

Lee-Cork Harbour Catchment Assessment 2010-2015 (HA 19)



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 Lee-Cork Harbour 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 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, sub-catchment 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 River Lee and all streams entering tidal water in Cork Harbour and Youghal Bay and between Knockaverry and Templebreedy Battery, Co. Cork, draining a total area of 2,153km². The largest urban centre in the catchment is Cork City. The other main urban centres are Ballincollig, Macroom, Carrigaline, Crosshaven, Blarney, Glanmire, Midleton, Carrigtohill, Cobh, Passage West and Belvelly. The total population of the catchment is approximately 328,850 with a population density of 153 people per km².

The headwaters of the Lee, upstream of Gouganebarra Lake, drain the western part of the Sheehy Mountains along the Cork-Kerry border. The Lee flows east towards Inchigeelagh, where is joined by the Toon River from the west. It then flows through the sinuous Carrigadrohid reservoir which also receives the flow from the Sullane River before flowing through the ESB generating station at Carrigadrohid dam and into Inishcarra Reservoir where it is joined by the Dripsey River.

Downstream of the Inishcarra hydroelectric dam, the Lee cuts through a steep-sided sandstone gorge before turning east towards Lough Mahon. The Lee is then joined by the River Bride which drains the western extent of the valley to the west of Farnanes and Crookstown. It flows past Ballincollig, after which it is joined by the Shournagh River.

The Lee becomes tidal at Sunday's Well and then passes through Cork City where it is joined by the Bride (Cork City), Glasheen and Clashaboy Rivers before entering Lough Mahon. The Lee flows through Lough Mahon and the estuary north of Cobh Island, where the Owennacurra and Dungourney Rivers flow into the estuary through Midleton, draining much of the eastern part of the catchment.

The Lee then escapes to the south of Cobh by means of two gorges cut into the sandstone ridge either side of Cobh Island. At the southern end of Cork Harbour the Owenboy (Cork) enters from the west, draining the area to the west of Carrigaline. The Lee then flows out to sea between Crosshaven and Roches Point.

Several small coastal rivers drain the area to the southeast of Cork Harbour and the area at the eastern extreme of the catchment is drained by the Womanagh River which flows into the sea on the western side of Youghal Bay.

The Lee-Cork Harbour catchment comprises 18 subcatchments (Table 1, Figure 1) with 92 river water bodies, three lakes, 13 transitional, six coastal water bodies and 16 groundwater bodies. There are five heavily modified and no artificial water bodies in the catchment.

Table 1. List of subcatchments in the Lee-Cork Harbour catchment

Subcatchment ID	Subcatchment Name
19_1	Kiln_SC_010
19_2	Tibbotstown_SC_010
19_3	Lee[Cork]_SC_020
19_4	Foherish_SC_010
19_5	Manin_SC_010
19_6	Lee[Cork]_SC_030
19_7	Sullane_SC_020
19_8	Lee[Cork]_SC_060
19_9	Lee[Cork]_SC_050
19_10	Sullane_SC_010
19_11	Glashaboy[L.Mahon]_SC_010
19_12	Farrannamanagh_SC_010
19_13	Owennacurra_SC_010
19_14	Lee[Cork]_SC_010
19_15	Owenboy[Cork]_SC_010
19_16	Womagh_SC_010
19_17	Glasheen[Cork city]_SC_010
19_18	Lee[Cork]_SC_040

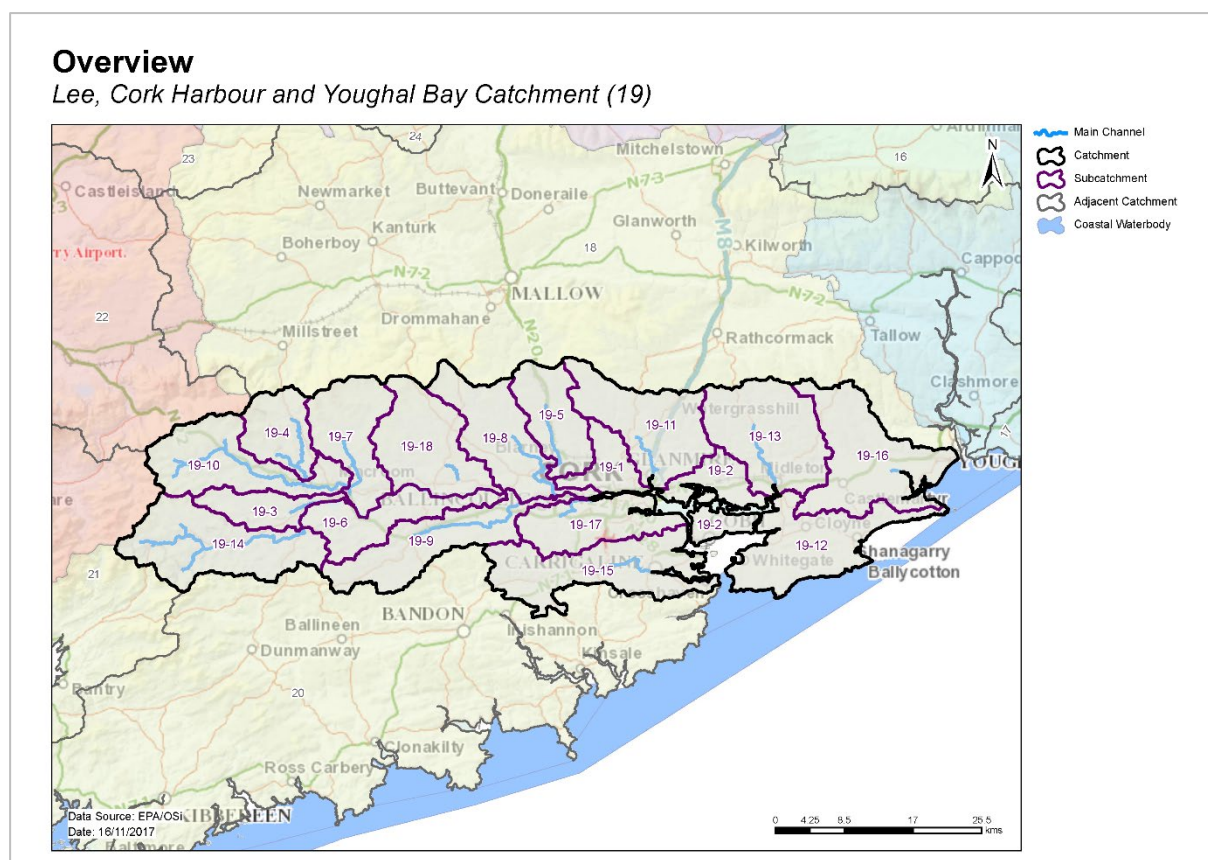


Figure 1. Subcatchments in the Lee-Cork Harbour catchment

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 51 (54%) river and lake water bodies at Good or High status, and 19 (20%) at less than Good status in 2015 (Table 2, Figure 2). Twenty-five (26%) river and lake water bodies are unassigned.
- ◆ Twenty-two river water bodies and sites have a high ecological status objective. In 2015, 20 (90%) of these water bodies were at High status and two were at Good status (Figure 3, Appendix 1).
- ◆ The number of water bodies at each status class in 2007-09 and 2010-15 are shown in Figures 4 (rivers) and 5 (lakes).
- ◆ Since 2007-09 when WFD monitoring began, 19 water bodies have an improved status whereas 17 have deteriorated (Figure 7).

2.1.2 Transitional and coastal (TraC)

- ◆ There are four TraC, water bodies at Good status, five at Moderate status, one at Poor status and nine unassigned (Table 2, Figure 2). There are no high ecological status objective water bodies or sites.
- ◆ The numbers of water bodies at each status class in 2007-09 and 2010-15 are shown in Figure 6. Three have deteriorated, including Glashaboy Estuary which has declined from Good in 2007-09 to Poor in 2010-15. Lough Mahon and Owennacurra Estuary both declined from Good to Moderate status. Three have improved, two coastal Outer Cork and Cork Harbour and one transitional North Channel Great Island have improved from Moderate in 2007-09 to Good in 2010-15.
- ◆ The variation in nutrient concentrations and loads in the Lee (Cork) 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	<i>Not at Risk</i>	<i>Review</i>	<i>At Risk</i>
Rivers	92	26	25	9	7	0	25	50	20	22
Lakes	3	0	0	1	2	0	0	0	0	3
TraC	19	0	4	5	1	0	9	2	9	8

WFD Surface Water Body Status 2010 - 2015

Lee, Cork Harbour and Youghal Bay Catchment (19)

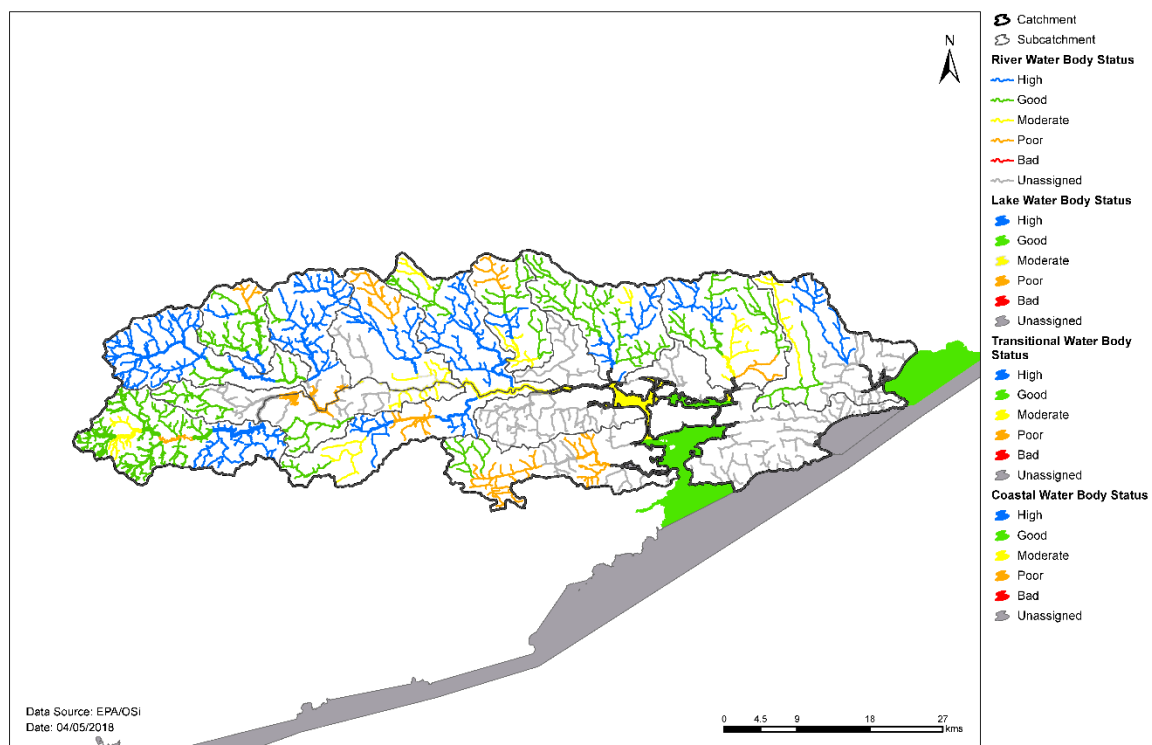


Figure 2. Surface water ecological status

High Status Objective Water Bodies and Sites

Lee, Cork Harbour and Youghal Bay Catchment (19)

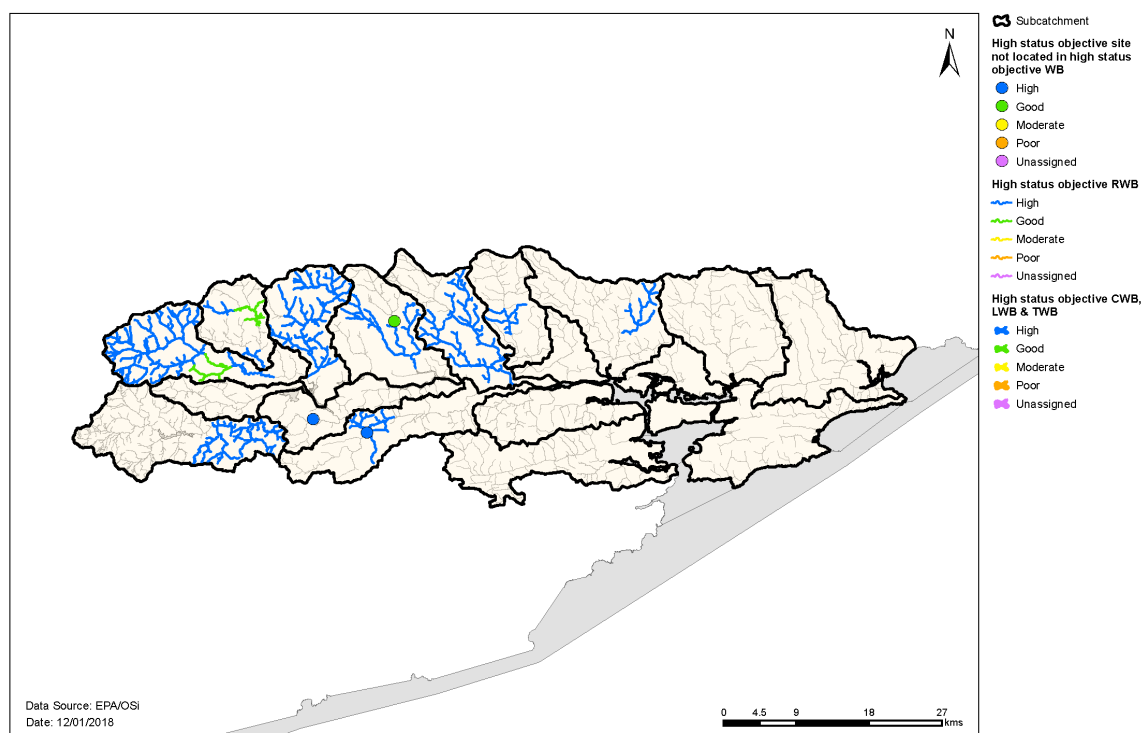


Figure 3. High ecological status objective water bodies and sites

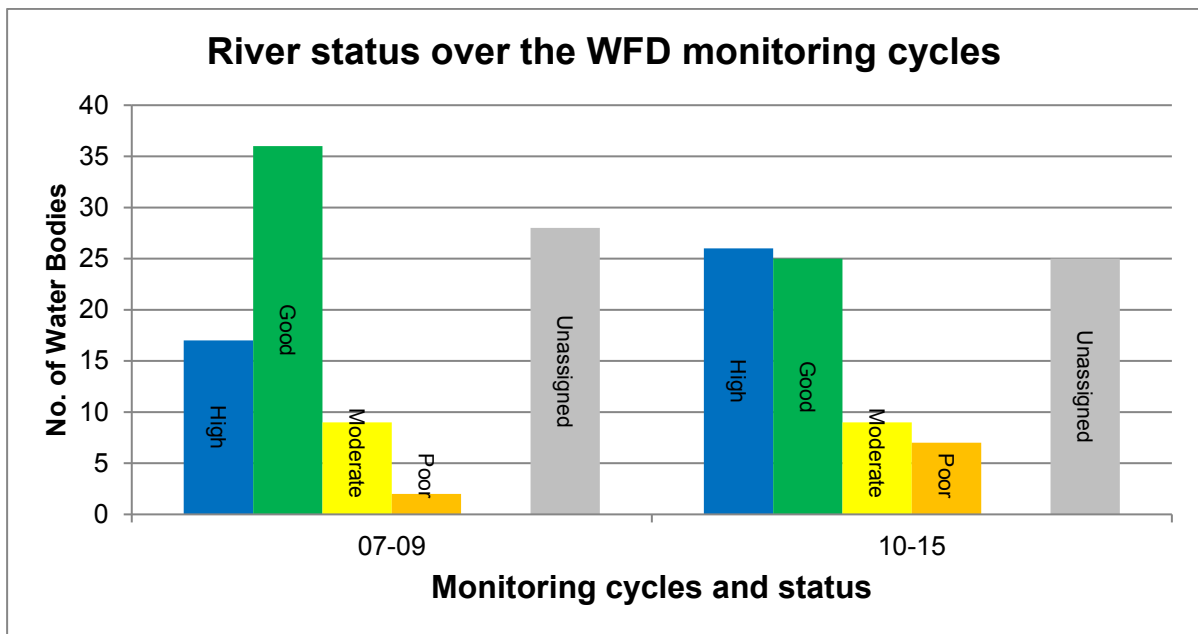


Figure 4. Number of river water bodies at each status class in 2007-09 and 2010-15

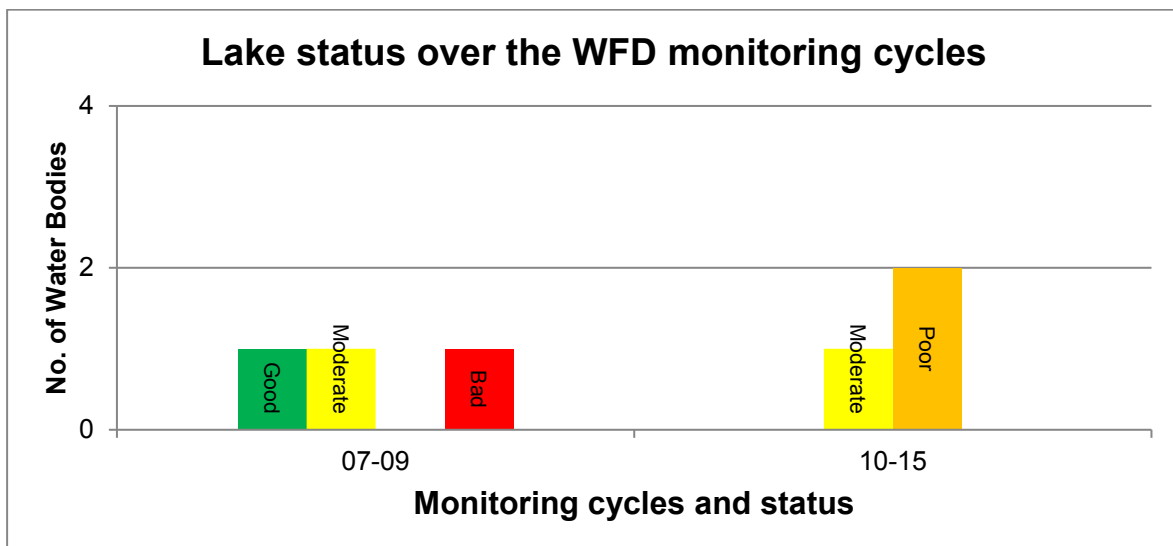


Figure 5. Number of lake water bodies at each status class in 2007-09 and 2010-15

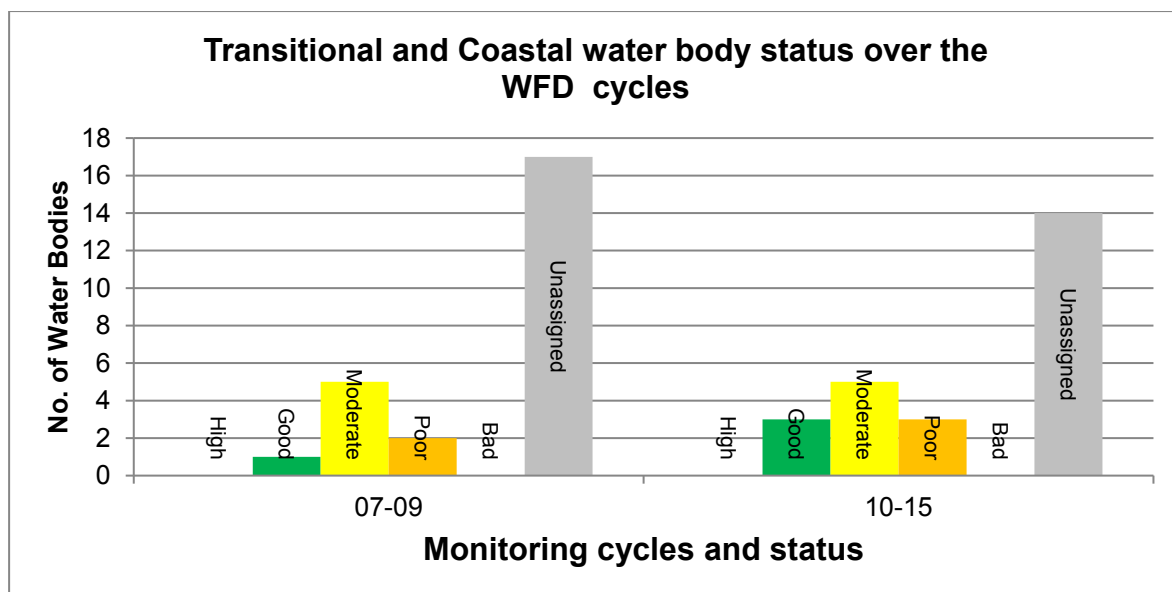


Figure 6. Number of TRaC water bodies at each status class in 2007-09 and 2010-15

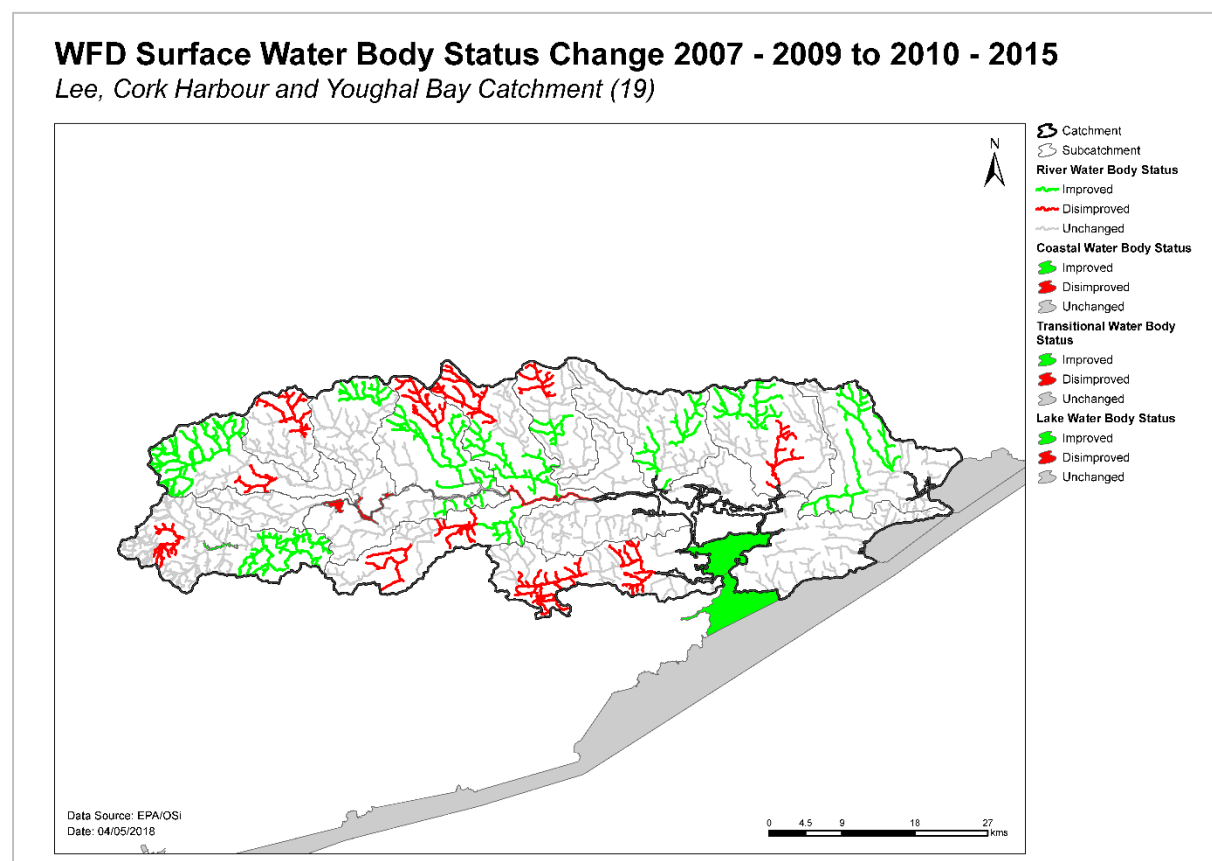


Figure 7. Surface water body status change from 2007-09 to 2010-15

2.2 Groundwater status

- ◆ There were 15 groundwater bodies at Good status and one at Poor status in both for the 2010-2015 assessment and the previous 2007-2012 period (Table 3, Figure 8, Figure 9).
- ◆ IE_SW_G_091 was classified at Poor status in 2015 due to ammonia concentrations (Figure 8).

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	16	15	1	3	11	2

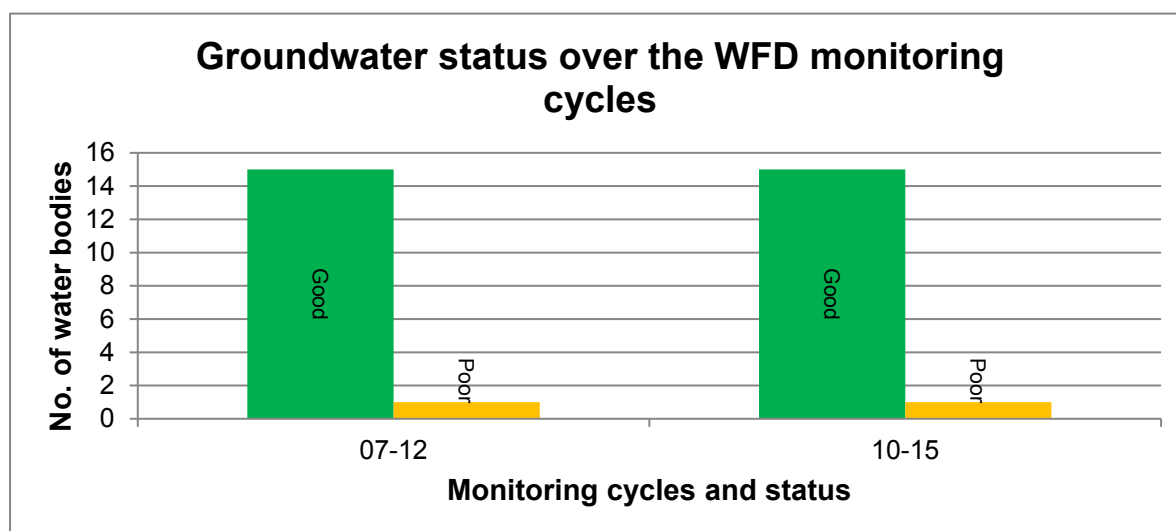


Figure 8. Number of groundwater bodies at each status class in 2007-12 and 2010-15

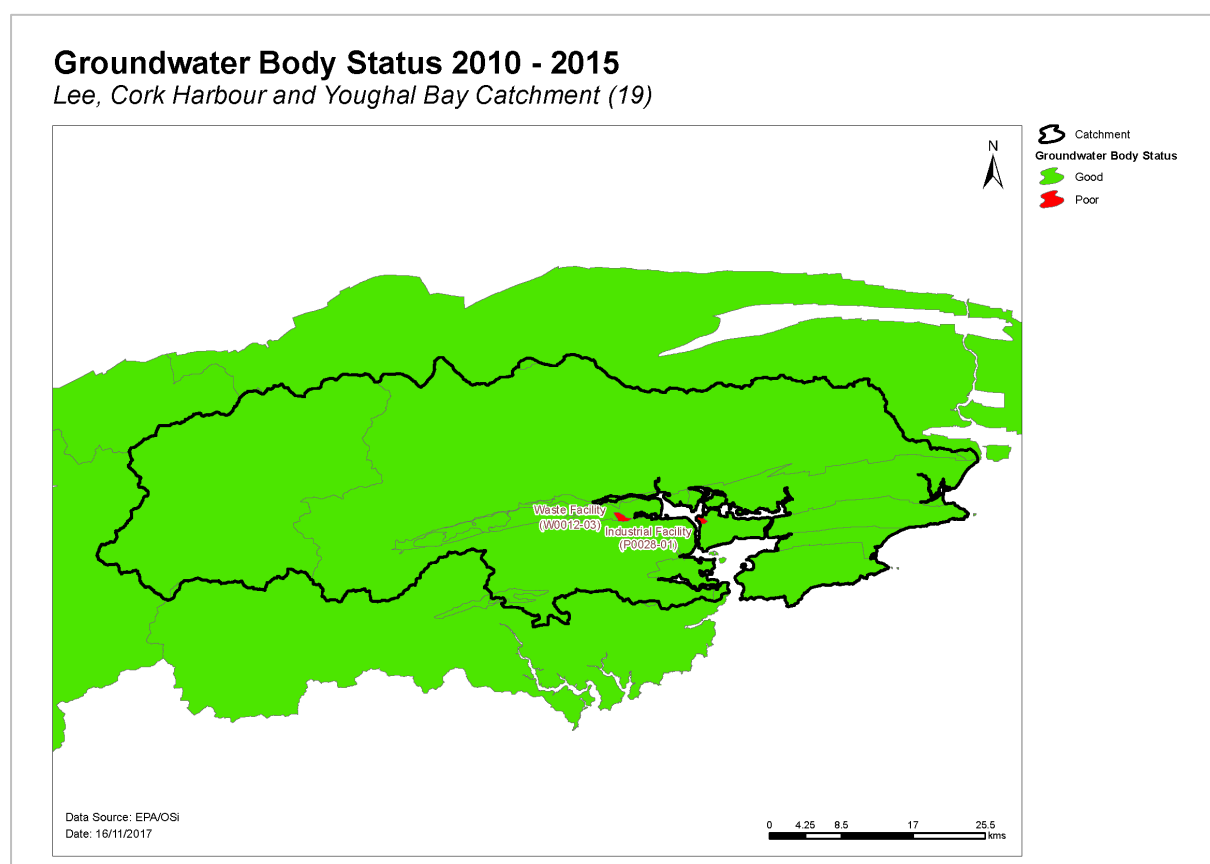


Figure 9. Groundwater body status.

2.3 Risk of not meeting surface water environmental objectives

2.3.1 Rivers and lakes

- ◆ There are 50 *Not at Risk* river water bodies (Figure 10, 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 20 river water bodies in *Review*. This includes 15 water bodies where more information is required and four water bodies where measures have recently been implemented and improvements have not yet been realised.
- ◆ Twenty-two river water bodies and all three lake 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.

2.3.2 Transitional and coastal (TraC)

- ◆ There are two *Not at Risk* TraCs water bodies (Figure 10, Table 2) and these require no additional investigative assessment or measures to be applied, other than those measures that are already in place.
- ◆ Nine TraC water bodies are in *Review*. More information is required in water bodies where measures have recently been implemented and improvements have not yet been realised.
- ◆ There are eight TraC water bodies in the catchment that are *At Risk* of not meeting their water quality objectives. Measures will be needed in these water bodies to improve the water quality outcomes.

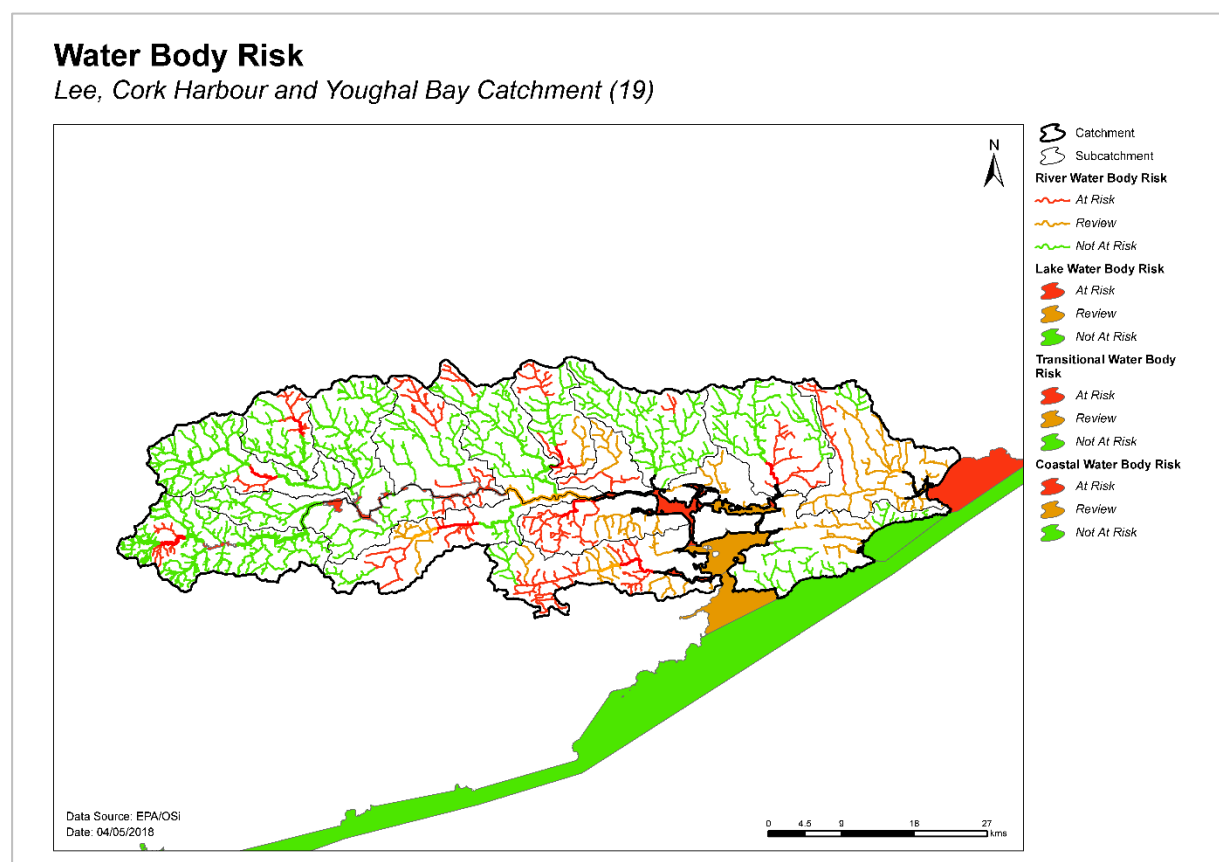


Figure 10. Surface water body risk

2.4 Risk of not meeting groundwater environmental objectives

- ◆ Three groundwater bodies are *Not at Risk* (Table 3, Figure 11) 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*. All 11 groundwater bodies in *Review* have elevated nitrate concentrations.
- ◆ There are two *At Risk* groundwater bodies. Waste Facility (W0012-02) (IE_SW_G_091) has ammonia issues and Lee Valley Gravels (IE_SE_G_094) is hydrologically linked to surface waters that are not meeting water quality objectives where it is considered that groundwater is a contributing source of nutrients (Table 4).

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
Lee Valley Gravels	IE_SW_19B041300	BRIDE (LEE)_040

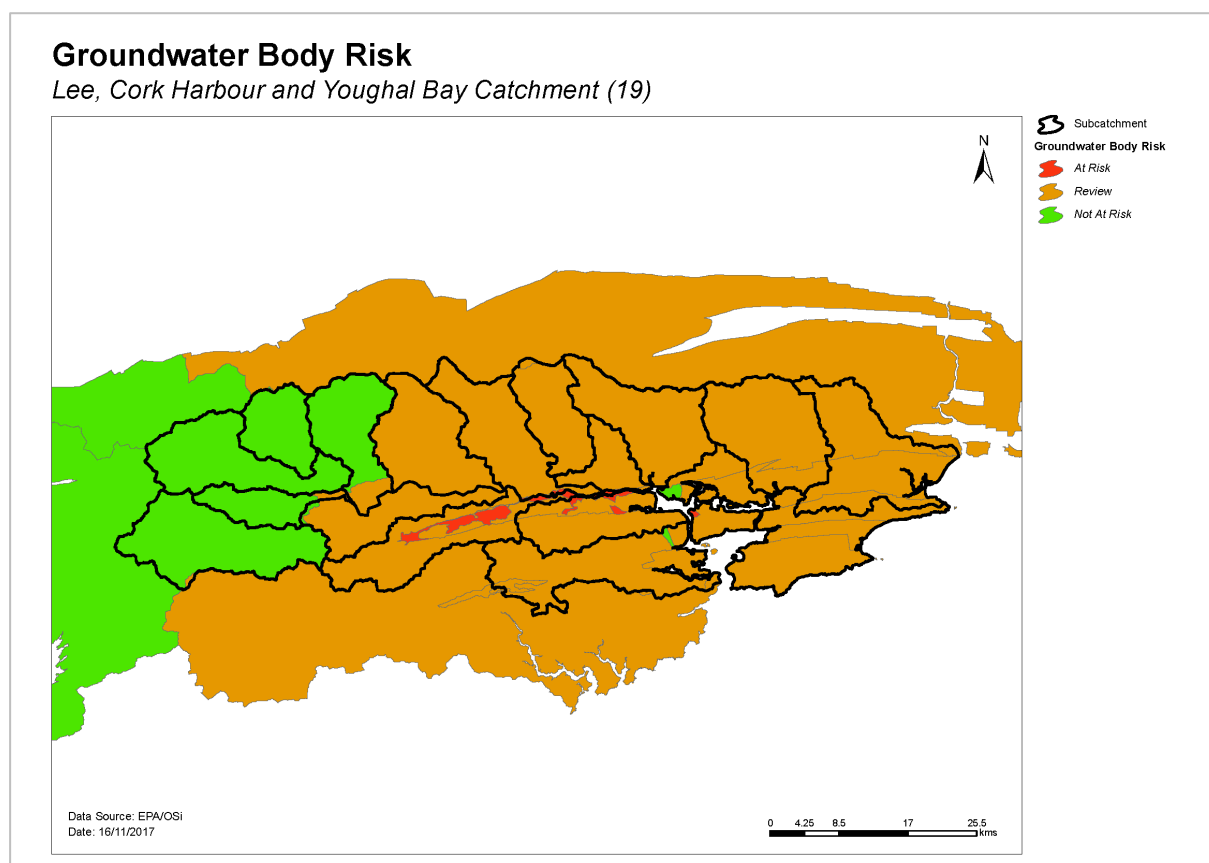


Figure 11. Groundwater body risk

2.5 Protected areas

2.5.1 Drinking water protected areas

- ◆ There are 85 abstractions in the Lee-Cork Catchment comprising eight group water schemes, and 50 public supply schemes (Appendix 4).
- ◆ Seventy-three of the abstractions are from nine groundwater bodies; and 12 are from 10 river water bodies. 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 the drinking water sources were compliant with the standards for pesticides in 2015, apart from three sources. Midleton groundwater body (for scheme 0500PUB2407) was non-compliant due to Triclopyr; Owennacurra_010 river water body (for scheme 0500PUB2406) was non-compliant due to MCPA, 2 4-D and Total pesticides; and Glashaboy (Lough Mahon)_030 (for scheme 0500PUB3303) was non-compliant due to MCPA.

2.5.2 Bathing waters

- ◆ There are four designated bathing waters in the catchment.
- ◆ Two of the bathing waters are in satisfactory condition.
- ◆ The remaining two (Youghal Claycastle and Youghal Front Strand Beach) failed to meet their environmental objectives, due to bacteriological water quality.
- ◆ The list of the bathing waters and the associated water bodies is provided in Table 5.

Table 5. Designated bathing waters in the catchment

Bathing Water	Water Body Intersection	Objective met?	Comment	Objective met?		Comment
Name	Code	Name	Code	Yes	No	
Redbarn	IESWBWC020_000_0100	Youghal Bay	IE_SW_020_0000	✓		
Garryvoe	IESWBWC040_000_0100	Ballycotton Bay	IE_SW_040_0000	✓		
Youghal, Claycastle	IESWBWC020_000_0200	Youghal Bay	IE_SW_020_0000		✓	Sufficient quality for 2012-2015. Less than Good Quality E. coli, 95th percentile: 612 and 90th percentile: 403. Results are biased by the poor 2012 season. Good quality IE results. Good quality is likely if the 2015 performance is repeated in 2016.
Youghal Front Strand Beach	IESWBWC020_000_0300	Youghal Bay	IE_SW_020_0000		✓	Youghal Front Strand beach was classified as having poor water quality (based on the assessment of bacteriological results) during 2011-2014 and 2012-2015.

2.5.3 Shellfish areas

- ◆ There are five designated shellfish areas in the catchment – Ballymacoda Bay, Rostellan South, Rostellan North, Cork Great Island North Channel and Rostellan West.
- ◆ Four are compliant with the relevant standards with no water quality issues.
- ◆ Cork Great Island North Channel, which is a transitional water body, did not meet its environmental objective.
- ◆ Details on the shellfish areas and their associated water bodies are summarised in Table 6.

Table 6. Designated shellfish areas in the catchment

Shellfish area		Water body intersection		Objective met?	
Name	Code	Name	Code	Yes	No
Ballymacoda Bay	IEPA2_0046	Youghal Bay	IE_SW_020_0000	✓	
Rostellan South	IEPA2_0047	Cork Harbour	IE_SW_060_0000	✓	
Rostellan North	IEPA2_0048	Cork Harbour	IE_SW_060_0000	✓	
Cork Great Island North Channel	IEPA2_0049	North Channel Great Island	IE_SW_060_0300		✓
Rostellan West	IEPA2_0064	Cork Harbour	IE_SW_060_0000	✓	

2.5.4 Nutrient sensitive areas

- ◆ There are two designated Nutrient Sensitive Areas (NSAs) (Lee Estuary/Lough Mahon, Owennacurra Estuary/North Channel) associated with two waste water treatment plants (Cork City and Midleton).
- ◆ One of the urban waste water treatment plants (Midleton) has tertiary treatment and therefore was compliant with the environmental objective for NSAs.
- ◆ Cork city urban waste water treatment was not compliant with the environmental objective for NSAs and is not due to be upgraded to tertiary treatment.
- ◆ The list of NSAs, associated agglomerations and intersecting water bodies are provided in Table 7.

Table 7. Nutrient sensitive areas in the catchment

Nutrient Sensitive Area		Agglomeration		Intersecting water bodies		Objective met?		Comment
Name	Code	Name	Code	Name	Code	Yes	No	
Lee Estuary / Lough Mahon	IETW_SW_2004_0041	Cork City	D0033	Lough Mahon	IE_SW_060_0750		✓	No tertiary treatment in place or planned.
Owennacurra Estuary / North Channel	IETW_SW_2004_0042	Midleton	D0056	Owennacurra Estuary	IE_SW_060_0400	✓		
				North Channel Great Island	IE_SW_060_0300			

2.5.5 Natura 2000 sites

- ◆ There are five 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.
- ◆ The one river water body (Lee (Cork)_050) with water dependent qualifying interests within these SACs has met its WFD Protected area objective (Appendix 5).
- ◆ There are five Special Protected Areas (SPAs) in the catchment:
 - Ballycotton Bay SPA

- Ballymacoda Bay SPA
- Cork Harbour SPA
- Mullaghanish to Musheramore Mountains SPA
- The Gearagh 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.

- ◆ There are five river water bodies that are designated as salmonid rivers (under Salmonid Regulations (S.I. 293 / 1988)) but are not located within SACs. Two of these water bodies (Lee (Cork)_020 and Lee (Cork)_090) have been prioritised for action as the water conservation objectives for this species are not being supported by ecological status (Appendix 5).

2.6 Heavily modified water bodies

- ◆ There are five designated heavily modified water bodies (HMWB) in the catchment: Inniscarra due to power generation and abstraction for drinking water; Carrigdrohid due to power generation; and Lee (Cork) Estuary Lower, Lough Mahon and Cork Harbour due to port facilities. Cork Harbour was classified as having Good Ecological Potential in 2013-15; Carrigdrohid was classified as having Poor Ecological Potential; and the remaining three were classified as Moderate.
- ◆ There are no designated artificial water bodies (AWB) in the Lee-Cork Harbour catchment.

3 Significant issues in *At Risk* water bodies

- ◆ Alteration of hydromorphological (or physical) conditions is one of the most significant issues in rivers in the Lee-Cork Harbour. This includes inputs of excess fine sediment and alteration of the morphology of the river channel, which in turn alter habitat conditions. This can occur because of, for example, implementing river and field drainage schemes, forestry activities, animal access, and discharge from quarries.
- ◆ Excess phosphate leading to eutrophication is also a concern in several water bodies. Ammonia is also an issue; however, it is for a limited number of water bodies.
- ◆ Elevated nutrients are the dominant issue for the *At Risk* TraC water bodies. Nutrients have caused high levels of opportunistic macroalgal and high dissolved oxygen conditions.
- ◆ The issues affecting groundwater bodies include excess ammonia and phosphorus concentrations that are being delivered to surface water bodies that are *At Risk*, via groundwater.

4 Significant pressures

4.1 Water bodies

- ◆ Where water bodies have been classed as *At Risk* due to water quality or survey data, significant pressures have been identified.
- ◆ Figure 12 shows 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 33 surface water bodies, 13 of which have multiple pressures. The significant pressures may be refined as further characterisation is carried out.
- ◆ The most significant pressures affecting these water bodies are other, diffuse urban, agriculture and hydromorphology (Figure 12).
- ◆ Urban Waste Water and Diffuse urban are the most significant pressures on TRaC water bodies.

4.1.2 Groundwater

- ◆ The significant pressure affecting the IE_SW_G_091 groundwater body is the waste facility W0012-03. The key parameter of concern is ammonia. The significant pressure affecting Lee Valley Gravels IE_SW_G_094 is domestic waste water, which may be impacting associated *At Risk* surface water bodies.

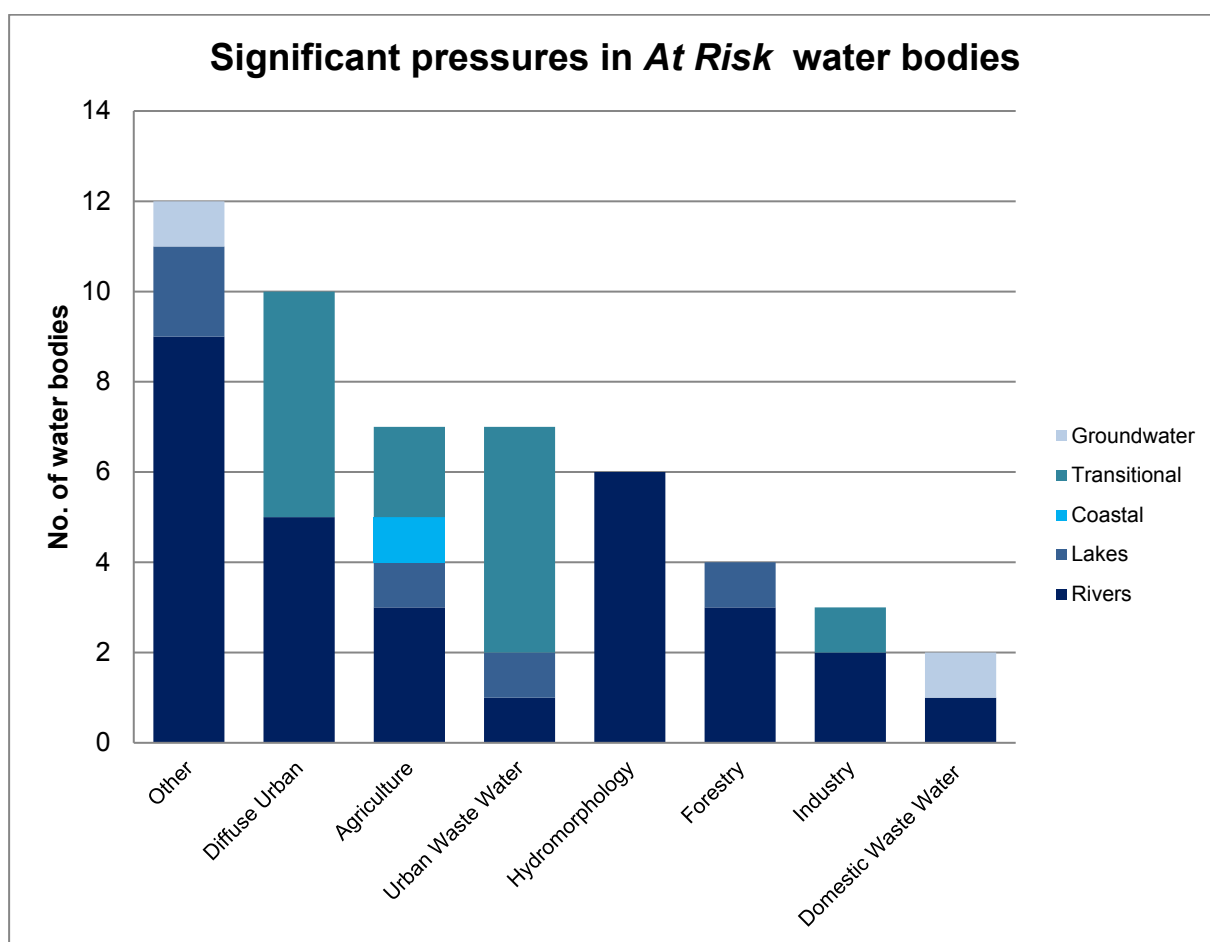


Figure 12. Significant pressures impacting on *At Risk* water bodies

4.2 Pressure type

4.2.1 Diffuse urban

- ◆ Diffuse urban pressures, caused, for example, by misconnections, leaking sewers and runoff from paved and unpaved areas, have been identified as a significant pressure in five river water bodies; Bride (Cork City)_020, Bride (Cork City)_010, Butlerstown_010, Owennacurra_040 and Martin_040 and five transitional water bodies Lee (Cork) Estuary Upper and Lower, Glashaboy Estuary, Owenacurra Estuary and Lough Mahon (Harper's Island) (Figure 13). Elevated concentrations of nutrients arising from towns and cities that the water bodies flow through are significant issues, as well as occasional low oxygen concentrations.

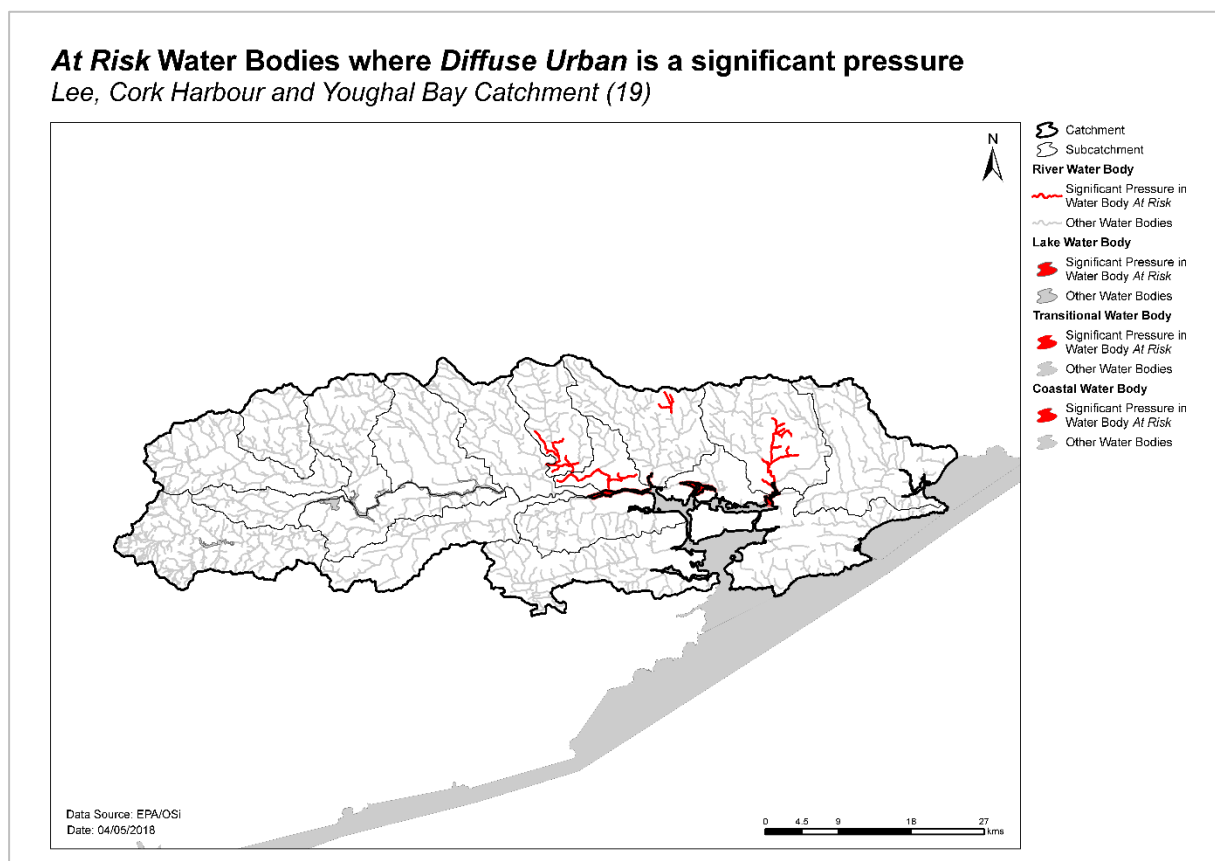


Figure 13. Water bodies that are At Risk and are impacted by diffuse urban impacts

4.2.2 Agriculture

- ◆ Agriculture is a significant pressure in three river water bodies Dungourney_020, Owenboy (Cork)_020 and Rathcoola_010 and one lake water body Allua. The issues related to farming around the lake are diffuse phosphorus loss to surface waters, mainly from areas of poorly draining soils around the lake shore, that might provide a direct pathway to the lake.
- ◆ Agriculture is a significant pressure on one coastal water body Youghal Bay and two transitional water bodies Glashaboy estuary and Owenboy estuary as shown in Figure 14.
- ◆ The pollution impact potential map showing areas of relative risk for phosphorus loss from agriculture to surface water is given in Appendix 6.

At Risk Water Bodies where **Agriculture** is a significant pressure Lee, Cork Harbour and Youghal Bay Catchment (19)

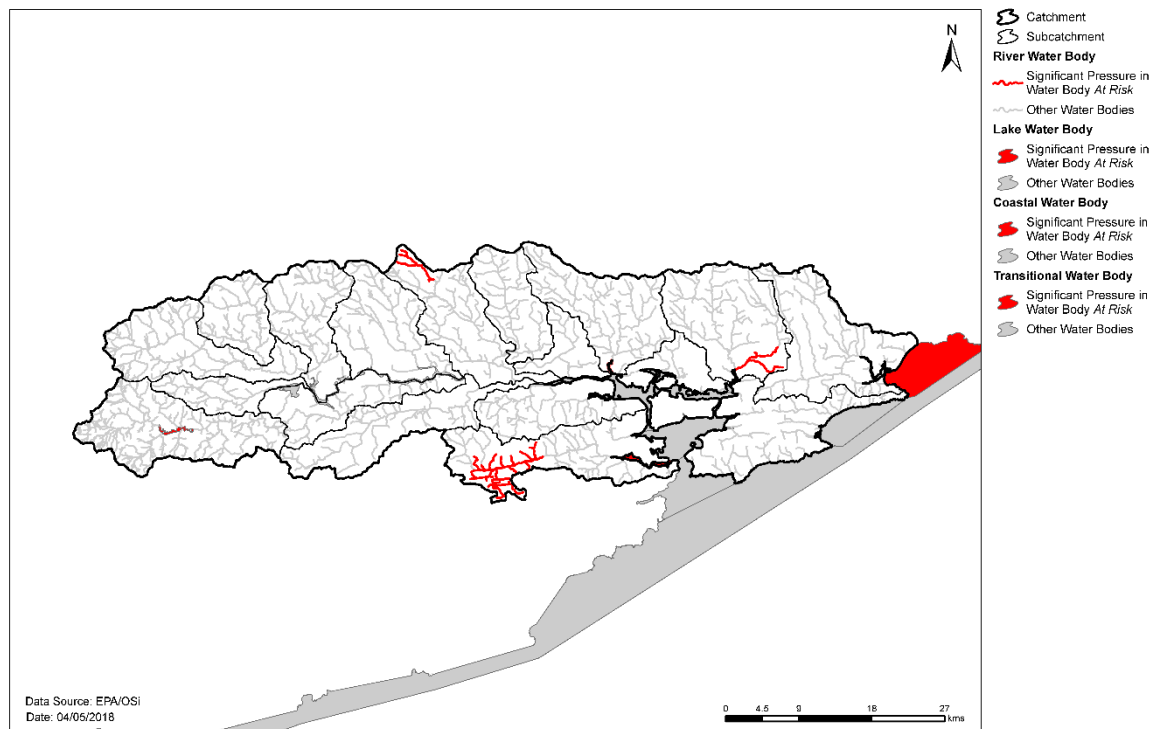


Figure 14. Water bodies that are *At Risk* and are impacted by agricultural activities

At Risk Water Bodies where **Urban Waste Water** is a significant pressure Lee, Cork Harbour and Youghal Bay Catchment (19)

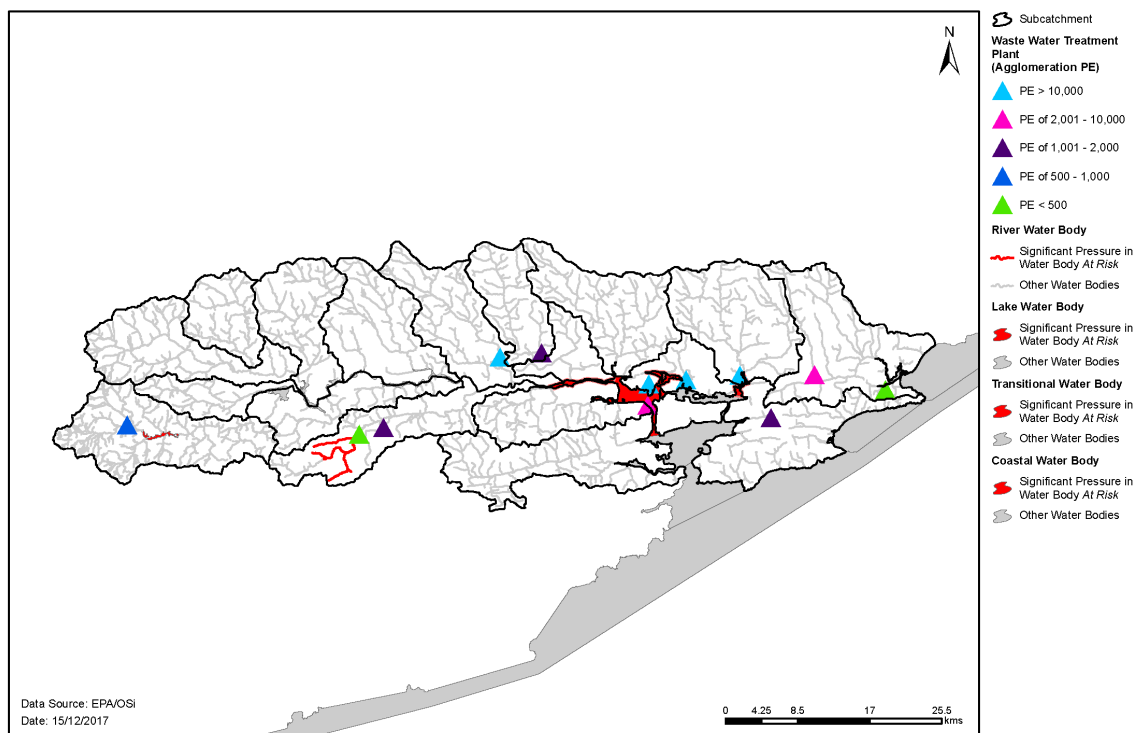


Figure 15. Water bodies that are *At Risk* and are impacted by urban waste water

4.2.3 Urban waste water treatment plants

- ◆ Urban Waste Water Treatment Plants (WWTPs) and agglomeration networks have been highlighted as a significant pressure in seven *At Risk* water bodies; details are given in Table 8 and Figure 15. One *At Risk* water body, Lough Mahon (Harper's Island), is impacted by the Carrigtohill WWTP, which has already been upgraded. All other water bodies, with the exception of Bride (Lee)_020, are impacted by WWTPs and/or agglomeration networks that are scheduled to be upgraded.

4.2.4 Hydromorphology

- ◆ Three river water bodies within the Kiln (Bride_010) and Owenboy (Cork_020 and 040) sub-catchments are subject to extensive modification due to channelization. In some cases, this bank modification has led to high levels of siltation.
- ◆ The presence of dams along the Lee system has resulted in two Heavily Modified Water Bodies located within the Lee and Sullane catchments. Riparian vegetation is impacted along a river water body of the Mainin subcatchment (Martin_010) due to maintenance. Figure 16 shows these areas.
- ◆ See Appendix 3 for information on these water bodies.

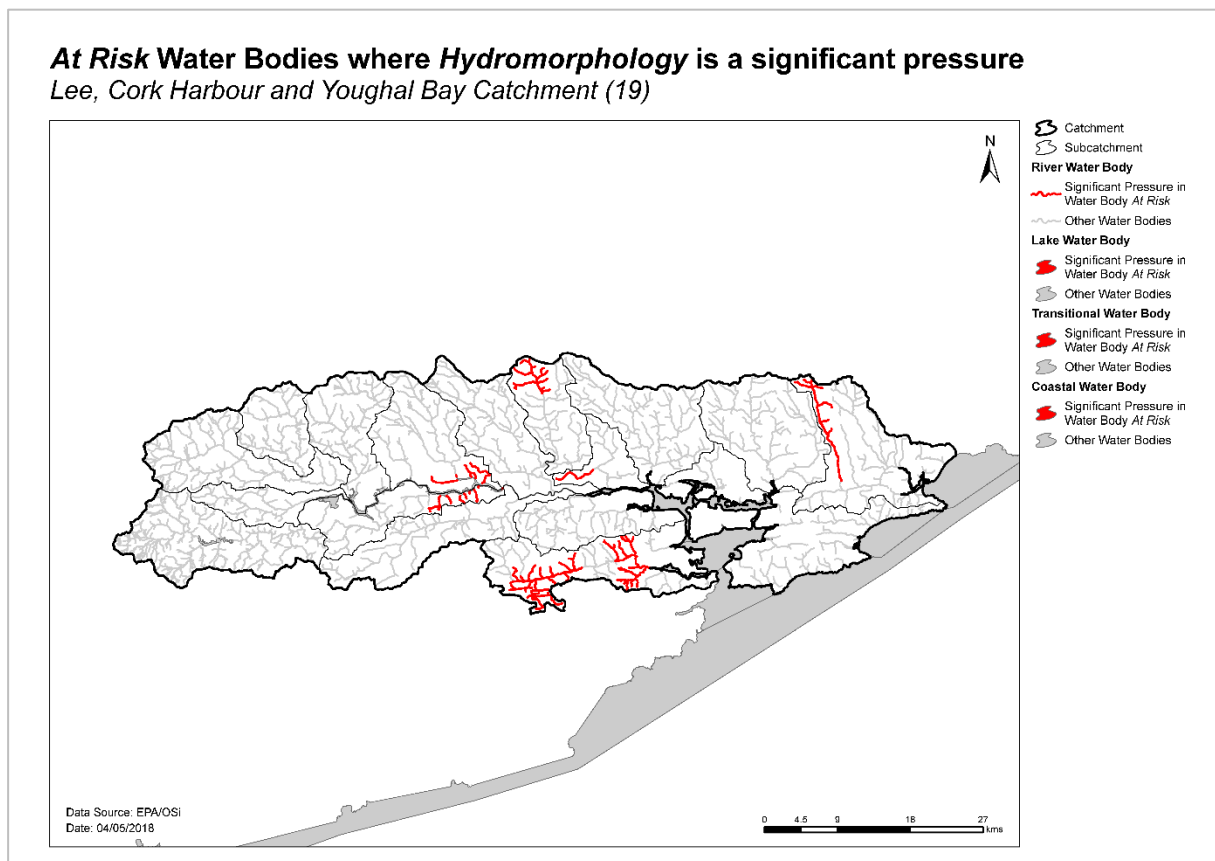


Figure 16. Water bodies that are *At Risk* and are impacted by hydromorphological pressures

Table 8. 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
Ballingeary D0431	500 to 1,000 p.e.	Allua	Poor	2022
Crookstown A0354	< 500 p.e.	Bride (Lee)_020	Moderate	N/A ¹
Cork City D0033	> 10,000 p.e.	Lee (Cork) Estuary Lower ²	Moderate	2023 ³
Cork City D0033	> 10,000 p.e.	Lee (Cork) Estuary Upper ²	Moderate	2023 ³
Cork City D0033	> 10,000 p.e.	Lough Mahon ⁴	Moderate	2023 ³
Passage Monkstown D0129	2,001 to 10,000 p.e.	Lough Mahon	Moderate	2018
Carrigtohill D0044	> 10,000 p.e.	Lough Mahon (Harper's Island)	Moderate	Complete
Midleton D0056	> 10,000 p.e.	Owenacurra Estuary ²	Moderate	2023 ³

¹ Currently not specified in improvement plans.

² The agglomeration network, rather than the WWTP has been identified as a significant pressure impacting Lee (Cork) Estuary Lower and Upper, and the Owenacurra Estuary.

³ The Cork City and Midleton expected completion dates relate to the agglomeration networks, rather than the WWTPs.

⁴ The Cork City WWTP and the network agglomeration have been identified as the significant pressures impacting Lough Mahon.

4.2.5 Forestry

- ◆ Forestry has been identified as a significant pressure in one lake (Allua) and three river water bodies (Dripsey_010, Foherish_020 and Keel_010) (Figure 17). The significant issues from forestry activities, such as planting, clear-felling and extraction can result in heavy siltation and excess nutrients, leading to eutrophication, in surface water bodies.

At Risk Water Bodies where Forestry is a significant pressure
Lee, Cork Harbour and Youghal Bay Catchment (19)

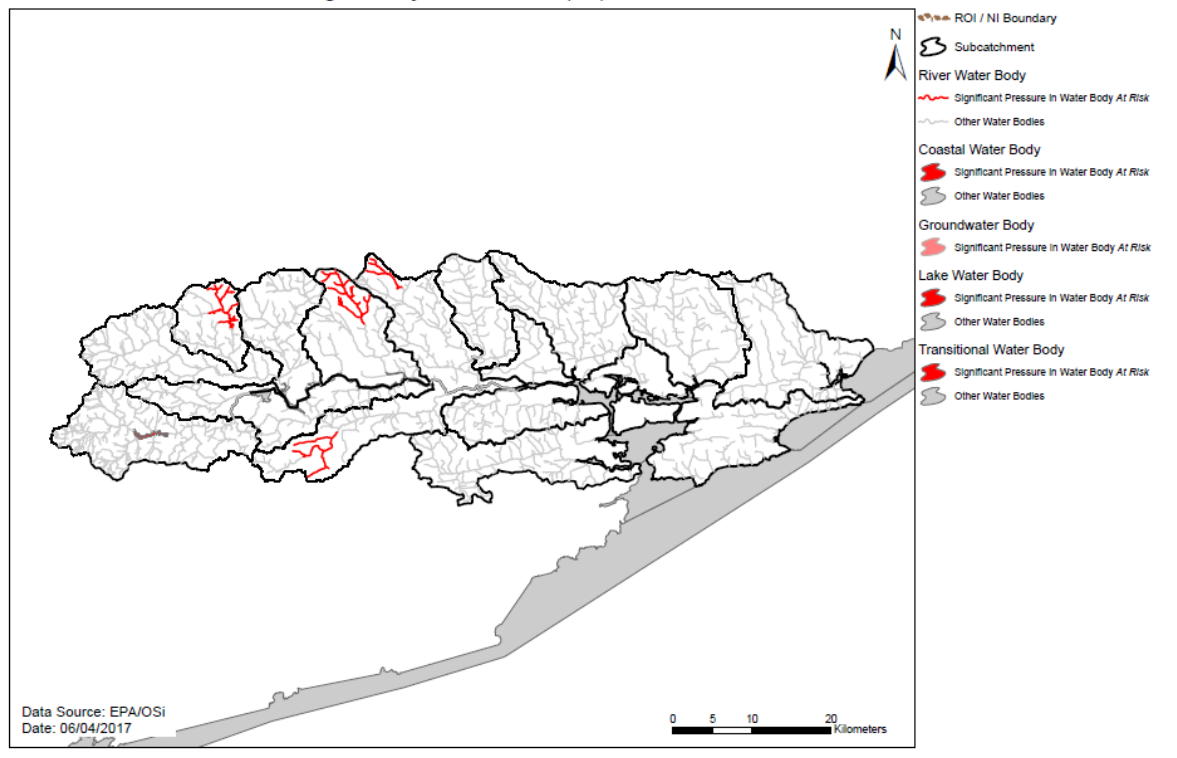


Figure 17. Water bodies that are *At Risk* and are impacted by forestry activities

4.2.6 Industry

Industry has been identified as a significant pressure in two river water bodies (Dungourney_020 and Womanagh_010) and one transitional water body (Owenacurra Estuary) (Figure 18). These are point pressures arising from discharges that are causing nutrient and other issues.

At Risk Water Bodies where *Industry* is a significant pressure

Lee, Cork Harbour and Youghal Bay Catchment (19)

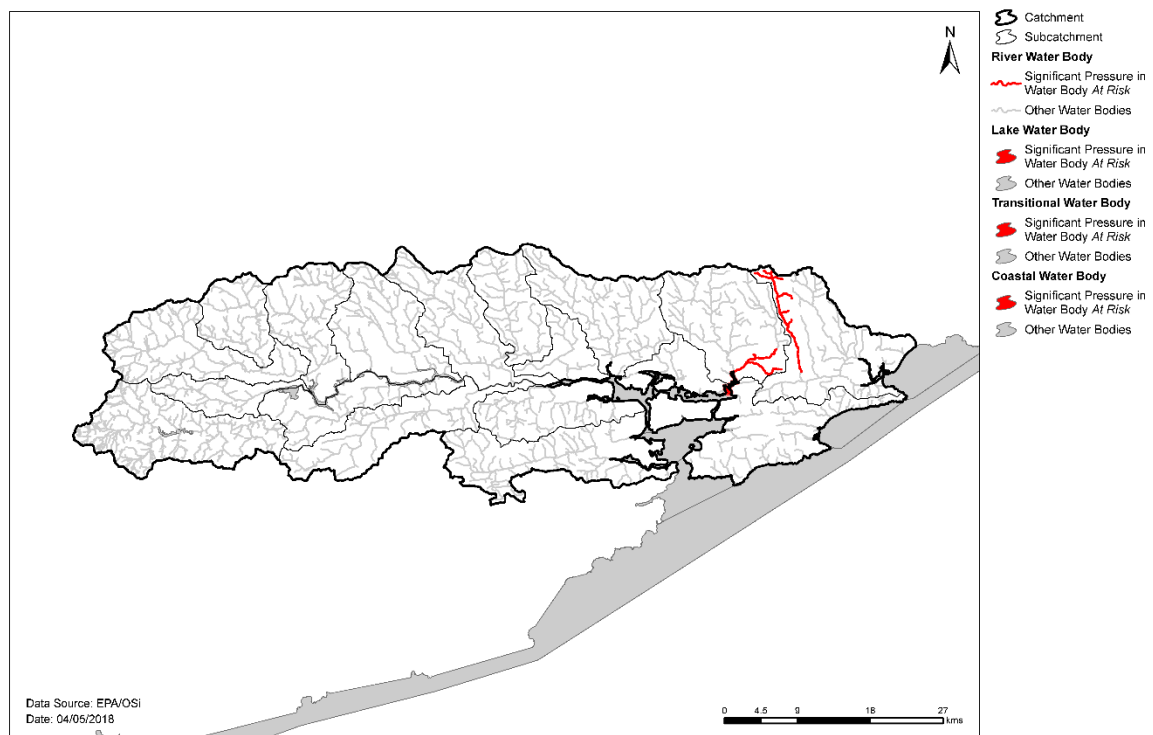


Figure 18. Water bodies that are *At Risk* and are impacted by industry

At Risk Water Bodies where *Domestic Waste Water* is a significant pressure

Lee, Cork Harbour and Youghal Bay Catchment (19)

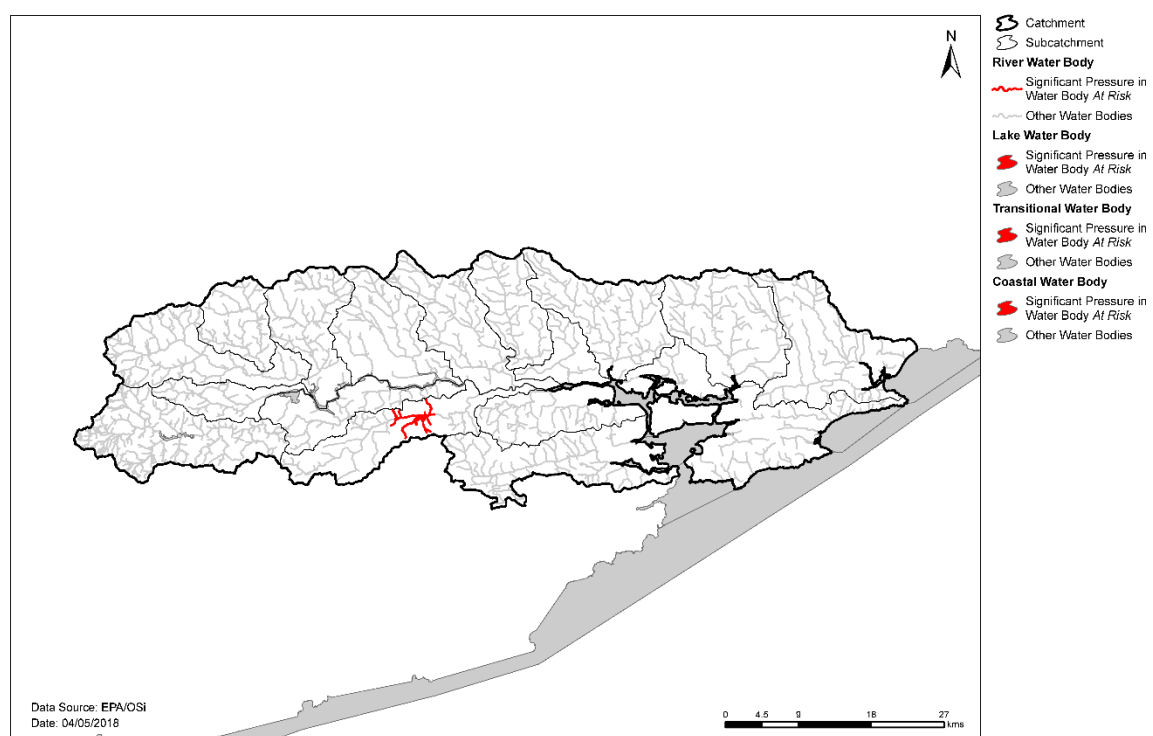


Figure 19. Water bodies that are *At Risk* and are impacted by domestic waste water

4.2.7 Domestic waste water

- ◆ Domestic waste water has been identified as a significant pressure in Bride (Lee)_040 river water body (Figure 19). This is due to the presence of unsuitable domestic waste water treatment systems. The significant issue from this source is excess nutrients.
- ◆ The significant pressure affecting the groundwater body Lee Valley Gravels IE_SW_G_094 is domestic waste water.

4.2.8 Other significant pressures

- ◆ *Unknown Anthropogenic*
Eight *At Risk* river water bodies and two lake water bodies have unknown anthropogenic pressures (Figure 20). The impacts include elevated phosphate concentrations, deterioration in fish status, and siltation issues.
- ◆ *Illegal Dumping*
Martin_010 river water body is *At Risk* and has illegal dumping identified as a significant pressure (Figure 21).
- ◆ *Waste*
The significant pressure affecting the IE_SW_G_091 *At Risk* groundwater body is a waste facility.

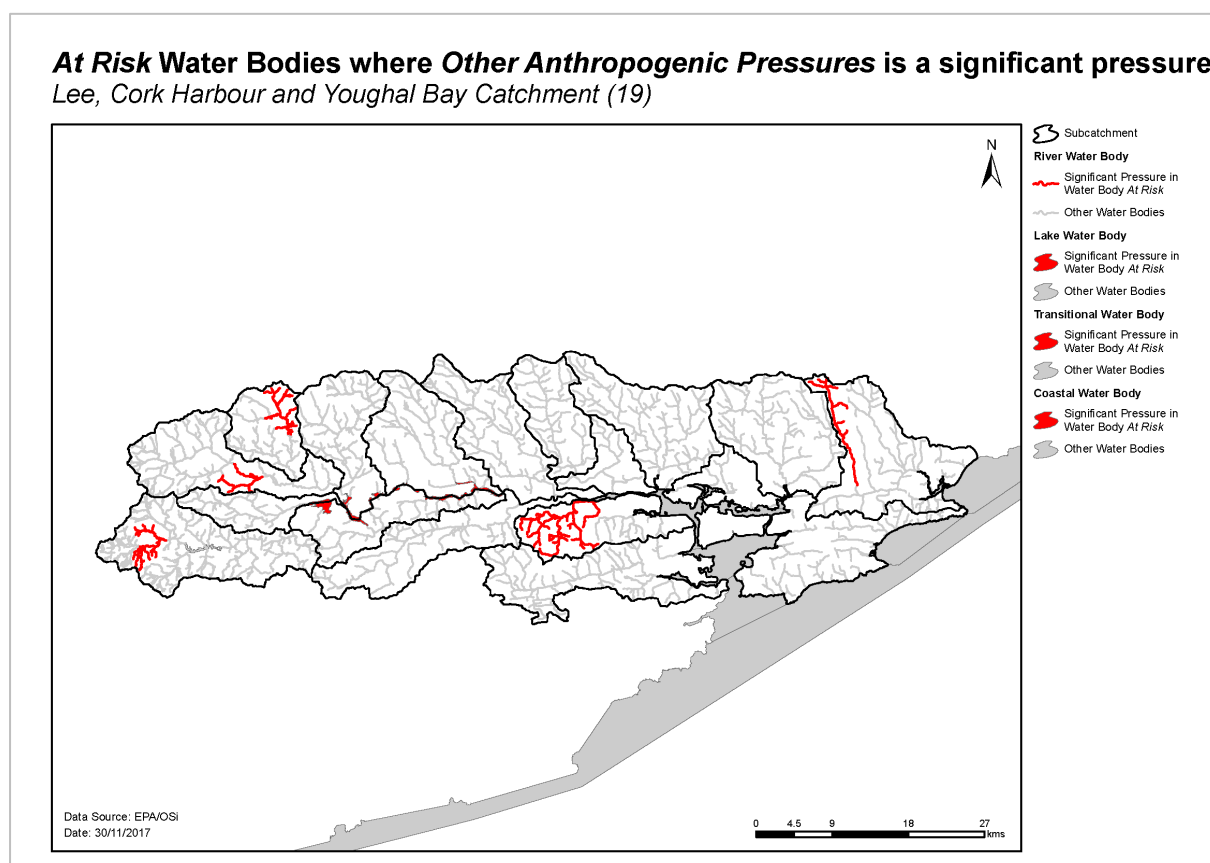


Figure 20. Water bodies that are *At Risk* and are impacted by Other Anthropogenic pressures

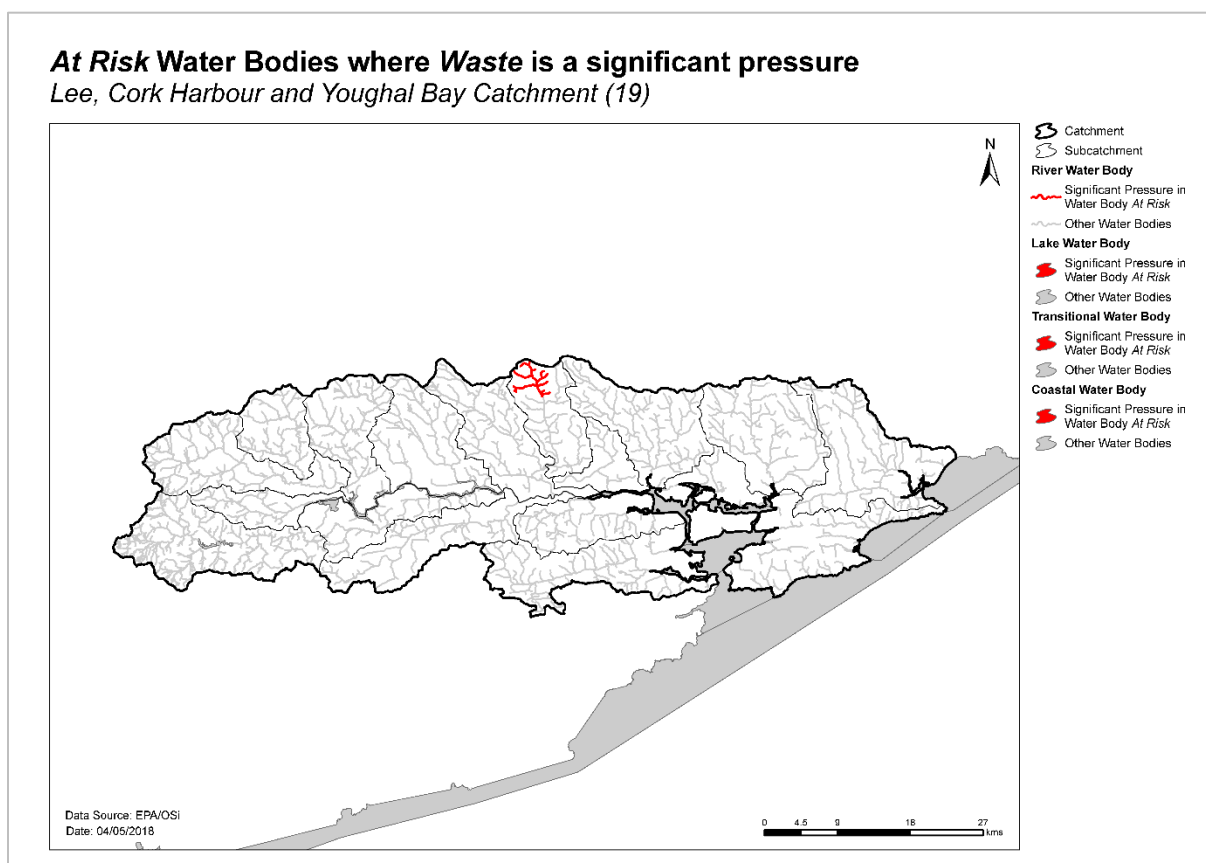


Figure 21. Water bodies that are *At Risk* and are impacted by waste issues

5 Load reduction assessment

5.1 River water body load reductions

- ◆ The results of the main channel assessment for the Lee river indicate that orthophosphate, ammonia and TON concentrations are relatively low (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 Lee-Cork Harbour catchment, water chemistry data are available for 38 of the 92 water bodies. The available data indicate that load reductions are required in two river water bodies (Table 10).

Table 10. Relative load reductions required in monitored water bodies that are *At Risk*.

Water body	P Load Reduction Required
Martin_040	High
Womanagh_010	Med

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 Oskar 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.

- Owenacurra Estuary appears to be P limited. The upgrading of Midleton WWTP agglomeration network (D0056) is in progress (Storm Water Overflows SW03 and SW04). This estuary will be monitored to assess if these upgrades bring about the expected improvements.
- Glashaboy Estuary has issues with phytoplankton, fish and nutrients. The estuary is P limited but there are very high DIN concentrations in winter. Further Characterisation (IA3) is required to determine the water quality in the inflowing river to assess potential impacts from the urban area.
- Lee (Cork) Estuary Upper and Lower and Lough Mahon will be monitored to see if the Cork City WWTP (D0033) agglomeration network upgrades bring about improvements.
- Lough Mahon (Harper's Island) is at Moderate Status. As a first step, this water body will be monitored to see if the upgrades to Carrigtohill WWTP (D0044) bring about improvements.
- Owenboy Estuary is unmonitored but has been identified as eutrophic using a probe. Further Characterisation (IA3) is required to determine the water quality in the estuary. Youghal Bay is addressed in the Blackwater Catchment Assessment.

As part of the Ireland's commitment to the Oskar Convention, nutrient flux or load monitoring has been carried out on the Lee Estuary since 1990 (Figure 21a and 21b). Further analysis of these nutrient load trends is available at <http://dx.doi.org/10.3318/BIOE.2016.23>.

Figure 21a – Total Nitrogen Load (Tonnes/year) 1990-2015

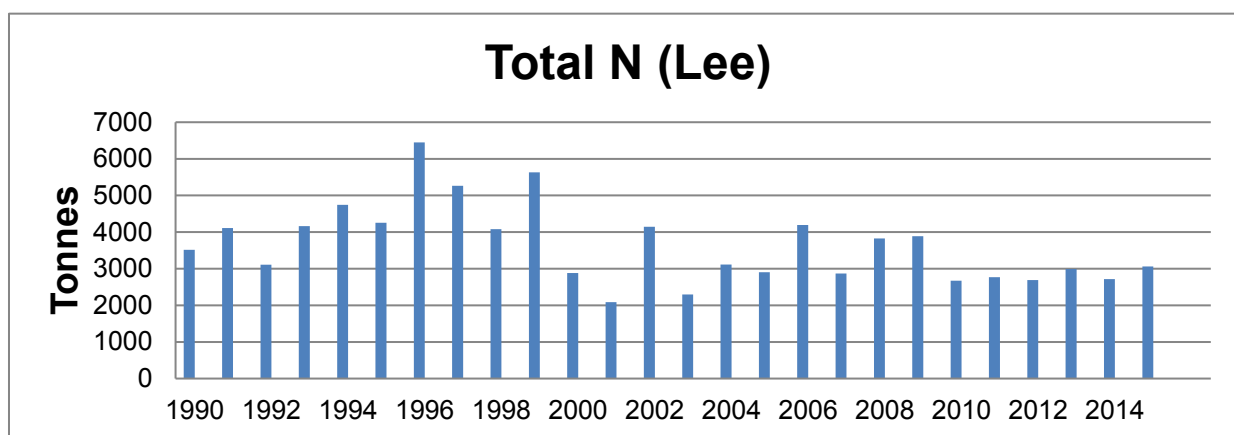
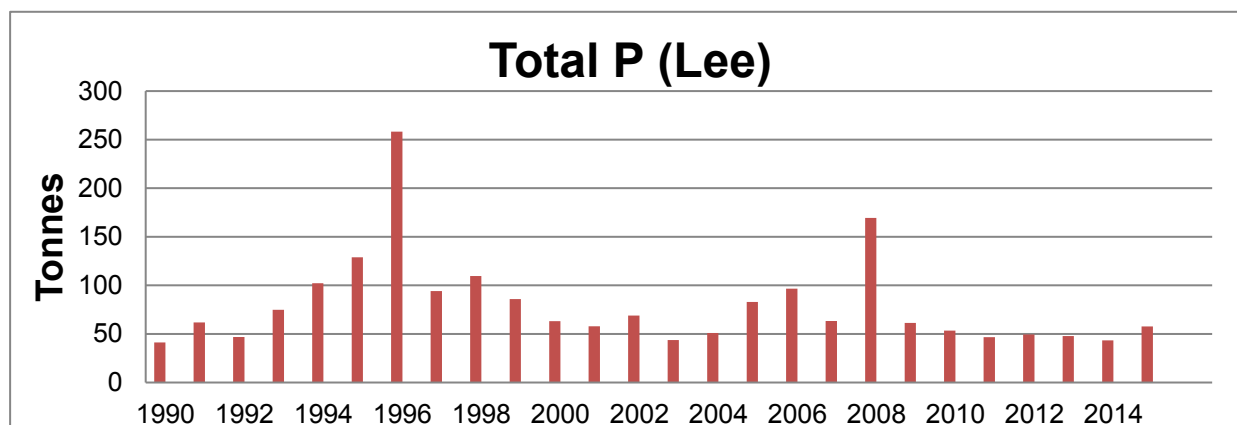


Figure 21b – Total Phosphorus Load (Tonnes/year) 1990-2015



6 Further characterisation and local catchment assessments

- ◆ Further characterisation through local catchment assessments is needed in 25 of the *At Risk* 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 20 of the *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 of the 10 IA assessment scenarios are given in Appendix 7.

Table 11. Local Characterisation 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	IA 10	Total
At Risk	26	0	1	1	3	8	8	0	1	0	48
Review	5	0	13	0	0	5	0	0	0	0	23

Note water bodies may have multiple categories of Local Catchment Assessments

7 Catchment summary

- ◆ Of the 92 river water bodies, 22 are *At Risk* of not meeting their WFD objectives.
- ◆ All three lake water bodies in the catchment are *At Risk* of not meeting their WFD objectives.
- ◆ Excess phosphorus leading to eutrophication is also a concern in several water bodies, as well as ammonia for a limited number of water bodies. Elevated phosphorous is associated in the catchment with pressure types diffuse urban, agriculture, urban waste water, forestry, industry, agriculture and domestic waste water and anthropogenic pressures (Unknown). The ammonia is associated with a waste facility.
- ◆ Hydromorphological (or physical) conditions is a major issue for three surface water bodies, all of which are at risk from channelization which reduces habitat quality and leads to sedimentation.

- ◆ There are five heavily modified water bodies affected by impoundments (2) or port facilities (3).
- ◆ There are eight TraC water bodies *At Risk* in the catchment. Elevated nutrients and hydromorphology are the dominant issues. There are links with the opportunistic macroalgae and high dissolved oxygen conditions.
- ◆ There are two groundwater bodies which are *At Risk* from contamination from ammonia generated from waste facilities which have the potential to impact on associated *At Risk* surface water bodies. One groundwater body also have the potential to contribute phosphate to associated surface water bodies that are also *At Risk* of not meeting surface water quality objectives with domestic waste water being the associated pressure.

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.

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. 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 Lee-Cork Harbour catchment are summarised below.

- ◆ Seven recommended areas for actions (Table 12, Figure 22) were selected.
- ◆ These are the Allua, Owenboy, Martin, Bride (Cork city), Keel Foherish, Carrigdrohid, and Middleton.
- ◆ These include:
 - 14 river and lake water bodies - 13 *At Risk* and one *Review*, and

- one *At Risk* transitional water body.
- ◆ One groundwater body, that is in *Review* due to groundwater contribution of nutrients to surface water bodies, intersects with one of the recommended areas for action, see Table 13. Actions taken to improve surface water will need to take account of the groundwater contribution to surface water.

A remaining forty-seven *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 23. These include:

- ◆ Thirty-one river and lake water bodies – 12 *At Risk* and 19 *Review*.
- ◆ Sixteen transitional and coastal water bodies – seven *At Risk* and nine *Review*.

Table 12 Recommended Areas for Action in the Lee-Cork Harbour Catchment

Recommended area for action	Number of water bodies	SCs	Local authority	Reason for Selection
Allua	2	19_14	Cork	<ul style="list-style-type: none"> • Building on proposed improvements at Ballingearry WWTP. • Opportunity to examine how to address water quality issues arising from agricultural practices on steep sloping rivers. • Active community groups that mentioned Lough Allua during public consultations. • Heritage: pre-Christian and monastic sites. • One deteriorated water body. • Lough Allua is failing to meet its protected area objectives for salmonids.
Owenboy	3	19_15	Cork	<ul style="list-style-type: none"> • Building on existing work completed by Cork County Council. • Opportunity develop appropriate measures for dealing with diffuse agriculture. • Two deteriorated water bodies. • Headwaters to Owenboy estuary which is <i>At Risk</i>.
Martin	2	19_5	Cork	<ul style="list-style-type: none"> • Building on improvements as a result of the removal of pressures (completion of railway line improvement works) in the headwaters. • Headwaters and tributary to the main channel of the river Lee. • One deteriorated water body.
Bride (Cork city)	2	19_1	Cork	<ul style="list-style-type: none"> • Cork city council have completed work and have a good understanding of issues - potential easy wins. • Pilot project in urban diffuse issues • Invasive species present. • OPW flood relief scheme on the Bride.
Keel Foherish	2	19_4	Cork	<ul style="list-style-type: none"> • Multi agency approach between Forestry Service, Coillte and Cork County Council. • Potential to examine impacts from wind farms. • Two deteriorated water bodies. • One of the deteriorated water bodies is a High Ecological Status objective water body.
Carrigdrohid	1	19_3	Cork	<ul style="list-style-type: none"> • Heavily Modified Water Body - opportunity to examine ecological potential, as opposed to status. • Potential to tie in with EPA project that will examine nutrient release from lake sediments. • Opportunity to tie in with management plan that is currently being developed for the Gearagh. • Opportunity to address fish passage at the dam. • One deteriorated water body.
Midleton	3	19_13	Cork	<ul style="list-style-type: none"> • Potential pilot project to examine links between groundwater in a karst aquifer to the overlying streams. • Important to address intermittent phytoplankton blooms in the estuary. • Midleton area is flagged for significant development. • One deteriorated water body. • One water body (Owenacurra_040) is failing to meet protected area objectives for drinking water.

Table 13 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_SW_G_087	Brinny Gravels East	Review	IE_SW_19O010800	Owenboy(Cork)_020	Owenboy

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 14 *At Risk* water bodies, it is predicted that one (7%) will improve by 2021 and thirteen (93%) will achieve their objective by 2027. For the one *Review* river water body, the absence of information on this water body means that there is no scientific basis to quantify this and therefore a 2027 date is set for this water body, see Table 14.

Table 14: 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	1	10
<i>Review</i>	1	0	1
Lake			
<i>At Risk</i>	2	0	2
<i>Review</i>	0	0	0
TraC			
<i>At Risk</i>	1	0	1
<i>Review</i>	0	0	0
Total	15	1	14

- ◆ Fifty-two water bodies have met their 2015 environmental objective. Two of the 52 *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 19 *At Risk* water bodies a 2027 date is applied to all 19 water bodies. For the 28 *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 15.

Table 15: 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
River			
<i>At Risk</i>	11	0	11
<i>Review</i>	19	0	19
Lake			
<i>At Risk</i>	1	0	1
<i>Review</i>	0	0	0
TraC			
<i>At Risk</i>	7	0	7
<i>Review</i>	9	0	9
Total	47	0	47

9.2 Groundwater

Fifteen of the sixteen groundwater bodies are currently Good status and, therefore, have met their environmental objectives. The one groundwater body, Waste Facility (W0012-03), in the Lee-Cork Harbour catchment that is less than Good status has an environmental objective date of 2027.

10 Acknowledgements

This Lee-Cork Harbour Catchment (Version 3) has been produced by the Catchment Science & Management Unit, EPA, with the assistance of the following: Cork County Council.

- Cork City 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.
- Electricity Supply Board.

Recommended Areas for Action

Lee, Cork Harbour and Youghal Bay Catchment (19)

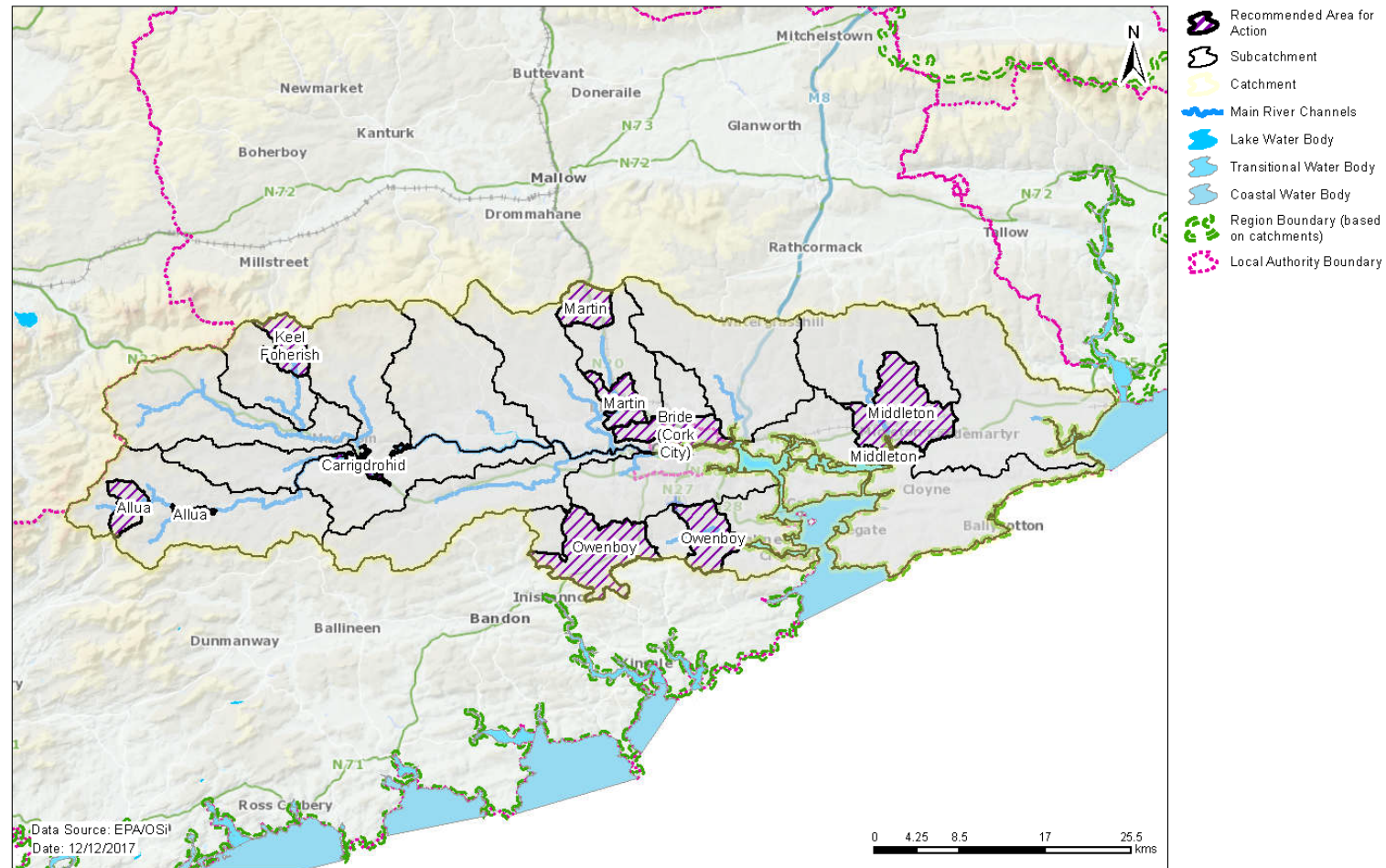


Figure 22 Location of Recommended Areas for Action in the Lee-Cork Harbour Catchment

Remaining *At Risk* and *Review* Water Bodies

Lee, Cork Harbour and Youghal Bay Catchment (19)

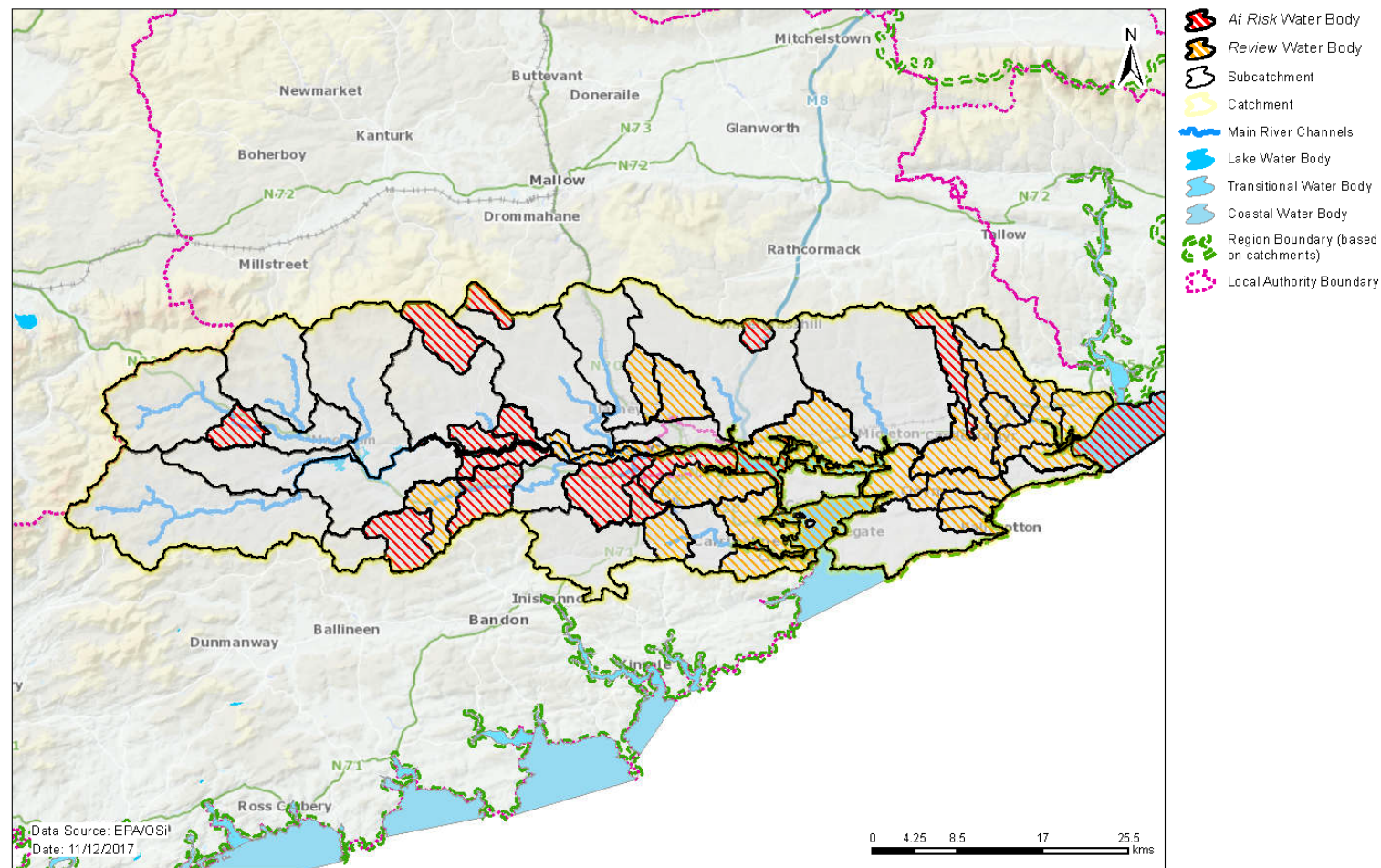


Figure 23 Location of *At Risk* and *Review* water bodies located outside Recommended Areas for Action in the Lee-Cork Harbour Catchment

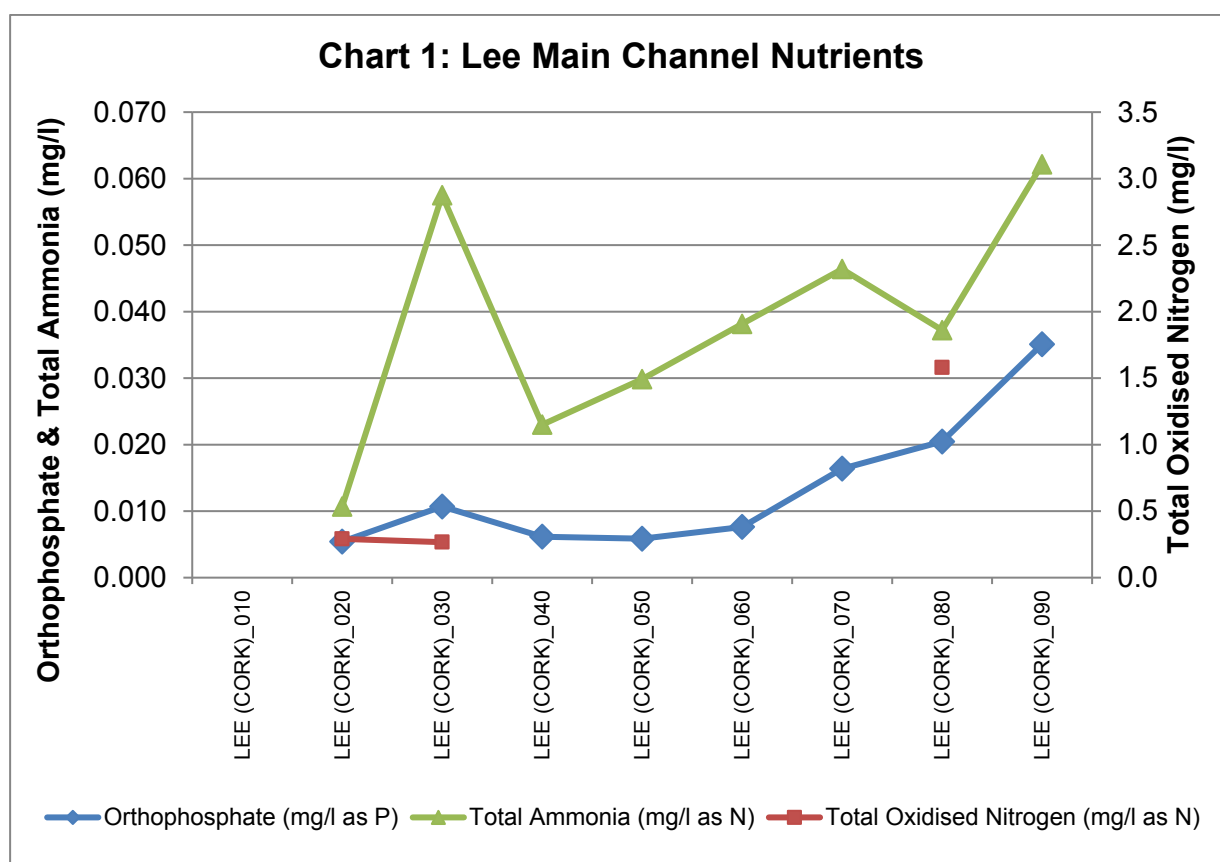
Appendix 1 High ecological status objective water bodies

Water body/ Site	Type	Codes	2015 Status
DOUGLAS (SULLANE)_010	River	IE_SW_19D040700	High
SULLANE_010	River	IE_SW_19S020100	High
SULLANE_020	River	IE_SW_19S020170	High
SULLANE_030	River	IE_SW_19S020200	High
SULLANE_040	River	IE_SW_19S020300	Good
SULLANE_050	River	IE_SW_19S020400	High
BUTLERSTOWN_020	River	IE_SW_19B060500	High
LEE (CORK)_040	River	IE_SW_19L030300	High
FOHERISH_010	River	IE_SW_19F020100	High
FOHERISH_020	River	IE_SW_19F020300	Good
FOHERISH_040	River	IE_SW_19F020600	High
DRIPSEY_020	River	IE_SW_19D060400	High
MARTIN_030	River	IE_SW_19M010400	High
AWBOY_010	River	IE_SW_19A030200	High
LANEY_010	River	IE_SW_19L010100	High
LANEY_020	River	IE_SW_19L010200	High
LANEY_030	River	IE_SW_19L010400	High
LANEY_040	River	IE_SW_19L010500	High
SHOURNAGH_020	River	IE_SW_19S010200	High
SHOURNAGH_030	River	IE_SW_19S010300	High
SHOURNAGH_040	River	IE_SW_19S010500	High
BRIDE (LEE)_030	River	IE_SW_19B040900	High

Appendix 2 Catchment scale nutrient concentrations and in-stream loads

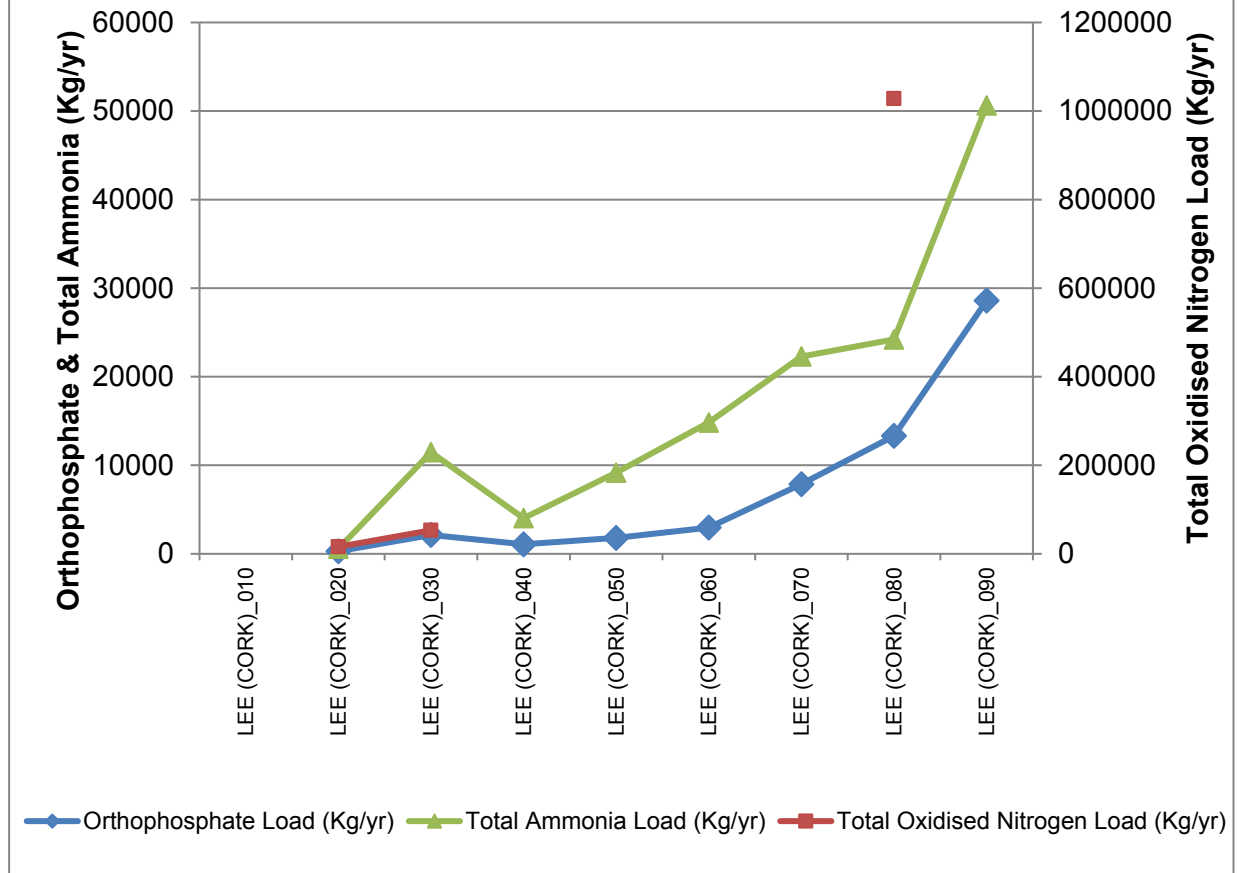
The results of the instream water quality assessment for the Lee channel are illustrated in Chart 1. The assessment is based on the mean concentration between 2013 and 2015 at each monitoring site from the headwaters to the estuary.

Orthophosphate concentrations in the Lee River increase downstream, ranging from 0.005 to 0.035mg/l. The EQS for orthophosphate (0.035mg/l), while not exceeded at any of the main channel water bodies, was equalled at LEE (CORK)_090. Total Oxidised Nitrogen (TON) data is unavailable for six of the nine Lee River water bodies. Where data is available, concentrations are low, and do not exceed the TON threshold of 2.6mg/l. Ammonia concentrations typically increase downstream without exceeding the 0.065mg/l EQS. Localised spikes of 0.058 and 0.062mg/l occur at LEE (CORK)_030 and LEE (CORK)_090, respectively.



The nutrient loadings for the Lee main channel (Chart 2) in comparison to the concentration trends (in Chart 1), shows that orthophosphate, TON and ammonia loads increased downstream corresponding to higher nutrient concentrations and stream flow.

Chart 2: Lee Main Channel Nutrient Loads



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
19_1	IE_SW_19B140110	Bride (Cork City)_020	River	At risk	Unassigned	Unassigned	N	DU,Hymo	2027	Bride (Cork city)
19_1	IE_SW_19B140300	Bride (Cork City)_010	River	At risk	Unassigned	Unassigned	N	DU	2027	Bride (Cork city)
19_1	IE_SW_19G880990	Glennamought Trib Bride_010	River	Review	Unassigned	Unassigned	N		2027	
19_1	IE_SW_060_0750	Lough Mahon	Transitional	At risk	Good	Moderate	N	UWW	2027	
19_1	IE_SW_060_0900	Lee (Cork) Estuary Lower	Transitional	At risk	Moderate	Moderate	N	DU,UWW	2027	
19_1	IE_SW_060_0950	Lee (Cork) Estuary Upper	Transitional	At risk	Moderate	Moderate	N	DU,UWW	2027	
19_2	IE_SW_19T250870	Tibbotstown_010	River	Review	Unassigned	Unassigned	N		2027	
19_2	IE_SW_060_0200	Cuskinny Lake	Transitional	Review	Unassigned	Unassigned	N		2027	
19_2	IE_SW_060_0600	Slatty Bridge, Fota Island	Transitional	Review	Unassigned	Unassigned	N		2027	
19_2	IE_SW_060_0700	Lough Mahon (Harper's Island)	Transitional	At risk	Moderate	Moderate	N	DU,UWW	2027	
19_3	IE_SW_19_139	Carrigdrohid	Lake	At risk	Good	Poor	N	Other	2027	Carrigdrohid
19_4	IE_SW_19F020300	Foherish_020	River	At risk	High	Good	Y	For,Other	2027	Keel Foherish
19_4	IE_SW_19K020200	Keel_010	River	At risk	Good	Poor	N	For,Other	2027	Keel Foherish
19_5	IE_SW_19B020500	Blarney_010	River	Review	Good	Good	N		2027	
19_5	IE_SW_19M010200	Martin_010	River	At risk	Moderate	Poor	N	Hymo,Other	2021	Martin
19_5	IE_SW_19M010600	Martin_040	River	At risk	Moderate	Moderate	N	DU	2027	Martin
19_8	IE_SW_19L030800	Lee (Cork)_090	River	Review	Good	Moderate	N		2027	
19_8	IE_SW_19R450050	Rathcoola_010	River	At risk	Good	Moderate	N	Ag	2027	
19_9	IE_SW_19B040610	Bride (Lee)_020	River	At risk	High	Moderate	N	UWW	2027	
19_9	IE_SW_19B040900	Bride (Lee)_030	River	Review	High	High	Y		2027	
19_9	IE_SW_19B041300	Bride (Lee)_040	River	At risk	High	Poor	N	DWW	2027	
19_10	IE_SW_19S020300	Sullane_040	River	At risk	High	Good	Y	Other	2027	
19_11	IE_SW_19B060200	Butlerstown_010	River	At risk	Moderate	Moderate	N	DU	2027	
19_11	IE_SW_060_0800	Glashaboy Estuary	Transitional	At risk	Good	Poor	N	Ag,DU	2027	
19_12	IE_SW_19A200870	Ardnahunch_010	River	Review	Unassigned	Unassigned	N		2027	
19_12	IE_SW_19K580980	Killmacahill_010	River	Review	Unassigned	Unassigned	N		2027	
19_12	IE_SW_19K630910	Knocknamadderee_010	River	Review	Unassigned	Unassigned	N		2027	
19_12	IE_SW_19S270790	Shanagarry_010	River	Review	Unassigned	Unassigned	N		2027	
19_12	IE_SW_020_0000	Youghal Bay	Coastal	At risk	Good	Good	N	Ag	2027	
19_12	IE_SW_050_0000	Outer Cork Harbour	Coastal	Review	Moderate	Good	N		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
19_12	IE_SW_060_0000	Cork Harbour	Coastal	Review	Moderate	Good	N		2027	
19_12	IE_SW_060_0100	Rostellan Lake	Transitional	Review	Unassigned	Unassigned	N		2027	
19_12	IE_SW_060_0300	North Channel Great Island	Transitional	Review	Moderate	Good	N		2027	
19_12	IE_SW_060_0400	Owenacurra Estuary	Transitional	At risk	Good	Moderate	N	DU,Ind,UWW	2027	Midleton
19_13	IE_SW_19D070700	Dungourney_020	River	At risk	Poor	Poor	N	Ag,Ind	2027	Midleton
19_13	IE_SW_19O030500	Owennacurra_040	River	At risk	Good	Moderate	N	DU	2027	Midleton
19_14	IE_SW_19_4	Allua	Lake	At risk	Bad	Poor	N	Ag,For,UWW	2027	Allua
19_14	IE_SW_19L030100	Lee (Cork)_020	River	At risk	Good	Moderate	N	Other	2027	Allua
19_15	IE_SW_19H050470	Hilltown 19_010	River	Review	Unassigned	Unassigned	N		2027	
19_15	IE_SW_19K620850	Kilnaglery 19_010	River	Review	Unassigned	Unassigned	N		2027	
19_15	IE_SW_19O011000	Owenboy (Cork)_030	River	Review	Unassigned	Unassigned	N		2027	
19_15	IE_SW_19O010400	Owenboy (Cork)_010	River	Review	Good	Good	N		2027	Owenboy
19_15	IE_SW_19O010800	Owenboy (Cork)_020	River	At risk	Good	Poor	N	Ag,Hymo	2027	Owenboy
19_15	IE_SW_19O011400	Owenboy (Cork)_040	River	At risk	Moderate	Poor	N	Hymo	2027	Owenboy
19_15	IE_SW_060_1000	Raffeen Lake, Shanbally	Coastal	Review	Unassigned	Unassigned	N		2027	
19_15	IE_SW_060_1100	Lough Beg / Curraghbinny	Transitional	Review	Unassigned	Unassigned	N		2027	
19_15	IE_SW_060_1200	Owenboy Estuary	Transitional	At risk	Unassigned	Unassigned	N	Ag	2027	
19_16	IE_SW_19E040700	East Ballyvergan_010	River	Review	Unassigned	Unassigned	N		2027	
19_16	IE_SW_19G840560	Gortavadda_010	River	Review	Unassigned	Unassigned	N		2027	
19_16	IE_SW_19M290850	Moanlahan_010	River	Review	Unassigned	Unassigned	N		2027	
19_16	IE_SW_19D030600	Dissour_020	River	Review	Moderate	High	N		2027	
19_16	IE_SW_19W011400	Womanagh_030	River	Review	Unassigned	Unassigned	N		2027	
19_16	IE_SW_19W011000	Womanagh_010	River	At risk	Moderate	Moderate	N	Hymo,Ind,Other	2027	
19_16	IE_SW_19W011300	Womanagh_020	River	Review	Moderate	Good	N		2027	
19_16	IE_SW_030_0100	Womanagh Estuary	Transitional	Review	Unassigned	Unassigned	N		2027	
19_17	IE_SW_19C120740	Curragheen (Cork City)_010	River	At risk	Unassigned	Unassigned	N	Other	2027	
19_17	IE_SW_19G040700	Glasheen (Cork City)_010	River	At risk	Unassigned	Unassigned	N	Other	2027	
19_17	IE_SW_19M300900	Moneygurney 19_010	River	Review	Unassigned	Unassigned	N		2027	
19_17	IE_SW_19T050890	Two Pot (Cork City)_010	River	At risk	Unassigned	Unassigned	N	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
19_18	IE_SW_19_138	Inniscarra	Lake	At risk	Moderate	Moderate	N	Other	2027	
19_18	IE_SW_19D060150	Dripsy_010	River	At risk	High	Poor	N	For	2027	
19_18	IE_SW_19L030600	Lee (Cork)_080	River	At risk	Poor	Moderate	N	Hymo	2027	

Ag: Agriculture

DWW: Domestic Waste Water

For: Forestry

Hymo: Hydromorphology

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.

M+Q: Mines and Quarries

Peat: Peat Drainage and Extraction

DU: Diffuse Urban

UWW: Urban Waste Water

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
0500PRI4705	Inse Mhor / Inse Beg GWSS	Ballinhassig West	IE_SW_G_005	N/A	No data
0500PRI2703	Ballyglass GWSS	Ballinhassig East	IE_SW_G_004	N/A	No data
0500PRI2707	Clonmult GWS	Ballinhassig East	IE_SW_G_004	N/A	No data
0500PRI2708	Clonpriest/Ballymado g GWSS	Midleton	IE_SW_G_058	N/A	No data
0500PRI2711	Farran GWS	Ballinhassig East	IE_SW_G_004	N/A	No data
0500PRI2712	Gortroe GWS	Midleton	IE_SW_G_058	N/A	No data
0500PRI2714	Kilcredon GWSS	Knockadoon East	IE_SW_G_045	N/A	No data
0500PRI2721	Walterstown GWSS	Knockadoon West	IE_SW_G_046	Yes	N/A
0500PUB4405	Tareltan	Ballinhassig West	IE_SW_G_005	N/A	No data
0500PUB4406	Johnstown	Ballinhassig West	IE_SW_G_005	N/A	No data
0500PUB2506	Knockadoon	Knockadoon East	IE_SW_G_045	N/A	No data
	Knockadoon	Knockadoon East	IE_SW_G_045	N/A	No data
0500PUB2508	Mogeely	Midleton	IE_SW_G_058	Yes	N/A
0500PUB2509	Walshstown	Ballinhassig East	IE_SW_G_004	N/A	No data
0500PUB3101	Parkmore	Ballinhassig East	IE_SW_G_004	N/A	No data
0500PUB3102	Crookstown	Lee Valley Gravels	IE_SW_G_094	Yes	N/A
0500PUB3201	Aghabullogue	Ballinhassig East	IE_SW_G_004	N/A	No data
0500PUB3202	Aghavrin	Ballinhassig East	IE_SW_G_004	N/A	No data
0500PUB3203	Borehole 3	Ballinhassig East	IE_SW_G_004	Yes	N/A
	Borehole 1	Ballinhassig East	IE_SW_G_004	Yes	N/A
	Borehole 2	Ballinhassig East	IE_SW_G_004	Yes	N/A
0500PUB3204	Donoghmore	Ballinhassig East	IE_SW_G_004	Yes	N/A
	Coollicka	Ballinhassig East	IE_SW_G_004	Yes	N/A
	Kilmartin	Ballinhassig East	IE_SW_G_004	Yes	N/A
0500PUB3206	Gleann Dara Housing Estate.	Ballinhassig East	IE_SW_G_004	Yes	N/A
	Grenagh (Lehane)	Ballinhassig East	IE_SW_G_004	Yes	N/A
	Grenagh	Ballinhassig East	IE_SW_G_004	Yes	N/A
	Grenagh 2, St Lachtains Terra	Ballinhassig East	IE_SW_G_004	Yes	N/A
	Quarry Hall	Ballinhassig East	IE_SW_G_004	Yes	N/A
	Derry's Lane	Ballinhassig East	IE_SW_G_004	Yes	N/A
0500PUB3207	Rylane	Ballinhassig East	IE_SW_G_004	N/A	No data
	Rylane	Ballinhassig East	IE_SW_G_004	N/A	No data
0500PUB3208	Stoneview Blarney	Ballinhassig East	IE_SW_G_004	N/A	No data
0500PUB3209	Vicarstown	Ballinhassig East	IE_SW_G_004	N/A	No data
0500PUB3306	Whitechurch	Ballinhassig East	IE_SW_G_004	N/A	No data
	Whitechurch	Ballinhassig East	IE_SW_G_004	N/A	No data
	Whitechurch	Ballinhassig East	IE_SW_G_004	N/A	No data
0500PUB1216	Watergrasshill Tower	Ballinhassig East	IE_SW_G_004	N/A	No data
0500PUB2305	Inchigeelagh	Ballinhassig West	IE_SW_G_005	N/A	No data

Scheme Code	Scheme Name	Water Body	Water Body Code	Objective met? Yes /No	Reason why not met
	Inchigeelagh	Ballinhassig West	IE_SW_G_005	N/A	No data
0500PUB2306	Kilnamartyra	Ballinhassig West	IE_SW_G_005	N/A	No data
0500PUB2401	Bilberry	Ballinhassig East	IE_SW_G_004	N/A	No data
0500PUB2402	Clash/Leamleara	Ballinhassig East	IE_SW_G_004	N/A	No data
0500PUB2403	Cloyne	Cloyne	IE_SW_G_028	Yes	N/A
	Cloyne	Whitegate	IE_SW_G_079	Yes	N/A
	Cloyne	Cloyne	IE_SW_G_028	Yes	N/A
	Cloyne	Cloyne	IE_SW_G_028	Yes	N/A
0500PUB2404	Tibbotstown	Midleton	IE_SW_G_058	N/A	No data
0500PUB2405	Ballincurrag/Lisgoold	Ballinhassig East	IE_SW_G_004	N/A	No data
	Ballincurrag/Lisgoold	Ballinhassig East	IE_SW_G_004	N/A	No data
0500PUB2407	Whitegate Regional	Midleton	IE_SW_G_058	No	Triclopyr
0500PUB2408	Tibbotstown	Ballinhassig East	IE_SW_G_004	Yes	N/A
	Tibbotstown	Ballinhassig East	IE_SW_G_004	Yes	N/A
0500PUB2502	Dungourney	Ballinhassig East	IE_SW_G_004	N/A	No data
0500PUB2504	Killeagh	Midleton	IE_SW_G_058	Yes	N/A
	Killeagh	Midleton	IE_SW_G_058	Yes	N/A
	Killeagh	Midleton	IE_SW_G_058	Yes	N/A
0500PUB2505	Kilcraheen	Midleton	IE_SW_G_058	N/A	No data
0500PUB3102	Crookstown	Ballinacollig	IE_SW_G_002	Yes	N/A
0500PUB3103	Knockburden	Ballinhassig East	IE_SW_G_004	N/A	No data
0500PUB3106	Airport Cottages	Ballinhassig East	IE_SW_G_004	N/A	No data
0500PUB3205	Spring	Ballinhassig East	IE_SW_G_004	N/A	No data
0500PUB3301	Carrignavar	Ballinhassig East	IE_SW_G_004	Yes	N/A
	Carrignavar	Ballinhassig East	IE_SW_G_004	Yes	N/A
	Carrignavar	Ballinhassig East	IE_SW_G_004	Yes	N/A
0500PUB3302	Cool East	Ballinhassig East	IE_SW_G_004	N/A	No data
0500PUB3305	Whitechurch/Ryefield	Ballinhassig East	IE_SW_G_004	N/A	No data
0500PUB2103	Kilmurray/Clonmacow	Ballinhassig East	IE_SW_G_004	N/A	No data
	Kilmurray/Clonmacow	Ballinhassig East	IE_SW_G_004	N/A	No data
0500PUB2105	Newcestown	Ballinhassig East	IE_SW_G_004	N/A	No data
0500PUB2301	Ballinagree	Ballinhassig West	IE_SW_G_005	N/A	No data
0500PUB2303	Ballymakeera	Ballinhassig West	IE_SW_G_005	Yes	N/A
0500PUB2304	Clondrohid	Ballinhassig West	IE_SW_G_005	N/A	No data
	Clondrohid	FOHERISH_030	IE_SW_19F020400	N/A	No data
0400PUB1001	Cork City Water Supply	LEE (CORK)_090	IE_SW_19L030800	Yes	N/A
0500PUB2107	Glanmire	BUTLERSTOWN_020	IE_SW_19B060500	Yes	N/A
	Glanmire	BUTLERSTOWN_020	IE_SW_19B060500	Yes	N/A
	Glanmire	BUTLERSTOWN_020	IE_SW_19B060500	Yes	N/A
0500PUB2302	Ballingeary	LEE (CORK)_030	IE_SW_19L030200	N/A	No data
0500PUB2307	Macroom	SULLANE_060	IE_SW_19S020480	Yes	N/A
0500PUB2406	Midleton	OWENNACURRA_040	IE_SW_19O030500	No	MCPA,

Scheme Code	Scheme Name	Water Body	Water Body Code	Objective met? Yes /No	Reason why not met
					2,4-D, Total Pesticides
0500PUB2501	Ballymacoda	Gortavadda_010	IE_SW_19G840560	N/A	No data
0500PUB2508	Mogeely	WOMANAGH_010	IE_SW_19W011000	Yes	N/A
0500PUB3303	Glashaboy	GLASHABOY (LOUGH MAHON)_030	IE_SW_19G010600	No	MCPA
0500PUB3401	Cork Harbour & City	LEE (CORK)_080	IE_SW_19L030600	Yes	N/A

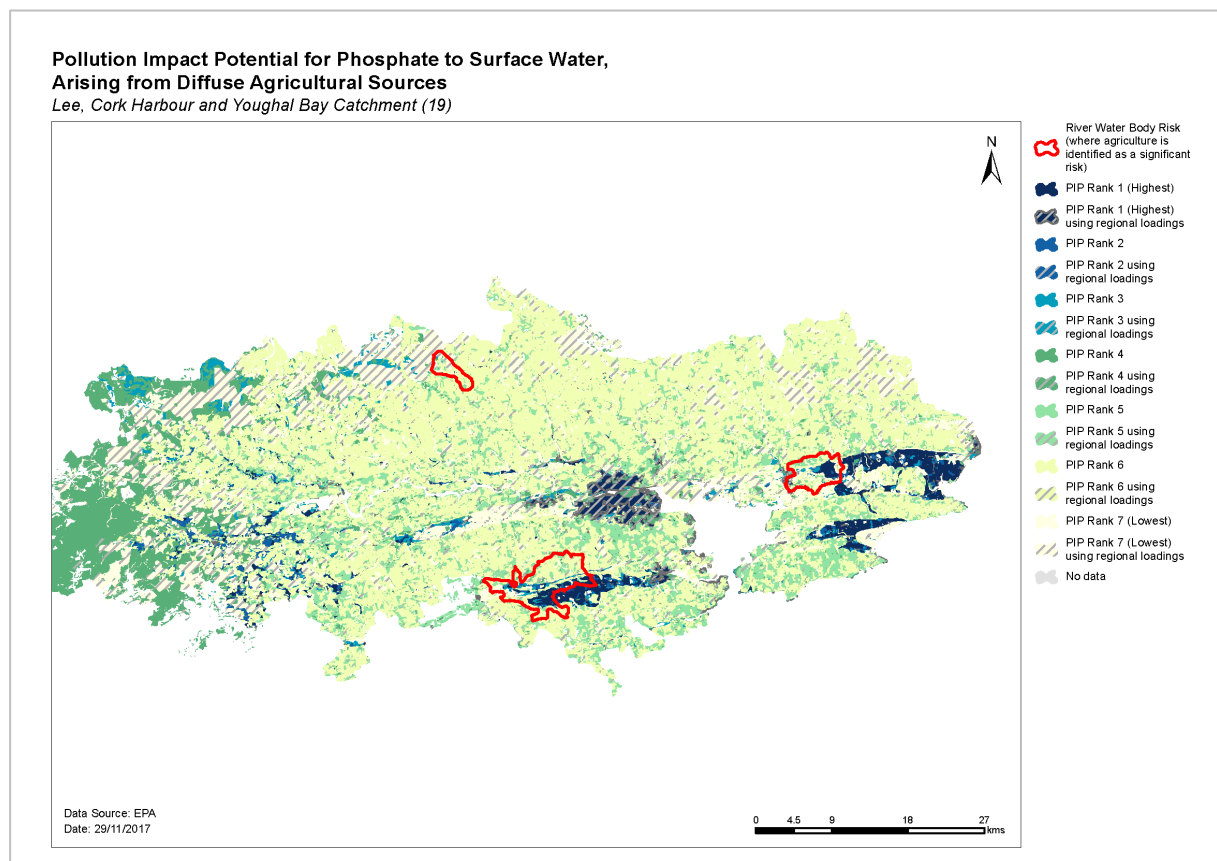
Appendix 5 Prioritisation of water bodies with Natura 2000 site qualifying interests

River water bodies that are designated as salmonid rivers (under Salmonid Regulations (S.I. 293 / 1988)) but that are not located within SACs have also been listed.

SAC Name	Relevant Qualifying interests	Target status	Water body type	Water bodies	Status (risk)	Prioritise?	Code	Survey data?
Ballymacoda (Clonpriest And Pillmore) SAC 000077	none							
Great Island Channel SAC 001058	none							
Mullaghanish Bog SAC 001890	none							
St. Gobnet's Wood SAC 000106	none							
The Gearagh SAC 000108	none							
	1106	Good	River	Lee (Cork)_050	Unassigned (NAR)	No	IE_SW_19L030360	Yes
Salmonids (outside SACs)	1106	Good	River	Lee (Cork)_010	Good (NAR)	No	IE_SW_19L030040	Yes
			River	Lee (Cork)_020	Moderate (R)	Yes	IE_SW_19L030100	Yes
			River	Lee (Cork)_030	Good (NAR)	No	IE_SW_19L030200	Yes
			River	Lee (Cork)_040	High (NAR - HES Obj)	No	IE_SW_19L030300	Yes
			River	Lee (Cork)_090	Moderate (AT RISK)	Yes	IE_SW_19L030800	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