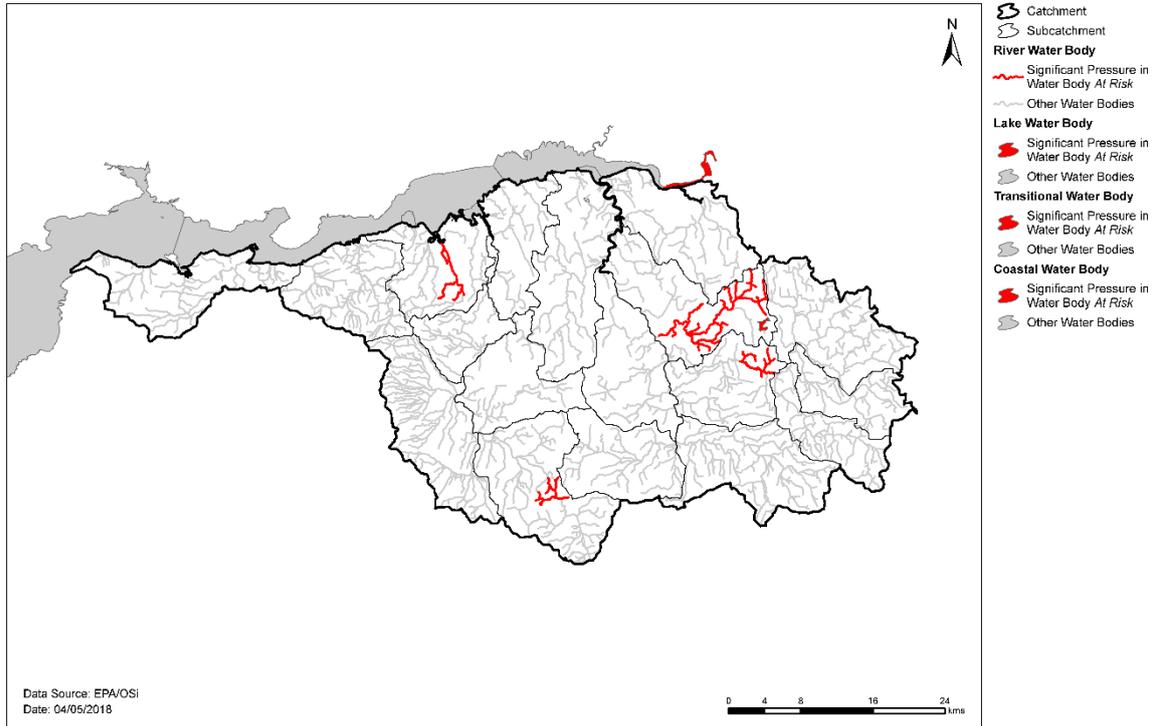


Figure 14. Water bodies that are *At Risk* and are impacted by hydromorphological pressures

At Risk Water Bodies where Industry is a significant pressure
 Shannon Estuary South Catchment (24)

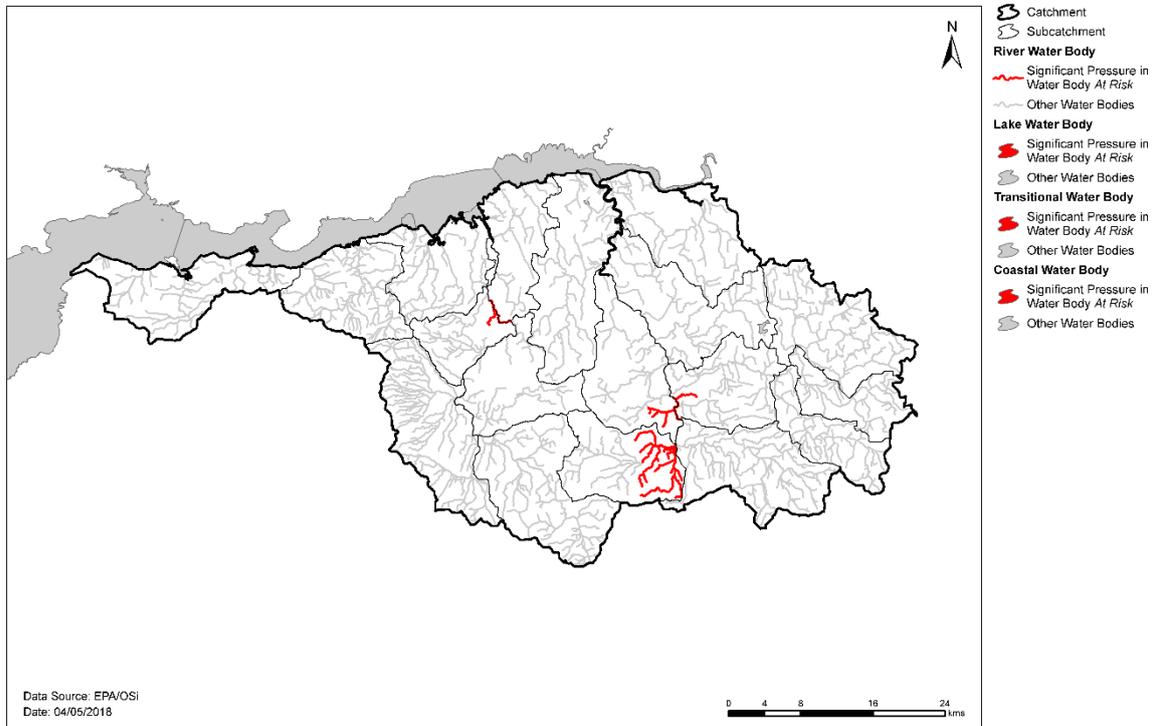


Figure 15. Water bodies that are *At Risk* and are impacted by industrial activities

At Risk Water Bodies where Other Anthropogenic Pressures is a significant pressure
 Shannon Estuary South Catchment (24)

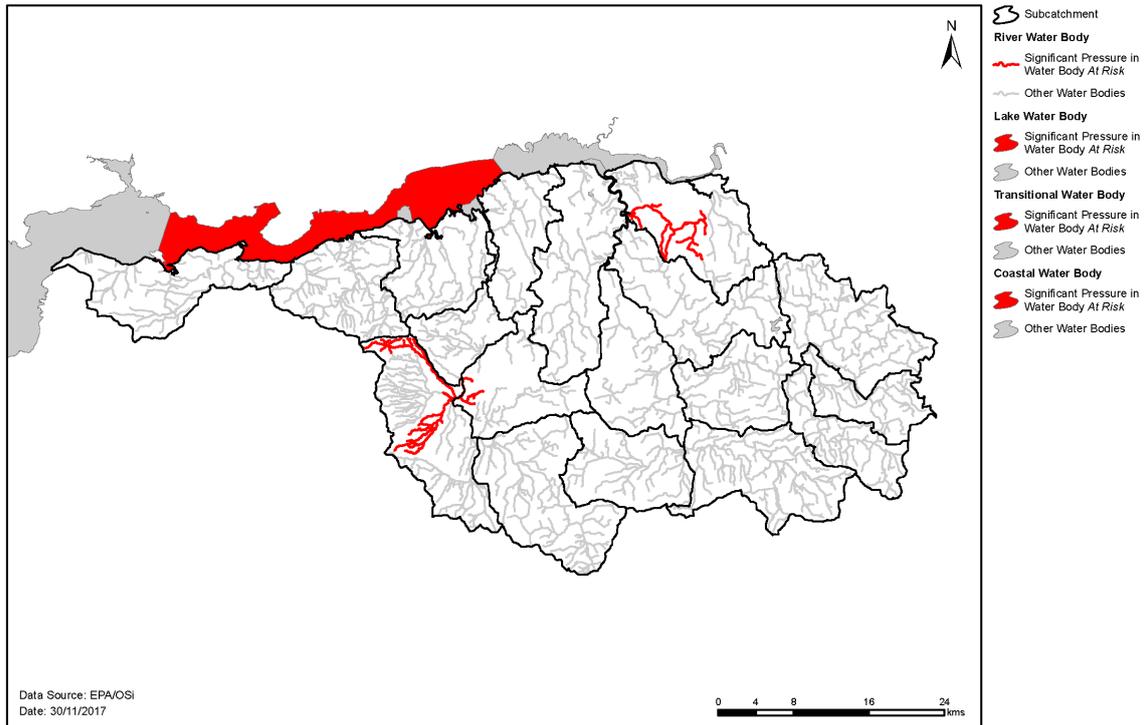


Figure 16. Water bodies that are *At Risk* and are impacted other anthropogenic pressures

At Risk Water Bodies where Invasive Species is a significant pressure
 Shannon Estuary South Catchment (24)

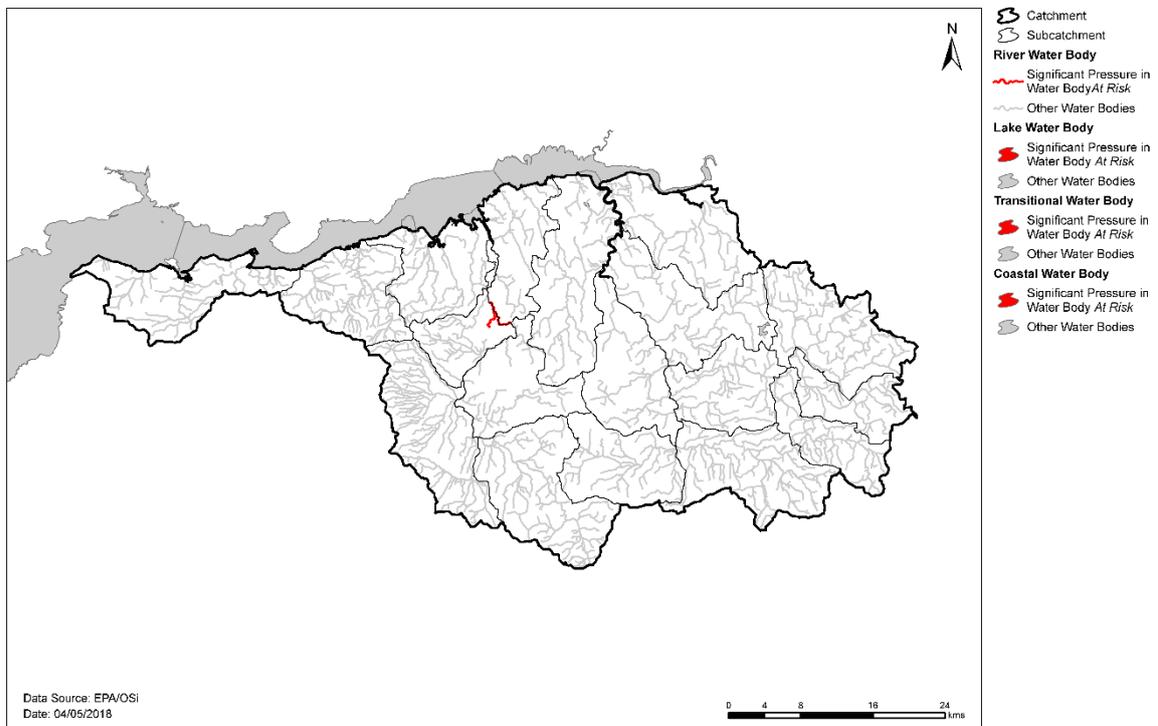


Figure 17. Water bodies that are *At Risk* and are impacted Invasive Species

At Risk Water Bodies where Extractive Industry is a significant pressure
 Shannon Estuary South Catchment (24)

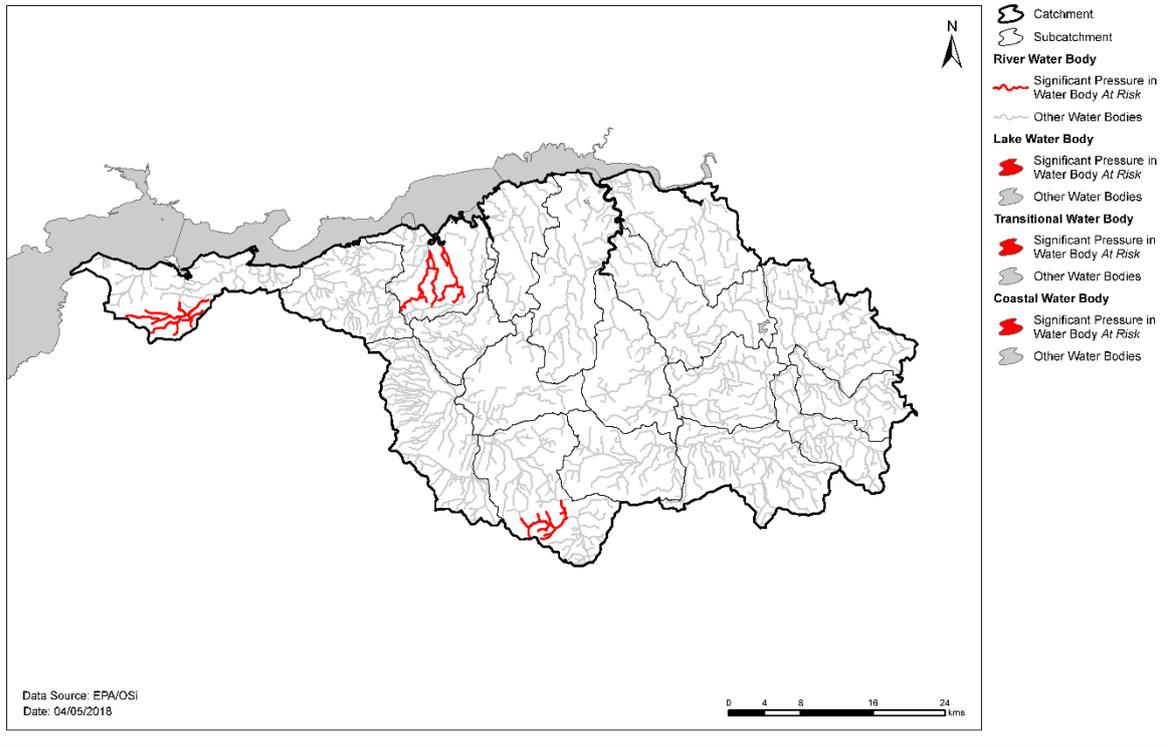


Figure 18. Water bodies that are *At Risk* and are impacted by extractive industry

At Risk Water Bodies where Diffuse Urban is a significant pressure
 Shannon Estuary South Catchment (24)

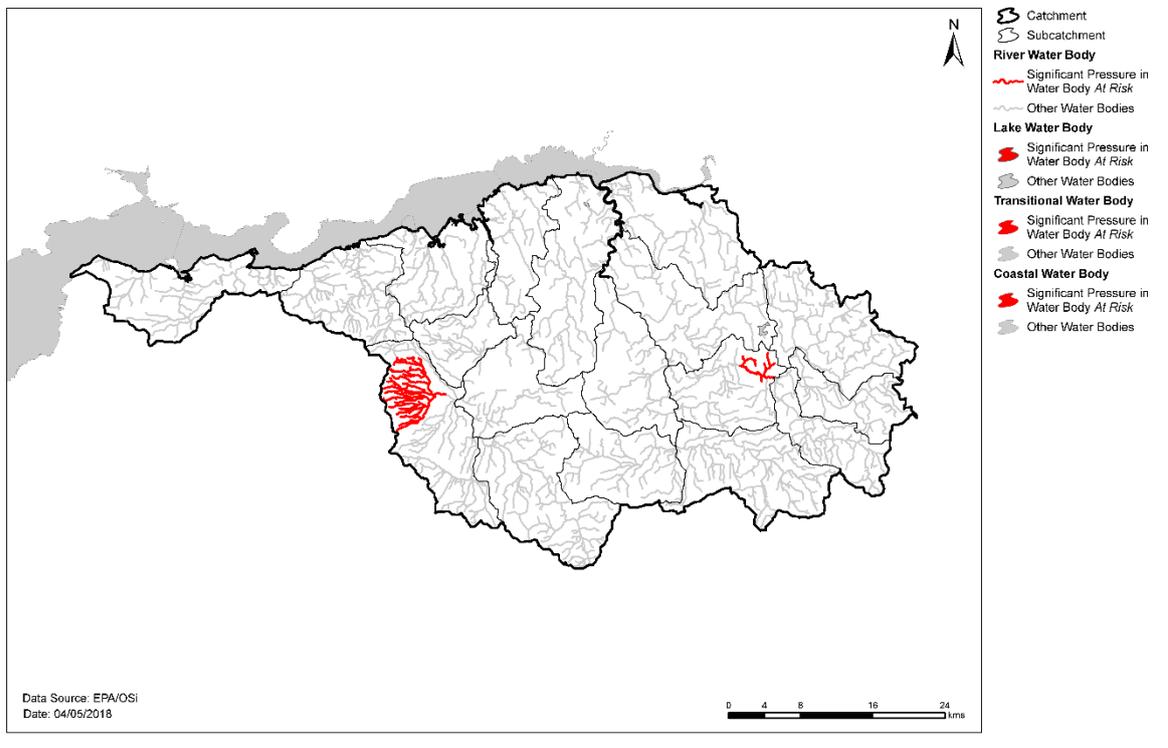


Figure 19. Water bodies that are *At Risk* and are impacted by diffuse urban impacts

At Risk Water Bodies where Forestry is a significant pressure Shannon Estuary South Catchment (24)

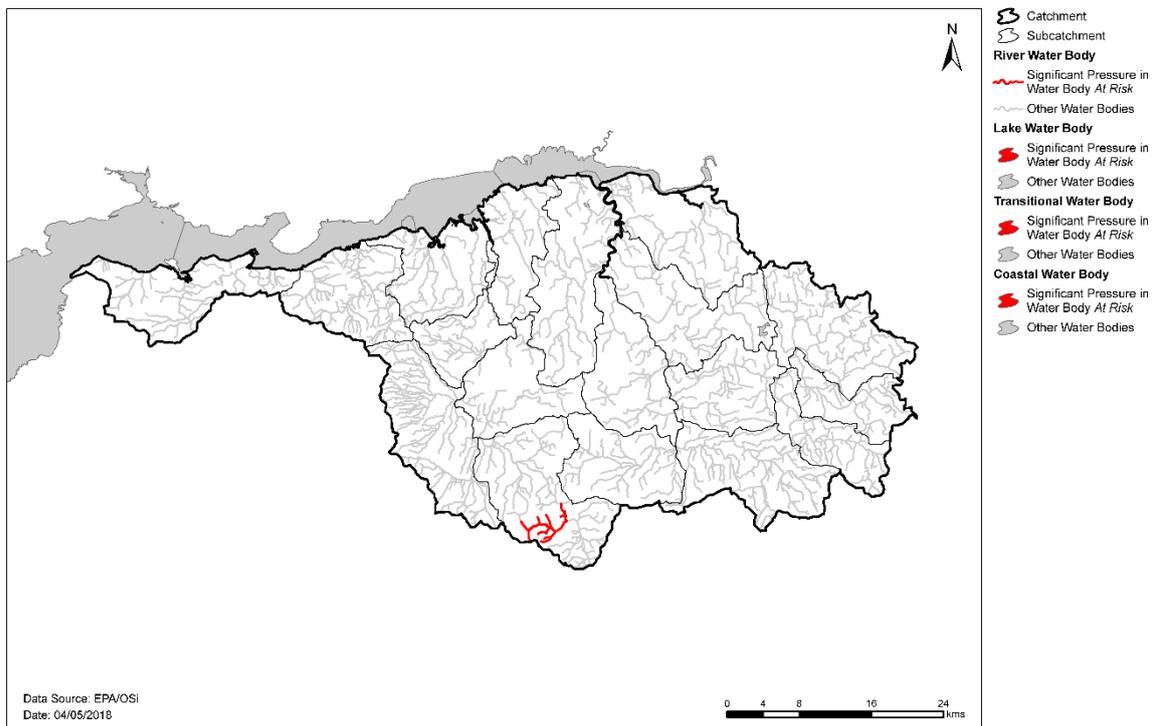


Figure 20. Water bodies that are *At Risk* and are impacted by forestry activities

5 Load reduction assessment

5.1 River water body load reductions

- ◆ The results of the main channel assessment for both the Maigue and Deel (Newcastlewest) rivers indicate that orthophosphate is the main parameter of concern (Appendix 2).
- ◆ 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 30th 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 Shannon, South Estuary catchment, water chemistry data are available for 26 of the 96 water bodies monitoring stations. The available data indicate that load reductions are required in 16 river water bodies (Table 7).

5.2 TraC load reductions

Some 18 estuaries in Ireland have been monitored on a continual basis since 1990 as part of Ireland's commitment under the Convention for the Protection of the Marine Environment of the

North-East Atlantic (the Ospar Convention). This has shown that generally over the long term, nutrients have decreased but further reduction will be required in many cases to support Good Ecological Status. However, many estuaries have not been monitored to the same degree, and where monitoring data is insufficient, an ongoing programme of modelling has been undertaken to estimate potential nutrient load removal from contributing sub-catchments.

Different estuaries may require reductions in different nutrients. Further modelling work is required to determine precisely what load reductions are required, but in the interim, further monitoring will be carried out to assess the improvements resulting from various planned measures, and to confirm the nature of the issues.

- ◆ Phosphorus load reductions will be required to support the Maigne and Deel estuaries.
- ◆ The Maigne Estuary is at Moderate Status due to MRP (summer and winter) and DO and is potentially P limited. Modelling indicates that approximately 50% of annual TP is from waste water and 40% is from pasture. Eight of the 49 river water bodies feeding the estuary require P load reductions, with three requiring a 'V. High' reductions (see Section 5.1). There are currently no WWTP load reductions identified through the Irish Water investment programme. Further modelling work is required to identify a target load reduction and consider how best this might be achieved.
- ◆ The Deel Estuary is at Moderate Status due to MRP and DO and is potentially P limited. Of the 26 river water bodies feeding the estuary, four require 'V. High' P load reductions (see section 5.1). Modelling indicates that of the 19 t yr⁻¹ of TP entering the estuary, approximately 25% is from waste water and 60% is from agriculture. There are currently no WWTP load reductions identified through the Irish Water investment programme. Further modelling work is required to identify a target load reduction and consider how best this might be achieved.

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

Water body	P Load Reduction Required
Maigne_040	V. High
Deel (Newcastlewest)_090	V. High
Charleville Stream_010	V. High
Deel (Newcastlewest)_110	V. High
Deel (Newcastlewest)_030	V. High
Mahore_020	V. High
Deel (Newcastlewest)_120	V. High
Maigne_080	High
Ballylongford_020	High
Clonshire_010	High
Deel (Newcastlewest)_060	Med
Morningstar_060	Med
Bunoke_010	Med
Maigne_010	Med
Owvane (Limerick)_030	Low
Camoge_030	Low

As part of the Ireland's commitment to the Oskar Convention, nutrient flux or load monitoring has been carried out on the Deel and Maigne Estuaries since 1990 (Figure 20a to 20d). Further analysis of these nutrient load trends is available at <http://dx.doi.org/10.3318/BIOE.2016.23>. Graphs for the Shannon Old Channel and Tail Race are available in the Lower Shannon (HA25D) Report, Pages 20-21.

Figure 20a – Total Nitrogen Load (Tonnes/year) 1990-2015

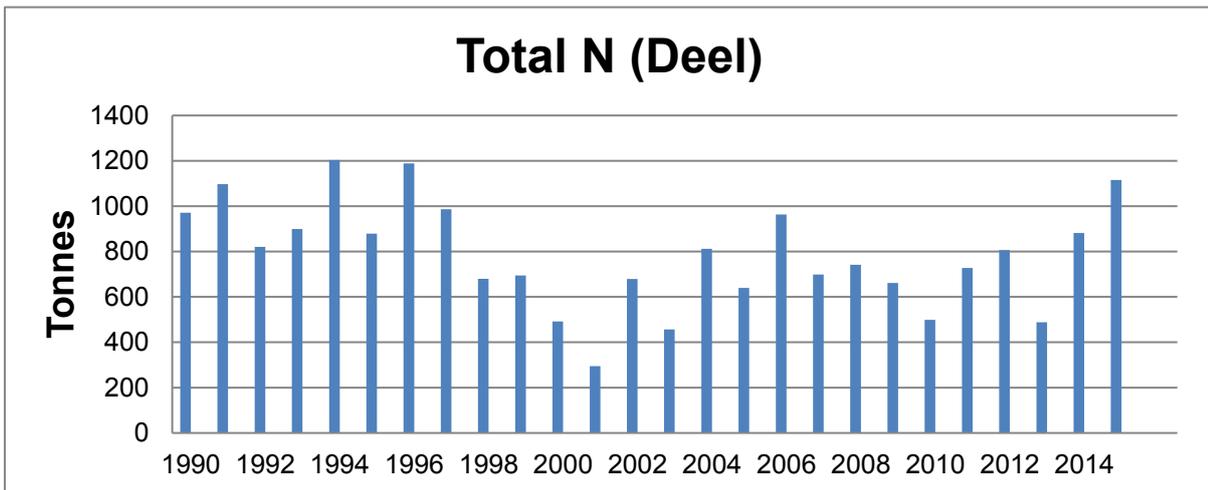


Figure 20b – Total Phosphorus Load (Tonnes/year) 1990-2015

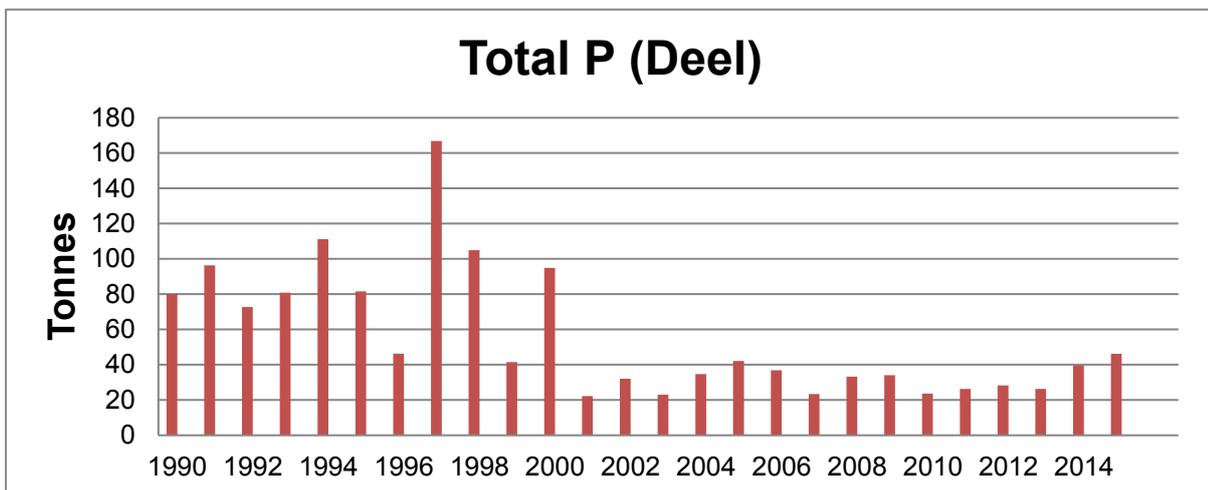


Figure 20c – Total Nitrogen Load (Tonnes/year) 1990-2015

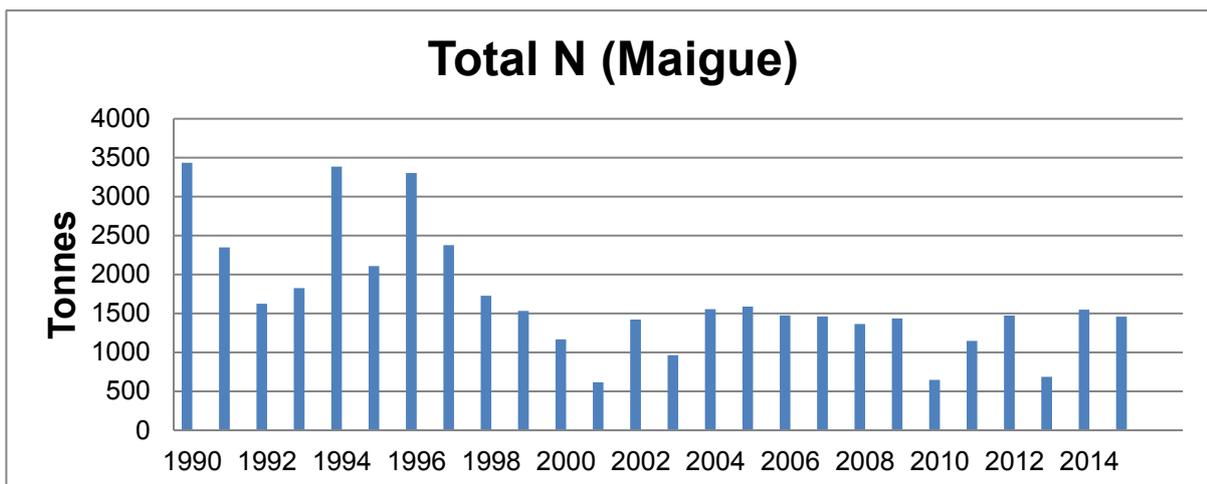
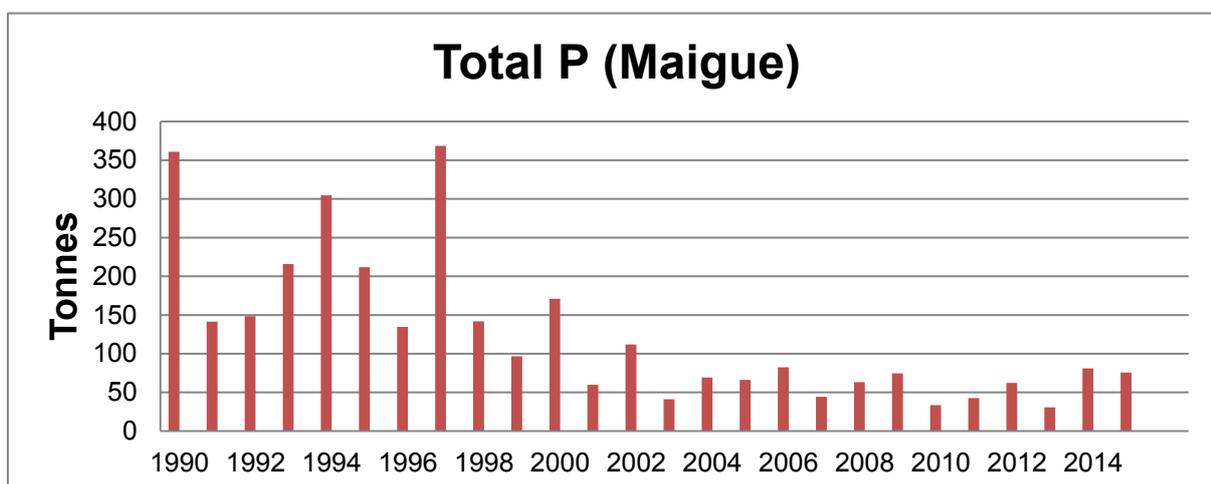


Figure 20d – Total Phosphorus Load (Tonnes/year) 1990-2015



6 Further characterisation and local catchment assessments

- ◆ Further characterisation through local catchment assessments is needed in 44 of the *At Risk* river and lake 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 37 of the *Review* 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.
- ◆ Brief definitions on the 10 IA assessment scenarios are given in Appendix 7.

Table 8. Local Catchment Assessment Allocation for *At Risk* and *Review* River and Lake Water Bodies in the Catchment

Risk	IA 1	IA 2	IA 3	IA4	IA 5	IA6	IA 7	IA 8	IA 9	Total
At Risk	22	13	11	0	2	3	39	0	0	90

Review	9	4	18	2	1	0	3	0	0	37
Note water bodies may have multiple categories of Local Catchment Assessments										

7 Catchment summary

- ◆ Of the 95 river water bodies, 43 are *At Risk* of not meeting their WFD objectives
- ◆ One lake water body is *At Risk* of not meeting their WFD objectives.
- ◆ Five of the eight (all transitional) TraC water bodies are *At Risk* of not meeting their WFD objectives.
- ◆ Excess phosphorus leading to eutrophication is a major issue in surface water bodies. While excess ammonium is also of concern, it is only for a limited number of water bodies.
- ◆ Hydromorphological (or physical) conditions (including the input of excessive fine sediment) and poor habitat quality are also of concern for several surface water bodies.
- ◆ Of the 28 groundwater bodies, nine are *At Risk*. The dominant issue is elevated nutrient concentrations in groundwater bodies that are contributing to their associated surface water bodies. Aluminium from the licensed industrial site is a significant issue in one groundwater body.

8 Areas for Action

8.1 Process of Selection

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 5 areas for action in the Shannon South Estuary catchment.

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. Since this selection, the Local Authorities Water and Communities Office (LAWCO) have undertaken public engagement and feedback sessions in each local authority.

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, or when feedback from the public engagement process is assessed, areas for action may 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 Shannon South Estuary catchment are summarised below.

- ◆ Five recommended areas for actions (Table 9, Figure 21) were selected.
- ◆ These are the Lough Gur, Camoge, Ovwane, Drumcamoge and Upper Deel.
- ◆ These include 15 river and lake water bodies – 11 *At Risk* and four *Review*.
- ◆ Nine groundwater bodies, that are *At Risk or Review* due to groundwater contribution of nutrients to surface water bodies, intersect with five 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.

A remaining 74 *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 22. These include:

- ◆ sixty-six river water bodies – 33 *At Risk* and 33 *Review*, and
- ◆ eight TraC water bodies – five *At Risk* and three *Review*.

Table 9. Recommended Areas for Action in the Shannon South Estuary catchment

Recommended area for action	Number of water bodies	SCs	Local authority	Reason for Selection
Lough Gur	2	24_13	Limerick	<ul style="list-style-type: none"> • Opportunity to work with a strong group water scheme here. Many farmers in the area are members of the scheme • Active community and angling groups. • High recreational and amenity value. • Important for biodiversity and heritage.
Camoge	4	24_12 24_13	Limerick	<ul style="list-style-type: none"> • Shared ground with the Corcas. • Build on improvements as a result of in stream works completed by Inland Fisheries Ireland. • Headwaters of the river Camoge. • Active angling clubs.

				<ul style="list-style-type: none"> • One potential 'quick win'. • Two deteriorated water bodies.
Owvane	2	24_7	Limerick	<ul style="list-style-type: none"> • Potential to build on improvement works completed by Inland Fisheries Ireland. • Two potential 'quick wins'. • One deteriorated water body.
Drumcomoge	1	24_2	Limerick	<ul style="list-style-type: none"> • Multi-agency effort/cross county opportunity. • Headwaters to the Camoge which is already a project. • Similar issues to the Arra WRAA. • Another test case for poorly drained soils • Good tidy towns group that could be incorporated (Emly)
Upper Deel	6	24_15	Limerick Cork	<ul style="list-style-type: none"> • Multi-agency approach between Cork and Limerick. • Pilot project for the very poorly draining soils in Limerick • There is the potential for a rivers trust here • Community involvement, including active tidy towns group. • The Deel is a good trout fishery • Two deteriorated water bodies.

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

Groundwater bodies			Intersecting surface water bodies		Recommended Area for Action	
Code	Name	Risk	Code	Name		
IE_SH_G_022	Ballingarry	At risk	IE_SH_24C010600	CAMOGGE_030	Camoge	
IE_SH_G_084		Review	IE_SH_24C010200	CAMOGGE_010		
IE_SH_G_084		Review	IE_SH_24C010400	CAMOGGE_020		
IE_SH_G_084		Review	IE_SH_24C010600	CAMOGGE_030		
IE_SH_G_084		Fedamore	Review	IE_SH_24B080900		BALLYNAMONA_010
IE_SH_G_106			At risk	IE_SH_24B080900		BALLYNAMONA_010
IE_SH_G_106		Herbertstown	At risk	IE_SH_24C010200		CAMOGGE_010
IE_SH_G_106			At risk	IE_SH_24C010400		CAMOGGE_020
IE_SH_G_030	Ballylongford	Review	IE_SH_24D020100	DEEL (NEWCASTLEWEST)_030	Upper Deel Project	

IE_SH_G_030		Review	IE_SH_24D020200	DEEL (NEWCASTLEWEST)_040	
IE_SH_G_030		Review	IE_SH_24D020300	DEEL (NEWCASTLEWEST)_050	
IE_SH_G_122	Kilmeedy	At risk	IE_SH_24D020400	DEEL (NEWCASTLEWEST)_060	
IE_SH_G_190		Review	IE_SH_24D020300	DEEL (NEWCASTLEWEST)_050	
IE_SH_G_190	Newcastle West	Review	IE_SH_24D020400	DEEL (NEWCASTLEWEST)_060	
IE_SH_G_203		Review	IE_SH_24D020200	DEEL (NEWCASTLEWEST)_040	
IE_SH_G_203		Review	IE_SH_24D020300	DEEL (NEWCASTLEWEST)_050	
IE_SH_G_203	Shanagolden	Review	IE_SH_24D020400	DEEL (NEWCASTLEWEST)_060	
IE_SH_G_030		Review	IE_SH_24O020090	OWVANE (LIMERICK)_020	
IE_SH_G_030	Ballylongford	Review	IE_SH_24O020200	OWVANE (LIMERICK)_030	Owvane Project
IE_SH_G_055	Charleville	At risk	IE_SH_24D040400	DRUMCOMOGE_010	
IE_SH_G_193	North Kilmallock	At risk	IE_SH_24D040400	DRUMCOMOGE_010	Drumcomoge Project
IE_SH_G_084		Review	IE_SH_24B900440	BALLYCULLANE 24_010	
IE_SH_G_084	Fedamore	Review	IE_SH_24_99	Gur	Lough Gur

9 Environmental Objectives

9.1 Surface Water

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.

- ◆ Assuming resources are available and actions are taken in the recommended areas for action, of the 11 *At Risk* water bodies, it is predicted that three (27%) will achieve improvements by 2021, eight (73%) will achieve their objective by 2027.
- ◆ For the four *Review* 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 set for these water bodies, see Table 11.

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

Risk Category	No. of Water Bodies	No. of WBs for 2021 Improvement	No. of WBs for 2027 Status Improvement
---------------	---------------------	---------------------------------	--

River			
<i>At Risk</i>	11	3	8
<i>Review</i>	4	0	4
<i>Total</i>	15	3	12

- ◆ Sixteen water bodies have met their 2015 environmental objective. One of the 16 *Not at Risk* water bodies met their 2015 environmental objectives for ecological status but failed to meet their protected areas objectives.
- ◆ As action is not yet planned to be taken in the remaining 38 *At Risk* surface water bodies, a 2027 date is applied to all these water bodies. For the 36 *Review* 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 set for these water bodies, see Table 12.

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

Risk Category	No. of Water Bodies	No. of WBs for 2021 Improvement	No. of WBs for 2027 Status Improvement
Rivers			
<i>At Risk</i>	33	0	33
<i>Review</i>	33	0	33
Lake			
<i>At Risk</i>	0	0	0
<i>Review</i>	0	0	0
TraC			
<i>At Risk</i>	5	0	5
<i>Review</i>	3	0	3
Total	74	0	74

9.2 Groundwater

- ◆ Twenty-two of the 25 groundwater bodies are currently Good status and, therefore, have met their environmental objectives.
- ◆ Of the three groundwater bodies that are Poor status, all have a 2027 environmental objective.

Table 13 Environmental Objective dates of Poor status groundwater bodies in the Shannon South Estuary catchment

Water body code	Water body name	Environmental Objective
IE_SH_G_106	Herbertstown	2027
IE_SH_G_141	Limerick City Southwest	2027
IE_SH_G_252	Industrial Facility (P0035-04)	2027

10 Acknowledgements

This Shannon South Estuary Catchment Assessment (Version 3) has been produced by the Catchment Science & Management Unit, EPA, with the assistance of the following:

- Limerick City & County Council.
- Cork County Council.
- Kerry County Council.
- Tipperary 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 Agriculture.
- DAFM Forest Service.
- Coillte.
- Teagasc.
- National Federation of Group Water Schemes.
- National Parks and Wildlife Service.
- Waterways Ireland.
- Board Iascaigh Mhara.
- Marine Institute.
- Sea Fisheries Protection Authority.
- Kerry LIFE.

Recommended Areas for Action Shannon Estuary South Catchment (24)

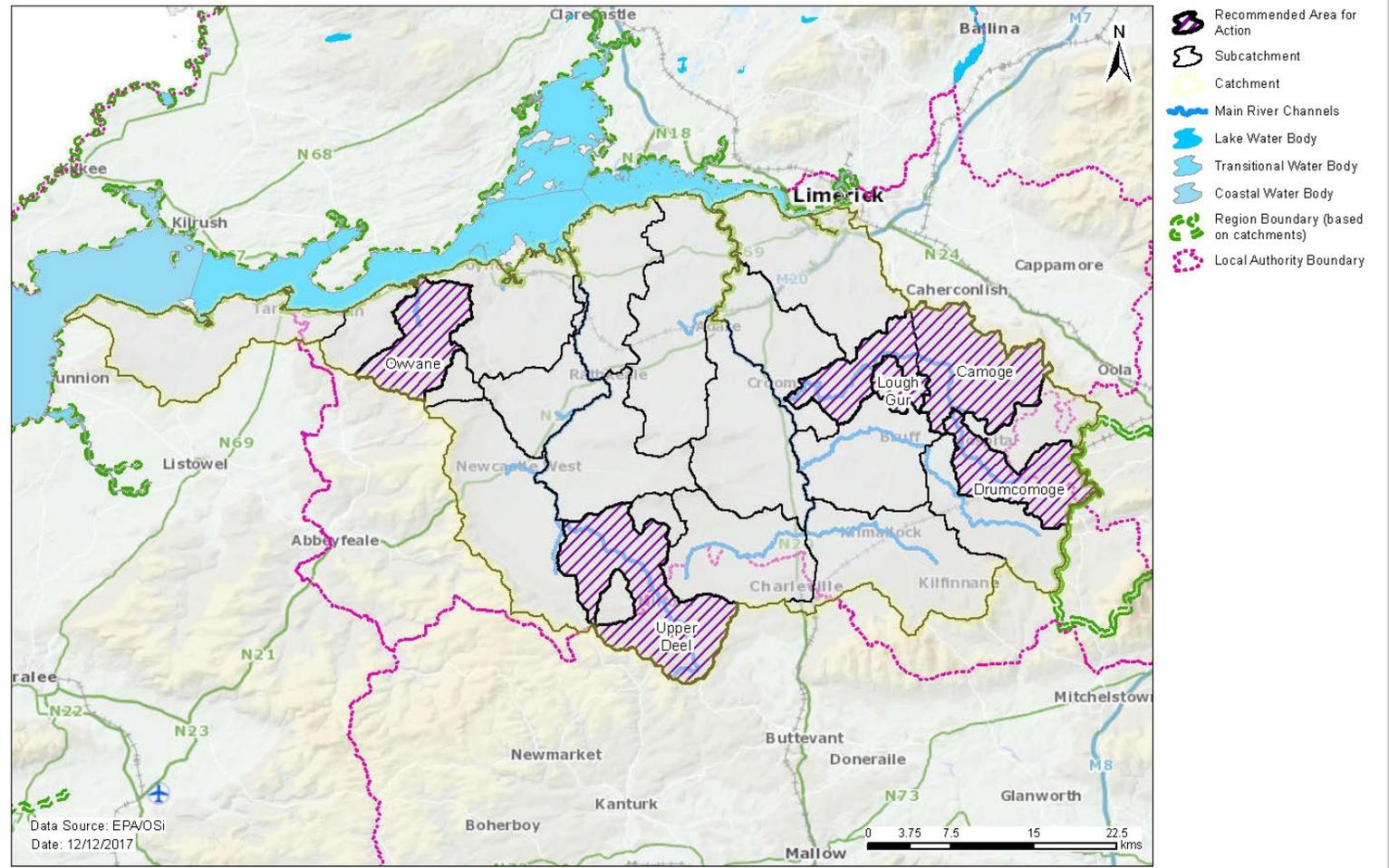


Figure 21. Location of Recommended Areas for Action in the Shannon South Estuary catchment

Appendix 1 High ecological status objective water bodies and sites

Water body/ Site	Type	Codes	2015 Status
Bleach	Lake	IE_SH_24_90	High

Appendix 2 Catchment scale nutrient concentrations and in-stream loads

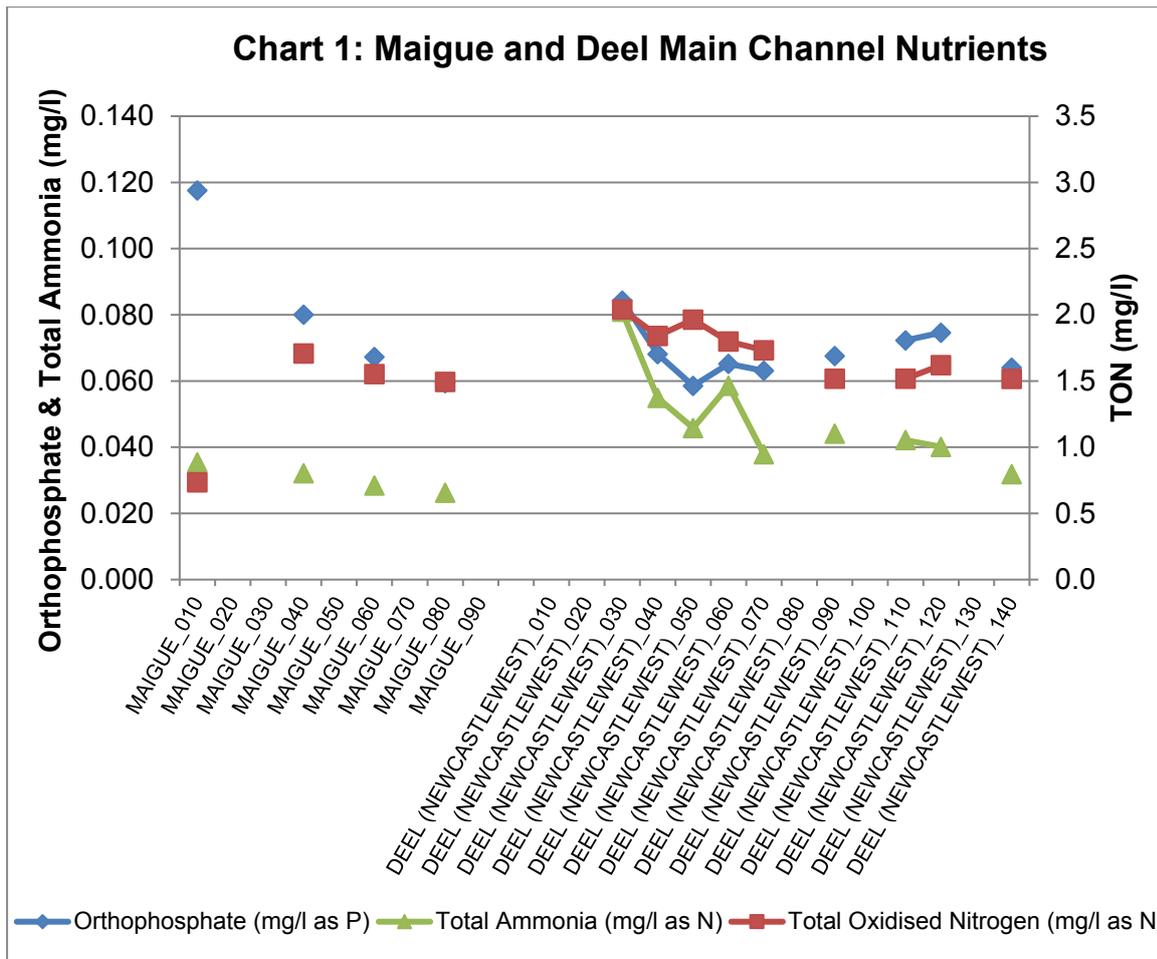
The results of the instream water quality assessment for the Shannon Estuary South catchment main channels are illustrated in Chart 1. The assessment is based on the mean concentrations between 2013 and 2015 at each site from the headwaters down to the estuary. Average orthophosphate concentrations in the Maigue River decrease downstream from 0.118 to 0.059mg/l significantly exceeding the EQS for good status (0.035mg/l) at MAIGUE_010, MAIGUE_040, MAIGUE_060 and MAIGUE_080.

Ammonia concentrations are relatively uniform and remain below the EQS (0.065mg/l) at all sampling points where water chemistry data is available.

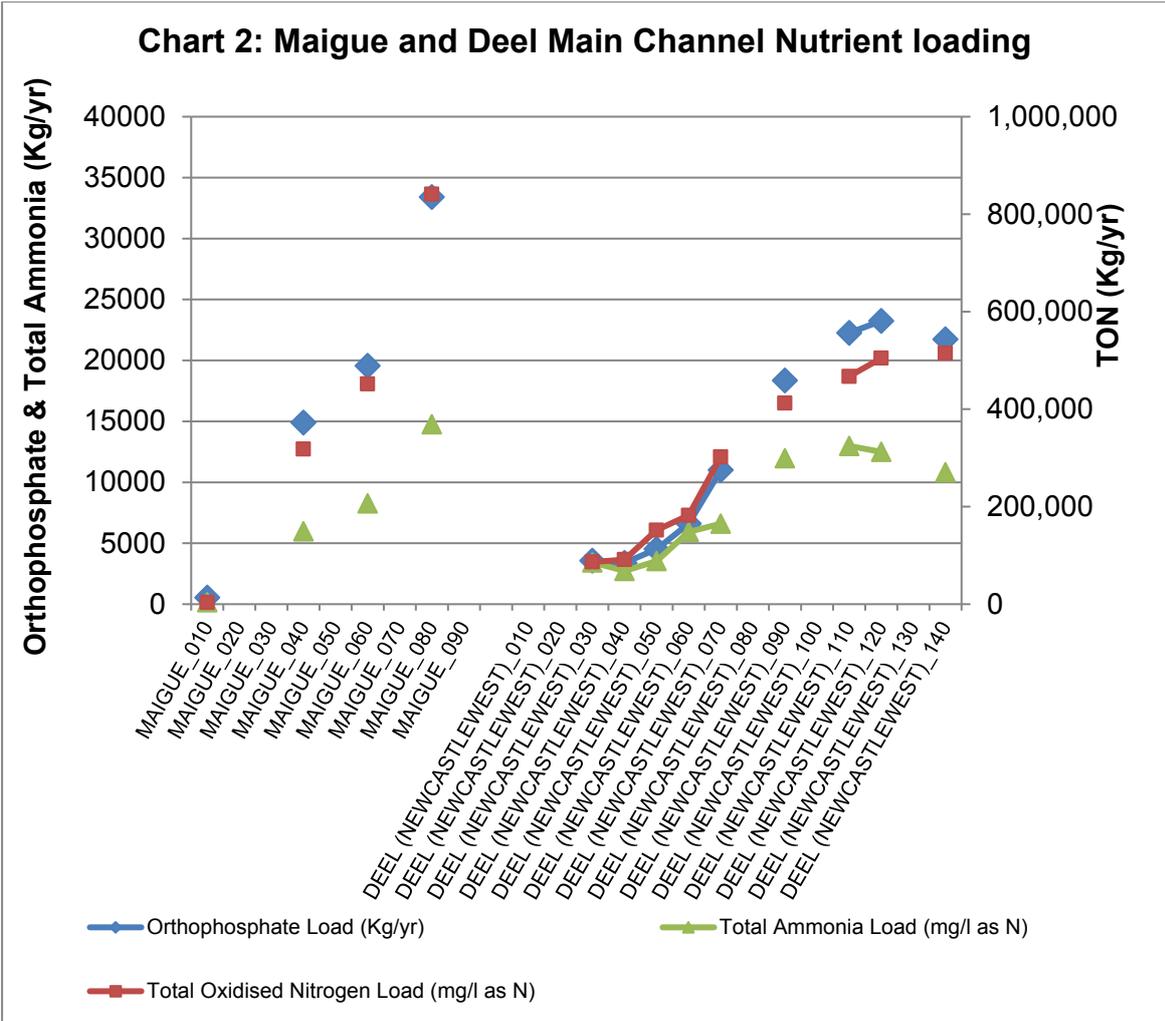
TON concentrations increase markedly from the headwaters at MAIGUE_010 (0.7mg/l) to 1.7mg/l at MAIGUE_040. Thereafter concentrations remain moderately low, without exceeding the TON threshold concentration of 2.6mg/l. Note: only four of the nine main channel water bodies have associated water chemistry.

Average orthophosphate concentrations in the Deel River are consistently elevated and exceed the EQS at all sampling points where monitoring data is available. The highest orthophosphate concentration (0.084mg/l) occurs at DEEL (NEWCASTLEWEST)_040.

The EQS for ammonia was exceeded at DEEL (NEWCASTLEWEST)_040 (0.081mg/l), whereas downstream concentrations remain below the EQS. TON concentrations decreased downstream of DEEL (NEWCASTLEWEST)_040, remaining moderately low without exceeding the TON threshold. Note: water chemistry data was unavailable for five of the 14 main channel monitoring points.



In the Maigue River TON and ammonia increased downstream in response to increasing flow. Orthophosphate load increased downstream, in spite of a trend of decreasing concentration. In the Deel River, nutrient loads increased from DEEL (NEWCASTLEWEST)_030 to DEEL (NEWCASTLEWEST)_090, levelling off thereafter.



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

Sub-catchment 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
24_1	IE_SH_24D021000	Deel (Newcastlewest)_100	River	At Risk	Poor	Moderate	N	Ag	2027	
24_1	IE_SH_24D021100	Deel (Newcastlewest)_110	River	At Risk	Moderate	Poor	N	Ag	2027	
24_1	IE_SH_24D021300	Deel (Newcastlewest)_120	River	At Risk	Moderate	Poor	N	Ind,Other	2027	
24_1	IE_SH_24D021320	Deel (Newcastlewest)_130	River	Review	Unassigned	Unassigned	N		2027	
24_1	IE_SH_24D021400	Deel (Newcastlewest)_140	River	Review	Unassigned	Unassigned	N		2027	
24_1	IE_SH_24S030780	Slewaun Stream (North Branch)_010	River	Review	Unassigned	Unassigned	N		2027	
24_1	IE_SH_060_0600	Deel Estuary	Transitional	At Risk	Moderate	Moderate	N	Ag	2027	
24_2	IE_SH_24D040400	Drumcomoge_010	River	At Risk	Unassigned	Unassigned	N	Ag	2027	Drumcomoge
24_4	IE_SH_24O010790	Owenskaw_010	River	At Risk	Unassigned	Unassigned	N	Ag	2027	
24_5	IE_SH_24A010400	Ahacronane_010	River	At Risk	Unassigned	Poor	N	Ag	2027	
24_5	IE_SH_24A010900	Ahacronane_020	River	At Risk	Poor	Poor	N	Ag,Hymo,M+Q	2027	
24_5	IE_SH_24D071200	Dooncaha Stream_010	River	At Risk	Poor	Poor	N	Ag,Peat	2027	
24_5	IE_SH_24F230770	Foynes_010	River	Review	Unassigned	Unassigned	N		2027	
24_5	IE_SH_24G060100	Glenbane West Stream_010	River	Review	Unassigned	Unassigned	N		2027	
24_5	IE_SH_24L030600	Lismakeery Stream_010	River	At Risk	Poor	Poor	N	Ag	2027	
24_5	IE_SH_24S022000	Shanagolden Stream_010	River	At Risk	Good	Moderate	N	Ag,UWW	2027	
24_5	IE_SH_060_0350	Foynes Harbour	Transitional	Review	Unassigned	Unassigned	N		2027	
24_5	IE_SH_060_0400	Poulaweala Lough / Quayfield Lough	Transitional	Review	Unassigned	Unassigned	N		2027	
24_6	IE_SH_24C020780	Charleville Stream_010	River	At Risk	Poor	Poor	N	Ag,DWW,Ind,UWW	2027	
24_6	IE_SH_24C020800	Charleville Stream_020	River	At Risk	Poor	Poor	N	Ag,Ind,UWW	2027	
24_6	IE_SH_24C280480	Coolagowan_010	River	At Risk	Unassigned	Unassigned	N	Ag	2027	
24_6	IE_SH_24M010020	Maigue_010	River	At Risk	Poor	Poor	N	Ag,DWW	2027	
24_6	IE_SH_24M010050	Maigue_020	River	Review	Poor	Good	N		2027	
24_7	IE_SH_24O020090	Owvane (Limerick)_020	River	At Risk	Good	Good	N	Ag	2021	Owvane
24_7	IE_SH_24O020200	Owvane (Limerick)_030	River	At Risk	Good	Moderate	N	Ag	2021	Owvane

Sub-catchment 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
24_8	IE_SH_24W060910	West Liskennett_010	River	Review	Unassigned	Unassigned	N		2027	
24_9	IE_SH_24A270640	Astee_West_010	River	Review	Unassigned	Unassigned	N		2027	
24_9	IE_SH_24B030400	Ballylongford_010	River	At Risk	Moderate	Poor	N	Ag,Peat	2027	
24_9	IE_SH_24B030700	Ballylongford_020	River	At Risk	Good	Moderate	N	Ag,Peat	2027	
24_9	IE_SH_24B030860	Ballylongford_030	River	Review	Unassigned	Unassigned	N		2027	
24_9	IE_SH_24F320750	Farranmiller 24_010	River	Review	Unassigned	Unassigned	N		2027	
24_9	IE_SH_24R300270	Ralappane_010	River	Review	Unassigned	Unassigned	N		2027	
24_9	IE_SH_24T010100	Tarbert_010	River	At Risk	Good	Good	N	Ag,UWW	2027	
24_9	IE_SH_060_0000	Mouth Of The Shannon (Has 23;27)	Coastal	Review	Moderate	Moderate	N		2027	
24_10	IE_SH_24B040800	Ballynaclogh_010	River	Review	Unassigned	Unassigned	N		2027	
24_10	IE_SH_24B050300	Barnakyle_010	River	At Risk	Poor	Poor	N	Ag	2027	
24_10	IE_SH_24B050600	Barnakyle_020	River	At Risk	Poor	Poor	N	Other	2027	
24_10	IE_SH_24N150630	24n15_010	River	Review	Unassigned	Unassigned	N		2027	
24_10	IE_SH_060_0700	Maigue Estuary	Transitional	At Risk	Moderate	Moderate	N	Ag	2027	
24_10	IE_SH_060_0800	Upper Shannon Estuary	Transitional	At Risk	Good	Poor	N	Ag	2027	
24_10	IE_SH_060_0900	Limerick Dock	Transitional	At Risk	Good	Moderate	N	Hymo	2027	
24_11	IE_SH_24B670530	Ballysallagh 24_010	River	Review	Unassigned	Unassigned	N		2027	
24_11	IE_SH_24F050850	Fairyfield_Glebe_010	River	Review	Unassigned	Unassigned	N		2027	
24_11	IE_SH_24L010400	Loobagh_020	River	Review	Moderate	Good	N		2027	
24_11	IE_SH_24L010600	Loobagh_030	River	Review	Good	Good	N		2027	
24_11	IE_SH_24M010300	Maigue_030	River	At Risk	Moderate	Moderate	N	Ag	2027	
24_12	IE_SH_24B080900	Ballynamona_010	River	Review	Unassigned	Unassigned	N		2027	Camoge
24_12	IE_SH_24C010200	Camoge_010	River	At Risk	Moderate	Moderate	N	UWW	2027	Camoge
24_12	IE_SH_24M040900	Mahore_020	River	At Risk	Moderate	Good	N	UWW	2027	
24_13	IE_SH_24_99	Gur	Lake	At Risk	Bad	Poor	N	DWW,Hymo	2027	Lough Gur
24_13	IE_SH_24B900440	Ballycullane 24_010	River	Review	Unassigned	Unassigned	N		2027	Lough Gur
24_13	IE_SH_24C010400	Camoge_020	River	At Risk	Good	Poor	N	Ag,Hymo	2027	Camoge
24_13	IE_SH_24C010600	Camoge_030	River	At Risk	Moderate	Poor	N	Ag,Hymo	2021	Camoge
24_13	IE_SH_24M010600	Maigue_060	River	Review	Unassigned	Unassigned	N		2027	

Sub-catchment 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
24_13	IE_SH_24M010900	Maigue_080	River	At Risk	Moderate	Moderate	N	Ag,UWW	2027	
24_13	IE_SH_24M010980	Maigue_090	River	Review	Unassigned	Unassigned	N		2027	
24_13	IE_SH_24M440880	Mondellihy_010	River	Review	Unassigned	Unassigned	N		2027	
24_13	IE_SH_24S270530	South Drumbloughan_010	River	Review	Unassigned	Unassigned	N		2027	
24_14	IE_SH_24A040500	Arra_010	River	At Risk	Poor	Poor	N	Ag,DU,DWW	2027	
24_14	IE_SH_24B060100	Bunoke_010	River	At Risk	Poor	Poor	N	Ag	2027	
24_14	IE_SH_24D020700	Deel (Newcastlewest)_080	River	At Risk	Poor	Moderate	N	Ag	2027	
24_14	IE_SH_24D020800	Deel (Newcastlewest)_090	River	At Risk	Moderate	Moderate	N	Other	2027	
24_15	IE_SH_24A020800	Ahavarraga Stream_010	River	At Risk	Bad	Poor	N	Ag,UWW	2027	
24_15	IE_SH_24D020070	Deel (Newcastlewest)_010	River	Review	Unassigned	Unassigned	N		2027	Upper Deel
24_15	IE_SH_24D020090	Deel (Newcastlewest)_020	River	Review	Unassigned	Unassigned	N		2027	Upper Deel
24_15	IE_SH_24D020100	Deel (Newcastlewest)_030	River	At Risk	Good	Moderate	N	Ag,For,M+Q	2027	Upper Deel
24_15	IE_SH_24D020200	Deel (Newcastlewest)_040	River	At Risk	Moderate	Moderate	N	Ag,Hymo,UWW	2027	Upper Deel
24_15	IE_SH_24D020300	Deel (Newcastlewest)_050	River	At Risk	Poor	Moderate	N	Ag	2027	Upper Deel
24_15	IE_SH_24D020400	Deel (Newcastlewest)_060	River	At Risk	Moderate	Poor	N	Ag,UWW	2027	Upper Deel
24_15	IE_SH_24F010410	Finglasha Stream_010	River	Review	Unassigned	Unassigned	N		2027	
24_16	IE_SH_24C030300	Clonshire_010	River	At Risk	Poor	Poor	N	Ag,UWW	2027	
24_16	IE_SH_24C030600	Clonshire_020	River	Review	Unassigned	Unassigned	N		2027	
24_16	IE_SH_24C030710	Clonshire_030	River	At Risk	Poor	Poor	N	Ag,DWW	2027	
24_16	IE_SH_24C030900	Clonshire_040	River	At Risk	Poor	Poor	N	Ag	2027	
24_16	IE_SH_24G050600	Greanagh_010	River	At Risk	Poor	Poor	N	Ag,DWW	2027	
24_16	IE_SH_24G070400	Greanagh Stream_010	River	Review	Unassigned	Unassigned	N		2027	
24_16	IE_SH_24K620500	Kilmoreen_010	River	Review	Unassigned	Unassigned	N		2027	
24_16	IE_SH_24T240890	Tonlegee 24_010	River	Review	Unassigned	Unassigned	N		2027	
24_16	IE_SH_24T250670	Tobermurry_010	River	Review	Unassigned	Unassigned	N		2027	
24_17	IE_SH_24B010890	Ballyania Stream_010	River	Review	Unassigned	Unassigned	N		2027	

Sub-catchment 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
24_17	IE_SH_24G200860	Goat Island_010	River	Review	Unassigned	Unassigned	N		2027	
24_17	IE_SH_24M010400	Maigue_040	River	At Risk	Moderate	Moderate	N	Ag,Ind	2027	
24_17	IE_SH_24M020600	Morningstar_050	River	At Risk	Moderate	Moderate	N	DU,Hymo	2027	
24_17	IE_SH_24M020800	Morningstar_060	River	At Risk	Moderate	Good	N	Ag,DWW	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
24_18	IE_SH_24D320860	Deegerty_010	River	Review	Unassigned	Unassigned	N		2027	
24_18	IE_SH_24D320950	Deegerty_020	River	Review	Unassigned	Unassigned	N		2027	
24_18	IE_SH_24D330670	Dromlohan 24_010	River	Review	Unassigned	Unassigned	N		2027	
24_18	IE_SH_24I060560	Issane 24_010	River	Review	Unassigned	Unassigned	N		2027	
24_18	IE_SH_060_0300	Lower Shannon Estuary	Transitional	At Risk	Moderate	Moderate	N	Other	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	Reason why not met
0500PUB1105	Monabricka	Hospital GWB	IE_SH_G_107	Yes	N/A
1300PUB1010	Tieraclea (Tarbert) PWSS 071E	Ballylongford GWB	IE_SH_G_030	Yes	N/A
1900PRI3002	Ballyshonick	GWDTE-Askeaton North Fens (SAC002279)	IE_SH_G_245	Yes	N/A
1900PRI3003	Kilcornan				
1900PRI3007	Ballysteen	Ballysteen GWB	IE_SH_G_037	Yes	N/A
1900PRI3008	Griston	Charleville GWB	IE_SH_G_055	Yes	N/A
1900PRI3008	Griston				
1900PRI3021	Killeedy	Ballylongford GWB	IE_SH_G_030	Yes	N/A
1900PRI3021	Killeedy				
1900PRI3021	Killeedy	Shanagolden GWB	IE_SH_G_203	Yes	N/A
1900PRI3021	Killeedy				
1900PRI3034	Cappagh No.1	GWDTE-Askeaton South Fens (SAC002279)	IE_SH_G_249	Yes	N/A
1900PRI3034	Cappagh No.1				
1900PRI3035	Cappagh No.2	Askeaton GWB	IE_SH_G_010	Yes	N/A
1900PRI3035	Cappagh No.2	GWDTE-Askeaton South Fens (SAC002279)	IE_SH_G_249	Yes	N/A
1900PRI3036	Glenbrohane	Charleville GWB	IE_SH_G_055	Yes	N/A
1900PRI3036	Glenbrohane				
1900PRI3037	Creeves	Askeaton GWB	IE_SH_G_010	Yes	N/A
1900PRI3043	Granagh	Ballingarry GWB	IE_SH_G_022	Yes	N/A
1900PRI3043	Granagh				
1900PRI3043	Granagh				
1900PRI3045	Ballinamona	Charleville GWB	IE_SH_G_055	Yes	N/A
1900PRI3057	Kilfinny	Fedamore GWB	IE_SH_G_084	Yes	N/A
1900PRI3057	Kilfinny				
1900PRI3057	Kilfinny				
1900PRI3057	Kilfinny	Ballingarry GWB	IE_SH_G_022	Yes	N/A
1900PRI3065	Croagh	Fedamore GWB	IE_SH_G_084	Yes	N/A
1900PRI3068	Newbridge/Cooltominn	Askeaton GWB	IE_SH_G_010	Yes	N/A
1900PRI3084	Ballinvreena	Charleville GWB	IE_SH_G_055	Yes	N/A
1900PRI3085	Coolcappa	Ballylongford GWB	IE_SH_G_030	Yes	N/A
1900PRI3108	Knockainey/Kilballyowen	Hospital GWB	IE_SH_G_107	Yes	N/A
1900PRI3108	Knockainey/Kilballyowen				
1900PRI3108	Knockainey/Kilballyowen				
1900PRI3147	Craggs/Borragone	Askeaton GWB	IE_SH_G_010	Yes	N/A

Scheme Code	Scheme Name	Water Body	Water Body Code	Objective met? Yes /No	Reason why not met
1900PRI3147	Craggs/Borragone				
1900PRI3151	Lough Gur	Fedamore GWB	IE_SH_G_084	Yes	N/A
1900PRI3151	Lough Gur				
1900PRI3161	Killeen/Coshma	Patrickswell GWB	IE_SH_G_197	Yes	N/A
1900PRI3181	Mountdavid	Ballylongford GWB	IE_SH_G_030	Yes	N/A
1900PRI3189	Baggotstown	Hospital GWB	IE_SH_G_107	Yes	N/A
1900PRI3189	Baggotstown				
1900PRI3201	Carnane	Herbertstown	IE_SH_G_106	Yes	N/A
1900PRI3201	Carnane				
1900PRI3213	Crean	Ballingarry GWB	IE_SH_G_022	Yes	N/A
1900PRI3218	Newtown Clarina	Kildimo GWB	IE_SH_G_119	Yes	N/A
1900PRI3223	Bulgaden	North Kilmallock GWB	IE_SH_G_193	Yes	N/A
1900PRI3242	Feenagh	Newcastle West GWB	IE_SH_G_190	Yes	N/A
1900PRI3268	Caherline/Newtown	Herbertstown	IE_SH_G_106	Yes	N/A
1900PRI3285	Ballybricken	Ballylongford GWB	IE_SH_G_130	Yes	N/A
1900PRI3285	Ballybricken				
1900PRI3285	Ballybricken	Herbertstown	IE_SH_G_106	Yes	N/A
1900PRI3458	Farradonnelly	Fedamore GWB	IE_SH_G_084	Yes	N/A
1900PRI3460	Knockea	Limerick City Southwest GWB	IE_SH_G_141	Yes	N/A
1900PUB0056	Rockhill Water Supply	Bruree GWB	IE_SH_G_046	Yes	N/A
1900PUB1002	Adare PUB DWS	Fedamore GWB	IE_SH_G_084	Yes	N/A
1900PUB1002	Adare PUB DWS	Maigne_080	IE_SH_24M010900	Yes	N/A
1900PUB1007	Athlacca PUB DWS	Ballingarry GWB	IE_SH_G_022	Yes	N/A
1900PUB1008	Ballingarry PUB DWS	Ballingarry GWB	IE_SH_G_022	Yes	N/A
1900PUB1013	Bruff PUB DWS	Hospital GWB	IE_SH_G_107	Yes	N/A
1900PUB1013	Bruff PUB DWS				
1900PUB1013	Bruff PUB DWS				
1900PUB1014	Bruree PUB DWS	Bruree GWB	IE_SH_G_046	Yes	N/A
1900PUB1019	Carrigkerry PUB DWS	Ballylongford GWB	IE_SH_G_030	Yes	N/A
1900PUB1022	Castletown/Ballyagran PUB DWS	Bruree GWB	IE_SH_G_046	Yes	N/A
1900PUB1023	Croom PUB DWS	Fedamore GWB	IE_SH_G_084	Yes	N/A
1900PUB1023	Croom PUB DWS				
1900PUB1023	Skagh, Croom	Fedamore GWB	IE_SH_G_084	Yes	N/A
1900PUB1027	Foynes/Shannon Estuary PUB DWS	Deel (Newcastlewest)_140	IE_SH_24D021400	No	2013 & 2016

Scheme Code	Scheme Name	Water Body	Water Body Code	Objective met? Yes /No	Reason why not met
					2,4-D Clopyralid MCPA Mecoprop <u>2015</u> MCPA
1900PUB1030	Glin PUB DWS	Ballylongford GWB	IE_SH_G_030	Yes	N/A
1900PUB1031	Herbertstown PUB DWS	Herbertstown	IE_SH_G_106	Yes	N/A
1900PUB1035	Kilfinnane	Charleville GWB	IE_SH_G_055	Yes	N/A
1900PUB1035	Ardpatrick	Charleville GWB	IE_SH_G_055	Yes	N/A
1900PUB1036	Kilmallock PUB DWS	Charleville GWB	IE_SH_G_055	No	<u>2016</u> Clopyralid – treated water at Kilmallock WTP <u>2013</u> MCPA Clopyralid
1900PUB1036	Kilmallock PUB DWS	Loobagh_030	IE_SH_24L010600	No	<u>2016</u> Clopyralid – treated water at Kilmallock WTP <u>2013</u> MCPA Clopyralid
1900PUB1037	Kilteely PUB DWS	Knockroe Southwest GWB	IE_SH_G_131	Yes	N/A
1900PUB1038	Knocklong PUB DWS	Hospital GWB	IE_SH_G_107	Yes	N/A
1900PUB1038	Knocklong PUB DWS				
1900PUB1039	Loughill PUB DWS	Ballylongford GWB	IE_SH_G_030	Yes	N/A
1900PUB1042	Castlemahon .W.S.	Deel (Newcastlewest)_070	IE_SH_24D020600	No	<u>2013 & 2016</u>

Scheme Code	Scheme Name	Water Body	Water Body Code	Objective met? Yes /No	Reason why not met
					2,4-D Clopyralid MCPA Mecoprop
1900PUB1046	Rathkeale PUB DWS	Ballyallinan GWB	IE_SH_G_024	Yes	N/A
1900PUB1046	Rathkeale PUB DWS				
1900PUB1047	Borehole*	Bruree GWB	IE_SH_G_046	Yes	N/A
1900PUB1048	Fedamore PUB DWS	Fedamore GWB	IE_SH_G_084	Yes	N/A
1900PUB1050	Hospital PUB DWS	Hospital GWB	IE_SH_G_107	Yes	N/A
1900PUB1050	Hospital PUB DWS				
1900PUB1056	South West Regional Water Supply	Newcastlewest GWB	IE_SH_G_190	Yes	N/A
1900PUB1056	South West Regional Water Supply	Ballylongford GWB	IE_SH_G_030	Yes	N/A
1900PUB1056	South West Regional Water Supply	Feenagh GWB	IE_SH_G_088	Yes	N/A
1900PUB1101	Martinstown Water Supply	Charleville GWB	IE_SH_G_055	Yes	N/A

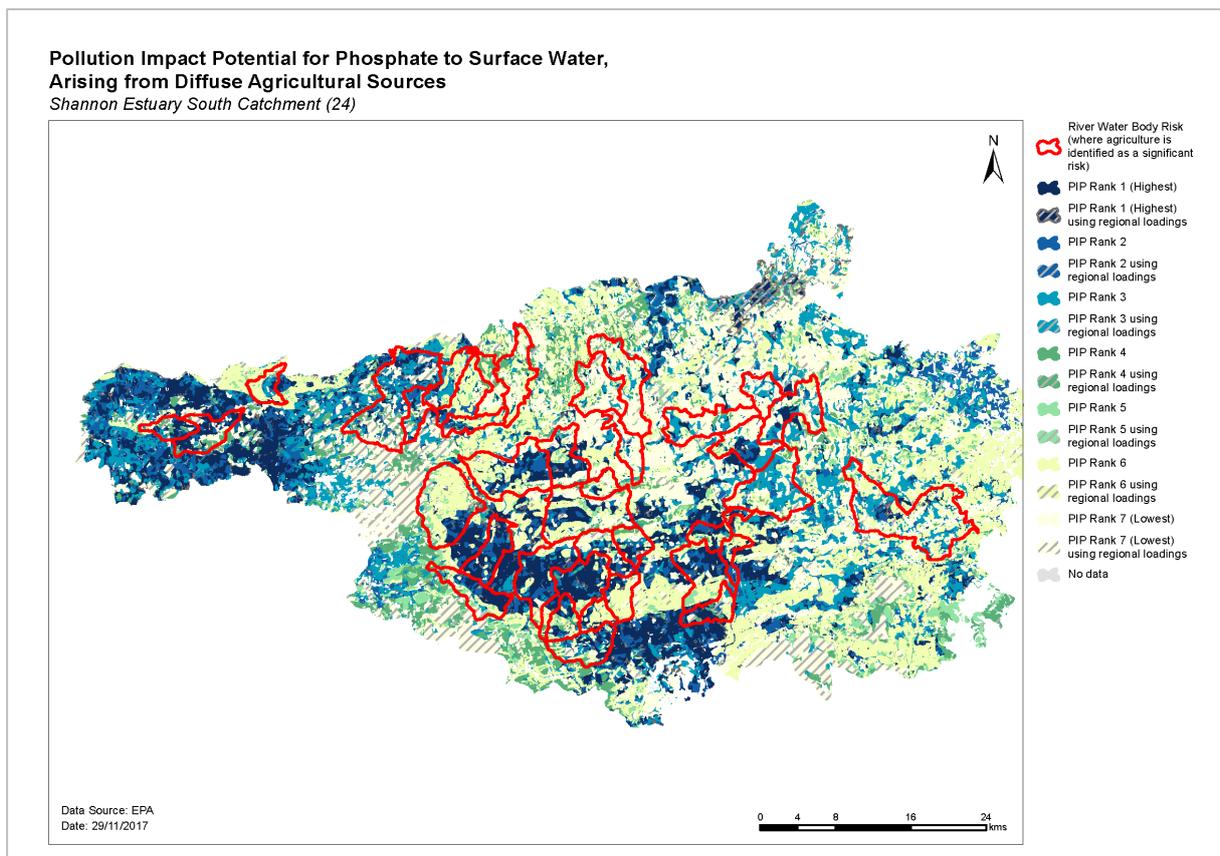
* No name documente

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?
Askeaton Fen Complex SAC 002279	7230	Good GW level	Groundwater	Askeaton GWB	Good (R)	No	IE_SH_G_010	No
			Groundwater	GWDTE-Askeaton North Fens (SAC002279)	Good (R)	No	IE_SH_G_245	No
			Groundwater	GWDTE-Askeaton South Fens (SAC002279)	Good (R)	No	IE_SH_G_249	No
Ballyhoura Mountains SAC 002036	none							
Barrigone SAC 000432	none							
Curraghchase Woods SAC 000174	none							
Glen Bog SAC 001430	none							
Lower River Shannon SAC 002165	1150	Good	Transitional	Poulaweala Lough / Quayfield Lough	Unassigned (R)	Yes	IE_SH_060_0400	Yes
Tory Hill SAC 000439	7230	Good GW level	Groundwater	GWDTE-Tory Hill (SAC000439)	Good (R)	No	IE_SH_G_176	Yes

Appendix 6 Pollution Impact Potential (PIP) Map for Phosphorus

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 phosphorus to surface water. The risk of phosphorus 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